



REGULAR MEETING OF THE DOWAGIAC CITY COUNCIL

Municipal Building, 241 S. Front Street, Dowagiac, Michigan

Monday, October 28, 2013, 7:00 p.m.

AGENDA

- CALL TO ORDER -Mayor Donald D. Lyons
- PLEDGE OF ALLEGIANCE TO THE FLAG -Mayor Donald D. Lyons
- ROLL CALL -Mayor Donald D. Lyons
-Mayor Pro-Tem Leon Laylin
-Councilmember Charles Burling
-Councilmember James Dodd
-Councilmember Randall Gross, Sr.
-Councilmember Lori Hunt
-Councilmember Bob Schuur
- APPROVAL OF MINUTES OF PREVIOUS MEETING – October 14, 2013
- QUESTIONS FROM CITY COUNCIL –
- COMMENTS FROM THE AUDIENCE (NON-AGENDA) –
- COMMENTS FROM THE AUDIENCE (AGENDA) –
- PUBLIC HEARING –
1. Public hearing to receive public comments on the proposed Wastewater Treatment Plant Improvements Project.
- APPOINTMENTS –
1. Cemetery Board – Recommended by Mayor and offered by Mayor Pro-Tem:
Appoint Janice Hadley to fill an unexpired term of May 2014.
- RESOLUTIONS –
1. Resolution to adopt a final project plan for Wastewater system improvements and designating an authorized project representative.
 2. Resolution to approve an intergovernmental agreement with the City of Buchanan to purchase and share use of a sewer camera van.
 3. Resolution to accept the Michigan Department of Transportation closure report for the former maintenance garage on Wolf Street.

4. Resolution to set a fee for a PBT (Preliminary Breath Test) that is required for probation.
5. Resolution to amend the annual compensation of the elected position of City Clerk.
6. Resolution to amend the annual compensation of the elected position of City Treasurer.
7. Resolution to amend the annual compensation of the elected positions of Mayor and City Council members.
8. Resolution to authorize and direct the City Treasurer to pay the following bills and payroll due: (Roll Call)

BILLS

\$214,078.42

PAYROLL (2)

\$116,892.14

TOTAL

\$330,970.56

CITY MANAGER REPORT ON QUESTIONS FROM COUNCIL FROM PREVIOUS MEETINGS –

COMMENTS FROM CITY OFFICIALS –

ADJOURNMENT –

Kevin P. Anderson
City Manager

Attachments

DOWAGIAC CITY COUNCIL MEETING

Monday October 14, 2013

A regular meeting of the Dowagiac City Council was called to order by Mayor Pro-Tem Leon D. Laylin at 7:00 p.m.

Mayor Pro-Tem Laylin led the Pledge of Allegiance to the flag.

PRESENT: Mayor Pro-Tem Leon D. Laylin; Councilmembers James B. Dodd, Randall G. Gross, Sr., Lori A. Hunt and Bob B. Schuur.

ABSENT: Mayor Donald D. Lyons; Councilmember Charles K. Burling.

STAFF: City Manager Kevin P. Anderson and City Clerk James E. Snow.

Councilmember Dodd moved and Councilmember Hunt seconded that the minutes of the September 23, 2013 meeting be approved.

Approved unanimously.

APPOINTMENT

1. Local Officers Compensation Commission- Recommended by Mayor and offered by Mayor Pro-Tem:
Appoint Leon Anderson, Jr for a term expiring December 2016.

Councilmember Schuur moved and Councilmember Dodd seconded to approve the Mayor's appointment.

Approved unanimously.

CITY MANAGER REPORT

1. Memorandum of Understanding with Wayne Township

From the City Manager:

WAYNE TOWNSHIP MEMORANDUM OF UNDERSTANDING

Wayne Township has received notification from staff at the USDA that they are eligible for a grant in the amount of 45% of the total project cost to extend a water line to connect to the City's water system and extend the water line on Nubour Road past the City's former landfill. Additionally, they are also eligible for a low interest loan for a 40-year time period. The USDA is awaiting congressional approval of the federal budget before they can finalize agreements with Wayne Township. The total project cost is estimated to be \$1,050,000. The grant will be in the amount of \$472,500 and the loan will be in the amount of \$577,500.

DOWAGIAC CITY COUNCIL MEETING

Monday October 14, 2013

Page Two

Over the past several years the City has been in conversations with Wayne Township elected officials regarding both City and Township commitments to the project. Those conversations have now been reduced to writing and I have attached a Memorandum of Understanding (MOU). The MOU was approved by the Wayne Township Board on October 7, 2013. The following points are intended to give further background of the items listed in the MOU:

- The City will pay a special assessment of 15% of the water line construction project. A special assessment agreement is necessary because one municipality cannot special assess another without the other municipality's permission. Since the City is an owner of property in the special assessment district, it is appropriate and fair to participate in the construction costs for this project. 15% of the total projected cost is \$157,500. By contracting for a special assessment, it will allow the City to pay its special assessment over the 40-year term of the loan if the City so chooses.
- The only caveat to making payments over a long period of time is that if there is a cash flow problem that arises because of the timing of when assessments are levied and collected and the first bond payment for interest comes due, the City will prepay a portion of the City's special assessment agreement to make sure there is enough money in the fund to pay the interest cost. The first interest payment is projected to be about \$37,000. If the City prepays, the balance of special assessments would be reduced by \$37,000 leaving only \$127,500 to pay over 40 years at a fixed interest rate. The only potential cash flow timing issue is in the first year.
- This water line will run along one road with city residents on one side and township residents on the other. The Township cannot assess properties outside of their jurisdiction so the MOU commits the City to charge a tap fee for those city residents that want to be served by city water. The tap fee would be an amount equal to what the special assessments are for property owners in Wayne Township. These tap fees would then be used to reduce the debt for the project. The goal is that each user of the water system pays their fair share.
- Wayne Township agrees that if there is any new construction within this special assessment district, those residents would be required to connect to the municipal water system.
- The final piece of the agreement calls for the City's fire department to be automatically called to respond to any structure fires within Wayne Township. Historically, there have been between 4-7 structure fires in Wayne Township per year. The City of Dowagiac Fire Department is normally called to help in these situations. The only difference with this agreement is that the City's Fire Department will be automatically called by County Dispatch when this situation arises.

DOWAGIAC CITY COUNCIL MEETING

Monday October 14, 2013

Page Three

RECOMMENDATION

I recommend that City Council approve the attached Memorandum of Understanding with Wayne Township.

Councilmember Schuur moved and Councilmember Gross seconded that the recommendation of the City Manager be adopted.

ADOPTED unanimously.

RESOLUTIONS-

1. Resolution to appoint and enter into a contract service agreement for City Attorney services.

Councilmember Dodd offered and moved the adoption of the following resolution; seconded by Councilmember Schuur.

WHEREAS, Chapter 7 of the Dowagiac City Charter specifies the Administrative Officers of the City and provides for their appointment; and

WHEREAS, with the closure of long time City Attorney Westrate's office, the Administrative Officer position of City Attorney is currently vacant; and

WHEREAS, the Charter requires the City Attorney to be appointed by and compensation set by City Council; and

WHEREAS, proposals for City Attorney were solicited and interviews have been conducted; and

WHEREAS, the City Manager proposes the appointment of Sarah Mathews, of Mathews Law Office, PLLC, to fill the City Attorney vacancy.

NOW, THEREFORE, BE IT RESOLVED that the City of Dowagiac, by the affirmative vote of its Council, does hereby appoint Sarah Mathews, of Mathews Law Office, PLLC, as the City Attorney.

BE IT FURTHER RESOLVED that the City of Dowagiac does hereby authorize the City Manager to execute the attached Contract Services Agreement with Sarah Mathews for City Attorney services.

ADOPTED unanimously.

2. Resolution to authorize the Museum Advisory Committee to implement a fund-raising project for the Dowagiac Area History Museum.

DOWAGIAC CITY COUNCIL MEETING

Monday October 14, 2013

Page Four

Councilmember Schuur offered and moved the adoption of the following resolution; seconded by Councilmember Hunt.

WHEREAS, the Museum Advisory Committee has been developing a plan to raise funds for the growth, expansion and operation of the Dowagiac Area History Museum; and

WHEREAS, raising private funds would enhance museum experience for local residents and visitors; and

WHEREAS, it is typical for local museums to raise private funds for a variety of projects and operations.

NOW, THEREFORE, BE IT RESOLVED that the City Council does hereby authorize the Museum Advisory Committee to implement a fundraising project for the Dowagiac Area History Museum and authorizes that funds raised will be placed in a non-reverting fund for exclusive use at the museum.

ADOPTED unanimously.

3. Resolution to authorize budget amendments for fiscal year 2013-14.

Councilmember Schuur offered and moved the adoption of the following resolution; seconded by Councilmember Dodd.

WHEREAS, the City administration has reviewed the attached budgets for the 2013-14 fiscal year and the actual revenues and expenditures through September 30, 2013; and

WHEREAS, the City administration recommends revision of the attached budgets in accordance with the latest projections available; and

WHEREAS, the attached report for these funds indicates the current budget and the recommended budget revisions.

NOW, THEREFORE, BE IT RESOLVED that the City of Dowagiac, by the affirmative vote of its City Council, does hereby adopt the attached, recommended revised budgets.

ADOPTED unanimously.

4. Resolution to confirm the special assessment roll against properties remaining delinquent in the payment of code enforcement expenses incurred by the City.

Councilmember Dodd offered and moved the adoption of the following resolution; seconded by Councilmember Schuur.

DOWAGIAC CITY COUNCIL MEETING

Monday October 14, 2013

Page Five

WHEREAS, Chapter 66, Section 66.19 of the Dowagiac City Code, "Single Lot Assessments-Generally," provides that the City of Dowagiac is authorized to levy a special assessment against single premises for expenses which are chargeable against such premises under the provisions of the Dowagiac City Code; and

WHEREAS, the Dowagiac City Council, upon due consideration and deliberation, determined for the preservation of the public peace, health and safety of the city that certain deteriorating property condition(s) existed on private properties described in Appendix A, attached hereto and incorporated herein by reference, and that the abatement by the City of such deteriorating property condition(s) was necessary by virtue of non-compliance with the provisions of Chapter 18 of the Dowagiac City Code; and

WHEREAS, this expense is chargeable against such premises and the owner thereof under the provisions of the Charter, the Code and the law of the State of Michigan and is not of the class required to be prorated among several lots and parcels of land in a special assessment district; and

WHEREAS, an account of labor, material, and services for which such expenses incurred has been billed to the property owner by the City Building Official, as provided in Chapter 66 of the Dowagiac City Code; and

WHEREAS, this bill had not been paid; and

WHEREAS, the City Manager has directed the City Assessor to prepare a special assessment roll covering all such charges which have not been paid; and

WHEREAS, said roll has been filed with the City Clerk and is now being presented to the Council for confirmation and levy; and

WHEREAS, said special assessment roll is attached hereto and made a part of this resolution.

NOW, THEREFORE, BE IT RESOLVED that the Dowagiac City Council hereby confirms the attached special assessment roll for the parcels more fully described in Appendix A attached hereto and incorporated herein by reference and directs the City Administration to levy said assessments against the individual properties therein set forth.

ADOPTED unanimously.

5. Resolution to confirm the special assessment roll against properties remaining delinquent in the payment of utility bill expenses incurred by the City.

DOWAGIAC CITY COUNCIL MEETING

Monday October 14, 2013

Page Six

Councilmember Schuur offered and moved the adoption of the following resolution; seconded by Councilmember Gross.

WHEREAS, Chapter 82, Section 82.24 (c) of the Dowagiac City Code, "UTILITIES", provides that the City of Dowagiac is authorized to place as a lien on the premises to which electric, water and/or sewer service is provided for delinquent utilities for six (6) months or more; and

WHEREAS, delinquent utilities with such lien are charged on the next property tax bill for the premises; and

WHEREAS, the Dowagiac City Council upon review of the various single premises described in Appendix A attached hereto and incorporated herein by reference, determined by virtue of non-compliance with the provisions of Chapter 82, Section 82-24 (c) of the Dowagiac City Code; and

WHEREAS, the City Manager has directed the City Assessor to prepare a special assessment roll covering all such charges which have not been paid; and

WHEREAS, said roll has been filed with the City Clerk and is now being presented to the Council for confirmation and levy; and

WHEREAS, said special assessment roll is attached hereto and made a part of this resolution.

NOW, THEREFORE, BE IT RESOLVED that the City of Dowagiac, by the affirmative vote of its City Council, does hereby confirm the attached special assessment roll for the parcels more fully described in Appendix A attached hereto and incorporated herein by reference and directs the City Administration to levy said assessments against the individual properties therein set forth.

ADOPTED unanimously.

6. Resolution to authorize and direct the City Treasurer to pay the following bills and payroll due:

Councilmember Schuur offered and moved the adoption of the following resolution; seconded by Councilmember Dodd.

WHEREAS, the following information has been reviewed by the City Manager and City Treasurer and is being presented to City Council with a recommendation to approve invoices and payroll #1 for the period ending 10/10/13:

Invoices FY2012-13: 670,332.82
Invoices FY 2013-14: 35,048.25

DOWAGIAC CITY COUNCIL MEETING

Monday October 14, 2013

Page Seven

Payroll: 113,429.14

Total: 818,810.21

BE IT RESOLVED that the City Manager and City Treasurer are hereby authorized and directed to pay the following bills and payroll due:

Invoices	Payroll	Total
\$705,381.07	\$113,429.14	\$818,810.21

ADOPTED on a roll call vote.

Ayes: Five (5) Dodd, Gross, Hunt, Laylin and Schuur

Nays: None (0)

Absent: One (1) Burling

Abstain: None (0)

RESOLUTIONS, Continued (CLOSED SESSION)

7. Resolution to adjourn to a closed session to discuss strategies to deal with litigation.

Councilmember Dodd offered and moved the adoption of the following resolution; seconded by Councilmember Gross.

WHEREAS, the Michigan Open Meetings Law, Public Act 267 of the Public Acts of 1976 as amended, provides that public bodies may meet in closed session for the purpose to discuss strategies for dealing with litigation; and

WHEREAS, the Mayor and City Council desire to meet with the City Manager and the City Attorney to discuss litigation.

NOW, THEREFORE, BE IT RESOLVED the City Council will hereby adjourn to closed session to discuss litigation.

ADOPTED on a roll call vote.

DOWAGIAC CITY COUNCIL MEETING

Monday October 14, 2013

Page Eight

Ayes: Five (5) Dodd, Gross, Hunt, Laylin and Schuur

Nays: None (0)

Absent: One (1) Burling

Abstain: None (0)

TIME: 7:37 P.M.

LATER: 8:37 P.M.

Upon motion by Councilmember Schuur and seconded by Councilmember Dodd, the Dowagiac City Council adjourned at 8:37 p.m.

Leon D. Laylin, Mayor Pro-Tem

James E. Snow, City Clerk

CITY OF DOWAGIAC

MEMO TO: Mayor Lyons and City Council Members

FROM: Kevin P. Anderson, City Manager

DATE: October 25, 2013

SUBJECT: Appointment to Boards and Commissions

A Mayoral appointment is on Monday's agenda for your consideration. The appointment is recommended by the Mayor and offered by the Mayor Pro-Tem. The proposed appointment is as follows:

Cemetery Board

- ✓ Appoint Janice Hadley to fill an unexpired term of May 2014.

CITY OF DOWAGIAC

MEMO TO: Mayor Lyons and City Council Members

FROM: Kevin P. Anderson, City Manager

DATE: October 25, 2013

SUBJECT: Wastewater Treatment Plant SRF Project Plan Amendment 1

For the past two years, the City of Dowagiac has been working with consulting engineering firms to develop a plan consistent with the State Revolving Loan Fund (SRF) so that the City can qualify for grants and low interest loans for major improvement projects at the wastewater treatment facility. The plan calls for a phased approach for making improvements over the next 10 years. The initial plan calls for two major construction projects that will increase capacity and reduce operating costs by replacing existing blowers with smaller, more efficient units with variable speed drives.

It is anticipated that the project will be paid for through a combination of grants, low interest loans, energy efficiency savings and budgeted capital funds.

A public hearing is scheduled during the City Council meeting on October 28 at 7:00 p.m. After the public hearing it will be Council's first opportunity to consider adoption of the project plan.

The SRF Project Plan Amendment 1 is in the online version of the agenda and has not been printed to save paper and printing costs. Please let me know if you would like a paper copy.

RECOMMENDATION

Approve a resolution authorizing the STF Project Plan Amendment 1 for the City of Dowagiac wastewater treatment plant.

Support Documents:

- Cover Memo-City Mgr.
- Resolution
- Project Plan/Amendment

**A RESOLUTION ADOPTING A FINAL PROJECT PLAN
FOR WASTEWATER SYSTEM IMPROVEMENTS AND
DESIGNATING AN AUTHORIZED PROJECT REPRESENTATIVE**

WHEREAS, the _____ City of Dowagiac _____ (*legal name of applicant*) recognizes the need to make improvements to its existing wastewater treatment and collection system; and

WHEREAS, the _____ City of Dowagiac _____ (*legal name of applicant*) authorized _____ Fleis & Vandenbrink Engineering, Inc. _____ (*name of consulting engineering firm*) to prepare a Project Plan, which recommends the construction of _____ improvements to the City of Dowagiac _____
_____ Wastewater Treatment Plant as specified in the SRF Project Plan Amendment 1 _____
_____ ; and

WHEREAS, said Project Plan was presented at a Public Hearing held on _____ October 28, 2013 _____ and all public comments have been considered and addressed;

NOW THEREFORE BE IT RESOLVED, that the _____ City of Dowagiac _____ (*legal name of applicant*) formally adopts said Project Plan and agrees to implement the selected alternative (Alternative No. ~~xxxxxxx~~ WWTP-C-2 and Alternative No. WWTP-D-3.

BE IT FURTHER RESOLVED, that the _____ City Manager _____ (*title of the designee's position*), a position currently held by _____ Kevin P. Anderson _____ (*name of the designee*), is designated as the authorized representative for all activities associated with the project referenced above, including the submittal of said Project Plan as the first step in applying to the State of Michigan for a revolving fund loan to assist in the implementation of the selected alternative.

Yeas:

Nays:

Abstain:

Absent:

I certify that the above Resolution was adopted by _____ (*the governing body of the applicant*) on _____.

BY: _____
Name and Title (*please print or type*)

Signature

Date

NOTICE OF PUBLIC HEARING

The City of Dowagiac will hold a public hearing on the proposed Wastewater Treatment Plant Improvements project for the purpose of receiving comments from interested persons.

The hearing will be held at 7:00 p.m. on October 28, 2013 at City Hall located at 241 S. Front Street, Dowagiac, Michigan 49047.

The purpose of the proposed project is to address inefficient and aging aeration equipment and to correct a hydraulic bottleneck at the tertiary filtration process.

Project construction will involve replacing the antiquated aeration blowers, diffusers and controls that provide air to the aeration tanks with new, more efficient equipment. The project will also include removal of the existing sand filters and installation of a new tertiary disc filter system.

The proposed project is not anticipated to impact the cultural or environmental climate of the area.

The estimated cost to users for the proposed project will be a monthly increase of \$1.20 for a typical residential user.

Copies of the plan detailing the proposed project are available for inspection at City Hall – 241 S. Front Street, Dowagiac, Michigan 49047.

Written comments received before the hearing record is closed on October 28, 2013 will receive responses in the final project plan. Written comments should be sent to:

The City of Dowagiac
Attn: Kevin P. Anderson, City Manager
241 S. Front Street
PO Box 430
Dowagiac, MI 49047

**CITY OF DOWAGIAC
SRF PROJECT PLAN AMENDMENT NO. 1
MAY 22, 2013**

TABLE OF CONTENTS

	PAGE NO.
I. PURPOSE	1
II. EXECUTIVE SUMMARY	1
III. SUMMARY OF PROJECT PLAN MODIFICATIONS	2
IV. SECONDARY TREATMENT	2
V. TERTIARY FILTRATION ALTERNATIVES	4
VI. USER COSTS	5
VII. CAPITAL IMPROVEMENTS AND ASSET MANAGEMENT PLAN	5
VIII. ENVIRONMENTAL EVALUATION	5
 APPENDICES	
APPENDIX A – GREEN PROJECT RESERVE	

PURPOSE

This document is an Amendment to the draft City of Dowagiac Clean Water State Revolving Fund (SRF) Project Plan prepared in May 2012; herein referred to as the 2012 Project Plan. This Amendment further defines the scope of the proposed SRF Project and provides the rationale for deferring some of the less urgent work developed in the Project Plan to a ten year capital improvements program.

This Amendment is a part of the 2012 Project Plan and both the 2013 Amendment and the 2012 Project Plan were placed on Public Display in accordance with the SRF Program Public Participation requirements. In addition to refining the scope to be implemented as part of an SRF Project, this Amendment updates the environmental reviews, as appropriate, and outlines the Green Project Reserve eligibility for certain portions of the Selected Alternatives.

EXECUTIVE SUMMARY

In May 2012, the City of Dowagiac (City) prepared a State Revolving Fund (SRF) Project Plan for the purpose of obtaining funding to make necessary improvements at the City's Wastewater Treatment Plant (WWTP) and wastewater collection system through the SRF loan program. The SRF loan program provides low-interest loans for financing WWTP and wastewater collection system improvements.

The 2012 Project Plan identified a total of nine selected WWTP and ten pump station improvements projects, with a total estimated capital cost of \$4.98 million. While all of these improvements will become necessary at some point in the foreseeable future to maintain a reliable and effective wastewater utility, the total cost of the improvements represents a substantial financial hurdle to the City. A review of the individual selected alternatives identified two areas of the WWTP where the anticipated capital investment will provide immediate benefits with regard to the integrity of the treatment process while reducing operation and maintenance costs. This Amendment recommends implementing the following Improvements from the 2012 Project Plan as the 2014 SRF Project:

- Secondary Treatment Alternative WWTP-C-2 – Optimum Performance of Existing Facilities
- Tertiary Filtration Alternative WWTP-D-3 – Installation of Disc Filters

The energy and savings realized from these improvements, will qualify many components of the two alternatives for forgiveness of a portion of the loan principle amount through the SRF's Green Project Reserve (GPR) program.

The remaining Alternatives developed in the 2012 Project Plan are necessary and will likely become urgent in the near future. As such, they will be addressed through an Asset Management Plan with a ten year capital improvements program for the WWTP and wastewater collection system. The capital improvements program will prioritize the remainder of the needed improvements and recommend an implementation schedule. It is anticipated that preparation of the Asset Management Plan will be funded through the new Stormwater, Asset management, and Wastewater (SAW) grant and loan program being developed by the MDEQ.

SUMMARY OF PROJECT PLAN MODIFICATIONS

The 2012 Project Plan developed and evaluated a number of improvements that will be required to maintain the long-term efficacy of the wastewater collection system and WWTP. Table 31 of Section IV – Selected Alternatives provides a summary list of the identified projects. Many of the improvements address the age of the system and should be implemented in the near term to protect the significant capital investment the City has made in the existing systems. Some of the improvements are both urgent and offer significant savings with regard to energy demand.

The projected capital cost to immediately implement all of the alternatives developed in the 2012 Project Plan is \$4.98 million. A project of this magnitude would present a significant financial challenge to the City. The approach taken with this Amendment is to prioritize the improvements and refine the scope of the SRF Project to address the most urgent and immediate needs, deferring less critical needs to a ten year capital improvements program. Doing so will allow the City to build reserves in the sewer fund over a period of several years and strategically address the needed capital improvements through an Asset Management Plan.

The construction of the improvements proposed in this Amendment is anticipated to begin in FY2014 and the remaining improvements, as summarized in Table 31, will be completed over the course of the next several years. The City's most immediate needs include improvements to the secondary treatment and tertiary treatment systems; Alternative WWTP-C-2 and Alternative WWTP-D-3 address these needs. The urgency of implementing these alternatives relates to the age and condition of the existing facilities as well as the substantial energy that can be realized.

Implementing Alternative WWTP-C-2 and Alternative WWTP-D-3 will correct immediate issues such as deteriorated concrete, aged equipment, code issues, and excessive energy consumption. The money saved through the implementation of these two Alternatives in terms of ongoing Operation and Maintenance (O&M) costs can then be used to help fund the remaining improvements. Additionally, the improvements proposed under Alternative WWTP-D-3 in the 2012 Project Plan will address a hydraulic issue in the existing tertiary filters that limits the plant hydraulic capacity to 1.8 million gallons per day (MGD). The WWTP is rated 2.5 MGD average day and 4.0 MGD peak so the bottleneck at the tertiary filters is significant.

This Amendment provides supplemental information regarding the need for these improvements and outlines the Green Project Reserve eligibility for certain elements.

SECONDARY TREATMENT

The largest energy use at the WWTP relates to the aeration blowers that supply air to the activated sludge process and aerobic digestion. The City of Dowagiac WWTP was designed and built when energy costs were relatively low and energy conservation was not a major factor in the decision making process. The aeration equipment available at that time was much less efficient as compared to technologies currently available for implementation. Alternative WWTP-C-2 involves replacing the existing coarse bubble diffusers with fine bubble diffusers, replacing the existing blowers with smaller, more efficient units, and providing the necessary controls to optimize air delivery and the resulting supplied power.

The existing activated sludge aeration process consists of three aeration basins operated in parallel. Air is continuously delivered to these basins to provide mixing and to maintain a sufficient dissolved

oxygen (DO) level for adequate microbiological treatment of the wastewater. The air is supplied to the aeration basins by three Spencer turbine blowers that were installed when the WWTP was expanded in the late 1970's.

As described in the 2012 Project Plan, the existing blowers are inefficient and functioning well beyond their useful life, presenting significant operational challenges. Since there is no way to throttle the inlet air, the blowers must operate at 100% capacity. Some efficiency could be gained if the air delivery could be controlled based on the air demand required for adequate treatment of the wastewater. However, the existing aeration system is so inefficient and outdated that modifications to allow for optimization of air delivery would not be cost effective.

The selected Secondary Treatment Alternative in the 2012 Project Plan is Alternative WWTP-C-2, Optimum Performance of Existing Facilities, with an estimated construction cost of \$1,309,050. This Alternative consists of a series of upgrades and improvements to the existing secondary treatment process. While all of the improvements identified will be required to provide for continued operation of the secondary treatment facilities, a few key components will also provide the City with significant energy savings by addressing the shortcomings of the existing aeration system discussed above. These energy savings can then be used to partially fund future improvements to the WWTP. The upgrades and improvements outlined in Alternative WWTP-C-2 in the 2012 SRF Project Plan that will significantly increase energy efficiency include:

- Installation of three new high-efficiency variable speed blowers dedicated to the activated sludge process with new automated controls and valves. The new blowers will be connected to the WWTP Supervisory Control and Data Acquisition (SCADA) system for automated control and monitoring.
- Installation of D.O. probes and transmitters connected to the WWTP SCADA system for real-time aeration system control and monitoring.
- Replacement of the existing air flow meters and integration into the WWTP SCADA system.
- Replacement of the existing coarse bubble diffuser system with much more efficient fine bubble diffusers.

While some of the repairs to the existing secondary treatment process included in Alternative WWTP-C-2 will not necessarily improve the efficiency of the aeration system (and will thus not be eligible for principle forgiveness through the GPR program), these repairs are necessary and will be less costly if completed as part of the aeration system upgrades. This is primarily due to the cost of dewatering and cleaning the process tanks, efficiency in performing the work without the existing or proposed aeration systems present and minimizing future disruption of the secondary process.

The proposed fine bubble diffuser aeration system (including the new blowers, D.O. monitoring system, and SCADA control improvements) will be considerably more efficient than the existing coarse bubble system, providing a three-fold increase to the oxygen transfer efficiency in the Secondary Treatment process. As such, the fine bubble diffusers will significantly reduce the air supply required, allowing smaller blowers to be provided.

Adding online D.O. monitoring and improving the SCADA control system will further enhance the energy savings by matching air supply to demand as is necessary for proper treatment of the wastewater. At current average operating conditions, energy savings of over 70% are possible through the proposed aeration system upgrades. The secondary treatment improvements will have

a great impact on the overall electrical energy consumption at the plant representing immediate savings that can be reinvested in the other needed improvements.

TERTIARY FILTRATION ALTERNATIVES

As described in the 2012 Project Plan, the secondary effluent is typically pumped to the tertiary filtration system for removal of suspended solids to very low levels to comply with NPDES Permit requirements. The existing tertiary filtration system consists of a four-cell multi-media gravity filter and ancillary equipment (feed pumps, back wash pumps, air wash blowers) that was installed as part of the 1980 WWTP improvements project.

The existing tertiary filtration system has been identified as a hydraulic bottleneck. Although the filters were originally rated for 2.5 MGD average flow and 4.0 MGD maximum daily flow; the maximum flow achievable through the existing filter cells is 1.8 MGD. The WWTP can receive flows greater than 2.0 MGD during wet weather. Flows received beyond the WWTP's capacity are routed to a storage lagoon. Wastewater stored in the lagoon is fed back to the WWTP when the high flows subside; however the tertiary filters are taken offline during lagoon dewatering operations to prevent solids overloading from algae.

As discussed in the 2012 Project Plan, the MDEQ has restricted the City from expanding its Service Area until the WWTP can reliably treat 2.5 MGD. The tertiary filtration system must be improved in order to restore the actual WWTP capacity.

The 2012 Project Plan presented four tertiary treatment alternatives, including two principal alternatives; WWTP-D-2 and WWTP-D-3. The net present worth analysis presented in Table 21 of the 2012 Project Plan indicates the WWTP-D-3, Installation of Disc Filters, is the most cost effective alternative.

SELECTED TERTIARY FILTRATION ALTERNATIVE – WWTP-D-3

Alternative WWTP-D-3 remains the recommended alternative to address the needs for the tertiary filtration process. The Recommended Alternative includes the following items:

- Removal of the existing filter feed pumps and associated piping
- Installation of higher efficiency filter feed pumps and Variable Frequency Drives (VFDs)
- Installation of two parallel disc filter units
- Filter piping improvements
- Valve replacement
- Improvements to the filter building
- Upgrades to the electrical and control systems

The estimated construction cost for Alternative WWTP-D-3 is \$554,800.

The Recommended Alternative will replace inefficient filter feed pumps and an antiquated filter process with more efficient pumps and newer, more efficient filtration technology. The new disc filter process is anticipated to reduce electrical usage approximately 36% over the existing filter process and approximately 25% over Alternative WWTP-D-2. In addition to the significant electrical savings, the disc filter process is expected to require 94% less backwash water than the existing filter process and 88% less backwash water than Alternative WWTP-D-2. Reducing the volume of backwash

water reduces the amount of water that is returned to the head of the WWTP and frees up treatment capacity.

USER COSTS

The 2012 Project Plan presented the increase in monthly user charge rates for each alternative. The monthly charge increase for a typical residential user for the Alternatives recommended in this Amendment is presented in the following table. The estimated monthly user cost is based on a loan amount for the entire construction cost, not including the GPR principal forgiveness. Additionally, the estimated user cost does not take into consideration the energy savings realized by the Selected Alternatives. Any savings due to the GPR and/or electrical costs would be applied to the sewer enterprise fund and be available to implement the other identified capital improvement projects.

Alternative	Estimated Construction Cost	Estimated Monthly User Cost*
Secondary Treatment Alternative WWTP-C-2 – Optimum Performance of Existing Facilities	\$ 1,309,050	\$0.84
Tertiary Treatment Alternative WWTP-D-3 – Installation of Disc Filters	\$ 554,800	\$0.36
TOTAL RECOMMENDED ALTERNATIVES	\$ 1,863,850	\$1.20

*F&V has reviewed these rates based on available information using basic financial calculations, however we are not a Municipal Financial Advisor. We recommend the City consult with a MFA to confirm and refine these rates.

