OCTOBER 2012 SEMI-ANNUAL VOLUNTARY REMEDIATION PLAN PROGRESS REPORT

139 BRAMPTON ROAD
SAVANNAH, CHATHAM COUNTY, GEORGIA
HSI Site No. 10208

Submitted to:

Georgia Department of Natural Resources
Hazardous Waste Management Branch
Suite 1462, East Tower
2 Martin Luther King Jr. Drive SE
Atlanta, Georgia 30334

Prepared for:

Dale Hendrix, Sr., Trustee under Trust for Benefit of Brenda Heisey
c/o Dwight Feemster, Esq
Duffy and Feemster, LLC
and
Rheem Manufacturing Company
c/o Troutman Sanders LLP
Bank of America Plaza
Suite 5200
600 Peachtree Street, NE
Atlanta, Georgia

Prepared by:

amec

AMEC Environment & Infrastructure, INC.
396 Plasters Avenue, NE
Atlanta, Georgia 30024

October 2012

amec

October 30, 2012

Mr. Derrick Williams
Acting Program Manager
Hazardous Sites Response Program
Georgia Environmental Protection Division
2 Martin Luther King, Jr. Drive, SE
Suite 1462 East Floyd Tower
Atlanta, Georgia 30334

Subject: **October 2012 Semi-Annual Voluntary Remediation Plan Progress Report**
139 Brampton Road (former Rheem Manufacturing)
Savannah, Chatham County, Georgia
HSI Site No. 10208 Tax Parcel ID#1-0720-01-002

Dear Mr. Williams:

On behalf of Dale Hendrix, Sr., Trustee under Trust for Benefit of Brenda Heisey, and Rheem Manufacturing Company, AMEC Environment & Infrastructure, Inc. (AMEC), respectfully submits this Progress Report No.2 for the 139 Brampton Road property in Savannah, Chatham County, Georgia (HSI Site No. 10208, Tax Parcel ID#1-0720-01-002). This Progress Report is required by the Voluntary Remediation Program (VRP) statute and requested by the Georgia Environmental Protection Division (EPD) in their comment letter dated October 4, 2011.

This report is for the exclusive use of Mr. Dale Hendrix, Sr., Trustee under Trust for Benefit of Brenda Heisey and Rheem Manufacturing Company, and for regulatory submittal. If you have any questions and/or comments regarding the material presented in the report, please contact Mr. Chuck Ferry (404) 817-0107 or by email at chuck.ferry@amec.com.

Sincerely,

AMEC E&I, Inc.

Tyler Boyles
Project Geologist

Charles T. Ferry, P.E.
Senior Principal Engineer

cc: Ms. Hollister A. Hill, Troutman Sanders, LLP
Ms. Barbara Ann Cook, Rheem Manufacturing Company
Mr. Dwight Feemster, Duffy & Feemster, LLC

Project No. 6121-09-0220

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICIES

1.0 PROJECT SUMMARY

The 139 Brampton Road Site ("Site") is an approximately 11.1-acre parcel of land located in Savannah, Chatham County, Georgia. The property is commercially developed with various structures which are currently leased for warehousing of wood, construction and paper products and for office space. Historically, the Site was developed in the early 1960s for the reconditioning and manufacturing of drums. Site operations continued in a similar manner by various entities until the early to mid 1970s when drum reconditioning activities stopped. The drum manufacturing operation continued at the Site until the early 1990s. Since 1994 the Site has been occupied by various commercial tenants for warehousing and office space.

The subject Property is zoned heavy industrial and is located in close proximity to the Georgia Port Authority – Garden City Terminal Container Port in Savannah, Georgia. The Property has been utilized for commercial/industrial purposes for approximately 5 decades.

The property has been the subject of a number of environmental assessments conducted between 1985 and 2009, which revealed the presence of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals in soil and groundwater. The property was listed on the Hazardous Site Inventory (HSI) in June 1994 as site number 10208 due to the presence of lead in soil and tetrachloroethene in groundwater.

A Voluntary Remediation Plan Application (VRPA), dated December 13, 2010, was submitted to Georgia Environmental Protection Division (EPD) to enter the Site into the Voluntary Remediation Program (VRP). The Georgia EPD approved the VRPA with conditions and comments presented in two letters dated October 4, 2011 and accepted the 139 Brampton Road property into the VRP.

This Semi-Annual Voluntary Remediation Plan Progress Report No. 2 was prepared in accordance with the Voluntary Remediation Program (VRP) for the 139 Brampton Road Site, HSI Site No. 10208/Tax Parcel ID#1-0720-01-002.

2.0 ACTIONS TAKEN SINCE LAST SUBMITTAL

The activities currently identified to be performed at the 139 Brampton Road Site are outlined in the approved VRPA, as well as, EPD's conditions and comments presented in their VRPA approval letter dated October 4, 2011. The activities that have been performed since submittal of the Semi-Annual Voluntary Remediation Plan Progress Report No. 1 dated April 30, 2012 are described in the following sections.

2.1 VAPOR INTRUSION

The results of the subsurface investigations identified the presence of chlorinated solvents in the groundwater on the southern end of the subject property. As a result, an evaluation of the potential for vapor intrusion to indoor air has been completed in accordance with the February 22, 2004 USEPA "User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings."

2.1.1 Vapor Intrusion Risk Evaluation

AMEC evaluated the potential impact of groundwater and soil contamination on future indoor air quality for the three industrial buildings located at 139 Brampton Road in Savannah, Georgia (the Site). The Site was formerly used for the reconditioning and/or manufacturing of drums from the early 1960s until the early 1990s. Since 1994 various commercial have used the on-Site buildings for warehousing and office space. The surrounding area is in close proximity to the Georgia Port Authority – Garden City Terminal Container Port and is primarily industrial/commercial. The current buildings are situated on slab foundations. Maximum detected groundwater and soil concentrations were used to estimate worst-case potential exposures for current and future industrial/commercial workers that might be exposed to indoor air vapor emissions from the subsurface.

Five groundwater monitoring wells (EW-1, EW-2, GW-1, GW-7, and W-5) located close to three current buildings (Warehouse A, Warehouse B, and the Open Air Warehouse) were sampled in March 2012 for volatile organic compounds (VOCs). A summary of the March 2012 groundwater testing results is presented on Figure 1. Previous groundwater sampling events occurred beginning in 1987 through 2000, but these older data were not considered representative of current groundwater conditions. In 2012, seven VOCs were detected in three of five groundwater samples, and these data are further considered in the indoor air risk evaluation. The maximum detected groundwater VOC concentrations are listed on Table 1.

In March 2012 soil samples were collected from 28 soil boring locations at depths ranging from ground surface to 7 feet below ground surface (bgs). A summary of the soil testing results is presented on Figure 2. Nineteen VOCs were detected in these soil samples, and the maximum detected concentrations are summarized on Table 2.

2.1.2 Exposure Assessment

In order to identify groundwater constituents of potential concern (COPCs) for the vapor intrusion pathway, the maximum detected groundwater concentrations were compared to target groundwater concentrations from USEPA's Vapor Intrusion Screening Level (VISL) Calculator Version 1.0. These screening levels are presented in Table 1 and are based on a conservative residential exposure scenario with target carcinogenic risk of 10^{-6} and target hazard index of 1. As a result of this screening step, three constituents were identified as groundwater COPCs and carried through the vapor intrusion risk evaluation. These COPCs include 1,1-dichloroethane, tetrachloroethene, and trichloroethene.

In order to identify soil COPCs for the vapor intrusion pathway, the maximum detected soil concentrations from March 2012 were compared to generic inhalation Soil Screening Levels (SSLs) obtained from the Soil Screening Guidance: Technical Background Document (USEPA, 1996). These screening levels are presented in Table 2. None of the detected soil concentrations were greater than the inhalation SSLs. Based on this screening step, no soil COPCs were identified for this Site.

The three VOCs in groundwater were evaluated as a potential source of volatile emissions into a current/future commercial use building located on the property. AMEC utilized the USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (USEPA, 2002) as a primary guidance document. In accordance with the guidance, AMEC estimated future indoor air concentrations at the Site, using USEPA's Johnson and Ettinger Model for Subsurface Vapor Intrusion into Buildings (GW-ADV, Version 3.1) (the J&E Model) (USEPA, 2004). The maximum detected concentrations were conservatively used as the groundwater exposure point concentrations in the J&E Model runs.

