City of Birmingham
A Walkable Community

MEMORANDUM

Community Development Department

DATE: **August 26, 2015**

TO: **Joseph A. Valentine, City Manager**

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

SUBJECT: **Set a Public Hearing for a Brownfield Plan for 2483 W. Maple, DFCU Financial (formerly Cranbrook Car Care)**

The State Brownfield Redevelopment Statute (Public Act 381 of 1996, as amended) allows the City to approve a Brownfield Plan in order to help finance the cleanup of a contaminated site through the use of Tax Increment Financing (TIF). A brief summary of the statute, prepared by the City's Brownfield Consultant, is attached for reference.

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.

On July 16, 2015, the Brownfield Redevelopment Authority reviewed a Brownfield Plan submitted for the above-captioned property 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 was requesting reimbursement was estimated at $221,930. After much discussion, the Brownfield Redevelopment Authority postponed the consideration of the Brownfield Plan to July 30, 2015 to allow the applicant time to hire an attorney and investigate BP's potential liability for all or part of the contamination cleanup costs.

At the request of the applicant, this matter was again postponed from July 30, 2015 to August 13, 2015.

On August 13, 2015, the applicant appeared before the Brownfield Redevelopment Authority with their environmental consultants, and their attorney, Mr. George Curran with Kotz Snagster Wysocki P.C., who was hired to explore BP's potential liability for the site. Please see the attached letter from PM Environmental dated August 11, 2015 outlining the outcome of discussions with BP's attorneys, as well as a detailed explanation of the applicant's proposed changes to the requested reimbursement amount by removing all expenses related to groundwater sampling and additional delineation that may be related to LUST Closure. The Authority voted unanimously to approve the Brownfield Plan with the revisions made by the applicant. If the City Commission approves the Brownfield Plan, the maximum amount for which the developer would be eligible to be reimbursed through tax increment financing for this

project is $189,226. On August 13, 2015 the Birmingham Brownfield Redevelopment Authority also approved the proposed reimbursement agreement pertaining to the Brownfield Plan for 2483 W. Maple. This agreement sets forth the process by which the developer will submit requests for reimbursement to the Authority.

The Planning Division now requests that the City Commission set a public hearing date for **October 12, 2015** to consider approval of the Brownfield Plan as recommended by the Brownfield Redevelopment Authority. Please find attached all relevant documents and the draft meeting minutes for your review.

SUGGESTED ACTION:

To set a public hearing date of **October 12, 2015** to consider the approval of the Brownfield Plan and Reimbursement Agreement for 2483 W. Maple, DFCU Financial.

CITY OF BIRMINGHAM

RESOLUTION APPROVING A BROWNFIELD PLAN FOR 2483 W. MAPLE ROAD

Moved by Commission Member _____, Seconded by Commission Member _____,

WHEREAS, the Birmingham Brownfield Redevelopment Authority (the "Authority"), pursuant to 1996 PA 381, as amended (the "Act"), prepared and recommended for approval by this Commission a brownfield plan ("the Plan") for property located at 2483 West Maple Road, Birmingham, Michigan; and,

WHEREAS, the City of Birmingham, at least ten days before the meeting of this Commission at which this resolution is considered, provided notice of a hearing to all taxing jurisdictions which are affected by the Plan (the "Taxing Jurisdictions") and fully informed the Taxing Jurisdictions about the fiscal and economic implications of the Plan; and,

WHEREAS, the City of Birmingham, at least ten days before the meeting of this Commission at which this resolution is considered, provided notice of the hearing to the Department of Environmental Quality and the Michigan Strategic Fund (or its designee); and,

WHEREAS, this Commission held a public hearing on the Plan at which officials from the Taxing Jurisdictions had an opportunity to be heard in regard to the adoption of the brownfield plan, interested persons had an opportunity to be heard, any written communications with reference to the Plan were received and considered, and a record of the public hearing, including all data presented at the hearing, was made and preserved.

NOW, THEREFORE, BE IT RESOLVED THAT

1. The Plan constitutes a public purpose.

2. The Plan meets all of the requirements for a brownfield plan set forth in Section 13 of the Act.

3. The proposed method of financing the costs of the eligible activities, as described in the Plan, is feasible and the Authority has the ability to arrange the financing.

4. The costs of the eligible activities proposed in the Plan are reasonable and necessary to carry out the purposes of the Act.

5. The amount of captured taxable value estimated to result from the adoption of the Plan is reasonable.

6. The Plan is approved.

7. The reimbursement agreement pertaining to the Plan is approved.

AYES:

NAYS:
ABSENT:

MOTION CARRIED.

I, Laura Pierce, Clerk of the City of Birmingham, certify that the foregoing is a true and compared copy of a Resolution duly made and passed by the Birmingham City Commission at a meeting held on October 12, 2015.
Laura Pierce, City Clerk

3. Resolution approving the Brownfield Plan and associated Reimbursement Agreement pertaining to the Brownfield Plan for 2483 W. Maple Rd. and requesting the city clerk to forward the Brownfield Plan and Reimbursement Agreement to the Birmingham City Commission for their review and consideration.

Chairperson Gotthelf offered background. The owner of the property located at 2483 W. Maple Rd. 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. They anticipate four full-time jobs and five part-time jobs when it is completed. Ms. Ecker added that all planning approvals have been granted for the construction of the new bank building and the associated drive-through facility and parking. The site contains parkland and an alley that the applicant uses under a license agreement with the City.

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.

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.

Mr. Haynes noted there were some costs removed from the plan because the actual value won't support their reimbursement. Ms. Messerang clarified that they gauged how much could be reimbursed within the 30 years and used that cost to determine what could be included in the plan. Due care activities include disposal of ground water and soil; installation of a vapor barrier if necessary, which cost is split between local and state school taxes and requires DEQ approval. Additional response activities include ground water sampling. Preparation of the Brownfield plan consists of installation of up to three new source wells.

Ms. Messerang explained that Mr. Sam Karana, the property owner, plans to pursue legal action against BP and should he prevail he will no longer seek reimbursement for any costs that overlap. Mr. Karana confirmed that he bought the property as-is in 2010 from Jabra and he is not responsible for what happened prior to that time. Jabra purchased the site from BP in 2005.

Chairperson Gotthelf stated she has found BP to be very cooperative. They prefer to take action themselves rather than the owner taking the action and then being reimbursed. Mr. Haynes clarified that the Reimbursement Agreement for this proposal contains a clause that says if the developer obtains any money from any liable party the developer will reimburse the Authority. The Authority will return those monies back to the taxing jurisdictions proportionally.

Mr. Robertson observed there is no incentive on the developer or anybody else to go after the money. Meanwhile the Authority puts up all of their taxes and hopes that somebody will go after BP. Mr. Haynes explained the statute allows the Brownfield Authority to pursue BP as

well. However, the question is whether the Authority wants to do that. Ms. Torcolacci pointed out the developer's incentive is that if they pursue BP they can get reimbursement a lot sooner than 30 years.

Chairperson Gotthelf was bothered that it has been a year since the investigation began and there has been no effort to bring in BP and have them pay for some of the cost. Ms. Ritchie noted that BP will only pay for remediation of what they caused, which is basically only soil removal. They aren't going to pay for all of the other expenses to redevelop the site.

Mr. Robertson questioned why the Brownfield Authority would put up all of this tax increment financing money if no one has gone after BP who is probably responsible for the spill. Mr. Hayes explained the developer will front the money to remediate the site. He will have spent say $100,000 in response costs to remove soil. The Authority reimburses him at about $3,000/yr., so the taxing jurisdiction's reimbursement is pretty low. If the developer recovers the money from BP it reduces the money that the Brownfield Authority pays. So, the Authority is not fronting the money; it is reimbursing the developer to remediate the site. Mr. Robertson thought the developer should have gone after BP a year ago as opposed to starting with the Brownfield.

Mr. Haynes reiterated that the statute allows the Authority to sue BP and recover the response costs. Mr. Robertson did not think that suing BP is the Authority's job. The Authority's job is to protect the tax revenues of the City.

Mr. Stuntz noted the Authority has some flexibility through the Reimbursement Agreement process where if funding does come in from BP to address some of the costs, those will no longer be reimbursable. Also, whatever concerns the Authority might have at this point could be addressed so the developer can move forward with the redevelopment.

Ms. Ritchie said that the developer will finish taking out the tanks and the remaining soil next week. Construction is anticipated to begin in August. Ms. Ecker advised the developer has all planning approvals in place and the license agreements have been approved by the City Commission. Now it is a matter of submitting construction drawings for Building Permit review.

Mr. Robertson indicated he would be happy to pass the Brownfield, but first they have to go after BP. He thinks they have it backwards. The chairperson added that if conversations with BP had taken place a year ago, perhaps they would have been a player at this point and paid for all the investigation that has happened to date. When she has worked with BP in the past they have gotten back to her within days. Mr. Robertson thought it is the developer's responsibility rather than that of the Brownfield Authority to have conversations and go after BP before the Authority passes a Brownfield that basically pays for BP's responsibility.

Mr. Ritchie noted that BP only has to get the LUST to closure with the DEQ. All they have to do is prove there aren't any exposure pathways, verify that contamination hasn't migrated off-site, write a closure report, and they are done. They could leave all of the soil in place and still close the open LUST. The developer is building over that and that is why the majority of the soil is coming out.

Mr. Stuntz said in this case there probably won't be much difference in the taxes because if they successfully pursue BP and get them to pay for closure related activities, say that's $30,000. At this point there is a $200,000 Brownfield Plan which will not be fully reimbursed at the end of 30 years. If it makes any difference at all, it will be a very small one. However, the point is precedent and process, which can be addressed through a Reimbursement Agreement.

Mr. Robertson agreed it is not about the money; it is about the process. The process is 1) the developer shouldn't have started construction if he was expecting money from the Brownfield Authority; 2) the developer should have gone to the responsible party before coming before this Authority; and 3) he doesn't want to hold up the developer but the Authority has a responsibility for the process.

It was concluded that at $3,000/yr. it makes no difference if the Authority passes on this today or in 60 to 90 days. Two options were discussed: 1) the Authority would not approve the Brownfield Plan today; they would allow time for the developer to hire a lawyer to see what he can get and then come back; or 2) the Authority recommends approval today for a lesser amount than is being requested, based on what they think BP will pay.

Mr. Karana said he would pay an attorney 30% of the estimated $100,000 that they capture from BP.

Chairperson Gotthelf agreed to provide two key names for BP in this area, the attorney and the head of real estate. Then the three can run this through with them and find out their response.

Motion by Mr. Robertson
Seconded by Ms. Torcolacci to table this proposal to Thursday, July 30 at 8:30 a.m. when the Authority can hear from the developer with respect to his conversations regarding BP's liability for this bill.

Voice
Vote: Yeas, 4
Nays, 0
Absent, Zabriskie

Motion carried, 4-0.

3. Resolution approving the Brownfield Plan and associated Reimbursement Agreement pertaining to the Brownfield Plan for 2483 W. Maple Rd. (former 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.

Chairperson Gotthelf offered background. The owner of the property located at 2483 W. Maple Rd. 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.

On July 13, 2015, the Brownfield Redevelopment Authority reviewed a Brownfield Plan submitted for the above-captioned property 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. At that meeting the Authority had requested additional information from the applicant.

Ms. Massering said at the last meeting the group discussed firming up where exactly the developer stood in terms of pursuing BP for liability. In addition they worked out some costs and discussed them with AKT to insure that any of the costs being sought for reimbursement are not related to any of the LUST closure activities that BP would be held liable for. Therefore expenses associated with the ground water sampling and some additional characterization have been removed. If BP had gone out there to close they would have incurred those costs.

Chairperson Gotthelf clarified that previously the Plan requested reimbursement of $221,930 and now it is down to $189,226 for a difference of about $32,700. The original figure of $60,000 reflected an estimate of the cost that BP or the liable party would have incurred for their closure. Now the actual numbers have come in of how much it costs to do the full remediation of the soil and transportation. The difference of what BP could have done and what has been done now is that BP could have left a lot of the soil in place and put some protections down, such as a restrictive covenant. However, because of the new use the applicant removed a lot of soil and did a more thorough cleanup.

Mr. George Curran with Kotz Snagster Wysocki PC, attorney for the applicant, Karana Real Estate, LLC ("Karana") to assist in evaluating the issues before the Authority this morning. The issue comes down to the liability of BP which was the owner at the time of the reported incident in 1992 and the ability of a subsequent property owner, Karana who acquired the property some 15 years later, to pursue a course of action.

Mr. Curran said he has contacted BP's counsel and he would expect BP to take the position that the property was conveyed to Armada Oil pursuant to an agreement that left a covenant on the record indicating the 1992 release. They will further point to the fact there is an as-is provision on the acquisition of the property by Karana. They will indicate that the restrictive covenant on the property was recorded. The new owner proceeded to obtain a Baseline Environmental Assessment ("BEA") which will insulate the new owner from liability. Based upon that, BP will

take the position that these costs that were incurred were not “necessary” because they were not “required” under the statute or the case law interpreting the statute and they will point to several cases that are instructive in that respect.

Both BP and Armada will likely argue that the 1992 release, which is the basis on which Karana’s cleanup efforts were undertaken, was not unknown to Karana at the time it acquired the property and when it performed the BEA; and accordingly they will contend they have no liability. It is certain they will fight this if they are brought into litigation and it is also certain that the cost of litigation will be significant. It is anticipated that both Armada and BP would contend that if there is a cause of action for negligence the three year statute of limitations for property damage claims and the six year statute of limitations applicable to other personal claims would bar recovery. It is also expected they would argue under Michigan law that the claim accrues at the time the wrong upon which the claim is based was done regardless of when the damage results.

It could be argued that the Response Cost Statute under the Natural Resources Environmental Protection Act provides a six-year window for a party, commencing at the time the initiation of work takes place at the site and that has not expired. It would likely require litigation, and if BP and Armada decline to voluntarily participate, that is certainly the route that this could go. The prospect of litigation is both uncertain and expensive given the facts and the law presented. Otherwise Mr. Karana has no ability to go after BP for the cleanup.

Since it is expected that neither BP nor Armada will voluntarily participate in paying for the reimbursement of Karana for any cost, recovery, or other remediation activities undertaken at the site, Karana is seeking the assistance of the Brownfield Redevelopment Authority to enable it to return the site to productive use in Birmingham, employing and servicing its residents, and contributing to the growth and prosperity of the community.

Chairperson Gotthelf established that BP sold the property to Armada on May 24, 2005 and that Armada sold it to Karana on August 6, 2010. Karana did a BEA and that assessment indicated some contamination. Mr. Mike Kulka representing the Karanas talked about that. He noted the slug of soil looks the same as it did in 1992. There isn’t any new contamination that they would be liable for. They have cleaned up the contamination that has been there for over twenty years. Karana will maintain ownership of the property and will lease it to the credit union. The sale price in 2010 reflected a diminution in value as a result of the contaminated soil on the site.

Mr. Sam Karana, the property owner, advised that in 2010 he bought the property from Armada Oil Co. for $480,000 which was fair market value and he bought the business for $378,000. At that time property values were down because of the economy.

Chairperson Gotthelf clarified the purchase price of $480,000 in 2010 was discounted because of the contamination.

Mr. Haynes noted the statute permits the Authority to pursue a liable party for the TIF monies that the Authority has allowed the developer to fund. Mr. Kulka added that in the state’s eyes BP is a liable party. Chairperson Gotthelf said BP could be liable only for the cost to close the

site which is $60,000. Mr. Haynes added to the extent those costs have been removed from this proposal the Authority has nothing to after BP for.
The costs that Karana is asking this Authority to reimburse are costs that BP would not be liable for. They were incurred due to the redevelopment effort.

Mr. Robertson was concerned whether the additional cleanup cost is something that a reasonable community would request before a new development goes in.

Chairperson Gotthelf questioned if Karana received a discount at the time they purchased the property back in 2010 reflecting the contamination; then are they double dipping and getting that money again by a Brownfield reimbursement. Mr. Kulka responded most of the soil had to be removed for suitability even if it wasn't contaminated. The stability of that soil would never support a new foundation where the tank basin and everything surrounding it is located. Therefore they are asking for the total cost of the soil removal; not the excavation or the backfill (transportation and disposal of contaminated soil costs only).

Ms. Zabriskie noted notwithstanding the contamination, 2010 was the depth of the recession and it is hard to say if Karana got a discount how much of that was attributable to the contamination, and how much was attributable to market factors.

It was noted the vapor barrier is being proposed underneath the building to ensure that of there are any residual vapors they will not enter the building. Mr. Kulka observed that corporate America has recently been taking a conservative approach in order to avoid litigation. Ms. Ecker advised the fact this is a commercial development is keeping the cleanup cost lower than it would be if it was mixed-use or residential.

Chairperson Gotthelf stated the current appraised value of the property is $918,785 with the gas station up. Now it will be $1.1 million. Mr. Karana will get paid back quicker if the new appraised value comes in higher.

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 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 Rd., Birmingham, Michigan, intends to develop a new bank building at 2483 West Maple Rd., and has determined that the subject property needs approximately $189,226 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 Rd,, dated August 11, 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 Rd. prepared by PM Environmental dated August 11, 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.

Chairperson Gotthelf initiated discussion about whether this authority wants to pay for the vapor barrier in the amount of $50,000. Mr. Kulka noted there is one location that arguably would warrant a vapor barrier. If ground water appears, which is likely to occur, the barrier would be warranted. Therefore he can support the vapor barrier is needed as part of this development; however it is a grey area Chairperson Gotthelf said the Authority doesn't know if the Dept. of Environmental Quality ("DEQ") will approve the vapor barrier or not. If it is not necessary, then they will not approve using school tax dollars for doing it. Ms. Ecker said Karana is asking the Authority for $25,180 and the State and school tax is $24,800; so $50,000 is the total cost. The group was okay with paying for the vapor barrier because they thought it ought to go in.

Voice Vote: **Yeas, Robertson, Zabriskie, Gotthelf, Runco, Torcolacci**
Nays, None
Absent, None

Motion carried, 5-0.

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BIRMINGHAM BROWNFIELD REDEVELOPMENT AUTHORITY

August 11, 2015

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

Prepared on Behalf of:

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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, Asbestos Activities, and Preparation of a Brownfield Plan.
Reimbursable Costs:	Up to $189,226
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

DECRIPTION 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.

Redevelopment activities commenced in July 2015 with the demolition of the former building in July 2015 with a slated completion goal of Spring 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 began with demolition in Summer 2015, with a completion goal of Spring 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 3,800 gallons of groundwater during redevelopment activities, soil disposal and transportation of 4,108 tons of contaminated soil associated with development activities, assessment, oversight and VSR sampling for gas VOCs and Gasoline Range Organics (GRO) during redevelopment activities, and reporting, at a cost of $126,576.

   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.

2. Asbestos Activities; including a pre-demolition asbestos survey and oversight/abatement activities.

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 $189,226.

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 $184,176.

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

[Back to Non-Printer Friendly Version] [Send To Printer]

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]

Property Class:	201 - 201 Bus Imp	**Assessed Value:**	$447,260
School District:	030 - 030 Birmingham City Sch	**Taxable Value:**	$390,140
State Equalized Value:	$447,260	**Map #**	POST
PPBusCode	0	**Date of Last Name Chg:**	08/20/2010
		Date Filed:	
		Notes:	N/A
Historical District:	N/A	**Census Block Group:**	N/A

Principal Residence Exemption	June 1st	Final
2015	0.0000 %	-
2014	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]

	Frontage		Depth
Lot 1:	0.00 Ft.		0.00 Ft.
Lot 2:	0.00 Ft.		0.00 Ft.
Lot 3:	0.00 Ft.		0.00 Ft.
Total Frontage:	0.00 Ft.	**Average Depth:**	0.00 Ft.

Total Acreage:	0.38		
Zoning Code:	BI		
Total Estimated Land Value:	$679,900	**Mortgage Code:**	00000
Land Improvements:	$21,430	**Lot Dimensions/Comments:**	
Renaissance Zone:	NO		
Renaissance Zone Expiration Date:			
ECF Neighborhood Code:	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,		

⊟	w/Bays	3710 Sq. Ft.	1957

General Information

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

****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.
Privacy Policy

Appendix B

PM ENVIRONMENTAL Environmental & Engineering Services

FOR DEQ USE ONLY
BEA Disclosure #_____

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

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*	☐	☒	☐
Operator*	☐	☒	☐

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.

	YES	NO
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.**	☐	☒

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 ☐
Category D ☐
Category S ☒

	YES	NO
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.	☒	☐

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 Karana — 9-30-2010
(Person legally authorized to bind the person seeking liability protection) — Date

Name (Typed or Printed) Salman Karana

Title Member

02-3004-2

RECEIVED 10/25/10

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENT

LANSING

JENNIFER M. GRANHOLM
GOVERNOR

REBECCA A. HUMPHRIES
DIRECTOR

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

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.

J. Ritchie

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

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

Enclosure

4080 West Eleven Mile Road
Berkley, MI 48072
Office: 248.336.9988
Fax: 877.884.6775

3340 Ranger Road
Lansing, MI 48906
Office: 517.321.3331
Fax: 877.884.6775

77 Monroe Center, Suite 602
Grand Rapids, MI 49503
Office: 616.285.8857
Fax: 877.884.6775

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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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 f 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-

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.	**Soil:** Soil was sampled at the highest PID reading (1,127 parts per million (ppm)). **Groundwater:** 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.	**Soil:** Soil was sampled at the highest PID reading (1,901 ppm). **Groundwater:** Sampled	2.0-7.0

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-3 (20.0)	11.0-12.0	VOCs and Lead	Assess the area north of the gasoline UST basin.	**Soil:** Soil was sampled at the highest PID reading (1,327 ppm). **Groundwater:** 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.	**Soil:** Soil was sampled at the highest PID reading (11.2 ppm). Groundwater: 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.	**Soil:** 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. **Groundwater:** 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.	**Soil:** Soil was sampled at the highest PID reading (1.4 ppm). Groundwater: 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.	**Soil:** 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. **Groundwater:** 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.	**Soil:** 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. **Groundwater:** Sampled	1.0-6.0

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-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.	**Soil:** 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. **Groundwater:** 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.	**Soil:** 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. **Groundwater:** 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.	**Soil:** 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. **Groundwater:** 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.	**Soil:** 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. **Groundwater:** 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.	**Soil:** Soil was sampled at the highest PID reading (283 ppm). **Groundwater:** Not encountered.	Not Applicable
SB-14 (15.0)	4.0-5.0	Gasoline range VOCs	Assess the area of the northern pump islands.	**Soil:** Soil was sampled at the highest PID reading (498 ppm). **Groundwater:** Not sampled.	Not Applicable

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-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.	**Soil:** Soil was sampled at the highest PID reading (1,324 ppm) and the bottom of the boring. **Groundwater:** 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.	**Soil:** Soil was sampled at the highest PID reading (1,281 ppm) and the bottom of the boring. **Groundwater:** Not sampled.	Not Applicable
SB-17 (15.0)	2.0-3.0	Gasoline range VOCs	Assess the area south of the UST basin.	**Soil:** Soil was sampled at the highest PID reading (9.4 ppm). **Groundwater:** Not encountered.	Not Applicable
SB-18/PMW-5 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the southeast.	**Soil:** 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-19/PMW-6 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the southwest.	**Soil:** 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. **Groundwater:** Not encountered.	3.0-8.0

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-21/PMW-8 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the west.	**Soil:** 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-22/PMW-9 (15.0)	No Sample	Gasoline range VOCs	Delineate the extent of groundwater impact to the northwest.	**Soil:** 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-23 (15.0')	3.0-4.0	Gasoline range VOCs	Assess the area south of the western pump island.	**Soil:** Soil was sampled at the highest PID reading (98 ppm). **Groundwater:** 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.	**Soil:** Soil was sampled at the highest PID reading (255 ppm). **Groundwater:** Not encountered.	Not Applicable
SB-25 (15.0)	4.0-5.0	Gasoline range VOCs	Assess the area south of the UST basin.	**Soil:** Soil was sampled at the highest PID reading (224 ppm). **Groundwater:** Not encountered.	Not Applicable
SB-26 (15.0)	3.0-4.0	Gasoline range VOCs	Assess the area east of the UST basin.	**Soil:** Soil was sampled at the highest PID reading (1,363 ppm). Groundwater: 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.	**Soil:** Soil was sampled at the highest PID reading (2,376 ppm) and the bottom of the boring. **Groundwater:** Not sampled.	Not Applicable

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-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.	**Soil:** Soil was sampled at the highest PID reading (1,772 ppm) and near the bottom of the boring. **Groundwater:** 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.	**Soil:** Soil was sampled at the highest PID reading (1,639 ppm) and near the bottom of the boring. **Groundwater:** 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.	**Soil:** Soil was sampled at the highest PID reading (1,600 ppm) and near the bottom of the boring. **Groundwater:** Not encountered.	Not Applicable
OW-2RR	Not Applicable	Gasoline range VOCs	Assess groundwater impact in the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	3.0-8.0
OW-3RR	Not Applicable	Gasoline range VOCs	Assess groundwater impact in the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	4.0-9.0
OW-4R	Not Applicable	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	5.0-10.0
OW-5R	Not Applicable	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	5.0-10.0

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)
OW-7R	Not Applicable	Gasoline range VOCs	Assess groundwater impact north of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	5.0-10.0
OW-10	Not Applicable	Gasoline range VOCs	Assess groundwater impact east of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	3.0-8.0
OW-11	Not Applicable	Gasoline range VOCs	Assess groundwater impact southeast of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	6.5-11.5
OW-12	Not Applicable	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	5.0-10.0
OW-13	Not Applicable	Gasoline range VOCs	Assess groundwater impact west of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	4.5-9.5
MW-X	Not Applicable	Gasoline range VOCs	Assess groundwater impact northwest of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	2.0-7.0
MW-Y	Not Applicable	Gasoline range VOCs	Assess groundwater impact northwest of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	4.0-9.0
MW-Z	Not Applicable	Gasoline range VOCs	Assess groundwater impact north of the source area.	**Soil:** Not Applicable. **Groundwater:** Sampled	2.0-7.0

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)
MW-ZZ	Not Applicable	Gasoline range VOCs	Assess groundwater impact southwest of the source area.	**Soil:** Not Applicable. **Groundwater:** 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

Location (Total Depth in feet bgs)	Sample Depth (feet bgs)	Analysis	Objectives	Soil Exceedance (Applicable Part 213 RBSLs)	Groundwater Exceedance (Applicable Part 213 RBSLs)
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.	**Gas VOCs above DWP, GSIP, and Residential SVII**	**Gas VOCs and metals above DW and GSI**
	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.	**Gas VOCs above DWP and GSIP**	**Gas VOCs and lead above DW and GSI**
	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.	**Gas VOCs above DWP and GSIP**	**Gas VOCs and lead above DW and GSI**
	Groundwater 2.5-7.5				
SB/TMW-4 (18.0)	Soil 4.0-5.0	VOCs and Lead	Assess the area north of the	**Gas VOCs above DWP and GSIP**	**Gas VOCs and lead**