CAPITAL IMPROVEMENTS AND ASSET MANAGEMENT PLAN

The remainder of the improvements discussed in the 2012 Project Plan will be required in the near future in order to prevent process failures at the WWTP. However, unlike the improvements recommended for immediate implementation, the remaining improvements will not restore existing hydraulic capacity or result in major energy savings at the WWTP. As such, in order to control the total project costs, the remainder of the improvements will be addressed in a multi-year capital improvements program that will be developed as a part of an Asset Management Plan. As previously discussed, this Plan is proposed to be developed and funded under the new SAW program.

ENVIRONMENTAL EVALUATION

Environmental reviews were performed for the 2012 Project Plan. Due to constantly changing conditions, the endangered species review portion of the environmental review process is only valid for six months. According to the USFWS Section 7 review website, there has been no change in the Federally-listed endangered, threatened, or candidate species for Cass County; therefore we conclude that the original finding of no affect to Federally-listed species is still valid.

A request has been submitted to Michigan Natural Features Inventory (MNFI) for an updated review regarding impacts to State-listed endangered, threatened, unique, or candidate species. The response from MNFI will be included in the final Amendment submitted to MDEQ.

Elaine J. Venema

From: Elaine J. Venema
Sent: Tuesday, September 17, 2013 11:47 AM
To: 'mnfi@msu.edu'
Cc: Jeff Pugh
Subject: Rare Species Review Request - Dowagiac WWTP
Attachments: Site Maps.pdf

Hi,

We're requesting a rare species review for the Dowagiac wastewater treatment plant area. Attached is a USGS quad map showing the WWTP location; Cass County, Silver Creek Twp (T5S. R16W) section 35. Work areas are outlined in red boxes on the attached site maps.

Specifically, the City is looking to construct improvements to the existing WWTP. Proposed work includes replacing the existing aeration diffusers in the aeration tanks and replacing the blowers in the Blower Building. Other work includes removing the existing sand filters and installing a more efficient tertiary filtration system in the same footprint. Any excavation and construction work is limited to the existing WWTP site.

Please email me an invoice and we will get payment to you right away.

Thanks,

Elaine J. Venema, PE

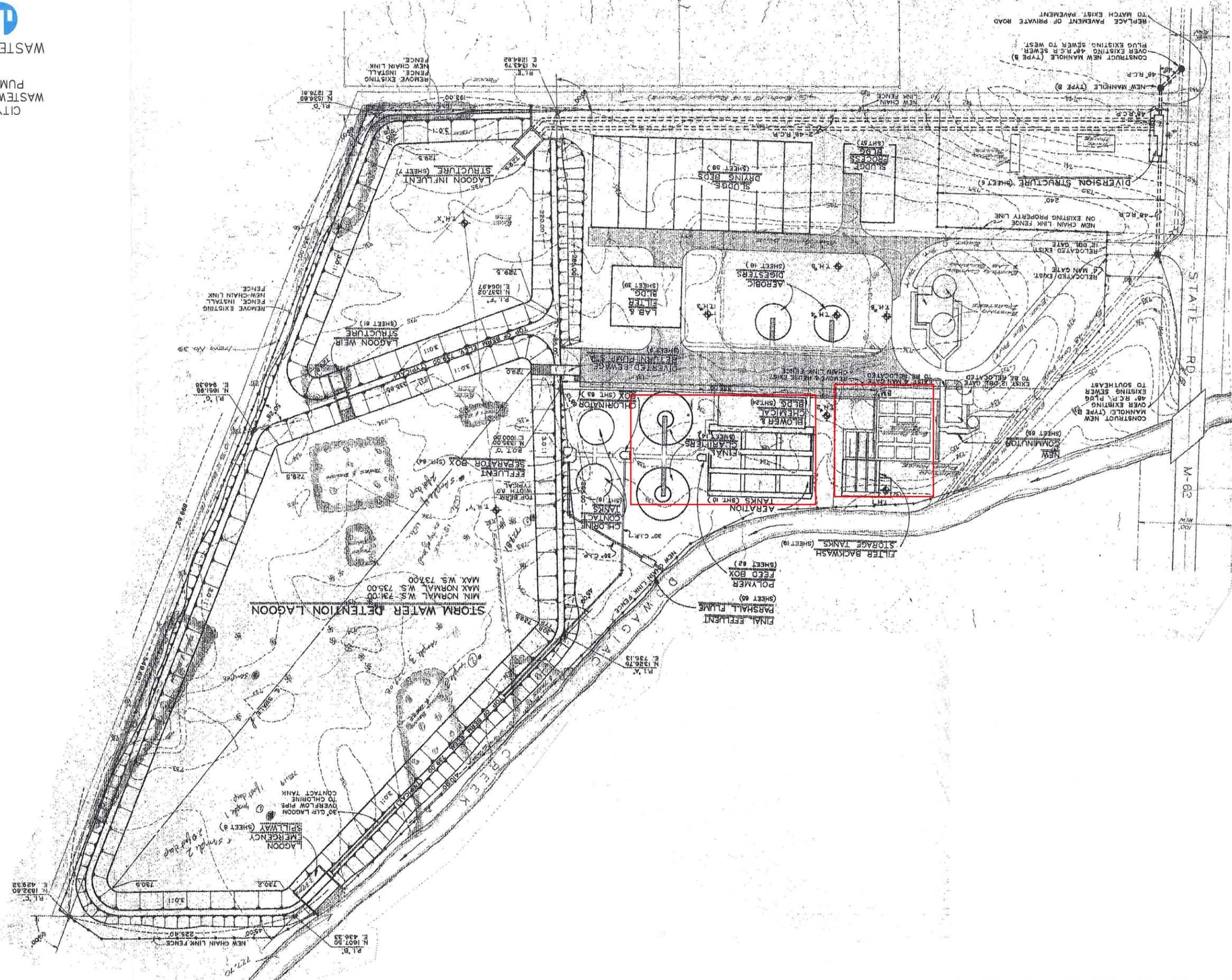
FLEIS & VANDENBRINK ENGINEERING, INC

2960 Lucerne Drive SE | Grand Rapids | MI | 49546

p: 616.977.1000 | c: 616.446.9669 | f: 616.977.1005

www.fveng.com

Please consider the environment before printing this email.



STATE RD.

M-62

STORM WATER DETENTION LAGOON

FINAL EFFLUENT
 PARSHALL FLUME
 POLYMER
 FEED BOX
 STORAGE TANKS (SHEET 19)

AERATION
 TANKS (SHEET 10)
 FINAL
 CLARIFIERS
 BLOWERS &
 CHEMICAL
 BLDG. (SHEET 4)

FILTER BACKWASH

STORAGE TANKS (SHEET 19)

POLYMER

FEED BOX

(SHEET 19)

FINAL EFFLUENT

PARSHALL FLUME

(SHEET 19)

STORAGE TANKS (SHEET 19)

Elaine J. Venema

From: Sanders, Mike (DNR) [SandersM1@michigan.gov]
Sent: Tuesday, September 17, 2013 12:35 PM
To: Elaine J. Venema
Cc: Jeff Pugh; Ridge, Sue (DNR)
Subject: RE: Rare Species Review Request - Dowagiac WWTP
Attachments: IA_1296_City of Dowagiac.pdf; INVOICE_RSR#1296.pdf

Hi Elaine,

Thank you for allowing MNFI to evaluate this project for potential impacts to legally protected species and other natural features. Attached is your invoice plus our standard Information Agreement (IA) which details how our data can be used.

Please let me know if you have questions. We will begin processing your data once payment is received and the signed IA is returned.

V/r,

Mike Sanders

Michael A. Sanders, MS, MA
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory
P.O. Box 13036
Lansing, MI 48901
desk: 517.241.2159
sander75@msu.edu

From: Elaine J. Venema [evenema@fveng.com]
Sent: Tuesday, September 17, 2013 11:46 AM
To: mnfi@msu.edu
Cc: Jeff Pugh
Subject: Rare Species Review Request - Dowagiac WWTP

Hi,

We're requesting a rare species review for the Dowagiac wastewater treatment plant area. Attached is a USGS quad map showing the WWTP location; Cass County, Silver Creek Twp (T5S. R16W) section 35. Work areas are outlined in red boxes on the attached site maps.

Specifically, the City is looking to construct improvements to the existing WWTP. Proposed work includes replacing the existing aeration diffusers in the aeration tanks and replacing the blowers in the Blower Building. Other work includes removing the existing sand filters and installing a more efficient tertiary filtration system in the same footprint. Any excavation and construction work is limited to the existing WWTP site.

Please email me an invoice and we will get payment to you right away.

Thanks,

Elaine J. Venema, PE
FLEIS & VANDENBRINK ENGINEERING, INC
2960 Lucerne Drive SE | Grand Rapids | MI | 49546
p: 616.977.1000 | c: 616.446.9669 | f: 616.977.1005
www.fveng.com

Please consider the environment before printing this email.

Information Agreement

The Michigan Natural Features Inventory (MNFI) is a member of the Natural Heritage Program Network and is part of Michigan State University Extension Service and the Michigan Department of Natural Resources. MNFI is an organization of professionals dedicated to the conservation of Michigan's special natural features. MNFI has the responsibility for inventorying and collecting information about the state's "elements of biological diversity". These data are used to guide conservation and land management activities throughout the state.

The MNFI database is an ongoing and continuously updated information base. The database is the only comprehensive single source of existing information on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. This database cannot provide a definitive statement on the presence, absence, or condition of the natural features in any given locality, since most sites have not been specifically or thoroughly surveyed. Furthermore, plant and animal populations and natural communities change with time. Therefore, the information services provided should not be regarded as a complete statement on the occurrence of special natural features of the area in question. In many cases the information may require the interpretation of a trained scientist.

The recipient(s) of the information understand that state endangered and threatened species are protected under state law (Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection). Any questions, observations, new findings, violations or permitting of project activities should be conducted with the Michigan Department of Natural Resources, Wildlife Division. Contact the Endangered Species Coordinator at (517) 373-1263. The recipient(s) of the information understand that federally endangered and threatened species are protected under federal law (Endangered Species Act of 1973). Any questions, observations, new findings, violations or permitting of project activities should be conducted with the U.S. Fish and Wildlife Service in East Lansing. Their phone number is (517) 351-2555. Recipients of the information are responsible for ensuring the protection of protected species before project activities begin.

MNFI is not a for-profit entity and fees for the data are turned back into database maintenance and program support. The costs for information can be obtained on our website MNFI.ANR.MSU.EDU under the services heading.

By acceptance of the information services made available through MNFI, the recipient understands that access to the information is provided for primary use only. MNFI requests that the user respect the confidential and sensitive nature of the information and restrict access to only those individuals requiring the information for the primary use. There should be no redistribution of the information. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection. Additionally, since the information is constantly being updated MNFI requests that any information service provided by MNFI is destroyed upon completion of the primary use. This information should be considered valid for one year only.

The user should identify MNFI as information contributors on any map or publication using MNFI information, as follows: **Michigan Natural Features Inventory. 2013. Biotics 4 - Michigan's Natural Heritage Database. Lansing, Michigan. (Accessed: Month Day, 2013).** Abbreviations are acceptable on maps if referenced in full on accompanying documents.



MSU EXTENSION

Michigan Natural Features Inventory

P.O. Box 13036
Lansing, MI 48901

(517) 373-1552
fax: (517) 373-9566

mnfi.anr.msu.edu

Rare Species Review #1296 - City of Dowagiac Waste Water Treatment Plant Improvements

Standard turn around

Rush order

Project or primary use of Information: data for legally protected species and other rare natural features.

Description of information: Section 35, T05S, R16W and surrounding 1.5 mile buffer.

Elaine Verema
Recipient (Please Print)

Elaine J. Neman
Signature

Fleis & Vanden Brink Engineering
Organization/Association

9/17/13
Date

SUMMARY

Following is a presentation of portions of the City of Dowagiac SRF Project Plan (with the May 22, 2013 Amendment) for Green Project Reserve (GPR) funding. Provisions of the Environmental Protection Agency's (EPA)'s GPR guidance document indicate that a number of the components in the Dowagiac Wastewater Treatment Plant (WWTP) Improvements project are eligible for "principal forgiveness", or a reduction in the loan capital amount.

As discussed in the May 22, 2013 Amendment, two of the Selected Alternatives in the SRF Project Plan are proposed as part of the 2014 SRF Project. The first Selected Alternative, entitled *Alternative WWTP-C-2 – Secondary Treatment, Optimum Performance of Existing Facilities*, outlines upgrades to the existing aeration system at the WWTP. The energy savings projected with this Alternative are in excess of 70% at current conditions and 50% at design flows and loadings as compared to the current system. The proposed improvements are being submitted under paragraph 3.2-2 of the Environmental Protection Agency's (EPA)'s GPR guidance document as a categorically eligible project that achieves at least a 20% reduction in energy consumption. As such, a business case is not required.

The second Selected Alternative, *WWTP-D-3 – Installation of Disc Filters*, upgrades the inefficient multimedia gravity filters to more efficient disc filters. The existing filtration system requires a great deal of backwash water and uses antiquated, inefficient feed pumps. The proposed filtration system would reduce the amount of backwash water needed by approximately 94% and reduce the electrical energy usage by approximately 36%. Due to these projected energy savings, the Disc Filter upgrade is also categorically eligible for GPR funding.

BACKGROUND

The aeration system improvements are discussed in detail as Alternative WWTP-C-2 in the *City of Dowagiac Wastewater System Project Plan for State Revolving Fund* project plan, dated May 2012, as modified by the May 22, 2013 Amendment. The tertiary filter improvements are presented as Alternative WWTP-D-3, as amended.

The Dowagiac WWTP serves the City of Dowagiac, the Cassopolis Area Utility Authority, the Sister Lakes Area Utility Authority, and Indian Lake. The plant has a peak rated capacity of 4.0 million gallons per day (MGD) and a design average capacity of 2.5 MGD. Plant processes include grit removal, comminution, primary clarification, complete mix activated sludge aeration with phosphorous removal, secondary clarification, tertiary filtration, and chlorination and dechlorination. Solids processes include aerobic sludge digestion and a rotary sludge press dewatering, followed by landfilling of the dewatered solids.

CLASSIFICATION

The proposed improvements to the secondary treatment facilities qualify for Categorical GPR principal forgiveness under Section 3.2-2 (Energy Efficient Categorical Projects) of the Environmental Protection Agency (EPA) *Procedures for Implementing Certain Provisions of EPA's Fiscal Year 2012 Appropriations Affecting the Clean Water and Drinking Water State Revolving Fund Programs* document. This categorical qualification is based on electrical energy savings in excess of 20% as a result of the project.

Similarly, the recommended tertiary filter alternative qualifies based on electrical energy savings greater than 20% and a reduction in backwash water generation.

CONFIRMATION

As previously mentioned, portions of the proposed improvements qualify for categorical GPR principal forgiveness based on energy savings. Following is a discussion for each project alternative, detailing the energy savings as a result of completing these alternatives:

Secondary Treatment Facilities

The plant currently has three aerated treatment basins. Two of the basins are used year round with the third basin typically used through the warmer months of the year to provide additional aeration capacity for ammonia-nitrogen removal (known as nitrification). Each of the aeration basins is equipped with a coarse bubble diffusion system. Coarse bubble diffusers, while relatively maintenance free, are inefficient at transferring oxygen from the supplied air into the wastewater when compared with currently available air diffusion technologies.

Air is supplied to the aeration basins by three existing Spencer centrifugal blowers, each rated at 3,250 cubic feet per minute (with an average blower efficiency of approximately 59%) and powered by a 150 horsepower motor. Two of the blowers are powered by original 1970's motors with a motor efficiency of approximately 80%. The third blower has been upgraded with an aftermarket premium efficiency motor with an efficiency of approximately 95%. The blowers are not equipped with inlet throttling valves so, when called to run, they operate at 100% capacity even when a smaller air volume would be sufficient.

The WWTP currently has no online monitoring system for the dissolved oxygen (D.O.) concentration in the aeration basins. WWTP operators periodically use a portable D.O. meter to monitor the D.O. concentration. This mode of operation results in excessively high D.O. concentrations. A review of the WWTP Monthly Operating Reports (MORs) from January 2011 through January 2013 shows an average aeration basin D.O. concentration of 5.8 mg/L (as opposed to the recommended minimum level of 2.0 mg/L), as well as significant day to day variations in the aeration basin D.O. concentrations.

Throughout the winter, a single blower is needed to meet the D.O. requirements of the aeration basins. However, during the warm summer months, a second blower is required at times to supply enough air. The increased air requirement is due to nitrification requirements and reduced oxygen transfer efficiency from the blower air into the wastewater. Due to the operational limitations of the existing system (lack of online D.O. monitoring and no automated control of the blowers), once the second blower is required (usually sometime in May), two blowers are run continuously (each at 100% capacity) through September. According to the WWTP personnel, with a single blower running, the blower amperage draw averages 175 Amps (112.6 hp). With two blowers running, the average amperage draw is 155 Amps (99.7 hp) per blower. Based on the second blower being required from May 15 through September 30, the energy costs associated with the current system operation are:

Fall/Winter/Spring:

1 blower X 112.6 hp X 0.7457 kW/hp X 24 hr/day X 226 day/yr = 455,431 kW-hr/yr

Summer:

2 blowers X 99.7 hp X 0.7457 kW/hp X 24 hr/day X 139 day/yr = 496,038 kW-hr/yr

Total of Existing Aeration Energy Usage:

Energy used = 455,431 kW-hr/yr + 496,038 kW-hr/yr = 951,469 kW-hr/yr

Energy cost = 1,352,998 kW-hr/yr X \$0.10 per kW-hr = \$95,147 per year

The proposed improvements to the aeration facilities include new variable speed blowers, rated at 1,150 standard cubic feet of air per minute (scfm) at full speed and capable of being slowed to supply lower air flow rates at reduced energy consumption. The new blowers will have an average blower efficiency of approximately 70% and will be powered by 75 horsepower premium efficiency motors with an efficiency of 95%. A D.O. monitoring system will also be added to the aeration basins. The D.O. monitors will be tied into the plant Supervisory Control and Data Acquisition (SCADA) system. The SCADA system will then be able to control the speed of the blowers to increase or decrease the amount of air being supplied in order to maintain a D.O concentration of 2.0 mg/L in the aeration basins. Additionally, the aeration basin diffuser system will be converted from coarse bubble diffusers to a fine bubble diffusion system. Fine bubble diffusers will provide increased oxygen transfer efficiency from the supplied air into the wastewater as compared to the existing coarse bubble diffusers and will result in the need for much smaller blowers.

Calculation of the amount of air needed requires knowledge of the organic and nutrient loadings to the aeration basins. Review of the WWTP MORs from January 2011 through January 2013 indicates that the current organic and nutrient concentrations in the influent to the aeration basins through the summer months average approximately 146 mg/L of BOD₅ and 16 mg/L of ammonia respectively. Through the winter months, the organic loading averages 168 mg/L of BOD₅ and ammonia concentrations are not measured since nitrification is not required.

At these organic and nutrient concentrations and at the current summer average day flow of 1.12 MGD, 68,000 pounds of air are required per day during the summer using the proposed aeration system (as opposed to 245,000 pounds of air delivered using the current aeration system). Through the winter months, when the average day flow drops to 1.07 MGD, 50,000 pounds of air are required per day using the proposed aeration system (as opposed to 209,000 pounds of air delivered using the current aeration system). The air calculations translate to an average air flow of 630 scfm through the summer and 463 scfm through the winter for the proposed aeration system. This means that, on average, 55% of current blower capacity is required to be in operation to supply the required air through the summer months and 40% of current blower capacity is required to be in operation to supply the required air through the winter months.

At current average flow and organic and nutrient concentrations, the energy required for the proposed aeration system is:

Fall/Winter/Spring:

0.40 blowers X 75 hp X 0.7457 kW/hp X 24 hr/day X 226 day/yr = 122,132 kW-hr/yr

Summer:

0.55 blowers X 75 hp X 0.7457 kW/hp X 24 hr/day X 139 day/yr = 102,210 kW-hr/yr

Total of Existing Aeration Energy Usage:

Energy used = 122,132 kW-hr/yr + 102,210 kW-hr/yr = 224,342 kW-hr/yr

Energy cost = 224,342 kW-hr/yr X \$0.10 per kW-hr = \$22,434 per year

The design average flow for the WWTP is 2.5 MGD and the peak flow is 4.0 MGD. Based on current average organic and nutrient concentrations, design concentrations of 150 mg/L for BOD₅ and 20 mg/L for ammonia were assumed for summer average day loadings and 120 mg/L for BOD₅ and 15 mg/L for ammonia were assumed for summer peak loadings. Based on these flow rates and concentrations, the proposed aeration system will require 160,000 pounds of air per day for the design average day flow and 196,000 pounds of air per day for the peak flow. These air requirements translate to air flows of 1,481 scfm and 1,815 scfm and will require 1.29 blowers and 1.58 blowers, respectively (based on proposed blower capacity). For the purpose of energy calculations, it is assumed that the current aeration system is sufficient to meet the design average and peak flows as currently operated (i.e. 2 blowers at full speed).

At design average and peak flows for summer organic and nutrient concentrations, the energy required for the proposed aeration system is:

Design Average:

Energy used = 1.29 blowers X 75 hp X 0.7457 kW/hp X 24 hr/day = 1,729 kW-hr/day

Energy cost = 1,729 kW-hr/day X \$0.10 per kW-hr = \$173

Peak Flow:

Energy used = 0.55 blowers X 75 hp X 0.7457 kW/hp X 24 hr/day = 2,118 kW-hr/day

Energy cost = 2,118 kW-hr/day X \$0.10 per kW-hr = \$212

At design average and peak flows for summer organic and nutrient concentrations, the energy required for the existing aeration system is:

Design Average and Peak Flow:

Energy used = 2 blowers X 99.7 hp X 0.7457 kW/hp X 24 hr/day = 3,569 kW-hr/day

Energy cost = 3,569 kW-hr/day X \$0.10 per kW-hr = \$357

Comparing the existing aeration system to the proposed aeration system, the energy and cost savings can be summarized as follows:

At Current Average Flow and Loading:

$((951,469 \text{ kW-hr/yr} - 224,342 \text{ kW-hr/yr})/951,469 \text{ kW-hr/yr}) \times 100\% = 76\%$ energy savings

$(951,469 \text{ kW-hr/yr} - 224,342 \text{ kW-hr/yr}) \times \$0.10/\text{kW-hr} = \$72,700$ per year savings

At Design Average Flow and Loading:

$((3,569 \text{ kW-hr/day} - 1,729 \text{ kW-hr/day})/3,569 \text{ kW-hr/day}) \times 100\% = 52\%$ energy savings

$(3,569 \text{ kW-hr/day} - 1,729 \text{ kW-hr/day}) \times \$0.10/\text{kW-hr} = \$184$ per day savings

At Peak Flow and Loading:

$((3,569 \text{ kW-hr/day} - 2,118 \text{ kW-hr/day})/3,569 \text{ kW-hr/day}) \times 100\% = 41\%$ energy savings

$(3,569 \text{ kW-hr/day} - 2,118 \text{ kW-hr/day}) \times \$0.10/\text{kW-hr} = \$145$ per day savings

The energy savings resulting from the proposed improvements to the aeration system at all design conditions exceeds the 20% guidance. As such, the energy savings qualify the project as categorically eligible.

Tertiary Filtration

The second Selected Alternative, *WWTP-D-3 – Installation of Disc Filters*, upgrades the inefficient multimedia gravity filters to more efficient fabric disc filters. The existing filtration system was designed to handle average influent flows of 2.5 MGD and peak flows up to 4.0 MGD; however the existing system is not currently achieving these loading rates. The City evaluated optimizing the existing filter system and also replacing the existing system with a more efficient technology.

The Recommended Alternative includes replacement of the existing multimedia (gravel/sand/anthracite) gravity filters with fabric disc filters, a newer, more efficient filter technology. The proposed disc filters have a much lower headloss than the existing filters, allowing for much smaller filter pump motors. The new filter feed pump motors will also be more efficient than the existing pump motors. In addition, because the proposed filters require less backwash water, the 30 hp backwash pumps would be replaced with 7.5 hp pumps.

The annual electrical usage for the existing tertiary filtration process is estimated at 258,455 kWh. Table 1 presents the motor loads, approximate runtimes, and electrical usage for the existing tertiary filters.

Table 1 - Electrical Usage Estimate, Existing Process

	Motor (hp)	No. of Motors	Total Motor (hp)	Est. BHP	Motor Efficiency	Est. Runtime (hrs/day)	Est. Runtime (hrs/yr)	Elec. Usage (kWh/yr)	Annual Cost (\$/yr)
Air wash blowers	20	2	40	20	85%	0.8	292	5,119	\$ 512
Filter feed pumps (C, C)	40	2	80	66	85%	12	3942	228,033	\$ 22,803
Filter feed pump (D)	30	1	30	25	85%	8	2602	57,008	\$ 5,701
Backwash feed pumps	30	2	60	30	85%	1.3	487	12,796	\$ 1,280
Backwash return pumps	2	1	2	2	85%	1.3	487	853	\$ 85
TOTAL								303,810	\$ 30,381

The annual electrical usage for the proposed disc filter process is estimated at 193,222 kWh. Table 2 presents the motor loads, approximate runtimes, and electrical usage for the proposed filtration process.

Table 2 - Electrical Usage Estimate, Proposed Process

	Motor (hp)	No. of Motors	Total Motor (hp)	Est. BHP	Motor Efficiency	Est. Runtime (hrs/day)	Est. Runtime (hrs/yr)	Elec. Usage (kWh/yr)	Annual Cost (\$/yr)
Filter feed pumps	25	2	50	46	88%	12	4380	169,088	\$ 16,909
Backwash feed pumps	7.5	2	15	15	88%	0.41	149	1,886	\$ 189
Filter drive	3	1	3	3	88%	24	8760	22,248	\$ 2,225
TOTAL								193,222	\$ 19,322

The difference in the electrical usage between the existing filtration process and the proposed filtration process is 110,588 kW-h per year, or approximately 36%.

In addition to the electrical savings, the proposed filters offer an additional environmental benefit. The backwash water required will be reduced by 94%. The existing filters must be backwashed at a

rate of 15 gallons per minute per square foot of filter media surface area. The filters are backwashed at a frequency dependent on the loading and solids content, but typically averaging twice per day for 10 minutes. This equates to approximately 98 million gallons per year or 19% of the influent flow rate. The proposed filters utilize approximately 1% of the influent flow rate for backwashing. This backwash water reduction significantly reduces the amount of backwash water routed back through the WWTP for additional treatment.

CONCLUSION

Significant energy and cost savings can be realized by converting the secondary treatment process into a fine bubble activated sludge process and installing new, higher efficiency, variable speed aeration blowers. The pre-design budgetary cost estimate of the improvements to the secondary treatment facilities is \$1,309,050, most of which should qualify for GPR principal forgiveness.

Similarly, the proposed disc filter system would substantially reduce the electrical usage due to smaller and more efficient filter feed pump and backwash pump motors, and elimination of the air wash blowers. In addition, the proposed filter system requires only a small fraction of the backwash water compared to the water volume necessary for the existing system. The pre-design budgetary cost estimate for the tertiary filter improvements is \$554,800, all of which should qualify for GPR principal forgiveness.

CITY OF DOWAGIAC

MEMO TO: Mayor Lyons and City Council Members

FROM: Kevin P. Anderson, City Manager

DATE: October 25, 2013

SUBJECT: Intergovernmental Agreement with City of Buchanan for a Sewer Camera Truck

While attending the 2013 Michigan Municipal League conference, I had the opportunity to talk with Buchanan's City Manager and discovered that they were in the process of purchasing a 2011 Ford Cargo Transit Van that is equipped with a sewer camera and all the controls necessary to video the sewer system per MDEQ operation and maintenance requirements. The City of Dowagiac's Department of Public Services had also begun investigating the potential of purchasing a sewer camera vehicle so we began discussing how one jointly purchased vehicle could serve both communities.

City of Dowagiac crews have seen a demonstration of the vehicle and the department heads of both communities have reviewed how we could operationally make one truck work for both communities. All are in agreement in an operation plan that shares hours of use, the maintenance cost and capital cost equally. The total cost of the unit and all necessary software and training is \$106,572.12, which would make the City's portion of the capital cost of \$53,286.06. The purchase of this vehicle will reduce our reliance on private contracted crews with which we annually spend between \$8,000-12,000 per year. In addition, if approved for a SAW grant, City crews can apply for grant eligible reimbursements as opposed to contracting out for this service.

This cooperative agreement will save sewer customers money and greatly improve our ability to respond when obstructions occur in pipelines.

RECOMMENDATION

Authorize the resolution to enter into an agreement with the City of Buchanan for sharing a sewer camera van with cash reserves within the sewer utility.

Support Documents:
Cover Memo-City Mgr.
Resolution

Councilmember _____ offered and moved the adoption of the following resolution; seconded by Councilmember _____.

WHEREAS, the City of Dowagiac does not currently have the ability to visually inspect sewer lines in emergency situations; and

WHEREAS, the State of Michigan is placing greater requirements on sewer utilities to identify problem areas within sewer lines; and

WHEREAS, the City of Dowagiac sewer service could be improved by having access to a sewer camera vehicle with GPS capability; and

WHEREAS, the City of Buchanan has a need for a similar vehicle; and

WHEREAS, the close proximity of both communities and past successes of intergovernmental agreements between the communities creates the potential for a strong, positive working relationship that can improve the level of service to utility customers in both communities; and

WHEREAS, staff from each community has worked on an operational plan to share equally in the cost and time that the vehicle is available to the respective communities.

NOW, THEREFORE, BE IT RESOLVED that the City of Dowagiac does hereby authorize the Mayor and City Clerk to execute an intergovernmental agreement with the City of Buchanan for a camera truck to televise sewer lines.

ADOPTED/REJECTED



Jack Doheny Supplies, Inc.

*"World's Largest Distributor of Sewer Cleaning
and Air Handling Equipment"*



777 Doheny Court
PO Box 609
Northville, MI 48167

800-336-4369
Fax: 248-349-2774

www.dohenysupplies.com

October 17, 2013

Jim Bradford
City of Dowagiac
501 South Front Street
Dowagiac, MI 49047
P: 269-782-8200

Dear Mr. Bradford

***We are pleased to provide you with a budget proposal for the
following IBAK Pipeline Inspection equipment:***

CAMERA

ORION 2 Pan and Tilt Camera With Case

For pushrod or camera tractor operation on KRA 65
LED lighting
Picture right side up in pushrod operation
Automatic reset, continuous angle of rotation
Integrated detector transmitter, camera guide device and transport
case

Pressure Test Set for JUNO / ORION / ORPHEUS, Hand pump with air dehumidifier and
pressure gauge

CAMERA TRACTOR

KRA65 Small Camera Steerable Tractor

For operation in lined 6" and up pipelines

Zero radius steering

Automatic Tilt Compensation (ATC)

Lowering Claw, toolset and spare parts

Includes 5", 6", 8" and 10" wheelsets

Carriage assembly for KRA65 tractor

KRA65 Pneumatic Wheels for large pipe with adaptors

Tractor Lowering Hook With Quick Disconnect

SYSTEM CONTROL UNIT

BK3.5 Control Unit Portable Control Panel (For all Mainline and

Operation of the camera and the KRA functions

Diagnostic and Control LCD Panel

Display For operating functions

In and output of video signal

RS232 interface

USB

Data display generator

Operating voltage 90-240VAC

Integrated QWERTY Keyboard

CABLE AND REEL

KW180 Cable Reel

Motor-driven cable winch for 656' of camera cable type 316/11

For operation from the operator's and rear sections of vehicle

Automatic level wind assembly

Includes Adaptor Cable to BK and BE

Remote control unit FB180

Electric footage meter transmitter with digital indicator

KUV 2.7 Cable Deflection Pulley for Standard and Fiber Optic Cable

Camera Cable 500 Feet Type 524/11 Terminated with connector

COMPUTER HARDWARE

Laptop Computer with windows software and video capture device

DATA MANAGEMENT SYSTEMS

Pipelogix SOFTWARE SYSTEMS

Standard features available with all reporting licenses:

Microsoft Windows based program

Compatible with Windows XP or Windows 2000

Menus and toolbars provide an easy to use interface

Content sensitive Help Menu

Manual provided as PDF file on the installation CD

Layouts or Screens can be customized for each users preference

All files needed to store information for a database are created

All filters, coding and database functions are built into Pipelogix (Flexidata) so it is not necessary to open external programs.

