



151 Martin  
Birmingham, MI 48009  
248.530.1800

## **BIRMINGHAM BROWNFIELD REDEVELOPMENT AUTHORITY AGENDA**

**Thursday, July 16, 2015 at 8:30 a.m.**

Birmingham City Hall (151 Martin Street)  
City Commission Room

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1. Call to Order
2. Approval of Minutes from the May 14, 2015 Meeting
3. Resolution approving the Brownfield Plan and associated Reimbursement Agreement pertaining to the Brownfield Plan for **2483 W. Maple** (Cranbrook Car Care) and requesting the City Clerk to forward the Brownfield Plan and Reimbursement Agreement to the Birmingham City Commission for their review and consideration.
4. Project Updates
5. Open to the public for items not on the Agenda
6. Adjournment

*Approved minutes of the meeting are available in the Community Development Office or online at [www.bhamgov.org](http://www.bhamgov.org).*

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Persons with disabilities that may require assistance for effective participation in this public meeting should contact the City Clerk's Office at the number (248) 530-1880, or (248) 644-5115 (for the hearing impaired) at least one day before the meeting to request help in mobility, visual, hearing, or other assistance.

Las personas con incapacidad que requieren algún tipo de ayuda para la participación en esta sesión pública deben ponerse en contacto con la oficina del escribano de la ciudad en el número (248) 530-1800 o al (248) 644-5115 (para las personas con incapacidad auditiva) por lo menos un día antes de la reunión para solicitar ayuda a la movilidad, visual, auditiva, o de otras asistencias. (Title VI of the Civil Rights Act of 1964).

**Brownfield Redevelopment Authority  
MINUTES  
City Commission Room of the Municipal Building  
151 Martin Street, Birmingham, Michigan**

**Thursday, May 14, 2015  
8:30 a.m.**

- 
1. Chairperson Gotthelf welcomed everyone and convened the meeting at 8:30 a.m.

Members Present: Chairperson Beth Gotthelf  
Paul Robertson, Jr.  
Robert Runco  
Dani Torcolacci  
Wendy Zabriskie

Members Absent: None

Also Present: Duayne Barbat, representing Shell Gas Station (former Citgo Gas Station)  
Scott Barbat, representing Shell Gas Station (former Citgo Gas Station)  
Blake Burstein, Intern  
Dan Cassidy, Vice President of SME, representing Catalyst Development Co.  
Anne Jamieson, AKT Peerless Environmental Services, City Brownfield Consultant  
Elizabeth Masserang, PM Environmental, Inc.  
Christie Santiago, PM Environmental, Inc.

Administration: Jana Ecker, Planning Director  
Mark Gerber, Finance Director  
Jeffrey Haynes, City Attorney  
Carole Salutes, Recording Secretary  
Joseph Valentine, City Manager

Ms. Torcolacci, newest Authority member, introduced herself and offered her background.

2. Approval of September 10, 2014 Minutes

**Motion by Mr. Robertson**

**Seconded by Ms. Zabriskie to approve the September 10, 2014 minutes as presented.**

**Voice**

**Vote: Yeas, Robertson, Zabriskie, Gotthelf, Runco, Torcolacci**

**Nays, 0**

**Absent, 0**

**Motion carried, 5-0.**

3. Resolution approving Brownfield Plan and associated Reimbursement Agreement pertaining to the Brownfield Plan for 33588 Woodward Ave. (former Citgo Gas Station) and requesting the city clerk to forward the Brownfield Plan and Reimbursement Agreement to the Birmingham City Commission for their review and consideration.

Ms. Ecker talked about the development. The owners are expanding the convenience store footprint, recladding the building, adding a new canopy, new tanks, new screenwalls, new lighting. Everything other than the shell of the original building with the addition will be new. When the applicants first submitted their Brownfield Plan the City saw there was not only contamination on the site, but that it was perhaps spreading to the public property to the east, south and west. They met with MDEQ who agreed to do additional testing to determine the furthest extent of the flow.

Mr. Haynes clarified that there was free product in the soil but apparently not in the ground water yet. The meeting with MDEQ established that fact and that the free product was probably confined to the site. The City was concerned that it was migrating into the alley, so the applicant went out and did some soil gas tests which showed no soil gas in the alley to the east.

Chairperson Gotthelf noted the total the developer is requesting is approximately \$200 thousand with another \$26 thousand of 15% contingency.

In response to Mr. Robertson, Ms. Santiago said the tanks have been removed from the ground as well as all of the contaminant. They took out almost four thousand tons of soil. Of the four thousand tons they removed, they are asking for reimbursement of a portion.

Ms. Masserang from PM Environmental covered the expenses that have been incurred already and what is to be incurred. Initially they were looking at an amount that was significantly less. However, the developer had some concerns about not addressing due care and additional response activities to the standard that the City wanted to see. They also wanted input from MDEQ and that meeting was arranged.

Per the City's request, the developer came forth to amend his SLUP to include and to insure that all soils above CSAT (soils that are impacted with gas that could be representative of free product) will be removed from the property. In order to address

the SLUP, 4,000 tons of soil had to be removed from the property. They are now requesting reimbursement for around three thousand tons of that soil.

Mr. Robertson noted there are some contaminants on the southern edge of the property. He asked if there is concern about leakage into the adjacent parcel. Ms. Santiago replied there was soil gas there and they dug up to the property boundary and removed all the impacted soil. They have to go back out now that the site has been backfilled and retest to show there is not a soil gas concern there any longer. The developer has spent a significant amount of money to clean up to that point.

Ms. Jamieson asked whether there was additional testing within the right-of-ways to ascertain whether or not there was any off-site migration. Ms. Santiago replied they did a ground penetrating radar survey to locate underground utilities but they still do not have a schedule of when they will get out to do the drilling. The entire site has pretty much been excavated. Ms. Jamieson said once they have more information they can make decisions on how to proceed.

Chairperson Gotthelf raised the question of whether there is a liable party for the contamination. Ms. Santiago said that is one thing the MDEQ is looking into to get the site to closure. Mr. Scott Barbat indicated the prior owner is a single owner/operator who is no longer in business. He had operated the station for about twenty years. Ms. Santiago noted the age of the contamination can't really be determined.

Mr. Haynes added there is a trust that shows up on the title search. There may be some recourse against those parties. The statute allows this authority to pursue liable parties for reimbursement of anything that this Authority agrees to reimburse the new owner. The State is doing their own investigation for a liable party.

Mr. Barbat said he purchased the property from one owner and the business from another. They cleaned up and excavated almost the entire site as they said they would at a cost of well over \$200 thousand. His property is clean.

Ms. Masserang said the EPA paid for the Phase 1 Environmental and that is as much as they can cover.

Discussion considered \$2,700 for asbestos containment which is another ticket item incurred as a result of the contamination. It is an additional cost that people sustain when they are renovating older facilities. Since the Authority had previously approved asbestos expenditure for the Catalyst Building they agreed to this reimbursement. Ms. Jamieson indicated it is a public health and safety issue.

**Motion by Mr. Robertson**  
**Seconded by Ms. Zabriskie**

Whereas, the City of Birmingham has created a Brownfield Redevelopment Authority and appointed members to serve on the Authority, pursuant of 1996 PA 381, and and

Whereas, the Brownfield Redevelopment Authority is charged with the review of Brownfield Plans for Brownfield projects in the City of Birmingham, and

Whereas, the owner/developer, 33588 Woodward, LLC, intends to develop a new retail building and gasoline station at 33588 Woodward Ave, and has determined that the subject property is in need of approximately \$226,153 in environmental cleanup in order to meet certain Michigan Department of Environmental Quality standards, and

Whereas, PM Environmental has prepared a Brownfield Plan for the environmental cleanup of the site at 33588 Woodward Ave. dated April 16, 2015, and

Whereas, the Brownfield Redevelopment Authority has reviewed the Brownfield Plan.

NOW THEREFORE BE IT RESOLVED THAT:

The Brownfield Redevelopment Authority approves the Brownfield Plan for 33588 Woodward Ave. (former Citgo Gas Station) prepared by PM Environmental dated April 16, 2015 and requests the city clerk to forward the Brownfield Plan and associated Reimbursement Agreement to the Birmingham City Commission for its review and approval pursuant to Act 381.

**Voice**

**Vote: Yeas, Robertson, Zabriskie, Gotthelf, Torcolacci, Runco**

**Nays, 0**

**Absent, 0**

**Motion carried, 5-0.**

The next step will be a public hearing before the City Commission. Mr. Robertson wanted to make sure they drill one hole in the parking lot to the south to see if there has been any migration. Ms. Santiago stated when she talked to the project manager at the MDEQ she specifically asked whether they were going to drill on the south adjoining property. The project manager indicated they can't go onto that property but will return later if they are concerned about something. Mr. Haynes said in answer to Mr. Robertson that either he or Ms. Jamieson will follow up with the MDEQ and report back.

4. Resolution approving the TIF reimbursement for the previously approved Brownfield project at 34977 Woodward Ave. (Catalyst Building) and directing the Brownfield Redevelopment Authority to reimburse the applicant for all expenses covered under their Reimbursement Agreement dated November 11, 2008 as listed in the reimbursement request dated July 1, 2014, to the extent of property taxes captured to date for 34977 Woodward Ave.

Chairperson Gotthelf explained that reimbursement is from the incremental tax increase of the property. The property has been built, occupied, and now it is assessed at a higher tax. At this time, the money between the low tax and the high tax is available for cost reimbursement as documented in the Brownfield Agreement that was entered into with the developer.

Mr. Dan Cassidy said he represents Catalyst Development who constructed the Greenleaf Trust Building. Their request for \$761,581.35 has been documented and reviewed by the City.

**Motion by Mr. Robertson**

**Seconded by Ms. Zabriskie to approve the request for \$761,581.35.**

**Voice**

**Vote: Yeas, Robertson, Zabriskie, Gotthelf, Torcolacci, Runco**  
**Nays, 0**  
**Absent, 0**

**Motion carried, 5-0.**

5. Project Updates by Ms. Ecker:

- Ø There are several projects that will be pending, primarily in the Rail District, but so far they have not seen any actual Brownfield plans.
- Ø The BP Station at Cranbrook and Maple Rd. is under discussion now. It will be redeveloped as a credit union. There are some issues about off-site migration. They received Final Site Plan approval at the Planning Board for the new construction. It is a Special Land Use so they still have to go before the City Commission.
- Ø The other project that seems to be close is on Lincoln in the Rail District, the former school bus garage property. A mixed-use building is proposed and the developer has indicated they will be submitting a Brownfield Plan and seeking reimbursement.

6. Open to the public for items not on the Agenda (no public comments)

7. Adjournment

No further business being evident, meeting adjourned at 9:20 a.m.

Respectfully submitted,

Carole Salutes  
Recording Secretary



## MEMORANDUM

Community Development Department

**DATE:** July 13, 2015

**TO:** Brownfield Redevelopment Authority

**FROM:** Jana L. Ecker, Planning Director

**SUBJECT:** Review of Brownfield Plan for 2483 W. Maple – Cranbrook Car Care

The owner of the property located at 2483 W. Maple is proposing to demolish the existing gasoline service station and car repair facility and has leased the property to DFCU Financial for construction of a new one story bank building with drive through banking. All planning approvals have been granted for the construction of the new bank building and the associated drive through facility and parking.

At this time, the applicant has submitted a Brownfield Plan seeking reimbursement of eligible environmental clean-up activities on the site due to contamination associated with its current use as a gasoline service station and car repair facility. The environmental clean-up cost for which the applicant is requesting reimbursement is estimated at \$221,930.

Accordingly, please find attached a copy of the Brownfield Plan for 2483 W. Maple, dated June 29, 2015. Both the City's legal counsel and the City's environmental consultant have reviewed the Brownfield Plan for 2483 W. Maple, and all requested amendments have been made by the applicant.

### **SUGGESTED ACTION:**

To adopt the following:

#### **RESOLUTION APPROVING THE BROWNFIELD PLAN FOR 2483 WEST MAPLE (FORMER BP GAS STATION)**

Whereas, the City of Birmingham has created a Brownfield Redevelopment Authority and appointed members to serve on the Authority, pursuant to 1996 PA 381, and

Whereas, the Brownfield Redevelopment Authority is charged with the review of Brownfield Plans for Brownfield projects in the City of Birmingham, and

Whereas, Karana Real Estate, LLC, the owner and developer of 2483 West Maple Road, Birmingham, Michigan, intends to develop a new bank building at 2483 West Maple Road, and

has determined that the subject property needs approximately \$221,930 in environmental costs in order to meet Michigan Department of Environmental Quality standards, and

Whereas, PM Environmental has prepared a Brownfield Plan for the environmental cleanup of the site at 2483 West Maple Road, dated June 29, 2015, and

Whereas, the Brownfield Redevelopment Authority has reviewed the Brownfield Plan.

NOW THEREFORE BE IT RESOLVED THAT:

The Brownfield Redevelopment Authority approves the Brownfield Plan for 2483 West Maple Road prepared by PM Environmental dated June 29, 2015 and requests the City Clerk to forward the Brownfield Plan and associated Reimbursement Agreement to the Birmingham City Commission for its review and approval pursuant to Act 381.

## **BIRMINGHAM BROWNFIELD REDEVELOPMENT AUTHORITY**

**June 29, 2015**

### **PROPOSED BANK BRANCH LOCATED AT 2483 WEST MAPLE ROAD BIRMINGHAM, MICHIGAN**

Prepared on Behalf of:

**Karana Real Estate, LLC**  
2483 West Maple Road  
Birmingham, Michigan 48009  
Contact Person: Mr. Sam Karana  
Telephone: (248) 647-0700

Prepared By:

**PM Environmental, Inc.**  
4080 West Eleven Mile Road  
Berkley, Michigan 48072  
Contact Person: Elizabeth Masserang  
Telephone: (248) 414-1441

**PM Environmental, Inc.**  
4080 West Eleven Mile Road  
Berkley, Michigan 48072  
Contact Person: Michael T. Kulka, P.E., C.P.  
Telephone: (248) 336-9988

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Appendix B	“Facility” Status Documentation
Appendix C	Site Maps
Appendix D	Preliminary Site Plans
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**PROJECT SUMMARY**

Project Name:	Proposed Bank Branch
Project Location:	The property is located at 2483 West Maple Road in Birmingham, Oakland County, Michigan.
Type of Eligible Property:	Facility
Eligible Activities:	Due Care Activities, Additional Response Activities, and Preparation of Brownfield Plan.
Reimbursable Costs:	Up to \$221,930
Years to Complete Reimbursement:	Approximately 30 Years
Estimated Capital Investment:	Approximately \$1.5 to 2 million
Project Overview:	This project includes the demolition of the existing gasoline service station and removal of the current UST system for new construction of a bank branch. The proposed redevelopment involves significant remediation and reinvestment. Demolition and redevelopment is anticipated to commence Summer 2015.

## **I. INTRODUCTION AND PURPOSE**

In order to promote the revitalization of environmentally distressed areas within the boundaries of Birmingham ("the City"), the City has established the Birmingham Brownfield Redevelopment Authority (BBRA) the "Authority" pursuant to the Brownfield Redevelopment Financing Act, Michigan Public Act (PA) 381 of 1996, as amended.

The primary purpose of this Brownfield Plan ("Plan") is to promote the redevelopment of and private investment in certain "Brownfield" properties within the City. Inclusion of property within this Plan will facilitate financing of environmental response and other eligible activities at eligible properties, and will also provide tax incentives to eligible tax payers willing to invest in revitalization of eligible sites, commonly referred to as Brownfields. By facilitating redevelopment of Brownfield properties, this Plan is intended to promote economic growth for the benefit of the residents of the City.

The Property is currently zoned B-1 – Neighborhood Business, is commercially developed, and located at the intersection of West Maple Road and North Cranbrook Road. The surrounding area is characterized by commercial and residential properties.

The identification or designation of a developer or proposed use for the eligible property that is subject to this Plan shall not be integral to the effectiveness or validity of this Plan. This Plan is intended to apply to the eligible property identified in this Plan and, to identify and authorize the eligible activities to be funded. Any change in the proposed developer or proposed use of the eligible property shall not necessitate an amendment to this Plan, affect the application of this Plan to the eligible property, or impair the rights available to the Authority under this Plan.

This plan is intended to be a living document which may be modified or amended as necessary to achieve the purposes of PA 381. The applicable sections of PA 381 are noted throughout the plan for reference purposes.

This Brownfield Plan contains information required by Section 13(1) of PA 381.

## **II. GENERAL DEFINITIONS AS USED IN THIS PLAN**

Terms used in this Brownfield Plan are defined as provided in the following statutes, as appropriate:

*The Brownfield Redevelopment Financing Act, 1996 Mich. Pub. Acts. 502 which amended Pub. Act 381, M.C.L. § 125.2651 et seq., as amended.*

### **III. BROWNFIELD PROJECT**

#### **DESCRIPTION OF THE ELIGIBLE PROPERTY AND THE PROJECT**

The Eligible Property consists of one legal parcel totaling 0.38 acres with a street address of 2483 West Maple Road, Birmingham, Oakland County, Michigan and the tax ID number of 08-19-35-101-001 (the "Property").

Karana Real Estate, LLC, or any affiliate, or such other developer as approved by the Authority, are, collectively the project developer ("Developer").

The property is developed with a 3,710 square foot gasoline service station located in the southeastern portion of the subject property, which was constructed in 1957, and currently contains four service bays with four in-ground hydraulic hoists. Three dispensers are located north of the subject building, and one dispenser is located west of the subject building. The property currently contains four 6,000-gallon gasoline underground storage tanks (USTs), one 8,000-gallon gasoline UST, and one 550-gallon waste oil UST located northwest of the subject building. The gasoline USTs were installed in 1957, 1963, and 1970, and the waste oil UST was installed in 1989. Current operations are consistent with a retail gasoline dispensing station and service garage. Asphalt and concrete paved areas surround the subject building and comprise much of the subject property.

The first developed use of the subject property occurred in 1957, with the construction of the current building. Prior to 1957 the subject property was vacant land. The subject property has operated as a gasoline service station from at least 1957 to the present.

The proposed redevelopment includes the removal and demolition of the existing UST system and building for the construction of a new bank branch. This significant investment will aid in the successful remediation and reuse of a contaminated property and ensure long-term investment along a prominent thoroughfare in Birmingham, West Maple Road.

Demolition is anticipated to begin in July 2015 with a slated completion goal of Winter 2015. The developer will invest an estimated \$1.5 to 2 million dollars in the redevelopment and create approximately 15 construction jobs, 5 part-time jobs, and 4 full-time jobs.

This parcel and all tangible personal property located thereon will comprise the eligible property and is referred to herein as the "Property." The legal description is included in Appendix A.

Appendix C includes site maps of the parcel and an eligible property boundary map. Preliminary site plans are included in Appendix D.

#### **BASIS OF ELIGIBILITY**

The Property is considered "Eligible Property" as defined by Act 381, Section 2 because: (a) the Property was previously utilized as a commercial property; and (b) the parcel comprising the Property has been determined to be a "facility."

Documentation regarding the property status is also provided in Appendix B.

A Baseline Environmental Assessment (BEA) was completed in October 2010, which documents that the property is an open LUST site with chemical concentrations of gasoline range volatile organic compounds (VOCs) in soil samples collected from the subject property, which exceed the Part 213 Residential/Commercial/ Industrial Drinking Water Protection (DWP), Groundwater Surface Water Interface Protection (GSIP), Soil Volatilization to Indoor Air Inhalation (SVII), Ambient Air Infinite Source Volatile Soil Inhalation (VSI), and Direct Contact (DC) Risk Based Screening Levels (RBSLs), Soil Saturation Concentration (Csat) Screening Levels, and Vapor Intrusion Screening Levels (VISLs) and in the groundwater samples collected from the subject property, which exceed the Part 213 Drinking Water (DW), Groundwater Surface Water Interface (GSI) RBSLs and VISLs. The subject property is a site, according to Part 213 of P.A. 451, as amended, and the rules promulgated thereunder.

PM has completed additional site assessments consisting of soil and groundwater analysis to verify current concentrations prior to redevelopment activities. On July 25 and 28, 2014, PM completed subsurface investigation activities at the subject property that consisted of advancing ten soil borings, installing five temporary monitoring wells, sampling 19 existing monitoring wells, and collecting soil and groundwater samples for laboratory analysis. No evidence of a new release was identified during this additional investigation.

Twelve soil samples and 24 groundwater samples were collected and analyzed for VOCs, polynuclear aromatic hydrocarbons (PNAs), polychlorinated biphenyls (PCBs), cadmium, chromium, and lead, or some combination thereof.

The general soil stratigraphy across the subject property generally consists of up to 6.0 feet of sand or clayey sand with occasional gravel content underlain with clay to 20.0 feet below ground surface (bgs), the maximum depth explored. Occasional beds of sand or sand seams were encountered in the lower clay unit at depths between 3.0 and 13.0 feet bgs. Limited, perched groundwater was encountered on the subject property within the sand soils underlain with clay at approximately 3.0 to 8.0 feet bgs beneath the subject property. This is similar to the geology noted during previous site investigations dating back to 1992.

The analytical results for the soil samples collected by PM were compared with the MDEQ Cleanup Criteria (GCC) and Screening Levels set forth in Part 201 Rules 299.1 through 299.50, dated December 30, 2013 entitled "Cleanup Criteria Requirements for Response Activity", in accordance with Section 20120a(1) using the Residential and Nonresidential cleanup criteria/ RBSLs.

Concentrations of gasoline VOCs were detected in soil samples collected from seven of the soil borings (SB-34 through SB-40) above the Nonresidential Soil VISLs.

No concentrations of PNAs, PCBs, and metals were detected in any of the soil samples collected from within the subject building above the laboratory method detection limits (MDLs) or the most restrictive Part 213 Residential RBSLs.

Concentrations of benzene were detected in the groundwater samples collected from five permanent monitoring wells above Nonresidential Groundwater VISLs.

No concentrations of PNAs and metals were detected in any of the groundwater samples collected from within the subject building above the laboratory MDLs or the most restrictive Part 213 Residential RBSLs.

A location where a hazardous substance is present in excess of the concentrations, which satisfy the requirements of subsection 20120a(1)(a) or (17), is a facility pursuant to Part 201. Contaminant concentrations identified on the subject property in soil indicated exceedances to the Part 213 Residential and Nonresidential DWP, GSIP, SVII, VSI, and SDC RBSLs. Therefore, the subject property is a "facility"/"site" in accordance with Part 213 of P.A. 451, as amended, and the rules promulgated thereunder.

**A. Description of Costs to Be Paid for With Tax Increment Revenues and Summary of Eligible Activities**

Tax Increment Financing revenues will be used to reimburse the costs of "eligible activities" (as defined by Section 2 of PA 381) as permitted under the Brownfield Redevelopment Financing Act that include: Due Care Activities, Additional Response Activities, and preparation of a Brownfield Plan and inclusion of interest as described in this Plan. A complete itemization of these activity expenses is included in Table 1 of Appendix E.

The project is expected to begin with demolition in Summer 2015, with a completion goal of Winter 2015.

The following eligible activities and budgeted costs are intended as part of the development of the property and are to be financed solely by the developer. The Authority is not responsible for any cost of eligible activities and will incur no debt.

1. Due Care Activities; including the installation of a vapor barrier, the disposal of approximately 40,000 gallons of groundwater during redevelopment activities, soil disposal and transportation of up to approximately 1,806 cubic yards of contaminated soil associated with development activities, oversight and VSR sampling for gas VOCs and Gasoline Range Organics (GRO) during redevelopment activities, and reporting, at a cost of \$189,330.

This Brownfield Plan accounts for the capture of \$50,000 for the installation of a vapor barrier. It is anticipated reimbursement of \$24,820 will be made utilizing the tax increment revenues generated by school taxes. Should the use of school taxes not be approved, reimbursement of the eligible expense shall be made utilizing tax increment revenues from local tax capture, if, and as available during the duration of this Brownfield Plan.

Based on the maximum duration of the brownfield plan and the estimated reimbursement, it is not anticipated the remaining portion (\$25,180) will be reimbursed. However, should the tax revenue become available during the duration of the Brownfield Plan, this portion will be reimbursed utilizing local tax revenue.

2. Additional Response Activities; groundwater sampling and the installation of up to three new source wells to verify the groundwater plume is stable and not migrating; additional delineation along utility corridors of soil/groundwater and soil gas to verify the absence of contaminant migration, at an estimated cost of \$25,000.
3. Preparation of Brownfield Plan and 381 Work Plan and associated activities (e.g. meetings with BBRA, etc.) at a cost of approximately \$7,600.

Should the use of school taxes not be approved, reimbursement of the eligible expense shall be made utilizing tax increment revenues from local tax capture, if, and as available during the duration of this Brownfield Plan.

All activities are intended to be “Eligible Activities” under the Brownfield Redevelopment Financing Act. The total estimated cost of Eligible Activities subject to reimbursement from tax increment revenues is approximately \$221,930.

**B. Estimate of Captured Taxable Value and Tax Increment Revenues**

Incremental taxes on real property included in the redevelopment project will be captured under this Brownfield Plan to reimburse eligible activity expenses. The taxable value of the real property was \$396,380 for the current tax year; no personal property is associated with the site. The estimated taxable value of the completed development is \$550,000. This assumes a one-year phase-in for completion of the redevelopment, which has been incorporated into the tax increment financing assumptions for this plan. An annual increase in taxable value of 1% has been used for calculation of future tax increments in this plan.

**C. Estimated Impact of Tax Increment Financing on Revenues of Taxing Jurisdictions**

The anticipated activities reimbursed or funded through tax increment financing total \$221,930.

Taxes will continue to be generated to taxing jurisdictions on local captured millages and school millages at the base combined taxable value of \$396,380 throughout the duration of this plan totaling approximately \$289,500 or \$9,650 annually.

Non-capturable millages; including debt millages, the zoo authority and art institute, will see an immediate increase in tax revenue following redevelopment and will provide anticipated new tax revenue of 39,122 throughout the duration of this plan.

For a complete breakdown of the captured millages and developer reimbursement please see “Table 2” in Appendix E.

**D. Method of Financing and Description of Advances by the Municipality**

Redevelopment activities at the property will be funded by Karana Real Estate, LLC. Costs for eligible activities funded by Karana Real Estate, LLC will be repaid under the Michigan Brownfield Redevelopment Financing Program (Michigan Public Act 381, as amended) with incremental taxes generated by future development of the property. No advances will be made by the BBRA for this project. All reimbursements authorized under this Brownfield Plan, as amended shall be governed by the Reimbursement Agreement.

**E. Maximum Amount of Note or Bonded Indebtedness**

No note or bonded indebtedness will be incurred by any local unit of government for this project.

**F. Duration of Brownfield Plan**

In no event shall the duration of the Plan, as amended exceed 35 years following the date of the resolution approving the Plan, as amended, nor shall the duration of the tax capture exceed the lesser of the period authorized under subsection (4) and (5) of Section 13 of Act 381 or 30 years. Further, in no event shall the beginning date of the capture of tax increment revenues be later than five years after the date of the resolution approving the Plan, as amended.

**G. Effective Date of Inclusion in Brownfield Plan**

The Property will become part of this Plan on the date this Plan is approved by the City of Birmingham City Commission.

**H. Displacement/Relocation of Individuals on Eligible Property**

There will be no displacement or relocation of persons or businesses under this Plan.

**I. Local Site Remediation Revolving Fund ("LSRRF")**

The BBRA has not established a Local Site Remediation Revolving Fund (LSRRF), therefore, use of a Local Site Remediation Revolving Fund is not part of the scope of this project.

**J. Other Material that the Authority or Governing Body Considers Pertinent**

The Developer and its affiliates shall comply with all applicable laws, ordinances, executive orders, or other regulations imposed by the City or any other properly constituted governmental authority with respect to the Property and shall use the Property in accordance with this Plan.

# Appendix A

**LEGAL DESCRIPTION**

T2N, R10E, SEC 35 THE MEYERING LAND COMPANY'S BIRMINGHAM HIGHLANDS SUB  
NO 1 LOTS 170 TO 176 INCL

## General Property Information

## City of Birmingham

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**Parcel:** 08-19-35-101-001 **Unit:** City of Birmingham

### Property Address [collapse]

2483 W MAPLE RD  
BIRMINGHAM, MI 48009-1543

### Owner Information [collapse]

KARANA REAL ESTATE LLC  
2483 W MAPLE RD  
BIRMINGHAM, MI 48009-1543

**Unit:** 08

### Taxpayer Information [collapse]

SEE OWNER INFORMATION

### General Information for Tax Year 2014 [collapse]

<b>Property Class:</b>	201 - 201 Bus Imp	<b>Assessed Value:</b>	\$447,260
<b>School District:</b>	030 - 030 Birmingham City Sch	<b>Taxable Value:</b>	\$390,140
<b>State Equalized Value:</b>	\$447,260	<b>Map #</b>	POST
<b>PPBusCode</b>	0	<b>Date of Last Name Chg:</b>	08/20/2010
<b>Historical District:</b>	N/A	<b>Date Filed:</b>	
		<b>Notes:</b>	N/A
		<b>Census Block Group:</b>	N/A
<b>Principal Residence Exemption</b>	<b>June 1st</b>	<b>Final</b>	
<b>2015</b>	0.0000 %	-	
<b>2014</b>	0.0000 %	0.0000 %	

Previous Year Info	MBOR Assessed	Final S.E.V.	Final Taxable
2013	\$618,090	\$384,000	\$384,000
2012	\$641,980	\$375,000	\$375,000

### Land Information [collapse]

	<b>Frontage</b>	<b>Depth</b>
<b>Lot 1:</b>	0.00 Ft.	0.00 Ft.
<b>Lot 2:</b>	0.00 Ft.	0.00 Ft.
<b>Lot 3:</b>	0.00 Ft.	0.00 Ft.
<b>Total Frontage:</b>	0.00 Ft.	<b>Average Depth:</b> 0.00 Ft.
<b>Total Acreage:</b>	0.38	
<b>Zoning Code:</b>	BI	
<b>Total Estimated Land Value:</b>	\$679,900	<b>Mortgage Code:</b> 00000
<b>Land Improvements:</b>	\$21,430	<b>Lot Dimensions/Comments:</b>
<b>Renaissance Zone:</b>	NO	
<b>Renaissance Zone Expiration Date:</b>		
<b>ECF Neighborhood Code:</b>	CAS	

### Legal Information for 08-19-35-101-001 [collapse]

T2N, R10E, SEC 35 THE MEYERING LAND COMPANY'S BIRMINGHAM HIGHLANDS SUB NO 1 LOTS 170 TO 176 INCL

## Sales Information

2 sale record(s) found.						
Sale Date	Sale Price	Instrument	Grantor	Grantee	Terms Of Sale	Liber/Page
08/06/2010	\$480,000.00	WD	ARMADA OIL GAS CO	KARANA REAL ESTATE	1-ValidSale	42360:773
05/19/2005	\$300,000.00	QC	BP PRODUCTS NORTH AMERICA INC	ARMADA OIL GAS CO	1-ValidSale	36760:668

## Building Information

1 building(s) found.		
Description	Floor Area	Yr Built
Commercial/Industrial Building 1 - Garage, Service Station,		

**General Information**

<b>Floor Area:</b>	3710 Sq. Ft.	<b>Estimated TCV:</b>	N/A
<b>Occupancy:</b>	Garage, Service Station, w/Bays	<b>Class:</b>	C
<b>Stories Above Ground:</b>	1	<b>Average Story Height:</b>	14
<b>Basement Wall Height:</b>	0	<b>Year Remodeled:</b>	0
<b>Year Built:</b>	1957	<b>Heat:</b>	Forced Air Furnace
<b>Percent Complete:</b>	100%	<b>Functional Percent Good:</b>	100%
<b>Physical Percent Good:</b>	40%	<b>Effective Age:</b>	46 yrs.
<b>Economic Percent Good:</b>	100%		

**\*\*Disclaimer:** BS&A Software provides this Web Site as a way for municipalities to display information online and is not responsible for the content or accuracy of the data herein. This data is provided for reference only and WITHOUT WARRANTY of any kind, expressed or inferred. Please contact your local municipality if you believe there are errors in the data.

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## Appendix B



DISCLOSURE OF A BASELINE ENVIRONMENTAL ASSESSMENT  
(FORM EQP4446 (REV. 4/03))

(Under the authority of Part 201, 1994 Act 451, as amended, and the Rules promulgated thereunder)

**DO NOT use this form for requesting a Baseline Environmental Assessment ("BEA") adequacy determination, OR if the property is not a facility, OR if the BEA was complete before the effective date of the BEA rules. Please answer the following questions as completely as possible.**

Name and address of submitter\*  
(individual or legal entity):

Karana Real Estate, LLC  
2483 West Maple Road  
Birmingham, Michigan 48009

Status relative to the property:

	Former	Current	Prospective
Owner*	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Operator*	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Address/location of property where  
BEA was conducted:

2483 West Maple Road  
Birmingham, Michigan 48009

County: Oakland

**Provide the property tax identification number(s) or, if applicable, the ward and item number(s) for the property identified in the BEA.** Required pursuant to Rule 907.

63-08-19-35-101-001

Contact person: Mr. Sam Karana

Telephone #: 248-219-0202

If the address of the person seeking liability protection above is different from the address that should be used to correspond with the contact person, please provide the contact person's address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Check the appropriate response to each of the following questions.

1. Is it known that the source of contamination at the property is primarily from any of the following?

- A leaking underground storage tank (UST) regulated under Part 213, 1994 PA 451, as amended.
- A licensed landfill or solid waste management facility.
- A licensed hazardous waste treatment, storage, or disposal facility.
- Oil and gas development related activities.

YES	NO
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>

The source of the release that resulted in this property becoming a "facility" will determine which DEQ division will maintain a file regarding this BEA.

2. Based on the Part 201 Rules, this BEA is a:

Category N	<input type="checkbox"/>
Category D	<input type="checkbox"/>
Category S	<input checked="" type="checkbox"/>

3. Is the property at which the BEA was conducted a "facility"\* as defined by Section 20101? If the answer to this question is NO, do not submit the BEA to the DEQ.

YES	NO
<input checked="" type="checkbox"/>	<input type="checkbox"/>

4. Was the BEA conducted\* prior to or within 45 days after the date of purchase\*, occupancy, or foreclosure of the property, whichever is earliest, and completed\* not more than 15 days after the date required by Section 20126(1)(c) or Rule 299.5903(8)?  
If the answer to either portion of this question is no, you are ineligible for an exemption from liability based on the BEA. YES NO  
☒ ☐
5. Is the BEA being disclosed to the DEQ no later than 8 months after the earliest of the date of purchase, occupancy, or foreclosure? All disclosures pursuant to Rule 919(3) must be submitted to the DEQ no later than 8 months after the earliest of the date of purchase, occupancy, or foreclosure. YES NO  
☒ ☐
6. Are any USTs or abandoned or discarded containers identified in the BEA? If yes, this information must be provided on Form EQP4476. YES NO  
☐ ☒
7. Does this BEA rely on an isolation zone or an engineering control that requires an affidavit pursuant to Rule 299.5909(3) or 299.5909(4)? If yes, a completed affidavit, Form EQP4479, must be attached or the BEA will not be considered complete. YES NO  
☐ ☒

With my signature below, I certify that the enclosed BEA and all related materials are complete and accurate to the best of my knowledge and belief. I understand that intentionally submitting false information to the DEQ is a felony and may result in fines up to \$25,000 for each violation.

Signature of Submitter: Salman Karan  
(Person legally authorized to bind the person seeking liability protection)

9.30.2010  
Date

Name (Typed or Printed) Salman Karan

Title Member



JENNIFER M. GRANHOLM  
GOVERNOR

RECEIVED  
10/25/10

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENT

LANSING



REBECCA A. HUMPHRIES  
DIRECTOR

02-3004-2

October 21, 2010

**SUBMITTAL OF A  
BASELINE ENVIRONMENTAL ASSESSMENT**

**Submitter:**

Karana Real Estate, LLC  
Mr. Sam Karana  
2483 West Maple Road  
Birmingham, Michigan 48009

BEA ID#: B201004608LV

**Property Address/Location:**

2483 West Maple Road  
Birmingham, Oakland County, Michigan

The Department of Natural Resources and Environment (DNRE) has received on October 20, 2010, a Baseline Environmental Assessment (BEA) dated September 30, 2010, and prepared by PM Environmental, Inc., for the above submitter. This BEA disclosure was submitted pursuant to Section 20126(1)(c) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.20126.

The submitter has not requested a written determination by the DNRE on the adequacy of the BEA, as allowed in Section 20129a of Part 201 of the NREPA. The BEA may be reviewed in the future to determine its adequacy. If the BEA is determined to be inadequate, the submitter may be liable under Part 201 for the contamination at the facility.

The DNRE is not at this time making any findings about whether the submitter is otherwise liable or covered by any other exemption from liability under Part 201. This BEA does not alter liability with regard to a subsequent release or threat of release or any exacerbation of existing conditions. This BEA is only for the person and property identified in the petition. The use of the property and any response activity undertaken must be in accordance with the requirements of all applicable or relevant and appropriate state and federal laws and regulations. Liability protection is conditioned on the timely and satisfactory completion of any response activities described in the submittal. Pursuant to R 299.5919(2), if the submitter sells or transfers the property, the submitter is required to disclose the BEA to a subsequent owner or operator in order to be entitled to an exemption from liability.

The BEA is based on the proposed use of hazardous substances as identified in the BEA. The DNRE will maintain an administrative record of each BEA. If at any time you provide the DNRE with post-BEA information related to your BEA, the DNRE will retain such information with the administrative record. Such post-BEA information will not be considered part of the BEA and acceptance of such information by the DNRE should in no way be construed to mean the DNRE will review or advise the submitter regarding the adequacy of such information for any purpose.

The submitter, as the owner and/or operator of a facility, has the following Due Care responsibilities under Section 20107a of Part 201 and Part 10 of the Part 201 Rules, unless covered by the exemptions in Section 20107a(4) or (5):

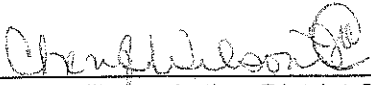
- Undertake measures as are necessary to prevent exacerbation of the existing contamination.
- Exercise due care by undertaking response activity necessary to mitigate unacceptable exposure to hazardous substances, mitigate fire and explosion hazards due to hazardous substances, and allow for the intended use of the facility in a manner that protects the public health and safety.
- Take reasonable precautions against the reasonably foreseeable acts or omissions of a third party and the consequences that foreseeably could result from those acts or omissions.
- Notify the DNRE if there are discarded or abandoned containers that contain hazardous substances on the property using Form EQP4476.
- Notify the DNRE and adjacent property owners if contaminants are migrating off the property (refer to Form EQP4482).
- Notify the local fire department if there is a fire or explosion hazard.
- Notify utility and easement holders if contaminants could cause unacceptable exposures and/or fire and explosion hazards.

Rule 1003(5) requires a person who is subject to the provisions of Section 20107a to maintain documentation of compliance with these requirements and to provide such documentation to the DNRE upon request. If the property use changes in the future, additional due care measures may be necessary. The property owner and operator must re-evaluate and document their continued compliance with Section 20107a.

The submitter may also have responsibility under applicable state and federal laws, including, but not limited to Part 201, Environmental Remediation; Part 111, Hazardous Waste Management; Part 211, Underground Storage Tank Regulations; Part 213, Leaking Underground Storage Tanks; Part 615, Supervisor of Wells of the NREPA; and the Michigan Fire Prevention Code, 1941 PA 207, as amended.

The BEA constitutes a response activity, consequently, this submittal is subject to Section 20137(4) and (5) of the NREPA.

Authorized signature:

  
Cheryl Wilson, Acting District Supervisor  
Remediation Division  
Southeast Michigan District Office  
586-753-3820

October 21, 2010  
Date

Attachment

cc: Ms. Jennifer L. Ritchie, PM Environmental, Incorporated

# **Environmental Risk Management**



**PM**  
ENVIRONMENTAL, INC.

**ISO 9001 Registered**

**Category-S Baseline Environmental Assessment  
Of the Gasoline Service Station  
(Parcel Identification Number 63-08-19-35-101-001)  
Located at 2483 West Maple Road  
Birmingham, Michigan**

**PM Environmental, Inc. Project No. 02-3004-2**

**Michigan**

**Alabama**

**Florida**

**Tennessee**

**North Carolina**

**800.485.0090**  
[www.pmenv.com](http://www.pmenv.com)

September 30, 2010

District Clerk  
MDNRE-RRD  
Southeast MI District Office  
27700 Donald Court  
Warren, Michigan 48092



**RE: Category-S Baseline Environmental Assessment of the  
Gasoline Service Station  
Parcel Identification Number 63-08-19-35-101-001  
Located at 2483 West Maple Road in Birmingham, Michigan  
PM Environmental, Inc., Project No. 02-3004-2**

Dear District Clerk:

Enclosed is one (1) copy of the above-referenced document prepared in accordance with the March 11, 1999 Instructions for Preparing and Disclosing Baseline Environmental Assessments, and the Part 201 Rules, by PM Environmental, Inc., on behalf of the new owner, Karana Real Estate, LLC. A disclosure of a Baseline Environmental Assessment Form, signed by Mr. Salman Karana, Member of Karana Real Estate, LLC has been included.

If you have any questions regarding the information in this report, please contact us at (248) 336-9988.

Sincerely,

**PM ENVIRONMENTAL, INC.**

A handwritten signature in black ink that reads 'J. Ritchie'.

Jennifer L. Ritchie, C.P.G.  
Project Manager

A handwritten signature in black ink that reads 'M.T. Kulka'.

Michael T. Kulka, P.E., C.P.  
Principal

Enclosure

---

**PM ENVIRONMENTAL, INC., PROJECT NUMBER 02-3004-2**  
**BASELINE ENVIRONMENTAL ASSESSMENT**

---

**CATEGORY-S BASELINE ENVIRONMENTAL  
ASSESSMENT CONDUCTED PURSUANT TO  
SECTION 20126(1)(c) OF 1994 PA 451, PART 201, AS  
AMENDED AND THE RULES PROMULGATED  
THEREUNDER**

**Location:**

*Gasoline Service Station  
2483 West Maple Road  
Birmingham, Michigan*

**Prepared For:**

*Karana Real Estate, LLC  
2483 West Maple Road  
Birmingham, Michigan*

**CATEGORY-S BASELINE ENVIRONMENTAL  
ASSESSMENT CONDUCTED PURSUANT TO SECTION  
20126(1)(C) OF 1994 PA 451, PART 201, AS AMENDED  
AND THE RULES PROMULGATED THEREUNDER  
FOR 2483 WEST MAPLE ROAD , BIRMINGHAM,  
OAKLAND COUNTY, MICHIGAN (PARCEL  
IDENTIFICATION NUMBER 63-08-19-35-101-001)**

**September 30, 2010**

*PM Environmental, Inc.*

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Appendix B:	Site Photos
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Appendix G:	Laboratory Reports

## **1.0 IDENTIFICATION OF AUTHOR AND DATE BEA WAS CONDUCTED AND DATE BEA WAS COMPLETED**

This Category-S Baseline Environmental Assessment (BEA) was conducted on September 17, 2010 (i.e., within 45 days of purchase) by Ms. Jennifer L. Ritchie, C.P.G., Project Manager, and reviewed by Mr. Michael T. Kulka, P.E., C.P., Principal, PM Environmental, Inc., 4080 West Eleven Mile Road, Berkley, Michigan. Professional resumes for the environmental professionals involved are included in Appendix A. This Category-S BEA was completed on September 30, 2010, which is within 60 days of purchase.

## **2.0 INTRODUCTION**

PM Environmental, Inc., (PME) has been retained by Karana Real Estate, LLC, Birmingham, Michigan, to provide environmental consulting services related to the development of a Category-S BEA for the Gasoline Service Station (Parcel Identification Number 63-08-19-35-101-001) located at 2483 West Maple Road, Birmingham, Oakland County, Michigan (Figure 1). Karana Real Estate, LLC purchased the subject property on August 6, 2010. PME personnel conducted a site investigation of the subject property on September 17, 2010. Color photographs of the subject property taken by Ms. Kristin Dawkins, PME Project Consultant, are presented in Appendix B.

The subject property consists of one (1) parcel totaling 0.38 acres and is located at the southeast corner of Maple Road and Cranbrook Road in Birmingham, Michigan (Figure 2). The property is developed with a 3,710 square foot gasoline service station located in the southeastern portion of the subject property, which was constructed in 1957, and currently contains four (4) service bays with four (4) in-ground hydraulic hoists. Three (3) gasoline pump islands are located north of the subject building, and one (1) gasoline pump island is located west of the subject building. The property currently contains four (4) 6,000-gallon gasoline USTs, one (1) 8,000-gallon gasoline UST, and one (1) 550-gallon waste oil UST in basins located northwest of the subject building. The gasoline USTs were installed in 1957, 1963, and 1970, and the waste oil UST was installed in 1989. Current operations are consistent with a retail gasoline dispensing station and service garage.

First developed use of the subject property occurred in 1957, with the construction of the current building. Prior to 1957 the subject property was vacant land. The subject property has operated as a gasoline service station from at least 1957 to the present.

PME completed a Phase I Environmental Site Assessment (ESA) for the subject parcels, dated September 17, 2010 (Appendix C). The following recognized environmental conditions (RECs) were identified:

- The subject property is an open LUST site. Previous site investigations have identified soil and groundwater contamination above Part 213 Risk Based Screening Levels (RBSLs). Based on this information, the subject property would be classified as a “facility,” as defined by Part 201 of P.A. 451 of the Michigan Natural Resources Environmental Protection Act (NREPA). The purchaser is eligible to complete a BEA for the property.

- Historical interior waste streams associated with the current and historic service garage operations from 1957 to the present would have consisted of general hazardous substances and/or petroleum products. This time period preceded major environmental regulations and current waste management and disposal procedures. The historical waste management practices associated with the former service operations are unknown and may be a source of subsurface contamination.
- During the site reconnaissance, PME observed one (1) catch basin floor drain in the service area. The historical waste management practices associated with the floor drain are unknown, and may be a source of subsurface contamination.
- During the site reconnaissance, PME observed four (4) in-ground hydraulic hoists inside the service bays. In-ground hoists have an underground reservoir for hydraulic fluids, which can contain PCBs. The potential exists that a release occurred from the current and/or former hydraulic hoist system and may be a source of subsurface contamination.
- City of Birmingham Fire and Building Department records document the presence of a fuel oil UST northeast of the subject building. PME was unable to determine if the fuel oil UST has been closed in place or removed. The potential exists for the fuel oil UST to be present on the property and/or for a release of fuel oil to have occurred.
- City of Birmingham Fire Department records included an incident report which was filed in June 2005. The report indicated waste oil was discarded into a catch basin at the southwest corner of the subject property. Fire Department personnel observed a black oily substance surrounding the catch basin and estimated the spill to be approximately 5.0 gallons. The potential exists that residual contamination remains in the area of the catch basin in the southwestern portion of the property.

No adjoining and/or nearby RECs have been identified.

In January 2006, PME advanced six (6) soil borings (SB-1 through SB-6), installed four (4) temporary monitoring wells (TMW-1 through TMW-4 and TMW-6), sampled seven (7) existing monitoring wells (OW-2RR, OW-3RR, OW-4R, OW-5R, OW-11, OW-13, and MW-X), and collected soil and groundwater samples for chemical analysis of volatile organic compounds (VOCs), polynuclear aromatic compounds (PNAs), polychlorinated biphenyls (PCBs), cadmium, chromium, and lead, or some combination thereof.

In April through August 2009, PME advanced twenty-four (24) soil borings (SB-7 through SB-30), installed nine (9) permanent monitoring wells (PMW-1 through PMW-9), and collected soil and groundwater samples for chemical analysis of VOCs, cadmium, chromium, and lead, or some combination thereof. Refer to Figures 3 and 4 for the location of the soil boring/monitoring wells.

Based upon the open LUST status and the chemical concentrations of gasoline range VOCs in soil samples collected from the subject property, which exceed the Part 213 Residential/Commercial/

Industrial Drinking Water Protection (DWP), Groundwater Surface Water Interface Protection (GSIP), Groundwater Contact Protection (GCP), Soil Volatilization to Indoor Air Inhalation (SVII), Ambient Air Infinite Source Volatile Soil Inhalation (VSI), and Direct Contact (DC) Risk Based Screening Levels (RBSLs) and Soil Saturation Concentration (Csat) Screening Levels and in the groundwater samples collected from the subject property, which exceed the Part 213 Drinking Water (DW), Groundwater Surface Water Interface (GSI), and Groundwater Volatilization to Indoor Air Inhalation (CVII) RBSLs, the subject property is a facility, according to Part 201 of P.A. 451, as amended, and the rules promulgated thereunder. Please refer to Section 4.5 for the analytical results of soil and groundwater samples collected by PME at the subject property.

Karana Real Estate, LLC will continue to use the subject property as a gasoline dispensing station and service garage. The use of the subject property for the aforementioned purposes will involve the use and storage of hazardous substances similar to contaminants identified at the subject property above the Part 213 Residential RBSLs. Therefore, a Category-S BEA is appropriate.

### **3.0 PROPERTY DESCRIPTION & INTENDED HAZARDOUS SUBSTANCE USE**

#### **3.1 Property Description**

The subject property consists of one (1) parcel totaling 0.38 acres and is located at the southeast corner of Maple Road and Cranbrook Road in Birmingham, Michigan. The property is developed with a 3,710 square foot gasoline service station located in the southeastern portion of the subject property, which was constructed in 1957, and currently contains four (4) service bays with four (4) in-ground hydraulic hoists. Three (3) gasoline pump islands are located north of the subject building, and one (1) gasoline pump island is located west of the subject building. The property currently contains four (4) 6,000-gallon gasoline USTs, one (1) 8,000-gallon gasoline UST, and one (1) 550-gallon waste oil UST in basins located northwest of the subject building. The gasoline USTs were installed in 1957, 1963, and 1970, and the waste oil UST was installed in 1989. Current operations are consistent with a retail gasoline dispensing station and service garage.

First developed use of the subject property occurred in 1957, with the construction of the current building. Prior to 1957 the subject property was vacant land. The subject property has operated as a gasoline service station from at least 1957 to the present.

The subject property is located in the Township two (2) North (T. 2N), Range 10 East (R. 10E), Section 35, Birmingham, Oakland County, Michigan. The subject property's legal description as identified by the Birmingham Township Assessing Department is included within Appendix D of this Category-S BEA.

### **3.2 Intended Hazardous Substance Use**

The purpose of this BEA is to describe the condition of the subject property at the time of transfer and to establish a basis to distinguish existing contamination from any new release in accordance with Michigan Administrative Code R 299 5901-5919.

