RCRA FACILITY INVESTIGATION - PHASE 1C WORK PLAN

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Worldwide Facilities Group
Remediation Team

December 8, 2004

Mr. Peter Ramanauskas
Project Manager
U.S. EPA, Region 5
Waste, Pesticide and Toxins Division
77 West Jackson Boulevard DW-8J
Chicago, IL 60604-3590

Re: GMC Powertrain Saginaw Metal Casting Operations, MID 041-793-340
RCRA Facility Investigation Phase 1C Work Plan, Interim Measures Work Plan for PCB Impacted Areas, and Interim Measures Work Plan for LNAPL Impacted Soil

Dear Mr. Ramanauskas:

Please find attached the third amendment (Phase 1C) to the April 19, 2000, Phase 1A RCRA Facility Investigation (RFI) Report and Phase 1B RFI Work Plan (Work Plan, EMCON, April 19, 2000) and two Interim Measures Work Plans (PCB Impacted Areas and LNAPL Impacted Soil).

The purpose of the Phase 1C investigation is to conduct additional investigative activities based on the results of the Phase 1A and 1B (including Amendment No. 1 and No. 2) investigative activities previously completed at the Site. The Phase 1C RFI Work Plan was originally submitted on March 3, 2004. The attached report has been revised as outlined in the General Motors (GM) Responses to U.S.EPA Comments dated June 17, 2004, the subsequent responses to comments transmitted via email on August 3, 2004, and the September 29, 2004 U.S. EPA's request for surface water pH monitoring..

The interim measures will address the PCB impacted areas in Investigative Units D and E and LNAPL impacted soil in Investigative Unit B. The attached reports have been revised as outlined in the General Motors (GM) Responses to U.S.EPA Comments dated June 17, 2004 and the July 16, 2004 U.S. EPA Conditional Approval.

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The U.S.EPA conditionally approved the work plans given GMs incorporation of the proposed revisions. The Phase 1C work has been scheduled to commence on Site beginning January 3, 2005. If you have any questions or comments, or would like any additional information, please contact me at (248) 753-5799.

Sincerely,

Cheryl R. Hiatt

Cheryl R. Hiatt
Project Coordinator

Attachments:

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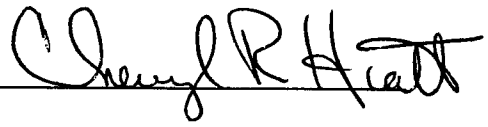
"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature: 

Name: Cheryl R. Hiatt

Title: Project Coordinator

Date: December 8, 2004

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1.0 INTRODUCTION

This report is to serve as a the third amendment (Phase 1C) to the April 19, 2000, Phase 1A RCRA Facility Investigation (RFI) Report and Phase 1B RFI Work Plan (Work Plan, EMCON, April 19, 2000). The Phase 1B Work Plan was approved by the United States Environmental Protection Agency (U.S. EPA) on April 26, 2000. On May 10, 2001, GM submitted a request for extension of the RFI Report in order to complete additional investigative activities at the Site, based on review of the collected Phase 1B data. The following presents the proposed additional scope of work to be completed under the Phase 1C Work Plan.

The purpose of this Amendment is to propose additional investigative activities to be collected based on the results of the Phases 1A and 1B (including Amendment No. 1 and No. 2) investigation activities previously completed at the Site.

The following sections present the proposed additional scope of work to be completed under this Phase 1C Amendment.

2.0 SITE WIDE ACTIVITIES

2.1 GROUNDWATER

2.1.1 FURTHER SITE-WIDE DELINEATION OF METALS

In order to appropriately identify current accurate concentrations of total metals present in groundwater at locations previously exhibiting exceedances of generic criteria, General Motors (GM) proposes to resample 80 wells using low-flow sampling techniques as presented in Table 1 and on corresponding Investigative Unit (IU) figures as attached. Groundwater water levels will be recorded at all existing monitoring wells on-Site prior to completing the resampling activities.

Groundwater samples were collected using EMCON's Standard Operating Procedure (SOP) for 'Groundwater Sampling Via Monitoring Wells', included in the original RFI Work Plan submitted in June 1998, as part of the Phase 1A (1998) and Phase 1B (2000) investigation programs. These procedures consisted of using bailers or submersible pumps to purge the wells and collect groundwater samples. These procedures were not designed to minimize disturbance to the water column, and may have resulted in increased turbidity in the groundwater samples. Therefore, as part of the prior RFI sampling events, groundwater samples were analyzed for total (unfiltered) and dissolved (filtered) metals to address concerns that this sampling protocol could have resulted in over estimating the actual metals concentrations in groundwater due to an increased level of suspended solids that may have been present in the samples. For example, out of 2,356 pairs of total/dissolved metals analysis collected through December 2001, 434 exhibited total metals concentrations greater than the MDEQ Part 201 Industrial Drinking Water Screening Criteria. Of these 434, only 41 (or approximately 10 percent) exhibited dissolved metals concentrations exceeding the same criteria.

More recently, GM has modified its standard RFI groundwater sampling protocol to incorporate the use of low flow sampling procedures. This method minimized the suspension of solids and allows collection of a more representative groundwater sample without the need for filtering. To better assess the significance of the previously reported metals concentrations in the unfiltered groundwater samples, GM proposed to resample 80 wells using the low flow sampling technique. The 80 proposed wells constitute all Site monitoring wells (75 overburden and 5 bedrock wells) where groundwater samples collected previously exhibited exceedances of screening criteria for total (unfiltered) metals. This sampling plan does not include all existing monitoring wells on Site.

Finally, the scope of work identified in the Phase 1C Work Plan includes all of the monitoring proposed in the CA750 Environmental Indicator Report for the purposes of verifying the "area of existing groundwater contamination" as defined in the form for the CA750 determination.

3.0 INVESTIGATIVE UNIT A

3.1 SOIL

3.1.1 FORMALDEHYDE ADJACENT TO SB-00517

Five additional borings were supposed to be advanced adjacent to SB-00517 during the Phase 1B Amendment No. 2 Work Plan in order to evaluate formaldehyde concentrations. The borings (SB-00417, SB-00516, SB-00517A, SB-00518, and SB-00617) were advanced, however due to the shifting of soil piles during plant operations in this area they were not in the locations indicated in the Amendment No. 2. GM proposes to install four additional borings (SB-00517B, SB-00517C, SB-00517D, and SB-00517E) as presented in Table 2 and on Figure A.1 (within a 1/4-acre area), for the purpose of delineating formaldehyde in soil adjacent to SB-00517. The proposed sampling locations and depths are appropriate to bound the formaldehyde vertically.

3.1.2 MANGANESE ADJACENT TO SB-00821A

Due to the manganese concentration detected in a soil sample collected at SB-00821A, GM proposes the installation of four borings near SB-00517 (SB-00517B, SB-00517C, SB-00517D, and SB-00517E) as presented in Table 2 and on Figure A.1 for the purpose of delineating manganese in soil west of SB-00821A and north of SB-00718A.

3.1.3 FORMALDEHYDE ADJACENT TO SB-00516

Due to the formaldehyde concentration detected in a soil sample collected at MW-00516 directly above the water table within foundry sand fill, GM proposes the installation of one additional soil boring to the west of SB-00516 (SB-00416) as presented in Table 2 and on Figure A.1 for the purpose of delineating formaldehyde.

3.1.4 CHROMIUM ADJACENT TO MW-00821

Due to the chromium concentration detected in a soil sample collected at MW-00821 near the ground surface, GM proposes the installation of two additional soil borings to the south and north of MW-00821 (SB-00820A and SB-0822A) as presented in Table 2 and on Figure A.1 for the purpose of delineating hexavalent and total chromium.

3.1.5 MANGANESE ADJACENT TO SB-00820

Due to the manganese concentration detected in a soil sample collected at SB-00820, GM proposes the installation of two additional soil borings, one to the southeast and one to the southwest of SB-00820 (SB-00820B and SB-00820C) and the collection of two surface soil samples, one (SB-00821C) directly to the east of MW-00821 and one (SB-00821B) directly to the east of SB-00820 as presented in Table 2 and on Figure A.1 for the purpose of delineating manganese.

3.1.6 MANGANESE ADJACENT TO SB-00718D

Due to the manganese concentration detected in a soil sample collected at SB-00718D, GM proposes the installation of one additional soil boring to the southwest of SB-00718D (SB-00717) as presented in Table 2 and on Figure A.1 for the purpose of delineating manganese.

4.0 INVESTIGATIVE UNIT B

4.1 SOIL

4.1.1 PCBs/LEAD ADJACENT TO SB-00709 AND B-15(2000-B)

Due to the PCB concentration detected in a soil sample collected at SB-00709, and the lead concentration reported from a soil sample collected at B-15(2000-B), GM proposes the installation of one soil boring to the south (SB-00708) of SB-00709 and B-15(2000-B) as presented in Table 2 and on Figure B.1 for the purpose of delineating PCBs and lead.

4.1.2 SHALLOW SOIL ALONG THE NORTHERN BOUNDARY OF IU-B

Two shallow surficial samples (SB-00310A and SB-00310B) (less than 2 feet) will be collected along the north boundary of IU B for the purpose of further delineating manganese, benzo(a)pyrene, and dibenzo(a,h)anthracene at the north end of IU B.

4.2 GROUNDWATER

4.2.1 DOWNGRADIENT VOCs ADJACENT TO VAP-00208

Due to the vinyl chloride concentrations detected in groundwater collected from VAP-00208, GM proposes the installation of one new permanent monitoring well 60 feet to the west of VAP-00208 (MW-00108) as presented in Table 1 and on Figure B.2 for the purpose of delineating and monitoring VOCs. Based on the results of vertical aquifer sampling conducted at VAP-00208 and adjacent locations, MW-00108 will be screened within the shallow overburden directly above the underlying clay unit. Two proposed monitoring wells (MW-00304A and MW-00304B) will be sampled in the overburden groundwater for VOC analysis.

4.2.2 LNAPL ADJACENT TO MW-00305

To further delineate the LNAPL plume boundary within IU B near wells MW-00304 and MW-00305, GM proposes the installation of two new permanent monitoring wells (MW-00304A and MW-00304B) and the resampling of one existing monitoring well (MW-00305) as presented in Table 1 and on Figure B.2. LNAPL, if detected in monitoring well MW-00305 should be sampled for VOCs, SVOCs, PCBs, metals, density, molecular weight, and viscosity. New monitoring wells, MW-00304A and MW-00304B

are to be installed at locations situated beyond the limits of the existing LNAPL. These two monitoring wells will be monitored with a dual phase probe to confirm absence of LNAPL, and if possible samples of groundwater will be collected from the monitoring wells and analyzed for VOCs as presented in Table 1 and on Figure B.2.

5.0 INVESTIGATIVE UNIT D

5.1 SOIL

5.1.1 CHROMIUM ADJACENT TO MW-02410

Due to the chromium concentration detected in a soil sample collected at MW-02410, GM proposes the installation of three borings to the north, west, and south (SB-02511, SB-02410 and SB-02510B) of MW-02410 respectively as presented in Table 2 and on Figure D.2 for the purpose of delineating hexavalent and total chromium.

5.1.2 PCBs/LEAD ADJACENT TO SB-00709 AND B-15(2000-B)

Due to the PCB concentration detected in a soil sample collected at SB-00709, and the lead concentration reported from a soil sample collected at B-15(2000-B), GM proposes the installation of one soil boring to the east (SB-00809) of SB-00709 and B-15(2000-B) as presented in Table 2 and on Figure D.1 for the purpose of delineating PCBs and lead. These boring in combination with SB-00708 presented in Section 4.1.1 and lead and PCB samples collected from other borings in the northeastern corner of IU B and northwestern corner of IU D should adequately characterize the extent of lead and PCB concentrations in the area for risk assessment purposes.

5.1.3 MANGANESE THROUGHOUT IU-D

Due to the manganese concentration detected in a soil sample collected at SB-02514 near the ground surface, GM proposes the installation of one additional soil boring to the northwest (SB-02514A) of SB-02514 as presented in Table 2 and on Figure D.1 for the purpose of delineating manganese.

Due to the manganese concentration detected in a soil sample collected at SB-00910 near the ground surface, GM proposes the installation of two additional soil borings to the south and east (SB-00909 and SB-01010) of SB-00910 as presented in Table 2 and on Figure D.1 for the purpose of delineating manganese.

Due to the manganese concentration detected in a soil sample collected at SB-02505 near the ground surface, GM proposes the installation of three additional soil borings to the north, southeast, and southwest (SB-02505A, SB-02505B, and SB-02505C) of SB-02505 as presented in Table 2 and on Figure D.2 for the purpose of delineating manganese.

5.1.4 PCBs ADJACENT TO SB-02619C

Due to the PCB concentration detected in a soil sample collected at SB-02619C that exceeds 1 mg/kg, GM proposes the installation of three additional soil borings to the south, west, and east (SB-02619E, SB-02619F, and SB-02619G) of SB-02619C as presented in Table 2 and on Figure D.1 for the purpose of delineating PCBs.

5.1.5 PCBS ADJACENT TO NUMBER 8 MOLD LINE

Due to the PCB concentration detected in a soil sample collected at SB-01711 that exceeds 1 mg/kg, GM proposes the installation of one additional soil boring to the west (SB-01611) of SB-01711 as presented in Table 2 and on Figure D.2 for the purpose of delineating PCBs.

6.0 INVESTIGATIVE UNIT E

6.1 SOIL

6.1.1 MANGANESE, CHROMIUM, AND PCBs ADJACENT TO MW-02320

Due to the manganese and chromium concentrations detected in soil samples collected at MW-02320, and PCB concentrations detected that exceeds 1 mg/kg, GM proposes the installation of four additional soil borings 25 feet to the north, east, south, and west (SB-02320A, SB-02320B, SB-02320C, and SB-02320D) of MW-02320 as presented in Table 2 and Figure E.2 to be analyzed for manganese, PCBs, and hexavalent and total chromium.

6.2 GROUNDWATER

6.2.1 FLUORIDE DOWNGRADIENT OF IU G AT MW-03734

The RCRA RFI Phase 1B Addendum No. 1, Additional Phase 1B Activities Memorandum (November 2, 2001) proposed five monitoring wells within IU E for to be sampled for fluoride. Four of the five wells were sampled. However, MW-03734 was inadvertently omitted. GM proposes the sampling of MW-03734 for fluoride as presented in Table 1, and on Figure E.3 to be analyzed for fluoride as part of the Phase 1C investigation activities.

6.2.2 SVOCs DETECTED AT MW-01119

Elevated SVOC concentrations were detected in a groundwater sample collected during Phase 1B RFI activities at MW-01119. In order to confirm these results, GM proposes to resample MW-01119 for SVOCs.

6.2.3 PCBs DETECTED AT MW-03235

Elevated PCB concentrations were detected in a groundwater sample collected during Phase 1A RFI activities at MW-03235. In order to confirm these results, GM proposes to resample MW-03235 for PCBs.

7.0 INVESTIGATIVE UNIT F

7.1 SOIL

7.1.1 SVOCs ADJACENT TO MW-02728

Due to SVOC concentrations detected in a soil sample collected at MW-02728 at the ground surface, GM proposes the installation of additional soil borings to the north (SB-02728B), south (SB-02728D), east (SB-02728C), and west (SB-02728A) of MW-02728 a as presented in Table 2 and on Figure F.1 for the purpose of delineating SVOCs.

8.0 INVESTIGATIVE UNIT G

8.1 SOIL

8.1.1 CHROMIUM ADJACENT TO TMW-04635

Due to chromium concentrations detected in a soil sample collected at TMW-04635 at the ground surface, GM proposes the installation of two additional soil borings to the northeast and southeast (SB-04635A and SB-04635B) of TMW-04635 as presented in Table 2 and on Figure G.2 for the purpose of delineating hexavalent and total chromium.

8.1.2 SURFICIAL SOIL SAMPLING IN NORTHERN PORTION OF IU-G

GM proposes to collect two additional surface soil samples from the locations B05(1998) and B12(1998) (B05-04 and B12-04, respectively), for the purpose of delineating surficial soil concentrations of PCBs, manganese, hexavalent, and total chromium as presented in Table 2 and on Figure G.2. No surficial samples were previously collected at these locations and the subsurface samples exceeded the screening criteria.

8.2 GROUNDWATER

8.2.1 GROUNDWATER-SURFACE WATER INTERFACE MONITORING WELLS ADJACENT TO SAGINAW RIVER

Due to concentrations of pH, ammonia, and metals detected in downgradient wells at various locations within IU G that exceed MDEQ groundwater/surface water interface (GSI) criteria, GM has installed four downgradient wells adjacent to the Saginaw River as GSI monitoring points in order to collect representative sample of groundwater venting to the river. These wells (MW-03945, MW-04051, MW-04257, and MW-04765) are presented in Table 1 and on Figure G.3. In addition to these recently installed wells, GM proposes to install one more downgradient well adjacent to the Saginaw River (MW-04764). The wells are screened in shallow fill above the underlying clay layer, and are anticipated to be screened approximately 5 to 10 feet below ground surface. These wells will be sampled for pH, ammonia, and metals. Groundwater water levels will be recorded at all existing monitoring wells on Site prior to complete the resampling activities.

Groundwater/surface water elevations in this area indicate that water is flowing from east to west with the lowest elevation at the Saginaw River. However, the depth of the

existing sewer line (runs parallel to and east of M-13) will be confirmed. This will be compared to the elevation of the overburden fill unit to identify whether an alternate migration path may exist. The City of Saginaw POTW will also be contacted to determine the pH of the influent to the POTW. In addition, the stability of the pH area due to natural buffering will be evaluated.

8.2.2 CITY OF SAGINAW SEWER BEDDING

To look at potential migration along the City of Saginaw's 72-inch combined interceptor sewer bedding, GM proposes the installation of a new monitoring well (MW-05157) into the water table within the trench for the sewer. The monitoring well will be sampled for pH, ammonia, and total metals.

To look at potential migration along the City of Saginaw's 36-inch sewer bedding along M-13, GM proposes the installation of four temporary monitoring wells (TMW-04044A, TMW-04044B, TMW-04044C, and TMW-04044D) into the water table within the trench for the sewer. The new monitoring wells will be located on either side of the 36-inch sewer, two to the north and two 50 feet south.

8.2.3 AMMONIA ACROSS IU G

Due to concentrations of ammonia detected in wells at various locations within IU G, GM has proposed to resample three wells in addition to the GSI monitoring wells (MW-04864, MW-8, and MW-17), and one new monitoring well (MW-05157) as presented in Table 1 and on Figure G.3. Samples will also be collected from GSI monitoring wells recently installed (MW-03945, MW-04051, MW-04257, MW-04764) in order to determine if ammonia exists in groundwater at the downgradient boundary of IU G.

8.2.4 ELEVATED pH IN GROUNDWATER ACROSS IU G

Due to concentrations of pH detected in wells at various locations within IU G, GM has proposed to install four wells (MW-04438, MW-04045, MW-04456, and MW-05452) from within the areas of elevated pH. GM also proposes to resample two existing wells (MW-04864 and MW-04250), in addition to the five proposed GSI monitoring wells, and one new monitoring well (MW-05157) being installed into 72-inch City of Saginaw sewer bedding as presented in Table 1 and on Figure G.3.

Section 8.2.1 of this work plan proposes the resampling of recently installed GSI monitoring wells, and Section 8.2.5 proposes the collection of surface water samples upstream, adjacent to and downstream of this area of the Site. The purpose of the installation of four new monitoring wells, which are located within the areas elevated pH across IU G is to establish a permanent monitoring point, which may allow for future monitoring. Many of the previous wells used to delineate the concentrations of pH within this area were temporary which no longer exist. Currently no ongoing groundwater monitoring program exists, however following the completion of the Phase 1C RFI scope, GM will work with U.S. EPA to define an initial groundwater monitoring program, of which these wells may be used.

8.2.5 pH IN SURFACE WATER

In order to further delineate pH in surface water within the Saginaw River, GM proposes to collect field readings up pH at various locations from within the river upgradient, adjacent, and downgradient of the Site (approximately 10).

8.2.6 VOCs ADJACENT TO FORMER OIL HOUSE, FORMER ORIGINAL DESULFURIZATION TREATMENT PAD, AND TMW-04046

Due to concentrations of VOCs detected in wells at various locations within IU G, GM has proposed to resample five wells (MW-8, MW-17, MW-18, MW-04434, and MW-04435), and one new temporary monitoring well (TMW-04046A) as presented in Table 1 and on Figures G.3 and G.4.

8.2.7 MONITORING WELL ABANDONMENT

Due to the recent MDEQ closure of the Former Original and Replacement Desulfurization Slag RCRA Treatment Units, GM proposes to abandon all historic wells associated with these units. This action was approved by U.S. EPA on May 10, 2004 and the work was subsequently completed on May 26, 2004. Abandoned wells include MW-1, MW-2, MW-10, MW-13, MW-14, MW-15, and MW-16.

9.0 INVESTIGATIVE UNIT H

9.1 SEDIMENT

9.1.1 PCBs WITHIN THE STORMWATER DITCH

The PCBs concentration detected from the sediment sample collected at H7 exceeds 1 mg/kg. Two additional sediment samples will be collected, one upstream and one downstream of H7 (H7A and H7B), for the purpose of delineating PCBs concentrations in the stormwater ditch located at the northwest boundary of IU-G as presented in Table 2 and on Figure H.1.

9.1.2 PCBs AND METALS WITHIN THE SECONDARY SETTLING BASIN

Four additional sediment samples with be collected from within the secondary settling basin located in IU H (H8-04, H9-04, H10-04, and H11-04) for the purpose of characterization of PCBs, lead, and manganese concentrations as presented in Table 2 and on Figure H.1.

9.2 GROUNDWATER AND SURFACE WATER

9.2.1 AMMONIA AND SVOC RESAMPLING WITHIN IU H

Due to concentrations of ammonia and SVOCs detected within the northeast corner of IU I, GM has proposed to resample one monitoring well (MW-17661) as presented in Table 1 and on Figure H.2 for the purpose of delineating ammonia and SVOCs in the northeast corner of IU I.

9.2.2 pH IN SURFACE WATER AT SECONDARY SETTLING BASIN

In order to assist in determining the pH value of surface water within the secondary settling basin, GM has proposed the collection two surface water samples (SW-3 and SW-4) as presented in Table 1 and on Figure H.2. The results will be used to identify whether this surface water could be as source of elevated pH in adjacent shallow perched groundwater. Previous indications of pH from the secondary basin indicate the pH is close to neutral (in the range of 6 to 7 standard units). The pH within the basin will be compared to upgradient and downgradient groundwater, in order to allow for proper characterization of pH across IU H.

10.0 INVESTIGATIVE UNIT I

10.1 SOIL

Classified sand was characterized and found to be "inert". GM believes that manganese is adequately characterized in soil within IU I for the purpose of risk assessment.

10.1.1 FORMALDEHYDE ADJACENT TO MW-06951

Due to formaldehyde concentrations detected in a soil sample collected at MW-06951 at 4 to 6 feet below ground surface, GM proposes the installation of one additional soil boring (SB-06951A) adjacent to MW-06951 as presented in Table 2 and on Figure I.1 for the purpose of confirming the formaldehyde concentration at this location.

10.1.2 EVALUATE SOURCE OF ELEVATED pH

The former quench slag pile previously existed within IU I, and shallow soils present in this area are believed to be a potential source for elevated pH in groundwater. In order to determine if groundwater with elevated pH is emanating from this area, GM proposes to complete shallow soil sampling above the water table, for the purpose of screening soils in the field for pH.

The SOP for screening soil pH in the field will be done in accordance with EPA SW846 Method 9045C. Sampling will be initiated from within the Former Quench Slag Staging Area and will be stepped out if elevated pH results are detected in order to determine the boundaries of this area. Soil will be analyzed from the ground surface down to the water table.. These activities will be completed to identify whether a source area may still exist above the water table at a location where the former quench slap pile previously existed, such that soil leaching may cause elevated pH in the adjacent shallow perched groundwater.

At each location a hydropunch will also be advanced using Geoprobe™ direct push techniques extending into the groundwater table, where a groundwater grab sample will be collected and analyzed for pH. Based on the field screening results, a monitoring well may be installed within this area.

At each location, a surface soil sample will be collected and analyzed for metals. In addition, up to one vadose zone (subsurface) soil sample exhibiting elevated pH will

also be analyzed for metals. The number of soil samples will be determined in the field as presented in Table 2 and located in the area outlined and labeled (B) on Figure I.1. If elevated pH is not identified, the source likely no longer exists.

10.2 GROUNDWATER

10.2.1 AMMONIA AND SVOC RESAMPLING WITHIN IU I

Due to concentrations of ammonia and SVOCs detected within IU I, GM has proposed to resample two monitoring wells (MW-06951, and MW-07959) as presented in Table 1 and on Figure I.2 for the purpose of delineating ammonia and SVOCs in the area.

Based on the results of previous overburden groundwater samples collected from within IU I and analyzed for ammonia, it would be appropriate to collect samples to the west of TMW-06652, and to the east of TMW-07048 in order to delineate ammonia concentrations in this area. However, based on previous investigations GM does not believe that there is shallow perched overburden groundwater present to the west of TMW-06652. In order to confirm that no shallow perched overburden groundwater is present to the west of TMW-06652, one temporary monitoring well will be advanced west of TMW-06652 (TMW-06552). If shallow groundwater is present, then a sample will be collected from a temporary well for the purpose of ammonia characterization. GM is not able to collect a shallow perched overburden groundwater sample directly to the east of TMW-07048 due to the large clay pile that is located in this area. An overburden groundwater sample from MW-17948 will also be collected for ammonia characterization because ammonia was not previously analyzed at this location.

11.0 INVESTIGATION UNIT J

None of the sediment samples collected in IU J exhibited concentrations greater than screening criteria. The sampling locations within IU J are presented on Figure J.1.

12.0 PROJECT SCHEDULE

Because additional investigative activities are being proposed under this Addendum (Phase 1C) to the April 19, 2000, Phase 1B RFI Work Plan, the project schedule will be adjusted accordingly. A revised schedule as found in Appendix A, describes the progress to date and the anticipated future schedule for completion of the Phase 1C scope of work.

Field work will be initiated upon U.S. EPA approval.

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV				Toxic Substance Control Act
		Direct Contact	Soil Volatilization to Indoor Air	Ambient Air Particulate Soil Inhalation	Ambient Air Finite VOC for 2 Meter Source Thickness	
		A	B	C	D	E
Total PCBs	6900	16	18000	6500	28000	1
Aluminum		377000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		400	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		2400				
Chloride						
Chromium		6200		240		
Chromium, Hexavalent		6200		240		
Chrysene		8000				
Cobalt	6.8	900		5900		
Cyanide (total)	0.39	250		250		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		570	0.33	78000	15	
cis-1,2-Dichloroethene		540	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		38000		210000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	1000000	4100000	880000	
Formaldehyde		85000	85	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	99000		1500		
Mercury	0.13	580	89	8800	62	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		52000	470	88000	360	
Nickel	20	150000		16000		
Pentachlorophenol		320		130000		
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9600		59000		
Sodium		1000000				
Toluene		250	250	12000000	36000	
Trichloroethene		500	37	2300000	440	
Vanadium		5600				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		158	150	1300000000	65000	
Zinc (Total)	47	830000				

MW-00926	9/14/98 0-2(ft)	9/14/98 4-6(ft)	9/14/98 6-8(ft)
	- mg/kg	- mg/kg	- mg/kg
Chromium	76	9	14
Manganese	1260	120	511
Total PCBs	0.35 J	ND (0.1)	ND (0.1)

SB-00617	1/6/03 8-10(ft)	1/6/03 10-12(ft)
	- mg/kg	- mg/kg
Formaldehyde	21	55

SB-00618	1/3/03 6-8(ft)	1/3/03 8-10(ft)	1/3/03 10-12(ft)	1/3/03 12-14(ft)
	- mg/kg	- mg/kg	- mg/kg	- mg/kg
Formaldehyde	ND (13)	ND (11)	24	3

SB-00517A	1/3/03 10-12(ft)	1/3/03 12-14(ft)
	- mg/kg	- mg/kg
Formaldehyde	ND (13)	18J5

MW-01329	9/11/98 0-2(ft)	9/11/98 4-6(ft)	9/11/98 6-8(ft)
	- mg/kg	- mg/kg	- mg/kg
Chromium	14	6	8
Manganese	260	214	230
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

SB-00622	5/31/00 20-23(ft) 5-8(ft)
	- mg/kg
Formaldehyde	ND (10) J
Manganese	533
Total PCBs	0.17 J

MW-01530	10/5/98 0-2(ft)	10/5/98 4-6(ft)
	- mg/kg	- mg/kg
Chromium	34	42
Manganese	364 J	448 J
Total PCBs	ND (0.1)	ND (0.1)

MW-11530	10/21/98 56-58(ft)	10/21/98 68-70(ft)
	- mg/kg	- mg/kg
Chromium	20 J[12 J	12 J
Manganese	273/209	338
Total PCBs	ND (0.1)/ND (0.1)	ND (0.1)

SB-00724	5/31/00 4-6(ft)
	- mg/kg
Chromium	8.3
Formaldehyde	ND (10) J
Manganese	94
Total PCBs	ND (0.1)

C1	11/19/98
	- mg/kg
Arsenic	65 [A]
Lead	1540 [A]/1330 J [A]
Total PCBs	1.8 J [E]

SB-00822	12/20/02 0-2(ft)	12/20/02 2-4(ft)
	- mg/kg	- mg/kg
Manganese	2350 [C]/3960 [C]	121

SB-00821A	12/20/02 0-2(ft)	12/20/02 2-4(ft)
	- mg/kg	- mg/kg
Manganese	10700 [C]	4860 [C]

SB-00721	5/31/00 2-4(ft)
	- mg/kg
Formaldehyde	ND (10) J
Manganese	198
Total PCBs	ND (0.1)

MW-00821	9/17/98 0-2(ft)	9/17/98 2-6(ft)	9/17/98 24-26(ft)
	- mg/kg	- mg/kg	- mg/kg
Chromium	292 J [C]	77 J	31 J
Manganese	8200 J [C]	2360 J [C]	410 J
Total PCBs	1.2 J [E]	ND (0.1)	ND (0.1)

SB-00820	12/20/02 0-2(ft)	12/20/02 2-4(ft)
	- mg/kg	- mg/kg
Manganese	12800 [C]	4470 [C]

SB-00718B	1/6/03 12-14(ft) 0-2(ft)	1/6/03 14-16(ft) 2-4(ft)
	- mg/kg	- mg/kg
Manganese	410	796

(A)

MW-00124	10/28/98 48-50(ft)	10/28/98 82-84(ft)
	- mg/kg	- mg/kg
Chromium	12/12	13
Manganese	225/222	343
Total PCBs	ND (0.1)/ND (0.1)	ND (0.1)

SB-00516	1/6/03 10-12(ft) 0.5-2.5(ft)	1/6/03 12-14(ft) 2.5-4.5(ft)
	mg/kg	mg/kg
Formaldehyde	79 (DD)	13

(A)

MW-00124	9/11/98 0-2(ft)	9/11/98 4-6(ft)	9/11/98 8-10(ft)	9/11/98 32-34(ft)
	- mg/kg	- mg/kg	- mg/kg	- mg/kg
Chromium	85	13	24	8
Manganese	472	142	198	496
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

SB-00517	5/31/00 10-13(ft) 0-3(ft)	5/31/00 18-18.5(ft) 8-9.5(ft)
	- mg/kg	- mg/kg
Formaldehyde	ND (10) J	39 J
Manganese	102	105
Total PCBs	0.444 J	ND (0.1)

(A)

SB-00316A	12/20/02 0-2(ft)	12/20/02 2-4(ft)	12/20/02 4-6(ft)	12/20/02 6-8(ft)	12/20/02 8-10(ft)	12/20/02 10-12(ft)	12/20/02 12-14(ft)
	- mg/kg	- mg/kg	- mg/kg	- mg/kg	- mg/kg	- mg/kg	- mg/kg
Total PCBs	0.344 J	0.266 J/0.33 J	ND (0.11)/ND (0.11)	ND (0.13)	ND (0.14)	ND (0.15)	ND (0.14)

SB-00316	6/1/00 10-13(ft) 0-3(ft)	6/1/00 13.5-15.5(ft) 3.5-5.5(ft)
	mg/kg	mg/kg
Formaldehyde	ND (10) J	ND (10) J
Manganese	237 J	31.2 J
Total PCBs	2.88 J [E]	0.276 J

(A)

MW-00017	9/11/98 0-2(ft)	9/11/98 6-8(ft)	9/11/98 22-24(ft)
	- mg/kg	- mg/kg	- mg/kg
Chromium	74	15	12
Manganese	1230	373	345
Total PCBs	ND (0.1)	ND (0.2)	ND (0.1)

SB-00718E	1/7/03 14-16(ft) 0.5-2.5(ft)	1/7/03 16-18(ft) 2.5-4.5(ft)	1/7/03 16-18(ft) 2.5-4.5(ft)
	mg/kg	mg/kg	mg/kg
Manganese	197	2170 [C]	55.4

(A)

SB-00718	6/1/00 11-14(ft) 1-4(ft)
	mg/kg
Formaldehyde	ND (10) J
Manganese	2670 J [C]
Total PCBs	ND (0.1)

(A)

MW-10713	10/20/98 36-38(ft)
	- mg/kg
Chromium	11/11
Manganese	266/239
Total PCBs	ND (0.1)/ND (0.1)

C3	11/19/98
	- mg/kg
Arsenic	25
Lead	1330 J [A]/1130 J [A]
Total PCBs	1.8 J [E]

SB-00718C	1/8/03 11-13(ft) 0.5-2.5(ft)	1/8/03 13-15(ft) 2.5-4.5(ft)
	mg/kg	mg/kg
Manganese	739	1720

(A)

SB-00718A	1/7/03 14-16(ft) 1.5-3.5(ft)	1/7/03 16-18(ft) 3.5-5.5(ft)
	mg/kg	mg/kg
Manganese	194	54.4

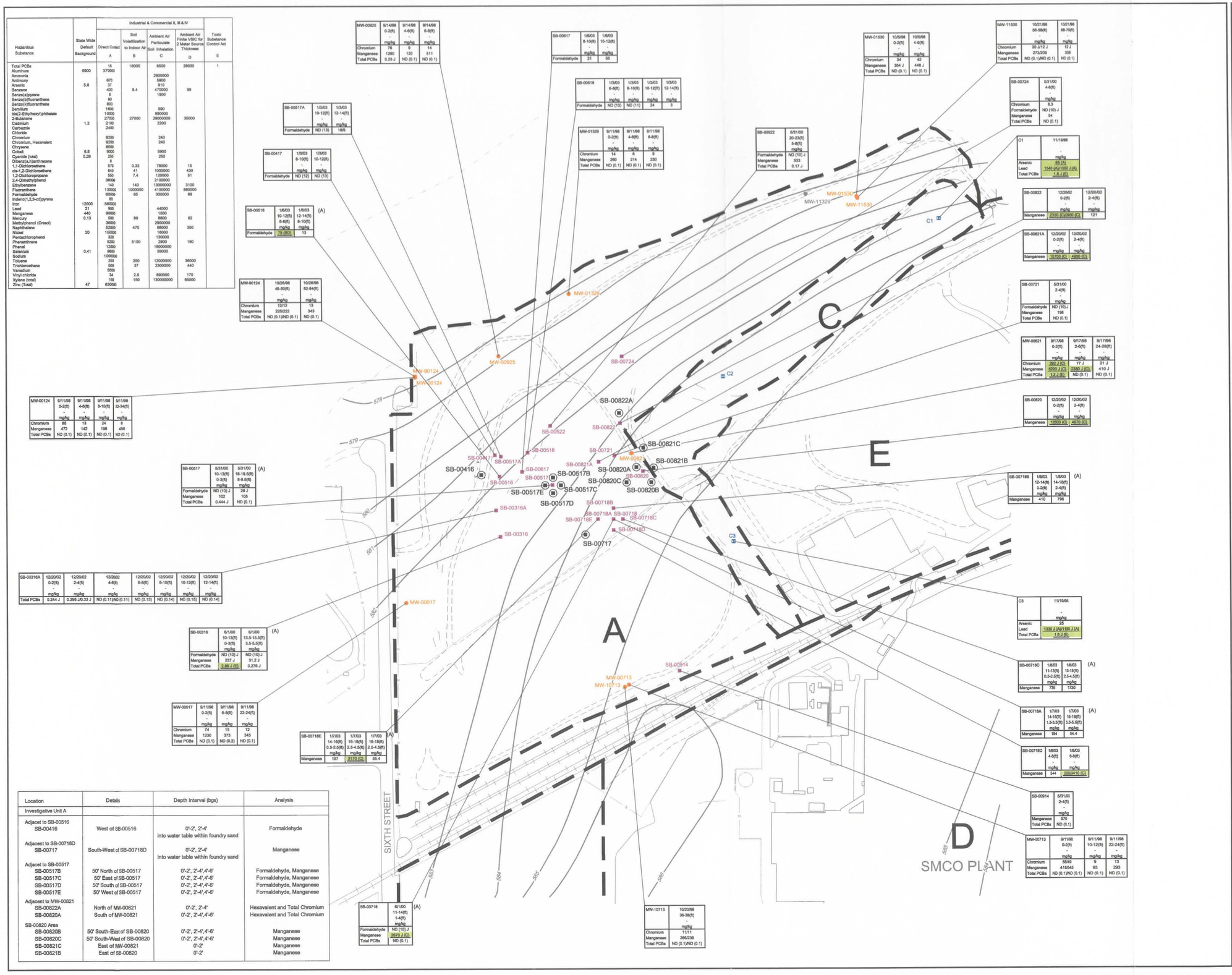
(A)

SB-00718D	1/8/03 4-6(ft)	1/8/03 6-8(ft)
	- mg/kg	- mg/kg
Manganese	344	2050/410 [C]

SB-00914	5/31/00 2-4(ft)
	- mg/kg
Manganese	570
Total PCBs	ND (0.1)

MW-00713	9/11/98 0-2(ft)	9/11/98 10-12(ft)	9/11/98 22-24(ft)
	- mg/kg	- mg/kg	- mg/kg
Chromium	5540	9	13
Manganese	418/545	93	293
Total PCBs	ND (0.1)/ND (0.1)	ND (0.1)	ND (0.1)

Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit A			
Adjacent to SB-00516 SB-00416	West of SB-00516	0'-2', 2'-4' into water table within foundry sand	Formaldehyde
Adjacent to SB-00718D SB-00717	South-West of SB-00718D	0'-2', 2'-4' into water table within foundry sand	Manganese
Adjacent to SB-00517 SB-00517B	50' North of SB-00517	0'-2', 2'-4',4'-6'	Formaldehyde, Manganese
SB-00517C	50' East of SB-00517	0'-2', 2'-4',4'-6'	Formaldehyde, Manganese
SB-00517D	50' South of SB-00517	0'-2', 2'-4',4'-6'	Formaldehyde, Manganese
SB-00517E	50' West of SB-00517	0'-2', 2'-4',4'-6'	Formaldehyde, Manganese
Adjacent to MW-00821 SB-00822A	North of MW-00821	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-00820A	South of MW-00821	0'-2', 2'-4',4'-6'	Hexavalent and Total Chromium
SB-00820 Area SB-00820B	50' South-East of SB-00820	0'-2', 2'-4',4'-6'	Manganese
SB-00820C	50' South-West of SB-00820	0'-2', 2'-4',4'-6'	Manganese
SB-00821C	East of MW-00821	0'-2'	Manganese
SB-00821B	East of SB-00820	0'-2'	Manganese



0 60 150ft

LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SEDIMENT SAMPLE LOCATION
- SAMPLE LOCATION - NO REPORTED DATA
- PROPOSED SOIL BORING LOCATION

NOTES

(A) FIRST DEPTH IS BELOW TOP OF PILE, SECOND DEPTH IS IN REFERENCE TO GROUND SURFACE.