Default and site-specific modeling parameters were used for estimating indoor air concentrations (Table 3). Based on site-specific soil boring logs, the depth to groundwater is estimated at approximately 11 feet. The soil type is primarily sandy clay with some silty sand. Soils were classified as SC (sandy clay) for the purposes of modeling. Also for the purposes of modeling, the dimensions of the smallest enclosed building, Warehouse B, was conservatively used as the target building size. Warehouse B is approximately 179 feet by 100.5 feet with a 32-foot ceiling height and 16-foot side eaves, while Warehouse A is approximately 100.5 feet by 481 feet with a 32-foot ceiling height and 16-foot side eaves. The third building is an open air shed and would not accumulate vapors. For the commercial land use scenario, an assumed air exchange rate of 1.5 exchanges per hour was used (mean rate for commercial buildings per Exposure Factors Handbook – 2011 Update, USEPA, 2011). Commercial/industrial workers were assumed to be exposed for 8 hours per day, for 250 days per year for 25 years (USEPA, 1991).

2.1.3 Toxicity Assessment

Toxicity values [Inhalation Reference Concentrations (RfCs) and Unit Risk Factors (URFs)] used in this evaluation were obtained from the USEPA Integrated Risk Information System (IRIS, 2012) and USEPA's May 2012 Regional Screening Level Table (USEPA, 2012). The toxicity values used in this assessment are listed on Table 4. The RfC is used to estimate non-carcinogenic inhalation hazards. The RfC is an estimate of the daily exposure to the human population (including sensitive subgroups such as children and the elderly) that is likely to be without an appreciable risk of deleterious effects. The estimated hazard is compared to a target hazard index (HI) of one. Cumulative hazards less than one are not likely to be associated with systemic or non-carcinogenic health risks.

Using the chemical-specific URF, the cumulative carcinogenic risk for the indoor vapor intrusion pathway was calculated and compared to a target risk of 10^{-5}. If the cumulative carcinogenic risk for site workers is less than 10^{-5}, risk is considered to be in the acceptable range under the Hazardous Site Response Act (HSRA). The URF is characterized as an upper-bound estimate designed to be protective of the majority of the human population.

2.1.4 Risk Characterization – Vapor Intrusion Modeling

The J&E Model was used to estimate indoor air concentrations with groundwater concentrations used as the input values. These estimated indoor air concentrations were then used to assess potential indoor air exposures and calculate cumulative incremental risks and hazards related to potential vapor intrusion into the site building (Table 4). The J&E Model output for each COPC are included in Appendix A. The J&E Model incorporates both convective and diffusive mechanisms for estimating the transport of contaminant vapors emanating from the subsurface into indoor spaces located directly above the source of contamination. The model is a one-dimensional analytical solution to vapor transport into indoor spaces, relating the vapor concentration in the building to the chemical concentration at the subsurface source area.

The J&E Model assumes the structure is located above the subsurface impacts and volatile emissions will enter through the concrete floor slab. This model does not incorporate dispersion, dilution, or bioattenuation. However, in actuality, the concentrations of volatile compounds may naturally attenuate over time. The model also assumes an infinite subsurface contamination source, while the distribution under the building is not homogeneous. In general, the assumptions used in the J&E modeling would tend to overestimate indoor air concentrations.

Table 4 summarizes the results of the risk calculations for commercial land use. The estimated incremental risk from vapor intrusion in indoor air is 7×10^{-9}. The estimated hazard index (HI) for vapor intrusion to indoor air from the COPCs in groundwater is 0.002. The HI is less than one and the incremental risks are less than 1×10^{-5}. Based on these results, the vapor intrusion pathway would not pose an unacceptable hazard or risk to occupational receptors working in the on-site buildings, and would not be of concern to human health in the future.

2.1.5 Parameters of Analysis

This assessment assumes uniform exposure across the site although groundwater concentrations vary by location. The assessment also assumes site workers will be exposed over a 25-year period for 250 days per year (USEPA, 1991). These assumptions would tend to overestimate risks because commercial workers do not typically remain in the same job and location for 25 years. In addition, the detected constituents are potentially biodegradable.

2.1.6 Summary and Conclusions

Risk calculations were completed using the March 2012 maximum detected groundwater concentrations in the J&E Model in order to estimate the indoor air concentrations for COPCs. Risk and hazard associated with estimated indoor air exposures were then calculated by estimating indoor air exposure concentrations and comparing these concentrations to inhalation toxicity benchmarks. The resulting estimated cumulative hazards and risks indicate no unacceptable risk or hazards for occupational receptors potentially exposed via indoor air vapor emissions based on maintaining the current hard cover and current building parameters.

2.2 CONTACT WITH MCDONALD VENTURES AND NORFOLK SOUTHERN (ADJACENT PROPERTIES)

In its October 4, 2011 VRP approval letter, EPD requested that adjacent properties, McDonald Ventures (to the north), and Norfolk Southern Railroad (to the east/south), be included as additional qualifying properties based on historic sampling results from 12 to 15 years ago. As detailed in Semi-Annual Voluntary Remediation Plan Progress Report No. 1 dated April 30, 2012, the Trustee and Rheem have contacted, by phone and letter, representatives with both McDonald Ventures and Norfolk Southern in order to obtain access and conduct updated assessment activities to evaluate whether it is necessary to add these properties as a VRP property. McDonald Ventures provided a copy of a 2005 Phase I Environmental Site Assessment Report for the McDonald Ventures property which stated that there was no Recognized Environmental Condition associated with the property.

During the second semi-annual period the Trustee, Rheem and their attorneys have sent to representatives of McDonald Ventures a draft Access Agreement with a proposed off-site scope of work plan with attached aerial photograph diagram (see Appendix B-1). Attorneys for Rheem and the Trustee also have contacted Norfolk Southern numerous times to ascertain what entity owns the Norfolk Property. In addition, an off-site scope of work plan and an aerial photograph diagram is attached for the Norfolk Southern Property (see Appendix B-2) Attorneys for Rheem and the Trustee have followed up with multiple phone calls, emails and other contacts with representatives of McDonald Ventures and Norfolk Southern.

They also have followed up with a letter, phone calls and personal requests that a representative of McDonald Ventures sign the authorization letter (attachment to Appendix B-1) authorizing Rheem, the Trustee and AMEC to obtain copies of other prior consultants reports of assessments done on the McDonald Ventures property in 1998-2002.

Based on conversations with representatives for McDonald Ventures and Norfolk Southern, Rheem and the Trustee believe access to these properties will be granted, subject to an acceptable access agreement. However, despite multiple efforts executed Access Agreements have not been finalized with either McDonald Ventures or Norfolk Southern Railroad at this time. Therefore, the Trustee and Rheem were unable to collect updated samples on these adjacent properties during the second semi-annual period of this project. Subject to further negotiations and obtaining executed access agreements with the adjacent property owners, sampling on these properties is anticipated to occur in the third semi-annual period of this project.

3.0 SCHEDULE AND FUTURE SUBMITTALS

As required by EPD, semi-annual progress reports must be submitted to EPD every April 30th and October 30th throughout the maximum five year duration of this project. An updated milestone schedule is included as Table 5 which describes the activities yet to be performed. A breakdown of professional service hours with a description of the services provided is included in Appendix C.

REFERENCES

IRIS, 2012. Integrated Risk Information System, www.epa.gov/iris.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance, OSWER Directive 9285.6-03, March 1991.

USEPA, 1996. Soil Screening Guidance: Technical Background Document, EPA/540/R-95/128, May 1996.

USEPA, 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, EPA530-D-02-004, November 2002.

USEPA, 2004. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, Office of Emergency and Remedial Response, February 2004.

USEPA, 2011. Exposure Factors Handbook, 2011 Edition. EPA/600/R-090/052F, September 2011.

USEPA, 2012. Regional Screening Levels Table, May 2012.

TABLES

Table 1
Summary of Groundwater Concentrations - 2012
Former Rheem Manufacturing Facility
139 Brampton Road, Savannah, GA

Parameter	2012 Maximum Detected Groundwater Concentration, ug/L (a)	Target Groundwater Concentration Protective of Indoor Air, ug/L (b)	Indoor Air COPC? (c)
Volatile Organic Compounds			
1,1-Dichloroethane	28	6.6	**Yes**
1,1-Dichloroethene	70	200	No
cis-1,2-Dichloroethene	16	NC	No
Methyl tert-butyl ether	5.1	390	No
Tetrachloroethene	120	13	**Yes**
Trichloroethene	57	1.1	**Yes**
Xylenes	230	490	No

(a) Maximum detected concentrations for EW-1, EW-2, GW-1, GW-7, W-5 sampled in March 2012.
(b) Calculated using OSWER Vapor Intrusion Screening Level (VISL) Calculator Version 1.0, May 2012 RSLs for TCR = 0.000001 and THQ = 1
(c) Compound selected as a COPC if maxiumum detected concentration is greater than target groundwater concentration protective of indoor air.
ug/L micrograms per liter
NC = No inhalation toxicity values available for this compound

PREPARED/DATE: LWC 9/25/2012
CHECKED/DATE: LMS 9/26/2012

Table 2
Comparison of Maximum Detected 2012 Soil Concentrations to Soil Screening Levels
Former Rheem Manufacturing Facility
139 Brampton Road, Savannah, GA