All Data is stored in Microsoft Access tables for easy export into standard formats

A database of infrastructure assets is maintained, making it possible to import all assets at once or as needed.

Surveys can be viewed within a project or within a database.

The Full reporting license also displays the surveys done on an asset for a historic perspective.

Hansen NDEU (Neztek Data Exchange Utility), GBA MasterSeries, CityWorks import/export routines available

Entry formats supported include Standard Pipelogix (Flexidata), WRc and PACP (version 2.2 and 4.2)

Lateral and Grout Surveys are standard

All defect and pipe detail codes can be customer modified

PACP and MACP codes are pre-loaded

Survey and Evaluation reports are standard to help with asset

PACP 4.2 assessment procedures used in pipe evaluation reports

MACP, PACP 2.2 and 4.2 import/export available

Backup and Quick Backup built in

CD/DVD burner built-in

Image Capture with Full screen controls to adjust color, sharpness.

Images may be captured and printed from a VHS playback or live

Inclinometer Survey to record the input.

A report displaying a graph of depth of pipe (in feet) and grade of pipe (in percent), a tabular printout of depth, grade, pitch, and roll readings taken every foot is available.

Pipelogix (Flexidata)'s Reader is free and can be distributed and installed on any computer to share the collected data

Pipelogix Lite Reporting Module

Databases contain all relevant information for your survey
User can do Basic sort on displayed fields to customize reports.
Reports are color-coded to five defect categories or grade values for easy viewing and identifying of critical pipes.

Standard paragraphs can be inserted into notes.
The Pipelogix (Flexidata) Standard Lite Caption Scheme can be used to display text on the video signal.

Surveys can be edited during creation if a mistake has been made.
The counter is automatically displayed in the survey form and controlled from the survey form.

The pre-set footage can be set to automatically enter at the start of each survey.
Inclinometer Surveys can be created.

Pipelogix DVS (Digital Video Survey) Module added to any license

Records a survey in MPEG format to create an MPEG1, MPEG2 file or Windows Media Format to create a WMV file.

Links to the observation are created as the digital file is recorded using the Pipelogix (Flexidata) Video Recorder Form.

A player program that can be distributed with the CD and installed on any computer to display the digital movie file along with the observations with instant access to the Video snaps may be taken and printed from the MPEG file or WMV
Features include Stop, Pause and Append.

CHASSIS

2011 Ford Transit Cargo Van

BODY OUTFITTING

Inspection Transit body outfitting (Includes 3000 watt inverter)
Fiberglass Abrasion Resistant Safety Ring for Manhole

Note: Price does not include any applicable taxes.

	PRICE: \$	112,100.00
ALLOWANCE FOR DEMONSTRATOR:	2011 Demonstrator/Rental Unit \$	(38,000.00)
	Discount	
		=====
	NET AFTER ALLOWANCE: \$	74,100.00

POPULAR OPTIONS TO CONSIDER:

The following items are optional. If you would like any of the options, please add corresponding price to above amount:

Specialty wheel sets:

Treaded Wheel set for 5" pipe for T66 (HARD Wheel)	\$	603.85
Treaded Wheel set for 6" pipe for T66 (HARD Wheel)	\$	825.64
Granulated Wheel set for 5" pipe for T66	\$	700.00
Granulated Wheel set for 6" pipe for T66	\$	858.97
High-Traction Wheels for 6" Pipe	\$	687.18

GIS Requirements should City choose to implement

QTY 2. Pipelogix Full Reporting Module for office (2 Required, 1 for each City)	\$	16,800.00
QTY 3. GIS Module Added (3 Required, 1 for each City and 1 for the truck)	\$	7,350.00
QTY 3. ESRI ArcGIS Runtime License (3 Required, 1 for each City and 1 for the truck)	\$	2,400.00
Pipelogix (Flexidata) Setup and Training at Customer Site (1 day classroom training, 2 days hands on training)	\$	5,400.00
RadioDetection RD7000 Locating Receiver with Soft-sided Carrying Case	\$	1,750.00

Note: This quotation expires in 30 days.

Thank you for your consideration of this budget price proposal.

Sincerely yours,

Bob Pflibsen

Bob Pflibsen
Sales Representative
269-806-1800
bobpflibsen@doheny-supplies.com

This quotation becomes a contract for delivery and payment of the merchandise listed above only when signed by the customer or one of its officers .

Customer: _____

By: _____

Date: _____

372.12 Arrow sign
150.00 Lettering

CITY OF DOWAGIAC

MEMO TO: Mayor Lyons and City Council Members

FROM: Kevin P. Anderson, City Manager

DATE: October 25, 2013

SUBJECT: Environmental Closure for Former MDOT Dowagiac Maintenance Garage

The former Dowagiac MDOT maintenance garage has now become the City's fire station on Wolf Street. In the late 1980's it was discovered that underground storage tanks located at this site while it was owned and operated by MDOT had leaked and caused some environmental concerns that needed to be remediated. Remediation has been in place since the four underground storage tanks were removed in 1991. Cleanup activities are nearing completion and MDOT is requesting that the City place a restrictive covenant on the property that restricts unacceptable exposure and ensure that the property does not pose a risk to humans.

The key element of this restrictive covenant is to not allow for a well to be placed on the property for consumption, irrigation or any other purpose. Since there is municipal water to the facility, this restrictive covenant will pose no harm or risk to the public.

The environmental closure report from MDOT is in the online version of the agenda and has not been printed to save paper and printing costs. Please let me know if you would like a paper copy.

RECOMMENDATION

Authorize the resolution for a restrictive covenant to be placed on the property at Wolf Street.

Support Documents:
Cover Memo-City Mgr.
Resolution

Councilmember _____ offered and moved the adoption of the following resolution;
seconded by Councilmember _____.

WHEREAS, underground storage tanks constructed and maintained at 101 Wolf Street by the Michigan Department of Transportation (MDOT) have been removed by MDOT;
and

WHEREAS, remediation activities have occurred at 101 Wolf Street since 1991; and

WHEREAS, it has been recommended by environmental engineers that, pursuant to state and federal environmental regulations, a restrictive covenant be placed on the property that prohibits the drilling of wells on site; and

WHEREAS, the proposed restrictive covenant will not impede the City's ability to use the property currently or in the future.

NOW, THEREFORE, BE IT RESOLVED that City Council does hereby authorize the placement of a restrictive covenant on the property located at 101 Wolf Street;
and

BE IT FURTHER RESOLVED that the City attorney shall review the final document and approve all attachments prior to execution of a final agreement.

ADOPTED/REJECTED

**DECLARATION OF RESTRICTIVE COVENANT
FOR A RESTRICTED NONRESIDENTIAL CORRECTIVE ACTION**

MDEQ Reference No: ___(B)___

This Declaration of Restrictive Covenant (Restrictive Covenant) has been recorded with the Cass County Register of Deeds to protect public health, safety, and welfare, and the environment by prohibiting or restricting activities that could result in unacceptable exposure to regulated substances present at the Property located at 101 Wolf Street, Dowagiac, Cass County, and legally described in the attached **Exhibit 2 (Legal Description of the Property)** that are inconsistent with the environmental conditions at the Property. **Exhibit 3 (Survey of Property)** provides a survey of the Property that is subject to the land and/or resource use restrictions specified in this Restrictive Covenant.

The Property is associated with Former MDOT Maintenance Garage (Facility ID No. 00021020) for which a closure Report (CR) was completed under Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.21301 *et seq.* Corrective actions that were implemented to address environmental contamination are fully described in the Closure Report dated ___(H)___ . A copy of the Closure Report is available from the Michigan Department of Environmental Quality (MDEQ), Remediation and Redevelopment Division (RRD) District Office.

The Property described contains regulated substances in excess of the concentrations developed as the unrestricted residential cleanup criteria under Section 21304a(2) of the NREPA. The MDEQ recommends that prospective purchasers or users of this Property undertake appropriate due diligence prior to acquiring or using this Property, and undertake appropriate actions to comply with the requirements of Section 21304c of the NREPA.

Part 213 requires the recording of this Restrictive Covenant with the Cass County Register of Deeds based upon the corrective action measures for the site to: 1) restrict unacceptable exposures to regulated substances located on the Property; 2) assure that the use of the Property is consistent with the exposure assumptions used to develop cleanup criteria under Section 21304a(2) of the NREPA; and 3) assure the exposure control measures relied upon in the Closure Report are effective.

The restrictions contained in this Restrictive Covenant are based upon information available at the time the corrective action was implemented by Michigan Department of Transportation (MDOT). Failure of the corrective action to achieve and maintain the cleanup criteria, exposure controls, and requirements specified in the Closure Report; future changes in the environmental condition of the Property; changes in the cleanup criteria developed under Section 21304a(2) of the NREPA; the discovery of environmental conditions at the Property that were not accounted for in the Closure Report; or use of the Property in a manner inconsistent with the restrictions described herein may result in this Restrictive Covenant not being protective of public health, safety, and welfare, and the environment. The adequacy of the corrective action undertaken pursuant to the Closure Report may not have been reviewed by the MDEQ.

Definitions

For the purposes of this Restrictive Covenant, the following definitions shall apply:

“MDEQ” means the Michigan Department of Environmental Quality, its successor entities, and those persons or entities acting on its behalf.

“Owner” means at any given time the then-current title holder of all or any portion of the Property.

“Property” means the real property as described in **Exhibit 2** (**Legal Description of the Property**) of this Restrictive Covenant that is subject to the restrictions, terms and conditions described herein.

All other terms used in this document which are defined in Part 3, Definitions, of the NREPA and Part 213 of the NREPA, shall have the same meaning in this document as in Part 3 and Part 213 of the NREPA, as of the date this Restrictive Covenant is filed.

Summary of Environmental Conditions and Corrective Action.

Historical use of underground storage tanks at the site have lead to the release of gasoline-related regulated compounds (including benzene, toluene, ethylbenzene, xylenes, naphthalene, and trimethylbenzene isomers) into the soil and groundwater beneath the site. Remaining contaminant concentrations in the soil and groundwater do not allow for unrestricted use of the Property. Specifically, concentrations of regulated substances remain in the groundwater in excess of nonresidential drinking water cleanup criteria. Furthermore, contaminant concentrations remaining in soil exceed nonresidential drinking water protection, direct contact, and volatilization to indoor air cleanup criteria. **Exhibit 3** is a scaled survey map of the site which also illustrates the location and extent of remaining soil and groundwater impacts. Residual Light Nonaqueous-Phase Liquid (LNAPL) were characterized using a Conceptual Site Model in accordance with American Society for Testing and Materials (ASTM) designation E2531-06 E1, and will remain in place. The restrictions provided for in this Restrictive Covenant serve to prevent unacceptable exposure to hazardous substances as a result of the conditions created by the presence of the LNAPL soil and groundwater contaminant concentrations that exceed unrestricted nonresidential criteria under Section 21304a(2) of the NREPA.

NOW THEREFORE,

1. Declaration of Land or Resource Use Restrictions.

MDOT, with the express written permission of the Owner of the Property hereby declares and covenants that the Property shall be subject to the following restrictions and conditions:

- a) Prohibited Land Uses: The Owner shall prohibit all uses of the Property as described in Exhibit 3 that are not compatible with or are inconsistent with the assumptions and basis for the nonresidential cleanup criteria established pursuant to Section 21304a(2) of the NREPA. Uses that are compatible with nonresidential cleanup criteria are generally described in **Exhibit 4** (Description of Allowable Uses). Cleanup criteria for land-use based response activities are located in the Government Documents Section of the State of Michigan Library.
- b) Prohibited Activities to Eliminate Unacceptable Exposures to Regulated Substances. The Owner shall prohibit activities on the Property that may result in exposures above levels established in the Closure Report. These prohibited activities include:

Exposure Restriction for Use of Groundwater:

- (i.) The construction and use of wells or other devices on the Property to extract groundwater for consumption, irrigation, or any other purpose, except as provided below:
 - (a) Wells and other devices constructed for the purpose of evaluating groundwater quality or to remediate subsurface contamination associated with a release of regulated substances into the environment are permitted provided the construction of the wells or devices complies with all applicable local, state, and federal laws and regulations and does not cause or result in a new release, exacerbation of existing contamination, or any other violation of local, state, or federal laws or regulations.
 - (b) Short-term dewatering for construction purposes is permitted provided the dewatering, including management and disposal of the groundwater, is conducted in accordance with all applicable local, state, and federal laws and regulations and does not cause or result in a new release, exacerbation of existing contamination, or any other violation of local, state, and federal environmental laws and regulations.

Direct Contact Exposure Barrier Restriction:

- (ii.) Any excavation or other intrusive activity that could affect the integrity of the subsurface soil in the area of identified impacts above the groundwater surface that serves to prevent direct contact exposure to contaminated soils at the Property. The soil barrier is between 6 and 7 feet thick, between the ground surface and the top of the groundwater surface and the identified impacts are located on the Property as shown on **Exhibit 3** (Survey of Property and Limits of Land). Disturbance of the barrier may be allowed during short-term construction or repair projects, or for purposes of further treating or remediating the subject contamination. Any excavation or other intrusive activity, including removing, altering, or disturbing the soil, that could affect the integrity of the barrier, must be replaced with a cover that provides at least an equivalent degree of protection as the original barrier within 14 days of completion of the work. Repair and/or replacement of the barrier must be completed unless additional sampling is conducted that demonstrates that a barrier in the area is no longer necessary in accordance with the applicable provisions and requirements of Part 213.

Vapor Intrusion Exposure Restriction (no buildings):

- (iii.) The construction of new structures, unless such construction incorporates engineering controls designed to eliminate the potential for subsurface vapor phase hazardous substances to migrate into the new structure at concentrations greater than applicable criteria; or, unless prior to construction of any structure, an evaluation of the potential for any hazardous substances to volatilize into indoor air assures the protection of persons who may be present in the buildings and is in compliance with Section 21304c of the NREPA.
- c) Prohibited Activities to Ensure Effectiveness and Integrity of the Corrective Action. The Owner shall prohibit activities on the Property that may interfere with any element of the Closure Report, including the performance of operation and maintenance activities, monitoring, or other measures necessary to ensure the effectiveness and integrity of the Closure Report.

2. Contaminated Soil Management. The Owner shall manage all soils, media, and/or debris located on the property in accordance with the applicable requirements of Sections 21304b of the NREPA; Part 111, Hazardous Waste Management, of the NREPA; Subtitle C of the Resource Conservation and Recovery Act, 42 USC Section 6901 *et seq.*; the administrative rules promulgated thereunder; and all other relevant state and federal laws.

3. Access. The Owner grants to the MDEQ and MDOT, and their designated representatives, the right to enter the Property at reasonable times for the purpose of determining and monitoring compliance with the Closure Report, including the right to take samples, inspect the operation and maintenance of the corrective action measures and inspect any records relating to them, and to perform any actions necessary to maintain compliance with Part 213 and the Closure Report. The right of access provided to MDOT above is not required under Part 213 for the corrective action to be considered approved. This provision was agreed to by the Owner at the time the Restrictive Covenant was recorded. Accordingly, The MDEQ will not enforce the Owner's obligation to provide access to MDOT.

4. Conveyance of Property Interest. A conveyance of title, easement, or other interest in the Property shall not be consummated by the Owner without adequate and complete provision for compliance with the terms of the Closure Report, and this Restrictive Covenant. A copy of this Restrictive Covenant shall be provided to all future owners, heirs, successors, lessees, easement holders, assigns, and transferees by the person transferring the interest in accordance with Section 21310a(2)(c) of the NREPA.

5. Audits Pursuant to Section 21315 of the NREPA. This Restrictive Covenant is subject to audits in accordance with the provisions of Section 21315 of the NREPA, and such an audit may result in a finding by the MDEQ that this Restrictive Covenant is not protective of the public health, safety, and welfare, and the environment.

6. Term of Restrictive Covenant. This Restrictive Covenant shall run with the Property and is binding on the Owner; future owners; and their successors and assigns, lessees, easement holders, and any authorized agents, employees, or persons acting under their direction and control. This Restrictive Covenant shall continue in effect until it is determined that the regulated substances no longer present an unacceptable risk to the public health, safety, or welfare, or the environment. Improper modification or rescission of any restriction necessary to prevent unacceptable exposure to regulated substances may result in the need to perform additional corrective actions by those parties responsible for performing corrective action at the Property or to comply with Section 21304c of the NREPA.

7. Enforcement of Restrictive Covenant. The State of Michigan, through the MDEQ, and MDOT may individually enforce the restrictions set forth in this Restrictive Covenant by legal action in a court of competent jurisdiction

8. Severability. If any provision of this Restrictive Covenant is held to be invalid by any court of competent jurisdiction, the invalidity of that provision shall not affect the validity of any other provision of this Restrictive Covenant, which shall continue unimpaired and in full force and effect.

9. Authority to Execute Restrictive Covenant. The undersigned person executing this Restrictive Covenant is the Owner, or has the express written permission of the Owner, The City of Dowagiac, Michigan, and represents and certifies that he or she is duly authorized and has been empowered to execute and record this Restrictive Covenant.

IN WITNESS WHEREOF, MDOT has caused this Restrictive Covenant, ___(B)___, to be executed on this ___(R)___ day of ___(S)___, 20___(T)___.

Michigan Department of Transportation

By: _____
Signature

Name: _____
Print or Type Name

Its: _____
Title

STATE OF Michigan
COUNTY OF Cass

The foregoing instrument was acknowledged before me this **[date]** by **[name of officer or agent, title of officer or agent]** of Michigan Department of Transportation on behalf of MDOT.

Notary Public Signature
(Stamp name of Notary Public)

Prepared by:
Allan R. Blaske, P.G., CPG
Senior Project Geologist
AECOM, 401 S. Washington Square, Suite 103, Lansing, MI 48933

When recorded return to:
City of Dowagiac
MDOT
AECOM

EXHIBIT 1

CONSENT OF OWNER

I, xxxxxxxxxxxx (on behalf of the City of Dowagiac), the current and legal Owner of the Property, do hereby consent to the recording of this Restrictive Covenant, ___(B)___, and authorize MDOT to file the Restrictive Covenant with the Cass County Register of Deeds for recording.

City of Dowagiac

By: _____
Signature

Name: _____
Print or Type Name

Its: _____
Title

STATE OF Michigan
COUNTY OF Cass

The foregoing instrument was acknowledged before me this **[date]** by **[name of officer or agent, title of officer or agent]** of the City of Dowagiac, on behalf of the City.

Notary Public Signature
(Stamp name of Notary Public)

EXHIBIT 2

LEGAL DESCRIPTION OF PROPERTY

DRAFT

EXHIBIT 3

SURVEY OF THE PROPERTY

DRAFT

EXHIBIT 4

DESCRIPTION OF ALLOWABLE USES

Allowable uses of the property will be limited to those consistent with commercial use / zoned commercial only.

DRAFT

EXHIBIT 5

CONSENT OF EASEMENT HOLDERS

As evidenced below by my signature, I agree and consent to the recording of the land and resource use restrictions specified in this Restrictive Covenant and hereby agree that my property interest shall be subject to, and subordinate to, the terms of the Restrictive Covenant.

____(CC)____

By: _____
Signature

Name: _____
Print or Type Name

Its: _____
Title

STATE OF ____ (U) ____
COUNTY OF ____ (V) ____

____ (W) ____

Notary Public Signature
____ (X) ____

COMPREHENSIVE SITE MODEL, SITE SUMMARY, AND CLOSURE REPORT FORMER MDOT DOWAGIAC MAINTENANCE GARAGE Confirmed Release No. C-0892-91, Facility ID No. 00021020

1. INTRODUCTION

The former Michigan Department of Transportation (MDOT) maintenance garage, located at 101 Wolf Street, Dowagiac, Michigan, has undergone subsurface investigation and remediation activities since removal of 4 underground storage tanks (USTs) in 1991. This report provides a comprehensive summary of site conditions, including the historic and current extent of site impacts, as well as a summary of remediation activities conducted at the site. The goal of this report is to provide support for the "closure" of the site, and removal of the UST release from the Michigan Department of Environmental Quality (MDEQ) list of open or active Leaking Underground Storage Tank (LUST) sites.

1.1. Site Location and Layout

The site is located at 101 Wolf Street, in Dowagiac, Cass County, Michigan. **Figure 1** illustrates the location of the project site, in the northwest portion of the City of Dowagiac. Access to the site is via Wolf Street, located west of North Paul Street. The property consists of 8.26 acres, with four buildings, and paved and grass/vegetated areas. The main building is the former maintenance garage, and is now the City of Dowagiac fire station. Two other buildings are used by the department of public works for storage and salt storage. The fourth building is a small shed, which housed the remediation system equipment, and is now used for storage by the fire department.

Figure 2 illustrates the layout of the project site, with the location of buildings, paved areas, former UST locations, and utilities. The site is served by municipal water, gas, and sewer, and overhead electrical service. Utilities enter the site from the southeast, from Wolf Street. Utilities are located on the south and east side of the main site building. No known utilities are located in the area of soil and groundwater impacts, on the west side of the main site building, other than an underground electrical line connecting the main building and the westernmost building on the site.

Figure 1 illustrates the location of the site in relation to surface water bodies. The Dowagiac Creek is located approximately 1,500 feet to the south-southwest of the site, and flows to the west. A small lake in a former gravel pit is located approximately 2,000 feet to the west of the site.

Surrounding properties include the Dowagiac Municipal Airport to the west and north, City of Dowagiac properties to the east (soccer fields, and the Dowagiac Union High School property further east across north Paul Street), Premier Tool and Die Cast Corporation to the northeast, and residential properties to the south.

2. SITE HISTORY

The Dowagiac Maintenance Garage was built by MDOT in 1956 and used by as a regional maintenance garage until 1990. Following closure of the maintenance garage by MDOT in 1990, the property was vacant or was used by various tenants until early 2009, when the City of Dowagiac purchased the property. The City then remodeled the maintenance garage building for use by the Dowagiac Department of Public Safety, Fire Rescue Division (Fire Department). The department of public works uses the former MDOT buildings on the site for salt storage and various operations. Although the Fire Department occupies the former maintenance garage building, the address of the department is 302 Wolf Street, rather than the 101 Wolf Street previously used by MDOT.

3. UST RELEASE and REPORTING HISTORY

3.1. UST Release

Since operations began at the site in 1956, a total of 5 USTs have been present at the site. These include:

- 10,000 gallon gasoline UST, installed 1980, removed April 17, 1991.
- 500 gallon diesel fuel UST, installed 1956, removed April 17, 1991
- 500 gallon waste oil UST, installed 1978, removed April 17, 1991
- 2,000 gallon diesel fuel UST, installed 1962, removed April 17, 1991
- 8,000 heating oil UST, installed 1955, removed prior to 1985.

A release (C-0892-91) was discovered during the removal of four underground storage tanks (USTs) at the site on April 17, 1991, and reported to the Michigan State Police. During the 1991 UST removal, the soil “exhibited a strong gasoline and diesel odor during excavation” (MDOT, 1995), and that “no free product was discovered.” The appropriate 20 and 45-day reports were submitted to the Michigan Department of Natural Resources. Following the reported release, MDOT installed monitoring wells, collected soil samples from borings, and performed a soil gas survey. Additional monitoring wells and soil borings were installed during a second round of investigation.

The extent of impacts (for all USTs at the site) was defined in 1994 and 1995. Following removal of the USTs, MDOT and their consultants performed site investigation activities and soil and groundwater remediation. The remediation consisted of soil vapor extraction, aquifer sparging, free product recovery, and groundwater extraction. The system was installed in December 1996 and operated until February 2002.

3.2. Reporting History

No Initial Assessment Report or Final Assessment Report has been prepared for the site. The following reports have been prepared for MDOT and/or the MDEQ:

- 20-Day and 45-Day report, MDOT, 1991
- Remedial Investigation Report, Phase II, January 12, 1995, MDOT Material and Technology Division. (MDOT, 1995)
- Pilot Study Report, October 10, 1995, NTH Consultants, Ltd. (NTH, 1995a)
- Additional Investigation, October 19, 1995, NTH Consultants, Ltd. (NTH, 1995b)
- Feasibility Study for Soil and Groundwater Remediation, October 27, 1995, NTH Consultants, Ltd. (NTH, 1995c)
- Final Assessment Report, April 2003 (STS, 2003)
- Monthly and quarterly reports, 1996 through March 2002.

Sampling conducted during these investigations indicated that the contaminants in the subsurface were gasoline-derived (BTEX, TMBs, and naphthalene) with negligible PNAs compounds related to diesel fuel. Furthermore, no MTBE was detected.

In 2002, AECOM (formerly STS Consultants) was retained by MDOT to determine the current extent of soil and groundwater impacts, and to design and operate a remediation system to gain final closure for the site. Due to the fact that a remediation system had been operated at the site between 1995 and 2001, data was collected to determine the current extent (at that time) of impacts, and to fill in gaps within the data set.

AECOM (formerly STS) installed seven monitor wells to determine the horizontal and vertical extent of groundwater impacts. These wells (MW-40 through MW-44) were installed at various locations (Figure 3) and various depths (Table 1). Installation of the wells and sampling provided horizontal and vertical delineation of the extent of groundwater impacts at that time.

To determine the extent of impacted soil, AECOM collected samples of the unsaturated soil in late 2002. The original extent of the soil impacts (as reported in 1994) was plotted on a scaled site map, and a sampling grid established following the "Verification of Soil Remediation" guidance document (MDNR, April 1994, Revision 1). In January 2003, AECOM conducted slug testing at the site to determine the hydraulic conductivity of the water table aquifer. Pilot testing was also conducted in January 2003 to determine the effectiveness of dual-phase high-vacuum extraction for removal of contaminants from the site.

The results of the 2002/2003 investigation activities were summarized into a Final Assessment Report (FAR), submitted to the MDEQ on April 1, 2003 (STS, 2003)

Following the FAR, STS installed a remediation system to address the soil and groundwater impacts. This system is discussed in more detail below. Various site updates have been submitted to MDEQ between 2003 and the present time.

In October 2010 additional soil sampling was conducted, which lead to the excavation of impacted soils in the source area in September 2011.

Groundwater sampling and monitoring has continued throughout the remediation to the July 2013.

3.3. Investigation and Remediation History

Investigation and remediation of the subsurface petroleum impacts at the site have been conducted since the removal of the underground storage tanks by MDOT in 1991. The table below provides a summary of site activities. Specific activities are discussed in other sections of this report, where additional details are provided. Full details of the activities are contained in the appropriate reports submitted to the MDEQ and referenced within this report.

Date	Activity
April 1991	Removal of USTs by MDOT
1994	MDOT Site Investigation
January 1995	MDOT Remedial Investigation Site Report
1995	NTH Site Investigation
1995-2002	NTH Remediation System Operation (SVE, Aquifer Sparging, GW Dewatering)
2002	STS Site Investigation, soil and groundwater sampling
April 2003	Final Assessment Report Submitted for site
February 2004	Dual-phase extraction remediation system began operation
April 2009	Shut down dual-phase extraction remediation system
May 2009	Startup of groundwater pump and treat system
February 2010	Shut down of groundwater pump and treat system
October 2010	Soil sampling in source area
September 2011	Excavation of source areas soil beneath the pavement cover
July 2013	Final round of groundwater sampling

4. SUBSURFACE CONDITIONS

4.1. Subsurface Geology

Soils beneath the site consist of fine to coarse sand with varying amounts of gravel. Soil is generally brown fine to medium grained sand, with trace amounts of silt and fine gravel. Groundwater is present at depths between 6 and 7 feet below ground surface. Laterally discontinuous clay layers are present beneath the site, at depths greater than 60 feet. Thin layers (1 to 2.5 feet) of sand and gravel fill are observed at various locations beneath the site, particularly beneath the asphalt pavement. Figure 4 illustrates the location of two cross-sectional diagrams (Figures 5 and 6), constructed for the site using soil boring data through the 2002 sampling event.

4.2. Hydrogeology

Groundwater is located beneath the site in a water table (unconfined) aquifer. The depth to the water table surface was determined during sampling of the on-site monitor wells using an electronic water level indicator. The depth to groundwater ranges between 5 and 9 feet below ground surface, depending on the surface elevation (Table 1).

The fine to coarse grained sand aquifer was the only water-bearing unit encountered during subsurface investigation at the site. Sampling of the groundwater has determined the vertical extent of impacts, so no further (vertical) investigation was performed. A thin clay layer was encountered during the initial installation of Monitor Well MW-1 at a depth of approximately 65 feet, but it is not known if this layer is continuous across the site.

The hydraulic conductivity of the aquifer was measured using rising head slug testing techniques. Measured hydraulic conductivity ranged between 0.0559 cm/sec and 0.3305 cm/sec. The average hydraulic conductivity of these wells is 0.1262 cm/sec (357.7 ft/day). Slug testing was performed using a bail down method. Data was analyzed using the Bouwer and Rice Method for unconfined aquifers. (STS, 2003).

The porosity of the sand is estimated to be 30%, based on published data for similar soils.

Between November 2002 and July 2013, the depth to the water table surface and groundwater elevation has been measured 24 times. Table 1 contains a summary of groundwater measurements from the site. Groundwater flow has been consistently to the west. Figure 7 is a contour map of groundwater elevation, with the groundwater flow direction from the July 2013 sampling event. This groundwater flow map is typical of the elevation and flow direction observed at the site over the past 20 years.

The gradient on the water table surface was measured using water table elevation data. Table 2 contains a summary of the calculated groundwater gradient and velocity using data from wells MW-43 and MW-16. Well MW-16 is downgradient of well MW-43, and these wells span the distance of the site. The calculated gradient ranges between 0.0012 (vertical feet per horizontal foot) to 0.0041. The 0.0041 measurement from July 17, 2003 appears to be an outlier, and is approximately twice the other measurements from the site. An average gradient of 0.0019 vertical feet per horizontal foot was determined for the site.

The velocity of the groundwater flow was calculated using the measured hydraulic conductivity (average of 357.7 ft/day), water table gradient (average of 0.0019 ft/ft), and porosity of 30%. Due to the consistency of the observed groundwater gradient from the period between November 2002 and July 2013, an average gradient value was utilized. The velocity was calculated to be 2.28 feet per day (834 feet per year). The direction of groundwater flow is toward the west. Table 2 contains a summary of the groundwater velocity calculations.

Groundwater elevation data measured in nested well sets (MW-11/MW-10, MW42S/MW-42D, and MW-42S/MW-41) does not indicate any significant vertical gradient within the water table aquifer (Table 3).

4.3. Subsurface Impacts

4.3.1. Soil Impacts

Soil impacts, where contaminants are present in the vadose-zone (unsaturated) soil and within the capillary fringe zone of the water table surface, are illustrated on Figure 8. The original (1994) delineated extent included an area to the west of the paved area, but it is not known from which depth interval these samples were collected. It is likely that this area represents contaminants contained within the capillary fringe smear zone. Figures 5 and 6 are cross sections which illustrate the extent of soil impacts beneath the site as it existed in 2002.

Additional soil sampling was conducted in 2002 by STS. This sampling delineated an area mostly contained beneath the pavement to the west of the building, with one sample in the area to the west of the paved area. The outline of delineated soil impacts also likely reflects a change in applicable criteria between 1994 and 2002, reduction of contaminant mass through operation of a remediation system, and the natural degradation of contaminants in the subsurface during this time.