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 3.5-8.5		northern pump islands.		**above DW and GSI**
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 Groundwater 5.0-10.0	VOCs and Lead	Assess the area south of the western pump island and catch basin.	NONE	**Lead above DW and GSI**
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 Groundwater 1.0-6.0	Gasoline range VOCs	Delineate the extent of impact to the northwest.	NONE	NONE
SB-9/PMW-2 (15.0)	Soil 5.0-6.0 and 14.0-15.0 Groundwater 2.0-7.0	Gasoline range VOCs	Delineate the extent of impact to the north.	NONE	NONE
SB-10/PMW-3 (15.0)	Soil 5.0-6.0 and 14.0-15.0 Groundwater 2.0-7.0	Gasoline range VOCs	Delineate the extent of impact to the northeast.	NONE	NONE
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

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

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 3.0-8.0	VOCs	groundwater impact to the west.		
SB-22/PMW-9 (15.0)	No Soil Sample Groundwater 3.0-8.0	Gasoline range VOCs	Delineate the extent of groundwater impact to the northwest.	Not Applicable	NONE
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.	**Gas VOCs above DWP and GSIP**	Not Applicable
SB-26 (15.0')	Soil 3.0-4.0	Gasoline range VOCs	Assess the area east of the UST basin.	**Gas VOCs above DWP, GSIP, and Residential SVII**	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.	**Gas VOCs above Commercial DWP, GSIP, GCP, SVII, DC, and Csat at (1.0-2.0)**	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.	**Gas VOCs above Commercial DWP, GSIP, GCP, SVII, VSI, DC, and Csat at (1.0-2.0)**	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.	**Gas VOCs above Commercial DWP, GSIP, GCP, SVII, DC, and Csat at (1.0-2.0)**	Not Applicable

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

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	**Benzene above DW**
	Groundwater 4.0-9.0				
MW-Z	No Soil Sample	Gasoline range VOCs	Assess groundwater impact north of the source area.	Not Applicable	**Benzene above DW**
	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 <u>facility</u> 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 likley 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

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Appendix B: Site Photos
Appendix C: Previous Site Investigations
Appendix D: Property Assessing Records and Legal Description
Appendix E: Material Safety Data Sheet
Appendix F: Soil Boring Logs
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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:
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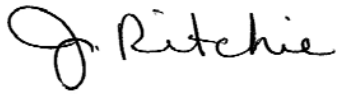

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Figures

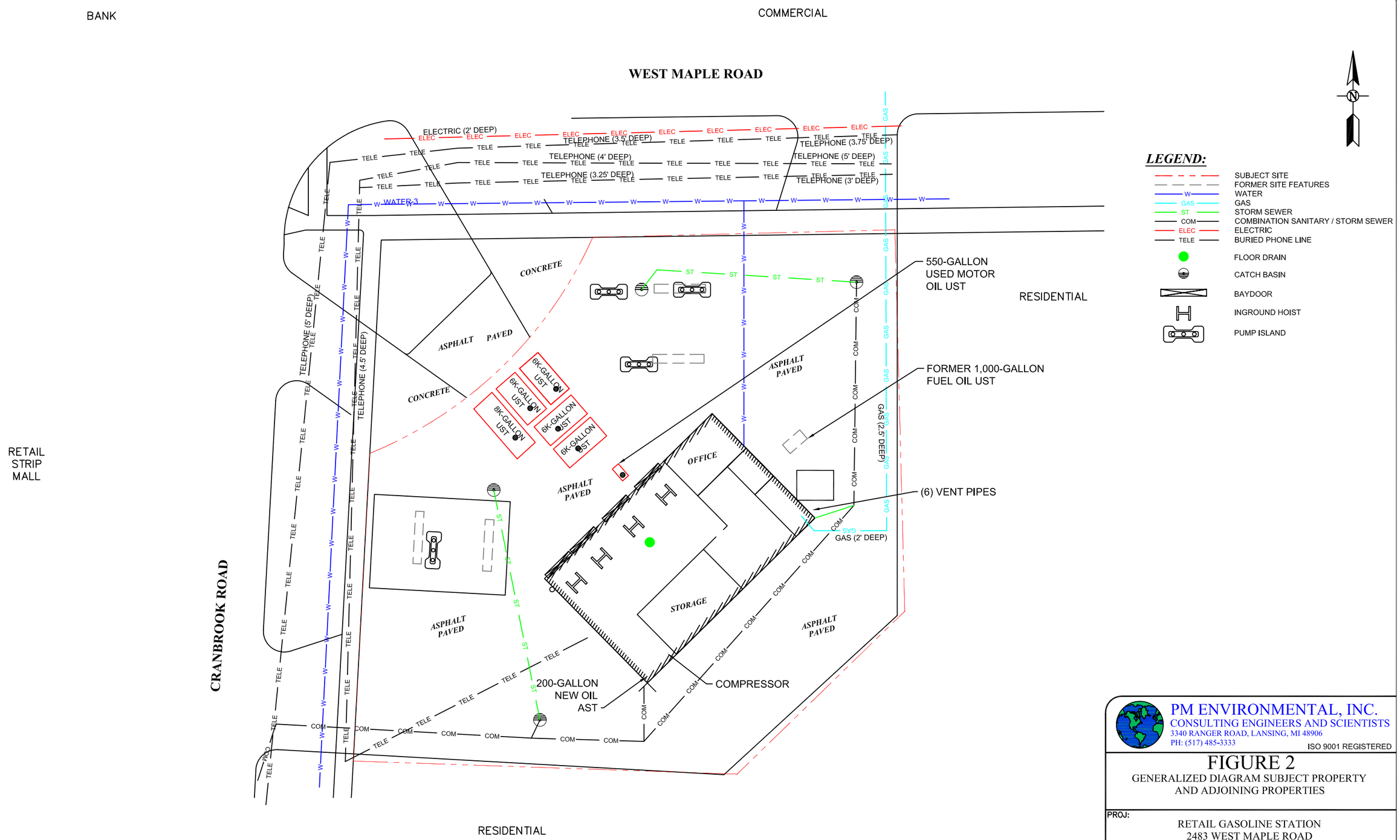

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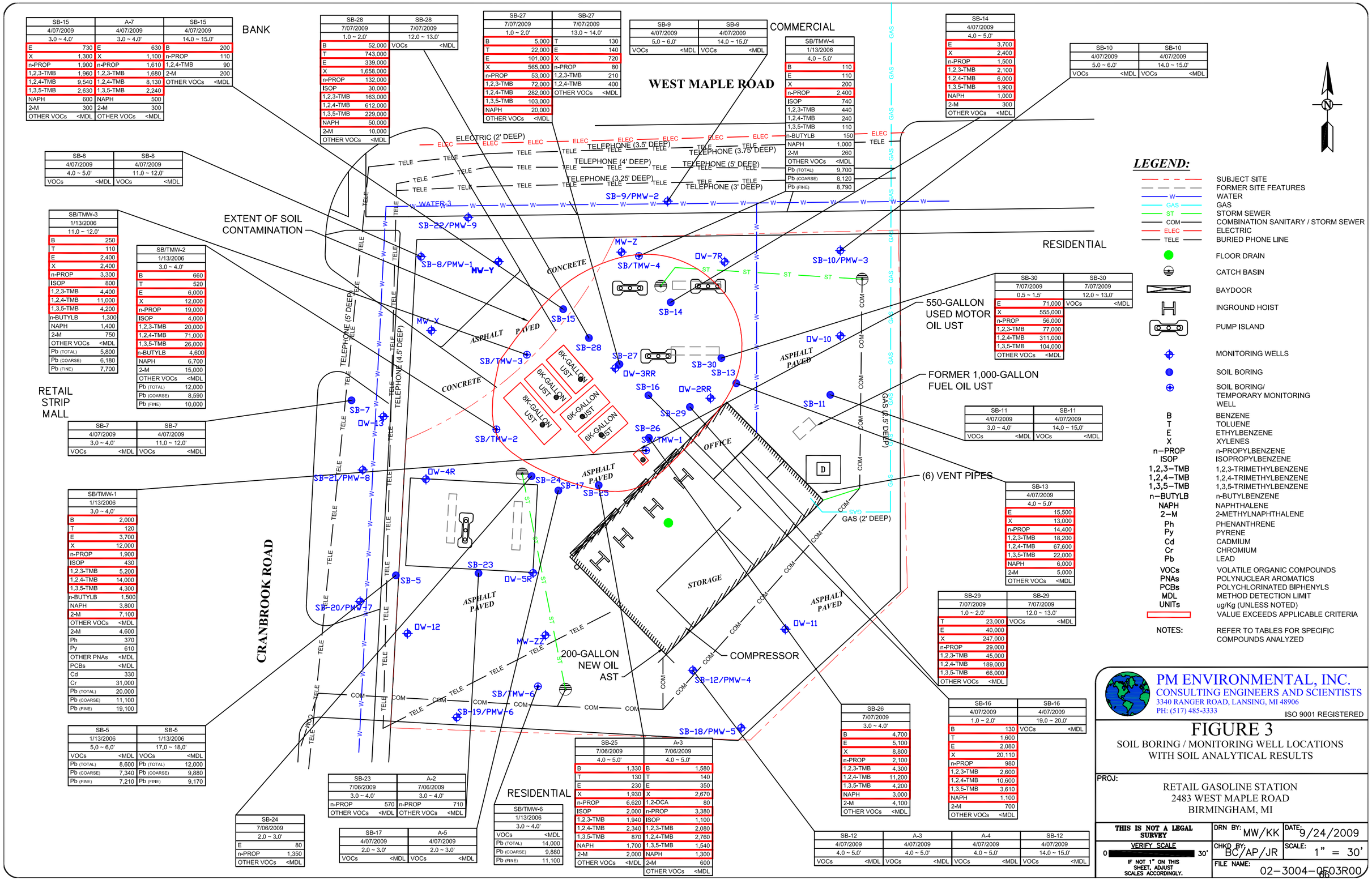
FIGURE 2

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' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: BC/AP/JR	SCALE: 1" = 30'
	FILE NAME: 02-3004-QE02R00	



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	1,2,4-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	

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

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-BUTYLB 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-BUTYLB 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-BUTYLB 4,600
NAPH 6,700
2-M 15,000
OTHER VOCs <MDL
Pb (TOTAL) 12,000
Pb (COARSE) 8,590
Pb (FINE) 10,000

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-BUTYLB 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

SB-24
7/06/2009
2.0 ~ 3.0'
E 80
n-PROP 1,350
OTHER VOCs <MDL

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

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-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-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-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	

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-13
4/07/2009
4.0 ~ 5.0'
E 15,500
X 13,000
n-PROP 14,400
1,2,3-TMB 18,200
1,2,4-TMB 67,600
1,3,5-TMB 22,000
NAPH 6,000
2-M 5,000
OTHER VOCs <MDL

SB-30	SB-30
7/07/2009	7/07/2009
0.5 ~ 1.5'	12.0 ~ 13.0'
E 71,000	VOCs <MDL
X 555,000	
n-PROP 56,000	
1,2,3-TMB 77,000	
1,2,4-TMB 311,000	
1,3,5-TMB 104,000	
OTHER VOCs <MDL	

SB-11	SB-11
4/07/2009	4/07/2009
3.0 ~ 4.0'	14.0 ~ 15.0'
VOCs <MDL	VOCs <MDL

PM ENVIRONMENTAL, INC.
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PH: (517) 485-3333
ISO 9001 REGISTERED

FIGURE 3

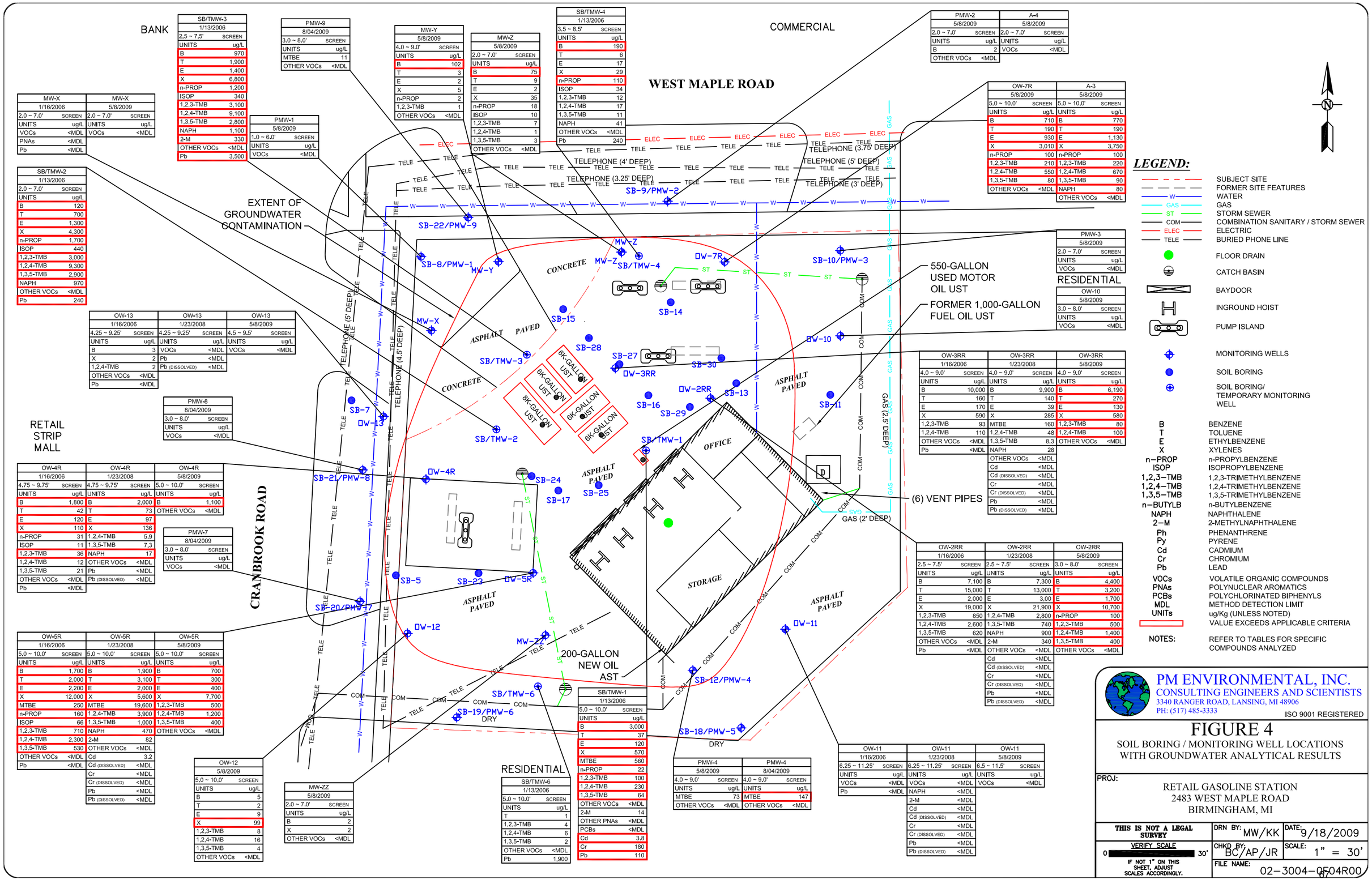
SOIL BORING / MONITORING WELL LOCATIONS WITH SOIL ANALYTICAL RESULTS

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

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE 0 30'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: MW/KK
DATE: 9/24/2009
CHKD BY: BC/AP/JR
SCALE: 1" = 30'
FILE NAME: 02-3004-0503R00



SB/TMW-3	
1/13/2006	
2.5 ~ 7.5'	SCREEN
UNITS	ug/L
B	970
T	1,900
E	1,400
X	6,800
n-PROP	1,200
ISOP	340
1,2,3-TMB	3,100
1,2,4-TMB	9,100
1,3,5-TMB	2,800
NAPH	1,100
2-M	330
OTHER VOCs	<MDL
Pb	3,500

PMW-9	
8/04/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
MTBE	11
OTHER VOCs	<MDL

MW-Y	
5/8/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
B	102
T	3
E	2
X	5
n-PROP	2
1,2,3-TMB	1
OTHER VOCs	<MDL

MW-Z	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
B	75
T	9
E	2
X	35
n-PROP	18
ISOP	10
1,2,3-TMB	7
1,2,4-TMB	1
1,3,5-TMB	3
OTHER VOCs	<MDL

SB/TMW-4	
1/13/2006	
3.5 ~ 8.5'	SCREEN
UNITS	ug/L
B	190
T	6
E	17
X	29
n-PROP	110
ISOP	34
1,2,3-TMB	12
1,2,4-TMB	17
1,3,5-TMB	11
NAPH	41
OTHER VOCs	<MDL
Pb	240

PMW-2	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
B	2
OTHER VOCs	<MDL

A-4	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

MW-X	
1/16/2006	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL
PNAs	<MDL
Pb	<MDL

MW-X	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

PMW-1	
5/8/2009	
1.0 ~ 6.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-7R	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	710
T	190
E	930
X	3,010
n-PROP	100
1,2,3-TMB	210
1,2,4-TMB	550
1,3,5-TMB	80
OTHER VOCs	<MDL

A-3	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	770
T	190
E	1,130
X	3,750
n-PROP	100
1,2,3-TMB	220
1,2,4-TMB	670
1,3,5-TMB	90
NAPH	80
OTHER VOCs	<MDL

SB/TMW-2	
1/13/2006	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
B	120
T	700
E	1,300
X	4,300
n-PROP	1,700
ISOP	440
1,2,3-TMB	3,000
1,2,4-TMB	9,300
1,3,5-TMB	2,900
NAPH	970
OTHER VOCs	<MDL
Pb	240

PMW-3	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

RESIDENTIAL

OW-10	
5/8/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-13	
1/16/2006	
4.25 ~ 9.25'	SCREEN
UNITS	ug/L
B	3
X	2
1,2,4-TMB	2
OTHER VOCs	<MDL
Pb	<MDL

OW-13	
1/23/2008	
4.25 ~ 9.25'	SCREEN
UNITS	ug/L
VOCs	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-13	
5/8/2009	
4.5 ~ 9.5'	SCREEN
UNITS	ug/L
VOCs	<MDL

PMW-8	
8/04/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-3RR	
1/16/2006	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
B	10,000
T	160
E	170
X	590
1,2,3-TMB	93
1,2,4-TMB	110
OTHER VOCs	<MDL
Pb	<MDL

OW-3RR	
1/23/2008	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
B	9,900
T	140
E	39
X	285
MTBE	160
1,2,4-TMB	48
1,3,5-TMB	8.3
NAPH	28
OTHER VOCs	<MDL
Cd	<MDL
Cd (DISSOLVED)	<MDL
Cr	<MDL
Cr (DISSOLVED)	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-3RR	
5/8/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
B	6,190
T	270
E	130
X	580
1,2,3-TMB	80
1,2,4-TMB	100
OTHER VOCs	<MDL

OW-4R	
1/16/2006	
4.75 ~ 9.75'	SCREEN
UNITS	ug/L
B	1,800
T	42
E	120
X	110
n-PROP	31
ISOP	11
1,2,3-TMB	36
1,2,4-TMB	12
1,3,5-TMB	21
OTHER VOCs	<MDL
Pb	<MDL

OW-4R	
1/23/2008	
4.75 ~ 9.75'	SCREEN
UNITS	ug/L
B	2,000
T	73
E	97
X	136
1,2,4-TMB	5.9
1,3,5-TMB	7.3
NAPH	17
OTHER VOCs	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-4R	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	1,100
OTHER VOCs	<MDL

PMW-7	
8/04/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-2RR	
1/16/2006	
2.5 ~ 7.5'	SCREEN
UNITS	ug/L
B	7,100
T	15,000
E	2,000
X	19,000
1,2,3-TMB	850
1,2,4-TMB	2,600
1,3,5-TMB	620
OTHER VOCs	<MDL
Pb	<MDL

OW-2RR	
1/23/2008	
2.5 ~ 7.5'	SCREEN
UNITS	ug/L
B	7,300
T	13,000
E	3,00
X	21,900
1,2,4-TMB	2,800
1,3,5-TMB	740
NAPH	900
2-M	340
OTHER VOCs	<MDL
Cd	<MDL
Cd (DISSOLVED)	<MDL
Cr	<MDL
Cr (DISSOLVED)	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-2RR	
5/8/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
B	4,400
T	3,200
E	1,700
X	10,700
n-PROP	100
1,2,3-TMB	500
1,2,4-TMB	1,400
1,3,5-TMB	400
OTHER VOCs	<MDL

OW-5R	
1/16/2006	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	1,700
T	2,000
E	2,200
X	12,000
MTBE	250
n-PROP	160
ISOP	66
1,2,3-TMB	710
1,2,4-TMB	2,300
1,3,5-TMB	530
OTHER VOCs	<MDL
Pb	<MDL

OW-5R	
1/23/2008	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	1,900
T	3,100
E	2,000
X	5,600
MTBE	19,600
1,2,4-TMB	3,900
1,3,5-TMB	1,000
NAPH	470
2-M	82
OTHER VOCs	<MDL
Cd	3.2
Cd (DISSOLVED)	<MDL
Cr	<MDL
Cr (DISSOLVED)	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-5R	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	700
T	300
E	400
X	7,700
1,2,3-TMB	500
1,2,4-TMB	1,200
1,3,5-TMB	400
OTHER VOCs	<MDL

OW-12	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	5
T	2
E	9
X	99
1,2,3-TMB	8
1,2,4-TMB	16
1,3,5-TMB	4
OTHER VOCs	<MDL

MW-ZZ	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
B	2
X	2
OTHER VOCs	<MDL

RESIDENTIAL

SB/TMW-6	
1/13/2006	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
T	1
1,2,3-TMB	4
1,2,4-TMB	6
1,3,5-TMB	2
OTHER VOCs	<MDL
Pb	1,900

SB/TMW-1	
1/13/2006	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	3,000
T	37
E	120
X	570
MTBE	560
n-PROP	22
1,2,3-TMB	100
1,2,4-TMB	230
1,3,5-TMB	64
OTHER VOCs	<MDL
2-M	14
OTHER PNAs	<MDL
PCBs	<MDL
Cd	3.8
Cr	180
Pb	110

PMW-4	
5/8/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
MTBE	73
OTHER VOCs	<MDL

PMW-4	
8/04/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
MTBE	147
OTHER VOCs	<MDL

OW-11	
1/16/2006	
6.25 ~ 11.25'	SCREEN
UNITS	ug/L
VOCs	<MDL
Pb	<MDL

OW-11	
1/23/2008	
6.25 ~ 11.25'	SCREEN
UNITS	ug/L
VOCs	<MDL
NAPH	<MDL
2-M	<MDL
Cd	<MDL
Cd (DISSOLVED)	<MDL
Cr	<MDL
Cr (DISSOLVED)	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-11	
5/8/2009	
6.5 ~ 11.5'	SCREEN
UNITS	ug/L
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

B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
n-PROP	n-PROPYLBENZENE
ISOP	ISOPROPYLBENZENE
1,2,3-TMB	1,2,3-TRIMETHYLBENZENE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE
n-BUTYLB	n-BUTYLBENZENE
NAPH	NAPHTHALENE
2-M	2-METHYLNAPHTHALENE
Ph	PHENANTHRENE
Py	PYRENE
Cd	CADMIUM
Cr	CHROMIUM
Pb	LEAD
VOCs	VOLATILE ORGANIC COMPOUNDS
PNAs	POLYNUCLEAR AROMATICS
PCBs	POLYCHLORINATED BIPHENYLS
MDL	METHOD DETECTION LIMIT
UNITs	ug/Kg (UNLESS NOTED)
	VALUE EXCEEDS APPLICABLE CRITERIA

NOTES: REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

PM ENVIRONMENTAL, INC.
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ISO 9001 REGISTERED

FIGURE 4

SOIL BORING / MONITORING WELL LOCATIONS WITH GROUNDWATER ANALYTICAL RESULTS

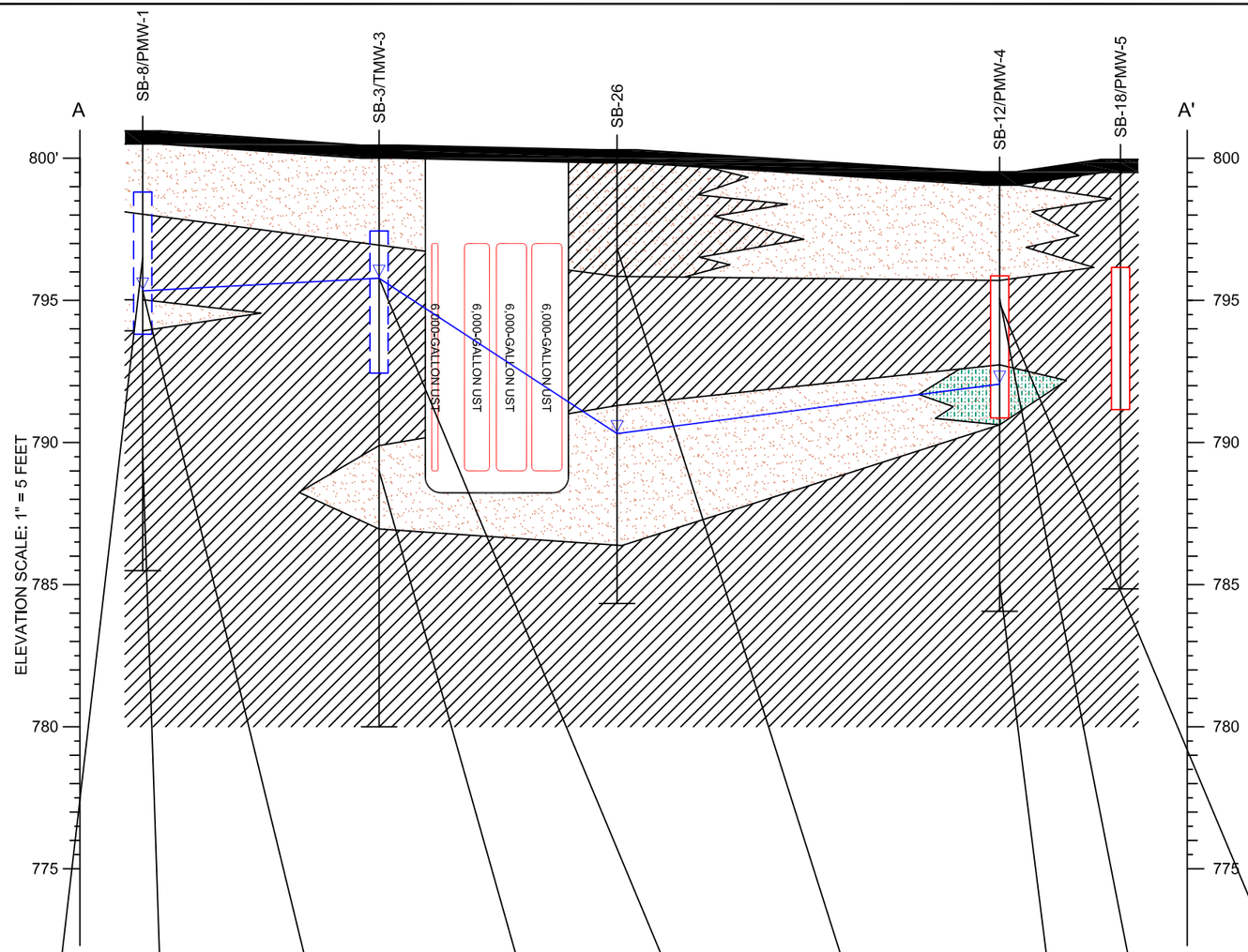
PROJ:

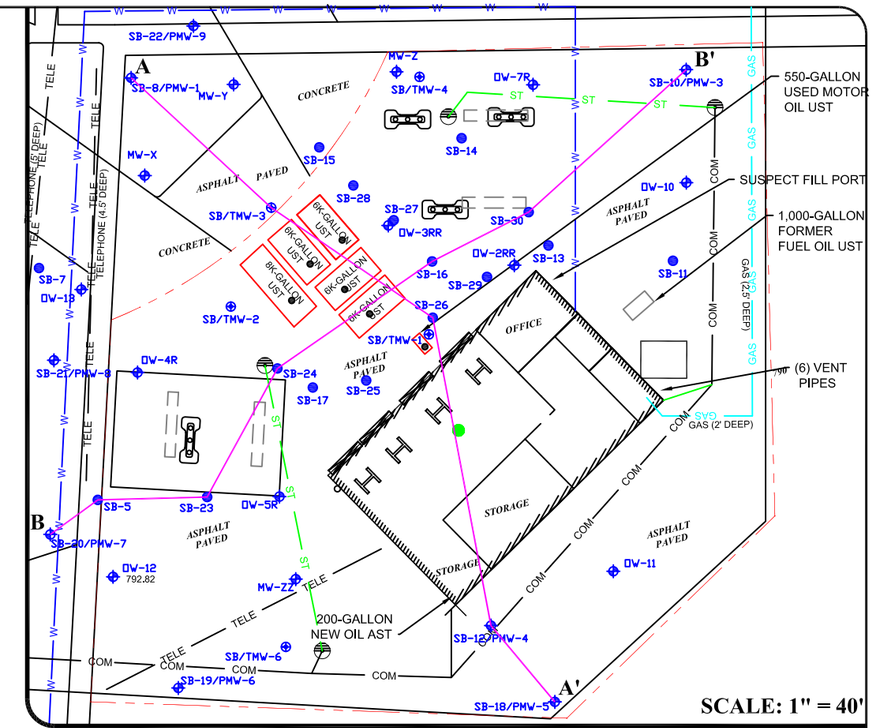
RETAIL GASOLINE STATION
2483 WEST MAPLE ROAD
BIRMINGHAM, MI

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE 0 30'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: MW/KK
DATE: 9/18/2009
CHKD BY: BC/AP/JR
SCALE: 1" = 30'
FILE NAME: 02-3004-0504R00





LEGEND:

- FILL OR ASPHALT
- SAND
- SILTY SAND
- CLAY
- CLAYEY SAND
- SCREEN
- TEMPORARY SCREEN
- GROUNDWATER ELEVATION (DATE SAMPLED)

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

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

PMW-1	
5/8/2009	
1.0 ~ 6.0'	SCREEN
UNITS	ug/L
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-BUTYLB	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-3	
1/13/2006	
2.5 ~ 7.5'	SCREEN
UNITS	ug/L
B	970
T	1,900
E	1,400
X	6,800
n-PROP	1,200
ISOP	340
1,2,3-TMB	3,100
1,2,4-TMB	9,100
1,3,5-TMB	2,800
NAPH	1,100
2-M	330
OTHER VOCs	<MDL
Pb	3,500

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-12
4/07/2009
14.0 ~ 15.0'
VOCs <MDL

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

PMW-4	
5/8/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
MTBE	73
OTHER VOCs	<MDL

PMW-4	
8/04/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
MTBE	147
OTHER VOCs	<MDL

5'
0
0
40'
SCALE

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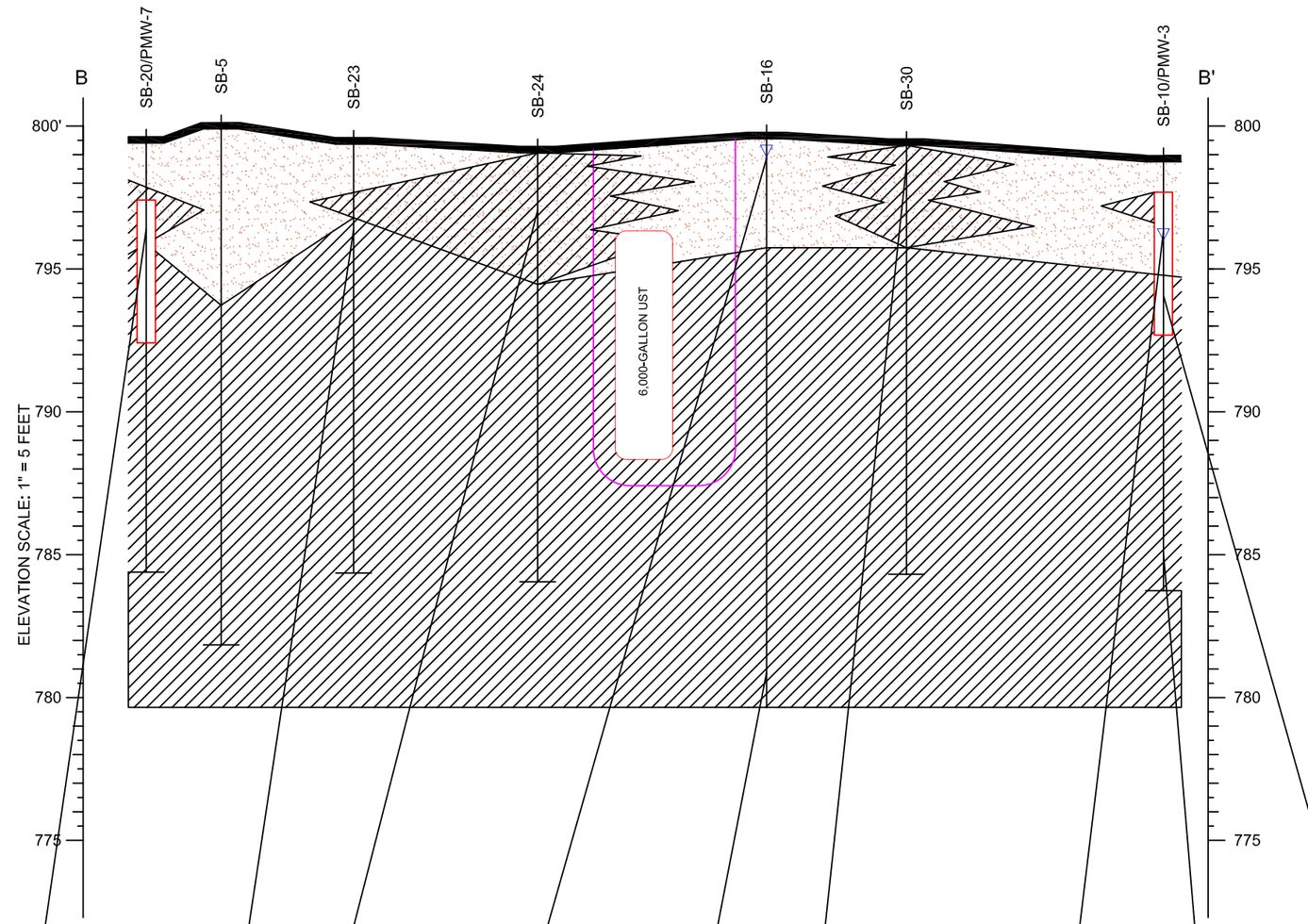
FIGURE 5

CONCEPTUAL GEOLOGICAL CROSS SECTION
A ~ A'

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

THIS IS NOT A LEGAL SURVEY	DRN BY: MW/KK	DATE: 9/24/2009
VERIFY SCALE 0 30' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: BC/AP/JR	SCALE: 1" = 30'
	FILE NAME: 02-3004-05R00	



PMW-7	
8/04/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

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

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

SB-24	
7/06/2009	
2.0 ~ 3.0'	
E	80
n-PROP	1,350
OTHER VOCs	<MDL

SB-16	
4/07/2009	
1.0 ~ 2.0'	
B	130
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

SB-16	
4/07/2009	
19.0 ~ 20.0'	
VOCs	<MDL

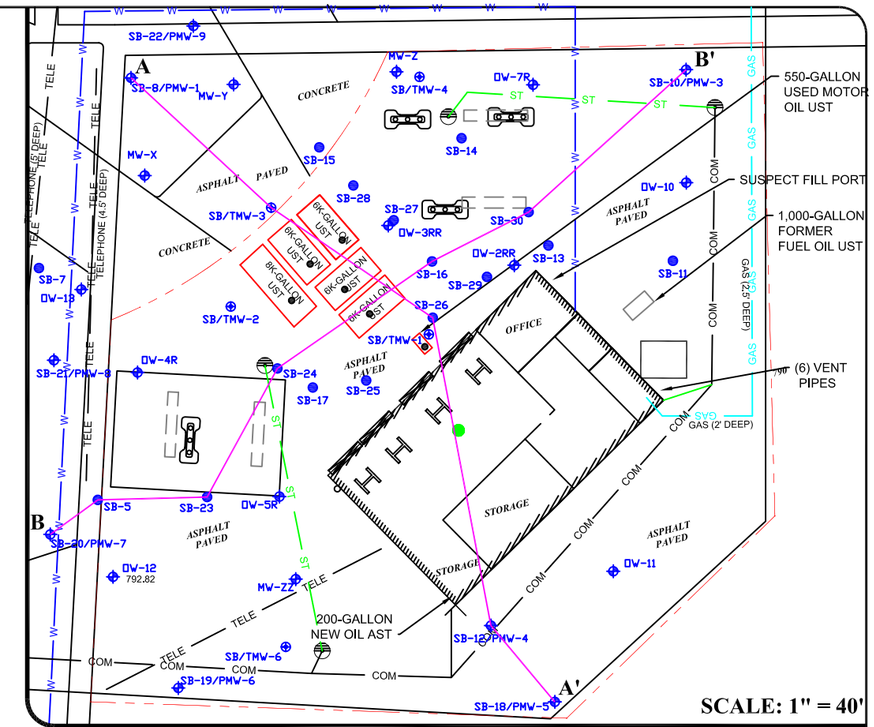
SB-30	
7/07/2009	
0.5 ~ 1.5'	
E	71,000
X	555,000
n-PROP	56,000
1,2,3-TMB	77,000
1,2,4-TMB	311,000
1,3,5-TMB	104,000
OTHER VOCs	<MDL

SB-30	
7/07/2009	
0.5 ~ 1.5'	
VOCs	<MDL

PMW-3	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

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

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



LEGEND:

- FILL OR ASPHALT
- SAND
- CLAY
- CLAYEY SAND
- SCREEN
- TEMPORARY SCREEN
- GROUNDWATER ELEVATION (DATE SAMPLED)

5'
0
0
40'
SCALE

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FIGURE 6

CONCEPTUAL GEOLOGICAL CROSS SECTION
B ~ B'

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

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE
0 30'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: MW/KK
DATE: 9/24/2009
CHKD BY: BC/AP/JR
SCALE: 1" = 30'
FILE NAME: 02-3004-0506R00

CHARTER
ONE BANK

COMMERCIAL BUILDING (UNDER
DEVELOPEMENT)

MAPLE ROAD

RETAIL
STRIP
MALL

CRANBROOK ROAD

RESIDENTIAL DWELLING

550-GALLON
USED MOTOR
OIL UST

RESIDENTIAL DWELLING

FORMER
1,000-GALLON
FUEL OIL UST

(6) VENT PIPES

200-GALLON
NEW OIL AST

RESIDENTIAL DWELLING

ELECTRIC (2' DEEP)
TELEPHONE (3.5' DEEP)
TELEPHONE (3.75' DEEP)
TELEPHONE (4' DEEP)
TELEPHONE (5' DEEP)
TELEPHONE (3.25' DEEP)
TELEPHONE (3' DEEP)
TELEPHONE (5' DEEP)
TELEPHONE (4.5' DEEP)
GAS (2.5' DEEP)
GAS (2' DEEP)

ASPHALT PAVED
CONCRETE
OFFICE
STORAGE
6K-GALLON UST

SB-9/PMW-2 792.47
SB-22/PMW-9 794.94
SB-8/PMW-1 794.89
MW-Y 795.27
MW-Z 795.42
SB/TMW-4
DW-7R 795.09
SB-10/PMW-3 794.23
MW-X 795.33
SB-15
SB-14
SB-28
SB-27
SB-30
DW-3RR 795.82
SB/TMW-3
DW-10 794.27
DW-2RR 795.60
SB-13
SB-16
SB-29
SB-11
SB-7
DW-18 793.40
SB/TMW-2
SB-26
SB/TMW-1
SB-21/PMW-8 791.47
DW-4R 794.29
SB-24
SB-17
SB-25
SB-5
SB-23
DW-5R 793.53
SB-20/PMW-7 791.71
DW-12 792.82
MW-ZZ 793.38
DW-11 789.55
SB-12/PMW-4 792.68
SB/TMW-6
SB-19/PMW-6
DRY
SB-18/PMW-5 790.60

LEGEND:

	SUBJECT SITE
	FORMER SITE FEATURES
W	WATER
GAS	GAS
ST	STORM SEWER
COM	COMBINATION SANITARY / STORM SEWER
ELEC	ELECTRIC
TELE	BURIED PHONE LINE
	FLOOR DRAIN
	CATCH BASIN
	BAYDOOR
	INGROUND HOIST
	PUMP ISLAND
	CURRENT/HISTORICAL MONITORING WELLS
	SOIL BORING
	SOIL BORING/ TEMPORARY MONITORING WELL
999.13	GROUNDWATER CONTOUR
999.13	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' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: BC/AP/JR	SCALE: 1" = 30'
	FILE NAME: 02-3004-0507R00	

Tables

HAZARDOUS SUBSTANCE	CAS NUMBER(s)
Unleaded Gasoline	
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
Oils, Lubricants, Greases	
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**

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

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[1]	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[2]	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
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
SUMMRY 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[1]	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.

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[2]	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)[1]			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)
[1] Rule 323.1057 of Part 4 Water Quality Standards
[2] 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.

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 [2]	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) [1]			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)

[1] Rule 323.1057 of Part 4 Water Quality Standards

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

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

Location (feet bgs)	Sample Depth (feet bgs)	Analysis	Objectives	Soil and/or Groundwater Sample Selection (justification)
SB-31 (15.0)	**Soil** 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	**Soil**: 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. **Groundwater**: Not encountered.
SB/TMW-32 (10.0)	**Soil** 1.0-2.0	VOCs, PNAs, PCBs, Cadmium, Chromium, and Lead	Assess service operations including in-ground hoist and floor drain	**Soil**: Sampled at the highest PID reading (1.4 ppm) above the saturated zone. **Groundwater**: Sampled.
	Groundwater 3.9-8.9	VOCs, PNAs, Cadmium, Chromium, and Lead		

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

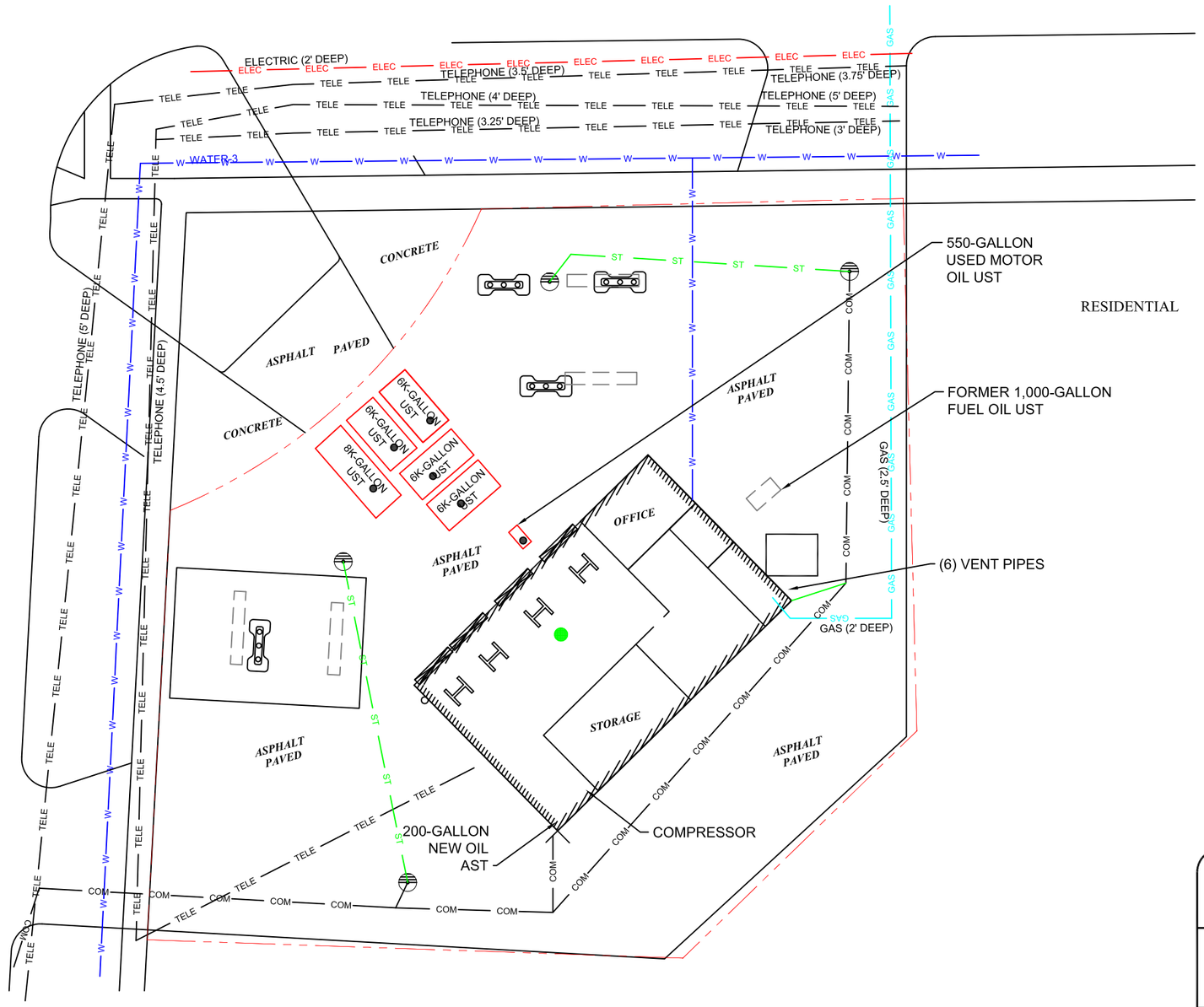
WEST MAPLE ROAD

RETAIL STRIP MALL

CRANBROOK ROAD

RESIDENTIAL

RESIDENTIAL



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

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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 0 [redacted] 30' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: BC/AP/JR/NM	SCALE: 1" = 30'
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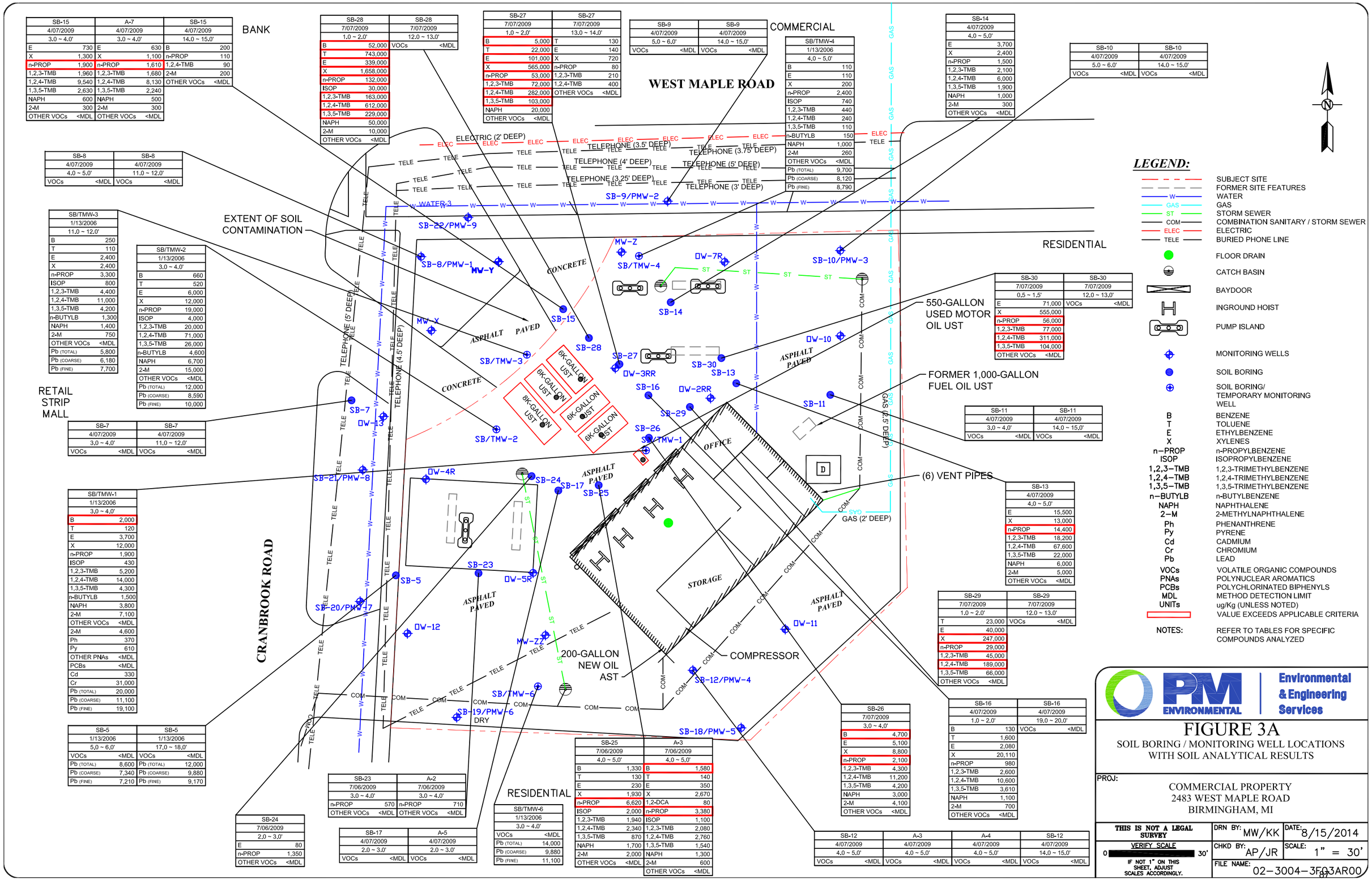


SB-15	
4/07/2009	
3.0 ~ 4.0'	
E	730
X	1,300
n-PROP	1,900
1,2,3-TMB	1,960
1,2,4-TMB	9,540
1,3,5-TMB	2,630
NAPH	600
2-M	300
OTHER VOCs	<MDL

A-7	
4/07/2009	
3.0 ~ 4.0'	
E	630
X	1,100
n-PROP	1,610
1,2,3-TMB	1,680
1,2,4-TMB	8,130
1,3,5-TMB	2,240
NAPH	500
2-M	300
OTHER VOCs	<MDL

SB-15	
4/07/2009	
14.0 ~ 15.0'	
B	200
n-PROP	110
1,2,4-TMB	90
2-M	200
OTHER VOCs	<MDL

SB-28	
7/07/2009	
1.0 ~ 2.0'	
B	52,000
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-28	
7/07/2009	
12.0 ~ 13.0'	
VOCs	<MDL

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

SB-27	
7/07/2009	
13.0 ~ 14.0'	
T	130
E	140
X	720
n-PROP	80
1,2,3-TMB	210
1,2,4-TMB	400
OTHER VOCs	<MDL

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

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

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-BUTYLB	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	
4/07/2009	
5.0 ~ 6.0'	
VOCs	<MDL

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

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

SB-8	
4/07/2009	
11.0 ~ 12.0'	
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-BUTYLB	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-BUTYLB	4,600
NAPH	6,700
2-M	15,000
OTHER VOCs	<MDL
Pb (TOTAL)	12,000
Pb (COARSE)	8,590
Pb (FINE)	10,000

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

SB-7	
4/07/2009	
11.0 ~ 12.0'	
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-BUTYLB	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	
1/13/2006	
5.0 ~ 6.0'	
VOCs	<MDL
Pb (TOTAL)	8,600
Pb (COARSE)	7,340
Pb (FINE)	7,210

SB-5	
1/13/2006	
17.0 ~ 18.0'	
VOCs	<MDL
Pb (TOTAL)	12,000
Pb (COARSE)	9,880
Pb (FINE)	9,170

SB-24	
7/06/2009	
2.0 ~ 3.0'	
E	80
n-PROP	1,350
OTHER VOCs	<MDL

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

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

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

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

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	
7/06/2009	
4.0 ~ 5.0'	
B	1,330
T	130
E	230
X	1,930
n-PROP	6,620
ISOP	2,000
1,2,3-TMB	1,940
1,2,4-TMB	2,340
1,3,5-TMB	870
NAPH	1,700
2-M	2,000
OTHER VOCs	<MDL

A-3	
7/06/2009	
4.0 ~ 5.0'	
B	1,580
T	140
E	350
X	2,670
1,2-DCA	80
n-PROP	3,380
ISOP	1,100
1,2,3-TMB	2,080
1,2,4-TMB	2,760
1,3,5-TMB	1,540
NAPH	1,300
2-M	600
OTHER 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-16	
4/07/2009	
1.0 ~ 2.0'	
B	130
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