Volatile Organic Compounds (VOCs)	Maximum Detected 2012 Concentration mg/kg	Inhalation of Volatiles SSL (1) mg/kg
1,1,1-Trichloroethane	0.017	1,200 (a)
1,2-Dichlorobenzene	0.13	560 (a)
1,3-Dichlorobenzene	0.0074	NA
1,4-Dichlorobenzene	0.018	(b)
2-Butanone	0.066	NA
Acetone	0.49	100,000 (a)
Benzene	0.14	0.8 (c)
Carbon Disulfide	0.011	720 (a)
Chlorobenzene	0.096	130 (d)
Cyclohexane	0.025	NA
cis-1,2-Dichloroethene	1.8	1,200 (a)
Ethylbenzene	11	400 (a)
Isopropylbenzene	0.18	NA
Methylcyclohexane	0.085	NA
Tetrachloroethene	5.2	11 (c)
Toluene	0.018	650 (a)
trans-1,2-Dichloroethene	0.043	3,100 (a)
Trichloroethene	2.2	5.0 (c)
Xylenes, mixture	3.74	410 (a)(e)

(1) Soil Screening Level (SSL) from Soil Screening Guidance: Technical Background Document, Appendix A, Table A-1, USEPA, 1996.
(a) Soil saturation concentration
(b) Chemical properties are such that this pathway is not a concern.
(c) Calculated value corresponds to a cancer risk level of 1 in one million.
(d) Calculated value corresponds to a noncancer hazard quotient of 1.
(e) Value for o-Xylene (most conservative value was selected for screening)
NA = Not available from this source.

Prepared By/Date: LWC 9/25/2012
Checked By/Date: LMS 9/26/2012

Table 3
Occupational Assumptions Used in Johnson & Ettinger Model (GW-ADV)
Former Rheem Manufacturing Facility
139 Brampton Road, Savannah, GA

Parameter	Value	Justification
Average Water Temp.	20.6 °C	Regional average (69° F)
Depth Below Grade to Enclosed Space Floor	15 cm	Slab on grade foundation - assumption
Depth Below Grade to Groundwater /Thickness of Soil Stratum	335 cm	Site-specific (11 ft); based on monitoring well data
Stratum A Soil Vapor Permeability	SC	Sandy Clay; site-specific
SCS Soil Type	SC	Sandy Clay; site-specific
Soil Dry Bulk Density	1.63 g/cm^3	Sandy Clay – Model value
Soil Total Porosity	0.385 unitless	Sandy Clay – Model value
Soil Water-filled Porosity	0.197 cm^3/cm^3	Sandy Clay – Model value
Enclosed Space Floor Thickness	10 cm	Model Default
Soil-Building Pressure Differential	40 $g/cm\text{-}s^2$	Model default
Enclosed Space Floor Length	5,456 cm	Site-specific for Warehouse B (179 ft)
Enclosed Space Floor Width	3,063 cm	Site-specific for Warehouse B (100.5 ft)
Enclosed Space Height	488 cm	Eave height (16 ft) for Warehouse B; site-specific.
Floor-Wall Seam Crack Width	0.1 cm	Model default
Indoor Air Exchange Rate	1.5/hr	Exposure Factors Handbook – 2011 Update. Mean for commercial buildings
Averaging Time, Carcinogens	70 years	Model default
Averaging Time, Noncarcinogens	25 years	Default for occupational
Exposure Duration	25 years	Default for occupational
Exposure Frequency	250 days/year	Default for occupational
Target Risk for Carcinogens	1×10^{-6} unitless	Target Risk
Target Hazard for Noncarcinogens	1 unitless	Target Hazard

Prepared by: LWC 9/25/12
Checked by: LMS 9/27/12

Table 4
Calculations of Risk to Indoor Air Concentrations
Site Worker - Future
Inhalation of Indoor Air

Parameter	Concentration in Air (ug/m^3)	Value Type (1)	Exposure Concentration (ug/m^3) (2)		Toxicity Values			Hazard Quotient (3) (Unitless)	Excess Cancer Risk (4) (Unitless)
			Noncarcinogen	Carcinogen	Inhalation RfC (mg/m^3)	Inhalation Unit Risk $(ug/m^3)^{-1}$	Source		
Volatile Organic Compounds									
1,1-Dichloroethane	5.69E-03	Modeled	1.30E-03	4.64E-04	--	1.6E-06	Cal EPA	--	7.4E-10
Tetrachloroethene	5.07E-02	Modeled	1.16E-02	4.13E-03	4.0E-02	2.6E-07	IRIS	2.9E-04	1.1E-09
Trichloroethene	1.69E-02	Modeled	3.86E-03	1.38E-03	2.0E-03	4.0E-06	IRIS	1.9E-03	5.5E-09
						Total:		2E-03	7E-09

PREPARED/DATE: LWC 9/25/12
CHECKED/DATE: LMS 9/27/12

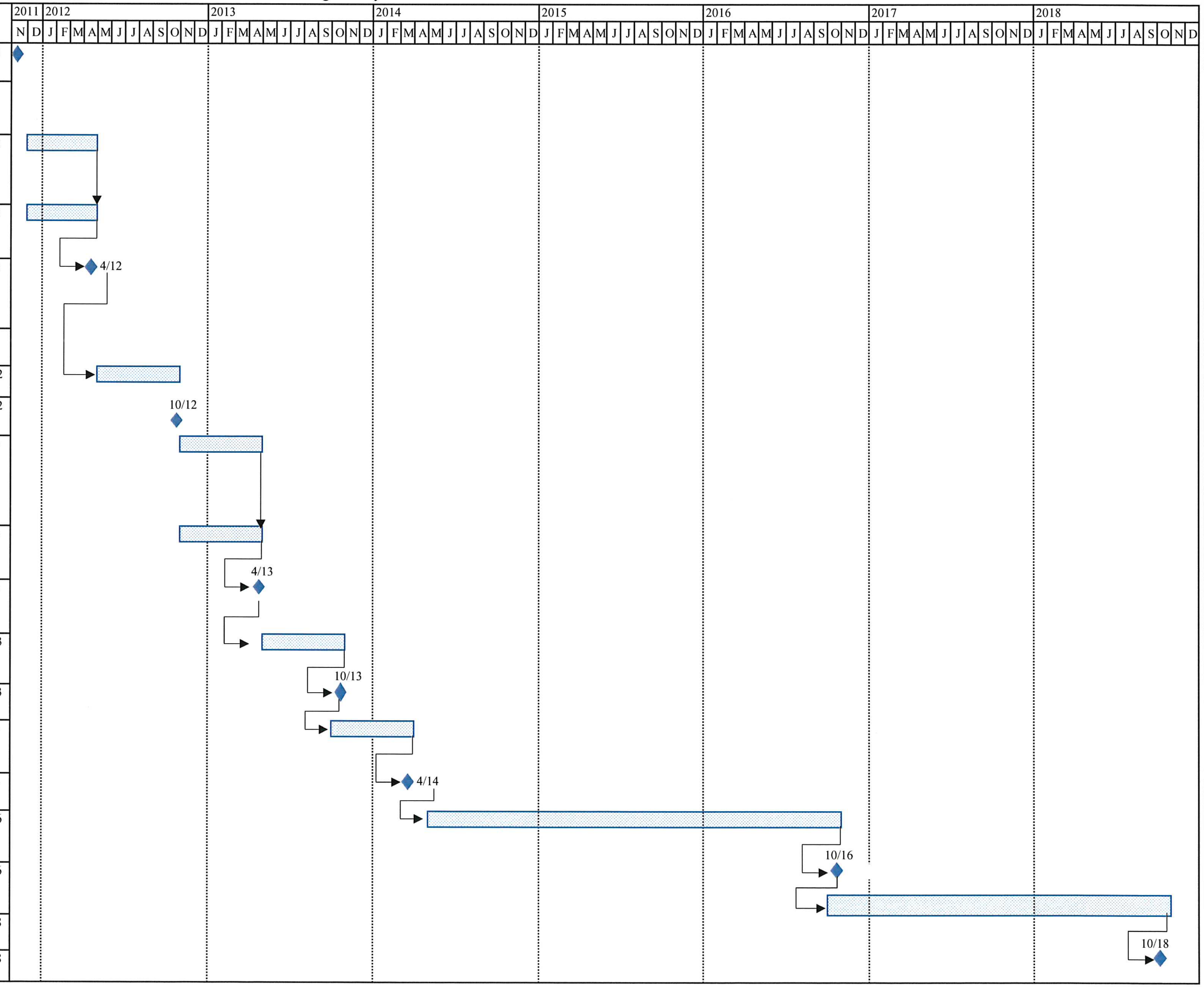
m^3 = cubic meters
mg = milligram
RfC = Reference Concentration
ug = micrograms
IRIS - Integrated Risk Information System; Cal EPA - California Environmental Protection Agency.
(1) Infinite source concentration from the Johnson and Ettinger Model (version GW-ADV 3.1, 02/04). Maximum detected groundwater concentration used as the exposure point concentration (Table 1).
(2) Exposure Concentration = See Equations below
(3) Hazard Quotient (Noncarcinogens) = Noncarcinogen Exposure Concentration/RfC x 1000 ug/mg
(4) Excess Cancer Risk (Carcinogens) = Carcinogen Exposure Concentration x Inhalation Unit Risk