Sampling was again conducted in October 2010, and the extent of soil impacts was further reduced when compared to the 2002 sampling event. Both the 2002 and the 2010 sampling events utilized a statistically random sampling scheme (MDEQ, 2002).

Further sampling was conducted during the excavation of soil in September 2011. These samples were collected from the bottom of the excavation sidewalls, within the capillary fringe smear zone at the top of the water table surface. The extent of soil impacts include small areas within the capillary fringe smear zone surrounding the 2011 excavation area, and a small area to the west of the west end of the excavation. It is unlikely that any vadose-zone impacts remain at the site. Figure 9 is a cross section which illustrates the vertical distribution of impacted soils beneath the site, following remediation and excavation efforts.

Appendix A contains soil sample analytical summary tables and sample locations maps for the various soil sampling events performed by STS/AECOM.

4.3.2. Groundwater Impacts

Table 4 contains a summary of groundwater sampling data collected from the site. This table includes data from the original sampling in 1994 through the most recent sampling event in July 2013. Figure 10 illustrates the extent of impacted groundwater beneath the site on three occasions – mid-1990s, 2003, and the most recent event in July 2013. As can be seen on the figure, the size of the groundwater plume has steadily decreased over time. Figure 11 illustrates the concentration of total BTEX concentration over time for wells within the plume at the site. As can be seen in this plot, concentrations have decreased over time, and show a sharp decrease in concentrations at MW-44s/MW-102 after the excavation activities.

Several sets of monitoring wells were installed at multiple depths to determine the vertical extent of impacts beneath the site. These include (Figure 3):

- Well MW-5 (10.70 feet deep below top of casing) and MW-6 (14.50 feet deep),
- Well MW-11 (10.50 feet deep) and MW-10 (30.70 feet deep),
- MW-42S (10.00 feet deep), MW-42D (23.65 feet deep), and MW-41 (39.50 feet deep), and
- MW-44S (9.90 feet deep) and MW-44D (29.50 feet deep) (this well was removed during the 2011 soil excavation).

Groundwater samples collected from these well sets indicates that the impacted groundwater is located within the upper 10 feet of the water table aquifer, and does not extend into deeper portions of the aquifer.

Figure 9 is a cross section which illustrates the current extent of groundwater impacts beneath the site.

4.3.3.LNAPL Impacts

Contaminants have been observed to be present in the groundwater, in the vadose zone, and within the capillary (“smear”) zone between the soil and groundwater surface. Evidence to support these observations include soil and groundwater sampling, chemical analysis of samples, soil staining, petroleum odor in soil, and screening meter detections (i.e. organic vapor analyzer equipped with a photoionization detector). This smear zone fluctuates as the level of the groundwater surface moves over time, due to changing weather and climate factors.

ASTM E 2531-06 (ASTM, 2006) has been adopted by MDEQ as the suggested guidance for characterization of LNAPL sites. In this guide, LNAPL is defined as:

LNAPL – “a light nonaqueous phase liquid having a specific gravity less than one and composed of one or more organic compounds that are immiscible or sparingly soluble in water and the term encompasses all potential occurrences of LNAPL (for example, free, residual, mobile, entrapped)”

Based on this definition, LNAPL is present at the site. However, under the former MDEQ guidance, no “free product” (non aqueous liquid on or within the water surface greater than 1/8 inch in thickness, that can be separately removed from the groundwater during sampling) has been observed at the site. NTH mentions (in a set of undated presentation slides) that “possible free-phase product in source area”, but no details are provided. The date of this presentation is not known, but it is likely from 1994, as it contains feasibility study information prior to installation of the remediation system. A map from the 1996 Remedial Action Plan indicates an area of free product, immediately to the west of the former UST basin. No supporting information, however, is available. Beginning in 2002 when STS began activities at the site, no free-phase petroleum/gasoline has been observed at the site. No “free product” has been observed during groundwater sampling, soil excavation, soil boring sampling, or remediation system installation.

Further definitions within ASTM E 2531-06 include:

Entrapped LNAPL – “residual LNAPL in the form of discontinuous blobs in the void space of a porous medium in a submerged portion of a smear zone resulting from the upward movement of the water table into an LNAPL body.”

Free LNAPL – “LNAPL that is hydraulically connected in the pore space and has the potential to be mobile in the environment.”

Mobile LNAPL – “free LNAPL that is moving laterally or vertically in the environment under prevailing hydraulic conditions.”

Residual LNAPL – “LNAPL that is hydraulically discontinuous and immobile under prevailing conditions.”

Based on evidence collected from the site over the previous 22 years, the contamination at the site can be classified as “residual” LNAPL. It is possible that some “entrapped” LNAPL is present, but without conducting microscopic analysis of the soil, this cannot be determined. No free or mobile LNAPL is present.

Figure 12 illustrates the extent of the delineated LNAPL beneath the site resulting from the release of petroleum from the USTs. The area of the original LNAPL body contains impacted vadose-zone soil

resulting directly from the release from the UST, and the LNAPL within the capillary fringe smear zone at the water table surface. (The residual LNAPL in the vadose zone has been removed through excavation.) The remaining vadose-zone soil and the capillary fringe smear zone contains residual and stable LNAPL in the subsurface. **Figure 8** illustrates the current extent of the LNAPL body (soil impacts), following the excavation of the grossly impacted soil in the source area in 2011. **Figures 5 and 6** illustrate cross sections through the impacted area, which show the subsurface geology and the extent of the LNAPL beneath the site. **Figure 9** is a diagram based on the known extent of impacts beneath the site, and is labeled to indicate the extent of the LNAPL body.

Under current hydrogeological site conditions, the LNAPL body at the site is stable and not mobile. The impacted zone is not expanding, and is slowly decreasing in size over time. The remaining LNAPL is not easily recoverable.

5. REMEDIATION HISTORY

A remediation system was installed at the site in December 1996 by a NTH, and operated until February 2002. This system consisted of soil vapor extraction, aquifer sparging, and groundwater dewatering, with 7 SVE wells, 4 air injection (sparging) wells, and 4 dewatering wells. While the system was effective at the removal of contaminants from the unsaturated soil, (based on the decrease in contaminant concentrations and the extent of impacts), an estimate of the total volume of soil remediated to date cannot be determined.

In late 2003, STS installed a system to remove both impacted groundwater and vapors from the vadose-zone soils, using a dual-phase extraction process. The system began operation in February 2004.

5.1. Dual-Phase Extraction

In late 2003, STS installed a remediation system consisting of dual-phase high-vacuum extraction to simultaneously remove impacted groundwater and vapors from the vadose-zone soils. This dual-phase system included 14 extraction wells to cover the area of impacted soil and groundwater outlined during the site investigation. Extracted groundwater was treated using liquid-phase granular activated carbon, prior to discharge to the small pond in the northern portion of the site. Extracted air was treated using vapor-phase activated carbon, and discharged through a vent stack.

The dual-phase extraction system operated between February 2004 and April 2009, and processed approximately 10.5 million gallons of water. A summary of the system operation is included on **Table 5**. **Figure 13** illustrates the concentrations of total VOCs in the remediation system influent water between February 2004 and February 2010. This plot shows contaminant removal during operation of the dual-phase extraction system, until it was replaced by the groundwater pump and treat system.

5.2. Groundwater Pump and Treat

After operation of the DPE system between February 2004 and April 2009, the extent of groundwater impacts decreased, and the bulk of the remaining groundwater impacts were located in the area between MW-44S and MW-5. Therefore, in May 2009, the site remediation was changed to a groundwater pump and treat system to better target the remaining impacts.

A 6-inch diameter extraction well was installed at a location approximately midway between MW-44s and MW-5 (**Figure 3**). This well was installed to a depth of 15 feet, with a 10-foot section of screen. A submersible groundwater pump was placed into the well to extract the water. Extracted groundwater was pumped through underground piping to the treatment building, where it was treated using liquid-phase carbon.

The groundwater system operated between May 2009 and February 2010, and processed approximately 1.53 million gallons of water. A summary of the system operation is included on **Table 5**.

The concentration of total VOCs in the remediation system influent water between February 2004 and February 2010 is illustrated on [Figure 13](#). The startup of the groundwater pump and treat system is noted on the plot of total VOC concentrations. Concentrations quickly increased when the pumping was initiated, but quickly decreased. Furthermore, the system piping fouled quickly with iron bacterial scaling and slime. This greatly reduced water production.

5.3. Soil Excavation

Following operation of the various remediation systems, contaminant concentrations in the system influent stabilize and did not continue to decline. It was suspected that a continuing source of contaminants was keeping concentrations in the groundwater elevated. It was therefore decided to conduct a soil sampling event to determine the extent of remaining soil impacts. This sampling was conducted in October 2010 and discovered significant remaining contamination in the capillary fringe zone which continued to provide contaminants to the underlying groundwater plume. [Figure 8](#) illustrates the extent of soil impacts identified during this sampling event. It was decided to remove these remaining impacts through excavation of the soil in the source zone.

Between September 19 and September 23, 2011, impacted soil at the site was removed and disposed. The intent of this work was to remove the grossly-impacted soil still remaining beneath the paved area to the west of the former maintenance garage, and remove this source of contamination to the underlying groundwater. [Figure 8](#) illustrates the location and outline of the soil excavation.

An area 100 feet by 40 feet was marked and the pavement cut and removed. The asphalt pavement was removed and taken to a recycling facility. Once the pavement was removed, approximately 1,280 tons of soil was excavated, and taken to the landfill in Three Rivers, Michigan for disposal. Approximately 9,500 gallons of water was removed from the bottom of the excavation for disposal. Soil samples were collected from the bottom of the sidewalls of the excavation, as well as a water sample. The excavation was backfilled with Class II sand fill, compacted, and repaved. Photographs of the excavation project are contained in [Appendix B](#).

Two monitoring wells were installed to replace the two wells (MW-44S and MW-44D) removed during the excavation, and to monitor the groundwater concentrations within the former excavation. The existing monitoring wells at the site are illustrated on [Figure 3](#). The two new monitoring wells were labeled MW-101 and MW-102.

[Figure 8](#) illustrates the extent of impacted soil as well as the extent of the excavation project. [Figure 9](#) is a west-to-east cross section illustrating the distribution of subsurface contaminants, the extent of the soil excavation, and the location of soil and groundwater samples. The LNAPL body of grossly-impacted soil in the vadose zone and the capillary zone in the source area was removed during this event.

6. RISK ASSESSMENT

6.1. Surrounding Property Uses

Surrounding properties include the Dowagiac Municipal Airport to the west and north, City of Dowagiac properties to the east (soccer fields, and the Dowagiac Union High School property further east across north Paul Street), Premier Tool and Die Cast Corporation to the northeast, and residential properties to the south.

The area surrounding the site is largely open land. North of the site is the Dowagiac Municipal Airport. The portion of the property adjacent to the MDOT property is a grass runway used for radio controlled aircraft. West of the site is agricultural land also owned by the City of Dowagiac. Within this parcel is a pond which fills a former gravel pit. North Paul Street is approximately 500 feet to the east of the site, and the area between the former MDOT property and the street is soccer fields, also owned by the City of

Dowagiac. To the east of North Paul Street is the Dowagiac Union High School, and a former industrial facility (owned by Premier Tool and Die Cast Corp). An additional Premier Tool and Die Cast Corporation facility is approximately 600 feet to the northeast of the site.

Residential properties are located to the south of the subject site. The nearest house is located approximately 200 feet south of the main (fire station) building. Other residential properties are located in this neighborhood, but much of the lots south of Wolf Street are vacant.

Figure 14 is an aerial photograph map which illustrates the area surrounding the former MDOT garage site.

6.2. Current Site Use

The site property is currently owned by the City of Dowagiac and is used as the fire station. The main building is used as the fire station, with offices in the front part of the building. The area west of the building is used for temporary storage of vehicles involved in accidents. The City of Dowagiac public works department utilizes the two other site buildings, one for salt storage, and the other for general storage. The pavement is well maintained. The northern portion of the site is kept mowed.

The site is served by water, natural gas, sanitary sewer, storm sewer, and electricity. These utilities enter the site from Wolf Street, from the southeast.

Current site use does not include any use of the subsurface. The site is served by municipal water, so no on-site drinking water wells are present. Also, no underground work is conducted which would expose the remaining impacted soil and groundwater.

6.3. Chemicals of Concern

Chemicals of concern include petroleum volatile organic compounds commonly derived from gasoline, including benzene, toluene, ethylbenzene, xylene isomers (BTEX), trimethylbenzene isomers (TMB), naphthalene, and 2-methylnaphthalene. MTBE has not been detected at the site.

Although the original release in 1991 was for gasoline and diesel fuel, sampling since removal of the tanks has revealed very little indication that diesel fuel was involved in the release. One or two samples from the initial sampling (1991) indicated the presence of PNA compounds. Soil sampling in 2002 included PNA compounds in the list of analytes, and only one sample (GP-11) contained any PNA compounds other than naphthalene or 2-methylnaphthalene (**Appendix A**). This boring was located approximately 85 feet west of the edge of the pavement, within the weeds and brush. These PNA compounds are not likely related to the UST release, but rather from other MDOT operations at the site.

Current extent of subsurface impacts, both in the soil and groundwater, are illustrated on **Figures 8 and 10**. **Tables 6 and 7** contain the maximum remaining concentrations at the site for soil and groundwater, and a comparison of these impacts to applicable Risk-based Screening Levels (RBSL). These tables contain data from the most recent sampling events, and represent the *remaining* concentrations at the site, following remediation system operation and soil excavation. For soil impacts, the locations which were removed during excavation were not included on this table, rather any sample location outside the excavation limits or samples collected from the excavation sidewalls represent the current highest remaining concentrations. Likewise, groundwater concentrations from the most recent sampling event (July 2013) represent the level of contaminants remaining in the dissolved plume.

6.4. Applicable Criteria

Applicable closure criteria are outlined in MDEQ RRD Operational Memorandum No. 1, Attachment 1 (MDEQ 2012). The site is currently used as a commercial facility (fire department), and not as a residential property. Therefore, nonresidential criteria apply. Table 1 of MDEQ 2012 contains residential and nonresidential groundwater criteria and screening levels, and Table 3 of MDEQ 2012 contains

nonresidential soil criteria and screening levels. These closure levels were used for comparison to chemical concentration data obtained from the site.

Tables 6 and 7 contain the remaining maximum concentrations at the site, as compared to applicable criteria for soil and groundwater.

6.5. Migration of Contaminants

Residual LNAPL is present within the vadose-zone soils and the capillary fringe smear zone, resulting from the release of petroleum from the USTs. As outlined above, the majority of the vadose-zone soils impacted with LNAPL have been removed during excavation. Areas of LNAPL within the capillary fringe smear zone at the water table surface remain. The LNAPL is residual and stable in the subsurface under current hydrogeological conditions.

Although the area impacted with residual LNAPL at the site has been greatly reduced, the residual LNAPL continues to be a source of ongoing contaminants in the subsurface. While the LNAPL is not mobile, the remaining residual LNAPL contributes contaminants to the dissolved phase within the groundwater and as vapor transport within the vadose zone.

The areas of remaining LNAPL (or more correctly termed “areas of high contaminant concentrations”) are covered by pavement. This pavement prevents precipitation from leaching contaminants from the shallow soil into the underlying groundwater. While no site cover is completely impermeable, the asphalt pavement greatly reduces the amount of precipitation which infiltrates into the soil beneath the site, thus limiting the leaching of contaminants.

Contaminants in the capillary fringe smear zone continue to add contaminants to dissolved phase in the groundwater. As the water table elevation moves up and down in response to precipitation and climate factors, contaminants enter the groundwater where concentrations gradients permit.

Once in the dissolved phase within the groundwater, the contaminants move with the groundwater flow. The groundwater flow is to the west, at an average rate of approximately 830 feet per year (2.28 feet per day). Organic contaminants, however, do not generally move at the same rate as the groundwater, and are slower due to retardation and degradation.

The dissolved phase plume at the site is shrinking in size over time (Figure 10), and contaminant concentrations continue to decline (Figure 11). As the contaminant plume leaves the area covered by pavement and migrates to the west in the area covered by weeds and brush, precipitation is able to infiltrate through the soil and into the groundwater. This precipitation contains dissolved oxygen which is a limiting factor for the naturally-occurring bacterial fauna in the subsurface that break down the contaminants in the groundwater. Thus, as the groundwater plume receives more precipitation, the natural attenuation is accelerated, which therefore decreases the size of the groundwater plume over time. Sampling has indicated that the contaminant concentrations continue to decline over time (Table 4) and the size of the plume is decreasing.

Active remediation ceased at the site in September 2011. Since this time, concentrations in the overall groundwater decreased, and the size of the plume has also decreased. Currently, the downgradient edge of the groundwater plume is located west of MW-11, and east of the site fence. Contaminant concentrations have not been detected at the wells (MW-16 and MW-17) at the property boundary (fence) in more than 10 years (Table 4). Clearly, contaminants are degrading within the groundwater, and are expected to continue to do so, as the source for additional groundwater impacts has largely been removed.

6.6. Exposure Pathways

The potential for exposure to contaminants at the site is very small. Impacts are limited to the capillary fringe smear zone and dissolved within the groundwater. Site uses and conditions do not provide for an easy route for exposure to the contaminants.

Within the following discussion, “criteria” and “RBSL” are used interchangeably, and refer to the closure standards outlined in MDEQ 2012 for soil and groundwater.

Table 8 provides an evaluation of the potential exposure pathways for the groundwater at the site. While several exposure pathways are considered relevant, none are considered to be a concern. Each exposure pathway is discussed below.

Residential Drinking Water – The site and surrounding area are served by municipal water from the City of Dowagiac. Therefore, no residential drinking water is obtained from the subsurface at the site. Furthermore, the site is not a residential site, so the residential drinking water pathway is not relevant.

Nonresidential Drinking Water – The site and surrounding area are served by municipal water from the City of Dowagiac. No water-supply wells are present on the site or the immediate surrounding area. Therefore, no drinking water is obtained from the subsurface at the site.

Two private wells are located within the residential housing, approximately 500 feet to the southeast of the site. It is not known if these wells are used for drinking water, irrigation, or some other purpose. Any water wells within this area will not be impacted by contaminants from the site, because these wells are located upgradient from the known groundwater impacts. Some private wells are located more than 2,500 feet southwest of the site, along M-62, and more than 3,750 feet north of the site along Yaw Street. Both of these areas are outside the city limits. Impacts at the site do not pose a concern to any of these private wells. These wells are located more than two-years travel time (groundwater flow at the site is approximately 830 feet per year), and not in the direction of groundwater flow (west). The municipal wells for the City of Dowagiac are located more than 4,500 feet to the southeast of the site.

There is no ordinance within the City of Dowagiac which prohibits installation of a private water well. Therefore, it is possible that the groundwater in the area could be developed for residential or nonresidential use. Also, the site is not located in a designated wellhead protection area. This pathway could be a concern, however, if nonresidential groundwater use (i.e. irrigation) were to be developed at the site.

While the contaminants at the site exceed this criteria and the exposure pathway is relevant, the RBSLs are not applicable and the pathway is not currently of concern. No impacts to residential or non-residential drinking water supplies are likely from this site.

Groundwater/Surface Water Interface – Contaminant concentrations in groundwater exceed the groundwater/surface water interface (GSI) criteria. However, the known extent of the plume of impacted groundwater does not leave the property. Groundwater flow is to the west, and the nearest surface water body in the direction of groundwater flow is more than 1,300 feet away. This is a pond which has filled a former gravel pit. To the south, the Dowagiac Creek is located approximately 1,400 feet away. This creek flows to the west-northwest, and is never closer than 1,400 feet to the site. While the GSI pathway is relevant and the RBSL is applicable, no exposure is likely to occur, so the pathway is not of concern.

Nonresidential Groundwater Volatilization to Indoor Air – Contaminant concentrations in groundwater do not exceed this criteria. The area of impacted groundwater is located away from the on-site buildings. The groundwater plume, as defined is between approximately 25 and 250 feet away from the western edge of the fire station building, and the groundwater flow direction is moving west, away from the building. Therefore, the RBSL is not applicable and the pathway is not of concern at this site.

Groundwater Direct Contact – Contaminant concentrations in groundwater do not exceed this criteria. The impacted groundwater is at a depth of between 7 and 8 feet below ground surface, and approximately ½ of the plume of impacted groundwater is located beneath asphalt pavement. Even if excavation into the subsurface were to occur within the groundwater plume, the concentrations are below this criteria, so the RBSL is not applicable and the pathway is not of concern.

Table 9 provides an evaluation of the potential exposure scenarios for soil at the site. While several exposure pathways are considered relevant, none are considered to be a concern. Each exposure pathway is discussed below.

Residential Drinking Water Protection – Contaminant concentrations in soil are above the drinking water protection criteria. Leaching of the contaminants from the soil into the underlying groundwater could result in the completion of this exposure pathway. The site is not residential, and as outlined above, the site received water from the City of Dowagiac, and therefore no drinking water is used from the groundwater at the site. Therefore, the pathway is not a concern.

Nonresidential Drinking Water Protection – As with the residential drinking water protection pathway described above, contaminant concentrations in soil are above the drinking water protection criteria. Leaching of the contaminants from the soil into the underlying groundwater could result in the completion of this exposure pathway. However, as outlined above, the site received water from the City of Dowagiac, and therefore no drinking water is used from the groundwater at the site. Therefore, the pathway is not currently a concern. This pathway could be a concern, however, if nonresidential groundwater use (i.e. irrigation) were to be developed at the site.

Groundwater/Surface Water Interface Protection – Contaminant concentrations exceed the GSI protection criteria, and therefore could leach to the groundwater at concentrations which would exceed the GSI criteria. These contaminants could, in theory, impact surface water. As discussed above for the groundwater impacts, no GSI receptors are associated with the site, and therefore the pathway is not of concern.

Soil Volatilization to Indoor Air – Concentrations of remaining contaminants in the subsurface following remediation efforts exceed the soil volatilization to indoor air criteria. These remaining contaminants are located within the capillary fringe smear zone beneath the site, at a depth of approximately 8 feet below ground surface. The remaining soil impacts are covered by site pavement. Soil impacts are not present beneath the buildings at the site, and subsurface conditions are not likely to cause volatilization of contaminants. While this exposure pathway is relevant and the RBSL is applicable, the pathway is not a concern.

Soil Direct Contact – Concentrations of remaining contaminants in the subsurface following remediation efforts exceed the soil direct contact criteria. These remaining contaminants are located within the capillary fringe smear zone beneath the site, at a depth of approximately 8 feet below ground surface. The remaining soil impacts are covered by site pavement. If excavations were to be performed in the soil within the impacted area, exposure to this soil could occur. This exposure pathway is relevant and the RBSL is applicable. The pathway is a concern if future excavation activities are performed at the site.

6.7. LUST Site Classification

Based on criteria outlined in MDEQ RRD Operational Memorandum No. 3 (MDEQ 2003), the site conditions allow for classification of this site as a **Class 3**.

To be classified as a Class 1 site, the following conditions would need to apply:

Immediate threat to human health, safety or sensitive environmental receptors, including:

- Explosive levels or concentrations of vapors that could cause acute health effects, are present within on-site buildings or subsurface utilities.
- Free product is present.

- An active public or private water supply well, water supply line, or public surface water intake is impacted or immediately threatened.
- Ambient vapor concentrations exceed concentrations of concern from and acute exposure, or safety viewpoint.
- A sensitive habitat or sensitive resources are impacted and affected.

The extent and concentrations of identified impacts at the site do not meet any of these criteria or scenarios, so the site does not qualify as a Class 1 site.

To be classified as a Class 2 site, the following conditions would need to apply:

Short-term (0-2 years) threat to human health, safety, or sensitive environmental receptors, including:

- There is potential for explosive levels, or concentrations of vapors that could cause acute effects, to accumulate in a building or utility system.
- Shallow contaminated surface soils are open to public access, and dwellings, parks, playgrounds, day care centers, schools, or similar use facilities are within 500 feet of those soils.
- A non-potable water supply well is impacted or immediately threatened.
- Groundwater is impacted and a public or private water supply well producing from the impacted aquifer is located within two years projected groundwater travel distance downgradient of the known extent of the chemicals of concern.
- Groundwater is impacted and a public or private water supply well producing from a different interval is located within the known extent of the chemicals of concern.
- Impacted surface water, storm water, or groundwater discharges within 500 feet of a sensitive habitat, resource, or surface water body or wetland.

Again, the extent and concentrations of identified impacts at the site do not meet any of these criteria or scenarios, so the site does not qualify as a Class 2 site. Based on the velocity of groundwater flow at the site, it is possible that private water supply wells are located within a two-year travel time distance from the site. The groundwater flow, however, is toward the west, in a direction where no private water supply wells are located. Furthermore, the plume appears to be stable and does not extend off the MDOT property. Therefore, the criteria for a Class 2 site have not been met.

To be classified as a Class 3 site, the following conditions need to apply:

Long-term (>2 years) threat to human health, safety, or sensitive environmental receptors:

- Subsurface soils (>3 feet BGS) are significantly impacted and depth between impacted soils and the first potable aquifer is less than 50 feet.
- Groundwater is impacted and potable water supply wells producing from the impacted interval are located >2 years groundwater travel time from the dissolved plume.
- Groundwater is impacted and non-potable water supply wells producing from the impacted interval are located >2 years groundwater travel time from the dissolved plume.
- Groundwater is impacted and non-potable water supply wells that do not produce from the impacted interval are located within the known extent of the chemical(s) of concern.
- Impacted surface water, storm water, or groundwater discharges within 1,500 feet of a sensitive habitat, surface water body, or wetlands.
- Shallow contaminated surface soils are open to public access, and dwellings, parks, playgrounds, day care centers, schools, or similar use facilities are more than 500 feet from those soils.

At the former MDOT maintenance garage site, subsurface soils (>3 feet BGS) are impacted, and depth between impacted soils and the first potable aquifer is less than 50 feet. However, the significantly impacted soils were removed during the excavation event in 2011, and therefore no longer remain. The shallow water table is impacted with contaminants, and the groundwater surface is within 10 feet of the ground surface. Impacted groundwater is present in a plume that extends to the west of the source area. This scenario illustrates that the potential exists for long-term threat to human health, safety, or sensitive environmental receptors, which justify the classification as a **Class 3** site.

To be classified as a Class 4 site, the following conditions need to apply:

No demonstrable long-term threat to human health, safety, or sensitive environmental receptors:

- Priority 4 scenarios encompass all other conditions not described for Class 1, Class 2, or Class 3 sites.
- Non-potable aquifer with no existing local use impacted.
- Impacted soils located more than 3 feet BGS and greater than 50 feet above the nearest aquifer.
- Groundwater is impacted and non-potable wells are located downgradient outside the known extent of the chemical(s) of concern, and they produce from a non-impacted zone.

Contaminant concentrations and the distribution of the contaminants in the soil and groundwater do not allow classification as a Class 4 site.

7. SITE CLOSURE

This report summarizes the history and current status of the environmental conditions related to the release of petroleum compounds from underground storage tanks at the site. To gain closure of the site and remove the site from the MDEQ list of “open” LUST sites, an assessment of the remaining risk has been performed. Three potential exposure pathways of concern are associated with the remaining contaminants at the site. These include nonresidential drinking water protection (soil), direct contact (soil), and nonresidential drinking water use (groundwater). Currently, these potential pathways are not complete. To prevent completion of these exposure pathways through future site activities, a restrictive covenant will be placed on the deed of the property, preventing activities which will lead to exposure of the remaining subsurface impacts. The final corrective action for the site will include and rely upon an institutional control to prevent exposure

The property is currently owned by the City of Dowagiac. Approval and consent of the property owner (including any affected easement holders) will be obtained prior to recording with the Register of Deeds. The restriction will be placed on the deed of the property, and a formal survey of the property recorded.

7.1. Restrictive Covenant

The corrective action will place a restriction on the use of groundwater at the site. No water-supply wells, for use as drinking water, potable, non-potable, or irrigation use, will be allowed to be installed on the property. This will prevent use of potentially impacted groundwater.

The corrective action will also restrict the exposure to subsurface soils. Prior to any subsurface work (utility installation, maintenance, subsurface excavation, building foundation, etc.) contractors will be made aware of the subsurface impacts, both the location and magnitude of contaminant concentrations. Construction workers will be required to maintain proper training during subsurface activities. Any excavated impacted soil will be required to be properly disposed, and will not be allowed for use at other portions of the site.

Appendix C contains a copy of the restrictive covenant as well as other required forms for site closure. These include:

- Declaration of Restrictive Covenant – EQP3854
- Notice to Local Units of Government of Land Use Restrictions – EQP3872
- Notice of Corrective Action – EQP3853
- Notice to Impacted Parties of Corrective Action – EQP4003

With these restrictions in place, exposure to subsurface contaminants will be prevented. The concentrations remaining in the subsurface are expected to continue to decline, and eventually, over time, the risk will no longer remain. If, at some time, the City of Dowagiac would choose to remove the restrictive covenant, an investigation of site conditions and potential exposure risk would need to be completed.