Karana Real Estate, LLC intends to continue to use the subject property as a gasoline dispensing station and service garage, which will involve the use and storage of hazardous substances (Table 1, Appendix E) similar to contaminants identified at the subject property. Therefore, a Category “S” BEA is the appropriate BEA.

The property contains four (4) 6,000-gallon gasoline USTs, one (1) 8,000-gallon gasoline UST, and one (1) 550-gallon waste oil UST in basins located northwest of the subject building. Three (3) gasoline pump islands are located north of the subject building, and one (1) gasoline pump island is located west of the subject building. The gasoline USTs were installed in 1957, 1963, and 1970, and the waste oil UST was installed in 1989. The USTs consist of cathodically protected steel and the product piping consists of fiberglass reinforced plastic. The UST system and associating product piping are equipped with automatic tank gauging and automatic line leak detectors.

Representative material safety data sheets (MSDSs) for the hazardous substances (Table 1) that are intended to be stored and dispensed at the subject property is presented in Appendix E. Existing contaminant concentrations present in soil beneath the subject property, or the absence thereof, will be the primary means of distinguishing a potential new release from existing contamination.

## **4.0 KNOWN CONTAMINATION**

### **4.1 Previous Site Investigations**

PME reviewed the following reports pertaining to previous environmental investigation completed at the subject property (Appendix C):

- Leaking Underground Storage Tank (LUST) Final Assessment Report (FAR), December 27, 1996, Delta Environmental Consultants, Inc. (Delta);
- Tier I Residential Restricted LUST Closure Report, June 27, 1997, Delta;
- Several LUST Supplemental Reports, June 29, 1999 – July 20, 2000 (a total of 3 reports were reviewed), Delta;
- Analytical Data (no reports), the most recent data provided to PME was a lab report dated November 4, 2004, prepared by Pace Analytical (Minneapolis, MN);
- Addendum FAR, September 30, 2009, PME; and
- Phase I ESA, September 17, 2010, PME.

The subject property is an open LUST site with one (1) release reported (confirmed release number C-0846-92). The release was reported on May 26, 1992 based on staining and damage observed during the removal of historic product piping. Based on the evidence of a release, a LUST

investigation was initiated and additional soil borings and permanent monitoring wells were installed. Approximately 330 cubic yards of impacted soil were removed from the site during the replacement of the piping and in response to the confirmed release.

Site assessment activities conducted at the subject property between approximately 1988 and 1999 by Exploration Technologies, Inc., and Delta, consisted of the advancement of soil borings, the installation of temporary and permanent monitoring wells, the collection of soil and groundwater samples for laboratory analysis of BTEX, MTBE, naphthalene, 2-methylnaphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB, however, historic groundwater samples and soil samples collected prior to 1999 were only analyzed for BTEX, MTBE, and/or polynuclear aromatics (PNAs).

Analytical results of soil samples collected from the subject property identified soil impact in the vicinity of the current gasoline and used motor oil USTs, and the current and historical pump islands. Benzene, ethylbenzene, xylenes, and/or methyl-tertiary butyl ether (MTBE) were present above the applicable Part 213 Tier 1 Commercial III SVII, Soil Direct Contact (SDC), Groundwater Contact Protection (GCP) RBSLs, Residential Drinking Water Protection (DWP) and/or Soil Volatilization to Indoor Air (SVII) RBSLs. Concentrations of xylenes in soil borings GMSB-3 and OW-3 also exceeded the Part 213 Tier 1 Soil Saturation (Csat) Screening Levels indicating that the potential exists for free phase hydrocarbons to be present. However, no free product has been identified at the subject property.

Analytical results of groundwater samples from the subject property identified groundwater impact in the area of the current and historical gasoline and used motor oil USTs, and the current and historical pump islands. However, the groundwater analytical data from November 2004 indicated that none of the contaminant concentrations exceeded the applicable Part 213 Tier 1 Commercial III Groundwater Volatilization to Indoor Air Inhalation (GVII) and Groundwater Contact (GC) RBSLs. Concentrations of benzene, ethylbenzene, xylenes, and 1,2,4-trimethylbenzene (TMB) were also identified in monitoring well OW-13, which is located beyond the northwest property boundary, within the Cranbrook Road right of way (ROW), above the Part 213 Tier 1 Residential Drinking Water (DW) RBSLs. This indicates that groundwater contamination extends beyond the northwest property boundary above the Part 213 Tier 1 Residential RBSLs.

A Tier 1 Restricted Residential Closure Report was submitted to the MDNRE in 1997. The MDNRE subsequently audited the Closure Report and identified the following deficiencies:

- A restrictive Covenant was submitted with the closure report. However, the restrictive covenant was for an Amoco site on 3010 Pontiac Lake Road, Waterford.
- The most recent groundwater data is from December of 1992. This data shows that groundwater contamination is present near the existing underground storage tanks and is also present to the north of the edge of the site.
- Monitoring wells OW-1 through OW-7 were installed with 10' screens. Contaminant concentrations in these wells may have become diluted and therefore may not be representative of the groundwater conditions on site.

The monitoring wells OW-1 through OW-7 were replaced with monitoring wells with 5 foot screens, in response to the MDNRE's request. However, further correspondence between Amoco Oil and the MDNRE documents that the MDNRE does not believe that the investigation at the site has documented that contaminant concentrations are stable and/or declining, thus calling into question the feasibility of natural attenuation as a remediation alternative, which is supported by subsequent groundwater data.

Subsurface investigations were performed by PME at the subject property from January 2006 through September 2009 to 1) investigate the soil profile, 2) determine the extent of soil impact northeast of the tank basin with free-phase potential, and 3) to determine the horizontal and vertical extent of soil and groundwater contamination above the MDNRE Tier 1 Residential RBSLs. Thirty (30) soil borings (SB-1 through SB-30) were advanced and nine (9) monitoring wells (PMW-1 through PMW-9) were installed to collect soil and groundwater samples for chemical analysis of VOCs, PNAs, PCBs, cadmium, chromium, and lead, or some combination thereof.

Concentrations of VOCs were detected in the soil samples at levels above the laboratory method detection limits (MDLs) and above Part 213 RBSLs. Concentrations of benzene, toluene, ethylbenzene, xylenes, 1,2,3-TMB, 1,2,4-TMB, and 1,3,5-TMB were detected in unsaturated soils at levels above the Part 213 Commercial III DWP, GSIP, GCP, SVII, VSI, and/or SDC RBSLs and/or Tier 1 generic Csat screening levels. Concentrations of benzene, ethylbenzene, xylenes, n-propylbenzene, 1,2,3-TMB, 1,2,4-TMB, and 1,3,5-TMB, naphthalene, and n-butylbenzene were detected in unsaturated soils at levels above the Part 213 Commercial DWP and/or GSIP RBSLs and/or Residential SVII RBSLs at soil samples in the area surrounding the current UST system located on the subject property. There were no VOC exceedances of any of the other applicable MDNRE Part 213 Tier I Residential or Commercial III RBSLs. The presence of the above target analytes in soil is consistent with the release of petroleum products from the former product piping replaced in 1992.

No concentrations of PNAs were detected in the soil samples at the subject property at levels above the most restrictive residential RBSLs. No concentrations of PCBs were detected in the soil samples at the subject property above the laboratory MDLs.

Concentrations of cadmium and lead were detected in the soil samples at levels above the laboratory MDLs, but not above the Statewide Default Background Levels (SDBLs). A concentration of chromium (31,000 µg/Kg) was detected in the soil sample collected at SB-1 above MDNRE Part 213 Tier 1 Residential and Commercial III DWP and GSIP RBSLs.

Concentrations of VOCs were detected in the groundwater samples at levels above the laboratory MDLs and above Part 213 RBSLs. A concentration of benzene was detected in the groundwater above MDNRE Part 213 Residential GVII RBSLs at monitoring well OW-3RR collected during the May 2009 sampling event, which is located in the source area northeast of the UST basin. Concentrations of benzene, toluene, ethylbenzene, xylenes, n-propylbenzene, 1,2,4-TMB, 1,3,5-TMB, and naphthalene were detected in groundwater above the Part 213 DW and/or GSI RBSLs at monitoring wells OW-2RR, OW-3RR, OW-4R, OW-5R, and OW-7R collected during the January

2006, January 2008, and May 2009 sampling events. Concentrations of benzene were detected in the groundwater above the Part 213 DW RBSLs at monitoring wells MW-Y and MW-Z collected during the May 2009 sampling event, which are located in the northwest portion of the subject property. Concentrations of methyl tert butyl ether (MTBE) were detected in the groundwater above the Part 213 DW RBSLs at monitoring well PMW-4 collected during the May and August 2009 sampling event, which is located in the south central of the subject property. There were no VOC exceedances of any of the other applicable MDNRE Part 213 Tier 1 Residential or Commercial III RBSLs. The presence of the above target analytes in groundwater is consistent with the release of petroleum products from the former product piping replaced in 1992.

Except for naphthalene and 2-methylnaphthalene associated with the gasoline UST system release, no concentrations of PNAs were detected in the groundwater samples at levels above the laboratory MDLs. No concentrations of PCBs were detected in the groundwater samples at the subject property above the laboratory MDLs.

Concentrations of cadmium, chromium, and lead were detected in the groundwater samples from the temporary monitoring wells above Part 213 DW and/or GSI RBSLs. However, these concentrations are likely due to elevated turbidity associated with the installation and sampling of temporary monitoring wells. Concentrations of cadmium, chromium, and lead were not detected in the groundwater samples collected from the permanent monitoring wells, except for cadmium concentrations above Part 213 GSI RBSLs collected from OW-5R during the January 2008 sampling event. However, a concentration of dissolved cadmium was not detected in the groundwater sample above laboratory MDLs. **Based on these analytical results, the subject property would be classified as a “facility,” as defined by Part 201 of P.A. 451 of the Michigan Natural Resources Environmental Protection Act (NREPA). The purchaser is eligible to complete a BEA for the property.**

The horizontal extent of soil impact in the area of the gasoline UST system is defined within the site boundaries to MDNRE Residential RBSLs. The vertical extent of soil impact is defined by the absence or below MDNRE Residential RBSLs of contamination in the lower clay soils at a depth of approximately 15.0 feet bgs. The horizontal extent of groundwater impact is delineated by the absence of groundwater, concentrations below the laboratory MDLs, or concentrations below the MDNRE Residential RBSLs. The vertical extent of groundwater impact is defined by the lower confining clay unit.

#### **4.2 Current Site Investigations**

In January 2006, PME advanced six (6) soil borings (SB-1 through SB-6), installed four (4) temporary monitoring wells (TMW-1 through TMW-4 and TMW-6), sampled seven (7) existing monitoring wells (OW-2RR, OW-3RR, OW-4R, OW-5R, OW-11, OW-13, and MW-X), and collected soil and groundwater samples for chemical analysis of VOCs, PNAs, PCBs, cadmium, chromium, and lead, or some combination thereof.

In April through August 2009, PME advanced twenty-four (24) soil borings (SB-7 through SB-30), installed nine (9) permanent monitoring wells (PMW-1 through PMW-9), and collected soil and groundwater samples for chemical analysis of VOCs, cadmium, chromium, and lead, or some combination thereof. Refer to Figures 3 and 4 for the location of the soil boring/monitoring wells.

### **Soil Sampling**

A total of thirty-eight (38) soil samples were collected from the subject property and submitted for laboratory analysis of VOCs, PNAs, PCBs, cadmium, chromium, and lead, or some combination thereof.

The soil borings were advanced to the desired depth using a Model 6610 DT Geoprobe and/or a stainless steel hand auger. Soil sampling was performed for soil classification, verification of subsurface geologic conditions, and to investigate the potential for soil and shallow groundwater contamination at the subject property. Soil samples were generally collected on a continuous basis using a 5 foot long macro-core. Soil boring logs are presented as Appendix F.

Soils collected from one (1) foot sample intervals were screened using a photo-ionization detector (PID) to determine if VOCs were present. Soil from specific depths was placed in plastic bags, sealed, and allowed to volatilize. The headspace within each bag was then monitored with the PID. The PID is able to detect trace levels of organic compounds in the air space within the plastic bag. The PID utilizes a 10.2 electron volt (eV) lamp. Therefore, the PID can only detect organic vapors with ionization potential less than or equal to 10.2 eV. In the absence of significant PID readings, soil samples were collected based upon visual/olfactory evidence of contamination, depth to groundwater, and/or a change in geology that is consistent with areas where contaminants would be likely to accumulate.

During drilling operations, the drilling equipment was cleaned to minimize the possibility of cross contamination. These procedures included cleaning equipment with a phosphate free solution and rinsing with tap, deionized, or distilled water after each sample collection. Drilling and sampling equipment was cleaned in this manner or with a high-temperature pressure washer, prior to field activities.

Soil samples for VOC analysis were preserved with methanol, in accordance with EPA method 5035, and then placed in appropriately labeled containers with Teflon lined lids and/or sanitized glass jars, placed in an ice packed cooler, and transported under chain of custody procedures for laboratory analysis within applicable holding times.

### **Groundwater Sampling**

A total of thirty-eight (38) groundwater samples were collected from the subject property and submitted for laboratory analysis of VOCs, PNAs, PCBs, cadmium, chromium, and lead, or some combination thereof.

Temporary monitoring wells (TMW-1 through TMW-4 and TMW-6) were installed in soil borings SB-1, SB-2, SB-3, SB-4, and SB-6 to collect groundwater samples for chemical analysis. A new well assembly consisting of a 5-foot long, one-inch diameter, 0.010-inch slot, schedule 40, PVC screen and a 1-inch diameter PVC casing was lowered into the borehole. After the screen for the well was set to the desired depth, natural sands were allowed to collapse around the well screen.

Permanent monitoring wells (PMW-1 through PMW-9) were installed in soil borings SB-8, SB-9, SB-10, SB-12, SB-18, SB-19, SB-20, SB-21, and SB-22 to collect groundwater samples for chemical analysis. The wells were constructed of 2-inch diameter, schedule 40 PVC casing with a 5-foot long, 0.010-inch slotted screen. The wells were capped and then fitted with a 5-inch diameter, 1-foot long, steel protective cover that was flush-mounted to the ground surface.

The wells were developed using a peristaltic pump equipped with new, chemically inert, 3/8-inch diameter polyethylene and silicon tubing. Well development was performed by purging until clear, turbid free groundwater was observed coming from the well, or the well purged dry. Well depth, well materials, and screened interval are documented on the well construction diagrams presented in Appendix F.

Groundwater samples from the monitoring wells were collected using low-flow sampling methods and protocols in general accordance with the October 22, 2004 MDNRE Operational Memorandum No. 2 Sampling and Analysis, Attachment 5 Collection of Samples for Comparison to Generic Criteria. The wells were sampled using a peristaltic pump equipped with new, chemically inert, 3/8-inch diameter polyethylene and silicon tubing at a low flow level within the well screen. After sampling was completed, purge water that was contained separately was returned to the well.

Groundwater samples were placed in appropriately labeled containers, placed in an ice packed cooler, and transported under chain of custody procedures for laboratory analysis within applicable holding times.

### **QA/QC Procedures**

Appropriate soil and water Quality Assurance/Quality Control (QA/QC) samples were also collected in general accordance with the October 22, 2004 and July 5, 2007 MDEQ Operational Memorandum No. 2 Sampling and Analysis, Attachment 5 Collection of Samples for Comparison to Generic Criteria and are summarized in the table below:

**Summary of QA/QC Samples**

Control	Soil	Groundwater
Trip Blank	A-1 (4/7/09) and A-1 (7/6/09)	A-1 (1/23/08) and A-1 (5/8/09)
Field Blank	A-5 (1/23/08), A-2 (4/7/09), A-2 (5/8/09), and A-4 (7/7/09)	
Co-located	A-5 at SB-17 (2.0-3.0') (4/7/09), A-7 at SB-15 (3.0-4.0') (4/8/09), A-2 at SB-23 (3.0-4.0')	A-2 at OW-4R (1/23/08), A-3 at OW-7R (5/8/09), and A-4 at PMW-

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Control	Soil	Groundwater
	(7/6/09), and A-3 at SB-25 (4.0-5.0') (7/7/09)	2 (5/8/09)
Equipment Blank	A-6 (4/7/09), A-8 (4/8/09), A-5 (7/7/09), and A-6 (7/7/09)	Not Applicable
Field Duplicate	Not Applicable	A-3 and A-4 (1/23/08)
MS/MSD	SB-29 (12.0-13.0') (7/7/09)	OW-5R (1/23/08) and OW-10 (5/8/09)

The above referenced QA/QC samples were submitted for laboratory analysis of VOCs and lead.

The samples were submitted to Brighton Analytical, L.L.C. of Brighton, Michigan, BIO-CHEM Environmental Analytical Laboratories of Grand Rapids, Michigan, and Merit Laboratories, Inc. of East Lansing, Michigan for laboratory analysis using United States Environmental Protection Agency (USEPA) Methods (8260B for VOCs, 8270C for PNAs, 8082 for PCBs, and 6020 for metals; Table 2). Refer to Table 3 for a summary of the 2006 soil analytical results, Table 4 for a summary of the 2009 soil analytical results, Table 5 for a summary of the 2006 and 2008 groundwater analytical results, and Table 6 for a summary of the 2009 groundwater analytical results and Appendix G for a copy of the laboratory analytical report.

Upon completion of the investigation, the soil borings were abandoned by placing the soil cuttings back into the borehole, filling the void with bentonite chips, hydrating the chips, resurfacing and returning the area to its pre-drilling condition.

Specifically, the subsurface investigation activities were conducted on the following portions of the subject property:

#### **Description of Soil Boring and Monitoring Well Locations**

Location (Total Depth in feet bgs)	Soil Sample Depth (feet bgs)	Analysis	Objectives	Soil and/or Groundwater Sample Selection (justification)	Monitoring Well (Screened Interval in feet bgs)
SB/TMW-1 (20.0)	3.0-4.0	VOCs, PNAs, PCBs, Cadmium, Chromium, and Lead	Assess the area of the used oil UST basin and the area south of the gasoline UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,127 parts per million (ppm)). <b>Groundwater:</b> Sampled	5.0-10.0
SB/TMW-2 (19.0)	3.0-4.0	VOCs and Lead	Assess the area west of the gasoline UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,901 ppm). <b>Groundwater:</b> Sampled	2.0-7.0

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<b>Location (Total Depth in feet bgs)</b>	<b>Soil Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>	<b>Monitoring Well (Screened Interval in feet bgs)</b>
SB/TMW-3 (20.0)	11.0-12.0	VOCs and Lead	Assess the area north of the gasoline UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,327 ppm). <b>Groundwater:</b> Sampled	2.5-7.5
SB/TMW-4 (18.0)	4.0-5.0	VOCs and Lead	Assess the area north of the northern pump islands.	<b>Soil:</b> Soil was sampled at the highest PID reading (11.2 ppm). <b>Groundwater:</b> Sampled	3.5-8.5
SB-5 (18.0)	5.0-6.0 and 17.0-18.0	VOCs and Lead	Assess the area west of the western pump island.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was sampled at a sand/clay interface and at the bottom of boring. <b>Groundwater:</b> Not encountered.	Not Applicable
SB/TMW-6 (19.0)	3.0-4.0	VOCs and Lead	Assess the area south of the western pump island and catch basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1.4 ppm). <b>Groundwater:</b> Sampled	5.0-10.0
SB-7 (15.0)	3.0-4.0 and 11.0-12.0	Gasoline range VOCs	Delineate the extent of impact to the west.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was sampled above the saturated zone and near the bottom of the boring. <b>Groundwater:</b> Not sampled.	Not Applicable
SB-8/PMW-1 (15.0)	4.0-5.0 and 11.0-12.0	Gasoline range VOCs	Delineate the extent of impact to the northwest.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was sampled above the saturated zone and near the bottom of the boring. <b>Groundwater:</b> Sampled	1.0-6.0

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<b>Location (Total Depth in feet bgs)</b>	<b>Soil Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>	<b>Monitoring Well (Screened Interval in feet bgs)</b>
SB-9/PMW-2 (15.0)	5.0-6.0 and 14.0-15.0	Gasoline range VOCs	Delineate the extent of impact to the north.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was sampled at the sand/clay interface and at the bottom of the boring. <b>Groundwater:</b> Sampled	2.0-7.0
SB-10/PMW-3 (15.0)	5.0-6.0 and 14.0-15.0	Gasoline range VOCs	Delineate the extent of impact to the northeast.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was sampled at the sand/clay interface and at the bottom of the boring. <b>Groundwater:</b> Sampled	2.0-7.0
SB-11 (15.0)	3.0-4.0 and 14.0-15.0	Gasoline range VOCs	Delineate the extent of impact to the east.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was sampled at the sand/clay interface and at the bottom of the boring. <b>Groundwater:</b> Not sampled.	Not Applicable
SB-12/PMW-4 (15.0)	4.0-5.0 and 14.0-15.0	Gasoline range VOCs	Delineate the extent of impact to the southeast.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was sampled above the water table and at the bottom of the boring. <b>Groundwater:</b> Sampled	4.0-9.0
SB-13 (15.0)	4.0-5.0	Gasoline range VOCs	Assess the extent of soil impact east of the UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (283 ppm). <b>Groundwater:</b> Not encountered.	Not Applicable
SB-14 (15.0)	4.0-5.0	Gasoline range VOCs	Assess the area of the northern pump islands.	<b>Soil:</b> Soil was sampled at the highest PID reading (498 ppm). <b>Groundwater:</b> Not sampled.	Not Applicable

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<b>Location (Total Depth in feet bgs)</b>	<b>Soil Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>	<b>Monitoring Well (Screened Interval in feet bgs)</b>
SB-15 (15.0)	3.0-4.0 and 14.0-15.0	Gasoline range VOCs	Assess the area west of the northern pump islands and north of the UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,324 ppm) and the bottom of the boring. <b>Groundwater:</b> Not sampled.	Not Applicable
SB-16 (20.0)	1.0-2.0 and 19.0-20.0	Gasoline range VOCs	Assess the area south of the northern pump islands and east of the UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,281 ppm) and the bottom of the boring. <b>Groundwater:</b> Not sampled.	Not Applicable
SB-17 (15.0)	2.0-3.0	Gasoline range VOCs	Assess the area south of the UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (9.4 ppm). <b>Groundwater:</b> Not encountered.	Not Applicable
SB-18/PMW-5 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the southeast.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was not sampled. <b>Groundwater:</b> Not encountered.	3.0-8.0
SB-19/PMW-6 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the southwest.	<b>Soil:</b> Based upon the lack of visual/ olfactory evidence of contamination or elevated PID readings, soil was not sampled. Groundwater: Not encountered.	3.0-8.0
SB-20/PMW-7 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the west- southwest.	Soil: Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was not sampled. <b>Groundwater:</b> Not encountered.	3.0-8.0

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<b>Location (Total Depth in feet bgs)</b>	<b>Soil Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>	<b>Monitoring Well (Screened Interval in feet bgs)</b>
SB-21/PMW-8 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the west.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was not sampled. <b>Groundwater:</b> Not encountered.	3.0-8.0
SB-22/PMW-9 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the northwest.	<b>Soil:</b> Based upon the lack of visual/olfactory evidence of contamination or elevated PID readings, soil was not sampled. <b>Groundwater:</b> Not encountered.	3.0-8.0
SB-23 (15.0')	3.0-4.0	Gasoline range VOCs	Assess the area south of the western pump island.	<b>Soil:</b> Soil was sampled at the highest PID reading (98 ppm). <b>Groundwater:</b> Not encountered.	Not Applicable
SB-24 (15.0)	2.0-3.0	Gasoline range VOCs	Assess the area northeast of the western pump island and south of the UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (255 ppm). <b>Groundwater:</b> Not encountered.	Not Applicable
SB-25 (15.0)	4.0-5.0	Gasoline range VOCs	Assess the area south of the UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (224 ppm). <b>Groundwater:</b> Not encountered.	Not Applicable
SB-26 (15.0)	3.0-4.0	Gasoline range VOCs	Assess the area east of the UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,363 ppm). <b>Groundwater:</b> Not sampled.	Not Applicable
SB-27 (15.0)	1.0-2.0 and 13.0-14.0	Gasoline range VOCs	Assess the area between the northern pump islands and UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (2,376 ppm) and the bottom of the boring. <b>Groundwater:</b> Not sampled.	Not Applicable

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<b>Location (Total Depth in feet bgs)</b>	<b>Soil Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>	<b>Monitoring Well (Screened Interval in feet bgs)</b>
SB-28 (15.0)	1.0-2.0 and 12.0-13.0	Gasoline range VOCs	Assess the area between the northern pump islands and UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,772 ppm) and near the bottom of the boring. <b>Groundwater:</b> Not sampled.	Not Applicable
SB-29 (15.0)	1.0-2.0 and 12.0-13.0	Gasoline range VOCs	Assess the area south of the northern pump islands and east of the UST basin.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,639 ppm) and near the bottom of the boring. <b>Groundwater:</b> Not encountered.	Not Applicable
SB-30 (15.0)	0.5-1.5 and 12.0-13.0	Gasoline range VOCs	Assess the area east of the northern pump islands.	<b>Soil:</b> Soil was sampled at the highest PID reading (1,600 ppm) and near the bottom of the boring. <b>Groundwater:</b> Not encountered.	Not Applicable
OW-2RR	Not Applicable	Gasoline range VOCs	Assess groundwater impact in the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	3.0-8.0
OW-3RR	Not Applicable	Gasoline range VOCs	Assess groundwater impact in the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	4.0-9.0
OW-4R	Not Applicable	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	5.0-10.0
OW-5R	Not Applicable	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	5.0-10.0

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<b>Location (Total Depth in feet bgs)</b>	<b>Soil Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>	<b>Monitoring Well (Screened Interval in feet bgs)</b>
OW-7R	Not Applicable	Gasoline range VOCs	Assess groundwater impact north of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	5.0-10.0
OW-10	Not Applicable	Gasoline range VOCs	Assess groundwater impact east of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	3.0-8.0
OW-11	Not Applicable	Gasoline range VOCs	Assess groundwater impact southeast of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	6.5-11.5
OW-12	Not Applicable	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	5.0-10.0
OW-13	Not Applicable	Gasoline range VOCs	Assess groundwater impact west of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	4.5-9.5
MW-X	Not Applicable	Gasoline range VOCs	Assess groundwater impact northwest of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	2.0-7.0
MW-Y	Not Applicable	Gasoline range VOCs	Assess groundwater impact northwest of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	4.0-9.0
MW-Z	Not Applicable	Gasoline range VOCs	Assess groundwater impact north of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	2.0-7.0

<b>Location (Total Depth in feet bgs)</b>	<b>Soil Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>	<b>Monitoring Well (Screened Interval in feet bgs)</b>
MW-ZZ	Not Applicable	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	<b>Soil:</b> Not Applicable. <b>Groundwater:</b> Sampled	2.0-7.0

### **4.3 Geology**

Two (2) generalized geologic cross-sections (A-A' and B-B'), based on the soil boring logs (Appendix F), are presented in Figures 5 and 6, respectively. The cross-sections depict the subsurface geology underlying the subject property and show depths of the UST basins. Summaries of soil and groundwater analytical results are provided on these vertical profile cross-sections. The general soil stratigraphy across the subject property generally consists of up to 6.0 feet of sand or clayey sand with occasional gravel content underlain with clay to 20.0 feet bgs, the maximum depth explored. Occasional beds of sand or sand seams were encountered in the lower clay unit at depths between 3.0 and 13.0 feet bgs. Limited, perched groundwater was encountered on the subject property within the sand soils underlain with clay at approximately 3.0 to 8.0 feet bgs beneath the subject property. This is similar to the geology noted during previous site investigations dating back to 1992. Soil boring logs are included in Appendix F.

### **4.4 Hydrogeology**

Limited, perched groundwater was generally encountered within the shallow sand soils at a depth between 3.0 and 8.0 feet bgs. Groundwater was not encountered within soil borings SB-5, SB-11, SB-13, SB-17, SB-18, SB-19, SB-20, SB-21, SB-22, SB-23, SB-24, SB-25, SB-29, and SB-30. This is similar to the hydrogeology noted during previous site investigations dating back to 1992, where limited, perched groundwater was generally encountered at the sand/clay interface.

The contoured groundwater potentiometric surface trend based on the groundwater elevations (Table 7) measured in monitoring wells on September 15, 2009, is presented in Figure 7. The general groundwater flow direction appears to be radial away from the UST system.

Given the monitoring wells (MW-5, MW-6, MW-7, and MW-8) along the south and west property boundary have been reported dry or to have less than 0.30 feet of reported water in the well, the limited groundwater appears local to the area of the UST system in the northwest portion of the subject property.

## 4.5 Chemical Analysis

March 2006 soil samples were submitted to Merit and June 2010 soil and groundwater samples were submitted to RTI, for laboratory analysis using USEPA Methods (Table 2). Refer to Tables 3 and 4 for a summary of the soil analytical results and Tables 5 and 6 for a summary of the groundwater analytical results. Copies of the laboratory analytical reports are included in Appendix G.

## 4.6 Analytical Results

The analytical results for the soil and groundwater samples collected by PME in 2006 through 2009 were compared with the State of Michigan Tier 1 Residential RBSLs as stated in Attachment 1 to MDNRE Operational Memorandum Number 1 “Part 201 Cleanup Criteria and Part 213 Risk-Based Screening Levels,” January 23, 2006, using the Residential/Commercial/Industrial RBSLs.

PME soil analytical data from 2006 through 2009 is summarized in Tables 3 and 4 and Figure 3. Groundwater analytical data from 2006 through 2009 is summarized in Tables 5 and 6 and Figure 4. Chemical Abstract Service (CAS) numbers and the known contaminant concentrations for each target analyte are compared to the Part 213 Tier 1 Residential/Commercial/ Industrial RBSLs in the above referenced tables.

The exceedances of the applicable Part 213 RBSLs are summarized in the table below:

**Summary of Soil and Groundwater Exceedences**

<b>Location (Total Depth in feet bgs)</b>	<b>Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil Exceedance (Applicable Part 213 RBSLs)</b>	<b>Groundwater Exceedance (Applicable Part 213 RBSLs)</b>
SB/TMW-1 (20.0)	Soil 3.0-4.0	VOCs, PNAs, PCBs, Cadmium, Chromium, and Lead	Assess the area of the used oil UST basin and the area south of the gasoline UST basin.	<b>Gas VOCs above DWP, GSIP, and Residential SVII</b>	<b>Gas VOCs and metals above DW and GSI</b>
	Groundwater 5.0-10.0				
SB/TMW-2 (19.0)	Soil 3.0-4.0	VOCs and Lead	Assess the area west of the gasoline UST basin.	<b>Gas VOCs above DWP and GSIP</b>	<b>Gas VOCs and lead above DW and GSI</b>
	Groundwater 2.0-7.0				
SB/TMW-3 (20.0)	Soil 11.0-12.0	VOCs and Lead	Assess the area north of the gasoline UST basin.	<b>Gas VOCs above DWP and GSIP</b>	<b>Gas VOCs and lead above DW and GSI</b>
	Groundwater 2.5-7.5				
SB/TMW-4 (18.0)	Soil 4.0-5.0	VOCs and Lead	Assess the area north of the	<b>Gas VOCs above DWP and GSIP</b>	<b>Gas VOCs and lead</b>

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<b>Location (Total Depth in feet bgs)</b>	<b>Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil Exceedance (Applicable Part 213 RBSLs)</b>	<b>Groundwater Exceedance (Applicable Part 213 RBSLs)</b>
	Groundwater 3.5-8.5		northern pump islands.		<b>above DW and GSI</b>
SB-5 (18.0)	Soil 5.0-6.0 and 17.0-18.0	VOCs and Lead	Assess the area west of the western pump island.	NONE	Not Applicable
SB/TMW-6 (19.0)	Soil 3.0-4.0	VOCs and Lead	Assess the area south of the western pump island and catch basin.	NONE	<b>Lead above DW and GSI</b>
	Groundwater 5.0-10.0				
SB-7 (15.0)	Soil 3.0-4.0 and 11.0-12.0	Gasoline range VOCs	Delineate the extent of impact to the west.	NONE	Not Applicable
SB-8/PMW-1 (15.0)	Soil 4.0-5.0 and 11.0-12.0	Gasoline range VOCs	Delineate the extent of impact to the northwest.	NONE	NONE
	Groundwater 1.0-6.0				
SB-9/PMW-2 (15.0)	Soil 5.0-6.0 and 14.0-15.0	Gasoline range VOCs	Delineate the extent of impact to the north.	NONE	NONE
	Groundwater 2.0-7.0				
SB-10/PMW-3 (15.0)	Soil 5.0-6.0 and 14.0-15.0	Gasoline range VOCs	Delineate the extent of impact to the northeast.	NONE	NONE
	Groundwater 2.0-7.0				
SB-11 (15.0)	Soil 3.0-4.0 and 14.0-15.0	Gasoline range VOCs	Delineate the extent of impact to the east.	NONE	Not Applicable

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<b>Location (Total Depth in feet bgs)</b>	<b>Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil Exceedance (Applicable Part 213 RBSLs)</b>	<b>Groundwater Exceedance (Applicable Part 213 RBSLs)</b>
SB-12/PMW-4 (15.0)	Soil 4.0-5.0 and 14.0-15.0	Gasoline range VOCs	Delineate the extent of impact to the southeast.	NONE	MTBE above DW
	Groundwater 4.0-9.0				
SB-13 (15.0)	Soil 4.0-5.0	Gasoline range VOCs	Assess the extent of soil impact east of the UST basin.	<b>Gas VOCs above DWP and GSIP</b>	Not Applicable
SB-14 (15.0)	Soil 4.0-5.0	Gasoline range VOCs	Assess the area of the northern pump islands.	<b>Gas VOCs above DWP and GSIP</b>	Not Applicable
SB-15 (15.0)	Soil 3.0-4.0 and 14.0-15.0	Gasoline range VOCs	Assess the area west of the northern pump islands and north of the UST basin.	<b>Gas VOCs above DWP and GSIP</b>	Not Applicable
SB-16 (20.0)	Soil 1.0-2.0 and 19.0-20.0	Gasoline range VOCs	Assess the area south of the northern pump islands and east of the UST basin.	<b>Gas VOCs above DWP and GSIP</b>	Not Applicable
SB-17 (15.0)	Soil 2.0-3.0	Gasoline range VOCs	Assess the area south of the UST basin.	NONE	Not Applicable
SB-18/PMW-5 (15.0)	No Soil Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the southeast.	Not Applicable	DRY
	Groundwater 3.0-8.0				
SB-19/PMW-6 (15.0)	No Soil Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the southwest.	Not Applicable	DRY
	Groundwater 3.0-8.0				
SB-20/PMW-7 (15.0)	No Soil Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the west-southwest.	Not Applicable	NONE
	Groundwater 3.0-8.0				
SB-21/PMW-8 (15.0)	No Soil Sample	Gasoline range	Delineate the extent of	Not Applicable	NONE

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<b>Location (Total Depth in feet bgs)</b>	<b>Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil Exceedance (Applicable Part 213 RBSLs)</b>	<b>Groundwater Exceedance (Applicable Part 213 RBSLs)</b>
	Groundwater 3.0-8.0	VOCs	groundwater impact to the west.		
SB-22/PMW-9 (15.0)	No Soil Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the northwest.	Not Applicable	NONE
	Groundwater 3.0-8.0				
SB-23 (15.0)	Soil 3.0-4.0	Gasoline range VOCs	Assess the area south of the western pump island.	NONE	Not Applicable
SB-24 (15.0)	Soil 2.0-3.0	Gasoline range VOCs	Assess the area northeast of the western pump island and south of the UST basin.	NONE	Not Applicable
SB-25 (15.0)	Soil 4.0-5.0	Gasoline range VOCs	Assess the area south of the UST basin.	<b>Gas VOCs above DWP and GSIP</b>	Not Applicable
SB-26 (15.0')	Soil 3.0-4.0	Gasoline range VOCs	Assess the area east of the UST basin.	<b>Gas VOCs above DWP, GSIP, and Residential SVII</b>	Not Applicable
SB-27 (15.0)	Soil 1.0-2.0 and 13.0-14.0	Gasoline range VOCs	Assess the area between the northern pump islands and UST basin.	<b>Gas VOCs above Commercial DWP, GSIP, GCP, SVII, DC, and Csat at (1.0-2.0)</b>	Not Applicable
SB-28 (15.0)	Soil 1.0-2.0 and 12.0-13.0	Gasoline range VOCs	Assess the area between the northern pump islands and UST basin.	<b>Gas VOCs above Commercial DWP, GSIP, GCP, SVII, VSI, DC, and Csat at (1.0-2.0)</b>	Not Applicable
SB-29 (15.0)	Soil 1.0-2.0 and 12.0-13.0	Gasoline range VOCs	Assess the area south of the northern pump islands and east of the UST basin.	<b>Gas VOCs above Commercial DWP, GSIP, GCP, SVII, DC, and Csat at (1.0-2.0)</b>	Not Applicable

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<b>Location (Total Depth in feet bgs)</b>	<b>Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil Exceedance (Applicable Part 213 RBSLs)</b>	<b>Groundwater Exceedance (Applicable Part 213 RBSLs)</b>
SB-30 (15.0)	Soil 0.5-1.5 and 12.0-13.0	Gasoline range VOCs	Assess the area east of the northern pump islands.	<b>Gas VOCs above Commercial DWP, GSIP, GCP, SVII, DC, and Csat at (0.5-1.5)</b>	Not Applicable
OW-2RR	No Soil Sample	Gasoline range VOCs	Assess groundwater impact in the source area.	Not Applicable	<b>Gas VOCs above DW and GSI</b>
	Groundwater 3.0-8.0				
OW-3RR	No Soil Sample	Gasoline range VOCs	Assess groundwater impact in the source area.	Not Applicable	<b>Gas VOCs above DW, GSI, and Residential GVII</b>
	Groundwater 4.0-9.0				
OW-4R	No Soil Sample	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	Not Applicable	<b>Gas VOCs above DW and GSI</b>
	Groundwater 5.0-10.0				
OW-5R	No Soil Sample	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	Not Applicable	<b>Gas VOCs above DW and GSI</b>
	Groundwater 5.0-10.0				
OW-7R	No Soil Sample	Gasoline range VOCs	Assess groundwater impact north of the source area.	Not Applicable	<b>Gas VOCs above DW and GSI</b>
	Groundwater 5.0-10.0				
OW-10	No Soil Sample	Gasoline range VOCs	Assess groundwater impact east of the source area.	Not Applicable	NONE
	Groundwater 3.0-8.0				
OW-11	No Soil Sample	Gasoline range VOCs	Assess groundwater impact southeast of the source area.	Not Applicable	NONE
	Groundwater 6.5-11.5				
OW-12	No Soil Sample	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	Not Applicable	<b>Xylenes above GSI</b>
	Groundwater 5.0-10.0				
OW-13	No Soil Sample	Gasoline range	Assess groundwater	Not Applicable	NONE

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Location (Total Depth in feet bgs)	Sample Depth (feet bgs)	Analysis	Objectives	Soil Exceedance (Applicable Part 213 RBSLs)	Groundwater Exceedance (Applicable Part 213 RBSLs)
	Groundwater 4.5-9.5	VOCs	impact west of the source area.		
MW-X	No Soil Sample	Gasoline range VOCs	Assess groundwater impact northwest of the source area.	Not Applicable	NONE
	Groundwater 2.0-7.0				
MW-Y	No Soil Sample	Gasoline range VOCs	Assess groundwater impact northwest of the source area.	Not Applicable	<b>Benzene above DW</b>
	Groundwater 4.0-9.0				
MW-Z	No Soil Sample	Gasoline range VOCs	Assess groundwater impact north of the source area.	Not Applicable	<b>Benzene above DW</b>
	Groundwater 2.0-7.0				
MW-ZZ	No Soil Sample	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	Not Applicable	NONE
	Groundwater 2.0-7.0				

A location where a hazardous substance is present in excess of the concentrations which satisfy the requirements of subsection 20120a(1)(a) or (17) is a facility pursuant to Part 201. Section 20120a(1)(a) requirements are the Cleanup Criteria for unrestricted residential usage. Contaminant concentrations identified on the subject property indicate exceedences to the Part 213 Residential/Commercial/Industrial DWP/DW, GSIP/GSI, GCP, SVII/GVII, VSI, and DC RBSLs and Csat Screening Levels. **Therefore the subject property is considered a facility under Part 201 of P.A. 451, as amended, and the rules promulgated thereunder.** Analytical results for the soil and groundwater samples collected from the subject property by PME are included within Appendix G of this report.

#### 4.6.1 Summary Soil Analytical Results

Concentrations of gasoline range VOCs were detected in the soil samples collected from the subject property in the area northeast of the current tank basin above the Part 213 Commercial III DWP, GSIP, GCP, SVII, VSI, and/or SDC RBSLs and/or Tier 1 generic Csat screening levels. Concentrations of gasoline range VOCs were detected in the soil samples collected from the subject property in the area surrounding the current UST system above the Part 213 Commercial III DWP and/or GSIP RBSLs and/or Residential SVII RBSLs. The presence of the above target analytes in soil is consistent with the release of petroleum products from the former product piping replaced in 1992.

No concentrations of PNAs were detected in the soil samples at the subject property at levels above the most restrictive residential RBSLs.

No concentrations of PCBs were detected in the soil samples at the subject property above the laboratory method detection limits (MDLs).

Concentrations of cadmium and lead were detected in the soil samples at levels above the laboratory MDLs, but not above the Statewide Default Background Levels (SDBLs). A concentration of chromium (31,000 µg/Kg) was detected in the soil sample collected at SB-1 above MDEQ Part 213 Tier 1 Residential and Commercial III DWP and GSIP RBSLs.

The horizontal extent of soil impact in the area of the gasoline UST system is defined within the site boundaries to MDEQ Residential RBSLs (Figure 3) to the north (SB-8, SB-9, and SB-10), south (SB-6 and SB-12), east (SB-10, SB-11, and SB-12), and west (SB-8, SB-7, and SB-5). The vertical extent of soil impact is defined by the absence or below MDEQ Residential RBSLs of contamination in the lower clay soils at a depth of approximately 15.0 feet bgs (SB-28 (12.0-13.0'), SB-29 (12.0-13.0'), SB-30 (12.0-13.0'), and SB-16 (19.0-20.0')).

PME estimates the volume of impacted soil at levels above the MDEQ generic Tier 1 Csat levels and or potential free-phase conditions (total VOCs greater than 70,000 parts per billion (PPB)) to be approximately 1,500 cubic yards in the area of the current UST system. These soils will likely be removed during UST system upgrade activities anticipated to occur in 2010-2011.

#### **4.6.2 Summary of Groundwater Analytical Results**

A concentration of benzene was detected in the groundwater above Part 213 Residential GVII RBSLs at monitoring well OW-3RR, which is located in the source area northeast of the UST basin. Concentrations of gasoline range VOCs were detected in groundwater at the subject property in the northwest and south central portion above the Part 213 DW and/or GSI RBSLs. The presence of the above target analytes in groundwater is consistent with the release of petroleum products from the former product piping replaced in 1992.

Except for naphthalene and 2-methylnaphthalene associated with the gasoline UST system release, no concentrations of PNAs were detected in the groundwater samples at levels above the laboratory MDLs.

No concentrations of PCBs were detected in the groundwater samples at the subject property above the laboratory MDLs.

Concentrations of cadmium, chromium, and lead were detected in the groundwater samples from the temporary monitoring wells above Part 213 DW and/or GSI RBSLs. However, these concentrations are likely due to elevated turbidity associated with the installation and sampling of temporary monitoring wells. Concentrations of cadmium, chromium, and lead were not detected in the groundwater samples collected from the permanent monitoring wells, except for cadmium

concentrations above Part 213 GSI RBSLs collected from OW-5R during the January 2008 sampling event. However, a concentration of dissolved cadmium was not detected in the groundwater sample above laboratory MDLs.

The horizontal extent of groundwater impact is delineated by the absence of groundwater, concentrations below the laboratory MDLs, or concentrations below the MDEQ Residential RBSLs to the north (PMW-1, PMW-9, PMW-2, and PMW-3), to the south (PMW-6 and PMW-5), to the east (PMW-3, OW-10, and OW-11), and west (PMW-7, PMW-8, OW-13, MW-X, and PMW-1) (Figure 4). The vertical extent of groundwater impact is defined by the lower confining clay unit (SB-28 (12.0-13.0'), SB-29 (12.0-13.0'), SB-30 (12.0-13.0'), and SB-16 (19.0-20.0')).

#### **4.6.3 Summary of QA/QC Analytical Results**

Quality Assurance/Quality Control (QA/QC) samples were submitted for analysis to establish the confidence in the quality of the laboratory results in general accordance with the October 22, 2004 and July 5, 2007 MDNRE Operational Memorandum No. 2 Sampling and Analysis, Attachment 5 Collection of Samples for Comparison to Generic Criteria, which was in effect at the time the sampling occurred. The QA/QC samples collected by PME during the June 16, 2010 sampling events are listed in the Summary of QA/QC Samples table in Section 4.1.

The QA/QC samples were submitted for laboratory analysis of VOCs and/or lead. In general, the results of the QA/QC samples were similar in concentration indicating analysis reproducibility, no cross contamination occurred, and percent recovery results were within acceptable ranges indicating accuracy of the analysis.

#### **4.7 Abandoned Containers**

No abandoned or discarded containers are currently known to exist at the subject property. The existing USTs, drums and containers will continue to be utilized and are in compliance with Part 215 of P.A. 451 of 1994, as amended. However, the current UST system is scheduled to be upgraded.

### **5.0 LIKELIHOOD OF OTHER CONTAMINATION**

Analytical results indicate that the soil and groundwater beneath the subject property has been impacted by gasoline range VOCs exceeding the Part 213 Residential and/or applicable Commercial III RBSLs (Section 4.3). Contamination identified at the subject property by PME is consistent with a release of unleaded gasoline and is consistent with results of previous site investigations dating back to 1992. It not likely that the contamination identified at the subject property can be attributed to migration from an off-site source, based upon the documented historical use of the subject property as a gasoline filling and/or service station dating back to at least 1957 and the status of the subject property as an open LUST site.

The site investigations conducted on the subject property by PME in January 2006 through August 2009 assessed the most likely areas of impact based upon the historical uses of the subject property; however, the potential exists for contamination to exist in soil and/or groundwater in areas of the subject property that were not assessed by PME or previous consultants.

## **6.0 ALTERNATIVE APPROACHES**

Not applicable.

## **7.0 CONCLUSIONS**

The subject property consists of one (1) parcel totaling 0.38 acres and is located at the southeast corner of Maple Road and Cranbrook Road in Birmingham, Michigan. The property is developed with a 3,710 square foot gasoline service station located in the southeastern portion of the subject property, which was constructed in 1957, and currently contains four (4) service bays with four (4) in-ground hydraulic hoists. Three (3) gasoline pump islands are located north of the subject building, and one (1) gasoline pump island is located west of the subject building. The property currently contains four (4) 6,000-gallon gasoline USTs, one (1) 8,000-gallon gasoline UST, and one (1) 550-gallon waste oil UST in basins located northwest of the subject building. The gasoline USTs were installed in 1957, 1963, and 1970, and the waste oil UST was installed in 1989. Current operations are consistent with a retail gasoline dispensing station and service garage.

The subject property has historically been used as a gasoline service station dating back to at least 1957. Concentrations of gasoline range VOCs exceeding the Part 213 Tier 1 Residential and applicable Commercial III RBSLs have been identified in soil and groundwater samples collected from the subject property, which the extent of impact has been documented to within the subject property boundaries.

Based upon the open LUST status and the chemical concentrations of gasoline range VOCs in the soil and groundwater samples collected from the subject property by PME in 2006 through 2010, which exceed the applicable Part 213 Residential/Commercial/Industrial DWP/DW, GSIP/GSI, GCP, SVII/GVII, VSI, and DC RBSLs and Csat Screening Levels, the subject property is a facility, according to Part 201 of P.A. 451, as amended, and the rules promulgated thereunder.

The intended use of the property will be as a gasoline dispensing station and auto repair shop; therefore, a Category-S BEA is appropriate to meet the needs of the proposed future property use.

Current contaminant concentrations in soil and groundwater in the areas where regulated or hazardous substances are intended to be used, stored, or managed, have been documented. Therefore, if the concentrations of target analytes identified in soil and groundwater at the subject property, at levels above the Part 213 Residential/Commercial/Industrial RBSLs, significantly exceed the maximum observed baseline contaminant levels in soil and groundwater samples collected from the subject property, this will be the means of distinguishing a new release from existing contamination.

In the event of a new release, Karana Real Estate, LLC will advance soil borings and monitoring wells in the vicinity of the release. Soil and groundwater samples will be collected and submitted for chemical analysis of target analytes indicative of the materials released and based on the MSDS (Appendix E). This sampling will be done to evaluate the lateral and vertical extent of the release. Analytical results will be compared to applicable Part 213 Tier 1 Residential RBSLs at the time of the new release. Any new impact significantly above the existing concentrations will be the liability of Karana Real Estate, LLC.

## **8.0 REFERENCES**

- MDNRE Operational Memorandum No. 1 “Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels,” Revised January 23, 2006;
- MDNRE Operational Memorandum No. 4, Site characterization and Remediation Verification – Attachment 10, (Peer Review Draft) Groundwater Not in an Aquifer, dated February 2007;
- MDNRE Operational Memorandum No. 2 “Sampling and Analysis,” October 22, 2004, Effective February 1, 2005;
- MDNRE Instructions for Preparing and Disclosing Baseline Environmental Assessments and Section 7a Compliance Analyses, Effective March 11, 1999;
- Leaking Underground Storage Tank (LUST) Final Assessment Report (FAR), December 27, 1996, Delta Environmental Consultants, Inc. (Delta);
- 
- Tier I Residential Restricted LUST Closure Report, June 27, 1997, Delta;
- Several LUST Supplemental Reports, June 29, 1999 – July 20, 2000 (a total of 3 reports were reviewed), Delta;
- Analytical Data (no reports), the most recent data provided to PME was a lab report dated November 4, 2004, prepared by Pace Analytical (Minneapolis, MN);
- Addendum FAR, September 30, 2009, PME; and
- Phase I ESA, September 17, 2010, PME.

## **9.0 ATTACHMENTS**

### **LIST OF FIGURES**

Figure 1	Site Location Map
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*Category-S Baseline Environmental Assessment of the Gasoline Service Station  
(Parcel Identification Number 63-08-19-35-101-001)  
Located at 2483 West Maple Road in Birmingham, Oakland County, Michigan  
PM Environmental, Inc., Project No. 02-3004-2; September 30, 2010*

This report was reviewed for its completeness and accuracy. Please feel free to contact us at (248) 336-9988 to discuss this report.

