City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

City Commission Meeting
September 12, 2017
Agenda

Honorable Mayor, City Commissioners and Residents: This shall serve as your official notification of the Public Hearing and Regular City Commission Meeting to be held Tuesday, September 12, 2017, at 7:30 p.m., in the City Commission Chambers, 23925 Woodward Avenue, Pleasant Ridge, Michigan 48069. The following items are on the Agenda for your consideration:

PUBLIC HEARING AND REGULAR CITY COMMISSION MEETING – 7:30 P.M.

1. **Meeting Called to Order.**

2. **Pledge of Allegiance.**

3. **Roll Call.**

4. **2017 City of Pleasant Ridge Beautification Awards.**

5. **PUBLIC DISCUSSION – items not on the Agenda.**

6. **Governmental Reports.**

7. **City Commission Liaison Reports.**
   - **Commissioner Foreman – Ferndale Public Schools.**
   - **Commissioner Perry – Planning/DDA, Committee Liaison.**
   - **Commissioner Scott – Historical Commission.**
   - **Commissioner Krzysiak – Recreation Commission.**

8. **Consideration of the following Consent Agenda.**
   All items listed on the Consent Agenda are considered to be routine by the City Commission, will be enacted by one motion and approved by a roll call vote. There will be no separate discussion of these items unless a City Commissioner or visitor so requests, in which event, the item will be removed from the consent agenda and considered as the last item of business.
   a. Minutes of the Public Hearing and Regular City Commission Meeting held Tuesday, August 8, 2017.
   b. Monthly Disbursement Report.
   c. 2018 MDOT Annual Permit for Work on State Trunkline Right of Way.
   d. Resolution regarding MI-MAUI membership.
   e. Resolution regarding SEMREO Aggregate Solar Purchasing Initiative participation.
   f. Iron Ridge Brownfield Plan Amendment.

9. **Ordinance regarding DAS/Small Cell/Wireless Facilities in Public Right of Way.**
   a. **PUBLIC HEARING** – Solicitation of public comments on Ordinance to amend

Chapter 62, Streets, Sidewalks and Other Public Places, by the additional of a new Section, Section 62-29 - DAS/Small Cell/Wireless facilities in the public rights-of-way.

b. Ordinance 425 to amend Chapter 62, Streets, Sidewalks and Other Public Places, by the additional of a new Section, Section 62-29 - DAS/Small Cell/Wireless facilities in the public rights-of-way.

10. Community Energy Management Plan Adoption.

11. Police Pension Millage Update.

12. City Manager's Report.

13. Other Business.

14. Adjournment.

In the spirit of compliance with the Americans with Disabilities Act, individuals with a disability should feel free to contact the City at least seventy-two (72) hours in advance of the meeting, if requesting accommodations.

City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

City Commission Meeting
August 8, 2017

Having been duly publicized, Mayor Metzger called the meeting to order at 7:32pm.

Present:	Commissioners Foreman, Krzysiak, Perry, Scott, Mayor Metzger
Also Present:	City Manager Breuckman, City Attorney Need, City Clerk Drealan
Absent:	None

SEMREO Update

Rick Bunch, Executive Director, Southeast Michigan Regional Energy Office, gave an update regarding SEMREO and their initiatives.

Public Discussion

Mr. Alex Lenko, 61 Wellesley, discussed an upcoming petition drive he is involved with. He is looking for additional volunteers.

Ms. Amanda Wahl, 3 Oxford, gave an update regarding the Pleasant Ridge Foundation.

Mr. Sean Campbell, 58 Sylvan, support for the development project at 23675 Woodward Avenue, announced his candidacy for City Commission.

Amanda Wahl, announced her candidacy for City Commission.

Alex Lenko, announced his candidacy for City Commission.

Bret Scott, announced his candidacy for City Commission.

Governmental Reports

Scott Pietrzak, Assistant City Manager, have an update regarding wildlife at the pool, the procedure for closing the pool due to weather, Community Center renovations and upgrades, new recycle bin delivery and use, and change in the weekly refuse collection day from Friday to Monday.

City Commission Liaison Report

Commissioner Krzysiak gave an update regarding events related to the Pleasant Ridge Recreation Commission.
Commissioner Scott gave an update regarding the Pleasant Ridge Historical Commission.
Commissioner Foreman gave an update regarding the Ferndale Public School District.
Commissioner Perry gave an update regarding the Pleasant Ridge Planning Commission and Downtown Development Authority.

Consent Agenda
Removal of item 8d.

17-3320

Motion by Commissioner Foreman, second by Commissioner Scott, that item 8d regarding scheduling a public hearing on Tuesday, September 12, 2017, at 7:30 p.m., to solicit public comments on an ordinance regarding DAS/Small Cell/Wireless Facilities in Public Rights-of-Way be removed and the remainder of the Consent Agenda be approved, as presented.

Adopted: Yeas: Commissioners Foreman, Scott, Krzysiak, Perry, Mayor Metzger.
Nays: None.

Ordinance 423 – Utility Extension
City Manager Breuckman gave an overview of the proposed ordinance. There have been no comments received on this item prior to the meeting.

Mayor Metzger opened the public hearing at 8:59pm. With no comments or discussion, Mayor Metzger closed the public hearing at 9:00pm.

17-3321

Motion by Commissioner Perry. Second by Commissioner Foreman that ordinance 423 amending Chapter 74, Utilities, Article II, Water, by the addition of a new division; Division 5 – Water System Extensions and Chapter 74, Utilities, Article III, Sewers, by the addition of a new division; Division 5 – Sewer System Extensions be adopted.

Adopted: Yeas: Commissioners Perry, Foreman, Scott, Krzysiak, Mayor Metzger.
Nays: None.

Ordinance 424 – Front Yard Fences on Ridge Road
City Manager Breuckman gave an overview of the proposed ordinance. There have been no comments received on this item prior to the meeting.

Mayor Metzger opened the public hearing at 9:03pm. With no comments or discussion, Mayor Metzger closed the public hearing at 9:04pm

17-3322

Motion by Commissioner Foreman, second by Commissioner Scott that Ordinance 424 amending Chapter 14 Building and Building Regulations, Article V, Fences, Section 117, Front Yard Fences be adopted.

Adopted: Yeas: Commissioners Foreman, Scott, Krzysiak, Perry, Mayor Metzger.
Nays: None.

Scheduling a public hearing on September 12, 2017 at 7:30pm

17-3323

Motion by Commissioner Perry, second by Commissioner Scott, that a public hearing be scheduled on Tuesday, September 12, 2017, at 7:30 p.m., to solicit public comments on an ordinance regarding DAS/Small Cell/Wireless Facilities in Public Rights-of-Way.

Adopted: Yeas: Commissioners Perry, Scott, Foreman, Krzysiak, Mayor Metzger.
Nays: None.

City Manager's Report
Solar Project at Community Center.
Energy Survey.
MML Event – Save MI City.

Other Business
Commissioner Foreman announced Beautification awards will be presented at the September 12, 2017 City Commission meeting.
Commissioner Krzysiak announced the next Book Club meetings on August 9, 2017 in Hessel Park and September 13, 2017, location to be announced and commented regarding an advocacy group Equality Michigan and Human Rights Act examination by the Michigan Civil Rights Commission. Comment period to the MCRC is from now to August 15, 2017.
Trivia Night at Community Center Thursday, August 10, 2017 at 6:30pm.

With no further business or discussion, Mayor Metzger adjourned the meeting at 9:43pm.

_____
Mayor Kurt Metzger

_____
Amy M. Drealan, City Clerk

August 2017

ACCOUNTS PAYABLE

PAYROLL LIABILITIES	$	9,818.70
TAX LIABILITIES	$	4,148,720.69
ACCOUNTS PAYABLE	$	497,751.47
TOTAL	$	4,656,290.86

PAYROLL

August 2, 2017	$	49,645.80
August 16, 2017	$	43,890.42
August 30, 2017	$	44,839.08
TOTAL	$	138,375.30

CHECK REGISTER FOR CITY OF PLEASANT RIDGE
PAYROLL LIABILITIES
AUGUST 2017

Check Date	Check	Vendor Name	Description	Amount
8/2/2017	1959	ALERUS FINANCIAL	RETIRMENT CONTRIBUTIONS	$ 1,261.96
8/2/2017	1960	MIFOP	UNON DUES	$ 141.00
8/2/2017	1961	MISDU	FOC DEDUCTIONS	$ 224.60
8/2/2017	1962	ALERUS FINANCIAL	RHSP CONTRIBUTIONS	$ 242.51
8/2/2017	1963	ICMA RETIREMENT TRUST - 401a	RETIRMENT CONTRIBUTIONS	$ 1,305.16
8/2/2017	1964	ICMA RETIREMENT TRUST - 457	RETIRMENT CONTRIBUTIONS	$ 197.10
8/16/2017	1969	ALERUS FINANCIAL	RETIRMENT CONTRIBUTIONS	$ 1,290.33
8/16/2017	1970	MISDU	FOC DEDUCTIONS	$ 224.60
8/16/2017	1971	ALERUS FINANCIAL	RHSP CONTRIBUTIONS	$ 242.51
8/16/2017	1972	ICMA RETIREMENT TRUST - 401a	RETIRMENT CONTRIBUTIONS	$ 1,190.16
8/30/2017	1978	ALERUS FINANCIAL	RETIRMENT CONTRIBUTIONS	$ 1,828.81
8/30/2017	1979	MISDU	FOC DEDUCTIONS	$ 224.60
8/30/2017	1980	ALERUS FINANCIAL	HCSP CONTRIBUTIONS	$ 255.20
8/30/2017	1981	ICMA RETIREMENT TRUST - 401a	RETIRMENT CONTRIBUTIONS	$ 1,190.16
			TOTAL PAYROLL LIABILITIES	$ 9,818.70

CITY OF PLEASANT RIDGE CHECK REGISTER
ACCOUNTS PAYABLE
August 8, 2017

Check Date	Check	Vendor Name	Description	Amount
8/8/2017	21394	A&F WATER HEATER & SPA	COMMUNITY CENTER REPAIRS	$ 1,900.00
8/8/2017	21395	ADKISON, NEED & ALLEN P.L.L.C.	CITY ATTORNEY SERVICES	$ 1,903.75
8/8/2017	21396	ALL GRAPHICS CORP	YOGA CAMP SHIRTS/SWIM TEAM SHIRTS	$ 1,226.00
8/8/2017	21397	CITY OF BERKLEY	JUNE 2017 PRISONER BOARD	$ 45.00
8/8/2017	21398	CITY OF PLEASANT RIDGE-GENERAL	CITY UTILITY SERVICES	$ 10,492.97
8/8/2017	21399	COMMUNITY MEDIA NETWORK	CITY COMMISSION RECORDING	$ 200.00
8/8/2017	21400	DAVID CEH	SPRINKLER REPAIRS	$ 235.00
8/8/2017	21401	DEBORAH GREEN	COMMISSION MEETING MINUTES	$ 50.00
8/8/2017	21402	DETROIT EDISON COMPANY	COMMUNITY STREET LIGHTING	$ 2,985.17
8/8/2017	21403	EGT GROUP, INC	PRINTING OF THE RIDGER	$ 1,899.24
8/8/2017	21404	EUGENE LUMBERG	CITY ATTORNEY SERVICES	$ 468.75
8/8/2017	21405	FLAME FURNACE	COMMUNITY CENTER REPAIRS	$ 757.00
8/8/2017	21406	GREAT AMERICA	TELEPHONE SERVICES	$ 433.00
8/8/2017	21407	GREAT LAKES WATER AUTHORITY	IWC CHARGES FOR JUNE 2017	$ 429.48
8/8/2017	21408	GREG WILLIAMSON	SPRINKLER REPAIRS	$ 414.00
8/8/2017	21409	HAZEL PARK RECREATION	2017 BASEBALL UMPIRE FEES	$ 345.00
8/8/2017	21410	HUNT SIGN COMPANY, LTD	NO PARKING SIGNS AND MATERIALS	$ 584.00
8/8/2017	21411	JANI-KING OF MICHIGAN, INC	JANITORIAL CLEANING SERVICES	$ 2,161.00
8/8/2017	21412	KIRK AND KAREN HALSTEAD	SPRINKLER REPAIRS	$ 355.00
8/8/2017	21413	MELANIE SEVALD	CSF CLASS	$ 168.00
8/8/2017	21414	MICHAEK KOLEZAR	UNIFORM ALLOWANCE REIMBURSEMENT	$ 143.82
8/8/2017	21415	MIKE GRIFFIN	SPRINKLER REPAIRS	$ 129.31
8/8/2017	21416	O'REILY AUTO PARTS	DPW SUPPLIES	$ 6.68
8/8/2017	21417	O.P. AQUATICS	POOL CHEMICALS AND SUPPLIES	$ 305.50
8/8/2017	21418	OAKLAND COUNTY TREASURER	INTEREST ON BONDS FOR GWKD	$ 56,045.21
8/8/2017	21419	PATRICK BLASIO	SPRINKLER REPAIRS	$ 235.00
8/8/2017	21420	PLANTE MORAN GROUP BENEFIT ADVISORS	BENEFITS CONSULTING SERVICES 2ND QUARTER	$ 1,000.00
8/8/2017	21421	RAY KEE	BUILDING INSPECTOR SRVS - JULY 2017	$ 1,350.00
8/8/2017	21422	RICHARD M DOYLE	EVA BRIGGS AWARD PHOTOS	$ 250.00
8/8/2017	21423	ROCKET ENTERPRISE, INC	ANNUAL FLAG SERVICE	$ 275.00
8/8/2017	21424	SOCRRA	REFUSE COLLECTION CONTRACT	$ 9,147.46
8/8/2017	21425	SOCWA	WATER PURCHASES JULY 2017	$ 26,202.82
8/8/2017	21426	TEEK ELECTRIC	ELECTRICAL WORK FOR DOG PARK	$ 2,400.00
8/8/2017	21427	THE DAVEY TREE EXPERT COMPANY	CITY TREE SERVICES	$ 1,880.00
8/8/2017	21428	UNIFIRST CORPORATION	MAT RENTAL & JANITORIAL SUPPLIES	$ 263.49
8/8/2017	21429	VICTORIA DICKINSON	SIT AND GET FIT JULY CLASS	$ 524.00
8/8/2017	21430	VINCE RIZZO	SWIM TEAM DINNER	$ 1,162.00
8/8/2017	21431	WEB MATTERS BY KRISTIE	MONTHLY WEBSITE HOSTING	$ 24.95
			Total for 8-8-2017	$ 128,397.60

CITY OF PLEASANT RIDGE CHECK REGISTER
ACCOUNTS PAYABLE
AUGUST 23, 2017

Check Date	Check	Vendor Name	Description	Amount
8/23/2017	21432	AMY DREALAN	457 REIMBURSEMENT	$ 248.29
8/23/2017	21433	ANDERSON, ECKSTEIN & WESTRICK	ENGINEERING SERVICES	$ 11,146.70
8/23/2017	21434	ASTI ENVIROMENTAL SERVICES	ENVIROMENTAL SERVICES	$ 1,060.86
8/23/2017	21435	BADGER METER, INC.	MOBILE HOSTING SERVICES	$ 165.57
8/23/2017	21436	BCBSM	HEALTH CARE BENEFITS	$ 23,721.04
8/23/2017	21437	BRILAR	DPW CONTRACT SERVICES	$ 34,691.34
8/23/2017	21438	CITY OF FERNDALE	FIRE CONTRACT PAYMENT - SEPTEMBER	$ 21,381.72
8/23/2017	21439	DEBORAH GREEN	PREPARATION OF MEETING MINUTES	$ 112.50
8/23/2017	21440	FERNDALE PIZZA CO., INC.	RECREATION SUPPLIES	$ 228.53
8/23/2017	21441	GT DISTRIBUTORS INC	POLICE DEPARTMENT SUPPLIES	$ 62.50
8/23/2017	21442	LEGAL SHIELD	PREPAID LEGAL SERVICES	$ 25.90
8/23/2017	21443	MACOMB COMMUNITY COLLEGE	POLICE TRAINING CLASSES	$ 300.00
8/23/2017	21444	MI MUNICIPAL RISK MANAGEMENT	INSURANCE BONDS	$ 70,437.00
8/23/2017	21445	MYRON GRANT	SIDEWALK REIMBURSEMENT	$ 150.00
8/23/2017	21446	NEW YORK BAGEL	SWIM TEAM SUPPLIES	$ 110.85
8/23/2017	21447	NORTHWESTERN UNIVERSITY	TRAINING - R RIED	$ 4,100.00
8/23/2017	21448	O.P. AQUATICS	POOL CHEMICALS AND SUPPLIES	$ 370.25
8/23/2017	21449	OAKLAND SCHOOLS	WATER BILL 7 TAX BILL PRINTING	$ 798.95
8/23/2017	21450	PLANTE & MORAN PLLC	ACCOUNTING SERVICES	$ 5,403.00
8/23/2017	21451	PRIORITY ONE EMERGENCY	POLICE DEPARTMENT SUPPLIES	$ 162.00
8/23/2017	21452	ROYAL LAWN SPRINKLER SERVICE	SPRINKLER REPAIRS	$ 505.00
8/23/2017	21453	SCHEER'S ACE HARDWARE	DPW SUPPLIES	$ 145.41
8/23/2017	21454	SOCRRA	REFUSE COLLECTION CONTRACT	$ 7,754.00
8/23/2017	21455	THE BANK OF NEW YORK	INTEREST ON POOL BONDS	$ 35,762.50
8/23/2017	21456	UNIFIRST CORPORATION	MAT RENTALS & JANITORIAL SUPPLIES	$ 796.54
8/23/2017	21457	UNUM LIFE INSURANCE COMPANY	HEALTH CARE BENEFITS	$ 156.00
8/23/2017	21458	VERIZON	WIRELESS SERVICES	$ 105.16
8/23/2017	21459	XFER COMMUNICATIONS	ONSITE TECHNICIAN REPAIRS	$ 1,283.00
8/23/2017	21460	AMY DREALAN	PERFORMANCE INSTALLMENT	$ 600.00
8/23/2017	21461	DARREN HUMPHREYS	PERFORMANCE INSTALLMENT	$ 600.00
8/23/2017	21462	JAMES BREUCKMAN	PERFORMANCE INSTALLMENT	$ 600.00
8/23/2017	21463	KEVIN NOWAK	PERFORMANCE INSTALLMENT	$ 600.00
8/23/2017	21464	ROBERT RIED	PERFORMANCE INSTALLMENT	$ 600.00
8/23/2017	21465	SCOTT PIETRZAK	PERFORMANCE INSTALLMENT	$ 600.00
8/23/2017	21466	SHAWNIE STAMPER	PERFORMANCE INSTALLMENT	$ 600.00
8/23/2017	21467	TIMOTHY SCHULTZ	PERFORMANCE INSTALLMENT	$ 600.00
			Total for 8-23-2017	$ 225,984.61

CITY OF PLEASANT RIDGE CHECK REGISTER
ACCOUNTS PAYABLE
AUGUST 30, 2017

Check Date	Check	Vendor Name	Description	Amount
8/30/2017	21468	COMCAST	TELECOMMUNICATION SERVICES	$ 648.28
8/30/2017	21469	J & J AUTO TRUCK CENTER	POLICE VEHICLE REPAIRS	$ 216.15
8/30/2017	21470	MARK ANTHONY	NORWICH/HANOVER STREET PROJECT	$ 52,197.75
8/30/2017	21471	NYE UNIFORM	UNIFORM PURCHASES-NOWAK	$ 463.00
8/30/2017	21472	SOUTHEASTERN OAKLAND COUNTY	REFUSE COLLECTION CONTRACT	$ 224.46
8/30/2017	21473	THE HUNTINGTON NATIONAL BANK	INTEREST PAYMENT-2017 CIP BONDS	$ 37,250.00
8/30/2017	21474	THOMAS MCEVOY	SPRINKLER REPAIRS	$ 1,600.00
8/30/2017	21475	TOSHIBA FINANCIAL SERVICES	COPIER LEASE SERVICES	$ 291.78
8/30/2017	21476	UNIFIRST CORPORATION	JANIROTIAL SUPPLIES	$ 263.49
8/30/2017	21477	WEB MATTERS BY KRISTIE	WEBSITE HOSTING SERVICES	$ 24.95
8/30/2017	21478	WEX BANK	PD FUEL PURCHASES	$ 2,412.40
8/30/2017	21479	VOID C HECK	VOID CHECK	$ -
8/30/2017	21480	DTE ENERGY	UNDERGROUND SERVICE INSTALL	$ 100.00
8/30/2017	21481	PRESERVATION DETROIT	PRESERVATION DETROIT TOUR 9/19/17	$ 270.00
8/30/2017	21482	HOMELAND SOLAR	COMMUNITY CENTER SOLAR PROJECT	$ 47,407.00
			Total for 8-30-2017	$ 143,369.26

CITY OF PLEASANT RIDGE CHECK REGISTER
TAX LIABILITIES
AUGUST 2017

Check Date	Check	Vendor Name	Description	Amount
08/08/2017	2468	BRENDAN FREY	2017 SUMMER TAX OVERPAYMENT	$ 205.98
08/08/2017	2469	CITY OF PLEASANT RIDGE-DDA	2017 TAX COLLECTIONS	$ 40,765.96
08/08/2017	2470	CITY OF PLEASANT RIDGE-GENERAL	2017 TAX COLLECTIONS	$ 9,345.34
08/08/2017	2471	CITY OF PLEASANT RIDGE-TAXES	2017 TAX COLLECTIONS	$ 1,857,444.50
08/08/2017	2472	CORELOGIC CENTRALIZED REFUNDS	2017 SUMMER TAX OVERPAYMENTS	$ 10,849.22
08/08/2017	2473	FERNDALE SCHOOL DISTRICT	2017 TAX COLLECTIONS	$ 858,507.54
08/08/2017	2474	OAKLAND COUNTY TREASURER	2017 TAX COLLECTIONS	$ 1,269,872.57
08/08/2017	2475	VOID CHECK	VOID CHECK	$ -
08/08/2017	2476	VOID CHECK	VOID CHECK	$ -
08/22/2017	2477	TITLE SOURCE	2016 TAX OVERPYMT - REPLACE #2354	$ 146.90
08/23/2017	2478	CITY OF PLEASANT RIDGE-DDA	2017 TAX COLLECTIONS	$ 1,013.07
08/23/2017	2479	CITY OF PLEASANT RIDGE-GENERAL	2017 TAX COLLECTIONS	$ 80.16
08/23/2017	2480	CITY OF PLEASANT RIDGE-TAXES	2017 TAX COLLECTIONS	$ 39,476.88
08/23/2017	2481	FERNDALE SCHOOL DISTRICT	2017 TAX COLLECTIONS	$ 18,598.21
08/23/2017	2482	OAKLAND COUNTY TREASURER	2017 TAX COLLECTIONS	$ 26,897.04
08/23/2017	2483	PETER STENGER	2017 SUMMER TAX OVERPAYMENT	$ 11,003.39
08/23/2017	2484	TREVOR WILSON & LAUREN HOULIHAN	2017 SUMMER TAX OVERPAYMENT	$ 4,513.93
			TOTAL TAX LIABILITIES	$ 4,148,720.69

City of Pleasant Ridge

Amy M. Drealan, City Clerk

From: Amy M. Drealan, City Clerk

To: Mayor and City Commission

Date: September 12, 2017

Re: MDOT Annual Permit for Work on State Highways

Overview

Each year, the City Commission must approve the Performance Resolution for Governmental Agencies and designate an authorized individual to sign the annual permit for work on State highways. This allows the City to perform any work within the MDOT right-of-way.

Requested Action

Approve the MDOT Performance Resolution for Governmental Agencies for the 2018 Annual Permit for work on State trunkline right-of-way, and appoint the City Manager and Assistant City Manager as authorized individuals to sign the annual permit.

Please feel free to contact me should you wish to discuss this matter further.

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
OAKLAND TRANSPORTATION SERVICE CENTER

KIRK T. STEUDLE
DIRECTOR

August 25, 2017

2018 ANNUAL PERMIT FOR WORK ON STATE TRUNKLINE RIGHT OF WAY

The MDOT Oakland TSC is now accepting 2018 Annual Permit applications. All permit applications are to be submitted via the MDOT electronic Construction Permit System (CPS). The 2018 Annual Permit will be effective January 1, 2018. Your 2017 Annual Permit shall continue to be used for any work occurring between now and December 31, 2017.

The Performance Resolution for Governmental Agencies (Form 2207B) was revised in December 2016, therefore, if you haven't done so already, an updated Resolution will be required for 2018. The form shall include the name or title of the designated person(s) authorized to sign permits and shall be uploaded into CPS with your Annual Permit application. I have attached a copy of the form and it can also be found on the internet at www.michigan.gov/mdot.

Each time you perform work under your Annual Permit you will need to submit an electronic Advance Notice via the MDOT electronic CPS system. No work shall be performed until the Advance Notice is approved by MDOT.

An Individual Permit is required for all proposed operations in the MDOT right of way not covered under the Annual Permit.

Municipalities, when working within their municipal limits, are exempt from permit fees.

Thank you for your cooperation. If you have any additional questions, feel free to contact me at 248-451-2453 or MDOT Permit Agent Wioletta Bilan at 248-451-2451.

Sincerely,

Stacey Gough
Oakland TSC Utility/Permit Engineer
goughs@michigan.gov

cc: Wioletta Bilan
File

PERFORMANCE RESOLUTION
FOR GOVERNMENTAL AGENCIES

This Performance Resolution is required by the Michigan Department of Transportation for purposes of issuing to a municipal utility an "Individual Permit for Use of State Highway Right of Way", or an "Annual Application and Permit for Miscellaneous Operations within State Highway Right of Way".

RESOLVED WHEREAS, the _____
(city, village, township, etc.)

hereinafter referred to as the "GOVERNMENTAL AGENCY," periodically applies to the Michigan Department of Transportation, hereinafter referred to as the "DEPARTMENT," for permits, referred to as "PERMIT," to construct, operate, use and/or maintain utilities or other facilities, or to conduct other activities, on, over, and under State Highway Right of Way at various locations within and adjacent to its corporate limits;

NOW THEREFORE, in consideration of the DEPARTMENT granting such PERMIT, the GOVERNMENTAL AGENCY agrees that:

1. Each party to this Agreement shall remain responsible for any claims arising out of their own acts and/or omissions during the performance of this Agreement, as provided by law. This Agreement is not intended to increase either party's liability for, or immunity from, tort claims, nor shall it be interpreted, as giving either party hereto a right of indemnification, either by Agreement or at law, for claims arising out of the performance of this Agreement.

2. If any of the work performed for the GOVERNMENTAL AGENCY is performed by a contractor, the GOVERNEMENTAL AGENCY shall require its contractor to hold harmless, indemnify and defend in litigation, the State of Michigan, the DEPARTMENT and their agents and employee's, against any claims for damages to public or private property and for injuries to person arising out of the performance of the work, except for claims that result from the sole negligence or willful acts of the DEPARTMENT, until the contractor achieves final acceptance of the GOVERNMENTAL AGENCY. Failure of the GOVERNMENTAL AGENCY to require its contractor to indemnify the DEPARTMENT, as set forth above, shall be considered a breach of its duties to the DEPARTMENT.

3. Any work performed for the GOVERNMENTAL AGENCY by a contractor or subcontractor will be solely as a contractor for the GOVERNMENTAL AGENCY and not as a contractor or agent of the DEPARTMENT. The DEPARTMENT shall not be subject to any obligations or liabilities by vendors and contractors of the GOVERNMENTAL AGENCY, or their subcontractors or any other person not a party to the PERMIT without the DEPARTMENT'S specific prior written consent and notwithstanding the issuance of the PERMIT. Any claims by any contractor or subcontractor will be the sole responsibility of the GOVERNMENTAL AGENCY.

4. The GOVERNMENTAL AGENCY shall take no unlawful action or conduct, which arises either directly or indirectly out of its obligations, responsibilities, and duties under the PERMIT which results in claims being asserted against or judgment being imposed against the State of Michigan, the Michigan Transportation Commission, the DEPARTMENT, and all officers, agents and employees thereof and those contracting governmental bodies performing permit activities for the DEPARTMENT and all officers, agents, and employees thereof, pursuant to a maintenance contract. In the event that the same occurs, for the purposes of the PERMIT, it will be considered as a breach of the PERMIT thereby giving the State of Michigan, the DEPARTMENT, and/or the Michigan Transportation Commission a right to seek and obtain any necessary relief or remedy, including, but not by way of limitation, a judgment for money damages.

5. The GOVERNMENTAL AGENCY will, by its own volition and/or request by the DEPARTMENT, promptly restore and/or correct physical or operating damages to any State Highway Right of Way resulting from the installation construction, operation and/or maintenance of the GOVERNMENTAL AGENCY'S facilities according to a PERMIT issued by the DEPARTMENT.

6. With respect to any activities authorized by a PERMIT, when the GOVERNMENTAL AGENCY requires insurance on its own or its contractor's behalf it shall also require that such policy include as named insured the State of Michigan, the Transportation Commission, the DEPARTMENT, and all officers, agents, and employees thereof and those governmental bodies performing permit activities for the DEPARTMENT and all officers, agents, and employees thereof, pursuant to a maintenance contract.

7. The incorporation by the DEPARTMENT of this resolution as part of a PERMIT does not prevent the DEPARTMENT from requiring additional performance security or insurance before issuance of a PERMIT.

8. This resolution shall continue in force from this date until cancelled by the GOVERNMENTAL AGENCY or the DEPARTMENT with no less than thirty (30) days prior written notice provided to the other party. It will not be cancelled or otherwise terminated by the GOVERNMENTAL AGENCY with regard to any PERMIT which has already been issued or activity which has already been undertaken.

BE IT FURTHER RESOLVED, that the following position(s) are authorized to apply to the DEPARTMENT for the necessary permit to work within State Highway Right of Way on behalf of the GOVERNMENTAL AGENCY.

Title and/or Name: _____

_____

_____

_____

_____

I HEREBY CERTIFY that the foregoing is a true copy of a resolution adopted by

the _____
(Name of Board, etc)

of the _____ of _____
(Name of GOVERNMENTAL AGENCY) (County)

at a _____ meeting held on the _____ day

of _____ A.D. _____.

Signed _____ Title _____

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: September 7, 2017

Re: Michigan Municipal Association for Utility Issues (MI-MAUI)

Overview

The Southeast Michigan Regional Energy Office (SEMREO) has successfully concluded its rate case for municipal streetlighting with DTE. The streetlighting coalition that successfully intervened in the rate case is now disbanded, as it was a purpose-specific group. Building on the success of the streetlighting coalition, SEMREO is now seeking to create a permanent successor group, MI-MAUI, to provide continuing oversight and advocacy on behalf of municipalities with the electric utilities.

The annual cost to Pleasant Ridge to join the MI-MAUI initiative will be $250. The resolution would allow the City Manager to contribute an additional $250 in any given fiscal year if requested by the MI-MAUI board of directors to address a specific issue that requires greater legal or technical resources.

Background

The streetlighting coalition was a purpose-driven group that was formed and funded to address the one DTE rate case. That case has concluded, but DTE will certainly bring more cases in the future. SEMREO is now proposing to form the Michigan Municipal Association for Utility Issues (MI-MAUI) as a successor organization to the streetlighting coalition. This would be an ongoing organization that can engage with utilities, monitor and, if necessary, intervene in MPSC proceedings that impact municipal interests, and provide technical and financial advice and support to municipalities.

Pleasant Ridge's annual membership fee is proposed at $250. Given that we pay over $36,000 annually to DTE for streetlighting, staff believes that this is a reasonable interest to monitor and protect our interests in Lansing regarding utility issues.

So far, the cities of Ann Arbor, Dearborn, and Royal Oak have joined MI-MAUI. St. Clair Shores, Huntington Woods, and Harper Woods are in the process of joining. All of these communities were members of the streetlighting coalition.

Please see the attached MI-MAUI overview for more detailed information.

Requested Action

City Commission consideration of the attached resolution joining the MI-MAUI initiative.

City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

RESOLUTION
MI-MAUI Membership

WHEREAS, the City of Pleasant Ridge spends approximately $85,000 on electricity and gas annually, an amount that has continued to grow even as Pleasant Ridge has made great strides in reducing other costs;

WHEREAS, Pleasant Ridge's budget remains under significant stress and reducing expenditures is of paramount importance;

WHEREAS, energy efficiency and renewable energy generation are widely reported to reduce cost and risk, increase resiliency and deliver better services for organizations that adopt them, yet Pleasant Ridge's ability to pursue further improvements in these areas is restricted by regulations, absence of market competition and limited control over equipment and technology choices;

WHEREAS, Pleasant Ridge has adopted planning objectives and policies that prioritize support for clean energy programs to reduce environmental and human health impacts of energy use and generation, and to promote Pleasant Ridge as a great place to live and work;

WHEREAS, Pleasant Ridge wishes to work collaboratively with regulated utilities as equal partners in addressing energy needs and concerns, rather than as adversaries in regulatory processes;

WHEREAS, Pleasant Ridge lacks the capacity, expertise and influence to collaborate on equal footing with utilities concerning projects and business practices, and likewise to monitor and participate reliably and effectively in processes of the Michigan Public Service Commission and other regulatory bodies, and;

WHEREAS, recent success of the Michigan Street Lighting Coalition (MSLC), in advocating for fair LED street lighting tariffs that reward investments in energy efficiency, demonstrates that cooperation among municipalities can effectively address many of the concerns cited above;

WHEREAS, the MSLC was founded to intervene only in recent DTE electricity rate cases affecting municipal street lighting tariffs, rather than to provide ongoing representation and advice across a broad range of energy utility issues that affect municipalities;

WHEREAS, municipal members of the MSLC now propose to create a standing organization, tentatively named the Michigan Municipal Association for Utility Issues (MI-MAUI), to engage in proactive dialogue with energy utilities to address needs and concerns collaboratively, to monitor MPSC and other energy regulatory processes that may affect municipalities, to intervene formally in those processes when deemed necessary, and to provide technical and financial advice to municipalities concerning clean energy projects and policies;

WHEREAS, voting membership in MI-MAUI is open to all Michigan municipalities, with annual dues apportioned according to population and estimated as $250 for Pleasant Ridge;

NOW, THEREFORE, be it resolved that Pleasant Ridge will join MI-MAUI with an annual membership contribution of $250;

FURTHER, be it resolved that the City Manager is authorized to contribute up to an additional $250 to MI-MAUI in any single fiscal year to undertake and budget for additional technical or legal activities as approved by the MI-MAUI board of directors;

FURTHER, be it resolved that Pleasant Ridge appoints the City Manager as its voting representative to MI-MAUI.

Signed this 12th day of September 2017, in the City of Pleasant Ridge State of Michigan in witness whereof the official seal and signature of the city.

_____

Amy M. Drealan, City Clerk

SOUTHEAST MICHIGAN REGIONAL ENERGY OFFICE

Michigan Municipal Association for Utility Issues

Municipalities in Michigan have too little control over energy costs, providers and technologies

Energy costs can eat up 5% or more of a municipality's budget, leading many to pursue energy efficiency and renewable energy initiatives in hopes of cutting costs, reducing environmental impacts and improving quality of life. Unfortunately, many attractive energy projects aren't feasible for municipalities because of regulatory or ownership barriers. For example, conversion to LED streetlights in Michigan has gone slower than many municipalities would like because utilities own the fixtures and thus control the pace of conversion, as well as what wattage and brand of LED are installed.

Likewise, municipalities have little control over energy costs because they generally cannot choose their energy providers, and prices are set by the Michigan Public Service Commission rather than through direct negotiation with the providers in a competitive market.

Finally, most municipalities lack expertise and capacity on staff to negotiate effectively with utilities about priorities, technology choices and costs of energy infrastructure projects.

Municipal budgets remain tight. It is widely recognized that good energy management can sharply reduce costs, yet many solutions are either unavailable to municipalities or very difficult to pursue. A shared resource is needed to give municipalities a stronger voice in regulatory proceedings, and more effective representation in their business relationships with utilities.

The Michigan Street Lighting Coalition provides a proven model for giving municipalities a voice in management of energy

The MSLC formed in 2014 to challenge changes to street lighting tariffs proposed to the Michigan Public Service Commission (MPSC) by DTE Energy, which would have reduced the savings municipalities can realize by investing in LED streetlight conversions. Twenty-five municipalities in southeast Michigan joined the Coalition, which SEMREO managed, retaining attorneys, expert witnesses and clean energy experts. Following extensive analysis and testimony, the MPSC rejected DTE's proposal and mandated a collaborative process. Over the following months, the MSLC team worked directly with DTE Energy and MPSC staff to craft fair and reasonable tariffs that reward municipal energy efficiency investments, which were approved by the MPSC on January 31, 2017.

MSLC's intervention increased potential savings from LED conversion dramatically. A city with 1,000 DTE-owned streetlights distributed among incumbent technologies (mercury

vapor and high-pressure sodium), wattages and wiring types representative of the region-wide DTE system will be able to save about $27,000 more per year by converting 100% to LEDs under the newly approved streetlight tariffs, compared to the rates DTE originally proposed. The new rates also offer better return on investment in LED conversions than the experimental LED rates that were in effect until now – protecting the projected return on investment of cities that already installed LEDs. We estimate that over 98% of older-technology streetlights owned by DTE could be converted to LEDs with annual savings that pay back the city's conversion expense in less than five years.

These significant, annual savings were cheaply won: our hypothetical, "average" city would have contributed about $3,500 to MSLC dues over two years, meaning it has received a greater than tenfold annual return on its investment.

Municipalities need ongoing, not episodic, representation in utility issues

Despite these solid victories, many issues related to streetlight tariffs, conversion costs and policies, and technology choices remain before us. DTE, for example, has no plans for converting approximately 70,000 high-pressure sodium streetlights to LED, even though each converted light would cost municipal customers $41-to $184 less per year to operate under the new tariffs. Also, LED streetlights can support various "smart grid" and "smart urban network" functions, and municipalities need to be deeply involved in discussing how these opportunities are pursued.

MAUI's agenda is not devoted only to streetlight issues, either. Municipalities receive many other regulated electric and gas services from utilities. Salient issues related to clean energy include utility and regulatory policies for municipal microgrids; for siting and net metering of solar PV or other renewable energy installations serving municipal facilities; and for gas and electric costs for municipal facilities. The organization may also tackle energy facility siting policies and decisions (e.g., utility-scale solar PV and wind turbine placement).

Without expert and regular municipal engagement, policies, regulations and costs of municipal clean energy initiatives will continue to be shaped primarily by utilities and regulators, who may have other interests in mind. No single municipality has the information, expertise and resources to meaningfully balance a utility company's influence in regulatory matters or its knowledge and motivation in business negotiations. Thanks to our successes in the MPSC rate cases, MSLC has momentum, credibility, experience and a team to tackle these issues and level the playing field for

municipalities, but structural changes are needed to move away from MSLC's single-issue campaign model to a standing association model.

The Michigan Municipal Association for Utility Issues (MI-MAUI)
By bundling resources and clout, and retaining experts in economics, energy and regulation, the Association will give municipalities a stronger voice in energy utility issues. General services will include:

- Engage regulated utilities in ongoing dialogue on regulatory and business policy issues related to clean energy programs, to identify issues of common concern and collaboratively craft solutions;
- Monitor, and participate when necessary in MPSC and other utility regulatory proceedings that impact municipalities' ability to pursue money-saving clean energy projects. However, MAUI will emphasize collaboration with utilities in preference to intervention in regulatory processes;
- Provide technical and financial advice and support to municipalities in their business relationships with utilities.

The Association's core mission will be to save money for municipalities by making clean energy projects pay, but it may engage with other utility issues when they arise incidental to its priority agenda. A relevant example would be MSLC's advocacy for fair and gradual rebalancing of the difference between DTE's tariffs for streetlights served by overhead and underground wiring: this issue had no energy efficiency implications but MSLC was the logical, and only, party able to represent municipal interests on that issue.

The Association will not engage directly in advocacy activities, but may cooperate with partners such as Michigan Municipal League, Michigan Townships Association, and non-profit energy and environmental organizations to advance relevant policy proposals.

Issues: Members will set the Association's priorities and assess themselves fees to cover necessary expenses in excess of the annual membership assessment. The scope is expected to remain focused on electricity and gas services provided by regulated utilities in Michigan.

Service area: Geographically, whereas MSLC has focused on the DTE Energy service territory, the Association will represent municipalities served by regulated utilities throughout the state. Doing so will allow us to apply lessons learned statewide, even

out the work flow from year to year, and get to a politically and financially effective scale faster.

Structure: The Association will have a membership structure and will be organized as a Board subcommittee of Southeast Michigan Regional Energy Office. All members will have voting participation in the Association's priorities, leadership elections and budgeting. SEMREO will staff and administer the Association, and will retain legal, regulatory and technical experts as authorized by the Association membership.

Membership: Cities, villages, townships, counties and other local government agencies in Michigan are eligible to join the Association. Municipal associations (including MML, MTA and MAC) and non-profit organizations that support municipal energy programs (including EcoWorks, SEEDS, Michigan Energy Options, Clean Energy Coalition, Michigan SAVES, NextEnergy and Metro Matters) may join as Associate Members without voting privileges.

Dues: Initial membership dues for the Association will be $0.05 per resident; for example, a municipality with population of 10,000 will have initial dues of $500. Minimum dues will be $250 and maximum will be $6,000.

Dues have been calculated to support a baseline, startup agenda. Association members may vote to undertake a broader program agenda or service offerings, or to intervene in MPSC rate case(s). To expedite implementation of these decisions, municipalities are asked to allow their staff to contribute up to a specified additional amount, suggested as equal to the initial dues, during the first year of the association.

Contact

Rick Bunch, Executive Director, Southeast Michigan Regional Energy Office
rick@regionalenergyoffice.org, (m)206-595-8293

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: September 7, 2017

Re: Southeast Michigan Regional Energy Office (SEMREO) Residential Solar Program

Overview

SEMREO has created a residential solar program that offers a turnkey solution for residents who are interested in exploring a solar energy system for their house.

Background

SEMREO is in the process of rolling out a solar program that offers a turnkey solution for homeowners who want to go solar. By aggregating many jobs, SEMREO and their partners can offer competitive pricing. SEMREO has partnered with Michigan Solar Solutions to do the solar installations and McNaughton-McKay Electric to supply the materials, both established and reputable companies.

There is no cost to the City to participate in the program, and residents may choose to use the SEMREO solution or to contact any other solar installer of their choice. By joining the program, the City commits only to publicize the program to make residents aware that this option exists and is available to them. There is no financial benefit, cost, or other arrangement between the City and SEMREO for this program.

The City is in the process of reviewing our solar regulations. Currently, solar energy systems are only allowed where they are not visible from the street. However, with the majority of our streets running east-west, this means that nearly half of our residents are not allowed to install solar equipment on their south-facing façade. This fact does not preclude us from participating in the SEMREO program, but the Commission should be aware that we have a current limitation that we must review. After the Planning Commission finishes their review process, they will either confirm the current restrictions, or recommend an ordinance to amend the solar restrictions. This process will likely take 3 to 4 months to complete.

Requested Action

City Commission consideration of the resolution to join SEMREO's residential solar program.

City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

RESOLUTION

ADOPTING THE SOUTHEAST MICHIGAN REGIONAL ENERGY OFFICE'S PROGRAM ON RESIDENTIAL SOLAR PURCHASING

WHEREAS, the City of Pleasant Ridge has adopted policies encouraging energy efficiency and renewable energy; and,

WHEREAS, access to low-cost, reliable energy is important to the economic development of the City and to the financial security of its residents and business; and,

WHEREAS, solar photovoltaic (PV) technology has declined in cost to the point where solar energy systems may pay back in as few as 7 years and will generate net savings for property owners in the long run; and

WHEREAS, renewable energy reduces energy related impacts on the local environment and the global climate; and,

WHEREAS, many property owners who are potentially interested in installing solar PV technology would welcome objective, third-party consultation about solar technology choices, providers, design and structural issues, costs, financial benefits and regulatory requirements; and,

WHEREAS, the City of Pleasant Ridge is dedicated to helping residents and businesses make informed, safe, and cost-effective choices about energy usage; and,

WHEREAS, the City of Pleasant Ridge has an interest in assuring that all solar PV installation work done in the city is safe, effective, and in compliance with building codes, zoning ordinances and other regulations; and

WHEREAS, the Southeast Michigan Regional Energy Office (SEMREO) offers its member municipalities, including the City of Pleasant Ridge the opportunity to participate in a residential solar PV program with access to highly experienced, local providers of technology, installation services and financing;

NOW, THEREFORE BE IT RESOLVED, as follows:

1. The Commission of the City of Pleasant Ridge endorses SEMREO's residential solar package that bundles reliable, cost-effective solar PV systems for residents and businesses; and,
2. The City will promote the program through municipal communication channels, such as on the City website, email communications with residents, newsletters, printed promotional material at kiosks, and so forth as applicable.

Signed this 12th day of September, 2017, in the City of Pleasant Ridge State of Michigan in witness whereof the official seal and signature of the city.

_____
Amy M. Drealan, City Clerk

SOUTHEAST MICHIGAN REGIONAL ENERGY OFFICE

Helping Southeast Michigan Homeowners Go Solar

Homeowners interested in solar energy may hesitate because of the need to choose among numerous installers and fast-changing technologies, concerns about reliability of equipment and projected savings, and limited understanding of building codes and other regulations. The Southeast Michigan Regional Energy Office (SEMREO) has assembled a low-cost, turnkey solar photovoltaic (PV) package that includes local providers and installers with optional financing, available exclusively to its member municipalities. By supporting this program, municipalities can increase homeowners' confidence and reduce their installation costs while supporting local businesses.

Key features

- Lower costs: SEMREO reduces equipment and installation costs for homeowners by purchasing and contracting in bulk.
- Buy Michigan: Equipment for the program is provided by McNaughton-McKay Electric (Madison Heights) and installations are performed by Michigan Solar Solutions (Commerce Township), both of which hire and train local labor.
- Convenience: Homeowners can rely on SEMREO's vetting and management of providers, rather than evaluating everything by themselves.
- Quality and compliance: Michigan Solar Solutions is one of the largest, most experienced local installers and is thoroughly versed in code requirements.
- Trusted voice: SEMREO represents the interests of its municipal members.

Advantages for participating municipalities

Southeast Michigan municipalities that promote clean, renewable energy are attractive to residents and businesses who want a community that invests in its future. Guiding property owners toward high quality, reliable providers and technology will have a multiplier effect, as satisfied customers influence their friends and neighbors to follow suit. On an administrative level, municipalities can better support property owners during permitting and other processes if equipment and installation come from trusted, familiar providers.

Municipal commitment

- **Endorse** the program via resolution or other official statement.
- **Promote** the program as a municipal offering through municipal communication channels, such as the City website, email communication to residents, newsletters, print materials at kiosks, and so forth. SEMREO will provide all materials and content to be used with municipal branding.
- **Encourage** building inspectors to attend SEMREO's solar PV workshops.

Municipal commitment does **NOT include** signing any contracts or allocating any funds towards the program.

For more information and to sign-up, please contact: Rick Bunch, SEMREO Executive Director, rick@regionalenergyoffice.org, (313) 749-8750

SOUTHEAST MICHIGAN REGIONAL ENERGY OFFICE

Residential Solar PV Costs and Benefits Illustration

Year	Cash Flow
0	($9,456.05)
1	$921.59
2	$976.89
3	$1,035.50
4	$1,097.63
5	$1,163.49
6	$1,233.30
7	$1,307.29
8	$1,385.73
9	$1,468.88
10	$1,557.01
11	$1,650.43
12	$1,749.45
13	$1,854.42
14	$1,965.69
15	$2,083.63
16	$2,208.65
17	$2,341.17
18	$2,481.64
19	$2,630.53
20	$2,788.37
21	$2,955.67
22	$3,133.01
23	$3,320.99
24	$3,520.25
25	$3,731.46

Net upfront cost

Avoided cost of DTE electricity in 1st year.

Savings grow in line with 6% annual increase in cost of electricity.

Equipment is warrantied for 25 years but will likely last much longer.

Investment Metrics	
Net value to homeowner (NPV)	**$15,187**
Payback	**8.2 years**

Assumptions	
Current electricity rate ($/kWh)	$0.165
Annual increase in $/kWh (avg. since 2006)	6%
Financing rate	5%
Federal tax credit	30%
Typical usage for home in SE Michigan (kWh/month)	535
Usage to be offset with solar	87%
Avg. electricity offset (kWh/month)	465

Homeowners can offset further electricity needs with easy, additional energy savings projects.

Cost Calculation	
System design, parts, permit, labor	$12,744.00
Sales tax	$764.64
Contract amount	$13,508.64
Federal tax credit (30%)	($4,052.59)
Net upfront cost	$9,456.05

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: September 7, 2017

Re: Iron Ridge Brownfield Plan Amendment

Overview

The Iron Ridge brownfield plan has been proceeding through County and State (MEDC) review. As part of that review, the MEDC is requiring that three of the residential parcels on the east side of Bermuda in Ferndale that have not yet been combined be removed from the plan.

The changes do not impact or alter any part of the plan in Pleasant Ridge, and the changes also do not impact the requested amount or payback period in the plan.

Background

The developer has requested an amendment to the previously approved Brownfield Plan to remove 3 parcels, identified as 3300, 3310, and 3334 Bermuda. Currently, they will not be recognized as eligible by the State as they are not yet combined and individually they are not adjacent or contiguous to a "facility" parcel.

A brownfield redevelopment plan has been prepared as Amended Brownfield Plan for the Iron Ridge project

A resolution approving of the amendment must be approved by both Pleasant Ridge and Ferndale. Ferndale's City Commission will consider the request at their September 11 meeting, with this being on our agenda for the following day.

The Oakland County Board of Commissioners resolution is slated to be considered at their September 28 meeting. Its validity requires that the amendment have concurring approval from both Ferndale and Pleasant Ridge before September 28.

Brownfield Plan Timeline

Please see below for some updated timelines. The developer has worked with the MDEQ and is has formally submitted the hard copies of the 381 Work Plan for final review, with the understanding that the amended Brownfield Plan requires approval by Pleasant Ridge, Ferndale, and then Oakland County.

The key dates in the process going forward are as follows:

- 9/11 – OCBRA Meeting

- 9/11 or 9/25 – Ferndale City Council Amendment Approval
- 9/12 – Resolution for Public Hearing to Oakland County Planning and Building Committee
- 9/12 – Pleasant Ridge City Commission – Amendment Approval
- 9/28 – Public Hearing/BoC Approval for Brownfield Plan
- 10/24 – MSF Board Meeting – Approval for 381 Work Plan

Requested Action

City Commission consideration of the resolution approving the amendment to the Iron Ridge brownfield plan.

OAKLAND COUNTY
BROWNFIELD REDEVELOPMENT AUTHORITY

BROWNFIELD PLAN FOR:

PROPOSED IRON RIDGE DEVELOPMENT

Located at:
3155-3351 Bermuda, 3164-3252 Bermuda, 3342-3350 Bermuda,
and 660 East 10 Mile Road, Ferndale;
400-404 East 10 Mile Road and 660 East 10 Mile Road, Pleasant Ridge,
Oakland County, Michigan

APRIL 5, 2017
Revised: August 25, 2017

Approved by BRA: September 11, 2017
Approved by County Commission: September 28, 2017

Prepared on Behalf of:

Iron Ridge Holdings, LLC and Iron Ridge Office, LLC
6960 Orchard Lake Road, Suite 300
West Bloomfield, MI 48322
Contact Persons: Mr. Dennis Griffin and Mr. John Breza
Telephone: (248) 855-3330

Prepared By:

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

PM ENVIRONMENTAL
Risk Well Managed

TABLE OF CONTENTS

APPENDICIES

TABLES

PROJECT SUMMARY

Project Name:	Iron Ridge – Proposed Mixed-Use Campus
Project Location:	The property consists of 21 parcels located partially in Ferndale and Pleasant Ridge, Oakland County, Michigan, 48220 and 48069 in Township one north (T.1N), Range 11 east (R.11E), Section 27.
Type of Eligible Property:	The property is determined to be a "Facility" or adjacent and contiguous to a "Facility"
Eligible Activities:	Baseline Environmental Site Assessment Activities, Due Care Activities, Demolition, Asbestos Activities, Infrastructure Improvements, Site Preparation, and Preparation of a Brownfield Plan and Act 381 Work Plan.
Developer Reimbursable Costs:	$6,562,728 (includes eligible activities and 15% contingency)
Years to Complete Developer Reimbursement :	22-26 Years from date of Brownfield Plan approval
Estimated Capital Investment:	Approximately $25-32 million (including Acquisition, Hard and Soft Costs)
Project Overview:	The project entails the extensive renovation of a former, dilapidated industrial building and surrounding property for reuse as an inclusive multi-use campus. The nearly 70,000 square foot vacant industrial building that anchors the campus, will be transformed into a market space, beer garden and brewery, and provide additional office and commercial space. The campus will include the renovation of three additional buildings that will be occupied by tech offices, professional offices, a fitness center, and commercial space. The construction of new apartment complexes to complement the site are also proposed along the eastern portion. Together, the existing building space and proposed new build totals approximately 231,000 square feet.

I. INTRODUCTION AND PURPOSE

In order to promote the revitalization of environmentally distressed, historic, functionally obsolete and blighted areas within the boundaries of Oakland County ("the County"), the County has established the Oakland County Brownfield Redevelopment Authority (OCBRA) the "Authority" pursuant to the Brownfield Redevelopment Financing Act, Michigan Public Act 381 of 1996, as amended ("Act 381").

The purpose of this Brownfield Plan (the "Plan") is to promote the redevelopment of and investment in the eligible "Brownfield" Property within the County and to facilitate financing of eligible activities at the Property. Inclusion of Property within any Plan in the County will facilitate financing of eligible activities at eligible properties, and will provide tax incentives to eligible taxpayers willing to invest in revitalization of eligible sites, commonly referred to as "Brownfields." By facilitating redevelopment of the Property, this Plan is intended to promote economic growth for the benefit of the residents of the County and all taxing units located within and benefited by the Authority.

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. If significant changes are made to the proposed redevelopment and proposed use, the Brownfield Redevelopment Authority and the County Commission as the Governing Body, in accordance with the Act, may amend this Plan. This includes approval by the City of Ferndale City Council and City of Pleasant Ridge City Commission for proposed amendments.

This Plan is intended to be a living document, which may be modified or amended in accordance with and as necessary to achieve the purposes of Act 381. The applicable sections of Act 381 are noted throughout the Plan for reference purposes.

This Brownfield Plan contains information required by Section 13(2) of Act 381, as amended

II. GENERAL PROVISIONS

A. Description of the Eligible Property (Section 13 (2)(h)) and Project

The Eligible Property consists of twenty-one (21) legal parcels totaling approximately 13 acres, referred to within this plan as the Property. All parcels are located within Pleasant Ridge and Ferndale, Oakland County, Michigan (the "Property") as outlined below.

Parcel ID Number	Address	City	Approx. Acreage	Eligibility	Current Zoning
25-27-201-005	3351 BERMUDA ST	Ferndale	0.169	"Facility"	M-1: Limited Industrial
25-27-201-012	3281 BERMUDA ST	Ferndale	0.165	Adjacent and contiguous to a "Facility"	M-1: Limited Industrial
25-27-201-013	3265 BERMUDA ST	Ferndale	1.139	"Facility"	M-1: Limited Industrial
25-27-201-015	3155 BERMUDA ST	Ferndale	0.750	"Facility"	M-1: Limited Industrial

25-27-201-019	3291 BERMUDA ST	Ferndale	1.000	Adjacent and contiguous to a "Facility"	M-1: Limited Industrial
25-27-201-020	660 E TEN MILE RD	Ferndale	0.290	"Facility"	M-1: Limited Industrial
25-27-202-008	3350 BERMUDA ST	Ferndale	0.177	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-009	3342 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-018	3252 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-019	3242 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-020	3232 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-021	3224 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-022	3216 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-023	3206 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-024	3164 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-052	BERMUDA (formerly 700-710 E TEN MILE RD	Ferndale	0.206	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-053	BERMUDA (formerly 3262-3280 BERMUDA ST)	Ferndale	0.434	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-127-009	404 E TEN MILE RD	Pleasant Ridge	1.875	"Facility"	Workplace
25-27-127-010	660 E TEN MILE RD	Pleasant Ridge	3.470	"Facility"	Workplace
25-27-127-012	400 E TEN MILE RD	Pleasant Ridge	1.100	"Facility"	Workplace
25-27-127-013	NO ADDRESS	Pleasant Ridge	0.330	"Facility"	Workplace

Iron Ridge Holdings, LLC and Iron Ridge Office LLC, or any related entity, or such other developer as approved by the Authority, are collectively the project developer ("Developer").

The Developer team consists of CG Emerson Real Estate Group (CG Emerson), Milford Singer Company, and First Holding Management Company (First Holding). Collectively they manage

approximately 3 million square feet of commercial space and more than 2,000 residential units. CG Emerson has had recent experience redeveloping multiple properties within close proximity to the current project. Furthermore, Milford Singer is a third-generation development, construction, and property management company that has been continuously active for over 90 years.

The Property consists of commercial, industrial, and residential land in an area characterized by an area of similar uses. The property zoning is anticipated to remain the same.

404 E. 10 Mile Road

The subject property, identified as 404 E. 10 Mile Road is developed with a 40,329 square foot commercial building. The building is mainly one-story with the central portion consisting of four stories and a basement. The northern portion of the subject building was occupied by Michigan Bell and utilized for service garages and machine shops in at least the 1950s. Additionally, the building contained an egg distributor in the 1950s. In the 1960s, the property was occupied by Frank's Nursery and utilized for warehousing of retail products, and by the late 1960s the building was occupied by Walmet Division of Valenite, Inc. A tool house was located on the southern portion of the property in at least the 1960s. Between 1974 and 1980, the current southern lobby area was developed in the area of the former tool house. Operations associated with Walmet consisted of manufacturing of carbides and included tooling and extrusion. The building was vacated by Walmet in 1994, and remained vacant through the 1990s. A portion of the building was occupied by professional offices from the early 2000s to 2016.

Associated with the following parcel:

Parcel ID Number	Address	City	Approx. Acreage	Eligibility	Current Zoning
25-27-127-009	404 E TEN MILE RD	Pleasant Ridge	1.875	"Facility"	Workplace

Walker Wire Properties

The main subject parcels, identified as 660 East 10 Mile Road (Ferndale and Pleasant Ridge) were initially developed prior to 1940 with dwellings. Industrial development began in the northern portion of the property in the mid-1940s, with the beginning of Walker Wire's operations. Multiple additions were constructed to the building through the early 1990s to expand the layout to the current building. The building, which totals approximately 74,000 square feet was occupied by various wire and steel companies, mainly identified as Walker Wire Company, from initial development in the 1940s until the mid-2000s. Operations included wire cutting, stretching, and chemical treatment.

The southern portion of the main parcel (660 East 10 Mile Road) was utilized by Michigan Bell for telephone pole storage from at least 1949 until at least 1957.

The subject parcel identified as 3351 Bermuda Street, was initially developed in the 1940s with the current building. The building, which totals approximate 1,150 square feet, was occupied by a W.E. Foltz Company from at least 1950 until 1975, and consisted of a small machine shop. Fire department records included documentation that the operations utilized trichloroethylene.

The building was purchased by Walker Wire in the early 1980s, and utilized as an employment office since that time.

The subject parcel identified as 3291 Bermuda Street was initially developed prior to 1940 with dwellings. A small tin shop was constructed on the property in the mid-1960s. All former buildings were demolished by 1980 when the parcel was converted to the current concrete paved surface lot for Walker Wire.

The subject parcel identified as 3281 Bermuda Street was initially developed prior to 1940 with a dwelling, which was demolished in the late 1970s when the parcel was converted to a concrete paved storage lot for Walker Wire. The current hazardous materials storage building, which totals approximately 2,600 square feet, was constructed on the western portion of the parcel in 1992.

The subject parcel identified as 3265 Bermuda Street was initially developed with portions of the current building constructed in the mid-1940s. The current building totals approximately 24,000 square feet. Various additions were constructed in the 1950s and 1980s. Former occupants included machinery manufacturers and tooling companies through the 1980s.

The subject parcel identified as 3155 Bermuda Street was initially developed in the mid-1940s with portions of the current industrial building, with additions in the 1950s. The current building totals approximately 18,500 square feet. The property was occupied by a nut and bolt manufacturer from at least 1950 until 1985. The building was generally utilized for limited warehousing and storage from that time until 2016.

The western subject parcels, identified as 400 East 10 Mile Road and associated parking lot, were initially developed prior to 1940 with a coal and fuel storage and sales operation. These operations ceased in the late 1970s, and the former silos were demolished and the current building was constructed. The current building at 400 East 10 Mile Road, which totals approximately 17,800 square feet was utilized for manufacturing operations from the 1970s until 1990s, associated with 404 East 10 Mile Road (carbide company). These operations ceased in the late 1990s, and the building was utilized for mostly warehousing with limited manufacturing by Walker Wire from the late 1990s until 2015. Former operations included stamping and presses. A small office building was present in the northwestern portion of the parcel, which was demolished between 2005 and 2008 to create more parking space for the adjoining property (404 East 10 Mile Road).

Associated with the following parcels:

Parcel ID Number	Address	City	Approx. Acreage	Eligibility	Current Zoning
25-27-201-005	3351 BERMUDA ST	Ferndale	0.169	“Facility”	M-1: Limited Industrial
25-27-201-012	3281 BERMUDA ST	Ferndale	0.165	Adjacent and contiguous to a “Facility”	M-1: Limited Industrial
25-27-201-013	3265 BERMUDA ST	Ferndale	1.139	“Facility”	M-1: Limited Industrial
25-27-201-015	3155 BERMUDA ST	Ferndale	0.750	“Facility”	M-1: Limited Industrial

25-27-201-019	3291 BERMUDA ST	Ferndale	1.000	Adjacent and contiguous to a "Facility"	M-1: Limited Industrial
25-27-201-020	660 E TEN MILE RD	Ferndale	0.290	"Facility"	M-1: Limited Industrial
25-27-127-010	660 E TEN MILE RD	Pleasant Ridge	3.470	"Facility"	Workplace
25-27-127-012	400 E TEN MILE RD	Pleasant Ridge	1.100	"Facility"	Workplace
25-27-127-013	NO ADDRESS	Pleasant Ridge	0.330	"Facility"	Workplace

Residential Lots

The 9 residential parcels along the east side of Bermuda Street identified as 3164-3252 Bermuda Street and 3342-3350 Bermuda Street, were initially developed for residential use and have retained residential usage since that time. At current, approximately half of the homes have since been demolished.

Two lots, also located along the east side of Bermuda with no address, identified as parcels 24-25-27-202-052 and 25-27-202-053 are included within the project. The parcels were initially developed for residential use and have since been converted to use as parking lots.

Associated with the following parcels:

Parcel ID Number	Address	City	Approx. Acreage	Eligibility	Current Zoning
25-27-202-008	3350 BERMUDA ST	Ferndale	0.177	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-009	3342 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-010	3334 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-013	3310 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-014	3300 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-018	3252 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-019	3242 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-020	3232 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential

25-27-202-021	3224 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-022	3216 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-023	3206 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-024	3164 BERMUDA ST	Ferndale	0.145	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-052	BERMUDA (formerly 700-710 E TEN MILE RD	Ferndale	0.206	Adjacent and contiguous to a "Facility"	R-3: Residential
25-27-202-053	BERMUDA (formerly 3262-3280 BERMUDA ST)	Ferndale	0.434	Adjacent and contiguous to a "Facility"	R-3: Residential

The Property's legal description is included in Appendix A. Property location maps are included in Appendix B.

Proposed Project

The proposed project entails the reuse of former industrial/warehouse buildings, identified as 404 and 660 E. 10 Mile Road, for use as tech. incubator and professional office space and a market/retail building, respectively. The proposed renovation is part of a larger revitalization that include surrounding property for reuse as an inclusive multi-use campus including the new construction of three multi-family residential buildings and the adaptive reuse of former industrial/warehouse buildings adjacent to 404 and 660 E. 10 Mile Road.

The nearly 70,000 square foot vacant industrial building, identified as 660 E 10 Mile Road (former Walker Wire site) that anchors the larger campus, will be transformed into a market space, beer garden and brewery, and provide additional office and commercial space. The campus will include the renovation of additional buildings that will be occupied by tech. offices, professional offices, a fitness center, and commercial and manufacturing space. The construction of new apartment complexes to complement the site are also proposed in the eastern portion. Together, the existing building space and proposed new build totals approximately 231,000 square feet.

The proposed project also includes the vacating of the ally between 660 E 10 Mile Road and 3351 Bermuda Street.

Interior renovation activities have begun in some of the existing buildings. Overall project commencement is anticipated to begin in the fall of 2017. Renovations are anticipated to continue over a two-three year period as improvements and tenant spaces are created.

The Developer will invest an estimated $32 million in the development and create approximately 200 construction jobs and create an anticipated 250 full-time equivalent (FTE) permanent jobs over the next three years. It is anticipated that up to an additional 50 FTE jobs will be re-located from other communities/counties.

Preliminary site plans and renderings are included in Appendix C.

B. Basis of Eligibility (Section 13 (2)(h) and Section 2(o))

The Property is considered "Eligible Property" as defined by Act 381, Section 2 because: (a) the Property was previously utilized or is currently utilized for a commercial and/or industrial purpose; (b) a portion of the project it is located within the City of Ferndale, a qualified local governmental unit under Act 381 and, (c) the parcels comprising the Property have each been determined to be a "facility" and/or adjacent and contiguous to a "facility."

PM Environmental has completed a scope of work pursuant to:

1. a Phase II ESA and Baseline Environmental Assessment (BEA) at 660 East 10 Mile Road and adjacent parcels completed in December 2015;
2. a Phase II ESA at 404 E. 10 Mile Road completed in June 2016; and
3. a BEA at 404 East 10 Mile Road and adjacent parcels complete in April 2017;

The BEAs and related environmental site assessments consisted of various subsurface investigations including the advancement of soil borings and temporary monitoring wells throughout the Property. Soil and groundwater analytical results identified concentrations of tetrachloroethylene/trichloroethylene (PCE/TCE), benzene, various petroleum volatile organic compounds (VOCs), benzo(a)pyrene, flourathene and/or phenanthrene, polychlorinated biphenyls (PCBs), chromium, cis-1, 2-DCE, and vinyl chloride all above various Part 201 Residential and Nonresidential cleanup criteria.

According to Section 20101(1)(s) of Part 201 a "facility" means any area, place, or property where a hazardous substance in excess of the concentrations that satisfy the cleanup criteria for unrestricted residential use has been released, deposited, disposed of, or otherwise comes to be located. The subject property is a "facility" as defined under Part 201, based on concentrations identified in soil and groundwater identified during previous site investigations.

Contaminant concentrations identified on the Property identified as 660 East 10 Mile Road, 3155-3351 Bermuda Street, and 400 East 10 Mile Road indicate exceedances to the Part 201 Residential and Nonresidential Drinking Water Protection/Drinking Water (DWP/DW), Groundwater Surface Water Interface Protection/Groundwater Surface Water Interface (GSIP/GSI), Direct Contact (DC) cleanup criteria and Vapor Intrusion Screening Levels (VISLs); therefore, the Property is a "facility" under Part 201.

Contaminant concentrations identified on the Property identified as 404 East 10 Mile Road indicate exceedances to the Part 201 Residential and Nonresidential DWP, GSIP, SVII (Soil Volatilization to Indoor Air Inhalation (SVII), Ambient Air Volatile Soil Inhalation (SVI), Particulate Soil Inhalation (PSI), and DC cleanup criteria. Therefore, the subject property is a facility under Part 201 of P.A. 451, as amended, and the rules promulgated thereunder.

Additional documentation and description of the locality of the identified contaminants and the property's "facility" status is provided in Appendix D.

C. Summary of Eligible Activities and Description of Costs (Sec. 13 (2)(a-b))

Tax Increment Financing revenues will be used to reimburse the costs of "eligible activities" (as defined by Section 2 of Act 381) as permitted under the Brownfield Redevelopment Financing Act that include: Baseline Environmental Site Assessments, Due Care Activities, Demolition, Asbestos Activities, Infrastructure Improvements, Site Preparation Activities, and preparation of a Brownfield Plan and Act 381 Work Plan. A complete itemization of these activities and associated expenses is included in Table 1.

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. All activities are intended to be "Eligible Activities" under the Brownfield Redevelopment Financing Act. The Authority is not responsible for any cost of eligible activities listed below and will incur no debt for these activities.

Eligible Activities - Ferndale

1. Baseline Environmental Site Assessment Activities include Phase I Environmental Site Assessments (ESAs), Phase II ESAs, and BEAs as required as part of the pre-purchase due diligence conducted on the property at a total cost of $37,205.

2. Due Care Activities includes the design and installation of a vapor barrier system including vapor evaluation for up to 4 quarters; contaminated soil transport and disposal associated with development activities; groundwater management; and, oversight/sampling/reporting by an environmental professional, removal of orphan USTs if encountered, at a total estimated cost of $865,375.