8. REFERENCES

- ASTM, 2006, Standard Guide for Development of Conceptual Site Models and Remediation Strategies for Light Nonaqueous-Phase Liquids Released to the Subsurface Remediation, ASTM E 2531-06
- MDEQ, 2002, Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria, August 2002
- MDEQ, 2003, RRD Operational Memorandum No. 3, Part 213 Leaking Underground Storage Tank (LUST) Site Classification System, August 21, 2003
- MDEQ, 2012, RRD Operational Memorandum No.1, Part 201 Residential Cleanup Criteria and Part 213 Risk-Based Screening Levels, Attachment 1, MDEQ Administrative Rules, September 28, 2012.
- MDOT, 1994, Remedial Investigation Report, Phase II, Dowagiac Maintenance Garage
- MDOT, 1995, Remedial Investigation Report, Phase II, January 12, 1995, MDOT Material and Technology Division
- NTH Consultants, Ltd., 1995a, Pilot Study Report, October 10, 1995
- NTH Consultants, Ltd., 1995b, Additional Investigation, October 19, 1995
- NTH Consultants, Ltd., 1995c, Feasibility Study for Soil and Groundwater Remediation, October 27, 1995
- STS Consultants, Ltd., 2003, Final Assessment Report, April 1, 2003

List of Figures

Figure 1	Project Site Location
Figure 2	Project Site Layout
Figure 3	Location of Monitoring Wells
Figure 4	Location of Subsurface Cross Sections
Figure 5	Cross Section A-A'
Figure 6	Cross Section B-B'
Figure 7	Water Table Elevation Contour, July 2013
Figure 8	Historical and Current Extent of Soil Impacts
Figure 9	Cross Section Through Excavated Area
Figure 10	Historical and Current Extent of Groundwater Impacts
Figure 11	Plot of Total BTEX vs. Time, Groundwater
Figure 12	Extent of LNAPL Body
Figure 13	Plot of Total VOCs in Remediation System Influent vs. Time
Figure 14	Aerial Photograph of Site and Surrounding Areas, with Adjacent Properties

List of Tables

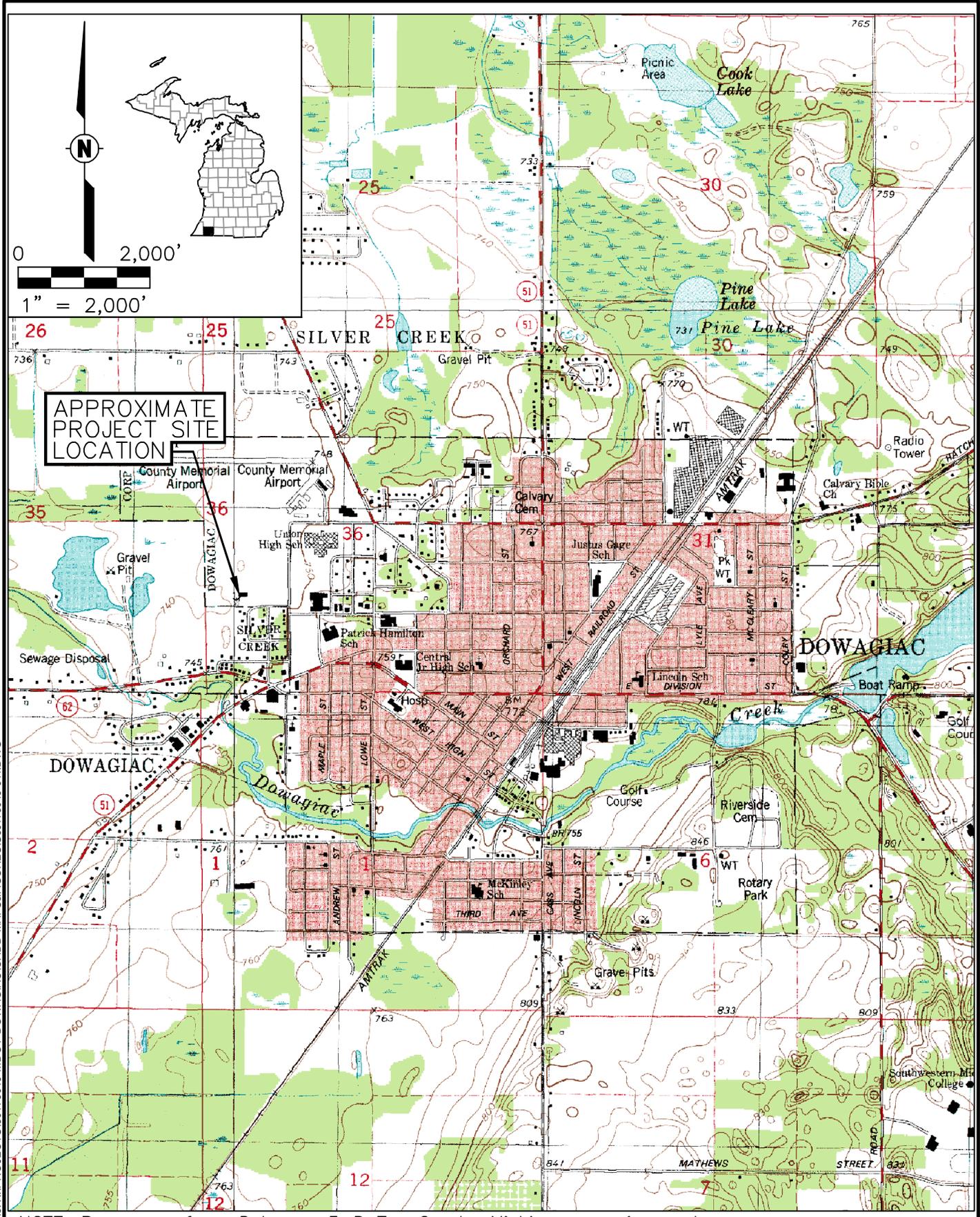
Table 1	Monitoring Well and Groundwater Elevation Data
Table 2	Horizontal Groundwater Gradient and Velocity Calculation Summary
Table 3	Vertical Groundwater Gradient Calculation Summary
Table 4	Summary of Groundwater Analytical Results
Table 5	Groundwater Treatment System – Operations Summary
Table 6	Tier I RBSL Comparison Table for <i>Remaining</i> Soil Impacts
Table 7	Tier I RBSL Comparison Table for <i>Remaining</i> Groundwater Impacts
Table 8	Groundwater Exposure Pathway Characterization
Table 9	Soil Exposure Pathway Characterization

List of Appendices

- Appendix A Summary of Soil Sampling Data from Various Sampling Events
- Appendix B Photographs from September 2011 Soil Excavation
- Appendix C Proposed Restrictive Covenant

DRAFT

ANSI A 8.5" x 11"
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Checked:
Designer:
Project Management Initials:
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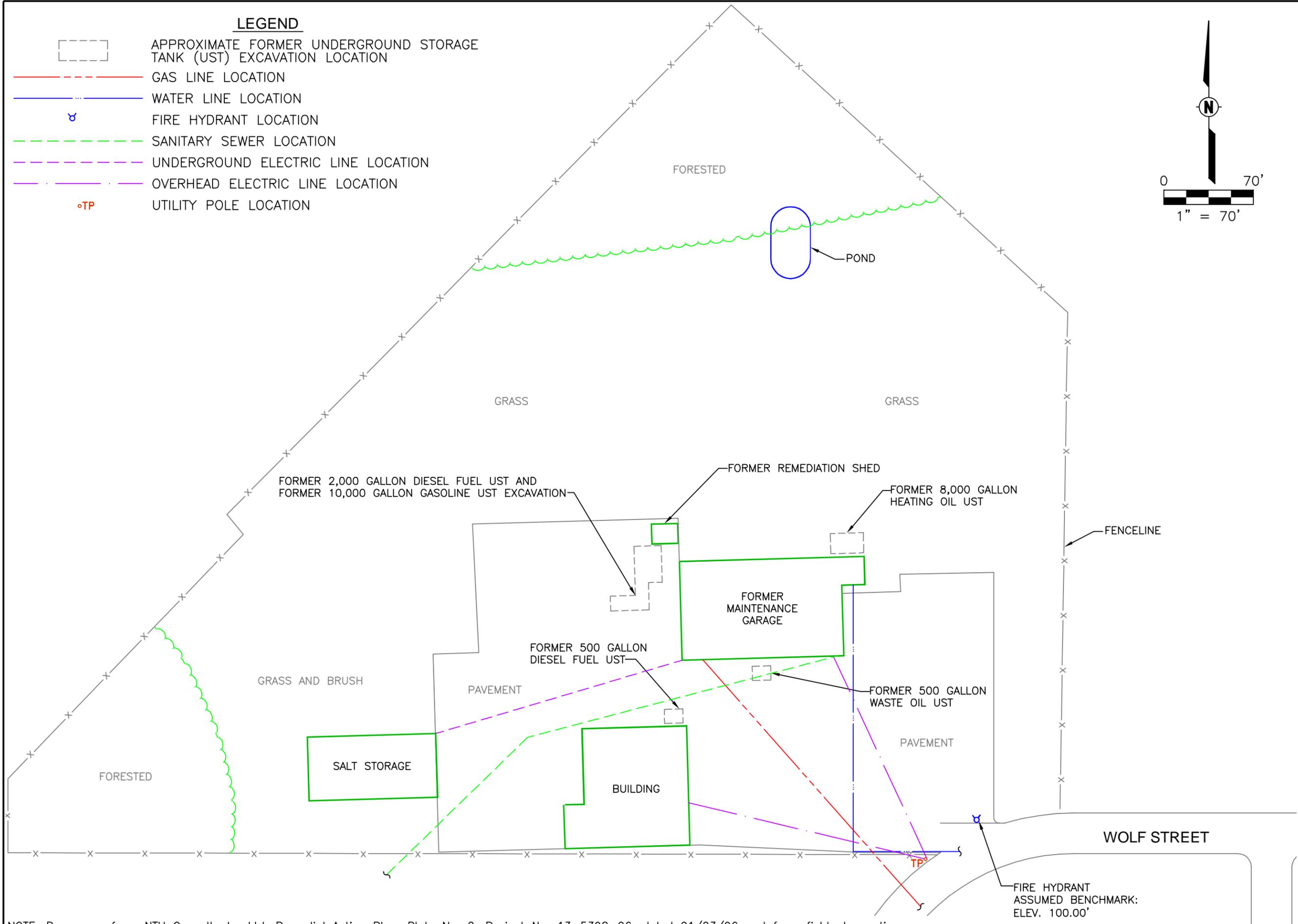
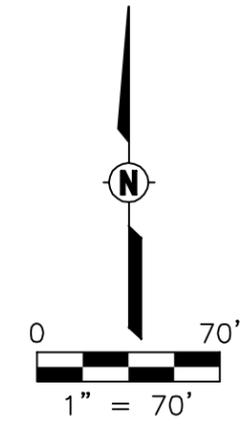
NOTE: Base map from DeLorme 3-D TopoQuads, Michigan mapping system.

FIGURE 1 - SITE PLAN - FORMER DOWAGIAC MAINTENANCE GARAGE
DOWAGIAC, MICHIGAN
MICHIGAN DEPARTMENT OF TRANSPORTATION
Project No.: 60179049



LEGEND

- APPROXIMATE FORMER UNDERGROUND STORAGE TANK (UST) EXCAVATION LOCATION
- GAS LINE LOCATION
- WATER LINE LOCATION
- ♣ FIRE HYDRANT LOCATION
- SANITARY SEWER LOCATION
- UNDERGROUND ELECTRIC LINE LOCATION
- OVERHEAD ELECTRIC LINE LOCATION
- TP UTILITY POLE LOCATION



PROJECT SITE PLAN
FORMER DOWAGIAC MAINTENANCE GARAGE
MICHIGAN DEPARTMENT OF TRANSPORTATION
DOWAGIAC, MICHIGAN

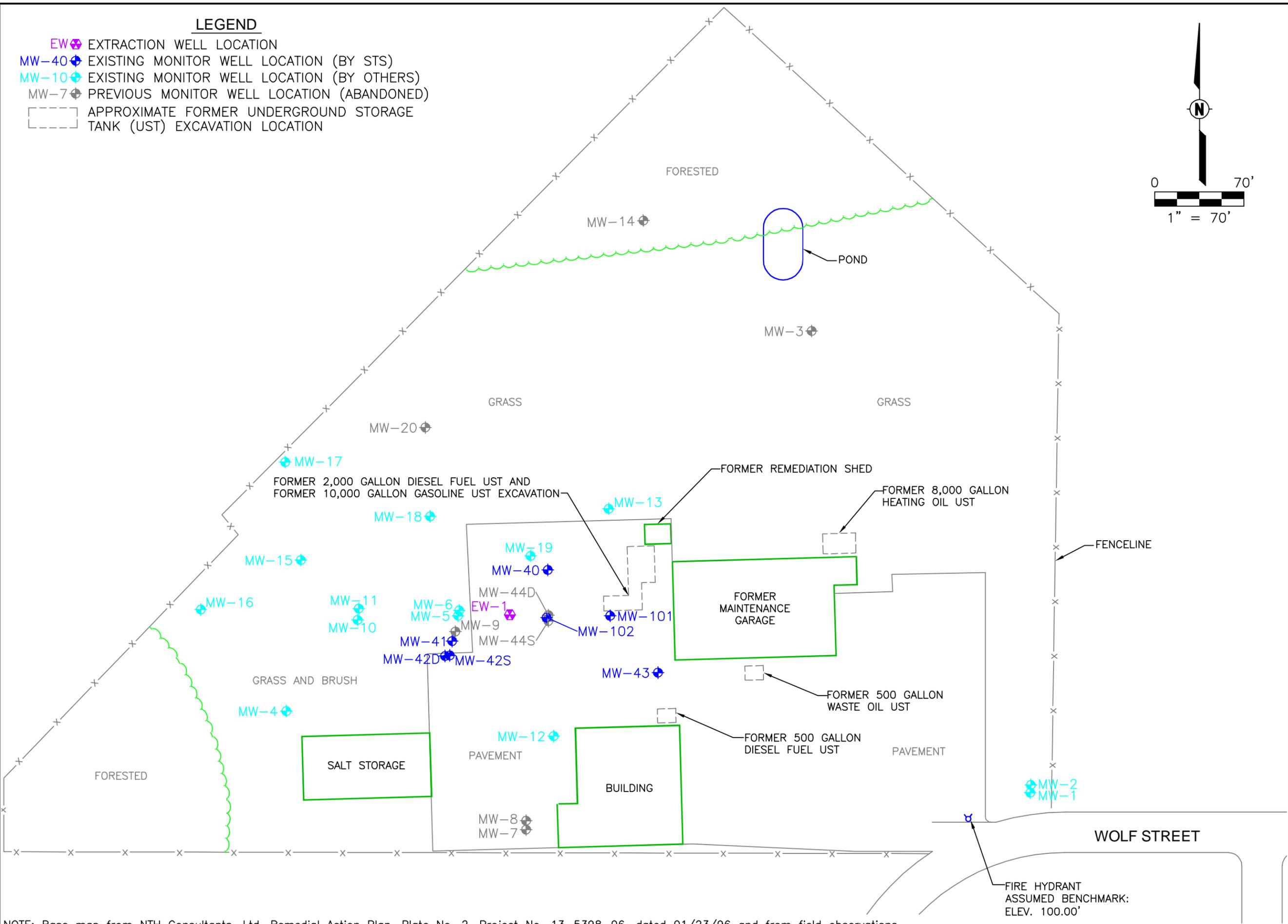
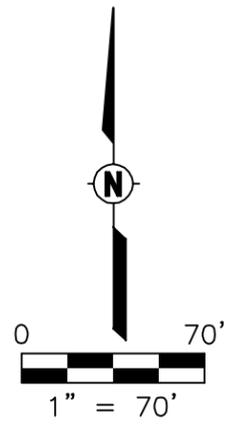
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PROJECT NUMBER	60179049
FIGURE NUMBER	2

NOTE: Base map from NTH Consultants, Ltd. Remedial Action Plan, Plate No. 2, Project No. 13-5398-06, dated 01/23/96 and from field observations.

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LEGEND

- EW-1 ⚡ EXTRACTION WELL LOCATION
- MW-40 ⚡ EXISTING MONITOR WELL LOCATION (BY STS)
- MW-10 ⚡ EXISTING MONITOR WELL LOCATION (BY OTHERS)
- MW-7 ⚡ PREVIOUS MONITOR WELL LOCATION (ABANDONED)
- APPROXIMATE FORMER UNDERGROUND STORAGE TANK (UST) EXCAVATION LOCATION



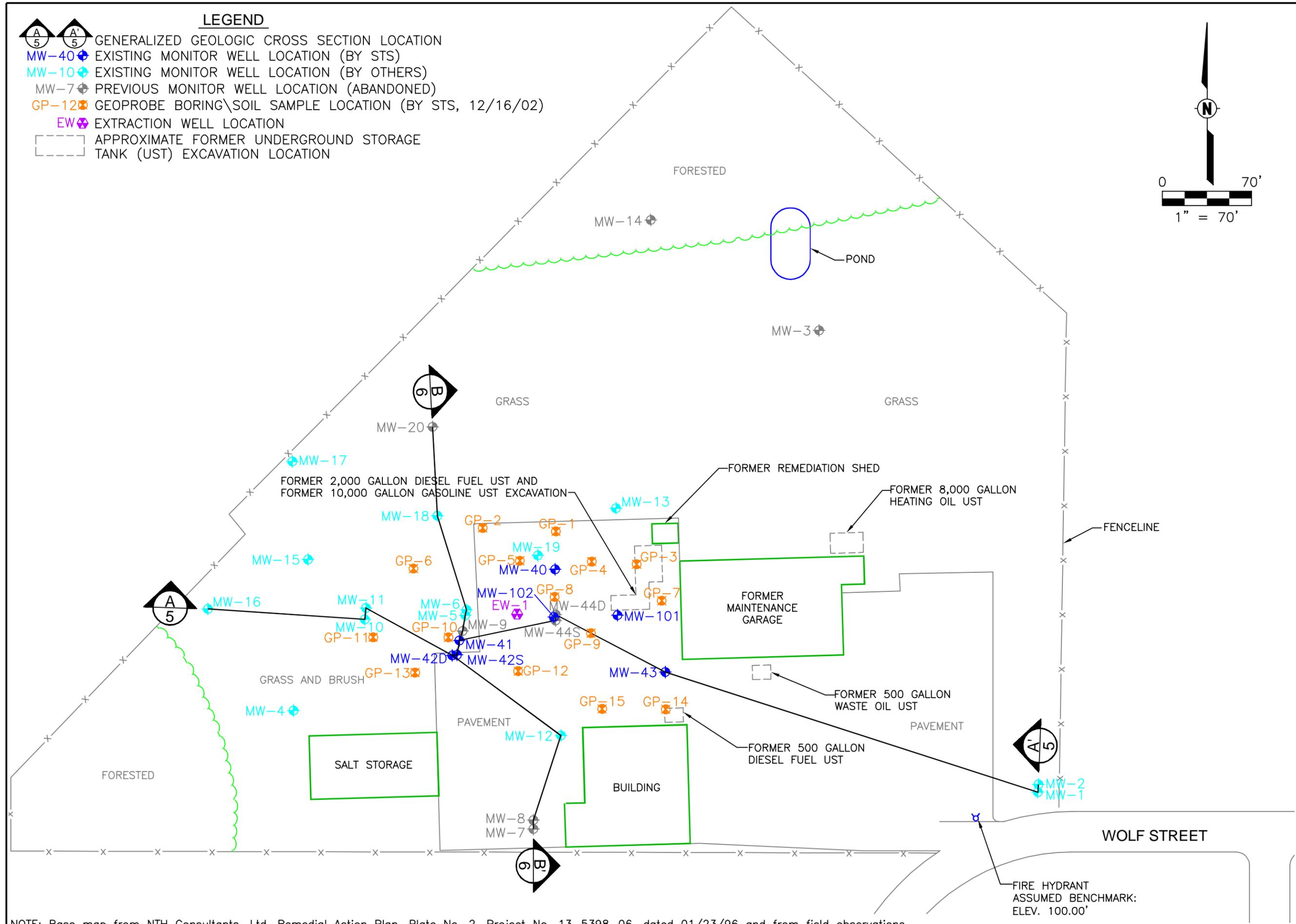
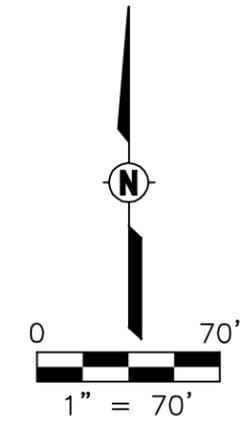
MONITOR WELL LOCATIONS
FORMER DOWAGIAC MAINTENANCE GARAGE
MICHIGAN DEPARTMENT OF TRANSPORTATION
DOWAGIAC, MICHIGAN

Drawn :	CJD 08/15/2013
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Approved:	ARB 08/15/2013
PROJECT NUMBER	60179049
FIGURE NUMBER	3

NOTE: Base map from NTH Consultants, Ltd. Remedial Action Plan, Plate No. 2, Project No. 13-5398-06, dated 01/23/96 and from field observations.

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- LEGEND**
- GENERALIZED GEOLOGIC CROSS SECTION LOCATION
 - EXISTING MONITOR WELL LOCATION (BY STS)
 - EXISTING MONITOR WELL LOCATION (BY OTHERS)
 - PREVIOUS MONITOR WELL LOCATION (ABANDONED)
 - GEOPROBE BORING\SOIL SAMPLE LOCATION (BY STS, 12/16/02)
 - EXTRACTION WELL LOCATION
 - APPROXIMATE FORMER UNDERGROUND STORAGE TANK (UST) EXCAVATION LOCATION

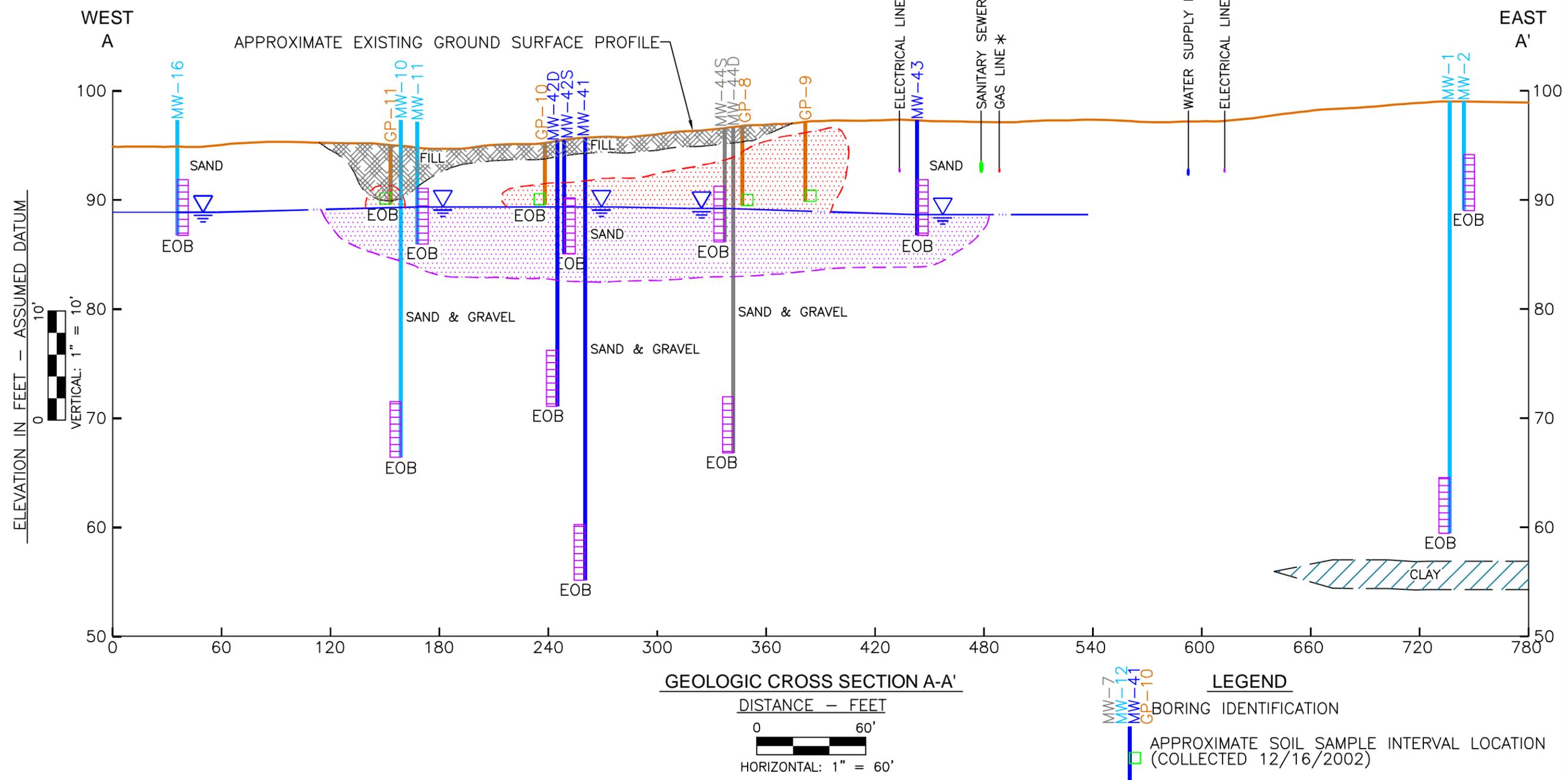


GENERALIZED GEOLOGIC CROSS SECTION LOCATIONS
 FORMER DOWAGIAC MAINTENANCE GARAGE
 MICHIGAN DEPARTMENT OF TRANSPORTATION
 DOWAGIAC, MICHIGAN

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Approved:	ARB 08/15/2013
PROJECT NUMBER	60179049
FIGURE NUMBER	4

NOTE: Base map from NTH Consultants, Ltd. Remedial Action Plan, Plate No. 2, Project No. 13-5398-06, dated 01/23/96 and from field observations.

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GEOLOGIC CROSS SECTION A-A'

DISTANCE - FEET
 0 60'
 HORIZONTAL: 1" = 60'

LEGEND

BORING IDENTIFICATION

- MW-7
- MW-12
- MW-41
- GP-10
- GP-11

- APPROXIMATE SOIL SAMPLE INTERVAL LOCATION (COLLECTED 12/16/2002)
- ▭ WELL SCREEN LOCATION AND GROUNDWATER SAMPLE INTERVAL (COLLECTED 11/19/2002)
- ▽ GROUNDWATER ELEVATION (COLLECTED 11/19/2002)
- EOB END OF BORING

- ESTIMATED EXTENT OF IMPACTED SOIL - 12/16/2002
- ESTIMATED EXTENT OF IMPACTED GROUNDWATER - 11/19/2002
- * NOTE: EXACT LOCATION AND DEPTH OF UTILITIES IS UNKNOWN.

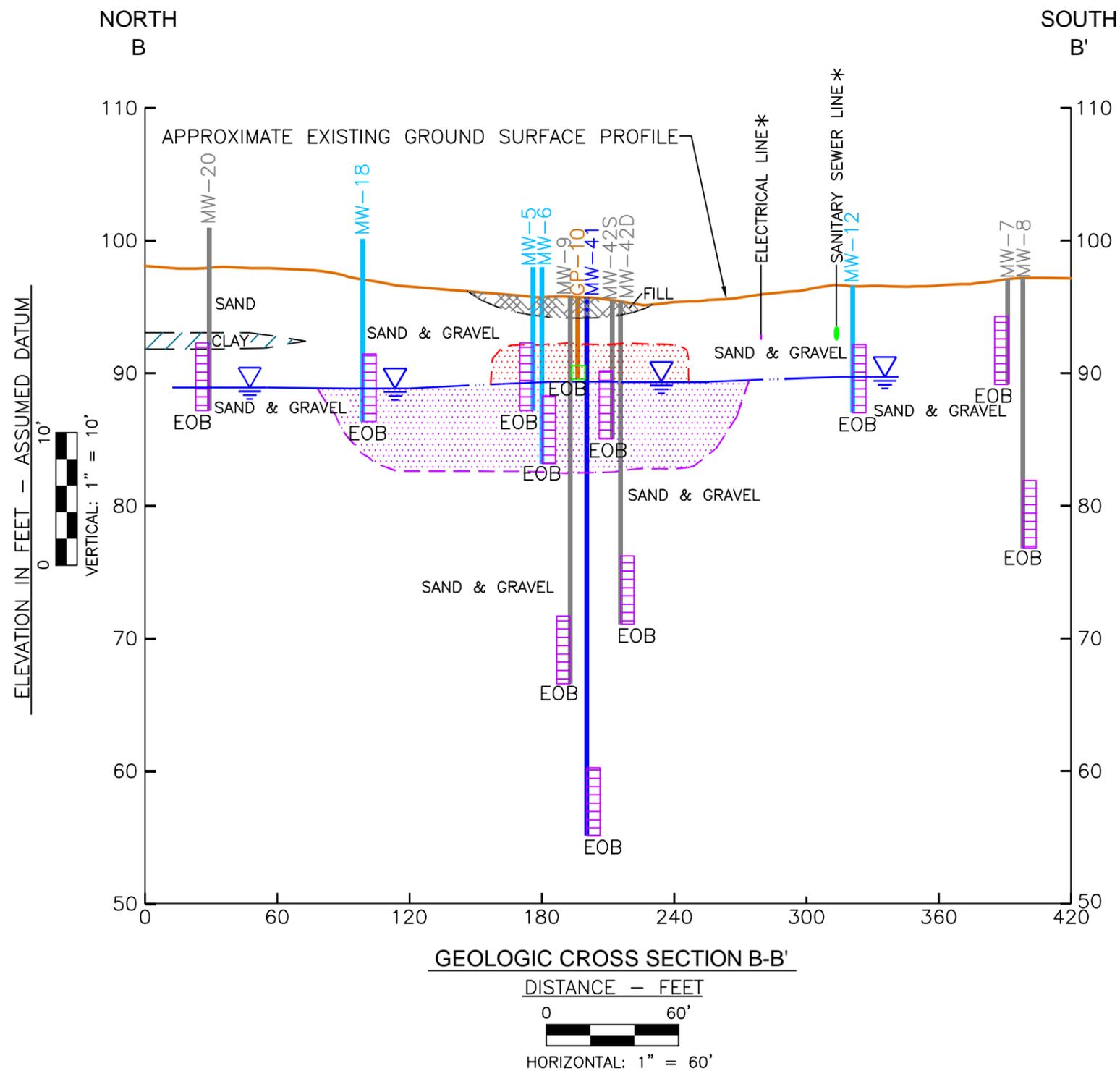
GENERALIZED GEOLOGIC CROSS SECTION A-A'
FORMER DOWAGIAC MAINTENANCE GARAGE
MICHIGAN DEPARTMENT OF TRANSPORTATION
DOWAGIAC, MICHIGAN

NOTE: Interpretation of subsurface soil conditions shown are based only on areas and depths sampled and/or tested. Horizontal and vertical subsurface conditions may vary between borings and test locations. Elevations shown are referenced to an assumed benchmark (EL. 100.00').

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PROJECT NUMBER	60179049
FIGURE NUMBER	5

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GENERALIZED GEOLOGIC CROSS SECTION B-B'
 FORMER DOWAGIAC MAINTENANCE GARAGE
 MICHIGAN DEPARTMENT OF TRANSPORTATION
 DOWAGIAC, MICHIGAN



NOTE: Interpretation of subsurface soil conditions shown are based only on areas and depths sampled and/or tested. Horizontal and vertical subsurface conditions may vary between borings and test locations. Elevations shown are referenced to an assumed benchmark (EL. 100.00').

* NOTE: EXACT LOCATION AND DEPTH OF UTILITIES IS UNKNOWN.

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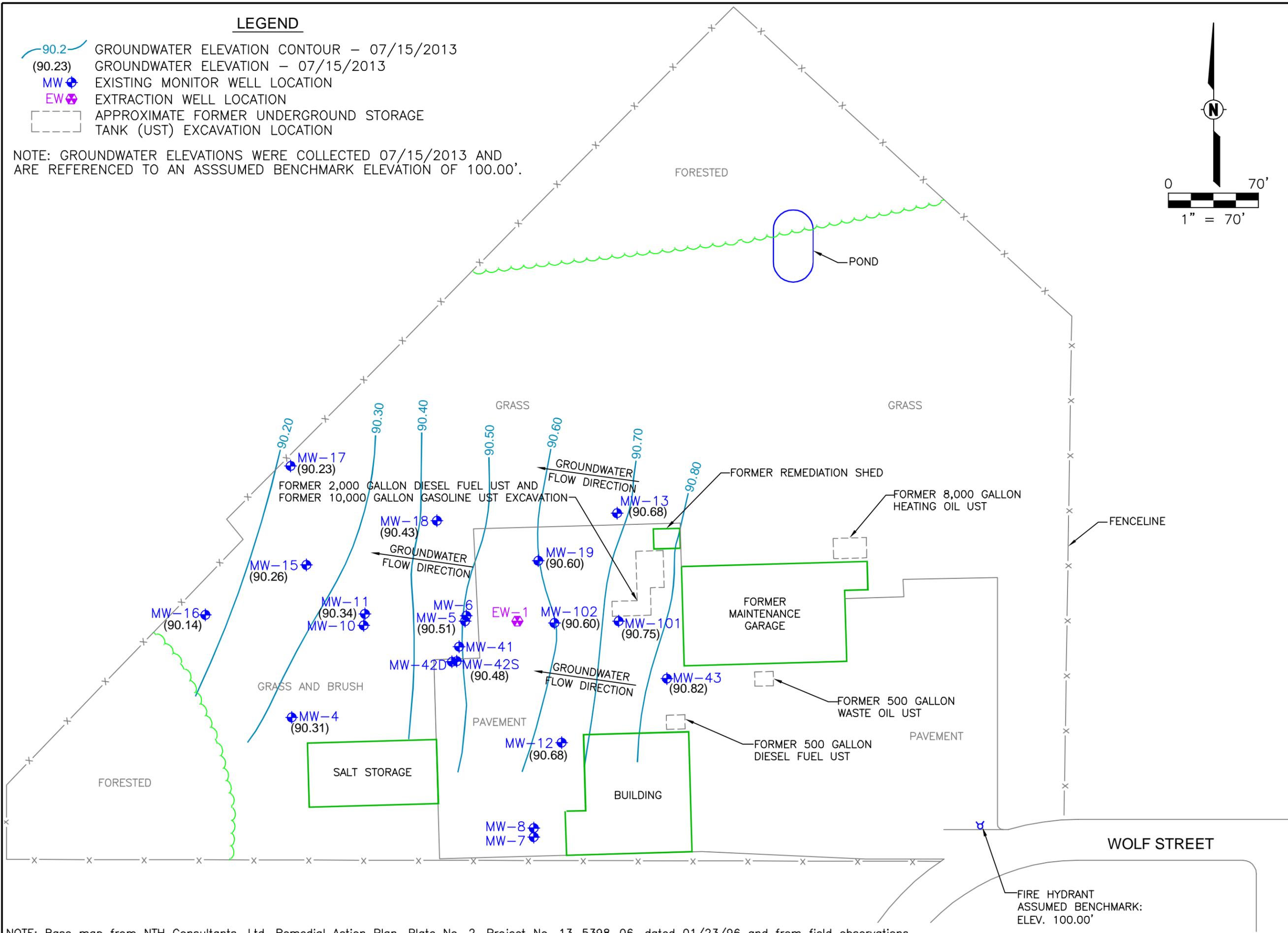
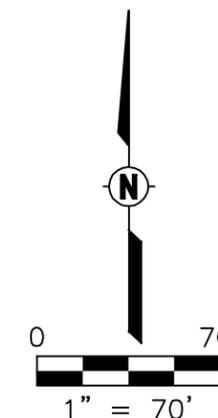
PROJECT NUMBER **60179049**

FIGURE NUMBER **6**

LEGEND

- 90.2 GROUNDWATER ELEVATION CONTOUR - 07/15/2013
- (90.23) GROUNDWATER ELEVATION - 07/15/2013
- MW + EXISTING MONITOR WELL LOCATION
- EW + EXTRACTION WELL LOCATION
- APPROXIMATE FORMER UNDERGROUND STORAGE TANK (UST) EXCAVATION LOCATION

NOTE: GROUNDWATER ELEVATIONS WERE COLLECTED 07/15/2013 AND ARE REFERENCED TO AN ASSUMED BENCHMARK ELEVATION OF 100.00'.