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT A & C
RFI PHASE 1C - SOIL & SEDIMENT

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 150'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure A1

17075-18(018)GN-WA001 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Drinking Water A	Industrial & Commercial II, III & IV: Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		68	0.13
Antimony		0.006		68	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.05		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		460	0.011
Chromium		0.1		460	0.011
Chromium, Hexavalent (Dissolved)		0.1		460	0.011
Chromium, Hexavalent		0.1		460	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.62
1,2-Dichloropropane		0.005	38	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.6		58000	
Iron	12000	5.6		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		10		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22

MW-00925	12/4/1998 mg/L	7/14/2000 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	25.3 (A)	8.67 (A)
Antimony	ND (0.05)	0.023 J (A)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.031	0.011
Beryllium	ND (0.005)	ND (0.005)
Chromium	0.048 (D)	-
Chromium, Hexavalent	-	ND (0.01)
Cobalt	0.024	-
Cyanide (total)	ND (0.01)	0.01 J (D)
Iron	85.3 J (A)	-
Iron (Dissolved)	4.85	-
Lead	0.149 (A)	0.034 (A)
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	3.42 J (A)	2.27
Mercury	0.001 (D)	-
Nickel	0.058	0.025
Vanadium	0.057 (D)	0.021 (D)

MW-01329	12/4/1998 mg/L	7/24/2000 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	1.53	0.065
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.446 (AD)	0.022
Beryllium	ND (0.005)	ND (0.005)
Chromium	ND (0.005)	-
Chromium, Hexavalent	-	0.014 (D)
Cobalt	ND (0.01)	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	175 J (A)	-
Iron (Dissolved)	9.71 (A)	-
Lead	0.007 (A)	ND (0.002)
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	1.03 J	0.83
Mercury	ND (0.0002)	-
Nickel	ND (0.02)	ND (0.02)
Vanadium	ND (0.01)	ND (0.01)

MW-01530	12/7/1998 mg/L	7/24/2000 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	2.33	1.72
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.052	0.085 (A)
Beryllium	ND (0.005)	ND (0.005)
Chromium	0.005	-
Chromium, Hexavalent	-	ND (0.01)
Cobalt	ND (0.01)	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	20.5 J (A)	-
Iron (Dissolved)	4.57	-
Lead	0.005 (A)	0.003
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	2.05 J	2.18
Mercury	ND (0.0002)	-
Nickel	ND (0.02)	ND (0.02)
Vanadium	ND (0.01)	0.007 J

MW-11530	12/2/1998 mg/L	7/18/2000 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	174 (A)	15.7 (A)
Antimony	0.054 (A)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.064 (A)	0.015
Beryllium	0.01 (A)	0.001 J
Chromium	0.327 (A)	-
Chromium, Hexavalent	-	ND (0.01)
Cobalt	0.129 (A)	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	385 (A)	-
Iron (Dissolved)	0.057 J	-
Lead	0.061 (A)	0.014 (A)
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	7.38 (A)	0.876
Mercury	0.0003	-
Nickel	0.365 (A)	0.103
Vanadium	0.356 (A)	0.042

MW-90124	12/14/1998 mg/L	7/20/2000 mg/L
1,2-Dichloropropane	0.001	ND (0.001)
Aluminum	0.117	0.052
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	0.035 J (A)
Arsenic	ND (0.005)	ND (0.025)
Beryllium	ND (0.005)	ND (0.005)
Chromium	ND (0.005)	-
Chromium, Hexavalent	-	ND (0.01)
Cobalt	ND (0.01)	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	2.18	-
Iron (Dissolved)	2.02	-
Lead	ND (0.002)	ND (0.004) UJ
Lead (Dissolved)	ND (0.002)	ND (0.004) UJ
Manganese	0.311	0.235 J
Mercury	ND (0.0002)	-
Nickel	ND (0.02)	ND (0.02)
Vanadium	ND (0.01)	ND (0.01)

MW-00124	12/3/1998 mg/L	7/27/2000 mg/L
1,2-Dichloropropane	0.001 J	ND (0.001)
Aluminum	0.282	13.2 (A)
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	0.029 J (A)
Arsenic	0.141 (A)	0.085 (A)
Beryllium	ND (0.005)	ND (0.005)
Chromium	ND (0.005)	-
Chromium, Hexavalent	-	ND (0.01)
Cobalt	ND (0.01)	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	0.425	-
Iron (Dissolved)	14.8 J (A)	-
Lead	0.068 (A)	0.04 (A)
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	2.5	2.95 J (A)
Mercury	0.001 (D)	-
Nickel	ND (0.02)	0.034
Vanadium	ND (0.01)	0.041 (D)

MW-00017	11/19/1998 mg/L	7/13/2000 mg/L
1,2-Dichloropropane	ND (0.001) UJ	ND (0.001)
Aluminum	53.2 (A)	58.2 (A)
Antimony	ND (0.05)	0.04 J (A)
Antimony (Dissolved)	ND (0.05)	0.023 J (A)
Arsenic	0.031	0.041
Beryllium	ND (0.005)	0.002 J
Chromium	0.177 (A)	-
Chromium, Hexavalent	-	ND (0.01)
Cobalt	0.022	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	145 (A)	-
Iron (Dissolved)	3.5 J	-
Lead	1.49 (A)	1.78 (A)
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	2.55	2.57 J
Mercury	0.001	-
Nickel	0.189 (A)	0.219 (A)
Vanadium	0.088 (A)	0.102 (A)

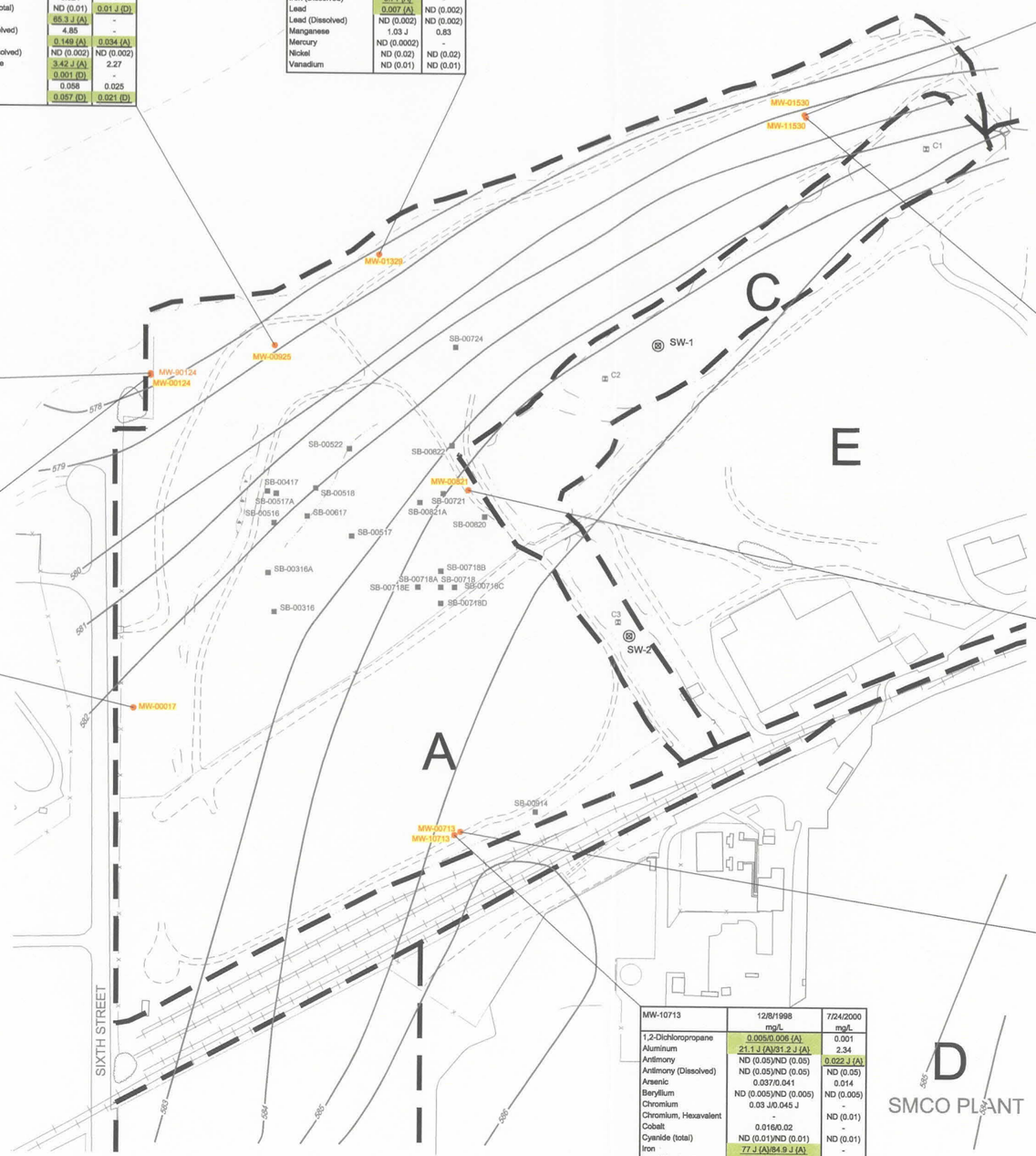
MW-00821	11/17/1998 mg/L	7/14/2000 mg/L
1,2-Dichloropropane	ND (0.001) UJ	ND (0.001)/ND (0.001)
Aluminum	49.8 J (A)	16.2 (A)/20.3 (A)
Antimony	ND (0.05)	ND (0.05)/ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)/ND (0.05)
Arsenic	0.027 J	0.018/0.019
Beryllium	ND (0.005)	ND (0.005)/0.001 J
Chromium	0.203 J (AD)	-
Chromium, Hexavalent	-	ND (0.01)/ND (0.01)
Cobalt	0.021 J	-
Cyanide (total)	ND (0.01)	ND (0.01)/0.02 J (D)
Iron	170 (A)	-
Iron (Dissolved)	2.53	-
Lead	2.36 J (AD)	1.07 (AD)/1.1 (AD)
Lead (Dissolved)	ND (0.002)	ND (0.002)/ND (0.002)
Manganese	3.69 (A)	1.63/1.71
Mercury	0.001 J (D)	-
Nickel	0.245 J (A)	0.085/0.106 (A)
Vanadium	0.077 J (AD)	0.027 (D)/0.033 (D)

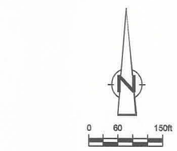
MW-00713	11/19/1998 mg/L	8/8/2000 mg/L
1,2-Dichloropropane	ND (0.001) UJ	ND (0.001)/ND (0.001)
Aluminum	57 (A)	10.4 J (A)/9.84 J (A)
Antimony	ND (0.05)	0.025 J (A)/0.023 J (A)
Antimony (Dissolved)	ND (0.05)	ND (0.05) UJ/ND (0.05) UJ
Arsenic	0.028	0.015 J/0.016 J
Beryllium	ND (0.005)	0.0003 J/0.0003 J
Chromium	0.176 (A)	-
Chromium, Hexavalent	-	ND (0.01)/ND (0.01)
Cobalt	0.027	-
Cyanide (total)	ND (0.01)	ND (0.01)/ND (0.01)
Iron	110 (A)	-
Iron (Dissolved)	4.8 J	-
Lead	1.67 (A)	1.21 (A)/1.03 (A)
Lead (Dissolved)	0.011 (A)	0.002 J/ND (0.004)
Manganese	2.74 (A)	2.58/2.52
Mercury	ND (0.0002)	-
Nickel	0.165 (A)	0.076/0.069
Vanadium	0.119 (A)	0.022/0.021

MW-10713	12/8/1998 mg/L	7/24/2000 mg/L
1,2-Dichloropropane	0.005/0.005 (A)	0.001
Aluminum	21.1 J (A)/31.2 J (A)	2.34
Antimony	ND (0.05)/ND (0.05)	0.022 J (A)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	ND (0.05)
Arsenic	0.037/0.041	0.014
Beryllium	ND (0.005)/ND (0.005)	ND (0.005)
Chromium	0.03 J/0.045 J	-
Chromium, Hexavalent	-	ND (0.01)
Cobalt	0.016/0.02	-
Cyanide (total)	ND (0.01)/ND (0.01)	ND (0.01)
Iron	77 J (A)/84.9 J (A)	-
Iron (Dissolved)	38.1 (A)/40.4 (A)	-
Lead	0.02 (A)/0.025 (A)	0.002
Lead (Dissolved)	ND (0.002)/ND (0.002)	ND (0.002)
Manganese	3.04 (A)/3.1 (A)	2.17
Mercury	ND (0.0002)/ND (0.0002)	-
Nickel	0.031 J/0.044 J	ND (0.02)
Vanadium	0.051/0.069 (A)	0.01 J

Location	Analysis
Investigative Unit A	
Low Flow Sampling	
MW-00017 (Resample)	Total Metals
MW-00124 (Resample)	Total Metals
MW-00713 (Resample)	Total Metals
MW-10713 (Resample)	Total Metals
MW-00821 (Resample)	Total Metals, SVOCs
MW-00925 (Resample)	Total Metals
MW-01329 (Resample)	Total Metals
MW-01530 (Resample)	Total Metals
MW-11530 (Resample)	Total Metals

Location	Analysis
Investigative Unit C	
Surface water	
SW-1	Total Metals, pH
SW-2	Total Metals, pH



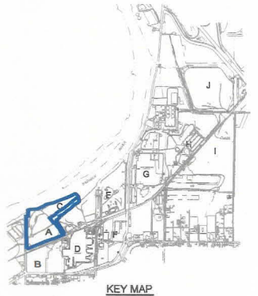


LEGEND

- A— — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- RESAMPLE OF MONITORING WELL
- PROPOSED SURFACE WATER SAMPLE LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT A & C
RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 150'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure A2

17075-18(018)GN-WA002 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs		16	16000	6500	28000	1
Aluminum	6900	370000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		440	8.4	4700000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		8900000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		3400				
Chloride						
Chromium		8200		240		
Chromium, Hexavalent		5200		340		
Chrysene		8000				
Cobalt	8.8	9000		5900		
Cyanide (total)	0.39	250		260		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		970	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	1000000	430	
1,2-Dichloropropene		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	10000000	41000000	880000	
Formaldehyde		60000	66	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	550000				
Lead	21	900		44000		
Manganese	440	90000		1500		
Mercury	0.13	680	89	8800	82	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		52000	470	88000	350	
Nickel	20	150000		16000		
Pentachlorophenol		330		130000		
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9600		59000		
Sodium		13000000				
Toluene		250	250	12000000	36000	
Trichloroethene		530	37	2300000	440	
Vanadium		5500				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		150	150	130000000	65000	
Zinc (Total)	47	630000				

B-3 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	5.28
Dibenz(a,h)anthracene	ND (0.92)
Lead	430
Total PCBs	ND (0.036)

VAP-00209-SB-00308A	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg	12/12/02 4-6(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Benzo(a)pyrene	0.7	8.2	4.4	1.1
Dibenz(a,h)anthracene	0.14	1.1	0.73	0.23
Manganese	5350 (C)	288	17000 (C)	12400 (C)

SB-00308	12/11/01 0-2(ft) mg/kg	12/11/01 2-4(ft) mg/kg
Benzo(a)pyrene	0.85	44 (A)
Dibenz(a,h)anthracene	0.15 J	11 J (A)

SB-00409	11/30/01 0-2(ft) mg/kg	11/30/01 4-6(ft) mg/kg	11/30/01 28-30(ft) mg/kg
Benzo(a)pyrene	1.5	0.041	0.052
Dibenz(a,h)anthracene	0.33	ND (0.4)	ND (0.41)

SB-00510	6/1/00 3-4(ft) mg/kg
Benzo(a)pyrene	ND (8)
Dibenz(a,h)anthracene	ND (8)
Lead	54.6
Manganese	126 J
Total PCBs	0.499 J

VAP-00207	12/11/02 0-2(ft) mg/kg	12/11/02 2-4(ft) mg/kg	12/11/02 4-6(ft) mg/kg
Benzo(a)pyrene	0.83	1.1	ND (0.39)
Dibenz(a,h)anthracene	0.22	0.26	ND (0.39)
Manganese	223	125	79.7

B-4 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.2)
Dibenz(a,h)anthracene	ND (0.2)
Lead	26
Total PCBs	ND (0.039)

MW-00509	9/25/98 0-2(ft) mg/kg	9/25/98 2-4(ft) mg/kg	9/25/98 12-14(ft) mg/kg
Benzo(a)pyrene	0.8	2.3	ND (0.3)
Dibenz(a,h)anthracene	ND (0.3)	0.4	ND (0.3)
Lead	148	323	5
Manganese	268	194	107
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

SB-00911A	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	0.78 J/0.59 J	ND (0.19)

B-2 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	5.04
Dibenz(a,h)anthracene	ND (0.95)
Lead	160
Total PCBs	ND (0.037)

B-10 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	4.92
Dibenz(a,h)anthracene	1.02
Lead	45
Total PCBs	ND (0.036)

B-11 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	1.5
Dibenz(a,h)anthracene	ND (0.9)
Lead	230
Total PCBs	ND (0.035)

B-5 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.89)
Dibenz(a,h)anthracene	ND (0.89)
Lead	99
Total PCBs	ND (0.036)

B-7 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.91)
Dibenz(a,h)anthracene	ND (0.91)
Lead	2200 (A)
Total PCBs	ND (0.036)

VAP-00108	12/11/02 0-2(ft) mg/kg	12/11/02 2-4(ft) mg/kg	12/11/02 4-6(ft) mg/kg
Benzo(a)pyrene	0.19/5.27	0.14	0.063
Dibenz(a,h)anthracene	0.063/0.11	0.047	ND (0.48)
Manganese	913/809	755	232

SB-00307a	6/13/00 1.5-3.5(ft) mg/kg
Lead	147
Manganese	2020 (C)

B-6 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	1.18
Dibenz(a,h)anthracene	ND (0.96)
Lead	130
Total PCBs	ND (0.038)

SB-00610	12/13/02 0-2(ft) mg/kg	12/13/02 2-4(ft) mg/kg
Total PCBs	ND (0.11)	0.54 J

B-1 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	0.354
Dibenz(a,h)anthracene	ND (0.19)
Lead	45
Total PCBs	ND (0.036)

B-9 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.18)
Dibenz(a,h)anthracene	ND (0.18)
Lead	190
Total PCBs	ND (0.036)

SB-00609	11/30/01 0-2(ft) mg/kg	11/30/01 2-4(ft) mg/kg
Benzo(a)pyrene	3.1	0.24
Dibenz(a,h)anthracene	0.65	0.036
Lead	156	16.7

SB-00709	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	ND (0.11)	43.5 J (A6)

B-8 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.19)
Dibenz(a,h)anthracene	ND (0.19)
Lead	89
Total PCBs	ND (0.037)

B-15 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	3.15
Dibenz(a,h)anthracene	ND (0.9)
Lead	1300 (A)
Total PCBs	0.203 J

B-14 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	3.52
Dibenz(a,h)anthracene	ND (0.94)
Lead	92
Total PCBs	0.223 J

MW-00008	9/25/98 0-2(ft) mg/kg	9/25/98 4-6(ft) mg/kg	9/25/98 22-24(ft) mg/kg
Benzo(a)pyrene	ND (0.3)	ND (0.3)	ND (0.3)/ND (0.3)
Dibenz(a,h)anthracene	ND (0.3)	ND (0.3)	ND (0.3)/ND (0.3)
Lead	11	37	4/4
Manganese	218	140	183/153
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)/ND (0.1)

SB-00008	8/30/00 2-4(ft) mg/kg
Lead	98.8

B-22 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	2.85
Dibenz(a,h)anthracene	ND (1.9)
Lead	68
Total PCBs	ND (0.036)

B-17 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	2
Dibenz(a,h)anthracene	ND (1.9)
Lead	64
Total PCBs	ND (0.037)

SB-00206	6/30/00 2-4(ft) mg/kg
Lead	79.4

SB-00106	6/30/00 2-4(ft) mg/kg
Lead	3480 (A)

SB-00608	11/28/01 0-2(ft) mg/kg	11/28/01 0-2(ft) mg/kg
Benzo(a)pyrene	0.34	0.59
Dibenz(a,h)anthracene	0.069	0.11
Lead	50.7 J	5.9 J

B-13 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	2.7
Dibenz(a,h)anthracene	ND (0.98)
Lead	260
Total PCBs	0.12 J

B-16 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.19)
Dibenz(a,h)anthracene	ND (0.19)
Lead	590
Total PCBs	ND (0.036)

SB-00005	3/1/00 0-1(ft) mg/kg	7/5/00 2-4(ft) mg/kg	7/5/00 2-4(ft) mg/kg
Lead	24	6.7	9.7

SB-00103B	6/30/00 2-4(ft) mg/kg
Lead	210

SB-00205	3/1/00 0-1(ft) mg/kg	3/1/00 0-1(ft) mg/kg
Lead	2080 (A)	1340 (A)

SB-00105	3/1/00 0-1(ft) mg/kg
Lead	2780 (A)

SB-00105A	7/5/00 2-4(ft) mg/kg
Lead	19.4

B-21 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.91)
Dibenz(a,h)anthracene	ND (0.91)
Lead	270
Total PCBs	0.18 J

B-12 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	2.19
Dibenz(a,h)anthracene	ND (0.95)
Lead	245
Total PCBs	1.96 J (B2)

B-18 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	6.03
Dibenz(a,h)anthracene	ND (0.92)
Lead	170
Total PCBs	ND (0.036)

SB-00104A	7/5/00 0-2(ft) mg/kg	7/5/00 2-4(ft) mg/kg
Lead	113	10.4

SB-00104B	7/5/00 0-2(ft) mg/kg	7/5/00 2-4(ft) mg/kg
Lead	570	1820 (A)

SB-00205A	7/5/00 0-2(ft) mg/kg	7/5/00 2-4(ft) mg/kg
Lead	5.1	14.7

SB-00508	6/1/00 1-3(ft) mg/kg
Benzo(a)pyrene	18 (A)
Dibenz(a,h)anthracene	2.3
Lead	3660 (A)
Manganese	3750 J (C)
Total PCBs	0.497 J

SB-00204	12/11/02 0-2(ft) mg/kg	12/11/02 2-4(ft) mg/kg	12/11/02 4-6(ft) mg/kg
Lead	70 J/135 J	33.8 J	ND (5.6)

B-20 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.9)
Dibenz(a,h)anthracene	ND (0.9)
Lead	65
Total PCBs	ND (0.035)

MW-10000	9/25/98 0-2(ft) mg/kg	9/25/98 6-8(ft) mg/kg	9/25/98 18-20(ft) mg/kg	9/25/98 32-34(ft) mg/kg	9/28/98 48-50(ft) mg/kg
Benzo(a)pyrene	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Dibenz(a,h)anthracene	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Lead	21	5	5	6	6
Manganese	213	213	213	224	292
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

SB-00607	6/1/00 2-4(ft) mg/kg
Benzo(a)pyrene	ND (0.3)
Dibenz(a,h)anthracene	ND (0.3)
Lead	48.3
Manganese	108 J
Total PCBs	ND (0.1)

B-25 (2000-B)	1/21/00 0-1(ft) mg/kg
Benzo(a)pyrene	1.93
Dibenz(a,h)anthracene	ND (1.9)
Lead	2.1
Total PCBs	ND (0.037)

SB-00406	11/29/01 0-2(ft) mg/kg	11/29/01 2-4(ft) mg/kg	11/29/01 2-4(ft) mg/kg	11/29/01 4-6(ft) mg/kg
Benzo(a)pyrene	0.58	0.48 J	ND (2) J	0.29
Dibenz(a,h)anthracene	0.14	0.1	ND (2)	0.083

SB-00205B	7/5/00 0-2(ft) mg/kg	7/5/00 2-4(ft) mg/kg
Lead	24	327

SB-00305	6/21/00 1-3(ft) mg/kg	6/21/00 6-10(ft) mg/kg	6/21/00 1-3(ft) mg/kg
Benzo(a)pyrene	0.03 J	ND (0.3)	2.8 J
Dibenz(a,h)anthracene	ND (0.3) J	ND (0.3)	0.4 J
Lead	4.1	5.4	119
Manganese	304	226	143
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

SB-00403	11/29/01 0-2(ft) mg/kg	11/29/01 4-6(ft) mg/kg
Benzo(a)pyrene	0.52	0.057
Dibenz(a,h)anthracene	0.12	ND (0.38)

B-26 (2000-B)	1/21/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (24)
Dibenz(a,h)anthracene	ND (24)
Lead	0.09
Total PCBs	ND (0.038)

B-27 (2000-B)	1/21/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (4.7)
Dibenz(a,h)anthracene	ND (4.7)
Lead	0.02
Total PCBs	ND (0.037)

B-19 (2000-B)	1/18/00 0-1(ft) mg/kg
Benzo(a)pyrene	1.55
Dibenz(a,h)anthracene	ND (0.97)
Lead	32
Total PCBs	0.138 J

B-23 (2000-B)	1/21/00 0-1(ft) mg/kg
Benzo(a)pyrene	3.93
Dibenz(a,h)anthracene	ND (1.8)
Lead	82
Total PCBs	0.097 J

SB-00407	6/1/00 4-6(ft) mg/kg	6/1/00 6-8(ft) mg/kg
Benzo(a)pyrene	ND (0.3)	ND (0.3)
Dibenz(a,h)anthracene	ND (0.3)	ND (0.3)
Lead	13.4	6.4
Manganese	97.6 J	224
Total PCBs	ND (0.1)	ND (0.1)

MW-00700	9/14/98 0-2(ft) mg/kg	9/14/98 4-6(ft) mg/kg	9/14/98 14-16(ft) mg/kg
Benzo(a)pyrene	0.9	ND (0.3)	ND (0.3)
Dibenz(a,h)anthracene	ND (0.3)	ND (0.3)	ND (0.3)
Lead	9 J	2 J	6 J
Manganese	232	14	219
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

B-24 (2000-B)	1/21/00 0-1(ft) mg/kg
Benzo(a)pyrene	ND (0.95)
Dibenz(a,h)anthracene	ND (0.95)
Lead	5.9
Total PCBs	ND (0.037)

Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit B			
Adjacent to SB-00709 SB-00708	50' South-East of SB-00709	0'-2', 2'-4'	PCBs, Lead
North Boundary SB-00310A	50' North West of SB-00308	0'-2'	Manganese, benzo(a)pyrene, dibenz(a,h)anthracene
SB-00310B	50' North East of SB-00308	0'-2'	Manganese, benzo(a)pyrene, dibenz(a,h)anthracene

SIXTH STREET

B

WAS

STREET

0 60 150ft

LEGEND

- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- PROPOSED SOIL BORING LOCATION

KEY MAP

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT B RFI PHASE 1C - SOIL

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 150'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure B1

17075-18(018)GN-WA003 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV Drinking Water A	Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		68	0.13
Antimony		0.006		68	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	36	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.39		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		480	0.011
Chromium		0.1		480	0.011
Chromium, Hexavalent (Dissolved)		0.1		480	0.011
Chromium, Hexavalent		0.1		480	0.011
Chrysene		0.005		0.006	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.82
1,2-Dichloropropene		0.005	36	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.206	0.206
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.8		58000	
Iron	12000	5.8		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22

VAP-00309A	12/18/02 2-7(ft) mg/L	12/18/02 7-12(ft) mg/L	12/18/02 12-17(ft) mg/L	12/18/02 17-22(ft) mg/L	1/6/03 37-42(ft) mg/L
Benzo(a)pyrene	ND (0.01)	ND (0.01)/ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)/ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Chrysene	ND (0.01)	ND (0.01)/ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)/ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)

SB-00309b	6/22/00 6-11(ft) mg/L
1,1-Dichloroethene	ND (0.001)
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
cis-1,2-Dichloroethene	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)
Total PCBs	ND (0.0002)
Trichloroethene	ND (0.001)
Vinyl chloride	0.001 J

SB-00309a	6/21/00 3-8(ft) mg/L
1,1-Dichloroethene	ND (0.001)
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
cis-1,2-Dichloroethene	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)
Total PCBs	ND (0.0002)
Trichloroethene	ND (0.001)
Vinyl chloride	0.001 J

MW-00309	7/31/00 mg/L	12/18/02 mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)
Aluminum	47.4 J (A)/50.8 J (A)	-
Antimony	0.021 J (A)/0.031 J (A)	-
Antimony (Dissolved)	ND (0.05)/ND (0.05)	-
Arsenic	0.037/0.035	-
Benzo(a)pyrene	0.002/0.003 (C)	ND (0.01)
Benzo(b)fluoranthene	0.002/0.003 (AC)	ND (0.01)
Beryllium	0.004 J (A)/0.004 J (A)	-
Cadmium	0.021 (A)/0.019 (A)	-
Chrysene	0.002/0.003	ND (0.01)
cis-1,2-Dichloroethene	ND (0.001)/ND (0.001)	-
Indeno(1,2,3-cd)pyrene	ND (0.01)/0.002	ND (0.01)
Lead	0.638 (A)/0.608 (A)	-
Lead (Dissolved)	ND (0.002)/0.011 (A)	-
Manganese	3.34 (A)/3.26 (A)	-
Nickel	0.151 (A)/0.153 (A)	-
Nickel (Dissolved)	ND (0.02)/0.008 J	-
Total PCBs	ND (0.0002)/ND (0.0002)	-
Trichloroethene	0.001/0.001	-
Vanadium	0.117 (A)/0.12 (A)	-
Vinyl chloride	ND (0.001)/ND (0.001)	-
Zinc	8.42 (A)/8.1 (A)	-

MW-00409	12/20/01 - mg/L
1,1-Dichloroethene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Trichloroethene	ND (0.001)
Vinyl chloride	ND (0.001)

VAP-00510	12/18/02 3.5-8.5(ft) mg/L	12/18/02 8.5-13.5(ft) mg/L	12/18/02 13.5-18.5(ft) mg/L	12/18/02 18.5-23.5(ft) mg/L	1/6/03 23.5-28.5(ft) mg/L	1/6/03 28.5-33.5(ft) mg/L
1,1-Dichloroethene	-	-	-	-	ND (0.001)	ND (0.001)
Benzo(a)pyrene	ND (0.01) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Chrysene	ND (0.01) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
cis-1,2-Dichloroethene	-	-	-	-	ND (0.001)	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Trichloroethene	-	-	-	-	ND (0.001)	0.0002
Vinyl chloride	-	-	-	-	ND (0.001)	ND (0.001)

SB-00408a	6/22/00 6-7(ft) mg/L	6/22/00 11-12(ft) mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)
Benzo(a)pyrene	0.003 (C)	-
Benzo(b)fluoranthene	0.003 (AC)	-
Chrysene	0.01 (AC)	-
cis-1,2-Dichloroethene	ND (0.001)	ND (0.001)
Indeno(1,2,3-cd)pyrene	0.003 (AC)	-
Trichloroethene	ND (0.001)	ND (0.001)
Vinyl chloride	ND (0.001)	ND (0.001)

TMW-0408a	12/17/01 mg/L
1,1-Dichloroethene	ND (0.001)
cis-1,2-Dichloroethene	0.0001
Trichloroethene	ND (0.001)
Vinyl chloride	ND (0.001)

TMW-00408B	12/19/01 mg/L
1,1-Dichloroethene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Trichloroethene	0.0002
Vinyl chloride	ND (0.001)

MW-00408	7/31/00 mg/L
1,1-Dichloroethene	ND (0.001)
Aluminum	63.1 J (A)
Antimony	0.025 J (A)
Antimony (Dissolved)	ND (0.05)
Arsenic	0.022 J
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Beryllium	0.003 J
Cadmium	ND (0.005)
Chrysene	ND (0.01)
cis-1,2-Dichloroethene	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)
Lead	0.094 (A)
Lead (Dissolved)	ND (0.002)
Manganese	2.62
Nickel	0.134 (A)
Nickel (Dissolved)	0.013 J
Total PCBs	ND (0.0002)
Trichloroethene	ND (0.001)
Vanadium	0.141 (A)
Vinyl chloride	ND (0.001)
Zinc	0.234

VAP-00209	12/16/02 3-8(ft) mg/L	12/16/02 8-13(ft) mg/L	12/16/02 13-18(ft) mg/L	12/16/02 18-23(ft) mg/L	1/2/03 42-47(ft) mg/L	1/3/03 37-42(ft) mg/L	1/5/03 32-37(ft) mg/L	1/6/03 27-32(ft) mg/L	1/7/03 22-27(ft) mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)	0.0002	ND (0.001)	0.0001	0.0005/0.0005	ND (0.001)	0.0001	0.0001
cis-1,2-Dichloroethene	0.0004	0.001	0.003	0.0002	0.028	0.1 (A)/0.099 (A)	0.016	0.022	0.011
Trichloroethene	0.001	0.001	0.006 (A)	0.0002	0.0002	ND (0.001)/ND (0.001)	0.0002	0.0004	0.003
Vinyl chloride	0.0005	0.002	0.002	0.0003	0.13 (A)	0.24 (A)/0.24 (A)	0.043 (A)	0.055 (A)	0.021 (A)

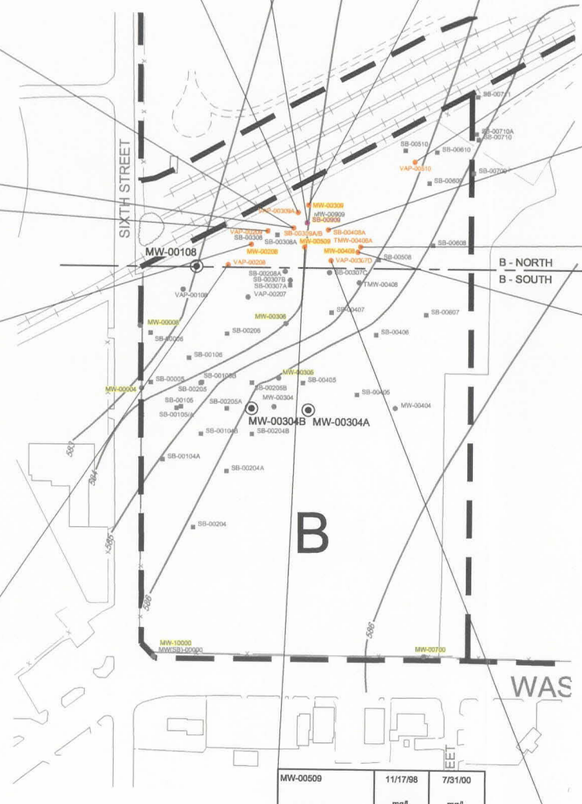
VAP-00208	12/19/01 15-20(ft) mg/L	12/19/01 10-15(ft) mg/L	12/19/01 40-45(ft) mg/L	12/20/01 20-25(ft) mg/L	12/20/01 25-30(ft) mg/L	12/20/01 35-40(ft) mg/L	12/20/01 5-10(ft) mg/L	12/20/01 30-35(ft) mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)	ND (0.001)/ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)/ND (0.001)	ND (0.001)	0.001
cis-1,2-Dichloroethene	0.0002	0.0001	0.001/0.001	0.001	0.009	0.005/0.005	0.0003	0.34 (A)
Trichloroethene	0.0002	0.001	ND (0.001)/0.0004	0.002	0.0002	0.0003/0.0003	0.002	ND (0.003)
Vinyl chloride	0.001	ND (0.001)	0.022 (A)/0.018 (A)	0.001	0.16 (A)	0.038 (A)/0.035 (A)	0.0004	1.3 (AC)

MW-00208	7/31/00 mg/L
1,1-Dichloroethene	ND (0.001)
Aluminum	3.11 J
Antimony	ND (0.05)
Antimony (Dissolved)	ND (0.05)
Arsenic	0.008 J
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Beryllium	0.0002 J
Cadmium	0.001 J
Chrysene	ND (0.01)
cis-1,2-Dichloroethene	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)
Lead	0.022 (A)
Lead (Dissolved)	ND (0.002)
Manganese	0.922
Nickel	0.029
Nickel (Dissolved)	0.015 J
Total PCBs	ND (0.0002)
Trichloroethene	ND (0.001)
Vanadium	0.007 J
Vinyl chloride	ND (0.001)
Zinc	0.026

MW-00509	11/17/98 mg/L	7/31/00 mg/L
1,1-Dichloroethene	0.015 J (A)	ND (0.05)
Aluminum	0.683 J	0.534 J
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	ND (0.005)	ND (0.025)
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	0.0004 J
Chromium	0.017 J	-
Chrysene	ND (0.01)	ND (0.01)
cis-1,2-Dichloroethene	3 J (A)	2.3 (A)
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)
Iron	2.02	-
Lead	0.009 J (A)	0.005 (A)
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	0.636	0.9
Nickel	0.051 J	0.015 J
Nickel (Dissolved)	0.112 (A)	0.003 J
Total PCBs	ND (0.0002)	ND (0.0002)
Trichloroethene	0.001 J	ND (0.05)
Vanadium	ND (0.01)	ND (0.01)
Vinyl chloride	3 J (AC)	2.4 J (AC)
Zinc	ND (0.01)	0.009 J

VAP-0307D	12/17/01 10-15(ft) mg/L	12/18/01 0-5(ft) mg/L	12/18/01 5-10(ft) mg/L	12/18/01 15-20(ft) mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)/ND (0.001)	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	0.0001	ND (0.001)/ND (0.001)	ND (0.001)	0.0001
Trichloroethene	ND (0.001)	ND (0.001)/ND (0.001)	ND (0.001)	ND (0.001)
Vinyl chloride	ND (0.001)	ND (0.001)/ND (0.001)	ND (0.001)	ND (0.001)

Location	Details	Analysis
Investigative Unit B		
Low Flow Sampling		
MW-00004 (Resample)		pH
MW-00008 (Resample)		Total Metals
MW-00208 (Resample)		Total Metals, SVOCs, VOCs
MW-00306 (Resample)		Total Metals
MW-00309 (Resample)		Total Metals, SVOCs
MW-00408 (Resample)		Total Metals
MW-00509 (Resample)		Total Metals, VOCs
MW-00700 (Resample)		Total Metals
MW-10000 (Resample)		Total Metals
MW-00108 (New Well)	60' West of VAP-00208	VOCs, SVOCs
LNAPL Area		
MW-00304B (New Well)	50' West of MW-00304	VOCs Test for separate phase to confirm absence of LNAPL
MW-00304A (New Well)	50' East of MW-00304	VOCs Test for separate phase to confirm absence of LNAPL
MW-00305 (Resample)		Analyze LNAPL for TAL Metals, TCL VOCs, SVOCs, and PCBs, Density, Molecular Weight, and Viscosity



N

0 60 150ft

LEGEND

- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- RESAMPLE OF MONITORING WELL
- PROPOSED MONITORING WELL LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT B - NORTH
RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 150'	Project №: 17075-18	Report №: 018	Drawing №: figure B2

17075-18(018)GN-WA004 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Drinking Water A	Industrial & Commercial II, III & IV: Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		68	0.13
Antimony		0.006		68	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.35		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		460	0.011
Chromium		0.1		460	0.011
Chromium, Hexavalent (Dissolved)		0.1		460	0.011
Chromium, Hexavalent		0.1		460	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.62
1,2-Dichloropropane		0.005	36	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.8		58000	
Iron	12000	5.8		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22

VAP-00108	12/16/02 3-8(ft) mg/L	12/16/02 8-13(ft) mg/L	12/17/02 13-18(ft) mg/L	12/17/02 18-23(ft) mg/L	1/2/03 38-43(ft) mg/L	1/3/03 33-38(ft) mg/L	1/5/03 28-33(ft) mg/L	1/6/03 23-28(ft) mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)/ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)/ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)/ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Vinyl chloride	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	0.001/0.001	0.001	0.002	0.0003

VAP-00207	12/17/02 5-10(ft) mg/L	12/17/02 10-15(ft) mg/L	12/17/02 15-20(ft) mg/L	12/17/02 20-25(ft) mg/L	12/17/02 20-25(ft) mg/L	1/2/03 25-30(ft) mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
cis-1,2-Dichloroethene	0.0001	0.0001	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Trichloroethene	0.0002	0.0003	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Vinyl chloride	0.0003	ND (0.001)	0.001	ND (0.001)	ND (0.001)	ND (0.001)

SB-00208a	6/22/00 6-7(ft) mg/L	6/22/00 9-10(ft) mg/L
1,1-Dichloroethene	ND (0.001)	0.001 J
Benzo(a)pyrene	ND (0.1)	-
Benzo(b)fluoranthene	ND (0.1)	-
Chrysene	ND (0.01)	-
cis-1,2-Dichloroethene	0.026	0.3 {A}
Indeno(1,2,3-cd)pyrene	ND (0.1)	-
Total PCBs	ND (0.0002)	-
Trichloroethene	0.001	0.001
Vinyl chloride	0.071 J {A}	0.69 J {A}

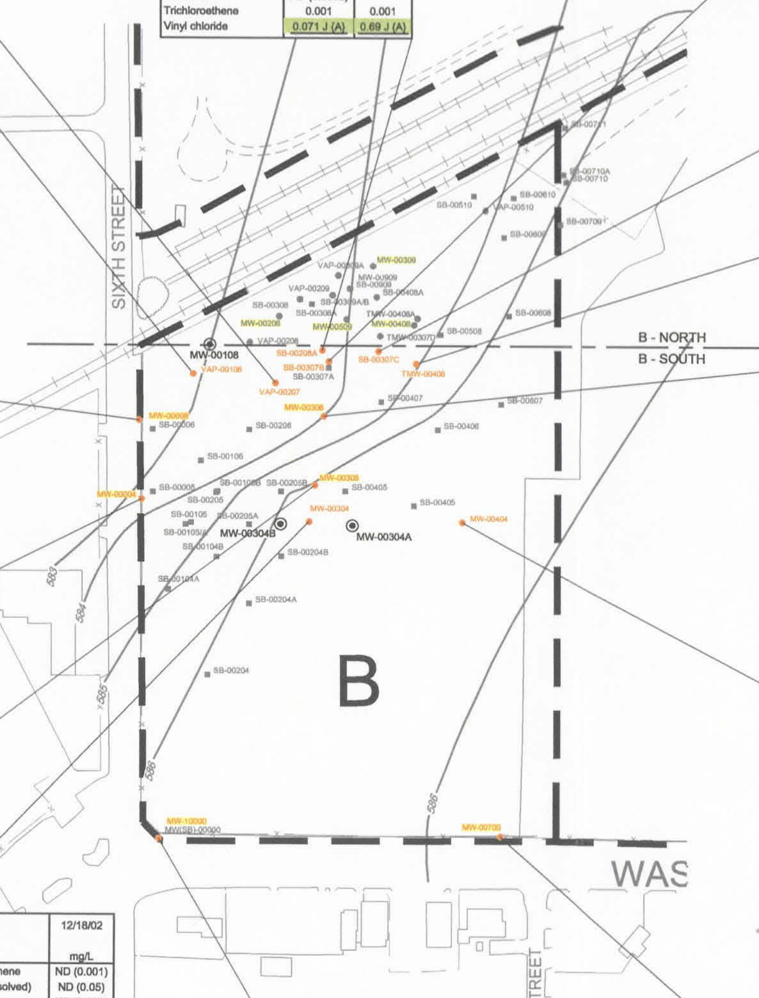
SB-00307b	6/22/00 13-14(ft) mg/L
1,1-Dichloroethene	ND (0.001)
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
cis-1,2-Dichloroethene	0.031
Indeno(1,2,3-cd)pyrene	ND (0.01)
Total PCBs	ND (0.0002)
Trichloroethene	ND (0.001)
Vinyl chloride	0.054 J {A}

SB-00307c	6/22/00 6-7(ft) mg/L
1,1-Dichloroethene	0.001 J
Benzo(a)pyrene	0.003 {C}
Benzo(b)fluoranthene	0.002
Chrysene	0.003
cis-1,2-Dichloroethene	0.095 {A}
Indeno(1,2,3-cd)pyrene	ND (0.01)
Total PCBs	ND (0.0002)
Trichloroethene	ND (0.001)
Vinyl chloride	0.096 J {A}

TMW-00408B	12/19/01 mg/L
1,1-Dichloroethene	ND (0.001)
cis-1,2-Dichloroethene	ND (0.001)
Trichloroethene	0.0002
Vinyl chloride	ND (0.001)

MW-00008	12/3/98 mg/L	7/14/00 mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)
Aluminum	3.73	0.731
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.012	0.003 J
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)
Chromium	ND (0.005)	-
Chrysene	ND (0.01)	ND (0.01)
cis-1,2-Dichloroethene	ND (0.001)	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)
Iron	13.5 {A}	-
Lead	0.02 {A}	0.004
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	1.15	0.576
Nickel	ND (0.02)	ND (0.02)
Nickel (Dissolved)	ND (0.02)	ND (0.02)
Total PCBs	ND (0.0002)	ND (0.0002)
Trichloroethene	ND (0.001)	ND (0.001)
Vanadium	0.016	0.005 J
Vinyl chloride	ND (0.001)	ND (0.001)
Zinc	0.045	0.005 J

MW-00306	8/9/00 mg/L	1/15/02 mg/L	1/15/02 mg/L	1/2/03 mg/L
1,1-Dichloroethene	ND (0.001)	-	-	ND (0.001)
Aluminum	2.5 J	-	-	-
Antimony	ND (0.05) UJ	-	-	-
Antimony (Dissolved)	ND (0.05) UJ	-	-	ND (0.05)
Arsenic	0.015 J	-	-	-
Benzo(a)pyrene	0.002	-	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	0.003 {AC}	-	ND (0.01)/ND (0.01)	ND (0.01)
Beryllium	0.0002 J	-	-	-
Cadmium	ND (0.005)	-	-	-
Chrysene	0.003	-	ND (0.01)/ND (0.01)	ND (0.01)
cis-1,2-Dichloroethene	0.001	-	-	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)	-	ND (0.01)/ND (0.01)	ND (0.01)
Lead	0.087 {A}	-	-	-
Lead (Dissolved)	0.003 J	-	-	ND (0.002)
Manganese	0.096	-	-	-
Nickel	0.128 {A}	-	-	-
Nickel (Dissolved)	0.088	-	-	ND (0.02)
Total PCBs	0.001 J {A}	ND (0.0002)/ND (0.0002)	-	0.0004 J
Trichloroethene	0.002	-	-	0.0005
Vanadium	0.013	-	-	-
Vinyl chloride	ND (0.001)	-	-	ND (0.001)
Zinc	0.063	-	-	-