3. Demolition Activities includes a pre-demolition survey, building demolition, foundation removal, fill/compaction/rough grading to balance site where building is located, removal of parking lots, removal of curbs and gutters, removal of sidewalks, removal of paved alley, and fees related to demolition engineering and design at an estimated of $457,500.

4. Asbestos Activities includes an asbestos survey, asbestos containing materials (ACM) abatement, oversight, air monitoring and associated reporting at an estimated cost of $60,000.

5. Infrastructure Improvements include an urban storm water management system; sidewalks; curbs; gutters; landscaping within the public right of way and public park; public lighting; public signage; public park and seating areas; replacement and installation of water mains; replacement and installation of sanitary sewer mains; and professional fees directly related to infrastructure improvements at an estimated cost of $1,430,000.

6. Site Preparation includes temporary construction access/road; temporary traffic control; temporary erosion control; temporary site control (fencing, gates, signage, and/or lighting); temporary facility; land balancing; grading; staking; clearing and grubbing; excavation of unstable materials; foundation work to address special soil concerns; fill and dewatering related to other eligible activities; relocation of active utilities (electric, gas, water, sewer); and other unique site preparation activities at an estimated cost of $610,000.

7. Preparation of the Brownfield Plan and Act 381 Work Plan (if necessary) and associated activities (e.g. meetings with BRA, review by City Attorney etc.) at a cost of approximately $12,500.

8. A 15% contingency of $513,431 is established to address unanticipated environmental and/or other conditions that may be discovered through the implementation of site activities. This excludes the cost of Baseline Environmental Assessment Activities and preparation of the Brownfield Plan and Act 381 Work Plan.

Eligible Activities – Pleasant Ridge

1. Baseline Environmental Site Assessment Activities include Phase I ESAs, Phase II ESAs, and BEAs, required as part of the pre-purchase due diligence conducted on the property at a total cost of $46,435.

2. Due Care Activities includes the design and installation of a vapor barrier system including vapor evaluation for up to 4 quarters; contaminated soil transport and disposal associated with development activities; groundwater management; and, oversight/sampling/reporting by an environmental professional at a total estimated cost of $1,666,875.

   The PCB Work Plan addresses these three parcels with PCB contamination and presents a plan to remove soil contamination to reduce concentrations to allow “high occupancy” and to maintain the surface cover as exposure barriers and eliminate the potential for impacted soil contact with concentrations greater than 1 milligram per kilogram (mg/kg) and less than 10 mg/kg, if not removed during soil excavation activities. A Restrictive Covenant (RC) to maintain any such exposure barriers is proposed as an institutional control mechanism. This PCB Work Plan is specific to address the PCB impact in soils regulated under the federal TSCA and is being submitted to the United States Environmental Protection Agency (USEPA) as notification of a planned PCB cleanup in accordance with 40 CFR 761(a)(3).

   The work plan activities will include the following based on the planned Nonresidential use of the property:

   - Excavation, transport, and disposal of PCB concentrations that exceed 10 mg/kg;
   - Delineation, as needed, of concentrations above 1 mg/kg but below 10 mg/kg to establish the restrictive covenant areas where surface cover will need to be installed and/or maintained to comply with high occupancy with a surface cover requirements.

   The subject property will be used for commercial operations, and the existing surface cover will be supplemented, maintained, or replaced upon completion of the soil removal activities. The existing central and western subject buildings will remain similar to the current layout with the exception of the potential removal of the loading dock from the southern portion of the western building (400 East 10 Mile Road). Paved parking areas will be replaced upon completion of the soil excavation activities. Current groomed grass and/or landscaped areas are anticipated to the replaced with similar surface cover and the northwestern parking area will be paved.

The planned use of the subject property is consistent with a nonresidential land-use under Part 201. Interior areas will be consistent with a high occupancy use as defined under TSCA. Additionally, exterior areas are anticipated to be remediated to high occupancy levels to provide flexibility in future use.

3. Demolition Activities includes a pre-demolition survey, building demolition, foundation removal, fill/compaction/rough grading to balance site where building is located, removal of parking lots, removal of curbs and gutters, removal of sidewalks, removal of paved alley, and fees related to demolition engineering and design at an estimated of $462,500.

4. Asbestos Activities includes an asbestos survey, asbestos containing materials (ACM) abatement, oversight, air monitoring and associated reporting at an estimated cost of $60,000.

5. Preparation of the Brownfield Plan and Act 381 Work Plan (if necessary) and associated activities (e.g. meetings with BRA, review by City Attorney etc.) at a cost of approximately $12,500.

6. A 15% contingency of $328,406 is established to address unanticipated environmental and/or other conditions that may be discovered through the implementation of site activities. This excludes the cost of Baseline Environmental Assessment Activities and preparation of the Brownfield Plan and Act 381 Work 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: (a) tax increment revenues in Ferndale is $3,472,580 with a potential $513,431 contingency resulting in a total cost of $3,986,011, and (b) tax increment revenues in Pleasant Ridge is $2,248,310 with a potential $328,406 contingency resulting in a total cost of $2,576,716. Therefore the total cost for reimbursement to the applicant is a not-to-exceed amount of $6,562,728 (including contingency), unless the Plan is amended and approved by the Cities of Ferndale and Pleasant Ridge, the OCBRA, and Oakland County Board of Commissioners.

This plan also allots capture for local administrative fees as outlined in Table 2 and Table 3.

The OCBRA has established a Local Brownfield Revolving Fund (LBRF). Capture for the LBRF is included in this plan following developer reimbursement, currently estimated at $475,000. The funds deposited into the LBRF as part of this Plan will be used in accordance with the requirements of Act 381, as amended.

D. Estimate of Captured Taxable Value and Tax Increment Revenues (Sec. 13 (2)(c))

Incremental taxes on real property included in the redevelopment project will be captured under this Plan to reimburse eligible activity expenses. The base taxable value of the Property located in both Ferndale and Pleasant Ridge shall be determined by the use of the 2017 tax year tax values. The base taxable value for the Property located in Ferndale is $361,440. The base taxable value of the Property located in Pleasant Ridge is $1,123,420.

Tax increment revenue capture is proposed to begin when tax increment is generated by redevelopment of the Property, which is expected to begin in 2019 or when full redevelopment is completed whichever occurs first. The estimated taxable value of the completed development in Ferndale is $3,604,850 and in Pleasant Ridge is $2,443,400. This assumes a two-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 0.5% has been used for calculation of future tax increments in this Plan. Tables 2 and Table 3 detail the estimate of captured tax increment revenues for each year of the Plan from the eligible property.

Prior to reimbursement of tax increment revenue to the Developer, payment of Brownfield Redevelopment Authority Administrative fees will occur first.

E. Method of Brownfield Plan Financing and Description of Advances by the Municipality (Sec. 13 (2)(d))

Eligible activities will be financed by Iron Ridge Holdings, LLC and/or Iron Ridge Office LLC. The Developer will be reimbursed for eligible costs as described in Section C and outlined in Table 1. Costs for Eligible Activities funded by Iron Ridge Holdings, LLC and/or Iron Ridge Office 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. The estimated amount of tax increment revenue capture that will be used to reimburse the Developer and Brownfield Redevelopment Authority is $7,359,727. This includes Brownfield Plan preparation, Brownfield Redevelopment Authority Administrative fees and LBRF deposits.

No advances will be made by the OCBRA for this project. All reimbursements authorized under this Plan shall be governed by the Reimbursement Agreement.

F. Maximum Amount of Note or Bonded Indebtedness (Sec. 13 (2)(e))

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

G. Duration of Brownfield Plan (Sec. 13 (2)(f))

In no event shall the duration of the Plan, exceed 35 years following the date of the resolution approving the Plan, 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. The Property will become part of this Plan on the date this Plan is approved by the Oakland County Board of Commissioners.

H. Estimated Impact of Tax Increment Financing on Revenues of Taxing Jurisdictions (Sec. 13 (2)(g))

Taxes will continue to be generated to taxing jurisdictions on local captured millages at the base taxable value of $1,123,420 in Pleasant Ridge and $361,440 in Ferndale throughout the duration of this Plan totaling approximately $1,020,628 or $36,451 annually in Pleasant Ridge and $332,478 or $12,314 annually in Ferndale.

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 new tax revenue of approximately $393,114 in Pleasant Ridge and $1,516,270 in Ferndale throughout the duration of this Plan.

A summary of the impact to taxing jurisdictions for the life of the Plan is summarized below, which assumes taxes are captured throughout the duration of the Plan as estimated in Table 2 and Table 3. "Taxes Preserved for Taxing Units" assumes the full capture of available taxes, however during LBRF capture, it is anticipated that more will be available to reimburse local taxing units as not all captureable taxes will be utilized to reimburse the LBRF and other administrative fees.

Pleasant Ridge

Millage	Rate	Taxes Generated by Property (incl. base value)	Taxes Preserved for Taxing Units
County Pk & Rec	0.2392	$18,306	$7,524
HCMA	0.2146	$16,423	$6,750
OCPTA	0.9941	$76,078	$31,270
County Operating	4.0400	$309,179	$127,081
OIS Allocated	0.1985	$15,191	$6,244
OIS Voted	3.1413	$240,402	$98,812
OCC	1.5707	$120,205	$49,408
Infrastructure	2.8472	$217,895	$89,561
City Operating	10.8434	$829,840	$341,087
City Oper-2015	2.7804	$212,783	$87,460
Solid Waste	1.6260	$124,437	$51,147
Pool/Rec OPER	1.2073	$92,394	$37,977
Park Improvement	0.7190	$55,025	$22,617
Publicity	0.3481	$26,640	$10,950
FPS Sinking Fund	1.3000	$99,488	$40,892
Library	0.3763	$28,798	$11,837
Subtotal	***32.4461***	***$2,483,082***	***$1,020,616***
School Operating	18.0000	$1,377,530	$566,204
SET	6.0000	$459,177	$188,735
Subtotal	***24.0000***	***$1,836,707***	***$754,938***
Total Capturable	***56.4461***	***$4,319,789***	***$1,775,554***
Zoo Authority (County)	0.0990	$7,576	$7,576
Art Institute (County)	0.1981	$15,160	$15,160
FPS Debt	7.0000	$535,706	$535,706
Pool/Rec Debt	1.2122	$92,769	$92,769
Total Non-Capturable	***8.5093***	***$660,780***	***$660,780***
Total	***64.9554***	***$4,980,570***	***$2,436,335***

Ferndale

Millage	Rate	Taxes Generated by Property (incl. base value)	Taxes Preserved for Taxing Units
County Pk & Rec	0.2392	$25,888	$2,334
HCMA	0.2146	$23,226	$2,094
OCPTA	0.9941	$107,589	$9,701
County Operating	4.0400	$437,238	$39,426
OIS Allocated	0.1985	$21,483	$1,937
OIS Voted	3.1413	$339,974	$30,656
OCC	1.5707	$169,993	$15,328
City Operating	13.9451	$1,509,240	$136,089
Refuse Disposal	2.0915	$226,357	$20,411
City Oper-Voted	4.4552	$482,174	$43,478
FPS Sinking Fund	1.3000	$140,695	$12,687
Library-Voted	0.9587	$103,757	$9,356
Library-Operating	0.9204	$99,612	$8,982
Subtotal	***34.0693***	***$3,687,228***	***$332,478***
School Operating	18.0000	$649,364	$58,553
SET	6.0000	$1,948,091	$175,660
Subtotal	***24.0000***	***$2,597,455***	***$234,213***
Total Capturable	***58.0693***	***$6,284,683***	***$566,691***
Zoo Authority (County)	0.0990	$10,715	$10,715
Art Institute (County)	0.1981	$21,440	$21,440
FPS Debt	7.0000	$757,591	$757,591
GWK Facility DBT	1.7340	$187,666	$187,666
Debt Service (Ferndale)	4.1790	$452,282	$452,282
Stormwater Settlement	2.0930	$226,520	$226,520
Total Non-Capturable	***15.3031***	***$1,656,213***	***$1,656,213***
Total	***73.3724***	***$7,940,895***	***$2,222,904***

For a complete breakdown of the captured millages and developer reimbursement please see "Table 2" and "Table 3."

I. Legal Description, Property Map, Statement of Qualifying Characteristics and Personal Property (Sec. 13 (2)(h))

The legal description of the Property included in this Plan is attached in Appendix A.

Property location maps are included in Appendix B.

Documentation of characteristics that qualify the property as eligible property is provided in Appendix D.

J. Displacement/Relocation of Individuals on Eligible Property (Sec. 13 (2)(i-l))

No displacement of residents or families is expected as part of this project. Compliance with all relocation requirements of PA 381 and the standards and provisions of the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, Public Law 91-646 will be kept. Currently there is one tenant. It is not anticipated displacement will occur during the project and therefore will not need relocation assistance.

K. Local Brownfield Revolving Fund ("LBRF") (Sec. 13 (2)(m))

The OCBRA has established a Local Brownfield Revolving Fund (LBRF). Capture for the LBRF is included in this plan for up to five (5) years in Ferndale and up to two (2) years in Pleasant Ridge, following developer reimbursement, currently estimated at $475,000. The funds deposited into the LBRF as part of this Plan will be used in accordance with the requirements of Act 381, as amended.

L. Other Material that the Authority or Governing Body Considers Pertinent (Sec. 13 (2)(n))

The Brownfield Redevelopment Authority and the County Commission as the Governing Body, in accordance with the Act, may amend this Plan in order to fund additional eligible activities associated with the Project described herein. This includes re-approval by the City of Ferndale City Council and City of Pleasant Ridge City Commission.

At this time, the developer intends to seek reimbursement from the Michigan Economic Development Corporation (MEDC)/Michigan Strategic Fund (MSF) and Michigan Department of Environmental Quality (MDEQ) support for the use of school millages. Should MEDC/MSF and/or MDEQ reimbursement not be received, the total local tax capture amount approved under this plan will be capped to the local contribution only and local taxes will not be utilized to reimbursement the school tax capture portion. Should for any reason, MEDC/MSF or MDEQ approval not be received, the developer may seek a potential amendment with the local municipalities at that time.

The tax increment financing tables provided in Tables 2 and 3 include the assumption of MEDC/MSF and MDEQ approval.

This Brownfield Plan is the only incentive being pursued by the developer from the City of Ferndale and Pleasant Ridge.

The developer is contemplating the use of other incentive programs, such as Property Assessed Clean Energy (PACE) financing, to aid in upfront equity assistance. These programs being contemplated are separate from any direct assistance requested from the municipalities. Additionally, this statement is not meant to limit the exploration of grant and financial assistance sought from future tenants of the property which should be viewed for their own merit if presented.

Since the initial submittal of the Brownfield Plan in April 2017, having lapsed State Equalization (May 22, 2017), the Base Year will require change to 2017. This is reflected in this revised version of the Brownfield Plan. The Base Year taxable value for purposes of this plan is now higher than

initially projected. Based on the decrease in available TIR, it is not projected within the attached TIF tables (Tables 2 and 3) that the developer will receive full reimbursement within the 26 year limitation in Pleasant Ridge. The requested eligible activity amount will remain unchanged. If the *actual* TIR collected on the property is projected to take longer than 26 years to fully reimburse the requested amount, the developer may seek an amendment at that time with the City of Pleasant Ridge and OCBRA, to extend the payback period.

Appendix A

PM ENVIRONMENTAL Environmental & Engineering Services

City of Ferndale

Legal Description: 3351 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-201-005*

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 252

Legal Description: 3281 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-201-012

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 259

Legal Description: 3265 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-201-013

T1N, R11E, SEC 27 WOODWARD HTS ROYAL OAK ADD LOTS 260 TO 266 INCL

Legal Description: 3155 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-201-015

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOTS 269 TO 272 INCL

Legal Description: 3291 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-201-019

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOTS 253 TO 258 INCL

Legal Description: 660 E TEN MILE RD, FERNDALE, MI Parcel Number: 25-27-201-020*

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOTS 248 TO 251 INCL EXC THAT PART TAKEN FOR I-696 HWY & DESC AS LYING NLY OF LINE DESC AS BEG AT NW COR OF LOT 251 TH SELY TO POINT ON E LINE OF LOT 251 LOC NLY 97 FT FROM SE COR OF LOT 251, TH SELY TO POINT ON W LINE OF LOT 248 LOC NLY 58 FT FROM SW COR OF LOT 248, TH ELY 29 FT AT RIGHT ANGLE TO W LINE OF LOT 248, TH SLY TO POINT ON S LINE OFLOT 248 LOC 35 FT ELY OF SW COR OF LOT 248, TH ELY 5.00 FT TO POINT OF ENDING 1/7/85 FR 017

Legal Description: 3350 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-008

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 244, ALSO 1/2 OF VAC ALLEY ADJ TO SAME

Legal Description: 3342 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-009

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 243

Legal Description: 3252 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-018

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 234

Legal Description: 3242 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-019

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 233

Legal Description: 3232 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-020

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 232

Legal Description: 3224 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-021

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 231

Legal Description: 3216 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-022

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 230

Legal Description: 3206 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-023

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 229

Legal Description: 3164 BERMUDA ST, FERNDALE, MI Parcel Number: 25-27-202-024

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOT 228

Legal Description: BERMUDA (formerly 700-710 E TEN MILE ROAD), FERNDALE, MI Parcel Number: 25-27-202-052

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOTS 246 & 247, ALSO 1/2 OF VAC ALLEY ADJ TO SAME09/25/84 FR 001 & 002

Legal Description: BERMUDA (formerly 3262-3280 BERMUDA ST), FERNDALE, MI Parcel Number: 25-27-202-053

T1N, R11E, SEC 27 WOODWARD HEIGHTS ROYAL OAK ADD LOTS 235, 236 & 237 11-9-90 FR 015, 016 & 017

City of Pleasant Ridge

Legal Description: 404 E TEN MILE RD, PLEASANT RIDGE, MI Parcel Number: 25-27-127-009

T1N, R11E, SEC 27 STEPHENSON-BARBER R O SUB NO 3 LOTS 266, 267, 268 & PART OF LOT 269, ALSO PART OF NW 1/4 ALL BEING DESC AS BEG AT NE COR OF SD LOT 266,TH N 89-11-00 W 277.56 FT ALG S LINE OF TEN MILE RD, TH S 03-59-40 W 47.81 FT,

TH S 27-39-20 E 400.39 FT, TH S 89-11-00 E 95.49 FT TO SE COR OF LOT 269, TH N 400 FT TO BEG

Legal Description: 660 E TEN MILE RD, PLEASANT RIDGE, MI Parcel Number: 25-27-127-010

T1N, R11E, SEC 27 STEPHENSON BARBER ROYAL OAK SUB NO 3 LOTS 261 TO 265 INCL, ALSO E 1/2 OF S 50 FT OF VAC BARBER AVE ADJ TO SD LOT 261, ALSO PART OF NW 1/4 OF SEC 27 BEG AT SE COR OF LOT 261 OF SD 'STEPHENSON BARBER ROYAL OAK SUB NO 3', TH S 575.86 FT ALG W LINE OF 'WOODWARD HEIGHTS ROYAL OAK ADD', TH N 28-28-15 W 606 FT, TH N 67-55-00 E 123 FT, TH S 89-11-00 E 175 FT TO BEG 12-3-15 CORR

Legal Description: 400 E TEN MILE RD, PLEASANT RIDGE, MI Parcel Number: 25-27-127-012

T1N, R11E, SEC 27 PART OF NE 1/4 OF NW 1/4 BEG AT PT DIST N 89-11-00 W 277.52 FT FROM INTER OF S LINE OF TEN MILE RD & W LINE OF BARBER AVE, TH S 03-59-40 W 48.59 FT, TH S 27-38-00 E 334.18 FT, TH SLY ALG W LINE OF 'STEPHENSON-BARBER ROYAL OAKSUB NO 3' TO SW COR OF LOT 270 OF SD SUB, TH ELY TO SE COR OF SD LOT, TH S 67-55-00 W 123 FT TO ELY R/W LINE GTRR, TH NW ALG SD R/W 631 FT, TH ELY 135.50 FT TO BEG 1.68 A

Legal Description: NO ADDRESS, PLEASANT RIDGE, MI Parcel Number: 25-27-127-013

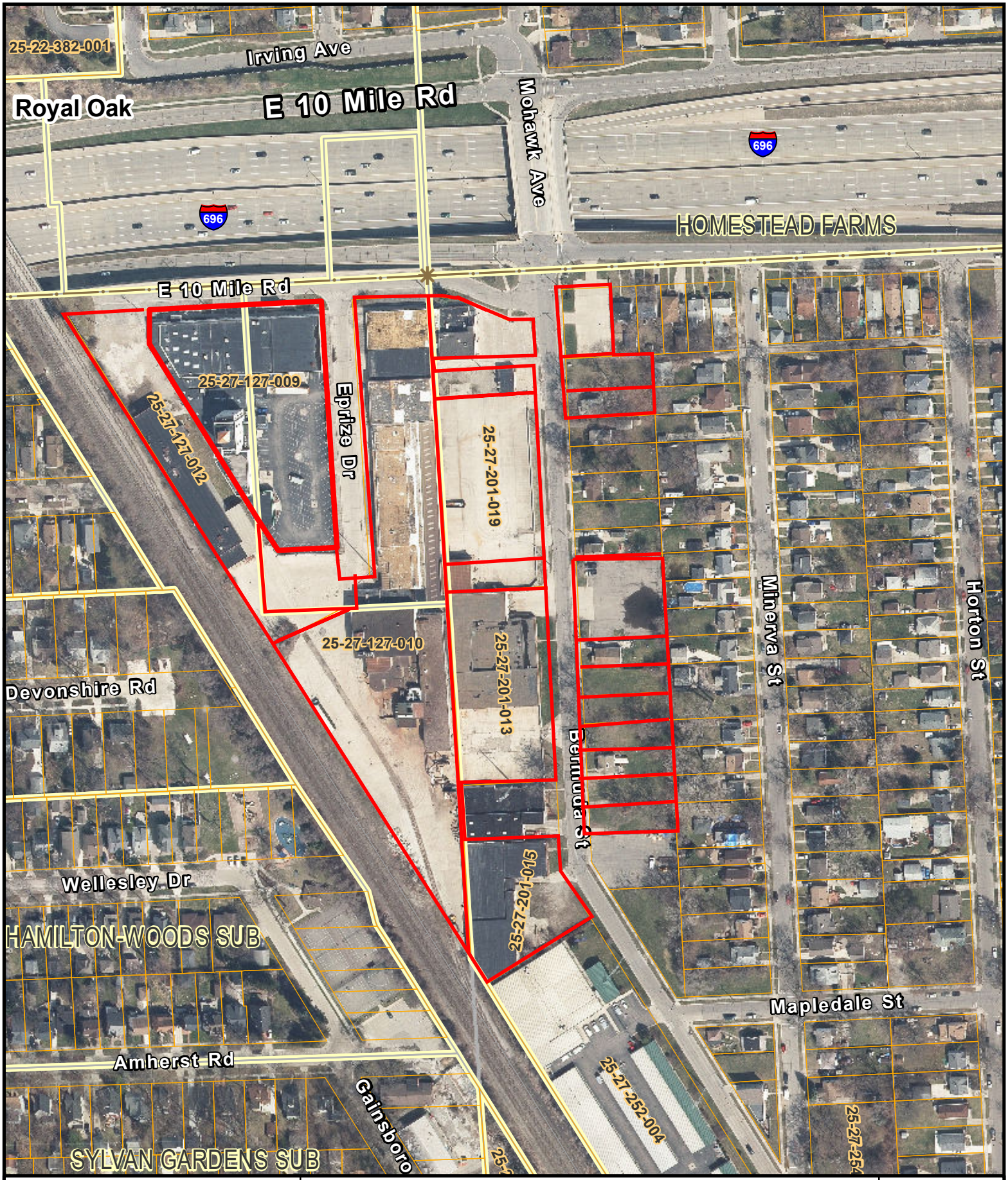
T1N, R11E, SEC 27 STEPHENSON BARBER ROYAL OAK SUB NO 3 TRIANGULAR PART OF LOT 269 MEAS 29.51 FT ON S LOT LI & MEAS 59.43 FT ON W LOT LI, ALSO ALL OF LOT 270, ALSO W 1/2 OF VAC S 50 FT OF BARBER AVE ADJ TO SD LOT 270 10-18-89 CORR

**Once the alleyway between 660 East 10 Mile Road and 3351 Bermuda is vacated, it will be divided equally between these two parcels.*

Appendix B

PM ENVIRONMENTAL Environmental & Engineering Services

Assessors 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

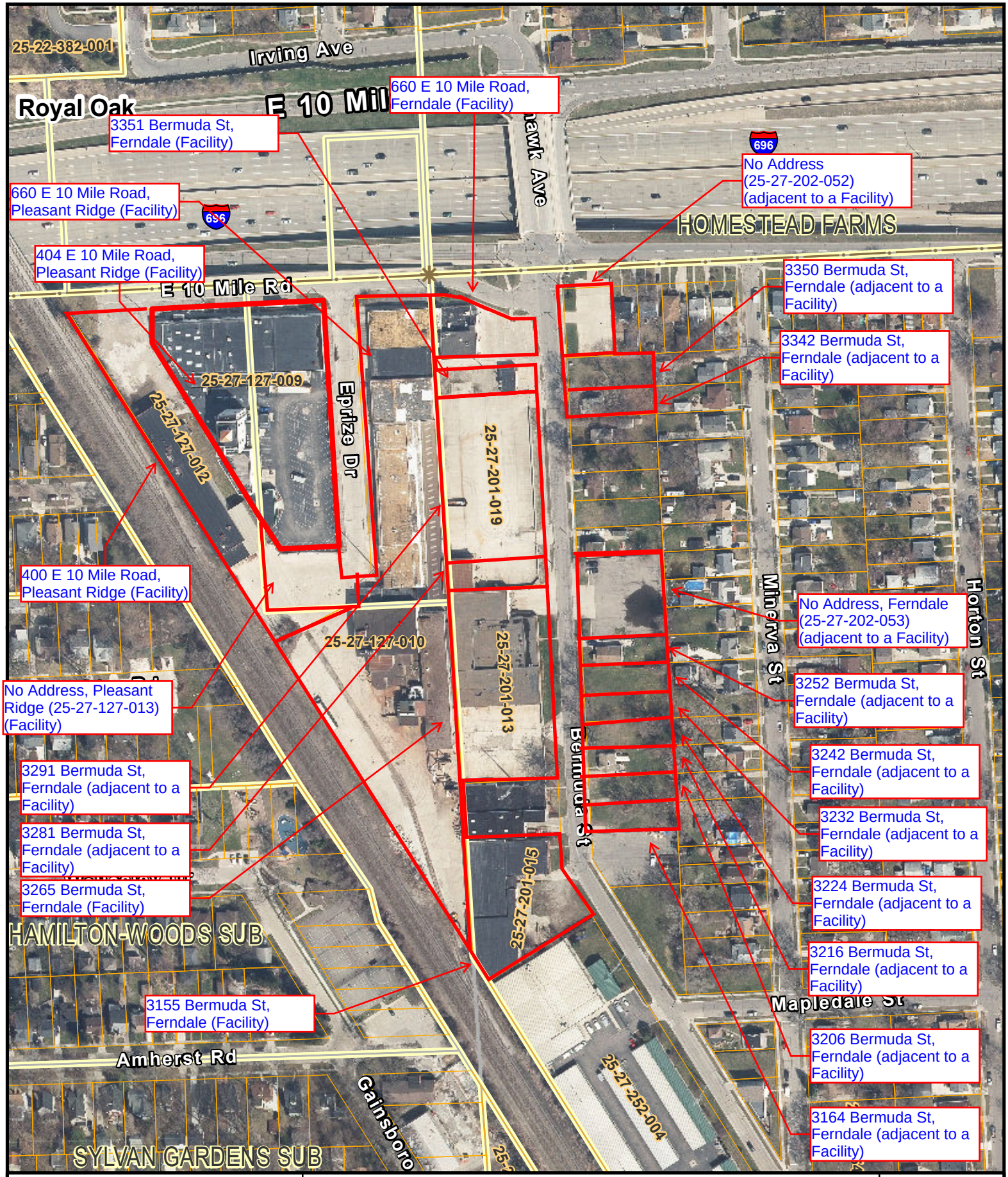
Date Created: 4/13/2017

NORTH

1 inch = 200 feet

Oakland County One Stop Shop 2100 Pontiac Lake Road Bldg. 41 West Waterford, MI 48328 Phone: 248-858-0721 Web: www.advantageoakland.com

Assessors Map



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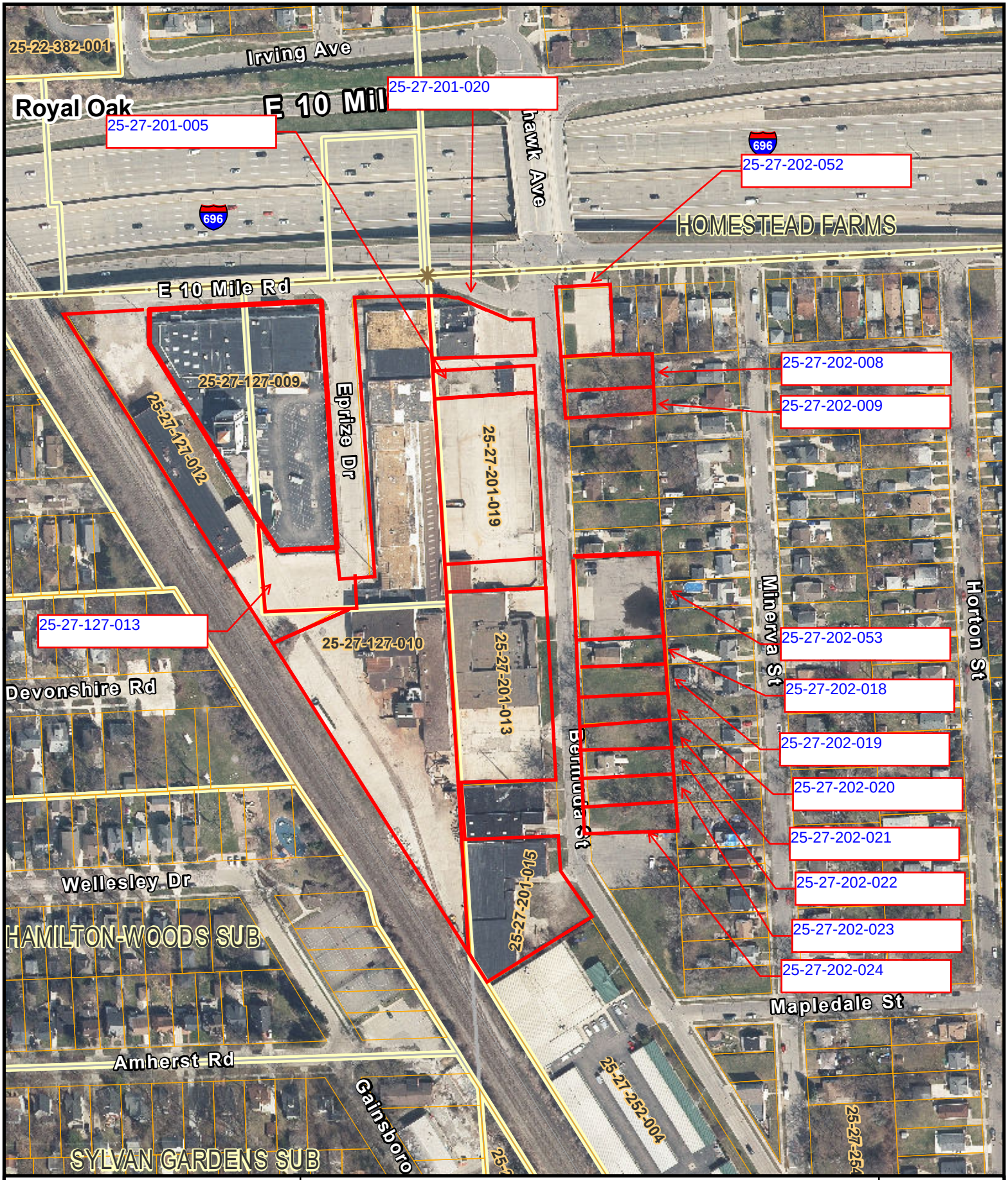
Assessors Map



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OAKLAND COUNTY MICHIGAN
Economic Development & Community Affairs

L. Brooks Patterson
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Date Created: 4/13/2017

NORTH

1 inch = 200 feet

Oakland County One Stop Shop 2100 Pontiac Lake Road Bldg. 41 West Waterford, MI 48328 Phone: 248-858-0721 Web: www.advantageoakland.com

Appendix C

PM ENVIRONMENTAL Environmental & Engineering Services

Iron Ridge Flat Plan

1" = 50'-0"

Area Square Footage Calculations

Long Market-	31,582 sq. ft.
Iron Row North Apartments-	27,647 sq. ft.
North Tech.-	24,443 sq. ft.
Fire Rover-	24,236 sq. ft.
South Tech.-	19,282 sq. ft.
Tower Office-	18,757 sq. ft.
Pulse Fitness-	15,454 sq. ft.
Detroit Air Compressor-	11,524 sq. ft.
Brew House-	9,789 sq. ft.
Beer Garden-	7,625 sq. ft.
Venue-	7,343 sq. ft.
North Anchor-	6,877 sq. ft.
NE Office-	4,983 sq. ft.
Transition-	4,857 sq. ft.
Personnel Building-	1,110 sq. ft.

Demo Square Footage Calculations

DEMO 1-	2,609 sq. ft.
DEMO 2-	7,111 sq. ft.
DEMO 3-	129 sq. ft.
DEMO4-	2,277 sq. ft.
TOTAL SQ. FT. =	12,126 sq. ft.

Total Parking Available On Site

PARKING AVAILABLE = 626 SPACES

krieger klatt ARCHITECTS
architecture interiors consulting
1412 E. 11 Mile Rd. | Royal Oak, MI 48067
P: 248.414.9270 **F:** 248.414.9275
www.kriegerklatt.com

Client:

Iron Ridge Holdings, LLC
520 N Main
Royal Oak, MI 48067

Project:

Iron Ridge - Flat Plan

Issued	Description	By
12-28-2016	Flat Plan	EM

PRELIMINARY NOT FOR CONSTRUCTION

Seal:

Note:

Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.

North Arrow:

North

Sheet Title:

Iron Ridge Flat Plan

Project Number:

16-181

Sheet Number:

A.101

PM Project No. 01-07985-0
Location: Proposed Ironridge Campus,
Ferndale and Pleasant Ridge, Michigan

Photograph 1

Project Concept Overview Photo

Photograph 2

Proposed Apartment Complex

PM Project No. 01-07985-0
Location: Proposed Ironridge Campus, Ferndale and Pleasant Ridge, Michigan

Photograph 3

Proposed Apartment Complex

Photograph 4

Proposed Campus (Brewery in front, apartments in back)

PM Project No. 01-07985-0
Location: Proposed Ironridge Campus,
Ferndale and Pleasant Ridge, Michigan

Photograph 5

Proposed Brewery (Exterior)

Photograph 6

Brewery Bar Area

PM Project No. 01-07985-0
Location: Proposed Ironridge Campus,
Ferndale and Pleasant Ridge, Michigan

Photograph 7

Brewery (Interior rendering)

Photograph 8

Proposed Office Building

Appendix D

PM ENVIRONMENTAL Environmental & Engineering Services

PM ENVIRONMENTAL
Risk Well Managed

Environmental & Engineering Services Nationwide

ENVIRONMENTAL SERVICES

BUILDING ARCHITECTURE, ENGINEERING & SCIENCE

INDUSTRIAL HYGIENE SERVICES

BROWNFIELDS & ECONOMIC INCENTIVES CONSULTING

BASELINE ENVIRONMENTAL ASSESSMENT

404 East 10 Mile Road | Pleasant Ridge, Michigan
PM Project Number 01-5706-1-0002

Prepared for:

Iron Ridge Office LLC
520 North Main Street
Royal Oak, Michigan 48067

Prepared by:

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

Know Your Risk.
Take Control.
Work with the Experts.

www.pmenv.com

PM ENVIRONMENTAL
Risk Well Managed

Metro Detroit
4080 W. 11 Mile Road
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t: 248.336.9988

Lansing
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Lansing, MI 48906
f: 877.884.6775
t: 517.321.3331

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

April 3, 2017

District Supervisor
Michigan Department of Environmental Quality
Southeast Michigan District Office
27700 Donald Court
Warren, Michigan 48092

RE: Baseline Environmental Assessment for the Commercial Property Located at 404 East 10 Mile Road, Pleasant Ridge, Michigan
Parcel ID: 25-27-127-009
PM Environmental, Inc. Project No. 01-5706-1-0002

Dear District Supervisor:

Enclosed is a copy of the Baseline Environmental Assessment prepared for the above referenced subject property in accordance with Section 20126(1)(c) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), P.A. 451 of 1994, as amended.

If you have any questions regarding the information in this report, please contact us at 800-313-2966.

Sincerely,
PM ENVIRONMENTAL, INC.

Jamie Antoniewicz, P.E.
Project Engineer

J. Adam Patton, CHMM
Manager - Site Investigation Services

Enclosure

PM ENVIRONMENTAL
Risk Well Managed

Metro Detroit
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Lansing
3340 Ranger Road
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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

April 3, 2017

Mr. Gregory Cooksey
Iron Ridge Office LLC
520 North Main Street
Royal Oak, Michigan 48067

RE: Baseline Environmental Assessment for the Commercial Property Located at 404 East 10 Mile Road, Pleasant Ridge, Michigan
Parcel ID: 25-27-127-009
PM Environmental, Inc. Project No. 01-5706-1-0002

Dear Mr. Cooksey:

Enclosed is a copy of the Baseline Environmental Assessment prepared for the above referenced subject property in accordance with Section 20126(1)(c) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), P.A. 451 of 1994, as amended.

THIS BASELINE ENVIRONMENTAL ASSESSMENT WAS PERFORMED FOR THE EXCLUSIVE USE OF IRON RIDGE OFFICE LLC AND OAKLAND COUNTY, EACH OF WHOM MAY RELY ON THE REPORT'S CONTENTS.

If you have any questions regarding the information in this report, please contact our office at 800-313-2966.

Sincerely,
PM ENVIRONMENTAL, INC.

Jamie Antoniewicz, P.E.
Project Engineer

J. Adam Patton, CHMM
Manager - Site Investigation Services

Enclosure

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION AND DISCUSSION

PM Environmental, Inc. (PM) completed a Baseline Environmental Assessment (BEA) for the commercial property (Parcel ID: 25-27-127-009) located at 404 East 10 Mile Road, Pleasant Ridge, Oakland County, Michigan 48069 (hereafter referred to as the "subject property"; Figure 1) in accordance with Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), P.A. 451 of 1994, as amended.

The subject property is identified as 404 East 10 Mile Road, Pleasant Ridge, Michigan, and consists of one 1.875 acre parcel (Figure 1). The subject property is developed with a 40,329 square foot commercial building. The building is mainly one-story with the central portion consisting of four stories and a basement (Figure 2). The property is currently zoned RO: Restricted Access.

Standard and other historical sources documented that the subject property was developed prior to 1940, and likely in 1933 based on Sanborn maps, with the northern and western-central portions of the current building. Additions were constructed in the 1960s, 1970s and 1990s to complete the current layout. The southern portion of the subject property was also occupied by a coal yard from at least the 1950s through late 1960s.

The northern portion of the subject building was occupied by Michigan Bell and utilized for service garages and machine shops in at least the 1950s. Additionally, the building contained an egg distributor in the 1950s. In the 1960s, the property was occupied by Frank's Nursery and utilized for warehousing of retail products, and by the late 1960s the building was occupied by Walmet Division of Valenite, Inc. The west-central portion of the subject building was formerly occupied by manufacturing operations in at least the 1950s and potentially as early as the 1930s. The building was occupied by Walmet by the 1960s. A tool house was located on the southern portion of the property in at least the 1960s. Between 1974 and 1980, the current southern lobby area was developed in the area of the former tool house. Operations associated with Walmet consisted of manufacturing of carbides and included tooling and extrusion. The building was vacated by Walmet in 1994, and remained vacant through the 1990s. The building has been occupied by professional offices since approximately 2000. Additionally, a portion of the northern building has been utilized for storage and limited fabrication of acoustical materials from approximately 2000 to 2016.

1.1 Owner/Operator Information

Iron Ridge Office LLC, 47 Oxford Road, Grosse Pointe, Michigan 48236, intends to purchase the subject property on or after April 7, 2017.

1.2 Intended Use of the Subject Property

Iron Ridge Office LLC intends to lease the property to commercial tenants.

1.3 Summary of All Appropriate Inquiry Phase I Environmental Assessment

PM completed a Phase I Environmental Site Assessment (ESA) dated March 30, 2017, in conformance with the scope and limitations of ASTM Practice E 1527-13 (i.e., the ‘ASTM Standard’). A copy of the March 2017 Phase I ESA, including photographs of the subject property, is included in Appendix A.

The following recognized environmental conditions (RECs) were identified in PM's March 2017 Phase I ESA:

- The southern portion of the subject property was occupied by a coal yard from at least the 1950s through the 1960s and the subject property was utilized for manufacturing operations from the 1960s until the 1990s. Previous site assessment activities completed in 1995 and 2015 document soil and groundwater contamination exists on-site above the current Part 201 Residential and Nonresidential Generic Cleanup Criteria. 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 NREPA, as amended.

- Analytical results from 1995, 2015, and 2016 identified polychlorinated biphenyls (PCBs) above Toxic Substance Control Act (TSCA) subpart D cleanup standards, up to and including concentrations requiring removal, and a BEA will not provide the purchaser liability protection under TSCA.

No adjoining and/or nearby RECs were identified.

1.3.1 Phase I ESA Exceptions or Deletions

There were no exceptions or deletions from the Federal All Appropriate Inquiry Rule under 40 CFR 312, or the ASTM Standard during the completion of PM's March 2017 Phase I ESA and no special terms or conditions applied to the preparation of the Phase I ESA.

1.3.2 Phase I ESA Data Gaps

PM did not identify any significant data gaps during the completion of the March 2017 Phase I ESA.

1.4 Summary of Previous Subsurface Site Investigations

PM reviewed the following previous environmental reports for the subject property. Relevant portions of the reports are available in the Phase I ESA in Appendix A or within Michigan Department of Environmental Quality (MDEQ) records.

Name of Report	Date of Report	Company that Prepared Report
Phase I ESA	October 5, 1993	Applied Science & Technology, Inc. (ASTI)
Subsurface Investigation	April 20, 1995	ASTI
Category D BEA	August 23, 1995	Integrated Environmental, Inc. (IE)
Phase I ESA	December 23, 2014	PM
Phase II ESA	June 14, 2016	PM

The Phase I ESA conducted in 1994 was conducted when the Walmet Division of Valenite, Inc. still occupied the subject property. The report documented that Valenite, Inc. and its related companies had occupied the subject property since 1956. Limited historical information reviewed was consistent with this report. Documented operations consisted of extruding or pressing carbide-grade powder, which was then hardened in a furnace. The Phase I ESA also included the west adjoining property, which in the report is identified as Building #3.

ASTI identified concerns related to the long term manufacturing operations, floor drains in the manufacturing areas, and the removal of the former underground storage tanks (USTs) with no documentation of sampling, as potential areas of concern.

Based on these concerns, the subsurface investigation was conducted by ASTI in 1995. Site assessment activities included advancement of soil borings in the areas of concern identified, and collection of soil and groundwater samples for laboratory analysis of volatile organic compounds (VOCs), polynuclear aromatic compounds (PNAs), PCBs, and metals. Analytical results documented various concentrations of contaminants above the current Part 201 Generic Cleanup Criteria on the subject property and the west adjoining property. Based on these analytical results, the BEA was conducted for the current owner.

A summary of the analytical results from the previous site investigations are included on Figures 3A and 4A and in Tables 1 through 3.

On July 2, 2015, PM completed a scope of work consisting of the advancement of 16 soil borings (SB-1 through SB-16) and the installation of five temporary monitoring wells (TMW-1, TMW-4, TMW-6, TMW-15, and TMW-16) to assess the RECs identified in PM's December 2014 Phase I ESA. A total of 19 soil and five groundwater samples were analyzed for VOCs, PNAs, PCBs, and metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc), or some combination thereof.

Analytical results from the July 2015 sampling event identified PCB concentrations above TSCA subpart D cleanup standards. Additional investigations were conducted in August, September, and November 2015 and May 2016 that included of the advancement of 41 soil borings (SB-1R, SB-3R, and SB-17 through SB-55) and the collection of soil samples for analysis of PCBs to further define the area of PCB impact identified in July 2015. Refer to Section 2.0 for a summary of the analytical results from the previous investigations.

1.5 Geology and Hydrogeology

Based on review of soil boring logs prepared by PM, the soil stratigraphy generally consists of loose sand and/or clayey sand to a depth of 6.0 to 12.0 feet bgs underlain by silty clay or clay to a depth of at least 20.0 feet bgs. Soils associated with the identified PCB impact were generally black or gray stained/discolored. Limited, perched, and discontinuous groundwater was encountered between 7.0 and 11.0 feet bgs.

Soil boring/temporary monitoring well logs depicting the soil stratigraphy and PID readings are included in Appendix B.

2.0 LOCATION OF CONTAMINATED MEDIA ON THE SUBJECT PROPERTY

The analytical results for the samples collected during site investigation activities were compared with the MDEQ Generic Cleanup Criteria and Screening Levels as presented 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.

Shallow groundwater (i.e. less than three meters bgs) analytical results were compared to Vapor Intrusions Screening Levels (VISLs) presented in the May 2013 MDEQ Guidance Document for the Vapor Intrusion Pathway.

PCB analytical results were further compared to TSCA subpart D cleanup standards as summarized below:

	No Action	Appropriate Cap w/Deed Restriction	Removal Required
High Occupancy Area (≥335 hours/year)	≤1 ppm	>1 to ≤10 ppm	>10 ppm
Low Occupancy Area (<335 hours/year)	≤25 ppm w/ deed restriction	>25 to ≤100 ppm	>100 ppm

Laboratory analytical reports from PM's 2015 and 2016 site investigation are included in Appendix C.

2.1 Summary of Soil/Groundwater Analytical Results – July 2015

The table below summarizes exceedances of cleanup criteria in the soil and groundwater samples collected by PM for soil borings SB-1 through SB-16.

SUMMARY OF ANALYTICAL RESULTS

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen Depth and [DTW] (feet bgs)	Analysis	Objectives	Part 201 Cleanup Criteria Exceedances	
					Soil	Groundwater
SB/TMW-1 (10.0)	2.0-3.0	5.6-10.6 [9.45]	VOCs, PNAs, PCBs, metals	Assess former manufacturing operations	**SVII/VSI/PSI/ DC/TSCA:** PCBs	NONE
SB-2 (15.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, arsenic	Assess former coal yard, west adjoining property, and previously identified PCB impact	**DWP/GSIP:** 1,1,1-trichloroethane, arsenic **DC(R)** PCBs, arsenic **TSCA:** PCBs	NA
SB-3 (15.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, metals	Assess former coal yard	**DWP/GSIP:** 1,1,1-trichloroethane **DC(R/NR)/ TSCA:** PCBs	NA
SB/TMW-4 (20.0)	4.0-5.0	9.6-14.6 [10.75]	VOCs, PNAs, PCBs, metals	Assess former coal yard and east adjoining property	NONE	NONE

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen Depth and [DTW] (feet bgs)	Analysis	Objectives	Part 201 Cleanup Criteria Exceedances	
					Soil	Groundwater
SB-5 (10.0)	4.0-5.0 and 9.0-10.0	NA	VOCs, PNAs, PCBs, metals	Assess former machine shop, manufacturing operations, floor drain and previous identified VOC impact	NONE	NA
SB/TMW-6* (20.0)	1.0-2.0	8.5-13.5 [9.61]	VOCs, PNAs, PCBs, arsenic	Assess west adjoining property and previously identified PCB impact	**DWP/GSIP:** 1,1,1-trichloroethane **SVII/VSI/PSI/ DC/TSCA:** PCBs	NONE
	4.0-5.0				NONE	
SB-7 (10.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, metals	Assess former machine shop and manufacturing operations	**DWP/GSIP/ DC(R):** arsenic	NA
SB-8 (15.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, arsenic	Assess west adjoining property and previously identified arsenic impact	NONE	NA
SB-9 (5.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, metals	Assess former manufacturing operations and previously identified arsenic impact	NONE	NA
SB-10 (9.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, metals	Assess former machine shop	NONE	NA
SB-11 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former manufacturing operations, former garage, and previously identified arsenic impact	**DWP/GSIP/ DC(R):** arsenic	NA
SB-12 (15.0)	4.0-5.0	NA	VOCs, PNAs, PCBs, metals	Assess former manufacturing operations and former garage	NONE	NA

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen Depth and [DTW] (feet bgs)	Analysis	Objectives	Part 201 Cleanup Criteria Exceedances	
					Soil	Groundwater
SB-13 (15.0)	1.0-2.0 and 4.0-5.0	NA	VOCs, PNAs, PCBs, metals	Assess former manufacturing operations and former garage	NONE	NA
SB-14 (15.0)	5.0-6.0	NA	VOCs, PNAs, PCBs, metals	Assess previously identified arsenic and PCB concentrations	**DWP/GSIP/ DC(R):** arsenic	NA
SB/TMW-15 (15.0)	1.0-2.0	5.9-10.9 [7.70]	VOCs, PNAs, PCBs, metals	Assess former coal yard	**DC(R):** lead	NONE
SB/TMW-16 (20.0)	2.0-3.0	8.5-13.5 [8.98]	VOCs, PNAs, PCBs, metals	Assess east adjoining property and previously identified PCB concentrations	**DWP/GSIP:** 1,1,1-trichloroethane	NONE

DW/P – Drinking Water/ Protection
GSI/P – Groundwater Surface Water Interface/ Protection
SVII – Soil Volatilization to Indoor Air Inhalation
DC – Direct Contact
VSI – Ambient Air Volatile Soil Inhalation
PSI – Particulate Soil Inhalation
R – Residential
NR – Nonresidential
* Boring location is not within the property boundary

2.1.1 Summary of Soil Analytical Results - July 2015

The soil analytical results are summarized on Figure 3B and in Tables 4 and 5.

Soil analytical results identified concentrations of 1,1,1-trichloroethane in SB-2, SB-6, and SB-16 above Part 201 Residential and Nonresidential DWP and GSIP cleanup criteria. Concentrations of VOCs in the remaining soil samples are below laboratory method detection limits (MDLs) and/or the most restrictive Part 201 Residential cleanup criteria.

Soil analytical results identified concentrations of PNAs in SB-3 and SB-15 below the most restrictive Part 201 Residential cleanup criteria. No concentrations of PNAs were identified in the remaining soil samples above laboratory MDLs.

Refer to Section 6.3 for a summary of the PCB analytical results.

Soil analytical results identified concentrations of arsenic in SB-2, SB-7, SB-11, and SB-14 above Part 201 Residential and Nonresidential DWP, GSIP, and Residential DC cleanup criteria. A concentration of lead was identified in SB-15 above Part 201 Residential DC cleanup criteria. Concentrations of the remaining metals are below the Statewide Default Background Levels (SDBLs) and/or the most restrictive Part 201 Residential cleanup criteria.

2.1.2 Summary of Groundwater Analytical Results – July 2015

The groundwater analytical results are summarized on Figure 4B and in Table 6.

Groundwater analytical results identified concentrations of 1,1,1-trichloroethane and/or 1,1-dichloroethane in samples collected from TMW-1, TMW-4, TMW-6, and TMW-15 below the most restrictive Part 201 Residential cleanup criteria. No concentrations of VOCs were identified in the remaining groundwater samples above laboratory MDLs.

No concentrations of PNAs were identified in any of the groundwater samples above laboratory MDLs.

No concentrations of metals were identified in any of the groundwater samples above the most restrictive Part 201 Residential cleanup criteria.

2.2 Summary of Soil Analytical Results – PCBs (1995-2016)

The analytical results from the PCB sampling and delineation activities are summarized on Figures 5A and 5B and in Table 7.

The table below summarizes the PCB analytical results as compared to TSCA subpart D cleanup standards with considerations for low or high occupancy areas.

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	PCB Concentration (mg/kg)	TSCA Cleanup Levels Based on Occupancy Areas (mg/kg) Action Applicable (Yes/No)					
			No Action		Maintain cap with institutional control		Removal Required	
			High	Low	High	Low	High	Low
			(≤1)	(≤25)	(>1 to ≤10)	(>25 to ≤100)	(>10)	(>100)
March and July 1995, ASTI and IE								
B1-1	2.0-4.0	<0.33	**YES**	**YES**	-	-	-	-
B3-1	0.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
B13-4	6.0-8.0	0.43	**YES**	**YES**	-	-	-	-
B13-5	8.0-10.0	<0.33	**YES**	**YES**	-	-	-	-
HB5	0.0-3.0	0.39	**YES**	**YES**	-	-	-	-
HB6	0.0-3.0	**17**	No	**YES**	No	-	**YES**	-
HB7	0.0-3.0	0.93	**YES**	**YES**	-	-	-	-
HB8	0.0-3.0	0.86	**YES**	**YES**	-	-	-	-
HB9	0.0-3.0	0.39	**YES**	**YES**	-	-	-	-
B16-1	0.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
B16-3	4.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
B17-1	0.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
B17-3	4.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
B18-1	0.0-2.0	0.44	**YES**	**YES**	-	-	-	-
B18-3	4.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
B19-2	2.0-4.0	<0.33	**YES**	**YES**	-	-	-	-
B19-3	4.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
B20-1	0.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
B20-4	6.0-8.0	<0.33	**YES**	**YES**	-	-	-	-

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	PCB Concentration (mg/kg)	TSCA Cleanup Levels Based on Occupancy Areas (mg/kg) Action Applicable (Yes/No)					
			No Action		Maintain cap with institutional control		Removal Required	
			High	Low	High	Low	High	Low
			(≤1)	(≤25)	(>1 to ≤10)	(>25 to ≤100)	(>10)	(>100)
July, August, and November 2015 and May 2016, PM								
SB-1	2.0-3.0	**11,000**	No	No	No	No	**YES**	**YES**
SB-1R	5.0-6.0	**7.4**	No	**YES**	**YES**	-	-	-
SB-1R	8.5-9.5	**247**	No	No	No	No	**YES**	**YES**
SB-2	2.0-3.0	**5.4**	No	**YES**	**YES**	-	-	-
SB-3	2.0-3.0	**23**	No	**YES**	No	-	**YES**	-
SB-3R	8.5-9.5	<0.33	**YES**	**YES**	-	-	-	-
SB-4	4.0-5.0	<0.33	**YES**	**YES**	-	-	-	-
SB-5	4.0-5.0	<0.33	**YES**	**YES**	-	-	-	-
SB-5	9.0-10.0	<0.33	**YES**	**YES**	-	-	-	-
SB-6*	1.0-2.0	**880**	No	No	No	No	**YES**	**YES**
SB-6*	4.0-5.0	<0.33	**YES**	**YES**	-	-	-	-
SB-7	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-8	1.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
SB-9	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-10	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-11	1.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
SB-12	4.0-5.0	<0.33	**YES**	**YES**	-	-	-	-
SB-13	1.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
SB-13	4.0-5.0	<0.33	**YES**	**YES**	-	-	-	-
SB-14	5.0-6.0	0.43	**YES**	**YES**	-	-	-	-
SB-15	1.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
SB-16	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-17	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-17	9.0-10.0	<0.33	**YES**	**YES**	-	-	-	-
SB-18	1.0-2.0	**44**	No	No	No	**YES**	**YES**	-
SB-18	2.0-3.0	**16**	No	**YES**	No	-	**YES**	-
SB-18	7.5-8.5	<0.33	**YES**	**YES**	-	-	-	-
SB-19	1.0-2.0	**20**	No	**YES**	No	-	**YES**	-
SB-19	2.0-3.0	**24**	No	**YES**	No	-	**YES**	-
SB-19	4.5-5.5	**10**	No	**YES**	**YES**	-	-	-
SB-19	6.5-7.5	<0.33	**YES**	**YES**	-	-	-	-
SB-20	1.0-2.0	**16**	No	**YES**	No	-	**YES**	-
SB-20	2.0-3.0	**43**	No	No	No	**YES**	**YES**	-
SB-20	7.0-8.0	<0.33	**YES**	**YES**	-	-	-	-
SB-21	2.0-30	<0.33	**YES**	**YES**	-	-	-	-
SB-22	2.0-3.0	**6**	No	**YES**	**YES**	-	-	-
SB-22	8.0-9.0	<0.33	**YES**	**YES**	-	-	-	-
SB-23	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-23	9.0-10.0	<0.33	**YES**	**YES**	-	-	-	-
SB-24	1.0-2.0	**6,188**	No	No	No	No	**YES**	**YES**
SB-24	8.0-9.0	<0.33	**YES**	**YES**	-	-	-	-

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	PCB Concentration (mg/kg)	TSCA Cleanup Levels Based on Occupancy Areas (mg/kg) Action Applicable (Yes/No)					
			No Action		Maintain cap with institutional control		Removal Required	
			High	Low	High	Low	High	Low
			(≤1)	(≤25)	(>1 to ≤10)	(>25 to ≤100)	(>10)	(>100)
SB-25	1.0-2.0	**7**	No	**YES**	**YES**	-	-	-
SB-25	2.0-3.0	**19**	No	**YES**	No	-	**YES**	-
SB-25	9.0-10.0	**1.2**	No	**YES**	**YES**	-	-	-
SB-26	2.0-3.0	**2.3**	No	**YES**	**YES**	-	-	-
SB-26	9.0-10.0	<0.33	**YES**	**YES**	-	-	-	-
SB-27	1.0-2.0	**15**	No	**YES**	No	-	**YES**	-
SB-27	2.0-3.0	**12**	No	**YES**	No	-	**YES**	-
SB-27	5.0-6.0	**9**	No	**YES**	**YES**	-	-	-
SB-28	1.0-2.0	**7**	No	**YES**	**YES**	-	-	-
SB-28	2.0-3.0	**14**	No	**YES**	No	-	**YES**	-
SB-28	7.0-8.0	<0.33	**YES**	**YES**	-	-	-	-
SB-29	2.0-3.0	**10**	No	**YES**	**YES**	-	-	-
SB-29	6.5-7.5	<0.33	**YES**	**YES**	-	-	-	-
SB-30	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-30	7.5-8.5	<0.33	**YES**	**YES**	-	-	-	-
SB-31	2.0-3.0	**1.8**	No	**YES**	**YES**	-	-	-
SB-32	2.0-3.0	**4.3**	No	**YES**	**YES**	-	-	-
SB-32	3.5-4.5	<0.33	**YES**	**YES**	-	-	-	-
SB-33	1.0-2.0	<0.33	**YES**	**YES**	-	-	-	-
SB-34	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-34	7.5-8.5	<0.33	**YES**	**YES**	-	-	-	-
SB-35	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-35	7.0-8.0	<0.33	**YES**	**YES**	-	-	-	-
SB-36	2.0-3.0	0.3	**YES**	**YES**	-	-	-	-
SB-36	7.0-8.0	0.25	**YES**	**YES**	-	-	-	-
SB-37	2.0-3.0	**1.8**	No	**YES**	**YES**	**-**	-	-
SB-37	8.0-9.0	<0.33	**YES**	**YES**	-	-	-	-
SB-38	2.0-3.0	**170**	No	No	No	No	**YES**	**YES**
SB-38	5.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
SB-39	2.0-3.0	**10,800**	No	No	No	No	**YES**	**YES**
SB-39	5.0-6.0	**4.9**	No	**YES**	**YES**	-	-	-
SB-40	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-40	5.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
SB-40	8.5-9.5	**2,015**	No	No	No	No	**YES**	**YES**
SB-41	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-41	5.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
SB-41	8.0-9.0	<0.33	**YES**	**YES**	-	-	-	-
SB-42	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-43	1.0-2.0	0.6	**YES**	**YES**	-	-	-	-
SB-43	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-43	5.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
SB-44	1.0-2.0	0.7	**YES**	**YES**	-	-	-	-

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	PCB Concentration (mg/kg)	TSCA Cleanup Levels Based on Occupancy Areas (mg/kg) Action Applicable (Yes/No)					
			No Action		Maintain cap with institutional control		Removal Required	
			High	Low	High	Low	High	Low
			(≤1)	(≤25)	(>1 to ≤10)	(>25 to ≤100)	(>10)	(>100)
SB-44	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-45	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-46	2.0-3.0	**11**	No	**YES**	No	-	**YES**	-
SB-46	5.0-6.0	**9**	No	**YES**	**YES**	-	-	-
SB-47	2.0-3.0	**21**	No	**YES**	No	-	**YES**	-
SB-47	6.5-7.5	<0.33	**YES**	**YES**	-	-	-	-
SB-48	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-49	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-50	0.5-1.5	**13**	No	**YES**	No	-	**YES**	-
SB-50	4.0-5.0	<0.33	**YES**	**YES**	-	-	-	-
SB-51	0.5-1.5	<0.33	**YES**	**YES**	-	-	-	-
SB-52	1.0-2.0	**32.6**	No	No	No	**YES**	**YES**	-
SB-52	2.0-3.0	0.94	**YES**	**YES**	-	-	-	-
SB-53	1.0-2.0	**54.9**	No	No	No	**YES**	**YES**	-
SB-53	2.0-3.0	**15**	No	**YES**	No	-	**YES**	-
SB-53	5.0-6.0	<0.33	**YES**	**YES**	-	-	-	-
SB-55	1.0-2.0	0.44	**YES**	**YES**	-	-	-	-
SB-54	1.0-2.0	**1.18**	No	**YES**	**YES**	-	-	-
SB-54	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-55	2.0-3.0	<0.33	**YES**	**YES**	-	-	-	-
SB-55	5.0-6.0	<0.33	**YES**	**YES**	-	-	-	-

mg/kg – micrograms/kilogram
* Boring location is not located within the subject property boundary upon review of available information

2.3 Subject Property Facility Status

A location where a hazardous substance is present in excess of the concentrations that 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 in soil and groundwater on the subject property indicate exceedances to the Part 201 Residential and Nonresidential DWP, GSIP, SVII, VSI, PSI, and DC cleanup criteria. Therefore, the subject property is a facility under Part 201 of P.A. 451, as amended, and the rules promulgated thereunder.

3.0 PROPERTY INFORMATION

3.1 Legal Description of Subject Property

A copy of the legal description is included in Appendix Das part of the assessing information.

3.2 Map of Subject Property

Refer to Figure 1, Property Location Map; and Figure 2, Generalized Diagram of the Subject Property and Surrounding Area which depicts the property/parcel boundaries.

3.3 Subject Location and Analytical Summary Maps

Figures 3 through 5 provide scaled maps of the subject property with site structures and sampling locations with analytical results.

3.4 Subject Property Location Map

Figures 1 and 2 provide scaled area maps depicting the subject property location in relation to the surrounding area.

3.5 Subject Property Address

As indicated in Section 1.0, the subject property (Parcel ID: 25-27-127-009) is located at 404 East 10 Mile Road, Pleasant Ridge, Oakland County, Michigan 48069.

3.6 Subject Spatial Data

As depicted in Figure 1, the subject property is located in township one North (T.1N), range 11 East (R.11E), and section 27, northwest quarter, northeast quarter-quarter in Pleasant Ridge, Oakland County, Michigan.

According to the MDEQ Groundwater Mapping Project Website, the center of the subject property is located at latitude 42.4748 and a longitude of -83.1347.

4.0 FACILITY STATUS OF SUBJECT PROPERTY

As indicated in Section 2.0, based upon documented exceedances of the Part 201 Residential and Nonresidential DWP, GSIP, SVII, VSI, PSI, and DC cleanup criteria in samples collected from the subject property, the subject property is a facility as defined under Part 201 of P.A. 451, as amended, and the rules promulgated thereunder.

4.1 Summary Data Tables

The analytical results were compared with the MDEQ Generic Cleanup Criteria and Screening Levels as presented 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. Shallow groundwater (i.e. less than three meters bgs) analytical results were compared to VISLs presented in the May 2013 MDEQ Guidance Document for the Vapor Intrusion Pathway. PCB analytical results were further compared to TSCA subpart D cleanup standards.

The analytical results for compounds exceeding Part 201 cleanup criteria are summarized in Section 2.0. A summary of the analytical results are in Tables 1 through 7.

4.2 Laboratory Reports and Chain of Custody Documentation

Samples collected by PM in 2015 and 2016 were submitted to Brighton Analytical LLC, Brighton, Michigan and Merit Laboratories, East Lansing, Michigan for chemical analysis under chain of custody procedures and within applicable holding times. A copy of the laboratory analytical reports from site investigations conducted by PM are included in Appendix C.

5.0 IDENTIFICATION OF BEA AUTHOR

This BEA was conducted on April 3, 2017, by Mr. Jamie Antoniewicz, P.E., Project Engineer, and reviewed by Mr. J. Adam Patton, Manager – Site Investigation Services, PM Environmental, Inc., which is prior to or within 45 days of becoming the property owner or operator. Qualification statements are provided as Appendix E.

We declare that, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in §312.10 of 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a property of the nature and history of the subject property. We have developed and performed the all appropriate inquires in conformance with the standards and practices set forth in 40 CFR Part 312.

Jamie Antoniewicz, P.E.
Project Engineer

J. Adam Patton, CHMM
Manager - Site Investigation Services

6.0 AAI REPORT OR ASTM PHASE I ESA

As indicated in Section 1.3, PM completed a Phase I ESA dated March 30, 2017, in conformance with the scope and limitations of ASTM Practice E 1527-13, for the subject property (Parcel ID: 25-27-127-009) located at 404 East 10 Mile Road, Pleasant Ridge, Oakland County, Michigan 48069. The scope of the Phase I ESA included consideration of hazardous substances as defined in Section 20101(1)(x) of P.A 451 of 1994, as amended, and constituted the performance of an All Appropriate Inquiry in conformance with the standards and practices set forth in 40 CFR Part 312.

A copy of the March 2017 Phase I ESA is included in Appendix A.

7.0 REFERENCES

- Michigan Department of Environmental Quality (MDEQ) Generic Cleanup Criteria and Screening Levels as presented in Part 201 Rules 299.1 through 299.50, dated December 30, 2013 entitled "Cleanup Criteria Requirements for Response Activity";
- MDEQ Operational Memorandum No. 4 "Site Characterization and Remediation Verification – Attachment 10, Peer Review Draft Groundwater Not in an Aquifer," February 2007;
- MDEQ Operational Memorandum No. 2 "Sampling and Analysis," October 22, 2004, Revised July 5, 2007;
- MDEQ May 2013 Guidance Document for the Vapor Intrusion Pathway;
- Baseline Environmental Submittal Form (EQP 4025), September 2015;
- Phase I ESA, October 5, 1993, Applied Science & Technology, Inc. (ASTI);
- Subsurface Investigation, April 20, 1995, ASTI;
- Category D BEA, August 23, 1995, Integrated Environmental, Inc. (IE);
- Phase I ESA, December 23, 2014, PM;
- Phase II ESA, June 14, 2016, PM; and
- Phase I ESA, March 30, 2017, PM.

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BASELINE ENVIRONMENTAL ASSESSMENT

660 East 10 Mile Road | Ferndale, Michigan
PM Project Number 01-5524-0-001

Prepared for:

Iron Ridge Holdings, LLC
47 Oxford Road
Grosse Pointe, Michigan 48236

Prepared by:

PM Environmental, Inc.
4080 West Eleven Mile Road
Berkley, MI 48072

PM ENVIRONMENTAL
Risk Well Managed

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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

December 10, 2015

District Supervisor
Michigan Department of Environmental Quality
Southeastern Michigan District Office
27700 Donald Court
Warren, Michigan 48092

RE: Baseline Environmental Assessment for the Industrial Property Located at 660 East 10 Mile Road, Ferndale, Michigan
PM Environmental, Inc. Project No. 01-5524-0-001

Dear District Supervisor:

Enclosed is a copy of the Baseline Environmental Assessment prepared for the above referenced subject property in accordance with Section 20126(1)(c) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), P.A. 451 of 1994 (Part 201), as amended.

If you have any questions regarding the information in this report, please contact us at 800-313-2966.

Sincerely,
PM ENVIRONMENTAL, INC.

Jamie Antoniewicz, P.E.
Project Engineer

Jennifer L. Ritchie, C.P.G.
Regional Site Investigation Manager

Enclosure

PM ENVIRONMENTAL
Risk Well Managed

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Grand Rapids
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Suite 301
Grand Rapids, MI 49504
f: 877.884.6775
t: 616.285.8857

December 10, 2015

Mr. Greg Cooksey
Iron Ridge Holdings, LLC
47 Oxford Road
Grosse Pointe, Michigan 48236

RE: Baseline Environmental Assessment for the Industrial Property Located at 660 East 10 Mile Road, Ferndale, Michigan
PM Environmental, Inc. Project No. 01-5524-0-001

Dear Mr. Cooksey:

Enclosed is a copy of the above-referenced document prepared in accordance with Section 20126(1)(c) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), P.A. 451 of 1994 (Part 201), as amended.