**REPORT PREPARED BY:**

PM Environmental, Inc.



Jennifer Ritchie, C.P.G.  
Project Manager

**REPORT REVIEWED BY:**

PM Environmental, Inc.



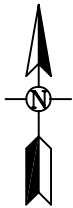
Michael T. Kulka, P.E., C.P.  
Principal

## Figures

BANK

COMMERCIAL

WEST MAPLE ROAD

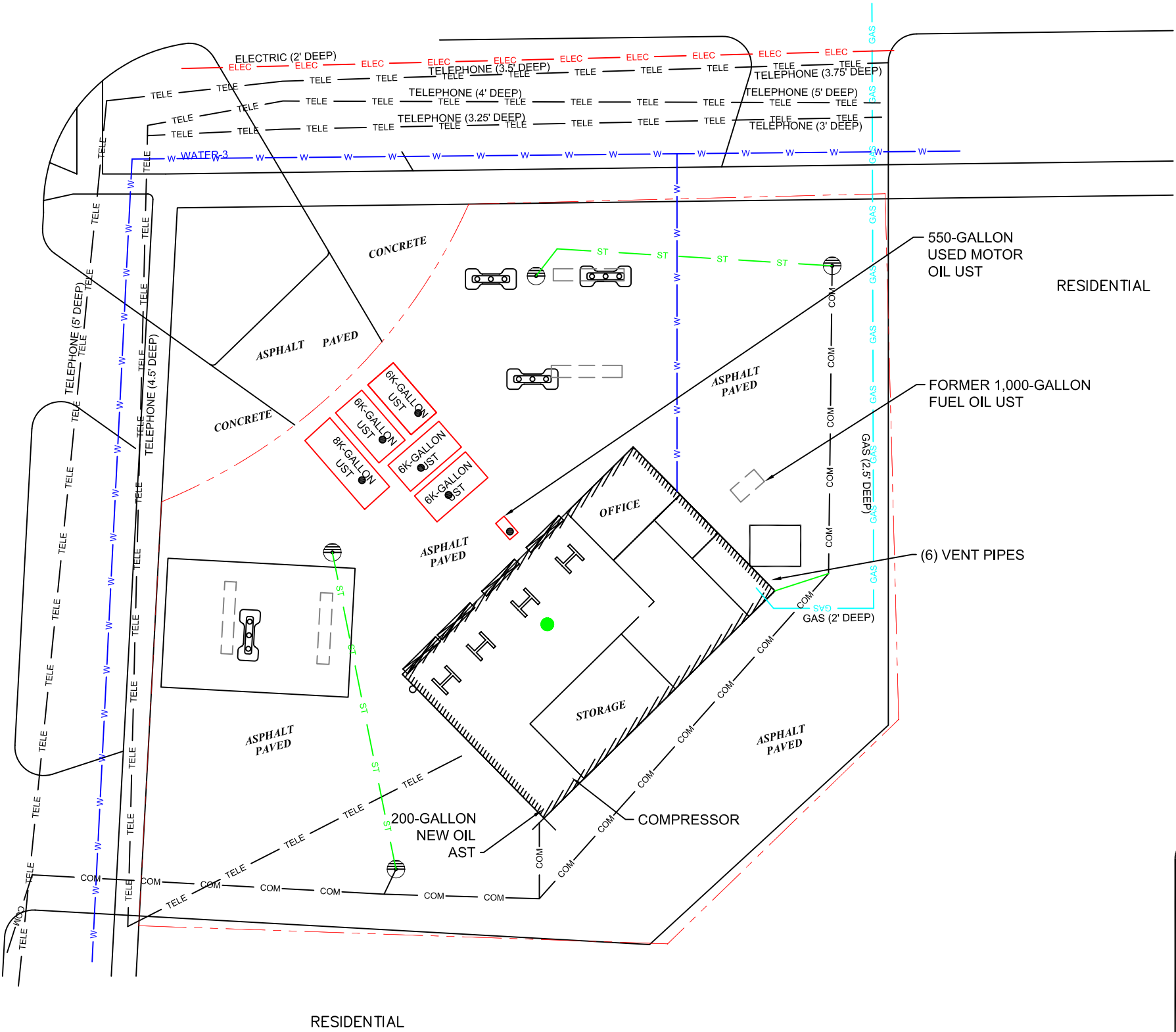


**LEGEND:**

- SUBJECT SITE
- FORMER SITE FEATURES
- WATER
- GAS
- STORM SEWER
- COMBINATION SANITARY / STORM SEWER
- ELECTRIC
- BURIED PHONE LINE
- FLOOR DRAIN
- CATCH BASIN
- BAYDOOR
- INGROUND HOIST
- PUMP ISLAND

RETAIL STRIP MALL

CRANBROOK ROAD



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ISO 9001 REGISTERED

**FIGURE 2**

GENERALIZED DIAGRAM SUBJECT PROPERTY  
AND ADJOINING PROPERTIES

PROJ: RETAIL GASOLINE STATION 2483 WEST MAPLE ROAD BIRMINGHAM, MI		
THIS IS NOT A LEGAL SURVEY	DRN. BY: MW/KK/MW	DATE: 5/26/2009
VERIFY SCALE 0 30'	CHKD. BY: BC/AP/JR	SCALE: 1" = 30'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.		
FILE NAME: 02-3004-0F02R00		

SB-15	A-7	SB-15
4/07/2009	4/07/2009	4/07/2009
3.0 ~ 4.0'	3.0 ~ 4.0'	14.0 ~ 15.0'
E 730	E 630	B 200
X 1,300	X 1,100	n-PROP 110
n-PROP 1,900	n-PROP 1,610	1,2,3-TMB 90
1,2,3-TMB 1,960	1,2,3-TMB 1,680	2-M 200
1,2,4-TMB 9,540	1,2,4-TMB 8,130	OTHER VOCs <MDL
1,3,5-TMB 2,630	1,3,5-TMB 2,240	
NAPH 600	NAPH 500	
2-M 300	2-M 300	
OTHER VOCs <MDL	OTHER VOCs <MDL	

BANK

SB-28	SB-28
7/07/2009	7/07/2009
1.0 ~ 2.0'	12.0 ~ 13.0'
B 52,000	VOCs <MDL
T 743,000	
E 339,000	
X 1,658,000	
n-PROP 132,000	
ISOP 30,000	
1,2,3-TMB 163,000	
1,2,4-TMB 612,000	
1,3,5-TMB 229,000	
NAPH 50,000	
2-M 10,000	
OTHER VOCs <MDL	

SB-27	SB-27
7/07/2009	7/07/2009
1.0 ~ 2.0'	13.0 ~ 14.0'
B 5,000	T 130
T 22,000	E 140
E 101,000	X 720
X 565,000	n-PROP 80
n-PROP 53,000	1,2,3-TMB 210
1,2,3-TMB 72,000	1,2,4-TMB 400
1,2,4-TMB 282,000	OTHER VOCs <MDL
1,3,5-TMB 103,000	
NAPH 20,000	
OTHER VOCs <MDL	

SB-9	SB-9
4/07/2009	4/07/2009
5.0 ~ 6.0'	14.0 ~ 15.0'
VOCs <MDL	VOCs <MDL

COMMERCIAL

SB/TMW-4
1/13/2006
4.0 ~ 5.0'
B 110
E 110
X 200
n-PROP 2,400
ISOP 740
1,2,3-TMB 440
1,2,4-TMB 240
1,3,5-TMB 110
n-BUTYL 150
NAPH 1,000
2-M 260
OTHER VOCs <MDL
Pb (TOTAL) 9,700
Pb (COARSE) 8,120
Pb (FINE) 8,790

SB-14
4/07/2009
4.0 ~ 5.0'
E 3,700
X 2,400
n-PROP 1,500
1,2,3-TMB 2,100
1,2,4-TMB 6,000
1,3,5-TMB 1,900
NAPH 1,000
2-M 300
OTHER VOCs <MDL

SB-10	SB-10
4/07/2009	4/07/2009
5.0 ~ 6.0'	14.0 ~ 15.0'
VOCs <MDL	VOCs <MDL

SB-8	SB-8
4/07/2009	4/07/2009
4.0 ~ 5.0'	11.0 ~ 12.0'
VOCs <MDL	VOCs <MDL

SB/TMW-3
1/13/2006
11.0 ~ 12.0'
B 250
T 110
E 2,400
X 2,400
n-PROP 3,300
ISOP 800
1,2,3-TMB 4,400
1,2,4-TMB 11,000
1,3,5-TMB 4,200
n-BUTYL 1,300
NAPH 1,400
2-M 750
OTHER VOCs <MDL
Pb (TOTAL) 5,800
Pb (COARSE) 6,180
Pb (FINE) 7,700

SB/TMW-2
1/13/2006
3.0 ~ 4.0'
B 660
T 520
E 6,000
X 12,000
n-PROP 19,000
ISOP 4,000
1,2,3-TMB 20,000
1,2,4-TMB 71,000
1,3,5-TMB 26,000
n-BUTYL 4,600
NAPH 6,700
2-M 15,000
OTHER VOCs <MDL
Pb (TOTAL) 12,000
Pb (COARSE) 8,590
Pb (FINE) 10,000

RETAIL STRIP MALL

SB-7	SB-7
4/07/2009	4/07/2009
3.0 ~ 4.0'	11.0 ~ 12.0'
VOCs <MDL	VOCs <MDL

SB/TMW-1
1/13/2006
3.0 ~ 4.0'
B 2,000
T 120
E 3,700
X 12,000
n-PROP 1,900
ISOP 430
1,2,3-TMB 5,200
1,2,4-TMB 14,000
1,3,5-TMB 4,300
n-BUTYL 1,500
NAPH 3,800
2-M 7,100
OTHER VOCs <MDL
2-M 4,600
Ph 370
Py 610
OTHER PNAs <MDL
PCBs <MDL
Cd 330
Cr 31,000
Pb (TOTAL) 20,000
Pb (COARSE) 11,100
Pb (FINE) 19,100

SB-5	SB-5
1/13/2006	1/13/2006
5.0 ~ 6.0'	17.0 ~ 18.0'
VOCs <MDL	VOCs <MDL
Pb (TOTAL) 8,600	Pb (TOTAL) 12,000
Pb (COARSE) 7,340	Pb (COARSE) 9,880
Pb (FINE) 7,210	Pb (FINE) 9,170

CRANBROOK ROAD

SB-23	A-2
7/06/2009	7/06/2009
3.0 ~ 4.0'	3.0 ~ 4.0'
n-PROP 570	n-PROP 710
OTHER VOCs <MDL	OTHER VOCs <MDL

SB-17	A-5
4/07/2009	4/07/2009
2.0 ~ 3.0'	2.0 ~ 3.0'
VOCs <MDL	VOCs <MDL

RESIDENTIAL

SB/TMW-6
1/13/2006
3.0 ~ 4.0'
VOCs <MDL
Pb (TOTAL) 14,000
Pb (COARSE) 9,880
Pb (FINE) 11,100

SB-25	A-3
7/06/2009	7/06/2009
4.0 ~ 5.0'	4.0 ~ 5.0'
B 1,330	B 1,580
T 130	T 140
E 230	E 350
X 1,930	X 2,670
n-PROP 6,620	1,2-DCA 80
ISOP 2,000	n-PROP 3,380
1,2,3-TMB 1,940	ISOP 1,100
1,2,4-TMB 2,340	1,2,3-TMB 2,080
1,3,5-TMB 870	1,2,4-TMB 2,760
NAPH 1,700	1,3,5-TMB 1,540
2-M 2,000	NAPH 1,300
OTHER VOCs <MDL	2-M 600
	OTHER VOCs <MDL

WEST MAPLE ROAD

SB-9	SB-9
4/07/2009	4/07/2009
5.0 ~ 6.0'	14.0 ~ 15.0'
VOCs <MDL	VOCs <MDL

COMMERCIAL

SB/TMW-4
1/13/2006
4.0 ~ 5.0'
B 110
E 110
X 200
n-PROP 2,400
ISOP 740
1,2,3-TMB 440
1,2,4-TMB 240
1,3,5-TMB 110
n-BUTYL 150
NAPH 1,000
2-M 260
OTHER VOCs <MDL
Pb (TOTAL) 9,700
Pb (COARSE) 8,120
Pb (FINE) 8,790

SB-14
4/07/2009
4.0 ~ 5.0'
E 3,700
X 2,400
n-PROP 1,500
1,2,3-TMB 2,100
1,2,4-TMB 6,000
1,3,5-TMB 1,900
NAPH 1,000
2-M 300
OTHER VOCs <MDL

SB-10	SB-10
4/07/2009	4/07/2009
5.0 ~ 6.0'	14.0 ~ 15.0'
VOCs <MDL	VOCs <MDL

LEGEND:

- SUBJECT SITE
- FORMER SITE FEATURES
- WATER
- GAS
- STORM SEWER
- COMBINATION SANITARY / STORM SEWER
- ELECTRIC
- BURIED PHONE LINE
- FLOOR DRAIN
- CATCH BASIN
- BAYDOOR
- INGROUND HOIST
- PUMP ISLAND
- MONITORING WELLS
- SOIL BORING
- SOIL BORING/ TEMPORARY MONITORING WELL
- BENZENE
- TOLUENE
- ETHYLBENZENE
- XYLENES
- n-PROP
- ISOP
- 1,2,3-TMB
- 1,2,4-TMB
- 1,3,5-TMB
- n-BUTYL
- NAPH
- 2-M
- Ph
- Py
- Cd
- Cr
- Pb
- VOCs
- PNAs
- PCBs
- MDL
- UNITS
- REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

NOTES:

REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED



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FIGURE 3

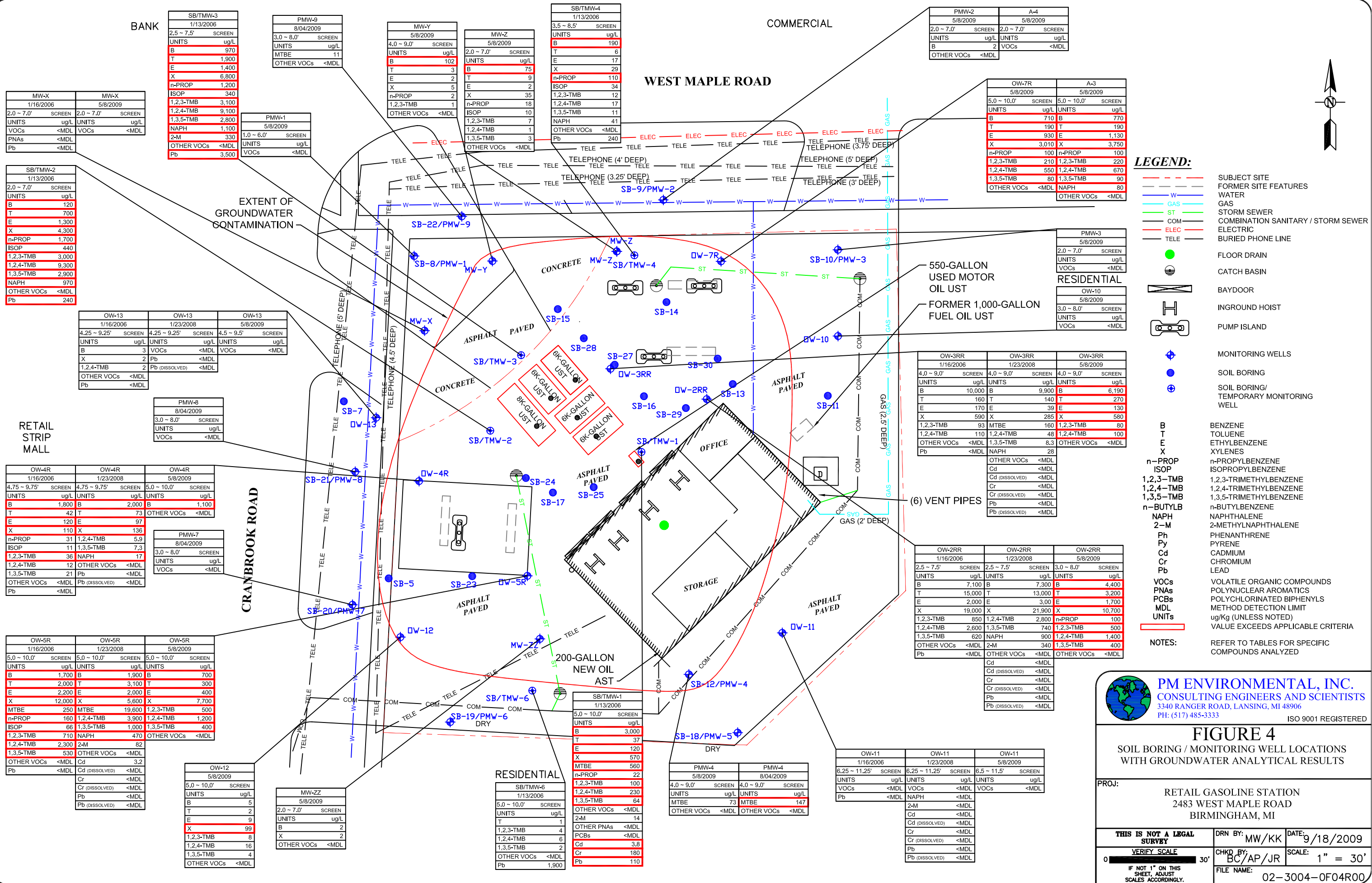
SOIL BORING / MONITORING WELL LOCATIONS  
WITH SOIL ANALYTICAL RESULTS

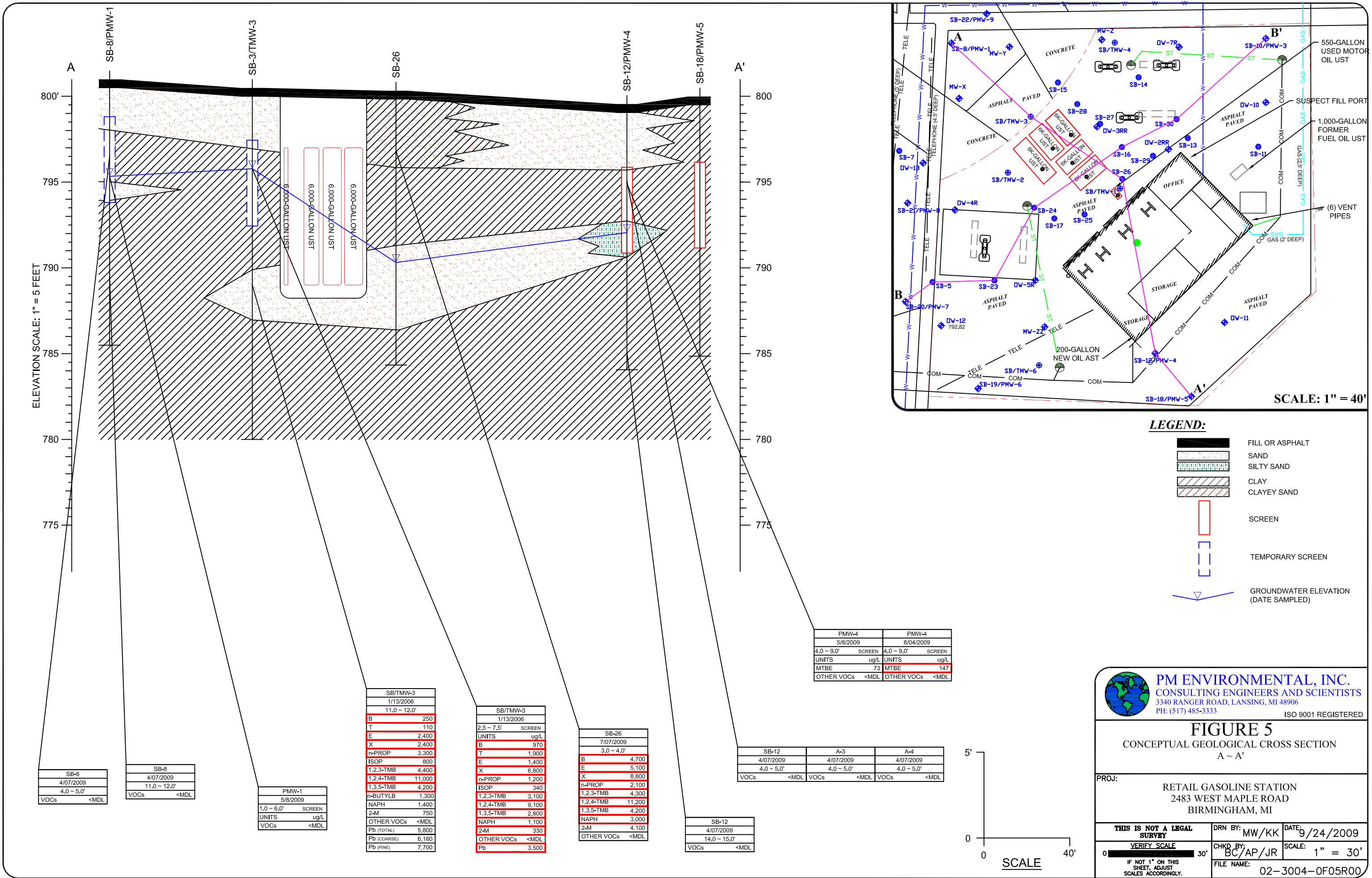
PROJ: RETAIL GASOLINE STATION  
2483 WEST MAPLE ROAD  
BIRMINGHAM, MI

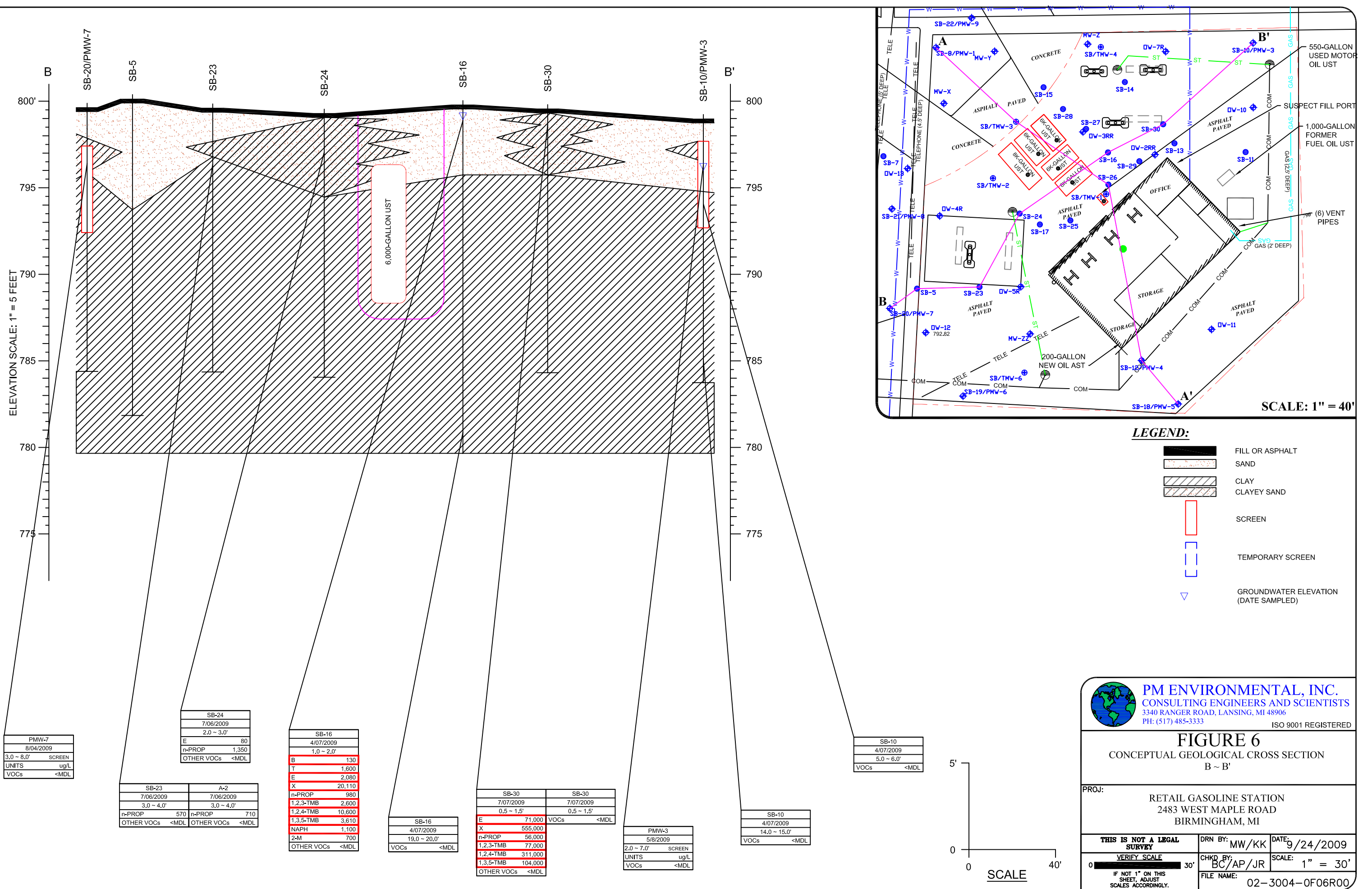
THIS IS NOT A LEGAL SURVEY  
VERIFY SCALE  
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: MW/KK  
CHKD BY: BC/AP/JR  
FILE NAME: 02-3004-0F03R00

DATE: 9/24/2009  
SCALE: 1" = 30'



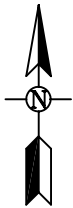




CHARTER  
ONE BANK

COMMERCIAL BUILDING (UNDER  
DEVELOPEMENT)

MAPLE ROAD



RESIDENTIAL DWELLING

FORMER  
1,000-GALLON  
FUEL OIL UST

(6) VENT PIPES

RESIDENTIAL DWELLING

LEGEND:

- SUBJECT SITE
- FORMER SITE FEATURES
- WATER
- GAS
- STORM SEWER
- COMBINATION SANITARY / STORM SEWER
- ELECTRIC
- BURIED PHONE LINE
- FLOOR DRAIN
- CATCH BASIN
- BAYDOOR
- INGROUND HOIST
- PUMP ISLAND
- CURRENT/HISTORICAL MONITORING WELLS
- SOIL BORING
- SOIL BORING/ TEMPORARY MONITORING WELL
- GROUNDWATER CONTOUR
- GROUNDWATER ELEVATION



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FIGURE 7

POTENTIOMETRIC SURFACE MAP  
(SEPTEMBER 15, 2009)

PROJ: RETAIL GASOLINE STATION 2483 WEST MAPLE ROAD BIRMINGHAM, MI		
THIS IS NOT A LEGAL SURVEY	DRN BY: MW/KK	DATE: 9/28/2009
VERIFY SCALE 0 30'	CHKD BY: BC/AP/JR	SCALE: 1" = 30'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.		
FILE NAME: 02-3004-0F07R00		

## Tables

**TABLE 1**  
**SUMMARY OF INTENDED-USE HAZARDOUS SUBSTANCES**  
**CRANBROOK CAR CARE,**  
**2483 WEST MAPLE ROAD, BIRMINGHAM, MICHIGAN**  
**PME PROJECT # 02-3004-2**

<b>HAZARDOUS SUBSTANCE</b>	<b>CAS NUMBER(s)</b>
<b>Unleaded Gasoline</b>	
Xylene	1330-20-7
Toluene	108-88-3
1,2,4-Trimethylbenzene	95-63-6
Benzene	71-43-2
n-Hexane	110-54-3
Cyclo-hexane	110-82-7
Ethylbenzene	100-41-4
Naphthalene	91-20-3
Styrene	100-42-5
<b>Oils, Lubricants, Greases</b>	
Petroleum Distillates, hydrotreated light naphthenic	64742-53-6
Petroleum Distillates, hydrotreated light paraffinic	64742-555-8

\* Refer to MSDS (Appendix E) for listing of CAS Numbers and proprietary ingredients

**TABLE 2**  
**SUMMARY OF TARGET ANALYTES AND USEPA METHODS**  
**CRANBROOK CAR CARE,**  
**2483 WEST MAPLE ROAD, BIRMINGHAM, MICHIGAN**  
**PME PROJECT # 02-3004-2**

Target Analyte	USEPA Method for Soil	USEPA Method for Water
VOCs	8260B	8260B
PNAs	8270C	8270C
PCBs	8082	8082
Metals	6020A	6020A

TABLE 3  
SUMMARY OF 2006 SOIL ANALYTICAL RESULTS  
VOCs, PNA's, PCBs, CADMIUM, CHROMIUM, AND LEAD  
CRANBROOK CAR CARE,  
2483 WEST MAPLE ROAD, BIRMINGHAM, MICHIGAN  
PME PROJECT # 02-3004-2

VOLATILE ORGANIC COMPOUNDS, POLYNUCLEAR AROMATIC COMPOUNDS, POLYCHLORINATED BIPHENYLS, AND METALS  (µg/Kg)			Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Ethylene dibromide (EDB) (1,2-Dibromoethane)	1,2-Dichloroethane	n-Propylbenzene	Isopropyl benzene	1,2,3-Trimethylbenzene <sup>1</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene	2-Methylnaphthalene	n-Butylbenzene	Other VOCs	2-Methylnaphthalene	Phenanthrene	Pyrene	Other PNAs	Polychlorinated Biphenyls	Cadmium	Chromium	Lead			
																										Total <sup>2</sup>	Coarse Fraction	Fine Fraction	
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	1634044	106934	107062	103651	98828	526738	95636	108678	91203	91576	104518	Various	91576	85018	129000	Various	1336363	7440439	16065831	7439921			
Sample ID		Sample Date	Sample Depth (bgs)	VOCs																				PCBs	Metals				
SB-1		1/13/2006	3.0-4.0'	2,000	120	3,700	12,000	<250	<20	<50	1,900	430	5,200	14,000	4,300	3,800	7,100	1,500	ND	4,600	370	610	ND	<330	330	31,000	20,000	11,100	19,100
SB-2		1/13/2006	3.0-4.0'	660	520	6,000	12,000	<1,500	<120	<300	19,000	4,000	20,000	71,000	26,000	6,700	15,000	4,600	ND	NA	NA	NA	NA	NA	NA	NA	12,000	8,590	10,000
SB-3		1/13/2006	11.0-12.0'	250	110	2,400	2,400	<250	<20	<50	3,300	800	4,400	11,000	4,200	1,400	750	1,300	ND	NA	NA	NA	NA	NA	NA	NA	5,800	6,180	7,700
SB-4		1/13/2006	4.0-5.0'	110	<50	110	200	<250	<20	<50	2,400	740	440	240	110	1000	260	150	ND	NA	NA	NA	NA	NA	NA	NA	9,700	8,120	8,790
SB-5		1/13/2006	5.0-6.0'	<50	<50	<50	<150	<250	<20	<50	<100	<100	<100	<100	<100	<250	<250	<50	ND	NA	NA	NA	NA	NA	NA	NA	8,600	7,340	7,210
SB-5		1/13/2006	17.0-18.0'	<50	<50	<50	<150	<250	<20	<50	<100	<100	<100	<100	<100	<250	<250	<50	ND	NA	NA	NA	NA	NA	NA	NA	12,000	9,880	9,170
SB-6		1/13/2006	3.0-4.0'	<50	<50	<50	<150	<250	<20	<50	<100	<100	<100	<100	<100	<250	<250	<50	ND	NA	NA	NA	NA	NA	NA	NA	14,000	9,880	11,100
MDEQ-RRD Operational Memorandum No. 1: Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels (RBSLs), December 10, 2004 Attachment 1: Soil Tables 2 and 3 Residential, Commercial, and Industrial Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 RBSLs																													
Residential/Commercial I (µg/Kg)																													
Statewide Default Background Levels			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Various	NA	NA	NA	Various	NA	1,200	18,000	21,000			
Drinking Water Protection (DWP) RBSL			100	16,000	1,500	5,600	800	20 {M}	100	1,600	91,000	1,800	2,100	1,800	35,000	57,000	1,600	Various	57,000	56,000	4.8E+5	Various	NLL	6,000	30,000	7.0E+5	NA	NA	
Groundwater Surface Water Interface Protection (GSIP) RBSL			4,000 {X}	2,800	360	700	15,000 {X}	20 {M}	7,200 {X}	NA	ID	570	570	1,100	870	ID	NA	Various	ID	5,300	ID	Various	NLL	7,700{G,X}	6,300	8.3E+6 {G,M,X}	NA	NA	
GSIP Human Drinking Water RBSL			240	NA	NA	NA	2,000	NA	120	NA	NA	NA	NA	NA	NA	NA	NA	Various	NA	NA	NA	Various	NA	3,000{G,X}	3,500{G,X}	2.5E+6{G,X}	NA	NA	
Groundwater Contact Protection (GCP) RBSL			2.2E+5	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	500	3.8E+5	3.0E+5	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	2.1E+6	5.5E+6	1.2E+5	Various	5.5E+6	1.1E+6	4.8E+5	Various	NLL	2.3E+8	1.4E+8	ID	NA	NA	
Soil Volatilization to Indoor Air Inhalation (SVII) RBSL			1,600	2.5E+5 {C}	87,000	1.5E+5 {C}	5.9E+6 {C}	670	2,100	ID	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	2.5E+5	ID	ID	Various	ID	2.8E+6	1.0E+9 {D}	Various	3.0E+6	NLV	NLV	NLV	NA	NA	
Ambient Air Infinite Source Volatile Soil Inhalation (VSI) RBSL			13,000	2.8E+6	7.2E+5	4.6E+7	2.5E+7	1,700	6,200	ID	1.7E+6	1.6E+7	2.1E+7	1.6E+7	3.0E+5	ID	ID	Various	ID	1.6E+5	6.5E+8	Various	2.4E+5	NLV	NLV	NLV	NA	NA	
Ambient Air Finite VSI RBSL for 5 Meter Source Thickness			34,000	5.1E+6	1.0E+6	6.1E+7	3.9E+7	1,700	11,000	ID	1.7E+6	3.8E+8	5.0E+8	3.8E+8	3.0E+5	ID	ID	Various	ID	1.6E+5	6.5E+8	Various	7.9E+6	NLV	NLV	NLV	NA	NA	
Ambient Air Finite VSI RBSL for 2 Meter Source Thickness			79,000	1.2E+7	2.2E+6	1.3E+8	8.7E+7	3,300	26,000	ID	2.8E+6	3.8E+8	5.0E+8	3.8E+8	3.0E+5	ID	ID	Various	ID	1.6E+5	6.5E+8	Various	7.9E+6	NLV	NLV	NLV	NA	NA	
Ambient Air Particulate Soil Inhalation (PSI) RBSL			3.8E+8	2.7E+10	1.0E+10	2.9E+11	2.0E+11	1.4E+7	1.2E+8	1.3E+9	5.8E+9	8.2E+10	8.2E+10	8.2E+10	2.0E+8	ID	ID	Various	ID	6.7E+6	6.7E+9	Various	5.2E+6	1.7E+6	2.6E+5		NA	1.0E+8	
Direct Contact (DC) RBSL			1.8E+5	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	1.5E+6	92	91,000	2.5E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	1.6E+7	8.1E+6	2.5E+6	Various	8.1E+6	1.6E+6	2.9E+7	Various	{T}	5.5E+5	2.5E+6	4.0E+5	4.0E+5	4.0E+5	
Soil Saturation Concentration Screening Levels (Csat)			4.0E+5	2.5E+5	1.4E+5	1.5E+5	5.9E+6	8.9E+5	1.2E+6	1.0E+7	3.9E+5	94,000	1.1E+5	94,000	NA	NA	1.0E+7	Various	NA	NA	NA	Various	NA	NA	NA	NA	NA	NA	NA
Industrial/Commercial II, III, IV (µg/Kg)																													
Industrial And Commercial Drinking Water Protection (DWP) RBSL			100	16,000	1,500	5,600	800	20 {M}	100	4,600	2.6E+5	1,800	2,100	1,800	1.0E+5	1.7E+5	4,600	Various	1.7E+5	1.6E+5	4.8E+5	Various	NLL	6,000	30,000	7.0E+5	NA	NA	
Soil Volatilization to Indoor Air Inhalation (SVII) RBSL			8,400	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	3,600	11,000	ID	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	4.7E+5	ID	ID	Various	ID	5.1E+6	1.0E+9 {D}	Various	1.6E+7	NLV	NLV	NLV	NA	NA	
Ambient Air Infinite Source Volatile Soil Inhalation (VSI) RBSL			45,000	3.3E+6	2.4E+6	5.4E+7	3.0E+7	5,800	21,000	ID	2.0E+6	1.9E+7	2.5E+7	1.9E+7	3.5E+5	ID	ID	Various	ID	1.9E+5	7.8E+8	Various	8.1E+5	NLV	NLV	NLV	NA	NA	
Ambient Air Finite VSI RBSL for 5 Meter Source Thickness			99,000	3.6E+7	3.1E+6	6.5E+7	4.1E+7	5,800	33,000	ID	2.0E+6	4.6E+8	6.0E+8	4.6E+8	3.5E+5	ID	ID	Various	ID	1.9E+5	7.8E+8	Various	2.8E+7	NLV	NLV	NLV	NA	NA	
Ambient Air Finite VSI RBSL for 2 Meter Source Thickness			2.3E+5	3.6E+7	6.5E+6	1.3E+8	8.9E+7	9,800	74,000	ID	3.0E+6	4.6E+8	6.0E+8	4.6E+8	3.5E+5	ID	ID	Various	ID	1.9E+5	7.8E+8	Various	2.8E+7	NLV	NLV	NLV	NA	NA	
Ambient Air Particulate Soil Inhalation (PSI) RBSL			4.7E+8	1.2E+10	1.3E+10	1.3E+11	8.8E+10	1.8E+7	1.5E+8	5.9E+8	2.6E+9	3.6E+10	3.6E+10	3.6E+10	8.8E+7	ID	ID	Various	ID	2.9E+6	2.9E+9	Various	6.5E+6	2.2E+6	2.4E+5	NA	NA	4.4E+7	
Direct Contact (DC) RBSL - Industrial and Commercial II			4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	430	4.2E+5	8.0E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	5.2E+7	2.6E+7	8.0E+6	Various	2.6E+7	5.2E+6	8.4E+7	Various	{T}	2.1E+6	9.2E+6	9.0E+5 (DD)	9.0E+5 (DD)	9.0E+5 (DD)	
DC RBSL - Commercial III			4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	600	5.9E+5	1.0E+7 {C}	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	7.2E+7	3.7E+7	1.0E+7 {C}	Various	3.7E+7	7.2E+6	1.5E+8	Various	{T}	2.1E+6	1.0E+7	4.0E+5	4.0E+5	4.0E+5	
DC RBSL - Commercial IV			4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	500	4.9E+5	9.4E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	6.1E+7	3.1E+7	9.4E+6	Various	3.1E+7	6.1E+6	1.1E+8	Various	{T}	2.1E+6	9.6E+6	4.0E+5	4.0E+5	4.0E+5	

Applicable Criteria Exceeded  
**BOLD** Value Exceeds Applicable Criteria  
bgs Below Grade Surface (feet)  
1 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance.  
2 Maximum of analyzed or calculated total lead value.  
{G} Metal GSIP Criteria for Surface Water Not Protected for Drinking Water Use based on 417.5 mg/L CaCO3 Hardness: Station ID 630003, River Rouge, near Birmingham, MI.

TABLE 4  
SUMMARY OF 2009 SOIL ANALYTICAL RESULTS  
GASOLINE RANGE VOCs  
CRANBROOK CAR CARE, 2483 WEST MAPLE ROAD, BIRMINGHAM, MI  
PME PROJECT 02-3004-2

GASOLINE RANGE VOLATILE ORGANIC COMPOUNDS  (µg/Kg)			Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Ethylene dibromide (EDB) (1,2-Dibromoethane)	1,2-Dichloroethane	n-Propylbenzene	Isopropyl benzene	1,2,3-Trimethylbenzene <sup>1</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene	2-Methylnaphthalene
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	1634044	106934	107062	103651	98828	526738	95636	108678	91203	91576
Sample ID	Sample Date	Sample Depth (bgs)	VOCs													
SB-7	04/07/2009	3.0-4.0'	<60	<60	<60	<160	<300	<30	<60	<60	<300	<60	<60	<60	<300	<100
SB-7	04/07/2009	11.0-12.0'	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-8	04/07/2009	4.0-5.0'	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-8	04/07/2009	11.0-12.0'	<70	<70	<70	<170	<300	<30	<70	<70	<400	<70	<70	<70	<400	<100
SB-9	04/07/2009	5.0-6.0'	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-9	04/07/2009	14.0-15.0'	<60	<60	<60	<160	<300	<30	<60	<60	<300	<60	<60	<60	<300	<100
SB-10	04/07/2009	5.0-6.0'	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-10	04/07/2009	14.0-15.0'	<70	<70	<70	<170	<300	<30	<70	<70	<400	<70	<70	<70	<400	<100
SB-11	04/08/2009	3.0-4.0'	<90	<90	<90	<290	<300	<30	<90	<90	<400	<90	<90	<90	<400	<200
SB-11	04/08/2009	14.0-15.0'	<70	<70	<70	<170	<300	<30	<70	<70	<400	<70	<70	<70	<400	<100
SB-12	04/07/2009	4.0-5.0'	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
A-3			<60	<60	<60	<160	<300	<30	<60	<60	<300	<60	<60	<60	<300	<100
A-4			<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-12	04/07/2009	14.0-15.0'	<80	<80	<80	<280	<300	<30	<80	<80	<400	<80	<80	<80	<400	<200
SB-13	04/08/2009	4.0-5.0'	<800	<800	15,500	13,000	<3,000	<300	<800	14,400	<4,000	18,200	67,600	22,000	6,000	5,000
SB-14	04/08/2009	4.0-5.0'	<100	<100	3,700	2,400	<600	<60	<100	1,500	<700	2,100	6,000	1,900	1,000	300
SB-15	04/08/2009	3.0-4.0'	<80	<80	730	1,300	<300	<30	<80	1,900	<400	1,960	9,540	2,630	600	300
A-7			<70	<70	630	1,100	<300	<30	<70	1,610	<300	1,680	8,130	2,240	500	300
SB-15	04/08/2009	14.0-15.0'	200	<70	<70	<170	<300	<30	<70	110	<300	<70	90	<70	<300	200
SB-16	04/07/2009	1.0-2.0'	130	1,600	2,080	20,110	<300	<30	<60	980	<300	2,600	10,600	3,610	1,100	700
SB-16	04/07/2009	19.0-20.0'	<80	<80	<80	<280	<300	<30	<80	<80	<400	<80	<80	<80	<400	<200
SB-17	04/07/2009	2.0-3.0'	<60	<60	<60	<160	<200	<20	<60	<60	<300	<60	<60	<60	<300	<100
A-5			<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-23	07/06/2009	3.0-4.0'	<70	<70	<70	<170	<300	<30	<70	570	<400	<70	<70	<70	<400	<100
A-2			<80	<80	<80	<280	<300	<30	<80	710	<400	<80	<80	<80	<400	<200
SB-24	07/06/2009	2.0-3.0'	<70	<70	80	<170	<300	<30	<70	1,350	<300	<70	<70	<70	<300	<100
SB-25	07/07/2009	4.0-5.0'	1,330	130	230	1,930	<300	<100	<70	6,620	2,000	1,940	2,340	870	1,700	2,000
A-3			1,580	140	350	2,670	<300	<70	80	3,380	1,100	2,080	2,760	1,540	1,300	600
SB-26	07/07/2009	3.0-4.0'	4,700	<300	5,100	8,800	<1,000	<100	<300	2,100	<2,000	4,300	11,200	4,200	3,000	4,100
SB-27	07/07/2009	1.0-2.0'	5,000	22,000	101,000	565,000	<10,000	<1,000	<3,000	53,000	<20,000	72,000	282,000	103,000	20,000	<7,000
SB-27	07/07/2009	13.0-14.0'	<70	130	140	720	<300	<30	<70	80	<400	210	400	<70	<400	<100
SB-28	07/07/2009	1.0-2.0'	52,000	743,000	339,000	1,658,000	<30,000	<3,000	<7,000	132,000	30,000	163,000	612,000	229,000	50,000	10,000
SB-28	07/07/2009	12.0-13.0'	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-29	07/07/2009	1.0-2.0'	<6,000	23,000	40,000	247,000	<20,000	<2,000	<6,000	29,000	<30,000	45,000	189,000	66,000	<30,000	<10,000
SB-29	07/07/2009	12.0-13.0'	<60	<60	<60	<160	<300	<30	<60	<60	<300	<60	<60	<60	<300	<100
SB-30	07/07/2009	0.5-1.5'	<7,000	<7,000	71,000	555,000	<30,000	<3,000	<7,000	56,000	<30,000	77,000	311,000	104,000	<30,000	<10,000
SB-30	07/07/2009	12.0-13.0'	<60	<60	<60	<160	<200	<20	<60	<60	<300	<60	<60	<60	<300	<100

MDEQ-RRD Operational Memorandum No. 1: Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels (RBSLs), January 23, 2006  
Attachment 1: Soil Tables 2 and 3 Residential, Commercial, and Industrial Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 RBSLs

Residential/Commercial I (µg/Kg)																
Drinking Water Protection (DWP) RBSL	100	16,000	1,500	5,600	800	20 {M}	100	1,600	91,000	1,800	2,100	1,800	35,000	57,000		
Groundwater Surface Water Interface Protection (GSIP) RBSL	4,000 {X}	2,800	360	700	15,000 {X}	20 {M}	7,200 {X}	NA	ID	570	570	1,100	870	ID		
GSIP Human Drinking Water RBSL	240	NA	NA	NA	2,000	NA	120	NA	NA	NA	NA	NA	NA	NA		
Groundwater Contact Protection (GCP) RBSL	2.2E+5	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	500	3.8E+5	3.0E+5	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	2.1E+6	5.5E+6		
Soil Volatilization to Indoor Air Inhalation (SVII) RBSL	1,600	2.5E+5 {C}	87,000	1.5E+5 {C}	5.9E+6 {C}	670	2,100	ID	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	2.5E+5	ID		
Ambient Air Infinite Source Volatile Soil Inhalation (VSI) RBSL	13,000	2.8E+6	7.2E+5	4.6E+7	2.5E+7	1,700	6,200	ID	1.7E+6	1.6E+7	2.1E+7	1.6E+7	3.0E+5	ID		
Ambient Air Finite VSI RBSL for 5 Meter Source Thickness	34,000	5.1E+6	1.0E+6	6.1E+7	3.9E+7	1,700	11,000	ID	1.7E+6	3.8E+8	5.0E+8	3.8E+8	3.0E+5	ID		
Ambient Air Finite VSI RBSL for 2 Meter Source Thickness	79,000	1.2E+7	2.2E+6	1.3E+8	8.7E+7	3,300	26,000	ID	2.8E+6	3.8E+8	5.0E+8	3.8E+8	3.0E+5	ID		
Ambient Air Particulate Soil Inhalation (PSI) RBSL	3.8E+8	2.7E+10	1.0E+10	2.9E+11	2.0E+11	1.4E+7	1.2E+8	1.3E+9	5.8E+9	8.2E+10	8.2E+10	8.2E+10	2.0E+8	ID		
Direct Contact (DC) RBSL	1.8E+5	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	1.5E+6	92	91,000	2.5E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	1.6E+7	8.1E+6		
Soil Saturation Concentration Screening Levels (Csat)	4.0E+5	2.5E+5	1.4E+5	1.5E+5	5.9E+6	8.9E+5	1.2E+6	1.0E+7	3.9E+5	94,000	1.1E+5	94,000	NA	NA		
Industrial/Commercial II, III, IV (µg/Kg)																
Industrial And Commercial Drinking Water Protection (DWP) RBSL	100	16,000	1,500	5,600	800	20 {M}	100	4,600	2.6E+5	1,800	2,100	1,800	1.0E+5	1.7E+5		
Soil Volatilization to Indoor Air Inhalation (SVII) RBSL	8,400	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	3,600	11,000	ID	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	4.7E+5	ID		
Ambient Air Infinite Source Volatile Soil Inhalation (VSI) RBSL	45,000	3.3E+6	2.4E+6	5.4E+7	3.0E+7	5,800	21,000	ID	2.0E+6	1.9E+7	2.5E+7	1.9E+7	3.5E+5	ID		
Ambient Air Finite VSI RBSL for 5 Meter Source Thickness	99,000	3.6E+7	3.1E+6	6.5E+7	4.1E+7	5,800	33,000	ID	2.0E+6	4.6E+8	6.0E+8	4.6E+8	3.5E+5	ID		
Ambient Air Finite VSI RBSL for 2 Meter Source Thickness	2.3E+5	3.6E+7	6.5E+6	1.3E+8	8.9E+7	9,800	74,000	ID	3.0E+6	4.6E+8	6.0E+8	4.6E+8	3.5E+5	ID		
Ambient Air Particulate Soil Inhalation (PSI) RBSL	4.7E+8	1.2E+10	1.3E+10	1.3E+11	8.8E+10	1.8E+7	1.5E+8	5.9E+8	2.6E+9	3.6E+10	3.6E+10	3.6E+10	8.8E+7	ID		
Direct Contact (DC) RBSL - Industrial and Commercial II	4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	430	4.2E+5	8.0E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	5.2E+7	2.6E+7		
DC RBSL - Commercial III	4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	600	5.9E+5	1.0E+7 {C}	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	7.2E+7	3.7E+7		
DC RBSL - Commercial IV	4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	500	4.9E+5	9.4E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	6.1E+7	3.1E+7		

Applicable Criteria Exceeded  
**BOLD** Value Exceeds Applicable Criteria  
bgs Below Grade Surface (feet)  
1 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance.