MW-00004	12/19/01 mg/L	12/19/01 - mg/L	12/17/02 - mg/L
1,1-Dichloroethene	-	ND (0.001)	-
Aluminum	-	0.038 J	-
Antimony	-	ND (0.05)	-
Antimony (Dissolved)	-	0.032 J {A}	0.027 J {A}
Arsenic	-	0.006	-
Benzo(a)pyrene	-	ND (0.01)	-
Benzo(b)fluoranthene	-	ND (0.01)	-
Beryllium	-	ND (0.005)	-
Cadmium	-	0.002 J	-
Chrysene	-	ND (0.01)	-
cis-1,2-Dichloroethene	-	ND (0.001)	-
Indeno(1,2,3-cd)pyrene	-	ND (0.01)	-
Lead	-	ND (0.002)	-
Lead (Dissolved)	-	ND (0.002)	-
Manganese	-	0.377	-
Nickel	-	ND (0.02)	-
Nickel (Dissolved)	-	ND (0.02)	-
Total PCBs	ND (0.0002)	-	-
Trichloroethene	-	0.0004	-
Vanadium	-	ND (0.01)	-
Vinyl chloride	-	ND (0.001)	-
Zinc	-	0.004 J	-

MW-00305	12/19/01 mg/L	1/3/03 mg/L
1,1-Dichloroethene	-	ND (0.001)
Antimony (Dissolved)	-	ND (0.05)
Benzo(a)pyrene	0.001	ND (0.01)
Benzo(b)fluoranthene	0.001	ND (0.01)
Chrysene	0.002	ND (0.01)
cis-1,2-Dichloroethene	-	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)	0.001
Lead (Dissolved)	-	ND (0.002)
Nickel (Dissolved)	-	ND (0.02)
Total PCBs	ND (0.0002)	ND (0.0002)
Trichloroethene	-	ND (0.001)
Vinyl chloride	-	ND (0.001)

MW-00304	12/18/02 mg/L
1,1-Dichloroethene	ND (0.001)
Antimony (Dissolved)	ND (0.05)
Benzo(a)pyrene	ND (0.096)
Benzo(b)fluoranthene	ND (0.096)
Chrysene	ND (0.096)
cis-1,2-Dichloroethene	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.096)
Lead (Dissolved)	ND (0.002)
Nickel (Dissolved)	0.051
Total PCBs	ND (0.2)
Trichloroethene	0.0002
Vinyl chloride	ND (0.001)

MW-10000	12/8/98 mg/L	7/25/00 mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)
Aluminum	78.9 J {A}	6.07 {A}
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.235 {A}	0.018
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.124 J {A}	-
Chrysene	ND (0.01)	ND (0.01)
cis-1,2-Dichloroethene	ND (0.001)	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)
Iron	182 J {A}	-
Lead	0.067 {A}	0.007 {A}
Lead (Dissolved)	ND (0.002)	ND (0.002)
Manganese	5.42 {A}	0.703
Nickel	0.218 J {A}	ND (0.02)
Nickel (Dissolved)	ND (0.02)	ND (0.02)
Total PCBs	ND (0.0002)	ND (0.0002)
Trichloroethene	ND (0.001)	ND (0.001)
Vanadium	0.179 {A}	0.019
Vinyl chloride	ND (0.001)	ND (0.001)
Zinc	0.415	0.045

MW-00700	12/3/98 mg/L	7/13/00 mg/L	7/13/00 mg/L
1,1-Dichloroethene	ND (0.001)	ND (0.001)	ND (0.001)
Aluminum	55.3 {A}	2.31	2.41
Antimony	ND (0.05)	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)	ND (0.05)
Arsenic	0.013	0.006	0.007
Benzo(a)pyrene	ND (0.01)	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)	ND (0.005)
Chromium	1.16 {A}	-	-
Chrysene	ND (0.01)	ND (0.01)	ND (0.01)
cis-1,2-Dichloroethene	ND (0.001)	ND (0.001)	ND (0.001)
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)	ND (0.01)
Iron	105 {A}	-	-
Lead	0.036 {A}	0.004	0.004
Lead (Dissolved)	ND (0.002)	ND (0.002)	ND (0.002)
Manganese	1.55	0.17 J	0.175 J
Nickel	0.653 {A}	0.071	0.077
Nickel (Dissolved)	0.275 {A}	ND (0.02)	ND (0.02)
Total PCBs	ND (0.0002)	ND (0.0002)/ND (0.0002)	-
Trichloroethene	ND (0.001)	ND (0.001)	ND (0.001)
Vanadium	0.121 {A}	0.012	0.012
Vinyl chloride	ND (0.001)	ND (0.001)	ND (0.001)
Zinc	0.187	0.012 J	0.012 J

MW-00404	12/21/01 mg/L	12/21/01 - mg/L
1,1-Dichloroethene	-	ND (0.001)
Aluminum	-	0.04
Antimony	-	ND (0.05)
Antimony (Dissolved)	-	ND (0.05)
Arsenic	-	0.002
Benzo(a)pyrene	-	ND (0.01)
Benzo(b)fluoranthene	-	ND (0.01)
Beryllium	-	ND (0.005)
Cadmium	-	ND (0.005)
Chrysene	-	ND (0.01)
cis-1,2-Dichloroethene	-	ND (0.001)
Indeno(1,2,3-cd)pyrene	-	ND (0.01)
Lead	-	ND (0.002)
Lead (Dissolved)	-	ND (0.002)
Manganese	-	0.091
Nickel	-	0.079
Nickel (Dissolved)	-	0.051
Total PCBs	ND (0.0002)	-
Trichloroethene	-	ND (0.001)
Vanadium	-	ND (0.01)
Vinyl chloride	-	ND (0.001)
Zinc	-	0.005

Location	Details	Analysis
Investigative Unit B		
Low Flow Sampling		
MW-00004 (Resample)		pH
MW-00008 (Resample)		Total Metals
MW-00208 (Resample)		Total Metals, SVOCs, VOCs
MW-00306 (Resample)		Total Metals
MW-00309 (Resample)		Total Metals, SVOCs
MW-00408 (Resample)		Total Metals
MW-00509 (Resample)		Total Metals, VOCs
MW-00700 (Resample)		Total Metals
MW-10000 (Resample)		Total Metals
MW-00108 (New Well)	60' West of VAP-00208	VOCs, SVOCs
LNAPL Area		
MW-00304B (New Well)	50' West of MW-00304	VOCs Test for separate phase to confirm absence of LNAPL
MW-00304A (New Well)	50' East of MW-00304	VOCs Test for separate phase to confirm absence of LNAPL
MW-00305 (Resample)		Analyze LNAPL for TAL Metals, TCL VOCs, SVOCs, and PCBs, Density, Molecular Weight, and Viscosity

0 60 150ft

LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- —585— GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- PROPOSED MONITORING WELL LOCATION
- RESAMPLE OF MONITORING WELL

NOTES:
1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT B - SOUTH
RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: DECEMBER 2004	
Scale: 1" = 150'	Project Nº: 17075-18	Report Nº: 018	Drawing Nº: figure B3

17075-18(018)GN-WA005 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs		16	16000	6500	28000	1
Aluminum	6900	370000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		400	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	36000	
Cadmium	1.2	2100		2200		
Carbazole		3400				
Chloride						
Chromium		6300		240		
Chromium, Hexavalent		6300		240		
Chrysene		6300				
Cobalt	5.8	9000		5900		
Cyanide (total)	0.39	250		250		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		570	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	10000000	4100000	880000	
Formaldehyde		60000	65	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	443	90000		1500		
Mercury	0.13	580	89	8800	62	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		83000	470	880000	350	
Nickel	20	150000		18000		
Pentachlorophenol		320		130000		
Phenanthrene		6200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	5800		59000		
Sodium		1000000				
Toluene		250	250	12000000	36000	
Trichloroethene		500	37	2300000	440	
Vanadium		6000				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		180	150	130000000	65000	
Zinc (Total)	47	630000				

MW-02418	9/22/98 0-2(ft) mg/kg	9/22/98 0-24(ft) mg/kg	9/22/98 2-4(ft) mg/kg	9/22/98 16-18(ft) mg/kg	9/22/98 24-48(ft) mg/kg	9/22/98 192-216(ft) mg/kg	9/22/98 0-2(ft) mg/kg	9/22/98 2-4(ft) mg/kg	9/22/98 16-18(ft) mg/kg
Antimony	ND (10)	-	ND (10)	ND (10)	-	-	ND (10)	ND (10)	ND (10)
Benzo(a)pyrene	0.5	-	0.5	ND (0.3) J	-	-	0.5 J	0.5 J	ND (0.3) J
Chromium	-	-	-	-	-	-	70	210	12
Manganese	1750	-	2390 (C)	278	-	-	1750	2390 (C)	278
Total PCBs	-	ND (0.1)	-	-	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

MW-12418	10/15/94 32-34(ft) mg/kg	10/15/94 48-50(ft) mg/kg	10/15/94 384-408(ft) mg/kg	10/15/94 576-600(ft) mg/kg	10/16/98 32-34(ft) mg/kg	10/16/98 48-50(ft) mg/kg
Antimony	ND (10)	ND (10)/ND (10)	-	-	ND (10)	ND (10)/ND (10)
Benzo(a)pyrene	ND (0.3)	ND (0.3)/ND (0.3)	-	-	ND (0.3)	ND (0.3)/ND (0.3)
Chromium	-	-	-	-	11	13/13
Manganese	196	228/230	-	-	196	228/230
Total PCBs	-	-	ND (0.1)	ND (0.1)/ND (0.1)	ND (0.1)	ND (0.1)/ND (0.1)

MW-01214	10/2/98 0-2(ft) mg/kg	10/2/98 4-6(ft) mg/kg	10/2/98 10-12(ft) mg/kg
Antimony	ND (10)	ND (10)	ND (10)
Benzo(a)pyrene	0.3	0.4	ND (0.3)
Chromium	115	161	19
Manganese	3650 (C)	3440 (C)	166
Total PCBs	0.25 J	0.8 J	ND (0.1)

SB-01113	6/13/00 0-2(ft) mg/kg
Antimony	ND (11.4) J/7.5 J
Benzo(a)pyrene	0.06/0.2
Manganese	65.3/119
Total PCBs	1.9 J (E)/1.89 J (E)

SB-01012	6/9/00 0-2(ft) mg/kg
Antimony	ND (10.7)
Benzo(a)pyrene	0.2
Manganese	2930 (C)
Total PCBs	0.351 J

SB-01011	6/9/00 0.3-2(ft) mg/kg
Antimony	ND (11.2)
Benzo(a)pyrene	0.7
Manganese	1530
Total PCBs	ND (0.1)

SB-198	10/21/98 0-2(ft) mg/kg	10/21/98 22-24(ft) mg/kg
Antimony	ND (10)	ND (10)
Benzo(a)pyrene	ND (0.3)/0.22	ND (0.3)/ND (0.04)
Chromium	381 (C)	15
Manganese	10000 (C)	260
Total PCBs	0.35 J	ND (0.1)

MW-10912	6/9/00 0-2(ft) mg/kg	6/9/00 4-6(ft) mg/kg	6/9/00 12-14(ft) mg/kg	6/9/00 22-24(ft) mg/kg	6/12/00 38-40(ft) mg/kg
Antimony	ND (10.7)	ND (11)	ND (10.8)	ND (11.7)	ND (11.6) J
Benzo(a)pyrene	1.3	0.06	ND (0.3)	ND (0.3)	ND (0.3)
Manganese	640	367	141	338	228
Total PCBs	1.27 J (E)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

SB-00711	6/20/00 0-2(ft) mg/kg	6/20/00 0-2(ft) mg/kg
Antimony	8.5 J	ND (11.6) J
Benzo(a)pyrene	0.06 J	3.7 J
Manganese	1140	1890
Total PCBs	0.6 J	ND (0.1)

SB-00811	6/20/00 0-2(ft) mg/kg
Antimony	ND (12) J
Benzo(a)pyrene	0.2
Manganese	270
Total PCBs	0.226 J

SB-298	10/21/98 1-3(ft) mg/kg
Antimony	ND (10)
Benzo(a)pyrene	2.7/2.3
Chromium	298 (C)
Manganese	8990 (C)
Total PCBs	32.2 J (AE)

SB-00710a	11/30/01 0-2(ft) mg/kg	11/30/01 0-2(ft) mg/kg
Antimony	9.1 J	9.5 J

SB-00710	6/20/00 0-2(ft) mg/kg
Antimony	946 J (A)
Benzo(a)pyrene	5
Manganese	2940 (C)
Total PCBs	2.63 J (E)

SB-00810	6/20/00 0-2(ft) mg/kg
Antimony	ND (11.2) J
Benzo(a)pyrene	2
Manganese	222
Total PCBs	ND (0.1)

SB-00910	6/9/00 0.3-2.3(ft) mg/kg	6/9/00 0.3-2.3(ft) mg/kg
Antimony	ND (10.9)	6.2 J
Benzo(a)pyrene	1.4	1.9
Manganese	4750 (C)	8540 (C)
Total PCBs	ND (0.1)	ND (0.1)

SB-00911	6/19/00 0-2(ft) mg/kg
Antimony	5.8 J
Benzo(a)pyrene	30 (A)
Manganese	1890 J
Total PCBs	0.192 J

MW-00812	10/21/98 1-3(ft) mg/kg
Antimony	ND (10)
Benzo(a)pyrene	ND (0.3)/0.04
Chromium	362 (C)
Manganese	11400 (C)
Total PCBs	ND (0.1)

SB-02214c	6/15/00 0.5-2.5(ft) mg/kg	6/15/00 7-9(ft) mg/kg
Benzo(a)pyrene	0.4	ND (0.3)
Total PCBs	0.177 J	ND (0.1)

SB-02214d	6/15/00 6-8(ft) mg/kg	6/15/00 6-8(ft) mg/kg	6/19/00 0-2(ft) mg/kg
Benzo(a)pyrene	0.08	0.03	0.2
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

SB-02214e	6/15/00 0-2(ft) mg/kg	6/19/00 6-8(ft) mg/kg
Benzo(a)pyrene	0.05	0.1
Total PCBs	ND (0.1)	ND (0.1)

SB-02214a	6/19/00 0-2(ft) mg/kg	6/19/00 6-8(ft) mg/kg
Benzo(a)pyrene	0.07	ND (0.3)
Total PCBs	ND (0.1)	ND (0.1)

SB-02214f	6/15/00 0-2(ft) mg/kg	6/15/00 6-8(ft) mg/kg
Benzo(a)pyrene	0.07	0.04
Total PCBs	ND (0.1)	ND (0.1)

SB-02214b	6/15/00 0-2(ft) mg/kg	6/15/00 6-8(ft) mg/kg
Benzo(a)pyrene	ND (0.3)	ND (0.3)
Total PCBs	0.246 J	ND (0.1)

SB-02417	6/9/00 0-2(ft) mg/kg	6/9/00 4.5-6.5(ft) mg/kg
Benzo(a)pyrene	0.09	0.2
Total PCBs	0.491 J	ND (0.1)

S-2	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

S-1	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

S-7	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	0.46

S-8	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

S-4	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	2

S-6	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	0.74

S-9	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

S-5	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

S-3	7/16/92 0-0.8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

SB-8	3/16/94 2-4(ft) mg/kg
Benzo(a)pyrene	ND (0.83)

SB-02318	6/9/00 0.5-2.5(ft) mg/kg
Benzo(a)pyrene	0.04
Total PCBs	ND (0.1)

SS-1	3/7/97 0-1(ft) mg/kg
Benzo(a)pyrene	0.366/0.53

SB-2	12/3/93 6-8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

SB-7	3/16/94 3.5-5(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

SS-4	3/7/97 0-1(ft) mg/kg
Benzo(a)pyrene	0.144

SB-02519	12/20/02 0-2(ft) mg/kg	12/20/02 2-4(ft) mg/kg
Total PCBs	0.2 J	ND (0.12)

SB-02518	6/5/00 0-2(ft) mg/kg	6/5/00 0-2(ft) mg/kg	6/5/00 4-6(ft) mg/kg
Benzo(a)pyrene	0.3	0.6	0.2
Total PCBs	0.29 J	2.62 J (E)	ND (0.1)

BH4-94	12/16/94 3-5(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

SB-02415	1/6/03 1-3(ft) mg/kg	1/6/03 3-5(ft) mg/kg
Formaldehyde	ND (11)	ND (11)

SS-6	3/7/97 0-1(ft) mg/kg
Benzo(a)pyrene	0.098

SB-02619D	12/20/02 0-2(ft) mg/kg	12/20/02 2-4(ft) mg/kg
Total PCBs	0.53 J	ND (0.11)

SB-02619	6/2/00 0-2(ft) mg/kg	6/2/00 0-2(ft) mg/kg
Total PCBs	ND (0.1)	3.75 J (E)

SB-02619A	12/20/02 0-2(ft) mg/kg	12/20/02 2-4(ft) mg/kg
Total PCBs	0.205 J	0.2 J

SB-02619C	12/20/02 0-2(ft) mg/kg	12/20/02 2-4(ft) mg/kg
Total PCBs	1.78 J (E)/8.9 J (E)	0.29 J

MW-2618	12/17/01 2-4(ft) mg/kg	12/17/01 4-6(ft) mg/kg
Antimony	10.2 J	7.6 J
Benzo(a)pyrene	0.27	0.071
Formaldehyde	ND (10)	0.7
Manganese	1320	973
Total PCBs	3.48 J (E)	0.867 J

SB-02618B	1/6/03 0-2(ft) mg/kg	1/6/03 2-4(ft) mg/kg
Total PCBs	0.284 J	ND (0.12)

SB-1	12/3/93 6-8(ft) mg/kg
Benzo(a)pyrene	6.5

SB-4	12/3/93 4-6(ft) mg/kg
Benzo(a)pyrene	1.5

SB-02418	6/9/00 0-2(ft) mg/kg	6/9/00 2-4(ft) mg/kg
Benzo(a)pyrene	0.1	0.6
Total PCBs	0.948 J	ND (0.1)

SB-3	12/3/93 6-8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

MW-02517	6/19/00 0-2(ft) mg/kg	6/19/00 3-6(ft) mg/kg	6/19/00 3-6(ft) mg/kg	6/19/00 0-2(ft) mg/kg	6/19/00 0-24(ft) mg/kg	6/19/00 3-6(ft) mg/kg	6/19/00 36-72(ft) mg/kg
Benzo(a)pyrene	1	0.08	0.1	1 J	-	0.1/0.08	-
Total PCBs	0.226 J	0.45 J	0.26 J	-	0.226 J	-	0.26 J/0.45 J

SS-5	3/7/97 0-1(ft) mg/kg
Benzo(a)pyrene	0.053

SS-3	3/7/97 0-1(ft) mg/kg
Benzo(a)pyrene	0.064

SS-2	3/7/97 0-1(ft) mg/kg
Benzo(a)pyrene	0.279

SB-5	3/16/94 6-8(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

SB-6	3/16/94 2-4(ft) mg/kg
Benzo(a)pyrene	ND (0.33)

SB-02514	1/6/03 1-3(ft) mg/kg	1/6/03 3-5(ft) mg/kg
Manganese	10200 (C)	1410

SB-02517	12/20/02 0-2(ft) mg/kg	12/20/02 2-4(ft) mg/kg
Total PCBs	0.232 J	0.31 J

SB-02512	12/3/01 2-4(ft) mg/kg	12/3/01 4-5(ft) mg/kg
Formaldehyde	ND (10)	0.6 J
Manganese	1680	3890 (C)

SB-02316	6/7/00 1-3(ft) mg/kg	6/7/00 4.5-6.5(ft) mg/kg
Antimony	ND (10.9) J	ND (11.1) J
Benzo(a)pyrene	0.1	ND (0.3)
Formaldehyde	ND (10) J	ND (10) J
Manganese	275 J	714 J
Total PCBs	ND (0.1)	ND (0.1)

Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit D			
Adjacent to SB-02619C			
SB-02619E	50' South of SB-02619C	0'-2', 2'-4'	PCBs
SB-02619F	50' West of SB-02619C	0'-2', 2'-4'	PCBs
SB-02619G	50' East of SB-02619C	0'-2', 2'-4'	PCBs
Adjacent to SB-01711			
SB-01611	50' West of SB-01711	12'-14', 14'-16', 16'-18', 18'-20'	PCBs
Adjacent to SB-00709			
SB-00809	50' East of SB-00709	0'-2', 2'-4'	PCBs, Lead
Vicinity of SB-02510 and MW-02410			
SB-02511	50' North of MW-02410	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-02410	50' West of SB-02510/MW-02410	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-02510B	50' South of SB-02510	0'-2', 2'-4'	Hexavalent and Total Chromium
Adjacent to SB-02514			
SB-02514A	50 'North-West of SB-02514	0'-2', 2'-4'	Manganese
Adjacent to SB-00910			
SB-01010	50' East of SB-02514	0'-2', 2'-4'	Manganese
SB-00909	50' South of SB-02514	0'-2', 2'-4'	Manganese
Adjacent to SB-02505			
SB-02505A	50' North of SB-02505	0'-2', 2'-4'	Manganese
SB-02505B	50' South-East of SB-02505	0'-2', 2'-4'	Manganese
SB-02505C	50' South-West of SB-02505	0'-2', 2'-4'	Manganese

D - NORTH
D - SOUTH

D
SMCO PLANT

SHINGTON AVENUE

NTH STREET

0 60 150ft

LEGEND

- A-- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- SOIL BORING LOCATION - HISTORICAL
- PROPOSED SOIL BORING LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.
5. LOCATION SB-10711 WAS SUMMED AT ND AND DETECTIONS AS SUMMATION OF THE DETECTED AROCLORS.

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT D - NORTH RFI PHASE 1C - SOIL

CONESTOGA-ROVERS & ASSOCIATES

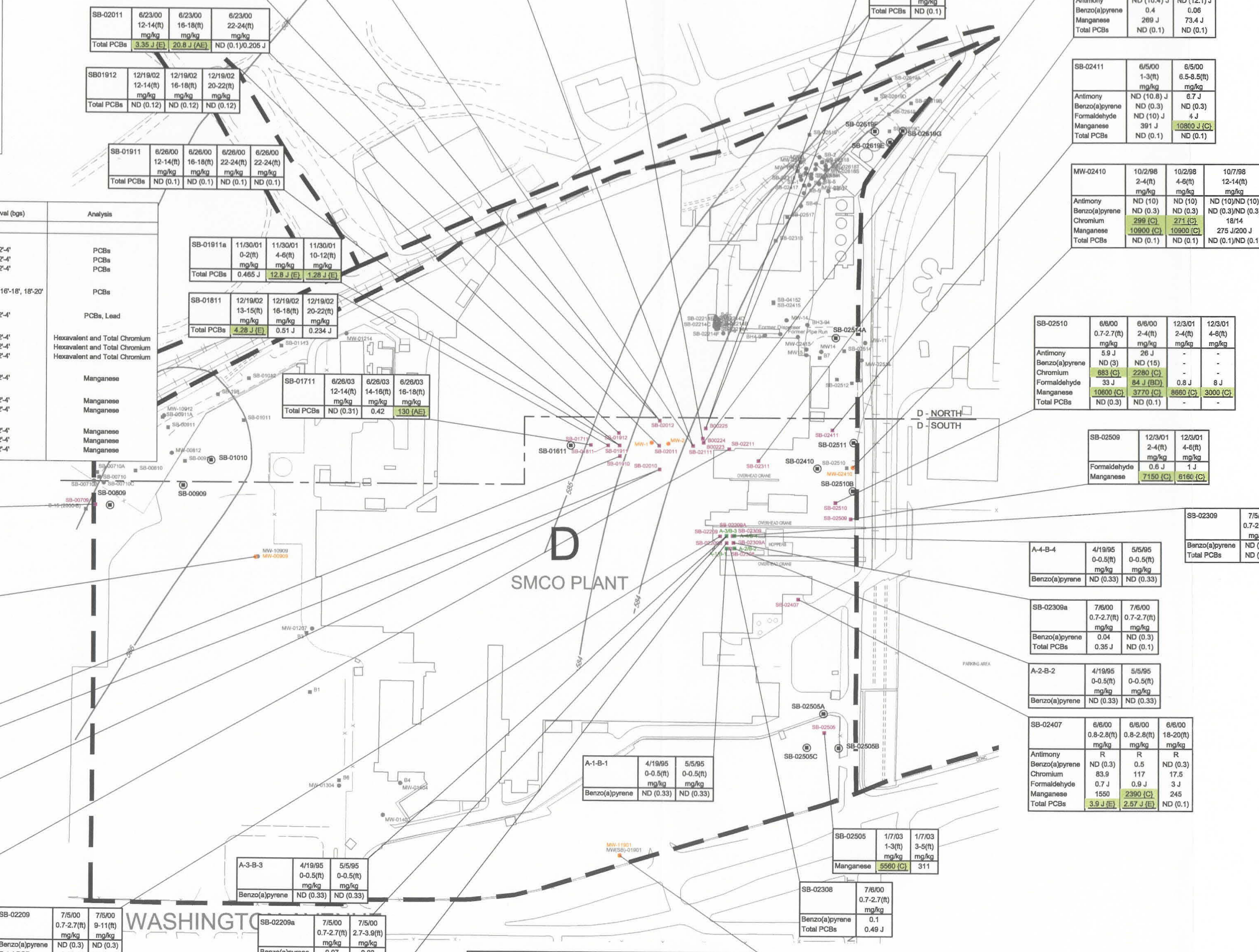
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 150'	Project Nº: 17075-18	Report Nº: 018	Drawing Nº: figure D1

17075-18(018)GN-WA008 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs		16	16000	6500	28000	1
Aluminum	6900	370000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		400	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		2400				
Chloride						
Chromium		9200		240		
Chromium, Hexavalent		9200		240		
Chrysene		8000				
Cobalt	6.8	9000		5900		
Cyanide (total)	0.39	250		250		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		570	0.33	78000	15	
cis-1,2-Dichloroethene		840	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	1000000	4100000	880000	
Formaldehyde		60000	65	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	90000		1500		
Mercury	0.13	580	89	8800	62	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		52000	470	88000	350	
Nickel	20	150000		16000		
Pentachlorophenol		320		130000		
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9600		59000		
Sodium		1000000				
Toluene		250	250	12000000	38000	
Trichloroethene		500	37	2300000	440	
Vanadium		5500				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		150	150	130000000	65000	
Zinc (Total)	47	630000				

Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit D			
Adjacent to SB-02619C			
SB-02619E	50' South of SB-02619C	0'-2', 2'-4'	PCBs
SB-02619F	50' West of SB-02619C	0'-2', 2'-4'	PCBs
SB-02619G	50' East of SB-02619C	0'-2', 2'-4'	PCBs
Adjacent to SB-01711			
SB-01611	50' West of SB-01711	12'-14', 14'-16', 16'-18', 18'-20'	PCBs
Adjacent to SB-00709			
SB-00809	50' East of SB-00709	0'-2', 2'-4'	PCBs, Lead
Vicinity of SB-02510 and MW-02410			
SB-02511	50' North of MW-02410	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-02410	50' West of SB-02510/MW-02410	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-02510B	50' South of SB-02510	0'-2', 2'-4'	Hexavalent and Total Chromium
Adjacent to SB-02514			
SB-02514A	50 'North-West of SB-02514	0'-2', 2'-4'	Manganese
Adjacent to SB-00910			
SB-01010	50' East of SB-02514	0'-2', 2'-4'	Manganese
SB-00909	50' South of SB-02514	0'-2', 2'-4'	Manganese
Adjacent to SB-02505			
SB-02505A	50' North of SB-02505	0'-2', 2'-4'	Manganese
SB-02505B	50' South-East of SB-02505	0'-2', 2'-4'	Manganese
SB-02505C	50' South-West of SB-02505	0'-2', 2'-4'	Manganese



SB-02111	6/30/00 24-26(ft) mg/kg	6/30/00 28-30(ft) mg/kg	6/30/00 34-36(ft) mg/kg	6/30/00 34-36(ft) mg/kg
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

SB-02012b	11/30/01 11-12(ft) mg/kg	11/30/01 12-14(ft) mg/kg	11/30/01 12-14(ft) mg/kg	11/30/01 16-18(ft) mg/kg	11/30/01 20-22(ft) mg/kg	11/30/01 18-20(ft) mg/kg
Total PCBs	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)

SB-02012	6/29/00 24-26(ft) mg/kg	6/29/00 28-30(ft) mg/kg	6/29/00 34-36(ft) mg/kg	6/29/00 34-36(ft) mg/kg
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	0.171 J

SB-02011	6/23/00 12-14(ft) mg/kg	6/23/00 16-18(ft) mg/kg	6/23/00 22-24(ft) mg/kg
Total PCBs	3.35 J {E}	20.8 J {AE}	ND (0.1)/0.205 J

SB01912	12/19/02 12-14(ft) mg/kg	12/19/02 16-18(ft) mg/kg	12/19/02 20-22(ft) mg/kg
Total PCBs	ND (0.12)	ND (0.12)	ND (0.12)

SB-01911	6/26/00 12-14(ft) mg/kg	6/26/00 16-18(ft) mg/kg	6/26/00 22-24(ft) mg/kg	6/26/00 22-24(ft) mg/kg
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

SB-01911a	11/30/01 0-2(ft) mg/kg	11/30/01 4-6(ft) mg/kg	11/30/01 10-12(ft) mg/kg
Total PCBs	0.465 J	12.8 J {E}	1.28 J {E}

SB-01811	12/19/02 13-15(ft) mg/kg	12/19/02 16-18(ft) mg/kg	12/19/02 20-22(ft) mg/kg
Total PCBs	4.28 J {E}	0.51 J	0.234 J

SB-01711	6/26/03 12-14(ft) mg/kg	6/26/03 14-16(ft) mg/kg	6/26/03 16-18(ft) mg/kg
Total PCBs	ND (0.31)	0.42	130 {AE}

SB-02111e	11/30/01 12-14(ft) mg/kg	11/30/01 16-18(ft) mg/kg	11/30/01 16-18(ft) mg/kg	11/30/01 22-24(ft) mg/kg
Total PCBs	ND (0.13)	ND (0.13)	ND (0.12)	ND (0.12)

B00224	2/11/00 0-10(ft) mg/kg
Total PCBs	ND (0.1)

B00225	2/11/00 0-8.5(ft) mg/kg
Total PCBs	ND (0.1)

B00226	2/11/00 0-8.5(ft) mg/kg
Total PCBs	ND (0.1)

B00223	2/11/00 0-11.6(ft) mg/kg
Total PCBs	ND (0.1)

SB-02311	6/5/00 1-3(ft) mg/kg	6/5/00 4-6(ft) mg/kg
Antimony	ND (10.4) J	ND (12.1) J
Benzo(a)pyrene	0.4	0.06
Manganese	269 J	73.4 J
Total PCBs	ND (0.1)	ND (0.1)

SB-02411	6/5/00 1-3(ft) mg/kg	6/5/00 6.5-8.5(ft) mg/kg
Antimony	ND (10.8) J	6.7 J
Benzo(a)pyrene	ND (0.3)	ND (0.3)
Formaldehyde	ND (10) J	4 J
Manganese	391 J	10800 J {C}
Total PCBs	ND (0.1)	ND (0.1)

MW-02410	10/2/98 2-4(ft) mg/kg	10/2/98 4-6(ft) mg/kg	10/7/98 12-14(ft) mg/kg
Antimony	ND (10)	ND (10)	ND (10)/ND (10)
Benzo(a)pyrene	ND (0.3)	ND (0.3)	ND (0.3)/ND (0.3)
Chromium	299 {C}	271 {C}	18/14
Manganese	10900 {C}	10900 {C}	275 J/200 J
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)/ND (0.1)

SB-02510	6/6/00 0.7-2.7(ft) mg/kg	6/6/00 2-4(ft) mg/kg	12/3/01 2-4(ft) mg/kg	12/3/01 4-6(ft) mg/kg
Antimony	5.9 J	26 J	-	-
Benzo(a)pyrene	ND (3)	ND (15)	-	-
Chromium	683 {C}	2280 {C}	-	-
Formaldehyde	33 J	84 J {BD}	0.8 J	8 J
Manganese	10600 {C}	3770 {C}	8660 {C}	3000 {C}
Total PCBs	ND (0.3)	ND (0.1)	-	-

SB-02509	12/3/01 2-4(ft) mg/kg	12/3/01 4-6(ft) mg/kg
Formaldehyde	0.6 J	1 J
Manganese	7150 {C}	6160 {C}

SB-02309	7/5/00 0.7-2.7(ft) mg/kg
Benzo(a)pyrene	ND (0.3)
Total PCBs	ND (0.1)

A-4-B-4	4/19/95 0-0.5(ft) mg/kg	5/5/95 0-0.5(ft) mg/kg
Benzo(a)pyrene	ND (0.33)	ND (0.33)

SB-02309a	7/6/00 0.7-2.7(ft) mg/kg	7/6/00 0.7-2.7(ft) mg/kg
Benzo(a)pyrene	0.04	ND (0.3)
Total PCBs	0.35 J	ND (0.1)

A-2-B-2	4/19/95 0-0.5(ft) mg/kg	5/5/95 0-0.5(ft) mg/kg
Benzo(a)pyrene	ND (0.33)	ND (0.33)

SB-02407	6/6/00 0.8-2.8(ft) mg/kg	6/6/00 0.8-2.8(ft) mg/kg	6/6/00 18-20(ft) mg/kg
Antimony	R	R	R
Benzo(a)pyrene	ND (0.3)	0.5	ND (0.3)
Chromium	83.9	117	17.5
Formaldehyde	0.7 J	0.9 J	3 J
Manganese	1550	2390 {C}	245
Total PCBs	3.9 J {E}	2.57 J {E}	ND (0.1)

SB-00709	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	ND (0.11)	43.5 J {AE}

MW-00909	10/15/98 0-2(ft) mg/kg	10/15/98 8-9(ft) mg/kg
Antimony	ND (10)	ND (10)/ND (10)
Benzo(a)pyrene	ND (0.3)	ND (0.3)/ND (0.3)
Chromium	24	13/12
Manganese	275	269/333
Total PCBs	ND (0.1)	ND (0.1)/ND (0.1)

SB-01910	12/19/02 18-20(ft) mg/kg	12/19/02 20-22(ft) mg/kg	12/19/02 22-24(ft) mg/kg
Total PCBs	0.485 J	0.205 J	0.31 J

SB-02010	6/28/00 11-13(ft) mg/kg	6/28/00 16-18(ft) mg/kg	6/28/00 20-22(ft) mg/kg	6/28/00 20-22(ft) mg/kg
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

SB-02010a	11/30/01 0-2(ft) mg/kg	11/30/01 5.5-7.5(ft) mg/kg	11/30/01 9.5-11.5(ft) mg/kg	11/30/01 12-13(ft) mg/kg
Total PCBs	0.395 J	0.31 J	0.46 J	ND (0.12)

SB-02211	6/6/00 0-2(ft) mg/kg	6/6/00 16-18(ft) mg/kg
Antimony	R	R
Benzo(a)pyrene	0.2	ND (0.3)
Chromium	22.1	16.2
Formaldehyde	2 J	3 J
Manganese	300	209
Total PCBs	0.23 J	ND (0.1)

SB-02209	7/5/00 0.7-2.7(ft) mg/kg	7/5/00 9-11(ft) mg/kg
Benzo(a)pyrene	ND (0.3)	ND (0.3)
Total PCBs	0.98 J	ND (0.1)

A-3-B-3	4/19/95 0-0.5(ft) mg/kg	5/5/95 0-0.5(ft) mg/kg
Benzo(a)pyrene	ND (0.33)	ND (0.33)

SB-02209a	7/5/00 0.7-2.7(ft) mg/kg	7/5/00 2.7-3.9(ft) mg/kg
Benzo(a)pyrene	0.07	0.03
Total PCBs	0.75 J	0.385 J

SB-02209b	7/6/00 0.7-2.5(ft) mg/kg
Benzo(a)pyrene	0.07
Total PCBs	0.69 J

A-1-B-1	4/19/95 0-0.5(ft) mg/kg	5/5/95 0-0.5(ft) mg/kg
Benzo(a)pyrene	ND (0.33)	ND (0.33)

MW-11901	10/12/98 0-2(ft) mg/kg	10/12/98 4-6(ft) mg/kg	10/12/98 12-14(ft) mg/kg	10/12/98 28-30(ft) mg/kg	10/12/98 44-46(ft) mg/kg	10/12/98 60-62(ft) mg/kg
Antimony	ND (10)	ND (10)	ND (10)/ND (10)	ND (10)	ND (10)	ND (10)
Benzo(a)pyrene	0.4	ND (0.3)	ND (0.3)/ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Chromium	14	3	13/13	14	12	24
Manganese	221	202	214/250	256	220	348
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)/ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

SB-02505	1/7/03 1-3(ft) mg/kg	1/7/03 3-5(ft) mg/kg
Manganese	5560 {C}	311

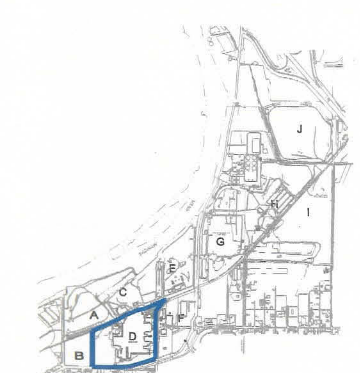
SB-02308	7/6/00 0.7-2.7(ft) mg/kg
Benzo(a)pyrene	0.1
Total PCBs	0.49 J

N
0 60 150ft

LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- —585— GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- SOIL BORING LOCATION - HISTORICAL
- PROPOSED SOIL BORING LOCATION

NOTES:
1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.
5. LOCATION SB-10711 WAS SUMMED AT ND AND DETECTIONS AS SUMMATION OF THE DETECTED AROCLORS.