SB-16	
4/07/2009	
19.0 ~ 20.0'	
VOCs	<MDL

SB-12	
4/07/2009	
4.0 ~ 5.0'	
VOCs	<MDL

A-3	
4/07/2009	
4.0 ~ 5.0'	
VOCs	<MDL

A-4	
4/07/2009	
4.0 ~ 5.0'	
VOCs	<MDL

SB-12	
4/07/2009	
14.0 ~ 15.0'	
VOCs	<MDL

SB-30	
7/07/2009	
0.5 ~ 1.5'	
E	71,000
X	555,000
n-PROP	56,000
1,2,3-TMB	77,000
1,2,4-TMB	311,000
1,3,5-TMB	104,000
OTHER VOCs	<MDL

SB-30	
7/07/2009	
12.0 ~ 13.0'	
VOCs	<MDL

SB-11	
4/07/2009	
3.0 ~ 4.0'	
VOCs	<MDL

SB-11	
4/07/2009	
14.0 ~ 15.0'	
VOCs	<MDL

SB-13	
4/07/2009	
4.0 ~ 5.0'	
E	15,500
X	13,000
n-PROP	14,400
1,2,3-TMB	18,200
1,2,4-TMB	67,600
1,3,5-TMB	22,000
NAPH	6,000
2-M	5,000
OTHER VOCs	<MDL

SB-29	
7/07/2009	
1.0 ~ 2.0'	
T	23,000
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-29	
7/07/2009	
12.0 ~ 13.0'	
VOCs	<MDL

LEGEND:

	SUBJECT SITE
	FORMER SITE FEATURES
W	WATER
GAS	GAS
ST	STORM SEWER
COM	COMBINATION SANITARY / STORM SEWER
ELEC	ELECTRIC
TELE	BURIED PHONE LINE
	FLOOR DRAIN
	CATCH BASIN
	BAYDOOR
	INGROUND HOIST
	PUMP ISLAND
	MONITORING WELLS
	SOIL BORING
	SOIL BORING/ TEMPORARY MONITORING WELL
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
n-PROP	n-PROPYLBENZENE
ISOP	ISOPROPYLBENZENE
1,2,3-TMB	1,2,3-TRIMETHYLBENZENE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE
n-BUTYLB	n-BUTYLBENZENE
NAPH	NAPHTHALENE
2-M	2-METHYLNAPHTHALENE
Ph	PHENANTHRENE
Py	PYRENE
Cd	CADMIUM
Cr	CHROMIUM
Pb	LEAD
VOCs	VOLATILE ORGANIC COMPOUNDS
PNAs	POLYNUCLEAR AROMATICS
PCBs	POLYCHLORINATED BIPHENYLS
MDL	METHOD DETECTION LIMIT
UNITs	ug/Kg (UNLESS NOTED)
	VALUE EXCEEDS APPLICABLE CRITERIA

NOTES: REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

PM ENVIRONMENTAL | Environmental & Engineering Services

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

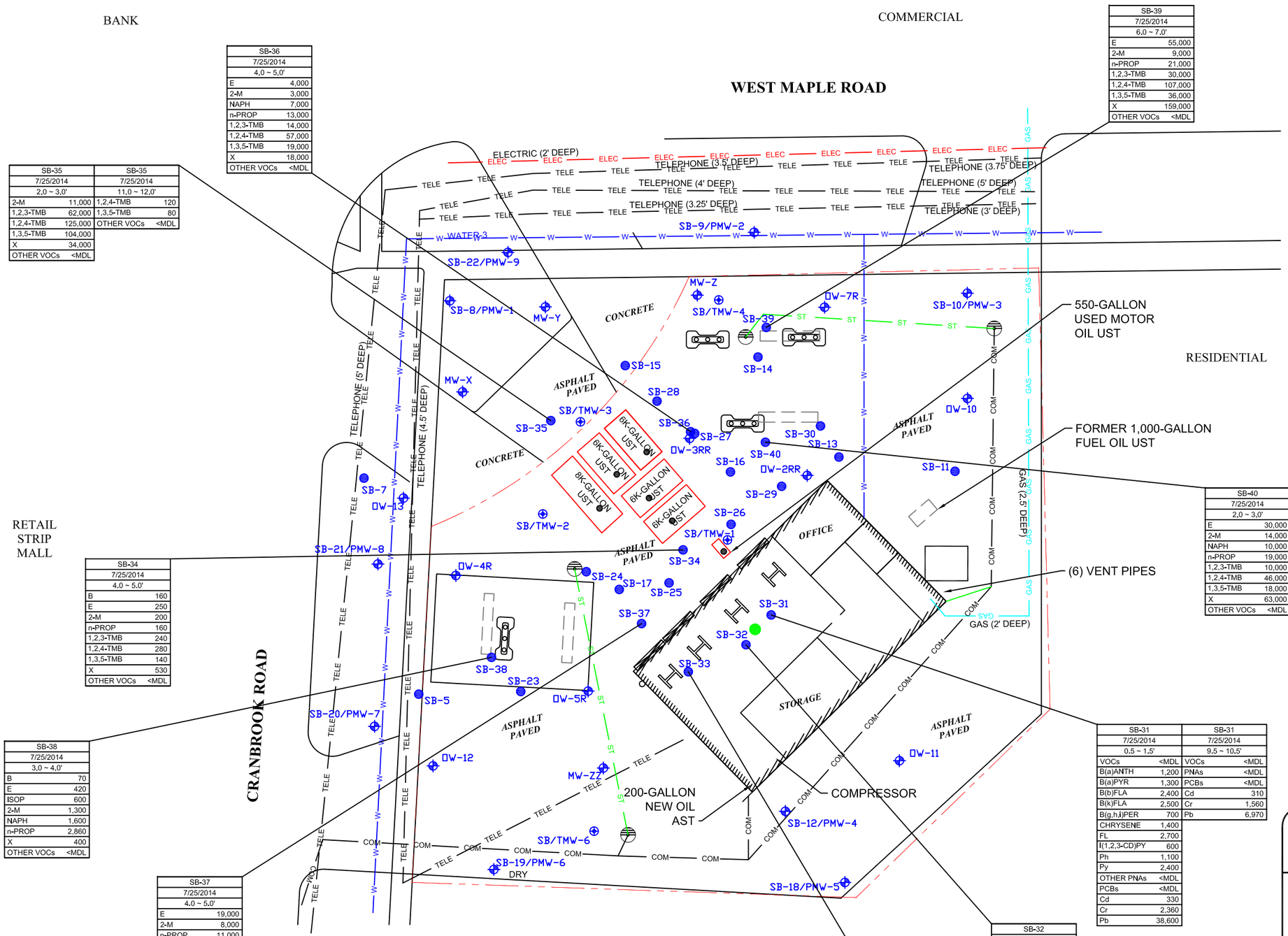
VERIFY SCALE 0 30'

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

DRN BY: MW/KK | DATE: 8/15/2014

CHKD BY: AP/JR | SCALE: 1" = 30'

FILE NAME: 02-3004-3F03AR00



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		SB-35	
7/25/2014		7/25/2014	
2.0 ~ 3.0'		11.0 ~ 12.0'	
2-M	11,000	1,2,4-TMB	120
1,2,3-TMB	62,000	1,3,5-TMB	80
1,2,4-TMB	125,000	OTHER VOCs	<MDL
1,3,5-TMB	104,000		
X	34,000		
OTHER VOCs	<MDL		

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-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

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-31		SB-31	
7/25/2014		7/25/2014	
0.5 ~ 1.5'		9.5 ~ 10.5'	
VOCs	<MDL	VOCs	<MDL
B(a)ANTH	1,200	PNAs	<MDL
B(a)PYR	1,300	PCBs	<MDL
B(b)FLA	2,400	Cd	310
B(k)FLA	2,500	Cr	1,560
B(g,h,i)PER	700	Pb	6,970
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-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

LEGEND:

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

NOTES: REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

PM ENVIRONMENTAL | Environmental & Engineering Services

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	DRN BY: MW/CS	DATE: 8/15/2014
VERIFY SCALE 0 30' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: JR/NM	SCALE: 1" = 30'
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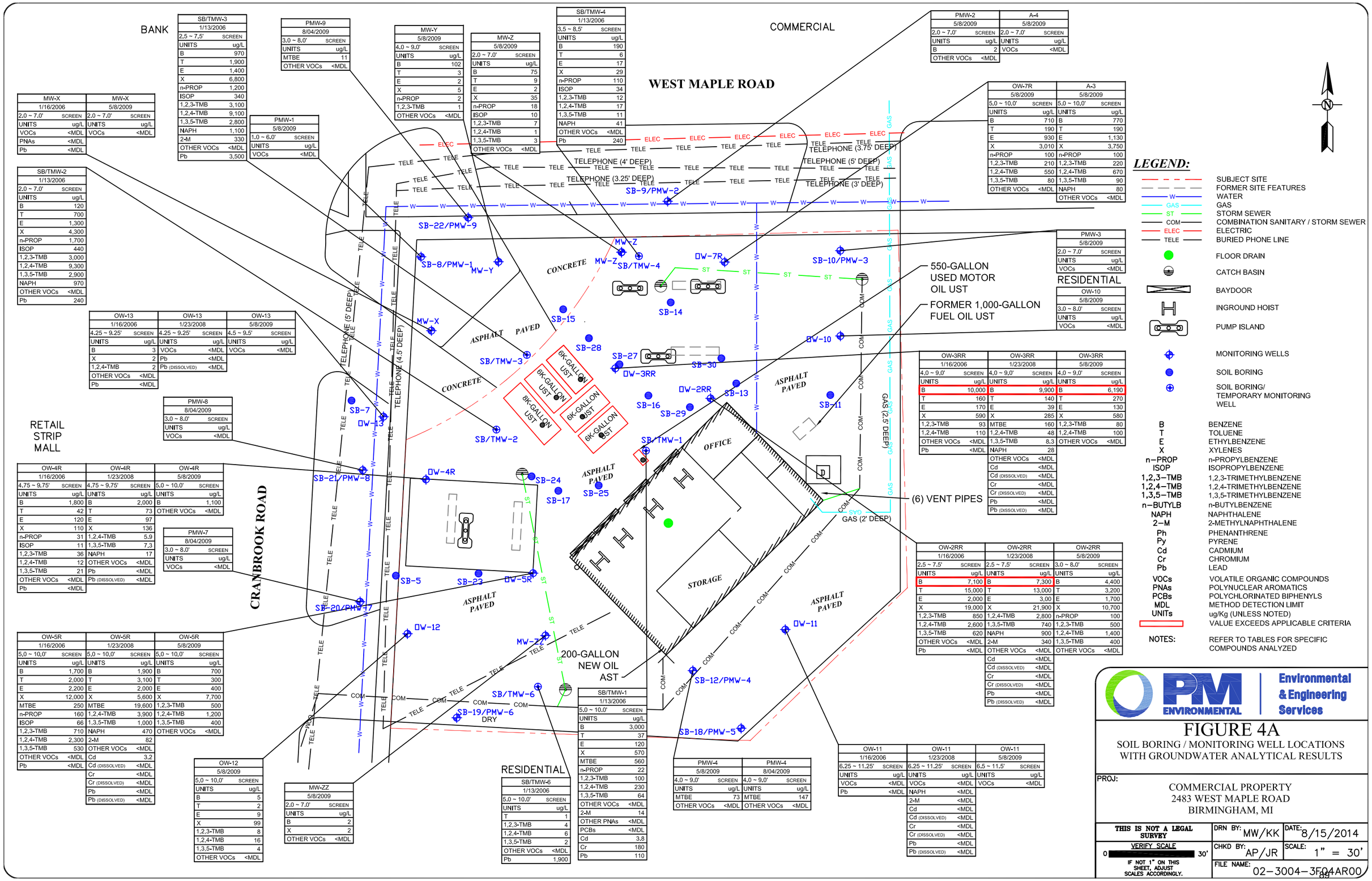


SB/TMW-3	
1/13/2006	
2.5 ~ 7.5'	SCREEN
UNITS	ug/L
B	970
T	1,900
E	1,400
X	6,800
n-PROP	1,200
ISOP	340
1,2,3-TMB	3,100
1,2,4-TMB	9,100
1,3,5-TMB	2,800
NAPH	1,100
2-M	330
OTHER VOCs	<MDL
Pb	3,500

PMW-9	
8/04/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
MTBE	11
OTHER VOCs	<MDL

MW-Y	
5/8/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
B	102
T	3
E	2
X	5
n-PROP	2
1,2,3-TMB	1
OTHER VOCs	<MDL

MW-Z	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
B	75
T	9
E	2
X	35
n-PROP	18
ISOP	10
1,2,3-TMB	7
1,2,4-TMB	1
1,3,5-TMB	3
OTHER VOCs	<MDL

SB/TMW-4	
1/13/2006	
3.5 ~ 8.5'	SCREEN
UNITS	ug/L
B	190
T	6
E	17
X	29
n-PROP	110
ISOP	34
1,2,3-TMB	12
1,2,4-TMB	17
1,3,5-TMB	11
NAPH	41
OTHER VOCs	<MDL
Pb	240

PMW-2	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
B	2
OTHER VOCs	<MDL

A-4	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

MW-X	
1/16/2006	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL
PNAs	<MDL
Pb	<MDL

MW-X	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

PMW-1	
5/8/2009	
1.0 ~ 6.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-7R	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	710
T	190
E	930
X	3,010
n-PROP	100
1,2,3-TMB	210
1,2,4-TMB	550
1,3,5-TMB	80
OTHER VOCs	<MDL

A-3	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	770
T	190
E	1,130
X	3,750
n-PROP	100
1,2,3-TMB	220
1,2,4-TMB	670
1,3,5-TMB	90
NAPH	80
OTHER VOCs	<MDL

SB/TMW-2	
1/13/2006	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
B	120
T	700
E	1,300
X	4,300
n-PROP	1,700
ISOP	440
1,2,3-TMB	3,000
1,2,4-TMB	9,300
1,3,5-TMB	2,900
NAPH	970
OTHER VOCs	<MDL
Pb	240

PMW-3	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

RESIDENTIAL

OW-10	
5/8/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-13	
1/16/2006	
4.25 ~ 9.25'	SCREEN
UNITS	ug/L
B	3
X	2
1,2,4-TMB	2
OTHER VOCs	<MDL
Pb	<MDL

OW-13	
1/23/2008	
4.25 ~ 9.25'	SCREEN
UNITS	ug/L
VOCs	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-13	
5/8/2009	
4.5 ~ 9.5'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-3RR	
1/16/2006	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
B	10,000
T	160
E	170
X	590
1,2,3-TMB	93
1,2,4-TMB	110
OTHER VOCs	<MDL
Pb	<MDL

OW-3RR	
1/23/2008	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
B	9,900
T	140
E	39
X	285
MTBE	160
1,2,4-TMB	48
1,3,5-TMB	8.3
NAPH	28
OTHER VOCs	<MDL
Cd	<MDL
Cd (DISSOLVED)	<MDL
Cr	<MDL
Cr (DISSOLVED)	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-3RR	
5/8/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
B	6,190
T	270
E	130
X	580
1,2,3-TMB	80
1,2,4-TMB	100
OTHER VOCs	<MDL

PMW-8	
8/04/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-4R	
1/16/2006	
4.75 ~ 9.75'	SCREEN
UNITS	ug/L
B	1,800
T	42
E	120
X	110
n-PROP	31
ISOP	11
1,2,3-TMB	36
1,2,4-TMB	12
1,3,5-TMB	21
OTHER VOCs	<MDL
Pb	<MDL

OW-4R	
1/23/2008	
4.75 ~ 9.75'	SCREEN
UNITS	ug/L
B	2,000
T	73
E	97
X	136
1,2,4-TMB	5.9
1,3,5-TMB	7.3
NAPH	17
OTHER VOCs	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-4R	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	1,100
OTHER VOCs	<MDL

PMW-7	
8/04/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
VOCs	<MDL

OW-2RR	
1/16/2006	
2.5 ~ 7.5'	SCREEN
UNITS	ug/L
B	7,100
T	15,000
E	2,000
X	19,000
1,2,3-TMB	850
1,2,4-TMB	2,600
1,3,5-TMB	620
OTHER VOCs	<MDL
Pb	<MDL

OW-2RR	
1/23/2008	
2.5 ~ 7.5'	SCREEN
UNITS	ug/L
B	7,300
T	13,000
E	3,00
X	21,900
1,2,4-TMB	2,800
1,3,5-TMB	740
NAPH	900
2-M	340
OTHER VOCs	<MDL
Cd	<MDL
Cd (DISSOLVED)	<MDL
Cr	<MDL
Cr (DISSOLVED)	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-2RR	
5/8/2009	
3.0 ~ 8.0'	SCREEN
UNITS	ug/L
B	4,400
T	3,200
E	1,700
X	10,700
n-PROP	100
1,2,3-TMB	500
1,2,4-TMB	1,400
1,3,5-TMB	400
OTHER VOCs	<MDL

OW-5R	
1/16/2006	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	1,700
T	2,000
E	2,200
X	12,000
MTBE	250
n-PROP	160
ISOP	66
1,2,3-TMB	710
1,2,4-TMB	2,300
1,3,5-TMB	530
OTHER VOCs	<MDL
Pb	<MDL

OW-5R	
1/23/2008	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	1,900
T	3,100
E	2,000
X	5,600
MTBE	19,600
1,2,4-TMB	3,900
1,3,5-TMB	1,000
NAPH	470
2-M	82
OTHER VOCs	<MDL
Cd	3.2
Cd (DISSOLVED)	<MDL
Cr	<MDL
Cr (DISSOLVED)	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-5R	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	700
T	300
E	400
X	7,700
1,2,3-TMB	500
1,2,4-TMB	1,200
1,3,5-TMB	400
OTHER VOCs	<MDL

OW-12	
5/8/2009	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	5
T	2
E	9
X	99
1,2,3-TMB	8
1,2,4-TMB	16
1,3,5-TMB	4
OTHER VOCs	<MDL

MW-ZZ	
5/8/2009	
2.0 ~ 7.0'	SCREEN
UNITS	ug/L
B	2
X	2
OTHER VOCs	<MDL

RESIDENTIAL

SB/TMW-6	
1/13/2006	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
T	1
1,2,3-TMB	4
1,2,4-TMB	6
1,3,5-TMB	2
OTHER VOCs	<MDL
Pb	1,900

SB/TMW-1	
1/13/2006	
5.0 ~ 10.0'	SCREEN
UNITS	ug/L
B	3,000
T	37
E	120
X	570
MTBE	560
n-PROP	22
1,2,3-TMB	100
1,2,4-TMB	230
1,3,5-TMB	64
OTHER VOCs	<MDL
2-M	14
OTHER PNAs	<MDL
PCBs	<MDL
Cd	3.8
Cr	180
Pb	110

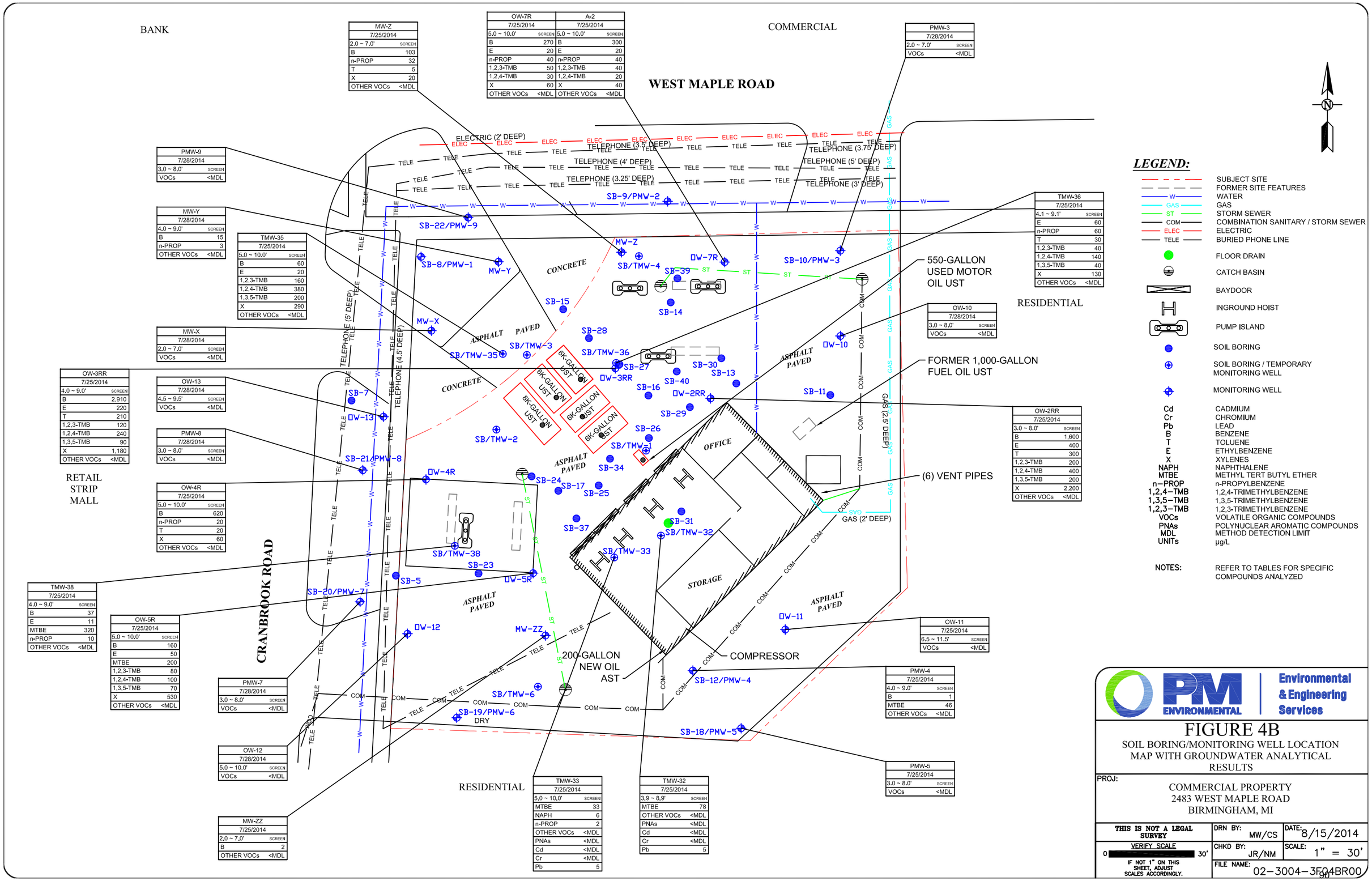
PMW-4	
5/8/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
MTBE	73
OTHER VOCs	<MDL

PMW-4	
8/04/2009	
4.0 ~ 9.0'	SCREEN
UNITS	ug/L
MTBE	147
OTHER VOCs	<MDL

OW-11	
1/16/2006	
6.25 ~ 11.25'	SCREEN
UNITS	ug/L
VOCs	<MDL
Pb	<MDL

OW-11	
1/23/2008	
6.25 ~ 11.25'	SCREEN
UNITS	ug/L
VOCs	<MDL
NAPH	<MDL
2-M	<MDL
Cd	<MDL
Cd (DISSOLVED)	<MDL
Cr	<MDL
Cr (DISSOLVED)	<MDL
Pb	<MDL
Pb (DISSOLVED)	<MDL

OW-11	
5/8/2009	
6.5 ~ 11.5'	SCREEN
UNITS	ug/L
VOCs	<MDL


BANK
COMMERCIAL
WEST MAPLE ROAD
RESIDENTIAL
RETAIL STRIP MALL
CRANBROOK ROAD
ELECTRIC (2' DEEP)
TELEPHONE (3.5' DEEP)
TELEPHONE (3.75' DEEP)
TELEPHONE (4' DEEP)
TELEPHONE (5' DEEP)
TELEPHONE (3.25' DEEP)
TELEPHONE (3' DEEP)
TELEPHONE (4.5' DEEP)
GAS (2.5' DEEP)
GAS (2' DEEP)
CONCRETE
ASPHALT PAVED
OFFICE
STORAGE
550-GALLON USED MOTOR OIL UST
FORMER 1,000-GALLON FUEL OIL UST
(6) VENT PIPES
COMPRESSOR
200-GALLON NEW OIL AST
6K-GALLON UST
8K-GALLON UST
SB-9/PMW-2
SB-22/PMW-9
SB-8/PMW-1
MW-Y
MW-Z
SB/TMW-4
OW-7R
SB-39
SB-10/PMW-3
SB-14
SB-15
MW-X
SB-28
SB/TMW-3
SB/TMW-35
SB/TMW-36
SB-27
OW-3RR
SB-30
SB-13
SB-40
SB-16
OW-2RR
SB-11
OW-10
SB-29
SB-26
SB/TMW-1
SB-34
SB-7
OW-13
SB/TMW-2
SB-21/PMW-8
OW-4R
SB-24
SB-17
SB-25
SB-37
SB-31
SB/TMW-32
SB/TMW-33
SB/TMW-38
SB-23
OW-5R
SB-5
SB-20/PMW-7
OW-12
MW-ZZ
OW-11
SB-12/PMW-4
SB/TMW-6
SB-19/PMW-6
DRY
SB-18/PMW-5
MW-ZZ
7/25/2014
2.0 ~ 7.0' SCREEN
B 2
OTHER VOCs <MDL
OW-7R
7/25/2014
5.0 ~ 10.0' SCREEN
B 270
E 20
n-PROP 40
1,2,3-TMB 50
1,2,4-TMB 30
X 60
OTHER VOCs <MDL
A-2
7/25/2014
5.0 ~ 10.0' SCREEN
B 300
E 20
n-PROP 40
1,2,3-TMB 40
1,2,4-TMB 20
X 40
OTHER VOCs <MDL
MW-Z
7/25/2014
2.0 ~ 7.0' SCREEN
B 103
n-PROP 32
T 5
X 20
OTHER VOCs <MDL
PMW-3
7/28/2014
2.0 ~ 7.0' SCREEN
VOCs <MDL
PMW-9
7/28/2014
3.0 ~ 8.0' SCREEN
VOCs <MDL
MW-Y
7/28/2014
4.0 ~ 9.0' SCREEN
B 15
n-PROP 3
OTHER VOCs <MDL
TMW-35
7/25/2014
5.0 ~ 10.0' SCREEN
B 60
E 20
1,2,3-TMB 160
1,2,4-TMB 380
1,3,5-TMB 200
X 290
OTHER VOCs <MDL
MW-X
7/28/2014
2.0 ~ 7.0' SCREEN
VOCs <MDL
OW-3RR
7/25/2014
4.0 ~ 9.0' SCREEN
B 2,910
E 220
T 210
1,2,3-TMB 120
1,2,4-TMB 240
1,3,5-TMB 90
X 1,180
OTHER VOCs <MDL
OW-13
7/28/2014
4.5 ~ 9.5' SCREEN
VOCs <MDL
PMW-8
7/28/2014
3.0 ~ 8.0' SCREEN
VOCs <MDL
OW-4R
7/25/2014
5.0 ~ 10.0' SCREEN
B 620
n-PROP 20
T 20
X 60
OTHER VOCs <MDL
TMW-38
7/25/2014
4.0 ~ 9.0' SCREEN
B 37
E 11
MTBE 320
n-PROP 10
OTHER VOCs <MDL
OW-5R
7/25/2014
5.0 ~ 10.0' SCREEN
B 160
E 50
MTBE 200
1,2,3-TMB 80
1,2,4-TMB 100
1,3,5-TMB 70
X 530
OTHER VOCs <MDL
PMW-7
7/28/2014
3.0 ~ 8.0' SCREEN
VOCs <MDL
OW-12
7/28/2014
5.0 ~ 10.0' SCREEN
VOCs <MDL
TMW-33
7/25/2014
5.0 ~ 10.0' SCREEN
MTBE 33
NAPH 6
n-PROP 2
OTHER VOCs <MDL
PNAs <MDL
Cd <MDL
Cr <MDL
Pb 5
TMW-32
7/25/2014
3.9 ~ 8.9' SCREEN
MTBE 78
OTHER VOCs <MDL
PNAs <MDL
Cd <MDL
Cr <MDL
Pb 5
TMW-36
7/25/2014
4.1 ~ 9.1' SCREEN
E 60
n-PROP 60
T 30
1,2,3-TMB 40
1,2,4-TMB 140
1,3,5-TMB 40
X 130
OTHER VOCs <MDL
OW-10
7/28/2014
3.0 ~ 8.0' SCREEN
VOCs <MDL
OW-2RR
7/25/2014
3.0 ~ 8.0' SCREEN
B 1,600
E 400
T 300
1,2,3-TMB 200
1,2,4-TMB 400
1,3,5-TMB 200
X 2,200
OTHER VOCs <MDL
OW-11
7/25/2014
6.5 ~ 11.5' SCREEN
VOCs <MDL
PMW-4
7/25/2014
4.0 ~ 9.0' SCREEN
B 1
MTBE 46
OTHER VOCs <MDL
PMW-5
7/25/2014
3.0 ~ 8.0' SCREEN
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
SOIL BORING
SOIL BORING / TEMPORARY MONITORING WELL
MONITORING WELL
Cd CADMIUM
Cr CHROMIUM
Pb LEAD
B BENZENE
T TOLUENE
E ETHYLBENZENE
X XYLENES
NAPH NAPHTHALENE
MTBE METHYL TERT BUTYL ETHER
n-PROP n-PROPYLBENZENE
1,2,4-TMB 1,2,4-TRIMETHYLBENZENE
1,3,5-TMB 1,3,5-TRIMETHYLBENZENE
1,2,3-TMB 1,2,3-TRIMETHYLBENZENE
VOCs VOLATILE ORGANIC COMPOUNDS
PNAs POLYNUCLEAR AROMATIC COMPOUNDS
MDL METHOD DETECTION LIMIT
UNITs µg/L
NOTES: REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED
PM ENVIRONMENTAL
Environmental & Engineering Services
FIGURE 4B
SOIL BORING/MONITORING WELL LOCATION MAP WITH GROUNDWATER ANALYTICAL RESULTS
PROJ:
COMMERCIAL PROPERTY
2483 WEST MAPLE ROAD
BIRMINGHAM, MI
THIS IS NOT A LEGAL SURVEY
VERIFY SCALE
0 30'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
DRN BY: MW/CS
DATE: 8/15/2014
CHKD BY: JR/NM
SCALE: 1" = 30'
FILE NAME: 02-3004-3F04BR00