TABLE 5  
SUMMARY OF 2006-2008 GROUNDWATER ANALYTICAL RESULTS  
VOCs, PNAs, PCBs, CADMIUM, CHROMIUM, AND LEAD  
CRANBROOK CAR CARE, 2483 WEST MAPLE, BIRMINGHAM, MICHIGAN  
PME PROJECT 02-3004-2

VOLATILE ORGANIC COMPOUNDS, POLYNUCLEAR AROMATIC COMPOUNDS, POLYCHLORINATED BIPHENYLS, AND METALS  (µg/L)			Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Ethylene dibromide (EDB) (1,2-Dibromoethane)	1,2-Dichloroethane	n-Propylbenzene	Isopropyl benzene	1,2,3-Trimethylbenzene <sup>2</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Methylnaphthalene	Naphthalene	Other Vocs	2-Methylnaphthalene	Other PNAs	Polychlorinated Biphenyls	Cadmium	Dissolved Cadmium	Chromium	Dissolved Chromium	Lead	Dissolved Lead	
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	1634044	106934	107062	103651	98828	526738	95636	108678	91576	91203	Various	91576	Various	1336363	7440439	7440439	16065831	16065831	7439921	7439921	
Sample ID	Sample Date	Screen Depth (bgs)	VOCs															PNAs		PCBs	Metals						
TMW-1	1/13/2006	5.0-10.0'	3,000	37	120	570	560	<20	<20	22	<20	100	230	64	<100	<100	<MDLs	14	<MDLs	<0.2	3.8	NA	180	NA	110	NA	
TMW-2	1/13/2006	2.0-7.0'	120	700	1,300	4,300	<300	<50	<50	1,700	440	3,000	9,300	2,900	<100	970	<MDLs	NA	NA	NA	NA	NA	NA	NA	240	NA	
TMW-3	1/13/2006	2.5-7.5'	970	1,900	1,400	6,800	<300	<50	<50	1,200	340	3,100	9,100	2,800	330	1,100	<MDLs	NA	NA	NA	NA	NA	NA	NA	3,500	NA	
TMW-4	1/13/2006	3.5-8.5'	190	6	17	29	<5	<1	<1	110	34	12	17	11	<5	41	<MDLs	NA	NA	NA	NA	NA	NA	NA	240	NA	
TMW-6	1/13/2006	5.0-10.0'	<1	1	<1	<3	<5	<1	<1	<1	<1	4	6	2	<5	<5	<MDLs	NA	NA	NA	NA	NA	NA	NA	1,900	NA	
MW-X	1/16/2006	2.0-7.0'	<1	<1	<1	<3	<5	<1	<1	<1	<1	<1	<1	<1	<5	<5	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	NA	
OW-2RR	1/16/2006	2.5-7.5'	7,100	15,000	2,000	19,000	<300	<50	<50	<50	<50	850	2,600	620	<300	<300	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3	
	1/23/2008		7,300	13,000	3,000	21,900	<80	<20	<20	NA	NA	NA	2,800	740	340	900	NA	NA	NA	NA	<0.50	<0.50	<10	<10	<3.0	<3.0	
OW-3RR	1/16/2006	4.0-9.0'	10,000	160	170	590	<200	<30	<30	<30	<30	93	110	<30	<200	<200	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3	
	1/23/2008		9,900	140	39	285	160	<1.0	<1.0	NA	NA	NA	48	8.3	<5	28	NA	NA	NA	NA	<0.50	<0.50	<10	<10	<3.0	<3.0	
OW-4R	1/16/2006	4.75-9.75'	1,800	42	120	110	<50	<10	<10	31	11	36	12	21	<50	<50	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3	
	1/23/2008		2,000	73	97	136	<4.0	<1.0	<1.0	NA	NA	NA	5.9	7.3	<5	17	NA	NA	NA	NA	NA	NA	NA	NA	<3.0	<3.0	
OW-5R	1/16/2006	5.0-10.0'	1,700	2,000	2,200	12,000	250	<30	<30	160	66	710	2,300	530	<200	<200	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3	
	1/23/2008		1,900	3,100	2,000	5,600	19,600	<10	<10	NA	NA	NA	3,900	1000	82	470	NA	NA	NA	NA	3.2	<0.50	<10	<10	<3.0	<3.0	
OW-11	1/16/2006	6.25-11.25'	<1	<1	<1	<3	<5	<1	<1	<1	<1	<1	<1	<1	<5	<5	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3	
	1/23/2008		<1.0	<1.0	<1.0	<2.0	<4.0	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<5	<5	NA	NA	NA	NA	<0.50	<0.50	<10	<10	<3.0	<3.0	
OW-13	1/16/2006	6.25-11.25'	3	<1	2	<3	<5	<1	<1	<1	<1	<1	2	<1	<5	<5	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3	
	1/23/2008		<1.0	<1.0	<1.0	<2.0	<4.0	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<5	<5	NA	NA	NA	NA	NA	NA	NA	NA	<3.0	<3.0	
MDEQ-RRD Operational Memorandum No. 1: Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels (RBSLs), December 10, 2004 Attachment 1: Table 1. Groundwater: Residential and Industrial-Commercial, Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 RBSLs																											
Residential/Commercial/Industrial (µg/L)																											
Residential & Commercial I Drinking Water (DW) RBSL			5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	0.05 {A}	5.0 {A}	80	800	63 {E}	63 {E}	72 {E}	260	520	Various	260	Various	0.5 {A}	5.0 {A}	5.0 {A}	100 {A}	100 {A}	4.0 {L}	4.0 {L}	
Industrial & Commercial II, III & IV Drinking Water RBSL (Ind/Com DW)			5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	0.05 {A}	5.0 {A}	230	2,300	63 {E}	63 {E}	72 {E}	750	1,500	Various	750	Various	0.5 {A}	5.0 {A}	5.0 {A}	100 {A}	100 {A}	4.0 {L}	4.0 {L}	
Groundwater Surface Water Interface (GSI) RBSL			200 {X}	140	18	35	730 {X}	0.2 {X}	360 {X}	ID	ID	17	17	45	ID	13	Various	ID	Various	0.2 {M}	6.4{G,X}	6.4{G,X}	240	240	47{G,X}	47{G,X}	
GSI Final Acute Values (FAV) <sup>1</sup>			1,800	1,700	320	630	13,000	ID	16,000	ID	ID	310	310	810	ID	200	Various	ID	Various	ID	2.5{G}	2.5{G}	120{G}	120{G}	14{G}	14{G}	
GSI Human Drinking Water RBSL			12	NA	NA	NA	100	0.05 {M}	6	NA	NA	NA	NA	NA	NA	NA	Various	NA	Various	NA	2.5 {G,X}	2.5 {G,X}	120 {G,X}	120 {G,X}	14{G}	14{G}	
Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation RBSL (Res GVII)			5,600	5.3E+5 {S}	1.1E+5	1.9E+5 {S}	4.7E+7 {S}	2,400	9,600	ID	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	ID	31,000 {S}	Various	ID	Various	45 {S}	NLV	NLV	NLV	NLV	NLV	NLV	
Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation RBSL (Ind/Com GVII)			35,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	4.7E+7 {S}	15,000	59,000	ID	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	ID	31,000 {S}	Various	ID	Various	45 {S}	NLV	NLV	NLV	NLV	NLV	NLV	
Groundwater Contact (GC) RBSL			11,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	6.1E+5	25	19,000	15,000	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	25,000 {S}	31,000 {S}	Various	25,000 {S}	Various	3.3 {AA}	1.9E+5	1.9E+5	4.6E+5	4.6E+5	ID	ID	
Screening Levels (µg/L)																											
Water Solubility			1.75E+6	5.26E+5	1.69E+5	1.86E+5	4.68E+7	4.20E+6	8.52E+6	NA	56,000	55,890	55,890	61,150	24,600	31,000	Various	24,600	Various	44.7	NA	NA	NA	NA	NA	NA	
Flammability and Explosivity Screening Level			68,000	61,000	43,000	70,000	ID	ID	2.5E+6	ID	29,000	56,000 {S}	56,000 {S}	ID	ID	NA	Various	ID	Various	ID	ID	ID	ID	ID	ID	ID	
Acute Inhalation Screening Level			67,000	ID	1.7E+5 {S}	1.9E+5 {S}	ID	ID	ID	ID	ID	ID	ID	ID	ID	31,000 {S}	Various	ID	Various	ID	ID	ID	ID	ID	ID	ID	

Applicable Criteria Exceeded  
**BOLD** Value Exceeds Applicable Criteria  
bgs Below Grade Surface (feet)  
<sup>1</sup> Rule 323.1057 of Part 4 Water Quality Standards  
<sup>2</sup> 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance  
{G} Metal GSI Criteria for Surface Water Not Protected for Drinking Water Use based on 417.5 mg/L CaCO3 Hardness: Station ID 630003, River Rouge, near Birmingham, MI.

TABLE 6  
SUMMARY OF 2009 GROUNDWATER ANALYTICAL RESULTS  
GASOLINE RANGE VOCs  
CRANBROOK CAR CARE, 2483 WEST MAPLE ROAD, BIRMINGHAM, MI  
PME PROJECT 02-3004-2

GASOLINE RANGE VOLATILE ORGANIC COMPOUNDS  (µg/L)			Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Ethylene dibromide (EDB) (1,2-Dibromoethane)	1,2-Dichloroethane	n-Propylbenzene	Isopropyl benzene	1,2,3-Trimethylbenzene <sup>2</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene	2-Methylnaphthalene
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	1634044	106934	107062	103651	98828	526738	95636	108678	91203	91576
Sample ID	Sample Date	Screen Depth (bgs)	VOCs													
PMW-1	05/08/2009	1.0-6.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-2	05/08/2009	2.0-7.0	2	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
A-4 (Colocated PMW-2)	05/08/2009		<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-3	05/08/2009	2.0-7.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-4	05/08/2009	4.0-9.0	<1	<1	<1	<2	73	<1	<1	<1	<5	<1	<1	<1	<5	<2
	08/04/2009		<1	<1	<1	<2	147	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-7	08/04/2009	3.0-8.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-8	08/04/2009	3.0-8.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-9	08/04/2009	3.0-8.0	<1	<1	<1	<2	11	<1	<1	<1	<5	<1	<1	<1	<5	<2
OW-2RR	05/08/2009	3.0-8.0	4,400	3,200	1,700	10,700	<500	<100	<100	100	<500	500	1,400	400	<500	<200
OW-3RR	05/08/2009	4.0-9.0'	6,190	270	130	580	<300	<50	<50	<50	<300	80	100	<50	<300	<100
OW-4R	05/08/2009	5.0-10.0	1,100	<100	<100	<200	<500	<100	<100	<100	<500	<100	<100	<100	<500	<200
OW-5R	05/08/2009	5.0-10.0'	700	300	400	7,700	<500	<100	<100	<100	<500	500	1,200	400	<500	<200
OW-7R	05/08/2009	5.0-10.0	710	190	930	3,010	<100	<20	<20	100	<100	210	550	80	<100	<40
A-3 (Colocated OW-7R)	05/08/2009		770	190	1,130	3,750	<50	<10	<10	100	<50	220	670	90	80	<20
OW-10	05/08/2009	3.0-8.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
OW-11	05/08/2009	6.5-11.5	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
OW-12	05/08/2009	5.0-10.0	5	2	9	99	<5	<1	<1	<1	<5	8	16	4	<5	<2
OW-13	05/08/2009	4.5-9.5	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
MW-X	05/08/2009	2.0-7.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
MW-Y	05/08/2009	4.0-9.0	102	3	2	5	<5	<1	<1	2	<5	1	<1	<1	<5	<2
MW-Z	05/08/2009	2.0-7.0	75	9	2	35	<5	<1	<1	18	10	7	1	3	<5	<2
MW-ZZ	05/08/2009	2.0-7.0	2	<1	<1	2	<10	<1	<1	<1	<5	<1	<1	<1	<5	<2
MDEQ-RRD Operational Memorandum No. 1: Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels (RBSLs), January 23, 2006 Attachment 1: Table 1. Groundwater: Residential and Industrial-Commercial, Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 RBSLs																
Residential/Commercial/Industrial (µg/L)																
Residential & Commercial I Drinking Water (DW) RBSL	5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	0.05 {A}	5.0 {A}	80	800	63 {E}	63 {E}	72 {E}	520	260		
Industrial & Commercial II, III & IV Drinking Water RBSL (Ind/Com DW)	5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	0.05 {A}	5.0 {A}	230	2,300	63 {E}	63 {E}	72 {E}	1,500	750		
Groundwater Surface Water Interface (GSI) RBSL	200 {X}	140	18	35	730 {X}	0.2 {X}	360 {X}	ID	ID	17	17	45	13	ID		
GSI Final Acute Values (FAV) <sup>1</sup>	1,800	1,700	320	630	13,000	ID	16,000	ID	ID	310	310	810	200	ID		
GSI Human Drinking Water RBSL	12	NA	NA	NA	100	0.05 {M}	6	NA	NA	NA	NA	NA	NA	NA		
Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation RBSL (Res GVII)	5,600	5.3E+5 {S}	1.1E+5	1.9E+5 {S}	4.7E+7 {S}	2,400	9,600	ID	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	31,000 {S}	ID		
Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation RBSL (Ind/Com GVII)	35,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	4.7E+7 {S}	15,000	59,000	ID	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	31,000 {S}	ID		
Groundwater Contact (GC) RBSL	11,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	6.1E+5	25	19,000	15,000	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	31,000 {S}	25,000 {S}		
Screening Levels (µg/L)																
Water Solubility	1.75E+6	5.26E+5	1.69E+5	1.86E+5	4.68E+7	4.20E+6	8.52E+6	NA	56,000	55,890	55,890	61,150	31,000	24,600		
Flammability and Explosivity Screening Level	68,000	61,000	43,000	70,000	ID	ID	2.5E+6	ID	29,000	56,000 {S}	56,000 {S}	ID	NA	ID		
Acute Inhalation Screening Level	67,000	ID	1.7E+5 {S}	1.9E+5 {S}	ID	ID	ID	ID	ID	ID	ID	ID	31,000 {S}	ID		

Applicable Criteria Exceeded  
**BOLD** Value Exceeds Applicable Criteria  
bgs Below Grade Surface (feet)  
<sup>1</sup> Rule 323.1057 of Part 4 Water Quality Standards  
<sup>2</sup> 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance.

**TABLE 7**  
**SUMMARY OF GROUNDWATER ELEVATION DATA**  
**CRANBROOK CAR CARE, 2483 WEST MAPLE ROAD, BIRMINGHAM, MI**  
**PME PROJECT 02-3004-2**

Monitoring Well	Top of Casing Elevation	Ground Surface Elevation	Depth of Well*	Static Groundwater Level	Groundwater Elevation	Static Groundwater Level	Groundwater Elevation	Static Groundwater Level	Groundwater Elevation	Static Groundwater Level	Groundwater Elevation
				January 23, 2008		May 8, 2009		August 4, 2009		September 15, 2009	
PMW-1	800.77	800.99	6.25	NA	NA	4.27	796.50	NA	NA	5.88	794.89
PMW-2	798.77	799.05	6.69	NA	NA	3.48	795.29	NA	NA	6.28	792.49
PMW-3	797.87	798.10	6.67	NA	NA	2.58	795.29	NA	NA	3.64	794.23
PMW-4	798.93	799.22	8.80	NA	NA	4.87	794.06	6.15	792.78	6.25	792.68
PMW-5	799.05	799.49	8.68	NA	NA	NA	NA	8.50	790.55	8.45	790.60
PMW-6	799.07	799.39	8.41	NA	NA	NA	NA	DRY	DRY	DRY	DRY
PMW-7	799.01	799.42	7.60	NA	NA	NA	NA	6.30	792.71	7.30	791.71
PMW-8	799.05	799.53	7.80	NA	NA	NA	NA	6.50	792.55	7.58	791.47
PMW-9	800.04	800.23	8.00	NA	NA	NA	NA	6.58	793.46	5.10	794.94
OW-2RR	799.70	799.88	7.65	3.27	796.43	2.82	796.88	NA	NA	4.10	795.60
OW-3RR	799.57	799.76	8.95	2.51	797.06	2.44	797.13	NA	NA	3.75	795.82
OW-4R	799.43	799.71	9.78	2.86	796.57	2.44	796.99	NA	NA	5.14	794.29
OW-5R	799.24	799.40	10.04	4.45	794.79	3.08	796.16	NA	NA	5.71	793.53
OW-7R	798.99	798.99	10.23	NA	NA	2.95	796.04	NA	NA	3.90	795.09
OW-10	797.82	798.33	8.20	NA	NA	2.45	795.37	NA	NA	3.55	794.27
OW-11	799.05	799.56	11.30	9.15	789.90	5.81	793.24	NA	NA	9.50	789.55
OW-12	799.10	799.20	9.45	NA	NA	3.28	795.82	NA	NA	6.28	792.82
OW-13	799.60	799.79	9.85	3.58	796.02	2.83	796.77	NA	NA	6.20	793.40
MW-X	800.18	800.52	6.96	NA	NA	3.19	796.99	NA	NA	4.85	795.33
MW-Y	800.33	800.54	8.98	NA	NA	3.50	796.83	NA	NA	5.06	795.27
MW-Z	799.16	799.46	7.00	NA	NA	2.47	796.69	NA	NA	3.68	795.42
MW-ZZ	798.58	798.82	7.02	NA	NA	2.82	795.76	NA	NA	5.20	793.38

\* Depth of well measured relative to the top of each well casing  
NA Not Applicable/Not Available  
DRY Well was dry during this sampling event



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## ADDITIONAL SITE ASSESSMENT

2483 West Maple Road | Birmingham, Michigan  
PM Project Number 02-3004-3

*Prepared for:*

**Cranbrook Car Care Inc.**  
2483 West Maple Road  
Birmingham, Michigan 48009

*Prepared by:*

**PM Environmental, Inc.**  
4080 West 11 Mile Road  
Berkley, Michigan 48072

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August 25, 2014

Mr. Salman Karana  
Cranbrook Car Care Inc.  
2483 West Maple Road  
Birmingham, Michigan 48009

**Re: Additional Site Assessment of the Cranbrook Car Care Property  
Located at 2483 West Maple Road in Birmingham, Michigan  
PM Environmental, Inc. Project No. 02-3004-3**

Dear Mr. Karana:

PM Environmental, Inc. (PM) completed additional site assessment of the Cranbrook Car Care property located at 2483 West Maple Road in Birmingham, Oakland County, Michigan (hereafter referred to as the "subject property") to verify current concentrations prior to redevelopment and leaking underground storage tank (LUST) closure activities. This additional site assessment report summarizes the activities conducted by PM in July 2014, the geology encountered, and the sample analytical results.

## **INTRODUCTION AND BACKGROUND**

The subject property consists of one parcel of land totaling 0.38 acres and is located on the southeast corner of Maple Road and Cranbrook Road in Birmingham, Oakland County, Michigan (Figure 1). The property is developed with a 3,710 square foot gasoline service station located in the southeastern portion of the subject property, which was constructed in 1957, and currently contains four service bays with four in-ground hydraulic hoists. Three dispensers are located north of the subject building, and one dispenser is located west of the subject building. The property currently contains four 6,000-gallon gasoline underground storage tanks (USTs), one 8,000-gallon gasoline UST, and one 550-gallon waste oil UST located northwest of the subject building. The gasoline USTs were installed in 1957, 1963, and 1970, and the waste oil UST was installed in 1989. Current operations are consistent with a retail gasoline dispensing station and service garage. Asphalt and concrete paved areas surround the subject building and comprise much of the subject property.

First developed use of the subject property occurred in 1957, with the construction of the current building. Prior to 1957 the subject property was vacant land. The subject property has operated as a gasoline service station from at least 1957 to the present.

PM has completed additional site assessments consisting of soil and groundwater analysis to verify current concentrations prior to redevelopment and leaking underground storage tank (LUST) closure activities.

## **SUBSURFACE INVESTIGATION**

Prior to the commencement of field activities, MissDig, a utility locating service, was contacted to locate utilities on or adjacent to the subject property. Utilities were marked by the respective utility companies where they entered or were located adjacent to the subject property.

On July 25 and 28, 2014, PM completed subsurface investigation activities at the subject property that consisted of advancing ten soil borings (SB-31 through SB-40), installing five temporary monitoring wells (TMW-32, TMW-33, TMW-35, TMW-36, and TMW-38), sampling 19 existing monitoring wells (PMW-3, PMW-4, PMW-5, PMW-7, PMW-8, PMW-9, OW-10 through OW-13, OW-4R, OW-5R, OW-2RR, OW-3RR, OW-7R, MW-X, MW-Y, MW-Z, and MW-ZZ), and collecting soil and groundwater samples for laboratory analysis.

Figure 3A depicts the historical soil boring locations with a summary of the previous analytical results and Figure 3B depicts the July 2014 soil boring locations with a summary of the current analytical results. PM collected 12 soil samples to assess current analytical concentrations. The soil boring logs, which depicts site-specific geology, PID readings and soil sample intervals are included within Appendix A.

Twelve soil samples and 24 groundwater samples were submitted to Merit Laboratories, Inc. in East Lansing, Michigan, for laboratory analysis of volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), polychlorinated biphenyls (PCBs), cadmium, chromium, and lead, or some combination thereof.

Specifically, the additional site assessments were conducted on the following areas of the subject property:

#### **Description of the Soil Boring/Temporary Monitoring Well Locations**

<b>Location (feet bgs)</b>	<b>Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>
SB-31 (15.0)	<b>Soil</b> 0.5-1.5 and 9.5-10.5	VOCs, PNAs, PCBs, Cadmium, Chromium, and Lead	Assess service operations including in- ground hoist and floor drain	<b>Soil:</b> Based on lack of field evidence of impact, a shallow sample was collected and a sample at the approximate depth of the in-ground hoist was collected. <b>Groundwater:</b> Not encountered.
SB/TMW-32 (10.0)	<b>Soil</b> 1.0-2.0	VOCs, PNAs, PCBs, Cadmium, Chromium, and Lead	Assess service operations including in- ground hoist and floor drain	<b>Soil:</b> Sampled at the highest PID reading (1.4 ppm) above the saturated zone. <b>Groundwater:</b> Sampled.
	<b>Groundwater</b> 3.9-8.9	VOCs, PNAs, Cadmium, Chromium, and Lead		

<b>Location (feet bgs)</b>	<b>Sample Depth (feet bgs)</b>	<b>Analysis</b>	<b>Objectives</b>	<b>Soil and/or Groundwater Sample Selection (justification)</b>
SB/TMW-33 (15.0)	<b>Soil</b> 1.5-2.5	VOCs, PNAs, PCBs, Cadmium, Chromium, and Lead	Assess service operations including in- ground hoist	<b>Soil:</b> Sampled at the highest PID reading (45.4 ppm) above the saturated zone. <b>Groundwater:</b> Sampled.
	<b>Groundwater</b> 5.0-10.0	VOCs, PNAs, Cadmium, Chromium, and Lead		
SB-34 (15.0)	<b>Soil</b> 4.0-5.0	Gasoline VOCs	Assess the area south of the UST basin	<b>Soil:</b> Sampled at the highest PID reading (41.5 ppm). <b>Groundwater:</b> Not encountered.
SB/TMW-35 (15.0)	<b>Soil</b> 2.0-3.0 and 11.0-12.0	Gasoline VOCs	Assess the area north of the UST basin	<b>Soil:</b> Sampled at the highest PID reading (1031 ppm) and sand/clay interface. <b>Groundwater:</b> Sampled.
	<b>Groundwater</b> 5.0-10.0			
SB/TMW-36 (15.0)	<b>Soil</b> 4.0-5.0	Gasoline VOCs	Assess the area east of the UST basin and dispenser	<b>Soil:</b> Sampled at the highest PID reading (982.7 ppm). <b>Groundwater:</b> Sampled.
	<b>Groundwater</b> 4.1-9.1			
SB-37 (20.0)	<b>Soil</b> 4.0-5.0	Gasoline VOCs	Assess the area south of the UST basin	<b>Soil:</b> Sampled at the highest PID reading (1375 ppm). <b>Groundwater:</b> Not encountered.
SB/TMW-38 (15.0)	<b>Soil</b> 3.0-4.0	Gasoline VOCs	Assess the western dispenser	<b>Soil:</b> Sampled at the highest PID reading (120.9 ppm). <b>Groundwater:</b> Sampled.
	<b>Groundwater</b> 4.0-9.0			
SB-39 (15.0)	<b>Soil</b> 6.0-7.0	Gasoline VOCs	Assess the northern dispensers	<b>Soil:</b> Sampled at the highest PID reading (1690 ppm). <b>Groundwater:</b> Not encountered.
SB-40 (15.0)	<b>Soil</b> 2.0-3.0	Gasoline VOCs	Assess the northern dispenser	<b>Soil:</b> Sampled at the highest PID reading (1497 ppm). <b>Groundwater:</b> Not encountered.

bgs = below ground surface

PID = photoionization detector

ppm = parts per million

## **GEOLOGY/HYDROGEOLOGY**

The general soil stratigraphy across the subject property generally consists of up to 6.0 feet of sand or clayey sand with occasional gravel content underlain with clay to 20.0 feet bgs, the maximum depth explored. Occasional beds of sand or sand seams were encountered in the lower clay unit at depths between 3.0 and 13.0 feet bgs. Limited, perched groundwater was

encountered on the subject property within the sand soils underlain with clay at approximately 3.0 to 8.0 feet bgs beneath the subject property. This is similar to the geology noted during previous site investigations dating back to 1992.

The soil boring logs are included in Appendix A, which summarize site-specific geology, sample depths, and PID readings.

## **ANALYTICAL RESULTS**

The analytical results for the soil samples collected by PM were compared with the MDEQ Cleanup Criteria (GCC) and Screening Levels set forth in Part 201 Rules 299.1 through 299.50, dated December 30, 2013 entitled "Cleanup Criteria Requirements for Response Activity", in accordance with Section 20120a(1) using the Residential and Nonresidential cleanup criteria/risk based screening levels (RBSLs). Appendix B contains the laboratory analytical report.

The soil analytical results are depicted on Figures 3A and 3B.

Concentrations of gasoline VOCs were detected in soil samples collected from soil borings SB-34 through SB-40 above the Nonresidential Soil Vapor Intrusion Screening Levels (VISLs).

No concentrations of PNAs, PCBs, and metals were detected in any of the soil samples (SB-31, SB-32, and SB-33) collected from within the subject building above the laboratory method detection limits (MDLs) or the most restrictive Part 213 Residential RBSLs.

The groundwater analytical results are depicted on Figures 4A and 4B.

Concentrations of benzene were detected in the groundwater samples collected from five permanent monitoring wells (OW-4R, OW-5R, OW-2RR, OW-3RR, and OW-7R) above Nonresidential Groundwater VISLs.

No concentrations of PNAs and metals were detected in any of the groundwater samples (TMW-32 and TMW-33) collected from within the subject building above the laboratory MDLs or the most restrictive Part 213 Residential RBSLs.

## **CONCLUSIONS AND RECOMMENDATIONS**

On July 25 and 28, 2014, PM completed subsurface investigation activities at the subject property that consisted of advancing ten soil borings (SB-31 through SB-40), installing five temporary monitoring wells (TMW-32, TMW-33, TMW-35, TMW-36, and TMW-38), sampling 19 existing monitoring wells (PMW-3, PMW-4, PMW-5, PMW-7, PMW-8, PMW-9, OW-10 through OW-13, OW-4R, OW-5R, OW-2RR, OW-3RR, OW-7R, MW-X, MW-Y, MW-Z, and MW-ZZ), and collecting soil and groundwater samples for laboratory analysis.

No evidence of a new release was identified during this additional investigation. The soil and groundwater concentrations appear to have decreased since the last sampling event in 2009.

PM recommends excavating approximately 2,000-2,500 cubic yards of impact source soils during redevelopment activities in the area of the UST basins and dispensers. Impact was not identified within the subject building from service operations. The current groundwater analytical results indicates that the plume remains delineated and stable.

Closure activities would consists of up to 2,500 cubic yards of soil excavation, removal of up to 40,000 gallons of impacted groundwater during excavation activities, excavation oversight, verification of soil remediation (VSR) sampling for gasoline VOCs and gasoline range organics (GRO), three additional quarterly groundwater sampling events, additional delineation along utility corridors, and reporting at an estimated cost not to exceed \$225,000. A breakdown of the cost are below.

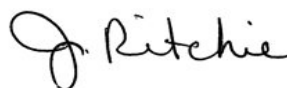
Soil Excavation - \$137,500 (based on 2,500 cubic yards at \$55 per yard)  
Groundwater Removal - \$20,000 (based on 40,000 gallons of water at \$0.5 per gallon)  
Oversight and VSR Sampling - \$15,000  
Three Quarters of Groundwater Sampling - \$20,000 (includes installation of additional wells)  
Additional Delineation - \$20,000  
Reporting - \$10,000

If you have any questions related to this report, contact our office at (248) 336-9988.

Sincerely,  
**PM Environmental, Inc.**



Nicole Matthias  
Staff Scientist



Jennifer L. Ritchie, CPG  
Regional Site Investigation Manager

## **FIGURES**

Figure 1	Property Vicinity Map
Figure 2	Generalized Diagram of the Subject Property and Adjoining Properties
Figure 3A	Historical Soil Boring Location Map with Soil Analytical Results
Figure 3B	Current Soil Boring Location Map with Soil Analytical Results
Figure 4A	Historical Monitoring Well Location Map with Groundwater Analytical Results
Figure 4B	Current Monitoring Well Location Map with Groundwater Analytical Results

## **TABLES**

Table 1	Summary of 2006 Soil Analytical Results – VOCs, PNAs, PCBs, and Metals (Cadmium, Chromium, and Lead)
Table 2	Summary of 2009 Soil Analytical Results – Gasoline VOCs
Table 3	Summary of 2014 Soil Analytical Results – VOCs, PNAs, PCBs, and Metals (Cadmium, Chromium, and Lead)
Table 4	Summary of 2006-2008 Groundwater Analytical Results – VOCs, PNAs, and Metals (Cadmium, Chromium, and Lead)
Table 5	Summary of 2009 Groundwater Analytical Results – Gasoline VOCs
Table 6	Summary of 2014 Groundwater Analytical Results – VOCs, PNAs, and Metals (Cadmium, Chromium, and Lead)

## **APPENDICES**

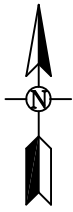
Appendix A	Soil Boring Logs
Appendix B	Laboratory Analytical Reports

## Figures

BANK

COMMERCIAL

WEST MAPLE ROAD

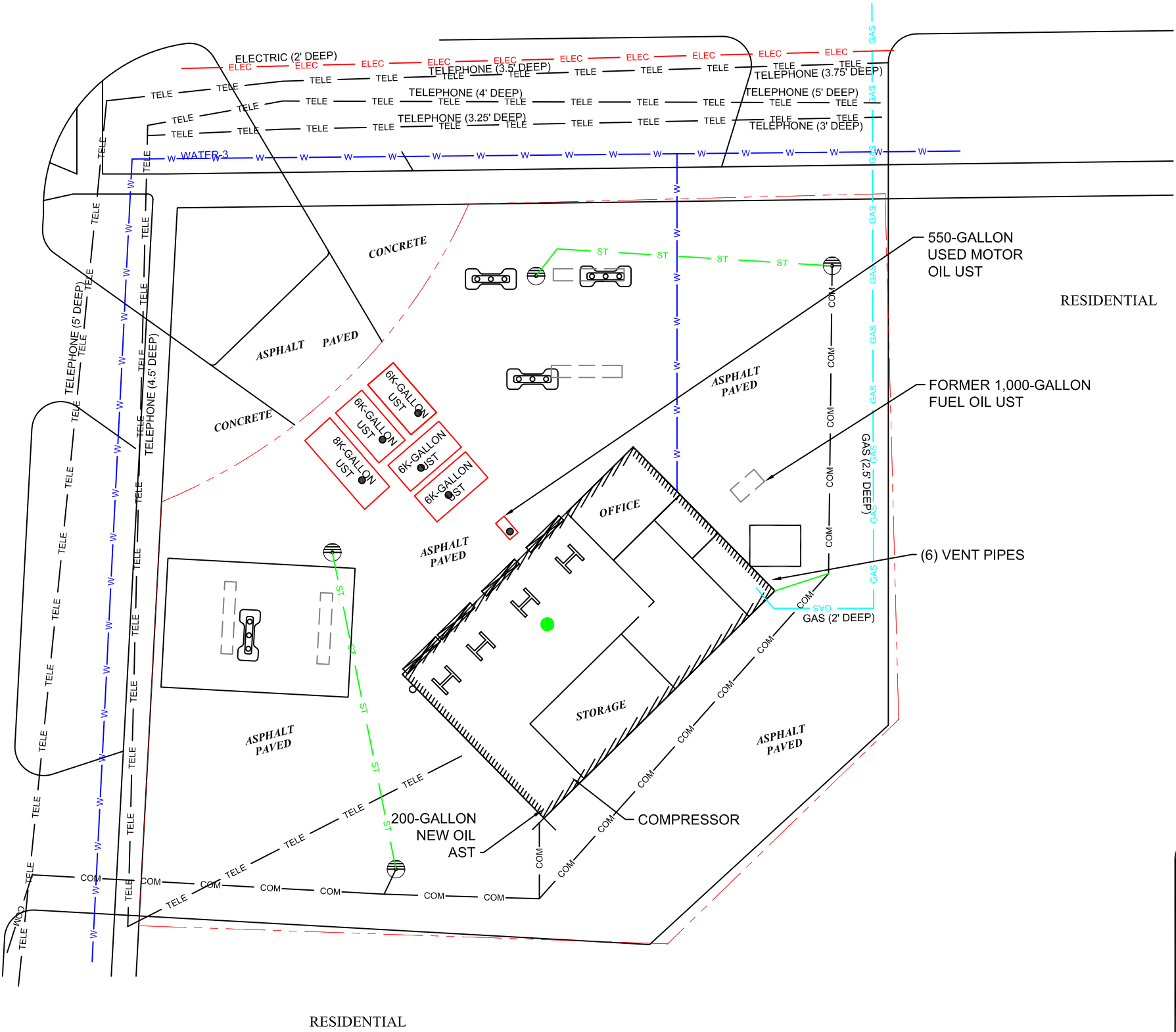


**LEGEND:**

- SUBJECT SITE
- FORMER SITE FEATURES
- WATER
- GAS
- STORM SEWER
- COMBINATION SANITARY / STORM SEWER
- ELECTRIC
- BURIED PHONE LINE
- FLOOR DRAIN
- CATCH BASIN
- BAYDOOR
- INGROUND HOIST
- PUMP ISLAND

RETAIL  
STRIP  
MALL

CRANBROOK ROAD



**FIGURE 2**  
GENERALIZED DIAGRAM SUBJECT PROPERTY  
AND ADJOINING PROPERTIES

PROJ: COMMERCIAL PROPERTY 2483 WEST MAPLE ROAD BIRMINGHAM, MI		
THIS IS NOT A LEGAL SURVEY	DRN BY: MW/KK/MW/CS	DATE: 8/12/2014
VERIFY SCALE	CHKD BY: BC/AP/JR/NM	SCALE: 1" = 30'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.		
FILE NAME: 02-3004-3F02R00		

SB-15	A-7	SB-15
4/07/2009	4/07/2009	4/07/2009
3.0 ~ 4.0'	3.0 ~ 4.0'	14.0 ~ 15.0'
E 730	E 630	B 200
X 1,300	X 1,100	n-PROP 110
n-PROP 1,900	n-PROP 1,610	1,2,3-TMB 90
1,2,3-TMB 1,960	1,2,3-TMB 1,680	2-M 200
1,2,4-TMB 9,540	1,2,4-TMB 8,130	OTHER VOCs <MDL
1,3,5-TMB 2,630	1,3,5-TMB 2,240	
NAPH 600	NAPH 500	
2-M 300	2-M 300	
OTHER VOCs <MDL	OTHER VOCs <MDL	

BANK

SB-28	SB-28
7/07/2009	7/07/2009
1.0 ~ 2.0'	12.0 ~ 13.0'
B 52,000	VOCs <MDL
T 743,000	
E 339,000	
X 1,658,000	
n-PROP 132,000	
ISOP 30,000	
1,2,3-TMB 163,000	
1,2,4-TMB 612,000	
1,3,5-TMB 229,000	
NAPH 50,000	
2-M 10,000	
OTHER VOCs <MDL	

SB-27	SB-27
7/07/2009	7/07/2009
1.0 ~ 2.0'	13.0 ~ 14.0'
B 5,000	T 130
T 22,000	E 140
E 101,000	X 720
X 565,000	n-PROP 80
n-PROP 53,000	1,2,3-TMB 210
1,2,3-TMB 72,000	1,2,4-TMB 400
1,2,4-TMB 282,000	OTHER VOCs <MDL
1,3,5-TMB 103,000	
NAPH 20,000	
OTHER VOCs <MDL	

SB-9	SB-9
4/07/2009	4/07/2009
5.0 ~ 6.0'	14.0 ~ 15.0'
VOCs <MDL	VOCs <MDL

COMMERCIAL

SB/TMW-4
1/13/2006
4.0 ~ 5.0'
B 110
E 110
X 200
n-PROP 2,400
ISOP 740
1,2,3-TMB 440
1,2,4-TMB 240
1,3,5-TMB 110
n-BUTYL 150
NAPH 1,000
2-M 260
OTHER VOCs <MDL
Pb (TOTAL) 9,700
Pb (COARSE) 8,120
Pb (FINE) 8,790

SB-14
4/07/2009
4.0 ~ 5.0'
E 3,700
X 2,400
n-PROP 1,500
1,2,3-TMB 2,100
1,2,4-TMB 6,000
1,3,5-TMB 1,900
NAPH 1,000
2-M 300
OTHER VOCs <MDL

SB-10	SB-10
4/07/2009	4/07/2009
5.0 ~ 6.0'	14.0 ~ 15.0'
VOCs <MDL	VOCs <MDL

SB-8	SB-8
4/07/2009	4/07/2009
4.0 ~ 5.0'	11.0 ~ 12.0'
VOCs <MDL	VOCs <MDL

SB/TMW-3
1/13/2006
11.0 ~ 12.0'
B 250
T 110
E 2,400
X 2,400
n-PROP 3,300
ISOP 800
1,2,3-TMB 4,400
1,2,4-TMB 11,000
1,3,5-TMB 4,200
n-BUTYL 1,300
NAPH 1,400
2-M 750
OTHER VOCs <MDL
Pb (TOTAL) 5,800
Pb (COARSE) 6,180
Pb (FINE) 7,700

SB/TMW-2
1/13/2006
3.0 ~ 4.0'
B 660
T 520
E 6,000
X 12,000
n-PROP 19,000
ISOP 4,000
1,2,3-TMB 20,000
1,2,4-TMB 71,000
1,3,5-TMB 26,000
n-BUTYL 4,600
NAPH 6,700
2-M 15,000
OTHER VOCs <MDL
Pb (TOTAL) 12,000
Pb (COARSE) 8,590
Pb (FINE) 10,000

RETAIL STRIP MALL

SB-7	SB-7
4/07/2009	4/07/2009
3.0 ~ 4.0'	11.0 ~ 12.0'
VOCs <MDL	VOCs <MDL

SB/TMW-1
1/13/2006
3.0 ~ 4.0'
B 2,000
T 120
E 3,700
X 12,000
n-PROP 1,900
ISOP 430
1,2,3-TMB 5,200
1,2,4-TMB 14,000
1,3,5-TMB 4,300
n-BUTYL 1,500
NAPH 3,800
2-M 7,100
OTHER VOCs <MDL
2-M 4,600
Ph 370
Py 610
OTHER PNAs <MDL
PCBs <MDL
Cd 330
Cr 31,000
Pb (TOTAL) 20,000
Pb (COARSE) 11,100
Pb (FINE) 19,100

SB-5	SB-5
1/13/2006	1/13/2006
5.0 ~ 6.0'	17.0 ~ 18.0'
VOCs <MDL	VOCs <MDL
Pb (TOTAL) 8,600	Pb (TOTAL) 12,000
Pb (COARSE) 7,340	Pb (COARSE) 9,880
Pb (FINE) 7,210	Pb (FINE) 9,170

CRANBROOK ROAD

SB-23	A-2
7/06/2009	7/06/2009
3.0 ~ 4.0'	3.0 ~ 4.0'
n-PROP 570	n-PROP 710
OTHER VOCs <MDL	OTHER VOCs <MDL

SB-17	A-5
4/07/2009	4/07/2009
2.0 ~ 3.0'	2.0 ~ 3.0'
VOCs <MDL	VOCs <MDL

RESIDENTIAL

SB/TMW-6
1/13/2006
3.0 ~ 4.0'
VOCs <MDL
Pb (TOTAL) 14,000
Pb (COARSE) 9,880
Pb (FINE) 11,100

SB-25	A-3
7/06/2009	7/06/2009
4.0 ~ 5.0'	4.0 ~ 5.0'
B 1,330	B 1,580
T 130	T 140
E 230	E 350
X 1,930	X 2,670
n-PROP 6,620	1,2-DCA 80
ISOP 2,000	n-PROP 3,380
1,2,3-TMB 1,940	ISOP 1,100
1,2,4-TMB 2,340	1,2,3-TMB 2,080
1,3,5-TMB 870	1,2,4-TMB 2,760
NAPH 1,700	1,3,5-TMB 1,540
2-M 2,000	NAPH 1,300
OTHER VOCs <MDL	2-M 600
	OTHER VOCs <MDL

SB-12	A-3	A-4	SB-12
4/07/2009	4/07/2009	4/07/2009	4/07/2009
4.0 ~ 5.0'	4.0 ~ 5.0'	4.0 ~ 5.0'	14.0 ~ 15.0'
VOCs <MDL	VOCs <MDL	VOCs <MDL	VOCs <MDL

SB-26
7/07/2009
3.0 ~ 4.0'
B 4,700
E 5,100
X 8,800
n-PROP 2,100
1,2,3-TMB 4,300
1,2,4-TMB 11,200
1,3,5-TMB 4,200
NAPH 3,000
2-M 4,100
OTHER VOCs <MDL

SB-29	SB-29
7/07/2009	7/07/2009
1.0 ~ 2.0'	12.0 ~ 13.0'
T 23,000	VOCs <MDL
E 40,000	
X 247,000	
n-PROP 29,000	
1,2,3-TMB 45,000	
1,2,4-TMB 189,000	
1,3,5-TMB 66,000	
OTHER VOCs <MDL	

SB-16	SB-16
4/07/2009	4/07/2009
1.0 ~ 2.0'	19.0 ~ 20.0'
B 130	VOCs <MDL
T 1,600	
E 2,080	
X 20,110	
n-PROP 980	
1,2,3-TMB 2,600	
1,2,4-TMB 10,600	
1,3,5-TMB 3,610	
NAPH 1,100	
2-M 700	
OTHER VOCs <MDL	

### LEGEND:

- SUBJECT SITE
- FORMER SITE FEATURES
- WATER
- GAS
- STORM SEWER
- COMBINATION SANITARY / STORM SEWER
- ELECTRIC
- BURIED PHONE LINE
- FLOOR DRAIN
- CATCH BASIN
- BAYDOOR
- INGROUND HOIST
- PUMP ISLAND
- MONITORING WELLS
- SOIL BORING
- SOIL BORING/ TEMPORARY MONITORING WELL
- BENZENE
- TOLUENE
- ETHYLBENZENE
- XYLENES
- n-PROP
- ISOP
- 1,2,3-TMB
- 1,2,4-TMB
- 1,3,5-TMB
- n-BUTYL
- NAPH
- 2-M
- Ph
- Py
- Cd
- Cr
- Pb
- VOCs
- PNAs
- PCBs
- MDL
- UNITS
- REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

NOTES:

REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED



FIGURE 3A  
SOIL BORING / MONITORING WELL LOCATIONS  
WITH SOIL ANALYTICAL RESULTS

PROJ: COMMERCIAL PROPERTY  
2483 WEST MAPLE ROAD  
BIRMINGHAM, MI

THIS IS NOT A LEGAL SURVEY  
VERIFY SCALE  
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: MW/KK  
CHKD BY: AP/JR  
FILE NAME: 02-3004-3F03AR00

DATE: 8/15/2014  
SCALE: 1" = 30'

BANK

COMMERCIAL

WEST MAPLE ROAD

SB-39	
7/25/2014	
6.0 ~ 7.0'	
E	55,000
2-M	9,000
n-PROP	21,000
1,2,3-TMB	30,000
1,2,4-TMB	107,000
1,3,5-TMB	36,000
X	159,000
OTHER VOCs	<MDL

SB-36	
7/25/2014	
4.0 ~ 5.0'	
E	4,000
2-M	3,000
NAPH	7,000
n-PROP	13,000
1,2,3-TMB	14,000
1,2,4-TMB	57,000
1,3,5-TMB	19,000
X	18,000
OTHER VOCs	<MDL

SB-35	
7/25/2014	
2.0 ~ 3.0'	
2-M	11,000
1,2,3-TMB	62,000
1,2,4-TMB	125,000
1,3,5-TMB	104,000
X	34,000
OTHER VOCs	<MDL

SB-34	
7/25/2014	
4.0 ~ 5.0'	
B	160
E	250
2-M	200
n-PROP	160
1,2,3-TMB	240
1,2,4-TMB	280
1,3,5-TMB	140
X	530
OTHER VOCs	<MDL

SB-38	
7/25/2014	
3.0 ~ 4.0'	
B	70
E	420
ISOP	600
2-M	1,300
NAPH	1,600
n-PROP	2,860
X	400
OTHER VOCs	<MDL

SB-37	
7/25/2014	
4.0 ~ 5.0'	
E	19,000
2-M	8,000
n-PROP	11,000
T	15,000
1,2,3-TMB	19,000
1,2,4-TMB	75,000
1,3,5-TMB	27,000
X	130,000
OTHER VOCs	<MDL

SB-33	
7/25/2014	
1.5 ~ 2.5'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	250
Cr	1,950
Pb	5,770

SB-32	
7/25/2014	
1.0 ~ 2.0'	
VOCs	<MDL
B(k)FLA	300
FL	300
Py	300
OTHER PNAs	<MDL
PCBs	<MDL
Cd	<MDL
Cr	2,150
Pb	16,200

SB-31	
7/25/2014	
0.5 ~ 1.5'	
VOCs	<MDL
B(a)ANTH	1,200
B(a)PYR	1,300
B(b)FLA	2,400
B(k)FLA	2,500
B(g,h,i)PER	700
CHRYSENE	1,400
FL	2,700
I(1,2,3-CD)PY	600
Ph	1,100
Py	2,400
OTHER PNAs	<MDL
PCBs	<MDL
Cd	330
Cr	2,360
Pb	38,600

SB-40	
7/25/2014	
2.0 ~ 3.0'	
E	30,000
2-M	14,000
NAPH	10,000
n-PROP	19,000
1,2,3-TMB	10,000
1,2,4-TMB	46,000
1,3,5-TMB	18,000
X	63,000
OTHER VOCs	<MDL

LEGEND:

- SUBJECT SITE  
--- FORMER SITE FEATURES  
--- WATER  
--- GAS  
--- STORM SEWER  
--- COMBINATION SANITARY / STORM SEWER  
--- ELEC  
--- TELE  
--- BURIED PHONE LINE
- FLOOR DRAIN  
● CATCH BASIN  
■ BAYDOOR  
■ INGROUND HOIST  
■ PUMP ISLAND  
● SOIL BORING  
● SOIL BORING / TEMPORARY MONITORING WELL  
● MONITORING WELL
- Cd  
Cr  
Pb  
B  
T  
E  
X  
Ph  
Py  
FL  
2-M  
NAPH  
I(1,2,3-CD)PY  
ISOP  
n-PROP  
B(a)ANTH  
B(a)PYR  
B(b)FLA  
B(g,h,i)PER  
B(k)FLA  
1,2,4-TMB  
1,3,5-TMB  
1,2,3-TMB  
VOCs  
PNAs  
PCBs  
MDL  
UNITS
- SUBJECT SITE  
● FORMER SITE FEATURES  
● WATER  
● GAS  
● STORM SEWER  
● COMBINATION SANITARY / STORM SEWER  
● ELEC  
● TELE  
● BURIED PHONE LINE  
● FLOOR DRAIN  
● CATCH BASIN  
● BAYDOOR  
● INGROUND HOIST  
● PUMP ISLAND  
● SOIL BORING  
● SOIL BORING / TEMPORARY MONITORING WELL  
● MONITORING WELL  
● CADMIUM  
● CHROMIUM  
● LEAD  
● BENZENE  
● TOLUENE  
● ETHYLBENZENE  
● XYLENES  
● PHENANTHRENE  
● PYRENE  
● FLUORANTHENE  
● 2-METHYLNAPHTHALENE  
● NAPHTHALENE  
● INDENO(1,2,3-CD)PYRENE  
● ISOPROPYLBENZENE  
● n-PROPYLBENZENE  
● BENZO(a)ANTHRACENE  
● BENZO(a)PYRENE  
● BENZO(b)FLUORANTHENE  
● BENZO(g,h,i)PERYLENE  
● BENZO(k)FLUORANTHENE  
● 1,2,4-TRIMETHYLBENZENE  
● 1,3,5-TRIMETHYLBENZENE  
● 1,2,3-TRIMETHYLBENZENE  
● VOLATILE ORGANIC COMPOUNDS  
● POLYNUCLEAR AROMATIC COMPOUNDS  
● POLYCHLORINATED BIPHENYLS  
● METHOD DETECTION LIMIT  
● μg/Kg (UNLESS NOTED)

NOTES: REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED



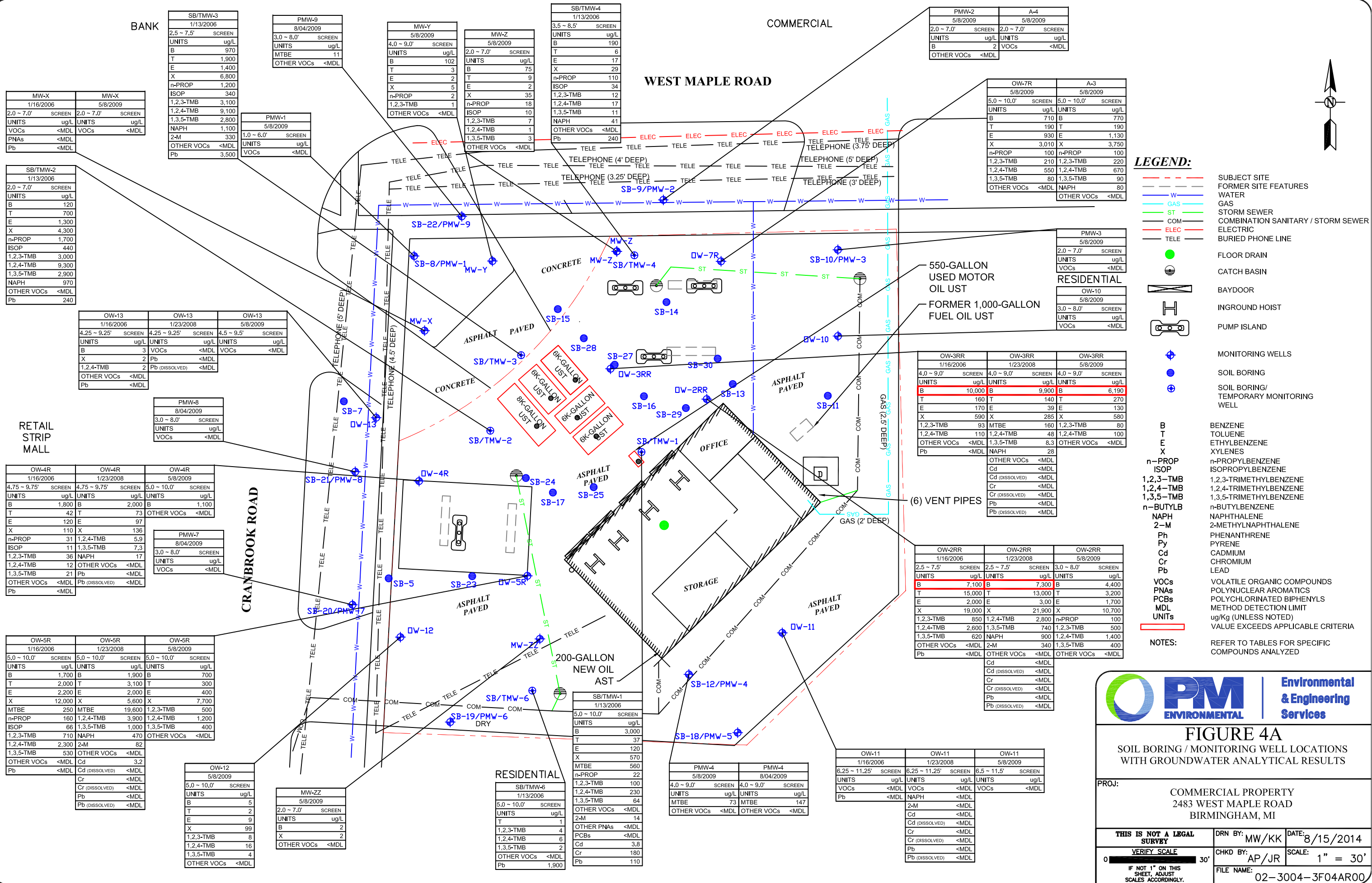
FIGURE 3B  
SOIL BORING/MONITORING WELL LOCATION  
MAP WITH SOIL ANALYTICAL RESULTS