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT D - SOUTH
RFI PHASE 1C - SOIL

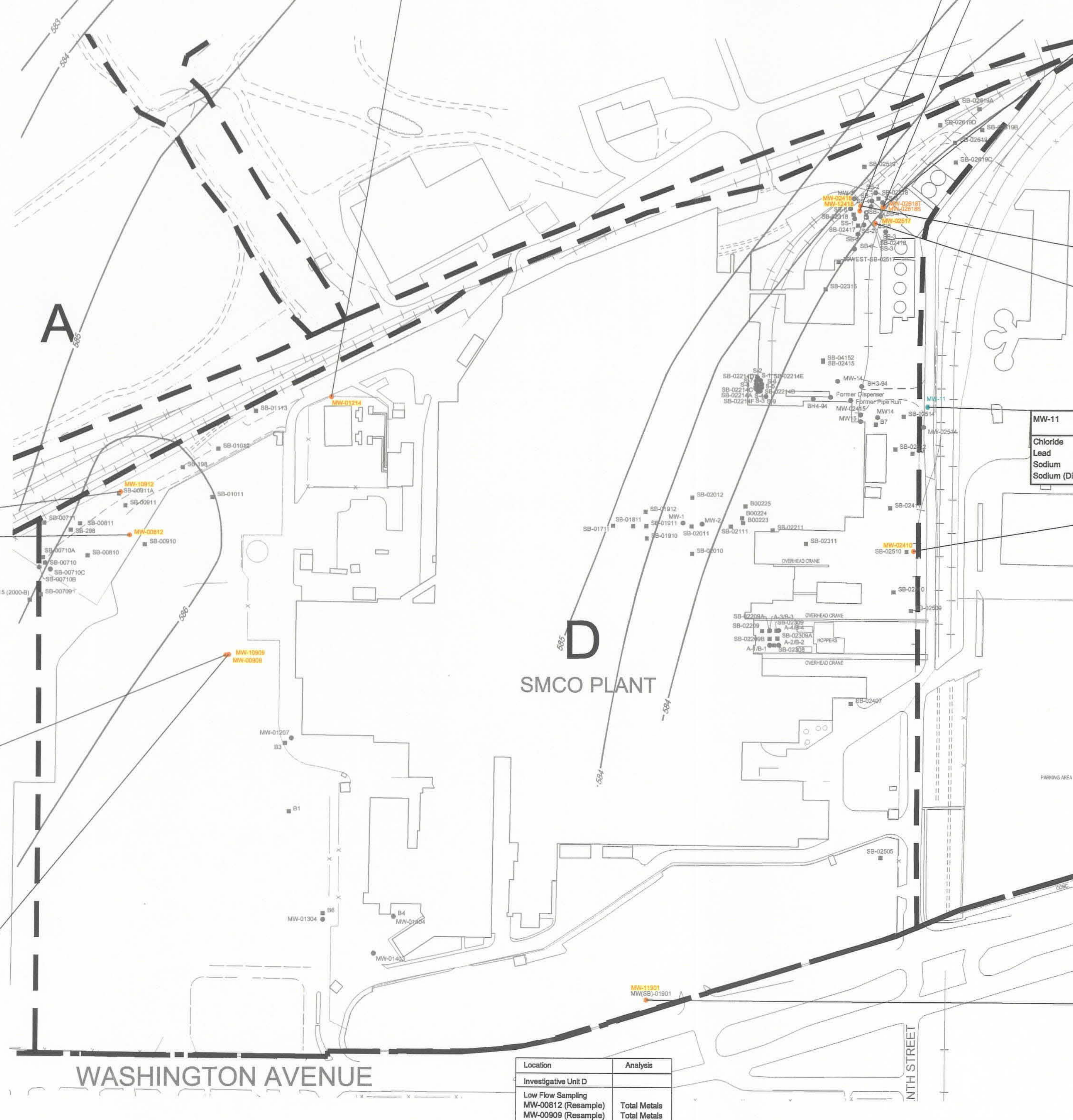
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: DECEMBER 2004	
Scale: 1" = 150'	Project Nº: 17075-18	Report Nº: 018	Drawing Nº: figure D2

17075-18(018)GN-WA007 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Drinking Water A	Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		68	0.13
Antimony		0.006		68	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.35		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		460	0.011
Chromium		0.1		460	0.011
Chromium, Hexavalent (Dissolved)		0.1		460	0.011
Chromium, Hexavalent		0.1		460	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.62
1,2-Dichloropropane		0.005	36	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.6		58000	
Iron	12000	5.6		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22



MW-01214	12/14/98 mg/L	7/26/00 mg/L
Aluminum	35.1 {A}/28.2 {A}	23.2 {A}
Antimony	ND (0.05)/ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	ND (0.05)
Beryllium	ND (0.005)/ND (0.005)	0.001 J
Cadmium	ND (0.004)/ND (0.004)	ND (0.005)
Chromium	0.078/0.059	-
Iron	54.6 {A}/45.6 {A}	-
Iron (Dissolved)	2.46/3.17	-
Lead	0.115 J {A}/0.123 {A}	0.1 {A}
Manganese	1.28/1.21	1.37
Nickel	0.076/0.069	0.074
Total PCBs	ND (0.0003)/ND (0.0002)	ND (0.0002)
Vanadium	0.056/0.044	0.044

MW-12418	12/9/98 mg/L
Aluminum	11 {A}/11.6 {A}
Antimony	ND (0.05)/ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)
Beryllium	ND (0.005)/ND (0.005)
Cadmium	ND (0.004)/ND (0.004)
Chromium	0.039/0.042
Iron	23.4 J {A}/26.4 J {A}
Iron (Dissolved)	0.036/0.034
Lead	0.01 {A}/0.01 {A}
Manganese	0.331/0.34
Nickel	0.032/0.037
Total PCBs	ND (0.0002)/ND (0.0002)
Vanadium	0.025/0.027

MW-02618T	12/19/01 mg/l
Aluminum	0.063 J
Antimony	ND (0.05)
Antimony (Dissolved)	ND (0.05)
Beryllium	ND (0.005)
Cadmium	ND (0.005)
Lead	ND (0.002)
Manganese	0.208
Nickel	ND (0.02)
Total PCBs	ND (0.0002)
Vanadium	ND (0.01)

MW-02618S	12/19/01 mg/L
Aluminum	0.068
Antimony	ND (0.05)
Antimony (Dissolved)	ND (0.05)
Beryllium	ND (0.005)
Cadmium	ND (0.005)
Lead	ND (0.002)
Manganese	0.198
Nickel	ND (0.02)
Total PCBs	0.0004 J
Vanadium	ND (0.01)

MW-02418	11/17/98 mg/L
Aluminum	49.7 J {A}/22 J {A}
Antimony	0.054 {A}/0.061 {A}
Antimony (Dissolved)	ND (0.05)/ND (0.05)
Beryllium	ND (0.005)/ND (0.005)
Cadmium	0.006 {A}/ND (0.004)
Chromium	0.196 J {A}/0.087 J
Iron	270 {A}/196 {A}
Iron (Dissolved)	19.8 {A}/21.5 {A}
Lead	2.04 J {A}/0.695 J {A}
Manganese	2.41/2.06
Nickel	0.623 J {A}/0.259 J {A}
Total PCBs	ND (0.0002)/ND (0.0002)
Vanadium	0.111 J {A}/0.059 J

MW-02517	7/31/00 mg/l	7/31/00 mg/l	12/13/01 mg/l
Aluminum	71 J {A}	-	-
Antimony	0.035 J {A}	-	-
Antimony (Dissolved)	ND (0.05)	-	-
Beryllium	0.004 J {A}	-	-
Cadmium	0.002 J	-	-
Lead	0.975 {A}	-	-
Manganese	3.37 {A}	-	-
Nickel	0.318 {A}	-	-
Total PCBs	-	0.002 J {A}	ND (0.0002)
Vanadium	0.126 {A}	-	-

MW-11	8/17/95 mg/L
Chloride	2200 {A}
Lead	0.026 {A}
Sodium	930 {A}
Sodium (Dissolved)	1200 {A}

MW-02410	12/15/98 mg/L	7/27/00 mg/L
Aluminum	61 {A}	19.2 {A}
Antimony	0.05 {A}	ND (0.05)
Antimony (Dissolved)	ND (0.05)	0.026 J {A}
Beryllium	ND (0.005)	0.001 J
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.339 {A}	-
Iron	79 J {A}	-
Iron (Dissolved)	0.043 J	-
Lead	0.037 {A}	0.034 {A}
Manganese	2.66 J {A}	1.06 J
Nickel	0.274 {A}	0.542 {A}
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.125 {A}	0.049

MW-10912	8/9/00 mg/L
Aluminum	19.5 J {A}/6.89 J {A}
Antimony	ND (0.05) UJ/ND (0.05) UJ
Antimony (Dissolved)	ND (0.05) UJ/ND (0.05) UJ
Beryllium	0.001 J/0.0003 J
Cadmium	ND (0.005)/ND (0.005)
Lead	0.033 {A}/0.006 {A}
Manganese	0.708/0.284
Nickel	0.051/0.031
Total PCBs	ND (0.0002)/ND (0.0002)
Vanadium	0.039/0.015

MW-00812	12/4/98 mg/L	7/19/00 mg/L
Aluminum	26.4 {A}	26.7 {A}
Antimony	ND (0.05)	0.026 J {A}
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Beryllium	ND (0.005)	0.001 J
Cadmium	ND (0.004)	0.004 J
Chromium	0.102	-
Iron	67.8 J {A}	-
Iron (Dissolved)	6.18 {A}	-
Lead	0.135 {A}	0.175 J {A}
Manganese	1.43 J	1.41 J
Nickel	0.084	0.143 {A}
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.056	0.058

MW-00909	12/10/98 mg/L	7/26/00 mg/L
Aluminum	67.8 {A}	3.09
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.157 {A}	-
Iron	115 J {A}	-
Iron (Dissolved)	6.58 {A}	-
Lead	0.342 {A}	0.012 {A}
Manganese	2.59	0.303
Nickel	0.156 {A}	0.022
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.126 {A}	0.008 J

MW-10909	12/10/98 mg/L	7/24/00 mg/L	7/24/00 mg/L
Aluminum	1.56/1.23	5.08 {A}	4.94 {A}
Antimony	ND (0.05)/ND (0.05)	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	ND (0.05)	ND (0.05)
Beryllium	ND (0.005)/ND (0.005)	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)/ND (0.004)	ND (0.005)	ND (0.005)
Chromium	ND (0.005)/ND (0.005)	-	-
Iron	2.53 J/2.16 J	-	-
Iron (Dissolved)	0.099/0.116	-	-
Lead	ND (0.002)/ND (0.002)	0.005 {A}	0.004
Manganese	0.095/0.092	0.203	0.191
Nickel	ND (0.02)/ND (0.02)	ND (0.02)	0.023
Total PCBs	ND (0.0002)/ND (0.0002)	ND (0.0002)	ND (0.0002)
Vanadium	ND (0.01)/ND (0.01)	0.012	0.012

Location	Analysis
Investigative Unit D	
Low Flow Sampling	
MW-00812 (Resample)	Total Metals
MW-00909 (Resample)	Total Metals
MW-10909 (Resample)	Total Metals
MW-10912 (Resample)	Total Metals
MW-11901 (Resample)	Total Metals
MW-01214 (Resample)	Total Metals
MW-02410 (Resample)	Total Metals
MW-12418 (Resample)	Total Metals
MW-02517 (Resample)	Total Metals
MW-02418 (Resample)	Total Metals

MW-11901	12/11/98 mg/l	7/27/00 mg/l
Aluminum	34.8 {A}	2.3/2.05
Antimony	ND (0.05)	ND (0.05)/ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)/ND (0.05)
Beryllium	ND (0.005)	ND (0.005)/ND (0.005)
Cadmium	ND (0.004)	ND (0.005)/ND (0.005)
Chromium	0.083	-
Iron	79.5 J {A}	-
Iron (Dissolved)	0.034	-
Lead	0.048 {A}	0.003/0.003
Manganese	1.51	0.146 J/0.142 J
Nickel	0.133 {A}	ND (0.02)/ND (0.02)
Total PCBs	ND (0.0002)	ND (0.0002)/ND (0.0002)
Vanadium	0.082 {A}	0.008 J/0.008 J

N

0 60 150ft

LEGEND

A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER

—585— GROUNDWATER ELEVATION FT. AMSL (NAVD 88)

MONITORING WELL LOCATION - RFI

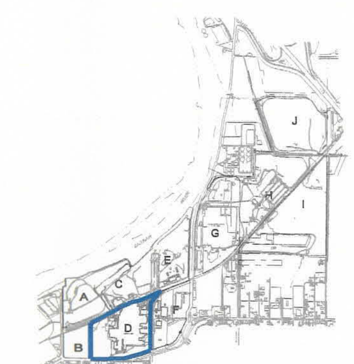
SAMPLE LOCATION - NO REPORTED DATA

MONITORING WELL LOCATION - HISTORICAL

RESAMPLE OF MONITORING WELL

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT D
RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: DECEMBER 2004	
Scale: 1" = 150'	Project Nº: 17075-18	Report Nº: 018	Drawing Nº: figure D3

17075-18(018)GN-WA008 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs		16	16000	6500	28000	1
Aluminum	6900	370000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		400	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		2400				
Chloride						
Chromium		9200		240		
Chromium, Hexavalent		9200		240		
Chrysene		8000				
Cobalt	6.8	9000		5900		
Cyanide (total)	0.39	250		250		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		570	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	1000000	4100000	880000	
Formaldehyde		60000	65	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	90000		1500		
Mercury	0.13	580	89	8800	62	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		52000	470	88000	350	
Nickel	20	150000		16000		
Pentachlorophenol		320		130000		
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9600		59000		
Sodium		1000000				
Toluene		250	250	12000000	36000	
Trichloroethene		500	37	2300000	440	
Vanadium		5500				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		150	150	130000000	65000	
Zinc (Total)	47	630000				

MW-03240	9/16/98 0-2(ft) mg/kg	9/16/98 3.5-6(ft) mg/kg	9/16/98 24-26(ft) mg/kg
Chromium	24 J	32 J	15 J
Lead	17 J	91 J	9 J
Manganese	427 J	1530 J	548 J
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

MW-13240	10/6/98 38-40(ft) mg/kg
Chromium	16
Lead	20
Manganese	593 J
Total PCBs	ND (0.1)

SB-03036	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	0.346 J	0.229 J

SB-03346	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	0.325 J	0.154 J

MW-03746	9/14/98 0-2(ft) mg/kg	9/14/98 4-6(ft) mg/kg	9/14/98 6-8(ft) mg/kg	9/14/98 16-18(ft) mg/kg
Chromium	91	6	9	15
Lead	39 J	5 J	8 J	8 J
Manganese	2110 (C)	184	247	530
Total PCBs	0.95 J	ND (0.1)	ND (0.1)	ND (0.1)

SB-03642	11/17/99 0-1(ft) mg/kg
Lead	89
Manganese	2720 (C)
Total PCBs	ND (0.2)

SB-03738	12/12/02 0-2(ft) mg/kg	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	0.398 J	1.18 J (E)	0.217 J

SB-03236	11/17/99 0-0.75(ft) mg/kg
Lead	121
Manganese	1880
Total PCBs	0.95 J

SB-03437	11/18/99 0-1.5(ft) mg/kg
Lead	19
Manganese	1360
Total PCBs	0.18 J

SB-03637	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	0.465 J	ND (0.11)

SB-03037	11/17/99 0-2(ft) mg/kg
Lead	9
Manganese	92
Total PCBs	0.18 J

SB-03737A	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	18.3 J (AE)	ND (0.12)

MW-03235	9/23/98 0-2(ft) mg/kg	9/23/98 12-14(ft) mg/kg	9/23/98 16-18(ft) mg/kg
Chromium	234	18	16
Lead	2030 (A)	11	8 J
Manganese	6170 (C)	846	498
Total PCBs	13.5 J (E)	ND (0.1)	ND (0.5)

SB-03737	11/17/99 0-1.5(ft) mg/kg
Lead	28
Manganese	5670 (C)
Total PCBs	1.45 J (E)

SB-03035	11/17/99 0-0.67(ft) mg/kg	11/17/99 0-0.67(ft) mg/kg
Lead	34	29
Manganese	6830 (C)	7370 (C)
Total PCBs	ND (0.1)	ND (0.1)

SB-03235	11/17/99 0-0.5(ft) mg/kg
Lead	12
Manganese	1380
Total PCBs	0.22 J

SB-03735	11/17/99 0-0.25(ft) mg/kg
Lead	25
Manganese	3490 (C)
Total PCBs	0.26 J

MW-12432	10/22/98 68-70(ft) mg/kg
Chromium	10/14
Lead	8/11
Manganese	209/330
Total PCBs	ND (0.1)/ND (0.1)

SB-02935	11/18/99 0-1.5(ft) mg/kg
Lead	23
Manganese	3290 (C)
Total PCBs	0.23 J

MW-03734	9/22/98 0-2(ft) mg/kg	9/22/98 6-8(ft) mg/kg	9/22/98 18-20(ft) mg/kg
Chromium	153	274 (C)	14
Lead	16 J	21 J	6 J
Manganese	3720 (C)	2090 (C)	233
Total PCBs	52.2 J (AE)	5.15 J (E)	ND (0.1)

MW-02432	9/16/98 0-2(ft) mg/kg	9/16/98 4-6(ft) mg/kg
Chromium	18 J	16 J
Lead	12 J	13 J
Manganese	460 J	396 J
Total PCBs	ND (0.1)	ND (0.1)

SB-03834	11/17/99 0-2(ft) mg/kg
Lead	26
Manganese	1760
Total PCBs	1.15 J (E)

SB-03834A	12/12/02 0-2(ft) mg/kg	12/12/02 2-4(ft) mg/kg
Total PCBs	ND (0.12)	ND (0.11)

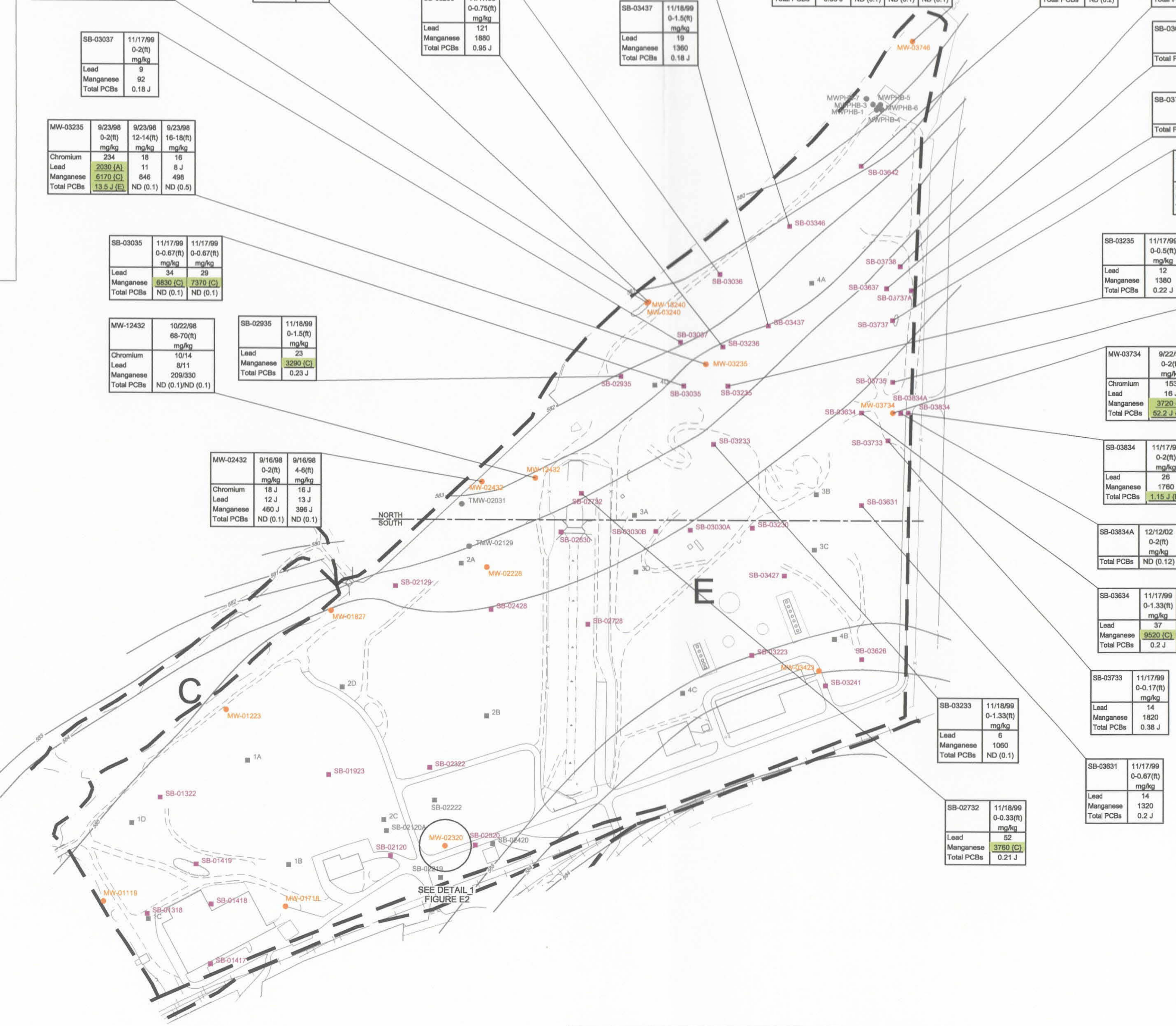
SB-03634	11/17/99 0-1.33(ft) mg/kg
Lead	37
Manganese	9520 (C)
Total PCBs	0.2 J

SB-03733	11/17/99 0-0.17(ft) mg/kg
Lead	14
Manganese	1820
Total PCBs	0.38 J

SB-03233	11/18/99 0-1.33(ft) mg/kg
Lead	6
Manganese	1060
Total PCBs	ND (0.1)

SB-03631	11/17/99 0-0.67(ft) mg/kg
Lead	14
Manganese	1320
Total PCBs	0.2 J

SB-02732	11/18/99 0-0.33(ft) mg/kg
Lead	52
Manganese	3760 (C)
Total PCBs	0.21 J



Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit E			
MW-02320 Area			
MW-02320A	10' North of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320B	10' East of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320C	10' South of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320D	10' West of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium

N

0 100 200ft

LEGEND

A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER

—585— GROUNDWATER ELEVATION FT. AMSL (NAVD 88)

MONITORING WELL LOCATION - RFI

SOIL BORING LOCATION - RFI

SAMPLE LOCATION - NO REPORTED DATA

PROPOSED SOIL BORING LOCATION

NOTE
(1) FIRST SAMPLE COLLECTED BELOW PILE IN FOUNDRY SAND.

NOTES:
1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT E - NORTH RFI PHASE 1C - SOIL

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

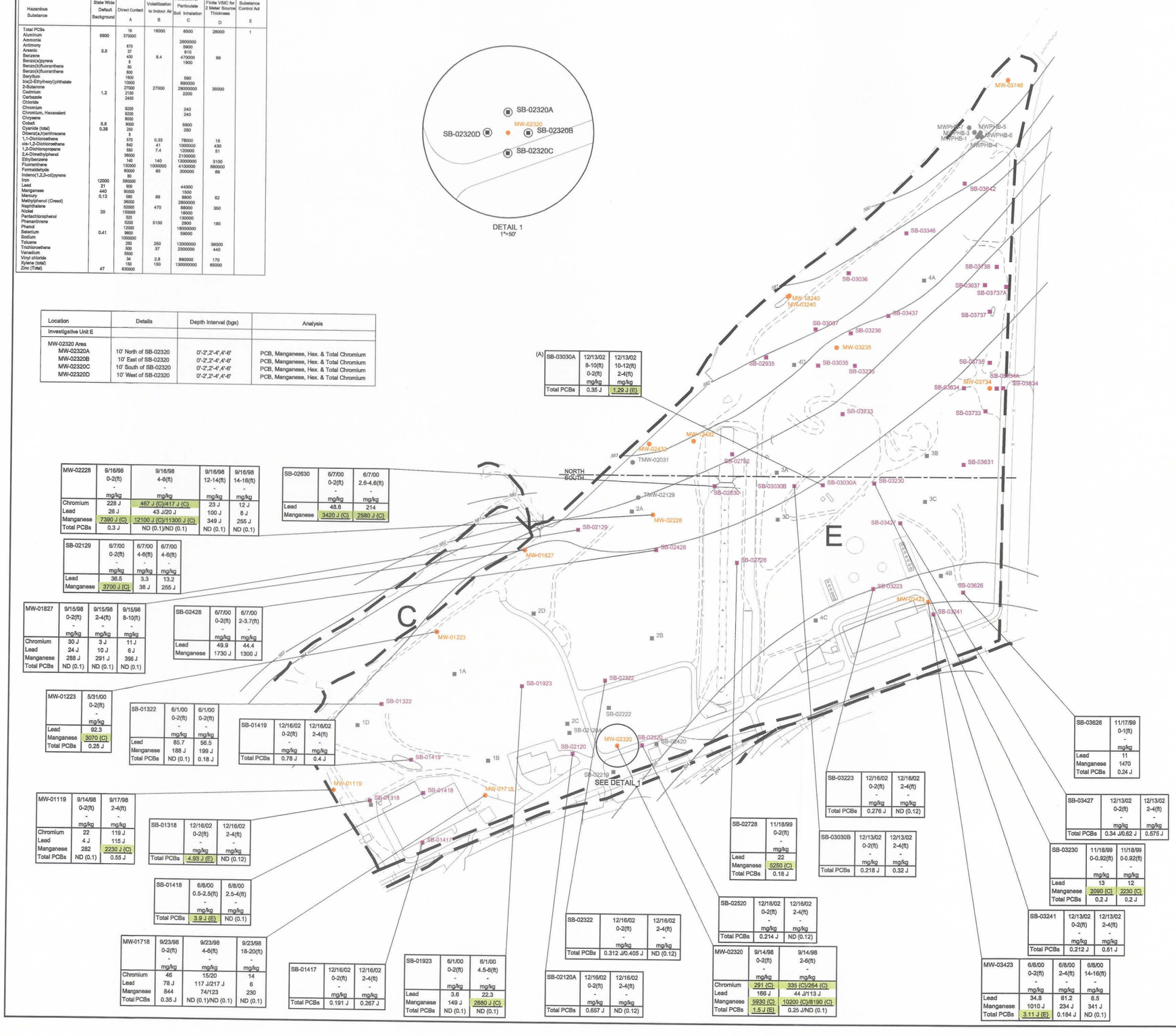
Project Manager: I.R.	Reviewed By: M.T.	Date: DECEMBER 2004	
Scale: 1" = 200'	Project Nº: 17075-18	Report Nº: 018	Drawing Nº: figure E1

17075-18(018)GN-WA009 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV				Toxic Substance Control Act
		Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	E
Total PCBs		16	16000	6500	28000	1
Aluminum	6900	376000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		430	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		2400				
Chloride						
Chromium		6200		240		
Chromium, Hexavalent		8000		240		
Chrysene		8000				
Cobalt	6.8	9000		5900		
Cyanide (total)	0.39	260		350		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		570	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	10000000	4100000	880000	
Formaldehyde		60000	65	300000	89	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	90000		1500		
Mercury	0.13	580	89	8800	82	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		82000	470	88000	350	
Nickel	20	150000		18000		
Pentachlorophenol		920		130000		
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9800		59000		
Sodium		1000000				
Toluene		260	260	12000000	36000	
Trichloroethene		550	37	2300000	440	
Vanadium		5600				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		150	150	1300000000	66000	
Zinc (Total)	47	630000				

Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit E			
MW-02320 Area			
MW-02320A	10' North of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320B	10' East of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320C	10' South of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320D	10' West of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium

DETAIL 1
1"=50'



(A) SB-03030A	12/13/02 8-10(ft) 0-2(ft) mg/kg	12/13/02 10-12(ft) 2-4(ft) mg/kg
Total PCBs	0.35 J	1.29 J (E)

MW-02228	9/16/98 0-2(ft) - mg/kg	9/16/98 4-6(ft) - mg/kg	9/16/98 12-14(ft) - mg/kg	9/16/98 14-16(ft) - mg/kg
Chromium	228 J	467 J (C)/417 J (C)	23 J	12 J
Lead	26 J	43 J/20 J	100 J	8 J
Manganese	7390 J (C)	12100 J (C)/11300 J (C)	349 J	255 J
Total PCBs	0.3 J	ND (0.1)/ND (0.1)	ND (0.1)	ND (0.1)

SB-02630	6/7/00 0-2(ft) - mg/kg	6/7/00 2.6-4.6(ft) - mg/kg
Lead	48.6	214
Manganese	3420 J (C)	2580 J (C)

SB-02129	6/7/00 0-2(ft) - mg/kg	6/7/00 4-6(ft) - mg/kg	6/7/00 4-6(ft) - mg/kg
Lead	36.5	3.3	13.2
Manganese	3700 J (C)	38 J	255 J

MW-01827	9/15/98 0-2(ft) - mg/kg	9/15/98 2-4(ft) - mg/kg	9/15/98 8-10(ft) - mg/kg
Chromium	30 J	3 J	11 J
Lead	24 J	10 J	6 J
Manganese	288 J	291 J	396 J
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

SB-02428	6/7/00 0-2(ft) - mg/kg	6/7/00 2-3.7(ft) - mg/kg
Lead	49.9	44.4
Manganese	1730 J	1300 J

MW-01223	5/31/00 0-2(ft) - mg/kg
Lead	92.3
Manganese	3070 (C)
Total PCBs	0.28 J

SB-01322	6/1/00 0-2(ft) - mg/kg	6/1/00 0-2(ft) - mg/kg
Lead	85.7	56.5
Manganese	188 J	199 J
Total PCBs	ND (0.1)	0.18 J

SB-01419	12/16/02 0-2(ft) - mg/kg	12/16/02 2-4(ft) - mg/kg
Total PCBs	0.78 J	0.4 J

MW-01119	9/14/98 0-2(ft) - mg/kg	9/17/98 2-4(ft) - mg/kg
Chromium	22	119 J
Lead	4 J	115 J
Manganese	282	2230 J (C)
Total PCBs	ND (0.1)	0.55 J

SB-01318	12/16/02 0-2(ft) - mg/kg	12/16/02 2-4(ft) - mg/kg
Total PCBs	4.93 J (E)	ND (0.12)

SB-01418	6/8/00 0.5-2.5(ft) - mg/kg	6/8/00 2.5-4(ft) - mg/kg
Total PCBs	3.9 J (E)	ND (0.1)

MW-01718	9/23/98 0-2(ft) - mg/kg	9/23/98 4-6(ft) - mg/kg	9/23/98 18-20(ft) - mg/kg
Chromium	46	15/20	14
Lead	78 J	117 J/217 J	6
Manganese	844	741/23	230
Total PCBs	0.35 J	ND (0.1)/ND (0.1)	ND (0.1)

SB-01417	12/16/02 0-2(ft) - mg/kg	12/16/02 2-4(ft) - mg/kg
Total PCBs	0.191 J	0.267 J

SB-01923	6/1/00 0-2(ft) - mg/kg	6/1/00 4.5-6(ft) - mg/kg
Lead	3.6	22.3
Manganese	149 J	2880 J (C)
Total PCBs	ND (0.1)	ND (0.1)

SB-02322	12/16/02 0-2(ft) - mg/kg	12/16/02 2-4(ft) - mg/kg
Total PCBs	0.312 J/0.405 J	ND (0.12)

SB-02120A	12/16/02 0-2(ft) - mg/kg	12/16/02 2-4(ft) - mg/kg
Total PCBs	0.657 J	ND (0.12)

MW-02320	9/14/98 0-2(ft) - mg/kg	9/14/98 2-6(ft) - mg/kg
Chromium	291 (C)	335 (C)/264 (C)
Lead	166 J	44 J/113 J
Manganese	5930 (C)	10200 (C)/8190 (C)
Total PCBs	1.5 J (E)	0.25 J/ND (0.1)

SB-02520	12/16/02 0-2(ft) - mg/kg	12/16/02 2-4(ft) - mg/kg
Total PCBs	0.214 J	ND (0.12)

SB-02728	11/18/99 0-2(ft) - mg/kg
Lead	22
Manganese	5250 (C)
Total PCBs	0.18 J

SB-03030B	12/13/02 0-2(ft) - mg/kg	12/13/02 2-4(ft) - mg/kg
Total PCBs	0.218 J	0.32 J

SB-03223	12/16/02 0-2(ft) - mg/kg	12/16/02 2-4(ft) - mg/kg
Total PCBs	0.276 J	ND (0.12)

MW-03423	6/8/00 0-2(ft) - mg/kg	6/8/00 2-4(ft) - mg/kg	6/8/00 14-16(ft) - mg/kg
Lead	34.8	61.2	6.5
Manganese	1010 J	234 J	341 J
Total PCBs	3.11 J (E)	0.184 J	ND (0.1)

SB-03241	12/13/02 0-2(ft) - mg/kg	12/13/02 2-4(ft) - mg/kg
Total PCBs	0.212 J	0.61 J

SB-03230	11/18/99 0-0.92(ft) - mg/kg	11/18/99 0-0.92(ft) - mg/kg
Lead	13	12
Manganese	2090 (C)	2230 (C)
Total PCBs	0.2 J	0.2 J

SB-03427	12/13/02 0-2(ft) - mg/kg	12/13/02 2-4(ft) - mg/kg
Total PCBs	0.34 J/0.62 J	0.575 J

SB-03626	11/17/99 0-1(ft) - mg/kg
Lead	11
Manganese	1470
Total PCBs	0.24 J

KEY MAP

0 100 200ft

LEGEND

- A– – INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- PROPOSED SOIL BORING LOCATION

NOTE
(A) FIRST DEPTH IS BELOW TOP OF PILE, SECOND DEPTH IS IN REFERENCE TO GROUND SURFACE.

NOTES:
1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT E - SOUTH
RFI PHASE 1C - SOIL

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project №: 17075-18	Report №: 018	Drawing №: figure E2

17075-18(018)GN-WA022 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Drinking Water A	Industrial & Commercial II, III & IV: Groundwater Volatilization to Indoor Air Inhalation B	Industrial & Commercial II, III & IV: Groundwater Contact C	Industrial & Commercial II, III & IV: Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		68	0.13
Antimony		0.006		68	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		36	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.26		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		480	0.011
Chromium		0.1		480	0.011
Chromium, Hexavalent (Dissolved)		0.1		480	0.011
Chromium, Hexavalent		0.1		480	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	8.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007		11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.62
1,2-Dichloropropane		0.005	36	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	30000	0.008
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.8		58000	
Iron	12000	5.8		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0008
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		380		1000000	
Sodium		380		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22

MW-13240	12/18/98 mg/L	7/25/00 mg/L	7/25/00 mg/L
Aluminum	24.4 (A)	9.24 (A)	10.2 (A)
Antimony	0.052 (A)	0.025 J (A)	0.026 J (A)
Antimony (Dissolved)	ND (0.05)	ND (0.05)	0.027 J (A)
Arsenic	0.022	0.016	0.016
Benzo(a)pyrene	ND (0.01)	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	0.001 J	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)	ND (0.005)
Chromium	0.044	-	-
Chrysene	ND (0.01)	ND (0.01)	ND (0.01)
Cobalt	0.018	-	-
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)	ND (0.01)
Iron	70.1 J (A)	-	-
Iron (Dissolved)	30 J (A)	-	-
Lead	0.023 (A)	0.011 (A)	0.01 (A)
Lead (Dissolved)	ND (0.002)	ND (0.002)	ND (0.002)
Manganese	2.05 J	1.38	1.43
Manganese (Dissolved)	0.846 J	0.877	0.888
Mercury	ND (0.0002)	-	-
Nickel	0.044	ND (0.02)	ND (0.02)
Total PCBs	ND (0.0002)	ND (0.0002)	ND (0.0002)
Vanadium	0.055	0.025	0.028

MWPHB-7	6/3/98 mg/L
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)

MW-03746	12/7/98 mg/L	8/8/00 mg/L
Aluminum	18.6 (A)	17.8 J (A)
Antimony	ND (0.05)	0.02 J (A)
Antimony (Dissolved)	ND (0.05)	ND (0.05) UJ
Arsenic	0.069 (A)	0.033
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	0.001 J
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.042 (D)	-
Chrysene	ND (0.01)	ND (0.01)
Cobalt	0.017	-
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)
Iron	97.1 J (A)	-
Iron (Dissolved)	37.2 (A)	-
Lead	0.053 (A)	0.042 (A)
Lead (Dissolved)	ND (0.002)	ND (0.004)
Manganese	4.27 J (A)	1.69
Manganese (Dissolved)	3.28 (A)	1.06
Mercury	ND (0.0002)	-
Nickel	0.034	0.033
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.044 (D)	0.036 (D)

MW-03240	11/18/98 mg/L	7/19/00 mg/L
Aluminum	125 (A)/161 (A)	122 (A)
Antimony	0.074 (A)/0.07 (A)	ND (0.25)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	0.028 J (A)
Arsenic	0.045/0.054 (A)	0.103 (A)
Benzo(a)pyrene	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)/ND (0.01)	ND (0.01)
Beryllium	0.023 (A)/0.028 (A)	0.02 J (A)
Cadmium	ND (0.004)/0.005	ND (0.025)
Chromium	0.349 (AD)/0.438 (AD)	-
Chrysene	ND (0.01)/ND (0.01)	ND (0.01)
Cobalt	0.274 (AD)/0.355 (AD)	-
Indeno(1,2,3-cd)pyrene	ND (0.01)/ND (0.01)	ND (0.01)
Iron	414 (A)/474 (A)	-
Iron (Dissolved)	102 (A)/92.6 (A)	-
Lead	0.102 (A)/0.13 (A)	2.16 J (AD)
Lead (Dissolved)	ND (0.002)/ND (0.002)	0.006 J (A)
Manganese	9.71 (A)/9.37 (A)	3.74 J (A)
Manganese (Dissolved)	5.36 (A)/5.47 (A)	3.54 J (A)
Mercury	0.001 (D)/0.001 (D)	-
Nickel	0.826 (A)/1.07 (A)	ND (0.1)
Total PCBs	ND (0.0002)/ND (0.0002)	ND (0.0002)
Vanadium	0.098 (AD)/0.117 (AD)	0.048 J (D)

MWPHB-5	6/3/98 mg/L
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)

MW-12432	12/3/98 mg/L	7/27/00 mg/L
Aluminum	5.27 (A)/4.97 (A)	3.05
Antimony	ND (0.05)/ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	ND (0.05)
Arsenic	ND (0.005)/ND (0.005)	0.003 J
Benzo(a)pyrene	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)/ND (0.01)	ND (0.01)
Beryllium	ND (0.005)/ND (0.005)	ND (0.005)
Cadmium	ND (0.004)/ND (0.004)	ND (0.005)
Chromium	0.016/0.015	-
Chrysene	ND (0.01)/ND (0.01)	ND (0.01)
Cobalt	ND (0.01)/ND (0.01)	-
Indeno(1,2,3-cd)pyrene	ND (0.01)/ND (0.01)	ND (0.01)
Iron	9.92 (A)/9.59 (A)	-
Iron (Dissolved)	0.139 J/0.208 J	-
Lead	0.005 (A)/0.004	0.003
Lead (Dissolved)	ND (0.002)/ND (0.002)	ND (0.002)
Manganese	0.275/0.262	0.152 J
Manganese (Dissolved)	0.06/0.06	0.045 J
Mercury	ND (0.0002)/ND (0.0002)	-
Nickel	ND (0.02)/ND (0.02)	ND (0.02)
Total PCBs	ND (0.0002)/ND (0.0002)	ND (0.0002)
Vanadium	0.015/0.013	0.008 J

MWPHB-6	6/3/98 mg/L
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)

MW-02432	12/9/98 mg/L	7/19/00 mg/L
Aluminum	41.6 (A)	0.833
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.027	0.02 J
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.139 (AD)	-
Chrysene	ND (0.01)	ND (0.01)
Cobalt	0.029	-
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)
Iron	95.8 J (A)	-
Iron (Dissolved)	0.197	-
Lead	0.11 (A)	0.004 J
Lead (Dissolved)	ND (0.002)	0.003 J
Manganese	2.76 (A)	0.8 J
Manganese (Dissolved)	0.227	0.761 J
Mercury	0.001 (D)	-
Nickel	0.103	ND (0.02)
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.083 (AD)	0.005 J

MWPHB-3	6/3/98 mg/L	6/3/98 mg/L
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)	ND (0.01)
Chrysene	ND (0.01)	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)

TMW-02031	12/17/01 mg/L
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)
Total PCBs	ND (0.0002)

MWPHB-1	6/3/98 mg/L
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)

TMW-02129	12/17/01 mg/L
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)
Total PCBs	ND (0.0002)

MWPHB-4	6/3/98 mg/L
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)

Location	Analysis
Investigative Unit E	
Low Flow Sampling	
MW-01119 (Resample)	Total Metals, SVOCs
MW-01223 (Resample)	Total Metals
MW-01718 (Resample)	Total Metals
MW-01827 (Resample)	Total Metals
MW-02228 (Resample)	Total Metals
MW-02320 (Resample)	Total Metals
MW-02432 (Resample)	Total Metals
MW-12432 (Resample)	Total Metals
MW-03235 (Resample)	Total Metals, PCB
MW-03240 (Resample)	Total Metals
MW-13240 (Resample)	Total Metals
MW-03423 (Resample)	Total Metals
MW-03734 (Resample)	Total Metals, Fluoride
MW-03746 (Resample)	Total Metals

MW-03734	12/7/98 mg/L	7/19/00 mg/L
Aluminum	42.9 (A)	1.19
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.026	0.012 J
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.116 (A)	-
Chrysene	ND (0.01)	ND (0.01)
Cobalt	0.019	-
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)
Iron	80.3 J (A)	-
Iron (Dissolved)	6.53 (A)	-
Lead	0.218 (A)	0.01 J (A)
Lead (Dissolved)	ND (0.002)	0.003 J
Manganese	1.7 J	0.674 J
Manganese (Dissolved)	0.323	0.627 J
Mercury	ND (0.0002)	-
Nickel	0.08	ND (0.02)
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.07 (A)	0.007 J

MW-02228	12/8/98 mg/L	7/19/00 mg/L
Aluminum	58.9 (A)	26.2 (A)
Antimony	ND (0.05)	0.026 J (A)
Antimony (Dissolved)	ND (0.05)	0.022 J (A)
Arsenic	0.036	0.025 J
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	0.001 J
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.24 (A)	-
Chrysene	ND (0.01)	ND (0.01)
Cobalt	0.031	-
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)
Iron	202 J (A)	-
Iron (Dissolved)	3.38	-
Lead	2.1 (A)	1.26 J (A)
Lead (Dissolved)	ND (0.002)	ND (0.004) UJ
Manganese	3.5 (A)	1.88 J
Manganese (Dissolved)	0.526	0.442 J
Mercury	0.001	-
Nickel	0.326 J (A)	0.167 (A)
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.095 (A)	0.053

MW-03235	11/18/98 mg/L	7/19/00 mg/L
Aluminum	37.2 (A)/45.6 (A)	2.21
Antimony	0.058 (A)/0.057 (A)	ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	ND (0.05)
Arsenic	0.051/0.066 (A)	0.013 J
Benzo(a)pyrene	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)/ND (0.01)	ND (0.01)
Beryllium	ND (0.005)/ND (0.005)	ND (0.005)
Cadmium	ND (0.004)/ND (0.004)	ND (0.005)
Chromium	0.282 (A)/0.339 (A)	-
Chrysene	ND (0.01)/ND (0.01)	ND (0.01)
Cobalt	0.04/0.048	-
Indeno(1,2,3-cd)pyrene	ND (0.01)/ND (0.01)	ND (0.01)
Iron	283 (A)/313 (A)	-
Iron (Dissolved)	86.8 (A)/84.6 (A)	-
Lead	0.136 (A)/0.161 (A)	0.007 J (A)
Lead (Dissolved)	ND (0.002)/ND (0.002)	ND (0.004) UJ
Manganese	4.86 (A)/5.01 (A)	1.91 J
Manganese (Dissolved)	1.81/1.73	1.73 J
Mercury	0.0002/0.0002	-
Nickel	0.194 (A)/0.23 (A)	ND (0.02)
Total PCBs	0.002 J (A)/0.002 J (A)	ND (0.0002)
Vanadium	0.053/0.066 (A)	0.007 J

MW-01827	12/8/98 mg/L	7/19/00 mg/L
Aluminum	18.3 (A)	27.3 (A)
Antimony	ND (0.05)	0.02 J (A)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.029	0.062 (A)
Benzo(a)pyrene	ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)	ND (0.01)
Beryllium	ND (0.005)	0.002 J
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.07 (D)	-
Chrysene	ND (0.01)	ND (0.01)
Cobalt	0.022	-
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)
Iron	58.2 J (A)	-
Iron (Dissolved)	6.15 (A)	-
Lead	0.038 (A)	0.073 J (A)
Lead (Dissolved)	ND (0.002)	ND (0.004) UJ
Manganese	1.9	2.31 J
Manganese (Dissolved)	0.783	0.702 J
Mercury	0.0003 (D)	-
Nickel	0.076	0.081
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.04 (D)	0.068 (AD)