THIS BASELINE ENVIRONMENTAL ASSESSMENT WAS PERFORMED FOR THE EXCLUSIVE USE OF IRON RIDGE HOLDINGS, LLC, WHO MAY RELY ON THE REPORT'S CONTENTS.

If you have any questions regarding the information in this report, please contact our office at 800-313-2966.

Sincerely,
PM ENVIRONMENTAL, INC.

Jamie Antoniewicz, P.E.
Project Engineer

Jennifer L. Ritchie, C.P.G.
Regional Site Investigation Manager

Enclosure

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION AND DISCUSSION

PM Environmental, Inc. (PM) completed a Baseline Environmental Assessment (BEA) for the industrial property located at 660 East 10 Mile Road, Ferndale/Pleasant Ridge, Oakland County, Michigan 48220/48069 (hereafter referred to as the "subject property"; Figure 1).

The subject property consists of nine parcels located in Ferndale and Pleasant Ridge (Figure 2). For ease of reference, PM has identified the property under its main address, 660 East 10 Mile Road, but the entire nine parcels included in this BEA are as follows:

Parcel ID Number	Address	City	Acreage	Building Size (sf)	Property Use
25-27-127-010	660 East 10 Mile Road	Pleasant Ridge	3.47	73,817	Vacant industrial building
25-27-201-020	660 East 10 Mile Road	Ferndale	0.29	6,036	Limited office operations for Walker Wire
25-27-201-013	3265 Bermuda Street	Ferndale	1.139	23,953	Vacant industrial building
25-27-201-005	3351 Bermuda Street	Ferndale	0.169	1,125	Office building utilized for general storage
25-27-201-019	3291 Bermuda Street	Ferndale	1.00	No structures	Surface parking lot
25-27-201-012	3281 Bermuda Street	Ferndale	0.165	2,602	Hazardous materials storage building
25-27-201-015	3155 Bermuda Street	Ferndale	0.75	18,516	Industrial building by a landscaping and snow removal company for storage of road salt and equipment and for general storage
25-27-127-012	400 East 10 Mile Road	Pleasant Ridge	1.10	17,752	Vacant industrial building
25-27-127-013	None	Pleasant Ridge	0.33	No structures	Surface parking lot

The main subject parcels, identified as 660 East 10 Mile Road (Ferndale and Pleasant Ridge) were initially developed prior to 1940 with dwellings. Industrial development began in the northern portion of the property in the mid-1940s, with the beginning of Walker Wire's operations. Multiple additions were constructed to the building through the early 1990s to expand the layout to the current building. The building was occupied by various wire and steel companies, mainly identified as Walker Wire Company, from initial development in the 1940s until the mid-2000s. Operations included wire cutting, stretching, and chemical treatment.

The southern portion of the main parcel (660 East 10 Mile Road) was utilized by Michigan Bell for telephone pole storage from at least 1949 until at least 1957. No evidence of chemical treatment (i.e. bulk chemical storage) was observed, and the area appeared to be for pole and equipment storage only.

The subject parcel identified as 3351 Bermuda Street was initially developed in the 1940s with the current building. The building was occupied by a W.E. Foltz Company from at least 1950 until 1975, and consisted of a small machine shop. Fire department records included documentation that the operations utilized trichloroethylene. The building was purchased by Walker Wire in the early 1980s, and utilized as an employment office since that time.

The subject parcel identified as 3291 Bermuda Street was initially developed prior to 1940 with dwellings. A small tin shop was constructed on the property in the mid-1960s. All former buildings were demolished by 1980 when the parcel was converted to the current concrete paved surface lot for Walker Wire.

The subject parcel identified as 3281 Bermuda Street was initially developed prior to 1940 with a dwelling, which was demolished in the late 1970s when the parcel was converted to a concrete paved storage lot for Walker Wire. The current hazardous materials storage building was constructed on the western portion of the parcel in 1992. The concrete floors in the building were observed to be in good condition, and interviews with representatives of Walker Wire document that the building was mainly used for used oil storage and dry bags of chemicals, and no significant solvent storage occurred in the building.

The subject parcel identified as 3265 Bermuda Street was initially developed with portions of the current building constructed in the mid-1940s. Various additions were constructed in the 1950s and 1980s. Former occupants included machinery manufacturers and tooling companies through the 1980s, with documented solvent use in Fire department records. The building has been occupied by Walker Wire since that time.

The subject parcel identified as 3155 Bermuda Street was initially developed in the mid-1940s with portions of the current industrial building, with additions in the 1950s. The property was occupied by a nut and bolt manufacturer from at least 1950 until 1985. The building has been generally utilized for limited warehousing and storage by Walker Wire since that time.

The western subject parcels, identified as 400 East 10 Mile Road and associated parking lot, were initially developed prior to 1940 with a coal and fuel storage and sales operation. These operations ceased in the late 1970s, and the former silos were demolished and the current building was constructed. The current building at 400 East 10 Mile Road was utilized for manufacturing operations from the 1970s until 1990s, associated with 404 East 10 Mile Road (carbide company). These operations ceased in the late 1990s, and the building has been utilized for mostly warehousing with limited manufacturing by Walker Wire since the late 1990s. Former operations included stamping and presses. A small office building was present in the northwestern portion of the parcel, which was demolished between 2005 and 2008 to create more parking space for the adjoining property (404 East 10 Mile Road).

1.1 Owner/Operator Information

Iron Ridge Holdings, LLC, 47 Oxford Road, Grosse Pointe, Michigan 48236, purchased the property on December 4, 2015.

1.2 Intended Use of the Subject Property

Iron Ridge Holdings, LLC intends to redevelop the property for retail and general commercial use.

1.3 Summary of All Appropriate Inquiry Phase I Environmental Assessment

PM completed a Phase I Environmental Site Assessment (ESA) for the subject property, dated November 30, 2015, in conformance with the scope and limitations of ASTM Practice E 1527-13 (i.e., the 'ASTM Standard'). A copy of the November 2015 Phase I ESA, including photographs of the subject property, is included in Appendix A.

The Phase I ESA also included 12 parcels located east of Bermuda Street; however, no RECs were identified with the parcels and are therefore excluded from this BEA.

The following recognized environmental conditions (RECs) were identified in PM's November 2015 Phase I ESA:

- The western portion of the subject property, identified as 400 East 10 Mile Road, 660 East 10 Mile Road, 3155 Bermuda Street, and 3265-3351 Bermuda Street, was historically occupied by various machine shops and manufacturing operations from the 1940s until the 2000s. Review of previous site assessments conducted in 1995 and 2015 document concentrations of various metals, polynuclear aromatic compounds (PNAs), and volatile organic compounds (VOCs) were detected in the soil and/or groundwater samples above the current Part 201 Residential and Nonresidential Drinking Water Protection (DWP) and Groundwater Surface Water Interface Protection (GSIP) Generic Cleanup Criteria (GCC). Additionally, concentrations of arsenic, polychlorinated biphenyls (PCBs), and benzo(a)pyrene were detected in soil samples above the current Part 201 Residential and/or Nonresidential Direct Contact GCC. Finally, cis-1,2-dichloroethylene and vinyl chloride were detected in groundwater above Vapor Intrusion Screening Levels (VISLs) in the vicinity of the former UST basin associated with 660 East 10 Mile Road. 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), as amended.

- Review of previous site assessment activities performed on the western parcel of the subject property documents concentrations of PCBs above the current Part 201 Residential Soil Direct Contact GCC and US EPA Toxic Substance Control Act (TSCA) Nonresidential cleanup standards in the vicinity of the central adjoining property (404 East 10 Mile Road). PCB contamination is not covered under the Michigan Department of Environmental Quality (MDEQ) liability protection afforded under a Baseline Environmental Assessment (BEA), and the known PCB contamination remains a concern.

The following adjoining REC was identified:

- The central adjoining property, identified as 404 East 10 Mile Road and located between 400 and 660 East 10 Mile Road, was occupied by manufacturing operations from at least the 1950s until 1990s. Previous subsurface investigations on the subject property document soil contamination above current Part 201 GCC along the eastern, southern, and western property boundary, which may be a result of migration from the central adjoining property.

1.3.1 Phase I ESA Exceptions or Deletions

There were no exceptions or deletions from the Federal All Appropriate Inquiry Rule under 40 CFR 312, or the ASTM Standard during the completion of PM's November 2015 Phase I ESA and no special terms or conditions applied to the preparation of the Phase I ESA.

1.3.2 Phase I ESA Data Gaps

PM did not identify any significant data gaps during the completion of the November 2015 Phase I ESA.

1.4 Summary of Previous Site Investigations

PM reviewed a previous Phase I ESA completed for the subject parcel identified as 400 East 10 Mile Road and the adjoining property located at 404 East 10 Mile Road by Applied Science and Technology, Inc. (ASTI) and dated October 5, 1993. The subject property is identified as Building 3 in the report, and at the time of the Phase I ESA was connected to 404 East 10 Mile Road via a catwalk, and was owned and operated by Walmet. Operations included general stamping and pressing. Two concerns were identified on the subject property parcel, which consisted of exterior staining at the southeast corner of the building, and a former 10,000-gallon used coolant oil UST removed from the eastern property boundary in the late 1980s with no confirmatory sampling completed.

PM also reviewed a Subsurface Investigation report prepared by ASTI for 400 and 404 East 10 Mile Road and dated April 20, 1995. The site assessment activities were performed to assess concerns identified in the 1993 Phase I ESA. Specifically, four soil borings were advanced in the southeastern portion to assess surficial staining, and seven soil borings were advanced in the former UST basin. A boring was also advanced in the northeastern portion of the property, for collection of a background sample.

No evidence of a release was identified in the former UST basin area, and no subsurface contamination was identified in this area. Therefore, PM considers the UST adequately assessed and no further investigation is recommended.

PM completed a Phase I ESA for the subject property in February 2015. The Phase I ESA identified the following RECs:

- The main subject building, identified as 660 East 10 Mile Road, was occupied by various wire and steel companies, mainly identified as Walker Wire Company, from initial development in the 1940s until the mid-2000s. Various additions has been constructed to the building to expand the original portion, located in the northwestern portion, to the south for the current layout. Operations included wire cutting, stretching, and chemical treatment. PM observed cracked and pitted floors in multiple former production areas. Historical interior waste streams associated with the former tooling operations would have consisted of general hazardous substances and/or petroleum products. A significant portion of this time period preceded major environmental regulations and current waste management and disposal procedures. The potential exists that a release occurred associated with these former operations and negatively impacted the subsurface.

- PM observed significant staining at the base of a steel coil holder in the western–central portion of the main subject building. The on-site manager indicated that steel coils were sprayed with oils prior to shipment, and that these operations were likely performed in this area since the 1990s. Based on the significant staining and length of operations, the potential exists that a release has occurred in this area and negatively impacted the subsurface.

- PM observed three 55-gallon drums of new oil and coolant in a secondary containment area in the western-central portion of 660 East 10 Mile Road. Significant staining was observed in the area, and the concrete floors were pitted and cracked. Mr. Craig indicated that the drum storage has been present since at least the 1990s. Based on the observed site conditions and length of time of operations, the potential exists that a release has occurred in this area and negatively impacted the subsurface.

- Floor drains were observed in various production areas of 660 East 10 Mile Road. Mr. Craig indicated that none of the drains were located in areas of former chemical storage, and most are sealed. No staining was observed. However, the long term operations associated with the building and unknown waste management practices associated with the floor drains may be a source of subsurface contamination.

- The eastern central portion of the main subject building contained an acid bath and rinse system from 1972 until the mid-2000s. Concrete pits were observed under the baths that contained chemicals for the operations, and staining / evidence of spills was observed during the site reconnaissance. Based on the length of time operations and observed site conditions, the potential exists that a release has occurred in this area and negatively impacted the subsurface.

- A wastewater treatment plant was present in the western-central portion of the property, which was installed in the 1990s to treat waste water generated in the acid bath and rinse section. Prior the 1990s, water was reportedly discharged to the sanitary sewer system. PM observed closed drains and cracked concrete in the waste water treatment area. Based on the length of time operations and observed site conditions, the potential exists that a release has occurred in this area and negatively impacted the subsurface.

- The northeastern subject building, identified as 3351 Bermuda Street, was initially developed in the 1940s and was occupied by a machine shop from at least 1950 until 1975. Fire department records included documentation that the operations utilized trichloroethylene. Historical interior waste streams associated with the former tooling operations 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 potential exists that a release occurred associated with these former operations and negatively impacted the subsurface.

- Fire inspection records for 3351 Bermuda Street document that the building was formerly occupied by W.E. Foltz Company from at least 1958 until 1972 and was heated with fuel oil stored in two 220-gallon aboveground storage tanks located at the “outside rear” of the building. Based on the length of time of use and lack of documentation of sufficient containment, the potential exists that a release of fuel oil has occurred.

- The eastern-central portion of the subject building, identified as 3265 Bermuda Street, was initially developed in the mid-1940s, with additions to the southern portion in the 1950s. Former occupants included machinery manufacturers and tooling companies through the 1980s, with documented solvent use in Fire department records. Historical interior waste streams associated with the former tooling operations 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 potential exists that a release occurred associated with these former operations and negatively impacted the subsurface.

- Fire inspection records for 3265 Bermuda Street from 1958 until 1972 document that the building was heated with fuel oil stored in a 1,000-gallon UST, but the location was not indicated. The potential exists for an orphan fuel oil UST to be present on the parcel identified as 3265 Bermuda Street and/or for a release of fuel oil to have occurred.

- The southeastern building of the subject property, identified as 3155 Bermuda, was initially developed in the mid-1940s with portions of the current industrial building, with additions in the 1950s. The property was occupied by a nut and bolt manufacturer from at least 1950 until 1985. Historical interior waste streams associated with the former tooling operations 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 potential exists that a release occurred associated with these former operations and negatively impacted the subsurface.

- The western portion of the subject property, identified as 400 East 10 Mile Road, was occupied by a coal yard from at least 1940 until the late 1960s, with unpaved coal storage areas throughout the property. The potential exists for subsurface contamination to be present from leaching of heavy metals, hazardous substances and/or petroleum products from these long term operations.

- The current building on the western portion of the subject property was occupied by manufacturing operations, reportedly associated with a carbide company that occupied the east adjoining property (404 East 10 Mile Road) from at least the 1970s until 1990s. Operations included stamping and presses. Historical interior waste streams associated with the former tooling operations 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 potential exists that a release occurred associated with these former operations and negatively impacted the subsurface.

- Review of previous site assessment activities performed on the western parcel of the subject property (400 East 10 Mile Road) in 1995 document concentrations of polychlorinated biphenyls (PCBs) above the current Part 201 Residential Soil Direct Contact Generic Cleanup Criteria and US EPA Toxic Substance Control Act (TSCA) Nonresidential cleanup standards. PCB contamination is not covered under the Michigan Department of Environmental Quality (MDEQ) liability protection afforded under a Baseline Environmental Assessment (BEA), and the known PCB contamination remains a concern.

- Review of previous site assessment activities performed on the western parcel of the subject property (400 East 10 Mile Road) in 1995 document concentrations of various metals were detected in the soil samples collected from the southeastern portion of the property above the state default background levels and current Part 201 Residential and Nonresidential Drinking Water Protection and Groundwater Surface Water Interface Protection Generic Cleanup Criteria (GCC). Additionally, concentrations of arsenic were detected in soil samples collected above the current Part 201 Residential Direct Contact GCC, but below the Nonresidential Direct Contact GCC. 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), as amended.

The following adjoining RECs were identified:

- The central adjoining property, identified as 404 East 10 Mile Road and located between 400 and 660 East 10 Mile Road, was occupied by manufacturing operations from at least the 1950s until 1990s. Previous subsurface investigations on the property in 1995 document soil contamination above current Part 201 GCC along the eastern property boundary, which has not been delineated in the direction of the subject property. The potential exists for known contamination to have migrated onto the subject property.

The central adjoining property, identified as 3205 Bermuda Street and located between two parcels of the subject property along Bermuda Street, has been occupied by machinery and compressor rebuilding companies since at least 1960, and was occupied by a bottling company from at least 1950 until 1957. Long term interior waste streams would have included hazardous substances and/or petroleum products. The building and operations directly abuts subject property boundaries. The potential exists that a release has occurred and migrated onto the subject property and impacted the subsurface.

1.5 Current Site 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. Ground penetrating radar (GPR) was utilized for clear the soil boring locations of utilities.

1.5.1 Geophysical Investigation

On June 8, 2015, PM completed a GPR survey at the 3265 Bermuda Street parcel (Figure 2) to investigate the potential for orphan USTs.

No anomalies consistent with the presence of orphan USTs were identified during the geophysical survey investigation. The complete Geophysical Investigation Survey Report is included in Appendix B.

1.5.2 Subsurface Investigation

Between June 8 and 10, 2015, PM completed a scope of work to assess RECs identified in PM's February 2015 Phase I ESA consisting of the advancement of 34 soil borings (SB-1 through SB-34), installation of 19 temporary monitoring wells (TMW-3, TMW-5, TMW-8 through TMW-11, TMW-13, TMW-14, TMW-16, TMW-19, TMW-21, TMW-24, TMW-27, and TMW-29

though TMW-34), and the collection of 31 soil and 19 groundwater samples, which were submitted to Merit Laboratories, Inc., East Lansing, Michigan for analysis of volatile organic compounds (VOCs), PNAs, PCBs, metals (arsenic, cadmium, chromium, lead, and/or zinc), pH, or some combination thereof.

On September 1, 2015, PM completed a scope of work consisting of the advancement of 12 soil borings (SB-27R, SB-35 through SB-45) to evaluate PCB concentrations along the property boundary.

The table below summarizes the Phase II ESA activities including total depth, objective of the soil borings, and sample justification. Refer to Figures 3 and 4 for soil boring/temporary monitoring well locations.

DESCRIPTION OF SOIL BORING/TEMPORARY MONITORING WELL LOCATIONS

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen and [DTW] (feet bgs)	Analysis	Objectives	Sample Selection (justification)
SB-1 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations in the main building	**Soil:** Sample collected from drain depth based on the lack of field evidence of contamination. **GW:** Not encountered.
SB-2 (15.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations and drain in the main building	**Soil:** Shallow drain depth sample collected based on the lack of field evidence of contamination. **GW:** Not encountered.
SB/TMW-3 (15.0)	0.5-1.5	2.09-7.09 [4.22]	VOCs, PNAs, PCBs, metals	Assess former operations and drain in 660 East 10 Mile	**Soil:** Shallow sample collected based on the lack of field evidence of contamination and the presence of shallow groundwater. **GW:** Sampled.
SB-4 (15.0)	2.0-3.0 and 5.0-6.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations and drain in the main building	**Soil:** Samples collected from the shallow and deeper sand/clay interface based on the lack of field evidence of contamination. **GW:** Not encountered.
SB-5 (20.0)	0.5-1.5	3.29-8.29 [5.07]	VOCs, PNAs, PCBs, metals	Assess former operations in the main building	**Soil:** Shallow sample collected based on the lack of field evidence of contamination. **GW:** Sampled.
SB-6 (15.0)	0.5-1.5 and 6.0-7.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations in the main building	**Soil:** Shallow and sand/clay interface samples collected based on the lack of field evidence of contamination. **GW:** Not encountered.

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen and [DTW] (feet bgs)	Analysis	Objectives	Sample Selection (justification)
SB-7 (10.0)	3.0-4.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations in the main building	**Soil:** Sand/clay interface sample collected based on the lack of field evidence of contamination. **GW:** Not encountered.
SB/TMW-8 (20.0)	NA	4.45-9.45 [5.80]	VOCs, PNAs, metals, pH	Assess acid line and pits in the southern portion of the main building	**Soil:** Soil sample not collected based on the lack of field evidence of contamination. **GW:** Sampled.
SB/TMW-9 (20.0)	NA	4.75-9.75 [5.00]	VOCs, PNAs, metals, pH	Assess acid line and pits in the southern portion of the main building	**Soil:** Soil sample not collected based on the lack of field evidence of contamination and the presence of shallow groundwater. **GW:** Sampled.
SB/TMW-10 (15.0)	NA	4.15-9.15 [4.75]	VOCs, PNAs, metals	Assess wastewater treatment plant	**Soil:** Soil sample not collected based on the lack of field evidence of contamination and the presence of shallow groundwater. **GW:** Sampled.
SB/TMW-11 (9.5)	NA	3.91-8.91 [4.98]	VOCs, PNAs, metals	Assess wastewater treatment plant	**Soil:** Soil sample not collected based on the lack of field evidence of contamination and the presence of shallow groundwater. **GW:** Sampled.
SB-12 (15.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess exterior storage and nearby chemical storage room	**Soil:** Shallow sample collected based on the lack of field evidence of contamination. **GW:** Not sampled.
SB/TMW-13 (15.0)	1.0-2.0	2.84-7.84 [3.52]	VOCs, PNAs, metals, pH	Assess acid recovery room	**Soil:** Shallow sample collected based on the lack of field evidence of contamination and the presence of shallow groundwater. **GW:** Sampled.
SB/TMW-14 (15.0)	0.5-1.5	2.72-7.72 [4.09]	VOCs, PNAs, PCBs, metals	Assess former operations and drain in the main building	**Soil:** Shallow sample collected based on the lack of field evidence of contamination. **GW:** Sampled.

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen and [DTW] (feet bgs)	Analysis	Objectives	Sample Selection (justification)
SB-15 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess testing lab in the main building	**Soil:** Shallow sample collected based on the lack of field evidence of contamination. **GW:** Not sampled.
SB/TMW-16 (15.0)	1.0-2.0	3.05-8.05 [4.36]	VOCs, PNAs, PCBs, metals	Assess location of suspect UST and former operations in the main building	**Soil:** Sample collected from the interval with the highest PID reading (8.9 ppm). **GW:** Sampled.
SB-17 (15.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess location of suspect UST and former operations in the main building	**Soil:** Sample collected from the interval with the highest PID reading (3.2 ppm). **GW:** Not sampled.
SB-18 (6.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 3351 Bermuda Street	**Soil:** Sample collected from the interval with the highest PID reading (0.6 ppm). **GW:** Not encountered.
SB/TMW-19 (15.0)	6.0-7.0	4.15-9.15 [4.55]	VOCs and PNAs	Assess former operations and former AST at 3351 Bermuda Street	**Soil:** Sample collected from the interval with the highest PID reading (392 ppm). **GW:** Sampled.
SB-20 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 3155 Bermuda Street and potential for migration from 3205 Bermuda Street	**Soil:** Shallow sample collected based on the lack of field evidence of contamination. **GW:** Not sampled based on the lack of field evidence of contamination.
SB/TMW-21 (15.0)	1.0-2.0	3.55-8.55 [5.40]	VOCs, PNAs, PCBs, metals	Assess former operations at 3155 Bermuda Street	**Soil:** Shallow sample collected based on the lack of field evidence of contamination and the presence of shallow groundwater. **GW:** Sampled.
SB-22 (10.0)	1.0-2.0	NA	PNAs, PCBs, metals	Assess former operations at 3155 Bermuda Street	**Soil:** Shallow sample collected based on the lack of field evidence of contamination. **GW:** Not sampled based on the lack of field evidence of contamination.
SB-23 (4.0)	3.0-4.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 400 East 10 Mile	**Soil:** Sand/clay interface sample collected based on the lack of field evidence of contamination. **GW:** Not encountered.

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen and [DTW] (feet bgs)	Analysis	Objectives	Sample Selection (justification)
SB/TMW-24 (15.0)	3.0-4.0	8.06-13.06 [9.69]	VOCs, PNAs, PCBs, metals	Assess former operations at 400 East 10 Mile	**Soil:** Sand/clay interface sample collected based on the lack of field evidence of contamination. **GW:** Sampled.
SB-25 (15.0)	4.0-5.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 400 East 10 Mile	**Soil:** Sand/clay interface sample collected based on the lack of field evidence of contamination. **GW:** Not sampled based on the lack of field evidence of contamination.
SB-26 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 400 East 10 Mile and former coal storage	**Soil:** Shallow sample collected based on the lack of field evidence of contamination. **GW:** Not sampled based on the lack of field evidence of contamination.
SB/TMW-27/R (15.0)	1.0-2.0 and 2.0-3.0	5.0-10.0 [6.55]	VOCs, PNAs, PCBs, metals	Assess former coal storage on the western portion of the property	**Soil:** Shallow sample collected based on the lack of field evidence of contamination and presence of shallow groundwater. **GW:** Sampled.
SB-28 (15.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former coal storage on the western portion of the property	**Soil:** Shallow sample collected based on the lack of field evidence of contamination. **GW:** Not encountered.
SB/TMW-29 (15.0)	1.0-2.0	5.0-10.0 [7.45]	VOCs, PNAs, PCBs, metals	Assess former coal storage on the western portion of the property	**Soil:** Shallow sample collected based on the lack of field evidence of contamination and presence of shallow groundwater. **GW:** Sampled.
SB/TMW-30 (15.0)	1.0-2.0	2.86-7.86 [4.63]	VOCs, PNAs, PCBs, metals	Assess former coal storage on the western portion of the property	**Soil:** Shallow sample collected based on the lack of field evidence of contamination and presence of shallow groundwater. **GW:** Sampled.
SB/TMW-31 (20.0)	3.0-4.0	3.55-8.55 [4.15]	VOCs, PNAs, PCBs	Assess potential for migration from 404 East 10 Mile	**Soil:** Shallow sample collected based on the lack of field evidence of contamination and presence of shallow groundwater. **GW:** Sampled.

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen and [DTW] (feet bgs)	Analysis	Objectives	Sample Selection (justification)
SB/TMW-32 (10.0)	NA	3.96-8.96 [5.20]	VOCs and PNAs	Assess potential for migration from 3205 Bermuda Street	**Soil:** Soil sample not collected based on the lack of field evidence of contamination and presence of shallow groundwater. **GW:** Sampled.
SB/TMW-33 (15.0)	NA	3.75-8.75 [5.10]	VOCs and PNAs	Assess potential for migration from 3205 Bermuda Street	**Soil:** Soil sample not collected based on the lack of field evidence of contamination and presence of shallow groundwater. **GW:** Sampled.
SB/TMW-34 (15.0)	1.0-2.0	4.46-9.46 [5.80]	VOCs, PNAs, PCBs	Assess potential for migration from 404 East 10 Mile and previously identified PCB concentrations	**Soil:** Shallow sample collected based on the lack of field evidence of contamination and previous sample depth. **GW:** Sampled.
SB-35 (5.0)	2.0-3.0 and 4.0-5.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-36 (5.0)	2.0-3.0 and 4.0-5.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-37 (5.0)	1.0-2.0 and 4.0-5.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-38 (5.0)	1.0-2.0 and 4.0-5.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-39 (5.0)	1.0-2.0 and 2.0-3.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-40 (5.0)	1.0-2.0 and 4.0-5.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen and [DTW] (feet bgs)	Analysis	Objectives	Sample Selection (justification)
SB-41 (5.0)	1.0-2.0, 2.0-3.0, and 4.0-5.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-42 (5.0)	1.0-2.0 and 2.0-3.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-43 (5.0)	1.0-2.0 and 2.0-3.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-44 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.
SB-45 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**Soil:** Samples collected based on previous identified impact and/or field observations. **GW:** Not encountered.

GW – Groundwater NA – Not Applicable ppm – parts per million
bgs – below ground surface DTW – depth to water PID – photoionization detector

1.5.3 Investigation Techniques and QA/QC Procedures

The soil borings were advanced to the desired depth using a direct push drill rig and/or stainless steel hand auger. Soil sampling was performed for soil classification, verification of subsurface geologic conditions, and for investigating the potential and/or extent of soil and groundwater contamination at the subject property.

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 (i.e., Alconox®) and rinsing with distilled water after each sample collection. Drilling and sampling equipment was also cleaned in this manner prior to initiating field activities.

Soils collected from discrete sample intervals were screened using a 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 10.6 electron volts (eV) lamp. Soil samples were collected from the soil borings based upon the highest PID reading, visual/olfactory evidence, a change in geology, surficial soil, and/or directly above saturated soil.

Soil samples for VOC analysis were preserved with methanol, in accordance with United States Environmental Protection Agency (USEPA) method 5035. The soil samples were 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.

Temporary monitoring wells were installed to collect a groundwater samples for chemical analysis. A new well assembly was used for the temporary wells, consisting of a 5-foot long, one-inch diameter, 0.010-inch slot, schedule 40, PVC screen and a 1-inch diameter PVC casing. After the screen for the well was set to the desired depth, natural sands were allowed to collapse around the well screen. Each well was developed using either a new disposable 0.9-inch diameter bailer or 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.

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.

Upon completion of the investigation, the temporary well materials were removed from the soil boring and 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.

1.6 Geology and Hydrogeology

Based upon onsite observations of soil samples and cuttings collected from the soil borings that were advanced at the subject property by PM, the general soil stratigraphy consists of clayey sand to a depth of approximately 4.0 to 6.0 feet bgs, sand to a depth of 6.0 to 9.0 feet bgs, underlain by medium stiff clay to a depth of at least 20.0 feet bgs, the maximum depth explored. Perched, limited and discontinuous groundwater was encountered in the sand layer encountered between 4.0 and 9.0 feet bgs.

Soil boring logs depicting the soil stratigraphy and PID readings are included in Appendix C.

2.0 LOCATION OF CONTAMINATED MEDIA ON THE SUBJECT PROPERTY

The analytical results for the soil and groundwater samples collected during site investigation activities conducted by PM were compared with the MDEQ Generic Cleanup Criteria and Screening Levels as presented 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. When applicable, analytical results were compared to Vapor Intrusion Screening Level (VISLs) presented in the May 2013 MDEQ Guidance Document for the Vapor Intrusion Pathway.

The analytical results are summarized in Tables 1 through 4 and on Figures 3 and 4. The laboratory analytical reports are included in Appendix D.

SUMMARY OF SOIL AND GROUNDWATER ANALYTICAL RESULTS

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen Depth and [DTW] (feet bgs)	Analysis	Objectives	Part 201 Cleanup Criteria Exceedances	
					Soil	GW
SB-1 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations in the main building	NONE	NA
SB-2 (15.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations and drain in the main building	NONE	NA
SB/TMW-3 (15.0)	0.5-1.5	2.09-7.09 [4.22]	VOCs, PNAs, PCBs, metals	Assess former operations and drain in 660 East 10 Mile	NONE	NONE
SB-4 (15.0)	2.0-3.0 and 5.0-6.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations and drain in the main building	NONE	NA
SB-5 (20.0)	0.5-1.5	3.29-8.29 [5.07]	VOCs, PNAs, PCBs, metals	Assess former operations in the main building	NONE	NONE
SB-6 (15.0)	0.5-1.5 and 6.0-7.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations in the main building	NONE	NA
SB-7 (10.0)	3.0-4.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations in the main building	NONE	NA
SB/TMW-8 (20.0)	NA	4.45-9.45 [5.80]	VOCs, PNAs, metals, pH	Assess acid line and pits in the southern portion of the main building	NA	NONE
SB/TMW-9 (20.0)	NA	4.75-9.75 [5.00]	VOCs, PNAs, metals, pH	Assess acid line and pits in the southern portion of the main building	NA	NONE
SB/TMW-10 (15.0)	NA	4.15-9.15 [4.75]	VOCs, PNAs, metals	Assess wastewater treatment plant	NA	NONE
SB/TMW-11 (9.5)	NA	3.91-8.91 [4.98]	VOCs, PNAs, metals	Assess wastewater treatment plant	NA	NONE

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen Depth and [DTW] (feet bgs)	Analysis	Objectives	Part 201 Cleanup Criteria Exceedances	
					Soil	GW
SB-12 (15.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess exterior storage and nearby chemical storage room	**DWP:** Chromium **GSIP:** phenanthrene, chromium **DC(R):** benzo(a)pyrene	NA
SB/TMW-13 (15.0)	1.0-2.0	2.84-7.84 [3.52]	VOCs, PNAs, metals, pH	Assess acid recovery room	NONE	NONE
SB/TMW-14 (15.0)	0.5-1.5	2.72-7.72 [4.09]	VOCs, PNAs, PCBs, metals	Assess former operations and drain in the main building	NONE	NONE
SB-15 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess testing lab in the main building	NONE	NA
SB/TMW-16 (15.0)	1.0-2.0	3.05-8.05 [4.36]	VOCs, PNAs, PCBs, metals	Assess location of suspect UST and former operations in the main building	NONE	**DW:** cis-1,2-DCE, vinyl chloride **GSI:** vinyl chloride **VISLs:** cis-1,2-DCE, vinyl chloride
SB-17 (15.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess location of suspect UST and former operations in the main building	**DWP:** TCE	NA
SB-18 (6.0)	2.0-3.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 3351 Bermuda Street	NONE	NA
SB/TMW-19 (15.0)	6.0-7.0	4.15-9.15 [4.55]	VOCs and PNAs	Assess former operations and former AST at 3351 Bermuda Street	**DWP:** TCE	NONE
SB-20 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 3155 Bermuda Street and potential for migration from 3205 Bermuda Street	NONE	NA

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen Depth and [DTW] (feet bgs)	Analysis	Objectives	Part 201 Cleanup Criteria Exceedances	
					Soil	GW
SB/TMW-21 (15.0)	1.0-2.0	3.55-8.55 [5.40]	VOCs, PNAs, PCBs, metals	Assess former operations at 3155 Bermuda Street	NONE	NONE
SB-22 (10.0)	1.0-2.0	NA	PNAs, PCBs, metals	Assess former operations at 3155 Bermuda Street	**DWP:** PCE	NA
SB-23 (4.0)	3.0-4.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 400 East 10 Mile	NONE	NA
SB/TMW-24 (15.0)	3.0-4.0	8.06-13.06 [9.69]	VOCs, PNAs, PCBs, metals	Assess former operations at 400 East 10 Mile	**GSIP:** Fluoranthene and phenanthrene **DC(R/NR):** benzo(a)pyrene	NONE
SB-25 (15.0)	4.0-5.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 400 East 10 Mile	NONE	NA
SB-26 (10.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former operations at 400 East 10 Mile and former coal storage	NONE	NA
SB/TMW-27/R (15.0)	1.0-2.0 and 2.0-3.0	5.0-10.0 [6.55]	VOCs, PNAs, PCBs, metals	Assess former coal storage on the western portion of the property	**GSIP:** Fluoranthene, phenanthrene **DC(R/NR):** benzo(a)pyrene	NONE
SB-28 (15.0)	1.0-2.0	NA	VOCs, PNAs, PCBs, metals	Assess former coal storage on the western portion of the property	NONE	NA
SB/TMW-29 (15.0)	1.0-2.0	5.0-10.0 [7.45]	VOCs, PNAs, PCBs, metals	Assess former coal storage on the western portion of the property	NONE	NONE
SB/TMW-30 (15.0)	1.0-2.0	2.86-7.86 [4.63]	VOCs, PNAs, PCBs, metals	Assess former coal storage on the western portion of the property	NONE	NONE
SB/TMW-31 (20.0)	3.0-4.0	3.55-8.55 [4.15]	VOCs, PNAs, PCBs	Assess potential for migration from 404 East 10 Mile	NONE	NONE

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen Depth and [DTW] (feet bgs)	Analysis	Objectives	Part 201 Cleanup Criteria Exceedances	
					Soil	GW
SB/TMW-32 (10.0)	NA	3.96-8.96 [5.20]	VOCs and PNAs	Assess potential for migration from 3205 Bermuda Street	NA	NONE
SB/TMW-33 (15.0)	NA	3.75-8.75 [5.10]	VOCs and PNAs	Assess potential for migration from 3205 Bermuda Street	NA	NONE
SB/TMW-34 (15.0)	1.0-2.0	4.46-9.46 [5.80]	VOCs, PNAs, PCBs	Assess potential for migration from 404 East 10 Mile and previously identified PCB concentrations	**DWP:** benzene **GSIP:** petroleum VOCs	NONE
SB-35 (5.0)	2.0-3.0 and 4.0-5.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	NONE	NA
SB-36 (5.0)	2.0-3.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**DC(TSCA):** PCBs	NA
	4.0-5.0				NONE	
SB-37 (5.0)	1.0-2.0 and 4.0-5.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	NONE	NA
SB-38 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**DC(TSCA):** PCBs	NA
	4.0-5.0				NONE	
SB-39 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**DC(TSCA):** PCBs	NA
	2.0-3.0				NONE	
SB-40 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property	**DC(TSCA):** PCBs	NA

Location and Total Depth (feet bgs)	Soil Sample Depth (feet bgs)	TMW Screen Depth and [DTW] (feet bgs)	Analysis	Objectives	Part 201 Cleanup Criteria Exceedances	
					Soil	GW
	4.0-5.0			boundary with 404 East 10 Mile Road	NONE	
SB-41 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**DC(TSCA):** PCBs	NA
	2.0-3.0				**DC(TSCA):** PCBs	
	4.0-5.0				NONE	
SB-42 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**DC(TSCA):** PCBs	NA
	2.0-3.0				**DC(TSCA):** PCBs	
	4.0-5.0				NONE	
SB-43 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**DC(TSCA):** PCBs	NA
	2.0-3.0				**DC(TSCA):** PCBs	
	4.0-5.0				NONE	
SB-44 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	**DC(TSCA):** PCBs	NA
SB-45 (5.0)	1.0-2.0	NA	PCBs	Assess PCB concentrations along the property boundary with 404 East 10 Mile Road	NONE	NA

DW/P: drinking water/ protection
GSIP: Groundwater Surface Water Interface Protection
VISL: Vapor Intrusion Screening Level
DC: Direct Contact
R: Residential
NR: Nonresidential
PCE: tetrachloroethylene
TCE: trichloroethylene
DCE: dichloroethylene

2.1 Summary of Soil Analytical results

Soil analytical results are summarized in Tables 1 through 3 and on Figure 3.

Soil analytical results identified concentrations of PCE or TCE above Part 201 Residential and Nonresidential DWP cleanup criteria in the samples collected from SB-17, SB-19, and SB-22. A concentration of benzene in SB-34 above Part 201 Residential and Nonresidential DWP and various petroleum VOCs were identified in SB-24 above Part 201 GSIP cleanup criteria. Concentrations of various VOCs were identified in SB-15, SB-16, SB-18, SB-24, SB-26, SB-27, and SB-19 below the most restrictive Part 201 Residential cleanup criteria. No concentrations of

VOCs were identified in the remaining soil samples above laboratory method detection limits (MDLs).

Concentrations of benzo(a)pyrene were identified in SB-12, SB-24, and SB-27 above Part 201 Residential DC cleanup criteria and the concentrations in SB-24 and SB-27 were also above Nonresidential DC cleanup criteria. Concentrations of fluoranthene and/or phenanthrene were identified in SB-12, SB-24, and SB-27 above Part 201 GSIP cleanup criteria. Concentrations of various PNAs were identified in SB-5, SB-17, and SB-20 below the most restrictive Part 201 Residential cleanup criteria. No concentrations of PNAs were identified in the remaining soil samples above laboratory MDLs.

Concentrations of PCBs exceeded TSCA cleanup standards in shallow soil samples collected from SB-36 through SB-44 at concentrations between 1,300 and 489,000 µg/kg. A concentration of PCBs was identified above the laboratory MDL in SB-27 and SB-37, which are below the most restrictive Part 201 Residential cleanup criteria and TSCA cleanup standards. No concentrations of PCBs were identified above laboratory MDLs in any of the remaining soil samples collected.

Concentrations of various metals (arsenic, cadmium, chromium, lead, and/or zinc) were identified in each of the samples, where analyzed. A concentration of chromium was identified in SB-12 above Part 201 Residential and Nonresidential DWP and GSIP cleanup criteria. The remaining metal concentrations in soil are within SDBLs and/or below the most restrictive Part 201 Residential cleanup criteria.

A soil sample (SB-13) collected in the area of the acid line included a pH measurement which identified a pH of 7.63, which is not above characteristically hazardous levels.

2.2 Summary of Groundwater Analytical Results

Groundwater analytical results are summarized in Table 4 and on Figure 4.

Groundwater analytical results identified concentrations of cis-1,2-DCE and vinyl chloride in TMW-16 above Part 201 Residential and Nonresidential DW and/or GSI cleanup criteria and Residential and Nonresidential VISLs. Concentrations of various VOCs were identified in TMW-3, TMW-8, TMW-11, TNW-14, TMW-27, TMW-30, and TMW-34 below the most restrictive Part 201 Residential cleanup criteria. No concentrations of VOCs were identified in the remaining groundwater samples above laboratory MDLs.

No concentrations of PNAs were identified above laboratory MDLs in any of the groundwater samples collected.

Concentrations of various metals were identified below the most restrictive Part 201 Residential cleanup criteria.

Groundwater samples (TMW-8, 9, and 13) collected in the area of the acid line included pH measurements which identified pH ranges between 7.48 to 10.39, which are not above characteristically hazardous levels.

2.3 Subject Property Facility Status

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 exceedances to the Part 201 Residential and Nonresidential DWP/DW, GSIP/GSI, DC cleanup criteria and VISLs. Therefore, the subject property is a facility under Part 201 of P.A. 451, as amended, and the rules promulgated thereunder.

3.0 PROPERTY INFORMATION

3.1 Legal Description of Subject Property

A copy of the legal description is included in Appendix E as part of the assessing information.

3.2 Map of Subject Property

Refer to Figure 1, Property Location Map; and Figure 2, Generalized Diagram of the Subject Property and Surrounding Area which depicts the property/parcel boundaries.

3.3 Subject Location and Analytical Summary Maps

Figures 3 and 4 provide scaled maps of the subject property with site structures and sampling locations with analytical results.

3.4 Subject Property Location Map

Figures 1 and 2 provide scaled area maps depicting the subject property location in relation to the surrounding area.

3.5 Subject Property Address

As indicated in Section 1.0, the subject property is located at 660 East 10 Mile Road, Ferndale/Pleasant Ridge, Oakland County, Michigan 48220/48069 (hereafter referred to as the "subject property"; Figure 1).

The subject property consists of nine parcels located in Ferndale and Pleasant Ridge (Figure 2). For ease of reference, PM has identified the property under its main address, 660 East 10 Mile Road, but the entire nine parcels included in this BEA are as follows:

Parcel ID Number	Address	City	Acreage
25-27-127-012	400 East 10 Mile Road	Pleasant Ridge	1.10
25-27-127-013	No address identified	Pleasant Ridge	0.33
25-27-127-010	660 East 10 Mile Road	Pleasant Ridge	3.47
25-27-201-020	660 East 10 Mile Road	Ferndale	0.29
25-27-201-005	3351 Bermuda Street	Ferndale	0.169
25-27-201-019	3291 Bermuda Street	Ferndale	1.00
25-27-201-012	3281 Bermuda Street	Ferndale	0.165
25-27-201-013	3265 Bermuda Street	Ferndale	1.139
25-27-201-015	3155 Bermuda Street	Ferndale	0.75

3.6 Subject Spatial Data

As depicted in Figure 1, the subject property is located in township one North (T.1N), range 11 East (R.11E), and section 27, northwest quarter, northeast quarter-quarter in Ferndale and Pleasant Ridge, Oakland County, Michigan.

According to the MDEQ Groundwater Mapping Project Website, the center of the subject property is located at latitude 42.4740 and a longitude of -83.1343.

4.0 FACILITY STATUS OF SUBJECT PROPERTY

As indicated in Section 2.3, based upon documented exceedances of the Part 201 Residential and Nonresidential DWP/DW, GSIP/GSI, DC cleanup criteria and VISLs in soil and groundwater samples collected from the subject property, the subject property is a facility as defined under Part 201 of P.A. 451, as amended, and the rules promulgated thereunder.

4.1 Summary Data Tables

The analytical results were compared with the MDEQ Generic Cleanup Criteria and Screening Levels as presented 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.

The analytical results for target analytes exceeding Part 201 cleanup criteria are summarized in Section 2.0. A summary of the analytical results are included in Tables 1 through 4.

4.2 Laboratory Reports and Chain of Custody Documentation

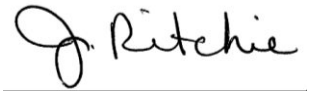
Samples collected were submitted to Merit Laboratories, Inc., East Lansing, Michigan for chemical analysis under chain of custody procedures and within applicable holding times. Refer to the laboratory analytical reports in Appendix D.

5.0 IDENTIFICATION OF BEA AUTHOR

This BEA was conducted on December 10, 2015, by Mr. Jamie Antoniewicz, P.E., Project Engineer, and reviewed by Ms. Jennifer L. Ritchie, C.P.G., Regional Site Investigation Manager, PM Environmental, Inc., which is prior to or within 45 days of becoming the property owner or operator. Qualification statements are provided as Appendix F.

We declare that, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in §312.10 of 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a property of the nature and history of the subject property. We have developed and performed the all appropriate inquires in conformance with the standards and practices set forth in 40 CFR Part 312.

Jamie Antoniewicz, P.E.
Project Engineer



Jennifer L. Ritchie, C.P.G.
Regional Site Investigation Manager

6.0 AAI REPORT OR ASTM PHASE I ESA

As indicated in Section 1.3, PM completed a Phase I ESA dated November 30, 2015 in conformance with the scope and limitations of ASTM Practice E 1527-13 of the subject property located at 660 East 10 Mile Road, Ferndale/Pleasant Ridge, Oakland County, Michigan 48220/48069. The scope of the Phase I ESA included consideration of hazardous substances as defined in Section 20101(1)(y) of P.A 451 of 1994, as amended, and constituted the performance of an All Appropriate Inquiry in conformance with the standards and practices set forth in 40 CFR Part 312.

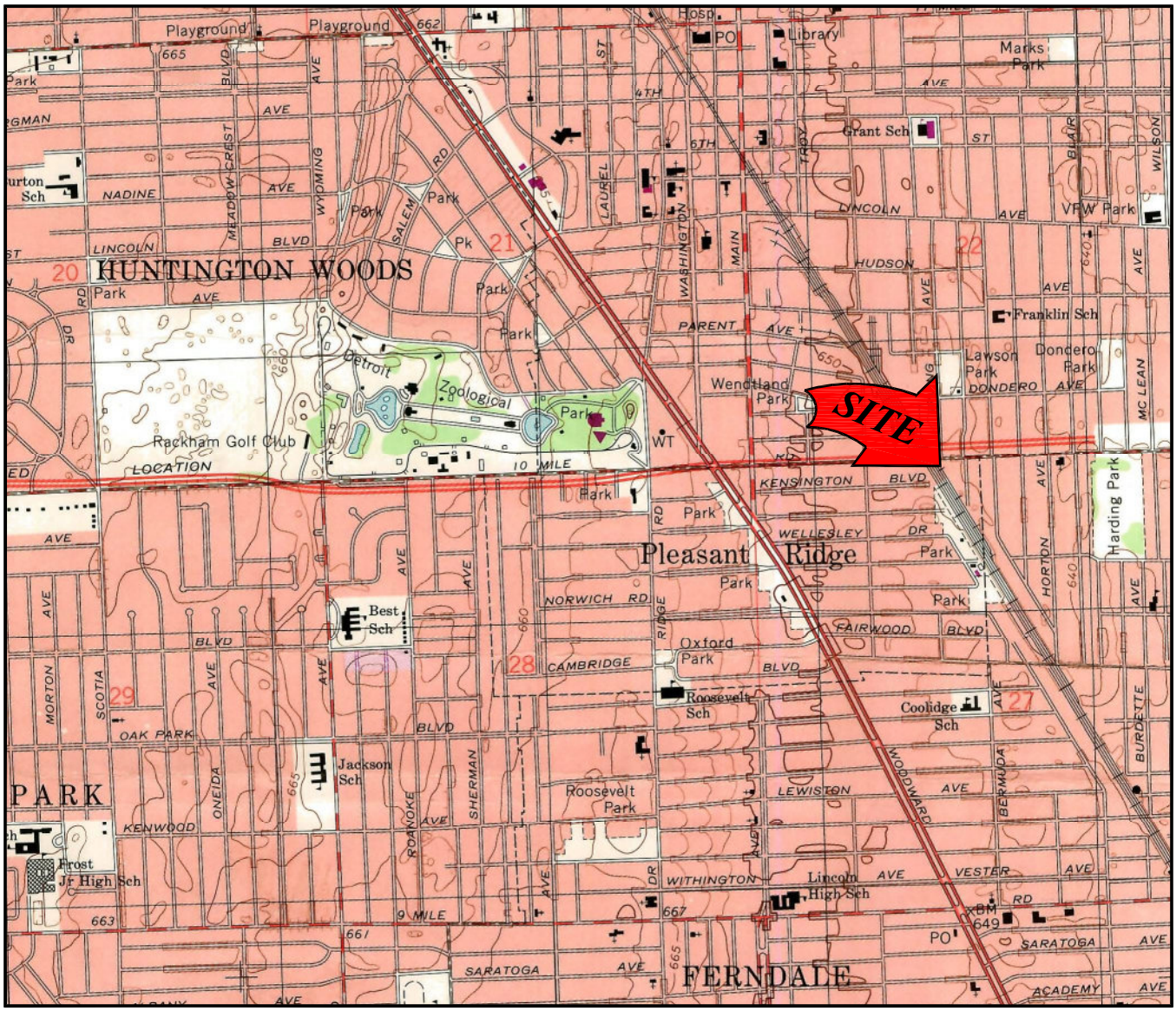
A copy of the November 2015 Phase I ESA is included in Appendix A.

7.0 REFERENCES

- Michigan Department of Environmental Quality (MDEQ) Generic Cleanup Criteria and Screening Levels as presented in Part 201 Rules 299.1 through 299.50, dated December 30, 2013 entitled “Cleanup Criteria Requirements for Response Activity”;
- MDEQ Operational Memorandum No. 4 “Site Characterization and Remediation Verification – Attachment 10, Peer Review Draft Groundwater Not in an Aquifer,” February 2007;
- MDEQ Operational Memorandum No. 2 “Sampling and Analysis,” October 22, 2004, Revised July 5, 2007;
- MDEQ May 2013 Guidance Document for the Vapor Intrusion Pathway;
- Baseline Environmental Submittal Form (EQP 4025), September 2015;
- Phase I ESA, October 5, 1993, ASTI;
- Subsurface Investigation, April 20, 1995, ASTI;
- Phase I ESA, February 11, 2015, PM; and,
- Phase I ESA, November 30, 2015, PM.

Figures

PM ENVIRONMENTAL Environmental & Engineering Services



MICHIGAN QUADRANGLE LOCATION

OAKLAND COUNTY

SCALE 1:24,000

1 MILE 1/2 MILE 0 1 MILE

FIGURE 1

PROPERTY VICINITY MAP

USGS, 7.5 MINUTE SERIES

ROYAL OAK, MI QUADRANGLE, 1996.

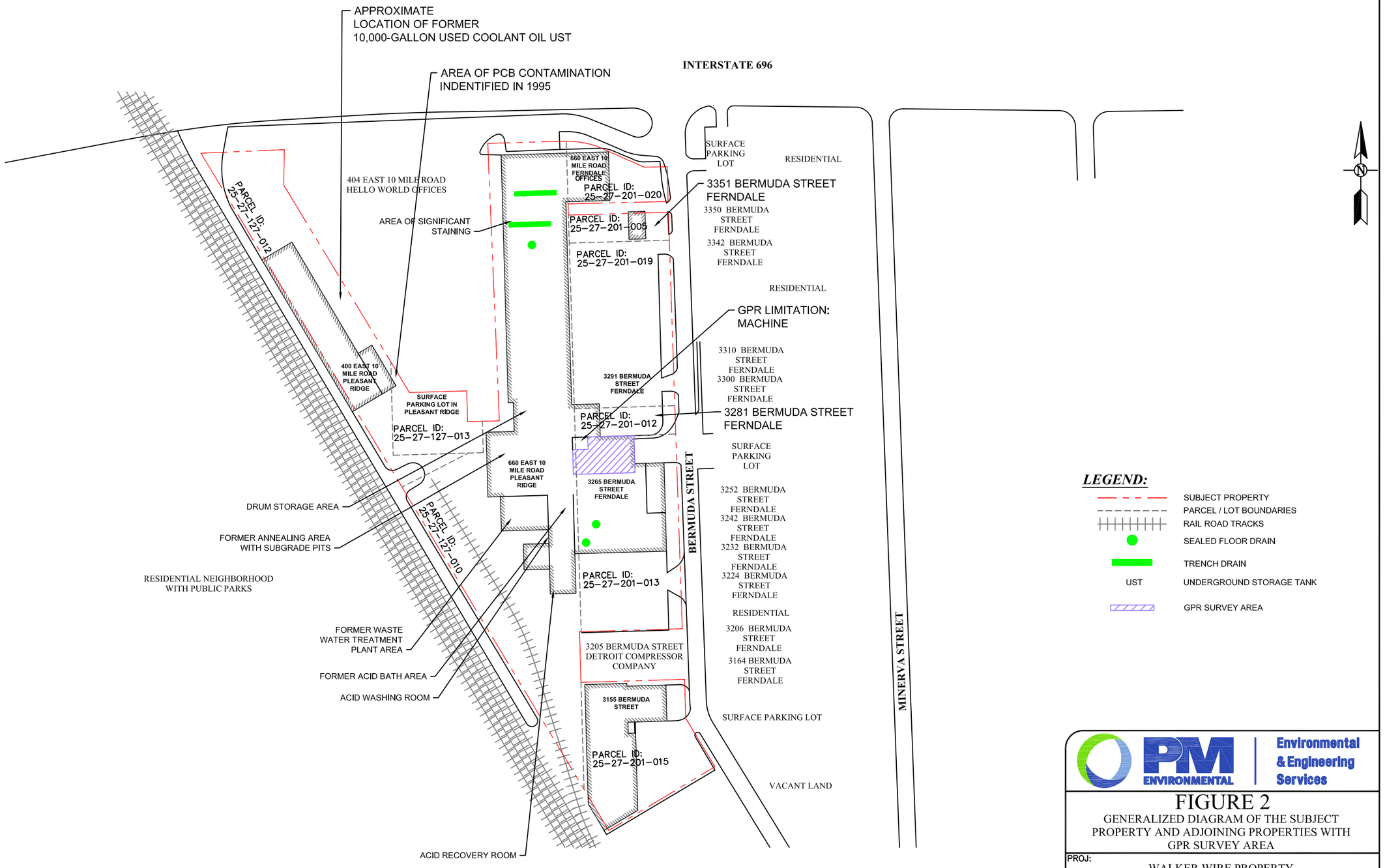
PM ENVIRONMENTAL | Environmental & Engineering Services

PROJ:
WALKER WIRE PROPERTY
660 EAST 10 MILE ROAD
FERNDALE, MI

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE
0 2,000'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: ES	DATE: 2/6/2015
CHKD BY: BS	SCALE: 1" = 2,000'
FILE NAME: 02-7954-0F01R00	



PM ENVIRONMENTAL | Environmental & Engineering Services

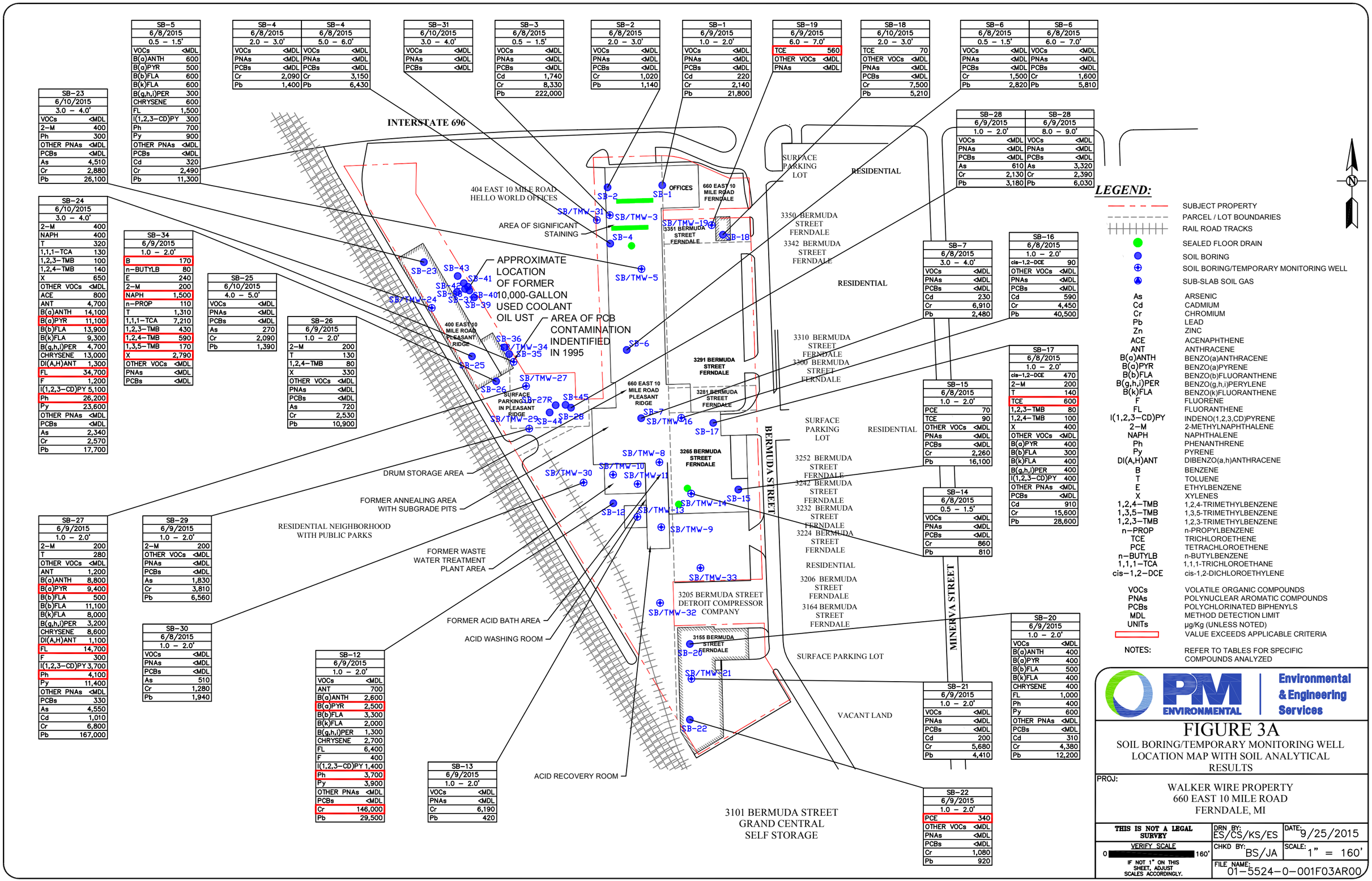
FIGURE 2

GENERALIZED DIAGRAM OF THE SUBJECT PROPERTY AND ADJOINING PROPERTIES WITH GPR SURVEY AREA

PROJ:

WALKER WIRE PROPERTY
660 EAST 10 MILE ROAD
FERNDALE, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: ES/CS/KS	DATE: 8/7/2015
VERIFY SCALE 0 — 160' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: BS/JA	SCALE: 1" = 160'
	FILE NAME: 01-5524-0-001F02R01	



SB-5	
6/8/2015	
0.5 – 1.5'	
VOCs	<MDL
B(a)ANTH	600
B(a)PYR	500
B(b)FLA	600
B(k)FLA	600
B(g,h,i)PER	300
CHRYSENE	600
FL	1,500
I(1,2,3–CD)PY	300
Ph	700
Py	900
OTHER PNAs	<MDL
PCBs	<MDL
Cd	320
Cr	2,490
Pb	11,300

SB-4	
6/8/2015	
2.0 – 3.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	2,090
Pb	1,400

SB-4	
6/8/2015	
5.0 – 6.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	3,150
Pb	6,430

SB-31	
6/10/2015	
3.0 – 4.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL

SB-3	
6/8/2015	
0.5 – 1.5'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	1,740
Cr	8,330
Pb	222,000

SB-2	
6/8/2015	
2.0 – 3.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	1,020
Pb	1,140

SB-1	
6/9/2015	
1.0 – 2.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	220
Cr	2,140
Pb	21,800

SB-19	
6/9/2015	
6.0 – 7.0'	
TCE	560
OTHER VOCs	<MDL
PNAs	<MDL

SB-18	
6/10/2015	
2.0 – 3.0'	
TCE	70
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	7,500
Pb	5,210

SB-6	
6/8/2015	
0.5 – 1.5'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	1,500
Pb	2,820

SB-6	
6/8/2015	
6.0 – 7.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	1,600
Pb	5,810

SB-28	
6/9/2015	
1.0 – 2.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	610
Cr	2,130
Pb	3,180

SB-28	
6/9/2015	
8.0 – 9.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	3,320
Cr	2,390
Pb	6,030

SB-23	
6/10/2015	
3.0 – 4.0'	
VOCs	<MDL
2–M	400
Ph	300
OTHER PNAs	<MDL
PCBs	<MDL
As	4,510
Cr	2,880
Pb	26,100

SB-24	
6/10/2015	
3.0 – 4.0'	
2–M	400
NAPH	400
T	320
1,1,1–TCA	130
1,2,3–TMB	100
1,2,4–TMB	140
X	650
OTHER VOCs	<MDL
ACE	800
ANT	4,700
B(a)ANTH	14,100
B(a)PYR	11,100
B(b)FLA	13,900
B(k)FLA	9,300
B(g,h,i)PER	4,700
CHRYSENE	13,000
DI(A,H)ANT	1,300
FL	34,700
F	1,200
I(1,2,3–CD)PY	5,100
Ph	26,200
Py	23,600
OTHER PNAs	<MDL
PCBs	<MDL
As	2,340
Cr	2,570
Pb	17,700

SB-34	
6/9/2015	
1.0 – 2.0'	
B	170
n–BUTYLB	80
E	240
2–M	200
NAPH	1,500
n–PROP	110
T	1,310
1,1,1–TCA	7,210
1,2,3–TMB	430
1,2,4–TMB	590
1,3,5–TMB	170
X	2,790
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL

SB-25	
6/10/2015	
4.0 – 5.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	270
Cr	2,090
Pb	1,390

SB-26	
6/9/2015	
1.0 – 2.0'	
2–M	200
T	130
1,2,4–TMB	80
X	330
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	720
Cr	2,530
Pb	10,900

SB-7	
6/8/2015	
3.0 – 4.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	230
Cr	6,910
Pb	2,480

SB-16	
6/8/2015	
1.0 – 2.0'	
cis–1,2–DCE	90
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	590
Cr	4,450
Pb	40,500

SB-17	
6/8/2015	
1.0 – 2.0'	
cis–1,2–DCE	470
2–M	200
T	140
TCE	600
1,2,3–TMB	80
1,2,4–TMB	100
X	400
OTHER VOCs	<MDL
B(a)PYR	400
B(b)FLA	300
B(k)FLA	400
B(g,h,i)PER	400
I(1,2,3–CD)PY	400
OTHER PNAs	<MDL
PCBs	<MDL
Cd	910
Cr	15,600
Pb	28,600

SB-15	
6/8/2015	
1.0 – 2.0'	
PCE	70
TCE	90
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	2,260
Pb	16,100

SB-14	
6/8/2015	
0.5 – 1.5'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	860
Pb	810

SB-20	
6/9/2015	
1.0 – 2.0'	
VOCs	<MDL
B(a)ANTH	400
B(a)PYR	400
B(b)FLA	500
B(k)FLA	400
CHRYSENE	400
FL	1,000
Ph	400
Py	600
OTHER PNAs	<MDL
PCBs	<MDL
Cd	310
Cr	4,380
Pb	12,200

SB-21	
6/9/2015	
1.0 – 2.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cd	200
Cr	5,680
Pb	4,410

SB-22	
6/9/2015	
1.0 – 2.0'	
PCE	340
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
Cr	1,080
Pb	920

SB-27	
6/9/2015	
1.0 – 2.0'	
2–M	200
T	280
OTHER VOCs	<MDL
ANT	1,200
B(a)ANTH	8,800
B(a)PYR	9,400
B(b)FLA	500
B(b)FLA	11,100
B(k)FLA	8,000
B(g,h,i)PER	3,200
CHRYSENE	8,600
DI(A,H)ANT	1,100
FL	14,700
F	300
I(1,2,3–CD)PY	3,700
Ph	4,100
Py	11,400
OTHER PNAs	<MDL
PCBs	330
As	4,550
Cd	1,010
Cr	6,800
Pb	167,000

SB-29	
6/9/2015	
1.0 – 2.0'	
2–M	200
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	1,830
Cr	3,810
Pb	6,560

SB-30	
6/8/2015	
1.0 – 2.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	510
Cr	1,280
Pb	1,940

SB-12	
6/9/2015	
1.0 – 2.0'	
VOCs	<MDL
ANT	700
B(a)ANTH	2,600
B(a)PYR	2,500
B(b)FLA	3,300
B(k)FLA	2,000
B(g,h,i)PER	1,300
CHRYSENE	2,700
FL	6,400
F	400
I(1,2,3–CD)PY	1,400
Ph	3,700
Py	3,900
OTHER PNAs	<MDL
PCBs	<MDL
Cr	146,000
Pb	29,500

SB-13	
6/9/2015	
1.0 – 2.0'	
VOCs	<MDL
PNAs	<MDL
Cr	6,190
Pb	420

LEGEND:

- SUBJECT PROPERTY
- PARCEL / LOT BOUNDARIES
- RAIL ROAD TRACKS
- SEALED FLOOR DRAIN
- SOIL BORING
- SOIL BORING/TEMPORARY MONITORING WELL
- SUB-SLAB SOIL GAS

As	ARSENIC
Cd	CADMIUM
Cr	CHROMIUM
Pb	LEAD
Zn	ZINC
ACE	ACENAPHTHENE
ANT	ANTHRACENE
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
F	FLUORENE
FL	FLUORANTHENE
I(1,2,3–CD)PY	INDENO(1,2,3,CD)PYRENE
2–M	2-METHYLNAPHTHALENE
NAPH	NAPHTHALENE
Ph	PHENANTHRENE
Py	PYRENE
DI(A,H)ANT	DIBENZO(a,h)ANTHRACENE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
1,2,4–TMB	1,2,4-TRIMETHYLBENZENE
1,3,5–TMB	1,3,5-TRIMETHYLBENZENE
1,2,3–TMB	1,2,3-TRIMETHYLBENZENE
n–PROP	n-PROPYLBENZENE
TCE	TRICHLOROETHENE
PCE	TETRACHLOROETHENE
n–BUTYLB	n-BUTYLBENZENE
1,1,1–TCA	1,1,1-TRICHLOROETHANE
cis–1,2–DCE	cis-1,2-DICHLOROETHYLENE
VOCs	VOLATILE ORGANIC COMPOUNDS
PNAs	POLYNUCLEAR AROMATIC COMPOUNDS
PCBs	POLYCHLORINATED BIPHENYLS
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 3A

SOIL BORING/TEMPORARY MONITORING WELL LOCATION MAP WITH SOIL ANALYTICAL RESULTS

PROJ:

WALKER WIRE PROPERTY
660 EAST 10 MILE ROAD
FERNDALE, MI

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE 0 160'