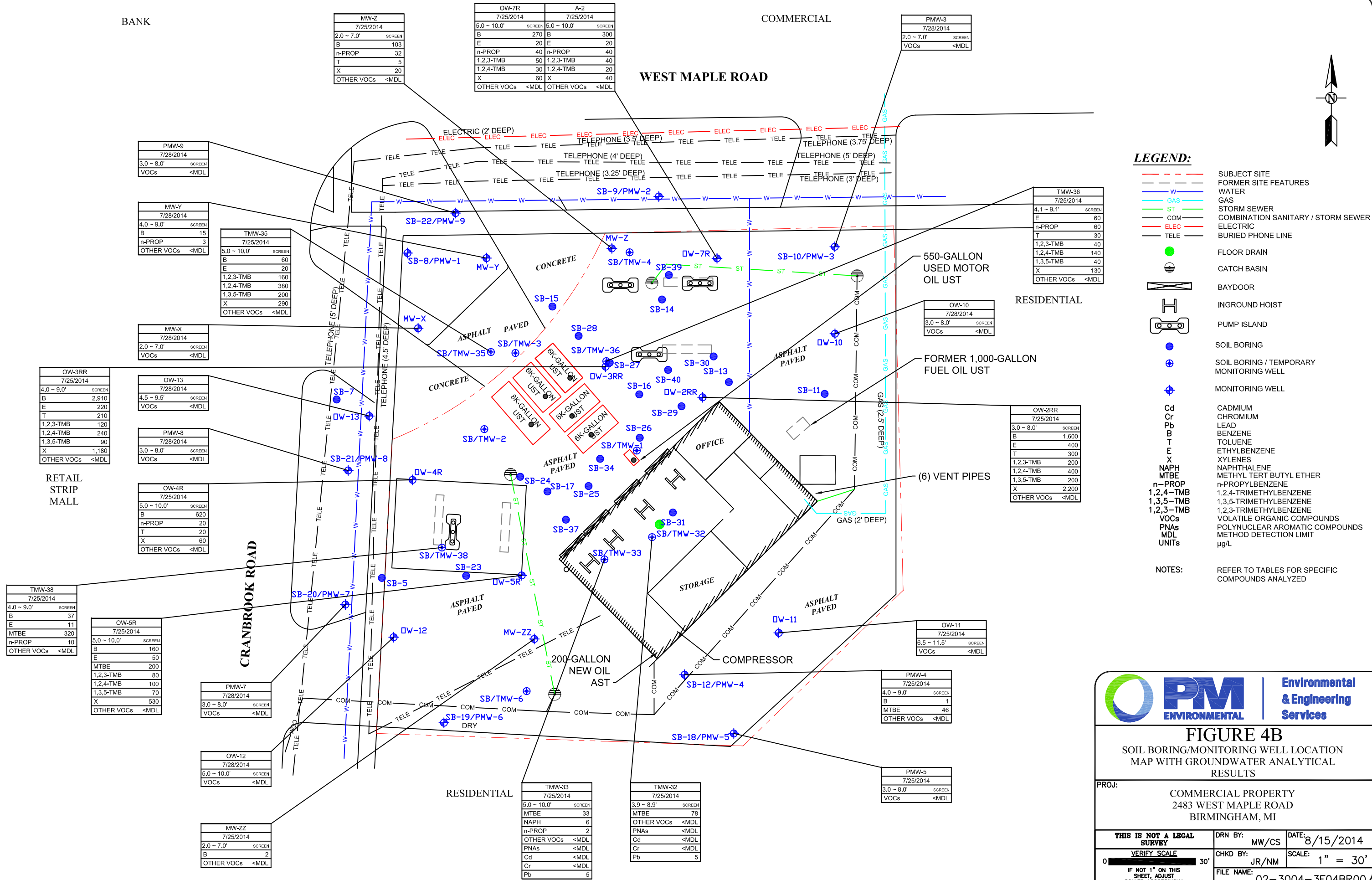
PROJ: COMMERCIAL PROPERTY  
2483 WEST MAPLE ROAD  
BIRMINGHAM, MI

THIS IS NOT A LEGAL SURVEY  
VERIFY SCALE  
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: MW/CS  
CHKD BY: JR/NM  
FILE NAME: 02-3004-3F03BR00

DATE: 8/15/2014  
SCALE: 1" = 30'





# Tables

TABLE 1  
SUMMARY OF 2006 SOIL ANALYTICAL RESULTS  
VOCS, PNAS, PCBS, CADMIUM, CHROMIUM, AND LEAD  
2483 WEST MAPLE ROAD, BIRMINGHAM, MICHIGAN  
PM PROJECT #02-3004-2

VOLATILE ORGANIC COMPOUNDS (VOCS), POLYNUCLEAR AROMATIC COMPOUNDS (PNAS), POLYCHLORINATED BIPHENYLS (PCBS), AND METALS (CADMIUM, CHROMIUM, AND LEAD)  (µg/Kg)			Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Ethylene dibromide (EDB) (1,2-Dibromoethane)	1,2-Dichloroethane	n-Propylbenzene	Isopropyl benzene	1,2,3- Trimethylbenzene <sup>1</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene	2-Methylnaphthalene	n-Butylbenzene	Other VOCs	2-Methylnaphthalene	Phenanthrene	Pyrene	Other PNAS	Polychlorinated Biphenyls	Cadmium	Chromium	Lead			
																										Total <sup>2</sup>	Coarse Fraction	Fine Fraction	
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	1634044	106934	107062	103651	98828	526738	95636	108678	91203	91576	104518	Various	91576	85018	129000	Various	1336363	7440439	16065831	7439921			
Sample ID		Sample Date	Sample Depth (bgs)	VOCs															PNAs				PCBs	Metals					
SB-1		1/13/2006	3.0-4.0	2,000	120	3,700	12,000	<250	<20	<50	1,900	430	5,200	14,000	4,300	3,800	7,100	1,500	ND	4,600	370	610	ND	<330	330	31,000	20,000	11,100	19,100
SB-2		1/13/2006	3.0-4.0	660	520	6,000	12,000	<1,500	<120	<300	19,000	4,000	20,000	71,000	26,000	6,700	15,000	4,600	ND	NA	NA	NA	NA	NA	NA	NA	12,000	8,590	10,000
SB-3		1/13/2006	11.0-12.0	250	110	2,400	2,400	<250	<20	<50	3,300	800	4,400	11,000	4,200	1,400	750	1,300	ND	NA	NA	NA	NA	NA	NA	NA	5,800	6,180	7,700
SB-4		1/13/2006	4.0-5.0	110	<50	110	200	<250	<20	<50	2,400	740	440	240	110	1000	260	150	ND	NA	NA	NA	NA	NA	NA	NA	9,700	8,120	8,790
SB-5		1/13/2006	5.0-6.0	<50	<50	<50	<150	<250	<20	<50	<100	<100	<100	<100	<250	<250	<50	ND	NA	NA	NA	NA	NA	NA	NA	NA	8,600	7,340	7,210
SB-5		1/13/2006	17.0-18.0	<50	<50	<50	<150	<250	<20	<50	<100	<100	<100	<100	<250	<250	<50	ND	NA	NA	NA	NA	NA	NA	NA	NA	12,000	9,880	9,170
SB-6		1/13/2006	3.0-4.0	<50	<50	<50	<150	<250	<20	<50	<100	<100	<100	<100	<250	<250	<50	ND	NA	NA	NA	NA	NA	NA	NA	NA	14,000	9,880	11,100
MDEQ-RRD Operational Memorandum No. 1: Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels (RBSLs), December 10, 2004 Attachment 1: Soil Tables 2 and 3 Residential, Commercial, and Industrial Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 RBSLs																													
Residential/Commercial I (µg/Kg)																													
Statewide Default Background Levels			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Various	NA	NA	NA	Various	NA	1,200	18,000	21,000			
Drinking Water Protection (DWP) RBSL			100	16,000	1,500	5,600	800	20 {M}	100	1,600	91,000	1,800	2,100	1,800	35,000	57,000	1,600	Various	57,000	56,000	4.8E+5	Various	NLL	6,000	30,000	7.0E+5	NA	NA	
Groundwater Surface Water Interface Protection (GSIP) RBSL			4,000 {X}	2,800	360	700	15,000 {X}	20 {M}	7,200 {X}	NA	ID	570	570	1,100	870	ID	NA	Various	ID	5,300	ID	Various	NLL	7,700{G,X}	6,300	8.3E+6 {G,M,X}	NA	NA	
GSIP Human Drinking Water RBSL			240	NA	NA	NA	2,000	NA	120	NA	NA	NA	NA	NA	NA	NA	NA	Various	NA	NA	NA	Various	NA	3,000{G,X}	3,500{G,X}	2.5E+6{G,X}	NA	NA	
Groundwater Contact Protection (GCP) RBSL			2.2E+5	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	500	3.8E+5	3.0E+5	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	2.1E+6	5.5E+6	1.2E+5	Various	5.5E+6	1.1E+6	4.8E+5	Various	NLL	2.3E+8	1.4E+8	ID	NA	NA	
Soil Volatilization to Indoor Air Inhalation (SVII) RBSL			1,600	2.5E+5 {C}	87,000	1.5E+5 {C}	5.9E+6 {C}	670	2,100	ID	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	2.5E+5	ID	ID	Various	ID	2.8E+6	1.0E+9 {D}	Various	3.0E+6	NLV	NLV	NLV	NA	NA	
Ambient Air Infinite Source Volatile Soil Inhalation (VSI) RBSL			13,000	2.8E+6	7.2E+5	4.6E+7	2.5E+7	1,700	6,200	ID	1.7E+6	1.6E+7	2.1E+7	1.6E+7	3.0E+5	ID	ID	Various	ID	1.6E+5	6.5E+8	Various	2.4E+5	NLV	NLV	NLV	NA	NA	
Ambient Air Finite VSI RBSL for 5 Meter Source Thickness			34,000	5.1E+6	1.0E+6	6.1E+7	3.9E+7	1,700	11,000	ID	1.7E+6	3.8E+8	5.0E+8	3.8E+8	3.0E+5	ID	ID	Various	ID	1.6E+5	6.5E+8	Various	7.9E+6	NLV	NLV	NLV	NA	NA	
Ambient Air Finite VSI RBSL for 2 Meter Source Thickness			79,000	1.2E+7	2.2E+6	1.3E+8	8.7E+7	3,300	26,000	ID	2.8E+6	3.8E+8	5.0E+8	3.8E+8	3.0E+5	ID	ID	Various	ID	1.6E+5	6.5E+8	Various	7.9E+6	NLV	NLV	NLV	NA	NA	
Ambient Air Particulate Soil Inhalation (PSI) RBSL			3.8E+8	2.7E+10	1.0E+10	2.9E+11	2.0E+11	1.4E+7	1.2E+8	1.3E+9	5.8E+9	8.2E+10	8.2E+10	8.2E+10	2.0E+8	ID	ID	Various	ID	6.7E+6	6.7E+9	Various	5.2E+6	1.7E+6	2.6E+5	NA		1.0E+8	
Direct Contact (DC) RBSL			1.8E+5	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	1.5E+6	92	91,000	2.5E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	1.6E+7	8.1E+6	2.5E+6	Various	8.1E+6	1.6E+6	2.9E+7	Various	{T}	5.5E+5	2.5E+6	4.0E+5	4.0E+5	4.0E+5	
Soil Saturation Concentration Screening Levels (Csat)			4.0E+5	2.5E+5	1.4E+5	1.5E+5	5.9E+6	8.9E+5	1.2E+6	1.0E+7	3.9E+5	94,000	1.1E+5	94,000	NA	NA	1.0E+7	Various	NA	NA	NA	Various	NA	NA	NA	NA	NA	NA	NA
Industrial/Commercial II, III, IV (µg/Kg)																													
Industrial And Commercial Drinking Water Protection (DWP) RBSL			100	16,000	1,500	5,600	800	20 {M}	100	4,600	2.6E+5	1,800	2,100	1,800	1.0E+5	1.7E+5	4,600	Various	1.7E+5	1.6E+5	4.8E+5	Various	NLL	6,000	30,000	7.0E+5	NA	NA	
Soil Volatilization to Indoor Air Inhalation (SVII) RBSL			8,400	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	3,600	11,000	ID	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	4.7E+5	ID	ID	Various	ID	5.1E+6	1.0E+9 {D}	Various	1.6E+7	NLV	NLV	NLV	NA	NA	
Ambient Air Infinite Source Volatile Soil Inhalation (VSI) RBSL			45,000	3.3E+6	2.4E+6	5.4E+7	3.0E+7	5,800	21,000	ID	2.0E+6	1.9E+7	2.5E+7	1.9E+7	3.5E+5	ID	ID	Various	ID	1.9E+5	7.8E+8	Various	8.1E+5	NLV	NLV	NLV	NA	NA	
Ambient Air Finite VSI RBSL for 5 Meter Source Thickness			99,000	3.6E+7	3.1E+6	6.5E+7	4.1E+7	5,800	33,000	ID	2.0E+6	4.6E+8	6.0E+8	4.6E+8	3.5E+5	ID	ID	Various	ID	1.9E+5	7.8E+8	Various	2.8E+7	NLV	NLV	NLV	NA	NA	
Ambient Air Finite VSI RBSL for 2 Meter Source Thickness			2.3E+5	3.6E+7	6.5E+6	1.3E+8	8.9E+7	9,800	74,000	ID	3.0E+6	4.6E+8	6.0E+8	4.6E+8	3.5E+5	ID	ID	Various	ID	1.9E+5	7.8E+8	Various	2.8E+7	NLV	NLV	NLV	NA	NA	
Ambient Air Particulate Soil Inhalation (PSI) RBSL			4.7E+8	1.2E+10	1.3E+10	1.3E+11	8.8E+10	1.8E+7	1.5E+8	5.9E+8	2.6E+9	3.6E+10	3.6E+10	3.6E+10	8.8E+7	ID	ID	Various	ID	2.9E+6	2.9E+9	Various	6.5E+6	2.2E+6	2.4E+5	NA	NA	4.4E+7	
Direct Contact (DC) RBSL - Industrial and Commercial II			4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	430	4.2E+5	8.0E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	5.2E+7	2.6E+7	8.0E+6	Various	2.6E+7	5.2E+6	8.4E+7	Various	{T}	2.1E+6	9.2E+6	9.0E+5 (DD)	9.0E+5 (DD)	9.0E+5 (DD)	
DC RBSL - Commercial III			4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	600	5.9E+5	1.0E+7 {C}	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	7.2E+7	3.7E+7	1.0E+7 {C}	Various	3.7E+7	7.2E+6	1.5E+8	Various	{T}	2.1E+6	1.0E+7	4.0E+5	4.0E+5	4.0E+5	
DC RBSL - Commercial IV			4.0E+5 {C}	2.5E+5 {C}	1.4E+5 {C}	1.5E+5 {C}	5.9E+6 {C}	500	4.9E+5	9.4E+6	3.9E+5 {C}	94,000 {C}	1.1E+5 {C}	94,000 {C}	6.1E+7	3.1E+7	9.4E+6	Various	3.1E+7	6.1E+6	1.1E+8	Various	{T}	2.1E+6	9.6E+6	4.0E+5	4.0E+5	4.0E+5	

Applicable Criteria Exceeded

**BOLD** Value Exceeds Applicable Criteria

bgs Below Grade Surface (feet)

1 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance.

2 Maximum of analyzed or calculated total lead value.

{G} Metal GSIP Criteria for Surface Water Not Protected for Drinking Water Use based on 417.5 mg/L CaCO3 Hardness: Station ID 630003, River Rouge, near Birmingham, MI.

TABLE 2  
SUMMARY OF 2009 SOIL ANALYTICAL RESULTS  
GASOLINE RANGE VOLATILE ORGANIC COMPOUNDS  
2483 WEST MAPLE ROAD, BIRMINGHAM, MI  
PM PROJECT #02-3004-2

GASOLINE RANGE VOLATILE ORGANIC COMPOUNDS  (µg/Kg)			Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Ethylene dibromide (EDB) (1,2-Dibromoethane)	1,2-Dichloroethane	n-Propylbenzene	Isopropyl benzene	1,2,3-Trimethylbenzene <sup>1</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene	2-Methylnaphthalene
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	1634044	106934	107062	103651	98828	526738	95636	108678	91203	91576
Sample ID	Sample Date	Sample Depth (bgs)	GVOCs													
SB-7	04/07/2009	3.0-4.0	<60	<60	<60	<160	<300	<30	<60	<60	<300	<60	<60	<60	<300	<100
SB-7	04/07/2009	11.0-12.0	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-8	04/07/2009	4.0-5.0	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-8	04/07/2009	11.0-12.0	<70	<70	<70	<170	<300	<30	<70	<70	<400	<70	<70	<70	<400	<100
SB-9	04/07/2009	5.0-6.0	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-9	04/07/2009	14.0-15.0	<60	<60	<60	<160	<300	<30	<60	<60	<300	<60	<60	<60	<300	<100
SB-10	04/07/2009	5.0-6.0	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-10	04/07/2009	14.0-15.0	<70	<70	<70	<170	<300	<30	<70	<70	<400	<70	<70	<70	<400	<100
SB-11	04/08/2009	3.0-4.0	<90	<90	<90	<290	<300	<30	<90	<90	<400	<90	<90	<90	<400	<200
SB-11	04/08/2009	14.0-15.0	<70	<70	<70	<170	<300	<30	<70	<70	<400	<70	<70	<70	<400	<100
SB-12	04/07/2009	4.0-5.0	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
A-3			<60	<60	<60	<160	<300	<30	<60	<60	<300	<60	<60	<60	<300	<100
A-4			<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-12	04/07/2009	14.0-15.0	<80	<80	<80	<280	<300	<30	<80	<80	<400	<80	<80	<80	<400	<200
SB-13	04/08/2009	4.0-5.0	<800	<800	15,500	13,000	<3,000	<300	<800	<b>14,400</b>	<4,000	18,200	67,600	22,000	6,000	5,000
SB-14	04/08/2009	4.0-5.0	<100	<100	3,700	2,400	<600	<60	<100	1,500	<700	2,100	6,000	1,900	1,000	300
SB-15	04/08/2009	3.0-4.0	<80	<80	730	1,300	<300	<30	<80	<b>1,900</b>	<400	1,960	9,540	2,630	600	300
A-7			<70	<70	630	1,100	<300	<30	<70	<b>1,610</b>	<300	1,680	8,130	2,240	500	300
SB-15	04/08/2009	14.0-15.0	200	<70	<70	<170	<300	<30	<70	110	<300	<70	90	<70	<300	200
SB-16	04/07/2009	1.0-2.0	130	1,600	2,080	20,110	<300	<30	<60	980	<300	2,600	10,600	3,610	1,100	700
SB-16	04/07/2009	19.0-20.0	<80	<80	<80	<280	<300	<30	<80	<80	<400	<80	<80	<80	<400	<200
SB-17	04/07/2009	2.0-3.0	<60	<60	<60	<160	<200	<20	<60	<60	<300	<60	<60	<60	<300	<100
A-5			<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-23	07/06/2009	3.0-4.0	<70	<70	<70	<170	<300	<30	<70	570	<400	<70	<70	<70	<400	<100
A-2			<80	<80	<80	<280	<300	<30	<80	710	<400	<80	<80	<80	<400	<200
SB-24	07/06/2009	2.0-3.0	<70	<70	80	<170	<300	<30	<70	1,350	<300	<70	<70	<70	<300	<100
SB-25	07/07/2009	4.0-5.0	1,330	130	230	1,930	<300	<100	<70	<b>6,620</b>	2,000	1,940	2,340	870	1,700	2,000
A-3			<b>1,580</b>	140	350	2,670	<300	<70	80	<b>3,380</b>	1,100	2,080	2,760	1,540	1,300	600
SB-26	07/07/2009	3.0-4.0	<b>4,700</b>	<300	5,100	8,800	<1,000	<100	<300	<b>2,100</b>	<2,000	4,300	11,200	4,200	3,000	4,100
SB-27	07/07/2009	1.0-2.0	<b>5,000</b>	22,000	<b>101,000</b>	<b>565,000</b>	<10,000	<1,000	<3,000	<b>53,000</b>	<20,000	72,000	<b>282,000</b>	<b>103,000</b>	20,000	<7,000
SB-27	07/07/2009	13.0-14.0	<70	130	140	720	<300	<30	<70	80	<400	210	400	<70	<400	<100
SB-28	07/07/2009	1.0-2.0	<b>52,000</b>	<b>743,000</b>	<b>339,000</b>	<b>1,658,000</b>	<30,000	<3,000	<7,000	<b>132,000</b>	30,000	<b>163,000</b>	<b>612,000</b>	<b>229,000</b>	50,000	10,000
SB-28	07/07/2009	12.0-13.0	<70	<70	<70	<170	<300	<30	<70	<70	<300	<70	<70	<70	<300	<100
SB-29	07/07/2009	1.0-2.0	<6,000	23,000	40,000	<b>247,000</b>	<20,000	<2,000	<6,000	<b>29,000</b>	<30,000	45,000	<b>189,000</b>	66,000	<30,000	<10,000
SB-29	07/07/2009	12.0-13.0	<60	<60	<60	<160	<300	<30	<60	<60	<300	<60	<60	<60	<300	<100
SB-30	07/07/2009	0.5-1.5'	<7,000	<7,000	71,000	<b>555,000</b>	<30,000	<3,000	<7,000	<b>56,000</b>	<30,000	77,000	<b>311,000</b>	<b>104,000</b>	<30,000	<10,000
SB-30	07/07/2009	12.0-13.0	<60	<60	<60	<160	<200	<20	<60	<60	<300	<60	<60	<60	<300	<100
MDEQ-RRD Operational Memorandum No. 1: Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels (RBSLs), January 23, 2006 Attachment 1: Soil Tables 2 and 3 Residential, Commercial, and Industrial Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 RBSLs																
Residential/Commercial I (µg/Kg)																
Drinking Water Protection (DWP) RBSL	100	16,000	1,500	5,600	800	20 (M)	100	1,600	91,000	1,800	2,100	1,800	35,000	57,000		
Groundwater Surface Water Interface Protection (GSIP) RBSL	4,000 (X)	2,800	360	700	15,000 (X)	20 (M)	7,200 (X)	NA	ID	570	570	1,100	870	ID		
GSIP Human Drinking Water RBSL	240	NA	NA	NA	2,000	NA	120	NA	NA	NA	NA	NA	NA	NA	NA	NA
Groundwater Contact Protection (GCP) RBSL	2.2E+5	2.5E+5 (C)	1.4E+5 (C)	1.5E+5 (C)	5.9E+6 (C)	500	3.8E+5	3.0E+5	3.9E+5 (C)	94,000 (C)	1.1E+5 (C)	94,000 (C)	2.1E+6	5.5E+6		
Soil Volatilization to Indoor Air Inhalation (SVII) RBSL	1,600	2.5E+5 (C)	87,000	1.5E+5 (C)	5.9E+6 (C)	670	2,100	ID	3.9E+5 (C)	94,000 (C)	1.1E+5 (C)	94,000 (C)	2.5E+5	ID		
Ambient Air Infinite Source Volatile Soil Inhalation (VSI) RBSL	13,000	2.8E+6	7.2E+5	4.6E+7	2.5E+7	1,700	6,200	ID	1.7E+6	1.6E+7	2.1E+7	1.6E+7	3.0E+5	ID		
Ambient Air Finite VSI RBSL for 5 Meter Source Thickness	34,000	5.1E+6	1.0E+6	6.1E+7	3.9E+7	1,700	11,000	ID	1.7E+6	3.8E+8	5.0E+8	3.8E+8	3.0E+5	ID		
Ambient Air Finite VSI RBSL for 2 Meter Source Thickness	79,000	1.2E+7	2.2E+6	1.3E+8	8.7E+7	3,300	26,000	ID	2.8E+6	3.8E+8	5.0E+8	3.8E+8	3.0E+5	ID		
Ambient Air Particulate Soil Inhalation (PSI) RBSL	3.8E+8	2.7E+10	1.0E+10	2.9E+11	2.0E+11	1.4E+7	1.2E+8	1.3E+9	5.8E+9	8.2E+10	8.2E+10	8.2E+10	2.0E+8	ID		
Direct Contact (DC) RBSL	1.8E+5	2.5E+5 (C)	1.4E+5 (C)	1.5E+5 (C)	1.5E+6	92	91,000	2.5E+6	3.9E+5 (C)	94,000 (C)	1.1E+5 (C)	94,000 (C)	1.6E+7	8.1E+6		
Soil Saturation Concentration Screening Levels (Csat)	4.0E+5	2.5E+5	1.4E+5	1.5E+5	5.9E+6	8.9E+5	1.2E+6	1.0E+7	3.9E+5	94,000	1.1E+5	94,000	NA	NA		
Industrial/Commercial II, III, IV (µg/Kg)																
Industrial And Commercial Drinking Water Protection (DWP) RBSL	100	16,000	1,500	5,600	800	20 (M)	100	4,600	2.6E+5	1,800	2,100	1,800	1.0E+5	1.7E+5		
Soil Volatilization to Indoor Air Inhalation (SVII) RBSL	8,400	2.5E+5 (C)	1.4E+5 (C)	1.5E+5 (C)	5.9E+6 (C)	3,600	11,000	ID	3.9E+5 (C)	94,000 (C)	1.1E+5 (C)	94,000 (C)	4.7E+5	ID		
Ambient Air Infinite Source Volatile Soil Inhalation (VSI) RBSL	45,000	3.3E+6	2.4E+6	5.4E+7	3.0E+7	5,800	21,000	ID	2.0E+6	1.9E+7	2.5E+7	1.9E+7	3.5E+5	ID		
Ambient Air Finite VSI RBSL for 5 Meter Source Thickness	99,000	3.6E+7	3.1E+6	6.5E+7	4.1E+7	5,800	33,000	ID	2.0E+6	4.6E+8	6.0E+8	4.6E+8	3.5E+5	ID		
Ambient Air Finite VSI RBSL for 2 Meter Source Thickness	2.3E+5	3.6E+7	6.5E+6	1.3E+8	8.9E+7	9,800	74,000	ID	3.0E+6	4.6E+8	6.0E+8	4.6E+8	3.5E+5	ID		
Ambient Air Particulate Soil Inhalation (PSI) RBSL	4.7E+8	1.2E+10	1.3E+10	1.3E+11	8.8E+10	1.8E+7	1.5E+8	5.9E+8	2.6E+9	3.6E+10	3.6E+10	3.6E+10	8.8E+7	ID		
Direct Contact (DC) RBSL - Industrial and Commercial II	4.0E+5 (C)	2.5E+5 (C)	1.4E+5 (C)	1.5E+5 (C)	5.9E+6 (C)	430	4.2E+5	8.0E+6	3.9E+5 (C)	94,000 (C)	1.1E+5 (C)	94,000 (C)	5.2E+7	2.6E+7		
DC RBSL - Commercial III	4.0E+5 (C)	2.5E+5 (C)	1.4E+5 (C)	1.5E+5 (C)	5.9E+6 (C)	600	5.9E+5	1.0E+7 (C)	3.9E+5 (C)	94,000 (C)	1.1E+5 (C)	94,000 (C)	7.2E+7	3.7E+7		
DC RBSL - Commercial IV	4.0E+5 (C)	2.5E+5 (C)	1.4E+5 (C)	1.5E+5 (C)	5.9E+6 (C)	500	4.9E+5	9.4E+6	3.9E+5 (C)	94,000 (C)	1.1E+5 (C)	94,000 (C)	6.1E+7	3.1E+7		

Applicable Criteria Exceeded

**BOLD** Value Exceeds Applicable Criteria

bgs Below Grade Surface (feet)

1 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance.

TABLE 3  
SUMMARY OF 2014 SOIL ANALYTICAL RESULTS  
VOCs, PNAS, PCBS, METALS  
2483 WEST MAPLE ROAD, BIRMINGHAM, MI  
PM PROJECT #02-3004-3

VOLATILE ORGANIC COMPOUNDS (VOCs), POLYNUCLEAR AROMATIC COMPOUNDS (PNAS), POLYCHLORINATED BIPHENYLS (PCBS), AND METALS (CADMIUM, CHROMIUM, AND LEAD)  (µg/Kg)			Benzene	Ethylbenzene	Isopropyl benzene	2-Methylnaphthalene	Naphthalene	n-Propylbenzene	Toluene	1,2,3-Trimethylbenzene <sup>1</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes	Other VOCs	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Other PNAS	Polychlorinated Biphenyls	Cadmium	Chromium	Lead	
Chemical Abstract Service Number (CAS#)			71432	100414	98828	91576	91203	103651	108883	526738	95636	108678	1330207	Various	56553	50328	205992	207089	191242	218019	206440	193395	85018	129000	Various	1336363	7440439	16065831	7439921	
Sample ID	Sample Date	Sample Depth (feet bgs)	VOCs												PNAs												PCBs	Metals		
SB-31	07/25/2014	0.5-1.5	<70	<70	<400	<480	<480	<100	<100	<100	<100	<100	<170	ND	1,200	1,300	2,400	2,500	700	1,400	2,700	600	1,100	2,400	ND	ND	330	2,360	38,600	
SB-31	07/25/2014	9.5-10.5	<70	<70	<400	<470	<470	<100	<100	<100	<100	<100	<170	ND	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	ND	ND	310	1,560	6,970	
SB-32	07/25/2014	1.0-2.0	<70	<70	<300	<430	<430	<100	<100	<100	<100	<100	<170	ND	<300	<300	<300	300	<300	<300	300	<300	<300	300	ND	ND	<200	2,150	16,200	
SB-33	07/25/2014	1.5-2.5	<70	<70	<400	<480	<480	<100	<100	<100	<100	<100	<170	ND	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	ND	ND	250	1,950	5,770	
SB-34	07/25/2014	4.0-5.0	160	250	<400	200	<400	160	<90	240	280	140	530	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-35	07/25/2014	2.0-3.0	<4,000	<4,000	<20,000	11,000	<20,000	<4,000	<4,000	62,000	125,000	104,000	34,000	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-35	07/25/2014	11.0-12.0	<70	<70	<400	<100	<400	<70	<70	<70	120	80	<170	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-36	07/25/2014	4.0-5.0	<1,000	4,000	<7,000	3,000	7,000	13,000	<1,000	14,000	57,000	19,000	18,000	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-37	07/25/2014	4.0-5.0	<4,000	19,000	<20,000	8,000	<20,000	11,000	15,000	19,000	75,000	27,000	130,000	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-38	07/25/2014	3.0-4.0	70	420	600	1,300	1,600	2,860	<70	<70	<70	<70	400	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-39	07/25/2014	6.0-7.0	<3,000	55,000	<20,000	9,000	<20,000	21,000	<3,000	30,000	107,000	36,000	159,000	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-40	07/25/2014	2.0-3.0	<1,000	30,000	<7,000	14,000	10,000	19,000	<1,000	10,000	46,000	18,000	63,000	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cleanup Criteria Requirements for Response Activity (R 299.1 - R 299.50) Generic Soil Cleanup Criteria Tables 2 and 3: Residential and Non-Residential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Risk-Based Screening Levels, December 30, 2013 MDEQ Guidance Document For The Vapor Intrusion Pathway, Policy and Procedure Number: 09-017, Appendix D Vapor Intrusion Screening Values, May 2013																														
Residential (µg/Kg)																														
Statewide Default Background Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,200	18,000	21,000	
Drinking Water Protection (DWP)	100	1,500	91,000	57,000	35,000	1,600	16,000	1,800	2,100	1,800	5,600	Various	NLL	NLL	NLL	NLL	NLL	NLL	NLL	NLL	7.30E+05	NLL	56,000	4.80E+05	Various	NLL	6,000	30,000	7.00E+05	
Groundwater Surface Water Interface Protection (GSIP)	4,000 [X]	360	3,200	4,200	730	ID	5,400	570	570	1,100	820	Various	NLL	NLL	NLL	NLL	NLL	NLL	NLL	NLL	5,500	NLL	2,100	ID	Various	NLL	[G,X]	3,300	2.50E+06[G,X]	
Soil Volatilization to Indoor Air Inhalation (SVII)	1,600	87,000	4.0E+05 (C)	2.70E+06	2.50E+05	ID	3.3E+05 (C)	2.6E+06 (C)	4.3E+06 (C)	2.6E+06 (C)	6.3E+06 (C)	Various	NLV	NLV	ID	NLV	NLV	ID	NLV	NLV	ID	1.0E+9 (D)	NLV	2.8E+06	1.0E+9 (D)	Various	3.0E+06	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (VSI)	13,000	7.20E+05	1.70E+06	1.50E+06	3.00E+05	ID	2.80E+06	1.60E+07	2.10E+07	1.60E+07	4.60E+07	Various	NLV	NLV	ID	NLV	NLV	ID	NLV	NLV	ID	7.40E+08	NLV	1.6E+05	6.5E+08	Various	2.40E+05	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness	34,000	1.00E+06	1.70E+06	1.50E+06	3.00E+05	ID	5.10E+06	3.80E+08	5.00E+08	3.80E+08	6.10E+07	Various	NLV	NLV	ID	NLV	NLV	ID	NLV	NLV	ID	7.4E+08	NLV	1.6E+05	6.5E+08	Various	7.9E+06	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness	79,000	2.20E+06	2.80E+06	1.50E+06	3.00E+05	ID	1.20E+07	3.80E+08	5.00E+08	3.80E+08	1.30E+08	Various	NLV	NLV	ID	NLV	NLV	ID	NLV	NLV	ID	7.4E+08	NLV	1.6E+05	6.5E+08	Various	7.9E+06	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (PSI)	3.80E+08	1.00E+10	5.80E+09	6.70E+08	2.00E+08	1.30E+09	2.70E+10	8.20E+10	8.20E+10	2.90E+11	Various	ID	1.5E+06	ID	ID	8.0E+08	ID	ID	9.3E+09	ID	6.7E+06	6.7E+09	Various	5.2E+06	1.70E+06	2.60E+05	1.00E+08			
Direct Contact (DC)	1.80E+05	2.2E+07 (C)	2.5E+07 (C)	8.10E+06	1.60E+07	2.50E+06	5.0E+07 (C)	3.2E+07 (C)	3.2E+07 (C)	3.2E+07 (C)	4.1E+08 (C)	Various	20,000	2,000	20,000	2.00E+05	2.5E+06	2.0E+06	4.6E+07	20,000	1.6E+06	2.9E+07	Various	(T)	5.50E+05	2.50E+06	4.00E+05			
Nonresidential (µg/Kg)																														
Drinking Water Protection (Nonres DWP)	100	1,500	2.60E+05	1.70E+05	1.00E+05	4,600	16,000	1,800	2,100	1,800	5,600	Various	NLL	NLL	NLL	NLL	NLL	NLL	NLL	NLL	7.30E+05	NLL	1.60E+05	4.80E+05	Various	NLL	6,000	30,000	7.00E+05	
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)	8,400	4.6E+05 (C)	7.3E+05 (C)	4.90E+06	4.70E+05	ID	6.1E+05 (C)	4.8E+06 (C)	8.0E+06 (C)	4.8E+06 (C)	1.2E+07 (C)	Various	NLV	NLV	ID	NLV	NLV	ID	NLV	NLV	ID	1.0E+9 (D)	NLV	5.1E+06	1.0E+9 (D)	Various	1.6E+07	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)	45,000	2.40E+06	2.00E+06	1.80E+06	3.50E+05	ID	3.30E+06	1.90E+07	2.50E+07	1.90E+07	5.40E+07	Various	NLV	NLV	ID	NLV	NLV	ID	NLV	NLV	ID	8.9E+08	NLV	1.90E+05	7.8E+08	Various	8.10E+05	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness	99,000	3.10E+06	2.00E+06	1.80E+06	3.50E+05	ID	3.60E+07	4.60E+08	6.00E+08	4.60E+08	6.50E+07	Various	NLV	NLV	ID	NLV	NLV	ID	NLV	NLV	ID	8.8E+08	NLV	1.90E+05	7.8E+08	Various	2.8E+07	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness	2.30E+05	6.50E+06	3.00E+06	1.80E+06	3.50E+05	ID	3.60E+07	4.60E+08	6.00E+08	4.60E+08	1.30E+08	Various	NLV	NLV	ID	NLV	NLV	ID	NLV	NLV	ID	8.8E+08	NLV	1.90E+05	7.8E+08	Various	2.8E+07	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Nonres PSI)	4.70E+08	1.30E+10	2.60E+09	2.90E+08	8.80E+07	5.90E+08	1.20E+10	3.60E+10	3.60E+10	1.30E+11	Various	ID	1.9E+06	ID	ID	3.5E+08	ID	ID	4.1E+09	ID	2.9E+06	2.9E+09	Various	6.5E+06	2.20E+06	2.40E+05	4.40E+08			
Direct Contact (Nonres DC)	8.40E+05 (C)	7.1E+07 (C)	8.0E+07 (C)	2.60E+07	5.20E+07	8.00E+06	1.6E+08 (C)	1.0E+08 (C)	1.0E+08 (C)	1.0E+08 (C)	1.0E+09 (C)	Various	80,000	8,000	80,000	8.00E+05	7.0E+06	8.0E+06	1.3E+08	80,000	5.2E+06	8.4E+07	Various	(T)	2.10E+06	9.20E+06	9.0E+5 (DD)			
Screening Levels (µg/Kg)																														
Soil Saturation Concentration Screening Levels (C <sub>sat</sub> )	4.00E+05	1.40E+05	3.90E+05	NA	NA	1.00E+07	2.50E+05	94,000	1.10E+05	94,000	1.50E+05	Various	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Various	NA	NA	NA	NA	
Residential Vapor Intrusion Soil Screening Levels (S <sub>VI-res</sub> )	50	200	250	7,500	440	140	10,000	3,200	2,200	1,700	290	Various	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	5,100	6.5E+07	Various	1,900	NL	NL	NL	
Nonresidential Vapor Intrusion Soil Screening Levels (S <sub>VI-nr</sub> )	85	4,000	300	1.26E+05	8,900	2,400	1.69E+05	53,000	37,000	28,000	4,900	Various	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	86,000	1.09E+09	Various	39,000	NL	NL	NL	

**BOLD**  
bgs  
1  
ND  
NA/NL/ID  
NLL/NLV  
{G}

Applicable Criterion/RBSL Exceeded  
Value Exceeds Applicable Criterion/RBSL  
Below Ground Surface (feet)  
1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.  
Non-detected at levels above laboratory method detection limit (MDL)  
Not Applicable/Not Listed/Insufficient Data  
Not Likely to Leach/Not Likely to Volatilize  
Metal GSIP Criteria for Surface Water Protected for Drinking Water Use based on 418 mg/L CaCO3 Hardness: Station ID 630003, Rouge River at Wattles Road, City of Troy, MI.

TABLE 4  
SUMMARY OF 2006-2008 GROUNDWATER ANALYTICAL RESULTS  
VOCs, PNAS, PCBS, CADMIUM, CHROMIUM, AND LEAD  
2483 WEST MAPLE, BIRMINGHAM, MICHIGAN  
PM PROJECT #02-3004-2

VOLATILE ORGANIC COMPOUNDS (VOCs), POLYNUCLEAR AROMATIC COMPOUNDS (PNAS), POLYCHLORINATED BIPHENYLS (PCBS), AND METALS (CADMIUM, CHROMIUM, AND LEAD)  (µg/L)	Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Ethylene dibromide (EDB) (1,2-Dibromoethane)	1,2-Dichloroethane	n-Propylbenzene	Isopropyl benzene	1,2,3-Trimethylbenzene <sup>2</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Methylnaphthalene	Naphthalene	Other Vocs	2-Methylnaphthalene	Other PNAS	Polychlorinated Biphenyls	Cadmium	Dissolved Cadmium	Chromium	Dissolved Chromium	Lead	Dissolved Lead		
Chemical Abstract Service Number (CAS#)	71432	108883	100414	1330207	1634044	106934	107062	103651	98828	526738	95636	108678	91576	91203	Various	91576	Various	1336363	7440439	7440439	16065831	16065831	7439921	7439921		
Sample ID	Sample Date	Screen Depth (bgs)	VOCs													PNAs		PCBs	Metals							
TMW-1	1/13/2006	5.0-10.0	3,000	37	120	570	560	<20	<20	22	<20	100	230	64	<100	<100	<MDLs	14	<MDLs	<0.2	3.8	NA	180	NA	110	NA
TMW-2	1/13/2006	2.0-7.0	120	700	1,300	4,300	<300	<50	<50	1,700	440	3,000	9,300	2,900	<100	970	<MDLs	NA	NA	NA	NA	NA	NA	NA	240	NA
TMW-3	1/13/2006	2.5-7.5	970	1,900	1,400	6,800	<300	<50	<50	1,200	340	3,100	9,100	2,800	330	1,100	<MDLs	NA	NA	NA	NA	NA	NA	NA	3,500	NA
TMW-4	1/13/2006	3.5-8.5	190	6	17	29	<5	<1	<1	110	34	12	17	11	<5	41	<MDLs	NA	NA	NA	NA	NA	NA	NA	240	NA
TMW-6	1/13/2006	5.0-10.0	<1	1	<1	<3	<5	<1	<1	<1	<1	4	6	2	<5	<5	<MDLs	NA	NA	NA	NA	NA	NA	NA	1,900	NA
MW-X	1/16/2006	2.0-7.0	<1	<1	<1	<3	<5	<1	<1	<1	<1	<1	<1	<1	<5	<5	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	NA
OW-2RR	1/16/2006	2.5-7.5	7,100	15,000	2,000	19,000	<300	<50	<50	<50	<50	850	2,600	620	<300	<300	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3
	1/23/2008		7,300	13,000	3,000	21,900	<80	<20	<20	NA	NA	NA	2,800	740	340	900	NA	NA	NA	NA	<0.50	<0.50	<10	<10	<3.0	<3.0
OW-3RR	1/16/2006	4.0-9.0	10,000	160	170	590	<200	<30	<30	<30	<30	93	110	<30	<200	<200	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3
	1/23/2008		9,900	140	39	285	160	<1.0	<1.0	NA	NA	NA	48	8.3	<5	28	NA	NA	NA	NA	<0.50	<0.50	<10	<10	<3.0	<3.0
OW-4R	1/16/2006	4.75-9.75	1,800	42	120	110	<50	<10	<10	31	11	36	12	21	<50	<50	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3
	1/23/2008		2,000	73	97	136	<4.0	<1.0	<1.0	NA	NA	NA	5.9	7.3	<5	17	NA	NA	NA	NA	NA	NA	NA	NA	<3.0	<3.0
OW-5R	1/16/2006	5.0-10.0	1,700	2,000	2,200	12,000	250	<30	<30	160	66	710	2,300	530	<200	<200	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3
	1/23/2008		1,900	3,100	2,000	5,600	19,600	<10	<10	NA	NA	NA	3,900	1000	82	470	NA	NA	NA	NA	3.2	<0.50	<10	<10	<3.0	<3.0
OW-11	1/16/2006	6.25-11.25	<1	<1	<1	<3	<5	<1	<1	<1	<1	<1	<1	<1	<5	<5	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3
	1/23/2008		<1.0	<1.0	<1.0	<2.0	<4.0	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<5	<5	NA	NA	NA	NA	<0.50	<0.50	<10	<10	<3.0	<3.0
OW-13	1/16/2006	6.25-11.25	3	<1	2	<3	<5	<1	<1	<1	<1	<1	2	<1	<5	<5	<MDLs	NA	NA	NA	NA	NA	NA	NA	<3	<3
	1/23/2008		<1.0	<1.0	<1.0	<2.0	<4.0	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<5	<5	NA	NA	NA	NA	NA	NA	NA	NA	<3.0	<3.0
MDEQ-RRD Operational Memorandum No. 1: Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels (RBSLs), December 10, 2004																										
Attachment 1: Table 1. Groundwater: Residential and Industrial-Commercial, Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 RBSLs																										
Residential/Commercial/Industrial (µg/L)																										
Residential & Commercial I Drinking Water (DW) RBSL	5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	0.05 {A}	5.0 {A}	80	800	63 {E}	63 {E}	72 {E}	260	520	Various	260	Various	0.5 {A}	5.0 {A}	5.0 {A}	100 {A}	100 {A}	4.0 {L}	4.0 {L}		
Industrial & Commercial II, III & IV Drinking Water RBSL (Ind/Com DW)	5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	0.05 {A}	5.0 {A}	230	2,300	63 {E}	63 {E}	72 {E}	750	1,500	Various	750	Various	0.5 {A}	5.0 {A}	5.0 {A}	100 {A}	100 {A}	4.0 {L}	4.0 {L}		
Groundwater Surface Water Interface (GSI) RBSL	200 {X}	140	18	35	730 {X}	0.2 {X}	360 {X}	ID	ID	17	17	45	ID	13	Various	ID	Various	0.2 {M}	6.4{G,X}	6.4{G,X}	240	240	47{G,X}	47{G,X}		
GSI Final Acute Values (FAV) <sup>1</sup>	1,800	1,700	320	630	13,000	ID	16,000	ID	ID	310	310	810	ID	200	Various	ID	Various	ID	2.5{G}	2.5{G}	120{G}	120{G}	14{G}	14{G}		
GSI Human Drinking Water RBSL	12	NA	NA	NA	100	0.05 {M}	6	NA	NA	NA	NA	NA	NA	NA	Various	NA	Various	NA	2.5 {G,X}	2.5 {G,X}	120 {G,X}	120 {G,X}	14{G}	14{G}		
Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation RBSL (Res GVII)	5,600	5.3E+5 {S}	1.1E+5	1.9E+5 {S}	4.7E+7 {S}	2,400	9,600	ID	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	ID	31,000 {S}	Various	ID	Various	45 {S}	NLV	NLV	NLV	NLV	NLV	NLV		
Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation RBSL (Ind/Com GVII)	35,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	4.7E+7 {S}	15,000	59,000	ID	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	ID	31,000 {S}	Various	ID	Various	45 {S}	NLV	NLV	NLV	NLV	NLV	NLV		
Groundwater Contact (GC) RBSL	11,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	6.1E+5	25	19,000	15,000	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	25,000 {S}	31,000 {S}	Various	25,000 {S}	Various	3.3 {AA}	1.9E+5	1.9E+5	4.6E+5	4.6E+5	ID	ID		
Screening Levels (µg/L)																										
Water Solubility	1.75E+6	5.26E+5	1.69E+5	1.86E+5	4.68E+7	4.20E+6	8.52E+6	NA	56,000	55,890	55,890	61,150	24,600	31,000	Various	24,600	Various	44.7	NA	NA	NA	NA	NA	NA		
Flammability and Explosivity Screening Level	68,000	61,000	43,000	70,000	ID	ID	2.5E+6	ID	29,000	56,000 {S}	56,000 {S}	ID	ID	NA	Various	ID	Various	ID	ID	ID	ID	ID	ID	ID		
Acute Inhalation Screening Level	67,000	ID	1.7E+5 {S}	1.9E+5 {S}	ID	ID	ID	ID	ID	ID	ID	ID	ID	31,000 {S}	Various	ID	Various	ID	ID	ID	ID	ID	ID	ID		

Applicable Criteria Exceeded  
**BOLD** Value Exceeds Applicable Criteria  
bgs Below Grade Surface (feet)  
<sup>1</sup> Rule 323.1057 of Part 4 Water Quality Standards  
<sup>2</sup> 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance.  
{G} Metal GSI Criteria for Surface Water Not Protected for Drinking Water Use based on 417.5 mg/L CaCO3 Hardness: Station ID 630003, River Rouge, near Birmingham, MI.