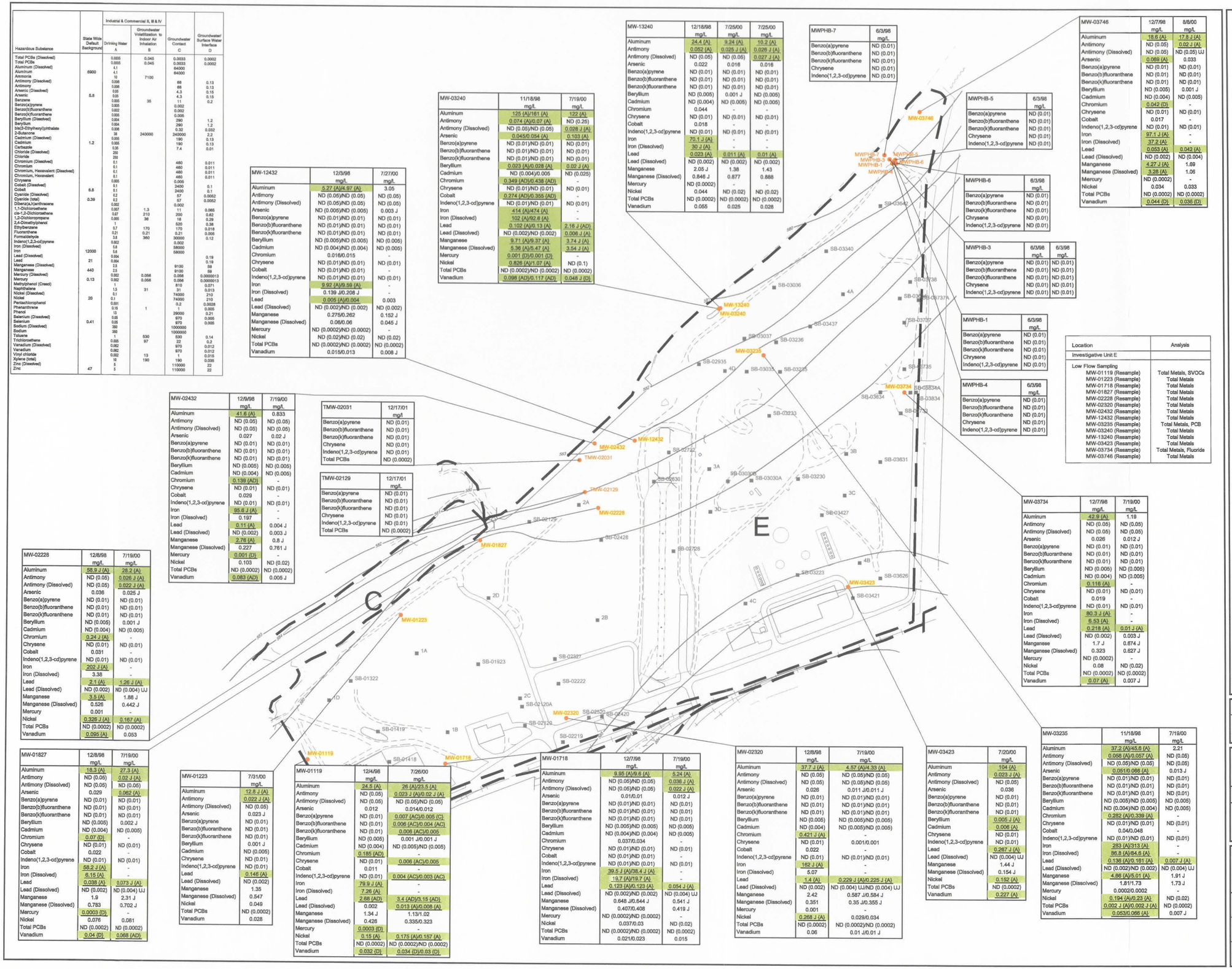
MW-01223	7/31/00 mg/L
Aluminum	12.8 J (A)
Antimony	0.022 J (A)
Antimony (Dissolved)	ND (0.05)
Arsenic	0.023 J
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Beryllium	0.001 J
Cadmium	ND (0.005)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)
Lead	0.146 (A)
Lead (Dissolved)	ND (0.002)
Manganese	1.35
Manganese (Dissolved)	0.547
Nickel	0.049
Total PCBs	ND (0.0002)
Vanadium	0.028

MW-01119	12/4/98 mg/L	7/26/00 mg/L
Aluminum	24.5 (A)	26 (A)/23.5 (A)
Antimony	ND (0.05)	0.023 J (A)/0.02 J (A)
Antimony (Dissolved)	ND (0.05)	ND (0.05)/ND (0.05)
Arsenic	0.012	0.014/0.012
Benzo(a)pyrene	ND (0.01)	0.007 (AC)/0.005 (C)
Benzo(b)fluoranthene	ND (0.01)	0.006 (AC)/0.004 (AC)
Benzo(k)fluoranthene	ND (0.01)	0.006 (AC)/0.005
Beryllium	ND (0.005)	0.001 J/0.001 J
Cadmium	ND (0.004)	ND (0.005)/ND (0.005)
Chromium	0.185 (AD)	-
Chrysene	ND (0.01)	0.006 (AC)/0.005
Cobalt	0.011	-
Indeno(1,2,3-cd)pyrene	ND (0.01)	0.004 (AC)/0.003 (AC)
Iron	79.9 J (A)	-
Iron (Dissolved)	7.26 (A)	-
Lead	2.88 (AD)	3.4 (AD)/3.15 (AD)
Lead (Dissolved)	0.002	0.013 (A)/0.008 (A)
Manganese	1.34 J	1.13/1.02
Manganese (Dissolved)	0.426	0.335/0.323
Mercury	0.0003 (D)	-
Nickel	0.15 (A)	0.175 (A)/0.157 (A)
Total PCBs	ND (0.0002)	ND (0.0002)/ND (0.0002)
Vanadium	0.032 (D)	0.034 (D)/0.03 (D)

MW-01718	12/7/98 mg/L	7/19/00 mg/L
Aluminum	9.95 (A)/9.6 (A)	5.24 (A)
Antimony	ND (0.05)/ND (0.05)	0.036 J (A)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	0.022 J (A)
Arsenic	0.01/0.01	0.012 J
Benzo(a)pyrene	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)/ND (0.01)	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)/ND (0.01)	ND (0.01)
Beryllium	ND (0.005)/ND (0.005)	ND (0.005)
Cadmium	ND (0.004)/ND (0.004)	ND (0.005)
Chromium	0.037/0.034	-
Chrysene	ND (0.01)/ND (0.01)	ND (0.01)
Cobalt	ND (0.01)/ND (0.01)	-
Indeno(1,2,3-cd)pyrene	ND (0.01)/ND (0.01)	ND (0.01)
Iron	39.5 J (A)/38.4 J (A)	-
Iron (Dissolved)	19.7 (A)/19.7 (A)	-
Lead	0.123 (A)/0.123 (A)	0.054 J (A)
Lead (Dissolved)	ND (0.002)/ND (0.002)	ND (0.004) UJ
Manganese	0.648 J/0.644 J	0.541 J
Manganese (Dissolved)	0.407/0.408	0.419 J
Mercury	ND (0.0002)/ND (0.0002)	-
Nickel	0.037/0.03	ND (0.02)
Total PCBs	ND (0.0002)/ND (0.0002)	ND (0.0002)
Vanadium	0.021/0.023	0.015

MW-02320	12/8/98 mg/L	7/19/00 mg/L
Aluminum	37.7 J (A)	4.57 (A)/4.33 (A)
Antimony	ND (0.05)	ND (0.05)/ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)/ND (0.05)
Arsenic	0.028	0.011 J/0.011 J
Benzo(a)pyrene	ND (0.01)	ND (0.01)/ND (0.01)
Benzo(b)fluoranthene	ND (0.01)	ND (0.01)/ND (0.01)
Benzo(k)fluoranthene	ND (0.01)	ND (0.01)/ND (0.01)
Beryllium	ND (0.005)	ND (0.005)/ND (0.005)
Cadmium	ND (0.004)	ND (0.005)/ND (0.005)
Chromium	0.421 J (A)	-
Chrysene	ND (0.01)	0.001/0.001
Cobalt	0.022	-
Indeno(1,2,3-cd)pyrene	ND (0.01)	ND (0.01)/ND (0.01)
Iron	162 J (A)	-
Iron (Dissolved)	5.07	-
Lead	1.4 (A)	0.228 J (A)/0.225 J (A)
Lead (Dissolved)	ND (0.002)	ND (0.004) UJ/ND (0.004) UJ
Manganese	2.42	0.587 J/0.584 J
Manganese (Dissolved)	0.351	0.35 J/0.355 J
Mercury	0.001	-
Nickel	0.268 J (A)	0.029/0.034
Total PCBs	ND (0.0002)	ND (0.0002)/ND (0.0002)
Vanadium	0.06	0.01 J/0.01 J

MW-03423	7/20/00 mg/L
Aluminum	104 (A)
Antimony	0.023 J (A)
Antimony (Dissolved)	ND (0.05)
Arsenic	0.036
Benzo(a)pyrene	ND (0.01)
Benzo(b)fluoranthene	ND (0.01)
Benzo(k)fluoranthene	ND (0.01)
Beryllium	0.005 J (A)
Cadmium	0.006 (A)
Chrysene	ND (0.01)
Indeno(1,2,3-cd)pyrene	ND (0.01)
Lead	0.267 J (A)
Lead (Dissolved)	ND (0.004) UJ
Manganese	1.44 J
Manganese (Dissolved)	0.154 J
Nickel	0.162 (A)
Total PCBs	ND (0.0002)
Vanadium	0.227 (A)



KEY MAP

0 100 200ft

LEGEND

- A-- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- RESAMPLE OF MONITORING WELL

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT E
RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

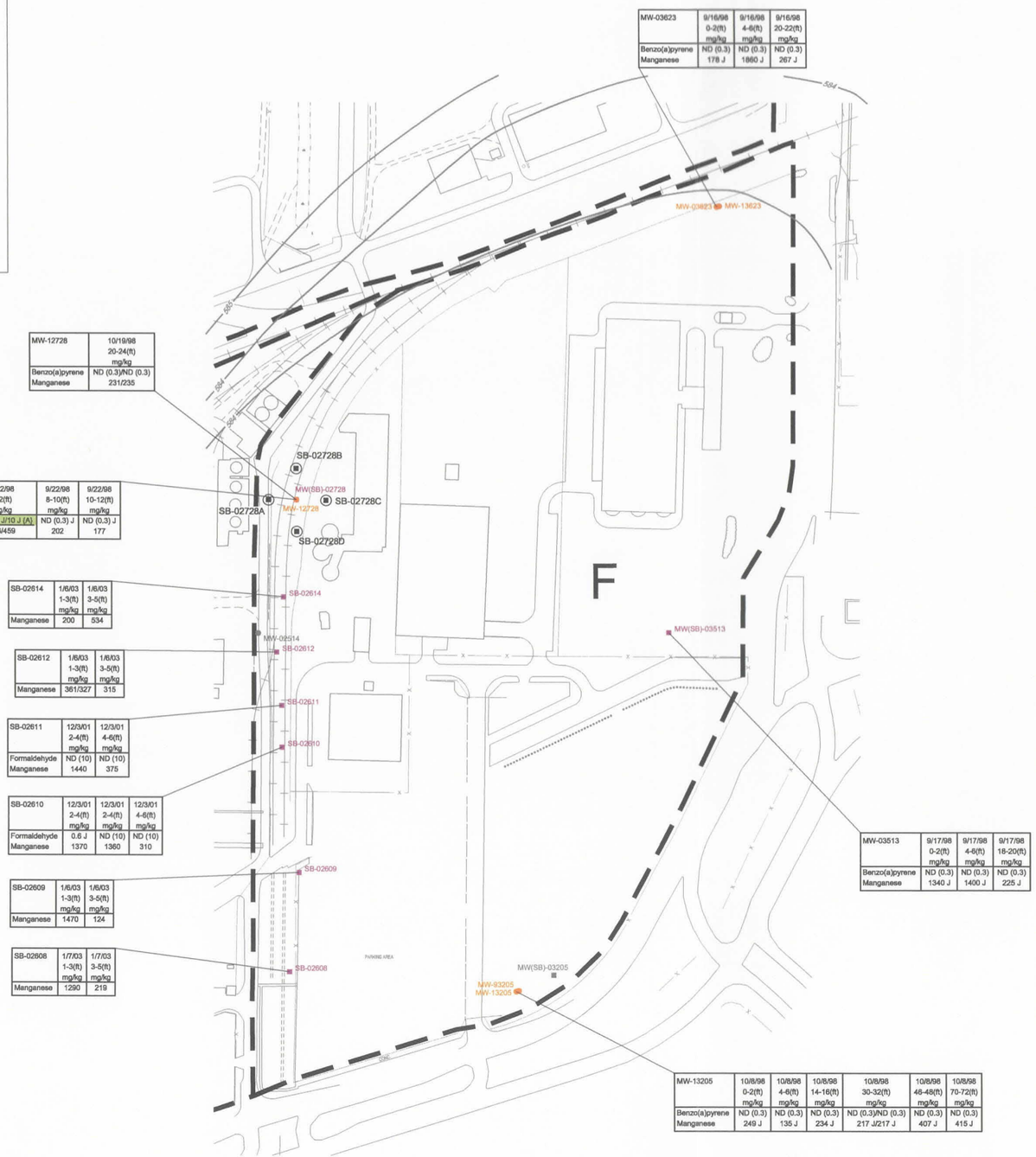
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure E3

17075-18(018)GN-WA010 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs		18	18000	6500	28000	1
Aluminum	6900	377000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		440	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		2400				
Chloride						
Chromium		9200		240		
Chromium, Hexavalent		6200		240		
Chrysene		8000				
Cobalt	6.8	9000		5900		
Cyanide (total)	0.39	200		350		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		570	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	61	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	1000000	4100000	880000	
Formaldehyde		60000	65	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	90000		1500		
Mercury	0.13	590	89	8800	62	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		52000	470	88000	350	
Nickel	20	150000		16000		
Pentachlorophenol		320		130000		
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	960		59000		
Sodium		1000000				
Toluene		200	250	12000000	36000	
Trichloroethene		500	37	2300000	440	
Vanadium		5600				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		150	150	130000000	65000	
Zinc (Total)	47	630000				

Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit F			
Adjacent to MW-02728			
SB-02728A	West of MW-02728	0'-2'	SVOCs
SB-02728B	North of MW-02728	0'-2'	SVOCs
SB-02728C	East of MW-02728	0'-2'	SVOCs
SB-02728D	South of MW-02728	0'-2'	SVOCs



MW-03623	9/16/98 0-2(ft) mg/kg	9/16/98 4-6(ft) mg/kg	9/16/98 20-22(ft) mg/kg
Benzo(a)pyrene	ND (0.3)	ND (0.3)	ND (0.3)
Manganese	178 J	1860 J	267 J

MW-12728	10/19/98 20-24(ft) mg/kg
Benzo(a)pyrene	ND (0.3)/ND (0.3)
Manganese	231/235

MW-02728	9/22/98 0-2(ft) mg/kg	9/22/98 8-10(ft) mg/kg	9/22/98 10-12(ft) mg/kg
Benzo(a)pyrene	ND (0.3) J/10 J (A)	ND (0.3) J	ND (0.3) J
Manganese	366/459	202	177

SB-02614	1/6/03 1-3(ft) mg/kg	1/6/03 3-5(ft) mg/kg
Manganese	200	534

SB-02612	1/6/03 1-3(ft) mg/kg	1/6/03 3-5(ft) mg/kg
Manganese	361/327	315

SB-02611	12/3/01 2-4(ft) mg/kg	12/3/01 4-6(ft) mg/kg
Formaldehyde	ND (10)	ND (10)
Manganese	1440	375

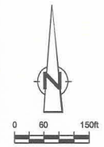
SB-02610	12/3/01 2-4(ft) mg/kg	12/3/01 2-4(ft) mg/kg	12/3/01 4-6(ft) mg/kg
Formaldehyde	0.6 J	ND (10)	ND (10)
Manganese	1370	1360	310

SB-02609	1/6/03 1-3(ft) mg/kg	1/6/03 3-5(ft) mg/kg
Manganese	1470	124

SB-02608	1/7/03 1-3(ft) mg/kg	1/7/03 3-5(ft) mg/kg
Manganese	1290	219

MW-03513	9/17/98 0-2(ft) mg/kg	9/17/98 4-6(ft) mg/kg	9/17/98 18-20(ft) mg/kg
Benzo(a)pyrene	ND (0.3)	ND (0.3)	ND (0.3)
Manganese	1340 J	1400 J	225 J

MW-13205	10/8/98 0-2(ft) mg/kg	10/8/98 4-6(ft) mg/kg	10/8/98 14-16(ft) mg/kg	10/8/98 30-32(ft) mg/kg	10/8/98 46-48(ft) mg/kg	10/8/98 70-72(ft) mg/kg
Benzo(a)pyrene	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)/ND (0.3)	ND (0.3)	ND (0.3)
Manganese	249 J	135 J	234 J	217 J/217 J	407 J	415 J



LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- PROPOSED SOIL BORING LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
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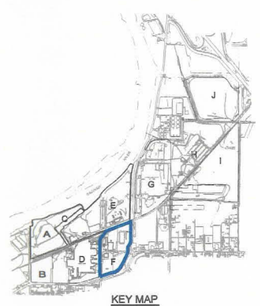
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT F RFI PHASE 1C - SOIL

CONESTOGA-ROVERS & ASSOCIATES

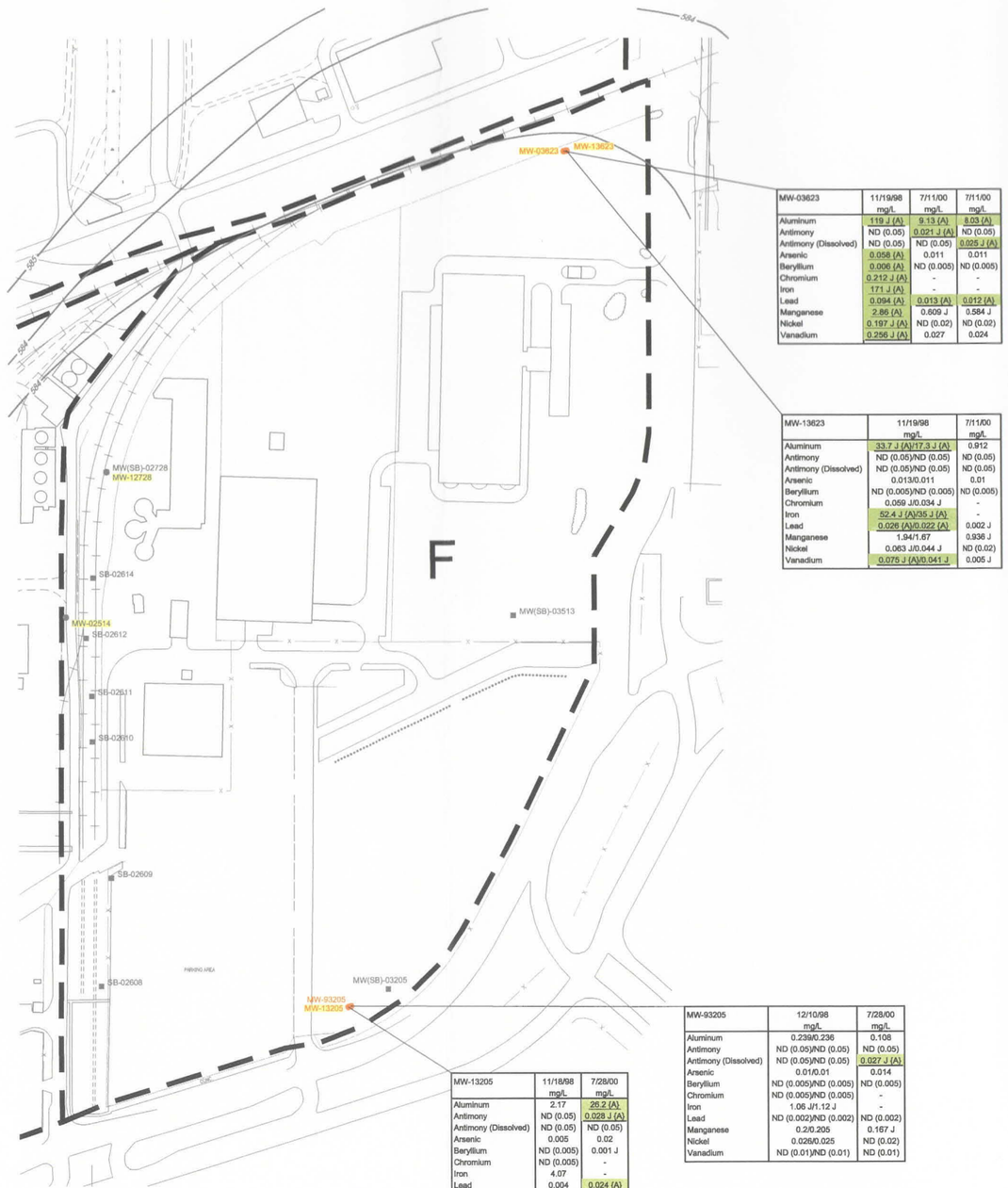
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 150'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure F1

17075-18(018)GN-WA011 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV			
		Drinking Water A	Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		16	7100		
Antimony (Dissolved)		0.006		68	0.13
Antimony		0.006		68	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.35		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		460	0.011
Chromium		0.1		460	0.011
Chromium, Hexavalent (Dissolved)		0.1		460	0.011
Chromium, Hexavalent		0.1		460	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.82
1,2-Dichloropropane		0.005	36	16	0.29
2,4-Dimethylphenol		1		820	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.9	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.6		58000	
Iron	12000	5.6		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		359		1000000	
Sodium		359		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22

Location	Analysis
Investigative Unit F	
Low Flow Sampling	
MW-02514 (Resample)	Total Metals
MW-12728 (Resample)	Total Metals
MW-13205 (Resample)	Total Metals
MW-03623 (Resample)	Total Metals
MW-13623 (Resample)	Total Metals

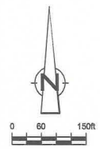


MW-03623	11/19/98 mg/L	7/11/00 mg/L	7/11/00 mg/L
Aluminum	119 J (A)	9.13 (A)	8.03 (A)
Antimony	ND (0.05)	0.021 J (A)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)	0.025 J (A)
Arsenic	0.058 (A)	0.011	0.011
Beryllium	0.006 (A)	ND (0.005)	ND (0.005)
Chromium	0.212 J (A)	-	-
Iron	171 J (A)	-	-
Lead	0.094 (A)	0.013 (A)	0.012 (A)
Manganese	2.86 (A)	0.609 J	0.584 J
Nickel	0.197 J (A)	ND (0.02)	ND (0.02)
Vanadium	0.256 J (A)	0.027	0.024

MW-13623	11/19/98 mg/L	7/11/00 mg/L
Aluminum	33.7 J (A)/17.3 J (A)	0.912
Antimony	ND (0.05)/ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	ND (0.05)
Arsenic	0.013/0.011	0.01
Beryllium	ND (0.005)/ND (0.005)	ND (0.005)
Chromium	0.059 J/0.034 J	-
Iron	52.4 J (A)/35 J (A)	-
Lead	0.026 (A)/0.022 (A)	0.002 J
Manganese	1.94/1.67	0.936 J
Nickel	0.063 J/0.044 J	ND (0.02)
Vanadium	0.075 J (A)/0.041 J	0.005 J

MW-13205	11/18/98 mg/L	7/28/00 mg/L
Aluminum	2.17	26.2 (A)
Antimony	ND (0.05)	0.028 J (A)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.005	0.02
Beryllium	ND (0.005)	0.001 J
Chromium	ND (0.005)	-
Iron	4.07	-
Lead	0.004	0.024 (A)
Manganese	0.161	1.04 J
Nickel	ND (0.02)	0.064
Vanadium	ND (0.01)	0.067 (A)

MW-93205	12/10/98 mg/L	7/28/00 mg/L
Aluminum	0.239/0.236	0.108
Antimony	ND (0.05)/ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	0.027 J (A)
Arsenic	0.01/0.01	0.014
Beryllium	ND (0.005)/ND (0.005)	ND (0.005)
Chromium	ND (0.005)/ND (0.005)	-
Iron	1.06 J/1.12 J	-
Lead	ND (0.002)/ND (0.002)	ND (0.002)
Manganese	0.2/0.205	0.167 J
Nickel	0.026/0.025	ND (0.02)
Vanadium	ND (0.01)/ND (0.01)	ND (0.01)



LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- RESAMPLE OF MONITORING WELL

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
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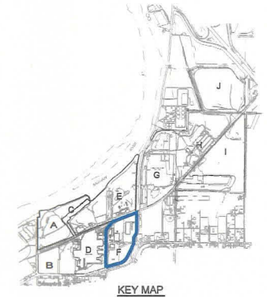
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT F
RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 150'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure F2

17075-18(018)GN-WA012 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV					Toxic Substance Control Act
		Direct Contact	Soil Volatilization to Indoor Air	Ambient Air Particulate Soil Inhalation	Ambient Air Finite VSIC for 2 Meter Source Thickness		
		A	B	C	D		E
Total PCBs	6900	16	16000	6500	28000		1
Aluminum		370000					
Ammonia				2900000			
Antimony		670		5900			
Arsenic	5.8	37		910			
Benzene		400	8.4	470000	99		
Benzo(a)pyrene		8		1900			
Benzo(b)fluoranthene		80					
Benzo(k)fluoranthene		800					
Beryllium		1600		590			
bis(2-Ethylhexyl)phthalate		13000		890000			
2-Butanone		27000	27000	29000000	36000		
Cadmium	1.2	2100		2200			
Carbazole		2400					
Chloride							
Chromium		9200		240			
Chromium, Hexavalent		6200		240			
Chrysene		8000					
Cobalt	5.8	9000		5900			
Cyanide (total)	0.39	250		250			
Dibenz(a,h)anthracene		8					
1,1-Dichloroethene		570	0.33	78000	15		
cis-1,2-Dichloroethene		640	41	10000000	430		
1,2-Dichloropropane		550	7.4	120000	51		
2,4-Dimethylphenol		36000		2100000			
Ethylbenzene		140	140	13000000	3100		
Fluoranthene		130000	10000000	4100000	880000		
Formaldehyde		60000	65	300000	89		
Indeno(1,2,3-cd)pyrene		83					
Iron	12000	580000					
Lead	21	900		44000			
Manganese	440	90000		1500			
Mercury	0.13	580	89	8800	82		
Methylphenol (Cresol)		36000		2900000			
Naphthalene		52000	470	88000	350		
Nickel	20	150000		16000			
Pentachlorophenol		320		130000			
Phenanthrene		5200	5100	2900	190		
Phenol		12000		18000000			
Selenium	0.41	9800		58000			
Sodium		1000000					
Toluene		250	250	12000000	36000		
Trichloroethene		500	37	2300000	440		
Vanadium		5500					
Vinyl chloride		34	2.8	890000	170		
Xylene (total)		150	150	1300000000	85000		
Zinc (Total)	47	630000					

Location	Details	Depth Interval (bgs)	Analysis
Adjacent toTMW-04635			
SB-04635A	50' North-East of TMW-04635	0'-2', 2'-4'	Hex. and Total Chromium
SB-04635B	50' South-East of TMW-04635	0'-2', 2'-4'	Hex. and Total Chromium
B05-04	Resample B05 (1998)	0'-2'	PCBs
B12-04	Resample B12 (1998)	0'-2'	Hex. and Total Chromium, Manganese

B06 (1998)	2/5/98 1-2(ft) mg/kg		
Arsenic	4		
Chromium	55		
Manganese	1310		
Total PCBs	0.3 J		

B07 (1998)	2/5/98 3-4(ft) mg/kg		
Arsenic	2		
Chromium	37		
Manganese	517		
Total PCBs	ND (0.1)		

B08 (1998)	2/5/98 3-4(ft) mg/kg		
Arsenic	4		
Chromium	25		
Manganese	153		
Total PCBs	ND (0.1)		

STOCK	2/6/98 0-2(ft) mg/kg		
Arsenic	3		
Chromium	58		
Manganese	1130		
Total PCBs	ND (0.1)		

B13 (1998)	2/6/98 3-4(ft) mg/kg		
Arsenic	3		
Chromium	17		
Manganese	569		
Total PCBs	ND (0.1)		

SB-1	6/2/98 2-3(ft) mg/kg		
Arsenic	6		
Chromium	123		
Manganese	2320 (C)		
Total PCBs	0.25 J		

B05 (1998)	2/5/98 3-4(ft) mg/kg		
Arsenic	11		
Chromium	109		
Manganese	904		
Total PCBs	3.35 J (E)		

TMW-04356	12/18/02 0-2(ft) mg/kg	12/18/02 2-4(ft) mg/kg	
Total PCBs	0.253 J	0.209 J	

B12 (1998)	2/6/98 3-4(ft) mg/kg		
Arsenic	7		
Chromium	328 (C)		
Manganese	9600 (C)		
Total PCBs	ND (0.1)		

SB-04552	6/9/00 0-2(ft) mg/kg		
Arsenic	1.4 J		
Manganese	84.9		

MW-04854	9/18/98 0-2(ft) mg/kg	9/18/98 4-6(ft) mg/kg	9/18/98 12-14(ft) mg/kg	
Arsenic	2	3	2	
Chromium	19	10	13	
Manganese	404 J	119 J	222 J	
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	

SB-04251	12/18/02 0-2(ft) mg/kg	12/18/02 2-4(ft) mg/kg	
Total PCBs	0.186 J/ND (0.11)	0.191 J	

MW-04250	9/15/98 0-2(ft) mg/kg	9/15/98 4-6(ft) mg/kg	9/15/98 12-14(ft) mg/kg	
Arsenic	3/3	13	6	
Chromium	35 J/46 J	358 J (C)	14 J	
Manganese	614 J/523 J	9860 J (C)	407 J	
Total PCBs	ND (0.1)/ND (0.1)	ND (0.1)	ND (0.1)	

B04 (1998)	2/5/98 3-4(ft) mg/kg		
Arsenic	2		
Chromium	61		
Manganese	845		
Total PCBs	ND (0.1)		

B11 (1998)	2/6/98 3-4(ft) mg/kg		
Arsenic	12		
Chromium	487 (C)		
Manganese	11400 (C)		
Total PCBs	ND (0.1)		

B-2 (2000-G)	11/29/00 0-2(ft) mg/kg		
Arsenic	4.2		
Chromium	25.6		
Manganese	334		
Total PCBs	ND (0.1)		

MW-04040	9/17/98 0-2(ft) mg/kg	9/17/98 4-6(ft) mg/kg	9/17/98 14-16(ft) mg/kg	
Arsenic	1	4	5	
Chromium	11 J	42 J	14 J	
Manganese	77 J	291 J	249 J	
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	

B-4 (2000-G)	11/29/00 1-2.5(ft) mg/kg		
Arsenic	0.6 J		
Chromium	4		
Manganese	35		
Total PCBs	0.18 J		

B03 (1998)	2/5/98 3-4(ft) mg/kg		
Arsenic	ND (1)		
Chromium	3		
Manganese	12		
Total PCBs	ND (0.1)		

B-3 (2000-G)	11/29/00 0-2(ft) mg/kg		
Arsenic	1 J		
Chromium	40.6		
Manganese	952		
Total PCBs	ND (0.1)		

EB-119	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 8-10(ft) mg/kg	
Arsenic	3.1	5.7	2.5	
Chromium Total	23	110	19	

EB-120	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 10-12(ft) mg/kg	
Arsenic	2.8	3.4	5.3	
Chromium Total	42	25	8	

EB-114	9/1/87 0-2(ft) mg/kg	9/1/87 4-5.5(ft) mg/kg	9/1/87 9-11(ft) mg/kg	
Arsenic	11	81 (A)	6.4	
Chromium Total	32	52	9.7	

SB-05145	6/8/00 0-2(ft) mg/kg	6/8/00 2-3(ft) mg/kg	
Arsenic	1.3 J	1.8 J	
Manganese	145 J	206 J	

SB-05246	6/8/00 0-2(ft) mg/kg	6/8/00 0-2(ft) mg/kg	
Arsenic	2.6 J	2.9	
Manganese	526 J	464 J	

SB-05245	6/8/00 0-2(ft) mg/kg	6/8/00 0-2(ft) mg/kg	6/8/00 2-3.3(ft) mg/kg
Arsenic	2.3 J	3.3	2.3 J
Manganese	314 J	710 J	359 J

SB-05046	6/8/00 0-2(ft) mg/kg		
Arsenic	2.1 J		
Manganese	449 J		

B-1 (1987)	9/1/87 1-2(ft) mg/kg	9/1/87 4.5-5.5(ft) mg/kg	
Arsenic	11	4.9	

B02 (1998)	2/5/98 3.5-4.5(ft) mg/kg		
Arsenic	12		
Chromium	20		
Manganese	248		
Total PCBs	ND (0.1)		

B01 (1998)	2/5/98 3-4(ft) mg/kg		
Arsenic	2		
Chromium	30		
Manganese	721		
Total PCBs	ND (0.1)		

SS-1	6/3/98 0-0(ft) mg/kg		
Arsenic	4		
Chromium	94		
Manganese	1980		
Total PCBs	ND (0.1)		

SB-4	6/3/98 2-3(ft) mg/kg		
Arsenic	3		
Chromium	47		
Manganese	790		
Total PCBs	ND (0.1)		

SB-3	6/3/98 2-3(ft) mg/kg		
Arsenic	2		
Chromium	9		
Manganese	209		
Total PCBs	ND (0.1)		

B10 (1998)	2/6/98 3-4(ft) mg/kg		
Arsenic	2		
Chromium	34		
Manganese	675		
Total PCBs	ND (0.1)		

SB-2	6/3/98 2-3(ft) mg/kg		
Arsenic	5		
Chromium	59		
Manganese	1810		
Total PCBs	0.5 J		

EB-101	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 10-12(ft) mg/kg	
Arsenic	4.7	1.6	5.5	
Chromium Total	110	14	12	

EB-107	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 10-12(ft) mg/kg	
Arsenic	9	11	5.6	
Chromium Total	52	100	11	

B-2 (1987)	9/1/87 1-2(ft) mg/kg	9/1/87 3-4(ft) mg/kg	
Arsenic	5.2	5	

EB-113	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 6-8(ft) mg/kg	
Arsenic	7.2	3.8	6.1	
Chromium Total	21	25	50	

EB-102	9/1/87 0-2(ft) mg/kg	9/1/87 8-10(ft) mg/kg	9/1/87 10-12(ft) mg/kg	
Arsenic	2.7	0.8	10	
Chromium Total	64	85	14	

MW-3	9/1/87 1-2(ft) mg/kg	9/1/87 3-4(ft) mg/kg	
Arsenic	13	5.4	

FORMER NODULAR IRON PLANT AREA

G

G - NORTH

G - SOUTH

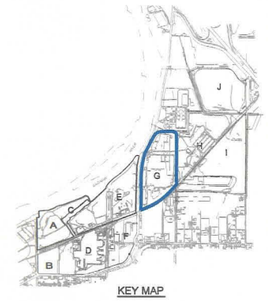
0 100 200ft

LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- SAMPLE LOCATION - NO DATA
- SOIL BORING LOCATION - HISTORICAL
- MONITORING WELL LOCATION - HISTORICAL
- PROPOSED SOIL BORING LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT G - NORTH RFI PHASE 1C - SOIL

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure G1

17075-18(018)GN-WA013 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Fickle VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs	18	18000	6500	28000		1
Aluminum	6900	377000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		400	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		2400				
Chloride						
Chromium		9200		240		
Chromium, Hexavalent		8200		240		
Chrysene		8000				
Cobalt	6.8	9000		5900		
Cyanide (total)	0.39	250		260		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		670	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	1000000	4100000	880000	
Formaldehyde		60000	66	300000	89	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	90000		1800		
Mercury	0.13	580	89	8800	62	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		52000	470	88000	350	
Nickel	20	150000		16000		
Pentachlorophenol		320		130000	3100	
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9600		59000		
Sodium		17000000				
Toluene		250	250	12000000	36000	
Trichloroethene		530	37	2300000	440	
Vanadium		5600				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		150	150	130000000	85000	
Zinc (Total)	47	630000				

TMW-04635	3/6/03 0-2(ft) mg/kg	3/6/03 2-4(ft) mg/kg	3/6/03 8-10(ft) mg/kg	3/6/03 16-18(ft) mg/kg
Arsenic	1.4	1.1	4	3.6
Chromium Total	309 (C)	15.6	59 J	13.1
Manganese	856 J	126 J	403 J	189 J
Total PCBs	0.105 J	ND (0.38)	ND (0.5)	ND (0.37)

SB-04836d	12/5/01 0-2(ft) mg/kg	12/5/01 2-4(ft) mg/kg
Arsenic	0.7 J	0.9 J

SB-04836c	12/5/01 0-2(ft) mg/kg	12/5/01 2-4(ft) mg/kg
Arsenic	ND (2.8)	2.4 J/2.2 J

SB-04836e	12/5/01 0-2(ft) mg/kg	12/5/01 2-4(ft) mg/kg
Arsenic	ND (3)	0.9 J

SB-04836b	12/5/01 0-2(ft) mg/kg	12/5/01 2-4(ft) mg/kg
Arsenic	ND (2.8)	1.2 J

B-8 (2000-G)	11/29/00 0-2(ft) mg/kg
Arsenic	1.5
Chromium	47.8
Manganese	1260
Total PCBs	ND (0.1)

SB-04836a	12/5/01 0-2(ft) mg/kg	12/5/01 2-4(ft) mg/kg
Arsenic	ND (3.1)	0.6 J

B-9 (2000-G)	11/29/00 1-3(ft) mg/kg
Arsenic	1.7
Chromium	17.1
Manganese	304
Total PCBs	ND (0.1)

B-7 (2000-G)	11/29/00 1-2.5(ft) mg/kg
Arsenic	0.9 J/1 J
Chromium	13.5/13.8
Manganese	114/159
Total PCBs	ND (0.1)/ND (0.1)

B-10 (2000-G)	11/29/00 4-6(ft) mg/kg
Arsenic	1.3
Chromium	10.7
Manganese	101
Total PCBs	ND (0.1)

TMW-04135	3/6/03 0-2(ft) mg/kg	3/6/03 2-4(ft) mg/kg	3/6/03 8-10(ft) mg/kg
Arsenic	1.8	2.6	1.9
Chromium Total	16.6	19.4	11.5
Manganese	274 J	229 J	152 J
Total PCBs	0.067 J	ND (0.38)	ND (0.39)

BB-4B	9/1/87 0-2(ft) mg/kg	9/1/87 1-2(ft) mg/kg	9/1/87 3-4(ft) mg/kg	9/1/87 4-6(ft) mg/kg
Arsenic	2.3	4.5	1.8	4.6
Chromium Total	22	-	-	43

Location	Details	Depth Interval (bgs)	Analysis
Adjacent toTMW-04635 SB-04835A SB-04835B	50' North-East of TMW-04635 50' South-East of TMW-04635	0'-2', 2'-4' 0'-2', 2'-4'	Hex. and Total Chromium Hex. and Total Chromium
B05-04 B12-04	Resample B05 (1998) Resample B12 (1998)	0'-2' 0'-2'	PCBs Hex. and Total Chromium, Manganese

TMW-04130	3/6/03 0-2(ft) mg/kg	3/6/03 2-4(ft) mg/kg	3/6/03 8-10(ft) mg/kg	3/6/03 18-20(ft) mg/kg
Arsenic	1.2	2.4	1.7	4.8
Chromium Total	68.6	21.6	12.1	7.3
Manganese	1220 J	292 J	246 J	150 J
Total PCBs	ND (0.38)	ND (0.46)	ND (0.41)	ND (0.49)

TMW-04127	3/6/03 0-2(ft) mg/kg	3/6/03 2-4(ft) mg/kg	3/6/03 2-4(ft) mg/kg	3/6/03 8-10(ft) mg/kg
Arsenic	1.4	1.4	1.4	1.6
Chromium Total	69.4	54.2	42.8	5.9
Manganese	1580 J	901 J	825 J	77.2 J
Total PCBs	ND (0.36)	ND (0.35)	ND (0.35)	ND (0.41)

TMW-04528	3/7/03 0-2(ft) mg/kg	3/7/03 2-4(ft) mg/kg	3/7/03 8-10(ft) mg/kg	3/7/03 18-20(ft) mg/kg
Arsenic	1.1	0.44	1.2	6.7
Chromium Total	20.4	6.7	9.5	13.3
Manganese	440 J	89.7 J	120 J	452 J
Total PCBs	ND (0.35)	ND (0.38)	ND (0.48)	ND (0.74)

MW-04831	9/10/98 0-2(ft) mg/kg	9/10/98 6-8(ft) mg/kg	9/10/98 24-26(ft) mg/kg	9/10/98 26-28(ft) mg/kg
Arsenic	10	8	2	5
Chromium	126	85	7	12
Manganese	1030	963	146 J	247 J
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

EB-122	9/1/87 0-2(ft) mg/kg	9/1/87 6-8(ft) mg/kg	9/1/87 18-20(ft) mg/kg
Arsenic	1.9	3.7	2.3
Chromium Total	78	59	13

EB-121	9/1/87 0-2(ft) mg/kg	9/1/87 6-8(ft) mg/kg	9/1/87 12-14(ft) mg/kg
Arsenic	5.2	2.1	4.5
Chromium Total	81	64	22

EB-123	9/1/87 0-2(ft) mg/kg	9/1/87 6-8(ft) mg/kg	9/1/87 10-20(ft) mg/kg
Arsenic	2.4	3.2	2.1
Chromium Total	86	100	19

MW-4	9/1/87 1-2(ft) mg/kg	9/1/87 3-4(ft) mg/kg
Arsenic	5.9	6

SB-05036b	12/6/01 0-2(ft) mg/kg	12/6/01 2-4(ft) mg/kg
Arsenic	1.4 J	2.3 J

EB-115	9/1/87 0-2(ft) mg/kg	9/1/87 4-8(ft) mg/kg	9/1/87 9.5-11.5(ft) mg/kg
Arsenic	10	21	8.3
Chromium Total	22	26	10

EB-116	9/1/87 0-2(ft) mg/kg	9/1/87 6-8(ft) mg/kg	9/1/87 10-12(ft) mg/kg
Arsenic	8.3	2.4	2.1
Chromium Total	10	44	13

EB-108	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 9.5-11.5(ft) mg/kg
Arsenic	16	11	4.5
Chromium Total	28	40	24

SB-05036a	12/11/01 0-2(ft) mg/kg	12/11/01 2-4(ft) mg/kg
Arsenic	1.8/0.5 J	ND (1.2)

B-5 (1987)	9/1/87 3-4(ft) mg/kg	9/1/87 5-6(ft) mg/kg
Arsenic	3.1	13

SB-05036g	12/6/01 0-2(ft) mg/kg	12/6/01 2-4(ft) mg/kg
Arsenic	2.1 J	2.2 J

B-6 (1987)	9/1/87 1-2(ft) mg/kg	9/1/87 3-4(ft) mg/kg
Arsenic	9	9

EB-124	9/1/87 0-2(ft) mg/kg	9/1/87 6-8(ft) mg/kg	9/1/87 8-20(ft) mg/kg
Arsenic	2.1	1.8	8
Chromium Total	65	69	33

SB-05036i	12/6/01 0-2(ft) mg/kg	12/6/01 2-4(ft) mg/kg
Arsenic	1.9 J	2 J

MW-05036	10/30/98 0-2(ft) mg/kg	10/30/98 4-6(ft) mg/kg	10/30/98 30-32(ft) mg/kg
Arsenic	2	4	4/5
Chromium	59	71	12/13
Manganese	1100	1200	214/215
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)/ND (0.1)

TMW-05035	3/6/03 0-2(ft) mg/kg	3/6/03 2-4(ft) mg/kg	3/6/03 8-10(ft) mg/kg
Arsenic	0.91	2.3	0.93
Chromium Total	43.5	62.9	7.4
Manganese	1230 J	1130 J	83.1 J
Total PCBs	ND (0.4)	0.066 J	ND (0.4)

TMW-05032	3/7/03 0-2(ft) mg/kg	3/7/03 2-4(ft) mg/kg	3/7/03 8-10(ft) mg/kg	3/7/03 18-20(ft) mg/kg
Arsenic	2.3	1.1	5.1	3.6
Chromium Total	33.7 J	16.8	44.7	5.3
Manganese	1250 J	300 J	722 J	182 J
Total PCBs	0.043 J	ND (0.39)	ND (0.6)	ND (0.43)

EB-109	9/1/87 0-2(ft) mg/kg	9/1/87 3.5-5.5(ft) mg/kg	9/1/87 9-10.5(ft) mg/kg
Arsenic	12	16	3.2
Chromium Total	27	10	150

SB-05036c	12/11/01 0-2(ft) mg/kg	12/11/01 2-4(ft) mg/kg
Arsenic	2.6	2.5

EB-110	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 12-14(ft) mg/kg
Arsenic	2.2	9.8	3.3
Chromium Total	49	51	14

EB-103	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 10-12(ft) mg/kg
Arsenic	2	1.9	0.9
Chromium Total	ND (1)	ND (1)	7.9

SB-05036d	12/6/01 0-2(ft) mg/kg	12/6/01 2-4(ft) mg/kg	12/6/01 0-2(ft) mg/kg
Arsenic	0.7 J	0.8 J	0.7 J

EB-104	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 10-12(ft) mg/kg
Arsenic	2.3	3.8	1.8
Chromium Total	32	29	12

EB-117	9/1/87 0-2(ft) mg/kg	9/1/87 4-8(ft) mg/kg	9/1/87 12-14(ft) mg/kg
Arsenic	2.3	3.7	2.6
Chromium Total	120	28	12

SB-05036e	12/6/01 0-2(ft) mg/kg	12/6/01 2-4(ft) mg/kg
Arsenic	2.6 J	3.5

EB-111	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 10-12(ft) mg/kg
Arsenic	1.4	5.9	1.3
Chromium Total	42	44	8.3

SB-05036f	12/6/01 0-2(ft) mg/kg	12/6/01 2-4(ft) mg/kg
Arsenic	1.3 J	1.4 J

EB-105	9/1/87 0-2(ft) mg/kg	9/1/87 6-8(ft) mg/kg	9/1/87 8-10(ft) mg/kg
Arsenic	1.8	4.6	ND (0.8)
Chromium Total	36	23	9

EB-106	9/1/87 0-2(ft) mg/kg	9/1/87 2-4(ft) mg/kg	9/1/87 12-14(ft) mg/kg
Arsenic	2.7	3.3	2.7
Chromium Total	40	22	12

EB-112	9/1/87 0-2(ft) mg/kg	9/1/87 4-6(ft) mg/kg	9/1/87 12-14(ft) mg/kg
Arsenic	11	2.8	1.5
Chromium Total	38	30	12

SB-05036h	12/6/01 0-2(ft) mg/kg	12/6/01 2-4(ft) mg/kg
Arsenic	2.4 J	4.4

EB-118	9/1/87 0-2(ft) mg/kg	9/1/87 5-8(ft) mg/kg	9/1/87 12-14(ft) mg/kg
Arsenic	2.5	6.1	2.5
Chromium Total	60	23	12

MW-04832	9/10/98 0-2(ft) mg/kg	9/10/98 6-8(ft) mg/kg	9/10/98 24-26(ft) mg/kg	9/10/98 26-28(ft) mg/kg
Arsenic	2	2	2	2
Chromium	12	11	8	8
Manganese	1030	1020	1020	1020
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

FORMER NODULAR IRON PLANT AREA

G

G - NORTH

G - SOUTH

SEE FIGURE G2a FOR DETAIL OF THIS AREA

0 100 200ft

LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- SOIL BORING LOCATION - HISTORICAL
- MONITORING WELL LOCATION - HISTORICAL
- PROPOSED SOIL BORING LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT G - SOUTH RFI PHASE 1C - SOIL

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88 TOPO - SANBORN, 1998

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure G2

17075-18(018)GN-WA014 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs	6900	16	16000	6500	28000	1
Aluminum		370000				
Ammonia				29000000		
Antimony		670		6900		
Arsenic	5.8	37		910		
Benzene		400	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		8900000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		3200		
Carbazole		2400				
Chloride						
Chromium		9200		240		
Chromium, Hexavalent		6200		240		
Chrysene		8200				
Cobalt	6.8	9000		5900		
Cyanide (total)	0.39	250		350		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		670	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	10000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	10000000	4100000	880000	
Formaldehyde		60000	65	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	90000		1500		
Mercury	0.13	590	89	8800	82	
Methylphenol (Cresol)		36000		29000000		
Naphthalene		82000	470	88000	350	
Nickel	20	150000		16000		
Pentachlorophenol		320		130000		
Phenanthrene		6200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9600		59000		
Sodium		1000000				
Toluene		250	250	12000000	36000	
Trichloroethene		500	37	2300000	440	
Vanadium		6500				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		190	190	1300000000	85000	
Zinc (Total)	47	630000				

SB-04634B	3/7/03 0-24(ft) mg/kg	3/7/03 24-48(ft) mg/kg
Total PCBs	ND (0.4)	0.047 J

SB-04535	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg
Total PCBs	0.385 J	0.37 J

SB-04534E	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg	12/9/02 4-6(ft) mg/kg	12/9/02 6-8(ft) mg/kg
Total PCBs	0.484 J	0.202 J/0.197 J	ND (0.12)	ND (0.12)

SB-04435	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg
Total PCBs	ND (0.12)	ND (0.12)

SB-04434	9/15/98 0-2(ft) mg/kg	9/15/98 4-6(ft) mg/kg	9/15/98 13-15(ft) mg/kg
Arsenic	2	3	5
Chromium	9 J	25 J	14 J
Manganese	212 J	200 J	344 J
Total PCBs	0.35 J	0.8 J	ND (0.1)

SB-04534D	12/10/01 0-2(ft) mg/kg	12/10/01 2-4(ft) mg/kg	12/10/01 4-6(ft) mg/kg
Total PCBs	1.05 J (E).	12.8 J (E).	3.98 J (E)/5.18 J (E).