Carcinogen Exposure Concentration = CA x ET x EF x ED/ AT_c where: Noncarcinogen Exposure Concentration = CA x ET x EF x ED/AT_{nc} where:

CA = Constituent Concentration in Air (estimated)	See above	AT_{nc} = Averaging Time (Noncarcinogen, hours)	219,000
ET = Exposure Time (hours per day)	8	AT_c = Averaging Time (Carcinogenic, hours)	613,200
EF = Exposure Frequency (days per year)	250		
ED = Exposure Duration (years)	25		

Former Rheem Manufacturing Facility - Gantt Schedule

Item	Task Name	Duration	Start	Finish
1	Prepare milestone schedule and cost estimate for financial assurance	Complete		12/8/2011
2	Execute access agreement with adjacent properties to the north, south and east and include additional qualifying parcels to the VRPA	Started		
	Perform initial groundwater assessment program which will consist of sampling existing on-site wells (3 known), installation and sampling additional on-site wells and hydraulic conductivity tests.	Complete		4/30/2012
	Perform additional soil characterization to further delineate known lead impacts and check for impacts of regulated substances listed in Table 3 of the VRPA.	Complete		4/30/2012
	Prepare First Progress Report which will include fate and transport model, status of existing monitoring well network, revised RRS for all constituents, updated Conceptual Site Model (CSM) and milestone schedule.	Complete		4/30/2012
3	Continue negotiating access agreements with adjacent properties to the north, south and east			
	Perform Vapor Intrusion Risk Evaluation	Compelte		10/30/2012
	Prepare Second Progress Report with vapor intrusion into on-site building modeling, updated CSM and milestone schedule.	Compelte		10/30/2012
4	Begin off-site groundwater delineation which will consist of sampling existing off-site wells (3 known), installation and sampling additional off-site wells. Complete horizontal and vertical delineation of on-site groundwater impacts, if applicable.	6 months	10/30/2012	4/30/2013
	Begin off-site soil characterization to delineate impacts of regulated substances. Complete horizontal delineation of on-site soil impacts.	6 months	10/30/2012	4/30/2013
	Prepare Third Progress Report with updated CSM and milestone schedule.		4/30/2013	4/30/2013
5	Complete horizontal delineation of soil and groundwater and update CSM	6 months	4/30/2013	10/30/2013
	Prepare Fourth Progress Report with updated CSM and milestone schedule		10/30/2013	10/30/2013
6	Complete vertical delineation of soil and groundwater, update CSM, finalize VRP and provide preliminary cost estimate for soil remediation activities using soil averaging.	6 months	10/30/2013	4/30/2014
	Prepare Fifth Progress Report with updated CSM and milestone schedule		4/30/2014	4/30/2014
7	Complete soil remediation activities using soil averaging, complete all assessment and modeling efforts, prepare sixth through ninth Progress Reports.	30 Months	4/30/2014	10/30/2016
8	Submit Compliance Status Report to certify soil and vapor compliance and demonstrate no risk of exposure for groundwater impacts		10/30/2016	10/30/2016
9	Assume two years of semi-annual groundwater monitoring and reporting	24 months	10/30/2016	10/30/2018
	Submit Delisting request			10/30/2018

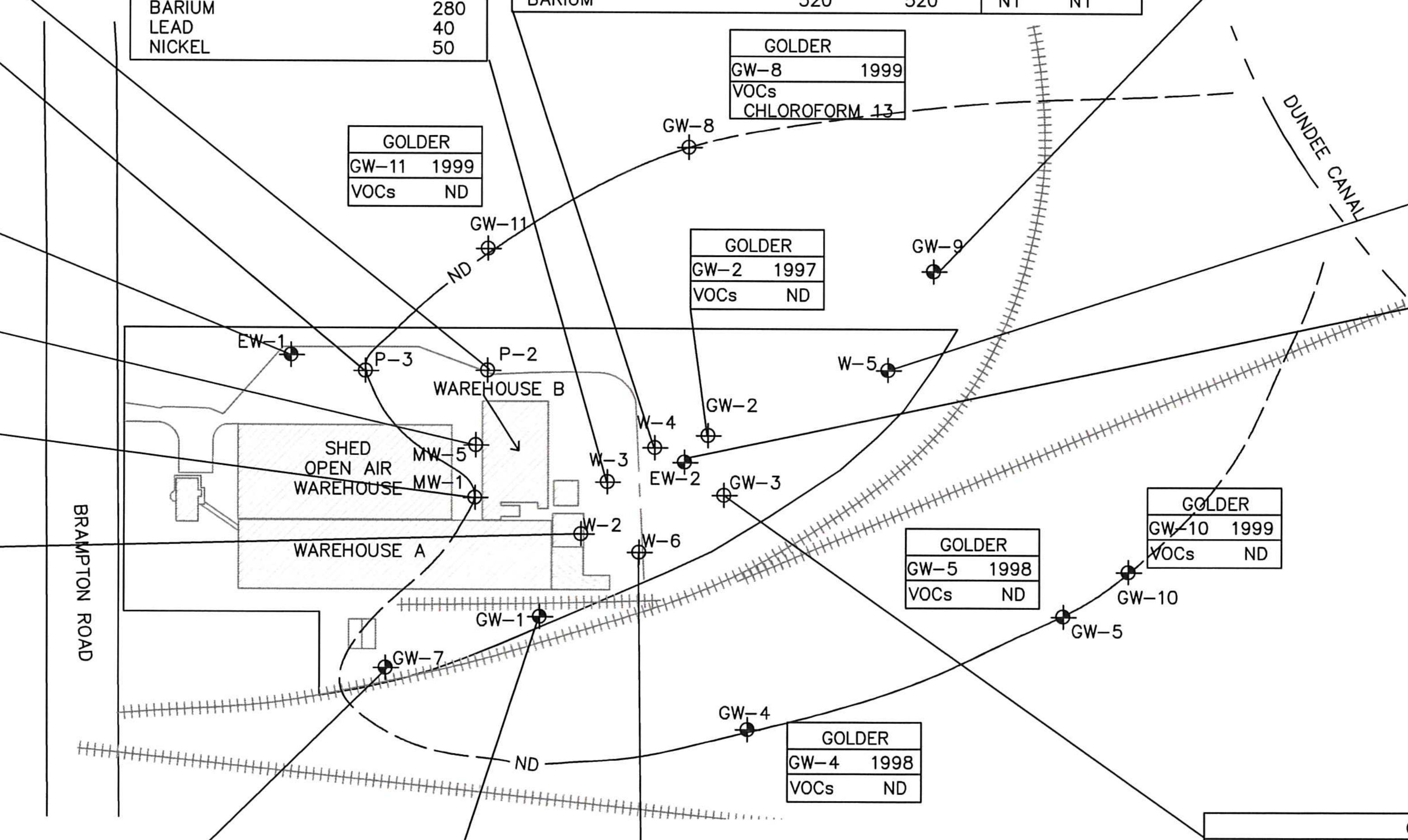


Project: Former Rheem Manufacturing Facility
Date: 10/30/2012
MACTEC Project No. 6121-09-0220

Task

Milestone

FIGURES



	EMC	GOLDER
P-2	3/1993	1999
VOCs		
1,1 DICHLOEOETHANE	65.5	33
1,1 DICHLOROETHENE	90.7	23

	EMC
P-3	3/1993
VOCs	ND

	AMEC
EW-1	3/8/2012
VOCs	BRL
METALS	
BARIUM, TOTAL	74
BARIUM, DISSOLVED	68.5

	EMC	GOLDER
MW-5	3/1993	1997
VOCs		
1,1 DICHLOEOETHANE	ND	5.4

	EMC
MW-1	3/1993
VOCs	ND

	DAMES & MOORE	EMC
W-2	11/6/1987	3/1993
VOCs		
1,1 DICHLOROETHANE	24	41
1,1 DICHLOROETHENE	25	485
trans 1,2 DICHLOROETHENE	93	ND
1,1,1 TRICHLOROETHANE	18	40
BENZENE	ND	15
ETHYLBENZENE	12	ND
METHYLENE CHLORIDE	6.7	ND
TETRACHLOROETHENE	5.9	ND
TRICHLOROETHENE	7.7	ND
TOLUENE	19	ND
VINYL CHLORIDE	24	22.8
METALS		
BARIUM	350	NT
BERYLLIUM	NT	3
LEAD	20	NT
MERCURY	ND	7
NICKEL	80	NT