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[1]	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[2]	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	<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
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[1]	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	**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 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[1]	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes	Other VOCs
Chemical Abstract Service Number (CAS#)			71432	100414	98828	91576	91203	103651	108883	526738	95636	108678	1330207	Various
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**VOCs**											
SB-31	07/25/2014	0.5-1.5	<70	<70	<400	<480	<480	<100	<100	<100	<100	<100	<170	ND
SB-31	07/25/2014	9.5-10.5	<70	<70	<400	<470	<470	<100	<100	<100	<100	<100	<170	ND
SB-32	07/25/2014	1.0-2.0	<70	<70	<300	<430	<430	<100	<100	<100	<100	<100	<170	ND
SB-33	07/25/2014	1.5-2.5	<70	<70	<400	<480	<480	<100	<100	<100	<100	<100	<170	ND
SB-34	07/25/2014	4.0-5.0	160	250	<400	200	<400	160	<90	240	280	140	530	ND
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
SB-35	07/25/2014	11.0-12.0	<70	<70	<400	<100	<400	<70	<70	<70	120	80	<170	ND
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
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
SB-38	07/25/2014	3.0-4.0	70	420	600	1,300	1,600	2,860	<70	<70	<70	<70	400	ND
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
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
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
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
Groundwater Surface Water Interface Protection (GSIP)			4,000 {X}	360	3,200	4,200	730	ID	5,400	570	570	1,100	820	Various
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
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
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
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
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	8.20E+10	2.90E+11	Various
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
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
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
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
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
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
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	3.60E+10	1.30E+11	Various
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
Screening Levels (µg/Kg)														
Soil Saturation Concentration Screening Levels (Csat)			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
Residential Vapor Intrusion Soil Screening Levels (S_{vi-res})			50	200	250	7,500	440	140	10,000	3,200	2,200	1,700	290	Various
Nonresidential Vapor Intrusion Soil Screening Levels (S_{vi-nr})			85	4,000	300	1.26E+05	8,900	2,400	1.69E+05	53,000	37,000	28,000	4,900	Various

VOLATILE ORGANIC COMPOUNDS (VOCS), POLYNUCLEAR AROMATIC COMPOUNDS (PNAS), POLYCHLORINATED BIPHENYLS (PCBS), AND METALS (CADMIUM, CHROMIUM, AND LEAD) (µg/Kg)			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#)			56553	50328	205992	207089	191242	218019	206440	193395	85018	129000	Various	1336363	7440439	16065831	7439921
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**PNAs**											**PCBs**	**Metals**		
SB-31	07/25/2014	0.5-1.5	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	<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	<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	<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	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-35	07/25/2014	2.0-3.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-35	07/25/2014	11.0-12.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-36	07/25/2014	4.0-5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-37	07/25/2014	4.0-5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-38	07/25/2014	3.0-4.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-39	07/25/2014	6.0-7.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-40	07/25/2014	2.0-3.0	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	1,200	18,000	21,000
Drinking Water Protection (DWP)			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)			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)			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)			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			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			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)			ID	1.5E+06	ID	ID	8.0E+08	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)			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)			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)			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)			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			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			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)			ID	1.9E+06	ID	ID	3.5E+08	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)			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 (Csat)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Various	NA	NA	NA	NA
Residential Vapor Intrusion Soil Screening Levels (S_{vi-res})			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_{vi-nr})			NL	NL	NL	NL	NL	NL	NL	NL	86,000	1.09E+09	Various	39,000	NL	NL	NL

Applicable Criterion/RBSL Exceeded
BOLD Value Exceeds Applicable Criterion/RBSL
bgs Below Ground Surface (feet)
1 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.
ND Non-detected at levels above laboratory method detection limit (MDL)
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.

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[2]	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) [1]			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)
[1] Rule 323.1057 of Part 4 Water Quality Standards
[2] 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 [2]	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) [1]			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

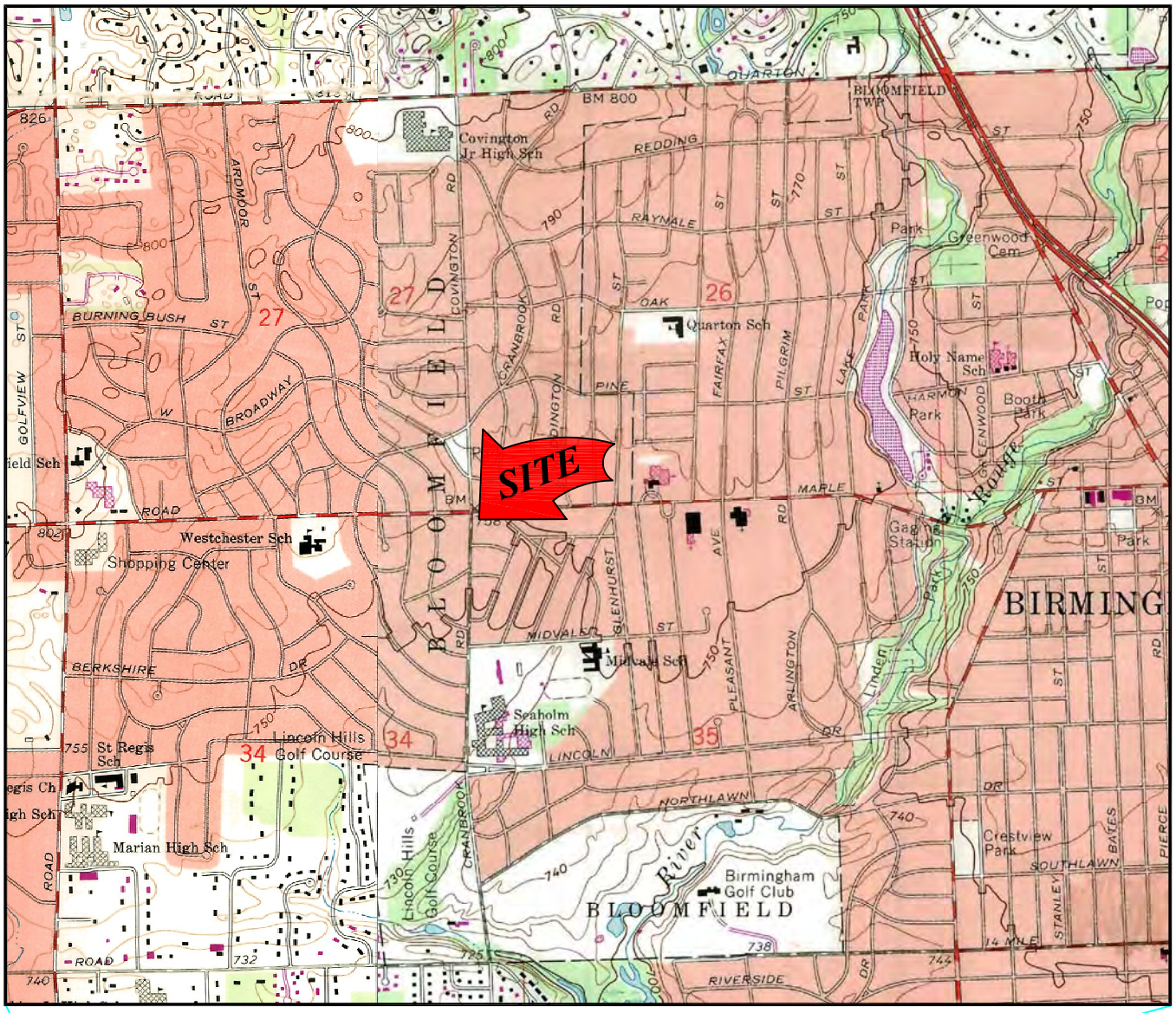
Applicable Criteria Exceeded
BOLD Value Exceeds Applicable Criteria
bgs Below Grade Surface (feet)
[1] Rule 323.1057 of Part 4 Water Quality Standards
[2] 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene per MDEQ guidance.

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[5]	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) [2]				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) [2]				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 ($GW_{VI\text{-}res}$) [3]				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 ($GW_{VI\text{-}nr}$)[3]				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)
[1] Rule 323.1057 of Part 4 Water Quality Standards
[2] Tier 1 GVII Criteria based on 3 meter (or greater) groundwater depth
[3] (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.

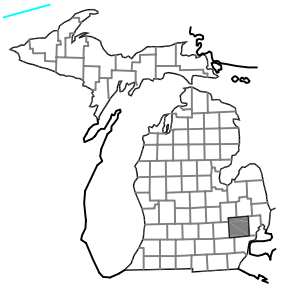
Appendix C



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

SCALE 1:24,000

1 MILE 1/2 MILE 0 1 MILE

FIGURE 1

PROPERTY VICINITY MAP

USGS, 7.5 MINUTE SERIES

BIRMINGHAM, MI QUADRANGLE, 1968. PHOTO REVISED 1982.

PM ENVIRONMENTAL, INC.
CONSULTING ENGINEERS AND SCIENTISTS
Toll Free: (800) 485-0090
Web: www.pmenv.com
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:	02-3094-0F01R00		

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 Flooplain data may not always be present on the map.

OAKLAND COUNTY MICHIGAN
Economic Development & Community Affairs

L. Brooks Patterson
Oakland County Executive

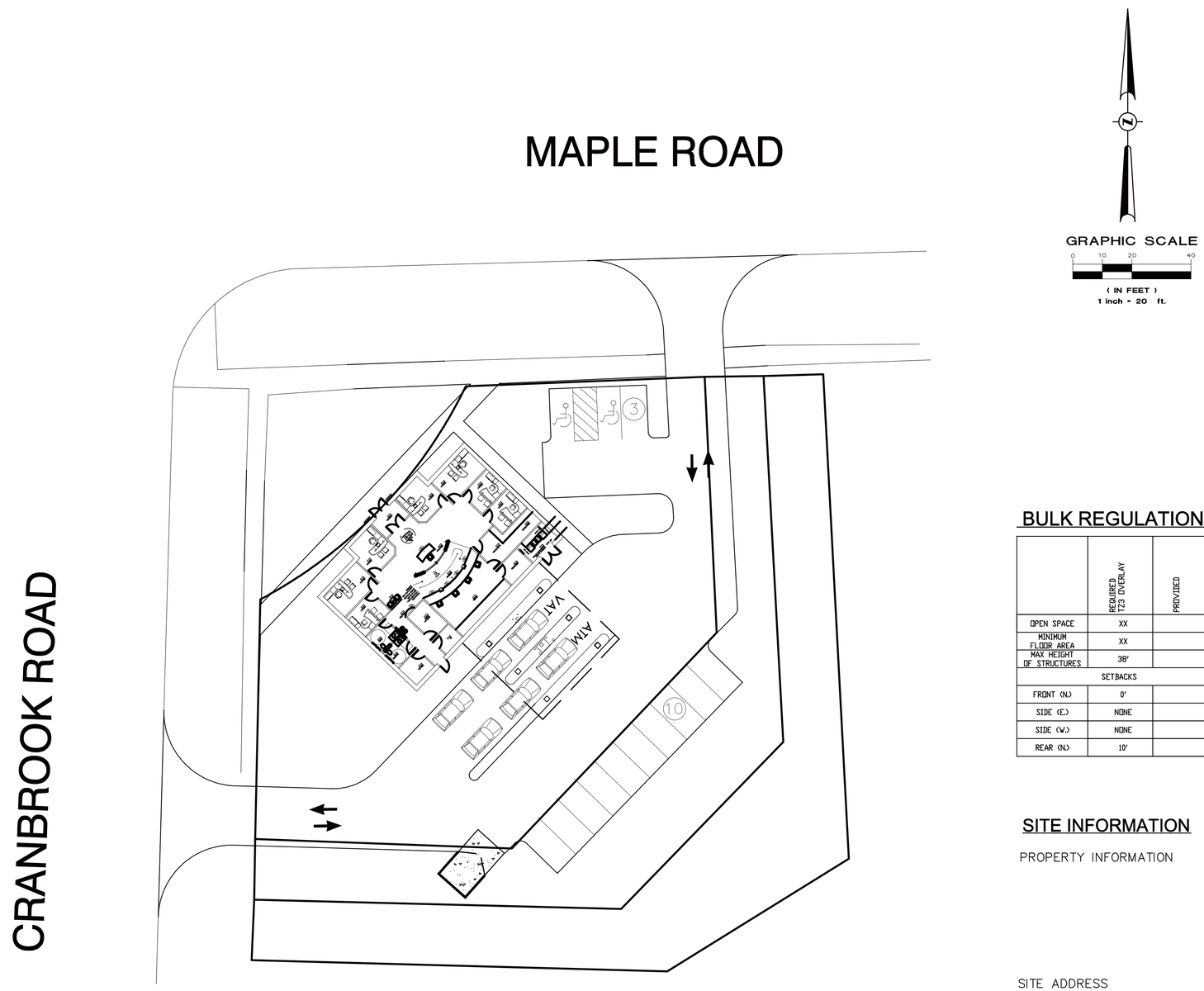
Date Created: 2/16/2015

NORTH

100 1 inch = 50 feet

Appendix D

PM ENVIRONMENTAL Environmental & Engineering Services



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 48908

PARKING
REQUIRED NUMBER OF PARKING SPACES:

	REQUIREMENT		REQUIRED PARKING
BANKS	1 SPACE FOR EACH 300 SQ FT OF FLOOR AREA	3,531 GSFT	12 SPACES
	7 STACKING SPACES FOR EACH WINDOW OR ATM		7 STACKS

12 SPACES REQUIRED
?? STACKS REQUIRED

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

PREPARED UNDER THE SUPERVISION OF:

PROJECT LOG
CONCEPT VERSION 2 05-01-14

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

RICHARD L. FOSGITT, PE - CONSULTANT
393 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

140401

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RICHARD L. FOSGITT, P.E.

Appendix E

PM ENVIRONMENTAL Environmental & Engineering Services

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**
Due Care Activities			
Installation of a Vapor Barrier	$ 50,000	$ 24,820	$ 25,180
Disposal of Groundwater During Excavation Activities (3,800 gallons at $0.325/gallon)	$ 1,235		$ 1,235
Transportion and disposal of contaminated soil (4,108.76 tons at $23/yard)			
Transportation (approximately $11/cubic yards)	$ 45,196		$ 45,196
Disposal to a Type II Landfill (approximately $12/cubic yards)	$ 49,305		$ 49,305
Assessment, Oversight and VSR Sampling for Gas VOCs and Gasoline Range Organics (GRO)	$ 25,840		$ 25,840
Reporting	5,000		$ 5,000
Due Care Activities Sub-Total	**$ 176,576**	**$ 24,820**	**$ 151,756**
Asbestos			
Pre-Demo Asbestos Survey/Reporting	$ 1,200		$ 1,200
Asbestos Abatement and Oversight Activities	$ 3,850		$ 3,850
Asbestos Sub-Total	**$ 5,050**	**$ -**	**$ 3,850**
Preparation of Brownfield Plan			
Brownfield Plan	$ 7,600	$ 3,773	$ 3,827
Brownfield Sub-Total	**$ 7,600**	**$ 3,773**	**$ 3,827**
Total Cost of Developer Eligible Activities to be Funded Through TIF	**$ 189,226**	**$ 28,593**	**$ 164,434**

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, approximately 4,108 tons of contaminated soil required transportation and proper disposal from the site in association with development activities as well as the disposal of approximately 3,800 gallons of contaminated groundwater. This plan accounts for the contaminated soil to be transported and disposed of at a Type II Landfill as well as the disposal 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.

Assessment, Oversight and VSR sampling and reporting for gasoline volatile organic compounds (VOCs) and Gasoline Range Organics (GRO) is also included, which document and verify site conditions following soil removal activities.

This plan also includes reporting associated with additional response activities.

Asbestos Activities

An ACM survey, proper abatement and oversight activities have been completed and costs included, accordingly.

Brownfield Plan

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

Tax Increment Financing Estimates
Table 2

		2015	2016 YR1	2017 YR2	2018 YR3	2019 YR4	2020 YR5	2021 YR6	2022 YR7	2023 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 *minus* Taxable Value)			$ 153,620	$ 153,620	$ 159,120	$ 164,675	$ 170,286	$ 175,952	$ 181,676	$ 187,456
Local Taxes - Millage										
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**
School Taxes										
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**
Non-Capturable Millages										
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		**$ 164,434**	**$ 160,694**	**$ 156,954**	**$ 153,080**	**$ 149,070**	**$ 144,925**	**$ 140,641**	**$ 136,218**	**$ 131,654**
MDEQ Reimbursed Expenses										
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%

Tax Increment Financing Estimates
Table 2

2024 YR9	2025 YR10	2026 YR11	2027 YR12	2028 YR13	2029 YR14	2030 YR15	2031 YR16	2032 YR17	2033 YR18	2034 YR19	2035 YR20	2036 YR21	2037 YR22	2038 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
$ 126,948	**$ 122,098**	**$ 117,104**	**$ 111,963**	**$ 106,674**	**$ 101,235**	**$ 95,646**	**$ 89,905**	**$ 84,009**	**$ 77,958**	**$ 71,750**	**$ 65,384**	**$ 58,857**	**$ 52,168**	**$ 45,316**
$ 318														
$ -														

Tax Increment Financing Estimates
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	$ 681	
$ 38,299	**$ 31,116**	**$ 23,764**	**$ 16,242**	**$ 8,548**	**$ 681**	**$ -**	

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 Act 381 of Public Acts of 1996, 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 demolishing the existing gasoline service station and constructing a new bank branch office 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 Due Care Activities, Asbestos Abatement, 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, are estimated to be $189,226 for developer reimbursement.

F. The Brownfield Plan Authorizes the use of Tax Increment Revenues that are generated by Local and School 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 is 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 and School 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) Due Care Activities; (2) Asbestos Abatement; or (3) 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 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 West Maple Road Birmingham, Michigan 48009 Attn: Sam Karana By certified mail

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.	Due Care Activities	
2.	Asbestos Abatement	
3.	Brownfield Plan preparation	
	Total Cost Reimbursement Request	

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

Developer: _____

Signature: _____

Title: _____

Address: _____

_____

PM ENVIRONMENTAL
Risk Well Managed

Environmental & Engineering Services Nationwide

ENVIRONMENTAL SERVICES

BUILDING ARCHITECTURE, ENGINEERING & SCIENCE

INDUSTRIAL HYGIENE SERVICES

BROWNFIELDS & ECONOMIC INCENTIVES CONSULTING

SITE REMEDIATION SUMMARY REPORT

2483 West Maple Road | Birmingham, Michigan
PM Project Number 01-5395-1-003

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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Lansing, MI 48906
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t: 517.321.3331

Grand Rapids
560 5th Street NW,
Suite 301
Grand Rapids, MI 49504
f: 877.884.6775
t: 616.285.8857

August 5, 2015

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

RE: Site Remediation Summary Report for the Former Gasoline Service Station Located at 2483 West Maple Road in Birmingham, Michigan
PM Environmental Project No. 01-5395-1-003

Dear Mr. Karana:

PM Environmental, Inc. (PM) has completed remediation oversight and sampling activities at the former gasoline service station property located at 2483 West Maple Road in Birmingham, Oakland County, Michigan (hereafter referred to as the "subject property"). PM conducted oversight during underground storage tank (UST) system removal, in-ground hoist removal, and impacted soil and groundwater removal activities in July 2015 in preparation for redevelopment. Photographs of the remediation activities are included in Appendix A.

Soil and groundwater samples were collected in July 2015 to identify the current contaminant concentrations throughout the subject property.

The analytical results for the soil and groundwater samples collected by PM were compared with the MDEQ Cleanup Criteria 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); and the MDEQ Guidance Document For The Vapor Intrusion Pathway, Policy and Procedure Number: 09-017, Appendix D Vapor Intrusion Screening Values, May 2013.

INTRODUCTION AND BACKGROUND INFORMATION

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 subject property was formerly 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 formerly contained four service bays with four in-ground hydraulic hoists (Figure 2). The property formerly contained four 6,000-gallon gasoline USTs, one 8,000-gallon gasoline UST, and one 550-gallon waste oil UST located northwest of the former subject building. Three former dispensers were located north of the subject building, and one former dispenser was located west of the subject building. Former operations were consistent with a retail gasoline dispensing station and service garage, since first developed use of the subject property in 1957.

The subject property is an open Leaking Underground Storage Tank (LUST) site with one reported release (C-0846-92) confirmed on May 26, 1992. The subject property is being redeveloped for commercial use and LUST closure will be pursued following remediation activities outlined in this report. Figure 2 depicts the former and proposed site features.

JULY 2014 SUBSURFACE INVESTIGATION

On July 25 and 28, 2014, PM conducted a soil and groundwater investigation to determine current concentrations prior to redevelopment, which included 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, which is summarized in PM's Additional Site Assessment report dated August 25, 2014. Figure 3 depicts the soil boring locations with soil analytical results not excavated; and Figure 4 depicts the monitoring well locations with groundwater analytical results from July 2014 and July 2015. The soil analytical results for the sample locations not excavated are summarized in Table 1; and the groundwater analytical results are summarized in Table 2.

The impacted soil has been horizontally defined to within the property boundaries to below laboratory method detection limits (MDLs).

JULY 2015 GROUNDWATER MONITORING EVENT

On July 10, 2015, prior to excavation activities, PM collected groundwater samples from six existing monitoring wells (MW-Z, OW-4R, OW-5R, OW-7R, OW-12 and PMW-4) that would likely be destroyed during excavation activities. Six groundwater samples were submitted to Brighton Analytical, LLC (Brighton) in Brighton, Michigan for laboratory analysis of gasoline volatile organic compounds (VOCs.) The July 2015 groundwater analytical results are summarized on Figure 4 and Table 2. A copy of the Laboratory Analytical Report is included in Appendix B.

Concentrations of various gasoline VOCs were detected in the groundwater samples collected from MW-Z, OW-4R, OW-5R, and OW-7R above the Part 213 Residential and Nonresidential Drinking Water (DW) and/or Groundwater Surface Water Interface (GSI) RBSLs. In addition, concentrations of benzene were detected in the groundwater samples collected from OW-4R and OW-5R above the Residential and Nonresidential Vapor Intrusion Screening Levels (VISLs). However, the groundwater at the subject property is perched and limited. No concentrations of gasoline VOCs were detected in the groundwater samples collected from OW-12 and PMW-4 above the laboratory MDLs and/or most restrictive Part 213 Residential RBSLs.

JULY 2015 SOIL EXCAVATION AND SAMPLING ACTIVITIES

Between July 14 and 30, 2015, PM directed soil excavation activities of gasoline impacted soils associated with the 1992 release to facilitate the intended Nonresidential redevelopment of the subject property. The soil excavation activities were conducted by Parks Installation and Excavating, Inc. (Parks), Milford, Michigan. The excavation in the area of the former UST basin was advanced to an approximate depth of 12 feet below ground surface (bgs) and the remainder of the excavation area was advanced to approximate depths between 4.0 and 8.0 feet bgs.