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

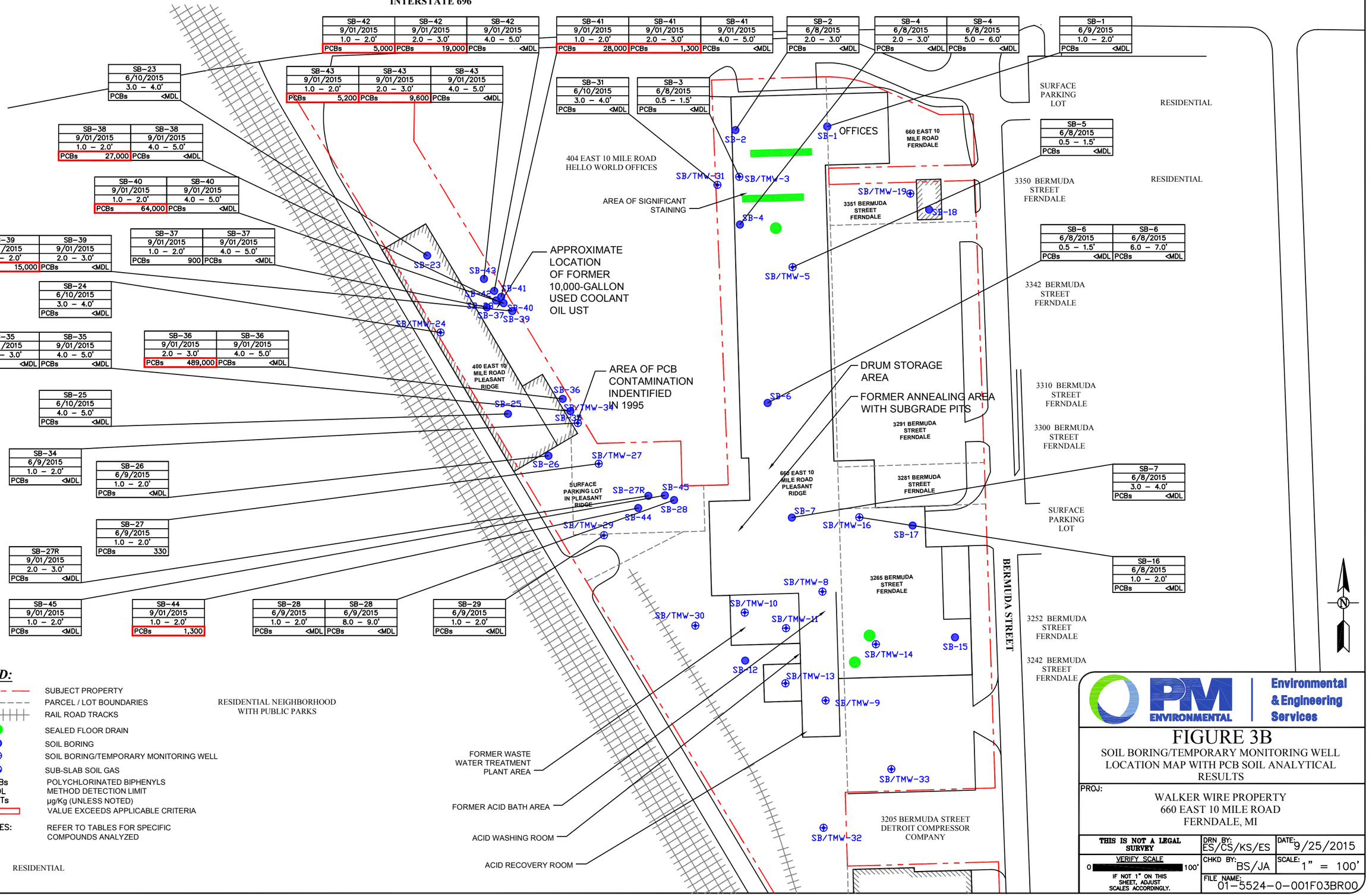
DRN BY: ES/CS/KS/ES

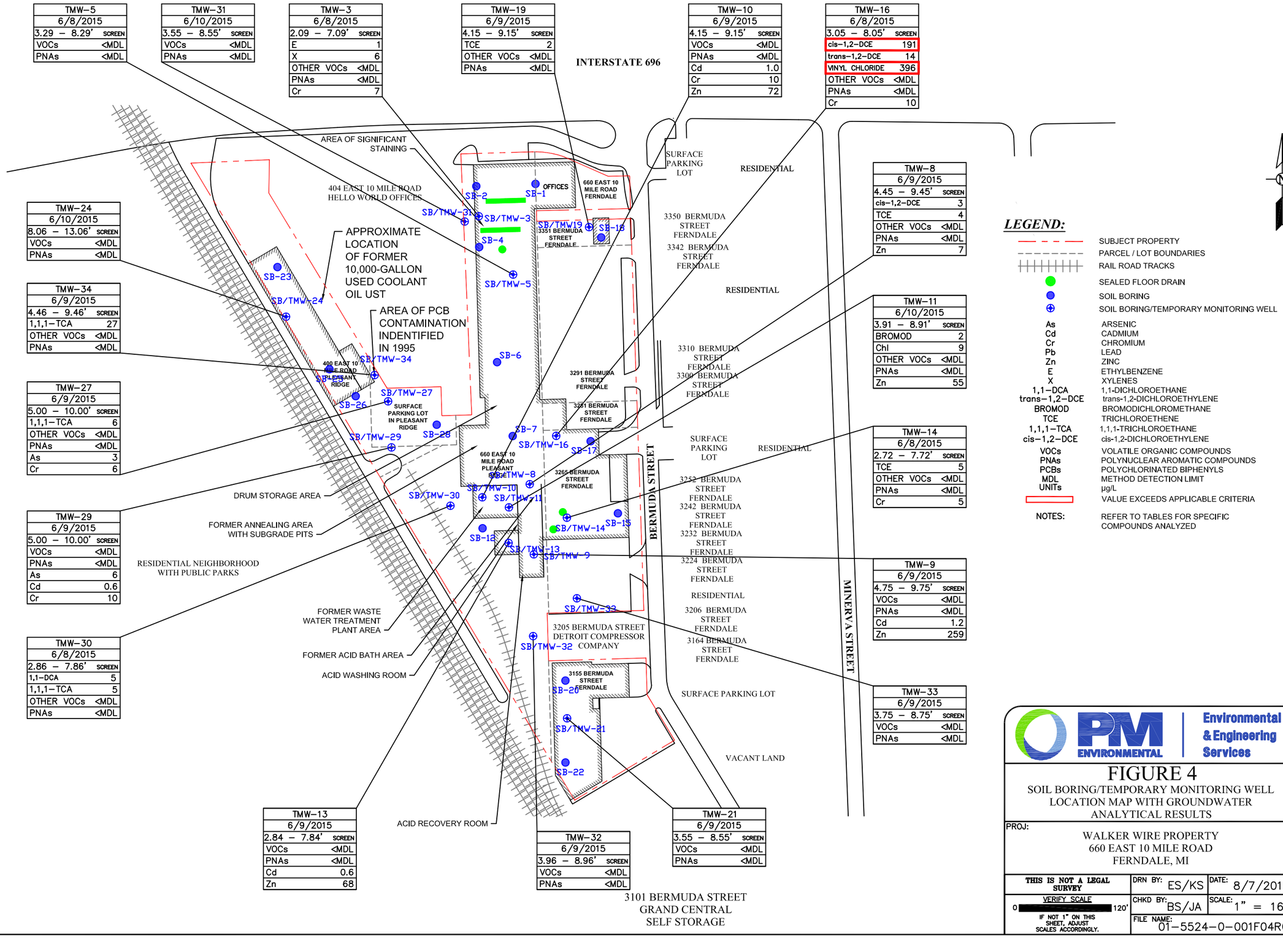
CHKD BY: BS/JA

DATE: 9/25/2015

SCALE: 1" = 160'

FILE NAME: 01–5524–0–001F03AR00


INTERSTATE 696
SB-42 9/01/2015 1.0 – 2.0' PCBs 5,000
SB-42 9/01/2015 2.0 – 3.0' PCBs 19,000
SB-42 9/01/2015 4.0 – 5.0' PCBs <MDL
SB-41 9/01/2015 1.0 – 2.0' PCBs 28,000
SB-41 9/01/2015 2.0 – 3.0' PCBs 1,300
SB-41 9/01/2015 4.0 – 5.0' PCBs <MDL
SB-2 6/8/2015 2.0 – 3.0' PCBs <MDL
SB-4 6/8/2015 2.0 – 3.0' PCBs <MDL
SB-4 6/8/2015 5.0 – 6.0' PCBs <MDL
SB-1 6/9/2015 1.0 – 2.0' PCBs <MDL
SB-23 6/10/2015 3.0 – 4.0' PCBs <MDL
SB-43 9/01/2015 1.0 – 2.0' PCBs 5,200
SB-43 9/01/2015 2.0 – 3.0' PCBs 9,600
SB-43 9/01/2015 4.0 – 5.0' PCBs <MDL
SB-31 6/10/2015 3.0 – 4.0' PCBs <MDL
SB-3 6/8/2015 0.5 – 1.5' PCBs <MDL
SB-38 9/01/2015 1.0 – 2.0' PCBs 27,000
SB-38 9/01/2015 4.0 – 5.0' PCBs <MDL
SB-40 9/01/2015 1.0 – 2.0' PCBs 64,000
SB-40 9/01/2015 4.0 – 5.0' PCBs <MDL
SB-39 9/01/2015 1.0 – 2.0' PCBs 15,000
SB-39 9/01/2015 2.0 – 3.0' PCBs <MDL
SB-37 9/01/2015 1.0 – 2.0' PCBs 900
SB-37 9/01/2015 4.0 – 5.0' PCBs <MDL
SB-24 6/10/2015 3.0 – 4.0' PCBs <MDL
SB-35 9/01/2015 2.0 – 3.0' PCBs <MDL
SB-35 9/01/2015 4.0 – 5.0' PCBs <MDL
SB-36 9/01/2015 2.0 – 3.0' PCBs 489,000
SB-36 9/01/2015 4.0 – 5.0' PCBs <MDL
SB-25 6/10/2015 4.0 – 5.0' PCBs <MDL
SB-34 6/9/2015 1.0 – 2.0' PCBs <MDL
SB-26 6/9/2015 1.0 – 2.0' PCBs <MDL
SB-27 6/9/2015 1.0 – 2.0' PCBs 330
SB-27R 9/01/2015 2.0 – 3.0' PCBs <MDL
SB-45 9/01/2015 1.0 – 2.0' PCBs <MDL
SB-44 9/01/2015 1.0 – 2.0' PCBs 1,300
SB-28 6/9/2015 1.0 – 2.0' PCBs <MDL
SB-28 6/9/2015 8.0 – 9.0' PCBs <MDL
SB-29 6/9/2015 1.0 – 2.0' PCBs <MDL
SB-5 6/8/2015 0.5 – 1.5' PCBs <MDL
SB-6 6/8/2015 0.5 – 1.5' PCBs <MDL
SB-6 6/8/2015 6.0 – 7.0' PCBs <MDL
SB-7 6/8/2015 3.0 – 4.0' PCBs <MDL
SB-16 6/8/2015 1.0 – 2.0' PCBs <MDL
APPROXIMATE LOCATION OF FORMER 10,000-GALLON USED COOLANT OIL UST
AREA OF PCB CONTAMINATION INDENTIFIED IN 1995
AREA OF SIGNIFICANT STAINING
404 EAST 10 MILE ROAD HELLO WORLD OFFICES
660 EAST 10 MILE ROAD FERNDALE
OFFICES
SURFACE PARKING LOT
RESIDENTIAL
3350 BERMUDA STREET FERNDALE
3351 BERMUDA STREET FERNDALE
3342 BERMUDA STREET FERNDALE
DRUM STORAGE AREA
FORMER ANNEALING AREA WITH SUBGRADE PITS
3291 BERMUDA STREET FERNDALE
3310 BERMUDA STREET FERNDALE
3300 BERMUDA STREET FERNDALE
400 EAST 10 MILE ROAD PLEASANT RIDGE
660 EAST 10 MILE ROAD PLEASANT RIDGE
3281 BERMUDA STREET FERNDALE
SURFACE PARKING LOT IN PLEASANT RIDGE
SURFACE PARKING LOT
3265 BERMUDA STREET FERNDALE
BERMUDA STREET
3252 BERMUDA STREET FERNDALE
3242 BERMUDA STREET FERNDALE
3205 BERMUDA STREET DETROIT COMPRESSOR COMPANY
FORMER WASTE WATER TREATMENT PLANT AREA
FORMER ACID BATH AREA
ACID WASHING ROOM
ACID RECOVERY ROOM
RESIDENTIAL NEIGHBORHOOD WITH PUBLIC PARKS
RESIDENTIAL
SB-1 SB-2 SB-3 SB-4 SB-5 SB-6 SB-7 SB-8 SB-10 SB-11 SB-12 SB-13 SB-14 SB-15 SB-16 SB-17 SB-18 SB-19 SB-23 SB-24 SB-25 SB-26 SB-27 SB-27R SB-28 SB-29 SB-30 SB-31 SB-32 SB-33 SB-34 SB-35 SB-36 SB-37 SB-38 SB-39 SB-40 SB-41 SB-42 SB-43 SB-44 SB-45
SB/TMW-3 SB/TMW-5 SB/TMW-7 SB/TMW-8 SB/TMW-9 SB/TMW-10 SB/TMW-11 SB/TMW-13 SB/TMW-14 SB/TMW-16 SB/TMW-19 SB/TMW-24 SB/TMW-27 SB/TMW-29 SB/TMW-30 SB/TMW-31 SB/TMW-32 SB/TMW-33 SB/TMW-34
LEGEND:
SUBJECT PROPERTY
PARCEL / LOT BOUNDARIES
RAIL ROAD TRACKS
SEALED FLOOR DRAIN
SOIL BORING
SOIL BORING/TEMPORARY MONITORING WELL
SUB-SLAB SOIL GAS
PCBs POLYCHLORINATED BIPHENYLS
MDL METHOD DETECTION LIMIT
UNITs µg/Kg (UNLESS NOTED)
VALUE EXCEEDS APPLICABLE CRITERIA
NOTES: REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED
N
PM ENVIRONMENTAL
Environmental & Engineering Services
FIGURE 3B
SOIL BORING/TEMPORARY MONITORING WELL LOCATION MAP WITH PCB SOIL ANALYTICAL RESULTS
PROJ: WALKER WIRE PROPERTY 660 EAST 10 MILE ROAD FERNDALE, MI
THIS IS NOT A LEGAL SURVEY
VERIFY SCALE 0 100' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
DRN BY: ES/CS/KS/ES
CHKD BY: BS/JA
DATE: 9/25/2015
SCALE: 1" = 100'
FILE NAME: 01-5524-0-001F03BR00


TMW–5
6/8/2015
3.29 – 8.29' SCREEN
VOCs <MDL
PNAs <MDL
TMW–31
6/10/2015
3.55 – 8.55' SCREEN
VOCs <MDL
PNAs <MDL
TMW–3
6/8/2015
2.09 – 7.09' SCREEN
E 1
X 6
OTHER VOCs <MDL
PNAs <MDL
Cr 7
TMW–19
6/9/2015
4.15 – 9.15' SCREEN
TCE 2
OTHER VOCs <MDL
PNAs <MDL
INTERSTATE 696
TMW–10
6/9/2015
4.15 – 9.15' SCREEN
VOCs <MDL
PNAs <MDL
Cd 1.0
Cr 10
Zn 72
TMW–16
6/8/2015
3.05 – 8.05' SCREEN
cis–1,2–DCE 191
trans–1,2–DCE 14
VINYL CHLORIDE 396
OTHER VOCs <MDL
PNAs <MDL
Cr 10
AREA OF SIGNIFICANT STAINING
404 EAST 10 MILE ROAD HELLO WORLD OFFICES
OFFICES
660 EAST 10 MILE ROAD FERNDALE
SB-2
SB-1
SB/TMW-31
SB/TMW-3
SB/TMW19
SB-18
SB-4
SB/TMW-5
APPROXIMATE LOCATION OF FORMER 10,000-GALLON USED COOLANT OIL UST
AREA OF PCB CONTAMINATION INDENTIFIED IN 1995
SB-23
SB/TMW-24
SB-6
SB/TMW-34
400 EAST 10 MILE ROAD PLEASANT RIDGE
SB-26
SB/TMW-27
SURFACE PARKING LOT IN PLEASANT RIDGE
SB-28
SB/TMW-29
SB-7
SB/TMW-16
SB-17
660 EAST 10 MILE ROAD PLEASANT RIDGE
SB/TMW-8
SB/TMW-10
SB/TMW-11
SB/TMW-30
DRUM STORAGE AREA
FORMER ANNEALING AREA WITH SUBGRADE PITS
RESIDENTIAL NEIGHBORHOOD WITH PUBLIC PARKS
SB-12
SB/TMW-14
SB-15
SB/TMW-13
SB/TMW-9
FORMER WASTE WATER TREATMENT PLANT AREA
FORMER ACID BATH AREA
ACID WASHING ROOM
ACID RECOVERY ROOM
SB/TMW-33
SB/TMW-32
SB-20
SB/TMW-21
SB-22
3101 BERMUDA STREET GRAND CENTRAL SELF STORAGE
SURFACE PARKING LOT
RESIDENTIAL
3350 BERMUDA STREET FERNDALE
3342 BERMUDA STREET FERNDALE
RESIDENTIAL
3310 BERMUDA STREET FERNDALE
3300 BERMUDA STREET FERNDALE
3291 BERMUDA STREET FERNDALE
3281 BERMUDA STREET FERNDALE
SURFACE PARKING LOT
RESIDENTIAL
3265 BERMUDA STREET FERNDALE
3252 BERMUDA STREET FERNDALE
3242 BERMUDA STREET FERNDALE
3232 BERMUDA STREET FERNDALE
3224 BERMUDA STREET FERNDALE
RESIDENTIAL
3206 BERMUDA STREET FERNDALE
3205 BERMUDA STREET DETROIT COMPRESSOR COMPANY
3164 BERMUDA STREET FERNDALE
3155 BERMUDA STREET FERNDALE
SURFACE PARKING LOT
VACANT LAND
BERMUDA STREET
MINERVA STREET
TMW–24
6/10/2015
8.06 – 13.06' SCREEN
VOCs <MDL
PNAs <MDL
TMW–34
6/9/2015
4.46 – 9.46' SCREEN
1,1,1–TCA 27
OTHER VOCs <MDL
PNAs <MDL
TMW–27
6/9/2015
5.00 – 10.00' SCREEN
1,1,1–TCA 6
OTHER VOCs <MDL
PNAs <MDL
As 3
Cr 6
TMW–29
6/9/2015
5.00 – 10.00' SCREEN
VOCs <MDL
PNAs <MDL
As 6
Cd 0.6
Cr 10
TMW–30
6/8/2015
2.86 – 7.86' SCREEN
1,1–DCA 5
1,1,1–TCA 5
OTHER VOCs <MDL
PNAs <MDL
TMW–13
6/9/2015
2.84 – 7.84' SCREEN
VOCs <MDL
PNAs <MDL
Cd 0.6
Zn 68
TMW–32
6/9/2015
3.96 – 8.96' SCREEN
VOCs <MDL
PNAs <MDL
TMW–21
6/9/2015
3.55 – 8.55' SCREEN
VOCs <MDL
PNAs <MDL
TMW–8
6/9/2015
4.45 – 9.45' SCREEN
cis–1,2–DCE 3
TCE 4
OTHER VOCs <MDL
PNAs <MDL
Zn 7
TMW–11
6/10/2015
3.91 – 8.91' SCREEN
BROMOD 2
Chl 9
OTHER VOCs <MDL
PNAs <MDL
Zn 55
TMW–14
6/8/2015
2.72 – 7.72' SCREEN
TCE 5
OTHER VOCs <MDL
PNAs <MDL
Cr 5
TMW–9
6/9/2015
4.75 – 9.75' SCREEN
VOCs <MDL
PNAs <MDL
Cd 1.2
Zn 259
TMW–33
6/9/2015
3.75 – 8.75' SCREEN
VOCs <MDL
PNAs <MDL
N
LEGEND:
SUBJECT PROPERTY
PARCEL / LOT BOUNDARIES
RAIL ROAD TRACKS
SEALED FLOOR DRAIN
SOIL BORING
SOIL BORING/TEMPORARY MONITORING WELL
As ARSENIC
Cd CADMIUM
Cr CHROMIUM
Pb LEAD
Zn ZINC
E ETHYLBENZENE
X XYLENES
1,1–DCA 1,1-DICHLOROETHANE
trans–1,2–DCE trans-1,2-DICHLOROETHYLENE
BROMOD BROMODICHLOROMETHANE
TCE TRICHLOROETHENE
1,1,1–TCA 1,1,1-TRICHLOROETHANE
cis–1,2–DCE cis-1,2-DICHLOROETHYLENE
VOCs VOLATILE ORGANIC COMPOUNDS
PNAs POLYNUCLEAR AROMATIC COMPOUNDS
PCBs POLYCHLORINATED BIPHENYLS
MDL METHOD DETECTION LIMIT
UNITs µg/L
VALUE EXCEEDS APPLICABLE CRITERIA
NOTES: REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED
PM ENVIRONMENTAL
Environmental & Engineering Services
FIGURE 4
SOIL BORING/TEMPORARY MONITORING WELL LOCATION MAP WITH GROUNDWATER ANALYTICAL RESULTS
PROJ:
WALKER WIRE PROPERTY
660 EAST 10 MILE ROAD
FERNDALE, MI
THIS IS NOT A LEGAL SURVEY
VERIFY SCALE
0 120'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
DRN BY: ES/KS
DATE: 8/7/2015
CHKD BY: BS/JA
SCALE: 1" = 160'
FILE NAME: 01–5524–0–001F04R01

Tables

PM ENVIRONMENTAL Environmental & Engineering Services

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
660 EAST 10 MILE ROAD, FERNDALE, MICHIGAN
PM PROJECT #01-5524-0-001

VOLATILE ORGANIC COMPOUNDS (µg/Kg)			Benzene	n-Butylbenzene	cis-1,2-Dichloroethylene	Ethylbenzene	2-Methylnaphthalene	Naphthalene	n-Propylbenzene	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	Trichloroethylene	1,2,3-Trimethylbenzene*	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes	Other VOCs
Chemical Abstract Service Number (CAS#)			71432	104518	156592	100414	91576	91203	103651	127184	108883	71556	79016	526738	95636	108678	1330207	Various
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**VOCs**															
SB-1	06/09/2015	1.0-2.0	<70	<70	<70	<70	<100	<400	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-2	06/08/2015	2.0-3.0	<70	<70	<70	<70	<100	<300	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-3	06/08/2015	0.5-1.5	<70	<70	<70	<70	<100	<400	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-4	06/08/2015	2.0-3.0	<60	<60	<60	<60	<100	<300	<60	<60	<60	<60	<60	<60	<60	<60	<160	<MDL
SB-4	06/08/2015	5.0-6.0	<70	<70	<70	<70	<100	<300	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-5	06/08/2015	0.5-1.5	<80	<80	<80	<80	<200	<400	<80	<80	<80	<80	<80	<80	<80	<80	<280	<MDL
SB-6	06/08/2015	0.5-1.5	<60	<60	<60	<60	<100	<300	<60	<60	<60	<60	<60	<60	<60	<60	<160	<MDL
SB-6	06/08/2015	6.0-7.0	<80	<80	<80	<80	<200	<400	<80	<80	<80	<80	<80	<80	<80	<80	<280	<MDL
SB-7	06/08/2015	3.0-4.0	<90	<90	<90	<90	<200	<400	<90	<90	<90	<90	<90	<90	<90	<90	<290	<MDL
SB-12	06/09/2015	1.0-2.0	<70	<70	<70	<70	<100	<300	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-13	06/09/2015	1.0-2.0	<60	<60	<60	<60	<100	<300	<60	<60	<60	<60	<60	<60	<60	<60	<160	<MDL
SB-14	06/08/2015	0.5-1.5	<60	<60	<60	<60	<100	<300	<60	<60	<60	<60	<60	<60	<60	<60	<160	<MDL
SB-15	06/08/2015	1.0-2.0	<70	<70	<70	<70	<100	<400	<70	70	<70	<70	90	<70	<70	<70	<170	<MDL
SB-16	06/08/2015	1.0-2.0	<70	<70	90	<70	<100	<400	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-17	06/08/2015	1.0-2.0	<70	<70	470	<70	200	<400	<70	<70	140	<70	**600**	80	100	<70	400	<MDL
SB-18	06/10/2015	2.0-3.0	<70	<70	<70	<70	<100	<300	<70	<70	<70	<70	70	<70	<70	<70	<170	<MDL
SB-19	06/09/2015	6.0-7.0	<80	<80	<80	<80	<200	<400	<80	<80	<80	<80	**560**	<80	<80	<80	<280	<MDL
SB-20	06/09/2015	1.0-2.0	<70	<70	<70	<70	<100	<300	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-22	06/09/2015	1.0-2.0	<70	<70	<70	<70	<100	<400	<70	**340**	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-21	06/09/2015	1.0-2.0	<80	<80	<80	<80	<200	<400	<80	<80	<80	<80	<80	<80	<80	<80	<280	<MDL
SB-23	06/10/2015	3.0-4.0	<70	<70	<70	<70	<100	<300	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-24	06/10/2015	3.0-4.0	<60	<60	<60	<60	400	400	<60	<60	320	130	<60	100	140	<60	650	<MDL
SB-25	06/10/2015	4.0-5.0	<60	<60	<60	<60	<100	<300	<60	<60	<60	<60	<60	<60	<60	<60	<160	<MDL
SB-26	06/09/2015	1.0-2.0	<60	<60	<60	<60	200	<300	<60	<60	130	<60	<60	<60	80	<60	330	<MDL
SB-27	06/09/2015	1.0-2.0	<80	<80	<80	<80	200	<400	<80	<80	280	<80	<80	<80	<80	<80	<280	<MDL
SB-28	06/09/2015	1.0-2.0	<60	<60	<60	<60	<100	<300	<60	<60	<60	<60	<60	<60	<60	<60	<160	<MDL
SB-28	06/09/2015	8.0-9.0	<70	<70	<70	<70	<100	<400	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-29	06/09/2015	1.0-2.0	<60	<60	<60	<60	200	<300	<60	<60	<60	<60	<60	<60	<60	<60	<160	<MDL
SB-30	06/08/2015	1.0-2.0	<70	<70	<70	<70	<100	<300	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-31	06/10/2015	3.0-4.0	<70	<70	<70	<70	<100	<300	<70	<70	<70	<70	<70	<70	<70	<70	<170	<MDL
SB-34	06/09/2015	1.0-2.0	**170**	80	<70	240	1,700	**1,500**	110	<70	1,310	7,210	<70	430	**590**	170	**2,790**	<MDL
Cleanup Criteria Requirements for Response Activity (R 299.1 - R 299.50) **Generic Soil Cleanup Criteria Tables 2 and 3: Residential and Non-Residential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Risk-Based Screening Levels, December 30, 2013** **MDEQ Guidance Document For The Vapor Intrusion Pathway, Policy and Procedure Number: 09-017, Appendix D Vapor Intrusion Screening Values, May 2013**																		
Residential (µg/Kg)																		
Statewide Default Background Levels			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Drinking Water Protection (Res DWP)			100	1,600	1,400	1,500	57,000	35,000	1,600	100	16,000	4,000	100	1,800	2,100	1,800	5,600	Various
Groundwater Surface Water Interface Protection (GSIP)			4,000 {X}	ID	12,000	360	4,200	730	ID	1,200 {X}	5,400	1,800	4,000 {X}	570	570	1,100	820	Various
Soil Volatilization to Indoor Air Inhalation (Res SVII)			1,600	ID	22,000	87,000	2.70E+06	2.50E+05	ID	11,000	3.3E+05 {C}	2.50E+05	1,000	2.6E+06 {C}	4.3E+06 {C}	2.6E+06 {C}	6.3E+06 {C}	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			13,000	ID	1.80E+05	7.20E+05	1.50E+06	3.00E+05	ID	1.70E+05	2.80E+06	3.80E+06	11,000	1.60E+07	2.10E+07	1.60E+07	4.60E+07	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			34,000	ID	4.20E+05	1.00E+06	1.50E+06	3.00E+05	ID	4.80E+05	5.10E+06	1.20E+07	25,000	3.80E+08	5.00E+08	3.80E+08	6.10E+07	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			79,000	ID	9.90E+05	2.20E+06	1.50E+06	3.00E+05	ID	1.1E+06	1.20E+07	2.80E+07	57,000	3.80E+08	5.00E+08	3.80E+08	1.30E+08	Various
Ambient Air Particulate Soil Inhalation (Res PSI)			3.80E+08	2.00E+09	2.30E+09	1.00E+10	6.70E+08	2.00E+08	1.30E+09	2.7E+09	2.70E+10	6.70E+10	1.30E+08	8.20E+10	8.20E+10	8.20E+10	2.90E+11	Various
Direct Contact (Res DC)			1.80E+05	2.50E+06	2.5E+06 {C}	2.2E+07 {C}	8.10E+06	1.60E+07	2.50E+06	2.0E+05 {C}	5.0E+07 {C}	5.0E+08 {C}	5.0E+5 {C,DD}	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	4,600	1,400	1,500	1.70E+05	1.00E+05	4,600	100	16,000	4,000	100	1,800	2,100	1,800	5,600	Various
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			8,400	ID	41,000	4.6E+05 {C}	4.90E+06	4.70E+05	ID	21,000	6.1E+05 {C}	4.60E+05	1,900	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	ID	2.10E+05	2.40E+06	1.80E+06	3.50E+05	ID	2.10E+05	3.30E+06	4.50E+06	14,000	1.90E+07	2.50E+07	1.90E+07	5.40E+07	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			99,000	ID	4.30E+05	3.10E+06	1.80E+06	3.50E+05	ID	4.90E+05	3.60E+07	1.50E+07	25,000	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	ID	1.00E+06	6.50E+06	1.80E+06	3.50E+05	ID	1.1E+06	3.60E+07	3.10E+07	58,000	4.60E+08	6.00E+08	4.60E+08	1.30E+08	Various
Ambient Air Particulate Soil Inhalation (Nonres PSI)			4.70E+08	ID	1.00E+09	1.30E+10	2.90E+08	8.80E+07	5.90E+08	1.2E+09	1.20E+10	2.90E+10	5.90E+07	3.60E+10	3.60E+10	3.60E+10	1.30E+11	Various
Direct Contact (Nonres DC)			8.40E+05 {C}	8.00E+06	8.0E+06 {C}	7.1E+07 {C}	2.60E+07	5.20E+07	8.00E+06	9.3E+05 {C}	1.6E+08 {C}	1.0E+09 {C}	6.6E+05 {C,DD}	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	1.00E+07	6.40E+05	1.40E+05	NA	NA	1.00E+07	88,000	2.50E+05	4.60E+05	5.00E+05	94,000	1.10E+05	94,000	1.50E+05	Various

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.
MDL Laboiratory method detection limit (MDL)
NA Not Applicable
NL Not Listed
NLL Not Likely to Leach
NLV Not Likely to Volatilize
ID Insufficient Data

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS
POLYNUCLEAR AROMATIC COMPOUNDS
660 EAST 10 MILE ROAD, FERNDALE, MICHIGAN
PM PROJECT #01-5524-0-001

POLYNUCLEAR AROMATIC COMPOUNDS (µg/Kg)			Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	2-Methylnaphthalene	Phenanthrene	Pyrene
Chemical Abstract Service Number (CAS#)			83329	208968	120127	56553	50328	205992	207089	191242	218019	53703	206440	86737	193395	91203	91576	85018	129000
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**PNAs**																
SB-1	06/09/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-2	06/08/2015	2.0-3.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-3	06/08/2015	0.5-1.5	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-4	06/08/2015	2.0-3.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-4	06/08/2015	5.0-6.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-5	06/08/2015	0.5-1.5	<300	<300	<300	600	500	600	600	300	600	<300	1,500	<300	300	<300	<300	700	900
SB-6	06/08/2015	0.5-1.5	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-6	06/08/2015	6.0-7.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-7	06/08/2015	3.0-4.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-12	06/09/2015	1.0-2.0	<300	<300	700	2,600	**2,500**	3,300	2,000	1,300	2,700	<300	6,400	400	1,400	<300	<300	**3,700**	3,900
SB-13	06/09/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-14	06/08/2015	0.5-1.5	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-15	06/08/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-16	06/08/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-17	06/08/2015	1.0-2.0	<300	<300	<300	<300	400	300	400	400	<300	<300	<300	<300	400	<300	<300	<300	<300
SB-18	06/10/2015	2.0-3.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-19	06/09/2015	6.0-7.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-20	06/09/2015	1.0-2.0	<300	<300	<300	400	400	500	400	<300	400	<300	1,000	<300	<300	<300	<300	400	600
SB-22	06/09/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-21	06/09/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-23	06/10/2015	3.0-4.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	400	300	<300
SB-24	06/10/2015	3.0-4.0	800	<500	4,700	14,100	**11,100**	13,900	9,300	4,700	13,000	1,300	**34,700**	1,200	5,100	<500	<500	**26,200**	23,600
SB-25	06/10/2015	4.0-5.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-26	06/09/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-27	06/09/2015	1.0-2.0	<300	<300	1,200	8,800	**9,400**	11,100	8,000	3,200	8,600	1,100	**14,700**	300	3,700	<300	<300	**4,100**	11,400
SB-28	06/09/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-28	06/09/2015	8.0-9.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-29	06/09/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-30	06/08/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-31	06/10/2015	3.0-4.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
SB-34	06/09/2015	1.0-2.0	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
Cleanup Criteria Requirements for Response Activity (R 299.1 - R 299.50) **Generic Soil Cleanup Criteria Tables 2 and 3: Residential and Non-Residential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Risk-Based Screening Levels, December 30, 2013** **MDEQ Guidance Document For The Vapor Intrusion Pathway, Policy and Procedure Number: 09-017, Appendix D Vapor Intrusion Screening Values, May 2013**																			
Residential (µg/Kg)																			
Statewide Default Background Levels			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Drinking Water Protection (Res DWP)			3.00E+05	5,900	41,000	NLL	NLL	NLL	NLL	NLL	NLL	NLL	7.30E+05	3.90E+05	NLL	35,000	57,000	56,000	4.80E+05
Groundwater Surface Water Interface Protection (GSIP)			8,700	ID	ID	NLL	NLL	NLL	NLL	NLL	NLL	NLL	5,500	5,300	NLL	730	4,200	2,100	ID
Soil Volatilization to Indoor Air Inhalation (Res SVII)			1.9E+08	1.60E+06	1.0E+9 {D}	NLV	NLV	ID	NLV	NLV	ID	NLV	1.0E+9 {D}	5.8E+08	NLV	2.50E+05	2.70E+06	2.8E+06	1.0E+9 {D}
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			8.1E+07	2.2E+06	1.4E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	7.40E+08	1.3E+08	NLV	3.0E+05	1.50E+06	1.6E+05	6.5E+08
Ambient Air Finite VSI for 5 Meter Source Thickness			8.1E+07	2.2E+06	1.4E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	7.4E+08	1.3E+08	NLV	3.0E+05	1.50E+06	1.6E+05	6.5E+08
Ambient Air Finite VSI for 2 Meter Source Thickness			8.1E+07	2.2E+06	1.4E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	7.4E+08	1.3E+08	NLV	3.0E+05	1.50E+06	1.6E+05	6.5E+08
Ambient Air Particulate Soil Inhalation (Res PSI)			1.4E+10	2.3E+09	6.7E+10	ID	1.5E+06	ID	ID	8.0E+08	ID	ID	9.3E+09	9.3E+09	ID	2.0E+08	6.70E+08	6.7E+06	6.7E+09
Direct Contact (Res DC)			4.1E+07	1.6E+06	2.3E+08	20,000	2,000	20,000	2.00E+05	2.5E+06	2.0E+06	2,000	4.6E+07	2.7E+07	20,000	1.6E+07	8.10E+06	1.6E+06	2.9E+07
Nonresidential (µg/Kg)																			
Drinking Water Protection (Nonres DWP)			8.80E+05	17,000	41,000	NLL	NLL	NLL	NLL	NLL	NLL	NLL	7.30E+05	8.90E+05	NLL	1.00E+05	1.70E+05	1.60E+05	4.80E+05
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			3.5E+08	3.0E+06	1.0E+9 {D}	NLV	NLV	ID	NLV	NLV	ID	NLV	1.0E+9 {D}	1.0E+9 {D}	NLV	4.70E+05	4.90E+06	5.1E+06	1.0E+9 {D}
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			9.7E+07	2.7E+06	1.6E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	8.9E+08	1.5E+08	NLV	3.50E+05	1.80E+06	1.90E+05	7.8E+08
Ambient Air Finite VSI for 5 Meter Source Thickness			9.7E+07	2.7E+06	1.6E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	8.8E+08	1.5E+08	NLV	3.50E+05	1.80E+06	1.90E+05	7.8E+08
Ambient Air Finite VSI for 2 Meter Source Thickness			9.7E+07	2.7E+06	1.6E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	8.8E+08	1.5E+08	NLV	3.50E+05	1.80E+06	1.90E+05	7.8E+08
Ambient Air Particulate Soil Inhalation (Nonres PSI)			6.2E+09	1.0E+09	2.9E+10	ID	1.9E+06	ID	ID	3.5E+08	ID	ID	4.1E+09	4.1E+09	ID	8.8E+07	2.90E+08	2.9E+06	2.9E+09
Direct Contact (Nonres DC)			1.3E+08	5.2E+06	7.3E+08	80,000	8,000	80,000	8.00E+05	7.0E+06	8.0E+06	8,000	1.3E+08	8.7E+07	80,000	5.2E+07	2.60E+07	5.2E+06	8.4E+07
Screening Levels (µg/Kg)																			
Soil Saturation Concentration Screening Levels (Csat)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

	Applicable Criterion/RBSL Exceeded
BOLD	Value Exceeds Applicable Criterion/RBSL
bgs	Below Ground Surface (feet)
MDL	Laboiratory method detection limit (MDL)
NA	Not Applicable
NL	Not Listed
NLL	Not Likely to Leach
NLV	Not Likely to Volatilize
ID	Insufficient Data

TABLE 3
SUMMARY OF SOIL ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS AND METALS
660 EAST 10 MILE ROAD, FERNDALE, MICHIGAN
PM PROJECT #01-5524-0-001

POLCHLORINATED BIPHNEYLS (PCBs) AND METALS (µg/Kg)			PCBs	Arsenic	Cadmium	Chromium	Lead	Zinc
Chemical Abstract Service Number (CAS#)			1336363	7440382	7440439	16065831	7439921	7440666
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**PCBs**	**METALs**				
SB-1	06/09/2015	1.0-2.0	<330	NA	220	2,140	21,800	NA
SB-2	06/08/2015	2.0-3.0	<330	NA	<200	1,020	1,140	NA
SB-3	06/08/2015	0.5-1.5	<330	NA	1,740	8,330	222,000	NA
SB-4	06/08/2015	2.0-3.0	<330	NA	<200	2,090	1,400	NA
SB-4	06/08/2015	5.0-6.0	<330	NA	<200	3,150	6,430	NA
SB-5	06/08/2015	0.5-1.5	<330	NA	320	2,490	11,300	NA
SB-6	06/08/2015	0.5-1.5	<330	NA	<200	1,500	2,820	NA
SB-6	06/08/2015	6.0-7.0	<330	NA	<200	1,600	5,810	NA
SB-7	06/08/2015	3.0-4.0	<330	NA	230	6,910	2,480	NA
SB-12	06/09/2015	1.0-2.0	<330	NA	<200	**146,000**	29,500	NA
SB-13	06/09/2015	1.0-2.0	NA	NA	<200	6,190	420	2,070
SB-14	06/08/2015	0.5-1.5	<330	NA	<200	860	810	NA
SB-15	06/08/2015	1.0-2.0	<330	NA	<200	2,260	16,100	NA
SB-16	06/08/2015	1.0-2.0	<330	NA	590	4,450	40,500	NA
SB-17	06/08/2015	1.0-2.0	<330	NA	910	15,600	28,600	NA
SB-18	06/10/2015	2.0-3.0	<330	NA	<200	7,500	5,210	NA
SB-19	06/09/2015	6.0-7.0	NA	NA	NA	NA	NA	NA
SB-20	06/09/2015	1.0-2.0	<330	NA	310	4,380	12,200	NA
SB-21	06/09/2015	1.0-2.0	<330	NA	200	5,680	4,410	NA
SB-22	06/09/2015	1.0-2.0	<330	NA	<200	1,080	920	NA
SB-23	06/10/2015	3.0-4.0	<330	4,510	<200	2,880	26,100	43,500
SB-24	06/10/2015	3.0-4.0	<330	2,340	<200	2,570	17,700	22,400
SB-25	06/10/2015	4.0-5.0	<330	270	<200	2,090	1,390	3,100
SB-26	06/09/2015	1.0-2.0	<330	720	<200	2,530	10,900	NA
SB-27	06/09/2015	1.0-2.0	330	4,550	1,010	6,800	167,000	NA
SB-28	06/09/2015	1.0-2.0	<330	610	<200	2,130	3,180	NA
SB-28	06/09/2015	8.0-9.0	<330	3,320	<200	2,390	6,030	NA
SB-29	06/09/2015	1.0-2.0	<330	1,830	<200	3,810	6,560	NA
SB-30	06/08/2015	1.0-2.0	<330	510	<200	1,280	1,940	NA
SB-31	06/10/2015	3.0-4.0	<330	NA	NA	NA	NA	NA
SB-34	06/09/2015	1.0-2.0	<330	NA	NA	NA	NA	NA
SB-27R	09/01/2015	2.0-3.0	<330	NA	NA	NA	NA	NA
SB-35	09/01/2015	2.0-3.0	<330	NA	NA	NA	NA	NA
SB-35	09/01/2015	4.0-5.0	<330	NA	NA	NA	NA	NA
SB-36	09/01/2015	2.0-3.0	**489,000**	NA	NA	NA	NA	NA
SB-36	09/01/2015	4.0-5.0	<330	NA	NA	NA	NA	NA
SB-37	09/01/2015	1.0-2.0	900	NA	NA	NA	NA	NA
SB-37	09/01/2015	4.0-5.0	<330	NA	NA	NA	NA	NA
SB-38	09/01/2015	1.0-2.0	**27,000**	NA	NA	NA	NA	NA
SB-38	09/01/2015	4.0-5.0	<330	NA	NA	NA	NA	NA
SB-39	09/01/2015	1.0-2.0	**15,000**	NA	NA	NA	NA	NA
SB-39	09/01/2015	2.0-3.0	<330	NA	NA	NA	NA	NA
SB-40	09/01/2015	1.0-2.0	**64,000**	NA	NA	NA	NA	NA
SB-40	09/01/2015	4.0-5.0	<330	NA	NA	NA	NA	NA
SB-41	09/01/2015	1.0-2.0	**28,000**	NA	NA	NA	NA	NA
SB-41	09/01/2015	2.0-3.0	**1,300**	NA	NA	NA	NA	NA
SB-41	09/01/2015	4.0-5.0	<330	NA	NA	NA	NA	NA
SB-42	09/01/2015	1.0-2.0	**5,000**	NA	NA	NA	NA	NA
SB-42	09/01/2015	2.0-3.0	**19,000**	NA	NA	NA	NA	NA
SB-42	09/01/2015	4.0-5.0	<330	NA	NA	NA	NA	NA
SB-43	09/01/2015	1.0-2.0	**5,200**	NA	NA	NA	NA	NA
SB-43	09/01/2015	2.0-3.0	**9,600**	NA	NA	NA	NA	NA
SB-43	09/01/2015	4.0-5.0	<330	NA	NA	NA	NA	NA
SB-44	09/01/2015	1.0-2.0	**1,300**	NA	NA	NA	NA	NA
SB-45	09/01/2015	1.0-2.0	<330	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	5,800	1,200	18,000	21,000	47,000
Drinking Water Protection (Res DWP)			NLL	4,600	6,000	30,000	7.00E+05	2.40E+06
Groundwater Surface Water Interface Protection (GSIP)			NLL	4,600	5,600 {G,X}	3,300	5.2E+06 {G,X}	2.7E+05 {G}
Soil Volatilization to Indoor Air Inhalation (Res SVII)			3.0E+06	NLV	NLV	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			2.40E+05	NLV	NLV	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness			7.9E+06	NLV	NLV	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness			7.9E+06	NLV	NLV	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Res PSI)			5.2E+06	7.20E+05	1.70E+06	2.60E+05	1.00E+08	ID
Direct Contact (Res DC)			{T}	7,600	5.50E+05	2.50E+06	4.00E+05	1.70E+08
Nonresidential (µg/Kg)								
Drinking Water Protection (Nonres DWP)			NLL	4,600	6,000	30,000	7.00E+05	5.00E+06
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			1.6E+07	NLV	NLV	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			8.10E+05	NLV	NLV	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness			2.8E+07	NLV	NLV	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness			2.8E+07	NLV	NLV	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Nonres PSI)			6.5E+06	9.10E+05	2.20E+06	2.40E+05	4.40E+07	ID
Direct Contact (Nonres DC)			{T}	37,000	2.10E+06	9.20E+06	9.0E+5 (DD)	6.30E+08
Screening Levels (µg/Kg)								
Soil Saturation Concentration Screening Levels (Csat)			NA	NA	NA	NA	NA	NA

{G} Metal GSIP Criteria for Surface Water Not Protected for Drinking Water Use based on 269 mg/L CaCO3 Hardness: Station ID 500011, Red Run Drain, near Warren, MI.

{T} Refer to the Toxic Substance Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended, to determine the applicability of TSCA cleanup standards. Alternatives to compliance with the standards listed below are possible under Subpart D. New Releases may be subject to the standards identified in Subpart G. Use Part 201 soil direct contact criteria in the table below where TSCA standards are not applicable.

LAND USE CATEGORY	TSCA, Subpart D	Part 201
Residential	1,000 µg/Kg, or	4,000 µg/Kg
Nonresidential	10,000 µg/Kg if capped	16,000 µg/Kg

	Applicable Criterion/RBSL Exceeded
BOLD	Value Exceeds Applicable Criterion/RBSL
bgs	Below Ground Surface (feet)
MDL	Laboiratory method detection limit (MDL)
NA	Not Applicable
NL	Not Listed
NLL	Not Likely to Leach
NLV	Not Likely to Volatilize
ID	Insufficient Data

TABLE 4
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS, POLYNUCLEAR AROMATIC COMPOUNDS, AND METALS
660 EAST 10 MILE ROAD, FERNDALE, MICHIGAN
PM PROJECT #01-5524-0-001

VOLATILE ORGANIC COMPOUNDS (µg/L)				Bromodichloromethane	Chloroform	1,1-Dichloroethane	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Ethylbenzene	1,1,1-Trichloroethane	Trichloroethylene	Vinyl chloride	Xylenes	Other VOCs	PNAs	Arsenic	Cadmium	Chromium	Lead	Zinc
Chemical Abstract Service Number (CAS#)				75274	67663	75343	156592	156605	100414	71556	79016	75014	1330207	Various	Various	7440382	7440439	16065831	7439921	7440666
Sample ID	**Sample Date**	**Screen Depth (feet bgs)**	**Depth to Groundwater (feet bgs)**	**VOCs**											**PNAs**	**METALS**				
TMW-3	06/08/2015	2.09-7.09	4.22	<1	<1	<1	<1	<1	1	<1	<1	<1	6	<MDL	<MDL	NA	<0.5	7	<3	NA
TMW-5	06/08/2015	3.29-8.29	5.07	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	<0.5	<5	<3	NA
TMW-8	06/09/2015	4.45-9.45	5.80	<1	<1	<1	3	<1	<1	<1	4	<1	<3	<MDL	<MDL	NA	<0.5	<5	<3	7
TMW-9	06/09/2015	4.75-9.75	5.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	1.2	<5	<3	259
TMW-10	06/09/2015	4.15-9.15	4.75	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	1.0	10	<3	72
TMW-11	06/10/2015	3.91-8.91	4.98	2	9	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	<0.5	<5	<3	55
TMW-13	06/09/2015	2.84-7.84	3.52	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	0.6	<5	<3	68
TMW-14	06/08/2015	2.72-7.72	4.09	<1	<1	<1	<1	<1	<1	<1	5	<1	<3	<MDL	<MDL	NA	<0.5	5	<3	NA
TMW-16	06/08/2015	3.05-8.05	4.36	<5	<5	<5	**191**	14	<5	<5	<5	**396**	<15	<MDL	<MDL	NA	<0.5	10	<3	NA
TMW-19	06/09/2015	4.15-9.15	4.55	<1	<1	<1	<1	<1	<1	<1	2	<1	<3	<MDL	<MDL	NA	NA	NA	NA	NA
TMW-21	06/09/2015	3.55-8.55	5.40	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	<0.5	<5	<3	NA
TMW-24	06/10/2015	8.06-13.06	9.69	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	<2	<0.5	<5	<3	<5
TMW-27	06/09/2015	5.0-10.0	6.55	<1	<1	<1	<1	<1	<1	6	<1	<1	<3	<MDL	<MDL	3	<0.5	6	<3	NA
TMW-29	06/09/2015	5.0-10.0	7.45	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	6	0.6	10	<3	NA
TMW-30	06/08/2015	2.86-7.86	4.63	<1	<1	5	<1	<1	<1	5	<1	<1	<3	<MDL	<MDL	<2	<0.5	<5	<3	NA
TMW-31	06/10/2015	3.55-8.55	4.15	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	NA	NA	NA	NA
TMW-32	06/09/2015	3.96-8.96	5.20	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	NA	NA	NA	NA
TMW-33	06/09/2015	3.75-8.75	5.10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<MDL	<MDL	NA	NA	NA	NA	NA
TMW-34	06/09/2015	4.46-9.46	5.80	<1	<1	<1	<1	<1	<1	27	<1	<1	<3	<MDL	<MDL	NA	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)				80 {A,W}	80 {A,W}	880	70 {A}	100 {A}	74 {E}	200 {A}	5.0 {A}	2.0 {A}	280 {E}	Various	Various	10 {A}	5.0 {A}	100 {A}	4.0 {L}	2,400
Nonresidential Drinking Water (Nonres DW)				80 {A,W}	80 {A,W}	2,500	70 {A}	100 {A}	74 {E}	200 {A}	5.0 {A}	2.0 {A}	280 {E}	Various	Various	10 {A}	5.0 {A}	100 {A}	4.0 {L}	5,000 {E}
Groundwater Surface Water Interface (GSI)				ID	350	740	620	1,500 {X}	18	89	200 {X}	13 {X}	41	Various	Various	10	4.6 {G,X}	11	30 {G,X}	270 {G}
Residential Groundwater Volatilization to Indoor Air Inhalation (Res GVII) [2]				4,800	28,000	1.00E+06	93,000	85,000	1.10E+05	6.60E+05	2,200	1,100	1.9E+5 {S}	Various	Various	NLV	NLV	NLV	NLV	NLV
Nonresidential Groundwater Volatilization to Indoor Air Inhalation (Nonres GVII) [2]				37,000	1.80E+05	2.30E+06	2.10E+05	2.00E+05	1.7E+5 {S}	1.3E+6 {S}	4,900	13,000	1.9E+5 {S}	Various	Various	NLV	NLV	NLV	NLV	NLV
Screening Levels (µg/L)																				
Residential Groundwater Vapor Intrusion Screening Levels ($GW_{vi\text{-}res}$) [3]				80	140	4,300	83	360	700	17,000	9.8	2.8	10,000	Various	Various	NL	NL	NL	NL	NL
Nonresidential Groundwater Vapor Intrusion Screening Levels ($GW_{vi\text{-}nr}$)[3]				170	720	18,000	350	1,500	2600	71000	41	52	10,000	Various	Various	NL	NL	NL	NL	NL
Water Solubility				6.74E+06	7.92E+06	5.06E+06	3.50E+06	6.30E+06	1.69E+05	1.33E+06	1.10E+06	2.76E+06	1.86E+05	Various	Various	NA	NA	NA	NA	NA
Flammability and Explosivity Screening Level				ID	ID	3.80E+05	5.30E+05	2.30E+05	43,000	ID	ID	33,000	70,000	Various	Various	ID	ID	ID	ID	ID

Applicable Criteria/RBSL Exceeded

BOLD Value Exceeds Applicable Criteria

bgs Below Ground Surface (feet)

MDL Laboiratory method detection limit (MDL)

[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 3.0 meters and not in contact with building foundation

NA Not Applicable

NL Not Listed

NLL Not Likely to Leach

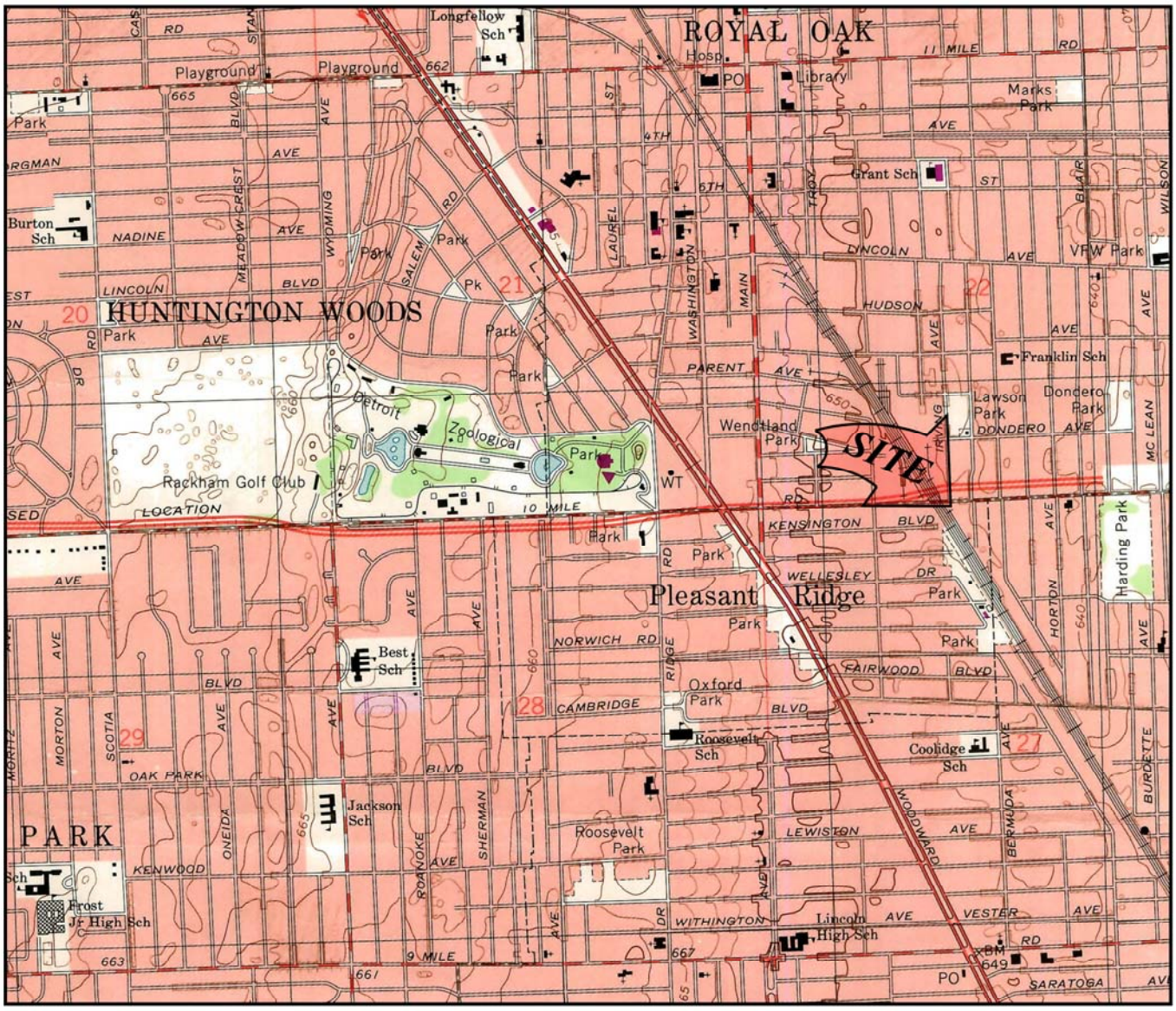
NLV Not Likely to Volatilize

ID Insufficient Data

{G} Metal GSI Criteria for Surface Water Not Protected for Drinking Water Use based on 269 mg/L CaCO3 Hardness: Station ID 500011, Red Run Drain, near Warren, MI.

Figures

PM ENVIRONMENTAL Environmental & Engineering Services



MICHIGAN QUADRANGLE LOCATION

OAKLAND COUNTY

SCALE 1:24,000

1 MILE 1/2 MILE 0 1 MILE

FIGURE 1

PROPERTY VICINITY MAP

USGS, 7.5 MINUTE SERIES

ROYAL OAK, MI QUADRANGLE, 1996.

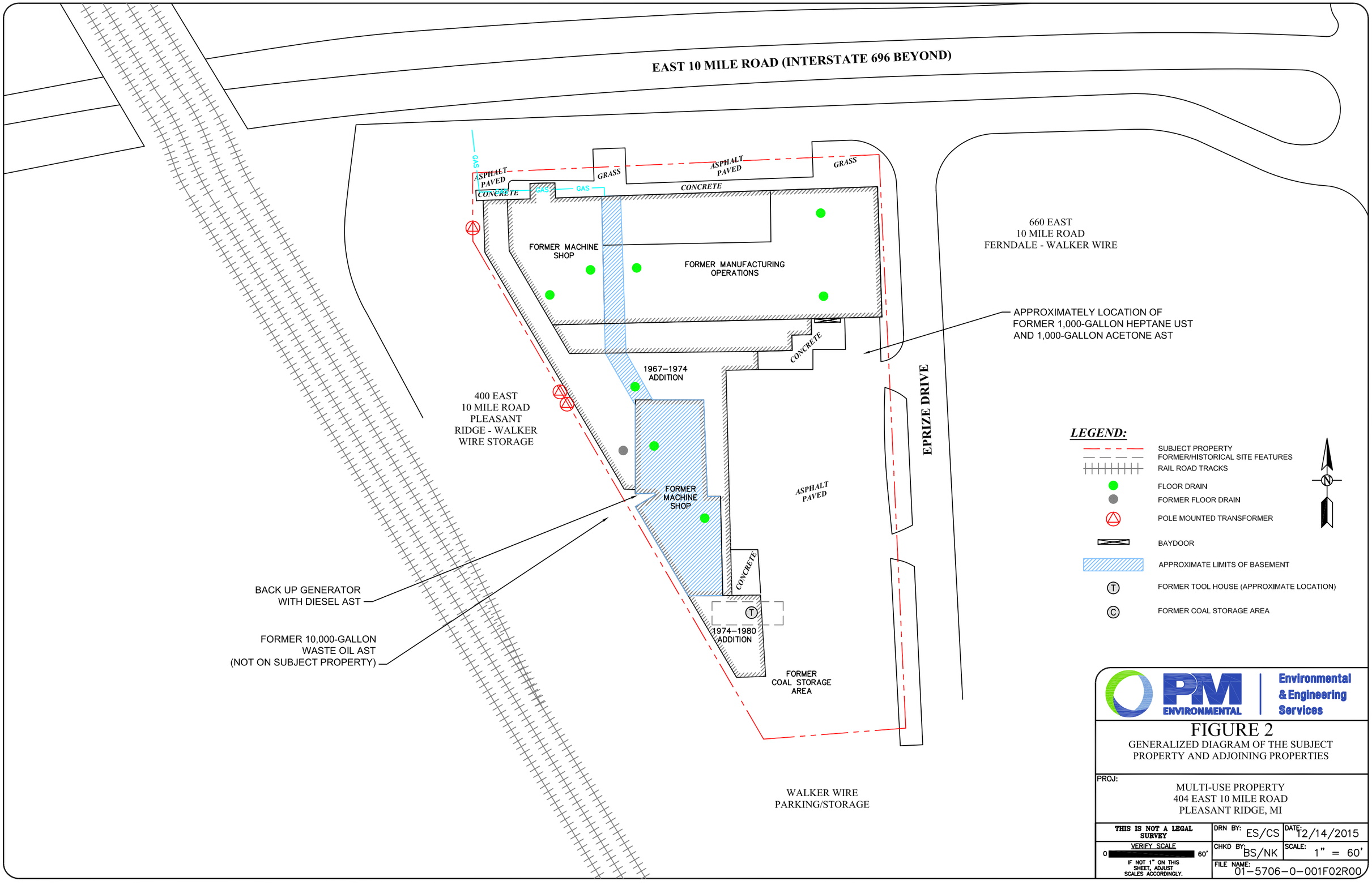
PM ENVIRONMENTAL | Environmental & Engineering Services

PROJ:
MULTI-USE PROPERTY
404 EAST 10 MILE ROAD
PLEASANT RIDGE, MI

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE
0 2,000'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: CS	DATE: 2/23/2016
CHKD BY: JA	SCALE: 1" = 2,000'
FILE NAME: 01-5706-0-001F01R00	



PM ENVIRONMENTAL | Environmental & Engineering Services

FIGURE 2

GENERALIZED DIAGRAM OF THE SUBJECT PROPERTY AND ADJOINING PROPERTIES

PROJ:

MULTI-USE PROPERTY
404 EAST 10 MILE ROAD
PLEASANT RIDGE, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: ES/CS	DATE: 12/14/2015
VERIFY SCALE 0 [redacted] 60' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: BS/NK	SCALE: 1" = 60'
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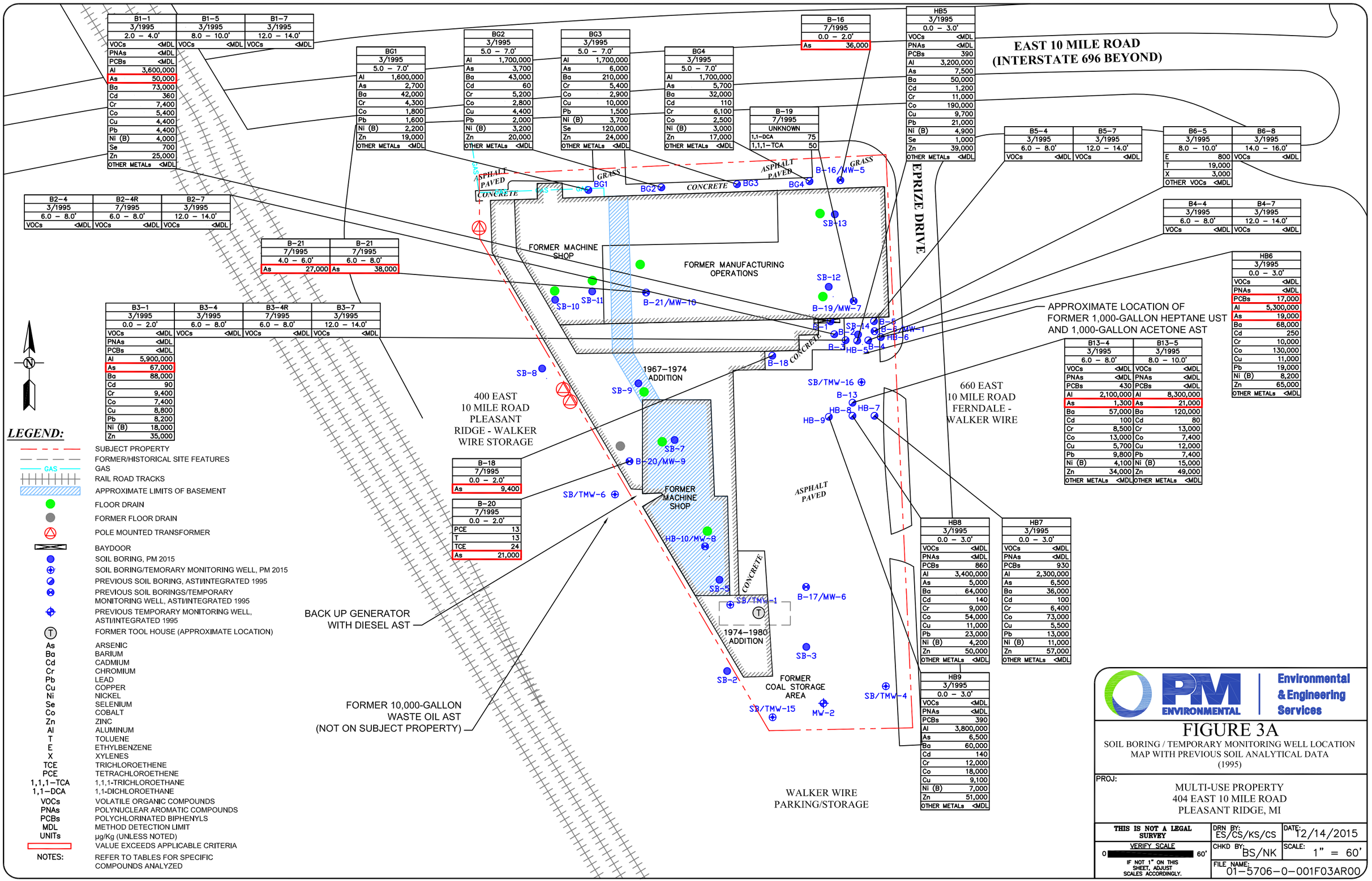

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FIGURE 3A

SOIL BORING / TEMPORARY MONITORING WELL LOCATION MAP WITH PREVIOUS SOIL ANALYTICAL DATA (1995)

PROJ:

MULTI-USE PROPERTY
404 EAST 10 MILE ROAD
PLEASANT RIDGE, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: ES/CS/KS/CS	DATE: 12/14/2015
VERIFY SCALE 0 60' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: BS/NK	SCALE: 1" = 60'
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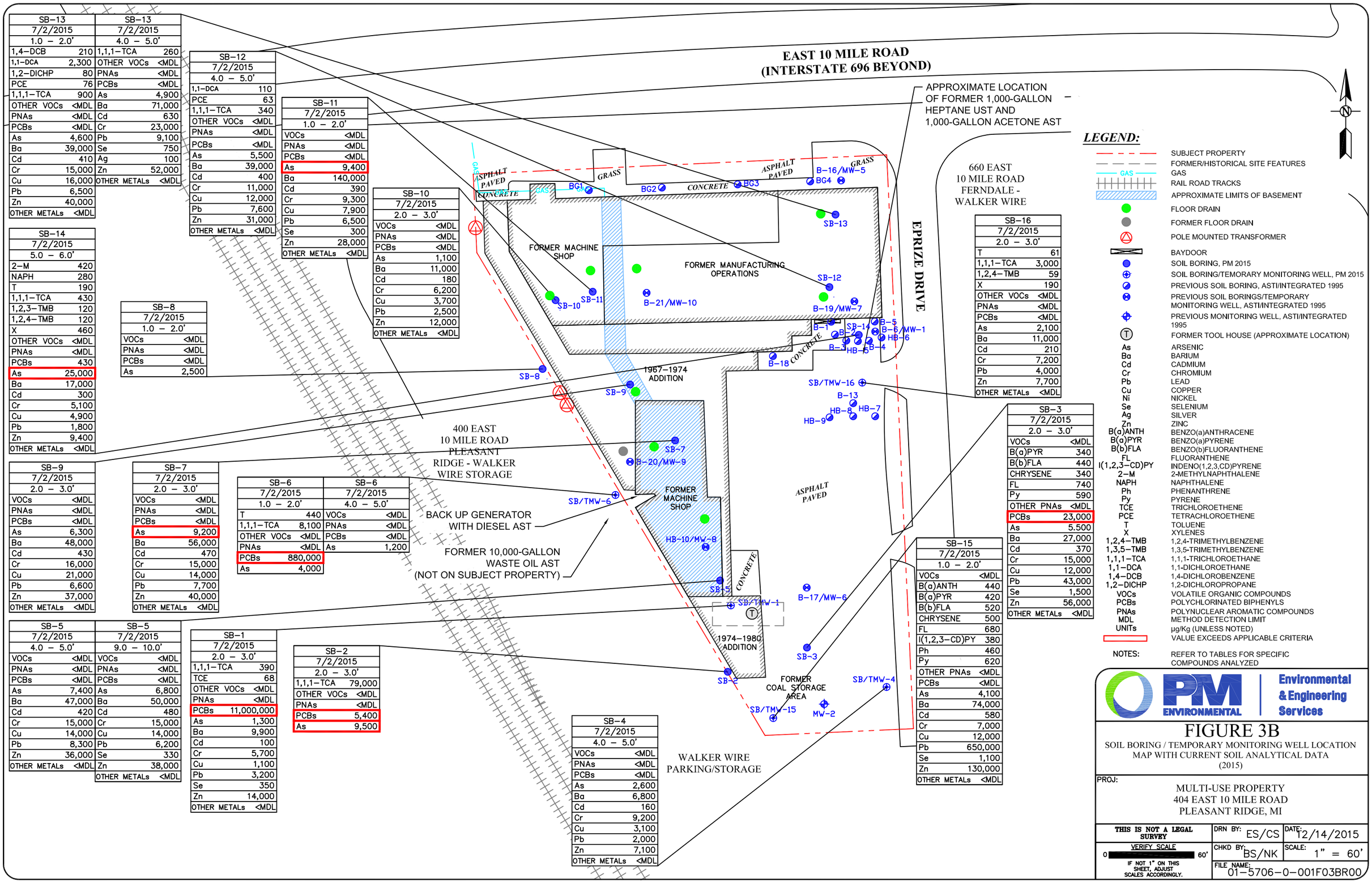

SB-13	
7/2/2015	
1.0 – 2.0'	
1,4-DCB	210
1,1-DCA	2,300
1,2-DICHP	80
PCE	76
1,1,1-TCA	900
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	4,600
Ba	39,000
Cd	410
Cr	15,000
Cu	16,000
Pb	6,500
Zn	40,000
OTHER METALs	<MDL

SB-13	
7/2/2015	
4.0 – 5.0'	
1,1,1-TCA	260
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	4,900
Ba	71,000
Cd	630
Cr	23,000
Pb	9,100
Se	750
Ag	100
Zn	52,000
OTHER METALs	<MDL

SB-12	
7/2/2015	
4.0 – 5.0'	
1,1-DCA	110
PCE	63
1,1,1-TCA	340
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	5,500
Ba	39,000
Cd	400
Cr	11,000
Cu	12,000
Pb	7,600
Zn	31,000
OTHER METALs	<MDL

SB-11	
7/2/2015	
1.0 – 2.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	9,400
Ba	140,000
Cd	390
Cr	9,300
Cu	7,900
Pb	6,500
Se	300
Zn	28,000
OTHER METALs	<MDL

SB-10	
7/2/2015	
2.0 – 3.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	1,100
Ba	11,000
Cd	180
Cr	6,200
Cu	3,700
Pb	2,500
Zn	12,000
OTHER METALs	<MDL

SB-14	
7/2/2015	
5.0 – 6.0'	
2-M	420
NAPH	280
T	190
1,1,1-TCA	430
1,2,3-TMB	120
1,2,4-TMB	120
X	460
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	430
As	25,000
Ba	17,000
Cd	300
Cr	5,100
Cu	4,900
Pb	1,800
Zn	9,400
OTHER METALs	<MDL