SB-04335	3/8/03 0-2(ft) mg/kg	3/8/03 2-4(ft) mg/kg
Total PCBs	0.103 J	ND (0.39)

SB-04434A	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg	12/9/02 4-6(ft) mg/kg	12/9/02 6-8(ft) mg/kg
Total PCBs	0.4 J	0.21 J	0.465 J	0.425 J

SB-04334	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg	12/9/02 4-6(ft) mg/kg	12/9/02 6-8(ft) mg/kg
Total PCBs	0.5 J	0.83 J	0.365 J	ND (0.13)

Location	Details	Depth Interval (bgs)	Analysis
Adjacent toTMW-04635			
SB-04635A	50' North-East of TMW-04635	0'-2', 2'-4'	Hex. and Total Chromium
SB-04635B	50' South-East of TMW-04635	0'-2', 2'-4'	Hex. and Total Chromium
B05-04	Resample B05 (1998)	0'-2'	PCBs
B12-04	Resample B12 (1998)	0'-2'	Hex. and Total Chromium, Manganese

SB-04333B	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg
Total PCBs	0.25 J	0.99 J

SB-04332B	3/8/03 0-2(ft) mg/kg	3/8/03 2-4(ft) mg/kg
Total PCBs	0.074 J	0.068 J

TMW-04332	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg	12/9/02 4-6(ft) mg/kg
Total PCBs	1.03 J	ND (0.13)	ND (0.17)

SB-04433D	12/4/01 0-2(ft) mg/kg	12/4/01 4-6(ft) mg/kg
Total PCBs	9.1 J (E)/10.6 J (E).	0.86 J

SB-04433c	12/4/01 0-2(ft) mg/kg	12/4/01 4-6(ft) mg/kg
Total PCBs	1.3 J (E)/0.695 J	0.365 J

SB-04433b	12/4/01 0-2(ft) mg/kg	12/4/01 4-6(ft) mg/kg
Total PCBs	4.6 J (E).	0.445 J

SB-04432	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg
Total PCBs	0.203 J/0.197 J	ND (0.13)/ND (0.12)

SB-04533d	12/5/01 0-2(ft) mg/kg	12/5/01 2-4(ft) mg/kg
Total PCBs	0.258 J/0.269 J	1.3 J (E).

SB-04533c	12/5/01 0-2(ft) mg/kg	12/5/01 2-4(ft) mg/kg
Total PCBs	0.98 J	0.291 J

SB-04533b	12/5/01 0-2(ft) mg/kg	12/5/01 2-4(ft) mg/kg
Total PCBs	0.315 J	0.63 J

SB-04533a	12/10/01 0-2(ft) mg/kg	12/10/01 4-6(ft) mg/kg
Total PCBs	0.251 J	0.21 J

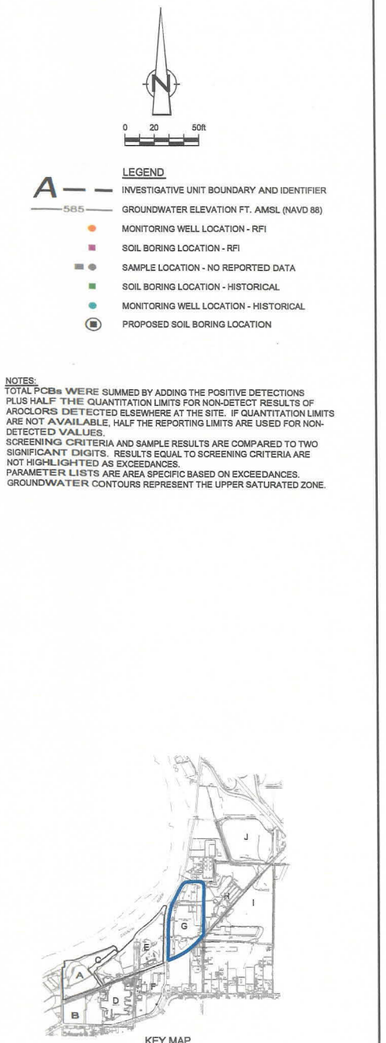
SB-04634	12/9/02 0-2(ft) mg/kg	12/9/02 2-4(ft) mg/kg
Total PCBs	0.357 J	0.271 J

SB-04534b	12/10/01 0-2(ft) mg/kg	12/10/01 4-6(ft) mg/kg
Total PCBs	1.3 J (E).	0.264 J

SB-04534c	12/10/01 0-2(ft) mg/kg	12/10/01 4-6(ft) mg/kg
Total PCBs	0.203 J	ND (0.13)

SB-04433a	12/4/01 0-2(ft) mg/kg	12/4/01 4-6(ft) mg/kg
Total PCBs	0.755 J	0.28 J

TMW-04936, MW-04836, SB-04836A, SB-04836B, SB-04836-C, B-7 (1987), B-7 (2000-G), TMW-04436, B-14, B-12, SB-04836-E, SB-04836-D, B-15, SB-05036-I, B-8 (2000-G), TMW-04935, TMW-05035, B-10 (2000-G), TMW-04235B, B-9 (2000-G), TMW-04436, SB-04635A, TMW-04635, SB-04635B, B-11, TMW-04235A, MW-04435, SB-04534A, SB-04535, MW-04835, TMW-04934, SB-04435, SB-04335, SB-04435A, SB-04634b, SB-04434, SB-04534E, SB-04534-B, SB-04534D, MW-04434, MW-04534, SB-04634, FNDN, TMW-04233, BB-4B, MW-04333, SB-04434A, SB-04534-C, SB-04433-A, SB-04433A, SB-04533-A, SB-04333B, SB-04435-D, SB-04433-B, SB-04533-D, SB-04333A, SB-04433-C, SB-04533-B, TMW-05032, SB-04533C, MW-04433, SB-04332b, SB-04432, TMW-04531, TMW-04332, TMW-04630, TMW-04528



0 20 50ft

LEGEND

- A — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 — GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- SOIL BORING LOCATION - HISTORICAL
- MONITORING WELL LOCATION - HISTORICAL
- PROPOSED SOIL BORING LOCATION

NOTES:

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3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT G - SOUTH
RFI PHASE 1C - SOIL

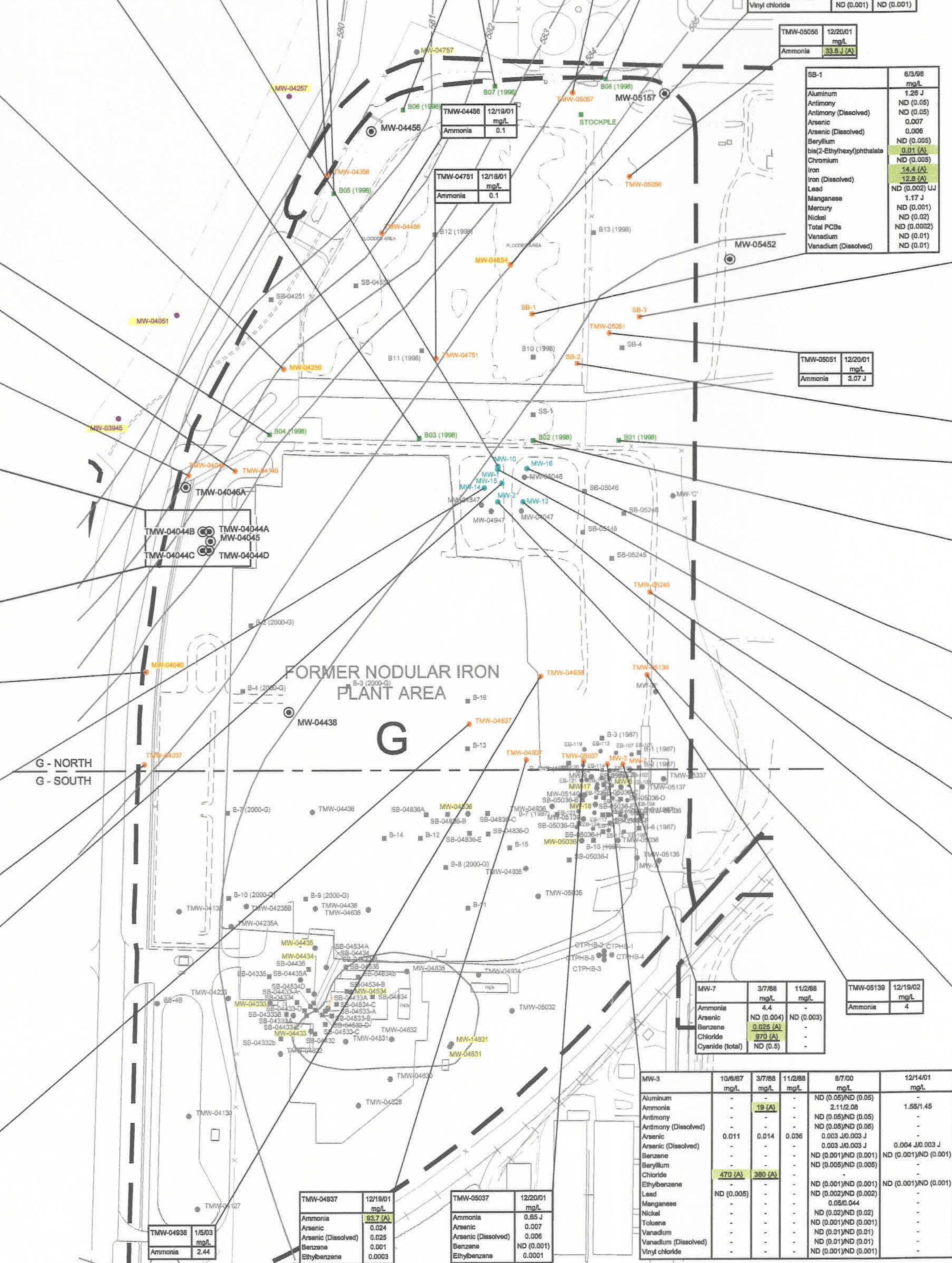
CONESTOGA-ROVERS & ASSOCIATES

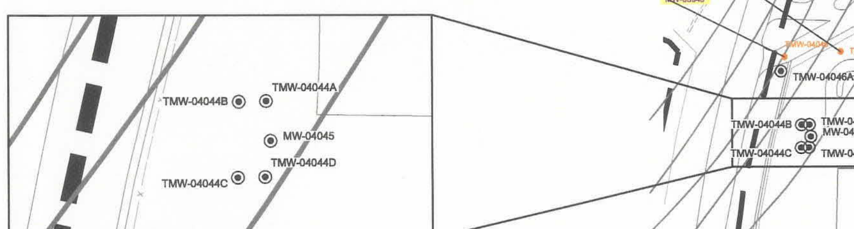
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1998

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 50'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure G2a

17075-18(018)GN-WA023 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV Drinking Water A	Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		66	0.13
Antimony		0.006		66	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.35		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		460	0.011
Chromium		0.1		460	0.011
Chromium, Hexavalent (Dissolved)		0.1		460	0.011
Chromium, Hexavalent		0.1		460	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.62
1,2-Dichloropropane		0.005	36	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.6		58000	
Iron	12000	5.6		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22





DETAIL
SCALE: 1" = 60'

B03 (1998)	2/6/98 mg/l
Antimony (Dissolved)	ND (0.05)
Arsenic (Dissolved)	ND (0.005)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	7.55 (A)
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

MW-10	10/6/87 mg/L	11/2/88 mg/L
Arsenic	0.01	0.006
Benzene	-	0.006 (A)
Chloride	38	-

B05 (1998)	2/6/98 mg/l
Antimony (Dissolved)	ND (0.05)
Arsenic (Dissolved)	0.009
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	ND (0.02)
Toluene	ND (0.001)
Total PCBs	0.001 J
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

TMW-04356	12/20/02 mg/L
Ammonia	3.14

B08 (1998)	2/6/98 mg/l
Antimony (Dissolved)	ND (0.05)
Arsenic (Dissolved)	ND (0.005)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	5.5
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

TMW-05057	12/18/02 mg/L
Ammonia	1.39

B06 (1998)	2/6/98 mg/l
Antimony (Dissolved)	ND (0.05)
Arsenic (Dissolved)	ND (0.005)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	ND (0.02)
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

B07 (1998)	2/6/98 mg/l
Antimony (Dissolved)	ND (0.05)
Arsenic (Dissolved)	ND (0.005)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	0.011 (A)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	0.283
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

MW-04854	12/4/98 mg/l	7/18/00 mg/l
Aluminum	6.31 (A)	7.29 (A)
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.01	0.011
Arsenic (Dissolved)	0.008	0.007
Benzene	ND (0.001)	ND (0.001)
Beryllium	ND (0.005)	ND (0.005)
bis(2-Ethylhexyl)phthalate	ND (0.01)	ND (0.01)
Chromium	0.01	-
Cyanide (total)	ND (0.01)	0.004
Ethylbenzene	ND (0.001)	ND (0.001)
Iron	6.57 J (A)	-
Iron (Dissolved)	0.052	-
Lead	0.008 (A)	0.012 (A)
Manganese	0.138	0.221
Mercury	ND (0.0002)	-
Nickel	ND (0.02)	ND (0.02)
Toluene	ND (0.001)	ND (0.001)
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.014	0.022
Vanadium (Dissolved)	ND (0.01)	0.008 J
Vinyl chloride	ND (0.001)	ND (0.001)

MW-04250	12/4/98 mg/L	7/18/00 mg/L
Aluminum	49.3 (A)/53 (A)	9.09 (A)
Antimony	ND (0.05)/ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	ND (0.05)
Arsenic	0.024/0.024	0.008
Arsenic (Dissolved)	0.007/0.007	0.005 J
Benzene	ND (0.001)/ND (0.001)	ND (0.001)
Beryllium	ND (0.005)/ND (0.005)	ND (0.005)
bis(2-Ethylhexyl)phthalate	ND (0.01)/ND (0.01)	ND (0.01)
Chromium	0.173 (AD)/0.186 (AD)	-
Cyanide (total)	ND (0.01)/ND (0.01)	0.007 (D)
Ethylbenzene	ND (0.001)/ND (0.001)	ND (0.001)
Iron	90.1 J (A)/96.7 J (A)	-
Iron (Dissolved)	0.038/0.027	-
Lead	0.18 (A)/0.194 (A)	0.023 (A)
Manganese	2.61 J/2.78 J (A)	0.337
Mercury	ND (0.0002)/0.0002 (D)	-
Nickel	0.082/0.077	ND (0.02)
Toluene	ND (0.001)/ND (0.001)	ND (0.001)
Total PCBs	ND (0.0002)/ND (0.0002)	ND (0.0002)
Vanadium	0.084 (AD)/0.089 (AD)	0.033 (D)
Vanadium (Dissolved)	0.011/ND (0.01)	0.014 (D)
Vinyl chloride	ND (0.001)/ND (0.001)	ND (0.001)

B04 (1998)	2/6/98 mg/l
Antimony (Dissolved)	ND (0.05)
Arsenic (Dissolved)	ND (0.005)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	0.181
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

TMW-04145	12/20/01 mg/L
Ammonia	0.1 J

TMW-04046	12/19/02 mg/L
Ammonia	2.17/0.41
Benzene	0.015 (A)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	0.083
Toluene	0.14
Vinyl chloride	ND (0.001)

TMW-04456	12/19/01 mg/L
Ammonia	0.1

TMW-04751	12/18/01 mg/L
Ammonia	0.1

TMW-05056	12/20/01 mg/L
Ammonia	33.8 J (A)

SB-1	6/3/98 mg/L
Aluminum	1.26 J
Antimony	ND (0.05)
Antimony (Dissolved)	ND (0.05)
Arsenic	0.007
Arsenic (Dissolved)	0.006
Beryllium	ND (0.005)
bis(2-Ethylhexyl)phthalate	0.01 (A)
Chromium	ND (0.005)
Iron	14.4 (A)
Iron (Dissolved)	12.8 (A)
Lead	ND (0.002) UJ
Manganese	1.17 J
Mercury	ND (0.001)
Nickel	ND (0.02)
Total PCBs	ND (0.0002)
Vanadium	ND (0.01)
Vanadium (Dissolved)	ND (0.01)

TMW-05051	12/20/01 mg/L
Ammonia	3.07 J

Location	Details	Analysis
Investigative Unit G		
New GSI Monitoring Wells		
MW-03945 (Recently Installed)	240' West of TMW-04145	pH, Ammonia, Total Metals
MW-04051 (Recently Installed)	270' Northwest of MW-04250	pH, Ammonia, Total Metals
MW-04257 (Recently Installed)	330' Southwest of MW-04757	pH, Ammonia, Total Metals
MW-04765 (Recently Installed)	240' Northwest of MW-04864	pH, Ammonia, Total Metals
MW-04764 (New Well)	West of MW-04864	pH, Ammonia, Total Metals
Elevated pH in Groundwater		
MW-04438 (New Well)		pH
MW-04045 (New Well)		pH
MW-04456 (New Well)		pH
MW-05452 (New Well)		pH
Surface Water Sampling		
Various Locations Upgradient, Adjacent, and Downgradient	Within Saginaw River	pH
Resample TMW-04046		
TMW-04046A (New Well)		VOCs
Low Flow Sampling		
MW-04854 (Resample)		Total Metals
MW-04864 (Resample)		Total Metals, Ammonia, pH
MW-04250 (Resample)		Total Metals, pH
MW-04040 (Resample)		Total Metals
MW-04333 (Resample)		Total Metals
MW-04433 (Resample)		Total Metals
MW-04434 (Resample)		Total Metals, VOCs
MW-04435 (Resample)		Total Metals, VOCs
MW-04534 (Resample)		Total Metals
MW-04757 (Resample)		Total Metals
MW-04831 (Resample)		Total Metals
MW-04836 (Resample)		Total Metals
MW-05036 (Resample)		Total Metals
MW-14831 (Resample)		Total Metals
MW-8 (Resample)		VOCs, Ammonia
MW-17 (Resample)		VOCs, Ammonia
MW-18 (Resample)		Total Metals, VOCs, Ammonia
TMW-04044A (New Well)	monitor sewer bedding	pH
TMW-04044B (New Well)	monitor sewer bedding	pH
TMW-04044C (New Well)	monitor sewer bedding	pH
TMW-04044D (New Well)	monitor sewer bedding	pH
MW-5157 (New Well)	monitor sewer bedding	Total Metals, Ammonia, pH

N

0 100 200ft

LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- —585— GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- MONITORING WELL LOCATION - GSI
- SAMPLE LOCATION - NO REPORTED DATA
- SOIL BORING LOCATION - HISTORICAL
- MONITORING WELL LOCATION - HISTORICAL
- PROPOSED MONITORING WELL LOCATION
- RESAMPLE OF MONITORING WELL

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

SB-3	6/3/98 mg/l
Aluminum	11.5 J (A)
Antimony	ND (0.05)
Antimony (Dissolved)	ND (0.05)
Arsenic	ND (0.005)
Arsenic (Dissolved)	ND (0.005)
Beryllium	ND (0.005)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Chromium	0.009
Iron	13.4 (A)
Iron (Dissolved)	0.027
Lead	0.032 J (A)
Manganese	0.365 J
Mercury	ND (0.001)
Nickel	0.043
Total PCBs	ND (0.0002)
Vanadium	ND (0.01)
Vanadium (Dissolved)	ND (0.01)

SB-2	6/3/98 mg/l
Aluminum	1.89 J/3.59 J
Antimony	ND (0.05)/ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)
Arsenic	ND (0.005)/ND (0.005)
Arsenic (Dissolved)	ND (0.005)/ND (0.005)
Beryllium	ND (0.005)/ND (0.005)
bis(2-Ethylhexyl)phthalate	ND (0.01)/ND (0.01)
Chromium	ND (0.005)/ND (0.005)
Iron	2.14/4.07
Iron (Dissolved)	0.053/0.041
Lead	0.008 J (A)/0.013 J (A)
Manganese	0.121 J/0.192 J
Mercury	ND (0.001)/ND (0.001)
Nickel	ND (0.02)/ND (0.02)
Total PCBs	ND (0.0002)/ND (0.0002)
Vanadium	ND (0.01)/ND (0.01)
Vanadium (Dissolved)	ND (0.01)/ND (0.01)

B01 (1998)	2/6/98 mg/l
Antimony (Dissolved)	ND (0.05)
Arsenic (Dissolved)	ND (0.005)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	0.205
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

B02 (1998)	2/6/98 mg/l
Antimony (Dissolved)	ND (0.05)
Arsenic (Dissolved)	ND (0.005)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	0.027
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

MW-16	11/20/90 mg/L	12/18/90 mg/L	1/29/91 mg/L	2/14/91 mg/L	1/5/03 mg/L
Ammonia	-	-	-	-	0.1
Arsenic (Dissolved)	0.049	0.041	0.043	0.038	-
Chloride	51	39	36	39	-
Iron (Dissolved)	0.85	0.14	0.14	0.12	-

MW-1	10/6/87 mg/L	11/2/88 mg/L	11/20/90 mg/L	12/18/90 mg/L	1/29/91 mg/L	2/14/91 mg/L
Arsenic	0.046	0.052	-	-	-	-
Arsenic (Dissolved)	-	-	0.017	0.012	0.01	ND (0.01)
Chloride	400 (A)	-	6	ND (1)	2.7	4.5
Iron (Dissolved)	-	-	0.03	ND (0.01)	ND (0.01)	0.01
Lead	ND (0.005)	-	-	-	-	-

TMW-05245	12/20/02 mg/L
Ammonia	3.8

MW-13	11/20/90 mg/L	12/18/90 mg/L	1/29/91 mg/L	2/14/91 mg/L
Arsenic (Dissolved)	0.015	0.01	0.011	ND (0.01)
Chloride	18	22	5.8	6.5
Iron (Dissolved)	0.01	ND (0.01)	ND (0.01)	ND (0.01)

MW-7	3/7/88 mg/L	11/2/88 mg/L
Ammonia	4.4	-
Arsenic	ND (0.004)	ND (0.003)
Benzene	0.025 (A)	-
Chloride	970 (A)	-
Cyanide (total)	ND (0.5)	-

TMW-05139	12/19/02 mg/L
Ammonia	4

MW-2	10/6/87 mg/l	11/2/88 mg/l	11/20/90 mg/l	12/18/90 mg/l	1/29/91 mg/l	2/14/91 mg/l	6/5/98 mg/l
Arsenic	0.046	0.022	-	-	-	-	0.005
Arsenic (Dissolved)	-	-	0.013	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.005)
Benzene	-	-	-	-	-	-	ND (0.001)
bis(2-Ethylhexyl)phthalate	-	-	-	-	-	-	ND (0.01)
Chloride	330 (A)	-	6.5	1.5	3.6	3.2	-
Chromium	-	-	-	-	-	-	0.044
Cyanide (total)	-	-	-	-	-	-	ND (0.01)
Ethylbenzene	-	-	-	-	-	-	ND (0.001)
Iron (Dissolved)	-	-	0.05	0.02	0.02	0.01	-
Lead	ND (0.005)	-	-	-	-	-	0.032 J (A)
Mercury	-	-	-	-	-	-	ND (0.001)
Nickel	-	-	-	-	-	-	0.025
Toluene	-	-	-	-	-	-	ND (0.001)
Total PCBs	-	-	-	-	-	-	ND (0.0002)
Vinyl chloride	-	-	-	-	-	-	ND (0.001)

MW-3	10/6/87 mg/L	3/7/88 mg/L	11/2/88 mg/L	8/7/00 mg/L	12/14/01 mg/L
Aluminum	-	-	-	ND (0.05)/ND (0.05)	-
Ammonia	-	19 (A)	-	2.11/2.08	1.55/1.45
Antimony	-	-	-	ND (0.05)/ND (0.05)	-
Antimony (Dissolved)	-	-	-	ND (0.05)/ND (0.05)	-
Arsenic	0.011	0.014	0.036	0.003 J/0.003 J	-
Arsenic (Dissolved)	-	-	-	0.003 J/0.003 J	0.004 J/0.003 J
Benzene	-	-	-	ND (0.001)/ND (0.001)	ND (0.001)/ND (0.001)
Beryllium	-	-	-	ND (0.005)/ND (0.005)	-
Chloride	470 (A)	380 (A)	-	-	-
Ethylbenzene	-	-	-	ND (0.001)/ND (0.001)	ND (0.001)/ND (0.001)
Lead	ND (0.005)	-	-	ND (0.002)/ND (0.002)	-
Manganese	-	-	-	0.05/0.044	-
Nickel	-	-	-	ND (0.02)/ND (0.02)	-
Toluene	-	-	-	ND (0.001)/ND (0.001)	-
Vanadium	-	-	-	ND (0.01)/ND (0.01)	-
Vanadium (Dissolved)	-	-	-	ND (0.01)/ND (0.01)	-
Vinyl chloride	-	-	-	ND (0.001)/ND (0.001)	-

TMW-04937	12/19/01 mg/L
Ammonia	93.7 (A)
Arsenic	0.024
Arsenic (Dissolved)	0.025
Benzene	0.001
Ethylbenzene	0.0003

TMW-05037	12/20/01 mg/L
Ammonia	0.65 J
Arsenic	0.007
Arsenic (Dissolved)	0.006
Benzene	ND (0.001)
Ethylbenzene	0.0001

TMW-04938	1/5/03 mg/L
Ammonia	2.44

TMW-04837	12/20/02 mg/L
Ammonia	0.94

TMW-04037	12/19/02 mg/L
Ammonia	0.51

MW-04040	11/18/98 mg/L	8/2/00 mg/L	12/19/02 mg/L
Aluminum	42.2 (A)	14.6 (A)	-
Ammonia	-	-	0.49
Antimony	ND (0.05)	ND (0.05)	-
Antimony (Dissolved)	ND (0.05)	ND (0.05)	-
Arsenic	0.022	0.012	-
Arsenic (Dissolved)	ND (0.005)	0.003 J	-
Benzene	ND (0.001) UJ	ND (0.001)	-
Beryllium	ND (0.005)	ND (0.005)	-
bis(2-Ethylhexyl)phthalate	ND (0.01)	ND (0.01)	-
Chromium	0.165 (A)	-	-
Cyanide (total)	ND (0.01)	ND (0.01)	-
Ethylbenzene	ND (0.001) UJ	ND (0.001)	-
Iron	82.6 (A)	-	-
Iron (Dissolved)	4.47 J	-	-
Lead	0.128 (A)	0.051 (A)	-
Manganese	2.91 (A)	1.07	-
Mercury	ND (0.0002)	-	-
Nickel	0.097	0.055	-
Toluene	ND (0.001) UJ	ND (0.001)	-
Total PCBs	ND (0.0002)	ND (0.0002)	-
Vanadium	0.063	0.027	-
Vanadium (Dissolved)	ND (0.01)	0.005 J	-
Vinyl chloride	ND (0.001) UJ	ND (0.001)	-

MW-14	11/20/90 mg/L	12/18/90 mg/L	1/29/91 mg/L	2/14/91 mg/L	12/19/94 mg/L	2/7/95 mg/L	8/17/95 mg/L
Arsenic (Dissolved)	0.011	0.011	0.017	0.01	-	-	-
Benzene	-	-	-	-	ND (0.001)	-	0.039 (A)/0.04 (A)
Chloride	12	4.9	7.4	6.1	-	1.6	-
Ethylbenzene	-	-	-	-	ND (0.001)	-	0.19/0.24
Iron (Dissolved)	0.37	0.02	ND (0.01)	0.01	-	-	-
Lead	-	-	-	-	-	0.0003	0.31 (A)
Toluene	-	-	-	-	ND (0.001)	-	0.097/0.11

MW-15	11/20/90 mg/L	12/18/90 mg/L	1/29/91 mg/L	2/14/91 mg/L	12/19/94 mg/L	8/17/95 mg/L
Arsenic (Dissolved)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	-	-
Benzene	-	-	-	-	0.13 (A)	ND (0.001)
Chloride	2.5	ND (1)	ND (1)	3.4	0.05	500 (A)
Ethylbenzene	-	-	-	-	1.5 (A)	ND (0.001)
Iron (Dissolved)	0.3	0.08	0.02	0.07	-	-
Lead	-	-	-	-	0.001	0.093 (A)
Toluene	-	-	-	-	1.3 (A)	ND (0.001)

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT G - NORTH
RFI PHASE 1C - GROUNDWATER

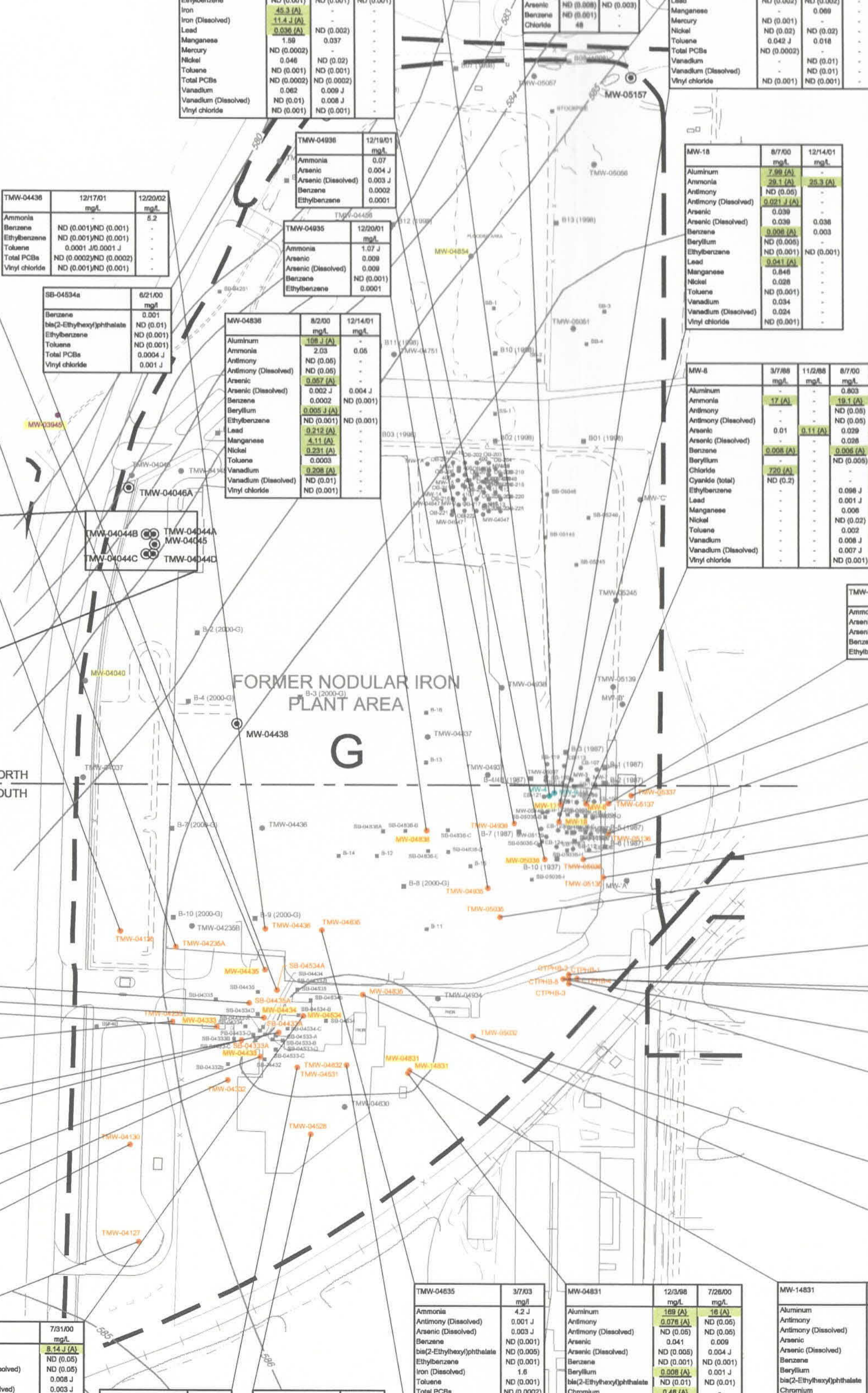
CONESTOGA-ROVERS & ASSOCIATES

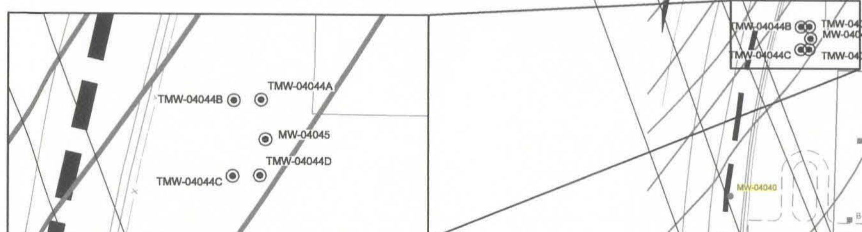
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project Nº: 17075-18	Report Nº: 018	Drawing Nº: figure G3

17075-18(018)GN-WA015 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Drinking Water A	Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		68	0.13
Antimony		0.006		68	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.35		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		460	0.011
Chromium		0.1		460	0.011
Chromium, Hexavalent (Dissolved)		0.1		460	0.011
Chromium, Hexavalent		0.1		460	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.62
1,2-Dichloropropane		0.005	36	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.6		58000	
Iron	12000	5.6		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22





DETAIL
SCALE: 1" = 60'

MW-05036	12/3/98 mg/L	8/2/00 mg/L	12/14/01 mg/L
Aluminum	13.1 (A)	0.813	-
Ammonia	-	-	2.4
Antimony	ND (0.05)	ND (0.05)	-
Antimony (Dissolved)	ND (0.05)	ND (0.05)	-
Arsenic	0.021	0.01	-
Arsenic (Dissolved)	ND (0.005)	0.009	0.008
Benzene	ND (0.001)	ND (0.001)	ND (0.001)
Beryllium	ND (0.005)	ND (0.005)	-
bis(2-Ethylhexyl)phthalate	ND (0.01)	ND (0.01)	-
Chromium	0.007	-	-
Cyanide (total)	ND (0.01)	0.005 J	-
Ethylbenzene	ND (0.001)	ND (0.001)	ND (0.001)
Iron	45.3 (A)	-	-
Iron (Dissolved)	11.4 J (A)	-	-
Lead	0.036 (A)	ND (0.002)	-
Manganese	1.59	0.037	-
Mercury	ND (0.0002)	-	-
Nickel	0.046	ND (0.02)	-
Toluene	ND (0.001)	ND (0.001)	-
Total PCBs	ND (0.0002)	ND (0.0002)	-
Vanadium	0.062	0.009 J	-
Vanadium (Dissolved)	ND (0.01)	0.008 J	-
Vinyl chloride	ND (0.001)	ND (0.001)	-

MW-4	10/6/87 mg/L	1/11/88 mg/L	11/2/88 mg/L
Ammonia	-	700 (A)	-
Arsenic	2.3 (A)	5.5 (AC)	0.89 (A)
Benzene	-	18 (AC)	-
Chloride	15000 (A)	6500 (A)	-
Cyanide (total)	-	ND (2.5)	-
Lead	ND (0.01)	-	-

MW-9	5/12/88 mg/L	11/2/88 mg/L
Ammonia	0.75	-
Arsenic	ND (0.008)	ND (0.003)
Benzene	ND (0.001)	-
Chloride	48	-

MW-17	6/4/98 mg/l	8/7/00 mg/l	12/14/01 mg/l	12/19/02 mg/l
Aluminum	-	ND (0.05)	-	-
Ammonia	-	25.5 (A)	24.4 (A)	-
Antimony	-	ND (0.05)	-	-
Antimony (Dissolved)	-	0.021 J (A)	-	-
Arsenic	0.022	0.029	-	-
Arsenic (Dissolved)	0.022	0.026	0.02	-
Benzene	0.069 J (A)	0.045 J (A)	0.004	0.002/0.002
Beryllium	-	ND (0.005)	-	-
bis(2-Ethylhexyl)phthalate	ND (0.01)	-	-	-
Chromium	ND (0.005)	-	-	-
Cyanide (total)	0.01	-	-	-
Ethylbenzene	0.016	0.006	0.0005	0.0004/0.0004
Lead	ND (0.002)	ND (0.002)	-	-
Manganese	-	0.069	-	-
Mercury	ND (0.001)	-	-	-
Nickel	ND (0.02)	ND (0.02)	-	-
Toluene	0.042 J	0.018	-	ND (0.001)/ND (0.001)
Total PCBs	ND (0.0002)	-	-	-
Vanadium	-	ND (0.01)	-	-
Vanadium (Dissolved)	-	ND (0.01)	-	-
Vinyl chloride	ND (0.001)	ND (0.001)	-	ND (0.001)/ND (0.001)