Soil excavation activities were conducted to remove soil concentrations exceeding the Part 213 Nonresidential Soil Volatilization to Indoor Air Inhalation (SVII) RBSLs or Soil Saturation Concentration (Csat) Screening Levels, and to remove concentrations representative of residual Light Non-Aqueous Phase Liquid (LNAPL) saturation in order to fulfill due care response activities and to assist in obtaining LUST closure at the subject property. A total of 4108.76 tons of petroleum impacted soils and approximately 3,800-gallons of petroleum impacted groundwater

were removed from the subject property. The impacted soils were transported to and disposed of at Waste Management's Eagle Valley Landfill in Orion, Michigan; and the impacted groundwater was transported by and disposed of at Bucks Oil Co., Inc. processing facility in Romulus, Michigan. Copies of solid and liquid waste manifests are included in Appendix C. Copies of landfill tickets are also included in Appendix C.

No mobile or migrating LNAPL (free product) was identified during excavation activities, which is consistent with previous site investigations. The limited groundwater encountered in the excavation did not recharge following dewatering activities. Therefore, no groundwater samples were collected as part of remediation activities.

A total of 33 VSR samples (S-1 through S-33) were collected from the subject property. Nineteen excavation floor samples were collected at VSR sample locations S-1, S-4 through S-6, S-9, S-12 through S-15, S-17, S-20, S-22, S-24, and S-27 through S-32 at depths ranging between 4.0 and 12.0 feet bgs and 14 excavation sidewall samples were collected at VSR sample locations S-2, S-3, S-7, S-8, S-10, S-11, S-16, S-18, S-19, S-21, S-23, S-25, S-26 and S-33 at depth ranging between 2.0 and 5.0 feet bgs. Figure 5 depicts the excavation area with VSR analytical results.

VSR samples were selected for chemical analysis from locations based on field screening that included the highest PID field-screening measurement, noticeable evidence of contamination (i.e., discoloration/staining, odors, etc.), and/or spatial representation of the excavation. The VSR samples were collected in general accordance with the 2002 MDEQ "Sampling Strategies and Stastics Training Materials for Part 201 Cleanup Criteria" guidance document, and were submitted for laboratory analysis of gasoline VOCs. The laboratory analytical reports are included in Appendix B.

Following the collection of verification of soil remediation (VSR) samples and the review of analytical data, The former tank basin area excavation was backfilled with 1x3 inch crushed limestone up to 6.0 feet bgs, and the remaining excavation areas were backfilled with 21AA crushed limestone up to 5 feet bgs, and then the entire excavation area was brought to grade with class II sand backfill. Construction Testing Services, Burton, Michigan conducted compaction testing on July 22, 23, and 31, 2015 with results ranging from 95.0 to 98.2 percent compaction throughout the excavation area, which confirmed compaction requirements for the proposed redevelopment.

Summary of VSR Analytical Results

A summary of the VSR sample analytical results are included on Figure 5 and in Table 3.

Concentrations of various gasoline VOCs were initially detected in sidewall samples S-7, S-18 and S-23, and in floor samples S-1 and S-12 above the residual LNAPL saturation (using the 40 times benzene, toluene, ethylbenzene, and xylenes (BTEX) calculation). Therefore, additional excavation was conducted in these areas and additional VSR samples were collected to confirm the removal of contaminated soil above residual LNAPL saturation.

Sidewall samples S-19 and S-26 were also excavated following the removal of the former subject building floor/foundation when additional impacted soils were encountered within/under the building footings and utility corridors.

All underground utilities formerly servicing the former subject building/property have been removed from the subject property.

Concentrations of various gasoline VOCs were detected in sidewall samples collected from S-2, S-8, S-10, S-11, S-21, S-22, S-27 and S-28 and floor samples collected from S-6, S-9, S-13, S-14, S-20 and S-30 above the Part 213 Residential and Nonresidential Drinking Water Protection (DWP) and/or Groundwater Surface Water Interface Protection (GSIP) RBSLs. Additionally, the concentrations of benzene, isopropyl benzene and n-propylbenzene were detected above the Nonresidential VISLs. No other concentrations of gasoline VOCs were detected in the VSR samples collected from the subject property above the laboratory MDLs and/or most restrictive Part 213 Residential RBSLs.

JULY 2015 UST SYSTEM AND IN-GROUND HOIST REMOVAL ACTIVITIES

Between July 14 and 30, 2015 PM conducted oversight and sampling activities during removal of the UST system, in-ground hoist, dispensers and associated product piping (Figure 2) by Parks. Four 6,000-gallon gasoline USTs, one 8,000-gallon gasoline UST, one 550-gallon used oil UST, four fuel dispensers and associated product piping, and four in-ground hoists were removed from the subject property. During demolition/excavation activities, an additional hoist cylinder was discovered in the eastern portion of the former subject building and a catch basin (potential oil/water separator) was encountered in the western portion of the former subject building, and were subsequently removed.

No residual product was identified in the gasoline USTs at the time of removal. The used oil UST, hoists, and catch basin contained approximately 700 gallons of residual product that was pumped and properly disposed of by Bucks Oil Co., Inc. prior to removal. Copies of the liquid waste manifests are included in Appendix C.

Upon removal, the gasoline USTs and the used oil UST were visually inspected and documented to be in good condition with no corrosion holes or pitting. However, one small hole was identified in the end of the 8,000-gallon gasoline UST; the origin of the hole was not determined, but did not appear to be from corrosion. No visual free product was observed in the open excavation. The UST Deregistration and Site Assessment forms will be submitted to the Michigan Department of Licensing and Regulatory Affairs, Bureau of Fire Services, Storage Tank Division (Appendix D).

The USTs and hoists were recycled at Regal Recycling in Howell, Michigan and/or Milford Salvage Iron and Metal Co., Inc. in Milford, Michigan. Copies of the recycling tickets are included in Appendix C.

A total of seven site assessment samples (SS-1 through SS-6 and SS-11) were submitted to Brighton for laboratory analysis of VOCs, polynuclear aromatic hydrocarbons (PNAs), polychlorinated biphenyls (PCBs), cadmium, chromium, and lead. Site Assessment samples SS-1 through SS-4 were collected beneath the former hoists, SS-5 was collected beneath the former 550-gallon used oil UST, SS-6 was collected beneath the additiional hoist cylinder, and SS-11 was collected beneath the catch basin. Site assessment samples collected in the area of the additional hoist cylinder (SS-7 though SS-10) were not submitted for laboratory analysis due to being excavated as part of the larger excavation, in which VSR samples were collected. Figure 6 depicts the site assessment sample locations with soil analytical results.

Summary of Site Assessment Analytical Results

A summary of the Site Assessment sample analytical results are included on Figure 6 and in Table 4.

A concentration of tetrachloroethene (PCE) was detected in the soil sample collected at SS-3 (6.0-7.0 feet bgs), and a concentration of methyl-tert-butyl ether (MTBE) was detected in the soil sample collected at SS-5 (8.0-9.0 feet bgs) above the Part 201 Residential and Nonresidential DWP cleanup criteria. No other concentrations of VOCs were detected in the remaining site assessment soil samples collected from the subject property above the laboratory MDLs. No concentrations of PCE were detected in any of the previous samples collected from the subject property, therefore, the concentration identified in SS-3 appears to be limited.

No concentrations of PNAs and PCBs were detected in any of the site assessment samples collected from the subject property above the laboratory MDLs.

Concentrations of cadmium, chromium, and lead were detected in each of the site assessment samples above the laboratory MDLs, but below the Michigan Statewide Default Background Levels (SDBLs) and/or most restrictive Part 201 Residential cleanup criteria.

CONCLUSIONS AND RECOMMENDATIONS

The subject property remains an open LUST site with one confirmed release (C-0846-92) reported in 1992. No evidence of a new release was identified during the July 2015 groundwater sampling event and remediation activities. The groundwater concentrations appear to be stable since the last sampling event in July 2014. Consistent with previous site investigations, no mobile or migrating LNAPL (free product) was observed during remediation activities, and no indication of a new release from the former UST system was evident.

The analytical results document that no soil concentrations remain on the subject property above the Part 213 Nonresidential SVII RBSLs or Csat Screening Levels, and no concentrations were identified representative of residual LNAPL saturation. However, soil concentrations remain above the Nonresidential VISLs, which are applicable if groundwater is present at a depth less than approximately 9.0 feet bgs. Limited perched groundwater has been identified on the subject property; although, the limited perched groundwater encountered during excavation activities did not recharge following the removal.

Subsequently, the proposed tenant is presumptively mitigating the potential vapor intrusion issue by installing a vapor barrier. Therefore, no additional investigation would be required to further assess the vapor intrusion pathway. In addition, no other applicable Part 213 Nonresidential RBSLs are exceeded for the proposed future development, and no additional response activities would be required for future planned Nonresidential use.

However, prior to the start of planned construction activities, PM recommends that an updated Documentation of Due Care Compliance be prepared that includes soil management and other construction-phase management actions required to maintain compliance with the due care provisions of Section 4c of Part 213, including preventing unacceptable exposures and exacerbation of existing contamination during construction.

If you have any questions or concerns, please feel free to contact our office at (800)-313-2966.

Sincerely,
PM Environmental, Inc.

Nicholas Lieder
Staff Geologist

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 3 Soil Boring Location Map with Soil Analytical Results (Post July 2015 Excavation)
Figure 4 Monitoring Well Location Map with Groundwater Analytical Results (2014-2015)
Figure 5 Excavation Sample Location Map with Verification of Soil Remediation Analytical Results
Figure 6 Clean Closure Sample Location Map with Analytical Results

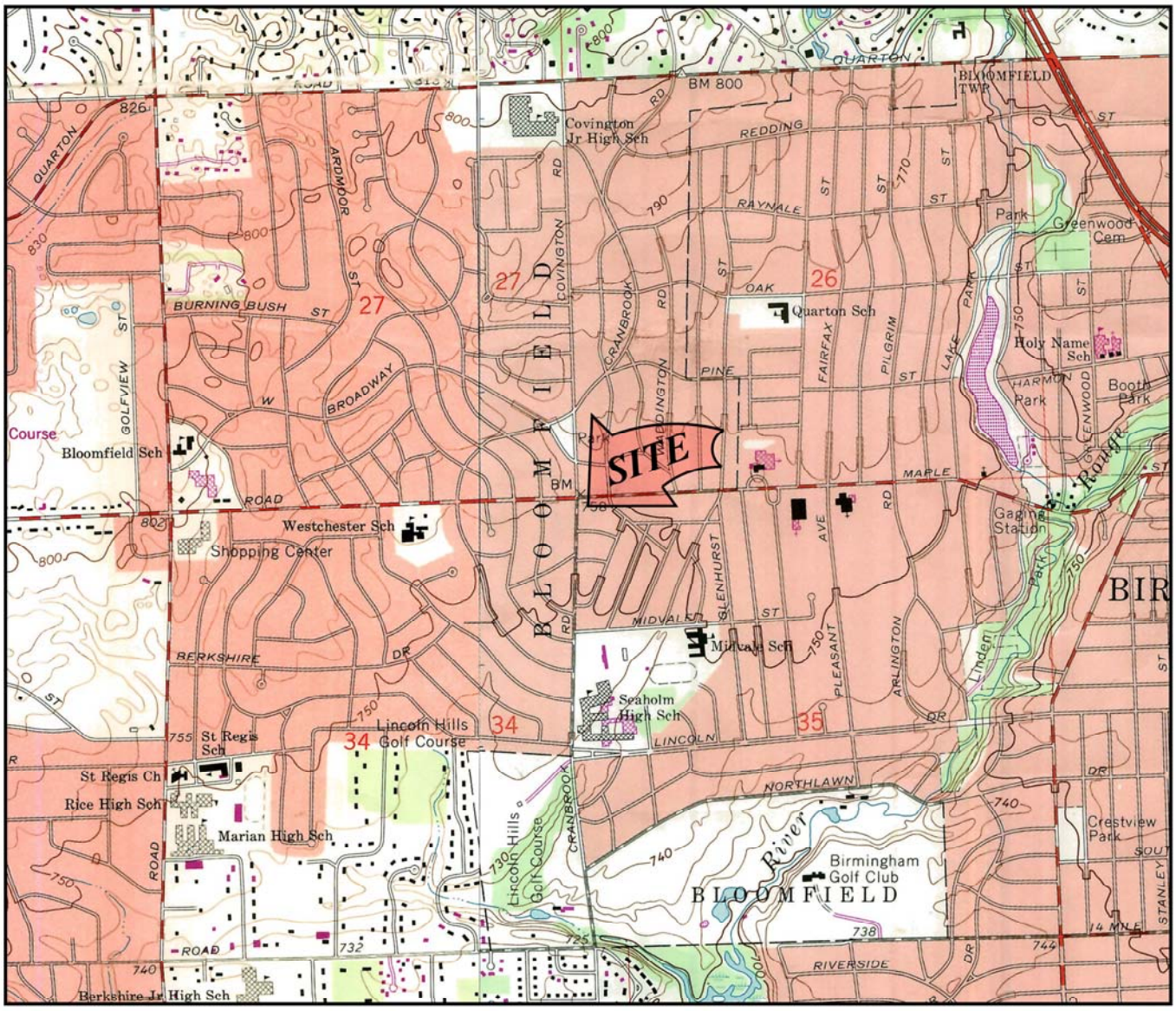
TABLES

Table 1 Summary of Soil Analytical Results (2006-2009) – Gasoline VOCs
Table 2 Summary of Groundwater Analytical Results (2014-2015) – Gasoline VOCs
Table 3 Summary of Verification of Soil Remediation Analytical Results (July 2015) – Gasoline VOCs
Table 4 Summary of Site Assessment Soil Analytical Results (July 2015) – VOCs, PNAs, PCBs, and Metals

APPENDICES

Appendix A Remediation Photographs
Appendix B Laboratory Analytical Reports
Appendix C Disposal Documentation
Appendix D UST Deregistration and Site Assessment forms

Figures



OAKLAND COUNTY

SCALE 1:24,000

1 MILE 1/2 MILE 0 1 MILE

FIGURE 1

PROPERTY VICINITY MAP

USGS, 7.5 MINUTE SERIES

BIRMINGHAM, MI QUADRANGLE, 1968. PHOTO REVISED 1982.

PM ENVIRONMENTAL Environmental & Engineering Services	PROJ: COMMERCIAL PROPERTY 2483 WEST MAPLE ROAD BIRMINGHAM, MI	THIS IS NOT A LEGAL SURVEY	DRN BY: MW/CS	DATE: 8/5/2015
		VERIFY SCALE 0 1" IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: JR/NM/AS	SCALE: 1" : 2,000'
			FILE NAME: 01-5395-12002F01R00	

BANK

COMMERCIAL

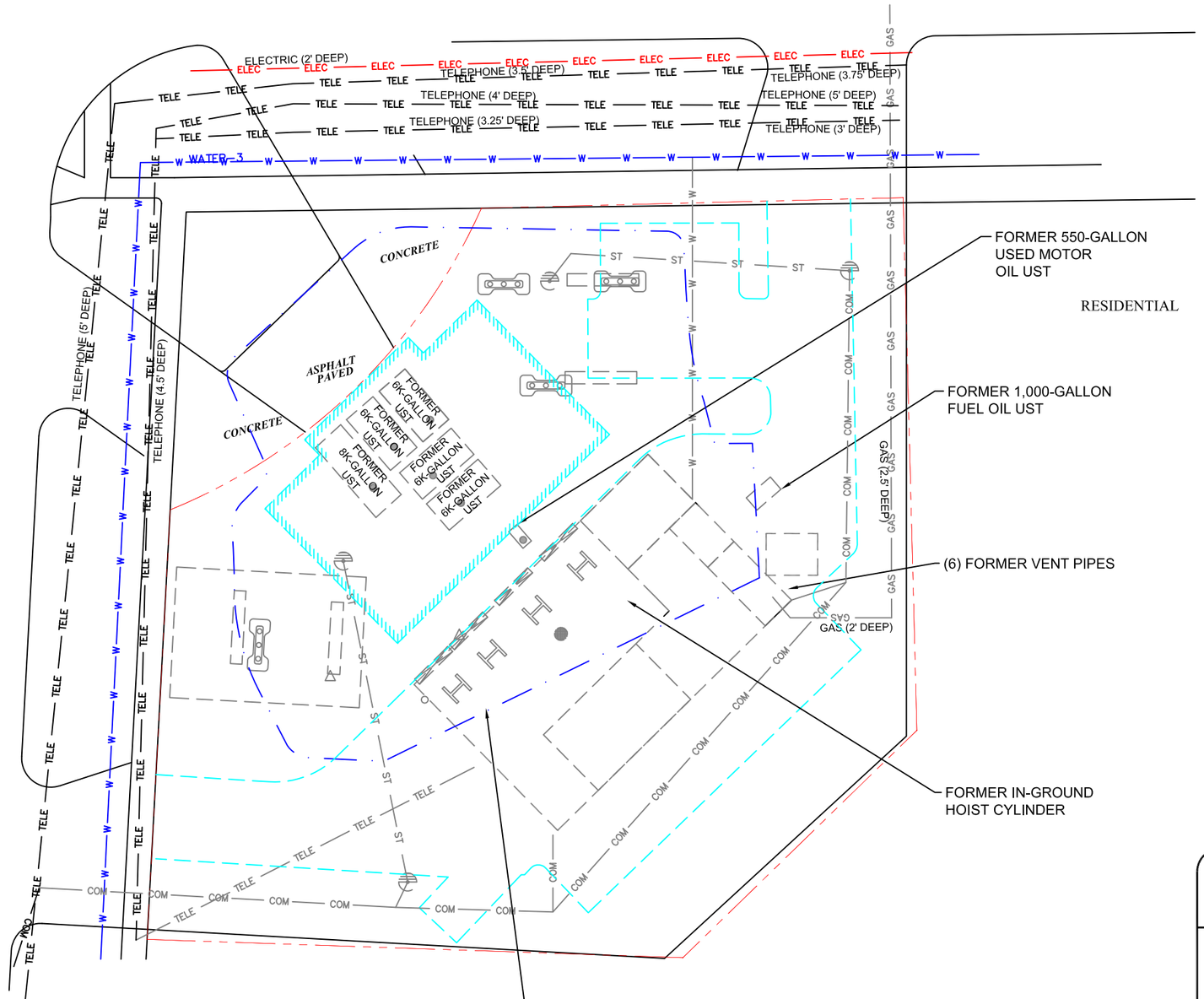
WEST MAPLE ROAD

RETAIL STRIP MALL

CRANBROOK ROAD

RESIDENTIAL

RESIDENTIAL



LEGEND:

- SUBJECT SITE
- FORMER SITE FEATURES
- WATER
- GAS
- STORM SEWER
- COMBINATION SANITARY / STORM SEWER
- ELECTRIC
- BURIED PHONE LINE
- EXCAVATION LIMITS
- PROPOSED SITE FEATURES
- FORMER WATER
- FORMER GAS
- FORMER STORM SEWER
- FORMER COMBINATION SANITARY / STORM SEWER
- FORMER BURIED PHONE LINE
- FORMER FLOOR DRAIN
- FORMER CATCH BASIN
- FORMER BAYDOOR
- FORMER INGROUND HOIST
- FORMER PUMP ISLAND
- FORMER FILL PORT
- FORMER VENT PIPE

PM ENVIRONMENTAL | Environmental & Engineering Services

FIGURE 2

GENERALIZED DIAGRAM OF THE SUBJECT PROPERTY AND ADJOINING PROPERTIES

PROJ:

COMMERCIAL PROPERTY
2483 WEST MAPLE ROAD
BIRMINGHAM, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: MW/CS/KS	DATE: 8/4/2015
VERIFY SCALE 0 30' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: JR/NM/NL	SCALE: 1" = 30'
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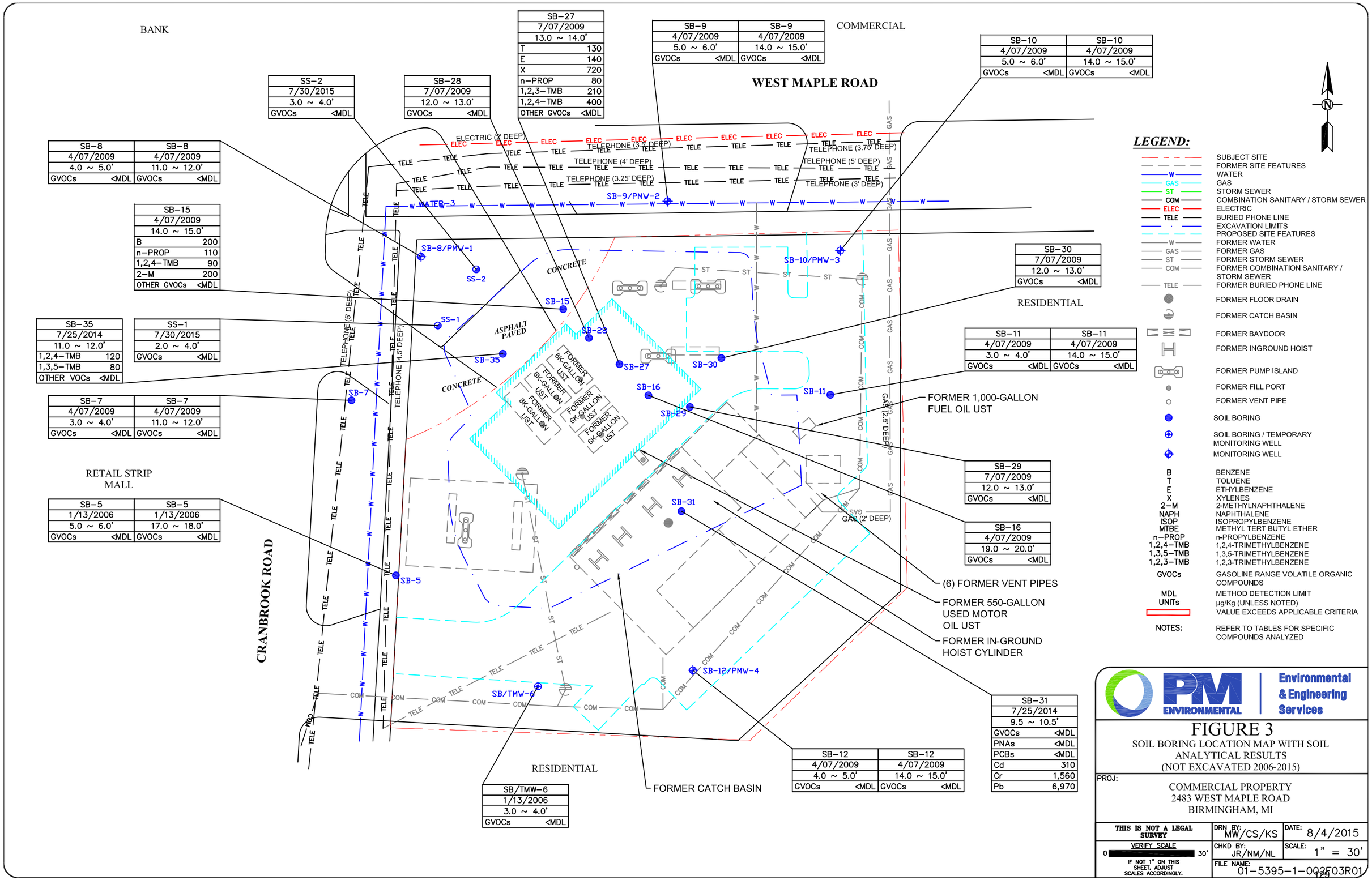

SB-27	
7/07/2009	
13.0 ~ 14.0'	
T	130
E	140
X	720
n-PROP	80
1,2,3-TMB	210
1,2,4-TMB	400
OTHER GVOCs	<MDL

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

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

SS-2
7/30/2015
3.0 ~ 4.0'
GVOCs <MDL

SB-28
7/07/2009
12.0 ~ 13.0'
GVOCs <MDL

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

SB-15
4/07/2009
14.0 ~ 15.0'
B	200
n-PROP	110
1,2,4-TMB	90
2-M	200
OTHER GVOCs	<MDL

SB-35
7/25/2014
11.0 ~ 12.0'
1,2,4-TMB	120
1,3,5-TMB	80
OTHER VOCs	<MDL

SS-1
7/30/2015
2.0 ~ 4.0'
GVOCs <MDL

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

SB-5	SB-5
1/13/2006	1/13/2006
5.0 ~ 6.0'	17.0 ~ 18.0'
GVOCs <MDL	GVOCs <MDL

SB-30
7/07/2009
12.0 ~ 13.0'
GVOCs <MDL

SB-11	SB-11
4/07/2009	4/07/2009
3.0 ~ 4.0'	14.0 ~ 15.0'
GVOCs <MDL	GVOCs <MDL

SB-29
7/07/2009
12.0 ~ 13.0'
GVOCs <MDL

SB-16
4/07/2009
19.0 ~ 20.0'
GVOCs <MDL

SB-31
7/25/2014
9.5 ~ 10.5'
GVOCs <MDL
PNAs <MDL
PCBs <MDL
Cd	310
Cr	1,560
Pb	6,970

SB-12	SB-12
4/07/2009	4/07/2009
4.0 ~ 5.0'	14.0 ~ 15.0'
GVOCs <MDL	GVOCs <MDL

SB/TMW-6
1/13/2006
3.0 ~ 4.0'
GVOCs <MDL

LEGEND:

- SUBJECT SITE
- FORMER SITE FEATURES
- WATER
- GAS
- STORM SEWER
- COMBINATION SANITARY / STORM SEWER
- ELECTRIC
- BURIED PHONE LINE
- EXCAVATION LIMITS
- PROPOSED SITE FEATURES
- FORMER WATER
- FORMER GAS
- FORMER STORM SEWER
- FORMER COMBINATION SANITARY / STORM SEWER
- FORMER BURIED PHONE LINE
- FORMER FLOOR DRAIN
- FORMER CATCH BASIN
- FORMER BAYDOOR
- FORMER INGROUND HOIST
- FORMER PUMP ISLAND
- FORMER FILL PORT
- FORMER VENT PIPE
- SOIL BORING
- SOIL BORING / TEMPORARY MONITORING WELL
- MONITORING WELL

B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
2-M	2-METHYLNAPHTHALENE
NAPH	NAPHTHALENE
ISOP	ISOPROPYLBENZENE
MTBE	METHYL TERT BUTYL ETHER
n-PROP	n-PROPYLBENZENE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE
1,2,3-TMB	1,2,3-TRIMETHYLBENZENE
GVOCs	GASOLINE RANGE VOLATILE ORGANIC COMPOUNDS
MDL	METHOD DETECTION LIMIT
UNITs	µg/Kg (UNLESS NOTED)
	VALUE EXCEEDS APPLICABLE CRITERIA
NOTES:	REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

PM ENVIRONMENTAL | Environmental & Engineering Services

FIGURE 3

SOIL BORING LOCATION MAP WITH SOIL ANALYTICAL RESULTS (NOT EXCAVATED 2006-2015)

PROJ:

COMMERCIAL PROPERTY
2483 WEST MAPLE ROAD
BIRMINGHAM, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: MW/CS/KS	DATE: 8/4/2015
VERIFY SCALE 0 30' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: JR/NM/NL	SCALE: 1" = 30'
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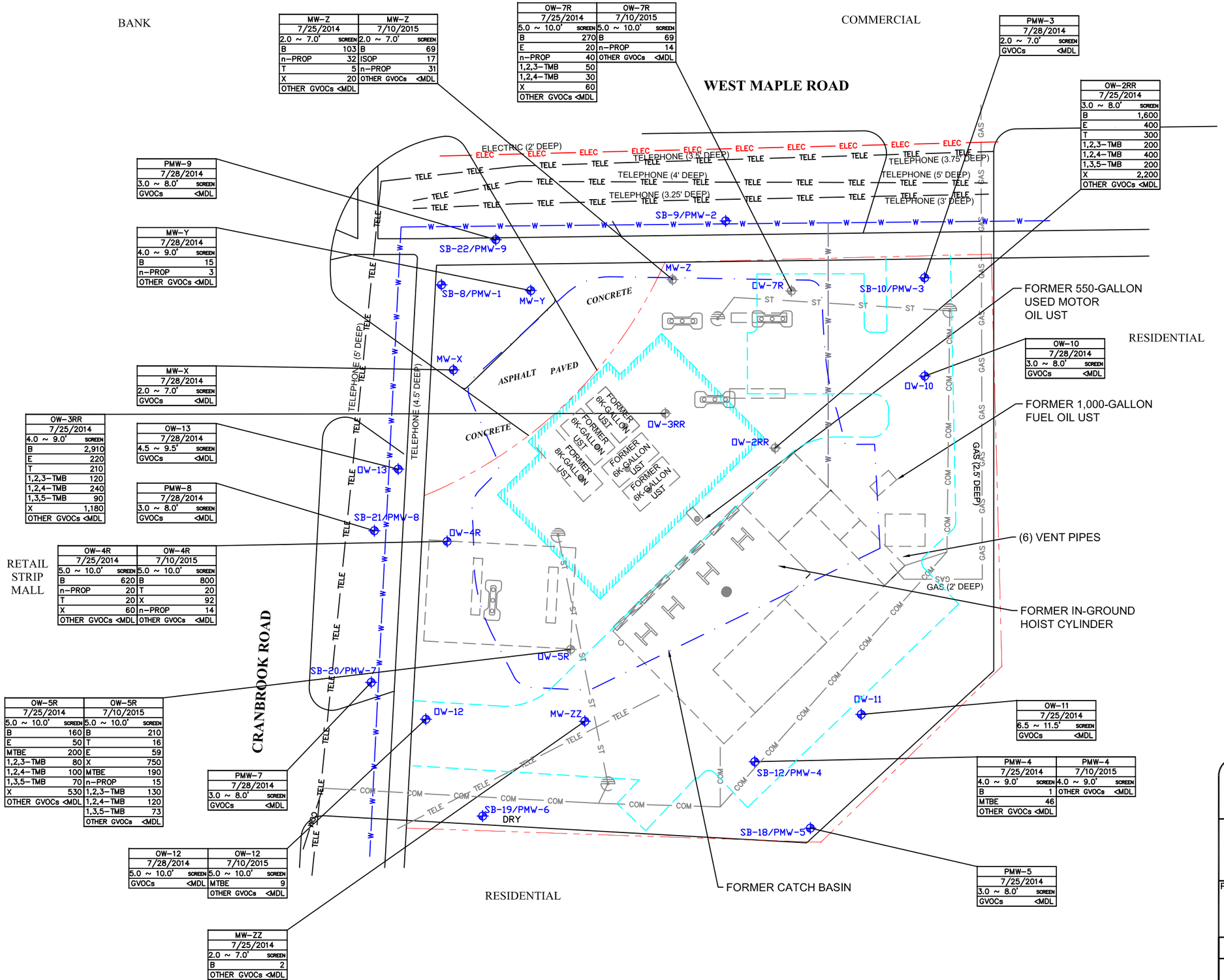


MW-Z	
7/25/2014	
2.0 ~ 7.0' SCREEN	
B	103
n-PROP	32
T	5
X	20
OTHER GVOCs <MDL	

MW-Z	
7/10/2015	
2.0 ~ 7.0' SCREEN	
B	69
ISOP	17
n-PROP	31
OTHER GVOCs <MDL	

OW-7R	
7/25/2014	
5.0 ~ 10.0' SCREEN	
B	270
E	20
n-PROP	40
1,2,3-TMB	50
1,2,4-TMB	30
X	60
OTHER GVOCs <MDL	

OW-7R	
7/10/2015	
5.0 ~ 10.0' SCREEN	
B	69
n-PROP	14
OTHER GVOCs <MDL	

PMW-3	
7/28/2014	
2.0 ~ 7.0' SCREEN	
GVOCs	<MDL

OW-2RR	
7/25/2014	
3.0 ~ 8.0' SCREEN	
B	1,600
E	400
T	300
1,2,3-TMB	200
1,2,4-TMB	400
1,3,5-TMB	200
X	2,200
OTHER GVOCs <MDL	

PMW-9	
7/28/2014	
3.0 ~ 8.0' SCREEN	
GVOCs	<MDL

MW-Y	
7/28/2014	
4.0 ~ 9.0' SCREEN	
B	15
n-PROP	3
OTHER GVOCs <MDL	

MW-X	
7/28/2014	
2.0 ~ 7.0' SCREEN	
GVOCs	<MDL

OW-3RR	
7/25/2014	
4.0 ~ 9.0' SCREEN	
B	2,910
E	220
T	210
1,2,3-TMB	120
1,2,4-TMB	240
1,3,5-TMB	90
X	1,180
OTHER GVOCs <MDL	

OW-13	
7/28/2014	
4.5 ~ 9.5' SCREEN	
GVOCs	<MDL

PMW-8	
7/28/2014	
3.0 ~ 8.0' SCREEN	
GVOCs	<MDL

OW-4R	
7/25/2014	
5.0 ~ 10.0' SCREEN	
B	620
n-PROP	20
T	20
X	60
OTHER GVOCs <MDL	

OW-4R	
7/10/2015	
5.0 ~ 10.0' SCREEN	
B	800
T	20
X	92
n-PROP	14
OTHER GVOCs <MDL	

OW-5R	
7/25/2014	
5.0 ~ 10.0' SCREEN	
B	160
E	50
MTBE	200
1,2,3-TMB	80
1,2,4-TMB	100
1,3,5-TMB	70
X	530
OTHER GVOCs <MDL	

OW-5R	
7/10/2015	
5.0 ~ 10.0' SCREEN	
B	210
T	16
E	59
X	750
MTBE	190
n-PROP	15
1,2,3-TMB	130
1,2,4-TMB	120
1,3,5-TMB	73
OTHER GVOCs <MDL	

PMW-7	
7/28/2014	
3.0 ~ 8.0' SCREEN	
GVOCs	<MDL

OW-12	
7/28/2014	
5.0 ~ 10.0' SCREEN	
GVOCs	<MDL

OW-12	
7/10/2015	
5.0 ~ 10.0' SCREEN	
MTBE	9
OTHER GVOCs <MDL	

MW-ZZ	
7/25/2014	
2.0 ~ 7.0' SCREEN	
B	2
OTHER GVOCs <MDL	

OW-10	
7/28/2014	
3.0 ~ 8.0' SCREEN	
GVOCs	<MDL

OW-11	
7/25/2014	
6.5 ~ 11.5' SCREEN	
GVOCs	<MDL

PMW-4	
7/25/2014	
4.0 ~ 9.0' SCREEN	
B	1
MTBE	46
OTHER GVOCs <MDL	

PMW-4	
7/10/2015	
4.0 ~ 9.0' SCREEN	
OTHER GVOCs	<MDL

PMW-5	
7/25/2014	
3.0 ~ 8.0' SCREEN	
GVOCs	<MDL

LEGEND:

	SUBJECT SITE
	FORMER SITE FEATURES
W	WATER
GAS	GAS
ST	STORM SEWER
COM	COMBINATION SANITARY / STORM SEWER
ELEC	ELECTRIC
TELE	BURIED PHONE LINE
	EXCAVATION LIMITS
	PROPOSED SITE FEATURES
W	FORMER WATER
GAS	FORMER GAS
ST	FORMER STORM SEWER
COM	FORMER COMBINATION SANITARY / STORM SEWER
TELE	FORMER BURIED PHONE LINE
	FORMER FLOOR DRAIN
	FORMER CATCH BASIN
	FORMER BAYDOOR
	FORMER INGROUND HOIST
	FORMER PUMP ISLAND
	FORMER FILL PORT
	FORMER VENT PIPE
	MONITORING WELL
	EXCAVATED MONITORING WELL
Cd	CADMIUM
Cr	CHROMIUM
Pb	LEAD
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
NAPH	NAPHTHALENE
MTBE	METHYL TERT BUTYL ETHER
n-PROP	n-PROPYLBENZENE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE
1,2,3-TMB	1,2,3-TRIMETHYLBENZENE
GVOCs	GASOLINE VOLATILE ORGANIC COMPOUNDS
PNAs	POLYNUCLEAR AROMATIC COMPOUNDS
MDL	METHOD DETECTION LIMIT
UNITs	µg/L
NOTES:	REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

PM ENVIRONMENTAL | Environmental & Engineering Services

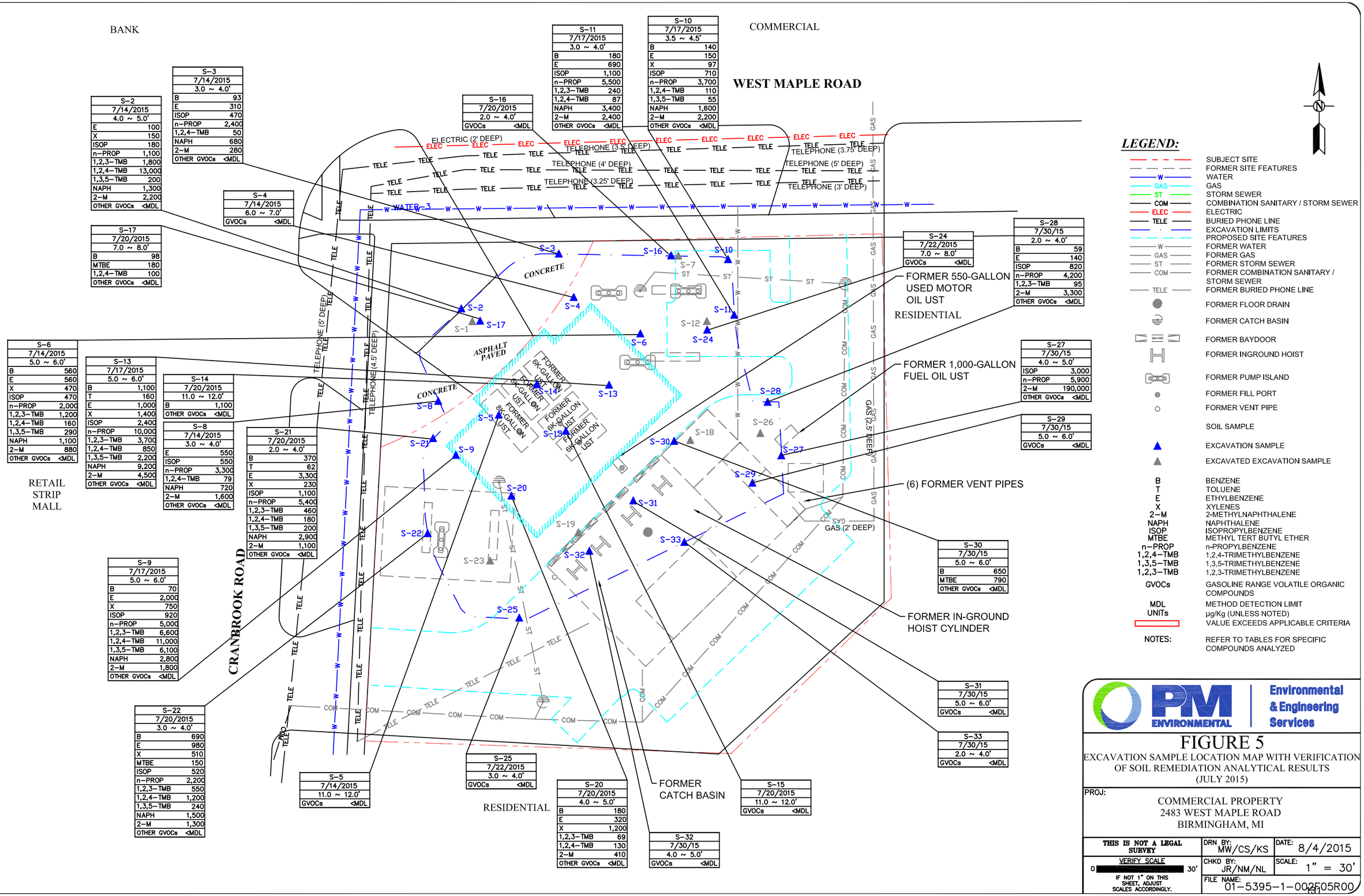
FIGURE 4

MONITORING WELL LOCATION MAP WITH GROUNDWATER ANALYTICAL RESULTS (2014 - 2015)

PROJ:

CRANBROOK CAR CARE
2483 WEST MAPLE ROAD
BIRMINGHAM, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: MW/CS/KS	DATE: 8/4/2015
VERIFY SCALE 0 30' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: JR/NM/JB	SCALE: 1" = 30'
	FILE NAME: 01-5395-1-002F04R01	



S-2	7/14/2015	4.0 ~ 5.0'
E	100	
X	150	
ISOP	180	
n-PROP	1,100	
1,2,3-TMB	1,800	
1,2,4-TMB	13,000	
1,3,5-TMB	200	
NAPH	1,300	
2-M	2,200	
OTHER GVOCs	<MDL	

S-3	7/14/2015	3.0 ~ 4.0'
B	93	
E	310	
ISOP	470	
n-PROP	2,400	
1,2,4-TMB	50	
NAPH	680	
2-M	280	
OTHER GVOCs	<MDL	

S-4	7/14/2015	6.0 ~ 7.0'
GVOCs	<MDL	

S-16	7/20/2015	2.0 ~ 4.0'
GVOCs	<MDL	

S-11	7/17/2015	3.0 ~ 4.0'
B	180	
E	690	
ISOP	1,100	
n-PROP	5,500	
1,2,3-TMB	240	
1,2,4-TMB	87	
NAPH	3,400	
2-M	2,400	
OTHER GVOCs	<MDL	

S-10	7/17/2015	3.5 ~ 4.5'
B	140	
E	150	
X	97	
ISOP	710	
n-PROP	3,700	
1,2,4-TMB	110	
1,3,5-TMB	55	
NAPH	1,600	
2-M	2,200	
OTHER GVOCs	<MDL	

S-17	7/20/2015	7.0 ~ 8.0'
B	98	
MTBE	180	
1,2,4-TMB	100	
OTHER GVOCs	<MDL	

S-24	7/22/2015	7.0 ~ 8.0'
GVOCs	<MDL	

S-28	7/30/15	2.0 ~ 4.0'
B	59	
E	140	
ISOP	820	
n-PROP	4,200	
1,2,3-TMB	95	
2-M	3,300	
OTHER GVOCs	<MDL	

S-27	7/30/15	4.0 ~ 5.0'
ISOP	3,000	
n-PROP	5,900	
2-M	190,000	
OTHER GVOCs	<MDL	

S-29	7/30/15	5.0 ~ 6.0'
GVOCs	<MDL	

S-6	7/14/2015	5.0 ~ 6.0'
B	560	
E	560	
X	470	
ISOP	470	
n-PROP	2,000	
1,2,3-TMB	1,200	
1,2,4-TMB	160	
1,3,5-TMB	290	
NAPH	1,100	
2-M	880	
OTHER GVOCs	<MDL	

S-13	7/17/2015	5.0 ~ 6.0'
B	1,100	
T	160	
E	1,000	
X	1,400	
ISOP	2,400	
n-PROP	10,000	
1,2,3-TMB	3,700	
1,2,4-TMB	850	
1,3,5-TMB	2,200	
NAPH	9,200	
2-M	4,500	
OTHER GVOCs	<MDL	

S-14	7/20/2015	11.0 ~ 12.0'
B	1,100	
OTHER GVOCs	<MDL	

S-8	7/14/2015	3.0 ~ 4.0'
E	550	
ISOP	550	
n-PROP	3,300	
1,2,4-TMB	79	
NAPH	720	
2-M	1,600	
OTHER GVOCs	<MDL	

S-21	7/20/2015	2.0 ~ 4.0'
B	370	
T	62	
E	3,300	
X	230	
ISOP	1,100	
n-PROP	5,400	
1,2,3-TMB	460	
1,2,4-TMB	180	
1,3,5-TMB	200	
NAPH	2,900	
2-M	1,100	
OTHER GVOCs	<MDL	

S-9	7/17/2015	5.0 ~ 6.0'
B	70	
E	2,000	
X	750	
ISOP	920	
n-PROP	5,000	
1,2,3-TMB	6,600	
1,2,4-TMB	11,000	
1,3,5-TMB	6,100	
NAPH	2,800	
2-M	1,800	
OTHER GVOCs	<MDL	

S-22	7/20/2015	3.0 ~ 4.0'
B	690	
E	980	
X	510	
MTBE	150	
ISOP	520	
n-PROP	2,200	
1,2,3-TMB	550	
1,2,4-TMB	1,200	
1,3,5-TMB	240	
NAPH	1,500	
2-M	1,300	
OTHER GVOCs	<MDL	

S-5	7/14/2015	11.0 ~ 12.0'
GVOCs	<MDL	

S-25	7/22/2015	3.0 ~ 4.0'
GVOCs	<MDL	

S-20	7/20/2015	4.0 ~ 5.0'
B	180	
E	320	
X	1,200	
1,2,3-TMB	69	
1,2,4-TMB	130	
2-M	410	
OTHER GVOCs	<MDL	

S-32	7/30/15	4.0 ~ 5.0'
GVOCs	<MDL	

S-15	7/20/2015	11.0 ~ 12.0'
GVOCs	<MDL	

S-30	7/30/15	5.0 ~ 6.0'
B	650	
MTBE	790	
OTHER GVOCs	<MDL	

S-31	7/30/15	5.0 ~ 6.0'
GVOCs	<MDL	

S-33	7/30/15	2.0 ~ 4.0'
GVOCs	<MDL	

FIGURE 5

EXCAVATION SAMPLE LOCATION MAP WITH VERIFICATION OF SOIL REMEDIATION ANALYTICAL RESULTS (JULY 2015)

PROJ:

COMMERCIAL PROPERTY
2483 WEST MAPLE ROAD
BIRMINGHAM, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: MW/CS/KS	DATE: 8/4/2015
VERIFY SCALE 0 30' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: JR/NM/NL	SCALE: 1" = 30'
	FILE NAME: 01-5395-1-002505R00	

BANK

COMMERCIAL

WEST MAPLE ROAD

ELECTRIC (2' DEEP)

TELEPHONE (3.5' DEEP)

TELEPHONE (3.75' DEEP)

TELEPHONE (4' DEEP)

TELEPHONE (5' DEEP)

TELEPHONE (3.25' DEEP)

TELEPHONE (3' DEEP)

WATER 3

CONCRETE

ASPHALT PAVED

FORMER 6K-GALLON UST

FORMER 550-GALLON USED MOTOR OIL UST

RESIDENTIAL

FORMER 1,000-GALLON FUEL OIL UST

(6) FORMER VENT PIPES

FORMER IN-GROUND HOIST CYLINDER

FORMER CATCH BASIN

RETAIL STRIP MALL

CRANBROOK ROAD

TELEPHONE (5' DEEP)

TELEPHONE (4.5' DEEP)

GAS (2.5' DEEP)

GAS (2' DEEP)

SS-1 SS-2 SS-3 SS-4 SS-5 SS-6 SS-11

SS-5	
7/17/2015	
8.0 – 9.0'	
MTBE	2,100
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	430
Cr	25,000
Pb	15,000

SS-1	
7/17/2015	
6.0 – 7.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	330
Cr	5,500
Pb	5,300

SS-2	
7/17/2015	
6.0 – 7.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	240
Cr	6,700
Pb	3,700

SS-4	
7/17/2015	
6.0 – 7.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	140
Cr	7,900
Pb	4,600

SS-11	
7/17/2015	
8.0'	
PCBs	<MDL
Cd	180
Cr	25,000
Pb	11,000

SS-3	
7/17/2015	
6.0 – 7.0'	
PCE	160
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	350
Cr	5,900
Pb	5,500

SS-6	
7/17/2015	
8.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	280
Cr	27,000
Pb	13,000

LEGEND:

- SUBJECT SITE
- FORMER SITE FEATURES
- W — WATER
- GAS — GAS
- ST — STORM SEWER
- COM — COMBINATION SANITARY / STORM SEWER
- ELEC — ELECTRIC
- TELE — BURIED PHONE LINE
- EXCAVATION LIMITS
- PROPOSED SITE FEATURES
- W — FORMER WATER
- GAS — FORMER GAS
- ST — FORMER STORM SEWER
- COM — FORMER COMBINATION SANITARY / STORM SEWER
- TELE — FORMER BURIED PHONE LINE
- FORMER FLOOR DRAIN
- FORMER CATCH BASIN
- FORMER BAYDOOR
- FORMER INGROUND HOIST
- FORMER PUMP ISLAND
- FORMER FILL PORT
- FORMER VENT PIPE
- SUB-SLAB SAMPLE

MTBE	METHYL TERT BUTYL ETHER
PCE	TETRACHLOROETHENE
VOCs	VOLATILE ORGANIC COMPOUNDS
PNAs	POLYNUCLEAR AROMATIC COMPOUNDS
PCBs	POLYCHLORINATED BIPHENYLS
MDL	METHOD DETECTION LIMIT
UNITs	µg/Kg (UNLESS NOTED)
NOTES:	REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

PM ENVIRONMENTAL | Environmental & Engineering Services

FIGURE 6

SITE ASSESSMENT SAMPLE LOCATION MAP SOIL WITH ANALYTICAL RESULTS (JULY 2015)

PROJ:

COMMERCIAL PROPERTY
2483 WEST MAPLE ROAD
BIRMINGHAM, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: MW/CS/KS	DATE: 8/4/2015
VERIFY SCALE 0 — 30' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: JR/NM/NL	SCALE: 1" = 30'
	FILE NAME: 01-5395-1-002506R00	

Tables

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS NOT EXCAVATED (2006-2015) - GASOLINE VOCS
FORMER CRANBROOK CAR CARE LOCATED AT 2483 WEST MAPLE ROAD IN BIRMINGHAM, MICHIGAN
PM PROJECT # 01-5395-1-002

GASOLINE VOLATILE ORGANIC COMPOUNDS (GVOCs) (µg/Kg)			Benzene	Toluene	Ethylbenzene	Xylenes	n-Propylbenzene	1,2,3-Trimethylbenzene[1]	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Methylnaphthalene	Other Gasoline VOCs
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	103651	526738	95636	108678	91576	Various
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**Gasoline VOCs**									
SB-5	1/13/2006	5.0-6.0	<50	<50	<50	<150	<100	<100	<100	<100	<250	ND
SB-5	1/13/2006	17.0-18.0	<50	<50	<50	<150	<100	<100	<100	<100	<250	ND
SB-6	1/13/2006	3.0-4.0	<50	<50	<50	<150	<100	<100	<100	<100	<250	ND
SB-7	04/07/2009	3.0-4.0	<60	<60	<60	<160	<60	<60	<60	<60	<100	ND
SB-7	04/07/2009	11.0-12.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-8	04/07/2009	4.0-5.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-8	04/07/2009	11.0-12.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-9	04/07/2009	5.0-6.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-9	04/07/2009	14.0-15.0	<60	<60	<60	<160	<60	<60	<60	<60	<100	ND
SB-10	04/07/2009	5.0-6.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-10	04/07/2009	14.0-15.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-11	04/08/2009	3.0-4.0	<90	<90	<90	<290	<90	<90	<90	<90	<200	ND
SB-11	04/08/2009	14.0-15.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-12	04/07/2009	4.0-5.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-12	04/07/2009	14.0-15.0	<80	<80	<80	<280	<80	<80	<80	<80	<200	ND
SB-15	04/08/2009	14.0-15.0	200	<70	<70	<170	110	<70	90	<70	200	ND
SB-16	04/07/2009	19.0-20.0	<80	<80	<80	<280	<80	<80	<80	<80	<200	ND
SB-27	07/07/2009	13.0-14.0	<70	130	140	720	80	210	400	<70	<100	ND
SB-28	07/07/2009	12.0-13.0	<70	<70	<70	<170	<70	<70	<70	<70	<100	ND
SB-29	07/07/2009	12.0-13.0	<60	<60	<60	<160	<60	<60	<60	<60	<100	ND
SB-30	07/07/2009	12.0-13.0	<60	<60	<60	<160	<60	<60	<60	<60	<100	ND
SB-31	07/25/2014	9.5-10.5	<70	<100	<70	<170	<100	<100	<100	<100	<470	ND
SB-35	07/25/2014	11.0-12.0	<70	<70	<70	<170	<70	<70	120	80	<100	ND
SS-1	7/30/2015	2.0-3.0	<50	<50	<50	<150	<50	<50	<50	<50	<250	ND
SS-2	7/30/2015	3.0-4.0	<50	<50	<50	<150	<50	<50	<50	<50	<250	ND
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)												
Drinking Water Protection (Res DWP)			100	16,000	1,500	5,600	91,000	1,800	2,100	1,800	57,000	Various
Groundwater Surface Water Interface Protection (GSIP)			4,000 {X}	5,400	360	820	3,200	570	570	1,100	4,200	Various
Soil Volatilization to Indoor Air Inhalation (Res SVII)			1,600	3.3E+05 {C}	87,000	6.3E+06 {C}	4.0E+05 {C}	2.6E+06 {C}	4.3E+06 {C}	2.6E+06 {C}	2.70E+06	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			13,000	2.80E+06	7.20E+05	4.60E+07	1.70E+06	1.60E+07	2.10E+07	1.60E+07	1.50E+06	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			34,000	5.10E+06	1.00E+06	6.10E+07	1.70E+06	3.80E+08	5.00E+08	3.80E+08	1.50E+06	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			79,000	1.20E+07	2.20E+06	1.30E+08	2.80E+06	3.80E+08	5.00E+08	3.80E+08	1.50E+06	Various
Ambient Air Particulate Soil Inhalation (Res PSI)			3.80E+08	2.70E+10	1.00E+10	2.90E+11	5.80E+09	8.20E+10	8.20E+10	8.20E+10	6.70E+08	Various
Direct Contact (Res DC)			1.80E+05	5.0E+07 {C}	2.2E+07 {C}	4.1E+08 {C}	2.5E+07 {C}	3.2E+07 {C}	3.2E+07 {C}	3.2E+07 {C}	8.10E+06	Various
Nonresidential (µg/Kg)												
Drinking Water Protection (Nonres DWP)			100	16,000	1,500	5,600	2.60E+05	1,800	2,100	1,800	1.70E+05	Various
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			8,400	6.1E+05 {C}	4.6E+05 {C}	1.2E+07 {C}	7.3E+05 {C}	4.8E+06 {C}	8.0E+06 {C}	4.8E+06 {C}	4.90E+06	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			45,000	3.30E+06	2.40E+06	5.40E+07	2.00E+06	1.90E+07	2.50E+07	1.90E+07	1.80E+06	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			99,000	3.60E+07	3.10E+06	6.50E+07	2.00E+06	4.60E+08	6.00E+08	4.60E+08	1.80E+06	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			2.30E+05	3.60E+07	6.50E+06	1.30E+08	3.00E+06	4.60E+08	6.00E+08	4.60E+08	1.80E+06	Various
Ambient Air Particulate Soil Inhalation (Nonres PSI)			4.70E+08	1.20E+10	1.30E+10	1.30E+11	2.60E+09	3.60E+10	3.60E+10	3.60E+10	2.90E+08	Various
Direct Contact (Nonres DC)			8.40E+05 {C}	1.6E+08 {C}	7.1E+07 {C}	1.0E+09 {C}	8.0E+07 {C}	1.0E+08 {C}	1.0E+08 {C}	1.0E+08 {C}	2.60E+07	Various
Screening Levels (µg/Kg)												
Soil Saturation Concentration Screening Levels (Csat)			4.00E+05	2.50E+05	1.40E+05	1.50E+05	1.00E+07	94,000	1.10E+05	94,000	NA	Various
Residential Vapor Intrusion Soil Screening Levels ($S_{VI\text{-}res}$)			50	10,000	200	290	140	3,200	2,200	1,700	7,500	Various
Nonresidential Vapor Intrusion Soil Screening Levels ($S_{VI\text{-}nr}$)			84.5	1.69E+05	4,000	4,900	2,400	53,000	37,000	28,000	1.26E+05	Various