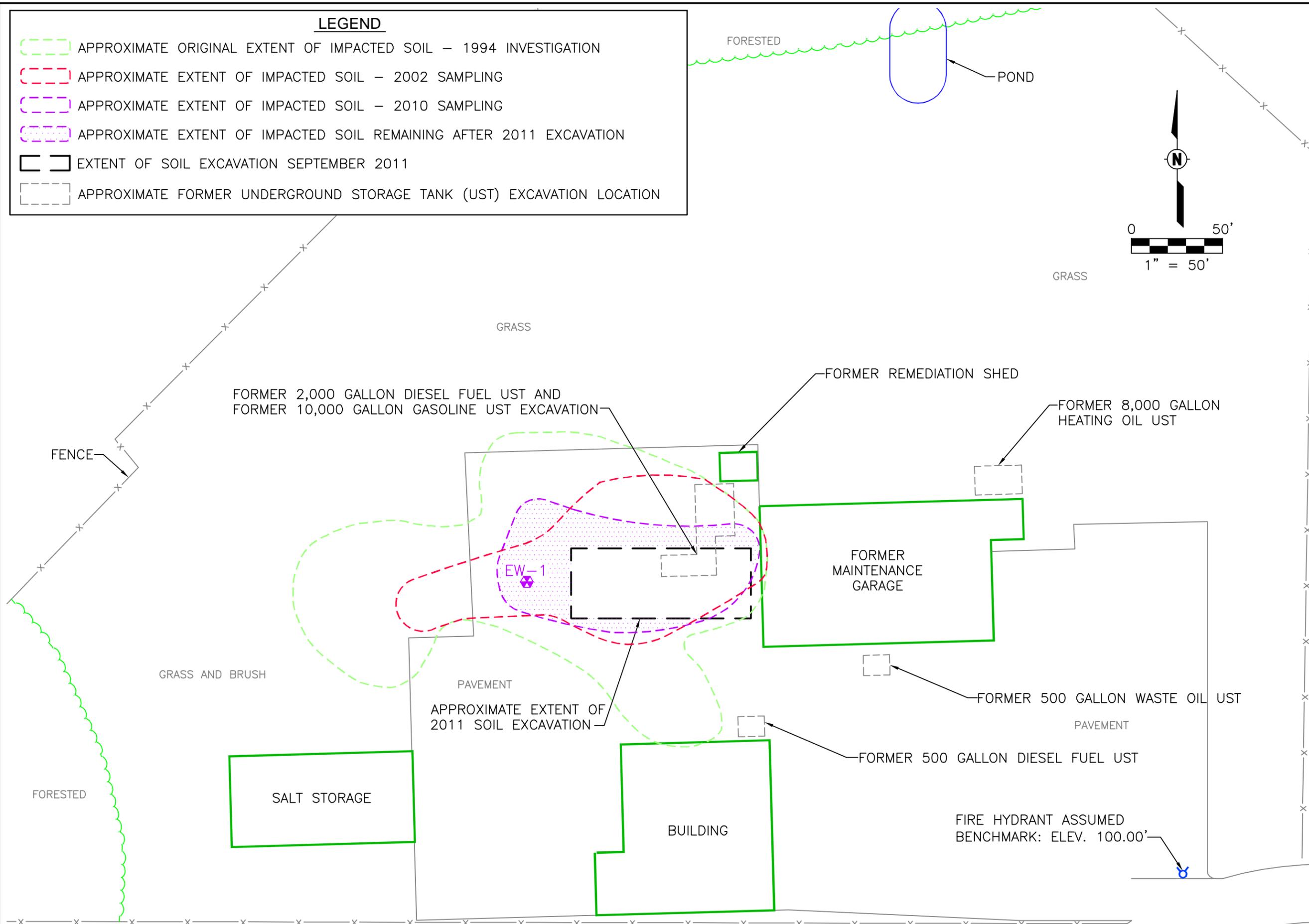
GROUNDWATER ELEVATION CONTOURS - 7/15/2013
 FORMER DOWAGIAC MAINTENANCE GARAGE
 MICHIGAN DEPARTMENT OF TRANSPORTATION
 DOWAGIAC, MICHIGAN

Drawn:	CJD 08/15/2013
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Approved:	ARB 08/15/2013
PROJECT NUMBER	60179049
FIGURE NUMBER	7

NOTE: Base map from NTH Consultants, Ltd. Remedial Action Plan, Plate No. 2, Project No. 13-5398-06, dated 01/23/96 and from field observations.

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HISTORICAL AND CURRENT EXTENT OF SOIL IMPACTS
 FORMER DOWAGIAC MAINTENANCE GARAGE
 MICHIGAN DEPARTMENT OF TRANSPORTATION
 DOWAGIAC, MICHIGAN



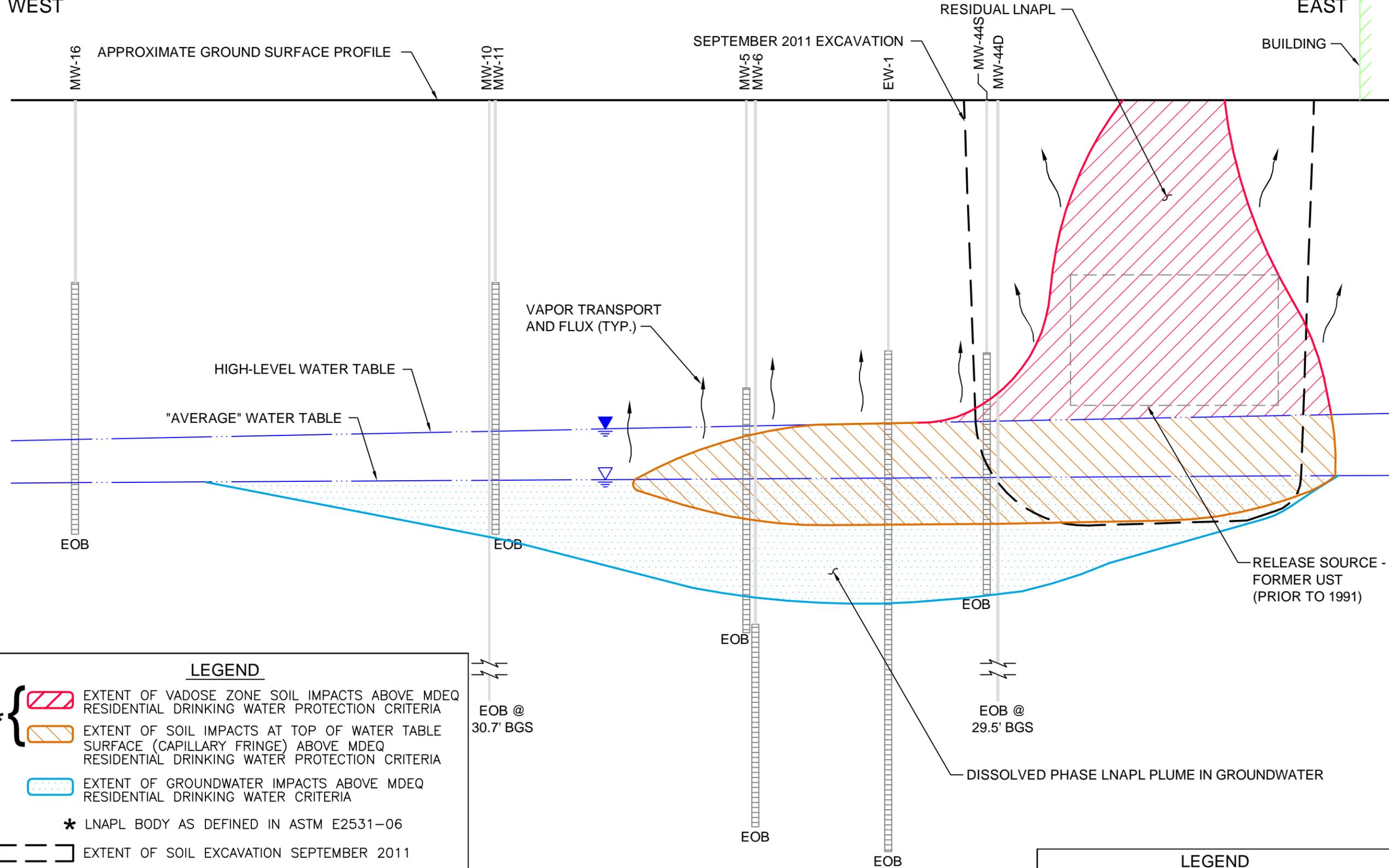
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NOTE: Base map from NTH Consultants, Ltd. Remedial Action Plan, Plate No. 2, Project No. 13-5398-06, dated 01/23/96 and from field observations.

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PROJECT NUMBER	60179049	
FIGURE NUMBER	8	

WEST

EAST



LEGEND

- * { EXTENT OF VADOSE ZONE SOIL IMPACTS ABOVE MDEQ RESIDENTIAL DRINKING WATER PROTECTION CRITERIA
- * { EXTENT OF SOIL IMPACTS AT TOP OF WATER TABLE SURFACE (CAPILLARY FRINGE) ABOVE MDEQ RESIDENTIAL DRINKING WATER PROTECTION CRITERIA
- EXTENT OF GROUNDWATER IMPACTS ABOVE MDEQ RESIDENTIAL DRINKING WATER CRITERIA
- * LNAPL BODY AS DEFINED IN ASTM E2531-06
- EXTENT OF SOIL EXCAVATION SEPTEMBER 2011

NOTE: SOIL GEOPROBE SAMPLES COLLECTED OCTOBER 2010, GROUNDWATER SAMPLES COLLECTED MARCH 8, 2011.

NOTE: Interpretation of subsurface soil conditions shown are based only on areas and depths sampled and/or tested. Horizontal and vertical subsurface conditions may vary between borings and test locations.

LEGEND

- MW MONITOR WELL
- EW EXTRACTION WELL
- B-10-A GEOPROBE SOIL BORING (OCT. 2010)
- EOB END OF BORING
- GROUNDWATER ELEVATION

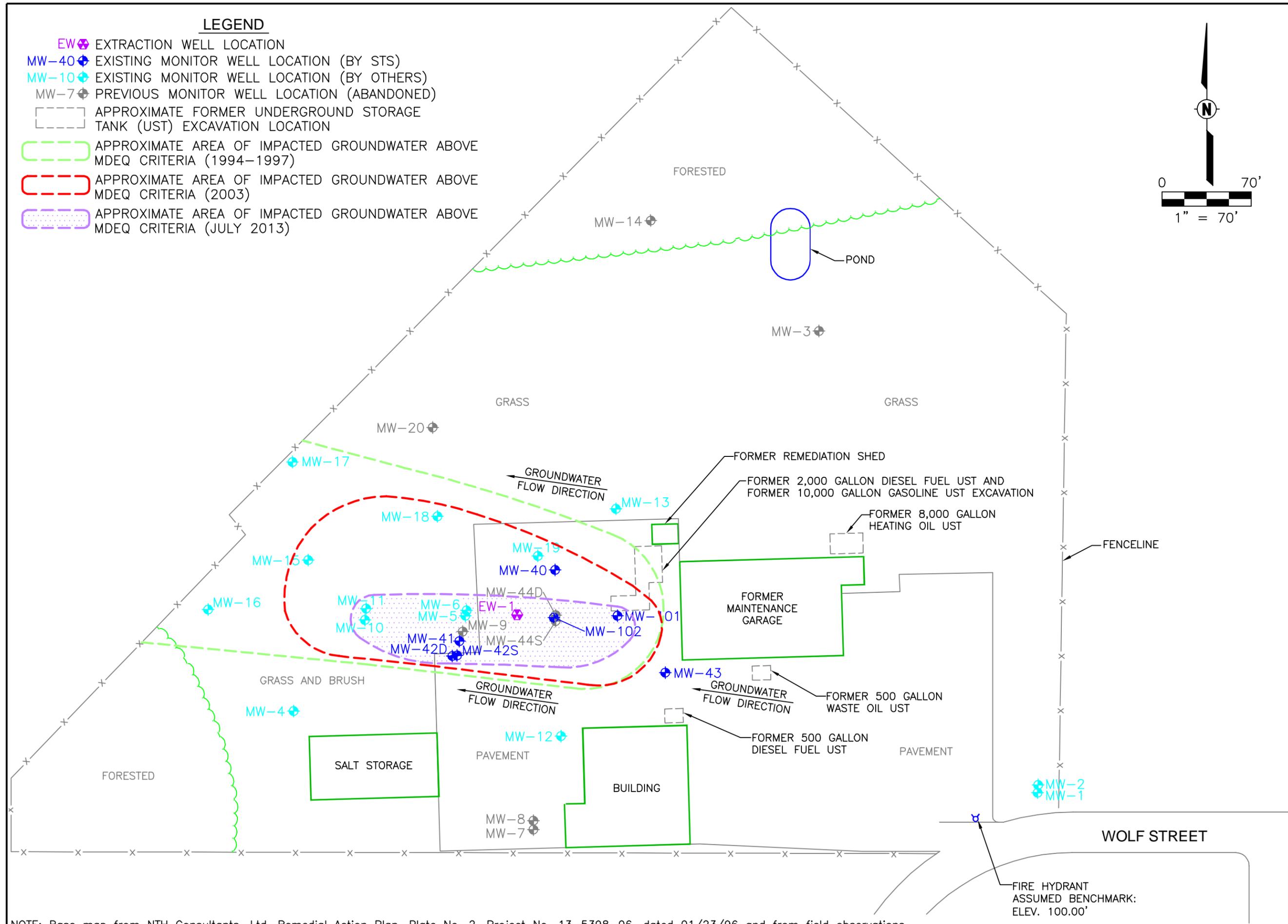
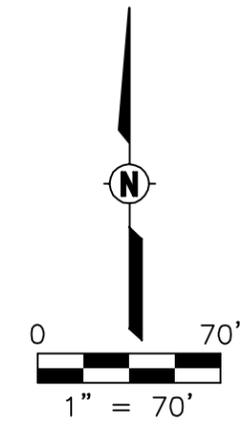
GENERALIZED CROSS SECTION THROUGH EXCAVATION AREA - SCHEMATIC
 FORMER DOWAGIAC MAINTENANCE GARAGE
 MICHIGAN DEPARTMENT OF TRANSPORTATION
 DOWAGIAC, MICHIGAN

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PROJECT NUMBER	60179049	
FIGURE NUMBER	9	

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LEGEND

- EW-1 ⚡ EXTRACTION WELL LOCATION
- MW-40 ⚡ EXISTING MONITOR WELL LOCATION (BY STS)
- MW-10 ⚡ EXISTING MONITOR WELL LOCATION (BY OTHERS)
- MW-7 ⚡ PREVIOUS MONITOR WELL LOCATION (ABANDONED)
- ⬜ APPROXIMATE FORMER UNDERGROUND STORAGE TANK (UST) EXCAVATION LOCATION
- ⬜ APPROXIMATE AREA OF IMPACTED GROUNDWATER ABOVE MDEQ CRITERIA (1994-1997)
- ⬜ APPROXIMATE AREA OF IMPACTED GROUNDWATER ABOVE MDEQ CRITERIA (2003)
- ⬜ APPROXIMATE AREA OF IMPACTED GROUNDWATER ABOVE MDEQ CRITERIA (JULY 2013)



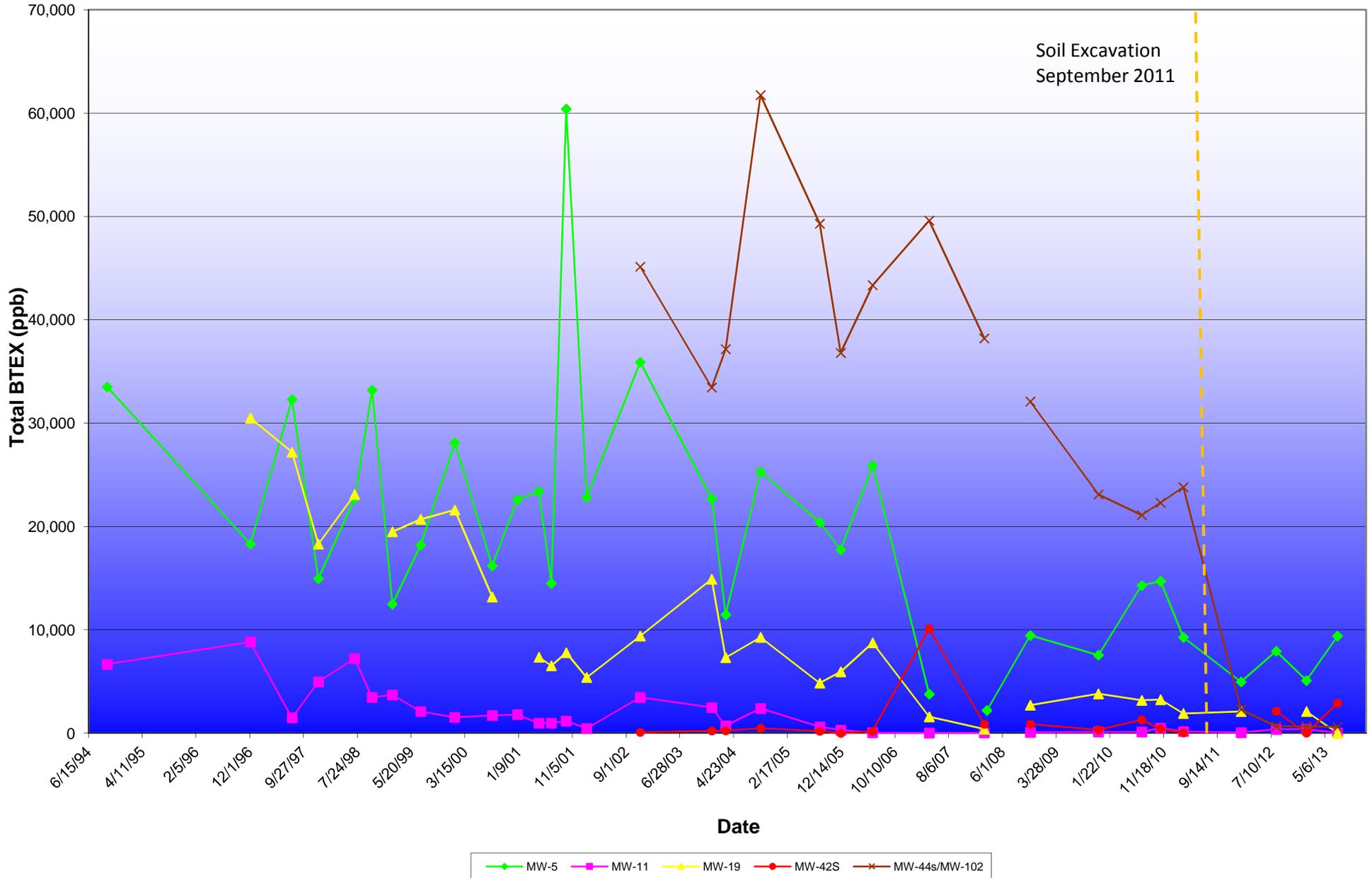
HISTORICAL AND CURRENT EXTENT OF GROUNDWATER IMPACTS
FORMER DOWAGIAC MAINTENANCE GARAGE
MICHIGAN DEPARTMENT OF TRANSPORTATION
DOWAGIAC, MICHIGAN

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PROJECT NUMBER	60179049
FIGURE NUMBER	10

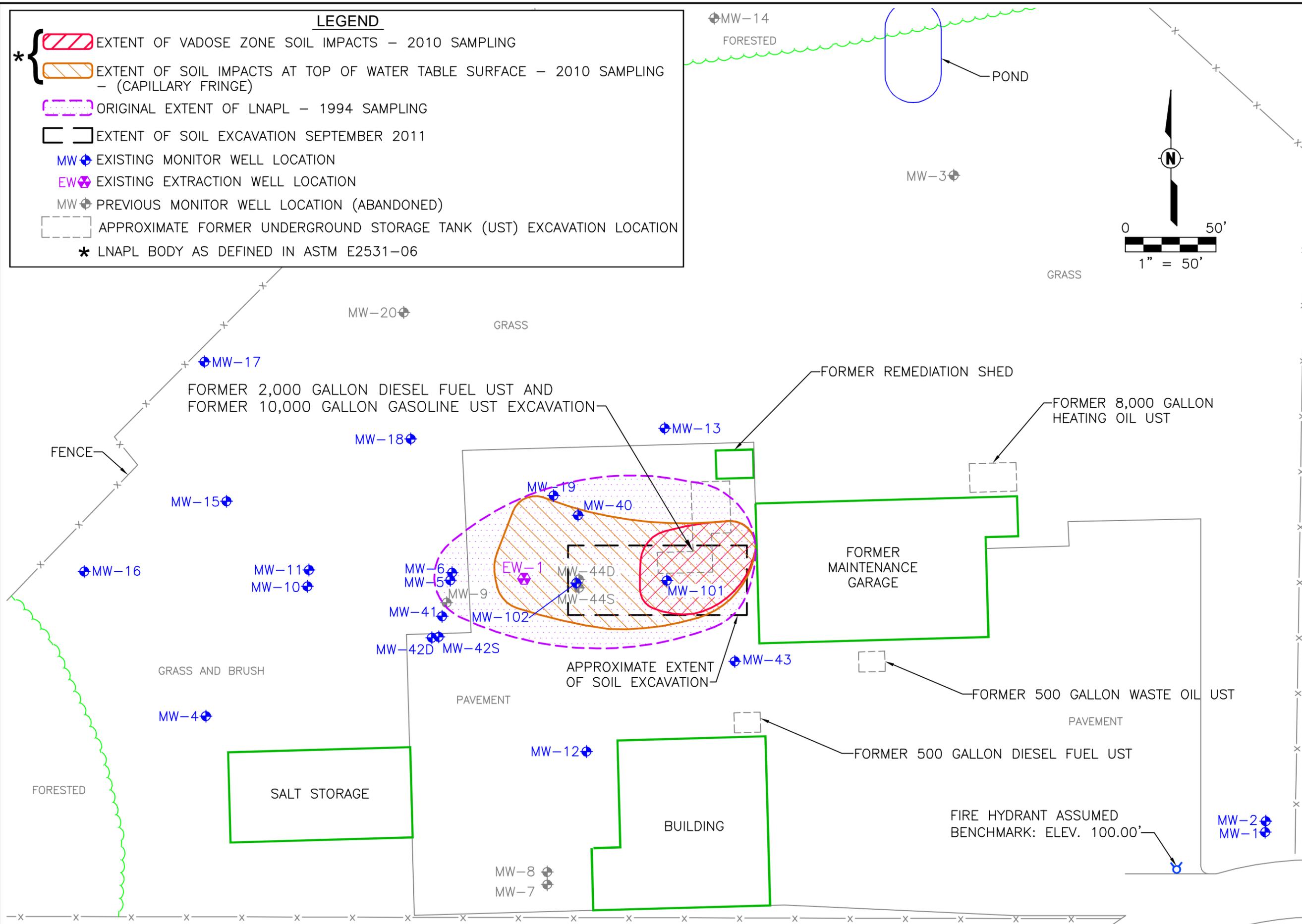
NOTE: Base map from NTH Consultants, Ltd. Remedial Action Plan, Plate No. 2, Project No. 13-5398-06, dated 01/23/96 and from field observations.

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FIGURE 11
TOTAL BTEX vs Time, Groundwater



**EXTENT OF LNAPL BODY
 FORMER DOWAGIAC MAINTENANCE GARAGE
 MICHIGAN DEPARTMENT OF TRANSPORTATION
 DOWAGIAC, MICHIGAN**

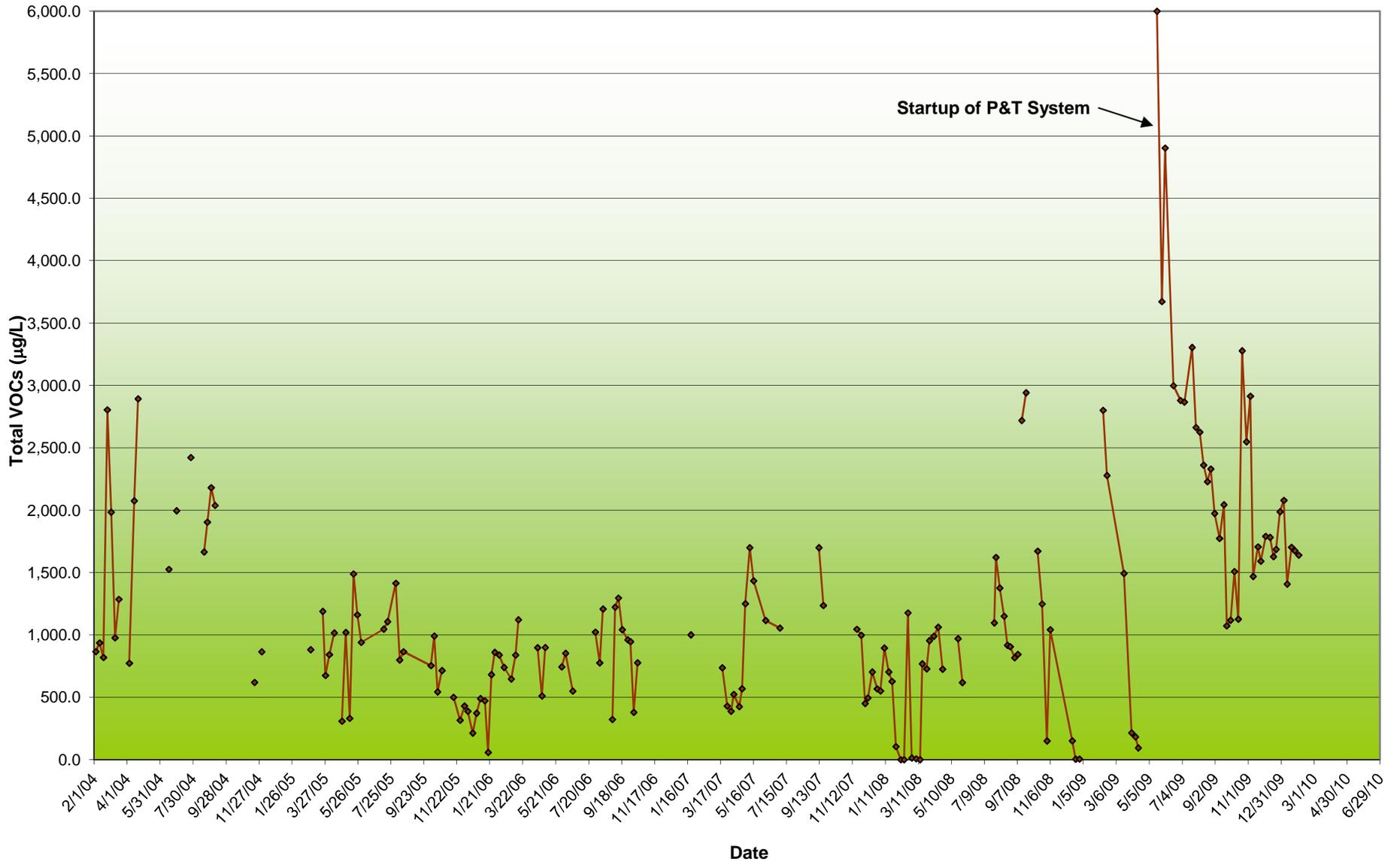


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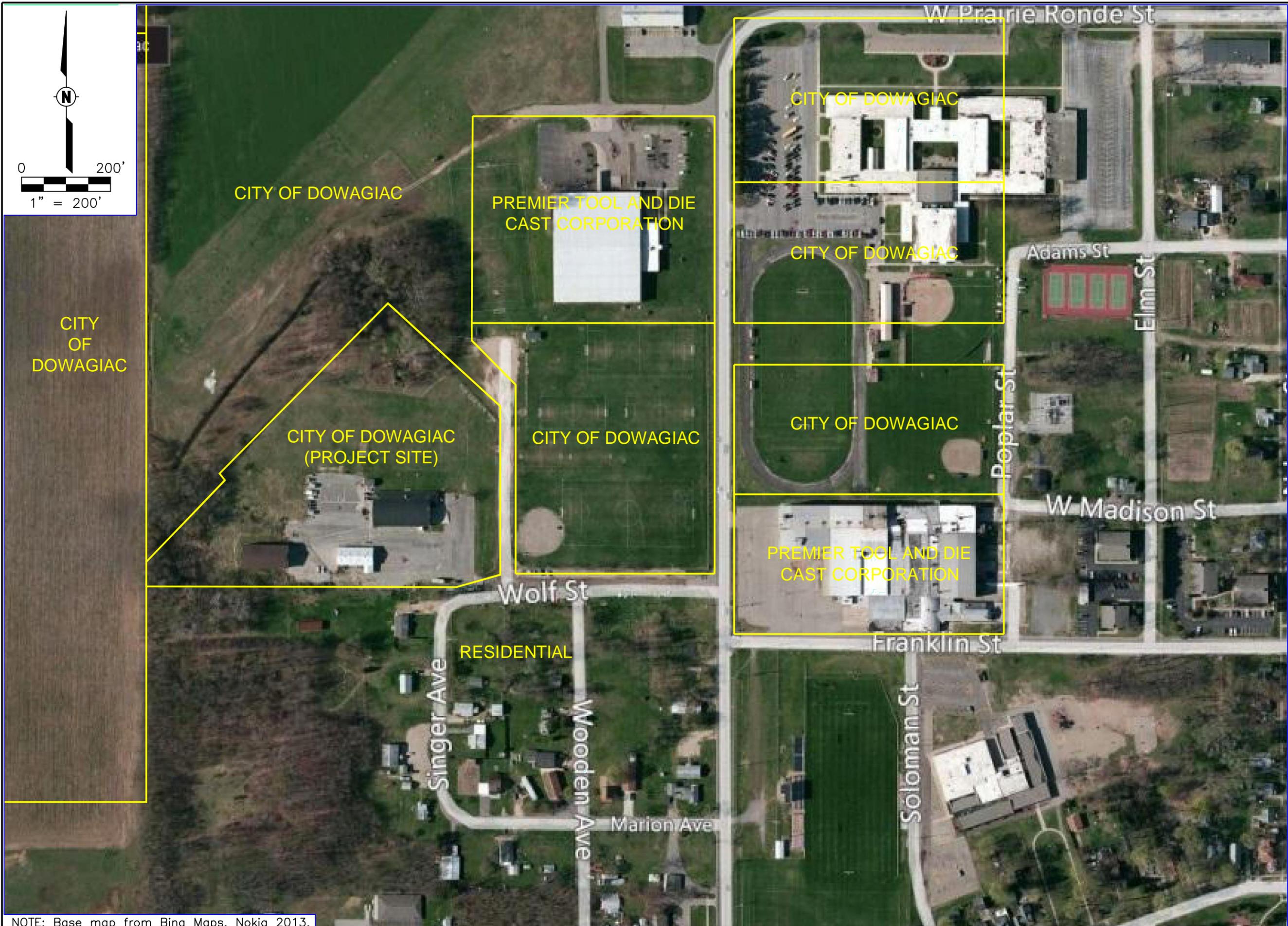
NOTE: Base map from NTH Consultants, Ltd. Remedial Action Plan, Plate No. 2, Project No. 13-5398-06, dated 01/23/96 and from field observations.