	DAMES & MOORE
W-3	11/6/1987
VOCs	
1,1 DICHLOROETHANE	20
1,1 DICHLOROETHENE	8.8
1,2 DICHLOROETHANE	51
trans 1,2 DICHLOROETHENE	100
1,1,1 TRICHLOROETHANE	9
BENZENE	12
CHLOROBENZENE	11
TRICHLOROETHENE	95
VINYL CHLORIDE	3.6
SVOCs	
1,2 DICHLOROBENZENE	40
METALS	
BARIUM	280
LEAD	40
NICKEL	50

	DAMES & MOORE		GOLDER	
W-4	11/6/1987	11/19/1987	1997	1997-DUP
VOCs				
1,1 DICHLOROETHANE	130	88	50	48
1,1 DICHLOROETHENE	36	130	45	43
trans 1,2 DICHLOROETHENE	30	30	11	10
BENZENE	14	15.5	47	47
CARBON TETRACHLORIDE	ND	6.2	ND	ND
TETRACHLOROETHENE	1,800	1,000	150	140
TRICHLOROETHENE	40	39	38	37
VINYL CHLORIDE	ND	ND	ND	ND
SVOCs				
1,2 DICHLOROBENZENE	ND	1.1	NT	NT
METALS				
BARIUM	520	520	NT	NT

	GOLDER
GW-9	1999
VOCs	
1,1 DICHLOROETHANE	28
1,1 DICHLOROETHENE	39
1,2 DICHLOROETHENE	9.1
BENZENE	8
TETRACHLOROETHENE	24
TRICHLOROETHENE	12

	GOLDER
GW-8	1999
VOCs	
CHLOROFORM	13

	GOLDER
GW-11	1999
VOCs	ND

	GOLDER
GW-2	1997
VOCs	ND

	DAMES & MOORE	EMC	GOLDER	AMEC
W-5	11/6/1987	3/1993	1997	3/8/2012
VOCs				
1,1 DICHLOROETHANE	9.7	127.7	19	28
1,1 DICHLOROETHENE	ND	ND	110	70
1,2 DICHLOROETHANE	ND	ND	12	<5.0
cis 1,2 DICHLOROETHENE	ND	ND	ND	6.3
trans 1,2 DICHLOROETHENE	ND	3.9	ND	<5.0
1,1,1 TRICHLOROETHANE	ND	ND	7	<5.0
BENZENE	ND	ND	8.4	<5.0
TETRACHLOROETHENE	12	26.6	16	120
TRICHLOROETHENE	ND	ND	ND	57
VINYL CHLORIDE	ND	8.5	ND	<2.0
METALS				
BARIUM, TOTAL	200	NT	NT	33.3
BARIUM, DISSOLVED	NT	NT	NT	31.8
NICKEL	30	NT	NT	NT

	AMEC
EW-2	3/8/2012
VOCs	
1,1 DICHLOROETHANE	5.7
1,1 DICHLOROETHENE	7.7
cis 1,2 DICHLOROETHENE	16
METHYL TERT-BUTYL ETHER	5.1
TETRACHLOROETHENE	76
TRICHLOROETHENE	51
METALS	
BARIUM, TOTAL	74.1
BARIUM, DISSOLVED	56.5

	GOLDER
GW-10	1999
VOCs	ND

	GOLDER
GW-5	1998
VOCs	ND

	GOLDER
GW-4	1998
VOCs	ND

	GOLDER	AMEC
GW-7	1999	3/8/2012
VOCs		
XYLENES	ND	230
METALS	NT	BRL

	GOLDER	AMEC
GW-1	1997	3/8/2012
VOCs		
TETRACHLOROETHENE	23	<5.0
TRICHLOROETHENE	11	<5.0
METALS		
BARIUM, TOTAL	NT	34.1
BARIUM, DISSOLVED	NT	26.2

	DAMES & MOORE	EMC
W-6	11/6/1987	3/1993
VOCs		
1,1 DICHLOROETHANE	3	ND
1,2 TRANS-DICHLOROETHENE	3.9	ND
TRICHLOROETHENE	17	6.6
METALS		
BARIUM	520	NT
LEAD	10	NT

	GOLDER
GW-3	1997
VOCs	
1,1 DICHLOROETHANE	140
1,1 DICHLOROETHENE	210
1,2 DICHLOROETHANE	7.3
cis/trans 1,2 DICHLOROETHENE	64
1,1,1 TRICHLOROETHANE	7.6
BENZENE	17
CHLOROBENZENE	18
ETHYLBENZENE	21
STYRENE	5.9
TETRACHLOROETHENE	400
TRICHLOROETHENE	49
XYLENES	24

LEGEND:

- MONITORING WELL LOCATION
- ABANDONED MONITORING WELL LOCATION
- VOCS — VOLATILE ORGANIC COMPOUNDS
- SVOCS — SEMI-VOLATILE ORGANIC COMPOUNDS
- ND — NOT DETECTED
- NT — NOT TESTED
- BRL — BELOW LABORATORY REPORTING LIMITS
- APPROXIMATE EXTENT OF TOTAL VOCs IN GROUNDWATER

NOTES:
RESULTS REPORTED IN MICROGRAMS PER LITER

SCALE IN FEET

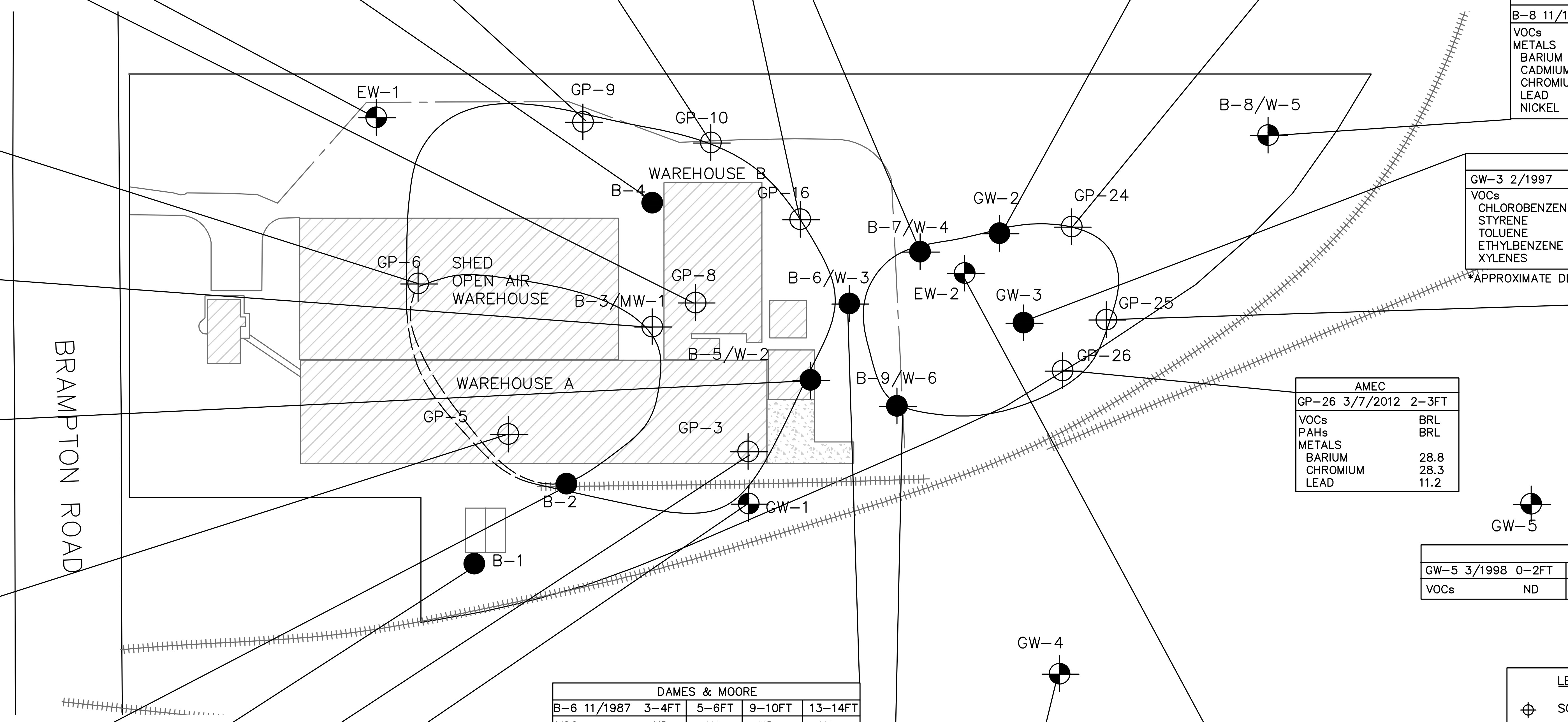
0 250 500

amec
AMEC Environment & Infrastructure
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324 (404)873-4761