TABLE 5  
SUMMARY OF 2009 GROUNDWATER ANALYTICAL RESULTS  
GASOLINE RANGE VOCs  
2483 WEST MAPLE ROAD, BIRMINGHAM, MI  
PM PROJECT #02-3004-2

GASOLINE RANGE VOLATILE ORGANIC COMPOUNDS  (µg/L)			Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Ethylene dibromide (EDB) (1,2-Dibromoethane)	1,2-Dichloroethane	n-Propylbenzene	Isopropyl benzene	1,2,3-Trimethylbenzene <sup>2</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene	2-Methylnaphthalene
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	1634044	106934	107062	103651	98828	526738	95636	108678	91203	91576
Sample ID	Sample Date	Screen Depth (bgs)	GVOCs													
PMW-1	05/08/2009	1.0-6.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-2	05/08/2009	2.0-7.0	2	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
A-4 (Colocated PMW-2)	05/08/2009		<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-3	05/08/2009	2.0-7.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-4	05/08/2009	4.0-9.0	<1	<1	<1	<2	73	<1	<1	<1	<5	<1	<1	<1	<5	<2
	08/04/2009		<1	<1	<1	<2	147	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-7	08/04/2009	3.0-8.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-8	08/04/2009	3.0-8.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
PMW-9	08/04/2009	3.0-8.0	<1	<1	<1	<2	11	<1	<1	<1	<5	<1	<1	<1	<5	<2
OW-2RR	05/08/2009	3.0-8.0	4,400	3,200	1,700	10,700	<500	<100	<100	100	<500	500	1,400	400	<500	<200
OW-3RR	05/08/2009	4.0-9.0'	6,190	270	130	580	<300	<50	<50	<50	<300	80	100	<50	<300	<100
OW-4R	05/08/2009	5.0-10.0	1,100	<100	<100	<200	<500	<100	<100	<100	<500	<100	<100	<100	<500	<200
OW-5R	05/08/2009	5.0-10.0'	700	300	400	7,700	<500	<100	<100	<100	<500	500	1,200	400	<500	<200
OW-7R	05/08/2009	5.0-10.0	710	190	930	3,010	<100	<20	<20	100	<100	210	550	80	<100	<40
A-3 (Colocated OW-7R)	05/08/2009		770	190	1,130	3,750	<50	<10	<10	100	<50	220	670	90	80	<20
OW-10	05/08/2009	3.0-8.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
OW-11	05/08/2009	6.5-11.5	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
OW-12	05/08/2009	5.0-10.0	5	2	9	99	<5	<1	<1	<1	<5	8	16	4	<5	<2
OW-13	05/08/2009	4.5-9.5	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
MW-X	05/08/2009	2.0-7.0	<1	<1	<1	<2	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2
MW-Y	05/08/2009	4.0-9.0	102	3	2	5	<5	<1	<1	2	<5	1	<1	<1	<5	<2
MW-Z	05/08/2009	2.0-7.0	75	9	2	35	<5	<1	<1	18	10	7	1	3	<5	<2
MW-ZZ	05/08/2009	2.0-7.0	2	<1	<1	2	<10	<1	<1	<1	<5	<1	<1	<1	<5	<2
MDEQ-RRD Operational Memorandum No. 1: Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels (RBSLs), January 23, 2006 Attachment 1: Table 1. Groundwater: Residential and Industrial-Commercial, Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 RBSLs																
Residential/Commercial/Industrial (µg/L)																
Residential & Commercial I Drinking Water (DW) RBSL	5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	0.05 {A}	5.0 {A}	80	800	63 {E}	63 {E}	72 {E}	520	260		
Industrial & Commercial II, III & IV Drinking Water RBSL (Ind/Com DW)	5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	0.05 {A}	5.0 {A}	230	2,300	63 {E}	63 {E}	72 {E}	1,500	750		
Groundwater Surface Water Interface (GSI) RBSL	200 {X}	140	18	35	730 {X}	0.2 {X}	360 {X}	ID	ID	17	17	45	13	ID		
GSI Final Acute Values (FAV) <sup>1</sup>	1,800	1,700	320	630	13,000	ID	16,000	ID	ID	310	310	810	200	ID		
GSI Human Drinking Water RBSL	12	NA	NA	NA	100	0.05 {M}	6	NA	NA	NA	NA	NA	NA	NA		
Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation RBSL (Res GVII)	5,600	5.3E+5 {S}	1.1E+5	1.9E+5 {S}	4.7E+7 {S}	2,400	9,600	ID	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	31,000 {S}	ID		
Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation RBSL (Ind/Com GVII)	35,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	4.7E+7 {S}	15,000	59,000	ID	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	31,000 {S}	ID		
Groundwater Contact (GC) RBSL	11,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	6.1E+5	25	19,000	15,000	56,000 {S}	56,000 {S}	56,000 {S}	61,000 {S}	31,000 {S}	25,000 {S}		
Screening Levels (µg/L)																
Water Solubility	1.75E+6	5.26E+5	1.69E+5	1.86E+5	4.68E+7	4.20E+6	8.52E+6	NA	56,000	55,890	55,890	61,150	31,000	24,600		
Flammability and Explosivity Screening Level	68,000	61,000	43,000	70,000	ID	ID	2.5E+6	ID	29,000	56,000 {S}	56,000 {S}	ID	NA	ID		
Acute Inhalation Screening Level	67,000	ID	1.7E+5 {S}	1.9E+5 {S}	ID	ID	ID	ID	ID	ID	ID	ID	31,000 {S}	ID		

Applicable Criteria Exceeded  
**BOLD** Value Exceeds Applicable Criteria  
bgs Below Grade Surface (feet)  
<sup>1</sup> Rule 323.1057 of Part 4 Water Quality Standards  
<sup>2</sup> 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance.

TABLE 6  
SUMMARY OF 2014 GROUNDWATER ANALYTICAL RESULTS  
VOCS, PNAS, AND METALS  
2483 WEST MAPLE ROAD, BIRMINGHAM, MI  
PM PROJECT #02-3004-3

VOLATILE ORGANIC COMPOUNDS (VOCs), POLYNUCLEAR AROMATIC HYDROCARBONS (PNAs), AND METALS (CADMIUM, CHROMIUM, AND LEAD)  (µg/L)				Benzene	Ethylbenzene	Methyl-tert-butyl ether (MTBE)	Naphthalene	n-Propylbenzene	Toluene	1,2,3-Trimethylbenzene <sup>5</sup>	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes	Other VOCs	Other PNAs	Cadmium	Chromium	Lead
Chemical Abstract Service Number (CAS#)				71432	100414	1634044	91203	103651	108883	526738	95636	108678	1330207	Various	Various	7440439	16065831	7439921
Sample ID	Sample Date	Screen Depth (feet bgs)	Depth to Groundwater (feet bgs)	VOCs											PNAs	Metals		
TMW-32	07/25/2014	3.9-8.9	5.46	<1	<1	78	<5	<1	<1	<1	<1	<1	<3	ND	ND	<0.5	<5	5
TMW-33	07/25/2014	5.0-10.0	6.65	<1	<1	33	6	2	<1	<1	<1	<1	<3	ND	ND	<0.5	<5	5
TMW-35	07/25/2014	5.0-10.0	3.90	60	20	<50	<50	<10	<10	160	380	200	290	ND	NA	NA	NA	NA
TMW-36	07/25/2014	4.1-9.1	6.52	<10	60	<50	<50	60	30	40	140	40	130	ND	NA	NA	NA	NA
TMW-38	07/25/2014	4.0-9.0	6.87	37	11	320	<30	10	<5	<5	<5	<5	<15	ND	NA	NA	NA	NA
PMW-3	07/28/2014	2.0-7.0	3.21	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
PMW-4	07/25/2014	4.0-9.0	5.90	1	<1	46	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
PMW-5	07/25/2014	3.0-8.0	7.82	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
PMW-7	07/28/2014	3.0-8.0	5.50	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
PMW-8	07/28/2014	3.0-8.0	5.70	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
PMW-9	07/28/2014	3.0-8.0	4.83	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
OW-10	07/28/2014	3.0-8.0	3.10	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
OW-11	07/25/2014	6.5-11.5	8.70	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
OW-12	07/28/2014	5.0-10.0	4.72	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
OW-13	07/28/2014	4.5-9.5	5.44	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
OW-4R	07/25/2014	5.0-10.0	4.42	620	<10	<50	<50	20	20	<10	<10	<10	60	ND	NA	NA	NA	NA
OW-5R	07/25/2014	5.0-10.0	5.02	160	50	200	<100	<20	<20	80	100	70	530	ND	NA	NA	NA	NA
OW-2RR	07/25/2014	3.0-8.0	3.70	1,600	400	<500	<500	<100	300	200	400	200	2,200	ND	NA	NA	NA	NA
OW-3RR	07/25/2014	4.0-9.0	3.50	2,910	220	<300	<300	<50	210	120	240	90	1,180	ND	NA	NA	NA	NA
OW-7R	07/25/2014	5.0-10.0	3.47	270	20	<50	<50	40	<10	50	30	<10	60	ND	NA	NA	NA	NA
A-2 (Co-locate OW-7R)				300	20	<50	<50	40	<10	40	20	<10	40	ND	NA	NA	NA	NA
MW-X	07/28/2014	2.0-7.0	4.41	<1	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
MW-Y	07/28/2014	4.0-9.0	4.80	15	<1	<5	<5	3	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
MW-Z	07/25/2014	2.0-7.0	3.40	103	<5	<30	<30	32	5	<5	<5	<5	20	ND	NA	NA	NA	NA
MW-ZZ	07/25/2014	2.0-7.0	4.44	2	<1	<5	<5	<1	<1	<1	<1	<1	<3	ND	NA	NA	NA	NA
Cleanup Criteria Requirements for Response Activity (R 299.1 - R 299.50) Generic Groundwater Cleanup Criteria Table 1: Residential and Non-Residential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Risk-Based Screening Levels, December 30, 2013 MDEQ Guidance Document For The Vapor Intrusion Pathway, Policy and Procedure Number: 09-017, Appendix D Vapor Intrusion Screening Values, May 2013																		
Residential/Nonresidential (µg/L)																		
Residential Drinking Water (Res DW)				5.0 {A}	74 {E}	40 {E}	520	80	790 {E}	63 {E}	63 {E}	72 {E}	280 {E}	Various	Various	5.0 {A}	100 {A}	4.0 {L}
Residential Health Based Drinking Water Values				NL	700 {E}	240 {E}	NL	NL	1,000 {E}	NL	1,000 {E}	1,000 {E}	10,000 {E}	Various	Various	NL	NL	NL
Nonresidential Drinking Water (Nonres DW)				5.0 {A}	74 {E}	40 {E}	1,500	230	790 {E}	63 {E}	63 {E}	72 {E}	280 {E}	Various	Various	5.0 {A}	100 {A}	4.0 {L}
Nonresidential Health Based Drinking Water Values				NL	700 {E}	690 {E}	NL	NL	1,000 {E}	NL	2,900 {E}	2,900 {E}	10,000 {E}	Various	Various	NL	NL	NL
Groundwater Surface Water Interface (GSI)				200 {X}	18	7,100 {X}	11	ID	270	17	17	45	41	Various	Various	{G,X}	11	2.5E+06 {G,X}
Residential Groundwater Volatilization to Indoor Air Inhalation (Res GVII) <sup>2</sup>				5,600	1.10E+05	4.7E+7 {S}	31,000 {S}	ID	5.3E+5 {S}	56,000 {S}	56,000 {S}	61,000 {S}	1.9E+5 {S}	Various	Various	NLV	NLV	NLV
Nonresidential Groundwater Volatilizationto Indoor Air Inhalation (Nonres GVII) <sup>2</sup>				35,000	1.7E+5 {S}	4.7E+7 {S}	31,000 {S}	ID	5.3E+5 {S}	56,000 {S}	56,000 {S}	61,000 {S}	1.9E+5 {S}	Various	Various	NLV	NLV	NLV
Screening Levels (µg/L)																		
Residential Groundwater Vapor Intrusion Screening Levels (GW <sub>VI-res</sub> ) <sup>3</sup>				27	700	2.50E+05	2.40E+02	92	36,000	2,400	1,700	1200	10,000	Various	Various	NL	NL	NL
Nonresidential Groundwater Vapor Intrusion Screening Levels (GW <sub>VI-nr</sub> ) <sup>3</sup>				140	2600	1.00E+06	1.20E+03	390	1.50E+05	10,000	7,300	5,100	10,000	Various	Various	NL	NL	NL
Water Solubility				1.75E+06	1.69E+05	4.68E+07	3.10E+04	NA	5.26E+05	56,000	56,000	61,000	1.86E+05	Various	Various	NA	NA	NA
Flammability and Explosivity Screening Level				68,000	43,000	ID	NA	ID	61,000	56,000 {S}	56,000 {S}	ID	70,000	Various	Various	ID	ID	ID

Applicable Criteria/RBSL Exceeded

**BOLD** Value Exceeds Applicable Criteria

bgs Below Ground Surface (feet)

ND Not detected at levels above the laboratory Method Detection Limit (MDL) or Minimum Quantitative Level (MQL)

<sup>1</sup> Rule 323.1057 of Part 4 Water Quality Standards

<sup>2</sup> Tier 1 GVII Criteria based on 3 meter (or greater) groundwater depth

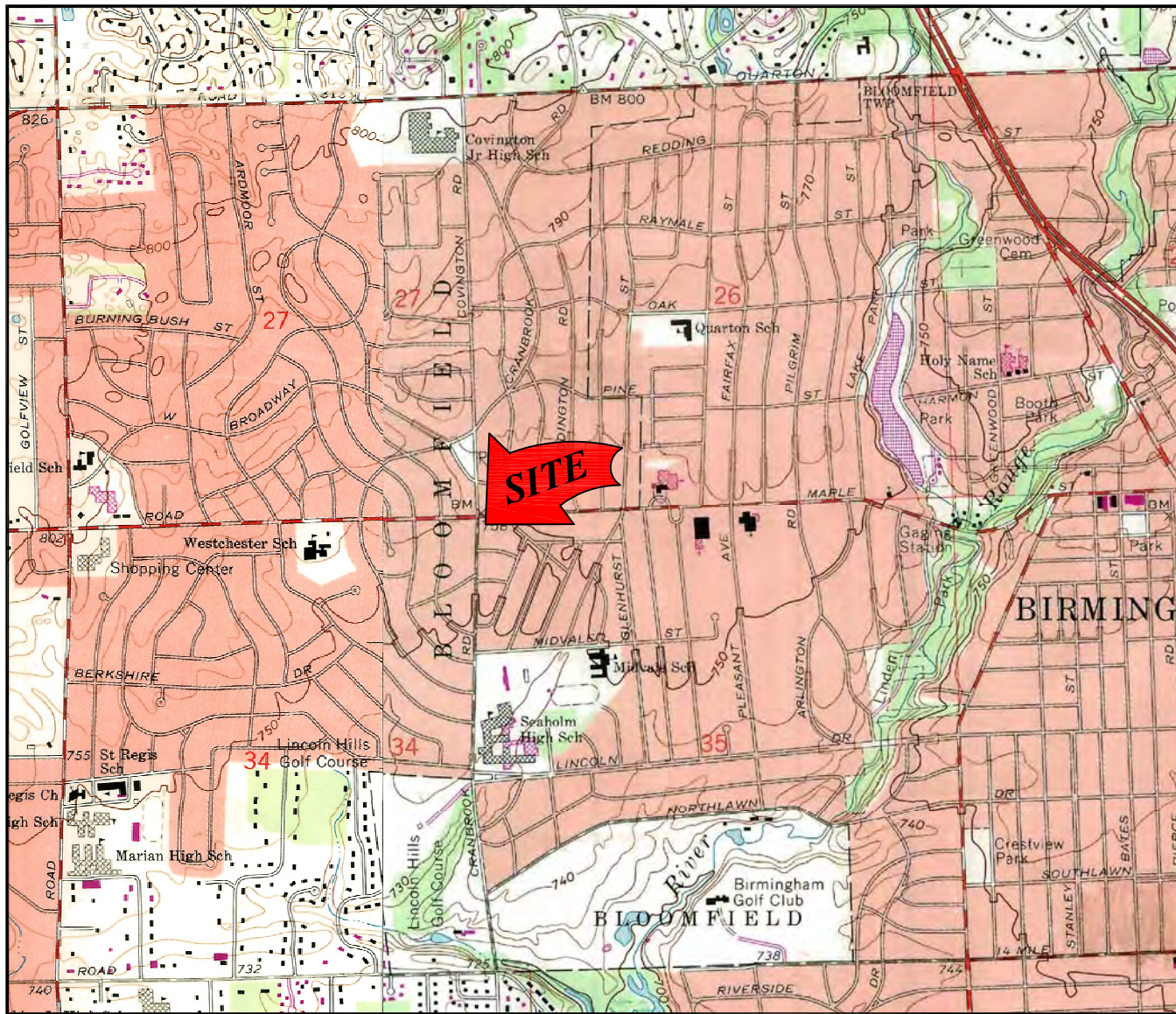
<sup>3</sup> (2013 Vapor Intrusion Guidance) Screening Levels based on depth to groundwater less than 1.5 meters and not in contact with building foundation

NA/NL/ID Not Applicable/Not Listed/Insufficient Data

NLL/NLV Not Likely to Leach/Not Likely to Volatilize

{G} Metal GSIP Criteria for Surface Water Protected for Drinking Water Use based on 418 mg/L CaCO3 Hardness: Station ID 630003, Rouge River at Wattles Road, City of Troy, MI.

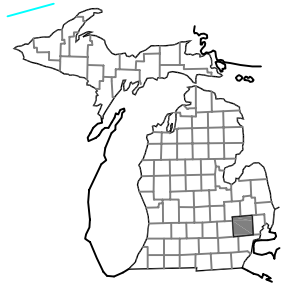
## Appendix C



6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

T: 2N, R: 10E, Sec. 35

## OAKLAND COUNTY



MICHIGAN QUADRANGLE LOCATION

1 MILE

1/2 MILE

SCALE 1:24,000

0

1 MILE

FIGURE 1

PROPERTY VICINITY MAP  
USGS, 7.5 MINUTE SERIES

BIRMINGHAM, MI QUADRANGLE, 1968. PHOTO REVISED 1982.



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ISO 9001 REGISTERED

PROJ:  
RETAIL GASOLINE STATION  
2483 WEST MAPLE ROAD  
BIRMINGHAM, MI

**THIS IS NOT A LEGAL  
SURVEY**

VERIFY SCALE

0 1"

IF NOT 1" ON THIS  
SHEET, ADJUST  
SCALES ACCORDINGLY.

DRN BY: MW

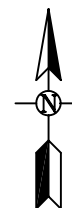
DATE: 9/30/2009

CHKD BY: JR

SCALE: 1" : 24,000'

FILE NAME:

02-3004-0F01R00



# Property Location Map



- 2 Foot Contours
- 5 Foot Contours
- FEMA Base Flood Elevations
- FEMA Cross Sections
- 100 yr - FEMA Floodplain
- 100 yr (detailed) - FEMA Floodplain
- 500 yr - FEMA Floodplain
- FLOODWAY - FEMA Floodplain

Disclaimer: The information provided herewith has been compiled from recorded deeds, plats, tax maps, surveys and other public records. It is not a legally recorded map or survey and is not intended to be used as one. Users should consult the information sources mentioned above when questions arise. FEMA Floodplain data may not always be present on the map.



**L. Brooks Patterson**  
Oakland County Executive

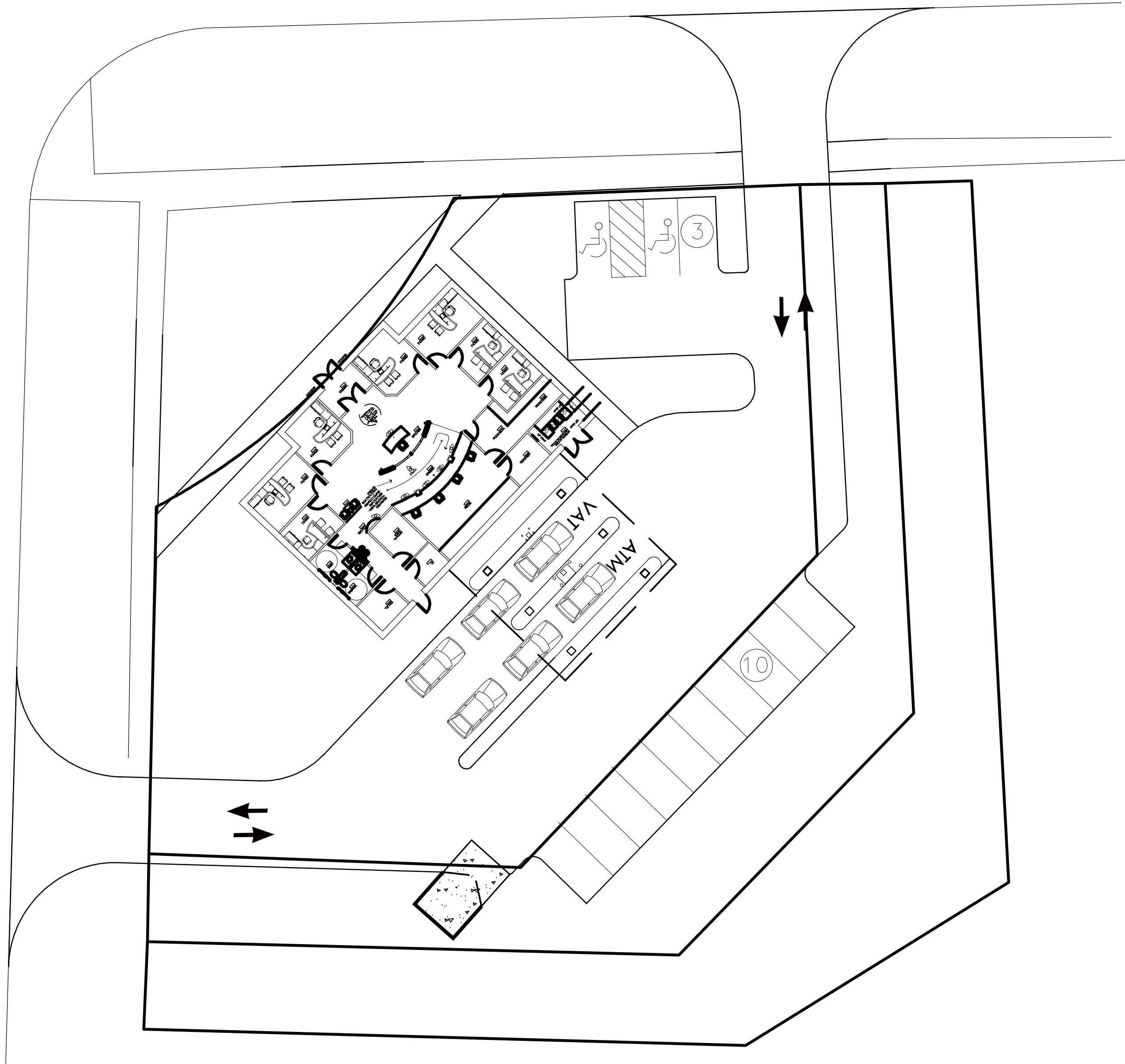
Date Created: 2/16/2015



## Appendix D

CRANBROOK ROAD

MAPLE ROAD



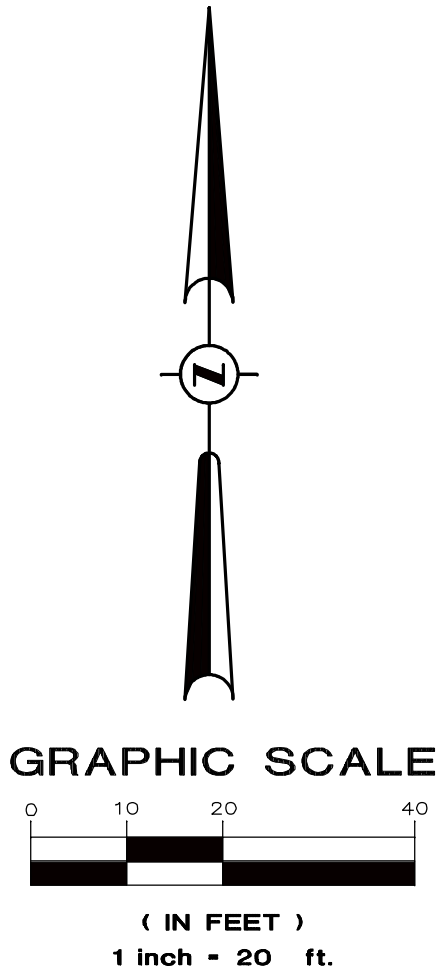
PARKING

REQUIRED NUMBER OF PARKING SPACES:

BANKS	REQUIREMENT		REQUIRED PARKING
	1 SPACE FOR EACH 300 SQ FT OF FLOOR AREA	3,531 GSFT	
	? STACKING SPACES FOR EACH WINDOW OR ATM		

PROVIDED NUMBER OF PARKING SPACES:  
13 PARKING SPACES, INCLUDING 2 ADA SPACES  
6 STACKING SPACES (3 EACH LANE AND AT ATM)

12 SPACES REQUIRED  
?? STACKS REQUIRED



BULK REGULATIONS

	REQUIRED TZ3 OVERLAY	PROVIDED
OPEN SPACE	XX	
MINIMUM FLOOR AREA	XX	
MAX. HEIGHT OF STRUCTURES	38'	
SETBACKS		
FRONT (N)	0'	
SIDE (E)	NONE	
SIDE (W)	NONE	
REAR (N)	10'	

SITE INFORMATION

PROPERTY INFORMATION

SITE ADDRESS  
MAPLE ROAD  
BIRMINGHAM, MI

ZONING CLASSIFICATION  
TZ3 OVERLAY DISTRICT

CLIENT INFORMATION

STRATEGIC PROPERTY SERVICES, LLC  
5750 NEW KING STREET, SUITE 120  
TROY, MI 48068

DFCU FINANCIAL - CITY OF BIRMINGHAM  
STRATEGIC PROPERTY SERVICES, LLC

MAPLE ROAD AND CRANBROOK ROAD  
CITY OF BIRMINGHAM  
OAKLAND COUNTY, MICHIGAN

OVERALL SITE PLAN

RICHARD L. FOSGITT, PE - CONSULTANT

393 River Road - Bay City, MI 48706  
989-513-4088

CONFIDENTIAL:  
Drawings contain confidential, proprietary,  
and copyrighted information.  
Reproduction or distribution of drawings  
or any information contained in these  
drawings without the written  
approval of the Owner.

PREPARED UNDER THE  
SUPERVISION OF:

PROJECT LOG		DATE	REVISION
FILE #	OVERALL		
PROJ. MGR:	RLF		
DESIGN BY:	RLF		
DRAWN BY:	RLF		
CHECKED BY:	RLF		
SCALE:	1"=20'		
SHEET:	NONE		
	1	OF	1

C1

140401

## Appendix E

**Table 1: 2483 West Maple Road, Birmingham - Eligible Activities Cost Estimates**

Item/Activity	Total Estimated Cost	School and/or Local MDEQ Act 381 Eligible Activities	Local Only Act 381 Eligible Activities
<b>Due Care Activities</b>			
Installation of a Vapor Barrier	\$ 50,000	\$ 24,820	\$ 25,180 *
Disposal of Groundwater During Excavation Activities (40,000 gallons at \$0.50/gallon)	\$ 20,000		\$ 20,000
Transportation and disposal of contaminated soil (1,806 cubic yards at \$55/yard)			
Transportation (approximately \$25/cubic yard)	\$ 45,150		\$ 45,150
Disposal to a Type II Landfill (approximately \$30/cubic yards)	\$ 54,180		\$ 54,180
Oversight and VSR Sampling for Gas VOCs and Gasoline Range Organics (GRO)	\$ 15,000		\$ 15,000
Reporting	5,000		\$ 5,000
<b>Due Care Activities Sub-Total</b>	<b>\$ 189,330</b>	<b>\$ 24,820</b>	<b>\$ 164,510</b>
<b>Additional Response Activities</b>			
Additional Delineation along Utility Corridors of Soil/Groundwater and Soil Gas	\$ 10,000		\$ 10,000
Four Quarters of Groundwater Sampling/Install up to 3 New Source Wells	\$ 10,000		\$ 10,000
Reporting	\$ 5,000		\$ 5,000
<b>Additional Response Activities Sub-Total</b>	<b>\$ 25,000</b>	<b>\$ -</b>	<b>\$ 25,000</b>
<b>Preparation of Brownfield Plan</b>			
Brownfield Plan	\$ 7,600	\$ 3,773	\$ 3,827
<b>Brownfield Sub-Total</b>	<b>\$ 7,600</b>	<b>\$ 3,773</b>	<b>\$ 3,827</b>
<b>Total Cost of Developer Eligible Activities to be Funded Through TIF</b>	<b>\$ 221,930</b>	<b>\$ 28,593</b>	<b>\$ 193,337</b>

\*Based on the estimated reimbursement, it is not anticipated that the local tax capture for the installation of a vapor barrier will be available within the duration of the brownfield plan. Therefore, this expense is not reflected in the total. However, should the funds become available, they will be utilized to reimburse this expense.

## **TABLE 1 ELIGIBLE BROWNFIELD COST SUMMARY**

This document provides a detailed description of the redevelopment activities proposed for inclusion in the Brownfield Plan for the property located at 2483 West Maple Road in Birmingham, Oakland County, Michigan.

### **Due Care Activities**

Based on existing topography and the preliminary grading plan, it is estimated that up to 2,500 cubic yards of contaminated soil will require transportation and proper disposal from the site in association with development activities as well as the disposal of approximately 40,000 gallons of contaminated groundwater. This plan accounts for up to 1,806 cubic yards of contaminated soil to be transported and disposed of at a Type II Landfill as well as the disposal of up to 40,000 gallons of contaminated groundwater.

If necessary, this brownfield plan includes the installation of a vapor barrier prior to occupancy, to prevent soil gas from entering the building and prevent potential inhalation exposures to occupants.

### **Additional Response Activities**

Additional delineation along utility corridors of soil and groundwater and soil gas will be necessary along with oversight and VSR sampling for gasoline volatile organic compounds (VOCs) and Gasoline Range Organics (GRO).

Four quarters of groundwater sampling with the potential to install up to three new source wells to verify the groundwater plume is stable and/or decreasing.

This plan also includes reporting associated with additional response activities.

### **Brownfield Plan**

This brownfield plan to be completed is considered an eligible activity.

Tax Increment Financing Estimates  
Table 2

		2015	2016	2017	2018	2019	2020	2021	2022	2023
			YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8
Base Taxable Value		\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380
Estimated New Taxable Value (estimated increase of 1%/year)			\$ 550,000	\$ 550,000	\$ 555,500	\$ 561,055	\$ 566,666	\$ 572,332	\$ 578,056	\$ 583,836
Incremental Difference (New Taxable Value <i>minus</i> Taxable Value)			\$ 153,620	\$ 153,620	\$ 159,120	\$ 164,675	\$ 170,286	\$ 175,952	\$ 181,676	\$ 187,456
<b>Local Taxes - Millage</b>										
County Operating	4.1900		\$ 644	\$ 644	\$ 667	\$ 690	\$ 713	\$ 737	\$ 761	\$ 785
OIS Allocated	0.2003		\$ 31	\$ 31	\$ 32	\$ 33	\$ 34	\$ 35	\$ 36	\$ 38
OIS Voted	3.1687		\$ 487	\$ 487	\$ 504	\$ 522	\$ 540	\$ 558	\$ 576	\$ 594
OCC Voted	1.5844		\$ 243	\$ 243	\$ 252	\$ 261	\$ 270	\$ 279	\$ 288	\$ 297
City Operating	11.6883		\$ 1,796	\$ 1,796	\$ 1,860	\$ 1,925	\$ 1,990	\$ 2,057	\$ 2,123	\$ 2,191
Refuse	0.9585		\$ 147	\$ 147	\$ 153	\$ 158	\$ 163	\$ 169	\$ 174	\$ 180
Library	1.1000		\$ 169	\$ 169	\$ 175	\$ 181	\$ 187	\$ 194	\$ 200	\$ 206
County Pk & Rec	0.2415		\$ 37	\$ 37	\$ 38	\$ 40	\$ 41	\$ 42	\$ 44	\$ 45
HCMA	0.2146		\$ 33	\$ 33	\$ 34	\$ 35	\$ 37	\$ 38	\$ 39	\$ 40
OCPTA	1.0000		\$ 154	\$ 154	\$ 159	\$ 165	\$ 170	\$ 176	\$ 182	\$ 187
Total Local Taxes (capturable)	24.3463		\$ 3,740	\$ 3,740	\$ 3,874	\$ 4,009	\$ 4,146	\$ 4,284	\$ 4,423	\$ 4,564
<b>School Taxes</b>										
School Operating	18.0000		\$ 2,765	\$ 2,765	\$ 2,864	\$ 2,964	\$ 3,065	\$ 3,167	\$ 3,270	\$ 3,374
SET	6.0000		\$ 922	\$ 922	\$ 955	\$ 988	\$ 1,022	\$ 1,056	\$ 1,090	\$ 1,125
Total School Taxes	24.0000		\$ 3,687	\$ 3,687	\$ 3,819	\$ 3,952	\$ 4,087	\$ 4,223	\$ 4,360	\$ 4,499
<b>Non-Capturable Millages</b>										
School Debt	3.9000		\$ 599	\$ 599	\$ 621	\$ 642	\$ 664	\$ 686	\$ 709	\$ 731
City Debt	1.3394		\$ 206	\$ 206	\$ 213	\$ 221	\$ 228	\$ 236	\$ 243	\$ 251
Zoo Authority	0.1000		\$ 15	\$ 15	\$ 16	\$ 16	\$ 17	\$ 18	\$ 18	\$ 19
Art Institute	0.2000		\$ 31	\$ 31	\$ 32	\$ 33	\$ 34	\$ 35	\$ 36	\$ 37
Total Non-Capturable Millages	5.5394		\$ 851	\$ 851	\$ 881	\$ 912	\$ 943	\$ 975	\$ 1,006	\$ 1,038
Local Annual Tax Increment Revenue			\$ 3,740	\$ 3,740	\$ 3,874	\$ 4,009	\$ 4,146	\$ 4,284	\$ 4,423	\$ 4,564
3 Mills of SET to State Brownfield Redevelopment Fund	3.0000		\$ 461	\$ 461	\$ 477	\$ 494	\$ 511	\$ 528	\$ 545	\$ 562
School Annual Tax Increment Revenue (after State BF Fund)			\$ 3,226	\$ 3,226	\$ 3,342	\$ 3,458	\$ 3,576	\$ 3,695	\$ 3,815	\$ 3,937
Annual Tax Increment Revenue			\$ 6,966	\$ 6,966	\$ 7,216	\$ 7,467	\$ 7,722	\$ 7,979	\$ 8,238	\$ 8,500
Annual Cumulative Incremental Taxes			\$ 6,966	\$ 13,932	\$ 21,148	\$ 28,615	\$ 36,337	\$ 44,316	\$ 52,554	\$ 61,054
Local-Only Reimbursed Expenses			\$ 3,740	\$ 3,740	\$ 3,874	\$ 4,009	\$ 4,146	\$ 4,284	\$ 4,423	\$ 4,564
Unreimbursed Eligible Expenses		\$ 193,337	\$ 189,597	\$ 185,857	\$ 181,983	\$ 177,974	\$ 173,828	\$ 169,544	\$ 165,121	\$ 160,557
<b>MDEQ Reimbursed Expenses</b>										
School Taxes			\$ 3,226	\$ 3,226	\$ 3,342	\$ 3,458	\$ 3,576	\$ 3,695	\$ 3,815	\$ 3,937
Unreimbursed Eligible Expenses		\$ 28,593	\$ 25,367	\$ 22,141	\$ 18,799	\$ 15,341	\$ 11,765	\$ 8,070	\$ 4,255	\$ 318

Tax Ratio	Millages	Percentage
Local Tax	24.3463	50.36%
School Tax	24.0000	49.64%
Total	48.3463	100.00%

## Table 2

2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
YR9	YR10	YR11	YR12	YR13	YR14	YR15	YR16	YR17	YR18	YR19	YR20	YR21	YR22	YR23
\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380
\$ 589,674	\$ 595,571	\$ 601,527	\$ 607,542	\$ 613,618	\$ 619,754	\$ 625,951	\$ 632,211	\$ 638,533	\$ 644,918	\$ 651,367	\$ 657,881	\$ 664,460	\$ 671,105	\$ 677,816
\$ 193,294	\$ 199,191	\$ 205,147	\$ 211,162	\$ 217,238	\$ 223,374	\$ 229,571	\$ 235,831	\$ 242,153	\$ 248,538	\$ 254,987	\$ 261,501	\$ 268,080	\$ 274,725	\$ 281,436
\$ 810	\$ 835	\$ 860	\$ 885	\$ 910	\$ 936	\$ 962	\$ 988	\$ 1,015	\$ 1,041	\$ 1,068	\$ 1,096	\$ 1,123	\$ 1,151	\$ 1,179
\$ 39	\$ 40	\$ 41	\$ 42	\$ 44	\$ 45	\$ 46	\$ 47	\$ 49	\$ 50	\$ 51	\$ 52	\$ 54	\$ 55	\$ 56
\$ 612	\$ 631	\$ 650	\$ 669	\$ 688	\$ 708	\$ 727	\$ 747	\$ 767	\$ 788	\$ 808	\$ 829	\$ 849	\$ 871	\$ 892
\$ 306	\$ 316	\$ 325	\$ 335	\$ 344	\$ 354	\$ 364	\$ 374	\$ 383.67	\$ 393.78	\$ 404.00	\$ 414.32	\$ 424.75	\$ 435.27	\$ 445.91
\$ 2,259	\$ 2,328	\$ 2,398	\$ 2,468	\$ 2,539	\$ 2,611	\$ 2,683	\$ 2,756	\$ 2,830	\$ 2,905	\$ 2,980	\$ 3,057	\$ 3,133	\$ 3,211	\$ 3,290
\$ 185	\$ 191	\$ 197	\$ 202	\$ 208	\$ 214	\$ 220	\$ 226	\$ 232	\$ 238	\$ 244	\$ 251	\$ 257	\$ 263	\$ 270
\$ 213	\$ 219	\$ 226	\$ 232	\$ 239	\$ 246	\$ 253	\$ 259	\$ 266	\$ 273	\$ 280	\$ 288	\$ 295	\$ 302	\$ 310
\$ 47	\$ 48	\$ 50	\$ 51	\$ 52	\$ 54	\$ 55	\$ 57	\$ 58	\$ 60	\$ 62	\$ 63	\$ 65	\$ 66	\$ 68
\$ 41	\$ 43	\$ 44	\$ 45	\$ 47	\$ 48	\$ 49	\$ 51	\$ 52	\$ 53	\$ 55	\$ 56	\$ 58	\$ 59	\$ 60
\$ 193	\$ 199	\$ 205	\$ 211	\$ 217	\$ 223	\$ 230	\$ 236	\$ 242	\$ 249	\$ 255	\$ 262	\$ 268	\$ 275	\$ 281
\$ 4,706	\$ 4,850	\$ 4,995	\$ 5,141	\$ 5,289	\$ 5,438	\$ 5,589	\$ 5,742	\$ 5,896	\$ 6,051	\$ 6,208	\$ 6,367	\$ 6,527	\$ 6,689	\$ 6,852
\$ 3,479	\$ 3,585	\$ 3,693	\$ 3,801	\$ 3,910	\$ 4,021	\$ 4,132	\$ 4,245	\$ 4,359	\$ 4,474	\$ 4,590	\$ 4,707	\$ 4,825	\$ 4,945	\$ 5,066
\$ 1,160	\$ 1,195	\$ 1,231	\$ 1,267	\$ 1,303	\$ 1,340	\$ 1,377	\$ 1,415	\$ 1,453	\$ 1,491	\$ 1,530	\$ 1,569	\$ 1,608	\$ 1,648	\$ 1,689
\$ 4,639	\$ 4,781	\$ 4,924	\$ 5,068	\$ 5,214	\$ 5,361	\$ 5,510	\$ 5,660	\$ 5,812	\$ 5,965	\$ 6,120	\$ 6,276	\$ 6,434	\$ 6,593	\$ 6,754
\$ 754	\$ 777	\$ 800	\$ 824	\$ 847	\$ 871	\$ 895	\$ 920	\$ 944	\$ 969	\$ 994	\$ 1,020	\$ 1,046	\$ 1,071	\$ 1,098
\$ 259	\$ 267	\$ 275	\$ 283	\$ 291	\$ 299	\$ 307	\$ 316	\$ 324	\$ 333	\$ 342	\$ 350	\$ 359	\$ 368	\$ 377
\$ 19	\$ 20	\$ 21	\$ 21	\$ 22	\$ 22	\$ 23	\$ 24	\$ 24	\$ 25	\$ 25	\$ 26	\$ 27	\$ 27	\$ 28
\$ 39	\$ 40	\$ 41	\$ 42	\$ 43	\$ 45	\$ 46	\$ 47	\$ 48	\$ 50	\$ 51	\$ 52	\$ 54	\$ 55	\$ 56
\$ 1,071	\$ 1,103	\$ 1,136	\$ 1,170	\$ 1,203	\$ 1,237	\$ 1,272	\$ 1,306	\$ 1,341	\$ 1,377	\$ 1,412	\$ 1,449	\$ 1,485	\$ 1,522	\$ 1,559
\$ 4,706	\$ 4,850	\$ 4,995	\$ 5,141	\$ 5,289	\$ 5,438	\$ 5,589	\$ 5,742	\$ 5,896	\$ 6,051	\$ 6,208	\$ 6,367	\$ 6,527	\$ 6,689	\$ 6,852
\$ 580	\$ 598	\$ 615	\$ 633	\$ 652	\$ 670	\$ 689	\$ 707	\$ 726	\$ 746	\$ 765	\$ 785	\$ 804	\$ 824	\$ 844
\$ 4,059	\$ 4,183	\$ 4,308	\$ 4,434	\$ 4,562	\$ 4,691	\$ 4,821	\$ 4,952	\$ 5,085	\$ 5,219	\$ 5,355	\$ 5,492	\$ 5,630	\$ 5,769	\$ 5,910
\$ 8,765	\$ 9,033	\$ 9,303	\$ 9,575	\$ 9,851	\$ 10,129	\$ 10,410	\$ 10,694	\$ 10,981	\$ 11,270	\$ 11,563	\$ 11,858	\$ 12,156	\$ 12,458	\$ 12,762
\$ 69,820	\$ 78,852	\$ 88,155	\$ 97,730	\$ 107,581	\$ 117,710	\$ 128,121	\$ 138,815	\$ 149,795	\$ 161,066	\$ 172,628	\$ 184,487	\$ 196,643	\$ 209,101	\$ 221,863
\$ 4,706	\$ 4,850	\$ 4,995	\$ 5,141	\$ 5,289	\$ 5,438	\$ 5,589	\$ 5,742	\$ 5,896	\$ 6,051	\$ 6,208	\$ 6,367	\$ 6,527	\$ 6,689	\$ 6,852
\$ 155,851	\$ 151,002	\$ 146,007	\$ 140,866	\$ 135,577	\$ 130,139	\$ 124,550	\$ 118,808	\$ 112,913	\$ 106,862	\$ 100,654	\$ 94,287	\$ 87,760	\$ 81,072	\$ 74,220
\$ 318														
\$ -														

## Table 2

2039 YR24	2040 YR25	2041 YR26	2042 YR27	2043 YR28	2044 YR29	2045 YR30	
\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 396,380	\$ 390,140	
\$ 684,594	\$ 691,440	\$ 698,354	\$ 705,338	\$ 712,391	\$ 719,515	\$ 726,710	
\$ 288,214	\$ 295,060	\$ 301,974	\$ 308,958	\$ 316,011	\$ 323,135	\$ 336,570	
\$ 1,208	\$ 1,236	\$ 1,265	\$ 1,295	\$ 1,324	\$ 1,354	\$ 1,410	\$ 29,592
\$ 58	\$ 59	\$ 60	\$ 62	\$ 63	\$ 65	\$ 67	\$ 1,415
\$ 913	\$ 935	\$ 957	\$ 979	\$ 1,001	\$ 1,024	\$ 1,066	\$ 22,379
\$ 456.65	\$ 467.49	\$ 478.45	\$ 489.51	\$ 500.69	\$ 511.97	\$ 533.26	\$ 11,190
\$ 3,369	\$ 3,449	\$ 3,530	\$ 3,611	\$ 3,694	\$ 3,777	\$ 3,934	\$ 82,549
\$ 276	\$ 283	\$ 289	\$ 296	\$ 303	\$ 310	\$ 323	\$ 6,769
\$ 317	\$ 325	\$ 332	\$ 340	\$ 348	\$ 355	\$ 370	\$ 7,769
\$ 70	\$ 71	\$ 73	\$ 75	\$ 76	\$ 78	\$ 81	\$ 1,706
\$ 62	\$ 63	\$ 65	\$ 66	\$ 68	\$ 69	\$ 72	\$ 1,516
\$ 288	\$ 295	\$ 302	\$ 309	\$ 316	\$ 323	\$ 337	\$ 7,063
\$ 7,017	\$ 7,184	\$ 7,352	\$ 7,522	\$ 7,694	\$ 7,867	\$ 8,194	\$ 171,947
\$ 5,188	\$ 5,311	\$ 5,436	\$ 5,561	\$ 5,688	\$ 5,816	\$ 6,058	\$ 127,126
\$ 1,729	\$ 1,770	\$ 1,812	\$ 1,854	\$ 1,896	\$ 1,939	\$ 2,019	\$ 42,375
\$ 6,917	\$ 7,081	\$ 7,247	\$ 7,415	\$ 7,584	\$ 7,755	\$ 8,078	\$ 169,501
\$ 1,124	\$ 1,151	\$ 1,178	\$ 1,205	\$ 1,232	\$ 1,260	\$ 1,313	\$ 27,544
\$ 386	\$ 395	\$ 404	\$ 414	\$ 423	\$ 433	\$ 451	\$ 9,460
\$ 29	\$ 30	\$ 30	\$ 31	\$ 32	\$ 32	\$ 34	\$ 706
\$ 58	\$ 59	\$ 60	\$ 62	\$ 63	\$ 65	\$ 67	\$ 1,413
\$ 1,597	\$ 1,634	\$ 1,673	\$ 1,711	\$ 1,751	\$ 1,790	\$ 1,864	\$ 39,122
\$ 7,017	\$ 7,184	\$ 7,352	\$ 7,522	\$ 7,694	\$ 7,867	\$ 8,194	
\$ 865	\$ 885	\$ 906	\$ 927	\$ 948	\$ 969	\$ 1,010	
\$ 6,052	\$ 6,196	\$ 6,341	\$ 6,488	\$ 6,636	\$ 6,786	\$ 7,068	
\$ 13,069	\$ 13,380	\$ 13,693	\$ 14,010	\$ 14,330	\$ 14,653	\$ 15,262	
\$ 234,932	\$ 248,312	\$ 262,005	\$ 276,016	\$ 290,345	\$ 304,998	\$ 320,261	
\$ 7,017	\$ 7,184	\$ 7,352	\$ 7,522	\$ 7,694	\$ 7,867	\$ 29,585	
\$ 67,203	\$ 60,019	\$ 52,667	\$ 45,145	\$ 37,452	\$ 29,585	\$ -	

## **BROWNFIELD REIMBURSEMENT AGREEMENT**

THIS AGREEMENT (the “Agreement”) dated \_\_\_\_\_, 2015 is entered into between the **CITY OF BIRMINGHAM** (“City”) and the **CITY OF BIRMINGHAM BROWNFIELD REDEVELOPMENT AUTHORITY** (the “Authority”), an authority established pursuant to 1996 PA 381, as amended (“Act 381”), whose addresses are 151 Martin Street, Birmingham, Michigan, 48009; and **Karana Real Estate, LLC** (the “Developer”), a Michigan limited liability company, whose address is 2483 West Maple Road, Birmingham, Michigan 48009.

### **RECITALS**

A. In accordance with Act 381, the Authority has adopted a Brownfield Plan for 2483 West Maple Road, Birmingham, Michigan that the City Commission of the City has approved (the “Brownfield Plan”).

B. The Developer owns property in the City located at 2483 West Maple Road (the “Property”), which is legally described on the attached Exhibit A. The Property is included in the Brownfield Plan as an eligible Property because it is a Facility due to the presence of certain hazardous substances on the Property as described in the Brownfield Plan.

C. The Developer plans to redevelop the Property by removing the existing building, removing and demolishing the existing underground storage tank (UST) system, and constructing a new bank building (the “Improvements”). The Improvements are intended to create temporary construction jobs and new full time jobs, increase the tax base within the City, and otherwise enhance the economic vitality and quality of life within the City.

D. Act 381, as amended permits the Authority to reimburse a developer for the costs of Eligible Activities on Eligible Property using Tax Increment Revenues generated by the redevelopment of the property.

E. To make the Improvements on the Property, the Developer will incur costs to conduct Eligible Activities—including Baseline Environmental Assessment Activities, Due Care Activities, Additional Response Activities, and the reasonable costs to prepare the Brownfield Plan—each of which will require the services of various contractors, engineers, environmental consultants, attorneys and other professionals (the “Eligible Costs”). The Eligible Costs, including contingencies, are estimated to be \$221,930 for developer reimbursement.

F. The Brownfield Plan Authorizes the use of Tax Increment Revenues that are generated by Local Taxes imposed on the Property to reimburse the Eligible Costs.

G. The parties are entering into this Agreement to establish the procedure for reimbursing the Eligible Costs and using Tax Increment Revenues in accordance with Act 381, as amended, and the Brownfield Plan.

Accordingly, the parties agree with each other as follows:

1. The Brownfield Plan

The Brownfield Plan is attached as Exhibit B and incorporated herein. To the extent provisions of the Brownfield Plan conflict with this Agreement, the terms and conditions of this Agreement control. To the extent provisions of the Brownfield Plan or this Agreement conflict with Act 381, as amended, Act 381 controls.

2. Term of Agreement

In accordance with the Brownfield Plan, the Authority shall capture the Tax Increment Revenues generated by the Improvements on the Property to reimburse the Eligible Costs until the earlier of the date that all the Eligible Costs are fully reimbursed under this Agreement or 30 years after the date the Authority begins to capture Tax Increment Revenues under the Brownfield Plan.

3. Eligible Activities

The Authority shall reimburse the Developer for Eligible Costs identified in the Brownfield Plan that were incurred before the City Commission approved the Brownfield Plan if permitted under Act 381, as amended. The Developer shall diligently pursue completion of the Eligible Activities set forth in the Brownfield Plan.

4. Reimbursement Source

During the term of this Agreement, the Authority shall capture the Tax Increment Revenues generated by the Improvements from Local Taxes imposed on the Property and any personal property located on the Property and use those Tax Increment Revenues to reimburse the Brownfield Plan Costs and the Eligible Costs in accordance with the Brownfield Plan and this Agreement.

5. Reimbursement Process

(a) On a quarterly basis, the Developer shall submit to the Authority requests for cost reimbursement for the Eligible Costs the Developer incurred during the prior period. These

requests shall be in the form attached as Exhibit C (“Petition”). The Petition shall identify whether the Eligible Activities are: (1) Baseline Environmental Assessment Activities; (2) Due Care Activities; (3) Additional Response Activities; or (4) the reasonable costs of developing and preparing the Brownfield Plan. The Petition shall describe each individual activity claimed as an Eligible Activity and the associated costs of that activity. Documentation of the costs incurred shall be included with the Petition including proof of payment and detailed invoices for the costs incurred sufficient to determine whether the costs incurred were for Eligible Activities. The Petition shall be signed by a duly authorized representative of Developer.