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PROJECT NUMBER	60179049	
FIGURE NUMBER	12	

FIGURE 13
Total VOCs vs. Time - Remediation System Influent



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AERIAL PHOTOGRAPH
 PROJECT SITE VICINITY AND ADJACENT PROPERTIES
 FORMER DOWAGIAC MAINTENANCE GARAGE
 MICHIGAN DEPARTMENT OF TRANSPORTATION
 DOWAGIAC, MICHIGAN

Drawn :	CJD	08/15/2013
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PROJECT NUMBER	60179049	
FIGURE NUMBER	14	

NOTE: Base map from Bing Maps, Nokia 2013.

TABLE 1
MDOT-Dowagiac Maintenance Garage
Monitoring Well and Groundwater Elevation Data

Well	Top of Casing Elevation (feet)	Total Depth (ft. BTOC)	November 19, 2002		January 22, 2003		March 7, 2003		May 7, 2003		July 17, 2003	
			Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)
MW-1		41.00	Not Measured		Not Measured		7.97		6.68		7.72	
MW-2			Not Measured		Not Measured		Not Measured		6.76		7.85	
MW-3	97.96	10.40	Not Measured		8.13	89.83	8.06	89.90	6.57	91.39	7.76	90.20
MW-4	96.03	10.30	7.02	89.01	6.81	89.22	6.74	89.29	5.34	90.69	6.55	89.48
MW-5	97.66	10.70	8.47	89.19	8.25	89.41	8.20	89.46	7.68	89.98	7.99	89.67
MW-6	97.98	14.50	8.75	89.23	8.55	89.43	8.47	89.51	7.07	90.91	8.28	89.70
MW-7			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-8			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-9			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-10	97.03	30.70	7.95	89.08	7.74	89.29	7.68	89.35	6.26	90.77	7.48	89.55
MW-11	96.67	10.50	7.62	89.05	7.40	89.27	7.34	89.33	5.91	90.76	7.14	89.53
MW-12	96.49	9.50	7.04	89.45	6.83	89.66	6.80	89.69	5.40	91.09	6.58	89.91
MW-13	100.29	11.70	8.86	91.43	10.74	89.55	10.66	89.63	9.20	91.09	10.42	89.87
MW-14	97.45	10.65	Not Measured		7.94	89.51	7.85	89.60	6.23	91.22	7.59	89.86
MW-15	96.72	10.70	7.77	88.95	7.55	89.17	7.48	89.24	6.04	90.68	7.29	89.43
MW-16	97.34	10.70	8.47	88.87	8.26	89.08	8.18	89.16	6.74	90.60	8.00	89.34
MW-17	100.13	12.70	11.23	88.90	11.01	89.12	10.93	89.20	9.44	90.69	Dry	
MW-18	100.17	12.65	11.08	89.09	10.87	89.30	10.79	89.38	9.34	90.83	10.58	89.59
MW-19	97.08	8.65	7.76	89.32	7.55	89.53	7.49	89.59	6.05	91.03	7.26	89.82
MW-20	101.04	13.70	12.00	89.04	11.76	89.28	11.69	89.35	10.19	90.85	11.45	89.59
MW-40	96.95	29.30	7.60	89.35	7.31	89.64	7.32	89.63	5.88	91.07	7.09	89.86
MW-41	95.29	39.50	6.03	89.26	5.82	89.47	5.78	89.51	4.39	90.90	5.55	89.74
MW-42S	94.93	10.00	5.68	89.25	5.47	89.46	5.41	89.52	4.01	90.92	5.20	89.73
MW-42D	95.11	23.65	5.87	89.24	5.66	89.45	5.61	89.50	4.19	90.92	5.40	87.91
MW-43	97.29	10.20	7.71	89.58	7.50	89.79	7.45	89.84	6.26	91.03	7.20	90.83
MW-44S	96.33	9.90	6.95	89.38	6.75	89.58	6.69	89.64	5.28	91.05	6.46	89.87
MW-44D	96.32	29.50	6.96	89.36	6.74	89.58	6.69	89.63	5.26	91.06	6.46	96.32

Elevation measured to LOCAL datum (100.00 feet), at fire hydrant (north side of flange), located at SE corner of site.

BTOC = Below top of casing.

ft. = feet

TABLE 1
MDOT-Dowagiac Maintenance Garage
Monitoring Well and Groundwater Elevation Data

Well	Top of Casing Elevation (feet)	Total Depth (ft. BTOC)	August 12, 2003		September 10, 2003		December 22, 2003		March 10, 2004		September 21, 2004	
			Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)
MW-1		41.00	8.07		8.44		7.34		6.23		7.97	
MW-2			8.20		8.58		7.48		6.28		8.12	
MW-3	97.96	10.40	8.14	89.82	8.56	89.40	7.37	90.59	6.07	91.89	8.08	89.88
MW-4	96.03	10.30	6.92	89.11	7.29	88.74	6.10	89.93	Dry		6.87	89.16
MW-5	97.66	10.70	8.35	89.31	8.72	88.94	7.52	90.14	6.38	91.28	8.28	89.38
MW-6	97.98	14.50	8.64	89.34	9.01	88.97	7.81	90.17	6.68	91.30	8.56	89.42
MW-7			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-8			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-9			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-10	97.03	30.70	7.83	89.20	8.22	88.81	7.01	90.02	5.85	91.18	7.76	89.27
MW-11	96.67	10.50	7.51	89.16	7.88	88.79	6.67	90.00	5.52	91.15	7.43	89.24
MW-12	96.49	9.50	6.93	89.56	7.30	89.19	6.13	90.36	5.00	91.49	6.87	89.62
MW-13	100.29	11.70	10.78	89.51	11.18	89.11	9.97	90.32	8.73	91.56	10.73	89.56
MW-14	97.45	10.65	7.97	89.48	8.39	89.06	7.12	90.33	5.46	91.99	7.92	89.53
MW-15	96.72	10.70	7.66	89.06	8.03	88.69	7.81	88.91	5.64	91.08	7.59	89.13
MW-16	97.34	10.70	8.36	88.98	8.73	88.61	7.51	89.83	6.36	90.98	8.31	89.03
MW-17	100.13	12.70	11.09	89.04	11.48	88.65	10.24	89.89	9.03	91.10	11.03	89.10
MW-18	100.17	12.65	10.94	89.23	11.33	88.84	10.12	90.05	8.94	91.23	10.88	89.29
MW-19	97.08	8.65	7.62	89.46	8.01	89.07	6.82	90.26	5.54	91.54	7.56	89.52
MW-20	101.04	13.70	7.83	93.21	12.23	88.81	10.99	90.05	9.78	91.26	11.78	89.26
MW-40	96.95	29.30	7.46	89.49	7.84	89.11	6.64	90.31	5.47	91.48	7.38	89.57
MW-41	95.29	39.50	5.92	89.37	6.29	89.00	5.09	90.20	3.96	91.33	5.84	89.45
MW-42S	94.93	10.00	5.58	89.35	5.96	88.97	4.75	90.18	3.61	91.32	5.50	89.43
MW-42D	95.11	23.65	5.77	89.34	6.15	88.96	4.93	90.18	3.78	91.33	5.69	89.42
MW-43	97.29	10.20	7.57	89.72	7.95	89.34	6.78	90.51	5.63	91.66	7.50	89.79
MW-44S	96.33	9.90	6.83	89.50	7.20	89.13	6.01	90.32	4.86	91.47	6.76	89.57
MW-44D	96.32	29.50	6.83	89.49	7.21	89.11	6.01	90.31	4.86	91.46	6.75	89.57

Elevation measured to LOCAL datum (100.00 feet), at fire hydrant (north side of flange), located at SE corner of site.

BTOC = Below top of casing.

ft. = feet

TABLE 1
MDOT-Dowagiac Maintenance Garage
Monitoring Well and Groundwater Elevation Data

Well	Top of Casing Elevation (feet)	Total Depth (ft. BTOC)	August 17, 2005		December 12, 2005		June 8, 2006		April 20, 2007		March 7, 2008	
			Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)
MW-1		41.00	7.93		Not Measured		7.44		6.33		Not Measured	
MW-2			8.07		Not Measured		7.58		6.47		Not Measured	
MW-3	97.96	10.40	7.96	90.00	8.00	89.96	7.38	90.58	6.28	91.68	Not Measured	
MW-4	96.03	10.30	6.83	89.20	6.85	89.18	6.19	89.84	5.09	90.94	4.31	91.72
MW-5	97.66	10.70	8.28	89.38	8.33	89.33	7.64	90.02	6.54	91.12	5.67	91.99
MW-6	97.98	14.50	8.56	89.42	8.60	89.38	7.93	90.05	6.83	91.15	5.94	92.04
MW-7			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-8			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-9			Not Measured		Not Measured		Not Measured		Not Measured		Not Measured	
MW-10	97.03	30.70	7.76	89.27	7.79	89.24	7.10	89.93	5.99	91.04	Not Measured	
MW-11	96.67	10.50	7.45	89.22	7.45	89.22	6.78	89.89	5.67	91.00	Not Measured	
MW-12	96.49	9.50	6.86	89.63	6.41	90.08	6.23	90.26	5.14	91.35	4.37	92.12
MW-13	100.29	11.70	10.70	89.59	10.78	89.51	10.08	90.21	8.94	91.35	8.10	92.19
MW-14	97.45	10.65	7.29	90.16	7.30	90.15	6.55	90.90	5.40	92.05	Not Measured	
MW-15	96.72	10.70	7.59	89.13	7.60	89.12	6.93	89.79	5.79	90.93	4.93	91.79
MW-16	97.34	10.70	8.30	89.04	8.35	88.99	7.62	89.72	6.49	90.85	5.69	91.65
MW-17	100.13	12.70	11.01	89.12	11.04	89.09	10.40	89.73	9.18	90.95	Not Measured	
MW-18	100.17	12.65	10.86	89.31	10.92	89.25	10.21	89.96	9.10	91.07	8.19	91.98
MW-19	97.08	8.65	7.55	89.53	7.63	89.45	6.91	90.17	5.79	91.29	Not Measured	
MW-20	101.04	13.70	11.74	89.30	11.77	89.27	11.13	89.91	9.93	91.11	Not Measured	
MW-40	96.95	29.30	7.39	89.56	7.41	89.54	6.72	90.23	5.66	91.29	Not Measured	
MW-41	95.29	39.50	5.84	89.45	5.86	89.43	5.34	89.95	4.11	91.18	Not Measured	
MW-42S	94.93	10.00	5.50	89.43	5.54	89.39	4.86	90.07	3.77	91.16	Not Measured	
MW-42D	95.11	23.65	5.70	89.41	5.72	89.39	5.01	90.10	3.93	91.18	Not Measured	
MW-43	97.29	10.20	7.48	89.81	7.56	89.73	6.89	90.40	5.78	91.51	5.02	92.27
MW-44S	96.33	9.90	6.74	89.59	6.84	89.49	6.12	90.21	5.01	91.32	Not Measured	
MW-44D	96.32	29.50	6.73	89.59	6.82	89.50	6.12	90.20	5.00	91.32	Not Measured	

Elevation measured to LOCAL datum (100.00 feet), at fire hydrant (north side of flange), located at SE corner of site.

BTOC = Below top of casing.

ft. = feet

TABLE 1
MDOT-Dowagiac Maintenance Garage
Monitoring Well and Groundwater Elevation Data

Well	Top of Casing Elevation (feet)	Total Depth (ft. BTOC)	November 4, 2008		November 19, 2009		July 19, 2010		November 1, 2010		March 7, 2011	
			Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)
MW-1		41.00	6.57		6.75		Not Measured		Abandoned		Abandoned	
MW-2			6.15		5.86		Not Measured		Abandoned		Abandoned	
MW-3	97.96	10.40	6.51	91.45	6.72	91.24	Not Measured		Abandoned		Abandoned	
MW-4	96.03	10.30	5.39	90.64	5.55	90.48	6.31	89.72	6.85	89.18	4.79	91.24
MW-5	97.66	10.70	6.79	90.87	6.96	90.70	7.69	89.97	8.28	89.38	6.20	91.46
MW-6	97.98	14.50	7.09	90.89	7.27	90.71	8.01	89.97	8.60	89.38	6.50	91.48
MW-7			Dry		Not Measured		Not Measured		Not Measured		Not Measured	
MW-8			5.34		Not Measured		Not Measured		Not Measured		Not Measured	
MW-9			6.94		7.13		Not Measured		Abandoned		Abandoned	
MW-10	97.03	30.70	6.25	90.78	6.44	90.59	7.21	89.82	7.77	89.26	5.67	91.36
MW-11	96.67	10.50	5.92	90.75	6.13	90.54	6.88	89.79	7.45	89.22	5.36	91.31
MW-12	96.49	9.50	5.50	90.99	5.61	90.88	6.32	90.17	6.90	89.59	4.88	91.61
MW-13	100.29	11.70	9.19	91.10	9.41	90.88	10.12	90.17	10.77	89.52	8.64	91.65
MW-14	97.45	10.65	6.21	91.24	6.45	91.00	Not Measured		Abandoned		Abandoned	
MW-15	96.72	10.70	6.06	90.66	6.24	90.48	7.02	89.70	7.59	89.13	5.46	91.26
MW-16	97.34	10.70	6.78	90.56	6.97	90.37	7.76	89.58	8.31	89.03	6.20	91.14
MW-17	100.13	12.70	9.67	90.46	9.69	90.44	10.48	89.65	11.07	89.06	8.89	91.24
MW-18	100.17	12.65	9.34	90.83	9.54	90.63	10.28	89.89	10.90	89.27	8.75	91.42
MW-19	97.08	8.65	6.15	90.93	6.29	90.79	7.00	90.08	7.62	89.46	5.52	91.56
MW-20	101.04	13.70	10.21	90.83	10.43	90.61	Not Measured		Abandoned		Abandoned	
MW-40	96.95	29.30	Abandoned									
MW-41	95.29	39.50	4.47	90.82	4.59	90.70	Not Measured		Not Measured		Not Measured	
MW-42S	94.93	10.00	4.13	90.80	4.22	90.71	4.97	89.96	5.54	89.39	3.49	91.44
MW-42D	95.11	23.65	4.31	90.80	4.44	90.67	5.18	89.93	5.76	89.35	3.67	91.44
MW-43	97.29	10.20	6.13	91.16	6.25	91.04	6.96	90.33	7.57	89.72	5.53	91.76
MW-44S	96.33	9.90	5.37	90.96	5.50	90.83	6.21	90.12	6.82	89.51	4.73	91.60
MW-44D	96.32	29.50	5.37	90.95	5.49	90.83	6.21	90.11	6.81	89.51	4.73	91.59

Elevation measured to LOCAL datum (100.00 feet), at fire hydrant (north side of flange), located at SE corner of site.

BTOC = Below top of casing.

ft. = feet

TABLE 1
MDOT-Dowagiac Maintenance Garage
Monitoring Well and Groundwater Elevation Data

Well	Top of Casing Elevation (feet)	Total Depth (ft. BTOC)	January 23, 2012		August 6, 2012		January 22, 2013		July 15, 2013		Depth to GW (ft. BTOC)	Static GW Elev. (ft.)
			Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)	Depth to GW (ft. BTOC)	Static GW Elev. (ft.)		
MW-1		41.00	Abandoned		Abandoned		Abandoned		Abandoned			
MW-2			Abandoned		Abandoned		Abandoned		Abandoned			
MW-3	97.96	10.40	Abandoned		Abandoned		Abandoned		Abandoned			
MW-4	96.03	10.30	4.42	91.61	7.07	88.96	6.14	89.89	5.72	90.31		
MW-5	97.66	10.70	5.84	91.82	8.47	89.19	7.56	90.10	7.15	90.51		
MW-6	97.98	14.50	6.16	91.82	8.78	89.20	7.88	90.10	7.47	90.51		
MW-7			Not Measured		Not Measured		Not Measured		Not Measured			
MW-8			Not Measured		Not Measured		Not Measured		Not Measured			
MW-9			Abandoned		Abandoned		Abandoned		Abandoned			
MW-10	97.03	30.70	5.36	91.67	7.96	89.07	7.03	90.00	6.49	90.54		
MW-11	96.67	10.50	4.96	91.71	7.65	89.02	6.73	89.94	6.33	90.34		
MW-12	96.49	9.50	4.62	91.87	7.11	89.38	6.21	90.28	5.81	90.68		
MW-13	100.29	11.70	8.29	92.00	10.94	89.35	10.06	90.23	9.61	90.68		
MW-14	97.45	10.65	Abandoned		Abandoned		Abandoned		Abandoned			
MW-15	96.72	10.70	5.03	91.69	7.78	88.94	6.84	89.88	6.46	90.26		
MW-16	97.34	10.70	5.75	91.59	8.52	88.82	7.58	89.76	7.20	90.14		
MW-17	100.13	12.70	8.43	91.70	11.26	88.87	10.31	89.82	9.90	90.23		
MW-18	100.17	12.65	8.35	91.82	11.08	89.09	10.15	90.02	9.74	90.43		
MW-19	97.08	8.65	5.21	91.87	DRY		DRY		6.48	90.60		
MW-20	101.04	13.70	Abandoned		Abandoned		Abandoned		Abandoned			
MW-40	96.95	29.30	Abandoned		Abandoned		Abandoned		Abandoned			
MW-41	95.29	39.50	3.50	91.79	6.16	89.13	5.23	90.06	4.80	90.49		
MW-42S	94.93	10.00	Not Measured		5.76	89.17	4.85	90.08	4.45	90.48		
MW-42D	95.11	23.65	Not Measured		5.95	89.16	5.03	90.08	4.63	90.48		
MW-43	97.29	10.20	5.28	92.01	7.76	89.53	6.91	90.38	6.47	90.82		
MW-44S	96.33	9.90	Abandoned		Abandoned		Abandoned		Abandoned			
MW-44D	96.32	29.50	Abandoned		Abandoned		Abandoned		Abandoned			
MW-101	96.82	11.63	4.89	91.93	7.43	89.39	6.46	90.36	6.07	90.75		
MW-102	96.29	12.11	4.44	91.85	7.00	89.29	6.11	90.18	5.69	90.60		

Elevation measured to LOCAL datum (100.00 feet), at fire hydrant (north side of flange), located at SE corner of site.

BTOC = Below top of casing.

ft. = feet



TABLE 2
Horizontal Groundwater Gradient and Velocity Calculation Summary
Former MDOT Maintenance Garage, Dowagiac, MI

Date of GW Level Reading	Horizontal Gradient Calculation							GW Flow Direction	Hydraulic Conductivity (cm/sec)	Porosity (%)	Ave. Linear Horizontal Velocity (ft/yr)
	Upgradient Well		Downgradient Well		Vert. Head Difference (feet)	Horz. Dist. Between Wells (feet)	Horizontal Gradient (ft/ft)				
	Well	GW Elevation (feet)	Well	GW Elevation (feet)							
11/19/2002	MW-43	89.58	MW-16	88.87	0.71	367	0.0019	West	1.26E-01	0.3	842
1/22/2003	MW-43	89.79	MW-16	89.08	0.71	367	0.0019	West	1.26E-01	0.3	842
3/7/2003	MW-43	89.84	MW-16	89.16	0.68	367	0.0019	West	1.26E-01	0.3	806
5/7/2003	MW-43	91.03	MW-16	90.60	0.43	367	0.0012	West	1.26E-01	0.3	510
7/17/2003	MW-43	90.83	MW-16	89.34	1.49	367	0.0041	West	1.26E-01	0.3	1,767
8/12/2003	MW-43	89.72	MW-16	88.98	0.74	367	0.0020	West	1.26E-01	0.3	878
9/10/2003	MW-43	89.34	MW-16	88.61	0.73	367	0.0020	West	1.26E-01	0.3	866
12/22/2003	MW-43	90.51	MW-16	89.83	0.68	367	0.0019	West	1.26E-01	0.3	806
3/10/2004	MW-43	91.66	MW-16	90.98	0.68	367	0.0019	West	1.26E-01	0.3	806
9/21/2004	MW-43	89.79	MW-16	89.03	0.76	367	0.0021	West	1.26E-01	0.3	901
8/17/2005	MW-43	89.81	MW-16	89.04	0.77	367	0.0021	West	1.26E-01	0.3	913
12/12/2005	MW-43	89.73	MW-16	88.99	0.74	367	0.0020	West	1.26E-01	0.3	878
6/8/2006	MW-43	90.40	MW-16	89.72	0.68	367	0.0019	West	1.26E-01	0.3	806
4/20/2007	MW-43	91.51	MW-16	90.85	0.66	367	0.0018	West	1.26E-01	0.3	783
3/7/2008	MW-43	92.27	MW-16	91.65	0.62	367	0.0017	West	1.26E-01	0.3	735
11/4/2008	MW-43	91.16	MW-16	90.56	0.60	367	0.0016	West	1.26E-01	0.3	712
11/19/2009	MW-43	91.04	MW-16	90.37	0.67	367	0.0018	West	1.26E-01	0.3	795
7/19/2010	MW-43	90.33	MW-16	89.58	0.75	367	0.0020	West	1.26E-01	0.3	889
11/1/2010	MW-43	89.72	MW-16	89.03	0.69	367	0.0019	West	1.26E-01	0.3	818
3/7/2011	MW-43	91.76	MW-16	91.14	0.62	367	0.0017	West	1.26E-01	0.3	735
1/23/2012	MW-43	92.01	MW-16	91.56	0.45	367	0.0012	West	1.26E-01	0.3	534
8/6/2012	MW-43	89.53	MW-16	88.82	0.71	367	0.0019	West	1.26E-01	0.3	842
1/22/2013	MW-43	90.38	MW-16	89.76	0.62	367	0.0017	West	1.26E-01	0.3	735
7/15/2013	MW-43	90.82	MW-16	90.14	0.68	367	0.0019	West	1.26E-01	0.3	806

SITE AVERAGE 0.0019

834

TABLE 3
Vertical Groundwater Gradient Calculation Summary
Former MDOT Maintenance Garage, Dowagiac, MI

Date	Gradient							
	Upper Well		Deeper Well		GW Elevation Difference (feet)	Distance (bottom of screen to bottom of screen) (feet)	Groundwater Gradient (ft/ft)	Vertical Gradient Direction
	Well	GW Elevation (feet)	Well	GW Elevation (feet)				
Vertical Gradient MW-11 (Shallow)/MW-11 (Deep) Well Set								
11/19/2002	MW-11	89.05	MW-10	89.08	-0.03	20.20	-0.00149	Upward
1/22/2003	MW-11	89.27	MW-10	89.29	-0.02	20.20	-0.00099	Upward
3/7/2003	MW-11	89.33	MW-10	89.35	-0.02	20.20	-0.00099	Upward
5/7/2003	MW-11	90.76	MW-10	90.77	-0.01	20.20	-0.00050	Upward
7/17/2003	MW-11	89.53	MW-10	89.55	-0.02	20.20	-0.00099	Upward
8/12/2003	MW-11	89.16	MW-10	89.2	-0.04	20.20	-0.00198	Upward
9/10/2003	MW-11	88.79	MW-10	88.81	-0.02	20.20	-0.00099	Upward
12/22/2003	MW-11	90.00	MW-10	90.02	-0.02	20.20	-0.00099	Upward
3/10/2004	MW-11	91.15	MW-10	91.18	-0.03	20.20	-0.00149	Upward
9/21/2004	MW-11	89.24	MW-10	89.27	-0.03	20.20	-0.00149	Upward
8/17/2005	MW-11	89.22	MW-10	89.27	-0.05	20.20	-0.00248	Upward
12/12/2005	MW-11	89.22	MW-10	89.24	-0.02	20.20	-0.00099	Upward
6/8/2006	MW-11	89.89	MW-10	89.93	-0.04	20.20	-0.00198	Upward
4/20/2007	MW-11	91.00	MW-10	91.04	-0.04	20.20	-0.00198	Upward
3/7/2008	MW-11		MW-10			20.20		
11/4/2008	MW-11	90.75	MW-10	90.78	-0.03	20.20	-0.00149	Upward
11/19/2009	MW-11	90.54	MW-10	90.59	-0.05	20.20	-0.00248	Upward
7/19/2010	MW-11	89.79	MW-10	89.82	-0.03	20.20	-0.00149	Upward
11/1/2010	MW-11	89.22	MW-10	89.26	-0.04	20.20	-0.00198	Upward
3/7/2011	MW-11	91.31	MW-10	91.36	-0.05	20.20	-0.00248	Upward
1/23/2012	MW-11	91.71	MW-10	91.67	0.04	20.20	0.00198	Downward
8/6/2012	MW-11	89.02	MW-10	89.07	-0.05	20.20	-0.00248	Upward
1/22/2013	MW-11	89.94	MW-10	90.00	-0.06	20.20	-0.00297	Upward
7/15/2013	MW-11	90.34	MW-10	90.54	-0.20	20.20	-0.00990	Upward

TABLE 3
Vertical Groundwater Gradient Calculation Summary
Former MDOT Maintenance Garage, Dowagiac, MI

Date	Gradient							
	Upper Well		Deeper Well		GW Elevation Difference (feet)	Distance (bottom of screen to bottom of screen) (feet)	Groundwater Gradient (ft/ft)	Vertical Gradient Direction
	Well	GW Elevation (feet)	Well	GW Elevation (feet)				
Vertical Gradient MW-42S/MW-42D Well Set								
11/19/2002	MW-42S	89.25	MW-42D	89.24	0.01	10.65	0.00094	Downward
1/22/2003	MW-42S	89.46	MW-42D	89.45	0.01	10.65	0.00094	Downward
3/7/2003	MW-42S	89.52	MW-42D	89.50	0.02	10.65	0.00188	Downward
5/7/2003	MW-42S	90.92	MW-42D	90.92	0	10.65	0.00000	None
7/17/2003	MW-42S	89.73	MW-42D	87.91	1.82	10.65	0.17089	Downward
8/12/2003	MW-42S	89.35	MW-42D	89.34	0.01	10.65	0.00094	Downward
9/10/2003	MW-42S	88.97	MW-42D	88.96	0.01	10.65	0.00094	Downward
12/22/2003	MW-42S	90.18	MW-42D	90.18	0	10.65	0.00000	None
3/10/2004	MW-42S	91.32	MW-42D	91.33	-0.01	10.65	-0.00094	Upward
9/21/2004	MW-42S	89.43	MW-42D	89.42	0.01	10.65	0.00094	Downward
8/17/2005	MW-42S	89.43	MW-42D	89.41	0.02	10.65	0.00188	Downward
12/12/2005	MW-42S	89.39	MW-42D	89.39	0	10.65	0.00000	None
6/8/2006	MW-42S	90.07	MW-42D	90.10	-0.03	10.65	-0.00282	Upward
4/20/2007	MW-42S	91.19	MW-42D	91.18	0.01	10.65	0.00094	Downward
3/7/2008	MW-42S		MW-42D			10.65	0.00000	
11/4/2008	MW-42S	90.80	MW-42D	90.80	0	10.65	0.00000	None
11/19/2009	MW-42S	90.71	MW-42D	90.67	0.04	10.65	0.00376	Downward
7/19/2010	MW-42S	89.96	MW-42D	89.93	0.03	10.65	0.00282	Downward
11/1/2010	MW-42S	89.39	MW-42D	89.35	0.04	10.65	0.00376	Downward
3/7/2011	MW-42S	91.44	MW-42D	91.44	0	10.65	0.00000	None
1/23/2012	MW-42S		MW-42D			10.65	0.00000	
8/6/2012	MW-42S	89.17	MW-42D	89.16	0.01	10.65	0.00094	Downward
1/22/2013	MW-42S	90.08	MW-42D	90.08	0	10.65	0.00000	None
7/15/2013	MW-42S	90.48	MW-42D	90.48	0	10.65	0.00000	None

TABLE 3
Vertical Groundwater Gradient Calculation Summary
Former MDOT Maintenance Garage, Dowagiac, MI

Date	Gradient							
	Upper Well		Deeper Well		GW Elevation Difference (feet)	Distance (bottom of screen to bottom of screen) (feet)	Groundwater Gradient (ft/ft)	Vertical Gradient Direction
	Well	GW Elevation (feet)	Well	GW Elevation (feet)				
Vertical Gradient MW-42S/MW-41 Well Set								
11/19/2002	MW-42S	89.25	MW-41	89.26	-0.01	29.50	-0.00034	Upward
1/22/2003	MW-42S	89.46	MW-41	89.47	-0.01	29.50	-0.00034	Upward
3/7/2003	MW-42S	89.52	MW-41	89.51	0.01	29.50	0.00034	Downward
5/7/2003	MW-42S	90.92	MW-41	90.90	0.02	29.50	0.00068	Downward
7/17/2003	MW-42S	89.73	MW-41	89.74	-0.01	29.50	-0.00034	Upward
8/12/2003	MW-42S	89.35	MW-41	89.27	0.08	29.50	0.00271	Upward
9/10/2003	MW-42S	88.97	MW-41	89.00	-0.03	29.50	-0.00102	Upward
12/22/2003	MW-42S	90.18	MW-41	90.20	-0.02	29.50	-0.00068	Upward
3/10/2004	MW-42S	91.32	MW-41	91.33	-0.01	29.50	-0.00034	Upward
9/21/2004	MW-42S	89.43	MW-41	89.45	-0.02	29.50	-0.00068	Upward
8/17/2005	MW-42S	89.43	MW-41	89.45	-0.02	29.50	-0.00068	Upward
12/12/2005	MW-42S	89.39	MW-41	89.43	-0.04	29.50	-0.00136	Upward
6/8/2006	MW-42S	90.07	MW-41	89.95	0.12	29.50	0.00407	Downward
4/20/2007	MW-42S	91.19	MW-41	91.18	0.01	29.50	0.00034	Downward
3/7/2008	MW-42S	---	MW-41	---				
11/4/2008	MW-42S	90.80	MW-41	90.82	-0.02	29.50	-0.00068	Upward
11/19/2009	MW-42S	90.71	MW-41	90.70	0.01	29.50	0.00034	Downward
7/19/2010	MW-42S	89.96	MW-41	---				
11/1/2010	MW-42S	89.39	MW-41	---				
3/7/2011	MW-42S	91.44	MW-41	---				
1/23/2012	MW-42S		MW-41	91.79				
8/6/2012	MW-42S	89.17	MW-41	89.13	0.04	29.50	0.00136	Downward
1/22/2013	MW-42S	90.08	MW-41	90.06	0.02	29.50	0.00068	Downward
7/15/2013	MW-42S	90.48	MW-41	90.49	-0.01	29.50	-0.00034	Upward