SB-8	
7/2/2015	
1.0 – 2.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	2,500

SB-9	
7/2/2015	
2.0 – 3.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	6,300
Ba	48,000
Cd	430
Cr	16,000
Cu	21,000
Pb	6,600
Zn	37,000
OTHER METALs	<MDL

SB-7	
7/2/2015	
2.0 – 3.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	9,200
Ba	56,000
Cd	470
Cr	15,000
Cu	14,000
Pb	7,700
Zn	40,000
OTHER METALs	<MDL

SB-6	
7/2/2015	
1.0 – 2.0'	
T	440
1,1,1-TCA	8,100
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	880,000
As	4,000

SB-6	
7/2/2015	
4.0 – 5.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	1,200

SB-5	
7/2/2015	
4.0 – 5.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	7,400
Ba	47,000
Cd	420
Cr	15,000
Cu	14,000
Pb	8,300
Zn	36,000
OTHER METALs	<MDL

SB-5	
7/2/2015	
9.0 – 10.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	6,800
Ba	50,000
Cd	480
Cr	15,000
Cu	14,000
Pb	6,200
Se	330
Zn	38,000
OTHER METALs	<MDL

SB-1	
7/2/2015	
2.0 – 3.0'	
1,1,1-TCA	390
TCE	68
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	11,000,000
As	1,300
Ba	9,900
Cd	100
Cr	5,700
Cu	1,100
Pb	3,200
Se	350
Zn	14,000
OTHER METALs	<MDL

SB-2	
7/2/2015	
2.0 – 3.0'	
1,1,1-TCA	79,000
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	5,400
As	9,500

SB-4	
7/2/2015	
4.0 – 5.0'	
VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	2,600
Ba	6,800
Cd	160
Cr	9,200
Cu	3,100
Pb	2,000
Zn	7,100
OTHER METALs	<MDL

SB-16	
7/2/2015	
2.0 – 3.0'	
T	61
1,1,1-TCA	3,000
1,2,4-TMB	59
X	190
OTHER VOCs	<MDL
PNAs	<MDL
PCBs	<MDL
As	2,100
Ba	11,000
Cd	210
Cr	7,200
Pb	4,000
Zn	7,700
OTHER METALs	<MDL

SB-3	
7/2/2015	
2.0 – 3.0'	
VOCs	<MDL
B(a)PYR	340
B(b)FLA	440
CHRYSENE	340
FL	740
Py	590
OTHER PNAs	<MDL
PCBs	23,000
As	5,500
Ba	27,000
Cd	370
Cr	15,000
Cu	12,000
Pb	43,000
Se	1,500
Zn	56,000
OTHER METALs	<MDL

SB-15	
7/2/2015	
1.0 – 2.0'	
VOCs	<MDL
B(a)ANTH	440
B(a)PYR	420
B(b)FLA	520
CHRYSENE	500
FL	680
I(1,2,3-CD)PY	380
Ph	460
Py	620
OTHER PNAs	<MDL
PCBs	<MDL
As	4,100
Ba	74,000
Cd	580
Cr	7,000
Cu	12,000
Pb	650,000
Se	1,100
Zn	130,000
OTHER METALs	<MDL

LEGEND:

- SUBJECT PROPERTY
- FORMER/HISTORICAL SITE FEATURES
- GAS — GAS
- RAIL ROAD TRACKS
- APPROXIMATE LIMITS OF BASEMENT
- FLOOR DRAIN
- FORMER FLOOR DRAIN
- POLE MOUNTED TRANSFORMER
- BAYDOOR
- SOIL BORING, PM 2015
- SOIL BORING/TEMORARY MONITORING WELL, PM 2015
- PREVIOUS SOIL BORING, ASTI/INTEGRATED 1995
- PREVIOUS SOIL BORINGS/TEMPORARY MONITORING WELL, ASTI/INTEGRATED 1995
- PREVIOUS MONITORING WELL, ASTI/INTEGRATED 1995
- T — FORMER TOOL HOUSE (APPROXIMATE LOCATION)

As	ARSENIC
Ba	BARIUM
Cd	CADMIUM
Cr	CHROMIUM
Pb	LEAD
Cu	COPPER
Ni	NICKEL
Se	SELENIUM
Ag	SILVER
Zn	ZINC
B(a)ANTH	BENZO(a)ANTHRACENE
B(a)PYR	BENZO(a)PYRENE
B(b)FLA	BENZO(b)FLUORANTHENE
FL	FLUORANTHENE
I(1,2,3-CD)PY	INDENO(1,2,3,CD)PYRENE
2-M	2-METHYLNAPHTHALENE
NAPH	NAPHTHALENE
Ph	PHENANTHRENE
Py	PYRENE
TCE	TRICHLOROETHENE
PCE	TETRACHLOROETHENE
T	TOLUENE
X	XYLENES
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE
1,1,1-TCA	1,1,1-TRICHLOROETHANE
1,1-DCA	1,1-DICHLOROETHANE
1,4-DCB	1,4-DICHLOROBENZENE
1,2-DICHP	1,2-DICHLOROPROPANE
VOCs	VOLATILE ORGANIC COMPOUNDS
PCBs	POLYCHLORINATED BIPHENYLS
PNAs	POLYNUCLEAR AROMATIC 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 3B

SOIL BORING / TEMPORARY MONITORING WELL LOCATION MAP WITH CURRENT SOIL ANALYTICAL DATA (2015)

PROJ:

MULTI-USE PROPERTY
404 EAST 10 MILE ROAD
PLEASANT RIDGE, MI

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE 0 60'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

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DATE: 12/14/2015
CHKD BY: BS/NK
SCALE: 1" = 60'
FILE NAME: 01-5706-0-001F03BR00

EAST 10 MILE ROAD
(INTERSTATE 696 BEYOND)

MW–10	
7/1995	
5.0 – 10.0'	SCREEN
VOCs	<MDL
As	9
Zn	50
OTHER METALs	<MDL

MW–5	
7/1995	
2.0 – 7.0'	SCREEN
1,1–DCA	35
1,1,1–TCA	8
OTHER VOCs	<MDL

MW–1	
3/1995	
7.0 – 12.0'	SCREEN
B	13
E	16
T	1,200
1,1,1–TCA	9
X	62
OTHER VOCs	<MDL
PNAs	<MDL
Ba	90
Zn	140
OTHER METALs	<MDL

MW–1R	
7/1995	
7.0 – 12.0'	SCREEN
1,1–DCA	5
E	12
T	2,500
X	62

EPRIZE DRIVE

APPROXIMATE LOCATION OF
FORMER 1,000-GALLON HEPTANE UST
AND 1,000-GALLON ACETONE AST

660 EAST
10 MILE ROAD
FERNDALE - WALKER WIRE

400 EAST
10 MILE ROAD
PLEASANT
RIDGE - WALKER
WIRE STORAGE

MW–9	
7/1995	
5.0 – 10.0'	SCREEN
1,1–DCA	8
1,2–DCA	9
1,1,1–TCA	39
TCE	15
OTHER VOCs	<MDL
As	7
Cu	20
Zn	100
OTHER METALs	<MDL

MW–6	
7/1995	
2.5 – 7.5'	SCREEN
1,1–DCA	6
1,1,1–TCA	31
OTHER VOCs	<MDL
As	7
Ba	400
Cd	0.6
Pb	5
Zn	580
OTHER METALs	<MDL

BACK UP GENERATOR
WITH DIESEL AST

FORMER 10,000-GALLON
WASTE OIL AST
(NOT ON SUBJECT PROPERTY)

MW–8	
7/1995	
0.0 – 1.5'	SCREEN
1,1–DCA	6
1,1,1–TCA	43
OTHER VOCs	<MDL

WALKER WIRE
PARKING/STORAGE

MW–2	
3/1995	
5.0 – 10.0'	SCREEN
1,1,1–TCA	29
OTHER VOCs	<MDL
PNAs	<MDL
Zn	70
OTHER METALs	<MDL

LEGEND:

- SUBJECT PROPERTY
- FORMER/HISTORICAL SITE FEATURES
- GAS — GAS
- RAIL ROAD TRACKS
- APPROXIMATE LIMITS OF BASEMENT
- FLOOR DRAIN
- FORMER FLOOR DRAIN
- POLE MOUNTED TRANSFORMER
- BAYDOOR
- SOIL BORING, PM 2015
- SOIL BORING/TEMORARY MONITORING WELL, PM 2015
- PREVIOUS SOIL BORING, ASTI/INTEGRATED 1995
- PREVIOUS SOIL BORINGS/TEMPORARY MONITORING WELL, ASTI/INTEGRATED 1995
- PREVIOUS TEMPORARY MONITORING WELL, ASTI/INTEGRATED 1995
- (T) FORMER TOOL HOUSE (APPROXIMATE LOCATION)

As	ARSENIC
Ba	BARIUM
Cd	CADMIUM
Pb	LEAD
Cu	COPPER
Zn	ZINC
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
1,1,1–TCA	1,1,1-TRICHLOROETHANE
1,1–DCA	1,1-DICHLOROETHANE
1,2–DCA	1,2-DICHLOROETHANE
TCE	TRICHLOROETHENE
VOCs	VOLATILE ORGANIC COMPOUNDS
UNITs	µg/L (UNLESS NOTED)
NOTES:	REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

PM ENVIRONMENTAL | Environmental & Engineering Services

FIGURE 4A

SOIL BORING / TEMPORARY MONITORING WELL LOCATION MAP WITH PREVIOUS GROUNDWATER ANALYTICAL DATA (1995)

PROJ:
MULTI-USE PROPERTY
404 EAST 10 MILE ROAD
PLEASANT RIDGE, MI

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE 0 60'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: ES/CS/KS/ES/CS
CHKD BY: BS/NK
FILE NAME: 01–5706–0–001F04AR00
DATE: 12/14/2015
SCALE: 1" = 60'

EAST 10 MILE ROAD
(INTERSTATE 696 BEYOND)

EPRIZE DRIVE

ASPHALT PAVED
CONCRETE
GRASS
GAS
BG1
BG2
BG3
BG4
B-16/MW-5
SB-13
FORMER MACHINE SHOP
FORMER MANUFACTURING OPERATIONS
SB-10
SB-11
B-21/MW-10
SB-12
B-19/MW-7
B-1
B-2
B-3
B-5
B-6/MW-1
HB-6
SB-14
HB-5
B-4
B-18
1967–1974 ADDITION
SB-8
SB-9
SB/TMW-16
B-13
HB-8
HB-7
HB-9
400 EAST
10 MILE ROAD
PLEASANT
RIDGE - WALKER
WIRE STORAGE
SB-7
B-20/MW-9
APPROXIMATE LOCATION OF
FORMER 1,000-GALLON HEPTANE UST
AND 1,000-GALLON ACETONE AST
660 EAST
10 MILE ROAD
FERNDALE - WALKER WIRE
TMW–6
7/2/2015
8.50 – 13.50' SCREEN
1,1,1–TCA 7
OTHER VOCs <MDL
PNAs <MDL
SB/TMW-6
FORMER MACHINE SHOP
HB-10/MW-8
ASPHALT PAVED
TMW–16
7/2/2015
8.50 – 13.50' SCREEN
VOCs <MDL
PNAs <MDL
SB-5
CONCRETE
SB/TMW-1
B-17/MW-6
1974–1980 ADDITION
SB-3
SB-2
FORMER COAL STORAGE AREA
SB/TMW-4
TMW–4
7/2/2015
9.55 – 14.55' SCREEN
1,1–DCA 3
1,1,1–TCA 10
OTHER VOCs <MDL
PNAs <MDL
BACK UP GENERATOR
WITH DIESEL AST
FORMER 10,000-GALLON
WASTE OIL AST
(NOT ON SUBJECT PROPERTY)
SB/TMW-15
MW-2
TMW–1
7/2/2015
5.55 – 10.55' SCREEN
1,1,1–TCA 7
OTHER VOCs <MDL
PNAs <MDL
Cd 0.2
Ag 0.2
OTHER METALs <MDL
TMW–15
7/2/2015
5.90 – 10.90' SCREEN
1,1,1–TCA 24
OTHER VOCs <MDL
PNAs <MDL
METALS <MDL
WALKER WIRE
PARKING/STORAGE

LEGEND:

- SUBJECT PROPERTY
- FORMER/HISTORICAL SITE FEATURES
- GAS — GAS
- RAIL ROAD TRACKS
- APPROXIMATE LIMITS OF BASEMENT
- FLOOR DRAIN
- FORMER FLOOR DRAIN
- POLE MOUNTED TRANSFORMER
- BAYDOOR
- SOIL BORING, PM 2015
- SOIL BORING/TEMORARY MONITORING WELL, PM 2015
- PREVIOUS SOIL BORING, ASTI/INTEGRATED 1995
- PREVIOUS SOIL BORINGS/TEMPORARY MONITORING WELL, ASTI/INTEGRATED 1995
- PREVIOUS TEMPORARY MONITORING WELL, ASTI/INTEGRATED 1995
- T — FORMER TOOL HOUSE (APPROXIMATE LOCATION)

Cd — CADMIUM
Ag — SILVER
1,1,1–TCA — 1,1,1-TRICHLOROETHANE
1,1–DCA — 1,1-DICHLOROETHANE
VOCs — VOLATILE ORGANIC COMPOUNDS
MDL — METHOD DETECTION LIMIT
UNITs — µg/Kg (UNLESS NOTED)
NOTES: REFER TO TABLES FOR SPECIFIC COMPOUNDS ANALYZED

PM ENVIRONMENTAL | Environmental & Engineering Services

FIGURE 4B

SOIL BORING / TEMPORARY MONITORING WELL LOCATION MAP WITH CURRENT GROUNDWATER ANALYTICAL DATA

PROJ:
MULTI-USE PROPERTY
404 EAST 10 MILE ROAD
PLEASANT RIDGE, MI

THIS IS NOT A LEGAL SURVEY	DRN BY: ES/CS/KS/CS	DATE: 12/14/2015
VERIFY SCALE 0 — 60' IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHKD BY: BS/NK	SCALE: 1" = 60'
	FILE NAME: 01–5706–0–001F04BR00	

SB-32	SB-32
11/24/2015	11/24/2015
2.0 ~ 3.0'	3.5 ~ 4.5'
PCBs 4,300	PCBs <MDL

B18-1	B18-3
7/1995	7/1995
0.0 – 2.0'	4.0 – 6.0'
PCBs 440	PCBs <MDL

SB-42
11/24/2015
2.0 ~ 3.0'
PCBs <MDL

SB-33
8/31/2015
1.0 – 2.0'
PCBs <MDL

SB-34	SB-34
8/31/2015	8/31/2015
2.0 – 3.0'	7.5 – 8.5'
PCBs <MDL	PCBs <MDL

SB-12
7/2/2015
4.0 – 5.0'
PCBs <MDL

B16-1	B16-3
7/1995	7/1995
0.0 – 2.0'	4.0 – 6.0'
PCBs <MDL	PCBs <MDL

SB-13	SB-13
7/2/2015	7/2/2015
1.0 – 2.0'	4.0 – 5.0'
PCBs <MDL	PCBs <MDL

B1-1
3/1995
2.0 – 4.0'
PCBs <MDL

B19-2	B19-3
7/1995	7/1995
2.0 – 4.0'	4.0 – 6.0'
PCBs <MDL	PCBs <MDL

SB-37	SB-37
8/31/2015	8/31/2015
2.0 – 3.0'	8.0 – 9.0'
PCBs 1,800	PCBs <MDL

B3-1
3/1995
0.0 – 2.0'
PCBs <MDL

SB-14
7/2/2015
5.0 – 6.0'
PCBs 430

HB6
3/1995
0.0 – 3.0'
PCBs 17,000

HB5
3/1995
0.0 – 3.0'
PCBs 390

SB-10
7/2/2015
2.0 – 3.0'
PCBs <MDL

SB-11
7/2/2015
1.0 – 2.0'
PCBs <MDL

SB-31
8/31/2015
2.0 – 3.0'
PCBs 1,800

SB-49
11/24/2015
2.0 ~ 3.0'
PCBs <MDL

SB-36	SB-36
8/31/2015	8/31/2015
2.0 ~ 3.0'	7.0 ~ 8.0'
PCBs 300	PCBs 250

SB-16
7/2/2015
2.0 – 3.0'
PCBs <MDL

HB7
3/1995
0.0 – 3.0'
PCBs 930

B13-4	B13-5
3/1995	3/1995
6.0 – 8.0'	8.0 – 10.0'
PCBs 430	PCBs <MDL

HB9
3/1995
0.0 – 3.0'
PCBs 390

HB8
3/1995
0.0 – 3.0'
PCBs 860

SB-46	SB-46
11/24/2015	11/24/2015
2.0 ~ 3.0'	5.0 ~ 6.0'
PCBs 11,000	PCBs <MDL

SB-30	SB-30
8/31/2015	8/31/2015
2.0 – 3.0'	7.5 – 8.5'
PCBs <MDL	PCBs <MDL

SB-29	SB-29
8/31/2015	8/31/2015
2.0 – 3.0'	6.5 – 7.5'
PCBs 10,000	PCBs <MDL

SB-28	SB-28	SB-28
8/31/2015	8/31/2015	8/31/2015
1.0 – 2.0'	2.0 – 3.0'	7.0 – 8.0'
PCBs 7,000	PCBs 14,000	PCBs <MDL

SB-48
11/24/2015
2.0 ~ 3.0'
PCBs <MDL

SB-47	SB-47
11/24/2015	11/24/2015
2.0 ~ 3.0'	6.5 ~ 7.5'
PCBs 21,000	PCBs <MDL

EAST 10 MILE ROAD
(INTERSTATE 696 BEYOND)

EPRIZE DRIVE

660 EAST
10 MILE ROAD
FERNDALE -
WALKER WIRE

400 EAST 10 MILE ROAD
PLEASANT RIDGE - WALKER
WIRE STORAGE

BACK UP GENERATOR
WITH DIESEL AST
FORMER 10,000-GALLON
WASTE OIL AST
(NOT ON SUBJECT PROPERTY)

WALKER WIRE
PARKING/STORAGE

FORMER MACHINE SHOP

FORMER MANUFACTURING OPERATIONS

1967–1974 ADDITION

1974–1980 ADDITION

FORMER MACHINE SHOP

FORMER COAL STORAGE AREA

APPROXIMATE LOCATION
OF FORMER 1,000-GALLON
HEPTANE UST AND
1,000-GALLONACETONE AST

ASPHALT PAVED

CONCRETE

GRASS

GAS

B-16/MW-5
SB-13
SB-10
SB-11
SB-12
B-19
SB-37
SB-42
SB-33
B-1
SB-14
HB-6
SB-34
B-3
HB-5
SB-32
B-18
SB-36
SB-8
SB-9
SB-31
SB/TMW-16
B-13
SB-49
HB-8
HB-9
HB-7
SB-7
SB-28
SB-30
B-20/MW-9
SB-51
SB-29
SB-48
SB-26
SB-27
SB-50
SB-25
SB-47
SB-46
SB-23
SB-24
SB-22
B-17/MW-6
SB-40
SB-1R/TMW-1
SB-41
SB-38
SB-21
SB-20
SB-39
SB-54
SB-52
SB-3/SB-3R
SB-53
SB-43
SB-18
SB-19
SB-55
SB-2
SB-45
SB/TMW-4
SB-17
SB-44
SB/TMW-15

LEGEND:

- SUBJECT PROPERTY
- FORMER/HISTORICAL SITE FEATURES
- GAS
- RAIL ROAD TRACKS
- APPROXIMATE LIMITS OF BASEMENT
- FLOOR DRAIN
- FORMER FLOOR DRAIN
- POLE MOUNTED TRANSFORMER
- BAYDOOR
- SOIL BORING, PM 2015
- SOIL BORING/TEMORARY MONITORING WELL, PM 2015
- PREVIOUS SOIL BORING, ASTI/INTEGRATED 1995
- PREVIOUS SOIL BORINGS/TEMPORARY MONITORING WELL, ASTI/INTEGRATED 1995
- PREVIOUS MONITORING WELL, ASTI/INTEGRATED 1995
- (T) FORMER TOOL HOUSE (APPROXIMATE LOCATION)

PCBs — POLYCHLORINATED BIPHENYLS
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 5A

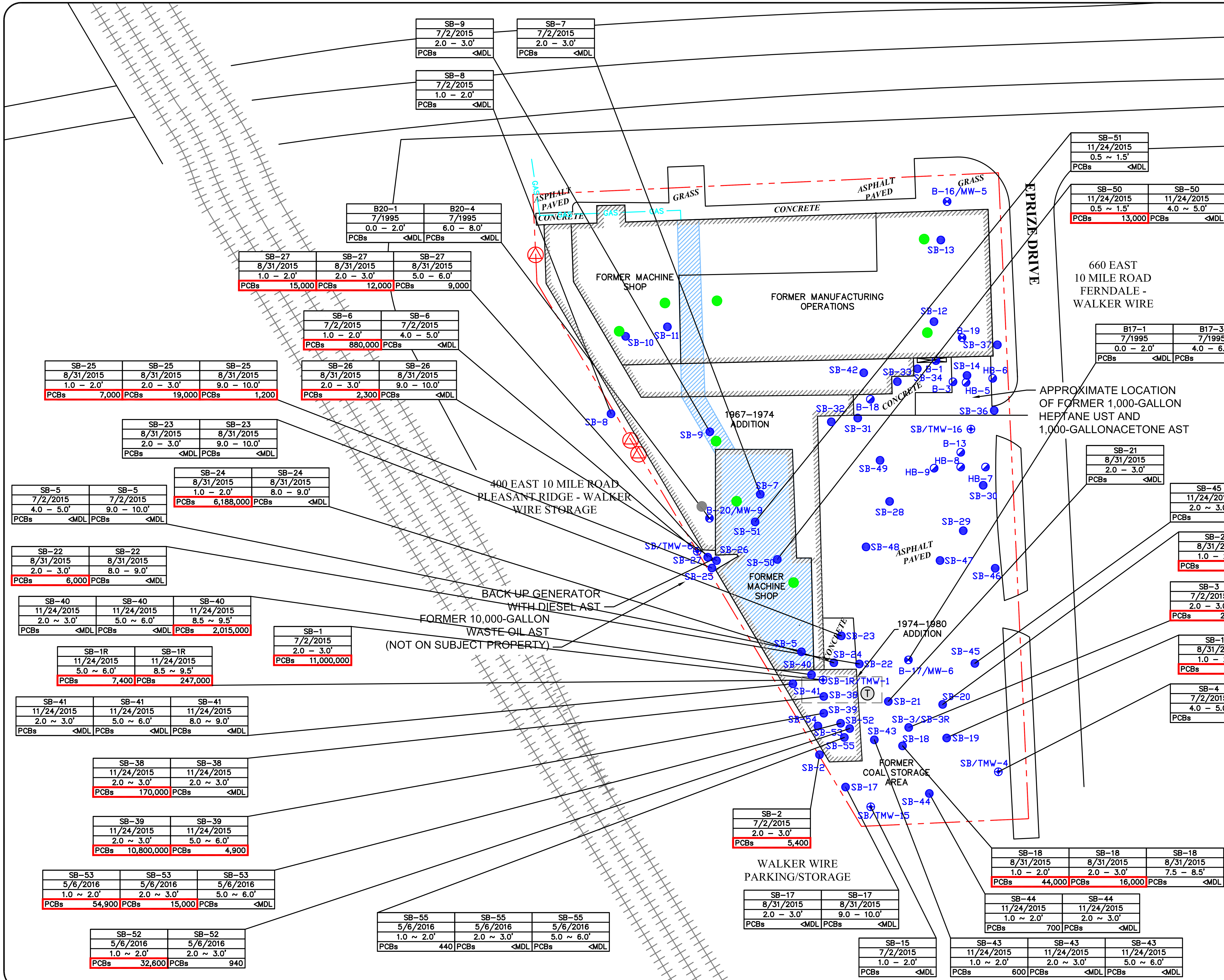
SOIL BORING/TEMPORARY MONITORING WELL LOCATION MAP WITH PCB ANALYTICAL RESULTS (1995, 2015 AND 2016)

PROJ:
MULTI-USE PROPERTY
404 EAST 10 MILE ROAD
PLEASANT RIDGE, MI

THIS IS NOT A LEGAL SURVEY

VERIFY SCALE
0 60'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: ES/CS/ES/CS
DATE: 5/25/2016
CHKD BY: BS/NK/JA
SCALE: 1" = 60'
FILE NAME: 01-5706-0-001F05AR00



EAST 10 MILE ROAD
(INTERSTATE 696 BEYOND)
N
EPRIZE DRIVE
400 EAST 10 MILE ROAD
PLEASANT RIDGE - WALKER
WIRE STORAGE
660 EAST
10 MILE ROAD
FERNDALE -
WALKER WIRE
FORMER MACHINE SHOP
FORMER MANUFACTURING OPERATIONS
1967–1974 ADDITION
1974–1980 ADDITION
FORMER MACHINE SHOP
FORMER COAL STORAGE AREA
WALKER WIRE PARKING/STORAGE
ASPHALT PAVED
GRASS
CONCRETE
GAS
APPROXIMATE LOCATION OF FORMER 1,000-GALLON HEPTANE UST AND 1,000-GALLON ACETONE AST
BACK UP GENERATOR WITH DIESEL AST
FORMER 10,000-GALLON WASTE OIL AST (NOT ON SUBJECT PROPERTY)
SB-9 7/2/2015 2.0 – 3.0' PCBs <MDL
SB-7 7/2/2015 2.0 – 3.0' PCBs <MDL
SB-8 7/2/2015 1.0 – 2.0' PCBs <MDL
B20-1 7/1995 0.0 – 2.0' PCBs <MDL
B20-4 7/1995 6.0 – 8.0' PCBs <MDL
SB-27 8/31/2015 1.0 – 2.0' PCBs 15,000
SB-27 8/31/2015 2.0 – 3.0' PCBs 12,000
SB-27 8/31/2015 5.0 – 6.0' PCBs 9,000
SB-6 7/2/2015 1.0 – 2.0' PCBs 880,000
SB-6 7/2/2015 4.0 – 5.0' PCBs <MDL
SB-25 8/31/2015 1.0 – 2.0' PCBs 7,000
SB-25 8/31/2015 2.0 – 3.0' PCBs 19,000
SB-25 8/31/2015 9.0 – 10.0' PCBs 1,200
SB-26 8/31/2015 2.0 – 3.0' PCBs 2,300
SB-26 8/31/2015 9.0 – 10.0' PCBs <MDL
SB-23 8/31/2015 2.0 – 3.0' PCBs <MDL
SB-23 8/31/2015 9.0 – 10.0' PCBs <MDL
SB-5 7/2/2015 4.0 – 5.0' PCBs <MDL
SB-5 7/2/2015 9.0 – 10.0' PCBs <MDL
SB-24 8/31/2015 1.0 – 2.0' PCBs 6,188,000
SB-24 8/31/2015 8.0 – 9.0' PCBs <MDL
SB-22 8/31/2015 2.0 – 3.0' PCBs 6,000
SB-22 8/31/2015 8.0 – 9.0' PCBs <MDL
SB-40 11/24/2015 2.0 ~ 3.0' PCBs <MDL
SB-40 11/24/2015 5.0 ~ 6.0' PCBs <MDL
SB-40 11/24/2015 8.5 ~ 9.5' PCBs 2,015,000
SB-1 7/2/2015 2.0 – 3.0' PCBs 11,000,000
SB-1R 11/24/2015 5.0 ~ 6.0' PCBs 7,400
SB-1R 11/24/2015 8.5 ~ 9.5' PCBs 247,000
SB-41 11/24/2015 2.0 ~ 3.0' PCBs <MDL
SB-41 11/24/2015 5.0 ~ 6.0' PCBs <MDL
SB-41 11/24/2015 8.0 ~ 9.0' PCBs <MDL
SB-38 11/24/2015 2.0 ~ 3.0' PCBs 170,000
SB-38 11/24/2015 2.0 ~ 3.0' PCBs <MDL
SB-39 11/24/2015 2.0 ~ 3.0' PCBs 10,800,000
SB-39 11/24/2015 5.0 ~ 6.0' PCBs 4,900
SB-53 5/6/2016 1.0 ~ 2.0' PCBs 54,900
SB-53 5/6/2016 2.0 ~ 3.0' PCBs 15,000
SB-53 5/6/2016 5.0 ~ 6.0' PCBs <MDL
SB-52 5/6/2016 1.0 ~ 2.0' PCBs 32,600
SB-52 5/6/2016 2.0 ~ 3.0' PCBs 940
SB-55 5/6/2016 1.0 ~ 2.0' PCBs 440
SB-55 5/6/2016 2.0 ~ 3.0' PCBs <MDL
SB-55 5/6/2016 5.0 ~ 6.0' PCBs <MDL
SB-2 7/2/2015 2.0 – 3.0' PCBs 5,400
SB-17 8/31/2015 2.0 – 3.0' PCBs <MDL
SB-17 8/31/2015 9.0 – 10.0' PCBs <MDL
SB-15 7/2/2015 1.0 – 2.0' PCBs <MDL
SB-43 11/24/2015 1.0 ~ 2.0' PCBs 600
SB-43 11/24/2015 2.0 ~ 3.0' PCBs <MDL
SB-43 11/24/2015 5.0 ~ 6.0' PCBs <MDL
SB-44 11/24/2015 1.0 ~ 2.0' PCBs 700
SB-44 11/24/2015 2.0 ~ 3.0' PCBs <MDL
SB-18 8/31/2015 1.0 – 2.0' PCBs 44,000
SB-18 8/31/2015 2.0 – 3.0' PCBs 16,000
SB-18 8/31/2015 7.5 – 8.5' PCBs <MDL
SB-4 7/2/2015 4.0 – 5.0' PCBs <MDL
SB-19 8/31/2015 1.0 – 2.0' PCBs 20,000
SB-19 8/31/2015 2.0 – 3.0' PCBs 24,000
SB-19 8/31/2015 4.5 – 5.5' PCBs 10,000
SB-19 8/31/2015 6.5 – 7.5' PCBs <MDL
SB-3 7/2/2015 2.0 – 3.0' PCBs 23,000
SB-3R 8/31/2015 8.5 – 9.5' PCBs <MDL
SB-20 8/31/2015 1.0 – 2.0' PCBs 16,000
SB-20 8/31/2015 2.0 – 3.0' PCBs 43,000
SB-20 8/31/2015 7.0 – 8.0' PCBs <MDL
SB-45 11/24/2015 2.0 ~ 3.0' PCBs <MDL
SB-21 8/31/2015 2.0 – 3.0' PCBs <MDL
B17-1 7/1995 0.0 – 2.0' PCBs <MDL
B17-3 7/1995 4.0 – 6.0' PCBs <MDL
SB-50 11/24/2015 0.5 ~ 1.5' PCBs 13,000
SB-50 11/24/2015 4.0 ~ 5.0' PCBs <MDL
SB-51 11/24/2015 0.5 ~ 1.5' PCBs <MDL

LEGEND:

- SUBJECT PROPERTY
- FORMER/HISTORICAL SITE FEATURES
- GAS
- RAIL ROAD TRACKS
- APPROXIMATE LIMITS OF BASEMENT
- FLOOR DRAIN
- FORMER FLOOR DRAIN
- POLE MOUNTED TRANSFORMER
- BAYDOOR
- SOIL BORING, PM 2015
- SOIL BORING/TEMORARY MONITORING WELL, PM 2015
- PREVIOUS SOIL BORING, ASTI/INTEGRATED 1995
- PREVIOUS SOIL BORINGS/TEMPORARY MONITORING WELL, ASTI/INTEGRATED 1995
- PREVIOUS MONITORING WELL, ASTI/INTEGRATED 1995
- T — FORMER TOOL HOUSE (APPROXIMATE LOCATION)

PCBs — POLYCHLORINATED BIPHENYLS
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 5B

SOIL BORING/TEMPORARY MONITORING WELL LOCATION MAP WITH PCB ANALYTICAL RESULTS (1995, 2015 AND 2016)

PROJ: MULTI-USE PROPERTY
404 EAST 10 MILE ROAD
PLEASANT RIDGE, MI

THIS IS NOT A LEGAL SURVEY
VERIFY SCALE 0 60'
IF NOT 1" ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRN BY: ES/CS/ES/CS | DATE: 5/25/2016
CHKD BY: BS/NK/JA | SCALE: 1" = 60'
FILE NAME: 01-5706-0-001F05BR00

Tables

PM ENVIRONMENTAL Environmental & Engineering Services

TABLE 1
ASTI MARCH 1995 AND INTEGRATED JULY 1995
SUMMARY OF SOIL ANALYTICAL RESULTS
VOCs AND PNAs
404 EAST 10 MILE ROAD, PLEASANT RIDGE, MICHIGAN
PM PROJECT # 01-5706-1-0002

VOLATILE ORGANIC COMPOUNDS (VOCs) AND POLYNUCLEAR AROMATIC COMPOUNDS (PNAs) (µg/Kg)			1,1-Dichloroethane	Ethylbenzene	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	Trichloroethylene	Xylenes	Other VOCs	Acenaphthene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	Other PNAs
Chemical Abstract Service Number (CAS#)			75343	100414	127184	108883	71556	79016	1330207	Various	83329	56553	50328	205992	207089	191242	218019	206440	86737	91203	85018	129000	Various
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**VOCs**								**PNAs**												
ASTI March 1995																							
B1-1	3/13/1995	2.0-4.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B1-5	3/13/1995	8.0-10.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B1-7	3/13/1995	12.0-14.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B2-4	3/13/1995	6.0-8.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B2-7	3/13/1995	12.0-14.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B3-1	3/13/1995	0.0-2.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B3-4	3/13/1995	6.0-8.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B3-7	3/13/1995	12.0-14.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B4-4	3/13/1995	6.0-8.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B4-7	3/13/1995	12.0-14.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B5-4	3/13/1995	6.0-8.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B5-7	3/13/1995	12.0-14.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B6-5	3/13/1995	8.0-10.0	<10	800	<10	19,000	<10	<10	3,000	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B6-8	3/13/1995	14.0-16.0	<10	<100	<10	<10	<10	<10	<30	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B13-4	3/14/1995	6.0-8.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B13-5	3/14/1995	8.0-10.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
HB1	March 1995	0.0-3.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
HB2	March 1995	0.0-3.0	<10	<100	<10	<10	31	<10	<30	<MDL	13,000	2,000	900	2,000	1,800	<330	1,400	2,000	960	3,000	1,100	3,900	<MDL
HB3	March 1995	0.0-3.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
HB4	March 1995	0.0-3.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
HB5	March 1995	0.0-3.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
HB6	March 1995	0.0-3.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
HB7	March 1995	0.0-3.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
HB8	March 1995	0.0-3.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
HB9	March 1995	0.0-3.0	<10	<100	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
IE August 1995																							
B2-4R	July 1995	6.0-8.0	<10	<100	<10	<10	<10	<10	<10	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B3-4R	July 1995	6.0-8.0	<10	<100	<10	<10	<10	<10	<10	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B14-1	7/25/1995	0.0-2.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B14-4	7/25/1995	6.0-8.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B15-1	7/25/1995	0.0-2.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B15-4	7/25/1995	6.0-8.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B16-1	7/25/1995	0.0-2.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B16-3	7/25/1995	4.0-6.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B17-1	7/25/1995	0.0-2.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B17-3	7/25/1995	4.0-6.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B18-1	7/25/1995	0.0-2.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B18-3	7/25/1995	4.0-6.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B19-2	7/26/1995	2.0-4.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B19-3	7/26/1995	4.0-6.0	75	<10	<10	<10	50	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B20-1	7/26/1995	0.0-2.0	<10	<10	13	13	<10	24	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B20-4	7/26/1995	6.0-8.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B21-2	7/27/1995	4.0-6.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
B21-3	7/27/1995	6.0-8.0	<10	<10	<10	<10	<10	<10	<30	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
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**																							
Residential (µg/Kg)																							
Drinking Water Protection (Res DWP)			18,000	1,500	100	16,000	4,000	100	5,600	Various	3.00E+05	NLL	NLL	NLL	NLL	NLL	NLL	7.30E+05	3.90E+05	35,000	56,000	4.80E+05	Various
Groundwater Surface Water Interface Protection (GSIP)			15,000	360	1,200 {X}	5,400	1,800	4,000 {X}	820	Various	8,700	NLL	NLL	NLL	NLL	NLL	NLL	5,500	5,300	730	2,100	ID	Various
Soil Volatilization to Indoor Air Inhalation (Res SVII)			2.30E+05	87,000	11,000	3.3E+05 {C}	2.50E+05	1,000	6.3E+06 {C}	Various	1.9E+08	NLV	NLV	ID	NLV	NLV	ID	1.0E+9 {D}	5.8E+08	2.50E+05	2.8E+06	1.0E+9 {D}	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			2.10E+06	7.20E+05	1.70E+05	2.80E+06	3.80E+06	11,000	4.60E+07	Various	8.1E+07	NLV	NLV	ID	NLV	NLV	ID	7.40E+08	1.3E+08	3.0E+05	1.6E+05	6.5E+08	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			5.90E+06	1.00E+06	4.80E+05	5.10E+06	1.20E+07	25,000	6.10E+07	Various	8.1E+07	NLV	NLV	ID	NLV	NLV	ID	7.4E+08	1.3E+08	3.0E+05	1.6E+05	6.5E+08	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			1.40E+07	2.20E+06	1.1E+06	1.20E+07	2.80E+07	57,000	1.30E+08	Various	8.1E+07	NLV	NLV	ID	NLV	NLV	ID	7.4E+08	1.3E+08	3.0E+05	1.6E+05	6.5E+08	Various
Ambient Air Particulate Soil Inhalation (Res PSI)			3.30E+10	1.00E+10	2.7E+09	2.70E+10	6.70E+10	1.30E+08	2.90E+11	Various	1.4E+10	ID	1.5E+06	ID	ID	8.0E+08	ID	9.3E+09	9.3E+09	2.0E+08	6.7E+06	6.7E+09	Various
Direct Contact (Res DC)			2.7E+07 {C}	2.2E+07 {C}	2.0E+05 {C}	5.0E+07 {C}	5.0E+08 {C}	5.0E+5 {C,DD}	4.1E+08 {C}	Various	4.1E+07	20,000	2,000	20,000	2.00E+05	2.5E+06	2.0E+06	4.6E+07	2.7E+07	1.6E+07	1.6E+06	2.9E+07	Various
Nonresidential (µg/Kg)																							
Drinking Water Protection (Nonres DWP)			50,000	1,500	100	16,000	4,000	100	5,600	Various	8.80E+05	NLL	NLL	NLL	NLL	NLL	NLL	7.30E+05	8.90E+05	1.00E+05	1.60E+05	4.80E+05	Various
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			4.30E+05	4.6E+05 {C}	21,000	6.1E+05 {C}	4.60E+05	1,900	1.2E+07 {C}	Various	3.5E+08	NLV	NLV	ID	NLV	NLV	ID	1.0E+9 {D}	1.0E+9 {D}	4.70E+05	5.1E+06	1.0E+9 {D}	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			2.50E+06	2.40E+06	2.10E+05	3.30E+06	4.50E+06	14,000	5.40E+07	Various	9.7E+07	NLV	NLV	ID	NLV	NLV	ID	8.9E+08	1.5E+08	3.50E+05	1.90E+05	7.8E+08	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			6.00E+06	3.10E+06	4.90E+05	3.60E+07	1.50E+07	25,000	6.50E+07	Various	9.7E+07	NLV	NLV	ID	NLV	NLV	ID	8.8E+08	1.5E+08	3.50E+05	1.90E+05	7.8E+08	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			1.40E+07	6.50E+06	1.1E+06	3.60E+07	3.10E+07	58,000	1.30E+08	Various	9.7E+07	NLV	NLV	ID	NLV	NLV	ID	8.8E+08	1.5E+08	3.50E+05	1.90E+05	7.8E+08	Various
Ambient Air Particulate Soil Inhalation (Nonres PSI)			1.50E+10	1.30E+10	1.2E+09	1.20E+10	2.90E+10	5.90E+07	1.30E+11	Various	6.2E+09	ID	1.9E+06	ID	ID	3.5E+08	ID	4.1E+09	4.1E+09	8.8E+07	2.9E+06	2.9E+09	Various
Direct Contact (Nonres DC)			8.7E+07 {C}	7.1E+07 {C}	9.3E+05 {C}	1.6E+08 {C}	1.0E+09 {C}	6.6E+05 {C,DD}	1.0E+09 {C}	Various	1.3E+08	80,000	8,000	80,000	8.00E+05	7.0E+06	8.0E+06	1.3E+08	8.7E+07	5.2E+07	5.2E+06	8.4E+07	Various
Screening Levels (µg/Kg)																							
Soil Saturation Concentration Screening Levels (Csat)			8.90E+05	1.40E+05	88,000	2.50E+05	4.60E+05	5.00E+05	1.50E+05	Various	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Various

	Applicable Criterion/RBSL Exceeded
	Soil boring was advanced on west-adjoining property identified as 400 East Ten Mile Road, Pleasant Ridge, MI 48069
BOLD	Value Exceeds Applicable Criterion/RBSL
bgs	Below Ground Surface (feet)
MDL	Laboratory Method Detection Limit
NA/NL/ID	Not Applicable/Not Listed/Insufficient Data
NLL/NLV	Not Likely to Leach/Not Likely to Volatilize

TABLE 2
ASTI MARCH 1995 AND INTEGRATED JULY 1995
SUMMARY OF SOIL ANALYTICAL RESULTS
PCBs AND METALS
404 EAST 10 MILE ROAD, PLEASANT RIDGE, MICHIGAN
PM PROJECT # 01-5706-1-0002

POLYCHLORINATED BIPHENYLS (PCBs) AND METALS (µg/Kg)			PCBs	Aluminum	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel (B)	Selenium	Silver	Zinc
Chemical Abstract Service Number (CAS#)			1336363	7429905	7440382	7440393	7440439	16065831	7440484	7440508	7439921	7439976	7440020	7782492	7440224	7440666
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**PCBs**	**Metals**												
ASTI March 1995																
B1-1	3/13/1995	2.0-4.0	ND	3.6E+06	**50,000**	73,000	360	7,400	5,400	4,400	4,400	<100	4,000	700	<50	25,000
B3-1	3/13/1995	0.0-2.0	ND	5.9E+06	**67,000**	88,000	90	9,400	7,400	8,800	8,200	<100	18,000	<50	<50	35,000
B7-4	3/14/1995	6.0-8.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B7-6	3/14/1995	10.0-12.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B8-3	3/14/1995	4.0-6.0	570	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B8-6	3/14/1995	10.0-12.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B9-5	3/14/1995	8.0-10.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B9-7	3/14/1995	12.0-14.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B10-4	3/14/1995	6.0-8.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B10-6	3/14/1995	10.0-12.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B11-5	3/14/1995	8.0-10.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B11-7	3/14/1995	12.0-14.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B12-5	3/14/1995	8.0-10.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B12-7	3/14/1995	12.0-14.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B13-4	3/14/1995	6.0-8.0	430	2.1E+06	1,300	57,000	100	8,500	13,000	5,700	9,800	<100	4,100	<500	<500	34,000
B13-5	3/14/1995	8.0-10.0	ND	8.3E+06	**21,000**	120,000	80	13,000	7,400	12,000	7,400	<100	15,000	<500	<500	49,000
HB1	March 1995	0.0-3.0	1,700	2.5E+06	8,000	230,000	1,100	17,000	25,000	12,000	57,000	<100	5,300	1,200	<500	73,000
HB2	March 1995	0.0-3.0	12,000	1.4E+06	7,700	290,000	850	12,000	50,000	10,000	33,000	<100	4,600	<500	<500	63,000
HB3	March 1995	0.0-3.0	7,800	2.4E+06	7,300	100,000	<50	17,000	29,000	9,000	30,000	<100	3,200	<500	<500	54,000
HB4	March 1995	0.0-3.0	14,000	4.0E+06	4,400	310,000	21	31,000	3,500	10,000	40,000	<100	1,300	600	<500	55,000
HB5	March 1995	0.0-3.0	390	3.2E+06	7,500	50,000	1,200	11,000	190,000	9,700	21,000	<100	4,900	1,000	<500	39,000
HB6	March 1995	0.0-3.0	**17,000**	5.3E+06	**19,000**	68,000	250	10,000	130,000	11,000	19,000	<100	8,200	<500	<500	65,000
HB7	March 1995	0.0-3.0	930	2.3E+06	6,500	36,000	100	6,400	73,000	5,500	13,000	<100	11,000	<500	<500	57,000
HB8	March 1995	0.0-3.0	860	3.4E+06	5,000	64,000	140	9,000	54,000	11,000	23,000	<100	4,200	<500	<500	50,000
HB9	March 1995	0.0-3.0	390	3.8E+06	6,500	60,000	140	12,000	18,000	9,100	<1,000	<100	7,000	<500	<500	51,000
BG1	March 1995	5.0-7.0	NA	1.6E+06	2,700	42,000	<50	4,300	1,800	<2,000	1,600	<100	2,200	<500	<500	19,000
BG2	March 1995	5.0-7.0	NA	1.7E+06	3,700	43,000	60	5,200	2,800	4,400	2,000	<100	3,200	<500	<500	20,000
BG3	March 1995	5.0-7.0	NA	1.7E+06	6,000	210,000	<50	5,400	2,900	10,000	1,500	<100	3,700	120,000	<500	24,000
BG4	March 1995	5.0-7.0	NA	1.7E+06	5,700	32,000	110	6,100	2,500	<2,000	<1,000	<100	3,000	<500	<500	17,000
IE August 1995																
B14-1	7/25/1995	0.0-2.0	7,400	NA	6,500	24,000	170	6,200	NA	4,900	13,000	100	NA	<500	<500	36,000
B14-4	7/25/1995	6.0-8.0	<330	NA	4,300	13,000	80	3,500	NA	2,400	1,100	<100	NA	<500	<500	18,000
B15-1	7/25/1995	0.0-2.0	<330	NA	15,000	28,000	190	8,000	NA	6,900	7,500	<100	NA	<500	<500	39,000
B15-4	7/25/1995	6.0-8.0	<330	NA	4,600	20,000	130	5,800	NA	3,500	1,000	<100	NA	<500	<500	22,000
B16-1	7/25/1995	0.0-2.0	<330	NA	9,100	53,000	130	8,300	NA	6,200	7,400	<100	NA	<500	<500	34,000
B16-3	7/25/1995	4.0-6.0	<330	NA	**36,000**	130,000	180	7,900	NA	3,000	<1,000	300	NA	<500	<500	25,000
B17-1	7/25/1995	0.0-2.0	<330	NA	5,500	19,000	110	5,200	NA	4,000	7,800	<100	NA	<500	<500	30,000
B17-3	7/25/1995	4.0-6.0	<330	NA	3,900	14,000	<50	3,500	NA	2,000	<1,000	<100	NA	<500	<500	19,000
B18-1	7/25/1995	0.0-2.0	440	NA	**9,400**	52,000	190	7,200	NA	16,000	23,000	<100	NA	<500	<500	51,000
B18-3	7/25/1995	4.0-6.0	<330	NA	5,600	25,000	70	5,700	NA	4,000	1,300	<100	NA	<500	<500	24,000
B19-2	7/26/1995	2.0-4.0	<330	NA	7,500	21,000	<50	5,600	NA	<1,000	<1,000	<100	NA	<500	<500	22,000
B19-3	7/26/1995	4.0-6.0	<330	NA	4,900	32,000	110	4,600	NA	3,300	1,700	<100	NA	<500	<500	51,000
B20-1	7/26/1995	0.0-2.0	<330	NA	**21,000**	90,000	1,200	9,000	NA	17,000	57,000	<100	NA	1,400	<500	240,000
B20-4	7/26/1995	6.0-8.0	<330	NA	4,800	24,000	70	4,800	NA	2,000	<1,000	<100	NA	<500	<500	20,000
B21-2	7/27/1995	4.0-6.0	NA	NA	**27,000**	55,000	160	7,800	NA	3,000	5,400	<100	NA	<500	<500	38,000
B21-3	7/27/1995	6.0-8.0	NA	NA	**38,000**	33,000	<50	5,200	NA	<1,000	<1,000	<100	NA	<500	<500	23,000
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 (SDBLs)			NA	6.90E+06	5,800	75,000	1,200	18,000	6,800	32,000	21,000	130	20,000	410	1,000	47,000
Drinking Water Protection (Res DWP)			NLL	1,000	4,600	1.30E+06	6,000	30,000	800	5.80E+06	7.00E+05	1,700	100,000	4,000	4,500	2.40E+06
Groundwater Surface Water Interface Protection (GSIP)			NLL	NA	4,600	8.2E+05 {G}	5,600 {G,X}	3,300	2,000	1.2E+05 {G}	5.2E+06 {G,X}	50 {M}; 1.2	1.2E+05 (G)	400	100 {M}; 27	2.7E+05 {G}
Soil Volatilization to Indoor Air Inhalation (Res SVII)			3.0E+06	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	48,000	NLV	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			2.40E+05	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	52,000	NLV	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness			7.9E+06	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	52,000	NLV	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness			7.9E+06	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	52,000	NLV	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Res PSI)			5.2E+06	ID	7.20E+05	3.30E+08	1.70E+06	2.60E+05	1.30E+07	1.30E+08	1.00E+08	2.00E+07	1.30E+07	1.30E+08	6.70E+06	ID
Direct Contact (Res DC)			{T}	5.0E+07 (DD)	7,600	3.70E+07	5.50E+05	2.50E+06	2.60E+06	2.00E+07	4.00E+05	1.60E+05	4.00E+07	2.60E+06	2.50E+06	1.70E+08
Nonresidential (µg/Kg)																
Drinking Water Protection (Nonres DWP)			NLL	1,000	4,600	1.30E+06	6,000	30,000	2,000	5.80E+06	7.00E+05	1,700	100,000	4,000	4,500	5.00E+06
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			1.6E+07	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	89,000	NLV	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			8.10E+05	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	62,000	NLV	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness			2.8E+07	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	62,000	NLV	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness			2.8E+07	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	62,000	NLV	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Nonres PSI)			6.5E+06	ID	9.10E+05	1.50E+08	2.20E+06	2.40E+05	5.90E+06	5.90E+07	4.40E+07	8.80E+06	1.60E+07	5.90E+07	2.90E+06	ID
Direct Contact (Nonres DC)			{T}	3.7E+08 (DD)	37,000	1.30E+08	2.10E+06	9.20E+06	9.00E+06	7.30E+07	9.0E+5 (DD)	5.80E+05	1.50E+08	9.60E+06	9.00E+06	6.30E+08
Screening Levels (µg/Kg)																
Soil Saturation Concentration Screening Levels (Csat)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Applicable Criterion/RBSL Exceeded

Soil boring was advanced on west-adjoining property identified as 400 East Ten Mile Road, Pleasant Ridge, MI 48069

BOLD Value Exceeds Applicable Criterion/RBSL

bgs Below Ground Surface (feet)

MDL Laboratory Method Detection Limit

NA Not Applicable

NLL Not Likely to Leach

{G} Metal GSIP Criteria for Surface Water Not Protected for Drinking Water Use based on 269 mg/L CaCO3 Hardness: Station ID 500011, Red Run, near Warren, MI.

{T} Refer to the Toxic Substance Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended, to determine the applicability of TSCA cleanup standards. Alternatives to compliance with the standards listed below are possible under Subpart D. New Releases may be subject to the standards identified in Subpart G. Use Part 201 soil direct contact criteria in the table below where TSCA standards are not applicable.

LAND USE CATEGORY	TSCA, Subpart D	Part 201
Residential	1,000 µg/Kg, or	4,000 µg/Kg
Nonresidential	10,000 µg/Kg if capped	16,000 µg/Kg

TABLE 3
ASTI MARCH 1995 AND INTEGRATED JULY 1995
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
VOCs, PNAs, AND MICHIGAN TEN METALS
404 EAST 10 MILE ROAD, PLEASANT RIDGE, MICHIGAN
PM PROJECT # 01-5706-1-0002

VOLATILE ORGANIC COMPOUNDS (VOCs), POLYNUCLEAR AROMATIC COMPOUNDS (PNAs), AND MICHIGAN TEN METALS (µg/L)			Benzene	1,1-Dichloroethane	1,2-Dichloroethane	Ethylbenzene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Xylenes	Other VOCs	PNAs	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver	Zinc
Chemical Abstract Service Number (CAS#)			71432	75343	107062	100414	108883	71556	79016	1330207	Various	Various	7440382	7440393	7440439	16065831	7440508	7439921	7439976	7782492	7440224	7440666
Sample ID	**Sample Date**	**Screen Depth (feet bgs)**	**VOCs**									**PNAs**	**Michigan Ten Metals**									
ASTI March 1995																						
MW-1	3/13/1995	7.00-12.00	13	<1	<1	16	1,200	9	<1	85	<MDL	<MDL	<500	90	<50	<50	<50	<50	<2	<500	<50	140
MW-2	3/15/1995	5.00-10.00	<1	<1	<1	<1	<1	29	<1	<3	<MDL	<MDL	<500	<50	<50	<50	<50	<50	<2	<500	<50	70
MW-3	3/14/1995	5.00-10.00	<1	<1	<1	<1	<1	10	<1	<3	<MDL	<MDL	<500	<50	<50	<50	<50	<50	<2	<500	<50	<50
IE August 1995																						
MW-1R	July 1995	7.00-12.00	<1	5	<1	12	2,500	<1	<1	62	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4	7/25/1995	7.00-12.00	<1	<1	<1	<1	<1	42	<1	<1	<MDL	NA	7	<200	<0.2	<50	<20	<3	<0.2	<5	<0.5	60
MW-5	7/25/1995	2.00-7.00	<1	35	<1	<1	<1	8	<1	<1	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6	7/25/1995	2.50-7.50	<1	6	<1	<1	<1	31	<1	<1	<MDL	NA	7	400	0.6	<50	40	5	<0.2	<5	<0.5	580
MW-8	7/26/1995	0.00-1.50	<1	6	<1	<1	<1	43	<1	<1	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-9	7/26/1995	5.00-10.00	<1	8	9	<1	<1	39	15	<1	<MDL	NA	7	<200	<0.2	<50	20	<3	<0.2	<5	<0.5	100
MW-10	7/27/1995	5.00-10.00	<1	<1	<1	<1	<1	<1	<1	<1	<MDL	NA	9	<200	<0.2	<50	<20	<3	<0.2	<5	<0.5	50
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}	880	5.0 {A}	74 {E}	790 {E}	200 {A}	5.0 {A}	280 {E}	Various	Various	10 {A}	2,000 {A}	5.0 {A}	100 {A}	1,000 {E}	4.0 {L}	2.0 {A}	50 {A}	34	2,400
Nonresidential Drinking Water (Nonres DW)			5.0 {A}	2,500	5.0 {A}	74 {E}	790 {E}	200 {A}	5.0 {A}	280 {E}	Various	Various	10 {A}	2,000 {A}	5.0 {A}	100 {A}	1,000 {E}	4.0 {L}	2.0 {A}	50 {A}	98	5,000 {E}
Groundwater Surface Water Interface (GSI)			200 {X}	740	360 {X}	18	270	89	200 {X}	41	Various	Various	10	1,300 {G}	4.6 {G,X}	11	21 {G}	30 {G,X}	0.0013	5.0	0.2 {M}; 0.06	270 {G}
Residential Groundwater Volatilization to Indoor Air Inhalation (Res GVII) [2]			5,600	1.00E+06	9,600	1.10E+05	5.3E+5 {S}	6.60E+05	2,200	1.9E+5 {S}	Various	Various	NLV	NLV	NLV	NLV	NLV	NLV	56 {S}	NLV	NLV	NLV
Nonresidential Groundwater Volatilizationto Indoor Air Inhalation (Nonres GVII) [2]			35,000	2.30E+06	59,000	1.7E+5 {S}	5.3E+5 {S}	1.3E+6 {S}	4,900	1.9E+5 {S}	Various	Various	NLV	NLV	NLV	NLV	NLV	NLV	56 {S}	NLV	NLV	NLV
Screening Levels (µg/L)																						
Residential Groundwater Vapor Intrusion Screening Levels ($GW_{VI\text{-}res}$) [3]			27	4,300	41	700	36,000	17,000	9.8	10,000	Various	Various	NL	NL	NL	NL	NL	NL	ID	NL	NL	NL
Nonresidential Groundwater Vapor Intrusion Screening Levels ($GW_{VI\text{-}nr}$)[3]			140	18,000	210	2600	1.50E+05	71000	41	10,000	Various	Various	NL	NL	NL	NL	NL	NL	ID	NL	NL	NL
Water Solubility			1.75E+06	5.06E+06	8.52E+06	1.69E+05	5.26E+05	1.33E+06	1.10E+06	1.86E+05	Various	Various	NA	NA	NA	NA	NA	NA	56	NA	NA	NA
Flammability and Explosivity Screening Level			68,000	3.80E+05	2.50E+06	43,000	61,000	ID	ID	70,000	Various	Various	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID

Applicable Criteria/RBSL Exceeded

Temporary monitoring well was installed on west-adjoining property identified as 400 East Ten Mile Road, Pleasant Ridge, MI 48069

BOLD Value Exceeds Applicable Criteria

bgs Below Ground Surface (feet)

MDL Laboratory Method Detection Limit

[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.

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 Not Protected for Drinking Water Use based on 269 mg/L CaCO3 Hardness: Station ID 500011, Red Run, near Warren, MI.

TABLE 4
PM JULY 2015
SUMMARY OF SOIL ANALYTICAL RESULTS
VOCs AND PNAs
404 EAST 10 MILE ROAD, PLEASANT RIDGE, MICHIGAN
PM PROJECT # 01-5706-1-0002

VOLATILE ORGANIC COMPOUNDS (VOCs) AND POLYNUCLEAR AROMATIC HYDROCARBONS (PNAs) (µg/Kg)			1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloropropane	2-Methylnaphthalene	Naphthalene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	1,2,3-Trimethylbenzene[1]	1,2,4-Trimethylbenzene	Xylenes	Other VOCs	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Other PNAs
Chemical Abstract Service Number (CAS#)			106467	75343	78875	91576	91203	127184	108883	71556	79016	526738	95636	1330207	Various	56553	50328	205992	218019	206440	193395	85018	129000	Various
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**VOCs**													**PNAs**								
SB-1	7/2/2015	2.0-3.0	<50	<50	<50	<250	<250	<50	<50	390	68	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-2	7/2/2015	2.0-3.0	<1,000	<1,000	<1,000	<5,000	<5,000	<1,000	<1,000	**79,000**	<1,000	<1,000	<1,000	<3,000	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-3	7/2/2015	2.0-3.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	340	440	340	740	<330	<330	590	<MDL
SB-4	7/2/2015	4.0-5.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-5	7/2/2015	4.0-5.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-5	7/2/2015	9.0-10.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-6	7/2/2015	1.0-2.0	<250	<250	<250	<1,250	<1,250	<250	440	**8,100**	<250	<250	<250	<750	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-6	7/2/2015	4.0-5.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-7	7/2/2015	2.0-3.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-8	7/2/2015	1.0-2.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-9	7/2/2015	2.0-3.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-10	7/2/2015	2.0-3.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-11	7/2/2015	1.0-2.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-12	7/2/2015	4.0-5.0	<50	110	<50	<250	<250	63	<50	340	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-13	7/2/2015	1.0-2.0	210	2,300	80	<250	<250	76	<50	900	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-13	7/2/2015	4.0-5.0	<50	<50	<50	<250	<250	<50	<50	260	<50	<50	<50	<150	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-14	7/2/2015	5.0-6.0	<50	<50	<50	420	280	<50	190	430	<50	120	120	460	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
SB-15	7/2/2015	1.0-2.0	<50	<50	<50	<250	<250	<50	<50	<50	<50	<50	<50	<150	<MDL	440	420	520	500	680	380	460	620	<MDL
SB-16	7/2/2015	2.0-3.0	<50	<50	<50	<250	<250	<50	61	**3,000**	<50	<50	59	190	<MDL	<330	<330	<330	<330	<330	<330	<330	<330	<MDL
Cleanup Criteria Requirements for Response Activity (R 299.1 - R 299.50) **Generic Soil Cleanup Criteria Tables 2 and 3: Residential and Non-Residential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Risk-Based Screening Levels, December 30, 2013** **MDEQ Guidance Document For The Vapor Intrusion Pathway, Policy and Procedure Number: 09-017, Appendix D Vapor Intrusion Screening Values, May 2013**																								
Residential (µg/Kg)																								
Statewide Default Background Levels			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Drinking Water Protection (Res DWP)			1,700	18,000	100	57,000	35,000	100	16,000	4,000	100	1,800	2,100	5,600	Various	NLL	NLL	NLL	NLL	7.30E+05	NLL	56,000	4.80E+05	Various
Groundwater Surface Water Interface Protection (GSIP)			360	15,000	4,600 {X}	4,200	730	1,200 {X}	5,400	1,800	4,000 {X}	570	570	820	Various	NLL	NLL	NLL	NLL	5,500	NLL	2,100	ID	Various
Soil Volatilization to Indoor Air Inhalation (Res SVII)			19,000	2.30E+05	4,000	2.70E+06	2.50E+05	11,000	3.3E+05 {C}	2.50E+05	1,000	2.6E+06 {C}	4.3E+06 {C}	6.3E+06 {C}	Various	NLV	NLV	ID	ID	1.0E+9 {D}	NLV	2.8E+06	1.0E+9 {D}	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			77,000	2.10E+06	25,000	1.50E+06	3.00E+05	1.70E+05	2.80E+06	3.80E+06	11,000	1.60E+07	2.10E+07	4.60E+07	Various	NLV	NLV	ID	ID	7.40E+08	NLV	1.60E+05	6.5E+08	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			77,000	5.90E+06	50,000	1.50E+06	3.00E+05	4.80E+05	5.10E+06	1.20E+07	25,000	3.80E+08	5.00E+08	6.10E+07	Various	NLV	NLV	ID	ID	7.4E+08	NLV	1.60E+05	6.5E+08	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			1.10E+05	1.40E+07	1.10E+05	1.50E+06	3.00E+05	1.1E+06	1.20E+07	2.80E+07	57,000	3.80E+08	5.00E+08	1.30E+08	Various	NLV	NLV	ID	ID	7.4E+08	NLV	1.60E+05	6.5E+08	Various
Ambient Air Particulate Soil Inhalation (Res PSI)			4.50E+08	3.30E+10	2.70E+08	6.70E+08	2.00E+08	2.7E+09	2.70E+10	6.70E+10	1.30E+08	8.20E+10	8.20E+10	2.90E+11	Various	ID	1.5E+06	ID	ID	9.3E+09	ID	6.7E+06	6.7E+09	Various
Direct Contact (Res DC)			4.00E+05	2.7E+07 {C}	1.40E+05	8.10E+06	1.60E+07	2.0E+05 {C}	5.0E+07 {C}	5.0E+08 {C}	5.0E+5 {C,DD}	3.2E+07 {C}	3.2E+07 {C}	4.1E+08 {C}	Various	20,000	2,000	20,000	2.0E+06	4.6E+07	20,000	1.6E+06	2.9E+07	Various
Nonresidential (µg/Kg)																								
Drinking Water Protection (Nonres DWP)			1,700	50,000	100	1.70E+05	1.00E+05	100	16,000	4,000	100	1,800	2,100	5,600	Various	NLL	NLL	NLL	NLL	7.30E+05	NLL	1.60E+05	4.80E+05	Various
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			1.00E+05	4.30E+05	7,400	4.90E+06	4.70E+05	21,000	6.1E+05 {C}	4.60E+05	1,900	4.8E+06 {C}	8.0E+06 {C}	1.2E+07 {C}	Various	NLV	NLV	ID	ID	1.0E+9 {D}	NLV	5.1E+06	1.0E+9 {D}	Various
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			2.60E+05	2.50E+06	30,000	1.80E+06	3.50E+05	2.10E+05	3.30E+06	4.50E+06	14,000	1.90E+07	2.50E+07	5.40E+07	Various	NLV	NLV	ID	ID	8.9E+08	NLV	1.90E+05	7.8E+08	Various
Ambient Air Finite VSI for 5 Meter Source Thickness			2.60E+05	6.00E+06	51,000	1.80E+06	3.50E+05	4.90E+05	3.60E+07	1.50E+07	25,000	4.60E+08	6.00E+08	6.50E+07	Various	NLV	NLV	ID	ID	8.8E+08	NLV	1.90E+05	7.8E+08	Various
Ambient Air Finite VSI for 2 Meter Source Thickness			3.40E+05	1.40E+07	1.20E+05	1.80E+06	3.50E+05	1.1E+06	3.60E+07	3.10E+07	58,000	4.60E+08	6.00E+08	1.30E+08	Various	NLV	NLV	ID	ID	8.8E+08	NLV	1.90E+05	7.8E+08	Various
Ambient Air Particulate Soil Inhalation (Nonres PSI)			5.70E+08	1.50E+10	1.20E+08	2.90E+08	8.80E+07	1.2E+09	1.20E+10	2.90E+10	5.90E+07	3.60E+10	3.60E+10	1.30E+11	Various	ID	1.9E+06	ID	ID	4.1E+09	ID	2.9E+06	2.9E+09	Various
Direct Contact (Nonres DC)			1.90E+06	8.7E+07 {C}	6.6E+05 {C}	2.60E+07	5.20E+07	9.3E+05 {C}	1.6E+08 {C}	1.0E+09 {C}	6.6E+05 {C,DD}	1.0E+08 {C}	1.0E+08 {C}	1.0E+09 {C}	Various	80,000	8,000	80,000	8.0E+06	1.3E+08	80,000	5.2E+06	8.4E+07	Various
Screening Levels (µg/Kg)																								
Soil Saturation Concentration Screening Levels (Csat)			NA	8.90E+05	5.50E+05	NA	NA	88,000	2.50E+05	4.60E+05	5.00E+05	94,000	1.10E+05	1.50E+05	Various	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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.
MDL Laboratory Method Detection Limit
NA/NL/ID Not Applicable/Not Listed/Insufficient Data
NLL/NLV Not Likely to Leach/Not Likely to Volatilize

TABLE 5
PM JULY 2015
SUMMARY OF SOIL ANALYTICAL RESULTS
PCBs AND MICHIGAN TEN METALS
404 EAST 10 MILE ROAD, PLEASANT RIDGE, MICHIGAN
PM PROJECT # 01-5706-1-0002

POLYCHLORINATED BIPHENYLS (PCBs) AND MICHIGAN TEN METALS (µg/Kg)			PCBs	Arsenic	Barium	Cadmium	Chromium	Copper	Lead[1]	Mercury	Selenium	Silver	Zinc
Chemical Abstract Service Number (CAS#)			1336363	7440382	7440393	7440439	16065831	7440508	7439921	7439976	7782492	7440224	7440666
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**PCBs**	**Michigan Ten Metals**									
SB-1	7/2/2015	2.0-3.0	**11,000,000**	1,300	9,900	100	5,700	1,100	3,200	<50	350	<100	14,000
SB-2	7/2/2015	2.0-3.0	**5,400**	**9,500**	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-3	7/2/2015	2.0-3.0	**23,000**	5,500	27,000	370	15,000	12,000	43,000	<50	1,500	<100	56,000
SB-4	7/2/2015	4.0-5.0	<330	2,600	6,800	160	9,200	3,100	2,000	<50	<200	<100	7,100
SB-5	7/2/2015	4.0-5.0	<330	7,400	47,000	420	15,000	14,000	8,300	<50	<200	<100	36,000
SB-5	7/2/2015	9.0-10.0	<330	6,800	50,000	480	15,000	14,000	6,200	<50	330	<100	38,000
SB-6	7/2/2015	1.0-2.0	**880,000**	4,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-6	7/2/2015	4.0-5.0	<330	1,200	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-7	7/2/2015	2.0-3.0	<330	**9,200**	56,000	470	15,000	14,000	7,700	<50	<200	<100	40,000
SB-8	7/2/2015	1.0-2.0	<330	2,500	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-9	7/2/2015	2.0-3.0	<330	6,300	48,000	430	16,000	21,000	6,600	<50	<200	<100	37,000
SB-10	7/2/2015	2.0-3.0	<330	1,100	11,000	180	6,200	3,700	2,500	<50	<200	<100	12,000
SB-11	7/2/2015	1.0-2.0	<330	**9,400**	140,000	390	9,300	7,900	6,500	<50	300	<100	28,000
SB-12	7/2/2015	4.0-5.0	<330	5,500	39,000	400	11,000	12,000	7,600	<50	<200	<100	31,000
SB-13	7/2/2015	1.0-2.0	<330	4,600	39,000	410	15,000	16,000	6,500	<50	<200	<100	40,000
SB-13	7/2/2015	4.0-5.0	<330	4,900	71,000	630	23,000	<1,000	9,100	<50	750	100	52,000
SB-14	7/2/2015	5.0-6.0	430	**25,000**	17,000	300	5,100	4,900	1,800	<50	<200	<100	9,400
SB-15	7/2/2015	1.0-2.0	<330	4,100	74,000	580	7,000	12,000	**650,000**	<50	1,100	<100	130,000
SB-16	7/2/2015	2.0-3.0	<330	2,100	11,000	210	7,200	<1,000	4,000	<50	<200	<100	7,700
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	5,800	75,000	1,200	18,000	32,000	21,000	130	410	1,000	47,000
Drinking Water Protection (Res DWP)			NLL	4,600	1.30E+06	6,000	30,000	5.80E+06	7.00E+05	1,700	4,000	4,500	2.40E+06
Groundwater Surface Water Interface Protection (GSIP)			NLL	4,600	8.2E+05 {G}	5,600 {G,X}	3,300	1.2E+05 {G}	5.2E+06 {G,X}	50 {M}; 1.2	400	100 {M}; 27	2.7E+05 {G}
Soil Volatilization to Indoor Air Inhalation (Res SVII)			3.0E+06	NLV	NLV	NLV	NLV	NLV	NLV	48,000	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			2.40E+05	NLV	NLV	NLV	NLV	NLV	NLV	52,000	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness			7.9E+06	NLV	NLV	NLV	NLV	NLV	NLV	52,000	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness			7.9E+06	NLV	NLV	NLV	NLV	NLV	NLV	52,000	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Res PSI)			5.2E+06	7.20E+05	3.30E+08	1.70E+06	2.60E+05	1.30E+08	1.0E+08	2.00E+07	1.30E+08	6.70E+06	ID
Direct Contact (Res DC)			{T}	7,600	3.70E+07	5.50E+05	2.50E+06	2.00E+07	4.00E+05	1.60E+05	2.60E+06	2.50E+06	1.70E+08
Nonresidential (µg/Kg)													
Drinking Water Protection (Nonres DWP)			NLL	4,600	1.30E+06	6,000	30,000	5.80E+06	7.00E+05	1,700	4,000	4,500	5.00E+06
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			1.6E+07	NLV	NLV	NLV	NLV	NLV	NLV	89,000	NLV	NLV	NLV
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			8.10E+05	NLV	NLV	NLV	NLV	NLV	NLV	62,000	NLV	NLV	NLV
Ambient Air Finite VSI for 5 Meter Source Thickness			2.8E+07	NLV	NLV	NLV	NLV	NLV	NLV	62,000	NLV	NLV	NLV
Ambient Air Finite VSI for 2 Meter Source Thickness			2.8E+07	NLV	NLV	NLV	NLV	NLV	NLV	62,000	NLV	NLV	NLV
Ambient Air Particulate Soil Inhalation (Nonres PSI)			6.5E+06	9.10E+05	1.50E+08	2.20E+06	2.40E+05	5.90E+07	4.4E+07	8.80E+06	5.90E+07	2.90E+06	ID
Direct Contact (Nonres DC)			{T}	37,000	1.30E+08	2.10E+06	9.20E+06	7.30E+07	9.0E+5 (DD)	5.80E+05	9.60E+06	9.00E+06	6.30E+08
Screening Levels (µg/Kg)													
Soil Saturation Concentration Screening Levels (Csat)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Applicable Criterion/RBSL Exceeded
BOLD Value Exceeds Applicable Criterion/RBSL
bgs Below Ground Surface (feet)
MDL Laboratory Method Detection Limit
NA/NL/ID Not Applicable/Not Listed/Insufficient Data
NLL/NLV Not Likely to Leach/Not Likely to Volatilize
[1] Maximum of analyzed or calculated total lead value.
{G} Metal GSIP Criteria for Surface Water Not Protected for Drinking Water Use based on 269 mg/L CaCO3 Hardness: Station ID 500011, Red Run, near Warren, MI.
{T} Refer to the Toxic Substance Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended, to determine the applicability of TSCA cleanup standards.
Alternatives to compliance with the standards listed below are possible under Subpart D. New Releases may be subject to the standards identified in Subpart G.
Use Part 201 soil direct contact criteria in the table below where TSCA standards are not applicable.