Location	Details	Analysis
Investigative Unit G		
New GSI Monitoring Wells		
MW-03945 (Recently Installed)	240' West of TMW-04145	pH, Ammonia, Total Metals
MW-04051 (Recently Installed)	270' Northwest of MW-04250	pH, Ammonia, Total Metals
MW-04257 (Recently Installed)	330' Southwest of MW-04757	pH, Ammonia, Total Metals
MW-04765 (Recently Installed)	240' Northwest of MW-04864	pH, Ammonia, Total Metals
MW-04764 (New Well)	West of MW-04864	pH, Ammonia, Total Metals
Elevated pH in Groundwater		
MW-04438 (New Well)		pH
MW-04045 (New Well)		pH
MW-04456 (New Well)		pH
MW-05452 (New Well)		pH
Surface Water Sampling		
Various Locations Upgradient, Adjacent, and Downgradient	Within Saginaw River	pH
Resample TMW-04046		
TMW-04046A (New Well)		VOCs
Low Flow Sampling		
MW-04854 (Resample)		Total Metals
MW-04864 (Resample)		Total Metals, Ammonia, pH
MW-04250 (Resample)		Total Metals, pH
MW-04040 (Resample)		Total Metals
MW-04333 (Resample)		Total Metals
MW-04433 (Resample)		Total Metals
MW-04434 (Resample)		Total Metals, VOCs
MW-04435 (Resample)		Total Metals, VOCs
MW-04534 (Resample)		Total Metals
MW-04757 (Resample)		Total Metals
MW-04831 (Resample)		Total Metals
MW-04836 (Resample)		Total Metals
MW-05036 (Resample)		Total Metals
MW-14831 (Resample)		Total Metals
MW-8 (Resample)		VOCs, Ammonia
MW-17 (Resample)		VOCs, Ammonia
MW-18 (Resample)		Total Metals, VOCs, Ammonia
TMW-04044A (New Well)	monitor sewer bedding	pH
TMW-04044B (New Well)	monitor sewer bedding	pH
TMW-04044C (New Well)	monitor sewer bedding	pH
TMW-04044D (New Well)	monitor sewer bedding	pH
MW-5157 (New Well)	monitor sewer bedding	Total Metals, Ammonia, pH

0 100 200ft

LEGEND
- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- —585— GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- MONITORING WELL LOCATION - GSI
- SAMPLE LOCATION - NO REPORTED DATA
- MONITORING WELL LOCATION - HISTORICAL
- PROPOSED MONITORING WELL LOCATION
- RESAMPLE OF MONITORING WELL

NOTES:
1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

MW-04435	7/31/00 mg/L
Aluminum	22.6 J (A)
Antimony	ND (0.05)
Antimony (Dissolved)	ND (0.05)
Arsenic	0.017 J
Arsenic (Dissolved)	0.002 J
Benzene	ND (0.001)
Beryllium	0.001 J
bis(2-Ethylhexyl)phthalate	ND (0.01)
Cyanide (total)	ND (0.01)
Ethylbenzene	ND (0.001)
Lead	0.079 (A)
Manganese	2.32
Nickel	0.059
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium	0.03
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	0.003 J (A)

TMW-04436	12/17/01 mg/L	12/20/02 mg/L
Ammonia	-	5.2
Benzene	ND (0.001)/ND (0.001)	-
Ethylbenzene	ND (0.001)/ND (0.001)	-
Toluene	0.0001 J/0.0001 J	-
Total PCBs	ND (0.0002)/ND (0.0002)	-
Vinyl chloride	ND (0.001)/ND (0.001)	-

TMW-04936	12/19/01 mg/L
Ammonia	0.07
Arsenic	0.004 J
Arsenic (Dissolved)	0.003 J
Benzene	0.0002
Ethylbenzene	0.0001

TMW-04935	12/20/01 mg/L
Ammonia	1.07 J
Arsenic	0.009
Arsenic (Dissolved)	0.009
Benzene	ND (0.001)
Ethylbenzene	0.0001

MW-18	8/7/00 mg/L	12/14/01 mg/L
Aluminum	7.99 (A)	-
Ammonia	29.1 (A)	25.3 (A)
Antimony	ND (0.05)	-
Antimony (Dissolved)	0.021 J (A)	-
Arsenic	0.039	-
Arsenic (Dissolved)	0.039	0.036
Benzene	0.006 (A)	0.003
Beryllium	ND (0.005)	-
Ethylbenzene	ND (0.001)	ND (0.001)
Lead	0.041 (A)	-
Manganese	0.846	-
Nickel	0.028	-
Toluene	ND (0.001)	-
Vanadium	0.034	-
Vanadium (Dissolved)	0.024	-
Vinyl chloride	ND (0.001)	-

TMW-04235	12/14/01 mg/L
Benzene	ND (0.001)
Ethylbenzene	ND (0.001)
Toluene	0.0002 J
Total PCBs	ND (0.0002)
Vinyl chloride	ND (0.001)

SB-04534a	6/21/00 mg/l
Benzene	0.001
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Toluene	ND (0.001)
Total PCBs	0.0004 J
Vinyl chloride	0.001 J

TMW-04135	3/7/03 mg/l
Ammonia	1.8 J
Antimony (Dissolved)	0.002 J
Arsenic (Dissolved)	0.003 J
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.005)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	4.9
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.007)
Vinyl chloride	ND (0.001)

MW-04836	8/2/00 mg/L	12/14/01 mg/L
Aluminum	108 J (A)	-
Ammonia	2.03	0.05
Antimony	ND (0.05)	-
Antimony (Dissolved)	ND (0.05)	-
Arsenic	0.057 (A)	-
Arsenic (Dissolved)	0.002 J	0.004 J
Benzene	0.0002	ND (0.001)
Beryllium	0.005 J (A)	-
Ethylbenzene	ND (0.001)	ND (0.001)
Lead	0.212 (A)	-
Manganese	4.11 (A)	-
Nickel	0.231 (A)	-
Toluene	0.0003	-
Vanadium	0.208 (A)	-
Vanadium (Dissolved)	ND (0.01)	-
Vinyl chloride	ND (0.001)	-

MW-8	3/7/88 mg/L	11/2/88 mg/L	8/7/00 mg/L	12/14/01 mg/L	12/19/02 mg/L
Aluminum	-	-	0.803	-	-
Ammonia	17 (A)	-	19.1 (A)	55.7 (A)	33 (A)
Antimony	-	-	ND (0.05)	-	-
Antimony (Dissolved)	-	-	ND (0.05)	-	-
Arsenic	0.01	0.11 (A)	0.029	-	-
Arsenic (Dissolved)	-	-	0.026	0.066 (A)	-
Benzene	0.008 (A)	-	0.006 (A)	0.024 (A)	0.015 (A)
Beryllium	-	-	ND (0.005)	-	-
Chloride	720 (A)	-	-	-	-
Cyanide (total)	ND (0.2)	-	-	-	-
Ethylbenzene	-	-	0.098 J	0.046	0.043
Lead	-	-	0.001 J	-	-
Manganese	-	-	0.006	-	-
Nickel	-	-	ND (0.02)	-	-
Toluene	-	-	0.002	-	0.004
Vanadium	-	-	0.006 J	-	-
Vanadium (Dissolved)	-	-	0.007 J	-	-
Vinyl chloride	-	-	ND (0.001)	-	ND (0.001)

TMW-05136	12/19/01 mg/L
Ammonia	1.55/1.48
Arsenic	0.003 J/0.003 J
Arsenic (Dissolved)	0.003 J/0.002 J
Benzene	ND (0.001)/ND (0.001)
Ethylbenzene	ND (0.001)/ND (0.001)

TMW-05137	12/19/01 mg/L
Ammonia	4.26
Arsenic	0.02
Arsenic (Dissolved)	0.02
Benzene	ND (0.001)
Ethylbenzene	0.0001

TMW-05337	12/19/02 mg/L
Ammonia	5.5

TMW-05036	12/20/01 mg/L
Ammonia	17.7 J (A)
Arsenic	0.015
Arsenic (Dissolved)	0.015
Benzene	0.0002
Ethylbenzene	ND (0.001)

TMW-05035	3/7/03 mg/l
Ammonia	18 J (A)/19 J (A)
Antimony (Dissolved)	0.003/0.002 J
Arsenic (Dissolved)	0.016/0.016
Benzene	ND (0.001)/ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.005)/0.012 (A)
Ethylbenzene	ND (0.001)/ND (0.001)
Iron (Dissolved)	0.21/0.2
Toluene	ND (0.001)/ND (0.001)
Total PCBs	ND (0.0002)/ND (0.0002)
Vanadium (Dissolved)	0.005 J/0.004 J
Vinyl chloride	ND (0.001)/ND (0.001)

TMW-05135	12/19/02 mg/L
Ammonia	7.5/8.2

CTPHB-2	6/4/98 mg/L
Benzene	ND (0.001) UJ
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001) UJ
Toluene	0.002 J
Vinyl chloride	ND (0.001)

CTPHB-1	6/4/98 mg/L
Benzene	ND (0.001)/ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)/ND (0.01)
Ethylbenzene	ND (0.001)/ND (0.001)
Toluene	ND (0.001)/ND (0.001)
Vinyl chloride	ND (0.001)/ND (0.001)

CTPHB-4	6/4/98 mg/L
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Toluene	ND (0.001)
Vinyl chloride	ND (0.001)

CTPHB-5	6/4/98 mg/L
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Toluene	ND (0.001)
Vinyl chloride	ND (0.001)

CTPHB-3	6/4/98 mg/L
Benzene	ND (0.001) UJ
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001) UJ
Toluene	ND (0.001) UJ
Vinyl chloride	ND (0.001)

MW-04434	12/7/98 mg/L	7/24/00 mg/L	1/15/02 mg/L
Aluminum	33.3 (A)	19.1 (A)	-
Antimony	ND (0.05)	ND (0.05)	-
Antimony (Dissolved)	ND (0.05)	ND (0.05)	-
Arsenic	0.018	0.012	-
Arsenic (Dissolved)	ND (0.005)	0.003 J	-
Benzene	0.001	0.002	0.002
Beryllium	ND (0.005)	0.001 J	-
bis(2-Ethylhexyl)phthalate	ND (0.01)	ND (0.01)	ND (0.01)
Chromium	0.148 (A)	-	-
Cyanide (total)	ND (0.01)	ND (0.01)	-
Ethylbenzene	0.001	0.001	0.0005
Iron	95 J (A)	-	-
Iron (Dissolved)	0.043	-	-
Lead	0.089 (A)	0.047 (A)	-
Manganese	1.45 J	0.952	-
Mercury	ND (0.0002)	-	-
Nickel	0.075	0.037	-
Toluene	0.002	0.001	0.001 J
Total PCBs	0.001 J (A)	0.0004 J	ND (0.0002)
Vanadium	0.052	0.034	-
Vanadium (Dissolved)	ND (0.01)	ND (0.01)	-
Vinyl chloride	0.008 (A)	0.005 (A)	0.005 J (A)

SB-04435a	6/21/00 mg/L
Benzene	0.002
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vinyl chloride	0.003 J (A)

MW-04333	8/1/00 mg/L
Aluminum	42.9 J (A)/39.8 J (A)
Antimony	ND (0.05)/ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)
Arsenic	0.028/0.028
Arsenic (Dissolved)	0.002 J/0.002 J
Benzene	ND (0.001)/ND (0.001)
Beryllium	0.002 J/0.002 J
bis(2-Ethylhexyl)phthalate	ND (0.01)/ND (0.01)
Cyanide (total)	ND (0.01)/0.004 J
Ethylbenzene	ND (0.001)/ND (0.001)
Lead	0.181 (A)/0.179 (A)
Manganese	2.98 (A)/2.83 (A)
Nickel	0.115 (A)/0.112 (A)
Toluene	ND (0.001)/ND (0.001)
Total PCBs	ND (0.0002)/ND (0.0002)
Vanadium	0.056/0.052
Vanadium (Dissolved)	ND (0.01)/ND (0.01)
Vinyl chloride	ND (0.001)/ND (0.001)

TMW-04233	12/18/01 mg/l
Benzene	ND (0.001)
Ethylbenzene	ND (0.001)
Toluene	0.0002 J
Total PCBs	ND (0.0002)
Vinyl chloride	ND (0.001)

SB-04433a	6/21/00 mg/L
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Toluene	ND (0.001)
Total PCBs	0.001 J (A)
Vinyl chloride	ND (0.001)

SB-04333a	6/21/00 mg/L
Benzene	0.0003
bis(2-Ethylhexyl)phthalate	ND (0.01)
Ethylbenzene	ND (0.001)
Toluene	ND (0.001)
Total PCBs	0.0004 J
Vinyl chloride	ND (0.001)

TMW-04332	12/19/02 mg/l
Total PCBs	ND (0.0002)

MW-04433	8/1/00 mg/L
Aluminum	8.59 J (A)
Antimony	ND (0.05)
Antimony (Dissolved)	ND (0.05)
Arsenic	0.018 J
Arsenic (Dissolved)	0.01
Benzene	ND (0.001)
Beryllium	0.0003 J
bis(2-Ethylhexyl)phthalate	ND (0.01)
Cyanide (total)	ND (0.01)
Ethylbenzene	ND (0.001)
Lead	0.024 (A)
Manganese	0.928
Nickel	0.017 J
Toluene	0.0002
Total PCBs	ND (0.0002)
Vanadium	0.018
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

TMW-04130	3/7/03 mg/l
Ammonia	4.8 J
Antimony (Dissolved)	0.004
Arsenic (Dissolved)	0.006 J
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.005)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	3.3 J
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	0.001 J
Vinyl chloride	ND (0.001)

TMW-04127	3/7/03 mg/l
Ammonia	5.2 J
Antimony (Dissolved)	0.002
Arsenic (Dissolved)	0.002 J
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.005)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	7.3 (A)
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.007)
Vinyl chloride	ND (0.001)

MW-04534	7/31/00 mg/L
Aluminum	8.14 J (A)
Antimony	ND (0.05)
Antimony (Dissolved)	ND (0.05)
Arsenic	0.008 J
Arsenic (Dissolved)	0.003 J
Benzene	ND (0.001)
Beryllium	0.0004 J
bis(2-Ethylhexyl)phthalate	ND (0.01)
Cyanide (total)	ND (0.01)
Ethylbenzene	ND (0.001)
Lead	0.045 (A)
Manganese	1.36
Nickel	0.031
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium	0.011
Vanadium (Dissolved)	ND (0.01)
Vinyl chloride	ND (0.001)

TMW-04531	3/6/03 mg/l
Ammonia	2.1 J
Antimony (Dissolved)	0.002
Arsenic (Dissolved)	ND (0.01)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.005)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	0.96
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.007)
Vinyl chloride	ND (0.001)

TMW-04528	3/6/03 mg/L
Ammonia	5.3 J
Antimony (Dissolved)	0.001 J
Arsenic (Dissolved)	ND (0.01)
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.005)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	2.7
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.007)
Vinyl chloride	ND (0.001)

TMW-04635	3/7/03 mg/l
Ammonia	4.2 J
Antimony (Dissolved)	0.001 J
Arsenic (Dissolved)	0.003 J
Benzene	ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.005)
Ethylbenzene	ND (0.001)
Iron (Dissolved)	1.6
Toluene	ND (0.001)
Total PCBs	ND (0.0002)
Vanadium (Dissolved)	ND (0.007)
Vinyl chloride	ND (0.001)

TMW-04632	12/17/01 mg/L
Benzene	ND (0.001)
Ethylbenzene	ND (0.001)
Toluene	0.0001 J
Total PCBs	ND (0.0002)
Vinyl chloride	ND (0.001)

MW-04831	12/3/98 mg/L	7/26/00 mg/L
Aluminum	169 (A)	16 (A)
Antimony	0.076 (A)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.041	0.009
Arsenic (Dissolved)	ND (0.005)	0.004 J
Benzene	ND (0.001)	ND (0.001)
Beryllium	0.008 (A)	0.001 J
bis(2-Ethylhexyl)phthalate	ND (0.01)	ND (0.01)
Chromium	0.48 (A)	-
Cyanide (total)	ND (0.01)	ND (0.01)
Ethylbenzene	ND (0.001)	ND (0.001)
Iron	311 (A)	-
Iron (Dissolved)	3.31 J	-
Lead	0.208 (A)	0.032 (A)
Manganese	7.49 (A)	1.22
Mercury	0.001	-
Nickel	0.37 (A)	0.037
Toluene	ND (0.001)	ND (0.001)
Total PCBs	ND (0.0002)	ND (0.0002)
Vanadium	0.293 (A)	0.035
Vanadium (Dissolved)	ND (0.01)	ND (0.01)
Vinyl chloride	ND (0.001)	ND (0.001)

MW-14831	12/2/98 mg/l	7/28/00 mg/l
Aluminum	0.857	1.16/0.787
Antimony	ND (0.05)	ND (0.05)/ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)/ND (0.05)
Arsenic	0.013	0.011/0.011
Arsenic (Dissolved)	0.007	0.006/0.006
Benzene	ND (0.001)	ND (0.001)/ND (0.001)
Beryllium	ND (0.005)	ND (0.005)/ND (0.005)
bis(2-Ethylhexyl)phthalate	ND (0.01)	ND (0.01)/ND (0.01)
Chromium	ND (0.005)	-
Cyanide (total)	ND (0.01)	ND (0.01)/ND (0.01)
Ethylbenzene	ND (0.001)	ND (0.001)/ND (0.001)
Iron	2.1	-
Iron (Dissolved)	0.292 J	-
Lead	ND (0.002)	0.003/ND (0.002)
Manganese	0.144	0.14 J/0.133 J
Mercury	ND (0.0002)	-
Nickel	ND (0.02)	0.101/0.111 (A)
Toluene	ND (0.001)	ND (0.001)/ND (0.001)
Total PCBs	ND (0.0002)	ND (0.0002)/ND (0.0002)
Vanadium	ND (0.01)	0.005 J/0.005 J
Vanadium (Dissolved)	ND (0.01)	ND (0.01)/ND (0.01)
Vinyl chloride	ND (0.001)	ND (0.001)/ND (0.001)

MW-04835	12/17/01 mg/L	12/19/02 mg/L
Aluminum	0.116	-
Antimony	ND (0.05)	-
Antimony (Dissolved)	ND (0.05)	-
Arsenic	0.002 J	-
Arsenic (Dissolved)	0.002 J	-
Benzene	-	0.0001
Beryllium	ND (0.005)	-
bis(2-Ethylhexyl)phthalate	ND (0.01)	-
Chromium	ND (0.005)	-
Cyanide (total)	ND (0.01)	-
Ethylbenzene	-	ND (0.001)
Lead	0.001 J	-
Manganese	0.207	-
Nickel	ND (0.02)	-
Toluene	-	ND (0.001)
Total PCBs	ND (0.0002)	-
Vanadium	ND (0.01)	-
Vanadium (Dissolved)	ND (0.01)	-
Vinyl chloride	-	ND (0.001)

TMW-05032	3/6/03 mg/l
Ammonia	9.5 J/11 J (A)
Antimony (Dissolved)	0.001 J/0.004
Arsenic (Dissolved)	0.011/0.012
Benzene	ND (0.001)/ND (0.001)
bis(2-Ethylhexyl)phthalate	ND (0.01)/ND (0.01)
Ethylbenzene	ND (0.001)/ND (0.001)
Iron (Dissolved)	0.14/0.12
Toluene	ND (0.001)/ND (0.001)
Total PCBs	0.0001 J/0.0002 J
Vanadium (Dissolved)	ND (0.003) U/ND (0.003) U
Vinyl chloride	ND (0.001)/ND (0.001)

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT G - SOUTH RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project Nº: 17075-18	Report Nº: 018	Drawing Nº: figure G4

17075-18(018)GN-WA016 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs		16	16000	6500	28000	1
Aluminum	8900	370000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		400	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		2400				
Chloride						
Chromium		9200		240		
Chromium, Hexavalent		9200		240		
Chrysene		8000				
Cobalt	6.8	9000		5900		
Cyanide (total)	0.39	200		260		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		570	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		13000	10000000	4100000	880000	
Formaldehyde		60000	65	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	90000		1500		
Mercury	0.13	580	89	8800	62	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		52000	470	88000	350	
Nickel	20	15000		18000		
Pentachlorophenol		320		130000		
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9600		59000		
Sodium		1000000				
Toluene		250	250	12000000	36000	
Trichloroethene		500	37	2300000	440	
Vanadium		5500				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		150	150	130000000	65000	
Zinc (Total)	47	630000				

MW-05964	9/18/98 0-2(ft) mg/kg	9/18/98 4-6(ft) mg/kg	9/18/98 14-16(ft) mg/kg
Arsenic	4	4	3
Lead	8 J	7 J	5 J
Manganese	556 J	260 J	186 J
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

MW-15964	10/14/98 30-32(ft) mg/kg	10/14/98 48-50(ft) mg/kg
Arsenic	2/3	3
Lead	5/5	5
Manganese	224/208	219
Total PCBs	ND (0.1)/ND (0.1)	ND (0.1)

MW-05457	9/21/98 0-2(ft) mg/kg	9/21/98 4-6(ft) mg/kg	9/21/98 14-16(ft) mg/kg
Arsenic	4	12	2
Lead	12 J	21 J	5 J
Manganese	1190	1470	222
Total PCBs	0.9 J	0.75 J	ND (0.1)

H5	11/19/98 mg/kg
Arsenic	9/14
Lead	289/395 J/332 J/675 J
Manganese	2320/3140
Total PCBs	0.5 J/0.9 J

H2	11/17/98 mg/kg
Arsenic	31
Lead	1600 (A)/2490 J (A)
Manganese	15800 J
Total PCBs	7.15 J (E)

MW-17661	9/29/98 0-2(ft) mg/kg	9/29/98 4-6(ft) mg/kg	9/29/98 16-18(ft) mg/kg
Arsenic	4	4	2
Lead	152	7	5
Manganese	3380 (C)	252	242
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)

H1	11/17/98 mg/kg
Arsenic	23/22
Lead	1690 (A)/1830 J (A)/1580 (A)/2000 J (A)
Manganese	5470 J/5330 J
Total PCBs	1.75 J (E)/2.35 J (E)

MW-06656	9/18/98 0-2(ft) mg/kg	9/18/98 6-8(ft) mg/kg	9/18/98 14-16(ft) mg/kg
Arsenic	3	3	4/4
Lead	157 J	6 J	6 J/32 J
Manganese	2790 (C)	254 J	236 J/451 J
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)/ND (0.1)

MW-06357	9/17/98 0-2(ft) mg/kg	9/17/98 4-6(ft) mg/kg	9/17/98 22-24(ft) mg/kg
Arsenic	3	3	2/2
Lead	8 J	11 J	4 J/5 J
Manganese	267 J	491 J	196 J/224 J
Total PCBs	ND (0.1)	ND (0.1)	ND (0.1)/ND (0.1)

H3	11/16/98 mg/kg
Arsenic	9/9
Lead	290/300/289/309
Manganese	2810 J/3070 J
Total PCBs	1.8 J (E)/2.1 (E)

H7	11/19/98 mg/kg
Arsenic	11
Lead	221/246 J
Manganese	2150
Total PCBs	2.6 J (E)

MW-15450	9/30/98 32-34(ft) mg/kg
Arsenic	3/3
Lead	6/6
Manganese	252/239
Total PCBs	ND (0.1)/ND (0.1)

H4	11/17/98 mg/kg
Arsenic	47 (A)
Lead	1800 (A)/2430 J (A)
Manganese	6960 J
Total PCBs	2.6 J (E)

MW-05450	9/16/98 0-2(ft) mg/kg	9/16/98 4-6(ft) mg/kg	9/16/98 14-16(ft) mg/kg
Arsenic	2/2	3	5
Lead	42/37	4	5
Manganese	1420 J/1330 J	279 J	213 J
Total PCBs	ND (0.1)/ND (0.1)	ND (0.1)	ND (0.1)

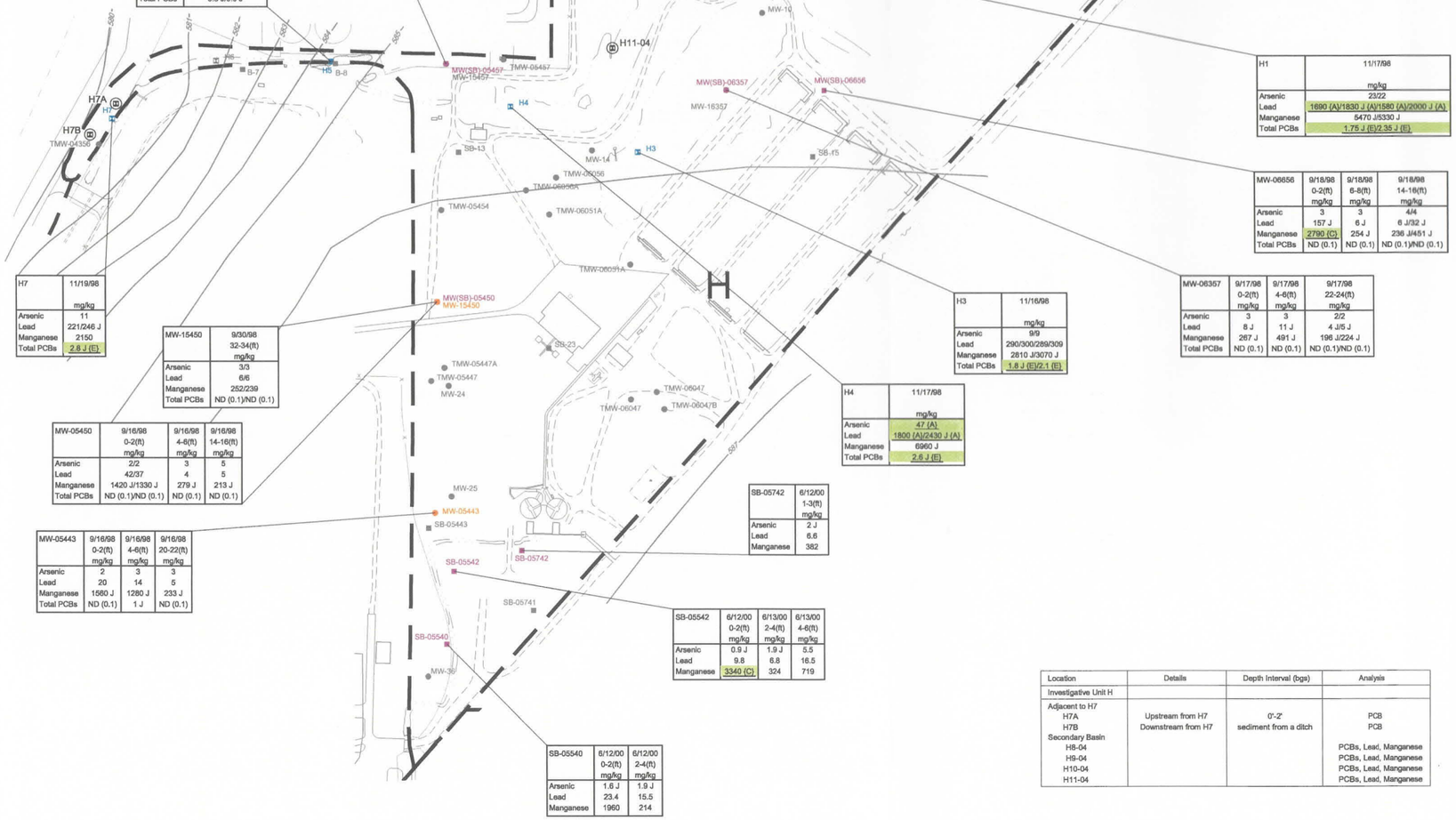
SB-05742	6/12/00 1-3(ft) mg/kg
Arsenic	2 J
Lead	6.6
Manganese	382

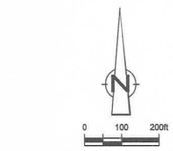
MW-05443	9/16/98 0-2(ft) mg/kg	9/16/98 4-6(ft) mg/kg	9/16/98 20-22(ft) mg/kg
Arsenic	2	3	3
Lead	20	14	5
Manganese	1580 J	1280 J	233 J
Total PCBs	ND (0.1)	1 J	ND (0.1)

SB-05542	6/12/00 0-2(ft) mg/kg	6/13/00 2-4(ft) mg/kg	6/13/00 4-6(ft) mg/kg
Arsenic	0.9 J	1.9 J	5.5
Lead	9.8	6.8	16.5
Manganese	3340 (C)	324	719

SB-05540	6/12/00 0-2(ft) mg/kg	6/12/00 2-4(ft) mg/kg
Arsenic	1.6 J	1.9 J
Lead	23.4	15.5
Manganese	1960	214

Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit H			
Adjacent to H7			
H7A	Upstream from H7	0'-2'	PCB
H7B	Downstream from H7	sediment from a ditch	PCB
Secondary Basin			
H8-04			PCBs, Lead, Manganese
H9-04			PCBs, Lead, Manganese
H10-04			PCBs, Lead, Manganese
H11-04			PCBs, Lead, Manganese





LEGEND

- A-- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SOIL BORING LOCATION - RFI
- SEDIMENT SAMPLE LOCATION
- SAMPLE LOCATION - NO REPORTED DATA
- PROPOSED SEDIMENT SAMPLE LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT H
RFI PHASE 1C - SOIL & SEDIMENT

CRA CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure H1

17075-18(018)GN-WA017 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV			
		Drinking Water A	Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	8900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		68	0.13
Antimony		0.006		68	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		36	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.35		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		480	0.011
Chromium		0.1		480	0.011
Chromium, Hexavalent (Dissolved)		0.1		480	0.011
Chromium, Hexavalent		0.1		480	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.82
1,2-Dichloropropane		0.005	36	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.8		58000	
Iron	12000	5.8		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		10		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22

MW-15964	11/30/98	7/26/00
	mg/L	mg/L
Aluminum	36.5 (A)	9.67 (A)
Beryllium	ND (0.005)	ND (0.005)
Chromium	0.062	-
Iron	49.9 (A)	-
Lead	0.014 (A)	0.009 (A)
Manganese	0.864	0.336
Nickel	0.06	0.043
Nickel (Dissolved)	ND (0.02)	ND (0.02)
Vanadium	0.078 (A)	0.025

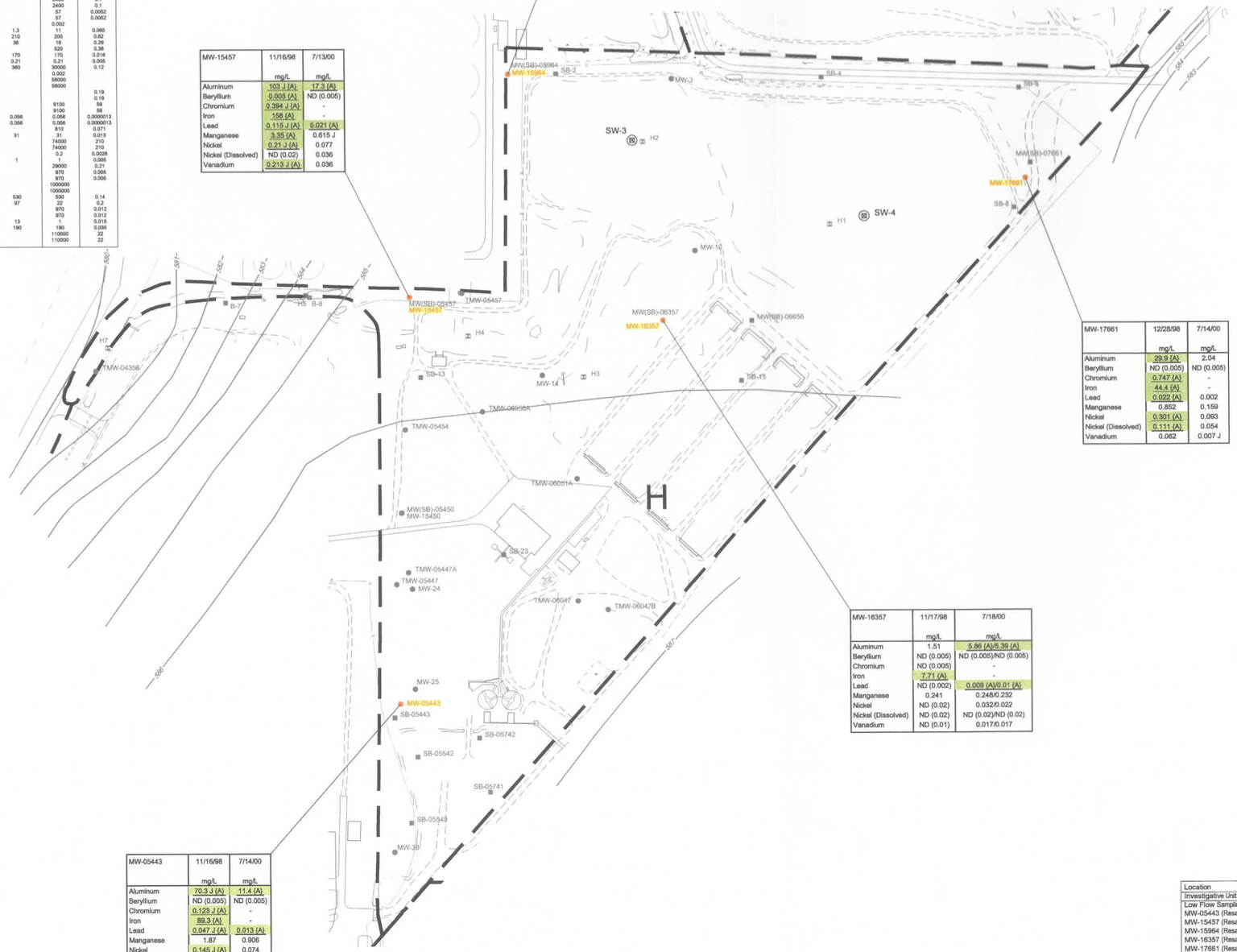
MW-15457	11/16/98	7/13/00
	mg/L	mg/L
Aluminum	103 J (A)	17.3 (A)
Beryllium	0.005 (A)	ND (0.005)
Chromium	0.394 J (A)	-
Iron	158 (A)	-
Lead	0.115 J (A)	0.021 (A)
Manganese	3.35 (A)	0.615 J
Nickel	0.21 J (A)	0.077
Nickel (Dissolved)	ND (0.02)	0.036
Vanadium	0.213 J (A)	0.036

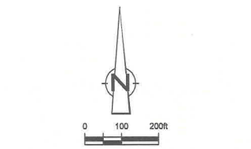
MW-17661	12/28/98	7/14/00
	mg/L	mg/L
Aluminum	29.9 (A)	2.04
Beryllium	ND (0.005)	ND (0.005)
Chromium	0.747 (A)	-
Iron	44.4 (A)	-
Lead	0.022 (A)	0.002
Manganese	0.852	0.159
Nickel	0.301 (A)	0.093
Nickel (Dissolved)	0.111 (A)	0.054
Vanadium	0.062	0.007 J

MW-16357	11/17/98	7/18/00
	mg/L	mg/L
Aluminum	1.51	5.86 (A)/5.39 (A)
Beryllium	ND (0.005)	ND (0.005)/ND (0.005)
Chromium	ND (0.005)	-
Iron	7.71 (A)	-
Lead	ND (0.002)	0.009 (A)/0.01 (A)
Manganese	0.241	0.248/0.232
Nickel	ND (0.02)	0.032/0.022
Nickel (Dissolved)	ND (0.02)	ND (0.02)/ND (0.02)
Vanadium	ND (0.01)	0.017/0.017

MW-05443	11/16/98	7/14/00
	mg/L	mg/L
Aluminum	70.3 J (A)	11.4 (A)
Beryllium	ND (0.005)	ND (0.005)
Chromium	0.123 J (A)	-
Iron	89.3 (A)	-
Lead	0.047 J (A)	0.013 (A)
Manganese	1.87	0.906
Nickel	0.145 J (A)	0.074
Nickel (Dissolved)	0.023	0.034
Vanadium	0.158 J (A)	0.028

Location	Analysis
Investigative Unit B	
Low Flow Sampling	
MW-05443 (Resample)	Total Metals
MW-15457 (Resample)	Total Metals
MW-15964 (Resample)	Total Metals
MW-16357 (Resample)	Total Metals
MW-17661 (Resample)	Total Metals, SVOCs, Ammonia
Surface Water	
SW-3	Total Metals, pH
SW-4	Total Metals, pH





LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- SEDIMENT SAMPLE LOCATION
- RESAMPLE OF MONITORING WELL
- PROPOSED SURFACE WATER SAMPLE LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT H

RFI PHASE 1C - GROUNDWATER & SURFACE WATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1998

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project N°: 17075-18	Report N°: 018	Drawing N°: figure H2

17075-18(018)GN-WA018 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Direct Contact A	Soil Volatilization to Indoor Air B	Ambient Air Particulate Soil Inhalation C	Ambient Air Finite VSIC for 2 Meter Source Thickness D	Toxic Substance Control Act E
Total PCBs		16	16000	6500	28000	1
Aluminum	6900	370000				
Ammonia				2900000		
Antimony		670		5900		
Arsenic	5.8	37		910		
Benzene		400	8.4	470000	99	
Benzo(a)pyrene		8		1900		
Benzo(b)fluoranthene		80				
Benzo(k)fluoranthene		800				
Beryllium		1600		590		
bis(2-Ethylhexyl)phthalate		10000		890000		
2-Butanone		27000	27000	29000000	35000	
Cadmium	1.2	2100		2200		
Carbazole		2400				
Chloride						
Chromium		9200		240		
Chromium, Hexavalent		9200		240		
Chrysene		8000				
Cobalt	6.8	9000		5900		
Cyanide (total)	0.39	250		250		
Dibenz(a,h)anthracene		8				
1,1-Dichloroethene		570	0.33	78000	15	
cis-1,2-Dichloroethene		640	41	1000000	430	
1,2-Dichloropropane		550	7.4	120000	51	
2,4-Dimethylphenol		36000		2100000		
Ethylbenzene		140	140	13000000	3100	
Fluoranthene		130000	1000000	4100000	880000	
Formaldehyde		60000	65	300000	69	
Indeno(1,2,3-cd)pyrene		80				
Iron	12000	580000				
Lead	21	900		44000		
Manganese	440	90000		1500		
Mercury	0.13	580	89	8800	82	
Methylphenol (Cresol)		36000		2900000		
Naphthalene		52000	470	88000	350	
Nickel	20	150000		16000		
Pentachlorophenol		320		130000		
Phenanthrene		5200	5100	2900	190	
Phenol		12000		18000000		
Selenium	0.41	9600		59000		
Sodium		1000000				
Toluene		250	250	12500000	36000	
Trichloroethene		500	37	2300000	440	
Vanadium		5500				
Vinyl chloride		34	2.8	890000	170	
Xylene (total)		150	150	1300000000	65000	
Zinc (Total)	47	630000				

SB-08264	6/23/00 0-2(ft) - mg/kg
Formaldehyde	ND (10)/ND (10)
Manganese	408/222

SB-07151	12/11/02 0-2(ft) - mg/kg	12/11/02 0-2(ft) - mg/kg	12/11/02 3-5(ft) - mg/kg	12/11/02 5-7(ft) - mg/kg	12/11/02 7-9(ft) - mg/kg
Formaldehyde	ND (12)	ND (12)	61	14	4

MW-07959	9/22/98 0-2(ft) - mg/kg	9/22/98 4-6(ft) - mg/kg	9/22/98 6-10(ft) - mg/kg	9/22/98 10-12(ft) - mg/kg	9/22/98 32-34(ft) - mg/kg
Formaldehyde	ND (10) J	ND (10) J	ND (10) J/ND (10) J	14 J	ND (10) J
Manganese	625 J	613 J	188 J/811 J	3290 (C)	232

MW-06951	9/21/98 0-2(ft) - mg/kg	9/21/98 4-6(ft) - mg/kg	9/21/98 8-10(ft) - mg/kg
Formaldehyde	ND (10) J	78 J (BD)	29 J
Manganese	1670	685	697

TMW-06852	12/11/02 0-2(ft) - mg/kg	12/11/02 3-5(ft) - mg/kg	12/11/02 5-7(ft) - mg/kg	12/11/02 7-9(ft) - mg/kg
Formaldehyde	ND (12)	7.4	5.2	ND (12)

SB-06949	12/11/02 0-2(ft) - mg/kg	12/11/02 3-5(ft) - mg/kg	12/11/02 5-7(ft) - mg/kg	12/11/02 7-9(ft) - mg/kg
Formaldehyde	ND (11)	17	20/52	6.4

MW-97948	9/24/98 0-2(ft) - mg/kg	9/24/98 4-10(ft) - mg/kg	9/24/98 22-24(ft) - mg/kg	9/24/98 36-38(ft) - mg/kg	9/25/98 52-54(ft) - mg/kg	9/25/98 66-68(ft) - mg/kg
Formaldehyde	ND (10) J	ND (10) J	20 J/16 J	21 J	43 J	40 J
Manganese	292	297	267/251	230	388	505

MW-06445	9/21/98 0-2(ft) - mg/kg	9/21/98 6-8(ft) - mg/kg	9/21/98 8-10(ft) - mg/kg
Formaldehyde	33 J	14 J	ND (10) J
Manganese	1240	266	215

MW-07245	9/23/98 0-2(ft) - mg/kg	9/23/98 4-6(ft) - mg/kg	9/23/98 6-12(ft) - mg/kg	9/23/98 26-30(ft) - mg/kg	9/23/98 46-48(ft) - mg/kg
Formaldehyde	ND (10) J	12 J	ND (10) J	17 J	14 J
Manganese	252	225	209	252	157

SB-07644	6/20/00 30-32(ft) 1-3(ft) mg/kg	(A)
Formaldehyde	ND (10)	
Manganese	181	

SB-06542	6/21/00 0-2(ft) - mg/kg
Formaldehyde	ND (10)
Manganese	1160

MW-06939	9/22/98 0-2(ft) - mg/kg	9/22/98 2-4(ft) - mg/kg	9/22/98 6-8(ft) - mg/kg
Formaldehyde	ND (10) J	56 J	52 J
Manganese	1170 J	855 J	145 J

SB-96939	6/7/00 30-34(ft) - mg/kg	6/7/00 44-47(ft) - mg/kg
Formaldehyde	5 J/5 J	5
Manganese	236/239	236

SB-07043	6/21/00 22-24(ft) 6-8(ft) mg/kg	(A)
Formaldehyde	ND (10)	
Manganese	5180 (C)	

SB-07541	6/20/00 26-28(ft) 0.5-2.5(ft) mg/kg	(A)
Formaldehyde	ND (10)	
Manganese	295	

MW-96939	5/31/00 0-2(ft) - mg/kg	5/31/00 2-4(ft) - mg/kg	5/31/00 18-20(ft) - mg/kg	6/5/00 60-62(ft) - mg/kg	6/5/00 74-76(ft) - mg/kg
Formaldehyde	ND (10) J	1 J	2 J	8 J	9 J
Manganese	2370 (C)	195	52.4	343 J	415 J

Location	Details	Depth Interval (bgs)	Analysis
Investigative Unit I			
Adjacent to MW-06951 SB-06951A	Resample MW-06951	0'-2'	Formaldehyde
Former Quench Slag File To Be Determined in Field		Above Water Table	pH

FORMER NODULAR IRON QUENCH SLAG STAGING AREA

(B)

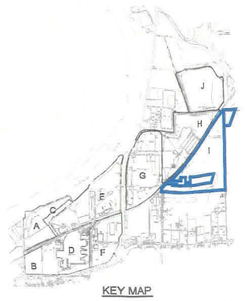
0 100 200ft

LEGEND

- A-- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT AMSL (NAVD 88)
- MONITORING WELL LOCATION-RFI
- SOIL BORING LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- PROPOSED SOIL BORING LOCATION

NOTES:
(A) FIRST DEPTH IS BELOW TOP OF PILE, SECOND DEPTH IS IN REFERENCE TO GROUND SURFACE.
(B) COMPLETE GEOPROBES TO WATER TABLE TO DELINEATE pH IN VADOSE ZONE.