139 BRAMPTON ROAD
SAVANNAH, GEORGIA

SUMMARY OF GROUNDWATER TEST RESULTS

Job Number	Task	Date	Scale	Drawn By	Reviewed By	Figure
6121-09-0220	01	FEB 2012	AS SHWON	RLA	TJB	1



AMEC		
EW-1 3/5/2012	2-4FT	
VOCs	BRL	
PAHs	BRL	
METALS		
BARIUM	60.8	
CHROMIUM	7.13	
LEAD	<5.70	

DAMES & MOORE		
B-4 11/1987	9-10FT	14-15FT
VOCs		
BENZENE	ND	0.019
ETHYLBENZENE	ND	0.017
TOLUENE	ND	0.053
XYLENE	ND	0.040
METALS		
LEAD	7.2	2.8

*APPROXIMATE DEPTH TO WATER AT P-2 6.98ft TO 10.2ft

AMEC		
GP-09 3/6/2012	1-2FT	5-6FT
VOCs	BRL	BRL
PAHS	BRL	BRL
METALS		
BARIUM	25.4	77.4
CHROMIUM	7.82	11.9
LEAD	27.9	19.9

AMEC			
GP-16 3/6/2012	1-2FT	6-7FT	DUP6-7FT
VOCs	BRL	BRL	BRL
PAHS	BRL	BRL	BRL
METALS			
ARSENIC	<6.18	8.15	<6.15
BARIUM	28.7	72.6	43.3
CHROMIUM	9.7	12.2	12.3
LEAD	32.7	13.7	7.33

GOLDER								
GW-2 2/1997	3.5-5FT	8.5-10FT	13.5-15FT	18.5-20FT	28.5-30FT	38.5-39.5FT	39.5-40FT	42.5-44FT
VOCs	ND	ND	ND	ND	ND	ND	ND	ND

AMEC	
GP-08 3/6/2012	6-7FT
VOCs	
CYCLOHEXANE	0.025
ETHYLBENZENE	0.034
ISOPROPYLBENZENE	0.055
METHYLCYCLOHEXANE	0.085
PAHs	BRL
1-METHYLNAPHTHALENE	1.2
METALS	
BARIUM	34.6
CHROMIUM	7.28
LEAD	10.8

AMEC			
GP-10 3/6/2012	0-1FT	2-3FT	6-7FT
VOCs	NT	BRL	BRL
PAHS	NT	BRL	BRL
METALS			
ARSENIC	NT	8.12	<6.31
BARIUM	NT	40	31.3
CHROMIUM	NT	14.1	17.3
LEAD	24.3	16.2	8.62

DAMES & MOORE				
B-7 11/1987	3-4FT	5-6FT	9-10FT	13-14FT
VOCs	ND	NA	NA	ND
METALS				
BARIUM	NA	7.1	450	NA
CADMIUM	NA	0.012	ND	NA
CHROMIUM	NA	53	23	NA
LEAD	NA	5.1	15	NA
NICKEL	NA	12	8	NA

AMEC	
GP-24 3/7/2012	3-4FT
VOCs	BRL
PAHs	BRL
METALS	
BARIUM	70.6
CHROMIUM	9.05
LEAD	21.7

AMEC	
GP-06 3/7/2012	4-5FT
VOCs	BRL
PAHs	BRL
METALS	
BARIUM	42.6
CHROMIUM	8.15
LEAD	<6.02

DAMES & MOORE			
B-8 11/1987	5-6FT	14-15FT	19-20FT
VOCs	NA	ND	NA
METALS			
BARIUM	12	NA	93
CADMIUM	0.018	NA	0.025
CHROMIUM	30	NA	30
LEAD	8	NA	7.7
NICKEL	6	NA	4.2

GOLDER			
GW-3 2/1997	0-5FT	9-10.5FT	14-15.5FT
VOCs			
CHLOROBENZENE	2.400	ND	ND
STYRENE	3.800	0.780	ND
TOLUENE	1.000	ND	ND
ETHYLBENZENE	14.000	2.800	ND
XYLENES	18.000	4.000	ND

*APPROXIMATE DEPTH TO WATER 6.17ft TO 8.92ft

DAMES & MOORE		
B-3 11/1987	9-10FT	19-20FT
SVOCs		
ACENAPHTHALENE	0.015	ND
ACENAPHTHYLENE	0.00042	ND
FLUORANTHENE	0.0024	ND
FLUORENE	0.013	ND
NAPHTHALENE	0.002	ND

*APPROXIMATE DEPTH TO WATER 8.95ft TO 10.8ft

AMEC	
GP-25 3/7/2012	3-4FT
VOCs	BRL
PAHs	BRL
METALS	
BARIUM	34.1
CHROMIUM	6.58
LEAD	6.59

DAMES & MOORE				
B-5 11/1987	3-4FT	5-6FT	9-10FT	14-15FT
VOCs	ND	NA	NA	ND
METALS				
BARIUM	NA	36	14	NA
CADMIUM	NA	0.051	0.012	NA
CHROMIUM	NA	34	65	NA
LEAD	NA	5.3	12	NA
MERCURY	NA	ND	0.04	NA
NICKEL	NA	7.5	12	NA

AMEC	
GP-26 3/7/2012	2-3FT
VOCs	BRL
PAHs	BRL
METALS	
BARIUM	28.8
CHROMIUM	28.3
LEAD	11.2

GOLDER				
GW-5 3/1998	0-2FT	4.5-6FT	9.5-11FT	14.5-16FT
VOCs	ND	ND	ND	ND

AMEC	
GP-05 3/6/2012	2-3FT
VOCs	
cis 1,2 DICHLOROETHENE	1.8
TETRACHLOROETHENE	5.2
trans 1,2 DICHLOROETHENE	0.043
TRICHLOROETHENE	2.2
PAHs	BRL
METALS	
BARIUM	23
CHROMIUM	6.07
LEAD	6.58

DAMES & MOORE				
B-6 11/1987	3-4FT	5-6FT	9-10FT	13-14FT
VOCs	ND	NA	ND	NA
METALS				
BARIUM	NA	31	NA	84
CHROMIUM	NA	16	NA	11
LEAD	NA	5.3	NA	0.83
NICKEL	NA	3.3	NA	2.5

AMEC		
EW-2 3/6/2012	3-4FT	5-6FT
VOCs		
1,2 DICHLOROBENZENE	0.13	<0.0067
1,3 DICHLOROBENZENE	0.0074	<0.0067
1,4 DICHLOROBENZENE	0.018	<0.0067
2 BUTANONE	0.066	<0.067
ACETONE	0.49	<0.130
BENZENE	0.014	0.019
CARBON DISULFIDE	0.011	<0.013
CHLOROBENZENE	0.096	<0.0067
ETHYLBENZENE	11	<0.0067
ISOPROPYLBENZENE	0.18	<0.0067
METHYLCYCLOHEXANE	0.027	<0.0067
TOLUENE	0.018	<0.0067
XYLENES	3.74	<0.0067
PAHS	BRL	BRL
METALS		
ARSENIC	<5.38	7.61
BARIUM	72.1	64
CHROMIUM	102	16.2
LEAD	466	12.5
MERCURY	0.491	<0.132

DAMES & MOORE		
B-2 11/1987	9-10FT	14-15FT
VOCs	ND	ND
SVOCs	ND	ND

GOLDER				
GW-1 2/1997	4-5.5FT	9-10.5FT	14-15.5FT	18-19.5FT
VOCs	ND	ND	ND	ND

DAMES & MOORE			
B-9 11/1987	5-6FT	9-10FT	14-15FT
VOCs	NA	ND	NA
METALS			
BARIUM	38	NA	8
CADMIUM	0.016	NA	0.02
CHROMIUM	25	NA	35
LEAD	12	NA	3.3
NICKEL	5.2	NA	16

DAMES & MOORE		
B-1 11/1987	9-10FT	14-15FT
VOCs	ND	ND
SVOCs	ND	ND

AMEC		
GP-03 3/5/2012	1-2FT	6-7FT
VOCs		
1,1,1 TRICHLOROETHANE	0.017	<0.0052
PAHS	BRL	BRL
METALS		
ARSENIC	<6.49	26
BARIUM	25.8	21.8
CHROMIUM	6.87	23.9
LEAD	8.13	6.88

GOLDER				
GW-4 3/1998	0-2FT	4.5-6FT	9.5-11FT	14.5-16FT
VOCs	ND	ND	ND	ND

LEGEND:

- SOIL BORING LOCATION (AMEC)
- SOIL BORING LOCATION (OTHERS)
- ABANDONED MONITORING WELL LOCATION
- EXISTING MONITORING WELL LOCATION
- VOCS VOLATILE ORGANIC COMPOUNDS
- SVOCS SEMI-VOLATILE ORGANIC COMPOUNDS
- ND NOT DETECTED
- NA NOT ANALYZED
- BRL BELOW LABORATORY REPORTING LIMITS
- APPROXIMATE EXTENT OF VOCs LESS THAN SOIL DELINEATION CRITERIA
- EXTENT OF VOCs GREATER THAN THE SOIL DELINEATION CONCENTRATION CRITERIA

SCALE IN FEET

0 100 200

NOTES:
RESULTS REPORTED IN MILLIGRAMS PER KILOGRAMS

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED
DRAWN TJB
CHECKED CTF
IN CHARGE CTF
DATE APRIL 2012

139 BRAMPTON ROAD
SAVANNAH, GEORGIA

amec
AMEC Environment & Infrastructure
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA (404) 873-4761

SUMMARY OF SOIL TEST RESULTS

SCALE AS SHOWN
CONTRACT 6121-09-0220
FIGURE NO. 2 | REV | PAGE NO

APPENDIX A

J&E MODEL OUTPUT

139 Brampton Road
Indoor Air Risk Evaluation - Data Inputs

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
75343	2.80E+01	1,1-Dichloroethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm²)
20.6	15	335	335			A	SC	SC		

Totals must add up to value of L_{WT} (cell G28)

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)
SC	1.63	0.385	0.197	SC	1.63	0.385	0.197	SC	1.63	0.385	0.197

Lookup Soil Parameters

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	5456	3063	488	0.1	1.5	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	1.6E-06	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	320	0.188	0.188	0.188	0.299	1.77E-09	0.837	1.49E-09	30.00	0.385	0.030	0.355	17,038

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.40E+06	1.70E+07	1.00E-04	15	7,333	4.66E-03	1.93E-01	1.79E-04	1.92E-03	0.00E+00	0.00E+00	1.60E-05	1.58E-04	320

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	5.41E+03	0.10	6.24E+00	1.92E-03	1.70E+03	1.98E+08	1.05E-06	5.69E-03	1.6E-06	NA

END

Prepared/Date: LWC 9/24/2012
Checked/Date: LMS 9/27/2012

139 Brampton Road
Indoor Air Risk Evaluation - Data Inputs

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	1.20E+02	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm²)
20.6	15	335	335			A	SC	SC		

Totals must add up to value of L_{WT} (cell G28)

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm³/cm³)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
SC	1.63	0.385	0.197	SC	1.63	0.385	0.197	SC	1.63	0.385	0.197

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	5456	3063	488	0.1	1.5	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	2.6E-07	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	320	0.188	0.188	0.188	0.299	1.77E-09	0.837	1.49E-09	30.00	0.385	0.030	0.355	17,038

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.40E+06	1.70E+07	1.00E-04	15	9,445	1.45E-02	6.00E-01	1.79E-04	1.86E-03	0.00E+00	0.00E+00	7.12E-06	7.33E-05	320

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	7.20E+04	0.10	6.24E+00	1.86E-03	1.70E+03	3.59E+08	7.05E-07	5.07E-02	2.6E-07	4.0E-02

END

Prepared/Date: LWC 9/24/2012
Checked/Date: LMS 9/27/2012

139 Brampton Road
Indoor Air Risk Evaluation - Data Inputs

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
79016	5.70E+01	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm²)
20.6	15	335	335			A	SC	SC		

Thickness columns: Totals must add up to value of L_{WT} (cell G28)

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm³/cm³)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)
SC	1.63	0.385	0.197	SC	1.63	0.385	0.197	SC	1.63	0.385	0.197

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	5456	3063	488	0.1	1.5	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	4.0E-06	2.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	320	0.188	0.188	0.188	0.299	1.77E-09	0.837	1.49E-09	30.00	0.385	0.030	0.355	17,038

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.40E+06	1.70E+07	1.00E-04	15	8,425	8.30E-03	3.44E-01	1.79E-04	2.04E-03	0.00E+00	0.00E+00	1.03E-05	1.04E-04	320

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	1.96E+04	0.10	6.24E+00	2.04E-03	1.70E+03	6.24E+07	8.63E-07	1.69E-02	4.0E-06	2.0E-03

END

Prepared/Date: LWC 9/24/2012
Checked/Date: LMS 9/27/2012

APPENDIX B-1

PROPOSED OFF-SITE SCOPE OF WORK FOR MCDONALD VENTURES PROPERY

August 27, 2012

Subject: **Heisey Trust Property (former Rheem Manufacturing Company facility)**
139 Brampton Road
Savannah, Georgia 31408

Voluntary Remediation Program Services
2012 Second Progress Report Period – October 2012
AMEC Project No. 6121-09-0220

SECOND SEMI-ANNUAL REPORTING PERIOD
PROPOSED OFF-SITE WORK PLAN ON MCDONALD VENTURES PROPERTY

Off-Site Access

In its October 4, 2011 VRP Approval Letter, GA EPD requested that the adjacent property to the north, belonging to McDonald Ventures be included as an additional qualifying property. This was based on historic test results which may not reflect current conditions, so current data is needed. To assist Rheem and Trustee in arranging for off-site access for current sampling, this proposed Work Plan describes the scope of sampling and testing to be performed on the McDonald Ventures Property during the second semi-annual reporting period.

Further Soil Characterization on McDonald Ventures Property

In order to assess off-site soil conditions, we plan to install four soil borings with a geo-probe drill rig on the McDonald Ventures property located north of the 139 Brampton Road site property boundary. Two borings will be installed north and two borings will be installed west of the existing building on the McDonald Ventures property using a geo-probe drill rig to a depth of approximately four feet. Soil samples will be collected at regular intervals and classified visually in field. Two soil samples from each boring will be collected and transported to the laboratory. The shallow sample will be analyzed for lead. Based on the laboratory results, testing of deeper soil samples may be warranted. AMEC has prepared the attached figure with the location of our recommended placement of the additional soil borings.

The soil samples will be collected in laboratory-supplied containers and maintained on ice and under chain-of-custody control from the time they are collected until they are released to the laboratory. The samples will be submitted to Analytical Environmental Services, Inc. in Atlanta, Georgia and tested for the presence of lead (EPA Method 8270C).

Further Groundwater Characterization on McDonald Ventures Property

In order to further assess off-site groundwater conditions. AMEC plans to install one additional monitoring well on the McDonald Ventures property during the second reporting period. The location of the well has been determined utilizing the data collected during the initial groundwater characterization effort. We plan to install the one additional monitoring well on the McDonald Ventures property using a geo-probe drill rig. AMEC has prepared the attached figure with the recommended placement for the additional well. In addition, the existing monitoring well GW-9 located on the McDonald Ventures property will be sampled during this field event.

The groundwater samples will be collected in laboratory-supplied containers and maintained on ice and under chain-of-custody control from the time they are collected until they are released to the laboratory. The samples will be submitted to Analytical Environmental Services, Inc. in Atlanta, Georgia and tested for the presence of volatile organic compounds (VOCs via EPA Method 8260B).

The updated potentiometric surface map, along with the groundwater chemistry and hydraulic conductivity data, will be used with the Biochlor contaminant migration modeling software to develop a preliminary fate and transport model.

Areas where concrete is penetrated in order to conduct the borings will be replaced and patched with concrete.

Miscellaneous

AMEC's activities will be performed in accordance with a site specific job hazard analysis and safety plan.