LAND USE CATEGORY	TSCA, Subpart D	Part 201
Residential	1,000 µg/Kg, or 10,000 µg/Kg if capped	4,000 µg/Kg
Nonresidential		16,000 µg/Kg

TABLE 6
PM JULY 2015
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
VOCs, PNAs, AND MICHIGAN TEN METALS
404 EAST 10 MILE ROAD, PLEASANT RIDGE, MICHIGAN
PM PROJECT # 01-5706-1-0002

VOLATILE ORGANIC COMPOUNDS (VOCs), POLYNUCLEAR AROMATIC COMPOUNDS (PNAs), AND MICHIGAN TEN METALS (µg/L)				1,1-Dichloroethane	1,1,1-Trichloroethane	Other VOCs	PNAs	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver	Zinc
Chemical Abstract Service Number (CAS#)				75343	71556	Various	Various	7440382	7440393	7440439	16065831	7440508	7439921	7439976	7782492	7440224	7440666
Sample ID	**Sample Date**	**Screen Depth (feet bgs)**	**Depth to Groundwater (feet bgs)**	**VOCs**			**PNAs**	**Michigan Ten Metals**									
TMW-1	07/02/15	5.55-10.55	9.45	<1	7	<1	<MDL	<1	<100	0.2	<5	<4	<3	<0.2	<5	0.2	<10
TMW-4	07/02/15	9.55-14.55	10.75	3	10	<1	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TMW-6	07/02/15	8.50-13.50	9.61	<1	7	<1	<MDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TMW-15	07/02/15	5.90-10.90	7.70	<1	24	<1	<MDL	<1	<100	<0.2	<5	<4	<3	<0.2	<5	<0.2	<10
TMW-16	07/02/15	8.50-13.50	8.98	<1	<1	<1	<MDL	NA	NA	NA	NA	NA	NA	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)				880	200 {A}	Various	Various	10 {A}	2,000 {A}	5.0 {A}	100 {A}	1,000 {E}	4.0 {L}	2.0 {A}	50 {A}	34	2,400
Nonresidential Drinking Water (Nonres DW)				2,500	200 {A}	Various	Various	10 {A}	2,000 {A}	5.0 {A}	100 {A}	1,000 {E}	4.0 {L}	2.0 {A}	50 {A}	98	5,000 {E}
Groundwater Surface Water Interface (GSI)				740	89	Various	Various	10	{G}	{G,X}	11	{G}	{G,X}	0.0013	5.0	0.2 {M}; 0.06	{G}
Residential Groundwater Volatilization to Indoor Air Inhalation (Res GVII) [2]				1.00E+06	6.60E+05	Various	Various	NLV	NLV	NLV	NLV	NLV	NLV	56 {S}	NLV	NLV	NLV
Nonresidential Groundwater Volatilizationto Indoor Air Inhalation (Nonres GVII) [2]				2.30E+06	1.3E+6 {S}	Various	Various	NLV	NLV	NLV	NLV	NLV	NLV	56 {S}	NLV	NLV	NLV
Screening Levels (µg/L)																	
Residential Groundwater Vapor Intrusion Screening Levels (GW_{VI-res}) [3]				4,300	17,000	Various	Various	NL	NL	NL	NL	NL	NL	ID	NL	NL	NL
Nonresidential Groundwater Vapor Intrusion Screening Levels (GW_{VI-nr})[3]				18,000	71000	Various	Various	NL	NL	NL	NL	NL	NL	ID	NL	NL	NL
Water Solubility				5.06E+06	1.33E+06	Various	Various	NA	NA	NA	NA	NA	NA	56	NA	NA	NA
Flammability and Explosivity Screening Level				3.80E+05	ID	Various	Various	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID

	Applicable Criteria/RBSL Exceeded
BOLD	Value Exceeds Applicable Criteria
bgs	Below Ground Surface (feet)
MDL	Laboratory Method Detection Limit
[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
NA/NL/ID	Not Applicable/Not Listed/Insufficient Data
NLV	Not Likely to Volatilize
{G}	Metal GSIP Criteria for Surface Water Not Protected for Drinking Water Use based on 269 mg/L CaCO3 Hardness: Station ID 500011, Red Run, near Warren, MI.

TABLE 7 (1 OF 2)
PM 2015 AND 2016
SUMMARY OF SOIL ANALYTICAL RESULTS
PCBs
404 EAST 10 MILE ROAD, PLEASANT RIDGE, MICHIGAN
PM PROJECT # 01-5706-1-0002

POLYCHLORINATED BIPHENYLS (PCBs) (µg/Kg)			PCBs
Chemical Abstract Service Number (CAS#)			1336363
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**PCBs**
SB-1	7/2/2015	2.0-3.0	**11,000,000**
SB-1R	11/24/2015	5.0-6.0	**7,400**
SB-1R	11/24/2015	8.5-9.5	**247,000**
SB-2	7/2/2015	2.0-3.0	**5,400**
SB-3	7/2/2015	2.0-3.0	**23,000**
SB-3R	8/31/2015	8.5-9.5	<330
SB-4	7/2/2015	4.0-5.0	<330
SB-5	7/2/2015	4.0-5.0	<330
SB-5	7/2/2015	9.0-10.0	<330
SB-6	7/2/2015	1.0-2.0	**880,000**
SB-6	7/2/2015	4.0-5.0	<330
SB-7	7/2/2015	2.0-3.0	<330
SB-8	7/2/2015	1.0-2.0	<330
SB-9	7/2/2015	2.0-3.0	<330
SB-10	7/2/2015	2.0-3.0	<330
SB-11	7/2/2015	1.0-2.0	<330
SB-12	7/2/2015	4.0-5.0	<330
SB-13	7/2/2015	1.0-2.0	<330
SB-13	7/2/2015	4.0-5.0	<330
SB-14	7/2/2015	5.0-6.0	430
SB-15	7/2/2015	1.0-2.0	<330
SB-16	7/2/2015	2.0-3.0	<330
SB-17	8/31/2015	2.0-3.0	<330
SB-17	8/31/2015	9.0-10.0	<330
SB-18	8/31/2015	1.0-2.0	**44,000**
SB-18	8/31/2015	2.0-3.0	**16,000**
SB-18	8/31/2015	7.5-8.5	<330
SB-19	8/31/2015	1.0-2.0	**20,000**
SB-19	8/31/2015	2.0-3.0	**24,000**
SB-19	8/31/2015	4.5-5.5	**10,000**
SB-19	8/31/2015	6.5-7.5	<330
SB-20	8/31/2015	1.0-2.0	**16,000**
SB-20	8/31/2015	2.0-3.0	**43,000**
SB-20	8/31/2015	7.0-8.0	<330
SB-21	8/31/2015	2.0-3.0	<330
SB-22	8/31/2015	2.0-3.0	**6,000**
SB-22	8/31/2015	8.0-9.0	<330
SB-23	8/31/2015	2.0-3.0	<330
SB-23	8/31/2015	9.0-10.0	<330
SB-24	8/31/2015	1.0-2.0	**6,188,000**
SB-24	8/31/2015	8.0-9.0	<330
SB-25	8/31/2015	1.0-2.0	**7,000**
SB-25	8/31/2015	2.0-3.0	**19,000**
SB-25	8/31/2015	9.0-10.0	**1,200**
SB-26	8/31/2015	2.0-3.0	**2,300**
SB-26	8/31/2015	9.0-10.0	<330
SB-27	8/31/2015	1.0-2.0	**15,000**
SB-27	8/31/2015	2.0-3.0	**12,000**
SB-27	8/31/2015	5.0-6.0	**9,000**
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			
Residential (µg/Kg)			
Drinking Water Protection (Res DWP)			NLL
Groundwater Surface Water Interface Protection (GSIP)			NLL
Soil Volatilization to Indoor Air Inhalation (Res SVII)			3.0E+06
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			2.40E+05
Ambient Air Finite VSI for 5 Meter Source Thickness			7.9E+06
Ambient Air Finite VSI for 2 Meter Source Thickness			7.9E+06
Ambient Air Particulate Soil Inhalation (Res PSI)			5.2E+06
Direct Contact (Res DC)			{T}
Nonresidential (µg/Kg)			
Drinking Water Protection (Nonres DWP)			NLL
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			1.6E+07
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			8.10E+05
Ambient Air Finite VSI for 5 Meter Source Thickness			2.8E+07
Ambient Air Finite VSI for 2 Meter Source Thickness			2.8E+07
Ambient Air Particulate Soil Inhalation (Nonres PSI)			6.5E+06
Direct Contact (Nonres DC)			{T}
Screening Levels (µg/Kg)			
Soil Saturation Concentration Screening Levels (Csat)			NA

	Applicable Criterion/RBSL Exceeded
BOLD	Value Exceeds Applicable Criterion/RBSL
bgs	Below Ground Surface (feet)
NA/NL/ID	Not Applicable/Not Listed/Insufficient Data
NLL/NLV	Not Likely to Leach/Not Likely to Volatilize
{T}	Refer to the Toxic Substance Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended, to determine the applicability of TSCA cleanup standards. Alternatives to compliance with the standards listed below are possible under Subpart D. New Releases may be subject to the standards identified in Subpart G. Use Part 201 soil direct contact criteria in the table below where TSCA standards are not applicable.

LAND USE CATEGORY	**TSCA, Subpart D**	**Part 201**
Residential	1,000 µg/Kg, or 10,000 µg/Kg if capped	4,000 µg/Kg
Nonresidential		16,000 µg/Kg

TABLE 7 (2 OF 2)
PM 2015 AND 2016
SUMMARY OF SOIL ANALYTICAL RESULTS
PCBs
404 EAST 10 MILE ROAD, PLEASANT RIDGE, MICHIGAN
PM PROJECT # 01-5706-1-0002

POLYCHLORINATED BIPHENYLS (PCBs) **(µg/Kg)**			PCBs
Chemical Abstract Service Number (CAS#)			1336363
Sample ID	**Sample Date**	**Sample Depth (feet bgs)**	**PCBs**
SB-28	8/31/2015	1.0-2.0	**7,000**
SB-28	8/31/2015	2.0-3.0	**14,000**
SB-28	8/31/2015	7.0-8.0	<330
SB-29	8/31/2015	2.0-3.0	**10,000**
SB-29	8/31/2015	6.5-7.5	<330
SB-30	8/31/2015	2.0-3.0	<330
SB-30	8/31/2015	7.5-8.5	<330
SB-31	8/31/2015	2.0-3.0	**1,800**
SB-32	11/24/2015	2.0-3.0	**4,300**
SB-32	11/24/2015	3.5-4.5	<330
SB-33	8/31/2015	1.0-2.0	<330
SB-34	8/31/2015	2.0-3.0	<330
SB-34	8/31/2015	7.5-8.5	<330
SB-35	8/31/2015	2.0-3.0	<330
SB-35	8/31/2015	7.0-8.0	<330
SB-36	8/31/2015	2.0-3.0	300
SB-36	8/31/2015	7.0-8.0	250
SB-37	9/1/2015	2.0-3.0	**1,800**
SB-37	9/1/2015	8.0-9.0	<330
SB-38	11/24/2015	2.0-3.0	**170,000**
SB-38	11/24/2015	5.0-6.0	<330
SB-39	11/24/2015	2.0-3.0	**10,800,000**
SB-39	11/24/2015	5.0-6.0	**4,900**
SB-40	11/24/2015	2.0-3.0	<330
SB-40	11/24/2015	5.0-6.0	<330
SB-40	11/24/2015	8.5-9.5	**2,015,000**
SB-41	11/24/2015	2.0-3.0	<330
SB-41	11/24/2015	5.0-6.0	<330
SB-41	11/24/2015	8.0-9.0	<330
SB-42	11/24/2015	2.0-3.0	<330
SB-43	11/24/2015	1.0-2.0	600
SB-43	11/24/2015	2.0-3.0	<330
SB-43	11/24/2015	5.0-6.0	<330
SB-44	11/24/2015	1.0-2.0	700
SB-44	11/24/2015	2.0-3.0	<330
SB-45	11/24/2015	2.0-3.0	<330
SB-46	11/24/2015	2.0-3.0	**11,000**
SB-46	11/24/2015	5.0-6.0	**9,000**
SB-47	11/24/2015	2.0-3.0	**21,000**
SB-47	11/24/2015	6.5-7.5	<330
SB-48	11/24/2015	2.0-3.0	<330
SB-49	11/24/2015	2.0-3.0	<330
SB-50	11/24/2015	0.5-1.5	**13,000**
SB-50	11/24/2015	4.0-5.0	<330
SB-51	11/24/2015	0.5-1.5	<330
SB-52	5/6/2016	1.0-2.0	**32,600**
SB-52	5/6/2016	2.0-3.0	940
SB-53	5/6/2016	1.0-2.0	**54,900**
SB-53	5/6/2016	2.0-3.0	**15,000**
SB-53	5/6/2016	5.0-6.0	<330
SB-54	5/6/2016	1.0-2.0	**1,180**
SB-54	5/6/2016	2.0-3.0	<330
SB-55	5/6/2016	1.0-2.0	440
SB-55	5/6/2016	2.0-3.0	<330
SB-55	5/6/2016	5.0-6.0	<330
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			
Residential (µg/Kg)			
Drinking Water Protection (Res DWP)			NLL
Groundwater Surface Water Interface Protection (GSIP)			NLL
Soil Volatilization to Indoor Air Inhalation (Res SVII)			3.0E+06
Ambient Air Infinite Source Volatile Soil Inhalation (Res VSI)			2.40E+05
Ambient Air Finite VSI for 5 Meter Source Thickness			7.9E+06
Ambient Air Finite VSI for 2 Meter Source Thickness			7.9E+06
Ambient Air Particulate Soil Inhalation (Res PSI)			5.2E+06
Direct Contact (Res DC)			{T}
Nonresidential (µg/Kg)			
Drinking Water Protection (Nonres DWP)			NLL
Soil Volatilization to Indoor Air Inhalation (Nonres SVII)			1.6E+07
Ambient Air Infinite Source Volatile Soil Inhalation (Nonres VSI)			8.10E+05
Ambient Air Finite VSI for 5 Meter Source Thickness			2.8E+07
Ambient Air Finite VSI for 2 Meter Source Thickness			2.8E+07
Ambient Air Particulate Soil Inhalation (Nonres PSI)			6.5E+06
Direct Contact (Nonres DC)			{T}
Screening Levels (µg/Kg)			
Soil Saturation Concentration Screening Levels (Csat)			NA

	Applicable Criterion/RBSL Exceeded
BOLD	Value Exceeds Applicable Criterion/RBSL
bgs	Below Ground Surface (feet)
NA/NL/ID	Not Applicable/Not Listed/Insufficient Data
NLL/NLV	Not Likely to Leach/Not Likely to Volatilize
{T}	Refer to the Toxic Substance Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended, to determine the applicability of TSCA cleanup standards. Alternatives to compliance with the standards listed below are possible under Subpart D. New Releases may be subject to the standards identified in Subpart G. Use Part 201 soil direct contact criteria in the table below where TSCA standards are not applicable.

LAND USE CATEGORY	TSCA, Subpart D	Part 201
Residential	1,000 µg/Kg, or 10,000 µg/Kg if capped	4,000 µg/Kg
Nonresidential		16,000 µg/Kg

Tables

PM ENVIRONMENTAL Environmental & Engineering Services

Table 1: Ironridge, Ferndale/Pleasant Ridge Eligible Activities Cost Estimates 4.5.17					
Item/Activity	**Total Request**	**MDEQ Act 381 Eligible Activities - Ferndale**	**MSF Act 381 Eligible Activities - Ferndale**	**MDEQ Act 381 Eligible Activities - Pleasant Ridge**	**MSF Act 381 Eligible Activities - Pleasant Ridge**
Baseline Environmental Assessments					
Phase I ESA	$ 7,000	$ 4,900		$ 2,100	
Phase II ESA/BEA/DDCC	$ 76,640	$ 32,305		$ 44,335	
Baseline Environmental Assessments Sub-Total	**$ 83,640**	**$ 37,205**	**$ -**	**$ 46,435**	**$ -**
Due Care Activities					
Vapor Barrier Design and Installation					
Design	$ 10,000	$ 5,000		$ 5,000	
Oversight	$ 36,000	$ 18,000		$ 18,000	
Vapor Evaluation, Reporting 4 Quarters	$ 150,000	$ 75,000		$ 75,000	
Western Building Installation (Proposed Fitness Center)	$ 67,500	$ -		$ 67,500	
Eastern Building Installation (Former Walker Wire)	$ 450,000	$ 135,000		$ 315,000	
Southern Building Installation (3155 Bermuda St)	$ 80,000	$ 80,000		$ -	
Contaminated Soil Removal, Transport and Disposal					
PCB Remediation Activities 404 10 Mile (5,720 Tons)	$ 991,000			$ 991,000	
PCB Remediation Activities Walker Wire Bldg (2100 Tons)	$ 357,000	$ 357,000		$ -	
Contaminated Soil Transport and Disposal associated with Development Activities (1500 Tons)	$ 163,000	$ 81,500		$ 81,500	
Groundwater Management	$ 107,750	$ 53,875		$ 53,875	
Oversight, Sampling and Reporting by Environmental Professional	$ 110,000	$ 55,000		$ 55,000	
Removal of USTs if encountered	$ 10,000	$ 5,000		$ 5,000	
Due Care Activities Sub-Total	**$ 2,532,250**	**$ 865,375**	**$ -**	**$ 1,666,875**	**$ -**
Demolition					
Predemolition Audit or Survey	$ 20,000		$ 10,000		$ 10,000
Building Demolition	$ 300,000		$ 150,000		$ 150,000
Dewatering During Foundation Removal	$ 20,000		$ 10,000		$ 10,000
Fill/Compaction/Rough Grading to Balance Site Where Building was Located	$ 10,000		$ 2,500		$ 7,500
Removal of Abandoned Utilities	$ 200,000		$ 100,000		$ 100,000
Removal of Parking Lots/Sidewalks/Curbs/Gutters	$ 200,000		$ 100,000		$ 100,000
Fill/Compaction/Rough Grading to Balance Site Where Site Improvements were Located	$ 100,000		$ 50,000		$ 50,000
Fees related to Demolition Engineering and Design	$ 70,000		$ 35,000		$ 35,000
Demolition Sub-Total	**$ 920,000**	**$ -**	**$ 457,500**	**$ -**	**$ 462,500**
Asbestos Activities					
Asbestos Survey	$ 20,000	$ 10,000		$ 10,000	
Asbestos Abatement, Oversight, Air Monitoring and Reporting	$ 100,000		$ 50,000		$ 50,000
Asbestos Activities Sub-Total	**$ 120,000**	**$ 10,000**	**$ 50,000**	**$ 10,000**	**$ 50,000**
Infrastructure Improvements					
Urban Storm water Management System	$ 250,000		$ 250,000		
Sidewalks	$ 100,000		$ 100,000		
Curbs and Gutters	$ 50,000		$ 50,000		
Roads	$ 250,000		$ 250,000		
Public Lighting	$ 100,000		$ 100,000		
Public Signage	$ 50,000		$ 50,000		
Storm Sewers	$ 100,000		$ 100,000		
Water Mains	$ 100,000		$ 100,000		
Sanitary Sewer Mains	$ 100,000		$ 100,000		
Landscaping	$ 150,000		$ 150,000		
Park/Seating Areas	$ 50,000		$ 50,000		
Professional Fees Directly Related to Infrastructure Improvements	$ 130,000		$ 130,000		
Infrastructure Sub-Total	**$ 1,430,000**	**$ -**	**$ 1,430,000**	**$ -**	**$ -**
Site Preparation					
Staking Related to Eligible Activities	$ 50,000		$ 50,000		
Geotechnical Engineering	$ 25,000		$ 25,000		
Clearing and Grubbing	$ 50,000		$ 50,000		
Temporary Construction Access and/or Roads	$ 5,000		$ 5,000		
Temporary Traffic Control	$ 25,000		$ 25,000		
Temporary Facility	$ 10,000		$ 10,000		
Temporary Erosion Control	$ 15,000		$ 15,000		
Temporary Site Control (fencing, gates, signage, lighting etc.)	$ 25,000		$ 25,000		
Excavation of Unstable Material	$ 25,000		$ 25,000		
Foundation Work to Address Special Soil Concerns	$ 100,000		$ 100,000		
Fill Relating to Other Eligible Activities	$ 25,000		$ 25,000		
Dewatering Relating to Other Eligible Activities	$ 25,000		$ 25,000		
Grading	$ 30,000		$ 30,000		
Relocation of Active Utilities (Electric, Gas, Water, Sewer)	$ 100,000		$ 100,000		
Unique Site Preparation Activities	$ 50,000		$ 50,000		
Professional Fees Directly Related to Site Preparation Activities	$ 50,000		$ 50,000		
Site Preparation Sub-Total	**$ 610,000**	**$ -**	**$ 610,000**	**$ -**	**$ -**
Preparation of Brownfield Plan and Act 381 Workplan					
Brownfield Plan	$ 25,000	$ 6,250	$ 6,250	$ 6,250	$ 6,250
Brownfield Plan and Act 381 Workplan Sub-Total	**$ 25,000**	**$ 6,250**	**$ 6,250**	**$ 6,250**	**$ 6,250**
Eligible Activities Sub-Total	**$ 5,720,890**	**$ 918,830**	**$ 2,553,750**	**$ 1,729,560**	**$ 518,750**
15% Contingency*	$ 841,838	$ 131,306	$ 382,125	$ 251,531	$ 76,875
Developer Eligible Reimbursement Total	**$ 6,562,728**	**$ 1,050,136**	**$ 2,935,875**	**$ 1,981,091**	**$ 595,625**

*15% Contingency excludes preparation of Brownfield Plan/381 Work Plan and Baseline Environmental Assessments

Tax Increment Revenue Capture Estimates - Pleasant Ridge
Table 2a
400-404 East 10 Mile Road and 660 East 10 Mile Road, Pleasant Ridge,
Oakland County, Michigan
June 19, 2017

Estimated Taxable Value (TV) Increase Rate: 0.5% per year

Plan Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Calendar Year	2017	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
*Base Taxable Value	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420
Estimated New TV		$ 1,221,700	$ 2,443,400	$ 2,467,834	$ 2,492,512	$ 2,517,437	$ 2,542,612	$ 2,568,038	$ 2,593,718	$ 2,619,656	$ 2,645,852	$ 2,672,311	$ 2,699,034	$ 2,726,024	$ 2,753,284	$ 2,780,817
Incremental Difference (New TV - Base TV)		**$ 98,280**	**$ 1,319,980**	**$ 1,344,414**	**$ 1,369,092**	**$ 1,394,017**	**$ 1,419,192**	**$ 1,444,618**	**$ 1,470,298**	**$ 1,496,236**	**$ 1,522,432**	**$ 1,548,891**	**$ 1,575,614**	**$ 1,602,604**	**$ 1,629,864**	**$ 1,657,397**
School Capture	Millage Rate															
State Education Tax (SET)	6.0000	$ 6,741	$ 590	$ 7,920	$ 8,066	$ 8,215	$ 8,364	$ 8,515	$ 8,668	$ 8,822	$ 8,977	$ 9,135	$ 9,293	$ 9,454	$ 9,616	$ 9,779	$ 9,944
School Operating Tax	18.0000	$ 20,222	$ 1,769	$ 23,760	$ 24,199	$ 24,644	$ 25,092	$ 25,545	$ 26,003	$ 26,465	$ 26,932	$ 27,404	$ 27,880	$ 28,361	$ 28,847	$ 29,338	$ 29,833
School Total	**24.0000**	**$ 26,962**	**$ 2,359**	**$ 31,680**	**$ 32,266**	**$ 32,858**	**$ 33,456**	**$ 34,061**	**$ 34,671**	**$ 35,287**	**$ 35,910**	**$ 36,538**	**$ 37,173**	**$ 37,815**	**$ 38,462**	**$ 39,117**	**$ 39,778**
Local Capture	Millage Rate															
County Pk & Rec	0.2392	$ 269	$ 24	$ 316	$ 322	$ 327	$ 333	$ 339	$ 346	$ 352	$ 358	$ 364	$ 370	$ 377	$ 383	$ 390	$ 396
HCMA	0.2146	$ 241	$ 21	$ 283	$ 289	$ 294	$ 299	$ 305	$ 310	$ 316	$ 321	$ 327	$ 332	$ 338	$ 344	$ 350	$ 356
OCPTA	0.9941	$ 1,117	$ 98	$ 1,312	$ 1,336	$ 1,361	$ 1,386	$ 1,411	$ 1,436	$ 1,462	$ 1,487	$ 1,513	$ 1,540	$ 1,566	$ 1,593	$ 1,620	$ 1,648
County Operating	4.0400	$ 4,539	$ 397	$ 5,333	$ 5,431	$ 5,531	$ 5,632	$ 5,734	$ 5,836	$ 5,940	$ 6,045	$ 6,151	$ 6,258	$ 6,365	$ 6,475	$ 6,585	$ 6,696
OIS Allocated	0.1985	$ 223	$ 20	$ 262	$ 267	$ 272	$ 277	$ 282	$ 287	$ 292	$ 297	$ 302	$ 307	$ 313	$ 318	$ 324	$ 329
OIS Voted	3.1413	$ 3,529	$ 309	$ 4,146	$ 4,223	$ 4,301	$ 4,379	$ 4,458	$ 4,538	$ 4,619	$ 4,700	$ 4,782	$ 4,866	$ 4,949	$ 5,034	$ 5,120	$ 5,206
OCC	1.5707	$ 1,765	$ 154	$ 2,073	$ 2,112	$ 2,150	$ 2,190	$ 2,229	$ 2,269	$ 2,309	$ 2,350	$ 2,391	$ 2,433	$ 2,475	$ 2,517	$ 2,560	$ 2,603
Infrastructure	2.8472	$ 3,199	$ 280	$ 3,758	$ 3,828	$ 3,898	$ 3,969	$ 4,041	$ 4,113	$ 4,186	$ 4,260	$ 4,335	$ 4,410	$ 4,486	$ 4,563	$ 4,641	$ 4,719
City Operating	10.8434	$ 12,182	$ 1,066	$ 14,313	$ 14,578	$ 14,846	$ 15,116	$ 15,389	$ 15,665	$ 15,943	$ 16,224	$ 16,508	$ 16,795	$ 17,085	$ 17,378	$ 17,673	$ 17,972
City Oper-2015	2.7804	$ 3,124	$ 273	$ 3,670	$ 3,738	$ 3,807	$ 3,876	$ 3,946	$ 4,017	$ 4,088	$ 4,160	$ 4,233	$ 4,307	$ 4,381	$ 4,456	$ 4,532	$ 4,608
Solid Waste	1.6260	$ 1,827	$ 160	$ 2,146	$ 2,186	$ 2,226	$ 2,267	$ 2,308	$ 2,349	$ 2,391	$ 2,433	$ 2,475	$ 2,518	$ 2,562	$ 2,606	$ 2,650	$ 2,695
Pool/Rec OPER	1.2073	$ 1,356	$ 119	$ 1,594	$ 1,623	$ 1,653	$ 1,683	$ 1,713	$ 1,744	$ 1,775	$ 1,806	$ 1,838	$ 1,870	$ 1,902	$ 1,935	$ 1,968	$ 2,001
Park Improvement	0.7190	$ 808	$ 71	$ 949	$ 967	$ 984	$ 1,002	$ 1,020	$ 1,039	$ 1,057	$ 1,076	$ 1,095	$ 1,114	$ 1,133	$ 1,152	$ 1,172	$ 1,192
Publicity	0.3481	$ 391	$ 34	$ 459	$ 468	$ 477	$ 485	$ 494	$ 503	$ 512	$ 521	$ 530	$ 539	$ 548	$ 558	$ 567	$ 577
FPS Sinking Fund	1.3000	$ 1,460	$ 128	$ 1,716	$ 1,748	$ 1,780	$ 1,812	$ 1,845	$ 1,878	$ 1,911	$ 1,945	$ 1,979	$ 2,014	$ 2,048	$ 2,083	$ 2,119	$ 2,155
Local Total	**32.0698**	**$ 36,028**	**$ 3,152**	**$ 42,331**	**$ 43,115**	**$ 43,907**	**$ 44,706**	**$ 45,513**	**$ 46,329**	**$ 47,152**	**$ 47,984**	**$ 48,824**	**$ 49,673**	**$ 50,530**	**$ 51,395**	**$ 52,269**	**$ 53,152**
Non-Capturable Millages	Millage Rate															
Zoo Authority (County)	0.0990	$ 111	$ 10	$ 131	$ 133	$ 136	$ 138	$ 140	$ 143	$ 146	$ 148	$ 151	$ 153	$ 156	$ 159	$ 161	$ 164
Art Institute (County)	0.1981	$ 223	$ 19	$ 261	$ 266	$ 271	$ 276	$ 281	$ 286	$ 291	$ 296	$ 302	$ 307	$ 312	$ 317	$ 323	$ 328
FPS Debt (Pleasant Ridge and Ferndale)	7.0000	$ 7,864	$ 688	$ 9,240	$ 9,411	$ 9,584	$ 9,758	$ 9,934	$ 10,112	$ 10,292	$ 10,474	$ 10,657	$ 10,842	$ 11,029	$ 11,218	$ 11,409	$ 11,602
Pool/Rec Debt (Pleasant Ridge)	1.2122	$ 1,362	$ 119	$ 1,600	$ 1,630	$ 1,660	$ 1,690	$ 1,720	$ 1,751	$ 1,782	$ 1,814	$ 1,845	$ 1,878	$ 1,910	$ 1,943	$ 1,976	$ 2,009
Library (Pleasant Ridge)	0.3763	$ 423	$ 37	$ 497	$ 506	$ 515	$ 525	$ 534	$ 544	$ 553	$ 563	$ 573	$ 583	$ 593	$ 603	$ 613	$ 624
Total Non-Capturable Taxes	**8.8856**	**$ 9,982**	**$ 873**	**$ 11,729**	**$ 11,946**	**$ 12,165**	**$ 12,387**	**$ 12,610**	**$ 12,836**	**$ 13,064**	**$ 13,295**	**$ 13,528**	**$ 13,763**	**$ 14,000**	**$ 14,240**	**$ 14,482**	**$ 14,727**
Total Capturable Millages	**56.0698**																
Total Tax Increment Revenue (TIR) Available for Capture		$ 5,511	$ 74,011	$ 75,381	$ 76,765	$ 78,162	$ 79,574	$ 80,999	$ 82,439	$ 83,894	$ 85,362	$ 86,846	$ 88,344	$ 89,858	$ 91,386	$ 92,930	

Tax Increment Revenue Capture Estimates - Pleasant Ridge
Table 2a
400-404 East 10 Mile Road and 660 East 10 Mile Road, Pleasant Ridge,
Oakland County, Michigan
June 19, 2017

Estimated Taxable Value (TV) Increase Rate:

Plan Year	16	17	18	19	20	21	22	23	24	25	26	27	28	TOTAL
Calendar Year	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	
*Base Taxable Value	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ 1,123,420	$ -
Estimated New TV	$ 2,808,625	$ 2,836,712	$ 2,865,079	$ 2,893,729	$ 2,922,667	$ 2,951,893	$ 2,981,412	$ 3,011,226	$ 3,041,339	$ 3,071,752	$ 3,102,470	$ 3,133,494	$ 3,164,829	$ -
Incremental Difference (New TV - Base TV)	**$ 1,685,205**	**$ 1,713,292**	**$ 1,741,659**	**$ 1,770,309**	**$ 1,799,247**	**$ 1,828,473**	**$ 1,857,992**	**$ 1,887,806**	**$ 1,917,919**	**$ 1,948,332**	**$ 1,979,050**	**$ 2,010,074**	**$ 2,041,409**	$ -
School Capture	Millage Rate													
State Education Tax (SET)	6.0000	$ 10,111	$ 10,280	$ 10,450	$ 10,622	$ 10,795	$ 10,971	$ 11,148	$ 11,327	$ 11,508	$ 11,690	$ 11,874	$ 12,060	$ 12,248	$ 270,442
School Operating Tax	18.0000	$ 30,334	$ 30,839	$ 31,350	$ 31,866	$ 32,386	$ 32,913	$ 33,444	$ 33,981	$ 34,523	$ 35,070	$ 35,623	$ 36,181	$ 36,745	$ 811,327
School Total	**24.0000**	**$ 40,445**	**$ 41,119**	**$ 41,800**	**$ 42,487**	**$ 43,182**	**$ 43,883**	**$ 44,592**	**$ 45,307**	**$ 46,030**	**$ 46,760**	**$ 47,497**	**$ 48,242**	**$ 48,994**	**$ 1,081,769**
Local Capture	Millage Rate														
County Pk & Rec	0.2392	$ 403	$ 410	$ 417	$ 423	$ 430	$ 437	$ 444	$ 452	$ 459	$ 466	$ 473	$ 481	$ 488	$ 10,782
HCMA	0.2146	$ 362	$ 368	$ 374	$ 380	$ 386	$ 392	$ 399	$ 405	$ 412	$ 418	$ 425	$ 431	$ 438	$ 9,673
OCPTA	0.9941	$ 1,675	$ 1,703	$ 1,731	$ 1,760	$ 1,789	$ 1,818	$ 1,847	$ 1,877	$ 1,907	$ 1,937	$ 1,967	$ 1,998	$ 2,029	$ 44,808
County Operating	4.0400	$ 6,808	$ 6,922	$ 7,036	$ 7,152	$ 7,269	$ 7,387	$ 7,506	$ 7,627	$ 7,748	$ 7,871	$ 7,995	$ 8,121	$ 8,247	$ 182,098
OIS Allocated	0.1985	$ 335	$ 340	$ 346	$ 351	$ 357	$ 363	$ 369	$ 375	$ 381	$ 387	$ 393	$ 399	$ 405	$ 8,947
OIS Voted	3.1413	$ 5,294	$ 5,382	$ 5,471	$ 5,561	$ 5,652	$ 5,744	$ 5,837	$ 5,930	$ 6,025	$ 6,120	$ 6,217	$ 6,314	$ 6,413	$ 141,590
OCC	1.5707	$ 2,647	$ 2,691	$ 2,736	$ 2,781	$ 2,826	$ 2,872	$ 2,918	$ 2,965	$ 3,012	$ 3,060	$ 3,108	$ 3,157	$ 3,206	$ 70,797
Infrastructure	2.8472	$ 4,798	$ 4,878	$ 4,959	$ 5,040	$ 5,123	$ 5,206	$ 5,290	$ 5,375	$ 5,461	$ 5,547	$ 5,635	$ 5,723	$ 5,812	$ 128,334
City Operating	10.8434	$ 18,273	$ 18,578	$ 18,886	$ 19,196	$ 19,510	$ 19,827	$ 20,147	$ 20,470	$ 20,797	$ 21,127	$ 21,460	$ 21,796	$ 22,136	$ 488,752
City Oper-2015	2.7804	$ 4,686	$ 4,764	$ 4,843	$ 4,922	$ 5,003	$ 5,084	$ 5,166	$ 5,249	$ 5,333	$ 5,417	$ 5,503	$ 5,589	$ 5,676	$ 125,323
Solid Waste	1.6260	$ 2,740	$ 2,786	$ 2,832	$ 2,879	$ 2,926	$ 2,973	$ 3,021	$ 3,070	$ 3,119	$ 3,168	$ 3,218	$ 3,268	$ 3,319	$ 73,290
Pool/Rec OPER	1.2073	$ 2,035	$ 2,068	$ 2,103	$ 2,137	$ 2,172	$ 2,208	$ 2,243	$ 2,279	$ 2,316	$ 2,352	$ 2,389	$ 2,427	$ 2,465	$ 54,417
Park Improvement	0.7190	$ 1,212	$ 1,232	$ 1,252	$ 1,273	$ 1,294	$ 1,315	$ 1,336	$ 1,357	$ 1,379	$ 1,401	$ 1,423	$ 1,445	$ 1,468	$ 32,408
Publicity	0.3481	$ 587	$ 596	$ 606	$ 616	$ 626	$ 636	$ 647	$ 657	$ 668	$ 678	$ 689	$ 700	$ 711	$ 15,690
FPS Sinking Fund	1.3000	$ 2,191	$ 2,227	$ 2,264	$ 2,301	$ 2,339	$ 2,377	$ 2,415	$ 2,454	$ 2,493	$ 2,533	$ 2,573	$ 2,613	$ 2,654	$ 58,596
Local Total	**32.0698**	**$ 54,044**	**$ 54,945**	**$ 55,855**	**$ 56,773**	**$ 57,701**	**$ 58,639**	**$ 59,585**	**$ 60,542**	**$ 61,507**	**$ 62,483**	**$ 63,468**	**$ 64,463**	**$ 65,468**	**$ 1,445,504**
Non-Capturable Millages	Millage Rate														
Zoo Authority (County)	0.0990	$ 167	$ 170	$ 172	$ 175	$ 178	$ 181	$ 184	$ 187	$ 190	$ 193	$ 196	$ 199	$ 202	$ 4,574
Art Institute (County)	0.1981	$ 334	$ 339	$ 345	$ 351	$ 356	$ 362	$ 368	$ 374	$ 380	$ 386	$ 392	$ 398	$ 404	$ 9,152
FPS Debt (Pleasant Ridge and Ferndale)	7.0000	$ 11,796	$ 11,993	$ 12,192	$ 12,392	$ 12,595	$ 12,799	$ 13,006	$ 13,215	$ 13,425	$ 13,638	$ 13,853	$ 14,071	$ 14,290	$ 323,387
Pool/Rec Debt (Pleasant Ridge)	1.2122	$ 2,043	$ 2,077	$ 2,111	$ 2,146	$ 2,181	$ 2,216	$ 2,252	$ 2,288	$ 2,325	$ 2,362	$ 2,399	$ 2,437	$ 2,475	$ 56,001
Library (Pleasant Ridge)	0.3763	$ 634	$ 645	$ 655	$ 666	$ 677	$ 688	$ 699	$ 710	$ 722	$ 733	$ 745	$ 756	$ 768	$ 17,384
Total Non-Capturable Taxes	**8.8856**	**$ 14,974**	**$ 15,224**	**$ 15,476**	**$ 15,730**	**$ 15,987**	**$ 16,247**	**$ 16,509**	**$ 16,774**	**$ 17,042**	**$ 17,312**	**$ 17,585**	**$ 17,861**	**$ 18,139**	**$ 410,498**
Total Capturable Millages	**56.0698**														
Total Tax Increment Revenue (TIR) Available for Capture		$ 94,489	$ 96,064	$ 97,654	$ 99,261	$ 100,883	$ 102,522	$ 104,177	$ 105,849	$ 107,537	$ 109,243	$ 110,965	$ 112,704	$ 114,461	$ -

Tax Increment Revenue Capture Estimates - Pleasant Ridge
Table 2b
400-404 East 10 Mile Road and 660 East 10 Mile Road, Pleasant Ridge,
Oakland County, Michigan
June 19, 2017

Developer Maximum Reimbursement	Proportionality	School & Local Taxes	Local-Only Taxes	Total
State	**42.80%**	**$ 1,102,932**	**$ -**	$ 1,102,932
Local	**57.20%**	**$ 1,473,784**	**$ -**	$ 1,473,784
TOTAL				
MDEQ	76.88%	$ 1,981,091	$ -	$ 1,981,091
MSF	23.12%	$ 595,625	$ -	$ 595,625

Estimated Total Years of Plan: 28

Estimated Capture	
Administrative Fees	$ 140,000
State Revolving Fund	$ 135,221
LSRRF	$ 100,000

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Total State Incremental Revenue		$ 2,359	$ 31,680	$ 32,266	$ 32,858	$ 33,456	$ 34,061	$ 34,671	$ 35,287	$ 35,910	$ 36,538	$ 37,173	$ 37,815	$ 38,462	$ 39,117	$ 39,778	$ 40,445	$ 41,119	$ 41,800
State Brownfield Revolving Fund (50% of SET)		$ 295	$ 3,960	$ 4,033	$ 4,107	$ 4,182	$ 4,258	$ 4,334	$ 4,411	$ 4,489	$ 4,567	$ 4,647	$ 4,727	$ 4,808	$ 4,890	$ 4,972	$ 5,056	$ 5,140	$ 5,225
State TIR Available for Reimbursement		**$ 2,064**	**$ 27,720**	**$ 28,233**	**$ 28,751**	**$ 29,274**	**$ 29,803**	**$ 30,337**	**$ 30,876**	**$ 31,421**	**$ 31,971**	**$ 32,527**	**$ 33,088**	**$ 33,655**	**$ 34,227**	**$ 34,805**	**$ 35,389**	**$ 35,979**	**$ 36,575**
Total Local Incremental Revenue		$ 3,152	$ 42,331	$ 43,115	$ 43,907	$ 44,706	$ 45,513	$ 46,329	$ 47,152	$ 47,984	$ 48,824	$ 49,673	$ 50,530	$ 51,395	$ 52,269	$ 53,152	$ 54,044	$ 54,945	$ 55,855
BRA Administrative Fee ($5000/year)		$ 5,000	$ 6,848	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000
Local TIR Available for Reimbursement		**$ (1,848)**	**$ 35,483**	**$ 38,115**	**$ 38,907**	**$ 39,706**	**$ 40,513**	**$ 41,329**	**$ 42,152**	**$ 42,984**	**$ 43,824**	**$ 44,673**	**$ 45,530**	**$ 46,395**	**$ 47,269**	**$ 48,152**	**$ 49,044**	**$ 49,945**	**$ 50,855**
Total State & Local TIR Available		**$ 2,064**	**$ 63,203**	**$ 66,348**	**$ 67,657**	**$ 68,980**	**$ 70,316**	**$ 71,666**	**$ 73,028**	**$ 74,405**	**$ 75,795**	**$ 77,199**	**$ 78,618**	**$ 80,050**	**$ 81,497**	**$ 82,958**	**$ 84,434**	**$ 85,924**	**$ 87,429**
DEVELOPER	Beginning Balance																		
DEVELOPER Reimbursement Balance	***$ 2,576,716***	***$ 2,574,652***	***$ 2,511,449***	***$ 2,445,101***	***$ 2,377,444***	***$ 2,308,464***	***$ 2,238,148***	***$ 2,166,482***	***$ 2,093,454***	***$ 2,019,049***	***$ 1,943,253***	***$ 1,866,054***	***$ 1,787,437***	***$ 1,707,387***	***$ 1,625,890***	***$ 1,542,932***	***$ 1,458,499***	***$ 1,372,575***	***$ 1,285,145***
MSF Non-Environmental Costs	*$ 595,625*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -				
State Tax Reimbursement		$ 477	$ 6,408	$ 6,526	$ 6,646	$ 6,767	$ 6,889	$ 7,013	$ 7,137	$ 7,263	$ 7,390	$ 7,519	$ 7,648	$ 7,780	$ 7,912	$ 8,045	$ 8,180	$ 8,317	$ 8,455
Local Tax Reimbursement		$ -	$ 8,202	$ 8,811	$ 8,993	$ 9,178	$ 9,365	$ 9,553	$ 9,744	$ 9,936	$ 10,130	$ 10,326	$ 10,524	$ 10,725	$ 10,927	$ 11,131	$ 11,337	$ 11,545	$ 11,755
Total MSF Reimbursement Balance		*$ 595,148*	*$ 580,538*	*$ 565,201*	*$ 549,562*	*$ 533,617*	*$ 517,363*	*$ 500,797*	*$ 483,916*	*$ 466,716*	*$ 449,196*	*$ 431,351*	*$ 413,178*	*$ 394,674*	*$ 375,835*	*$ 356,659*	*$ 337,142*	*$ 317,280*	*$ 297,070*
MDEQ Environmental Costs	*$ 1,981,091*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -				
State Tax Reimbursement		$ 1,587	$ 21,312	$ 21,707	$ 22,105	$ 22,507	$ 22,914	$ 23,324	$ 23,739	$ 24,158	$ 24,581	$ 25,008	$ 25,439	$ 25,875	$ 26,315	$ 26,760	$ 27,209	$ 27,662	$ 28,120
Local Tax Reimbursement		$ -	$ 27,281	$ 29,305	$ 29,913	$ 30,528	$ 31,148	$ 31,775	$ 32,408	$ 33,048	$ 33,694	$ 34,346	$ 35,005	$ 35,671	$ 36,343	$ 37,022	$ 37,707	$ 38,400	$ 39,099
Total MDEQ Reimbursement Balance		*$ 1,979,504*	*$ 1,930,911*	*$ 1,879,900*	*$ 1,827,882*	*$ 1,774,847*	*$ 1,720,785*	*$ 1,665,685*	*$ 1,609,538*	*$ 1,552,332*	*$ 1,494,057*	*$ 1,434,703*	*$ 1,374,259*	*$ 1,312,713*	*$ 1,250,055*	*$ 1,186,273*	*$ 1,121,357*	*$ 1,055,295*	*$ 988,076*
Local Only Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Local Tax Reimbursement																			
Total Local Only Reimbursement Balance		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -					
Total Annual Developer Reimbursement		*$ 2,064*	*$ 63,203*	*$ 66,348*	*$ 67,657*	*$ 68,980*	*$ 70,316*	*$ 71,666*	*$ 73,028*	*$ 74,405*	*$ 75,795*	*$ 77,199*	*$ 78,618*	*$ 80,050*	*$ 81,497*	*$ 82,958*	*$ 84,434*	*$ 85,924*	*$ 87,429*
LOCAL BROWNFIELD REVOLVING FUNI																			
LBRF Deposits *		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
State Tax Capture	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Local Tax Capture	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total LBRF Capture																			

* Up to five years of capture for LBRF Deposits after eligible activities are reimbursed. May be taken from DEQ & Local TIR only.

Footnotes:
Provide footnotes, as needed
*Based on the current TIF projection, it is not anticipated that the total amount of requested eligible expenses will be reimbursed within the 26 year payback.

Tax Increment Revenue Capture Estimates - Pleasant Ridge
Table 2b
400-404 East 10 Mile Road and 660 East 10 Mile Road, Pleasant Ridge,
Oakland County, Michigan
June 19, 2017

	19	20	21	22	23	24	25	26*	27	28	
	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	TOTAL
Total State Incremental Revenue	$ 42,487	$ 43,182	$ 43,883	$ 44,592	$ 45,307	$ 46,030	$ 46,760	$ 47,497	$ 48,242	$ 48,994	$ 1,081,769
State Brownfield Revolving Fund (50% of SET)	$ 5,311	$ 5,398	$ 5,485	$ 5,574	$ 5,663	$ 5,754	$ 5,845	$ 5,937	$ 6,030	$ 6,124	$ 135,221
State TIR Available for Reimbursement	**$ 37,176**	**$ 37,784**	**$ 38,398**	**$ 39,018**	**$ 39,644**	**$ 40,276**	**$ 40,915**	**$ 41,560**	**$ 42,212**	**$ 42,870**	$ 946,548
Total Local Incremental Revenue	$ 56,773	$ 57,701	$ 58,639	$ 59,585	$ 60,542	$ 61,507	$ 62,483	$ 63,468	$ 64,463	$ 65,468	$ 1,445,504
BRA Administrative Fee ($5000/year)	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 140,000
Local TIR Available for Reimbursement	**$ 51,773**	**$ 52,701**	**$ 53,639**	**$ 54,585**	**$ 55,542**	**$ 56,507**	**$ 57,483**	**$ 58,468**	**$ 59,463**	**$ 60,468**	$ 1,303,656
Total State & Local TIR Available	**$ 88,950**	**$ 90,486**	**$ 92,037**	**$ 93,603**	**$ 95,186**	**$ 96,784**	**$ 98,398**	**$ 100,028**	**$ 101,674**	**$ 103,337**	**$ 2,252,052**
DEVELOPER											
DEVELOPER Reimbursement Balance	***$ 1,196,195***	***$ 1,105,710***	***$ 1,013,673***	***$ 920,070***	***$ 824,884***	***$ 728,101***	***$ 629,703***	***$ 529,675***			***$ -***
MSF Non-Environmental Costs											$ -
State Tax Reimbursement	$ 8,594	$ 8,734	$ 8,876	$ 9,019	$ 9,164	$ 9,310	$ 9,458	$ 9,607			$ 199,134
Local Tax Reimbursement	$ 11,968	$ 12,182	$ 12,399	$ 12,618	$ 12,839	$ 13,062	$ 13,287	$ 13,515			$ 274,053
Total MSF Reimbursement Balance	*$ 276,509*	*$ 255,592*	*$ 234,317*	*$ 212,680*	*$ 190,677*	*$ 168,305*	*$ 145,560*	*$ 122,438*			*$ -*
MDEQ Environmental Costs											$ -
State Tax Reimbursement	$ 28,583	$ 29,050	$ 29,522	$ 29,999	$ 30,480	$ 30,966	$ 31,457	$ 31,953			$ 662,333
Local Tax Reimbursement	$ 39,806	$ 40,519	$ 41,240	$ 41,968	$ 42,703	$ 43,445	$ 44,195	$ 44,953			$ 911,521
Total MDEQ Reimbursement Balance	*$ 919,687*	*$ 850,118*	*$ 779,356*	*$ 707,390*	*$ 634,207*	*$ 559,795*	*$ 484,143*	*$ 407,237*			*$ -*
Local Only Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -			$ -
Local Tax Reimbursement											
Total Local Only Reimbursement Balance											$ -
Total Annual Developer Reimbursement	*$ 88,950*	*$ 90,486*	*$ 92,037*	*$ 93,603*	*$ 95,186*	*$ 96,784*	*$ 98,398*	*$ 100,028*			*$ 2,047,041*
LOCAL BROWNFIELD REVOLVING FUNI											
LBRF Deposits *	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 50,000**	**$ 50,000**	**$ 100,000**
State Tax Capture	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Local Tax Capture	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 50,000*	*$ 50,000*	*$ 100,000*
Total LBRF Capture											

* Up to five years of capture for LBRF Deposits

Footnotes:
Provide footnotes, as needed
*Based on the current TIF projection, it is not anticipated that the total amount of requested eligible expenses will be reimbursed within the 26 year payback.

Tax Increment Revenue Capture Estimates - Ferndale
Table 3a
3155-3351 Bermuda, 3164-3350 Bermuda, and 660 East 10 Mile Road, Ferndale;
Oakland County, Michigan
August 30, 2017

Estimated Taxable Value (TV) Increase Rate: 0.5% per year

Plan Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Calendar Year	2017	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
*Base Taxable Value	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440
Estimated New TV		$ 1,812,475	$ 3,604,150	$ 3,640,192	$ 3,676,593	$ 3,713,359	$ 3,750,493	$ 3,787,998	$ 3,825,878	$ 3,864,137	$ 3,902,778	$ 3,941,806	$ 3,981,224	$ 4,021,036	$ 4,061,246
Incremental Difference (New TV - Base TV)		**$ 1,451,035**	**$ 3,242,710**	**$ 3,278,752**	**$ 3,315,153**	**$ 3,351,919**	**$ 3,389,053**	**$ 3,426,558**	**$ 3,464,438**	**$ 3,502,697**	**$ 3,541,338**	**$ 3,580,366**	**$ 3,619,784**	**$ 3,659,596**	**$ 3,699,806**
School Capture	Millage Rate														
State Education Tax (SET)	6.0000	$ 2,169	$ 8,706	$ 19,456	$ 19,673	$ 19,891	$ 20,112	$ 20,334	$ 20,559	$ 20,787	$ 21,016	$ 21,248	$ 21,482	$ 21,719	$ 21,958	$ 22,199
School Operating Tax	18.0000	$ 6,506	$ 26,119	$ 58,369	$ 59,018	$ 59,673	$ 60,335	$ 61,003	$ 61,678	$ 62,360	$ 63,049	$ 63,744	$ 64,447	$ 65,156	$ 65,873	$ 66,597
School Total	**24.0000**	**$ 8,675**	**$ 34,825**	**$ 77,825**	**$ 78,690**	**$ 79,564**	**$ 80,446**	**$ 81,337**	**$ 82,237**	**$ 83,147**	**$ 84,065**	**$ 84,992**	**$ 85,929**	**$ 86,875**	**$ 87,830**	**$ 88,795**
Local Capture	Millage Rate														
County Pk & Rec	0.2392	$ 86	$ 347	$ 776	$ 784	$ 793	$ 802	$ 811	$ 820	$ 829	$ 838	$ 847	$ 856	$ 866	$ 875	$ 885
HCMA	0.2146	$ 78	$ 311	$ 696	$ 704	$ 711	$ 719	$ 727	$ 735	$ 743	$ 752	$ 760	$ 768	$ 777	$ 785	$ 794
OCPTA	0.9941	$ 359	$ 1,442	$ 3,224	$ 3,259	$ 3,296	$ 3,332	$ 3,369	$ 3,406	$ 3,444	$ 3,482	$ 3,520	$ 3,559	$ 3,598	$ 3,638	$ 3,678
County Operating	4.0400	$ 1,460	$ 5,862	$ 13,101	$ 13,246	$ 13,393	$ 13,542	$ 13,692	$ 13,843	$ 13,996	$ 14,151	$ 14,307	$ 14,465	$ 14,624	$ 14,785	$ 14,947
OIS Allocated	0.1985	$ 72	$ 288	$ 644	$ 651	$ 658	$ 665	$ 673	$ 680	$ 688	$ 695	$ 703	$ 711	$ 719	$ 726	$ 734
OIS Voted	3.1413	$ 1,135	$ 4,558	$ 10,186	$ 10,300	$ 10,414	$ 10,529	$ 10,646	$ 10,764	$ 10,883	$ 11,003	$ 11,124	$ 11,247	$ 11,371	$ 11,496	$ 11,622
OCC	1.5707	$ 568	$ 2,279	$ 5,093	$ 5,150	$ 5,207	$ 5,265	$ 5,323	$ 5,382	$ 5,442	$ 5,502	$ 5,562	$ 5,624	$ 5,686	$ 5,748	$ 5,811
City Operating	13.9451	$ 5,040	$ 20,235	$ 45,220	$ 45,723	$ 46,230	$ 46,743	$ 47,261	$ 47,784	$ 48,312	$ 48,845	$ 49,384	$ 49,929	$ 50,478	$ 51,033	$ 51,594
Refuse Disposal	2.0915	$ 756	$ 3,035	$ 6,782	$ 6,858	$ 6,934	$ 7,011	$ 7,088	$ 7,167	$ 7,246	$ 7,326	$ 7,407	$ 7,488	$ 7,571	$ 7,654	$ 7,738
City Oper-Voted	4.4552	$ 1,610	$ 6,465	$ 14,447	$ 14,607	$ 14,770	$ 14,933	$ 15,099	$ 15,266	$ 15,435	$ 15,605	$ 15,777	$ 15,951	$ 16,127	$ 16,304	$ 16,483
FPS Sinking Fund	1.3000	$ 470	$ 1,886	$ 4,216	$ 4,262	$ 4,310	$ 4,357	$ 4,406	$ 4,455	$ 4,504	$ 4,554	$ 4,604	$ 4,654	$ 4,706	$ 4,757	$ 4,810
Library-Voted	0.9587	$ 347	$ 1,391	$ 3,109	$ 3,143	$ 3,178	$ 3,213	$ 3,249	$ 3,285	$ 3,321	$ 3,358	$ 3,395	$ 3,432	$ 3,470	$ 3,508	$ 3,547
Library-Operating	0.9204	$ 333	$ 1,336	$ 2,985	$ 3,018	$ 3,051	$ 3,085	$ 3,119	$ 3,154	$ 3,189	$ 3,224	$ 3,259	$ 3,295	$ 3,332	$ 3,368	$ 3,405
Local Total	**34.0693**	**$ 12,314**	**$ 49,436**	**$ 110,477**	**$ 111,705**	**$ 112,945**	**$ 114,198**	**$ 115,463**	**$ 116,740**	**$ 118,031**	**$ 119,334**	**$ 120,651**	**$ 121,981**	**$ 123,324**	**$ 124,680**	**$ 126,050**
Non-Capturable Millages	Millage Rate														
Zoo Authority (County)	0.0990	$ 36	$ 144	$ 321	$ 325	$ 328	$ 332	$ 336	$ 339	$ 343	$ 347	$ 351	$ 354	$ 358	$ 362	$ 366
Art Institute (County)	0.1981	$ 72	$ 287	$ 642	$ 650	$ 657	$ 664	$ 671	$ 679	$ 686	$ 694	$ 702	$ 709	$ 717	$ 725	$ 733
FPS Debt (Pleasant Ridge and Ferndale)	7.0000	$ 2,530	$ 10,157	$ 22,699	$ 22,951	$ 23,206	$ 23,463	$ 23,723	$ 23,986	$ 24,251	$ 24,519	$ 24,789	$ 25,063	$ 25,338	$ 25,617	$ 25,899
GWK Facility DBT (Ferndale)	1.7340	$ 627	$ 2,516	$ 5,623	$ 5,685	$ 5,748	$ 5,812	$ 5,877	$ 5,942	$ 6,007	$ 6,074	$ 6,141	$ 6,208	$ 6,277	$ 6,346	$ 6,415
Debt Service (Ferndale)	4.1790	$ 1,510	$ 6,064	$ 13,551	$ 13,702	$ 13,854	$ 14,008	$ 14,163	$ 14,320	$ 14,478	$ 14,638	$ 14,799	$ 14,962	$ 15,127	$ 15,293	$ 15,461
Stormwater Settlement	2.0930	$ 756	$ 3,037	$ 6,787	$ 6,862	$ 6,939	$ 7,016	$ 7,093	$ 7,172	$ 7,251	$ 7,331	$ 7,412	$ 7,494	$ 7,576	$ 7,660	$ 7,744
Total Non-Capturable Taxes	**15.3031**	**$ 5,531**	**$ 22,205**	**$ 49,624**	**$ 50,175**	**$ 50,732**	**$ 51,295**	**$ 51,863**	**$ 52,437**	**$ 53,017**	**$ 53,602**	**$ 54,193**	**$ 54,791**	**$ 55,394**	**$ 56,003**	**$ 56,619**
Total Capturable Millages	**58.0693**														
Total Tax Increment Revenue (TIR) Available for Capture		$ 84,261	$ 188,302	$ 190,395	$ 192,509	$ 194,644	$ 196,800	$ 198,978	$ 201,177	$ 203,399	$ 205,643	$ 207,909	$ 210,198	$ 212,510	$ 214,845

Tax Increment Revenue Capture Estimates - Ferndale
Table 3a
3155-3351 Bermuda, 3164-3350 Bermuda, and 660 East 10 Mile Road, Ferndale;
Oakland County, Michigan
August 30, 2017

Estimated Taxable Value (TV) Increase Rate:

Plan Year	15	16	17	18	19	20	21	22	23	24	25	26	27	TOTAL
Calendar Year	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	
*Base Taxable Value	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ 361,440	$ -
Estimated New TV	$ 4,101,859	$ 4,142,877	$ 4,184,306	$ 4,226,149	$ 4,268,411	$ 4,311,095	$ 4,354,206	$ 4,397,748	$ 4,441,725	$ 4,486,143	$ 4,531,004	$ 4,576,314	$ 4,622,077	$ -
Incremental Difference (New TV - Base TV)	**$ 3,740,419**	**$ 3,781,437**	**$ 3,822,866**	**$ 3,864,709**	**$ 3,906,971**	**$ 3,949,655**	**$ 3,992,766**	**$ 4,036,308**	**$ 4,080,285**	**$ 4,124,703**	**$ 4,169,564**	**$ 4,214,874**	**$ 4,260,637**	$ -
School Capture	Millage Rate													
State Education Tax (SET)	6.0000	$ 22,443	$ 22,689	$ 22,937	$ 23,188	$ 23,442	$ 23,698	$ 23,957	$ 24,218	$ 24,482	$ 24,748	$ 25,017	$ 25,289	$ 25,564	$ 590,810
School Operating Tax	18.0000	$ 67,328	$ 68,066	$ 68,812	$ 69,565	$ 70,325	$ 71,094	$ 71,870	$ 72,654	$ 73,445	$ 74,245	$ 75,052	$ 75,868	$ 76,691	$ 1,772,431
School Total	**24.0000**	**$ 89,770**	**$ 90,754**	**$ 91,749**	**$ 92,753**	**$ 93,767**	**$ 94,792**	**$ 95,826**	**$ 96,871**	**$ 97,927**	**$ 98,993**	**$ 100,070**	**$ 101,157**	**$ 102,255**	$ 2,363,242
Local Capture	Millage Rate													
County Pk & Rec	0.2392	$ 895	$ 905	$ 914	$ 924	$ 935	$ 945	$ 955	$ 965	$ 976	$ 987	$ 997	$ 1,008	$ 1,019	$ 23,554
HCMA	0.2146	$ 803	$ 811	$ 820	$ 829	$ 838	$ 848	$ 857	$ 866	$ 876	$ 885	$ 895	$ 905	$ 914	$ 21,131
OCPTA	0.9941	$ 3,718	$ 3,759	$ 3,800	$ 3,842	$ 3,884	$ 3,926	$ 3,969	$ 4,012	$ 4,056	$ 4,100	$ 4,145	$ 4,190	$ 4,235	$ 97,887
County Operating	4.0400	$ 15,111	$ 15,277	$ 15,444	$ 15,613	$ 15,784	$ 15,957	$ 16,131	$ 16,307	$ 16,484	$ 16,664	$ 16,845	$ 17,028	$ 17,213	$ 397,812
OIS Allocated	0.1985	$ 742	$ 751	$ 759	$ 767	$ 776	$ 784	$ 793	$ 801	$ 810	$ 819	$ 828	$ 837	$ 846	$ 19,546
OIS Voted	3.1413	$ 11,750	$ 11,879	$ 12,009	$ 12,140	$ 12,273	$ 12,407	$ 12,542	$ 12,679	$ 12,817	$ 12,957	$ 13,098	$ 13,240	$ 13,384	$ 309,319
OCC	1.5707	$ 5,875	$ 5,940	$ 6,005	$ 6,070	$ 6,137	$ 6,204	$ 6,271	$ 6,340	$ 6,409	$ 6,479	$ 6,549	$ 6,620	$ 6,692	$ 154,664
City Operating	13.9451	$ 52,161	$ 52,733	$ 53,310	$ 53,894	$ 54,483	$ 55,078	$ 55,680	$ 56,287	$ 56,900	$ 57,519	$ 58,145	$ 58,777	$ 59,415	$ 1,373,152
Refuse Disposal	2.0915	$ 7,823	$ 7,909	$ 7,996	$ 8,083	$ 8,171	$ 8,261	$ 8,351	$ 8,442	$ 8,534	$ 8,627	$ 8,721	$ 8,815	$ 8,911	$ 205,947
City Oper-Voted	4.4552	$ 16,664	$ 16,847	$ 17,032	$ 17,218	$ 17,406	$ 17,597	$ 17,789	$ 17,983	$ 18,178	$ 18,376	$ 18,576	$ 18,778	$ 18,982	$ 438,696
FPS Sinking Fund	1.3000	$ 4,863	$ 4,916	$ 4,970	$ 5,024	$ 5,079	$ 5,135	$ 5,191	$ 5,247	$ 5,304	$ 5,362	$ 5,420	$ 5,479	$ 5,539	$ 128,009
Library-Voted	0.9587	$ 3,586	$ 3,625	$ 3,665	$ 3,705	$ 3,746	$ 3,787	$ 3,828	$ 3,870	$ 3,912	$ 3,954	$ 3,997	$ 4,041	$ 4,085	$ 94,402
Library-Operating	0.9204	$ 3,443	$ 3,480	$ 3,519	$ 3,557	$ 3,596	$ 3,635	$ 3,675	$ 3,715	$ 3,755	$ 3,796	$ 3,838	$ 3,879	$ 3,921	$ 90,630
Local Total	**34.0693**	**$ 127,433**	**$ 128,831**	**$ 130,242**	**$ 131,668**	**$ 133,108**	**$ 134,562**	**$ 136,031**	**$ 137,514**	**$ 139,012**	**$ 140,526**	**$ 142,054**	**$ 143,598**	**$ 145,157**	$ 3,354,749
Non-Capturable Millages	Millage Rate													
Zoo Authority (County)	0.0990	$ 370	$ 374	$ 378	$ 383	$ 387	$ 391	$ 395	$ 400	$ 404	$ 408	$ 413	$ 417	$ 422	$ 9,748
Art Institute (County)	0.1981	$ 741	$ 749	$ 757	$ 766	$ 774	$ 782	$ 791	$ 800	$ 808	$ 817	$ 826	$ 835	$ 844	$ 19,507
FPS Debt (Pleasant Ridge and Ferndale)	7.0000	$ 26,183	$ 26,470	$ 26,760	$ 27,053	$ 27,349	$ 27,648	$ 27,949	$ 28,254	$ 28,562	$ 28,873	$ 29,187	$ 29,504	$ 29,824	$ 689,279
GWK Facility DBT (Ferndale)	1.7340	$ 6,486	$ 6,557	$ 6,629	$ 6,701	$ 6,775	$ 6,849	$ 6,923	$ 6,999	$ 7,075	$ 7,152	$ 7,230	$ 7,309	$ 7,388	$ 170,744
Debt Service (Ferndale)	4.1790	$ 15,631	$ 15,803	$ 15,976	$ 16,151	$ 16,327	$ 16,506	$ 16,686	$ 16,868	$ 17,052	$ 17,237	$ 17,425	$ 17,614	$ 17,805	$ 411,499
Stormwater Settlement	2.0930	$ 7,829	$ 7,915	$ 8,001	$ 8,089	$ 8,177	$ 8,267	$ 8,357	$ 8,448	$ 8,540	$ 8,633	$ 8,727	$ 8,822	$ 8,918	$ 206,094
Total Non-Capturable Taxes	**15.3031**	**$ 57,240**	**$ 57,868**	**$ 58,502**	**$ 59,142**	**$ 59,789**	**$ 60,442**	**$ 61,102**	**$ 61,768**	**$ 62,441**	**$ 63,121**	**$ 63,807**	**$ 64,501**	**$ 65,201**	$ 1,506,872
Total Capturable Millages	**58.0693**														
Total Tax Increment Revenue (TIR) Available for Capture		$ 217,204	$ 219,585	$ 221,991	$ 224,421	$ 226,875	$ 229,354	$ 231,857	$ 234,386	$ 236,939	$ 239,519	$ 242,124	$ 244,755	$ 247,412	$ -

Tax Increment Revenue Capture Estimates - Ferndale
Table 3b
3155-3351 Bermuda, 3164-3350 Bermuda, and 660 East 10 Mile Road, Ferndale;
Oakland County, Michigan
August 30, 2017

Developer Maximum Reimbursement	Proportionality	School & Local Taxes	Local-Only Taxes	Total
State	**41.33%**	**$ 1,647,415**	**$ -**	$ 1,647,415
Local	**58.67%**	**$ 2,338,596**	**$ -**	$ 2,338,596
TOTAL				
MDEQ	26.35%	$ 1,050,136	$ -	$ 1,050,136
MSF	73.65%	$ 2,935,875	$ -	$ 2,935,875

Estimated Total Years of Plan:	27

Estimated Capture	
Administrative Fees	$ 175,500
State Revolving Fund	$ 295,405
LSRRF	$ 375,000

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Total State Incremental Revenue		$ 34,825	$ 77,825	$ 78,690	$ 79,564	$ 80,446	$ 81,337	$ 82,237	$ 83,147	$ 84,065	$ 84,992	$ 85,929	$ 86,875	$ 87,830	$ 88,795	$ 89,770	$ 90,754
State Brownfield Revolving Fund (50% of SET)		$ 4,353	$ 9,728	$ 9,836	$ 9,945	$ 10,056	$ 10,167	$ 10,280	$ 10,393	$ 10,508	$ 10,624	$ 10,741	$ 10,859	$ 10,979	$ 11,099	$ 11,221	$ 11,344
State TIR Available for Reimbursement		**$ 30,472**	**$ 68,097**	**$ 68,854**	**$ 69,618**	**$ 70,390**	**$ 71,170**	**$ 71,958**	**$ 72,753**	**$ 73,557**	**$ 74,368**	**$ 75,188**	**$ 76,015**	**$ 76,852**	**$ 77,696**	**$ 78,549**	**$ 79,410**
Total Local Incremental Revenue		$ 49,436	$ 110,477	$ 111,705	$ 112,945	$ 114,198	$ 115,463	$ 116,740	$ 118,031	$ 119,334	$ 120,651	$ 121,981	$ 123,324	$ 124,680	$ 126,050	$ 127,433	$ 128,831
BRA Administrative Fee ($6,500/year)		$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500
Local TIR Available for Reimbursement		**$ 42,936**	**$ 103,977**	**$ 105,205**	**$ 106,445**	**$ 107,698**	**$ 108,963**	**$ 110,240**	**$ 111,531**	**$ 112,834**	**$ 114,151**	**$ 115,481**	**$ 116,824**	**$ 118,180**	**$ 119,550**	**$ 120,933**	**$ 122,331**
Total State & Local TIR Available		**$ 73,407**	**$ 172,074**	**$ 174,059**	**$ 176,063**	**$ 178,088**	**$ 180,133**	**$ 182,198**	**$ 184,284**	**$ 186,391**	**$ 188,519**	**$ 190,668**	**$ 192,839**	**$ 195,031**	**$ 197,246**	**$ 199,482**	**$ 201,741**
DEVELOPER	Beginning Balance																
DEVELOPER Reimbursement Balance	***$ 3,986,011***	***$ 3,912,604***	***$ 3,740,530***	***$ 3,566,471***	***$ 3,390,408***	***$ 3,212,320***	***$ 3,032,187***	***$ 2,849,989***	***$ 2,665,705***	***$ 2,479,314***	***$ 2,290,795***	***$ 2,100,127***	***$ 1,907,288***	***$ 1,712,256***	***$ 1,515,011***	***$ 1,315,528***	***$ 1,113,787***
MSF Non-Environmental Costs	*$ 2,935,875*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -			
State Tax Reimbursement		$ 22,444	$ 50,156	$ 50,714	$ 51,277	$ 51,846	$ 52,420	$ 53,000	$ 53,586	$ 54,178	$ 54,775	$ 55,379	$ 55,989	$ 56,605	$ 57,227	$ 57,855	$ 58,489
Local Tax Reimbursement		$ 31,624	$ 76,584	$ 77,488	$ 78,401	$ 79,324	$ 80,256	$ 81,197	$ 82,148	$ 83,108	$ 84,077	$ 85,057	$ 86,046	$ 87,045	$ 88,054	$ 89,073	$ 90,102
Total MSF Reimbursement Balance		*$ 2,881,807*	*$ 2,755,067*	*$ 2,626,865*	*$ 2,497,187*	*$ 2,366,017*	*$ 2,233,341*	*$ 2,099,144*	*$ 1,963,411*	*$ 1,826,125*	*$ 1,687,273*	*$ 1,546,837*	*$ 1,404,803*	*$ 1,261,153*	*$ 1,115,873*	*$ 968,945*	*$ 820,354*
MDEQ Environmental Costs	*$ 1,050,136*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -			
State Tax Reimbursement		$ 8,028	$ 17,940	$ 18,140	$ 18,341	$ 18,545	$ 18,750	$ 18,958	$ 19,167	$ 19,379	$ 19,593	$ 19,809	$ 20,027	$ 20,247	$ 20,469	$ 20,694	$ 20,921
Local Tax Reimbursement		$ 11,312	$ 27,393	$ 27,717	$ 28,043	$ 28,373	$ 28,707	$ 29,043	$ 29,383	$ 29,727	$ 30,074	$ 30,424	$ 30,778	$ 31,135	$ 31,496	$ 31,861	$ 32,229
Total MDEQ Reimbursement Balance		*$ 1,030,796*	*$ 985,463*	*$ 939,606*	*$ 893,221*	*$ 846,303*	*$ 798,846*	*$ 750,845*	*$ 702,294*	*$ 653,189*	*$ 603,522*	*$ 553,290*	*$ 502,485*	*$ 451,103*	*$ 399,138*	*$ 346,583*	*$ 293,433*
Local Only Costs	*$ -*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Local Tax Reimbursement																	
Total Local Only Reimbursement Balance		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -			
Total Annual Developer Reimbursement		*$ 73,407*	*$ 172,074*	*$ 174,059*	*$ 176,063*	*$ 178,088*	*$ 180,133*	*$ 182,198*	*$ 184,284*	*$ 186,391*	*$ 188,519*	*$ 190,668*	*$ 192,839*	*$ 195,031*	*$ 197,246*	*$ 199,482*	*$ 201,741*
LOCAL BROWNFIELD REVOLVING FUN																	
LBRF Deposits *		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
State Tax Capture	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Local Tax Capture	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total LBRF Capture																	

* Up to five years of capture for LSRRF Deposits after eligible activities are reimbursed. May be taken from DEQ & Local TIR only.