NOTES:
1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT I RFI PHASE 1C - SOIL

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88 TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:
I.R.	M.T.	DECEMBER 2004
Scale: 1" = 200'	Project N°: 17075-18	Report N°: 018 / Drawing N°: figure I1

17075-18(018)GN-WA019 DEC 02/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV: Drinking Water A	Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater/ Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	8900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		88	0.13
Antimony		0.006		88	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.35		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		460	0.011
Chromium		0.1		460	0.011
Chromium, Hexavalent (Dissolved)		0.1		460	0.011
Chromium, Hexavalent		0.1		460	0.011
Chrysene		0.005		0.005	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.82
1,2-Dichloropropane		0.005	36	16	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.8	360	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.8		58000	
Iron	12000	5.8		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.015
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22

TMW-07457	12/20/01 mg/L
Ammonia	8.12
Cyanide (total)	0.03
Pentachlorophenol	ND (0.025)

TMW-07459	12/20/01 mg/L
Ammonia	30.5 (A)
Cyanide (total)	0.26 (A)
Pentachlorophenol	0.002 (A)

TMW-07962	12/20/01 mg/L
Ammonia	24.8 (A)
Cyanide (total)	0.48 (A)
Pentachlorophenol	0.001 (A)

TMW-07257	12/20/01 mg/L
Ammonia	11 (A)
Cyanide (total)	0.01
Pentachlorophenol	ND (0.025)

DSWB-4	6/5/98 mg/L
1,2-Dichloropropane	ND (0.001)
Benzene	ND (0.001)
Pentachlorophenol	ND (0.025)

DSWB-3	6/4/98 mg/L
1,2-Dichloropropane	ND (0.001)
Benzene	0.002
Pentachlorophenol	ND (0.025)

DSWB-5	6/5/98 mg/L
1,2-Dichloropropane	ND (0.001)/ND (0.001)
Benzene	ND (0.001)/ND (0.001)
Pentachlorophenol	ND (0.025)/ND (0.025)

MW-06951	12/3/98 mg/L	7/12/00 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	1.18	0.22
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.006	0.008
Benzene	ND (0.001)	0.001
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.009	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	5.12	-
Lead	0.006 (A)	0.001 J
Manganese	7.37 (A)	0.472 J
Manganese (Dissolved)	5.82 (A)	0.411 J
Nickel	0.066	ND (0.02)
Pentachlorophenol	ND (0.025)	ND (0.025)
Zinc	2.85	0.04 J

TMW-06951	12/17/02 mg/L
Ammonia	1.58/1.51

TMW-06652	12/17/02 mg/L
Ammonia	15.8 (A)

TMW-07048	12/17/02 mg/L
Ammonia	25 (A)

TMW-06848	12/20/01 mg/L
Ammonia	40.2 J (A)

MW-06445	12/3/98 mg/L	7/12/00 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	17.1 (A)	2.34
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.01	0.004 J
Benzene	ND (0.001)	ND (0.001)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.066	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	41.5 (A)	-
Lead	0.025 (A)	0.004 (A)
Manganese	1.14	0.208 J
Manganese (Dissolved)	ND (0.005)	0.009 J
Nickel	0.028	ND (0.02)
Pentachlorophenol	ND (0.025)	ND (0.025)
Zinc	0.51	0.065 J

MW-06939	12/4/98 mg/L	7/27/00 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	39.1 (A)	25.7 (A)
Antimony	ND (0.05)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	0.017	0.013
Benzene	ND (0.001)	0.001
Beryllium	ND (0.005)	0.001 J
Cadmium	ND (0.004)	ND (0.005)
Chromium	0.077	-
Cyanide (total)	ND (0.01)	0.01
Iron	52.2 J (A)	-
Lead	0.041 (A)	0.031 (A)
Manganese	1.01 J	0.726 J
Manganese (Dissolved)	ND (0.005)	0.004 J
Nickel	0.054	0.282 (A)
Pentachlorophenol	ND (0.025)	ND (0.025)
Zinc	0.174	0.275 J

TMW-06243	12/20/01 mg/L
Ammonia	6.18 J

TMW-06037	12/20/01 mg/L
Ammonia	2.85

MW-96939	8/4/00 mg/L	8/4/00 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	3.13	2.87
Antimony	0.023 J (A)	ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)
Arsenic	ND (0.025)	0.006 J
Benzene	ND (0.001)	ND (0.001)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.005)	ND (0.005)
Cyanide (total)	0.005 J	ND (0.01)
Lead	0.002	0.002
Manganese	0.294	0.275
Manganese (Dissolved)	0.172	0.17
Nickel	ND (0.02)	ND (0.02)
Pentachlorophenol	ND (0.025)	ND (0.025)
Zinc	0.015 J	0.013 J

MW-1S	12/15/01 mg/L
Ammonia	ND (0.05) UJ

MW-2S	12/16/01 mg/L
Ammonia	ND (0.05) UJ/ND (0.05) UJ

MW-4S	12/16/01 mg/L
Ammonia	ND (0.05) UJ

TMW-07957	12/20/01 mg/L
Ammonia	0.05
Cyanide (total)	ND (0.01)
Pentachlorophenol	ND (0.025)

MW-07959	12/4/98 mg/L	7/12/00 mg/L	12/20/01 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)	-
Aluminum	61.8 (A)	6.58 (A)	-
Ammonia	-	-	20.3 (A)
Antimony	ND (0.05)	ND (0.05)	-
Antimony (Dissolved)	ND (0.05)	ND (0.05)	-
Arsenic	0.072 (A)	0.022	-
Benzene	0.003	0.002	-
Beryllium	0.006 (A)	ND (0.005)	-
Cadmium	0.013 (A)	ND (0.005)	-
Chromium	0.296 (A)	-	-
Cyanide (total)	0.42 (A)	0.25 (A)	0.21 (A)
Iron	141 J (A)	-	-
Lead	2.14 (A)	0.135 (A)	-
Manganese	19.1 J (A)	1.18 J	-
Manganese (Dissolved)	ND (0.005)	0.004 J	-
Nickel	0.088	ND (0.02)	-
Pentachlorophenol	ND (0.025)	ND (0.025)	0.006 (A)
Zinc	37.1 (A)	2.26 J	-

MW-97948	12/9/98 mg/L	8/3/00 mg/L
1,2-Dichloropropane	0.006 (A)	0.003/0.003
Aluminum	0.531	5.71 (A)/4.37 (A)
Antimony	ND (0.05)	ND (0.05)/ND (0.05)
Antimony (Dissolved)	ND (0.05)	ND (0.05)/ND (0.05)
Arsenic	ND (0.005)	0.008 J/0.007 J
Benzene	0.016 (A)	0.003/0.003
Beryllium	ND (0.005)	ND (0.005)/ND (0.005)
Cadmium	ND (0.004)	ND (0.005)/ND (0.005)
Chromium	ND (0.005)	-
Cyanide (total)	ND (0.01)	ND (0.01)/ND (0.01)
Iron	5.01 J	-
Lead	ND (0.002)	0.004 (A)/0.003
Manganese	0.263	0.498/0.393
Manganese (Dissolved)	0.238	0.16/0.16
Nickel	0.024	0.033/0.024
Pentachlorophenol	ND (0.025)	ND (0.025)/ND (0.025)
Zinc	ND (0.01)	0.041 J/0.03 J

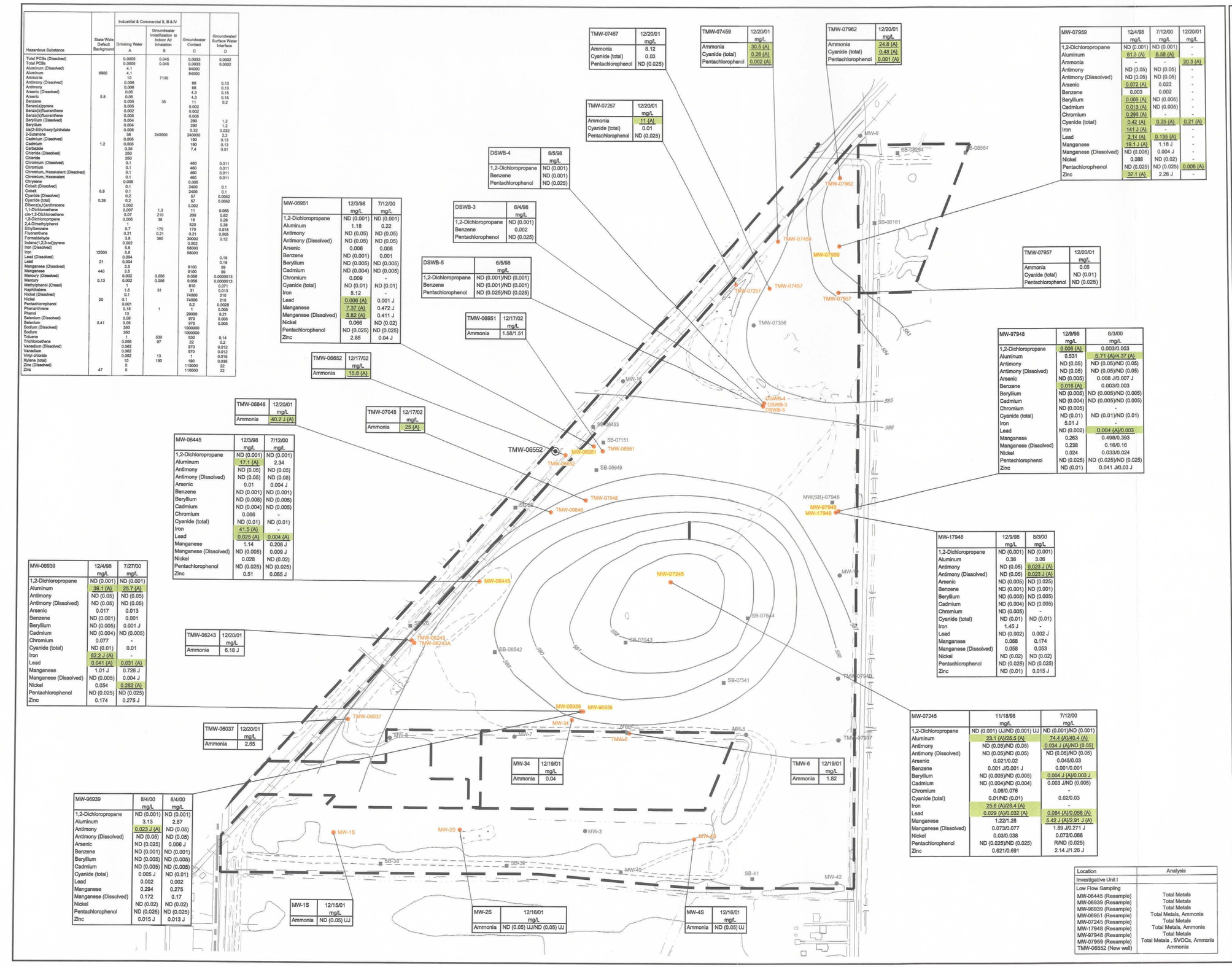
MW-17948	12/9/98 mg/L	8/3/00 mg/L
1,2-Dichloropropane	ND (0.001)	ND (0.001)
Aluminum	0.36	3.06
Antimony	ND (0.05)	0.023 J (A)
Antimony (Dissolved)	ND (0.05)	0.023 J (A)
Arsenic	ND (0.005)	ND (0.025)
Benzene	ND (0.001)	ND (0.001)
Beryllium	ND (0.005)	ND (0.005)
Cadmium	ND (0.004)	ND (0.005)
Chromium	ND (0.005)	-
Cyanide (total)	ND (0.01)	ND (0.01)
Iron	1.45 J	-
Lead	ND (0.002)	0.002 J
Manganese	0.068	0.174
Manganese (Dissolved)	0.058	0.053
Nickel	ND (0.02)	ND (0.02)
Pentachlorophenol	ND (0.025)	ND (0.025)
Zinc	ND (0.01)	0.015 J

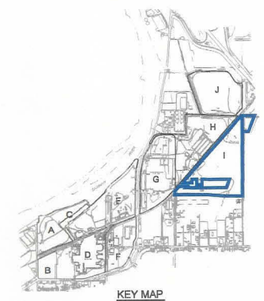
MW-07245	11/18/98 mg/L	7/12/00 mg/L
1,2-Dichloropropane	ND (0.001) UJ/ND (0.001) UJ	ND (0.001)/ND (0.001)
Aluminum	23.1 (A)/25.5 (A)	74.4 (A)/40.4 (A)
Antimony	ND (0.05)/ND (0.05)	0.034 J (A)/ND (0.05)
Antimony (Dissolved)	ND (0.05)/ND (0.05)	ND (0.05)/ND (0.05)
Arsenic	0.021/0.02	0.045/0.03
Benzene	0.001 J/0.001 J	0.001/0.001
Beryllium	ND (0.005)/ND (0.005)	0.004 J (A)/0.003 J
Cadmium	ND (0.004)/ND (0.004)	0.003 J/ND (0.005)
Chromium	0.06/0.076	-
Cyanide (total)	0.01/ND (0.01)	0.02/0.03
Iron	25.8 (A)/28.4 (A)	-
Lead	0.029 (A)/0.032 (A)	0.084 (A)/0.058 (A)
Manganese	1.22/1.28	5.42 J (A)/2.91 J (A)
Manganese (Dissolved)	0.073/0.077	1.89 J/0.271 J
Nickel	0.03/0.038	0.073/0.068
Pentachlorophenol	ND (0.025)/ND (0.025)	R/ND (0.025)
Zinc	0.821/0.691	2.14 J/1.28 J

MW-34	12/19/01 mg/L
Ammonia	0.04

TMW-6	12/19/01 mg/L
Ammonia	1.82

Location	Analysis
Investigative Unit I	
Low Flow Sampling	
MW-06445 (Resample)	Total Metals
MW-06939 (Resample)	Total Metals
MW-96939 (Resample)	Total Metals
MW-06951 (Resample)	Total Metals, Ammonia
MW-07245 (Resample)	Total Metals
MW-17948 (Resample)	Total Metals, Ammonia
MW-97948 (Resample)	Total Metals
MW-07959 (Resample)	Total Metals , SVOCs, Ammonia
TMW-06552 (New well)	Ammonia





0 100 200ft

LEGEND

- A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- 585 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
- MONITORING WELL LOCATION - RFI
- SAMPLE LOCATION - NO REPORTED DATA
- RESAMPLE OF MONITORING WELL
- PROPOSED MONITORING WELL LOCATION

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. PARAMETER LISTS ARE AREA SPECIFIC BASED ON EXCEEDANCES.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT I
RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project №: 17075-18	Report №: 018	Drawing №: figure I2

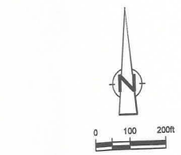
17075-18(018)GN-WA020 DEC 06/2004

Hazardous Substance	State Wide Default Background	Industrial & Commercial II, III & IV			
		Drinking Water A	Groundwater Volatilization to Indoor Air Inhalation B	Groundwater Contact C	Groundwater Surface Water Interface D
Total PCBs (Dissolved)		0.0005	0.045	0.0033	0.0002
Total PCBs		0.0005	0.045	0.0033	0.0002
Aluminum (Dissolved)		4.1		64000	
Aluminum	6900	4.1		64000	
Ammonia		10	7100		
Antimony (Dissolved)		0.006		88	0.13
Antimony		0.006		88	0.13
Arsenic (Dissolved)		0.05		4.3	0.15
Arsenic	5.8	0.05		4.3	0.15
Benzene		0.005	35	11	0.2
Benzo(a)pyrene		0.005		0.002	
Benzo(b)fluoranthene		0.002		0.002	
Benzo(k)fluoranthene		0.005		0.005	
Beryllium (Dissolved)		0.004		290	1.2
Beryllium		0.004		290	1.2
bis(2-Ethylhexyl)phthalate		0.006		0.32	0.032
2-Butanone		38	240000	240000	2.2
Cadmium (Dissolved)		0.005		190	0.13
Cadmium	1.2	0.005		190	0.13
Carbazole		0.35		7.4	0.01
Chloride (Dissolved)		250			
Chloride		250			
Chromium (Dissolved)		0.1		480	0.011
Chromium		0.1		480	0.011
Chromium, Hexavalent (Dissolved)		0.1		480	0.011
Chromium, Hexavalent		0.1		480	0.011
Chrysene		0.005		0.006	
Cobalt (Dissolved)		0.1		2400	0.1
Cobalt	6.8	0.1		2400	0.1
Cyanide (Dissolved)		0.2		57	0.0052
Cyanide (total)	0.39	0.2		57	0.0052
Dibenz(a,h)anthracene		0.002		0.002	
1,1-Dichloroethene		0.007	1.3	11	0.065
cis-1,2-Dichloroethene		0.07	210	200	0.62
1,2-Dichloropropene		0.005	36	18	0.29
2,4-Dimethylphenol		1		520	0.38
Ethylbenzene		0.7	170	170	0.018
Fluoranthene		0.21	0.21	0.21	0.005
Formaldehyde		3.8	380	30000	0.12
Indeno(1,2,3-cd)pyrene		0.002		0.002	
Iron (Dissolved)		5.8		58000	
Iron	12000	5.8		58000	
Lead (Dissolved)		0.004			0.19
Lead	21	0.004			0.19
Manganese (Dissolved)		2.5		9100	59
Manganese	440	2.5		9100	59
Mercury (Dissolved)		0.002	0.056	0.056	0.0000013
Mercury	0.13	0.002	0.056	0.056	0.0000013
Methylphenol (Cresol)		1		810	0.071
Naphthalene		1.5	31	31	0.013
Nickel (Dissolved)		0.1		74000	210
Nickel	20	0.1		74000	210
Pentachlorophenol		0.001		0.2	0.0028
Phenanthrene		0.15	1	1	0.005
Phenol		13		29000	0.21
Selenium (Dissolved)		0.05		970	0.005
Selenium	0.41	0.05		970	0.005
Sodium (Dissolved)		350		1000000	
Sodium		350		1000000	
Toluene		1	530	530	0.14
Trichloroethene		0.005	97	22	0.2
Vanadium (Dissolved)		0.062		970	0.012
Vanadium		0.062		970	0.012
Vinyl chloride		0.002	13	1	0.016
Xylene (total)		10	190	190	0.035
Zinc (Dissolved)		5		110000	22
Zinc	47	5		110000	22

MW-16080	11/17/98 mg/L	7/25/00 mg/L
Aluminum	8.58 J (A)	26.6 (A)
Iron	17.7 (A)	-
Lead	0.007 J (A)	0.027 (A)
Vanadium	0.021 J	0.068 (A)

MW-96080	11/30/98 mg/L	8/2/00 mg/L
Aluminum	1.2/1.25	4.54 J (A)/5.5 J (A)
Iron	2.1/2.25	
Lead	ND (0.002)/ND (0.002)	ND (0.01)/0.006 (A)
Vanadium	ND (0.01)/ND (0.01)	0.007 J/0.012

Location	Analysis
Investigative Unit J	
Low Flow Sampling MW-16080 (Resample) MW-96080 (Resample)	 Total Metals Total Metals



LEGEND

A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER

MONITORING WELL LOCATION - EXCEEDED CRITERIA

SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA

RESAMPLE OF MONITORING WELL

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT J
RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	DECEMBER 2004	
Scale: 1" = 200'	Project №: 17075-18	Report №: 018	Drawing №: figure J1

17075-18(018)GN-WA021 DEC 06/2004

TABLE 1

PROPOSED SAMPLING LOCATIONS - GROUNDWATER
RFI PHASE 1C
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Location	*Details*	*Analysis*
Investigative Unit A		
Low Flow Sampling		
MW-00017 (Resample)		Total Metals
MW-00124 (Resample)		Total Metals
MW-00713 (Resample)		Total Metals
MW-10713 (Resample)		Total Metals
MW-00821 (Resample)		Total Metals, SVOCs
MW-00925 (Resample)		Total Metals
MW-01329 (Resample)		Total Metals
MW-01530 (Resample)		Total Metals
MW-11530 (Resample)		Total Metals
Investigative Unit B		
Low Flow Sampling		
MW-00004 (Resample)		pH
MW-00008 (Resample)		Total Metals
MW-00208 (Resample)		Total Metals, SVOCs, VOCs
MW-00306 (Resample)		Total Metals
MW-00309 (Resample)		Total Metals, SVOCs
MW-00408 (Resample)		Total Metals
MW-00509 (Resample)		Total Metals, VOCs
MW-00700 (Resample)		Total Metals
MW-10000 (Resample)		Total Metals
MW-00108 (New Well)	60' West of VAP-00208	VOCs, SVOCs
LNAPL Area		
MW-00304B (New Well)	50' West of MW-00304	VOCs, Test for separate phase to confirm absence of LNAPL
MW-00304A (New Well)	50' East of MW-00304	VOCs, Test for separate phase to confirm absence of LNAPL
MW-00305 (Resample)		Analyze LNAPL for TAL Metals, TCL VOCs, SVOCs, and PCBs, Density, Molecular Weight, and Viscosity
Investigative Unit C		
SW-1		Total Metals, pH
SW-2		Total Metals, pH
Investigative Unit D		
Low Flow Sampling		
MW-00812 (Resample)		Total Metals
MW-00909 (Resample)		Total Metals
MW-10909 (Resample)		Total Metals
MW-10912 (Resample)		Total Metals
MW-11901 (Resample)		Total Metals
MW-01214 (Resample)		Total Metals
MW-02410 (Resample)		Total Metals
MW-12418 (Resample)		Total Metals
MW-02517 (Resample)		Total Metals
MW-02418 (Resample)		Total Metals

TABLE 1

PROPOSED SAMPLING LOCATIONS - GROUNDWATER
RFI PHASE 1C
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Location	*Details*	*Analysis*
Investigative Unit E		
Low Flow Sampling		
MW-01119 (Resample)		Total Metals, SVOCs
MW-01223 (Resample)		Total Metals
MW-01718 (Resample)		Total Metals
MW-01827 (Resample)		Total Metals
MW-02228 (Resample)		Total Metals
MW-02320 (Resample)		Total Metals
MW-02432 (Resample)		Total Metals
MW-12432 (Resample)		Total Metals
MW-03235 (Resample)		Total Metals, PCB
MW-03240 (Resample)		Total Metals
MW-13240 (Resample)		Total Metals
MW-03423 (Resample)		Total Metals
MW-03734 (Resample)		Total Metals, Fluoride
MW-03746 (Resample)		Total Metals
Investigative Unit F		
Low Flow Sampling		
MW-02514 (Resample)		Total Metals
MW-12728 (Resample)		Total Metals
MW-13205 (Resample)		Total Metals
MW-03623 (Resample)		Total Metals
MW-13623 (Resample)		Total Metals
Investigative Unit G		
New GSI Monitoring Wells		
MW-03945 (Recently Installed)	240' West of TMW-04145	pH, Ammonia, Total Metals
MW-04051 (Recently Installed)	270' Northwest of MW-04250	pH, Ammonia, Total Metals
MW-04257 (Recently Installed)	330' Southwest of MW-04757	pH, Ammonia, Total Metals
MW-04765 (Recently Installed)	240' Northwest of MW-04864	pH, Ammonia, Total Metals
MW-04764 (New Well)	West of MW-04864	pH, Ammonia, Total Metals
Elevated pH in Groundwater		
MW-04438 (New Well)		pH
MW-04045 (New Well)		pH
MW-04456 (New Well)		pH
MW-05452 (New Well)		pH
Surface Water Sampling		
Various Locations Upgradient, Adjacent, and Downgradient	Within Saginaw River	pH
Resample at TMW-04046 Location		
TMW-04046A (Temporary Well)		VOCs

TABLE 1

PROPOSED SAMPLING LOCATIONS - GROUNDWATER
RFI PHASE 1C
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Location	*Details*	*Analysis*
Low Flow Sampling		
MW-04854 (Resample)		Total Metals
MW-04864 (Resample)		Total Metals, Ammonia, pH
MW-04250 (Resample)		Total Metals, pH
MW-04040 (Resample)		Total Metals
MW-04333 (Resample)		Total Metals
MW-04433 (Resample)		Total Metals
MW-04434 (Resample)		Total Metals, VOCs
MW-04435 (Resample)		Total Metals, VOCs
MW-04534 (Resample)		Total Metals
MW-04757 (Resample)		Total Metals
MW-04831 (Resample)		Total Metals
MW-04836 (Resample)		Total Metals
MW-05036 (Resample)		Total Metals
MW-14831 (Resample)		Total Metals
MW-8 (Resample)		VOCs, Ammonia
MW-17 (Resample)		VOCs, Ammonia
MW-18 (Resample)		Total Metals, VOCs, Ammonia
TMW-04044A (New Well)	monitor sewer bedding	pH
TMW-04044B (New Well)	monitor sewer bedding	pH
TMW-04044C (New Well)	monitor sewer bedding	pH
TMW-04044D (New Well)	monitor sewer bedding	pH
MW-05157 (New Well)	monitor sewer bedding	Total Metals, Ammonia, pH
Investigative Unit H		
Low Flow Sampling		
MW-05443 (Resample)		Total Metals
MW-15457 (Resample)		Total Metals
MW-15964 (Resample)		Total Metals
MW-16357 (Resample)		Total Metals
MW-17661 (Resample)		Total Metals, SVOCs, Ammonia
Surface Water		
SW-3		Total Metals, pH
SW-4		Total Metals, pH
Investigative Unit I		
Low Flow Sampling		
MW-06445 (Resample)		Total Metals
MW-06939 (Resample)		Total Metals
MW-96939 (Resample)		Total Metals
MW-06951 (Resample)		Total Metals, Ammonia
MW-07245 (Resample)		Total Metals
MW-17948 (Resample)		Total Metals, Ammonia
MW-97948 (Resample)		Total Metals
MW-07959 (Resample)		Total Metals , SVOCs, Ammonia
Adjacent to MW-06951		
TMW-06552 (Temporary Well)	175' North-West of MW-06951	Ammonia
Investigative Unit I		
Low Flow Sampling		
MW-16080 (Resample)		Total Metals
MW-96080 (Resample)		Total Metals

TABLE 2

PROPOSED SAMPLING LOCATIONS - SOIL
RFI PHASE 1C
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Location	*Details*	*Depth Interval (bgs)*	*Analysis*
Investigative Unit A			
Adjacent to SB-00516			
SB-00416	West of SB-00516	0'-2', 2'-4' into water table within foundry sand	Formaldehyde
Adjacent to SB-00718D			
SB-00717	South-West of SB-00718D	0'-2', 2'-4' into water table within foundry sand	Manganese
Adjacent to SB-00517			
SB-00517B	50' North of SB-00517	0'-2', 2'-4',4'-6'	Formaldehyde, Manganese
SB-00517C	50' East of SB-00517	0'-2', 2'-4',4'-6'	Formaldehyde, Manganese
SB-00517D	50' South of SB-00517	0'-2', 2'-4',4'-6'	Formaldehyde, Manganese
SB-00517E	50' West of SB-00517	0'-2', 2'-4',4'-6'	Formaldehyde, Manganese
Adjacent to MW-00821			
SB-00820A	South of MW-00821	0'-2', 2'-4',4'-6'	Hexavalent and Total Chromium
SB-00822A	North of MW-00821	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-00820 Area			
SB-00820B	50' South-East of SB-00820	0'-2', 2'-4',4'-6'	Manganese
SB-00820C	50' South-West of SB-00820	0'-2', 2'-4',4'-6'	Manganese
SB-00821C	East of MW-00821	0'-2'	Manganese
SB-00821B	East of SB-00820	0'-2'	Manganese
Investigative Unit B			
Adjacent to SB-00709			
SB-00708	50' South-East of SB-00709	0'-2', 2'-4'	PCBs, Lead
North Boundary			
SB-00310A	50' North-West of SB-00308	0'-2'	Manganese, Benzo(a)pyrene, Dibenz(a,h)anthracene
SB-00310B	50' North-East of SB-00308	0'-2'	Manganese, Benzo(a)pyrene, Dibenz(a,h)anthracene
Investigative Unit D			
Adjacent to SB-01711			
SB-01611	50' West of SB-01711	12'-14', 14'-16', 16'-18', 18'-20'	PCBs
Adjacent to SB-02619C			
SB-02619E	50' South of SB-02619C	0'-2', 2'-4'	PCBs
SB-02619F	50' West of SB-02619C	0'-2', 2'-4'	PCBs
SB-02619G	50' East of SB-02619C	0'-2', 2'-4'	PCBs
Adjacent to SB-00709			
SB-00809		0'-2', 2'-4'	PCBs, Lead
Vicinity of SB-02510 and MW-02410			
SB-02410	50' West of SB-02510	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-02511	50' North of MW-02410	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-02510B	50' South of SB-02510	0'-2', 2'-4'	Hexavalent and Total Chromium
Adjacent to SB-02514			
SB-02514A	50 'North-West of SB-02514	0'-2', 2'-4'	Manganese
Adjacent to SB-00910			
SB-01010	50' East of SB-02514	0'-2', 2'-4'	Manganese
SB-00909	50' South of SB-02514	0'-2', 2'-4'	Manganese

TABLE 2

PROPOSED SAMPLING LOCATIONS - SOIL
RFI PHASE 1C
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

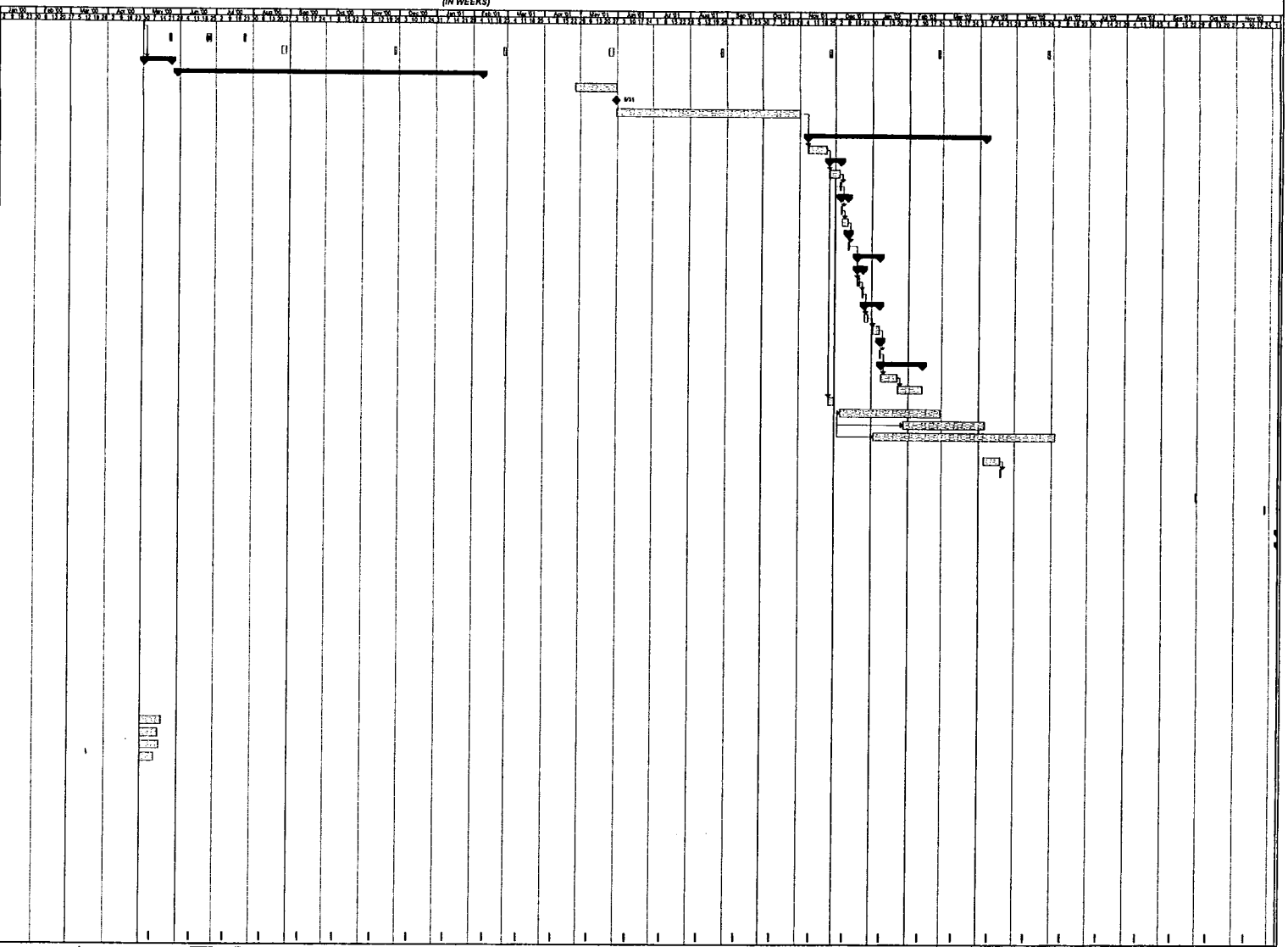
Location	*Details*	*Depth Interval (bgs)*	*Analysis*
Adjacent to SB-02505			
SB-02505A	50' North of SB-02505	0'-2', 2'-4'	Manganese
SB-02505B	50' South-East of SB-02505	0'-2', 2'-4'	Manganese
SB-02505C	50' South-West of SB-02505	0'-2', 2'-4'	Manganese
Investigative Unit E			
MW-02320 Area			
MW-02320A	10' North of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320B	10' East of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320C	10' South of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
MW-02320D	10' West of SB-02320	0'-2',2'-4',4'-6'	PCB, Manganese, Hex. & Total Chromium
Investigative Unit F			
Adjacent to MW-02728			
SB-02728A	West of MW-02728	0'-2'	SVOCs
SB-02728B	North of MW-02728	0'-2'	SVOCs
SB-02728C	East of MW-02728	0'-2'	SVOCs
SB-02728D	South of MW-02728	0'-2'	SVOCs
Investigative Unit G			
Adjacent toTMW-04635			
SB-04635A	50' North-East of TMW-04635	0'-2', 2'-4'	Hexavalent and Total Chromium
SB-04635B	50' South-East of TMW-04635	0'-2', 2'-4'	Hexavalent and Total Chromium
Northwest portion of IU G			
B05-04	Resample B05(1998)	0'-2'	PCBs
B12-04	Resample B12(1998)	0'-2'	Manganese, Hex. & Total Chromium
Investigative Unit H			
Adjacent to H7			
H7A	Upstream from H7	0'-2'	PCB
H7B	Downstream from H7	sediment from a ditch	PCB
Secondary Basin			
H8-04			PCB, Lead, Manganese
H9-04			PCB, Lead, Manganese
H10-04			PCB, Lead, Manganese
H11-04			PCB, Lead, Manganese
Investigative Unit I			
Adjacent to MW-06951			
SB-06951A	Resample MW-06951	0'-2'	Formaldehyde
Former Quench Slag Pile			
A number of locations to be Determined in the Field		Above Water Table	pH (Field Screening), Metals

APPENDIX A

PROJECT SCHEDULE

GMPT SAGINAW METAL CASTING OPERATIONS
PROJECT SCHEDULE
THROUGH COMPLETION OF RFI ACTIVITIES
(IN WEEKS)

ID	Task Name	Duration	Start	Finish
1	U S EPA Approval of Phase 1B Workplan	1 day	Mon 5/7/00	Mon 5/7/00
2	Monthly Groundwater Elevations	48 days	Tue 5/23/00	Tue 7/25/00
8	Quarterly Groundwater Elevations	456 days	Fri 8/25/00	Tue 8/26/03
19	Post Approval Preparation Period	17 days	Tue 5/30/00	Wed 6/24/00
20	Field Work Implementation	183 days	Tue 5/30/00	Thu 2/8/01
41	Phase 1B Amendment Preparation	5 wks	Fri 4/27/01	Thu 5/31/01
42	Submittal of Phase 1B Workplan Amendment	1 day	Thu 5/31/01	Thu 5/31/01
43	U.S. EPA Approval of Workplan Amendment	22 wks	Thu 5/31/01	Wed 10/31/01
44				
45	Additional Phase 1B Investigative Activities Amendment 1	107 days	Thu 11/8/01	Fri 4/5/02
46	Post Approval Preparations	12 days	Thu 11/8/01	Fri 11/23/01
47	IU B	6 days	Mon 11/26/01	Wed 12/5/01
48	Product Delineation IU B	7 days	Mon 11/26/01	Tue 12/4/01
49	Soil Sampling	1 day	Wed 12/5/01	Wed 12/5/01
50	IU D	4 days	Thu 12/6/01	Tue 12/11/01
51	Ext. Bds and D 7 Soil Sampling	1 day	Thu 12/6/01	Thu 12/6/01
52	60 Mold Line Additional Confirmatory Sampling	3 days	Fri 12/7/01	Tue 12/11/01
53	IU E	1 day	Wed 12/12/01	Wed 12/12/01
54	Temp. Well Inst. and Groundwater Sampling	1 day	Wed 12/12/01	Wed 12/12/01
55	IU G	13 days	Thu 12/13/01	Mon 1/7/02
56	Oil House	3 days	Thu 12/13/01	Mon 12/24/01
57	Soil Sampling	2 days	Thu 12/20/01	Fri 12/21/01
58	Groundwater Sampling	1 day	Mon 12/24/01	Mon 12/24/01
59	Benzene, As, Ammonia Delineation	9 days	Wed 12/26/01	Mon 1/7/02
60	Soil Sampling	3 days	Wed 12/26/01	Fri 12/28/01
61	Groundwater Sampling	4 days	Wed 1/2/02	Mon 1/7/02
62	IU H	1 day	Tue 1/8/02	Tue 1/8/02
63	Soil Sampling	1 day	Tue 1/8/02	Tue 1/8/02
64	IUs G, H, and I	35 days	Wed 1/9/02	Tue 2/12/02
65	Elevated pH Delineation	10 days	Wed 1/9/02	Tue 1/22/02
66	Hydrogeologic Characterization	3 wks	Wed 1/23/02	Tue 2/12/02
67	Groundwater Sampling of Existing Wells	1 wk	Mon 11/26/01	Fri 11/30/01
68	Sample Analyses	12 wks	Thu 12/6/01	Wed 2/27/02
69	Data Validation	10 wks	Mon 1/28/02	Fri 4/5/02
70	Data Analysis	21.6 wks	Thu 1/3/02	Mon 6/3/02
71				
72	Phase 1B Amendment No 2 Preparation	2 wks	Fri 4/5/02	Thu 4/18/02
73	Submittal of Phase 1B Workplan Amendment	1 day	Fri 4/19/02	Fri 4/19/02
74				
75	USEPA Conditional Approval of Work Plan Amendment	1 day	Mon 9/30/02	Mon 9/30/02
76	GM Response to USEPA Conditional Approval	1 day	Wed 11/27/02	Wed 11/27/02
77				
78	Additional Phase 1B Investigative Activities Amendment 2	86 days	Mon 12/9/02	Fri 3/28/03
79	IU B	14 days	Mon 12/9/02	Fri 12/26/02
80	Soil Sampling	7 days	Mon 12/9/02	Tue 12/17/02
81	Groundwater Sampling	10 days	Mon 12/9/02	Fri 12/20/02
82	IU D	4 days	Mon 12/16/02	Thu 12/19/02
83	Soil Sampling	3 days	Mon 12/16/02	Wed 12/18/02
84	Groundwater Sampling	4 days	Mon 12/16/02	Thu 12/19/02
85	IU G	22 days	Mon 12/16/02	Tue 1/14/03
86	Soil Sampling	5 days	Mon 12/16/02	Fri 12/20/02
87	Groundwater Sampling	9 days	Thu 1/2/03	Tue 1/14/03
88	IUs G, H, and I	35 days	Mon 12/16/02	Fri 1/17/03
89	Soil Sampling	10 days	Mon 1/6/03	Fri 1/17/03
90	Groundwater Sampling	10 days	Mon 1/6/03	Fri 1/17/03
91	Surface Water Sampling	1 day	Mon 12/16/02	Mon 12/16/02
92	Sample Analyses	50 days	Mon 12/9/02	Fri 2/14/03
93	Data Validation	30 days	Mon 2/17/03	Fri 3/28/03
94	MDEQ Migration Notification (New Part 201 Rules)	14 days	Mon 5/1/00	Thu 5/18/00
95	Phase I Environmental Site Assessment (South IU G)	11 days	Mon 5/1/00	Mon 5/15/00
96	Phase II Environmental Site Investigation (South IU G)	12 days	Mon 5/1/00	Tue 5/16/00
97	Phase I Environmental Site Assessment (North IU G)	10 days	Mon 5/1/00	Fri 5/12/00
98	Due Care Plan Updates	10 days	Tue 4/1/03	Mon 4/14/03
99	RR Phase 1C Activities	63 days	Mon 1/3/05	Wed 4/27/05
100	Additional Phase I C Investigative Activities	66 days	Mon 1/3/05	Fri 4/1/05
101	Field Activities	30 days	Mon 1/3/05	Fri 2/11/05
102	Sample Analyses	47 days	Thu 1/6/05	Fri 3/11/05
103	Data Validation	15 days	Mon 3/14/05	Fri 4/1/05
104	Data Analysis of Additional Investigative Activities	18 days	Mon 4/4/05	Wed 4/27/05
105	RR Phase 1B and 1C Reporting	87 days	Thu 4/3/85	Fri 8/26/05
106	Ecological and Human Health Risk Assessments	8 wks	Thu 4/28/05	Wed 6/22/05
107	Prepare RFI Report	8 wks	Mon 5/2/05	Fri 6/24/05
108	U S EPA Review	45 days	Mon 6/27/05	Fri 8/26/05
109	Additional Due Care Plan Updates	5 days	Mon 5/3/04	Fri 5/7/04
110	Soil Pile Investigation (Former Nodular Iron Plant Property)	8 days	Mon 11/1/04	Wed 11/24/04
111	Abandon Stormwater Ditch Discharge (Former Nodular Iron Plant Property)	8 days	Mon 3/14/04	Fri 3/26/04
112	Monthly Progress Reports (19th day of each month)	1458 days	Wed 5/19/99	Mon 12/12/05



Project Data Ty... Task Split Progress Milestone Summary Rolled Up Task Rolled Up Split Rolled Up Milestone Rolled Up Progress External Tasks Project Summary External Milestone

Project Schedule - RFI Phase 1C.mpp
Tue 12/7/04

GMPT SAGINAW METAL CASTING OPERATIONS
PROJECT SCHEDULE
THROUGH COMPLETION OF RFI ACTIVITIES
(IN WEEKS)