(b) The Authority shall review a Petition within 60 days after receiving the Petition. The Developer shall cooperate with the Authority by providing information and documentation to supplement the Petition as deemed reasonable and necessary by the Authority. The Authority shall identify in writing to Developer any costs deemed ineligible for reimbursement and the basis for the determination. The Developer then has 45 days to provide supplemental information or documents in support of any costs deemed ineligible by the Authority. Within 30 days after the Developer provides the supplemental information or documents, the Authority shall make a decision on the eligibility of the disputed cost and inform the Developer in writing of its determination. The Developer may appeal the Authority’s decision pursuant to law.

(c) Twice a year, after the summer and winter taxes are collected on the Property, the Authority shall capture the Tax Increment Revenues in accordance with the Brownfield Plan and use those Tax Increment Revenues to reimburse the Developer for approved Eligible Costs. The Authority is not obligated to reimburse the Developer for any approved Eligible Costs during any period of time that the Developer is delinquent in the payment of real or personal property taxes imposed on the Property.

(d) Interest is not an Eligible Cost.

(e) If there are insufficient funds available from Tax Increment Revenues captured under subparagraph (c) at any given time to pay all the Developer’s unreimbursed Eligible Costs, the Authority is not required to reimburse the Developer from any other source. The Authority shall, however, make additional payments toward the Developer’s remaining unreimbursed Eligible Costs in accordance with this Agreement as Tax Increment Revenues become available under subparagraph (c).

(f) The Authority shall reimburse the Developer for Eligible Costs as follows:

Check shall be payable to: Karana Real Estate, LLC  
Delivered to the following address: 2483 Maple Road Road  
Birmingham, Michigan 48009  
Attn: Sam Karana  
By certified mail

(g) If the Developer recovers costs of response activity paid with tax increment revenues that are captured pursuant to Act 381 from a person who is liable, the Developer will pay the Authority such costs. The Authority will disburse such costs, after any statutory deductions, to the local taxing jurisdictions in the proportion that the local taxing jurisdictions' taxes were captured. The costs so disbursed will be deducted from the reimbursements described in the Brownfield Plan.

6. Legislative Authorization

This Agreement is governed by and subject to the restrictions set forth in Act 381, as amended. If there is legislation enacted in the future that alters or affects the terms of this Agreement, including, but not limited to, the amount of Tax Increment Revenues subject to capture or the definition of Eligible Property or Eligible Activity, then the Developer's rights and the Authority's obligations under this Agreement may be modified accordingly by agreement of the parties.

7. Freedom of Information Act

The Developer stipulates that all Petitions and documentation submitted by Developer are open to the public under the Freedom of Information Act, Act No. 442 of the Public Acts of 1976, being Sections 15.23 to 15.24 of the Michigan Compiled Laws, and the Developer shall not bring any claim of trade secrets or other privilege or exception to the Freedom of Information Act related to Petitions and documentation submitted under this Agreement.

8. Plan Modification

The Brownfield Plan and this Agreement may be modified to the extent allowed under Act 381, as amended by mutual agreement of the parties.

9. Notices

All notices shall be given by registered or certified mail addressed to the parties at their respective addresses as shown above. Either party may change the address by written notice sent by registered or certified mail to the other party.

10. Assignment

The interest of any party under this Agreement shall not be assignable without the other party's written consent, which shall not be unreasonably withheld, except that the Developer may assign this Agreement for purposes of securing financing for the Improvements without the prior consent of the Authority.

11. Entire Agreement; Amendment

This Agreement constitutes the entire agreement between the parties. No other agreements, written, oral, express or implied, have been made or entered into by the parties concerning the subject matter of this Agreement. This Agreement may be modified or amended only by subsequent written agreement executed by all of the parties hereto. This Agreement has been the subject of negotiations between the parties and shall not be construed against any party as drafter.

12. Non-waiver

No delay or failure by either party to exercise any right under this Agreement, and no partial or single exercise of that right, shall constitute a waiver of that or any other right, unless otherwise expressly provided herein.

13. Headings

Headings in this Agreement are for convenience only and shall not be used to interpret or construe its provisions.

14. Governing Law

This Agreement shall be construed in accordance with and governed by the laws of the State of Michigan.

15. Counterparts

This Agreement may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same instrument.

16. Binding Effect

The provisions of this Agreement shall be binding upon and inure to the benefit of each of the parties and their respective heirs, legal representatives, successors, and assigns.

17. Definitions

Unless otherwise defined in this Agreement, the following terms have the definitions given to them by Act 381, as amended:

- (a) "Additional Response Activities" is defined by Section 2(a) of Act 381;
- (b) "Baseline Environmental Assessment" is defined by Section 2(c) of Act 381;

- (c) “Baseline Environmental Assessment Activities” is defined by Section 2(d) of Act 381;
- (d) “Brownfield Plan” is defined by Section 2(g) of Act 381;
- (e) “Due Care Activities” is defined by Section 2(l) of Act 381;
- (f) “Eligible Activities” is defined by Section 2(n) of Act 381;
- (g) “Eligible Property” is defined by Section 2(o) of Act 381;
- (h) “Facility” is defined by Section 2(q) of Act 381;
- (i) “Local Taxes” is defined by Section 2(y) of Act 381;
- (j) “Tax Increment Revenues” is defined by Section 2(ii) of Act 381;

**[signatures on next page]**

The parties have executed this Agreement of the dates set forth below.

**CITY OF BIRMINGHAM**

By: \_\_\_\_\_

Title: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**CITY OF BIRMINGHAM BROWNFIELD  
REDEVELOPMENT AUTHORITY**

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**Karana Real Estate, LLC**

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## **Exhibit A**

### Property Description

Land located in the City of Birmingham, Oakland County, Michigan, and described as:

Town 2 North, Range 10 East, Section 35, the Meyering Land Company's Birmingham Highlands Subdivision No. 1, Lots 170 to 176 inclusive.

## **Exhibit B**

Brownfield Plan

## Exhibit C

### Brownfield Request for Cost Reimbursement For Eligible Activities

Date: \_\_\_\_\_

Listed below are total costs expended for each eligible activity category for the expenses being submitted with this request. Attached is evidence of each cost item, including proof of payment and detailed invoices.

Eligible Activity Category		Total Cost
1	Phase II/BEA	
2	Due Care Activities	
3	Additional Response Activities	
4	Brownfield Plan preparation	
	Total Cost Reimbursement Request	

I certify that the information submitted on and with this Request for Cost Reimbursement is accurate and describes eligible costs described in the Brownfield Plan for this project approved by the City Commission of the City of Birmingham.

**Developer:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Address:** \_\_\_\_\_

\_\_\_\_\_

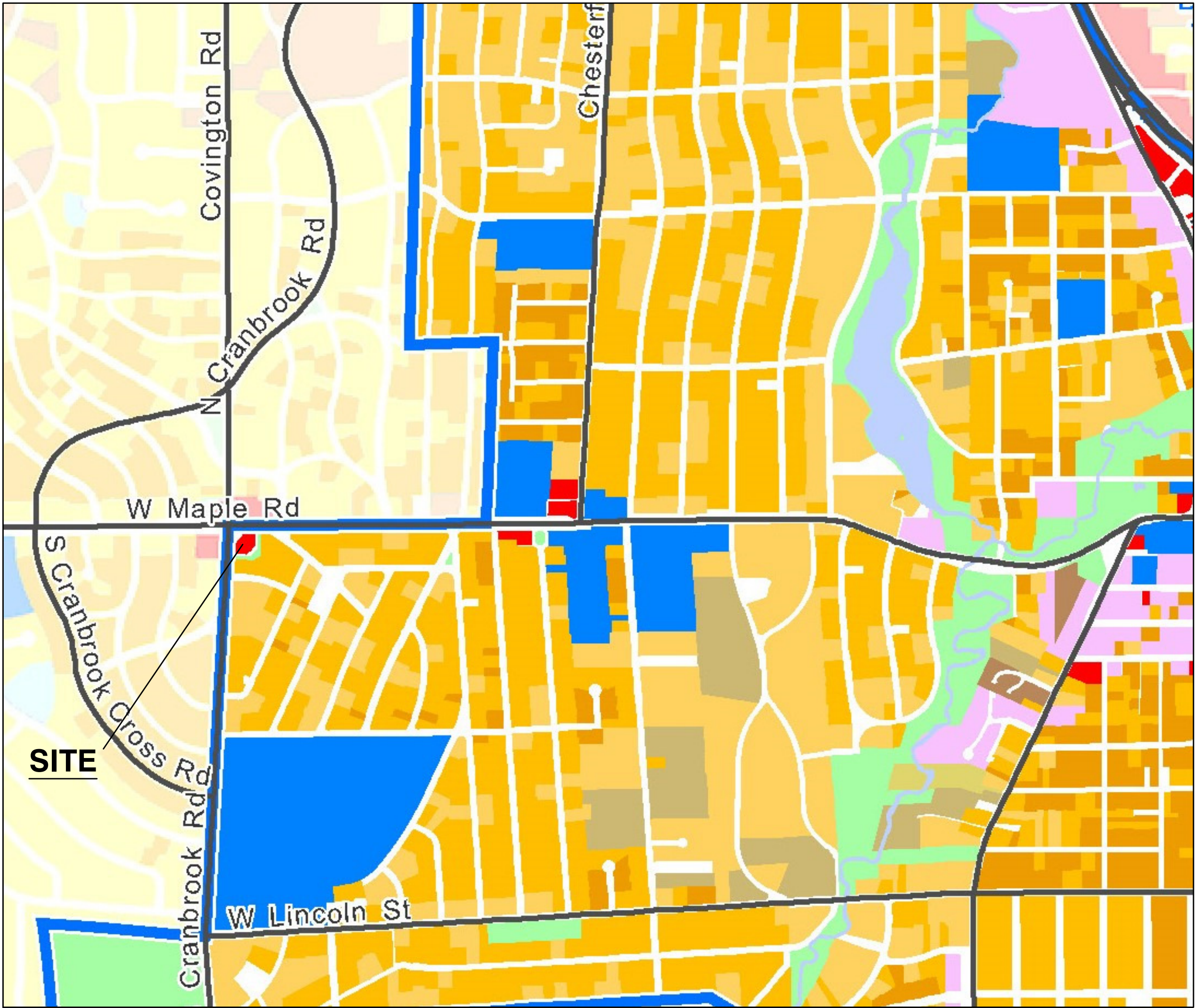
PRELIMINARY SITE PLANS FOR:



MAPLE ROAD  
CITY OF BIRMINGHAM  
OAKLAND COUNTY, MI

TABLE OF CONTENTS:

CV	TITLE PAGE
S1	SITE SURVEY
R1.0	REMOVAL PLAN
C1.0	OVERALL SITE PLAN
E1.0	PHOTOMETRIC PLAN
L101	LANDSCAPING PLAN
L102	LANDSCAPING DETAILS
A101	BUILDING ELEVATIONS



LOCATION MAP  
NO SCALE



FOR REVIEW ONLY 04-22-15  
NOT FOR CONSTRUCTION

DEVELOPER

STRATEGIC PROPERTY SERVICES  
ATTN: VINCE PANGLE  
5750 NEW KING STREET, SUITE 120  
TROY, MI 48068  
248-312-7200

ENGINEER

RICHARD L. FOSGITT, PE – CONSULTANT  
393 RIVER ROAD  
BAY CITY, MI 48706  
989-513-4058  
FOSGITTR@YAHOO.COM

ARCHITECT

Arconcepts Inc.  
17177 N. LAUREL PARK DR.  
SUITE 256  
LIVONIA, MI 48152  
734.591.1090

PREPARED UNDER THE  
SUPERVISION OF:  
RICHARD L. FOSGITT, PE  
REGISTERED PROFESSIONAL ENGINEER  
No. 43189  
STATE OF MICHIGAN

PROJECT LOG  
DATE: 04-22-15  
PROJECT: PRELIMINARY SITE PLAN

FILE # TITLE  
PROJ. MGR. RLF  
DESIGN BY: RLF  
DRAWN BY: RLF  
CHECKED BY: RLF  
SCALE: NONE  
SHEET: 1 OF 1

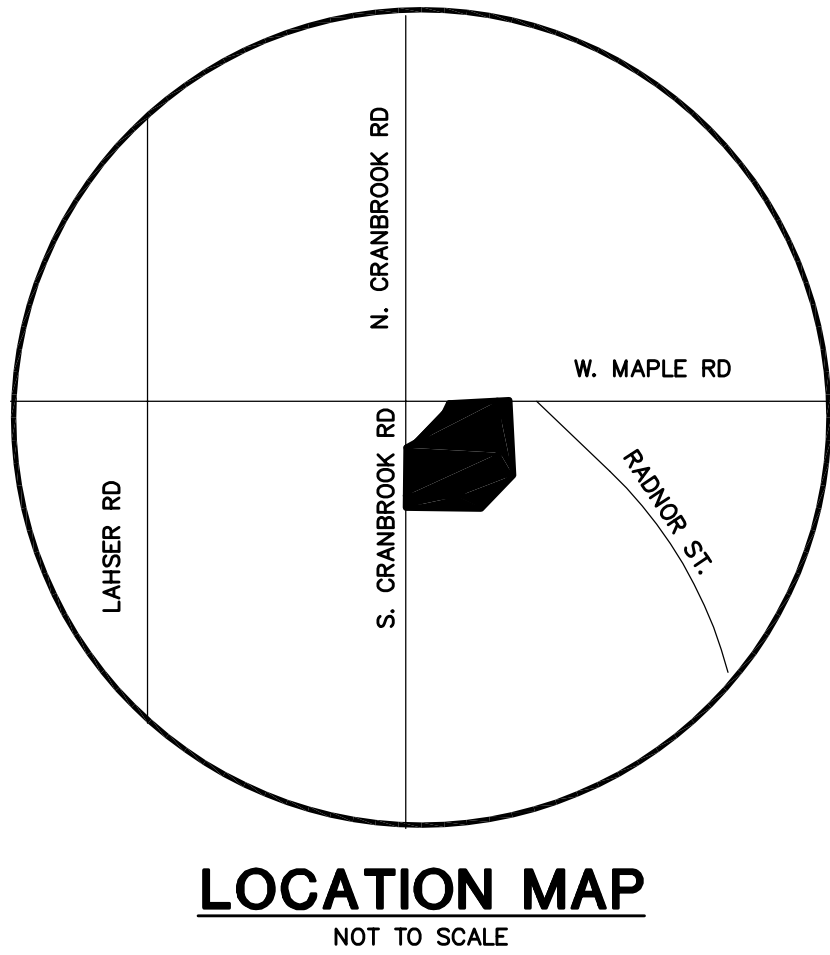
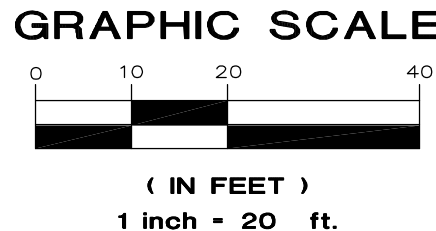
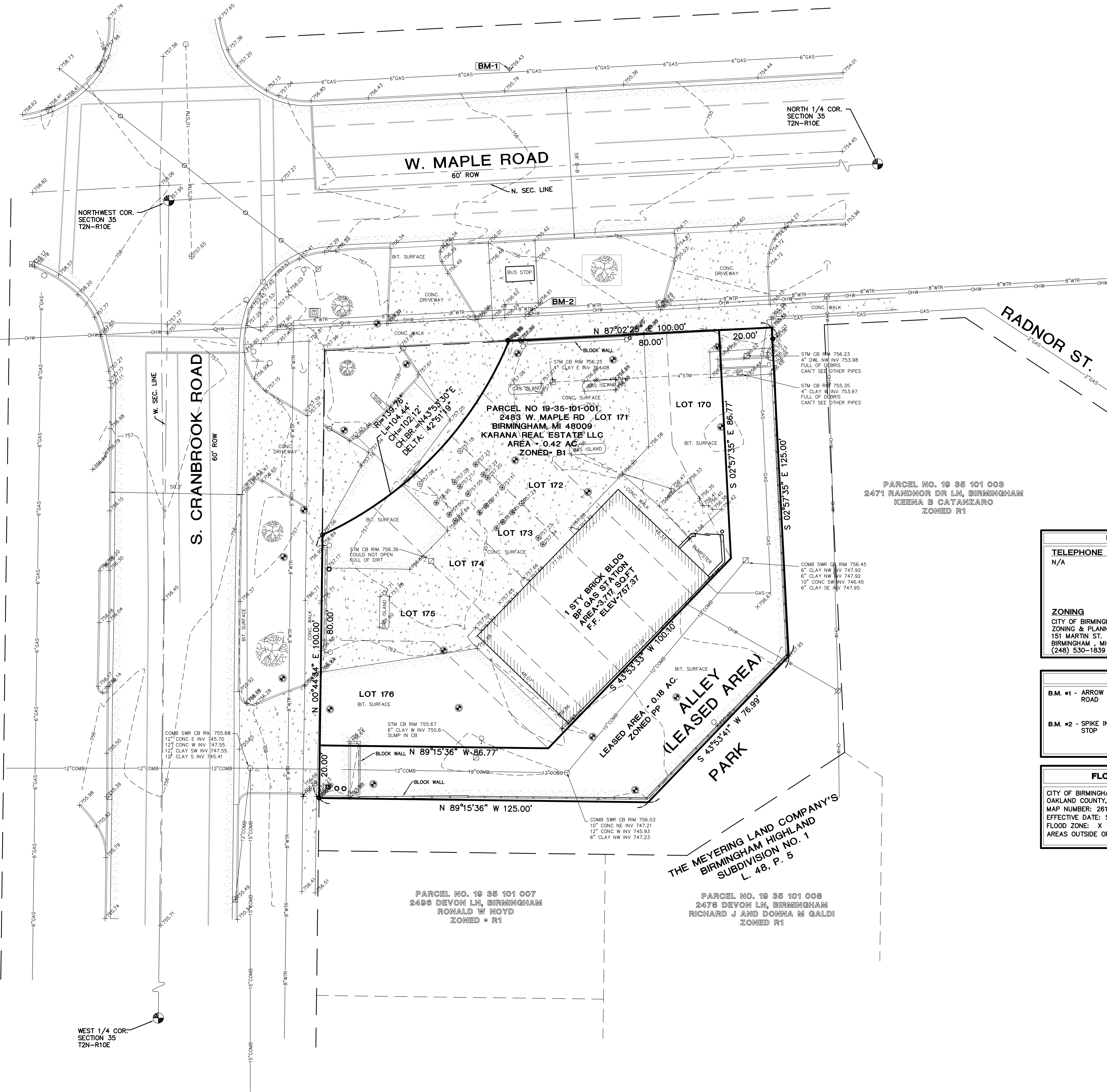
RICHARD L. FOSGITT, PE - CONSULTANT  
393 River Road - Bay City, MI 48706  
989-513-4058  
CONFIDENTIAL:  
Drawings contain confidential, proprietary,  
or any information contained in these  
documents is prohibited without the  
written approval of the Owner.

DFCU FINANCIAL - CITY OF BIRMINGHAM  
STRATEGIC PROPERTY SERVICES, LLC  
MAPLE ROAD  
CITY OF BIRMINGHAM  
OAKLAND COUNTY, MICHIGAN

PROJECT COVER SHEET

CV

141001



LEGEND	
	MONUMENT / SECTION CORNER
	FOUND PROPERTY IRON
	SET PROPERTY IRON
	EXISTING CATCHBASIN
	EXISTING MANHOLE/CATCHBASIN
	EXISTING MANHOLE
	EXISTING HYDRANT
	EXISTING VALVE
	EXISTING SANITARY SEWER
	EXISTING STORM SEWER
	EXISTING WATERMAIN
	EXISTING FENCE LINE
	EXISTING UNDERGROUND ELECTRIC LINE
	EXISTING UNDERGROUND GAS LINE
	EXISTING UNDERGROUND TELEPHONE LINE
	EXISTING CENTERLINE
	EXISTING OVERHEAD ELECTRICAL WIRES
	EXISTING MAILBOX / NEWSPAPER BOX
	EXISTING SIGN
	EXISTING DECIDUOUS TREES
	EXISTING CONIFEROUS TREES
	EXISTING UTILITY POWER POLE
	EXISTING TELEPHONE RISER

UTILITY CONTACTS	
TELEPHONE N/A	GAS CONSUMERS ENERGY
ZONING CITY OF BIRMINGHAM ZONING & PLANNING 151 MARTIN ST. BIRMINGHAM, MICHIGAN (248) 530-1839	WATER/SEWER CITY OF BIRMINGHAM ENGINEERING DEP. 151 MARTIN ST. BIRMINGHAM, MICHIGAN (248) 530-1839

BENCHMARKS	
B.M. #1 - ARROW ON HYD ON THE NORTH SIDE OF W. MAPLE ROAD	ELEV. 759.43
B.M. #2 - SPIKE IN POWER POLE ON SOUTH SIDE OF THE BUS STOP	ELEV. 757.96

FLOODPLAIN INFORMATION	
CITY OF BIRMINGHAM OAKLAND COUNTY, MICHIGAN MAP NUMBER: 2612500536F EFFECTIVE DATE: SEPTEMBER 29, 2006 FLOOD ZONE: X AREAS OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN	

UTILITY NOTE	
THE UTILITY LOCATIONS AS HEREON SHOWN ARE BASED ON FIELD OBSERVATIONS AND A CAREFUL REVIEW OF MUNICIPAL AND UTILITY RECORDS. HOWEVER, IT IS NOT POSSIBLE TO DETERMINE THE PRECISE SIZE, LOCATION, DEPTH, PRESSURE, OR ANY OTHER CHARACTERISTICS OF UNDERGROUND UTILITIES, TANKS OR SEPTIC FIELDS WITHOUT EXCAVATION. THEREFORE, WE CANNOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE BURIED UTILITY INFORMATION HEREON SHOWN. THE CONTRACTOR SHALL CALL MISS DIG (1-800-482-7171) A MINIMUM OF THREE WORKING DAYS PRIOR TO ANY EXCAVATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THESE UTILITY LOCATIONS PRIOR TO CONSTRUCTION AND MAKE EVERY EFFORT TO PROTECT AND/OR RELOCATE THEM AS REQUIRED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER/SURVEYOR AS SOON AS POSSIBLE IN THE EVENT A DISCREPANCY IS FOUND.	

ZONING INFORMATION	
ZONED- B-1 (NEIGHBORHOOD BUSINESS) ZONED- PP (PUBLIC PROPERTY) SETBACKS- FRONT: - REAR: - SIDE: -	

LEGAL DESCRIPTION	
FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. 14-30137 COMMITMENT DATE: 9/01/2014 AT 8:00 AM LAND IN THE CITY OF BIRMINGHAM, COUNTY OF OAKLAND, STATE OF MICHIGAN, TO WIT: LOTS 170 THROUGH 176, THE MEYERING LAND COMPANY'S BIRMINGHAM HIGHLANDS SUBDIVISION NO. 1, ACCORDING TO THE PLAT THEREOF AS RECORDED IN LIBER 48 OF PLATS, PAGE 5, OAKLAND COUNTY RECORDS, STATE OF MICHIGAN.	

CERTIFICATION	
THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS. THE FIELD WORK WAS COMPLETED ON 09/19/2014. DATE OF PLAT OR MAP: _____ BRIAN D FERGUSON PS #26454 401 BALASM ROAD CARROLLTON, MI 48724 PHONE: (989) 752-6500	

PREPARED UNDER THE SUPERVISION OF:

PROJECT LOG	FILE: 2014.346	DESIGNED BY: JDM	DRAWN BY: ZAA	CHECKED BY: JDM	SCALE: 1"=20'	SHEET: 1 OF 1
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DEARBORN FINANCIAL CREDIT UNION

SECTION 35, T2N-R10E  
OAKLAND COUNTY, MICHIGAN

ALTA/ ACSM LAND TITLE SURVEY

R.L. FOSGITT ENGINEERING PLC

393 RIVER ROAD  
BAY CITY, MICHIGAN  
989-513-4068

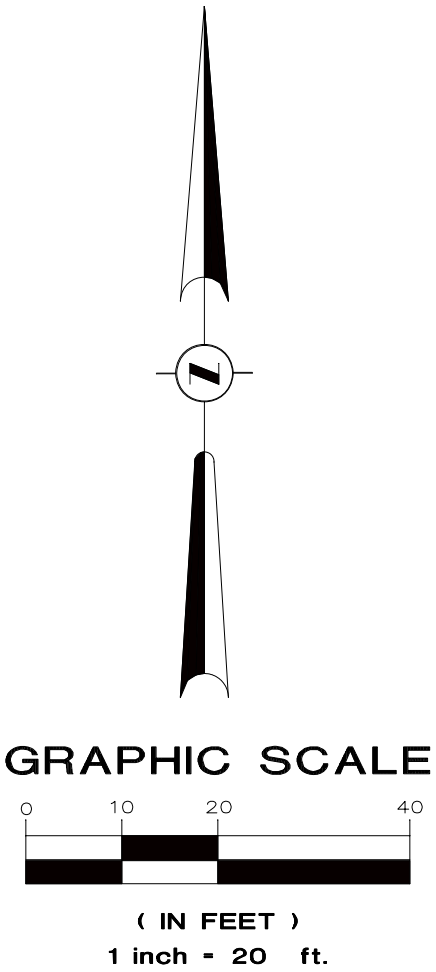
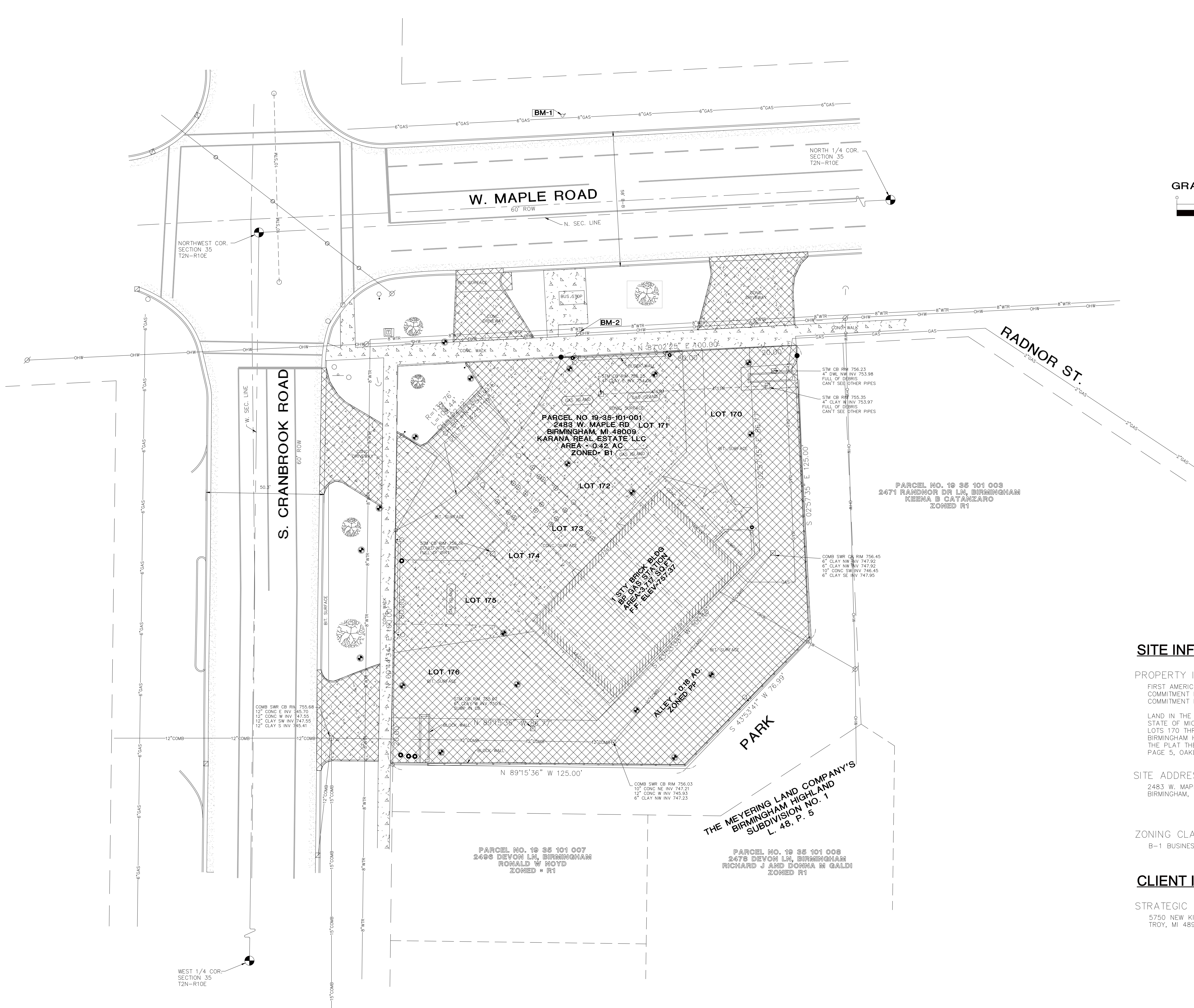
D&M SITE INC.

Surveying • Inspection • Testing • Engineering

401 BALSAM STREET PO BOX 159, CARROLLTON, MICHIGAN 48724  
PHONE: (989) 752-6500 • FAX: (989) 752-6600

1

2014.348



SITE INFORMATION

PROPERTY INFORMATION

FIRST AMERICAN TITLE INSURANCE COMPANY  
COMMITMENT NO. 14-30137  
COMMITMENT DATE: 9/01/2014 AT 8:00 AM

LAND IN THE CITY OF BIRMINGHAM, COUNTY OF OAKLAND,  
STATE OF MICHIGAN, TO WIT:  
LOTS 170 THROUGH 176, THE MEYERING LAND COMPANY'S  
BIRMINGHAM HIGHLANDS SUBDIVISION NO. 1, ACCORDING TO  
THE PLAT THEREOF AS RECORDED IN LIBER 48 OF PLATS,  
PAGE 5, OAKLAND COUNTY RECORDS, STATE OF MICHIGAN.

SITE ADDRESS

2483 W. MAPLE ROAD  
BIRMINGHAM, MI

ZONING CLASSIFICATION

B-1 BUSINESS

CLIENT INFORMATION

STRATEGIC PROPERTY SERVICES, LLC

5750 NEW KING STREET, SUITE 120  
TROY, MI 48008

DFCU FINANCIAL - CITY OF BIRMINGHAM  
STRATEGIC PROPERTY SERVICES, LLC

MAPLE ROAD AND CRANBROOK ROAD  
CITY OF BIRMINGHAM  
OAKLAND COUNTY, MICHIGAN

REMOVAL PLAN

RICHARD L. FOSGITT, PE - CONSULTANT

383 River Road - Bay City, MI 48706  
989-513-4058

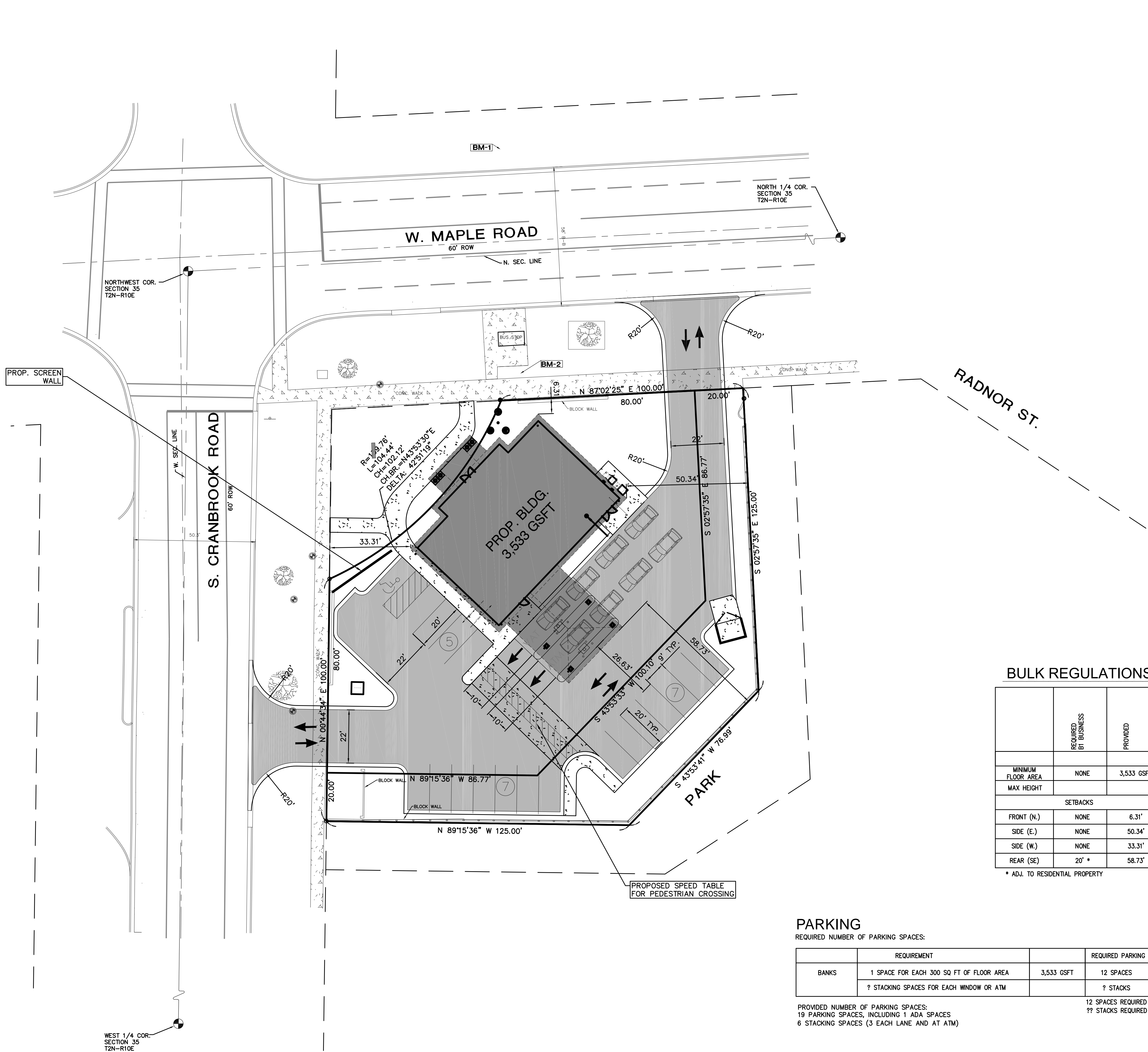
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and/or copyrighted information.  
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or any information contained in these  
documents is prohibited without the  
written approval of the Engineer.

PREPARED UNDER THE  
SUPERVISION OF:

PROJECT LOG		FILE #	REMOVAL PLAN
PRELIMINARY PLANS	DT-06-15	R/LF	R/LF
PROJ. MGR:		R/LF	R/LF
DESIGN BY:		R/LF	R/LF
DRAWN BY:		R/LF	R/LF
CHECKED BY:		R/LF	R/LF
SCALE:		1"=20'	NONE
SHEET:		1	OF 1

R1

140401



BULK REGULATIONS

	REQUIRED BY BUSINESS	PROVIDED
MINIMUM FLOOR AREA	NONE	3,533 GSFT
MAX HEIGHT		
SETBACKS		
FRONT (N.)	NONE	6.31'
SIDE (E.)	NONE	50.34'
SIDE (W.)	NONE	33.31'
REAR (SE)	20' *	58.73'

\* ADJ. TO RESIDENTIAL PROPERTY

SITE INFORMATION

PROPERTY INFORMATION

FIRST AMERICAN TITLE INSURANCE COMPANY  
COMMITMENT NO. 14-30137  
COMMITMENT DATE: 9/01/2014 AT 8:00 AM

LAND IN THE CITY OF BIRMINGHAM, COUNTY OF OAKLAND, STATE OF MICHIGAN, TO WIT:  
LOTS 170 THROUGH 176, THE MEYERING LAND COMPANY'S BIRMINGHAM HIGHLANDS SUBDIVISION NO. 1, ACCORDING TO THE PLAT THEREOF AS RECORDED IN LIBER 48 OF PLATS, PAGE 5, OAKLAND COUNTY RECORDS, STATE OF MICHIGAN.

SITE ADDRESS

2483 W. MAPLE ROAD  
BIRMINGHAM, MI

ZONING CLASSIFICATION

B-1 BUSINESS

CLIENT INFORMATION

STRATEGIC PROPERTY SERVICES, LLC

5750 NEW KING STREET, SUITE 120  
TROY, MI 48068

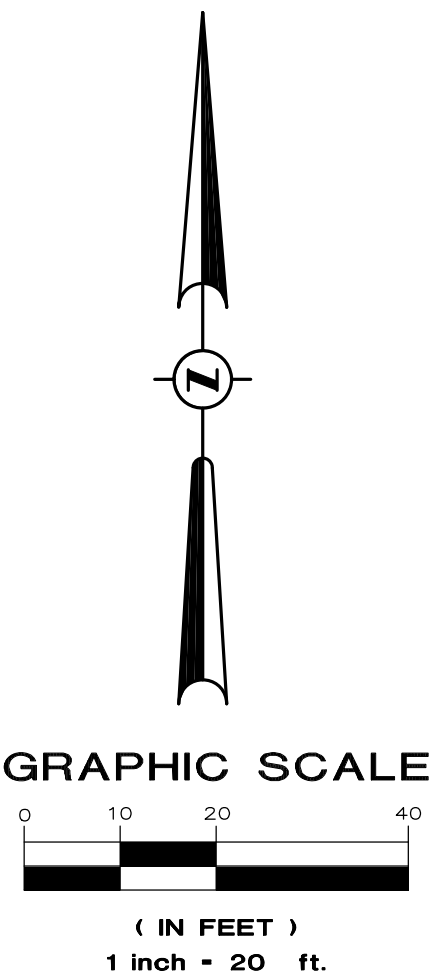
PARKING

REQUIRED NUMBER OF PARKING SPACES:

	REQUIREMENT		REQUIRED PARKING
BANKS	1 SPACE FOR EACH 300 SQ FT OF FLOOR AREA	3,533 GSFT	12 SPACES
	? STACKING SPACES FOR EACH WINDOW OR ATM		? STACKS

PROVIDED NUMBER OF PARKING SPACES:  
19 PARKING SPACES, INCLUDING 1 ADA SPACES  
6 STACKING SPACES (3 EACH LANE AND AT ATM)

12 SPACES REQUIRED  
?? STACKS REQUIRED



PREPARED UNDER THE SUPERVISION OF:

PROJECT LOG

FILE # OVERALL

PROJ MGR: RLF

DESIGN BY: RLF

DRAWN BY: RLF

CHECKED BY:

SCALE: 1"=20'

SHEET: 1 OF 1

RICHARD L. FOSGITT, PE - CONSULTANT

333 River Road - Bay City, MI 48706  
989-513-4058

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DFCU FINANCIAL - CITY OF BIRMINGHAM  
STRATEGIC PROPERTY SERVICES, LLC

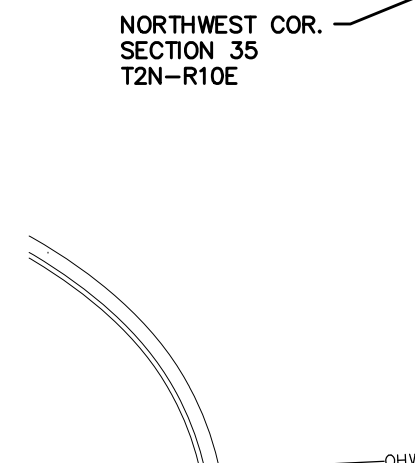
MAPLE ROAD AND CRANBROOK ROAD  
CITY OF BIRMINGHAM  
OAKLAND COUNTY, MICHIGAN

OVERALL SITE PLAN

C1.0

141001

Symbol	Label	Qty	Catalog Number	Description	Lamp	File	Lumens	LLF	Watts
	A	10	DSX1 LED 30C 530 40K TFTM MVOLT HS	DSX1 LED WITH (1) 30 LED LIGHT ENGINES, TYPE TFTM OPTIC, 4000K, @ 530mA WITH HOUSE SIDE: SHIELD	LED	DSX1_LED_30 C_530_40K_TF TM_MVOLT_H S.ies	Absolute	1.00	52
	M	2	EVO 35/18 8AR LS 120	8" LED DOWNLIGHT, 3500K, 1800 LUMENS, STANDARD DISTRIBUTION WITH CLEAR SPECULAR REFLECTOR	LED	EVO_35_18_8 AR_LS_120.i es	Absolute	1.00	34.6



 **LITHONIA  
LIGHTING** One Lithonia Way • Conyers, Georgia 30012 • Phone: 800.279.8041 • Fax: 770.918.1209 • [www.lithonia.com](http://www.lithonia.com)  
© 2011-2014 Acuity Brands Lighting, Inc. All rights reserved.

EXAMPLE: EVO 3501R 8A8 120														
Series	Color	Temperature	Nominal lumen values	Aperture/Trim color	Distribution	Finish	Voltage							
EVO	71/	2700 K	<b>18</b>	<b>1900 lumens</b>	8AP	Clear	(blank)	1.0 s/nh	(blank)					
	30/	3000 K	<b>22</b>	<b>2200 lumens</b>	8PD	Powder	VND	Very narrow (0.43 s/nh)	(blank)					
	<b>33A/</b>	<b>3500 K</b>	<b>28</b>	<b>2900 lumens</b>	8WTR	White	ND	Narrow (0.52 s/nh)	<b>LS</b>					
	41/	4100 K			8GR	Gold	<b>MD</b>	Medium (0.80 s/nh)	<b>277</b>					
					<b>8WR</b>	<b>White</b>	<b>WD</b>	<b>Wide (1.1 s/nh)</b>	<b>347</b>					
Options														
(blank)	0-10V dimming driver. Minimum dimming level 10%.			SF	Single fuse		TRBL	Black painted flange						
EDCS3*	Lutron® Hi-Lume® 2-wire forward-phase dimming driver. Minimum dimming level 1%.			RRL	RELOC® ready luminaire connectors enable a simple and consistent factory installed option across all ASL luminaire brands. Refer to RBL for complete nomenclature.		EL*	Emergency battery pack with integral test switch						
EDCS3A*	Lutron® Hi-Lume® 3-wire or EcoSystem® dimming driver. Minimum dimming level 1%.			ELR*	Emergency battery pack with remote test switch		CP*	Chicago pleum						
				NEPP*	Interface for Sensor Switch® nLight® network provided with integral power supply. Refer to ISD-62.0.									
				NSD*	Sensor Switch® nLight® one 5A relay with one 0-10 VDC dimming output; requires bus power, such as nP15 power pack. Refer to <a href="#">nPS-2.0</a> .									
				TRW*	White painted flange									

**RICHARD L. FOSGITT, PE. - CONSULTANT**

383 River Road - Bay City, MI 48706

989-513-4058

---

**CONFIDENTIAL:**

Drawings contain confidential, proprietary, and copyrighted information. No part of these drawings or any information contained in these documents is prohibited without the written approval of the Owner.

LANDSCAPE NOTES

1. PLAN MATERIAL TO BE NO. 1 GRADE, NORTHERN GROWN NURSERY STOCK AND SHALL BE GUARANTEED FOR A PERIOD OF 2 YEARS. LANDSCAPING SHALL BE INSTALLED IN A WORKMAN LIKE ORDER TO THE STANDARDS SET FORTH BY THE CITY OF BIRMINGHAM, AND IN A TIMELY MANNER.
  2. LANDSCAPE IS TO BE INSTALLED IN ACCORDANCE WITH THE CITY OF BIRMINGHAM LANDSCAPE ORDINANCE. DURING THE SPECIFIED PERIOD OF ESTABLISHMENT, THE OWNER SHALL ASSUME RESPONSIBILITY FOR MAINTAINING THE PLANTS IN A HEALTHY, NEAT AND ORDERLY APPEARANCE WHICH SHALL INCLUDE WATERING, CULTIVATION, AND WEED CONTROL.
  3. ALL PLANTING BEDS TO BE DRESSED WITH 4" DEPTH OF SHREDDED HARDWOOD BARK MULCH.
  4. LANDSCAPING TO BE IRRIGATED WITH AN AUTOMATIC IRRIGATION SYSTEM. LAWNS AND SHRUB AREAS SHALL BE WATERED BY SEPARATE ZONES TO MINIMIZE OVER WATERING.
  5. PRUNING OF LANDSCAPE MATERIALS SHALL BE KEPT TO A MINIMUM ORDER TO ACHIEVE PROPER MATURATION OF PLANTINGS.
  6. ALL PLANTING BEDS TO HAVE EDGING AS APPROVED BY THE CITY OF BIRMINGHAM REQUIREMENTS.
- IRRIGATION SPECIFICATIONS
1. ALL WORK IS TO BE IN COMPLIANCE WITH ALL LOCAL, STATE, AND FEDERAL CODES AND ORDINANCES.
  2. ALL UNDERGROUND ELECTRICAL CONNECTIONS ARE TO BE MADE WITH 3-M WIRE CONNECTORS, DRY.
  3. AUTO CONTROL VALVES ARE TO BE INSTALLED IN NDS VALVE BOXES OF APPROPRIATE SIZE.
  4. ALL CONTROL WIRING DOWNSTREAM OF THE CONTROLLER IS TO BE 14 AWG, UL APPROVED FOR DIRECT BURY.
  5. ALL ROTORS AND SPRAY POP-UPS SHALL BE INSTALLED ON SWING PIPE.
  6. ALL GCV SHALL BE INSTALLED ON 3-ELBOW PVC SWING JOINTS.
  7. SYSTEM DESIGN BASED UPON 22 GPM @ 60 PSI.
  8. ANY CHANGES IN AVAILABILITY OF SUPPLY SHOULD BE NOTED AND MODIFICATIONS TO THE DESIGN SHOULD BE MADE.
  9. CONTRACTOR TO VERIFY WATER PRESSURE AND AVAILABILITY PRIOR TO INSTALLATION.
  10. 120V, TO CONTROLLER AND COPPER STUB, BY OTHER THAN IRRIGATION CONTRACTOR.
  11. THERE WILL BE NO SUBSTITUTIONS OR CHANGES TO THE IRRIGATION DESIGN ALLOWED WITHOUT DIRECT, WRITTEN APPROVAL FROM THE IRRIGATION CONSULTANT.

PARKING LOT LANDSCAPE REQUIREMENTS PER ARTICLE 4, SECTION 4.20 LA-01

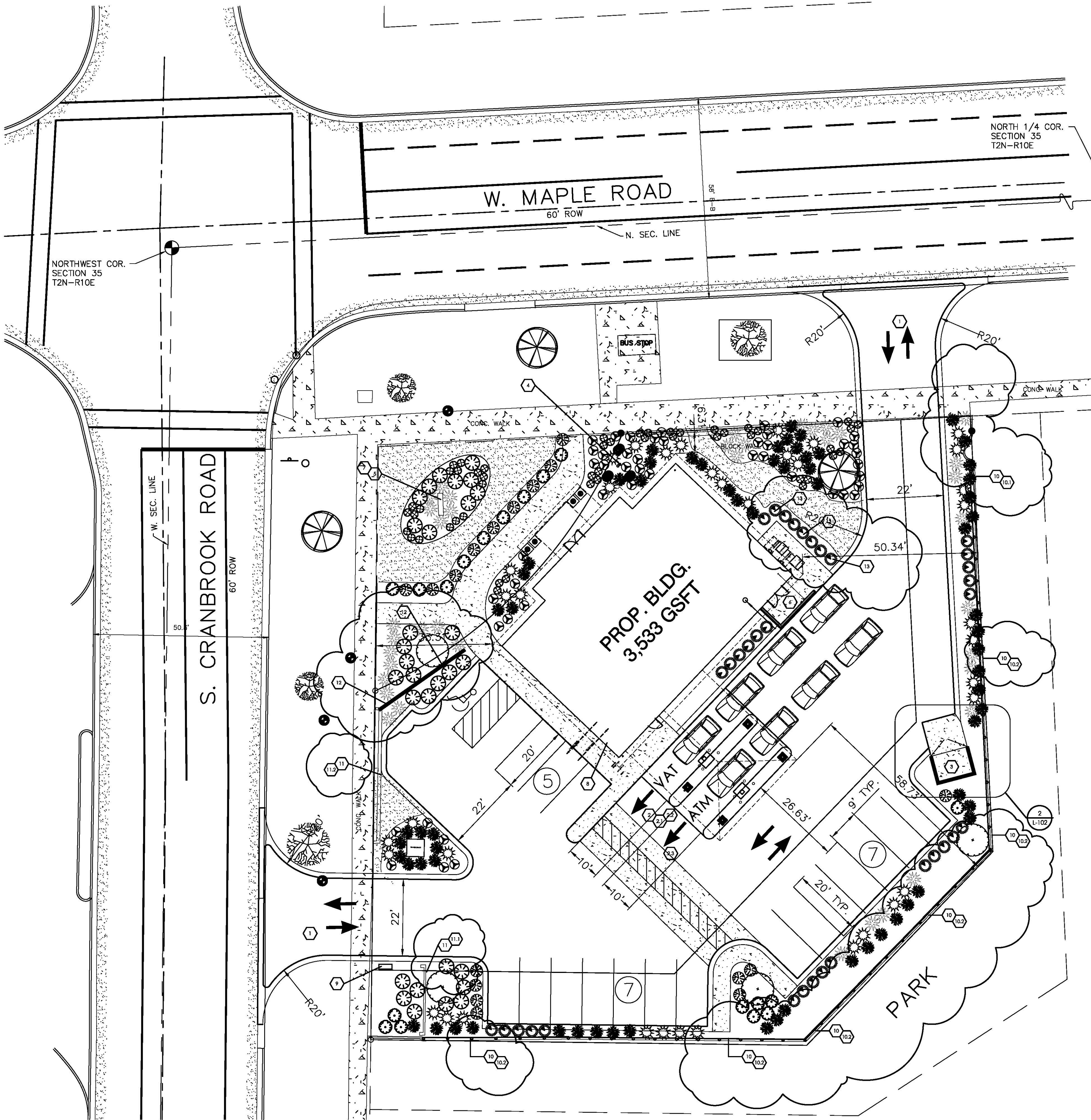
MEETS OR EXCEEDS CITY OF BIRMINGHAM REQUIREMENTS FOR LANDSCAPE ELEMENTS:  
OVERALL SITE LANDSCAPING  
STREET TREE REQUIREMENTS

GENERAL NOTES:

1. REFER TO CIVIL ENGINEERING DRAWINGS AS PART OF THIS PACKAGE FOR ALL RELATED SITE ENGINEERING INCLUDING, BUT NOT LIMITED TO:
  - 1.1. TITLE PAGE
  - 1.2. SITE SURVEY
  - 1.3. REMOVAL PLAN
  - 1.4. OVERALL SITE PLAN
  - 1.5. PHOTO-METRIC PLAN
2. REFER TO CIVIL ENGINEERING DRAWINGS AS PART OF THIS PACKAGE FOR ADDITIONAL RELATED REQUIREMENTS.
3. ALL WORK TO CONFORM TO THE CURRENT CITY OF BIRMINGHAM STANDARDS AND SPECIFICATIONS.
4. ALL ROOF CONDUCTORS TO TIE UNDERGROUND INTO THE STORM SEWER - REFER TO SHEET A-101.