Tax Increment Revenue Capture Estimates - Ferndale
Table 3b
3155-3351 Bermuda, 3164-3350 Bermuda, and 660 East 10 Mile Road, Ferndale;
Oakland County, Michigan
August 30, 2017

	17	18	19	20	21	22	23	24	25	26	27	
	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	TOTAL
Total State Incremental Revenue	$ 91,749	$ 92,753	$ 93,767	$ 94,792	$ 95,826	$ 96,871	$ 97,927	$ 98,993	$ 100,070	$ 101,157	$ 102,255	$ 2,363,242
State Brownfield Revolving Fund (50% of SET)	$ 11,469	$ 11,594	$ 11,721	$ 11,849	$ 11,978	$ 12,109	$ 12,241	$ 12,374	$ 12,509	$ 12,645	$ 12,782	$ 295,405
State TIR Available for Reimbursement	**$ 80,280**	**$ 81,159**	**$ 82,046**	**$ 82,943**	**$ 83,848**	**$ 84,762**	**$ 85,686**	**$ 86,619**	**$ 87,561**	**$ 88,512**	**$ 89,473**	$ 2,067,836
Total Local Incremental Revenue	$ 130,242	$ 131,668	$ 133,108	$ 134,562	$ 136,031	$ 137,514	$ 139,012	$ 140,526	$ 142,054	$ 143,598	$ 145,157	$ 3,354,749
BRA Administrative Fee ($6,500/year)	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 175,500
Local TIR Available for Reimbursement	**$ 123,742**	**$ 125,168**	**$ 126,608**	**$ 128,062**	**$ 129,531**	**$ 131,014**	**$ 132,512**	**$ 134,026**	**$ 135,554**	**$ 137,098**	**$ 138,657**	$ 3,179,249
Total State & Local TIR Available	**$ 204,023**	**$ 206,327**	**$ 208,654**	**$ 211,005**	**$ 213,379**	**$ 215,777**	**$ 218,198**	**$ 220,644**	**$ 223,115**	**$ 225,610**	**$ 228,130**	**$ 5,247,086**
DEVELOPER												
DEVELOPER Reimbursement Balance	***$ 909,765***	***$ 703,438***	***$ 494,784***	***$ 283,779***	***$ 70,400***	***$ 0***	***$ -***					***$ -***
MSF Non-Environmental Costs												$ -
State Tax Reimbursement	$ 59,130	$ 59,777	$ 60,431	$ 61,091	$ 61,758	$ 21,431						$ 1,159,556
Local Tax Reimbursement	$ 91,142	$ 92,192	$ 93,252	$ 94,323	$ 95,405	$ 30,422						$ 1,776,319
Total MSF Reimbursement Balance	*$ 670,082*	*$ 518,113*	*$ 364,430*	*$ 209,016*	*$ 51,853*	*$ -*						*$ -*
MDEQ Environmental Costs												$ -
State Tax Reimbursement	$ 21,150	$ 21,382	$ 21,616	$ 21,852	$ 22,090	$ 7,666						$ 414,763
Local Tax Reimbursement	$ 32,601	$ 32,976	$ 33,355	$ 33,739	$ 34,126	$ 10,882						$ 635,373
Total MDEQ Reimbursement Balance	*$ 239,682*	*$ 185,324*	*$ 130,353*	*$ 74,763*	*$ 18,547*	*$ -*						*$ -*
Local Only Costs	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*						*$ -*
Local Tax Reimbursement												
Total Local Only Reimbursement Balance												*$ -*
Total Annual Developer Reimbursement	*$ 204,023*	*$ 206,327*	*$ 208,654*	*$ 211,005*	*$ 213,379*	*$ 70,400*						*$ 3,986,011*
LOCAL BROWNFIELD REVOLVING FUN												
LBRF Deposits *	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 75,000**	**$ 75,000**	**$ 75,000**	**$ 75,000**	**$ 75,000**	**$ 375,000**
State Tax Capture	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*
Local Tax Capture	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ 75,000*	*$ 75,000*	*$ 75,000*	*$ 75,000*	*$ 75,000*	*$ 375,000*
Total LBRF Capture												

* Up to five years of capture for LSRRF Deposi

Table 4 - Post-Development Taxable Value Estimates

City of Ferndale

	Parcel No.	Address	LSD	2017 Taxable Value	Post-Development TV Estimate
1	24- 25-27-201-005	3351 BERMUDA ST	110	10,090	37,470
2	24- 25-27-201-012	3281 BERMUDA ST	110	5,620	5,740
3	24- 25-27-201-013	3265 BERMUDA ST	110	83,240	307,840
4	24- 25-27-201-015	3155 BERMUDA ST	110	50,450	265,810
5	24- 25-27-201-019	3291 BERMUDA ST	110	34,090	34,810
6	24- 25-27-201-020	660 E TEN MILE RD	110	17,150	137,850
7	24- 25-27-202-008	3350 BERMUDA ST	110	12,530	12,790
8	24- 25-27-202-009	3342 BERMUDA ST	110	15,080	10,500
9	24- 25-27-202-018	3252 BERMUDA ST	110	19,960	2,775,310
10	24- 25-27-202-019	3242 BERMUDA ST	110	10,250	
11	24- 25-27-202-020	3232 BERMUDA ST	110	8,530	
12	24- 25-27-202-021	3224 BERMUDA ST	110	10,250	
13	24- 25-27-202-022	3216 BERMUDA ST	110	17,870	
14	24- 25-27-202-023	3206 BERMUDA ST	110	8,530	
15	24- 25-27-202-024	3164 BERMUDA ST	110	8,530	
16	24- 25-27-202-053	BERMUDA	110	32,880	
17	24- 25-27-202-052	BERMUDA	110	16,390	16,730
				361,440	**3,604,850**

City of Pleasant Ridge

	Parcel No.	Address	LSD	2017 TV	Post-Development TV Estimate
1	60- 25-27-127-009	404 E TEN MILE RD	110	805,600	1,124,880
2	60- 25-27-127-010	660 E TEN MILE RD	110	227,020	1,059,230
3	60- 25-27-127-012	400 E TEN MILE RD	110	79,450	247,700
4	60- 25-27-127-013	No Address	110	11,350	11,590
				1,123,420	**2,443,400**

*Estimations provided are based on the Site Plan included in Appendix C

LAW OFFICES
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PROFESSIONAL LIMITED LIABILITY COMPANY

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OF COUNSEL:
KEVIN M. CHUDLER
SARAH J. GABIS
LINDA S. MAYER

May 25, 2017

VIA ELECTRONIC MAIL

Mr. James Breuckman, City Manager
City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

Re: City Code Ordinance Amendment
DAS/Small Cell/Wireless Facilities in Public Rights-of-Way

Dear Jim:

As requested, enclosed is a proposed ordinance to the City Code, dealing with DAS/Small Cell/Wireless Facilities in the public rights-of-way.

As we discussed, there is currently nothing in the City Code that deals with requests such as just received from Mobilitie to construct a new tower within the right-of-way. Section 62-21 speaks to utility poles, but many of these wireless providers are not considered "utilities" and this section is thus not applicable.

The Metro Act currently allows certain wireless providers to certain rights within the public right-of-way; however, the Metro Act is specifically inapplicable to construction of new towers or poles.

Note that the ordinance reserves complete discretion to the City Commission as to whether or not to grant a permit in any particular case. Nothing under current law requires us to do so. However, I suggest this ordinance so that the permit requirement is absolutely clear to the wireless providers.

Additionally, the law in this area is constantly evolving. Mobilitie has filed a petition with the Federal Communications Commission that, if approved, might grant them additional rights within the public right-of-way. However, this proposed Code amendment is proper under current law.

Please call if you need anything else.

Very truly yours,

ADKISON, NEED, ALLEN, & RENTROP, PLLC

Gregory K. Need.

/mms
Enc.

City of Pleasant Ridge
Ordinance No. 425

AN ORDINANCE TO AMEND THE CITY OF PLEASANT RIDGE CODE OF ORDINANCES, CHAPTER 62 – STREETS, SIDEWALKS AND OTHER PUBLIC PLACES.

THE CITY OF PLEASANT RIDGE ORDAINS:

Section 1.

A new Chapter 62, Article II, Sec. 62-29 is added to read as follows:

Sec. 62-29. - DAS/Small Cell/Wireless facilities in the public rights-of-way.

(a) Definitions. For purposes of this section, the following terms and phrases shall be defined as follows:

Collocation means the location of DAS/Small Cell/Wireless Facilities on an existing structure, tower, or building, with the view toward reducing the overall number of structures required to support wireless communication facilities within the City.

DAS/Small Cell/Wireless Network shall mean any distributed antennae system or small cell telecommunication or data wireless network.

DAS/Small Cell/Wireless Facilities or DAS/Small Cell/Wireless Network Facilities means structures of any nature installed and/or operated for the provision of DAS/Small Cell/Wireless Network services, including without limitation, antennas, supporting structures for antennas, poles, equipment shelters or houses, and any ancillary equipment.

Wireless communication facilities means and includes all structures and accessory facilities relating to the use of the radio frequency spectrum for the purpose of transmitting or receiving radio signals.

(b) License Agreement. No person shall install or operate, in whole or in part, DAS/Small Cell/Wireless Facilities or DAS/Small Cell/Wireless Network Facilities in a City public right-of-way or other public place without first applying for and receiving a DAS/Small Cell/Wireless license from the City Commission in a form and subject to such terms and conditions as is acceptable to the City Commission. Nothing herein shall be interpreted to require the City Commission to issue such a license and the City Commission reserves to itself discretion to grant, deny or modify a request for such a license as it determines to be in the best interest of the City and its citizens.

Public notice shall be provided per the procedures in Section 82-46 of the Pleasant Ridge City Code prior to any City Commission meeting at which it will consider an application for a DAS/Small Cell/Wireless license.

(c) METRO Act Permit. No person shall install or operate "telecommunications facilities," as defined in the Metropolitan Extension Telecommunications Rights-Of-Way Oversight Act, Act No. 48 of the Public Acts of 2002, as amended (the "Act") without first obtaining a permit under the Act from the City, including any part of a DAS/Small Cell/Wireless system constituting telecommunication facilities.

(d) Collocation Requirement. Prior to submitting an application for a permit under this section, the applicant shall investigate collocation on existing facilities as an option. The applicant shall explain in its permit application why collocation is commercially or otherwise impracticable. Providing for collocation of future wireless communication facilities shall be a condition of approval of any permit granted for a new supporting structure in the public right-of-way; provided, however, that the co-location requirement may be waived if the pole or support structure is disguised or stealthed so as to blend with the immediate environment (e.g., streetlights, power poles, etc.).

(e) Design Parameters. Where permitted by the City, the following minimal design parameters shall apply to co-located or new DAS/Small Cells/Wireless Network Facilities in City public rights-of-way:

(1) The required map(s) for proposed DAS/Small Cell/Wireless Facilities shall be legible, to scale, labeled with streets, and contain sufficient detail to clearly identify the proposed DAS/Small Cell/Wireless Network Facilities' locations and surroundings. Where applicable, the required map or list shall include and identify any requested pole height(s).

(2) The maximum height of a pole or other supporting structure installed to accommodate a DAS/Small Cell/Wireless Network shall be 35 feet.

(3) Unless otherwise permitted in Section (e) (6), DAS/Small Cell/Wireless Facilities shall be located no closer than 18 inches from an existing sidewalk/face of curb or 18 inches from a proposed future sidewalk/face of curb location.

(4) Unless otherwise permitted in Section (e) (6), DAS/Small Cell/Wireless Facilities shall be located no closer than 10 feet from any driveway.

(5) In residential areas, DAS/Small Cell/Wireless Facilities shall be located in line with a side lot line whenever possible and not in front of a house.

(6) The licensee shall field-stake all proposed locations for DAS/Small Cell/Wireless Facilities which shall be subject to the approval of the City, Oakland County Road Commission and/or the Michigan Department of Transportation as applicable. All approved DAS/Small Cell/Wireless Facilities' locations shall be on a per pole/equipment/other basis. Such approvals shall be memorialized by the City and licensee.

(7) Once precise locations have been approved in accordance with Section (e)(6), the licensee shall provide latitude and longitude coordinates for the DAS/Small Cell/Wireless Facilities' locations to the City Manager.

(8) The licensee shall be responsible to obtain such other permits and approvals as required by law.

(9) Architectural design:

a. Unless otherwise required by another applicable code or regulation, poles and/or antennas shall be painted a neutral color so as to reduce visual obtrusiveness.
b. At all pole sites related equipment shall use materials, colors, textures, screening, and landscaping that will blend the facilities to the natural setting and environment.
c. All poles shall be of monopole design and construction unless the City approves an alternate design. Disguising or stealthing poles is encouraged.

(f) Modifications. The City Commission may modify the design parameters of subsection (e), in its sole discretion based on its review of factors affecting the public health, safety and welfare.

(g) Compliance with Applicable Law. The City, in reviewing and authorizing a permit under the Act and/or a license referred to in this section, and the licensee, in the establishment and operation of any DAS/Small Cell/Wireless Network Facilities, shall comply with all applicable federal and state laws.

(h) Fees. Fees for the agreement and permits required shall be as provided for in the Act or those documents and as periodically authorized by resolution of the City Commission.

Section 2. Severability.

Should any provision or part of this Article be declared by any court of competent jurisdiction to be invalid or unenforceable, the same shall not affect the validity or enforceability of the balance of this Article, which shall remain in full force and effect.

Section 3. Repealer.

All other ordinances or parts of ordinances in conflict with this ordinance are hereby repealed only to the extent necessary to give this Ordinance full force and effect.

Section 4. Savings clause.

Nothing in this Article shall be construed to affect any suit or proceeding pending in any court or any rights acquired or any liability incurred, or any cause or causes of action acquired or

existing, under any act or ordinance hereby repealed as cited in Section 3 of this Ordinance; nor shall any just or legal right or remedy of any character be lost, impaired, or affected by this Ordinance.

Section 4. Effective Date.

This Ordinance shall become effective fifteen days after enactment and upon publication as provided by law.

Section 5. Adoption.

This Ordinance is hereby declared to have been adopted by the City Commission of the City of Pleasant Ridge at a meeting duly called and held on the ____ day of _____, 2017, and ordered to be given publication in the manner prescribed by law.

_____
James Breuckman, City Manager

_____
Amy M. Drealan, City Clerk

m:\pleasant ridge\ordinances\wireless facilities\2017-08-01 amendment.docx

Federal Communications Commission

RF Safety FAQ

Frequently asked questions about the safety of radiofrequency (RF) and microwave emissions from transmitters and facilities regulated by the FCC

For further information contact the FCC's RF Safety Program at rfsafety@fcc.gov (mailto:rfsafety@fcc.gov) or 1-888-225-5322

Index (click on topic below)

WHAT ARE "RADIOFREQUENCY" AND MICROWAVE RADIATION?

Electromagnetic radiation consists of waves of electric and magnetic energy moving together (*i.e.*, radiating) through space at the speed of light. Taken together, all forms of electromagnetic energy are referred to as the electromagnetic "spectrum." Radio waves and microwaves emitted by transmitting antennas are one form of electromagnetic energy. They are collectively referred to as "radiofrequency" or "RF" energy or radiation. Note that the term “radiation” does not mean “radioactive.” Often, the terms "electromagnetic field" or "radiofrequency field" are used to indicate the presence of electromagnetic or RF energy.

The RF waves emanating from an antenna are generated by the movement of electrical charges in the antenna. Electromagnetic waves can be characterized by a wavelength and a frequency. The wavelength is the distance covered by one complete cycle of the electromagnetic wave, while the frequency is the number of electromagnetic waves passing a given point in one second. The frequency of an RF signal is usually expressed in terms of a unit called the "hertz" (abbreviated "Hz"). One Hz equals one cycle per second. One megahertz MHz equals one million cycles per second.

Different forms of electromagnetic energy are categorized by their wavelengths and frequencies. The RF part of the electromagnetic spectrum is generally defined as that part of the spectrum where electromagnetic waves have frequencies in the range of about 3 kilohertz (3 kHz) to 300 gigahertz (300 GHz). Microwaves are a specific category of radio waves that can be loosely defined as radiofrequency energy at frequencies ranging from about 1 GHz to 30 GHz. (Back to Index)

WHAT IS NON-IONIZING RADIATION?

"Ionization" is a process by which electrons are stripped from atoms and molecules. This process can produce molecular changes that can lead to damage in biological tissue, including effects on DNA, the genetic material of living organisms. This process requires interaction with high levels of electromagnetic energy. Those types of electromagnetic radiation with enough energy to ionize biological material include X-radiation and gamma radiation. Therefore, X-rays and gamma rays are examples of ionizing radiation.

The energy levels associated with RF and microwave radiation, on the other hand, are not great enough to cause the ionization of atoms and molecules, and RF energy is, therefore, is a type of non-ionizing radiation. Other types of non-ionizing radiation include visible and infrared light. Often the term "radiation" is used, colloquially, to imply that ionizing radiation (radioactivity), such as that associated with nuclear power plants, is present. Ionizing radiation should not be confused with the lower-energy, non-ionizing radiation with respect to possible biological effects, since the mechanisms of action are quite different. (Back to Index)

HOW IS RADIOFREQUENCY ENERGY USED?

The most important use for RF energy is in providing telecommunications services. Radio and television broadcasting, cellular telephones, personal communications services (PCS), pagers, cordless telephones, business radio, radio communications for police and fire departments, amateur radio, microwave point-to-point links and satellite communications are just a few of the many telecommunications applications of RF energy. Microwave ovens are an example of a non-telecommunication use of RF energy. Radiofrequency radiation, especially at microwave frequencies, can transfer energy to water molecules. High levels of microwave energy will generate heat in water-rich materials such as most foods. This efficient absorption of microwave energy via water molecules results in rapid heating throughout an object, thus allowing food to be cooked more quickly in a microwave oven than in a conventional oven. Other important non-telecommunication uses of RF energy include radar and industrial heating and sealing. Radar is a valuable tool used in many applications range from traffic speed enforcement to air traffic control and military surveillance. Industrial heaters and sealers generate intense levels of RF radiation that rapidly heats the material being processed in the same way that a microwave oven cooks food. These devices have many uses in industry, including molding plastic materials, gluing wood products, sealing items such as shoes and pocketbooks, and processing food products. There are also a number of medical applications of RF energy, such as diathermy and magnetic resonance imaging (MRI). (Back to Index)

HOW IS RADIOFREQUENCY RADIATION MEASURED?

An RF electromagnetic wave has both an electric and a magnetic component (electric field and magnetic field), and it is often convenient to express the intensity of the RF environment at a given location in terms of units specific to each component. For example, the unit "volts per meter" (V/m) is used to express the strength of the electric field (electric "field strength"), and the unit "amperes per meter" (A/m) is used to express the strength of the magnetic field (magnetic "field strength"). Another commonly used unit for characterizing the total electromagnetic field is "power density." Power density is most appropriately used when the point of measurement is far enough away from an antenna to be located in the "far-field" zone of the antenna.

Power density is defined as power flow per unit area. For example, power density is commonly expressed in terms of watts per square meter (W/m^2), milliwatts per square centimeter (mW/cm^2), or microwatts per square centimeter ($\mu W/cm^2$). One mW/cm^2 equals 10 W/m^2, and 100 $\mu W/cm^2$ equal one W/m^2. With respect to frequencies in the microwave range, power density is usually used to express intensity of exposure.

The quantity used to measure the rate at which RF energy is actually absorbed in a body is called the "Specific Absorption Rate" or "SAR." It is usually expressed in units of watts per kilogram (W/kg) or milliwatts per gram (mW/g). In the case of exposure of the whole body, a standing ungrounded human adult absorbs RF energy at a maximum rate when the frequency of the RF radiation is in the range of about 70 MHz. This means that the "whole-body" SAR is at a maximum under these conditions. Because of this "resonance" phenomenon and consideration of children and grounded adults, RF safety standards are generally most restrictive in the frequency range of about 30 to 300 MHz. For exposure of parts of the body, such as the exposure from hand-held mobile phones, "partial-body" SAR limits are used in the safety standards to control absorption of RF energy (see later questions on mobile phones). (Back to Index)

WHAT BIOLOGICAL EFFECTS CAN BE CAUSED BY RF ENERGY?

Biological effects can result from exposure to RF energy. Biological effects that result from heating of tissue by RF energy are often referred to as "thermal" effects. It has been known for many years that exposure to very high levels of RF radiation can be harmful due to the ability of RF energy to heat biological tissue rapidly. This is the principle by which microwave ovens cook food. Exposure to very high RF intensities can result in heating of biological tissue and an increase in body temperature. Tissue damage in humans could occur during exposure to high RF levels because of the body's inability to cope with or dissipate the excessive heat that could be generated. Two areas of the body, the eyes and the testes, are particularly vulnerable to RF heating because of the relative lack of available blood flow to dissipate the excess heat load.

At relatively low levels of exposure to RF radiation, *i.e.*, levels lower than those that would produce significant heating, the evidence for production of harmful biological effects is ambiguous and unproven. Such effects, if they exist, have been referred to as "non-thermal" effects. A number of reports have appeared in the scientific literature describing the observation of a range of biological effects resulting from exposure to low levels of RF energy. However, in most cases, further experimental research has been unable to reproduce these effects. Furthermore, since much of the research is not done on whole bodies (*in vivo*), there has been no determination that such effects constitute a human health hazard. It is generally agreed that further research is needed to determine the generality of such effects and their possible relevance, if any, to human health. In the meantime, standards-setting organizations and government agencies continue to monitor the latest experimental findings to confirm their validity and determine whether changes in safety limits are needed to protect human health. (Back to Index)

CAN PEOPLE BE EXPOSED TO LEVELS OF RADIOFREQUENCY RADIATION THAT COULD BE HARMFUL?

Studies have shown that environmental levels of RF energy routinely encountered by the general public are typically far below levels necessary to produce significant heating and increased body temperature. However, there may be situations, particularly in workplace environments near high-powered RF sources, where the recommended limits for safe exposure of human beings to RF energy could be exceeded. In such cases, restrictive measures or mitigation actions may be necessary to ensure the safe use of RF energy. (Back to Index)

CAN RADIOFREQUENCY RADIATION CAUSE CANCER?

Some studies have also examined the possibility of a link between RF exposure and cancer. Results to date have been inconclusive. While some experimental data have suggested a possible link between exposure and tumor formation in animals exposed under certain specific conditions, the results have not been independently replicated. Many other studies have failed to find evidence for a link to cancer or any related condition. The Food and Drug Administration has further information on this topic with respect to RF exposure from mobile phones at the following Web site: FDA Radiation-Emitting Products Page (http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/ucm116335.htm) . (Back to Index)

WHAT RESEARCH IS BEING DONE ON RF BIOLOGICAL EFFECTS?

For many years, research into the possible biological effects of RF energy has been carried out in laboratories around the world, and such research is continuing. Past research has resulted in a large number of peer-reviewed scientific publications on this topic. For many years the U.S. Government has sponsored research into the biological effects of RF energy. The majority of this work was initiated by the Department of Defense, due in part, to the extensive military interest in using RF equipment such as radar and other relatively high-powered radio transmitters for routine military operations. In addition, some U.S. civilian federal agencies responsible for health and safety, such as the Environmental Protection Agency (EPA) and the U.S. Food and Drug Administration (FDA), have sponsored and conducted research in this area. At the present time, other U.S. civilian federal health and safety agencies and institutions, such as the National Toxicology Program and the National Institutes of Health, have also initiated RF bioeffects research.

In 1996, the World Health Organization (WHO) established a program called the International EMF Project, which is designed to review the scientific literature concerning biological effects of electromagnetic fields, identify gaps in knowledge about such effects, recommend research needs, and work towards international resolution of health concerns over the use of RF technology. The WHO maintains a Web site that provides extensive information on this project and about RF biological effects and research (www.who.int/peh-emf/en/ (http://www.who.int/peh-emf/en/)).

The FDA, the EPA and other federal agencies responsible for public health and safety have worked together and in connection with the WHO to monitor developments and identify research needs related to RF biological effects. More information about this can be obtained at the FDA Web site: FDA Radiation-Emitting Products - Current Research (http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/ucm116335.htm). (Back to Index)

WHAT LEVELS ARE SAFE FOR EXPOSURE TO RF ENERGY?

Exposure standards for radiofrequency energy have been developed by various organizations and governments. Most modern standards recommend safe levels of exposure separately for the general public and for workers. In the United States, the FCC has adopted and used recognized safety guidelines for evaluating RF environmental exposure since 1985. Federal health and safety agencies, such as the EPA, FDA, the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) have also been involved in monitoring and investigating issues related to RF exposure.

The FCC guidelines for human exposure to RF electromagnetic fields were derived from the recommendations of two expert organizations, the National Council on Radiation Protection and Measurements (NCRP) and the Institute of Electrical and Electronics Engineers (IEEE). Both the NCRP exposure criteria and the IEEE standard were developed by expert scientists and engineers after extensive reviews of the scientific literature related to RF biological effects. The exposure guidelines are based on thresholds for known adverse effects, and they incorporate prudent margins of safety. In adopting the current RF exposure guidelines, the FCC consulted with the EPA, FDA, OSHA and NIOSH, and obtained their support for the guidelines that the FCC is using.

Many countries in Europe and elsewhere use exposure guidelines developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The ICNIRP safety limits are generally similar to those of the NCRP and IEEE, with a few exceptions. For example, ICNIRP recommends somewhat different exposure levels in the lower and upper frequency ranges and for localized exposure due to such devices as hand-held cellular telephones. One of the goals of the WHO EMF Project (see above) is to provide a framework for international harmonization of RF safety standards. The NCRP, IEEE and ICNIRP exposure guidelines identify the same threshold level at which harmful biological effects may occur, and the values for Maximum Permissible Exposure (MPE) recommended for electric and magnetic field strength and power density in both documents are based on this level. The threshold level is a Specific Absorption Rate (SAR) value for the whole body of 4 watts per kilogram (4 W/kg).

In addition, the NCRP, IEEE and ICNIRP guidelines for maximum permissible exposure are different for different transmitting frequencies. This is due to the finding (discussed above) that whole-body human absorption of RF energy varies with the frequency of the RF signal. The most restrictive limits on whole-body exposure are in the frequency range of 30-300 MHz where the human body absorbs RF energy most efficiently when the whole body is exposed. For devices that expose only part of the body, such as mobile phones, different exposure limits are specified (see below), but these limits are based on the same underlying threshold level.

The exposure limits used by the FCC are expressed in terms of SAR, electric and magnetic field strength and power density for transmitters operating at frequencies from 100 kHz to 100 GHz. The applicable limits depend upon the type of sources (e.g, whether a cellphone or a broadcast transmitting antenna). The actual values can be found in our informational bulletin available in OET Bulletin 65 (http://www.fcc.gov/encyclopedia/oet-bulletins-line#65). (Back to Index)

WHY HAS THE FCC ADOPTED GUIDELINES FOR RF EXPOSURE?

The FCC authorizes and licenses devices, transmitters and facilities that generate RF radiation. It has jurisdiction over all transmitting services in the U.S. except those specifically operated by the Federal Government. However, the FCC's primary jurisdiction does not lie in the health and safety area, and it must rely on other agencies and organizations for guidance in these matters.

Under the National Environmental Policy Act of 1969 (NEPA), all Federal agencies are required to implement procedures to make environmental consideration a necessary part of an agency's decision-making process. Therefore, FCC approval and licensing of transmitters and facilities must be evaluated for significant impact on the environment. Human exposure to RF radiation emitted by FCC-regulated transmitters is one of several factors that must be considered in such environmental evaluations. In 1996, the FCC revised its guidelines for RF exposure as a result of a multi-year proceeding and as required by the Telecommunications Act of 1996.

Facilities under the jurisdiction of the FCC having a high potential for creating significant RF exposure to humans, such as radio and television broadcast stations, satellite-earth stations, experimental radio stations and certain cellular, PCS and paging facilities are required to undergo routine evaluation for compliance with RF exposure guidelines whenever an application is submitted to the FCC for construction or modification of a transmitting facility or renewal of a license. Failure to show compliance with the FCC's RF exposure guidelines in the application process could lead to the preparation of a formal Environmental Assessment, possible Environmental Impact Statement and eventual rejection of an application. Technical guidelines for evaluating compliance with the FCC RF safety requirements can be found in the FCC's OET Bulletin 65 (http://www.fcc.gov/encyclopedia/oet-bulletins-line#65) (see "OET Safety Bulletins" listing elsewhere at this Web site).

Low-powered, intermittent, or inaccessible RF antennas and facilities (including many cell sites) are normally "categorically excluded" from the requirement of routine evaluation for RF exposure. These exclusions are based on calculations and measurement data indicating that such transmitting stations or devices are unlikely to cause exposures in excess of the guidelines under normal conditions of use. The FCC's policies on RF exposure and categorical exclusion can be found in Section 1.1307(b) of the FCC's Rules and Regulations [47 CFR 1.1307(b)]. It should be emphasized, however, that these exclusions are not exclusions from compliance, but, rather, only exclusions from routine evaluation. Transmitters or facilities that are otherwise categorically excluded from evaluation may be required, on a case-by-case basis, to demonstrate compliance when evidence of potential non-compliance of the transmitter or facility is brought to the Commission's attention [see 47 CFR 1.1307(c) and (d)]. (Back to Index)

HOW SAFE ARE MOBILE AND PORTABLE PHONES?

In recent years, publicity, speculation, and concern over claims of possible health effects due to RF emissions from hand-held wireless telephones prompted various research programs to investigate whether there is any risk to users of these devices There is no scientific evidence to date that proves that wireless phone usage can lead to cancer or a variety of other health effects, including headaches, dizziness or memory loss. However, studies are ongoing and key government agencies, such as the Food and Drug Administration (FDA) continue to monitor the results of the latest scientific research on these topics. Also, as noted above, the World Health Organization has established an ongoing program to monitor research in this area and make recommendations related to the safety of mobile phones.

The FDA, which has primary jurisdiction for investigating mobile phone safety, has stated that it cannot rule out the possibility of risk, but if such a risk exists, "it is probably small." Further, it has stated that, while there is no proof that cellular telephones can be harmful, concerned individuals can take various precautionary actions, including limiting conversations on hand-held cellular telephones and making greater use of telephones with hands-free kits where there is a greater separation distance between the user and the radiating antenna. The Web site for the FDA's Center for Devices and Radiological Health provides further information on mobile phone safety: FDA Radiation-Emitting Products - Cell Phones (http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/default.htm).

The Government Accountability Office (http://www.gao.gov) (GAO) prepared a report (http://www.gao.gov/products/GAO-12-771) of its investigation into safety concerns related to mobile phones. The report concluded that further research is needed to confirm whether mobile phones are completely safe for the user, and the report recommended that the FDA take the lead in monitoring the latest research results.

The FCC's exposure guidelines specify limits for human exposure to RF emissions from hand-held mobile phones in terms of Specific Absorption Rate (SAR), a measure of the rate of absorption of RF energy by the body. The safe limit for a mobile phone user is an SAR of 1.6 watts per kg (1.6 W/kg), averaged over one gram of tissue, and compliance with this limit must be demonstrated before FCC approval is granted for marketing of a phone in the United States. Somewhat less restrictive limits, *e.g.*, 2 W/kg averaged over 10 grams of tissue, are specified by the ICNIRP guidelines used in Europe and most other countries.

Measurements and analysis of SAR in models of the human head have shown that the 1.6 W/kg limit is unlikely to be exceeded under normal conditions of use of cellular and PCS hand-held phones. The same can be said for cordless telephones used in the home. Testing of hand-held phones is normally done under conditions of maximum power usage, thus providing an additional margin of safety, since most phone usage is not at maximum power. Information on SAR levels for many phones is available electronically through the FCC's Web site and database (see next question). (Back to Index)

HOW CAN I OBTAIN THE SPECIFIC ABSORPTION RATE (SAR) VALUE FOR MY MOBILE PHONE?

As explained above, the Specific Absorption Rate, or SAR, is the unit used to determine compliance of cellular and PCS phones with safety limits adopted by the FCC. The SAR is a value that corresponds to the rate at which RF energy absorbed in the head of a user of a wireless handset. The FCC requires mobile phone manufacturers to demonstrate compliance with an SAR level of 1.6 watts per kilogram (averaged over one gram of tissue).

Information on SAR for a specific cell phone model can be obtained for almost all cellular telephones by using the FCC identification (ID) number for that model. The FCC ID number is usually printed somewhere on the case of the phone or device. In many cases, you will have to remove the battery pack to find the number. Once you have the number proceed as follows. Go to the following website: Equipment Authorization (http://www.fcc.gov/engineering-technology/laboratory-division/general/equipment-authorization). Click on the link for "FCC ID Search (https://www.fcc.gov/fccid)". Once you are there you will see instructions for inserting the FCC ID number. Enter the FCC ID number (in two parts as indicated: "Grantee Code" is comprised of the first three characters, the "Equipment Product Code" is the remainder of the FCC ID). Then click on "Start Search." Grant(s) of Equipment Authorization for this particular FCC ID number should then be available. Click on a check under "Display Grant" and the grant should appear. Look through the Grant for the section on SAR compliance, certification of compliance with FCC rules for RF exposure, or similar language. This section should contain the value(s) for typical or maximum SAR for your phone.

For portable phones and devices authorized since June 2, 2000, maximum SAR levels should be noted on the grant of equipment authorization. For phones and devices authorized between about mid-1998 and June 2000, detailed information on SAR levels is typically found in one of the "exhibits" associated with the grant. Therefore, once the grant is accessed in the FCC database, the exhibits can be viewed by clicking on the appropriate entry labeled "View Exhibit." Electronic records for FCC equipment authorization grants were initiated in 1998, so devices manufactured prior to this date may not be included in our electronic database.

Although the FCC database does not list phones by model number, there are certain non-government Web sites such as www.cnet.com (http://www.cnet.com/), that provide information on SAR from specific models of mobile phones. However, the FCC has not reviewed these sites for accuracy and makes no guarantees with respect to them. In addition to these sites, some mobile phone manufacturers make this information available at their own Web sites. Also, phones certified by the Cellular Telecommunications and Internet Association (CTIA) are now required to provide this information to consumers in the instructional materials that come with the phones.

If you want additional consumer information on safety of cell phones and other transmitting devices please consult the information available below. In particular, you may wish to read or download our further consumer information: Cell Phones: Wireless Devices and Health Concerns (/consumers/guides/wireless-devices-and-health-concerns), Specific Absorption Rate (SAR) For Cell Phones: (/consumers/guides/specific-absorption-rate-sar-cell-phones-what-it-means-you) What It Means For You, or General Wireless Device FAQ's (/general/telephone-guides). If you have any problems or additional questions you may contact us at: rfsafety@fcc.gov (mailto:rfsafety@fcc.gov) or you may call: 1-888-225-5322 (1-888-CALL-FCC). You may also wish to consult a consumer update on mobile phone safety published by the U.S. Food and Drug Administration (FDA) that can be found at: FDA Radiation-Emitting Products Page (http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/default.htm). (Back to Index)

DO "HANDS-FREE" EAR PIECES FOR MOBILE PHONES REDUCE EXPOSURE TO RF EMISSIONS? WHAT ABOUT MOBILE PHONE ACCESSORIES THAT CLAIM TO SHIELD THE HEAD FROM RF RADIATION?

"Hands-free" kits with ear pieces can be used with cell phones for convenience and comfort. In addition, because the phone, which is the source of the RF emissions, will not be placed against the head, absorption of RF energy in the head will be reduced. Therefore, it is true that use of an ear piece connected to a mobile phone will significantly reduce the rate of energy absorption (or "SAR") in the user's head. On the other hand, if the phone is mounted against the waist or other part of the body during use, then that part of the body will absorb RF energy. Even so, mobile phones marketed in the U.S. are required to meet safety limit requirements regardless of whether they are used against the head or against the body. So either configuration should result in compliance with the safety limit. Note that hands-free devices using Bluetooth technology also include a wireless transmitter; however, the Bluetooth transmitter operates at a much lower power than the cell phone.

A number of devices have been marketed that claim to "shield" or otherwise reduce RF absorption in the body of the user. Some of these devices incorporate shielded phone cases, while others involve nothing more than a metallic accessory attached to the phone. Studies have shown that these devices generally do not work as advertised. In fact, they may actually increase RF absorption in the head due to their potential to interfere with proper operation of the phone, thus forcing it to increase power to compensate. The Federal Trade Commission has published a Consumer Alert regarding these shields on its website at: FTC Consumer Information - Cell Phone Radiation Scam. (http://www.consumer.ftc.gov/articles/0109-cell-phone-radiation-scams) (Back to Index)

CAN MOBILE PHONES BE USED SAFELY IN HOSPITALS AND NEAR MEDICAL TELEMETRY EQUIPMENT?

The FCC does not normally investigate problems of electromagnetic interference from RF transmitters to medical devices. Some hospitals have policies, which limit the use of cell phones, due to concerns that sensitive medical equipment could be affected. The FDA's Center for Devices and Radiological Health (CDRH) has primary jurisdiction for medical device regulation. FDA staff has monitored this potential problem and more information is available from the CDRH Web site: http://www.fda.gov/Radiation-EmittingProducts (http://www.fda.gov/Radiation-EmittingProducts/). (Back to Index)

ARE WIRELESS CELLULAR AND PCS TOWERS AND ANTENNAS SAFE?

Cellular wireless radio services transmit using frequencies between 824 and 894 megahertz (MHz). Transmitters in the Personal Communications Service (PCS) use frequencies in the range of 1850-1990 MHz. More recently, advanced wireless services have been or are being introduced that transmit at frequencies in the 600, 700, 800, 1695-1780, 1915-1920, 1995-2020, 2110-2200 MHz spectrum ranges. Antennas used for cellular and PCS transmissions are typically located on towers, water tanks or other elevated structures including rooftops and the sides of buildings. The combination of antennas and associated electronic equipment is referred to as a cellular or PCS "base station" or "cell site." Typical heights for free-standing base station towers or structures are 50-200 feet. A cellular base station may utilize several "omni-directional" antennas that look like poles, 10 to 15 feet in length, although these types of antennas are less common in urbanized areas.

In urban and suburban areas, cellular and PCS service providers commonly use "sector" antennas for their base stations. These antennas are rectangular panels, *e.g.*, about 1 by 4 feet in size, typically mounted on a rooftop or other structure, but they are also mounted on towers or poles. Panel antennas are usually arranged in three groups of three each. It is common that not all antennas are used for the transmission of RF energy; some antennas may be receive-only.

At a given cell site, the total RF power that could be radiated by the antennas depends on the number of radio channels (transmitters) installed, the power of each transmitter, and the type of antenna. While it is theoretically possible for cell sites to radiate at very high power levels, the maximum power radiated in any direction usually does not exceed 500 watts.

The RF emissions from cellular or PCS base station antennas are generally directed toward the horizon in a relatively narrow pattern in the vertical plane. In the case of sector (panel) antennas, the pattern is fan-shaped, like a wedge cut from a pie. As with all forms of electromagnetic energy, the power density from the antenna decreases rapidly as one moves away from the antenna. Consequently, ground-level exposures are much less than exposures if one were at the same height and directly in front of the antenna.

Measurements made near typical cellular and PCS installations, especially those with tower-mounted antennas, have shown that ground-level power densities are hundreds to thousands of times less than the FCC's limits for safe exposure. This makes it extremely unlikely that a member of the general public could be exposed to RF levels in excess of FCC guidelines due solely to cellular or PCS base station antennas located on towers or monopoles.

When cellular and PCS antennas are mounted at rooftop locations it is possible that a person could encounter RF levels greater than those typically encountered on the ground. However, once again, exposures approaching or exceeding the safety guidelines are only likely to be encountered very close to and directly in front of the antennas. For sector-type antennas, RF levels to rear are usually very low. (Back to Index)

For further information on cellular services go to https://www.fcc.gov/general/cellular-service (/general/cellular-service).

ARE CELLULAR AND OTHER RADIO TOWERS LOCATED NEAR HOMES OR SCHOOLS SAFE FOR RESIDENTS AND STUDENTS?

As discussed above, radiofrequency emissions from antennas used for cellular and PCS transmissions result in exposure levels on the ground that are typically thousands of times below safety limits. These safety limits were adopted by the FCC based on the recommendations of expert organizations and endorsed by agencies of the Federal Government responsible for health and safety. Therefore, there is no reason to believe that such towers could constitute a potential health hazard to nearby residents or students.

Other antennas, such as those used for radio and television broadcast transmissions, use power levels that are generally much higher than those used for cellular and PCS antennas. Therefore, in some cases there could be a potential for higher levels of exposure to persons on the ground. However, all broadcast stations are required to demonstrate compliance with FCC safety guidelines, and ambient exposures to nearby persons from such stations are typically well below FCC safety limits. (Back to Index)

ARE EMISSIONS FROM RADIO AND TELEVISION BROADCAST ANTENNAS SAFE?

Radio and television broadcast stations transmit their signals via RF electromagnetic waves. There are thousands of radio and TV stations on the air in the United States. Broadcast stations transmit at various RF frequencies, depending on the channel, ranging from about 540 kHz for AM radio up to about 700 MHz for UHF television stations. Frequencies for FM radio and VHF television lie in between these two extremes. Broadcast transmitter power levels range from less then a watt to more than 100,000 watts. Some of these transmission systems can be a significant source of RF energy in the local environment, so the FCC requires that broadcast stations submit evidence of compliance with FCC RF guidelines.

The amount of RF energy to which the public or workers might be exposed as a result of broadcast antennas depends on several factors, including the type of station, design characteristics of the antenna being used, power transmitted to the antenna, height of the antenna and distance from the antenna. Note that the power normally quoted for FM and TV broadcast transmitters is the "effective radiated power" or ERP not the actual transmitter power mentioned above. ERP is the transmitter power delivered to the antenna multiplied by the directivity or gain of the antenna. Since high gain antennas direct most of the RF energy toward the horizon and not toward the ground, high ERP transmission systems such as used for UHF-TV broadcast tend to have less ground level field intensity near the station than FM radio broadcast systems with lower ERP and gain values. Also, since energy at some frequencies is absorbed by the human body more readily than at other frequencies, both the frequency of the transmitted signal and its intensity is important. Calculations can be performed to predict what field intensity levels would exist at various distances from an antenna.

Public access to broadcasting antennas is normally restricted so that individuals cannot be exposed to high-level fields that might exist near antennas. Measurements made by the FCC, EPA and others have shown that ambient RF radiation levels in inhabited areas near broadcasting facilities are typically well below the exposure levels recommended by current standards and guidelines. There have been a few situations around the country where RF levels in publicly accessible areas have been found to be higher than those recommended in applicable safety standards. As they have been identified, the FCC has required that stations at those facilities promptly bring their combined operations into compliance with our guidelines. Thus, despite the relatively high operating powers of many broadcast stations, such cases are unusual, and members of the general public are unlikely to be exposed to RF levels from broadcast towers that exceed FCC limits

Antenna maintenance workers are occasionally required to climb antenna structures for such purposes as painting, repairs, or lamp replacement. Both the EPA and OSHA have reported that in such cases it is possible for a worker to be exposed to high levels of RF energy if work is performed on an active tower or in areas immediately surrounding a radiating antenna. Therefore, precautions should be taken to ensure that maintenance personnel are not exposed to unsafe RF fields. (Back to Index)

HOW SAFE ARE RADIO ANTENNAS USED FOR PAGING AND "TWO-WAY" COMMUNICATIONS? WHAT ABOUT "PUSH-TO-TALK" RADIOS SUCH AS "WALKIE-TALKIES?"

Land-mobile communications include a variety of communications systems, which require the use of portable and mobile RF transmitting sources. These systems operate in several frequency bands between about 30 and 1000 MHz. Radio systems used by the police and fire departments, radio paging services and business radio are a few examples of these communications systems. They have the advantage of providing communications links between various fixed and mobile locations.

There are essentially three types of RF transmitters associated with land-mobile systems: base-station transmitters, vehicle-mounted transmitters, and hand-held transmitters. The antennas and power levels used for these various transmitters are adapted for their specific purpose. For example, a base-station antenna must radiate its signal to a relatively large area, and therefore, its transmitter generally has to use higher power levels than a vehicle-mounted or hand-held radio transmitter. Although base-station antennas usually operate with higher power levels than other types of land-mobile antennas, they are normally inaccessible to the public since they must be mounted at significant heights above ground to provide for adequate signal coverage. Also, many of these antennas transmit only intermittently. For these reasons, base-station antennas are generally not of concern with regard to possible hazardous exposure of the public to RF radiation. Studies at rooftop locations have indicated that high-powered paging antennas may increase the potential for exposure to workers or others with access to such sites, *e.g.*, maintenance personnel. This could be a concern especially when multiple transmitters are present. In such cases, restriction of access or other mitigation actions may be necessary.

Transmitting power levels for vehicle-mounted land-mobile antennas are generally less than those used by base-station antennas but higher than those used for hand-held units. Some manufacturers recommend that users and other nearby individuals maintain some minimum distance (*e.g.*, 1 to 2 feet) from a vehicle-mounted antenna during transmission or mount the antenna in such a way as to provide maximum shielding for vehicle occupants. Studies have shown that this is probably a conservative precaution, particularly when the percentage of time an antenna is actually radiating is considered. Unlike cellular telephones, which transmit continuously during a call, two-way radios normally transmit only when the "push-to-talk" button is depressed. This significantly reduces exposure, and there is no evidence that there would be a safety hazard associated with exposure from vehicle-mounted, two-way antennas when the manufacturer's recommendations are followed.

Hand-held "two-way" portable radios such as walkie-talkies are low-powered devices used to transmit and receive messages over relatively short distances. Because of the low power levels used, the intermittency of these transmissions ("push-to-talk"), and due to the fact that these radios are held away from the head, they

should not expose users to RF energy in excess of safe limits. Although FCC rules do not require routine documentation of compliance with safety limits for push-to-talk two-way radios as it does for cellular and PCS phones (which transmit continuously during use and which are held against the head), most of these radios are tested and the resulting SAR data are available from the FCC's Equipment Authorization (http://www.fcc.gov/oet/ea/) database. Click on the link for FCC ID Search (https://www.fcc.gov/fccid). (Back to Index)

HOW SAFE ARE MICROWAVE AND SATELLITE ANTENNAS?

Point-to-point microwave antennas transmit and receive microwave signals across relatively short distances (from a few tenths of a mile to 30 miles or more). These antennas are usually circular dish or rectangular in shape and are normally mounted on a supporting tower, rooftop, sides of buildings or on similar structures that provide clear and unobstructed line-of-sight paths between both ends of a transmission path. These antennas have a variety of uses, such as relaying long-distance telephone calls, and serving as links between broadcast studios and transmitting sites.

The RF signals from these antennas travel in a directed beam from a transmitting antenna to the receiving antenna, and dispersion of microwave energy outside of this narrow beam is minimal or insignificant. In addition, these antennas transmit using very low power levels, usually on the order of a few watts or less. Measurements have shown that ground-level power densities due to microwave directional antennas are normally thousands of times or more below recommended safety limits. Moreover, microwave tower sites are normally inaccessible to the general public. Significant exposures from these antennas could only occur in the unlikely event that an individual were to stand directly in front of and very close to an antenna for a period of time.

Ground-based antennas used for satellite-earth communications typically are parabolic dish antennas, some as large as 10 to 30 meters in diameter, that are used to transmit uplink or receive downlink microwave signals to or from satellites in orbit around the earth. These signals allow delivery of a variety of communications services, including television network programming, electronic news gathering and point-of-sale credit card transactions. Some satellite-earth station antennas are used only to receive RF signals (*i.e.*, like the satellite television antenna used at a residence), and because they do not transmit, RF exposure is not an issue for those antennas.

Since satellite-earth station antennas are directed toward satellites above the earth, transmitted beams point skyward at various angles of inclination, depending on the particular satellite being used. Because of the longer distances involved, power levels used to transmit these signals are relatively large when compared, for example, to those used by the terrestrial microwave point-to-point antennas discussed above. However, as with microwave antennas, the beams used for transmitting earth-to-satellite signals are concentrated and highly directional, similar to the beam from a flashlight. In addition, public access would normally be restricted at uplink sites where exposure levels could approach or exceed safe limits.

Although many satellite-earth stations are fixed sites, portable uplink antennas are also used, *e.g.*, for electronic news gathering. These antennas can be deployed in various locations. Therefore, precautions may be necessary, such as temporarily restricting access in the vicinity of the antenna, to avoid exposure to the main transmitted beam. In general, however, it is unlikely that a transmitting earth station antenna would routinely expose members of the public to potentially harmful levels of RF energy. (Back to Index)

ARE RF EMISSIONS FROM AMATEUR RADIO STATIONS HARMFUL?

There are hundreds of thousands of amateur radio operators ("hams") worldwide. Amateur radio operators in the United States are licensed by the FCC. The Amateur Radio Service provides its members with the opportunity to communicate with persons all over the world and to provide valuable public service functions, such as making communications services available during disasters and emergencies. Like all FCC licensees, amateur radio operators are required to comply with the FCC's guidelines for safe human exposure to RF fields. Under the FCC's rules, amateur operators can transmit with power levels of up to 1500 watts. However, most operators use considerably less power than this maximum. Studies by the FCC and others have shown that most amateur radio transmitters would not normally expose persons to RF levels in excess of safety limits. This is primarily due to the relatively low operating powers used by most amateurs, the intermittent transmission characteristics typically used and the relative inaccessibility of most amateur antennas. As long as appropriate distances are maintained from amateur antennas, exposure of nearby persons should be well below safety limits.

To help ensure compliance of amateur radio facilities with RF exposure guidelines, both the FCC and American Radio Relay League (ARRL) have issued publications to assist operators in evaluating compliance for their stations. The FCC's publication (Supplement B to OET Bulletin 65 (http://www.fcc.gov/encyclopedia/oet-bulletins-line#65)) can be viewed and downloaded elsewhere at this Web site (see "OET RF Safety Bulletins"). (Back to Index)

WHAT IS THE FCC'S POLICY ON RADIOFREQUENCY WARNING SIGNS? FOR EXAMPLE, WHEN SHOULD SIGNS BE POSTED, WHERE SHOULD THEY BE LOCATED AND WHAT SHOULD THEY SAY?

Radiofrequency warning or alerting signs should be used to provide information on the presence of RF radiation or to control exposure to RF radiation within a given area. Standard radiofrequency hazard warning signs are commercially available from several vendors. Appropriate signs should incorporate the format recommended by the Institute for Electrical and Electronics Engineers (IEEE) and as specified in the IEEE standard: IEEE Std C95.2-1999 (Web address: http://www.ieee.org (http://www.ieee.org)). Guidance concerning the placement of signs can be found in the IEEE Standard: IEEE Std C95.7-2005 (available for free through the IEEE Get Program). When signs are used, meaningful information should be placed on the sign advising affected persons of: (1) the nature of the potential hazard (i.e., high RF fields), (2) how to avoid the potential hazard, and (3) whom to contact for additional information. In some cases, it may be appropriate to also provide instructions to direct individuals as to how to work safely in the RF environment of concern. Signs should be located prominently in areas that will be readily seen by those persons who may have access to an area where high RF fields are present. (Back to Index)

CAN IMPLANTED ELECTRONIC CARDIAC PACEMAKERS BE AFFECTED BY NEARBY RF DEVICES SUCH AS MICROWAVE OVENS OR CELLULAR TELEPHONES?

Over the past several years there has been concern that signals from some RF devices could interfere with the operation of implanted electronic pacemakers and other medical devices. Because pacemakers are electronic devices, they could be susceptible to electromagnetic signals that could cause them to malfunction. Some anecdotal claims of such effects in the past involved emissions from microwave ovens. However, it has never been shown that the RF energy from a properly operating microwave oven is strong enough to cause such interference.

Some studies have shown that mobile phones can interfere with implanted cardiac pacemakers if a phone is used in close proximity (within about 8 inches) of a pacemaker. It appears that such interference is limited to older pacemakers, which may no longer be in use. Nonetheless, to avoid this potential problem, pacemaker patients can avoid placing a phone in a pocket close to the location of their pacemaker or otherwise place the phone near the pacemaker location during phone use. Patients with pacemakers should consult with their physician or the FDA if they believe that they may have a problem related to RF interference. Further information on this is available from the FDA: http://www.fda.gov/Radiation- EmittingProducts/ (http://www.fda.gov/Radiation-EmittingProducts). (Back to Index)

DOES THE FCC REGULATE EXPOSURE TO THE ELECTROMAGNETIC RADIATION FROM MICROWAVE OVENS, TELEVISION SETS AND COMPUTER MONITORS?

The Commission does not regulate exposure to emissions from these devices. Protecting the public from harmful radiation emissions from these consumer products is the responsibility of the U.S. Food and Drug Administration (FDA). Inquires should be directed to the FDA's Center for Devices and Radiological Health (CDRH), and, specifically, to the CDRH Office of Compliance at (301) 594-4654. (Back to Index)

DOES THE FCC ROUTINELY MONITOR RADIOFREQUENCY RADIATION FROM ANTENNAS?

The FCC does not have the resources or the personnel to routinely monitor the exposure levels due at all of the thousands of transmitters that are subject to FCC jurisdiction. However, while there are large variations in exposure levels in the environment of fixed transmitting antennas, it is exceedingly rare for exposure levels to approach FCC public exposure limits in accessible locations. In addition, the FCC does not routinely perform RF exposure investigations unless there is a reasonable expectation that the FCC exposure limits may be exceeded. (Back to Index)

DOES THE FCC MAINTAIN A DATABASE THAT INCLUDES INFORMATION ON THE LOCATION AND TECHNICAL PARAMETERS OF ALL OF THE TRANSMITTER SITES IT REGULATES?

The FCC does not have a comprehensive, transmitter-specific database for all of the services it regulates. However, the FCC does have information for some services such as radio and television broadcast stations, and many larger antenna towers are required to register with the Antenna Structure Registration (ASR) database if they meet certain criteria. In those cases, location information is generally specified in terms of degrees, minutes, and seconds of latitude and longitude. In some services, licenses are allowed to utilize additional transmitters or to increase power without notifying the FCC. Other services are licensed by geographic area, such that the FCC has no knowledge concerning the actual number or location of transmitters within that geographic area.

The *FCC General Menu Reports* (GenMen) (http://fjallfoss.fcc.gov/General_Menu_Reports/) search engine unites most of the FCC's licensing databases under a single umbrella. Databases included are the Wireless Telecommunications Bureau's ULS, the Media Bureau's CDBS, COALS (cable data) and BLS, and the International Bureau's IBFS. Entry points or search options in the various databases include frequency, state/county, latitude/longitude, call sign and licensee name.

The FCC also publishes, generally on a weekly basis, bulk extracts of its various licensing databases. Each licensing database has its own unique file structure. These extracts consist of multiple, very large files. OET maintains an index (http://www.fcc.gov/oet/info/database/fadb.html) to these databases.

OET has developed a *Spectrum Utilization Study Software* (http://www.fcc.gov/oet/info/software/suss/) tool-set that can be used to create a Microsoft Access version of the individual exported licensing databases and then create MapInfo mid and mif files so that radio assignments can be plotted. This experimental software is used to conduct internal spectrum utilization studies needed in the rule-making process. While the FCC makes this software available to the public, no technical support is provided. (Back to Index)

WHICH OTHER FEDERAL AGENCIES HAVE RESPONSIBILITIES RELATED TO POTENTIAL RF HEALTH EFFECTS?

Certain agencies in the Federal Government have been involved in monitoring, researching or regulating issues related to human exposure to RF radiation. These agencies include the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the National Telecommunications and Information Administration (NTIA) and the Department of Defense (DOD).

By authority of the Radiation Control for Health and Safety Act of 1968, the Center for Devices and Radiological Health (CDRH) of the FDA develops performance standards for the emission of radiation from electronic products including X-ray equipment, other medical devices, television sets, microwave ovens, laser products and sunlamps. The CDRH established a product performance standard for microwave ovens in 1971 limiting the amount of RF leakage from ovens. However, the CDRH has not adopted performance standards for other RF-emitting products. The FDA is, however, the lead federal health agency in monitoring the latest research developments and advising other agencies with respect to the safety of RF-emitting products used by the public, such as cellular and PCS phones.

The FDA's microwave oven standard is an emission standard (as opposed to an exposure standard) that allows specific levels of microwave energy leakage (measured at five centimeters from the oven surface). The standard also requires ovens to have two independent interlock systems that prevent the oven from generating microwaves if the latch is released or if the door of the oven is opened. The FDA has stated that ovens that meet its standards and are used according to the manufacturer's recommendations are safe for consumer and industrial use. More information is available from: FDA's website for Radiation-Emitting Products (http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/default.htm).

The EPA has, in the past, considered developing federal guidelines for public exposure to RF radiation. However, EPA activities related to RF safety and health are presently limited to advisory functions. For example, the EPA chairs an a Radiofrequency Interagency Working Group, which coordinates RF health-related activities among the various federal agencies with health or regulatory responsibilities in this area.

OSHA is part of the U.S. Department of Labor, and is responsible for protecting workers from exposure to hazardous chemical and physical agents. In 1971, OSHA issued a protection guide for exposure of workers to RF radiation [29 CFR 1910.97]. However, this guide was later ruled to be only advisory and not mandatory. Moreover, it was based on an earlier RF exposure standard that has now been revised. At the present time, OSHA uses the IEEE and/or FCC exposure guidelines for enforcement purposes under OSHA's general duty clause (for more information see: www.osha.gov/SLTC/radiofrequencyradiation/ (http://www.osha.gov/SLTC/radiofrequencyradiation/)).

NIOSH is part of the U.S. Department of Health and Human Services. It conducts research and investigations into issues related to occupational exposure to chemical and physical agents. NIOSH has, in the past, undertaken to develop RF exposure guidelines for workers, but final guidelines were never adopted by the agency. NIOSH conducts safety-related RF studies through its Engineering and Physical Agents EffectsHazards Branch in Cincinnati, Ohio.its Division of Applied Research and Technology (DART).

The NTIA is part of the U.S. Department of Commerce and is responsible for authorizing Federal Government use of the RF electromagnetic spectrum. Like the FCC, the NTIA also has NEPA responsibilities and has considered adopting guidelines for evaluating RF exposure from U.S. Government transmitters such as radar and military facilities. (Back to Index)

CAN LOCAL AND STATE GOVERNMENTAL BODIES ESTABLISH LIMITS FOR RF EXPOSURE?

In the United States, some local and state jurisdictions have also enacted rules and regulations pertaining to human exposure to RF energy. However, the Telecommunications Act of 1996 contained provisions relating to federal jurisdiction to regulate human exposure to RF emissions from certain transmitting devices. In particular, Section 704 of the Act states that, "No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions." Further information on FCC policy with respect to facilities siting is available from the FCC's Wireless Telecommunications Bureau (see https://www.fcc.gov/general/tower-and-antenna-siting (https://www.fcc.gov/general/tower-and-antenna-siting)) and from "A Local Government Official's Guide to Transmitting Antenna RF Emission Safety (http://wireless.fcc.gov/siting/FCC_LSGAC_RF_Guide.pdf)." (Back to Index)

WHERE CAN I OBTAIN MORE INFORMATION ON POTENTIAL HEALTH EFFECTS OF RADIOFREQUENCY ENERGY?

Although relatively few offices or agencies within the Federal Government routinely deal with the issue of human exposure to RF fields, it is possible to obtain information and assistance on certain topics from the following federal agencies, all of which also have Internet Web sites.

FDA: The Food and Drug Administration's Cell phone website (http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/default.htm) : http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/ (http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/)

There are many pages listed at the FDA web site. Topics include:

- Wireless medical devices. (http://www.fda.gov/MedicalDevices/DigitalHealth/WirelessMedicalDevices/default.htm)
- General Electronic Product Radiation Control. (http://www.fda.gov/Radiation-EmittingProducts/default.htm)
- FDA regulations that apply to manufacturers of electronic products (http://www.fda.gov/Radiation-EmittingProducts/ElectronicProductRadiationControlProgram/LawsandRegulations/default.htm)

EPA: The Environmental Protection Agency's overview of power-line emissions: http://www.epa.gov/radtown/power-lines.html. (http://www.epa.gov/radtown/power-lines.html)

- Power lines (http://www3.epa.gov/radtown/subpage.html#?scene=The+Burbs&polaroid=Power+Lines&sheet=0):
- Cell phone safety (http://nepis.epa.gov/Exe/ZyNET.exe/P1006A9Y.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2006+Thru+2010&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C06thru10%5CTxt%5C00000014%5CP1006A9Y.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL):

OSHA: The Occupational Safety and Health Administration's Health and Safety Topics Non-ionizing Radiation (http://www.osha.gov/SLTC/radiation_nonionizing/index.html).

NIOSH: The National Institute for Occupational Safety and Health's research on protecting workers from proven and possible EMF (electric and magnetic fields) health risks focusing on RF (radiofrequencies), ELF (extremely low frequencies) and Static magnetic fields: http://www.cdc.gov/niosh/topics/emf (http://www.cdc.gov/niosh/topics/emf).

NCI: The National Cancer Institute's Fact sheets on potential risks from exposure to:

- Magnetic fields: http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet (http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet)
- Cell phones: http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/cell-phones-fact-sheet (http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/cell-phones-fact-sheet).

NIEHS: The National Institute of Environmental Health Sciences' main page for electric and magnetic fields and potential health effects: http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm (http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm)

NTP: The National Toxicology Program's studies that:

- Test the biological effects of cellphones (GSM): http://ntp.niehs.nih.gov/testing/status/agents/ts-08013.html (http://ntp.niehs.nih.gov/testing/status/agents/ts-08013.html)

- Test the biological effects of cellphones (CDMA): http://ntp.niehs.nih.gov/testing/status/agents/ts-08015.html (http://ntp.niehs.nih.gov/testing/status/agents/ts-08015.html)

FCC: Questions regarding potential RF hazards from FCC-regulated transmitters can be directed to the Federal Communications Commission, Consumer & Governmental Affairs Bureau, 445 12th Street, S.W., Washington, D.C. 20554; Phone: 1-888-225-5322 (1-888-CALL-FCC); E-mail: rfsafety@fcc.gov (mailto:rfsafety@fcc.gov) .