Applicable Criterion/RBSL Exceeded
BOLD Value Exceeds Applicable Criterion/RBSL
bgs Below Ground Surface (feet)
ND Not detected at levels above the laboratory Method Detection Limit (MDL) or Minimum Quantitative Level (MQL)
NA Not Applicable
1 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (2014-2015) - GASOLINE VOCS
FORMER CRANBROOK CAR CARE LOCATED AT 2483 WEST MAPLE ROAD IN BIRMINGHAM, MICHIGAN
PM PROJECT #01-5395-1-002

GASOLINE VOLATILE ORGANIC COMPOUNDS (GVOCs) (µg/L)				Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Isopropyl benzene	n-Propylbenzene	1,2,3-Trimethylbenzene [5]	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene	Other Gasoline VOCs
Chemical Abstract Service Number (CAS#)				71432	108883	100414	1330207	1634044	98828	103651	526738	95636	108678	91203	Various
Sample ID	**Sample Date**	**Screen Depth (feet bgs)**	**Depth to Groundwater (feet bgs)**	**Gasoline VOCs**											
MW-X	7/28/2014	2.0-7.0	4.41	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
MW-Y	7/28/2014	4.0-9.0	4.80	15	<1	<1	<3	<5	<5	3	<1	<1	<1	<5	ND
MW-Z	7/25/2014	2.0-7.0	3.40	103	5	<5	20	<30	<30	32	<5	<5	<5	<30	ND
	7/10/2015		2.73	69	<10	<10	<30	<10	17	31	<10	<10	<10	<50	ND
MW-ZZ	7/25/2014	2.0-7.0	4.44	2	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
OW-2RR	07/25/2014	3.0-8.0	3.70	1,600	300	400	2,200	<500	<500	<100	200	400	200	<500	ND
OW-3RR	07/25/2014	4.0-9.0	3.50	2,910	210	220	1,180	<300	<300	<50	120	240	90	<300	ND
OW-4R	07/25/2014	5.0-10.0	4.42	620	20	<10	60	<50	<50	20	<10	<10	<10	<50	ND
	7/10/2015		3.72	800	20	<10	92	<10	<10	14	<10	<10	<10	<50	ND
OW-5R	07/25/2014	5.0-10.0	5.02	160	<20	50	530	200	<100	<20	80	100	70	<100	ND
	7/10/2015		4.22	210	16	59	750	190	<10	15	130	120	73	<50	ND
OW-7R	7/25/2014	5.0-10.0	3.47	270	<10	20	60	<50	<50	40	50	30	<10	<50	ND
	7/10/2015		3.15	69	<10	<10	<30	<10	<10	14	<10	<10	<10	<50	ND
OW-10	07/28/2014	3.0-8.0	3.10	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
OW-11	07/25/2014	6.5-11.5	8.70	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
OW-12	07/28/2014	5.0-10.0	4.72	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
	7/10/2015		4.28	<1	<1	<1	<3	9	<1	<1	<1	<1	<1	<5	ND
OW-13	07/28/2014	4.5-9.5	5.44	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
PMW-3	07/28/2014	2.0-7.0	3.21	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
PMW-4	07/25/2014	4.0-9.0	5.90	1	<1	<1	<3	46	<5	<1	<1	<1	<1	<5	ND
	7/10/2015		5.29	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<5	ND
PMW-5	07/25/2014	3.0-8.0	7.82	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
PMW-7	07/28/2014	3.0-8.0	5.50	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
PMW-8	07/28/2014	3.0-8.0	5.70	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
PMW-9	07/28/2014	3.0-8.0	4.83	<1	<1	<1	<3	<5	<5	<1	<1	<1	<1	<5	ND
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}	790 {E}	74 {E}	280 {E}	40 {E}	800	80	63 {E}	63 {E}	72 {E}	520	Various
Residential Health Based Drinking Water Values[1]				NL	1,000 {E}	700 {E}	10,000 {E}	240 {E}	NL	NL	NL	1,000 {E}	1,000 {E}	NL	Various
Nonresidential Drinking Water (Nonres DW)				5.0 {A}	790 {E}	74 {E}	280 {E}	40 {E}	2,300	230	63 {E}	63 {E}	72 {E}	1,500	Various
Nonresidential Health Based Drinking Water Values[1]				NL	1,000 {E}	700 {E}	10,000 {E}	690 {E}	NL	NL	NL	2,900 {E}	2,900 {E}	NL	Various
Groundwater Surface Water Interface (GSI)				200 {X}	270	18	41	7,100 {X}	ID	ID	17	17	45	11	Various
Residential Groundwater Volatilization to Indoor Air Inhalation (Res GVII) [2]				5,600	5.3E+5 {S}	1.10E+05	1.9E+5 {S}	4.7E+7 {S}	56,000 {S}	ID	56,000 {S}	56,000 {S}	61,000 {S}	31,000 {S}	Various
Nonresidential Groundwater Volatilization to Indoor Air Inhalation (Nonres GVII) [2]				35,000	5.3E+5 {S}	1.7E+5 {S}	1.9E+5 {S}	4.7E+7 {S}	56,000 {S}	ID	56,000 {S}	56,000 {S}	61,000 {S}	31,000 {S}	Various
Screening Levels (µg/L)															
Residential Groundwater Vapor Intrusion Screening Levels ($GW_{VI\text{-}res}$) [3]				27	36,000	700	10,000	2.50E+05	10	92	2,400	1,700	1,200	240	Various
Nonresidential Groundwater Vapor Intrusion Screening Levels ($GW_{VI\text{-}nr}$)[3]				140	1.50E+05	2,600	10,000	1.00E+06	53	390	10,000	7,300	5,100	1,200	Various
Residential Vapor Intrusion Shallow Groundwater Screening Levels ($GW_{VI\text{-}sump\text{-}res}$)[4]				5.0	1,000	700	10,000	250	5.0	1.0	5.0	1.7	1.2	5.0	Various
Nonresidential Vapor Intrusion Shallow Groundwater Screening Levels ($GW_{VI\text{-}sump\text{-}nr}$)[4]				5.0	1,000	700	10,000	1,000	5.0	1.0	10	7.3	5.1	5.0	Various
Water Solubility				1.75E+06	5.26E+05	1.69E+05	1.86E+05	4.68E+07	56,000	NA	NL	56,000	61,000	31,000	Various
Flammability and Explosivity Screening Level				68,000	61,000	43,000	70,000	ID	29,000	ID	NL	56,000 {S}	ID	NA	Various
DRAFT Acute Vapor Intrusion Screening Levels for Groundwater (µg/L)															
IRASL Groundwater (AGW_{vi})				11,000	2.59E+05	NL	1.54E+05	5.70E+05	NL	NL	NL	NL	NL	NL	Various
IRASL Groundwater In Contact With Structure ($AGW_{vi\text{-}sump}$)				11	260	NL	150	570	NL	NL	NL	NL	NL	NL	Various

	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)
ID	Insufficient Data
NA	Not Applicable
NL	Not Listed
[1]	Rule 323.1057 of Part 4 Water Quality Standards
[2]	Tier 1 GVII Criteria based on 3 meter (or greater) groundwater depth
[3]	(2013 Vapor Intrusion Guidance) Screening Levels based on depth to groundwater less than 1.5 meters and not in contact with building foundation
[4]	(2013 Vapor Intrusion Guidance) Screening levels based on groundwater in contact with the building foundation or within a sump
[5]	1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.

TABLE 3
SUMMARY OF VERIFICATION OF SOIL REMEDIATION ANALYTICAL RESULTS (JULY 2015) - GASOLINE VOCS
FORMER CRANBROOK CAR CARE LOCATED AT 2483 WEST MAPLE ROAD IN BIRMINGHAM, MICHIGAN
PM PROJECT # 01-5395-1-002

Gasoline Volatile Organic Compounds (VOCs) (µg/Kg)			Benzene	Toluene	Ethylbenzene	Xylenes	Methyl-tert-butyl ether (MTBE)	Isopropyl benzene	n-Propylbenzene	1,2,3-Trimethylbenzene[1]	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene	2-Methylnaphthalene	Other Gasoline VOCs
Chemical Abstract Service Number (CAS#)			71432	108883	100414	1330207	1634044	98828	103651	526738	95636	108678	91203	91576	Various
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**Gasoline VOCs**												
S-1	7/14/2015	6.5-7.5	1,700	190	1,900	3,900	<50	920	2,800	1,300	1,700	530	2,500	<250	ND
S-2	7/14/2015	4.0-5.0	<50	<50	100	150	<50	180	1,100	1,800	13,000	200	1,300	2,200	ND
S-3	7/14/2015	3.0-4.0	93	<50	310	<150	<50	470	2,400	<50	50	<50	680	280	ND
S-4	7/14/2015	6.0-7.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-5	7/14/2015	11.0-12.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-6	7/14/2015	5.0-6.0	560	<50	560	470	<50	470	2,000	1,200	160	290	1,100	880	ND
S-7	7/14/2015	3.0-4.0	56	<50	5,000	22,000	<50	410	1,100	2,800	8,300	1,800	1,700	<250	ND
A-2 (S-7 Co-located)			<50	<50	2,000	11,000	<50	240	750	1,900	5,900	1,300	1,100	<250	ND
S-8	7/14/2015	3.0-4.0	<50	<50	550	<150	<50	550	3,300	<50	79	<50	720	1,600	ND
S-9	7/17/2015	5.0-6.0	70	<50	2,000	750	<50	920	5,000	6,600	11,000	6,100	2,800	1,800	ND
S-10	7/17/2015	3.5-4.5'	140	<50	150	97	<50	710	3,700	<50	110	55	1,600	2,200	ND
S-11	7/17/2015	3.0-4.0	180	<50	690	<150	<50	1,100	5,500	240	87	<50	3,400	2,400	ND
S-12	7/17/2015	6.0-7.0	4,500	<1000	23,000	33,000	<1000	1,200	2,200	4,100	8,600	1,300	<5000	6,400	ND
S-13	7/17/2015	5.0-6.0	1,100	160	1,000	1,400	<50	2,400	10,000	3,700	850	2,200	9,200	4,500	ND
S-14	7/20/2015	11.0-12.0	1,100	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-15	7/20/2015	11.0-12.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-16	7/20/2015	2.0-4.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
A-5 (S-16 Co-located)			<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-17	7/20/2015	7.0-8.0	98	<50	<50	<150	180	<50	<50	<50	100	<50	<250	<250	ND
S-18	7/20/2015	3.0-4.0	720	<250	12,000	18,000	<250	1,600	6,300	17,000	53,000	8,800	5,300	6,300	ND
S-19	7/20/2015	3.0-4.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-20	7/20/2015	4.0-5.0	180	<50	320	1,200	<50	<50	<50	69	130	<50	<250	410	ND
S-21	7/20/2015	2.0-4.0	370	62	3,300	230	<50	1,100	5,400	460	180	200	2,900	1,100	ND
S-22	7/20/2015	3.0-4.0	690	<50	980	510	150	520	2,200	550	1,200	240	1,500	1,300	ND
S-23	7/20/2015	2.0-4.0	520	590	48,000	99,000	<500	5,900	23,000	37,000	120,000	38,000	10,000	11,000	ND
S-24	7/22/2015	7.0-8.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-25	7/22/2015	3.0-4.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-26	7/22/2015	3.0-4.0	<50	<50	<50	<150	<50	<50	81	<50	<50	<50	<250	<250	ND
S-27	7/30/2015	4.0-5.0	<1000	<1000	<1000	<3000	<1000	3,000	5,900	<1000	<1000	<1000	<5000	190,000	ND
S-28	7/30/2015	2.0-4.0	59	<50	140	<150	<50	820	4,200	95	<50	<50	<250	3,300	ND
S-29	7/30/2015	5.0-6.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-30	7/30/2015	5.0-6.0	650	<50	<50	<150	790	<50	<50	<50	<50	<50	<250	<250	ND
S-31	7/30/2015	5.0-6.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-32	7/30/2015	4.0-5.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
S-33	7/30/2015	2.0-4.0	<50	<50	<50	<150	<50	<50	<50	<50	<50	<50	<250	<250	ND
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)															
Drinking Water Protection (Res DWP)			100	16,000	1,500	5,600	800	1,600	91,000	1,800	2,100	1,800	35,000	57,000	Various
Groundwater Surface Water Interface Protection (GSIP)			4,000 {X}	5,400	360	820	1.40E+05 {X}	ID	3,200	570	570	1,100	730	4,200	Various
Soil Volatilization to Indoor Air Inhalation (Res SVII)			1,600	3.3E+05 {C}	87,000	6.3E+06 {C}	9.9E+06 {C}	ID	4.0E+05 {C}	2.6E+06 {C}	4.3E+06 {C}	2.6E+06 {C}	2.50E+05	2.70E+06	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			13,000	2.80E+06	7.20E+05	4.60E+07	2.50E+07	ID	1.70E+06	1.60E+07	2.10E+07	1.60E+07	3.00E+05	1.50E+06	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			34,000	5.10E+06	1.00E+06	6.10E+07	3.90E+07	ID	1.70E+06	3.80E+08	5.00E+08	3.80E+08	3.00E+05	1.50E+06	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			79,000	1.20E+07	2.20E+06	1.30E+08	8.70E+07	ID	2.80E+06	3.80E+08	5.00E+08	3.80E+08	3.00E+05	1.50E+06	Various
Ambient Air Particulate Soil Inhalation (Res PSI)			3.80E+08	2.70E+10	1.00E+10	2.90E+11	2.00E+11	1.30E+09	5.80E+09	8.20E+10	8.20E+10	8.20E+10	2.00E+08	6.70E+08	Various
Direct Contact (Res DC)			1.80E+05	5.0E+07 {C}	2.2E+07 {C}	4.1E+08 {C}	1.50E+06	2.50E+06	2.5E+07 {C}	3.2E+07 {C}	3.2E+07 {C}	3.2E+07 {C}	1.60E+07	8.10E+06	Various
Nonresidential (µg/Kg)															
Drinking Water Protection (Nonres DWP)			100	16,000	1,500	5,600	800	4,600	2.60E+05	1,800	2,100	1,800	1.00E+05	1.70E+05	Various
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			8,400	6.1E+05 {C}	4.6E+05 {C}	1.2E+07 {C}	1.8E+07 {C}	ID	7.3E+05 {C}	4.8E+06 {C}	8.0E+06 {C}	4.8E+06 {C}	4.70E+05	4.90E+06	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			45,000	3.30E+06	2.40E+06	5.40E+07	3.00E+07	ID	2.00E+06	1.90E+07	2.50E+07	1.90E+07	3.50E+05	1.80E+06	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			99,000	3.60E+07	3.10E+06	6.50E+07	4.10E+07	ID	2.00E+06	4.60E+08	6.00E+08	4.60E+08	3.50E+05	1.80E+06	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			2.30E+05	3.60E+07	6.50E+06	1.30E+08	8.90E+07	ID	3.00E+06	4.60E+08	6.00E+08	4.60E+08	3.50E+05	1.80E+06	Various
Ambient Air Particulate Soil Inhalation (Nonres PSI)			4.70E+08	1.20E+10	1.30E+10	1.30E+11	8.80E+10	5.90E+08	2.60E+09	3.60E+10	3.60E+10	3.60E+10	8.80E+07	2.90E+08	Various
Direct Contact (Nonres DC)			8.40E+05 {C}	1.6E+08 {C}	7.1E+07 {C}	1.0E+09 {C}	7.1E+06 {C}	8.00E+06	8.0E+07 {C}	1.0E+08 {C}	1.0E+08 {C}	1.0E+08 {C}	5.20E+07	2.60E+07	Various
Screening Levels (µg/Kg)															
Soil Saturation Concentration Screening Levels (Csat)			4.00E+05	2.50E+05	1.40E+05	1.50E+05	5.90E+06	3.90E+05	1.00E+07	94,000	1.10E+05	94,000	NA	NA	Various
Residential Vapor Intrusion Soil Screening Levels ($S_{VI\text{-}res}$)			50	10,000	200	290	14,000	250	140	3,200	2,200	1,700	440	7,500	Various
Nonresidential Vapor Intrusion Soil Screening Levels ($S_{VI\text{-}nr}$)			84.5	1.69E+05	4,000	4,900	2.38E+05	300	2,400	53,000	37,000	28,000	8,900	1.26E+05	Various

Applicable Criterion/RBSL Exceeded
BOLD Value Exceeds Applicable Criterion/RBSL
bgs Below Ground Surface (feet)
ND Non-detected at levels above laboratory method detection limit (MDL)
NA Not Applicable
ID Insufficient Data
1 1,2,3-Trimethylbenzene RBSLs based on the more restrictive of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.
Soil Sample Excavated

TABLE 4
SUMMARY OF SITE ASSESSMENT SOIL ANALYTICAL RESULTS (JULY 2015) - VOCS, PNAS, PCBS, AND METALS
FORMER CRANBROOK CAR CARE LOCATED AT 2483 WEST MAPLE ROAD IN BIRMINGHAM, MICHIGAN
PM PROJECT # 01-5395-1-002

VOLATILE ORGANIC COMPOUNDS (VOCs), POLYNUCLEAR AROMATIC HYDROCARBONS (PNAs) POLYCHLORINATED BIPHENYLS (PCBs), AND METALS (µg/Kg)			Methyl-tert-butyl ether (MTBE)	Tetrachloroethene	Other VOCs	PNAs	PCBs	Cadmium	Chromium*	Lead
Chemical Abstract Service Number (CAS#)			1634044	127184	Various	Various	1336363	7440439	16065831	7439921
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**VOCs**			**PNAs**	**PCBs**	**Metals**		
SS-1	7/17/2015	6.0-7.0	<50	<50	ND	ND	ND	330	5,500	5,300
SS-2	7/17/2015	6.0-7.0	<50	<50	ND	ND	ND	240	6,700	3,700
SS-3	7/17/2015	6.0-7.0	<50	160	ND	ND	ND	350	5,900	5,500
SS-4	7/17/2015	6.0-7.0	<50	<50	ND	ND	ND	140	7,900	4,600
SS-5	7/20/2015	8.0-9.0	2,100	<50	ND	ND	ND	430	25,000	15,000
SS-6	7/23/2015	8.0	<50	<50	ND	ND	ND	280	27,000	13,000
SS-11	7/24/2015	5.0-6.0	<50	<50	ND	ND	ND	180	25,000	11,000
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	1,200	18,000	21,000
Drinking Water Protection (Res DWP)			800	100	Various	Various	NLL	6,000	1.0E+09	7.00E+05
Groundwater Surface Water Interface Protection (GSIP)			1.40E+05 {X}	1,200 {X}	Various	Various	NLL	7.7E+3{G,X}	6.9E+9	8.3E+6{G,X}
Soil Volatilization to Indoor Air Inhalation (Res SVII)			9.9E+06 {C}	11,000	Various	Various	3.0E+06	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			2.50E+07	1.70E+05	Various	Various	2.40E+05	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness			3.90E+07	4.80E+05	Various	Various	7.9E+06	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness			8.70E+07	1.1E+06	Various	Various	7.9E+06	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Res PSI)			2.00E+11	2.7E+09	Various	Various	5.2E+06	1.70E+06	2.60E+05	NA
Direct Contact (Res DC)			1.50E+06	2.0E+05 {C}	Various	Various	{T}	5.50E+05	2.50E+06	4.00E+05
Nonresidential (µg/Kg)										
Drinking Water Protection (Nonres DWP)			800	100	Various	Various	NLL	6,000	1.0E+09	7.00E+05
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			1.8E+07 {C}	21,000	Various	Various	1.6E+07	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			3.00E+07	2.10E+05	Various	Various	8.10E+05	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness			4.10E+07	4.90E+05	Various	Various	2.8E+07	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness			8.90E+07	1.1E+06	Various	Various	2.8E+07	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Nonres PSI)			8.80E+10	1.2E+09	Various	Various	6.5E+06	2.2E+06	1.50E+08	NA
Direct Contact (Nonres DC)			7.1E+06 {C}	9.3E+05 {C}	Various	Various	{T}	2.1E+06	1.0E+09	9.00E+05 (DD)
Screening Levels (µg/Kg)										
Soil Saturation Concentration Screening Levels (Csat)			5.90E+06	88,000	Various	Various	NA	NA	NA	NA
Residential Vapor Intrusion Soil Screening Levels ($S_{VI\text{-}res}$)			14,000	52	Various	Various	1,900	NL	NL	NL
Nonresidential Vapor Intrusion Soil Screening Levels ($S_{VI\text{-}nr}$)			2.38E+05	1,000	Various	Various	39,000	NL	NL	NL

	Applicable Criterion/RBSL Exceeded
BOLD	Value Exceeds Applicable Criterion/RBSL
bgs	Below Ground Surface (feet)
ND	Non-detected at levels above laboratory method detection limit (MDL)
NA	Not Applicable
NL	Not Listed
NLL	Not Likely to Leach
NLV	Not Likely to Volatilize
*	Total chromium concentrations compared to chromium III generic cleanup criteria
NOTE:	Soil samples SS-7 through SS-10 were not submitted for laboratory analysis and were excavated.
{G}	Metal GSIP Criteria for Surface Water Not Protected for Drinking Water Use based on 418 mg/L CaCO3 Hardness: Station ID 630003, Rouge River at Wattles Road, City of Troy, MI

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August 11, 2015

City of Birmingham, BRA
151 Martin Street
Birmingham, MI 48

RE: Brownfield Plan Review for Cranbrook Car Care – 2483 W. Maple Road

Ms. Ecker,

This letter is to document activities that have taken place since the adjournment of the most recent Birmingham Brownfield Redevelopment Authority (BRA) meeting, which took place on July 13, 2015.

On July 23rd, 2015, PM Environmental, Inc. (PM), made contact with Douglas Reinhart, Senior Legal Counsel, for BP, who indicated they are not the responsible party for pursing LUST Closure costs, pursuant to the Purchase and Sale Agreement between BP and Armada.

Since that time, Sam Karana, the applicant, and PM have been in discussions with Mr. George Curran, with Kotz Sangster Wysocki P.C., regarding the viability of pursuing BP. Mr. Curran has indicated that based on the statute of limitations, Sam would be unlikely to recoup any funds from BP. Mr. Curran plans on attending the August 13th meeting to further discuss with the Brownfield Redevelopment Authority Board and have written documentation outlining his findings.

In addition to Mr. Karana's unlikelihood of recuperating costs for the 1992 Release, the costs being sought in the presented Brownfield Plan are considered independent of costs related to LUST Closure as broken out in the tables below.

The estimated cost to obtain closure for the open LUST recorded under Amoco/BP and the associated expenses are listed below:

LUST Closure Activities	**Estimated Cost**
Four Quarters of Groundwater Monitoring	$ 20,000
Four Quarters of Soil Gas Sampling	$ 20,000
Additional Characterization of residual LNAPL	$ 10,000
Completion of a Closure Report	$ 10,000
Total	**$ 60,000**

The environmental-related estimated costs associated with redevelopment being sought for reimbursement in the proposed Brownfield Plan:

Activity	**Estimated Cost**
Disposal of Groundwater During Excavation Activities (3,800 gallons at $0.325/gallon)	$ 1,235
Transportation and disposal of contaminated soil (4,108 tons at $23/yard)	$ 94,501

Oversight and VSR Sampling for Gas VOCs and Gasoline Range Organics (GRO)	$	25,840
Reporting	$	5,000
Installation of a Vapor Barrier	$	50,000
Pre-Demolition Asbestos Survey	$	1,200
Asbestos Abatement and Oversight Activities	$	3,850
Total	**$**	**189,226**

In order, to fully separate expense reimbursement for redevelopment from LUST Closure activities, a request is no longer being made for the reimbursement of the costs related to groundwater sampling or additional delineation.

Based on the request for reimbursement of costs directly relation to redevelopment plans, it is our opinion that a conflict does not exist in the use of TIF reimbursement to the developer since the proposed costs are shown above to be unrelated to LUST Closure. Furthermore, it is in more certainty than previously presented, that seeking reimbursement from BP/Amoco is not feasible for the remaining costs the owner is incurring to remediate the property.

Please feel free to contact us with any questions you may have.

Sincerely,

Elizabeth Masserang
Brownfield and Economic Incentive Consultant
PM Environmental, Inc.
4080 W. Eleven Mile Road
Berkley, MI 48072
Telephone: (248) 414-1441

Cc: Sam Karana
2483 West Maple Road
Birmingham, MI 48009

Attachments:

Attachment 1: BP Legal Correspondence
Attachment 2: Table 1, documenting previously requested costs reimbursement