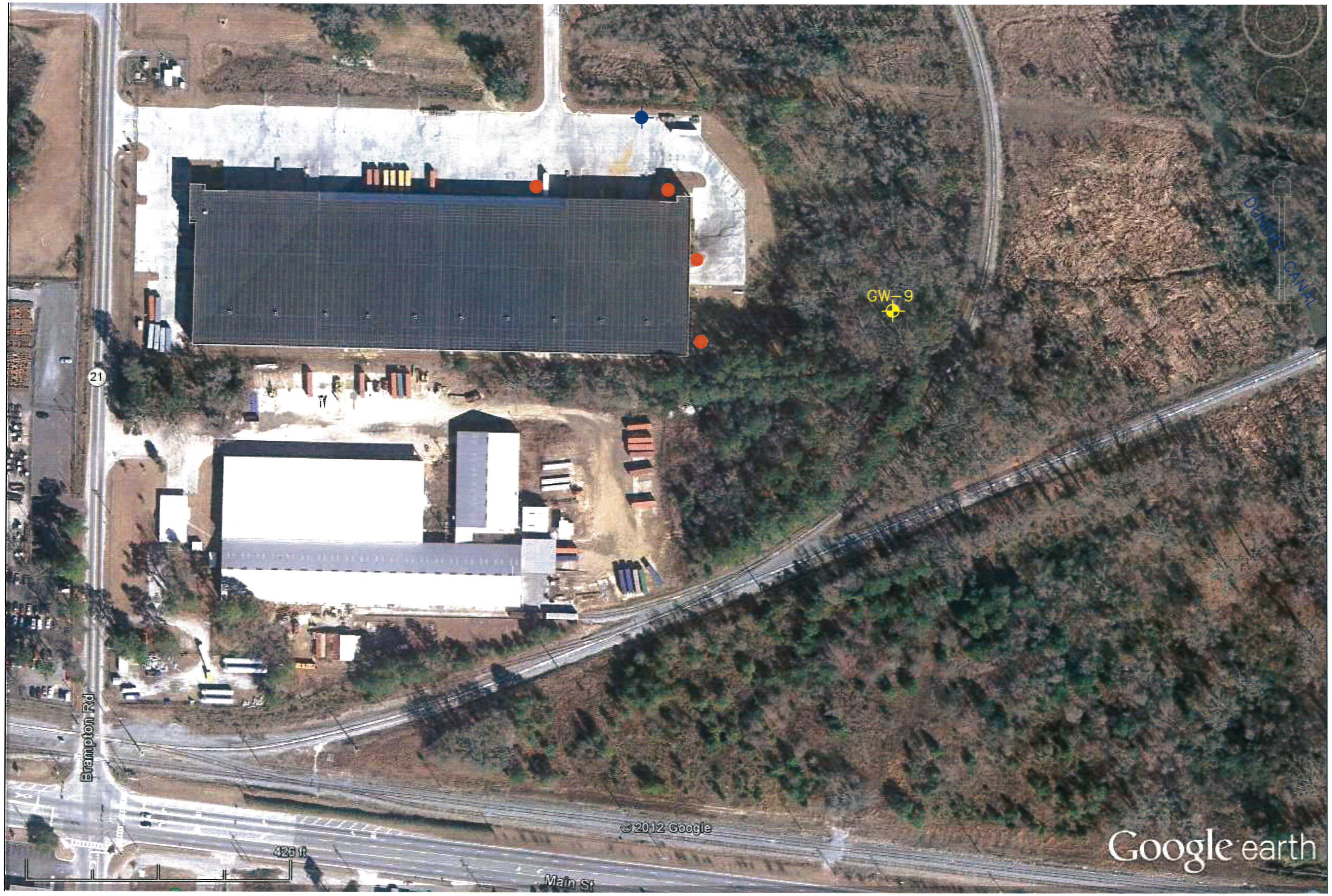
AMEC will call in a public utility clearance as required by law, and we will also have a private subcontractor clear each boring location prior to drilling.

Soil cuttings, well development water and other wastes will be drummed and the drums will be removed from the property upon completion of the field work.

Schedule

We anticipate that this field work will be conducted in September 2012 over a one week time period. AMEC will notify McDonald Ventures in advance of our specific schedule for property access.

M:\oldUdrive\Projects\Former Rheem Manufacturing Facility\Figures\Sept 2012 VRP Progress Activities\Proposed NS GW.dwg – Proposed MCD 07/26/2012



LEGEND

- PROPOSED SHALLOW SOIL BORING LOCATION
- PROPOSED MONITORING WELL LOCATION
- EXISTING MONITORING WELL LOCATION

amec

AMEC Environment & Infrastructure
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324 (404)873-4761

139 BRAMPTON ROAD
SAVANNAH, GEORGIA

MCDONALD VENTURES PROPERTY
PROPOSED LOCATIONS
FOR SOIL BORINGS &
GROUNDWATER SAMPLING

Job Number	Task	Date	Scale	Drawn By	Reviewed By	Figure
6121-09-0220	01	JULY 2012	AS SHWON	RLA	TJB	

APPENDIX B-2

PROPOSED OFF-SITE SCOPE OF WORK FOR NORFOLK SOUTHERN PROPERY

August 27, 2012

Subject: **Heisey Trust Property (former Rheem Manufacturing Company facility)**
139 Brampton Road
Savannah, Georgia 31408

Voluntary Remediation Program Services
2012 Second Progress Report Period – October 2012
AMEC Project No. 6121-09-0220

SECOND SEMI-ANNUAL REPORTING PERIOD
PROPOSED OFF-SITE WORK PLAN ON NORFOLK SOUTHERN PROPERTY

Off-Site Access

In its October 4, 2011 VRP Approval Letter, GA EPD requested that the adjacent property to the east and south belonging to Norfolk Southern Corporation be included as an additional qualifying property. This was based on historic test results which may not reflect current conditions, so current sampling data is needed. To assist Rheem and Trustee in arranging for off-site access for current sampling, this proposed Work Plan describes the scope of sampling and testing to be performed on the Norfolk Southern property during the second semi-annual reporting period.

Further Soil Characterization on Norfolk Southern Property

In order to assess off-site soil conditions, we plan to install soil borings in the middle of the Norfolk Southern property located south of the 139 Brampton Road site property boundary. Two soil borings will be installed using a hand auger to a depth of approximately 4 feet. Soil samples will be collected at regular intervals and classified visually in the field. Two soil samples from each boring will be collected and transported to the laboratory. The shallow sample will be analyzed for lead. Based on the laboratory results, testing of deeper soil samples may be warranted. AMEC has prepared the attached figure with the location of our recommended placement of the additional soil borings.

The soil samples will be collected in laboratory-supplied containers and maintained on ice and under chain-of-custody control from the time they are collected until they are released to the laboratory. The samples will be submitted to Analytical Environmental Services, Inc. in Atlanta, Georgia and tested for the presence of lead (EPA Method 8270C).

<u>Further Groundwater Characterization on Norfolk Southern Property</u>

In order to further assess off-site groundwater conditions, AMEC plans to install additional monitoring wells at selected locations on the Norfolk Southern property during the second reporting period. The locations of the wells have been determined utilizing the data collected during the initial groundwater characterization effort. We plan to install three additional monitoring wells on the eastern portion of the Norfolk Southern property using a hand auger and one monitoring well on the western portion of the property using a geo-probe drill rig. AMEC has prepared the attached figure with the recommended placement for the additional wells.

In addition, the existing monitoring wells GW-4, GW-5 and GW-10 on the Norfolk Southern property will be sampled during this field event. If we are unable to locate some or all of these existing monitoring wells, then we propose to drill and install up to two new groundwater wells in the area of those previous wells on the Norfolk Southern property in order to collect current groundwater samples.

The groundwater samples will be collected in laboratory-supplied containers and maintained on ice and under chain-of-custody control from the time they are collected until they are released to the laboratory. The samples will be submitted to Analytical Environmental Services, Inc. in Atlanta, Georgia and tested for the presence of volatile organic compounds (VOCs via EPA Method 8260B).

In order to obtain the data necessary for the future calculations associated with a groundwater model, AMEC will also collect water samples from the wells which will be analyzed for parameters relevant to the fate and transport of groundwater contamination. Field parameters will be measured which include temperature, pH, specific conductance, dissolved oxygen and oxidation-reduction potential. Laboratory analyses will be performed which include total organic carbon, alkalinity, chloride, ethene, ethane, ferrous iron, methane, nitrate, nitrite, sulfate and sulfide.

<u>Miscellaneous</u>

AMEC's activities will be performed in accordance with a site specific job hazard analysis and safety plan.

AMEC will call in a public utility clearance as required by law, and we will also have a private subcontractor clear each boring location prior to drilling.

Soil cuttings, well development water and other wastes will be drummed and the drums will be removed from the Norfolk Southern property upon completion of the field work.

Schedule

We anticipate that this field work will be conducted in September 2012 over a one week time period. AMEC will notify Norfolk Southern in advance of our specific schedule for property access.

M:\oldUdrive\Projects\Former Rheem Manufacturing Facility\Figures\Sept 2012 VRP Progress Activities\Proposed NS GW.dwg – Proposed NS 07/26/2012

LEGEND

- PROPOSED SHALLOW SOIL BORING LOCATION
- PROPOSED MONITORING WELL LOCATION
- EXISTING MONITORING WELL LOCATION

amec

AMEC Environment & Infrastructure
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324 (404)873-4761

139 BRAMPTON ROAD
SAVANNAH, GEORGIA

NORFOLK SOUTHERN PROPERTY
PROPOSED LOCATIONS
FOR SOIL BORINGS &
GROUNDWATER SAMPLING

Job Number	Task	Date	Scale	Drawn By	Reviewed By	Figure
6121-09-0220	01	JULY 2012	AS SHWON	RLA	TJB	

APPENDIX C

SUMMARY OF PROFESSIONAL ENGINEER'S SERVICES

Charles T. Ferry, P.E.
Summary of Hours and Services
139 Brampton Road
Savannah, Georgia
HSI Site No. 10832

Hours for post-approval Voluntary Remediation Plan implementation

(1) Project oversight and evluation of vapor intrusion modeling
3 hours invoiced between 7/23/12 and 10/18/12

(2) Prepare October 2012 Semi-Annual VRP Progress Report
2 hours invoiced between 10/18/12 and 10/30/12