General information on RF exposure is found on the FCC's Office of Engineering and Technology (OET) web page at: https://www.fcc.gov/general/radio-frequency-safety-0 (https://www.fcc.gov/general/radio-frequency-safety-0).

Information on the reported SAR values of devices (including cellular telephones and devices using Wi-Fi transmitters) can be found in the FCC's Office of Engineering and Technology Equipment Authorization (EA) database at: http://www.fcc.gov/oet/ea (https://www.fcc.gov/engineering-technology/laboratory-division/general/equipment-authorization). On this page you may search for information specific to a particular device by locating the FCC ID printed on the device (usually on the back or underneath, or behind the battery cover of the devices) and typing it into the FCC ID Search page. (https://www.fcc.gov/fccid)

General information on cellular telephones can be found at: https://www.fcc.gov/general/telephone-guides (https://www.fcc.gov/general/telephone-guides).

Information specific to fixed antenna structures can be found on the https://www.fcc.gov/general/tower-and-antenna-siting (https://www.fcc.gov/general/tower-and-antenna-siting)

Bureau/Office:

Engineering & Technology (https://www.fcc.gov/engineering-%26-technology)

Tags:

Devices, Engineering & Technology (/tags/devices-engineering-technology) - Safety (/tags/safety)

Updated:

Wednesday, November 25, 2015

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: September 7, 2017

Re: Community Energy Strategic Plan Adoption

Overview

The City has been working with EcoWorks and the Southeast Michigan Regional Energy Office (SEMREO) on a Community Energy Strategic Plan (CESP) funded by the Michigan Energy Office. The Plan is now in final draft format and is ready for consideration for adoption by the City Commission.

Background

The City has been working on this grant-funded project for about 2 years now. The CESP is the final step in the process, with the plan establishing a goal for the City to reduce energy usage by 25% by the year 2020. The plan also lays out a strategy to achieve that goal through energy efficiency and renewable energy projects. The City has already started to implement many of the projects that are included in the plan. Specifically, the City has:

- Converted all streetlights to LED fixtures
- Completed a complete conversion to LED lighting at the Community Center
- Completed a partial conversion to LED lighting at City Hall
- Increased roof insulation for a portion of the Community Center, and
- Completed the installation of a solar energy system at the Community Center.

It is likely that these projects alone will result in the City reaching our goal to reduce energy usage by 25% or more. We are working on a second tier of energy projects to be completed in the future to continue our efficiency and renewable energy efforts. The second tier of projects will be funded using the incremental savings achieved by the first round of energy projects. Based on returns so far, the first round of energy projects will likely save the City about $25,000 annually in energy costs.

A survey about the plan and energy issues generally was conducted for residents to provide feedback on a draft version of the plan and energy issues in general. The results of that survey were supportive of the draft version of the plan, and no major changes were required based on the survey result.

Requested Action

City Commission consideration of adoption of the Community Energy Strategic Plan.

City of Pleasant Ridge
Community Energy Strategic Plan

July 24th, 2017

Mayor
Kurt Metzger

City Commissioners
Jay Foreman
Jason Krzysiak
Ann Perry
Bret Scott

City Manager
James Breuckman

Table of Contents

Introduction and Development

The Pleasant Ridge Community Energy Strategic Plan (CESP) is a continuation of energy planning measures begun in 2016 in partnership with EcoWorks and the Southeast Michigan Regional Energy Office (SEMREO) with funding from the Michigan Energy Office. In July 2016 an Energy Management Plan Framework (EMPF) was developed by EcoWorks establishing guidelines for future energy management within the municipality and on June 14th, 2016 the Pleasant Ridge City Commission adopted a Resolution in Support of developing a Community Energy Strategic Plan.

The Community Energy Strategic Plan development process involved expanding analysis of facilities and energy systems within the municipal building portfolio, the independent creation and adoption of a supporting Revolving Energy Fund, and conducting a Community Energy Survey to reflect community energy priorities in planning efforts. In addition to establishing concrete municipal energy targets and identifying strategies to reduce expenses for Pleasant Ridge municipal operations, the Community Energy Strategic Plan supports the City's ongoing environmental goals as a signatory of the Mayors National Climate Action Agenda.

Supporting the overall Energy Vision, the CESP establishes a formal municipal Energy Protocol, specifies metrics for progress evaluation, and provides a detailed Municipal Energy Baseline to support clear and accurate energy accounting. The Baseline is followed by the Energy Plan which discusses building performance, identifies prioritized improvement areas, and reviews current progress towards meeting the Energy Protocol. Supporting the Energy Plan, Decision Making and Funding Structures are presented. Results and outcomes from the Pleasant Ridge Community Energy Survey are reviewed in Community Energy Priorities and lastly, Beyond 2020 addresses re-evaluation and introduces planning pathways to support future energy management initiatives.

1. Energy Vision

The City of Pleasant Ridge will increase the financial and environmental sustainability of local government operations through active support for energy efficiency and renewable energy initiatives at municipal facilities. By these efforts, the City will **reduce energy usage 25% by year 2020** compared to the 2015 baseline, and will be a regional leader on energy sustainability issues.

2. City of Pleasant Ridge 2020 Energy Protocol

The City of Pleasant Ridge Energy Protocol establishes a goal to reduce 25% of total municipal energy consumption by year 2020 relative to a 2015 baseline measurement. The scope of the Energy Protocol is defined as electricity and natural gas use for the Pleasant Ridge City Hall and Police Department, Pleasant Ridge Community Center, and municipal streetlights.

2a. Accounting and Metrics

With a commitment to furthering municipal financial and environmental sustainability, the City of Pleasant Ridge will measure success and progress towards meeting the 2020 energy goal with an annual assessment covering the following metrics:

Tracking Item	Metric
1. Purchased Electricity	kWh/year
2. Purchased Natural Gas	Therms/year
3. Total Energy Use	kBtu/year
4. Energy Expenses	$US/year
5. Total GHG Emissions	Metric Tons CO2e (MT CO2e/year)

Measurements of purchased energy consumption (kWh, therms, kBtu, $US) will track site energy consumed at the location of use while total greenhouse gas emissions (Metric Tons CO2e) will track total emissions resulting from generation and consumption of electricity and natural gas based on regional utility fuel mixes.[1]

2b. Progress Reporting

Annual evaluations and reporting covering the above metrics will be carried out by the Energy Manager in parallel with energy project assessments supporting the operation of the Revolving Energy Fund within the City Budget. Utility bill data for municipal operations is actively tracked by the Energy Manager using the Energy Star Portfolio Manager program. Once yearly energy and financial data for observed meters has been recorded, annual progress will be evaluated in comparison to the municipal energy baseline to quantify overall improvement and set priorities for meeting the 2020 target.

3. Municipal Energy Baseline

The City of Pleasant Ridge, in partnership with EcoWorks, benchmarked utility bills for municipal facilities in 2016 and established a baseline measurement timeframe covering the year of March 2015 to February 2016. Figure 1 below illustrates the energy system inventory and total energy consumption for the baseline. Figure 2 shows the proportional contribution to baseline energy use by location. Total baseline municipal energy consumption for the City of Pleasant Ridge is approximately 2.75 million kBtu. Correspondingly, the total emissions produced are 358 Metric Tons CO2e or the amount of carbon sequestered by 339 acres of U.S. forest in one year.[2]

Location	Site Electricity (kWh/yr.)	Site Natural Gas (therms/yr.)	Site Energy (kBtu/yr.)	Total Emissions (MT CO2e/yr.)	Baseline Energy Cost ($US)
City Hall/ PD	43,869	2,430	392,687	44	$6,918
City Hall Park	8,294	-	28,299	6	$1,148
Community Center	187,128	11,380	1,776,487	194	$28,166
Streetlights	161,679	-	551,648	113	$47,197
Total	**400,971**	**13,810**	**2,749,122**	**358**	**$83,429**

Fig. 1: 2015 Baseline municipal energy consumption for The City of Pleasant Ridge by location

[1] EPA Power Profiler

[2] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

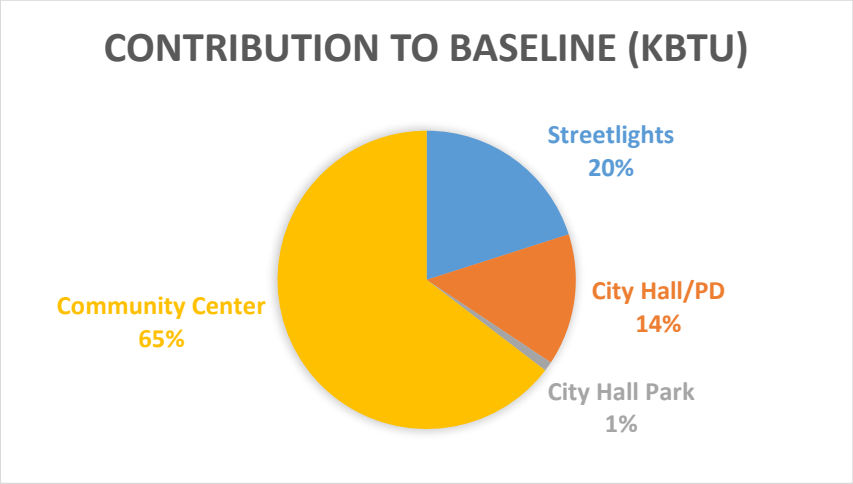


Fig. 2: Contribution by location to the total energy consumption for the 2015 energy baseline

4. Energy Strategy

The following section provides a breakdown of the primary City-owned sites that contribute to the overall energy baseline, reviews implemented actions and their results, and identifies pathways for meeting the targets set by the 2020 Energy Protocol.

Building performance is evaluated using weather normalized energy use intensity (EUI) calculated using the Energy Star Portfolio Manager program. Weather normalized energy use intensity accounts for annual temperature anomalies by determining a location-based yearly average temperature calculated using a 30-year time period.[3] The weather normalized EUI represents the energy consumed per ft^2 over the average year for Pleasant Ridge buildings, increasing precision in building evaluations and supporting decision making for energy planning. Figure 3 below shows the baseline performance of the Community Center and City Hall in comparison to national median EUI figures for similar facilities.

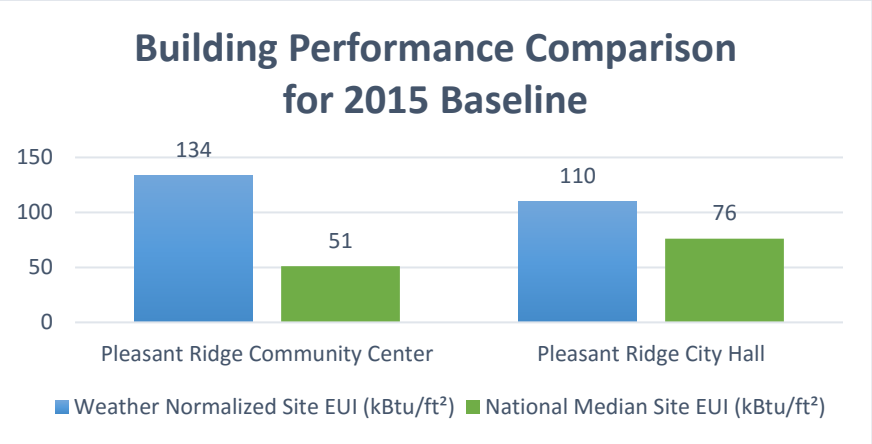


Fig. 3: Performance comparison of Pleasant Ridge municipal buildings to national medians

[3] https://portfoliomanager.zendesk.com/hc/en-us/articles/211027288-What-is-Weather-Normalized-energy-

4a. Pleasant Ridge City Hall and Police Department

City Hall Overview and Current Progress

Responsible for approximately 14% of total municipal energy consumption, the Pleasant Ridge City Hall and Police Department performed at a weather normalized energy use intensity (EUI) of 110 kBtu/ft² for the 2015 baseline year. Compared to data for similar buildings during this time period, the Pleasant Ridge City Hall underperformed the national median by approximately 30%, highlighting the opportunity for energy waste reduction initiatives.

Following benchmarking, the City Hall building underwent a partial LED retrofitting project in 2016 targeting the City Hall reception and office area as well as the office of the City Manager. This project is estimated to save over 2,000 kWh/year with projected cost savings exceeding $250.00/year. Additionally, two programmable smart thermostats were installed in 2016 to more accurately and efficiently control the building Heating, Ventilation, and Air Conditioning (HVAC) system. Most recently, an energy-intensive City Hall refrigerator was updated to an efficient model which is projected to generate annual savings of at least 1,500 kWh and $190/year. The Pleasant Ridge City Hall and Police Department facility has improved approximately 8% from baseline characteristics and currently performs at a weather normalized energy use intensity of 101.1 kBtu/ft².

City Hall Energy Opportunities

Based on a building walkthrough and energy assessment performed by EcoWorks in 2017, opportunities for further energy conservation and cost savings have been identified and compiled in the City Hall Energy Conservation Opportunities document.

An immediate opportunity lies in expanding on the benefits of the implemented partial LED retrofit project and converting 100% of the City Hall and Police Department lighting system to LED equivalents. Updating the City Hall lighting system to 100% LED is estimated to reduce energy consumption by an additional 2,700 kWh/year representing $300/year in cost savings.

Following a 100% LED retrofit project, the most significant reductions in energy waste for the Pleasant Ridge City Hall and Police Department will be achieved by increasing the performance of the building envelope. With limited modifications taking place since construction in 1961, updating the performance of the envelope through air sealing and insulating the attic space and sealing dispersed sources of air leakage is estimated to reduce overall building energy consumption by over 30%. Installing interior window inserts or window film to improve thermal performance of the existing windows represents an additional effective low to medium cost energy conservation opportunity.

Prioritizing upgrades to the City Hall building envelope will create opportunities for implementing further energy efficiency strategies. Following the completion of relevant insulation projects, right-sizing the HVAC system components to reflect reduced heating and cooling needs with Energy Star rated models will leverage initial investments in envelope upgrades to further minimize overall facility energy consumption. Additionally, the building walkthrough indicated that due to the poorly performing envelope several energy-intensive personal space heaters are used to compensate for uneven space conditioning.

Included in the overall municipal baseline measurement, the City Hall and Police Department houses the electricity meter for the adjacent park which includes three streetlights and a park irrigation system. While energy projects are not currently planned for this area, converting to LED streetlights and

utilizing a drip irrigation system may provide opportunities for future water and energy conservation benefits.

4b. Pleasant Ridge Community Center

Community Center Overview and Current Progress

Representing 65% of the overall 2015 municipal energy baseline, the Pleasant Ridge Community Center initially performed at a weather normalized energy use intensity of 134 kBtu/ft². In comparison to national median EUI figures for similar facilities, the Community Center was underperforming by approximately 62%.

Following an energy evaluation carried out by EcoWorks in 2016, select portions of the Community Center roof were insulated in connection with a roof replacement project. Most recently the City of Pleasant Ridge converted 100% of the Community Center lighting system to LED bulbs with a projected annual energy savings of 44,061 kWh and cost savings of $5,331/year. Electricity and energy cost savings since project implementation continue to be monitored through the utility bill tracking process. In the period since initial benchmarking, the Community Center has improved in energy use intensity by over 13% compared to the 2015 baseline and currently performs at a weather normalized site EUI of 116.4 kBtu/ft².

Community Center Energy Opportunities

Responsible for the majority of municipal energy consumption, the Pleasant Ridge Community Center presents several opportunities for improving building performance and capturing resulting energy expense savings.

Projected for implementation in Summer 2017, the 20 kW Community Center rooftop solar PV array will drive substantial reductions in purchased energy consumption and greenhouse gas emissions. Figure 3 below illustrates the expected benefits of the Community Center rooftop solar PV array in working towards the municipal Energy Protocol.

Array Size	Projected Annual Generation	Community Center Reduction	Total Baseline Reduction
20 kW	32,000 kWh	6%	4%

Fig. 3

The Community Center solar project will also generate significant financial and environmental benefits for the City of Pleasant Ridge. Figure 4 below provides an overview of the estimated impacts of the rooftop solar project over a 25-year time period. With an approximate payback period of 12 years, the Community Center solar array is projected to generate over $82,000 of net energy expense savings and avoid GHG emissions equivalent to the carbon sequestered by 501 Acres of U.S. forest in one year.[4]

	Energy Savings	Avoided Emissions	Cars Offset
25-Year Benefits	$82,530	530 MT CO2e	112

Fig. 4: 25-year analysis of Community Center rooftop solar array benefits.

[4] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

The Community Center pool has been identified as a priority for energy waste reduction efforts. Annual pool heating using natural gas is responsible for a significant proportion of total municipal energy consumption and a number of pathways have been identified to mitigate this expense. Solar pool heating systems provide a viable and proven method of drastically reducing natural gas pool heating expenses and it is recommended that this option is further explored by the Energy Manager. Following a preliminary assessment of the Pleasant Ridge Community Center pool heating system and proximity to future solar PV and waste heat resources, three distinct options have been identified for reducing natural gas use in pool heating as described below.

System Type	System Description
1. Solar Thermal	Solar thermal pool heaters are composed of collector panels installed in connection to the existing pool heating pipe circuit. Water is pumped through panels mounted on nearby roofs or a standalone framework and heated with solar energy before entering the conventional pool heater for final heating if necessary.
2. Solar Heat Pump	Solar heat pumps are electricity driven heat pumps designed to be simultaneously integrated with nearby solar PV arrays and the utility electric grid. This type of heat pump utilizes energy from the solar PV array when available and grid electricity when absent.
3. Waste Energy Heat Pump	Waste energy heat pumps are installed between existing air conditioning units and the pool heating system. This type of pool heater captures previously unused waste heat expelled from the air conditioning unit to heat pool water. An ancillary benefit of waste energy heat pump pool heaters lies in the additional potential to achieve up to 30% efficiency gains for the connected A/C unit through reduced operating temperatures.

4c. Pleasant Ridge Municipal Streetlights

Following municipal benchmarking efforts and the establishment of an energy baseline in 2015, the City of Pleasant Ridge undertook an initiative to convert existing streetlights to LEDs. Converting municipal streetlights to LED models reduced energy requirements from an estimated 161,679 kWh/year to 62,937 kWh/year, a 61% reduction in energy usage. Figure 4 below shows the estimated annual energy and cost savings as well as contribution to overall energy reduction targets.

	Energy Savings (kWh/yr.)	Energy Cost Savings ($US/yr.)	Municipal Baseline Reduction
LED Streetlight Retrofit	98,742	$11,806	12%

Fig. 4: Impacts of LED streetlight conversion

5. Project Decision Making and Funding Structure

As established in the Pleasant Ridge Revolving Energy Fund adopted in the 2017-2018 Budget, scoping and implementation of energy projects will be carried out by the Energy Manager and supporting staff. Funding for future renewable energy and energy efficiency initiatives will be sourced from a combination of the Revolving Energy Fund and General Budget and coordinated by the Energy Manager.

6. Community Energy Priorities

The Pleasant Ridge Community Energy Survey, developed in cooperation with EcoWorks, was opened for comment in June 2017 to gather feedback on the initial draft of the Community Energy Strategic Plan from Pleasant Ridge residents, identify energy priorities of community members, and gauge interest in potential future energy programs.

The feedback collected through the Energy Survey showed a high level of interest in home energy efficiency and renewable energy projects among residents of Pleasant Ridge. The primary obstacles to implementing energy projects were reported to be a combination of potentially high costs and unclear priorities for determining what projects would be most effective to pursue. In order to facilitate transparent and cost effective decision making for residential energy projects, two initiatives have been discussed and are under consideration.

6a. Residential Energy Programming

A significant portion of respondents to the Energy Survey indicated that access to informational resources on home energy efficiency and renewable energy options would increase residents' ability to make confident decisions and increase the likelihood of implementing future projects. To support this process, the City of Pleasant Ridge is considering offering annual or biannual workshops covering options for residential energy efficiency and renewable energy. Additionally, a potential recommendation is to establish an energy efficiency tool library housed at City Hall as a resource for residents to evaluate the performance of their homes.

6b. Group Purchasing

With 92% of respondents to the Energy Survey indicating that improving home energy efficiency was either a high or medium priority and 77% of respondents identifying cost as the main factor stopping them from pursuing energy projects, opportunities to decrease the cost of energy projects for homeowners are being explored. Group purchasing programs focusing on solar panels and energy efficiency are in the initial stages of development and may result in significant savings for participating residents.

7. Beyond 2020

The City of Pleasant Ridge is well positioned to meet the 2020 Energy Protocol through continued implementation of diverse energy efficiency and renewable energy projects. Following the final evaluation of the 2020 energy targets, it is recommended that a re-evaluation of the Community Energy Strategic Plan takes place to support further goals and assess the potential for expansion in scope to the broader community. This section explores future municipal energy planning pathways that will continue to build on the Energy Vision and reinforce the City's position as a regional leader in municipal energy sustainability.

7a. Community Solar Developments

Community solar projects allow residents and community stakeholders to invest in a locally sourced clean energy program. 85% of respondents to the Community Energy Survey indicated an interest in participating in a community solar program if offered and two sites within the City of Pleasant

Ridge (1- Industrial redevelopment zone and 2- Ferndale Lower Elementary School rooftop) have been identified as possible locations for exploring future community solar developments.

7b. Wind Energy

Based on financial viability and energy resource potentials, near term renewable energy initiatives within the City of Pleasant Ridge prioritize solar photovoltaic projects. It is recommended that future iterations of the Community Energy Strategic Plan evaluate the benefits of including wind turbines in the City's project portfolio and the corridor parallel with I-696 has been identified as a potential location.

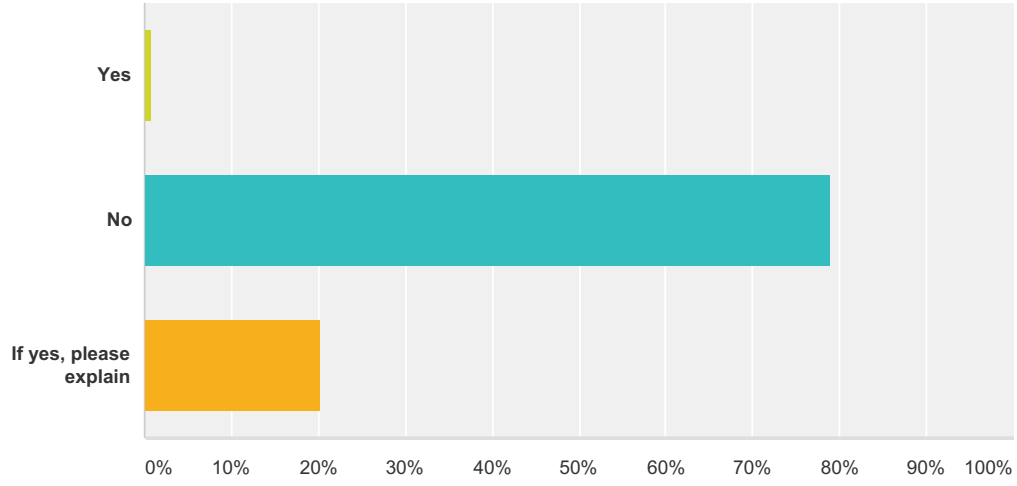
7c. Community Resilience and Emergency Preparedness

Building on the ambitious goals of the 2020 Energy Protocol, the Community Energy Strategic Plan has the opportunity to integrate a broader focus on fostering resiliency for the City of Pleasant Ridge. As energy prices continue to rise in parallel with increasing occurrences of extreme weather events, comprehensive planning with a focus on sustainable energy systems represents a primary pathway for supporting a prosperous and sustainable Pleasant Ridge community.

The Pleasant Ridge Community Center has significant potential to serve as a valuable resource for community resilience and emergency preparedness. Framing the upcoming rooftop solar PV project as the initial phase in establishing a building specific microgrid, it is recommended that future reassessments of the Community Energy Strategic Plan pursue planning efforts to both expand energy generation capacity of the solar array and integrate energy storage. Expanded generation capabilities will drive further reductions in overall municipal energy purchasing while integrated storage capabilities expand the functionality of the Community Center as a grid-independent source of clean energy for the wider community.

Q1 Energy Vision: The City of Pleasant Ridge will increase the financial and environmental sustainability of local government operations through active support for energy efficiency and renewable energy initiatives at municipal facilities. By these efforts, the City will reduce energy usage 25% by year 2020 compared to the 2015 baseline, and will be a regional leader on energy sustainability issues.Are there any aspects of the Pleasant Ridge Energy Vision that could be improved upon?

Answered: 123 Skipped: 20



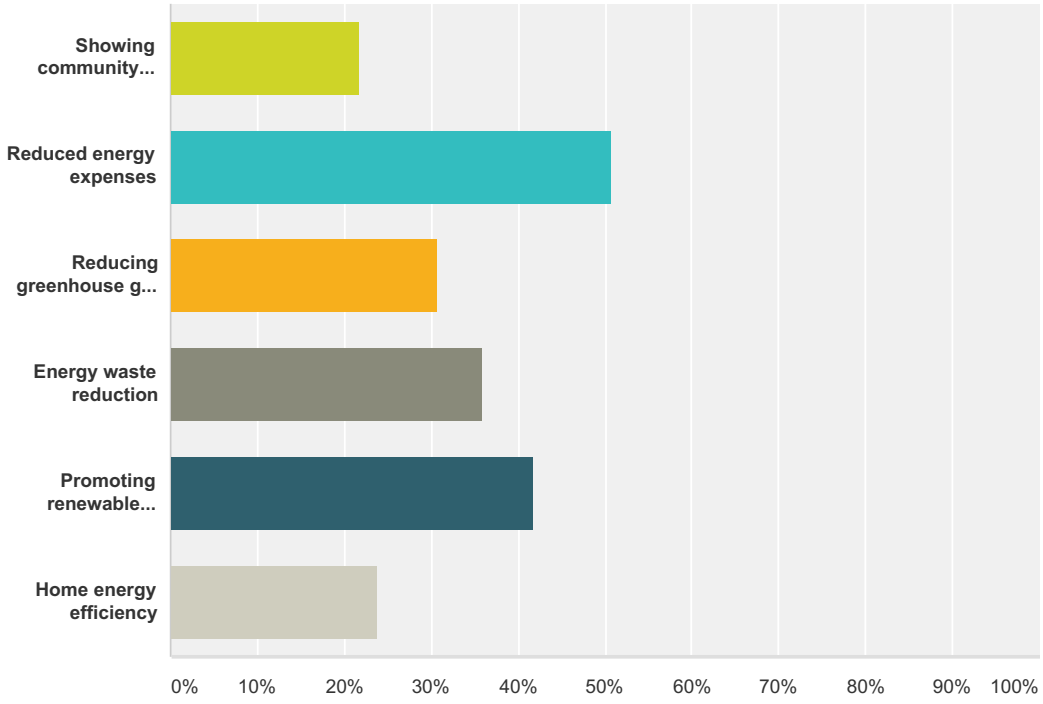
Answer Choices	Responses	
Yes	0.81%	1
No	78.86%	97
If yes, please explain	20.33%	25
Total		123

#	If yes, please explain	Date
1	Would like to see citywide thermal energy ala Wyandotte if possible	6/24/2017 6:53 AM
2	Solar lights in the parks	6/23/2017 3:59 PM
3	There are very few numbers (costs) listed, and no comparables. Also, no long term costs are listed (I understand this may be initially funded with grant money, but I cannot tell whether the grant covers all of the energy improvements or is for X term, etc.	6/22/2017 11:23 PM
4	Could always improve on energy usage	6/22/2017 10:41 PM
5	...while not resulting in additional short-term or long-term financial commitments of Pleasant Ridge residents.	6/22/2017 6:21 PM

6	The vision can always be improved upon. This is a great start but I would love to see PR hold a conference to help show other communities be leaders in this issue, have awards for citizens that make the biggest contributions invest in bike lanes to make the area more bike friendly.	6/20/2017 4:32 PM
7	If the company installing the solar panels were to offer a the residents interested in a similar venture a deal, that would be great. They woudl have the opportunity to sell to an entire community and offer a better bulk price for the residents of PR.	6/19/2017 7:33 PM
8	Could a community component be included for the future? For instance, if a solar grid is available, can there be a network or at least information and support for homeowners to access this renewable source. Not immediate but as part of a future vision??	6/18/2017 9:00 AM
9	Reduced costs of water by allowing residents to have wells to water lawns	6/16/2017 11:28 AM
10	Community education about we as individuals can be more efficient. Incentives to properly insulate homes and how to improve window efficiency without having to replace. We lose so much energy with heating and cooling anyway to help with this would be huge. Even if people could get an evaluation of their attic and how how it's vented and if it has proper insulation.	6/16/2017 8:26 AM
11	Please ensure the investment has a reasonable ROI	6/16/2017 7:46 AM
12	express support for the Paris Climate Accord	6/15/2017 8:20 PM
13	Implementation estimates should be included and a determination made that the City will actually save money over the expected life of the improvements	6/15/2017 7:22 PM
14	Harvest rain water at community garden	6/15/2017 4:08 PM
15	I like the ambition of the short term goal. Maybe a long term goal should be included too.	6/15/2017 3:59 PM
16	auto off lights, no overnight parking on streets would make dimmer street lights more effective	6/15/2017 3:14 PM
17	Coal, Coal, Coal. Beautiful Clean Coal	6/15/2017 3:09 PM
18	Given how small PR is, it is not a huge consumer of energy. These efforts could go into something more impactful.	6/15/2017 3:03 PM
19	Is wind an option? I've also heard of solar umbrella-like collectors, can those be used in residences?	6/15/2017 2:53 PM
20	supporting energy efficiency and renewable sources in homes.	6/15/2017 2:38 PM
21	Be more specific in what area you want to reduce	6/15/2017 2:07 PM
22	Don't use buzz words. Sustainability? What are we trying to sustain?	6/15/2017 1:49 PM
23	Including a longer-range vision for carbon neutrality would improve the vision. 2050 time horizon.	6/15/2017 11:31 AM
24	I am not sure exactly what the city is planning, but I would love to see the use of solar panels/energy - even if used in a limited capacity at some city buildings or for some limited purposes.	6/15/2017 8:56 AM
25	Something should be stated that Residents should not have to cover costs.	6/15/2017 8:55 AM

Q2 Which two benefits of a Community Energy Strategic Plan do you feel are most important?

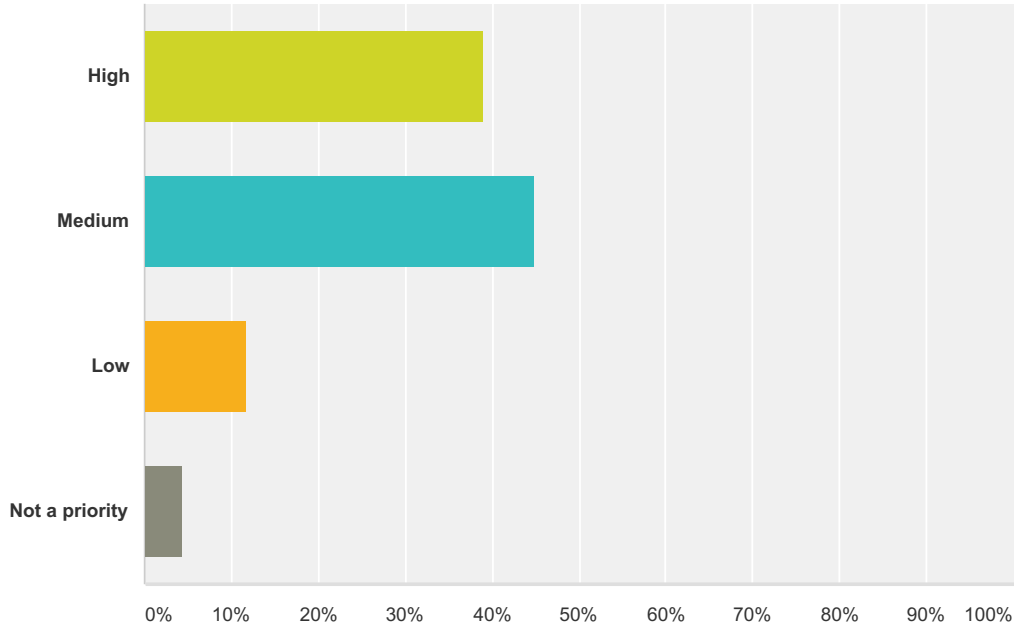
Answered: 134 Skipped: 9



Answer Choices	Responses	
Showing community leadership	**21.64%**	29
Reduced energy expenses	**50.75%**	68
Reducing greenhouse gas emissions	**30.60%**	41
Energy waste reduction	**35.82%**	48
Promoting renewable energy solutions	**41.79%**	56
Home energy efficiency	**23.88%**	32
Total Respondents: 134		

Q3 To what extent is improving energy efficiency in municipal facilities a priority for you?

Answered: 138 Skipped: 5



Answer Choices	Responses	
High	**39.13%**	54
Medium	**44.93%**	62
Low	**11.59%**	16
Not a priority	**4.35%**	6
Total		**138**

Q4 Are there any other comments or ideas you would like to share in helping to shape the Community Energy Strategic Plan?

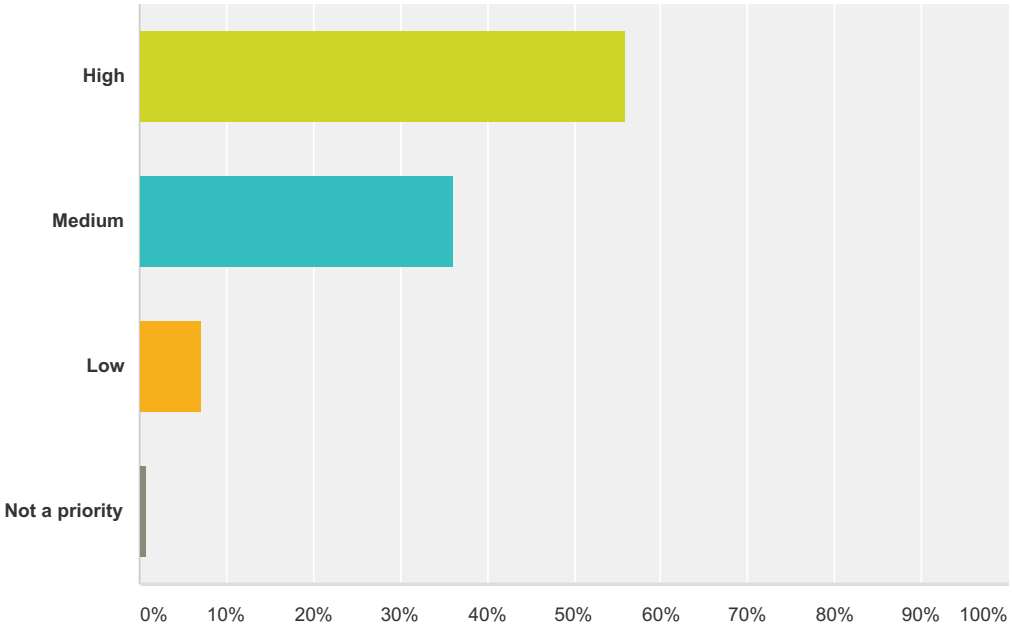
Answered: 40 Skipped: 103

#	Responses	Date
1	I hope to see follow up in the form of reporting both the results of this survey and new initiatives by the city as they are rolled out.	6/27/2017 7:21 PM
2	I have been very pleased with the LED lighting we have on our streets.	6/24/2017 5:36 PM
3	See answer to #1	6/24/2017 6:53 AM
4	I am not in favor of any strategy that increases cost, for example, a plan that saves $1 but costs $2 makes no sense to me.	6/23/2017 12:07 PM
5	I love the idea of solar panels providing energy at the Rec Center.	6/22/2017 11:23 PM
6	There should be a transparent cost/benefit analysis for any tactic associated with the Strategic Plan.	6/22/2017 6:21 PM
7	Installation of LED lights in the tennis courts.	6/22/2017 5:26 PM
8	This is just a waste of more tax payers money. If we save on energy will city hall be able to reopen on fridays? Why? Why does this city waste money on the dumbest things like the time it took to write this survey.	6/22/2017 4:46 PM
9	Seems like most lights have been converted to LED. Is this also the case for the ones outside the City's buildings? For example, the lighting around City Hall. Not the ones along the pathway, but the spotlights and ones that shine on the building and sign.	6/22/2017 2:45 PM
10	I recently upgraded our home to a smart home with a smart thermostat to save on energy ... to encourage EVERYONE in PR to do this the city should offer incentives of some sort	6/20/2017 5:20 PM
11	This initiative makes me want to continue to live in PR forever, thank you to the men and women who helped design this. In a time of great worldwide change and struggle, it is nice to feel like I can be a small part of a solution for once. PR should continue to strive to be a national leader in promoting intelligent energy policy. I believe home solar installation companies should be invited to set up a booth periodically at the pool to promote the idea of installing solar. PR should also try to be as bike-friendly as possible. Thank you again.	6/20/2017 4:32 PM
12	Whatever I can do to help keep energy usages and waste reduction to a minimum, I try to do	6/20/2017 10:23 AM
13	Can the installation of small wind turbines, possibly along 696, be incorporated in to the plan?	6/19/2017 4:10 AM
14	Refer to comment for #1.	6/18/2017 9:00 AM
15	Is there a way for the cardio machines at the gym to somehow power the TV attached to it? I would assume that technology is out there, I just have no idea how viable it is. But people using the gym constantly leave TV's on after they are done using the equipment. If the TV somehow powered down when they stopped moving, that would reduce costs. Not much - but every bit helps.	6/17/2017 11:49 AM
16	Love this topic. Thank you. I'm proud to be part of a city that thinks about this. For question #3 I only put medium because I see that greatest impact on energy being residential. Proper education on ways to make a difference or incentives to change things on an individual level. But I think showing responsibility from a leadership point of view is key. So maybe something that's visible like solar power at the community center could be a beacon for change. It's all about disrupting the way we all know and creating a new norm while educating.	6/16/2017 8:26 AM
17	Bigger opportunity is educating and assisting homeowners to reduce energy consumption	6/16/2017 7:46 AM
18	Unless reduced net costs to the city taxpayers is not the overriding goal of this program, there is the possibility that the city residents will be asked to foot the bill for immature or inefficient technology.	6/15/2017 7:22 PM
19	wind generator	6/15/2017 6:03 PM
20	This is fantastic. Thank you.	6/15/2017 4:57 PM
21	Way to go PR! We're so proud of the forward progress our community is making in what is a very frustrating time for renewable energy	6/15/2017 4:14 PM

22	It would be great if we could have a workshop to address what we could do at the level of an individual homeowner. What is the low hanging fruit for a typical Pleasant Ridge house? If steps were taken over time, what might that sequence look like?	6/15/2017 3:59 PM
23	I think it would be great if the city could facilitate household energy reduction plans that are only economically feasible when done en masse. The city has the ability to help coordinate action amongst multiple households. Would a group of residents get a discount on something like blown-in insulation services if the contractor doing the community center also did 14-15 households in a group? I'm thinking about how cheap it is to have your sidewalk poured if your neighbor is paying to have her driveway done since the contractor already has the concrete truck on-site; or how much cheaper homeowners can get trees if they buy them at the same time the city is buying trees. Use economy of scale to lower the cost of HE furnaces, HE hot water tanks, attic insulation, solar panels, solar water heaters, etc.	6/15/2017 3:41 PM
24	With the limited resources the City has, would it be a better use of its energies to provide better city services?	6/15/2017 3:03 PM
25	Are there any plans to contact residents/contractors to make solar more cost effective for homes with group purchases? Has PR looked into the google solar roof application?	6/15/2017 2:53 PM
26	More focus on improving efficiency in homes, more innovation and better communication with residents. The plan mostly seems to focus on upgrading lights and making buildings more efficient. We need public dashboards to track it, incentives for residents to improve home efficiency and more consumer education.	6/15/2017 2:38 PM
27	more emphasis and/or direct information on how individual homeowners can participate in lowering their own uses and costs would be appreciated.	6/15/2017 2:17 PM
28	Thank you!	6/15/2017 2:12 PM
29	Use water retention pools for public plant watering	6/15/2017 2:07 PM
30	Use the most cost-effective energy, not the "greenest".	6/15/2017 1:49 PM
31	Geothermal heating for pool?	6/15/2017 1:43 PM
32	Good idea!	6/15/2017 1:38 PM
33	Not looking to increase taxes/costs to the homeowner.	6/15/2017 1:33 PM
34	Converting streetlights to LED was a great savings opportunity. But in our community with heavier tree canopies, this lighting does not get thru the trees in summer months. This leaves our streets and sidewalks unsafe as you can not see what is in front of you, including lifted sidewalks or people. We really need to consider street level lighting so that it is safe to walk outside after dark.	6/15/2017 12:09 PM
35	I applaud the City of Pleasant Ridge for the engergy efficiency and renewable energy efforts and undertaken to date and described in the plan. Many of these are "low-hanging fruit" which are both cost effective and environmentally responsible. I encourage the City to continue energy planning going forward to tackle to more difficult next stages where improvements may result in cost increases, but recognizing that we all need to be on a path to zero carbon emissions within the next few decades if we want to prevent the worst effects of climate change.	6/15/2017 11:31 AM
36	I placed it high only because it is a direction that many feel we should all be going. Perhaps with the focus on what you are doing it will reflect on our own homes and give us examples on what we can do.	6/15/2017 11:14 AM
37	Consider electric vehicles for police if appropriate	6/15/2017 9:55 AM
38	N/A	6/15/2017 9:39 AM
39	Please be open to loosing restrictions, or making them more user friendly on home solar installations in our zoning codes. Provide small tax incentives for homeowners to do energy efficiency improvements.	6/15/2017 9:00 AM
40	Again, the residents should not feel these changes financially. Our taxes are already high, ...always rising and we are being driven out of our homes by these increases. All these ideas are great but they can be costly.	6/15/2017 8:55 AM

Q5 To what extent is improving energy efficiency in your home a priority for you?

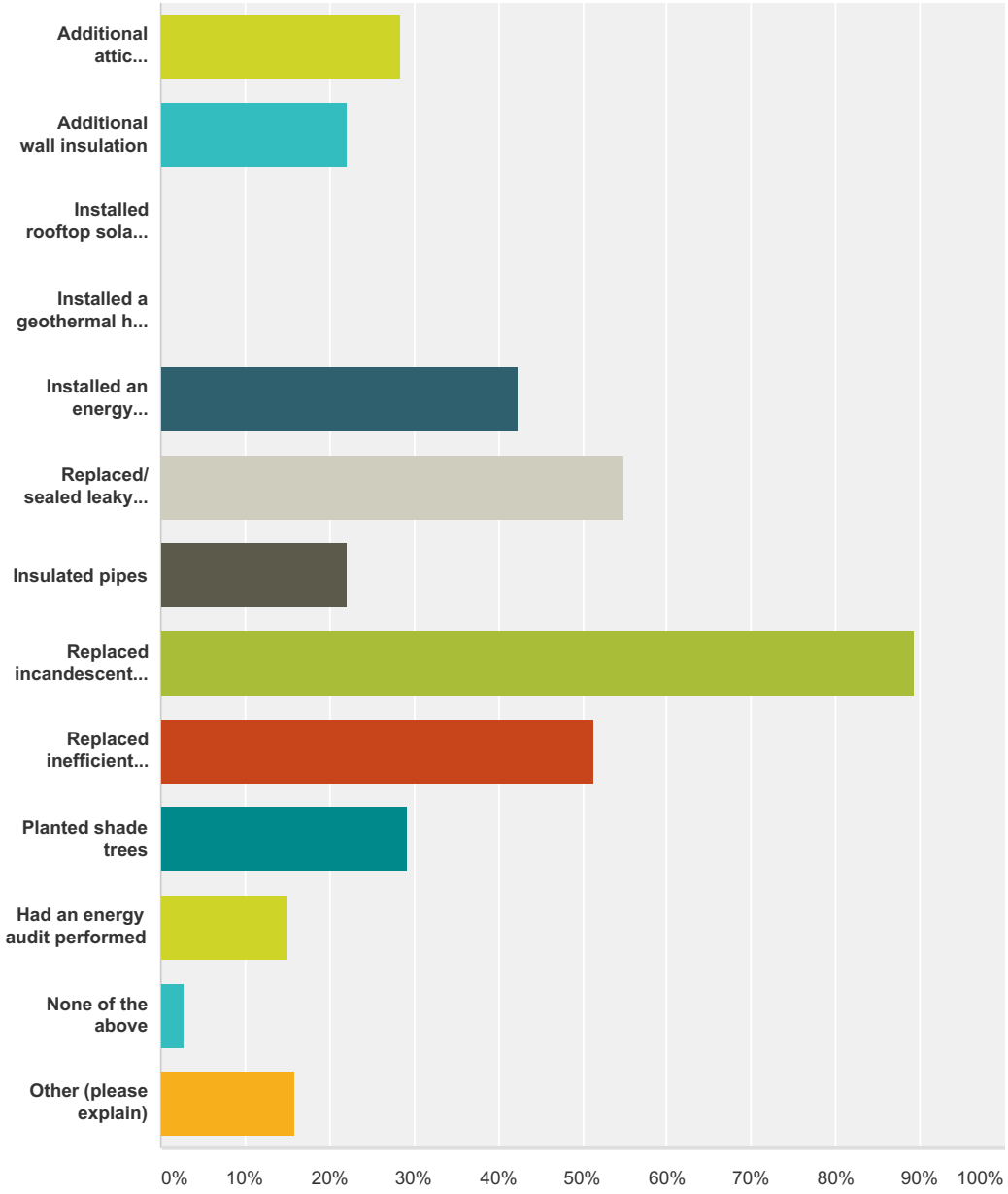
Answered: 127 Skipped: 16



Answer Choices	Responses	
High	**55.91%**	71
Medium	**36.22%**	46
Low	**7.09%**	9
Not a priority	**0.79%**	1
Total		**127**

Q6 Which of the following energy efficiency projects, if any, have you or the building/home owner carried out in the last 5 years?

Answered: 113 Skipped: 30



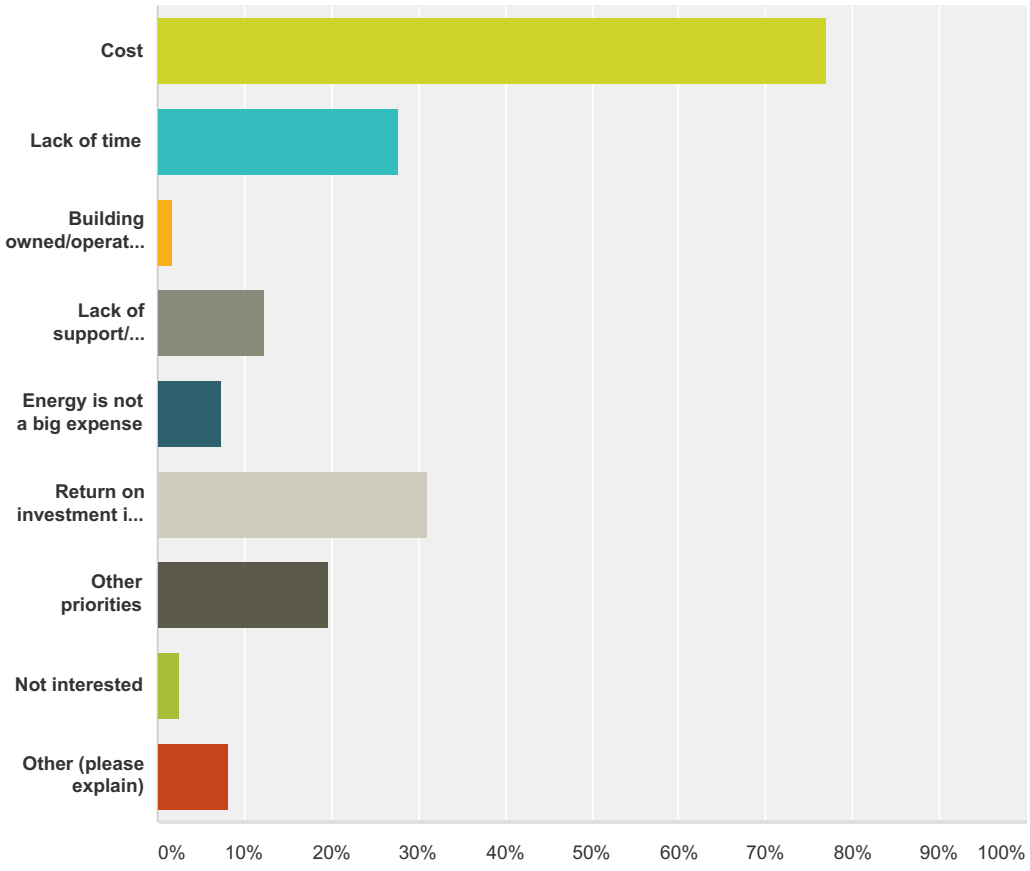
Answer Choices	Responses	
Additional attic insulation	**28.32%**	32
Additional wall insulation	**22.12%**	25
Installed rooftop solar panels	**0.00%**	0
Installed a geothermal heat pump	**0.00%**	0

Installed an energy efficient furnace	**42.48%**	48
Replaced/ sealed leaky doors or windows	**54.87%**	62
Insulated pipes	**22.12%**	25
Replaced incandescent light bulbs with CFLs or LEDs	**89.38%**	101
Replaced inefficient appliances	**51.33%**	58
Planted shade trees	**29.20%**	33
Had an energy audit performed	**15.04%**	17
None of the above	**2.65%**	3
Other (please explain)	**15.93%**	18
Total Respondents: 113		

#	Other (please explain)	Date
1	Thermostat	6/23/2017 4:03 PM
2	Installed a smart thermostat.	6/22/2017 8:00 PM
3	More efficient water heater. Reduction in general bloviating.	6/22/2017 5:30 PM
4	Replaced thermostat	6/22/2017 4:55 PM
5	Still lots more to do. Can the City provide a reference for residents? Easy access to info on the types of energy improvements we can look into.	6/22/2017 2:48 PM
6	Installed a smart thermostat (Nest)	6/20/2017 5:24 PM
7	I have a very shady roof or I would have solar panels too	6/20/2017 4:35 PM
8	Also added new roof, low-flow toilets, have revisited temp degrees in a/c & furnace usage	6/20/2017 10:26 AM
9	Had energy assessment and additional insulation done earlier.	6/19/2017 6:42 PM
10	Installesd new energy efficient windows	6/18/2017 1:34 PM
11	Never thought about the pipes. Looking at a solar roof system.	6/16/2017 8:33 AM
12	installed a smart meter and measuring device	6/15/2017 9:20 PM
13	replaced a water heater	6/15/2017 8:24 PM
14	energy efficient water heater installed	6/15/2017 6:46 PM
15	Smart thermostat	6/15/2017 2:41 PM
16	We do not use air conditioners, we mow with push mower, we keep house at 65 in day (winter) and 60 at night	6/15/2017 2:17 PM
17	Smart thermostat installed (NEST)	6/15/2017 1:46 PM
18	new windows on the second floor	6/15/2017 1:20 PM

Q7 Which factors have held you back from pursuing projects to increase your household or business energy efficiency? (Choose as many as applicable)

Answered: 122 Skipped: 21



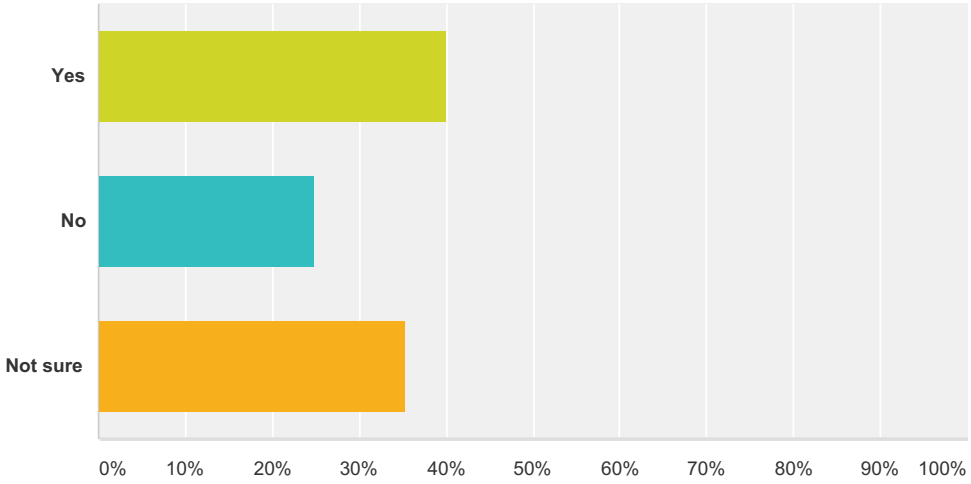
Answer Choices	Responses	
Cost	77.05%	94
Lack of time	27.87%	34
Building owned/operated by others	1.64%	2
Lack of support/ programs/ information	12.30%	15
Energy is not a big expense	7.38%	9
Return on investment is small or unclear	31.15%	38
Other priorities	19.67%	24
Not interested	2.46%	3
Other (please explain)	8.20%	10
Total Respondents: 122		

#	Other (please explain)	Date

1	Initial costs	6/27/2017 7:42 PM
2	Would love solar panels but city code restricts placement on my house. Converting to geo-thermal heating & cooling is cost-prohibitive. Commute to work in a car is 20-30 min; bus would take too long.	6/26/2017 8:30 PM
3	State tax credits are low / nonexistent compared to other states	6/24/2017 6:56 AM
4	Being in our 70's & 80's probably won't be here much longer.	6/22/2017 3:18 PM
5	We are retired seniors living on a fixed income in a modest 90+ year old wooden bungalow. We do not have the physical energy or the financial resources to tackle major energy saving projects. What I would like to see in place is community support and resources for the future owners of our property. Not lots of rules and restrictions about what has to be done, rather the pathway to renewable energy resources in PR.	6/18/2017 9:34 AM
6	Insulation is hard to retrofit into a century old house without tearing the walls apart...which isn't going to happen. Also, smart thermostats don't work with boilers.	6/17/2017 11:59 AM
7	small household--limited value to energy improvement. Good that we did finally get first-gallon water metering...	6/15/2017 9:14 PM
8	Would love to install solar panels, but don't know what makes sense	6/15/2017 8:24 PM
9	Historic home	6/15/2017 2:11 PM
10	Already implemented these projects years ago.	6/15/2017 1:55 PM

Q8 Within the next 5 years, are you planning any home or building renovations to increase energy efficiency?

Answered: 125 Skipped: 18



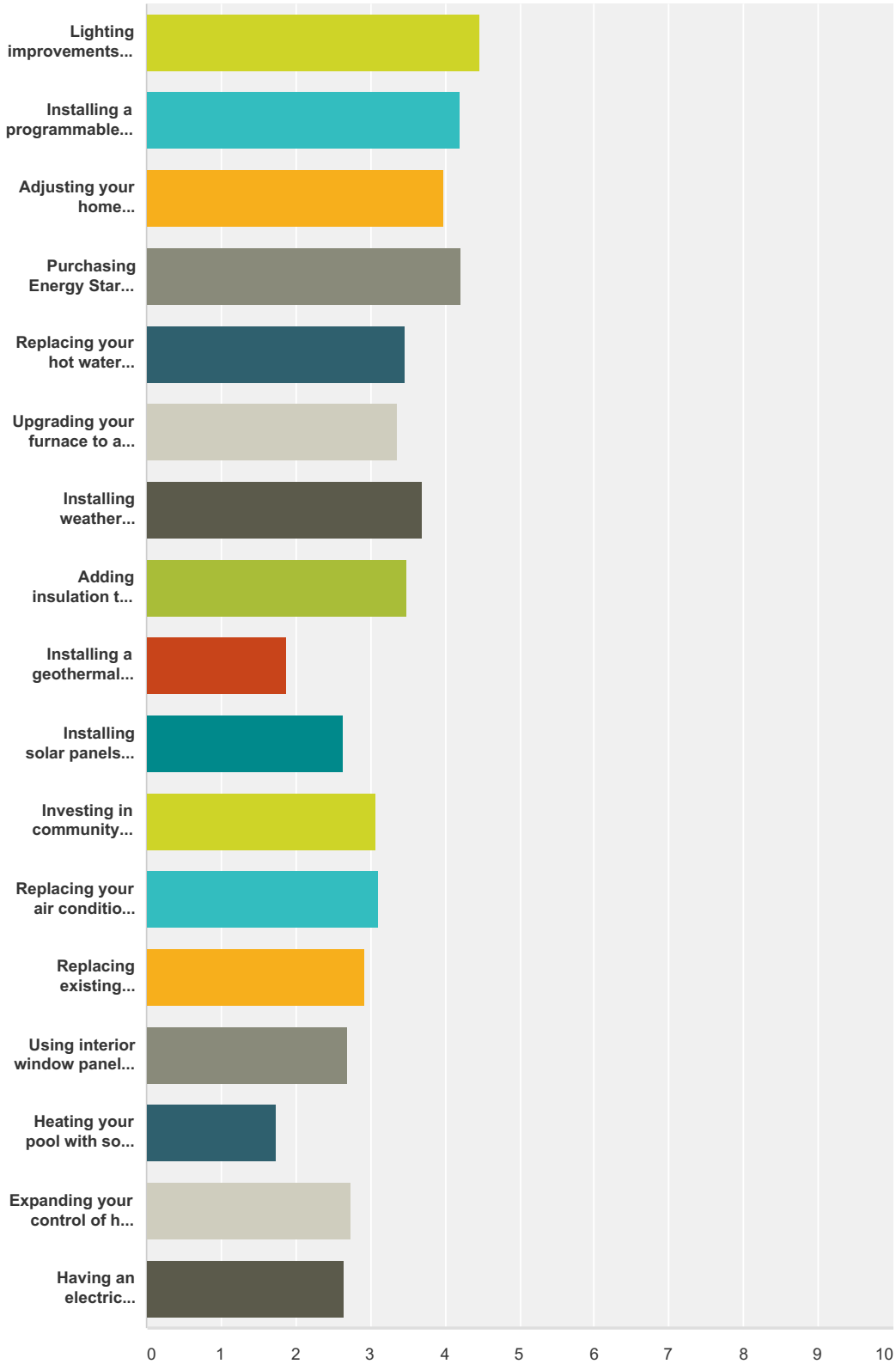
Answer Choices	Responses	
Yes	**40.00%**	50
No	**24.80%**	31
Not sure	**35.20%**	44
Total		**125**

#	If yes, please explain	Date
1	Considering solar roof	7/1/2017 10:29 AM
2	More insulation	6/25/2017 9:26 AM
3	Attic insulation	6/23/2017 12:10 PM
4	More insulation, house fan(s), replace doors, weatherproof windows	6/22/2017 11:26 PM
5	Replace windows	6/22/2017 4:55 PM
6	New furnace	6/22/2017 3:12 PM
7	Kitchen reno with insulation added to outside walls	6/20/2017 5:24 PM
8	We are hoping to add insulation this summer	6/20/2017 4:35 PM
9	New thermostat	6/19/2017 3:06 PM
10	New fridge. Possible solar panel. Just replaced doors, windows, furnace, hot water heater & AC. Questions below rated as 1 are actually n/a (already done) rather than not interested.	6/19/2017 4:22 AM
11	Replace boiler and hot water tank with energy efficient models	6/18/2017 1:34 PM
12	Windows and insulation	6/17/2017 11:41 PM
13	Possibly Solar roof,	6/16/2017 8:33 AM
14	Furnace replacement	6/16/2017 7:56 AM
15	Windows and doors	6/15/2017 9:30 PM

16	new storm door	6/15/2017 9:14 PM
17	Complete switch to LED from CFLs. Considering solar or small wind generation	6/15/2017 8:43 PM
18	replace furnace and another water heater, install programmable thermostat, replace more appliances, and see comment above about solar	6/15/2017 8:24 PM
19	Doing energy audit, more efficient appliances, attic ventilation	6/15/2017 5:03 PM
20	Windows	6/15/2017 4:12 PM
21	Additional attic insulation, skylight	6/15/2017 3:48 PM
22	more roof vents	6/15/2017 3:14 PM
23	Replace old storm windows, improve weather stripping, wall insulation, smart sprinkler controller	6/15/2017 2:41 PM
24	what exactly would depend on the amount of funds available to do the renovations	6/15/2017 2:21 PM
25	Solar Panels	6/15/2017 1:55 PM
26	Always retaining an open mind but have already done these things that are reflected in your next question #9.	6/15/2017 1:55 PM
27	windows on the first floor, insulation up-date	6/15/2017 1:20 PM
28	Plan to plant one or more shade trees, replace older appliances, replace older storm windows and doors. Would consider solar roof shingles and home energy storage battery if I can afford it.	6/15/2017 11:36 AM
29	Solar panels	6/15/2017 9:03 AM
30	Insulating, replacing windows/doors on back room of house.	6/15/2017 9:00 AM
31	New furnace, central air	6/15/2017 9:00 AM

Q9 On a scale of 1 to 5, how willing are you to explore the following energy efficiency measures, where 1 is not willing and 5 is very willing?

Answered: 125 Skipped: 18

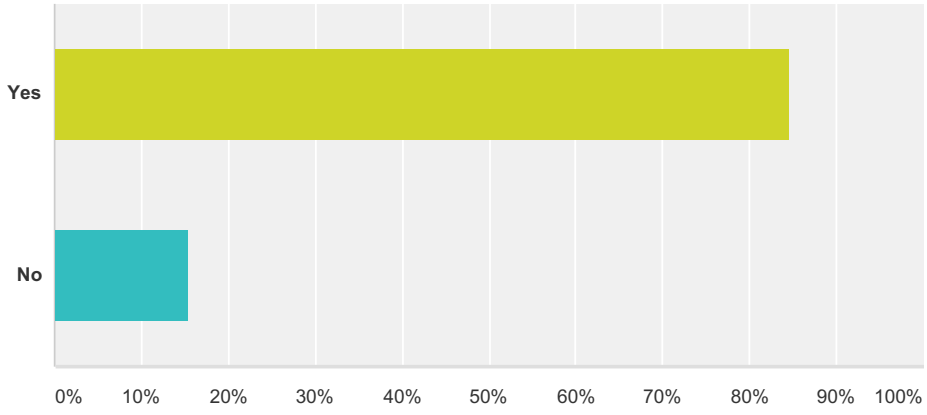


	1	2	3	4	5	Total	Weighted Average
Lighting improvements (Efficient LEDs, dimmers, occupancy sensors)	4.92% 6	0.82% 1	6.56% 8	18.85% 23	68.85% 84	122	4.46

Installing a programmable or smart thermostat	**11.76%** 14	**0.84%** 1	**7.56%** 9	**15.97%** 19	**63.87%** 76	119	4.19
Adjusting your home temperature by a few degrees to use less energy	**8.47%** 10	**6.78%** 8	**12.71%** 15	**21.19%** 25	**50.85%** 60	118	3.99
Purchasing Energy Star rated appliances	**6.61%** 8	**5.79%** 7	**8.26%** 10	**18.18%** 22	**61.16%** 74	121	4.21
Replacing your hot water system with a more efficient model	**15.97%** 19	**10.92%** 13	**17.65%** 21	**21.01%** 25	**34.45%** 41	119	3.47
Upgrading your furnace to an Energy Star rated model	**18.10%** 21	**11.21%** 13	**19.83%** 23	**17.24%** 20	**33.62%** 39	116	3.37
Installing weather stripping	**12.07%** 14	**9.48%** 11	**16.38%** 19	**21.55%** 25	**40.52%** 47	116	3.69
Adding insulation to your home	**14.04%** 16	**10.53%** 12	**21.93%** 25	**19.30%** 22	**34.21%** 39	114	3.49
Installing a geothermal heating system	**57.26%** 67	**17.95%** 21	**11.11%** 13	**7.69%** 9	**5.98%** 7	117	1.87
Installing solar panels on your home	**31.67%** 38	**17.50%** 21	**21.67%** 26	**15.00%** 18	**14.17%** 17	120	2.63
Investing in community renewable energy installations with your neighbors	**19.33%** 23	**14.29%** 17	**26.89%** 32	**19.33%** 23	**20.17%** 24	119	3.07
Replacing your air conditioner with an Energy Star rated model	**25.44%** 29	**11.40%** 13	**15.79%** 18	**21.05%** 24	**26.32%** 30	114	3.11
Replacing existing windows and doors with more efficient models	**29.82%** 34	**11.40%** 13	**15.79%** 18	**21.93%** 25	**21.05%** 24	114	2.93
Using interior window panels or film to improve window performance	**35.34%** 41	**18.10%** 21	**11.21%** 13	**12.07%** 14	**23.28%** 27	116	2.70
Heating your pool with solar energy or waste heat	**75.00%** 66	**1.14%** 1	**10.23%** 9	**3.41%** 3	**10.23%** 9	88	1.73
Expanding your control of home energy systems (i.e. through internet connected appliances)	**31.62%** 37	**9.40%** 11	**24.79%** 29	**21.37%** 25	**12.82%** 15	117	2.74
Having an electric vehicle	**35.29%** 42	**12.61%** 15	**21.85%** 26	**11.76%** 14	**18.49%** 22	119	2.66

Q10 Community Solar ProgramsA community solar project is a solar-electric system with shared ownership. Participants in a community solar project buy ownership shares in the solar system. The system is hosted at a location that can use the electricity and the host facility pays the system owners for the generated electricity. Participants in a community solar project can support renewable energy and earn a return on their investment. Community solar projects therefore allow the owners of the system to benefit from solar electricity even if they are unable to install a solar system at their house because of a lack of good solar access or ability to afford purchasing an entire solar system. If a Community Solar program was offered by the City of Pleasant Ridge, would you be interested in participating?

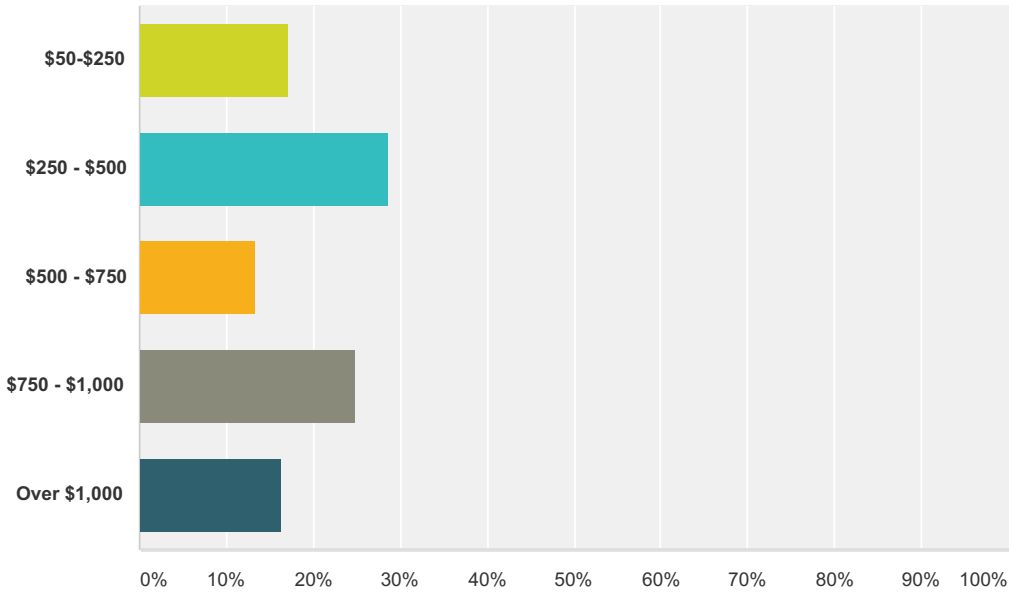
Answered: 123 Skipped: 20



Answer Choices	Responses	
Yes	84.55%	104
No	15.45%	19
Total		123

Q11 If interested in participating in a future Community Solar program, what level of investment would you consider?

Answered: 105 Skipped: 38



Answer Choices	Responses	
$50-$250	**17.14%**	18
$250 - $500	**28.57%**	30
$500 - $750	**13.33%**	14
$750 - $1,000	**24.76%**	26
Over $1,000	**16.19%**	17
Total		**105**

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: September 7, 2017

Re: Police Pension Millage Information Update

Overview

I will provide an update on the status of informational materials and upcoming information workshops for the Police Pension Millage at the September 12 City Commission meeting.

Background

Staff has been preparing fact sheets and other materials to provide information about the purpose of and need for the police pension millage. These materials will be available on the City website by the time of the September 12 meeting. An executive summary fact sheet will also be published in the upcoming Ridger to be delivered in early October.

Further, the dates for the information workshops are as follows:

- September 26 at 6 p.m. (the meet the candidates event will immediately follow at 7 p.m.)
- October 17 at 7 p.m.

Both events will be held at 4 Ridge. Staff will have a presentation about the purpose of and need for the police pension millage that summarizes the presentations that have already been made at City Commission meetings and the information that is available in the informational material available on the City website.

A postcard mailing will be sent to every house in the City notifying residents of the above workshop dates, and the availability of the informational materials on the City website. This mailing is scheduled to be delivered by the middle of the week of September 18.

Requested Action

No action is requested.