SITE PLAN KEY NOTES:

- 1 ENTRY | EGRESS DRIVES
- 2 DRIVE THRU CANOPY TO INCLUDE:
  - TWO DRIVE-THROUGH LANES
    - ONE (1) DRIVE-THROUGH (VAT) LANE
    - ONE (1) ATM LANE
  - TWO (2) BY-PASS LANES AT OUTSIDE.
  - PROVIDE CONCRETE UNDER DRIVE THRU CANOPY LANES.
- 2.1 UNDERSIDE OF DRIVE-THROUGH CANOPY TO INCLUDE FULLY RECESSED LIGHTING FIXTURES AS REQUIRED (REFER TO SHEET A-101 FOR ADDITIONAL INFORMATION)
- 2.2 SPEAKERS AT DRIVE-THROUGH SHALL NOT CAUSE NOISE THAT IS AUDIBLE FROM ADJACENT SITES.
- 2.3 DRIVE THRU ATM UNIT AND LANE
- 3 NEW CMU | BRICK (MATCHING BUILDING FACE BRICK) DUMPSTER SCREEN WALL. REFER TO L-102 FOR PLANS | DETAILS | ELEVATIONS. ADDITION OF BOLLARDS FOR VEHICLE PROTECTION OR LANDSCAPING IF DEEMED ABLE TO DURING CONSTRUCTION.
- 4 NEW FLAG POLE AND GROUND LIGHTING. REFER TO CIVIL ENGINEERING PACKAGE FOR ELECTRICAL REQUIREMENTS.
- 5 NEW MONUMENT GROUND SIGN "DFCU BIRMINGHAM" LOGO. REFER TO SIGNAGE SUBMITTAL FOR ELEVATIONS AND DETAILS AS PROVIDED UNDER SEPARATE PACKAGE BY OWNER CONTRACT AND SUBMITTED HEREIN. FOUNDATION & CONDUITS BY SIGN CONTRACTOR. ELECTRICAL SERVICE TO SIGN BY BUILDING GENERAL CONTRACTOR.
- 6 NEW CMU | BRICK (MATCHING BUILDING FACE BRICK) REAR ENTRY SCREEN WALL. REFER TO L-102 FOR PLANS | DETAILS | ELEVATIONS.
- 7 PLANTING BED TO BE RAISED TO 18" ABOVE GRADE AND WITHIN ALLOWABLE HEIGHT BY CITY OF BIRMINGHAM.
- 8 BUILDING WALL SIGN "DFCU BIRMINGHAM" LOGO. REFER TO SIGNAGE SUBMITTAL FOR ELEVATION AND DETAILS AS PROVIDED UNDER SEPARATE PACKAGE BY OWNER CONTRACT AND SUBMITTED HEREIN.
- 9 NEW MONUMENT DIRECTIONAL SIGN "DFCU BIRMINGHAM" LOGO. REFER TO SIGNAGE SUBMITTAL FOR ELEVATIONS AND DETAILS AS PROVIDED UNDER SEPARATE PACKAGE BY OWNER CONTRACT AND SUBMITTED HEREIN. FOUNDATION & CONDUITS BY SIGN CONTRACTOR. ELECTRICAL SERVICE TO SIGN BY BUILDING GENERAL CONTRACTOR.
- 10 EXISTING SCREEN WALL (MULTIPLE WYTHE CMU - 17 3/4" THICK TYP.). REFER TO CIVIL FOR ADDITIONAL INFORMATION. PROVIDE NEW LIMESTONE CAP FULL LENGTH OF SCREEN WALL. SEE DETAIL L-102 SIMILAR.
  - 10.1 EXISTING WALL 96" HIGH FROM GRADE TO TOP OF WALL
  - 10.2 EXISTING WALL 81" HIGH FROM GRADE TO TOP OF WALL
- 11 EXISTING SCREEN WALL WITH LIMESTONE CAP (SINGLE WYTHE CMU - 8" THICK TYP.). REFER TO CIVIL FOR ADDITIONAL INFORMATION.
  - 11.1 EXISTING WALL 35" HIGH FROM GRADE TO TOP OF WALL
  - 11.2 EXISTING WALL 36" HIGH FROM GRADE TO TOP OF WALL
- 12 NEW CMU | BRICK (MATCHING BUILDING FACE BRICK) SCREEN WALL. REFER TO L-102 FOR PLANS | DETAILS | ELEVATIONS.
- 13 PLANT HICKS YEW @ 30' O.C. (MAX) TO CREATE CONTINUOUS SCREEN OF HVAC CONDENSERS



1 LANDSCAPE SITE PLAN (ORIGINAL AS SUBMITTED)  
L-101 SCALE: 1/16" = 1'-0"

CIVIL ENGINEER'S BACKGROUND  
USED FOR REFERENCE PURPOSES  
ONLY AS IT PERTAINS TO  
ARCHITECTURAL LANDSCAPING  
PLAN HEREIN.

LANDSCAPING SCHEDULE

SYMB.	QUAN.	COMMON NAME	BOTANICAL NAME	SIZE	ROOT	COMMENTS
47		GROW-LOW FRAGRANT SUMAC	RHUS AROMATICA	12" HT.	CONT.	EVEN HARB. 9 O.C.
8		DWARF BURNING BUSH	EUONYMUS ALATA 'COMPACTA'	36" HT.	B & B	EVEN HARB. 9 O.C.
34		HICKS YEW	TAXUS x MEDIA 'HICKSII'	30" HT.	5 GAL.	EVEN HARB. 9 O.C. 100 TO 30' HT. (MAX) AT HVAC CONDENSER SCREEN AREA
48		KARL FORESTER FEATHER REED GRASS	CALAMAGRODITE x ACUTICULONA 'K2'	-	3 GAL.	FULL HARB. 9 O.C.
38		DWARF FOUNTAIN GRASS	PENNISETUM ALOPECUROIDES 'FAMINE' F	-	3 GAL.	EVEN HARB. 9 O.C.
49		HAPPY RETURNS	HENRICOCALLIS 'HAPPY RETURNS'	-	1 GAL.	FULL WELL ROOTED 9 O.C.
3		FLOWERING PEAR	Pyrus calleryana 'Brocton'	30" HT. MAX.	28.4	EVEN HARB. 20 O.C. MAX
18		BARBERY	BERBERIS THUNBERGII 'ATROPURPUREA NANA'	36" HT.	3 GAL.	EVEN HARB. 9 O.C.
38		BLUE WEDGE GRASS	HELECTOTRICHON SEMPERVIRENS	36" HT.	2.25 GAL.	FULL HARB. 9 O.C.
30		BROADMOOR JUMPER	JUNIPERUS SABINA 'BROADMOOR'	24" HT.	2.5 QUART.	FULL HARB. 9 O.C.
4		SAUCER MAGNOLIA	MAGNOLIA SOULANGEANA	20-30" HT. MAX.	28.4 GAL.	EVEN HARB. 20 O.C. MAX

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2014 04-14	82A	YTD
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CONSULTANT:

PROJECT:  
**DFCU BIRMINGHAM  
NEW BRANCH FACILITY**  
2483 W. MAPLE ROAD  
BIRMINGHAM, MI 48009

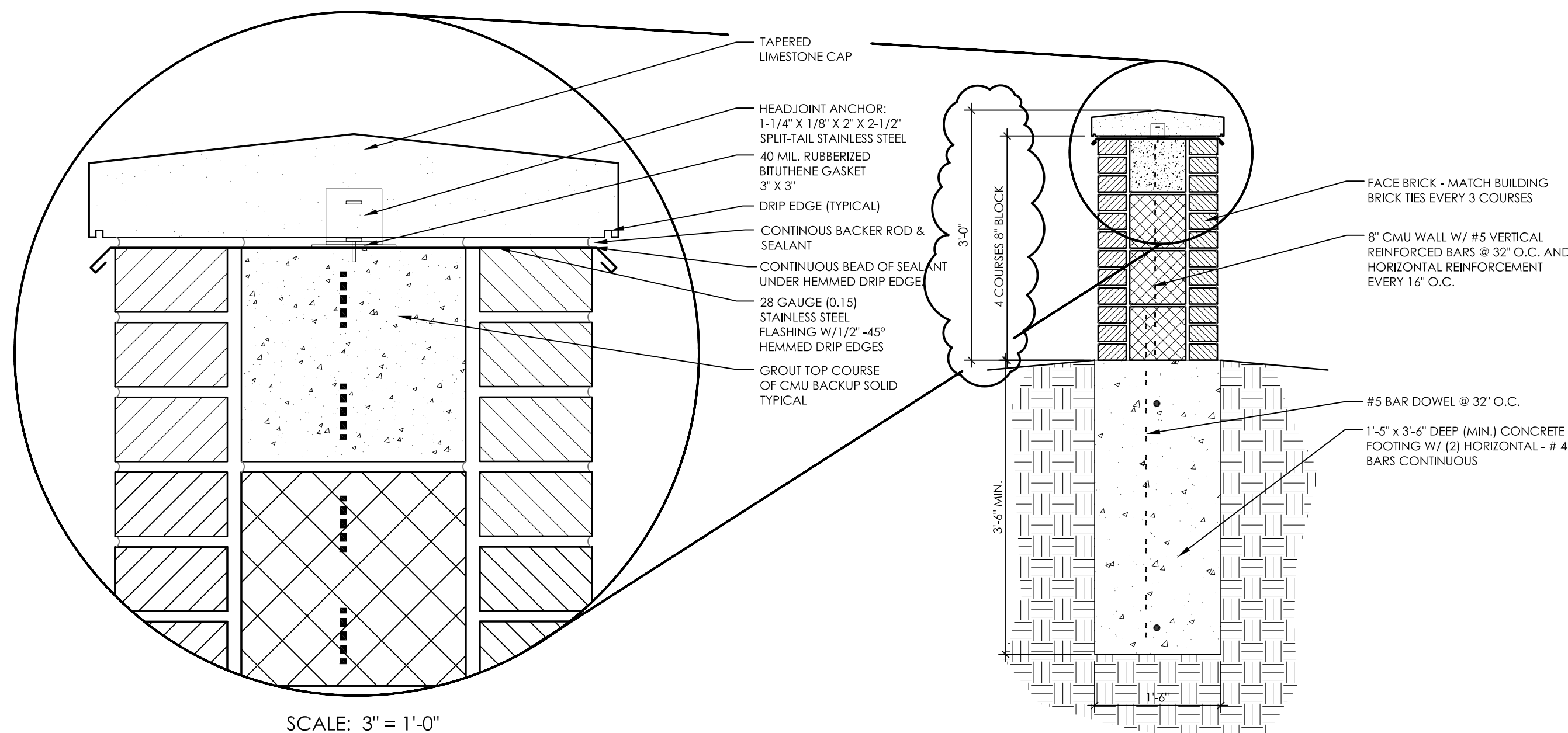
ORIGINAL AS SUBMITTED  
LANDSCAPE PLAN  
▲ PROJECT # DFC14-024

NOT ISSUED FOR CONSTRUCTION

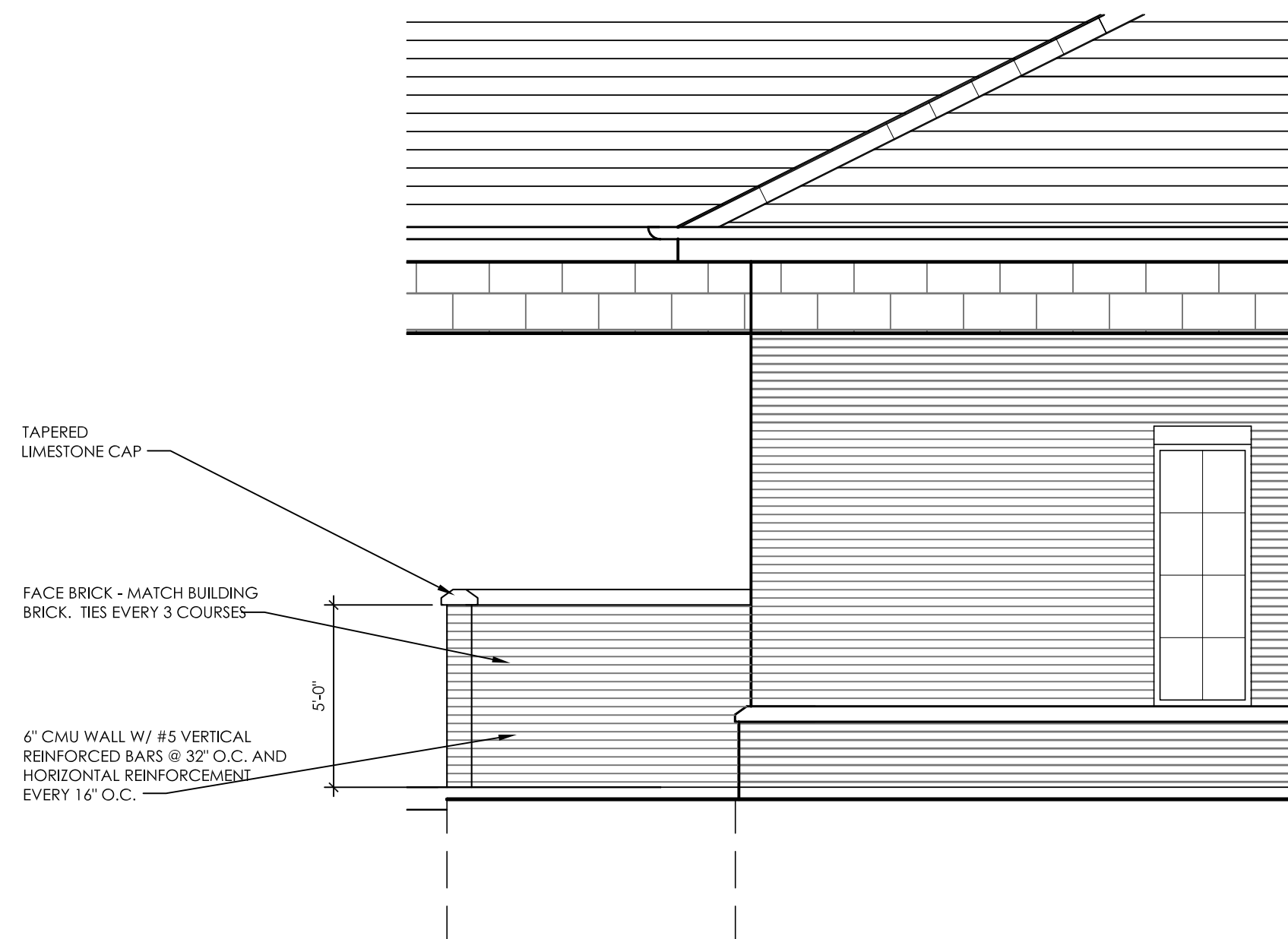
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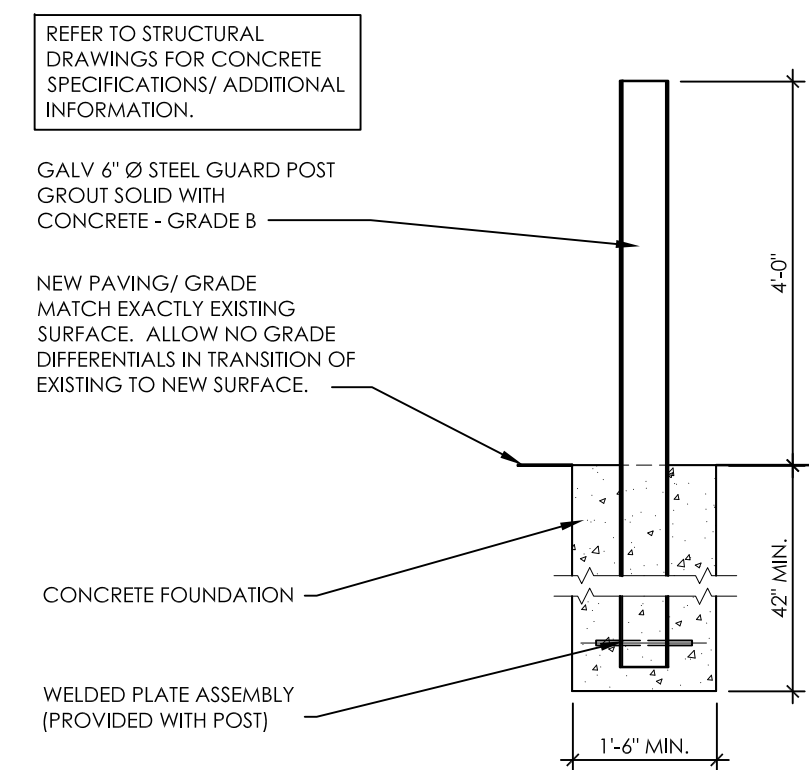
SHEET:  
**L-101**



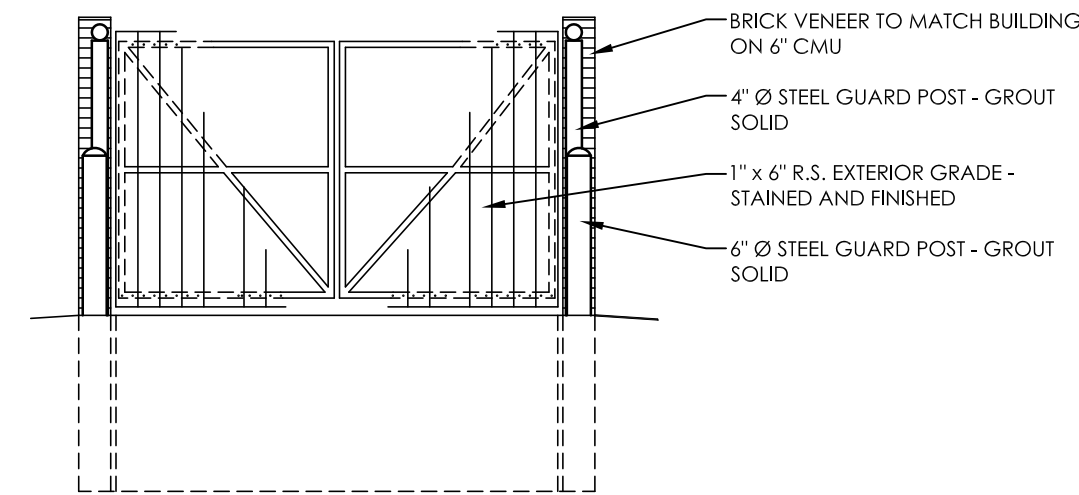
6  
L-102  
DETAIL @ SCREEN WALL (STREET)  
SCALE: 1/4" = 1'-0"



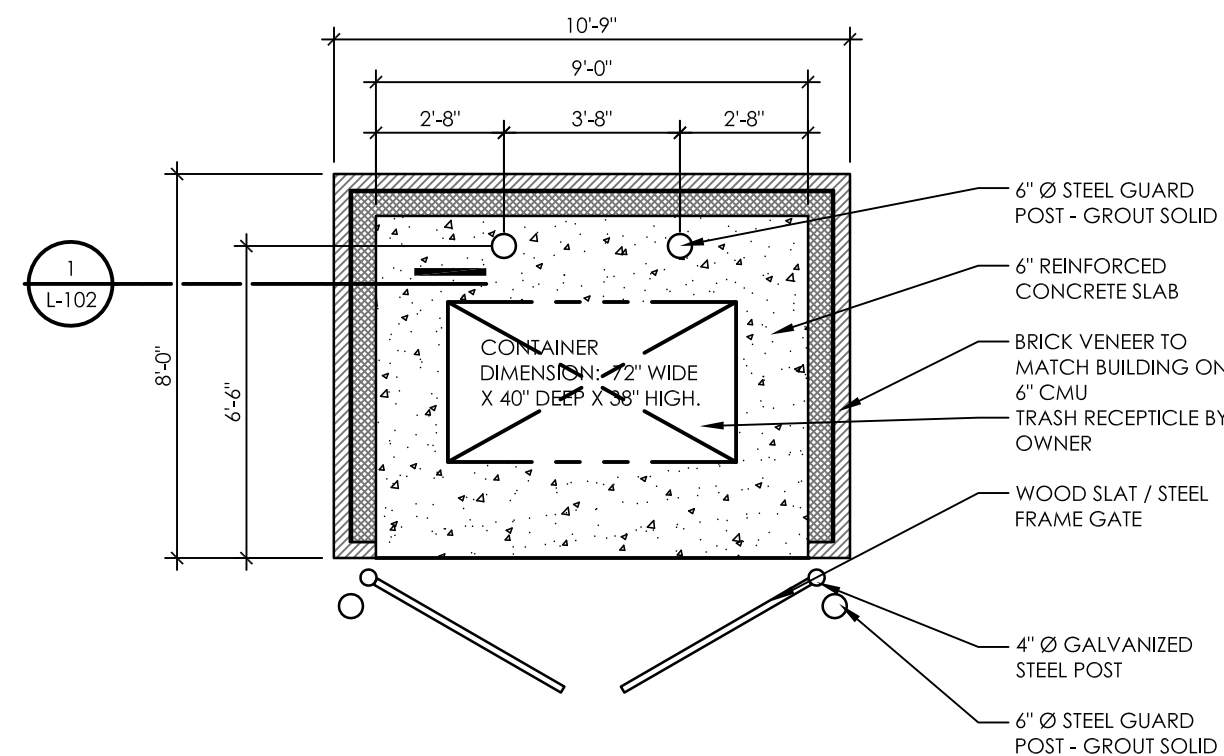
5  
L-102  
ELEVATION @ SCREEN WALL  
SCALE: 1/4" = 1'-0"



4  
L-102  
POST DETAIL  
SCALE: 1/2" = 1'-0"

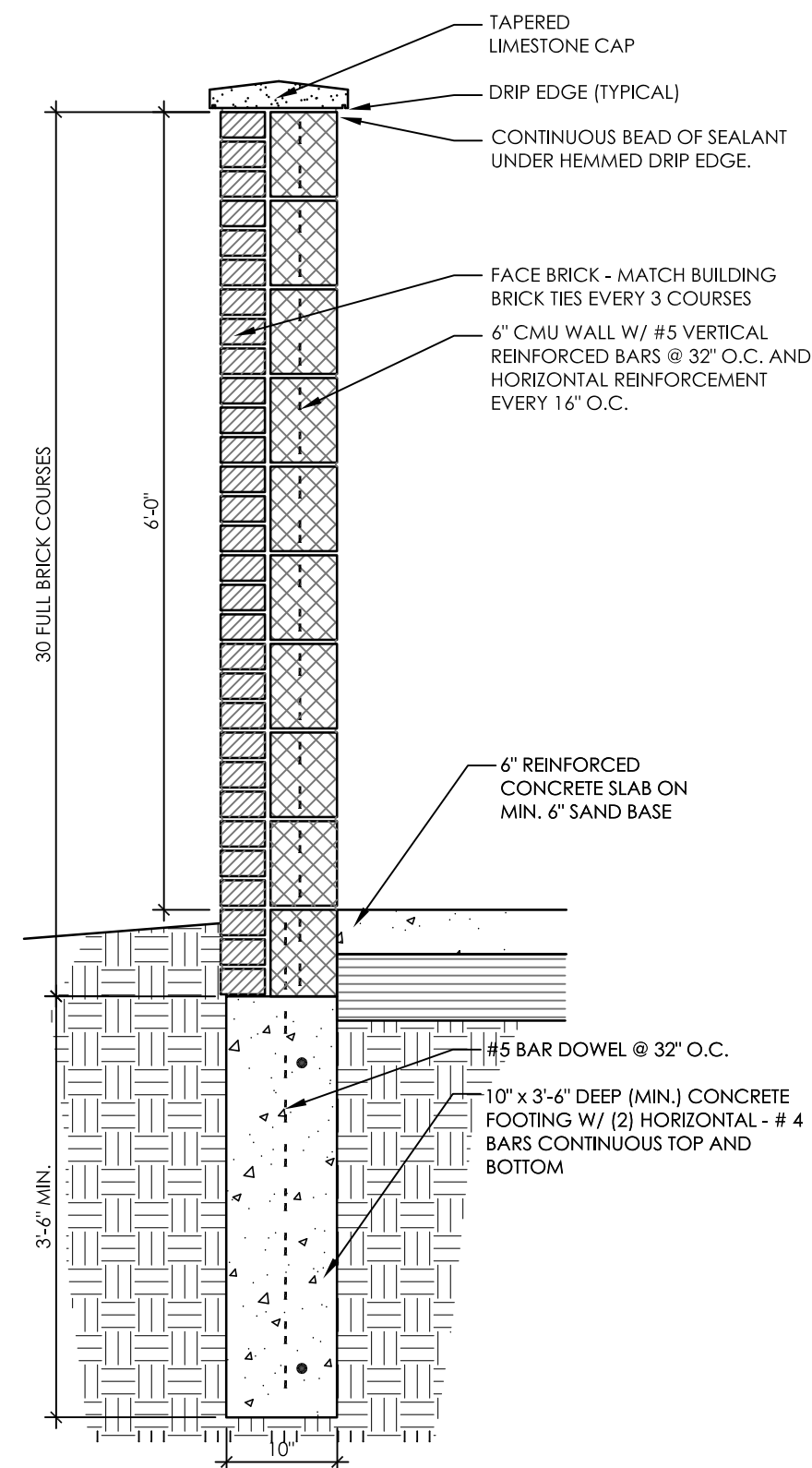


3  
L-102  
RECEPTACLE ELEVATION DETAIL  
SCALE: 1/4" = 1'-0"



2  
L-102  
RECEPTACLE PLAN  
SCALE: 1/4" = 1'-0"

LOCATION OF RECEPTACLE  
SCREEN WALL ON CIVIL  
DRAWINGS



1  
L-102  
RECEPTACLE SCREEN WALL DETAIL  
SCALE: 3/4" = 1'-0"

GENERAL NOTES:

- ALL CONSTRUCTION TO CONFORM TO APPLICABLE MICHIGAN BARRIER FREE AND ADA REQUIREMENTS.
- ALL LIGHTING SHALL BE SHIELDED AND DIRECTED DOWNWARD.
- CIVIL ENGINEER TO PROVIDE ADJACENT SITE CONDITIONS AS REQUIRED FOR DRAINAGE / RUN OFF DUE TO PROPOSED SITE GRADING.
- EXISTING SITE CHARACTERISTICS AS SHOWN ARE FROM OFFICE RECORDS; NO GUARANTEE IS GIVEN AS TO ACCURACY OR COMPLETENESS THEREOF; CONTACT MISS DIG (1-800-482-7171) SEVENTY-TWO HOURS (72) PRIOR TO ANY PROPOSED CONSTRUCTION SO THAT CONFLICTS WITH UTILITIES MAY BE RESOLVED.
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF BIRMINGHAM CURRENT STANDARDS AND SPECIFICATIONS.
- CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AND / OR THE AUTHORITY HAVING JURISDICTION, 48-HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- PRIOR TO CONSTRUCTION OF NEW DUMPSTER ENCLOSURE CONTRACTOR TO CONFIRM THE FINAL DUMPSTER DIMENSIONS AND ALL CLEAR DIMENSIONS REQUIRED FOR SANITATION TRUCK REMOVAL. CONTRACTOR TO CONSULT WITH ARCHITECT PRIOR IF CONFLICTS OCCUR.

STRUCTURAL GENERAL NOTES:

- 28 DAY CONCRETE COMPRESSIVE STRENGTH,  $f'_c$  = 4,500 PSI OR GREATER
- THE CONCRETE MIX DESIGN SHALL CONFORM TO ACI 318-08 CHAPTER 4 REQUIREMENTS FOR EXPOSURE CLASS F3.
- CONCRETE SHALL HAVE AN AIR CONTENT OR 5.5% BY VOLUME, PLUS OR MINUS 1.5%.
- CALCIUM CHLORIDE SHALL NOT BE ADDED TO THE CONCRETE MIX DESIGN
- COMPRESSIVE STRENGTH OF MASONRY,  $f_m$  = 1,500 PSI OR GREATER
- MORTAR FOR MASONRY SHALL BE TYPE "N"
- NET AREA COMPRESSIVE STRENGTH OF MASONRY UNITS SHALL BE 2,150 PSI OR GREATER
- GROUT FOR MASONRY SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH OF 2,000 PSI OR GREATER
- WELDED WIRE MESH REINFORCING SHALL CONFORM TO ASTM A 185, WITH A MINIMUM YIELD STRENGTH,  $f_y$  = 60,000 PSI
- ALL OTHER STEEL REINFORCING FOR CONCRETE OR MASONRY SHALL BE DEFORMED BARS, CONFORMING TO ASTM A 615
- STEEL PLATES, CHANNELS, AND ANGLES SHALL BE OF ASTM A 36 MATERIAL
- STEEL W-SHAPES SHALL BE OF ASTM A 992 MATERIAL
- ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE 2006 AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE, AWS D 1.1
- HOT DIPPED GALVANIZED STEEL SHALL CONFORM TO ASTM A 123
- THE OWNER SHALL ENGAGE AND RETAIN A QUALIFIED SPECIAL INSPECTION AGENCY FOR THE SPECIAL INSPECTION AND TESTING OF STEEL, CONCRETE, AND MASONRY AS REQUIRED BY THE 2009 MICHIGAN BUILDING CODE, TABLES 1704.3 (STEEL), 1704.4 (CONCRETE), AND 1704.5.1 (MASONRY)
- GROUND PAD PER N.E.C. 250-91

ARCHITECT NOT RESPONSIBLE FOR CONFIRMATION OR CLARIFICATION OF ANY EXISTING CONDITIONS. ALL CONDITIONS PROVIDED ASSUMED TO BE ACCURATE. CONTRACTOR TO CONFIRM ALL CONDITIONS PRIOR TO CONSTRUCTION AND NOTIFY OWNER IF DISCREPANCIES EXIST.

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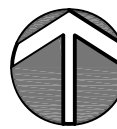
CONSULTANT:

PROJECT:  
**DFCU BIRMINGHAM  
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2483 W. MAPLE ROAD  
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ORIGINAL AS SUBMITTED  
LANDSCAPE DETAILS  
▲ PROJECT # DFC14-024

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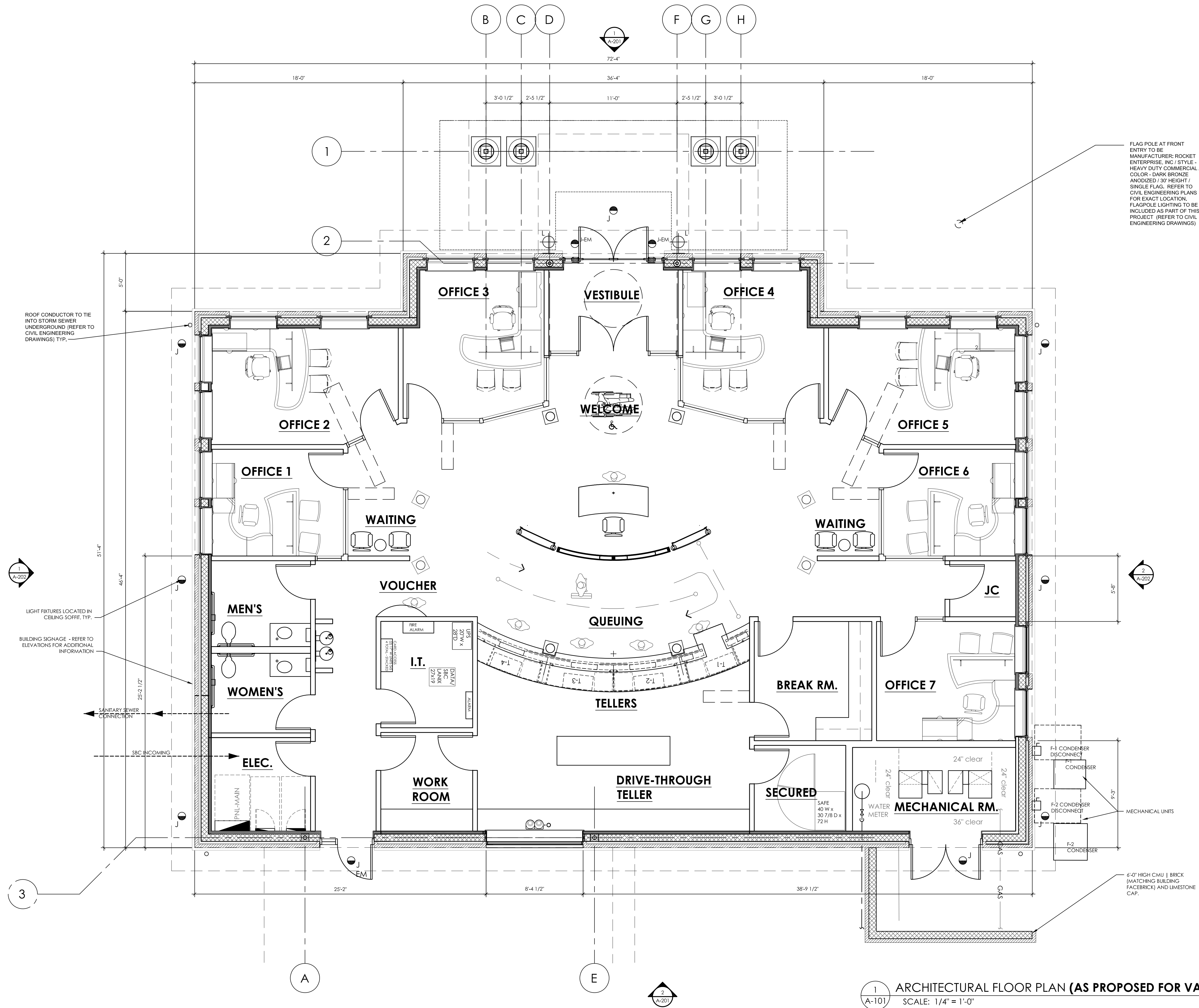
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NORTH

SHEET:

L-102



ROOF CONDUCTOR TO TIE INTO STORM SEWER UNDERGROUND (REFER TO CIVIL ENGINEERING DRAWINGS) TYP.

LIGHT FIXTURES LOCATED IN CEILING SOFFIT, TYP.

BUILDING SIGNAGE - REFER TO ELEVATIONS FOR ADDITIONAL INFORMATION

SANITARY SEWER CONNECTION

SBC INCOMING

FLAG POLE AT FRONT ENTRY TO BE MANUFACTURED BY: ROCKET ENTERPRISE, INC / STYLE - HEAVY DUTY COMMERCIAL / COLOR - DARK BRONZE / ANODIZED / 30' HEIGHT / SINGLE FLAG. REFER TO CIVIL ENGINEERING PLANS FOR EXACT LOCATION. FLAGPOLE LIGHTING TO BE INCLUDED AS PART OF THIS PROJECT (REFER TO CIVIL ENGINEERING DRAWINGS)

6'-0" HIGH CMU 1 BRICK (MATCHING BUILDING FACERBRICK) AND LIMESTONE CAP.

1 ARCHITECTURAL FLOOR PLAN (AS PROPOSED FOR VARIANCE)  
SCALE: 1/4" = 1'-0"

2015 04-22	REVISED PER CITY COMMENTS	VID
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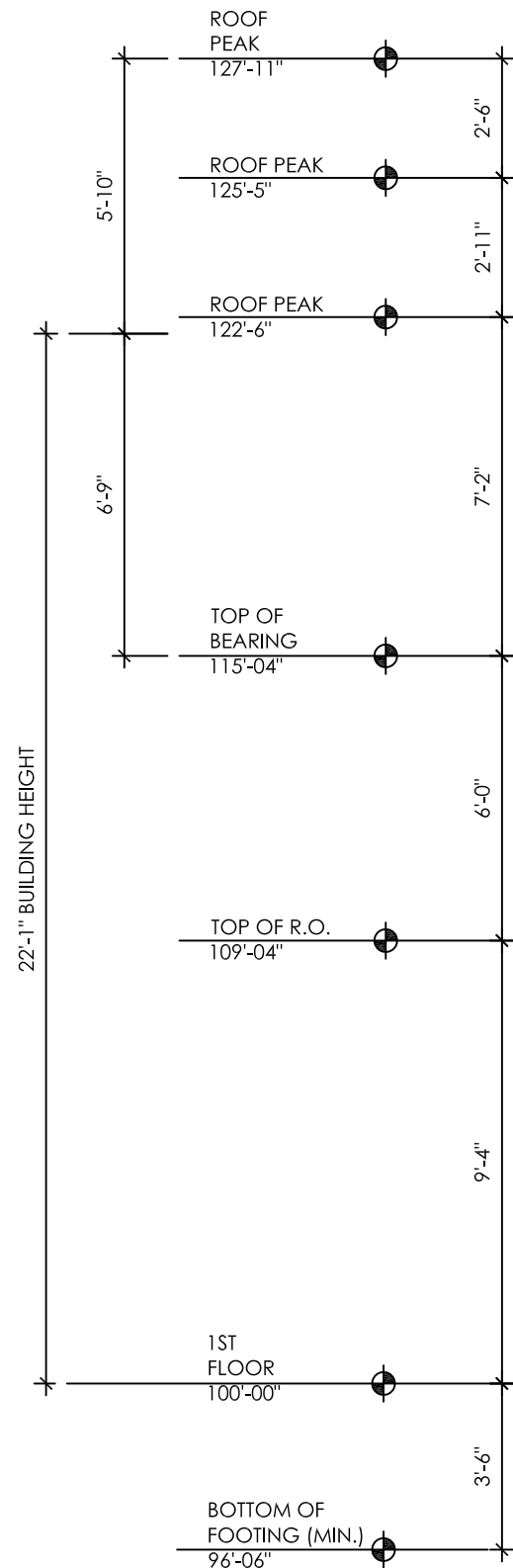
AS PROPOSED FOR VARIANCE  
ARCHITECTURAL FLOOR PLAN  
PROJECT # DFC14-024

NOT ISSUED FOR CONSTRUCTION

SEAL:

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SHEET:  
**A-101**



2 FRONT ELEVATION (AS PROPOSED FOR VARIANCE)  
SCALE: 1/4" = 1'-0"

## EXTERIOR MATERIAL SCHEDULE

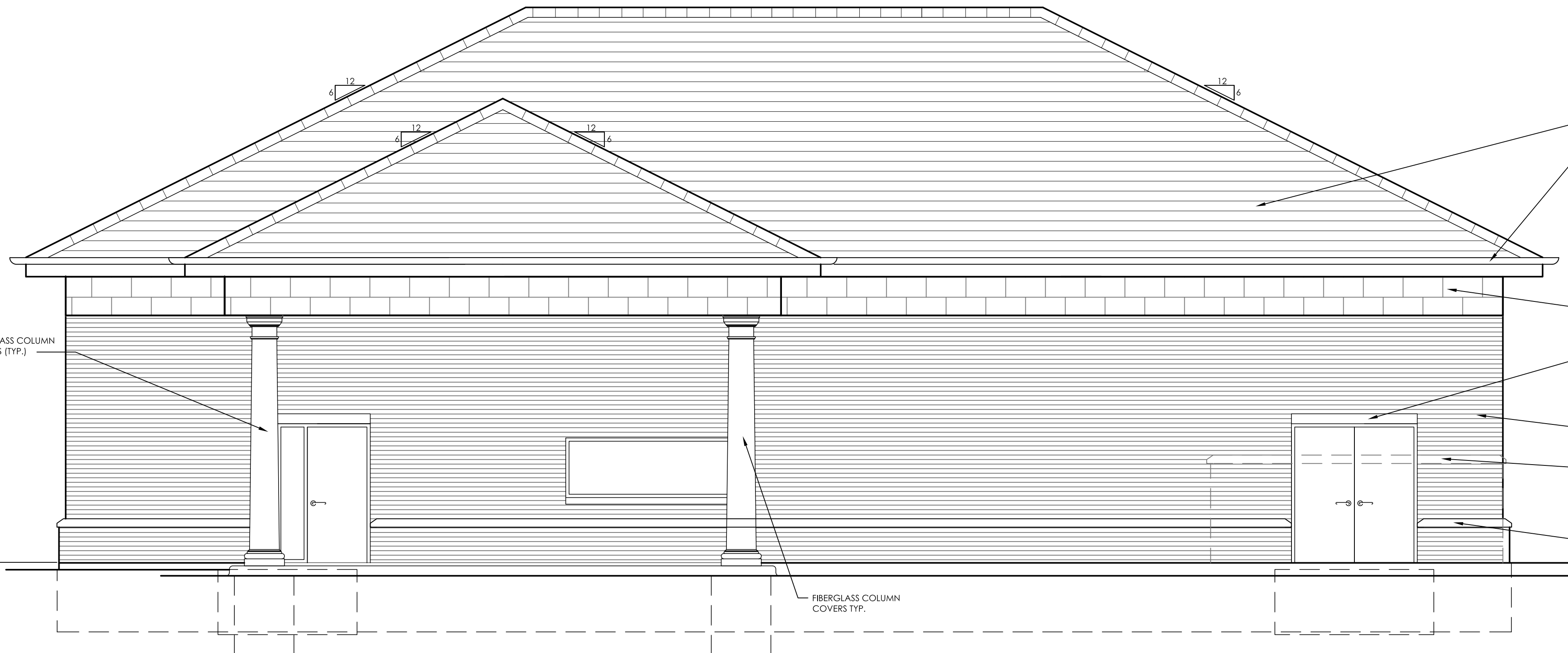
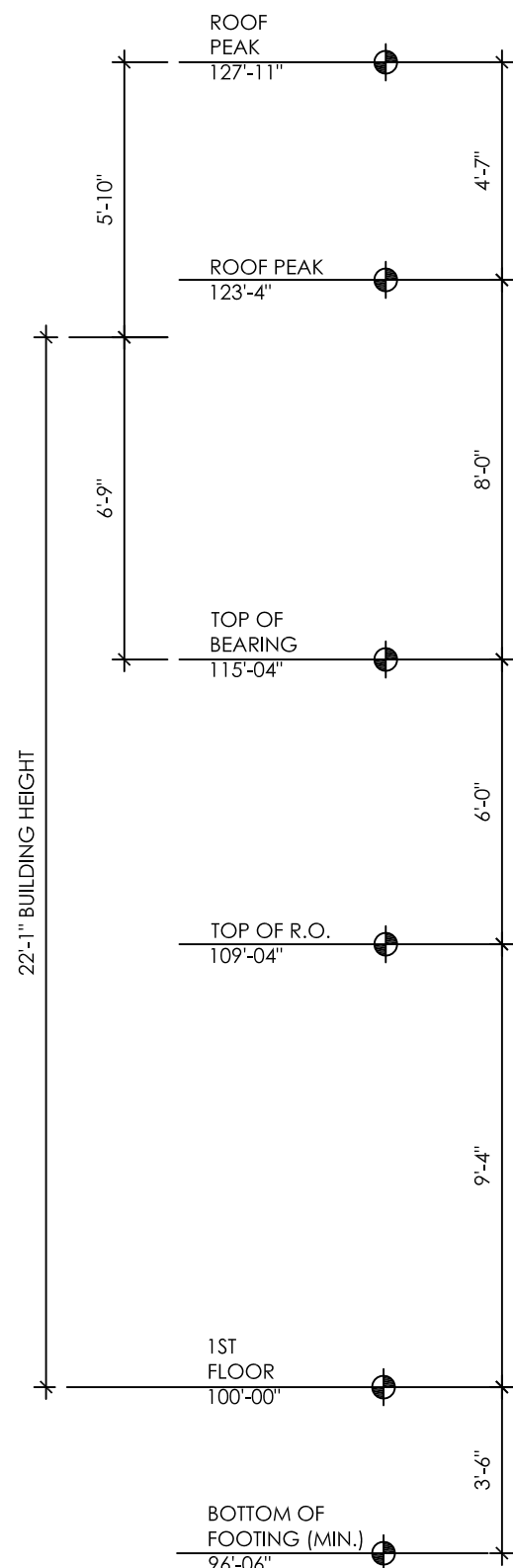
ID #	DESCRIPTION	SIZE	MANUFACTURER	MODEL / STYLE	COLOR / COLOR CODE	REMARKS
M-9	BRICK FACADE		REDLAND BRICK LAWRENCEVILLE		4-3111/ORTOWN MODULAR	DISTRIBUTED BY MELDON BRICK. CONTRACTOR TO COAT BRICK AND MORTAR WITH WATER REPELLENT. SURE KLEAN WEATHER SHIELD 36.0XANE WB CONCENTRATE PER MANUFACTURERS RECOMMENDATIONS. BRICK WATER REPELLENT DISTRIBUTED BY MASONPRO, INC. 1-800-697-4731
M-10	BRICK MORTAR		SOLOMON COLORS		503 #44H RED COLOR	DISTRIBUTED BY CLOT / CONTACT: DAVE HALL - (734) 789-1011. REFER TO STRUCTURAL DRAWINGS FOR MORTAR SPECIFICATIONS.
M-11	SHINGLES		CERTANTEED	LANDMARK SERIES TL	MOORE BLACK	40 YEAR SHINGLES. CONTACT DAN ZERNIC 800.359.7296 X3566.
M-12	PREFINISHED ALUM. FASCIA		QUALITY ALUMINUM PRODUCTS	SOLID COLOR	ROYAL BROWN	SUBMIT COLOR CHART FOR APPROVAL
M-13	PORCELAIN TILE	12"X24"	CLOT	GET	ALMOND	DISTRIBUTED BY CLOT / CONTACT: JACK LENNON - (248) 633-9970. TILE INSTALLATION: GROUT TO BE EXTERIOR RATED. CONTRACTOR TO COORDINATE EXPANSION JOINT LOCATIONS WITH ARCHITECT PRIOR TO CONSTRUCTION.
M-14	POLYMER-MODIFIED HYDRAULIC TILE GROUT		MAPEI	KER 700 SERIES ULTRA / COLOR	15+ BONE	CONTRACTOR TO PROVIDE / APPLY MIRACLE SEALANT #511 IMPREGRATOR ON GROUT ONLY. CONTRACTOR TO INSTALL FOLLOWING ALL MANUFACTURERS SPECIFICATIONS.
M-15	EXTERIOR GRADE PAINT		SHERWIN WILLIAMS	DURABONDS EXTERIOR PAINT	LOTUS POD SW7572	SCOFFIT - HORIZONTAL SURFACE. REFER TO SPECIFICATIONS FOR FINISHING INSTRUCTIONS. TAPE JOINTS / SBA COAT COMPLETE SURFACE/ EXT. GRADE PRIMER AND 2 COATS FINISH PAINT.
M-16	EXTERIOR GRADE PAINT		SHERWIN WILLIAMS	DURABONDS EXTERIOR PAINT	BITTERSWEET STEM SW7529	FASCIA - VERTICAL SURFACE. REFER TO SPECIFICATIONS FOR FINISHING INSTRUCTIONS. TAPE JOINTS / SBA COAT COMPLETE SURFACE/ EXT. GRADE PRIMER AND 2 COATS FINISH PAINT.
M-18	GUTTER / RECTANGULAR DOWNSPOUT	6"				DOWNSPOUT COLOR VARIES DEPENDING ON SURFACE CONDITIONS. IMPERIAL BROWN # BRICK CONDITIONS WHITE # FIBERGLAS COLUMN LOCATIONS
S-5	EXTERIOR PAINT		SHERWIN WILLIAMS	LATEX SEMI-GLOSS	CHUTNEY BROWN #SW1315	METAL DOORS / FRAMES PRIMER / PAINTED WITH EXTERIOR GRADE PAINT PRODUCT DISTRIBUTED BY SHERWIN WILLIAMS / CONTACT: DOUGIE HALL (216) 224-7509.
DECORATIVE COLUMNS						
COL-1	TRP CLASSIC COLUMN COVERS W/ SPUR & TRP TUSCAN CAP & BASE @ 2004	24" @	MELTON CLASSICS	#200FR		FACTORY PREFINISHED SOLID COLOR GEL COAT - SHERWIN WILLIAMS PURE WHITE #SW1004. CONNECTIONS TO FOLLOW MANUFACTURERS SPECIFICATION. MONOCHROME LOOK: ROUNDO AT SEAMS AND PRIMER PAINT ENTIRE COVER IN FIELD WITH SHERWIN WILLIAMS
COL-2	TRP CLASSIC COLUMN COVERS W/ SPUR & TRP TUSCAN CAP & BASE @ 2004	18" @	MELTON CLASSICS	#200FR		DURABLE LATEX PAINT WHITE #SW1004. CONNECTIONS TO FOLLOW MANUFACTURERS SPECIFICATION. MONOCHROME LOOK: ROUNDO AT SEAMS AND PRIMER PAINT ENTIRE COVER IN FIELD WITH SHERWIN WILLIAMS
COL-3	DURACLASSIC 1 PIECE COLUMN W/ TUSCAN CAP & BASE	10" @	MELTON CLASSICS	#200DC		DURABLE LATEX PAINT WHITE #SW1004. CONNECTIONS TO FOLLOW MANUFACTURERS SPECIFICATION.

COORDINATE DOWNSPOUT TIE INS WITH CIVIL ENGINEERING DRAWINGS - PROVIDE (4) FOUR LEADS AT CORNERS OF BUILDING AS SHOWN ON ELEVATIONS

ALL EXTERIOR FINISHES PER ASSOCIATED EXTERIOR FINISH MATERIALS BOARD SUBMITTED WITH SEE PLAN APPROVAL PKG.

NO ROOFTOP EQUIPMENT IS SCHEDULED AS PART OF THIS PROJECT

BUILDING FACADE % CALCULATIONS		
EAST ELEVATION		
BRICK: 31%		
PORCELAIN TILE: 13%		
ASPHALT SHINGLES: 50%		
OPEN AREA: 6%		
WEST ELEVATION		
BRICK: 30%		
PORCELAIN TILE: 13%		
ASPHALT SHINGLES: 47%		
OPEN AREA: 4%		
NORTH ELEVATION		
BRICK: 38%		
PORCELAIN TILE: 13%		
ASPHALT SHINGLES: 33%		
OPEN AREA: 16%		
SOUTH ELEVATION		
BRICK: 40%		
PORCELAIN TILE: 8%		
ASPHALT SHINGLES: 39%		
OPEN AREA: 7%		



1 REAR ELEVATION (AS PROPOSED FOR VARIANCE)  
SCALE: 1/4" = 1'-0"