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-1	41 ft	9/27/94 Abandoned Fall 2010	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
MW-2		9/27/94 Abandoned Fall 2010	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
MW-3	10.4 ft	9/27/94 Abandoned Fall 2010	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-4	10.3 ft	9/27/94	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
		12/5/96	<5.0	ND	ND	<3.0	ND	NS	NS	ND	NS
		7/25/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		12/19/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/9/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/16/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		2/4/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/13/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		8/15/00	ND	ND	ND	ND	ND	NS	NS	ND	NS
		5/3/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/11/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/24/02	ND	ND	ND	ND	ND	NS	NS	ND	NS
		11/19/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<5.0	<5.0
		12/23/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		8/17/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		12/12/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		6/8/06	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		4/20/07	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/7/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/21/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/1/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		1/24/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
8/7/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
1/23/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
7/16/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l	
MW-6	14.5 ft	9/27/94	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0	
		12/5/96	72	5	22	6	ND	NS	NS	ND	NS	
		7/24/97	23	1.4	ND	ND	ND	NS	NS	NS	ND	NS
		12/19/97	280	69	120	145	ND	NS	NS	NS	ND	NS
		7/9/98	6.6	1.4	ND	1.2	ND	NS	NS	NS	ND	NS
		10/15/98	29	8.5	3.7	9.8	ND	NS	NS	NS	ND	NS
		2/5/99	23	14	5.8	26.6	ND	NS	NS	NS	ND	NS
		7/13/99	3.2	1.8	8.1	6.7	ND	NS	NS	NS	ND	NS
		8/15/00	73	8.0	24	8.0	ND	NS	NS	NS	ND	NS
		1/3/01	5.1	1.3	4.5	ND	ND	NS	NS	NS	ND	NS
		5/3/01	33	5.0	43	19	ND	NS	NS	NS	ND	NS
		7/11/01	1.0	ND	ND	ND	ND	NS	NS	NS	ND	NS
		10/2/01	3.0	ND	ND	ND	ND	NS	NS	NS	ND	NS
		1/24/02	13	3.0	4.0	4.0	ND	NS	NS	NS	ND	NS
		11/20/02	3.3	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<1.0	<5.0	<5.0
		12/23/03	72	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	
		3/10/04	37	35	14	140	NS	3.5	<1.0	<5.0	<5.0	
		9/21/04	110	26	12	69	NS	13	<1.0	<5.0	<5.0	
		8/17/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	
		12/12/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	
		6/8/06	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	
		4/20/07	1.0	<1.0	1.1	<3.0	NS	<1.0	<1.0	<5.0	<5.0	
		3/7/08	39	20	210	64	NS	<1.0	<1.0	<5.0	<5.0	
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	
		11/19/09	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	
		7/21/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	
11/1/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0			
1/24/12	2.7	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0			
8/7/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0			
1/24/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0			
7/16/13	5.8	<1.0	1.2	<3.0	NS	<1.0	<1.0	<5.0	<5.0			

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-7		9/27/94	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
MW-8		9/27/94	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
MW-9		9/27/94	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
		12/5/96	<5.0	ND	<3.0	ND	ND	NS	NS	ND	NS
		7/25/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		12/19/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/9/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/16/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/13/99	1.5	1.3	5.5	5.8	ND	NS	NS	ND	NS
		8/15/00	ND	ND	ND	ND	ND	NS	NS	ND	NS
		5/3/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/11/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
1/24/02	6.0	1.0	10.0	6.0	ND	NS	NS	ND	NS		
		Abandoned Fall 2010									

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-10	30.7 ft	9/27/94	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
		12/5/96	<5.0	ND	<3.0	ND	ND	NS	NS	ND	NS
		7/25/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		12/19/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/9/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/16/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		2/4/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/13/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		8/15/00	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/3/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		5/3/01	3.0	ND	ND	ND	ND	NS	NS	ND	NS
		7/11/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/24/02	ND	ND	ND	ND	ND	NS	NS	ND	NS
		11/19/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<5.0	<5.0
		12/23/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		8/17/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/19/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/1/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		1/24/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
8/7/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
1/24/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
7/16/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-11	10.5 ft	9/27/94	3,500	670	<500	2,000	<500	NS	NS	<5.0	<5.0
		12/5/96	2,700	510	130	1,500	ND	NS	NS	170	NS
		7/25/97	660	110	330	390	ND	NS	NS	93	NS
		12/19/97	2,500	560	130	1,779	ND	NS	NS	53	NS
		7/9/98	3,900	920	ND	2,400	ND	NS	NS	120	NS
		10/16/98	2,000	430	150	878	<25	NS	NS	95	NS
		2/4/99	2,300	490	97	818	<25	NS	NS	97	NS
		7/13/99	930	490	98	579	ND	NS	NS	80	NS
		7/16/99	550	350	55	453	ND	NS	NS	82	NS
		1/19/00	800	400	10	325	<5.0	NS	NS	58	NS
		8/15/00	1,100	340	19	260	ND	NS	NS	83	NS
		1/3/01	1,300	340	13	141	<25	NS	NS	32	NS
		5/3/01	620	240	19	90	ND	NS	NS	67	NS
		7/11/01	540	300	18	120	ND	NS	NS	29	NS
		10/2/01	690	390	13	84	ND	NS	NS	44	NS
		1/24/02	280	150	9	21	ND	NS	NS	ND	NS
		11/19/02	2,600	610	47	210	<5.0	23	3.0	53	<5.0
		12/23/03	1,700	400	130	250	NS	16	<10.0	85	<50.0
		3/10/04	430	170	38	78	NS	3.1	9.4	27	<5.0
		9/21/04	1,700	420	50	230	NS	6.8	<5.0	140	<25
		8/17/05	580	6.2	12	16	NS	<1.0	<1.0	19	<5.0
		12/12/05	190	4.1	22	54	NS	2.0	5.9	22	<5.0
		6/8/06	53	<1.0	1.5	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		4/20/07	10	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		2/21/08	31	<1.0	1.3	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/4/08	77	<1.0	4.0	4.2	NS	<1.0	<1.0	5.4	<5.0
		11/19/09	120	<1.0	2.6	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/19/10	110	<1.0	2.3	4.0	NS	<1.0	<1.0	<5.0	<5.0
		11/1/10	470	1.9	14	12	NS	<1.0	<1.0	7.3	<5.0
		3/7/11	150	1.6	6	8.7	NS	<1.0	<1.0	<5.0	<5.0
1/24/12	52	<1.0	2.3	5.5	NS	<1.0	<1.0	5.6	<5.0		
8/7/12	330	3.4	13	19	NS	1.2	<1.0	14	<5.0		
1/24/13	330	5.6	15	41	NS	2.0	<1.0	24	<5.0		
7/16/13	18	<1.0	1.6	4.5	NS	<1.0	<1.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-12	9.5 ft	9/27/94	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
		12/6/96	<5.0	ND	<3.0	ND	ND	NS	NS	ND	NS
		7/25/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		12/18/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/9/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/16/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		2/5/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/15/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		8/15/00	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/4/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		5/3/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/11/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/24/02	ND	ND	ND	ND	ND	NS	NS	ND	NS
		11/20/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<5.0	<5.0
		12/23/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		8/17/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		12/12/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		6/8/06	12	7.8	37	36	NS	5.5	1.3	<5.0	<5.0
		7/10/06	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		4/20/07	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/7/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/20/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/2/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		1/23/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
8/6/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
1/22/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
7/15/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-13	11.7 ft	9/27/94	<1.0	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0
		12/6/96	<5.0	ND	<3.0	ND	ND	NS	NS	ND	NS
		7/24/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		12/18/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/9/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/15/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		2/5/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/14/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		8/15/00	ND	ND	ND	ND	ND	NS	NS	ND	NS
		5/3/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/11/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/24/02	ND	ND	ND	ND	ND	NS	NS	ND	NS
		11/20/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<5.0	<5.0
		12/23/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		8/17/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		12/12/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		6/8/06	2.4	1.6	9	7.5	NS	1.2	<1.0	<5.0	<5.0
		7/10/06	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		4/20/07	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/7/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/19/09	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/21/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/2/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		1/24/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
8/6/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
1/23/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
7/15/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-14	10.65 ft	9/27/94 Abandoned Fall 2010	1.7	<1.0	<1.0	<1.0	<1.0	NS	NS	<5.0	<5.0

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l	
MW-15	10.7 ft	9/27/94	60	14	<10	<10	<10	NS	NS	<5.0	<5.0	
		12/5/96	72	13	1	13	ND	NS	NS	ND	NS	
		7/25/97	86	12	1.1	11	ND	NS	NS	NS	ND	NS
		12/19/97	54	17	ND	15.7	ND	NS	NS	NS	ND	NS
		7/9/98	ND	1.3	ND	ND	ND	NS	NS	NS	ND	NS
		10/16/98	ND	ND	ND	ND	ND	NS	NS	NS	ND	NS
		2/4/99	49	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/14/99	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		8/15/00	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/3/01	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		5/3/01	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/11/01	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/24/02	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		11/19/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<1.0	<5.0	<5.0
		12/23/03	68	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		3/10/04	13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		8/17/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		12/12/05	4.1	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		6/8/06	2.2	1.5	7.9	7	NS	1.1	<1.0	<1.0	<5.0	<5.0
		4/20/07	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		3/7/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		11/19/09	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		7/19/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
		11/1/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0
3/7/11	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0		
1/24/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0		
8/7/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0		
1/23/13	15	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
7/16/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<1.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l	
MW-16	10.7 ft	9/27/94	<1.0	1.8	<1.0	1.9	1.5	NS	NS	<5.0	<5.0	
		12/5/96	35	ND	ND	<3.0	ND	NS	NS	ND	NS	
		7/25/97	ND	ND	ND	ND	ND	NS	NS	ND	NS	
		12/19/97	130	ND	ND	ND	2.7	ND	NS	NS	ND	NS
		7/9/98	65	65	2.3	1.2	4.1	ND	NS	NS	ND	NS
		10/16/98	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		2/4/99	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/14/99	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		8/15/00	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/3/01	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		5/3/01	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/11/01	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/24/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<5.0	<5.0	<5.0
		12/23/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		8/17/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		6/8/06	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		4/20/07	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		3/7/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		11/19/09	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		7/19/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		11/1/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		3/7/11	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
1/24/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0		
8/7/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0		
1/23/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0		
7/16/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-17	12.7 ft	12/5/96	<5.0	ND	ND	<3.0	ND	NS	NS	ND	NS
		7/25/97	280	ND	2.8	7.6	ND	NS	NS	ND	NS
		8/19/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		12/19/97	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/9/98	ND	ND	ND	ND	ND	NS	NS	ND	NS
		2/4/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/14/99	ND	ND	ND	ND	ND	NS	NS	ND	NS
		8/15/00	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/3/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		5/3/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		7/11/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	NS	NS	ND	NS
		1/24/02	2	<1.0	4	ND	ND	NS	NS	ND	NS
		12/23/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/19/09	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/20/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/1/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
3/7/11	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
1/24/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
8/7/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
1/23/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
7/15/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l	
MW-18	12.65 ft	12/10/96	570	220	120	360	ND	NS	NS	85	NS	
		7/24/97	4.5	19	ND	11	ND	NS	NS	ND	NS	
		12/19/97	1.4	16	ND	1.9	ND	NS	NS	NS	ND	NS
		7/9/98	ND	12	ND	6.5	ND	NS	NS	NS	ND	NS
		10/15/98	46	82	5	38.3	ND	NS	NS	NS	ND	NS
		2/4/99	33	69	3	33	ND	NS	NS	NS	ND	NS
		7/14/99	20	73	1	63.6	ND	NS	NS	NS	ND	NS
		1/20/00	68	200	5	181.7	<5.0	NS	NS	NS	17	NS
		8/15/00	10	10	ND	ND	ND	NS	NS	NS	ND	NS
		1/3/01	7	14	ND	2.3	ND	NS	NS	NS	ND	NS
		5/3/01	ND	1	ND	ND	ND	NS	NS	NS	ND	NS
		7/11/01	ND	1	ND	ND	ND	NS	NS	NS	ND	NS
		10/2/01	ND	ND	ND	ND	ND	NS	NS	NS	ND	NS
		1/24/02	ND	ND	ND	ND	ND	NS	NS	NS	ND	NS
		11/19/02	25	280	4.8	330	<5.0	250	35	<5.0	<5.0	<5.0
		12/23/03	45	130	3.3	98	NS	27	5.6	23	6.9	<5.0
		3/10/04	7.1	24	<1.0	7.2	NS	2.7	2.5	<5.0	<5.0	<5.0
		9/21/04	1.3	40	<1.0	6.2	NS	2.7	1.3	6.2	<5.0	<5.0
		8/17/05	11	25	<1.0	5.1	NS	3	<1.0	<5.0	<5.0	<5.0
		12/12/05	35	45	2.1	11	NS	4	6.5	<5.0	<5.0	<5.0
		6/8/06	<1.0	2.4	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		4/20/07	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		3/7/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		11/4/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		11/19/09	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
		7/20/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0
11/2/10	<1.0	1.7	<1.0	13	NS	<1.0	<1.0	<5.0	<5.0	<5.0		
3/8/11	1.7	9.8	1.9	17	NS	<1.0	<1.0	<5.0	<5.0	<5.0		
1/24/12	<1.0	<1.0	<1.0	4.9	NS	<1.0	<1.0	<5.0	<5.0	<5.0		
8/6/12	1.4	4.7	1.0	20	NS	1.3	<1.0	13	<5.0	<5.0		
1/23/13	4.1	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0		
7/15/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-19	8.65 ft	12/10/96	9,200	1,900	8,400	11,000	2,000	NS	NS	430	NS
		7/24/97	8,000	2,100	7,600	9,500	<1,000	NS	NS	340	NS
		12/18/97	3,400	1,500	5,000	8,400	<1,000	NS	NS	120	NS
		7/9/98	4,300	2,300	5,800	10,700	<1,000	NS	NS	26	NS
		2/5/99	3,100	1,800	4,100	10,500	<100	NS	NS	230	NS
		7/15/99	4,200	1,800	3,900	10,800	<100	NS	NS	86	NS
		1/20/00	4,200	2,100	4,900	10,400	<100	NS	NS	360	NS
		8/15/00	3,400	890	4,500	4,400	ND	NS	NS	150	NS
		5/3/01	1,400	860	1,400	3,700	ND	NS	NS	22	NS
		7/11/01	560	1,100	870	4,000	ND	NS	NS	290	NS
		10/2/01	3,500	790	1,000	2,500	ND	NS	NS	200	NS
		1/24/02	1,000	1,100	96	3,200	ND	NS	NS	300	NS
		11/19/02	3,500	800	2,200	2,900	<5.0	1,100	230	170	50
		12/22/03	2,700	1,500	4,400	6,300	NS	1,100	330	340	<250
		3/10/04	960	850	1,800	3,700	NS	610	120	110	24
		9/21/04	4,200	960	720	3,400	NS	1,200	170	320	51
		8/17/05	2,800	480	170	1,400	NS	800	110	160	61
		12/12/05	1,800	620	200	2,100	NS	820	190	150	64
		6/8/06	2,400	1,100	330	3,600	NS	870	200	200	51
		4/20/07	470	310	51	760	NS	560	110	87	<50
		2/21/08	120	100	11	160	NS	71	10	18	14
		11/4/08	1,000	570	140	1,000	NS	140	32	83	28
11/19/09	1,300	930	180	1,400	NS	71	15	76	16		
7/20/10	1,200	830	150	1,000	NS	28	6.8	110	13		
11/2/10	1,200	890	160	1,000	NS	19	4.1	190	15		
3/9/11	380	530	110	890	NS	27	5.7	110	5.3		
1/23/12	400	600	100	1,000	NS	30	7.8	150	13.0		
7/15/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
MW-20	13.7 ft	11/19/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<5.0	<5.0
		12/23/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		Abandoned Fall 2010									

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-40	29.3 ft	11/20/02	<1.0	5.4	4.0	26	<5.0	43	15	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		Abandoned 9/8/08									
MW-41	39.5 ft	11/20/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/16/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
MW-42S	10 ft	11/20/02	17	58	3.2	13	<5.0	1.3	<1.0	<5.0	<5.0
		12/22/03	85	100	10	31	NS	<1.0	<1.0	<5.0	<5.0
		3/10/04	18	160	1.9	56	NS	<1.0	2.4	5.5	<5.0
		9/21/04	17	350	7.6	120	NS	1.8	7.0	51	6.1
		8/17/05	68	83	15	25	NS	3.2	<1.0	23	<5.0
		12/12/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		6/8/06	30	14	82	65	NS	8.3	1.8	<5.0	<5.0
		4/20/07	1,200	1,500	3,400	4,000	NS	350	150	250	<5.0
		2/21/08	200	290	9.6	370	NS	75	24	68	11
		11/4/08	200	260	16	400	NS	30	45	120	17
		11/19/09	41	120	6.8	170	NS	1.5	5.2	47	<5.0
		7/20/10	340	240	600	110	NS	<1.0	2.7	120	13
		11/2/10	24	54	21	330	NS	<5.0	<1.0	110	8.6
		3/8/11	14	1.5	1.7	21	NS	<1.0	<1.0	46	<5.0
8/7/12	84	590	56	1,400	NS	290	130	200	34		
1/23/13	6.9	1.8	<1.0	6.5	NS	2	5	50	7.3		
7/16/13	190	640	880	1,200	NS	5.6	19	<250	11		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-42D	23.65 ft	11/20/02	<1.0	<1.0	<1.0	<3.0	<5.0	<1.0	<1.0	<5.0	<5.0
		12/22/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/20/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/2/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		8/7/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		1/23/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
7/16/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
MW-43	10.2 ft	11/20/02	2	<1.0	<1.0	<3.0	<5.0	2.0	<1.0	<5.0	7.4
		12/23/03	3.0	<1.0	2.8	<3.0	NS	2.3	<1.0	<5.0	<5.0
		3/10/04	6.0	1.6	3.1	4.0	NS	2.7	5.1	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	1.2	<1.0	<5.0	<5.0
		6/8/06	4.6	2.7	14	12	NS	3.4	<1.0	<5.0	<5.0
		4/20/07	1.4	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/7/08	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/4/08	1.1	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/19/09	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/20/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/2/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		1/23/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	16
		8/6/12	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
1/22/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		
7/15/13	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0		

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-44S	9.9 ft	11/20/02	7,100	3,400	14,000	16,000	<500	3,000	770	670	190
		12/22/03	6,600	2,000	12,000	10,000	NS	1,800	470	580	<500
		3/10/04	5,900	2,800	11,000	14,000	NS	2,100	560	600	200
		9/21/04	12,000	3,400	25,000	17,000	NS	2,700	590	870	180
		8/17/05	9,300	2,700	20,000	14,000	NS	2,000	490	650	160
		12/12/05	6,300	2,500	13,000	12,000	NS	1,800	450	560	190
		6/8/06	6,800	2,400	19,000	13,000	NS	1,400	340	410	<100
		4/20/07	7,400	3,200	21,000	18,000	NS	2,700	640	590	<250
		2/21/08	5,600	2,600	17,000	13,000	NS	1,800	470	680	150
		11/4/08	1,800	2,300	14,000	14,000	NS	1,900	490	<500	150
		11/19/09	1,700	2,000	8,400	11,000	NS	1,600	370	<500	170
		7/20/10	2,700	1,600	7,900	8,900	NS	1,400	360	550	150
		11/2/10	3,000	1,800	8,000	9,500	NS	1,500	370	460	190
		3/8/11	3,700	1,700	9,400	9,000	NS	1,300	340	<500	91
Removed during excavation, September 2011, replaced with MW-102											
MW-44D	29.5 ft	11/20/02	3	41	29	230	<5.0	140	48	<5.0	<5.0
		12/22/03	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		3/10/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		9/21/04	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		8/17/05	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		7/20/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
		11/2/10	<1.0	<1.0	<1.0	<3.0	NS	<1.0	<1.0	<5.0	<5.0
Removed during excavation, September 2011											

TABLE 4
MDOT - DOWAGIAC MAINTENANCE GARAGE
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Well Number	Well Depth	Sample Date	Benzene µg/l	Ethylbenzene µg/l	Toluene µg/l	Xylenes µg/l	MTBE µg/l	1,2,4-TMB µg/l	1,3,5-TMB µg/l	Naph µg/l	2-Mnaph µg/l
MW-101	11.63 ft	1/23/12	24	190	190	1,100	NS	200	64	51	8.8
		8/6/12	15	96	75	340	NS	160	22	32	5.7
		1/22/13	39	110	190	460	NS	210	39	28	8.1
		7/15/13	17	73	86	290	NS	270	19	51	6.6
MW-102	12.11 ft	1/23/12	53	260	190	1,800	NS	730	220	130	57
		8/6/12	72	110	68	410	NS	190	69	56	17
		1/22/13	120	110	88	340	NS	150	53	42	13
		7/15/13	98	120	49	340	NS	120	37	43	30

ND = Not detected above laboratory detection limit. Analyses from previous consultants, detection limits not known.
NS = Not sampled.

TABLE 5
MDOT Dowagiac
Groundwater Treatment System - Operation Summary

Date	Gallons	Hour	Δ Gallons	Δ hours	Gal/min	Cumulative Gallons
2/5/04	14,466,300	5,986.98				
2/18/04	14,474,749	6,084.21	8,449	97.23	1.45	8,449
2/25/04	14,488,765	6,250.29	14,016	166.08	1.41	22,465
3/3/04	14,599,750	6,418.27	110,985	167.98	11.01	133,450
3/10/04	14,670,968	6,585.67	71,218	167.40	7.09	204,668
3/17/04	14,718,400	6,755.37	47,432	169.70	4.66	252,100
3/26/04	14,737,145	6,797.80	18,745	42.43	7.36	270,845
4/5/04	14,761,212	6,870.59	24,067	72.79	5.51	294,912
4/14/04	14,781,539	6,927.08	20,327	56.49	6.00	315,239
4/21/04	14,796,397	6,954.85	14,858	27.77	8.92	330,097
5/5/04	14,796,900	6,955.34	503	0.49	17.11	330,600
5/13/04	14,797,265	6,956.05	365	0.71	8.57	330,965
5/19/04	14,799,827	6,968.00	2,562	11.95	3.57	333,527
6/17/04	14,806,430	7,011.43	6,603	43.43	2.53	340,130
6/24/04	14,809,258	7,016.10	2,828	4.67	10.09	342,958
6/30/04	14,809,830	7,017.05	572	0.95	10.04	343,530
7/6/04	14,810,410	7,018.32	580	1.27	7.61	344,110
7/14/04	14,811,612	7,022.11	1,202	3.79	5.29	345,312
7/26/04	14,816,608	7,156.41	4,996	134.30	0.62	350,308
8/5/04	14,820,071	7,349.73	3,463	193.32	0.30	353,771
8/19/04	14,822,472	7,374.48	2,401	24.75	1.62	356,172
8/25/04	14,951,590	7,517.80	129,118	143.32	15.02	485,290
9/1/04	14,969,440	7,535.76	17,850	17.96	16.56	503,140
9/8/04	15,122,860	7,705.00	153,420	169.24	15.11	656,560
9/21/04	15,165,250	7,753.57	42,390	48.57	14.55	698,950
10/6/04	15,167,343	7,757.29	2,093	3.72	9.38	701,043
10/19/04	15,169,065	7,760.67	1,722	3.38	8.49	702,765
11/10/04	15,179,245	7,777.55	10,180	16.88	10.05	712,945
11/19/04	15,239,095	7,945.14	59,850	167.59	5.95	772,795
11/24/04	15,291,355	8,065.69	52,260	120.55	7.23	825,055
12/2/04	15,316,400	8,121.66	25,045	55.97	7.46	850,100
1/7/05	15,350,807	8,135.42	34,407	13.76	41.68	884,507
3/1/05	15,378,447	8,185.23	27,640	49.81	9.25	912,147
3/4/05	15,409,450	8,252.55	31,003	67.32	7.68	943,150
3/17/05	15,416,517	8,257.88	7,067	5.33	22.10	950,217
3/23/05	15,582,355	8,408.24	165,838	150.36	18.38	1,116,055
3/28/05	15,642,300	8,461.35	59,945	53.11	18.81	1,176,000
4/4/05	15,647,482	8,465.84	5,182	4.49	19.24	1,181,182
4/13/05	15,856,660	8,679.47	209,178	213.63	16.32	1,390,360
4/22/05	16,041,325	8,873.68	184,665	194.21	15.85	1,575,025
4/27/05	16,042,792	8,875.00	1,467	1.32	18.52	1,576,492
5/4/05	16,047,534	8,879.50	4,742	4.50	17.56	1,581,234
5/11/05	16,053,000	8,883.61	5,466	4.11	22.17	1,586,700
5/18/05	16,054,413	8,884.78	1,413	1.17	20.13	1,588,113
5/25/05	16,237,035	9,049.24	182,622	164.46	18.51	1,770,735
6/1/05	16,335,710	9,126.03	98,675	76.79	21.42	1,869,410
6/10/05	16,402,600	9,181.32	66,890	55.29	20.16	1,936,300

TABLE 5
MDOT Dowagiac
Groundwater Treatment System - Operation Summary

Date	Gallons	Hour	Δ Gallons	Δ hours	Gal/min	Cumulative Gallons
6/13/05	16,439,215	9,215.92	36,615	34.60	17.64	1,972,915
6/24/05	16,439,380	9,216.07	165	0.15	18.33	1,973,080
7/12/05	16,439,500	9,216.23	120	0.16	12.50	1,973,200
7/19/05	16,457,305	9,233.44	17,805	17.21	17.24	1,991,005
7/29/05	16,483,165	9,260.63	25,860	27.19	15.85	2,016,865
7/30/05	16,483,424	9,260.84	259	0.21	20.56	2,017,124
7/30/05	16,484,100	9,261.48	676	0.64	17.60	2,017,800
7/30/05	16,485,732	9,262.84	1,632	1.36	20.00	2,019,432
7/30/05	16,492,735	9,268.61	7,003	5.77	20.23	2,026,435
8/3/05	16,587,625	9,349.75	94,890	81.14	19.49	2,121,325
8/10/05	16,720,255	9,459.63	132,630	109.88	20.12	2,253,955
8/17/05	16,889,205	9,582.37	168,950	122.74	22.94	2,422,905
8/25/05	17,021,584	9,681.52	132,379	99.15	22.25	2,555,284
10/6/05	17,055,545	9,712.35	33,961	30.83	18.36	2,589,245
10/12/05	17,211,147	9,857.65	155,602	145.30	17.85	2,744,847
10/18/05	17,364,992	10,000.90	153,845	143.25	17.90	2,898,692
10/26/05	17,561,943	10,195.90	196,951	195.00	16.83	3,095,643
11/4/05	17,596,900	10,248.81	34,957	52.91	11.01	3,130,600
11/16/05	17,619,100	10,268.33	22,200	19.52	18.95	3,152,800
11/28/05	17,919,200	10,531.53	300,100	263.20	19.00	3,452,900
12/6/05	18,127,925	10,692.38	208,725	160.85	21.63	3,661,625
12/12/05	18,274,320	10,805.48	146,395	113.10	21.57	3,808,020
12/21/05	18,310,885	10,833.74	36,565	28.26	21.56	3,844,585
12/28/05	18,468,825	10,970.02	157,940	136.28	19.32	4,002,525
1/4/06	18,492,870	10,990.05	24,045	20.03	20.01	4,026,570
1/12/06	18,509,925	11,005.62	17,055	15.57	18.26	4,043,625
1/18/16	18,626,350	11,100.32	116,425	94.70	20.49	4,160,050
1/24/06	18,629,650	11,102.55	3,300	2.23	24.66	4,163,350
1/30/06	18,631,900	11,103.69	2,250	1.14	32.89	4,165,600
2/7/06	18,633,500	11,104.80	1,600	1.11	24.02	4,167,200
2/16/06	18,946,470	11,322.04	312,970	217.24	24.01	4,480,170
3/1/06	19,318,400	11,633.06	371,930	311.02	19.93	4,852,100
3/9/06	19,324,970	11,641.97	6,570	8.91	12.29	4,858,670
3/14/06	19,453,950	11,766.85	128,980	124.88	17.21	4,987,650
3/22/06	19,482,416	11,797.88	28,466	31.03	15.29	5,016,116
4/13/06	19,482,850	11,798.05	434	0.17	42.55	5,016,550
4/18/06	19,592,411	11,909.91	109,561	111.86	16.32	5,126,111
4/26/06	19,770,250	12,102.67	177,839	192.76	15.38	5,303,950
5/2/06	19,834,843	12,246.01	64,593	143.34	7.51	5,368,543
5/9/06	19,845,508	12,277.88	10,665	31.87	5.58	5,379,208
6/1/06	19,908,700	12,466.61	63,192	188.73	5.58	5,442,400
6/8/06	19,925,385	12,636.33	16,685	169.72	1.64	5,459,085
6/14/06	19,932,365	12,647.07	6,980	10.74	10.83	5,466,065
6/21/06	19,973,358	12,698.67	40,993	51.60	13.24	5,507,058
6/30/06	19,979,000	12,704.10	5,642	5.43	17.32	5,512,700
7/10/06	19,981,870	12,707.37	2,870	3.27	14.63	5,515,570
8/1/06	19,984,000	12,709.18	2,130	1.81	19.61	5,517,700

TABLE 5
MDOT Dowagiac
Groundwater Treatment System - Operation Summary

Date	Gallons	Hour	Δ Gallons	Δ hours	Gal/min	Cumulative Gallons
8/9/06	20,028,900	12,752.32	44,900	43.14	17.35	5,562,600
8/15/06	20,105,628	12,896.17	76,728	143.85	8.89	5,639,328
8/25/06	20,105,900	12,896.44	272	0.27	16.79	5,639,600
9/1/06	20,118,025	13,063.17	12,125	166.73	1.21	5,651,725
9/6/06	20,156,650	13,185.39	38,625	122.22	5.27	5,690,350
9/12/06	20,265,025	13,326.75	108,375	141.36	12.78	5,798,725
9/19/06	20,267,410	13,339.45	2,385	12.70	3.13	5,801,110
9/29/06	20,271,100	13,342.96	3,690	3.51	17.52	5,804,800
10/4/06	20,275,000	13,347.52	3,900	4.56	14.25	5,808,700
10/10/06	20,301,335	13,491.28	26,335	143.76	3.05	5,835,035
10/17/06	20,305,144	13,659.83	3,809	168.55	0.38	5,838,844
10/25/06	20,316,500	13,674.26	11,356	14.43	13.12	5,850,200
10/31/06	20,355,675	13,690.86	39,175	16.60	39.33	5,889,375
12/20/06	20,368,440	13,696.70	12,765	5.84	36.43	5,902,140
12/29/06	20,375,470	13,699.81	7,030	3.11	37.67	5,909,170
1/18/07	20,375,883	13,700.06	413	0.25	27.53	5,909,583
1/22/07	20,461,160	13,747.12	85,277	47.06	30.20	5,994,860
1/31/07	20,516,000	13,781.97	54,840	34.85	26.23	6,049,700
3/20/07	20,740,100	13,940.65	224,100	158.68	23.54	6,273,800
3/29/07	20,941,950	14,156.79	201,850	216.14	15.56	6,475,650
4/5/07	21,055,600	14,324.81	113,650	168.02	11.27	6,589,300
4/10/07	21,123,400	14,448.08	67,800	123.27	9.17	6,657,100
4/20/07	21,267,900	14,607.95	144,500	159.87	15.06	6,801,600
4/25/07	21,367,340	14,728.95	99,440	121.00	13.70	6,901,040
5/1/07	21,384,900	14,773.87	17,560	44.92	6.52	6,918,600
5/9/07	21,386,030	14,774.69	1,130	0.82	22.97	6,919,730
5/16/07	21,391,000	14,777.99	4,970	3.30	25.10	6,924,700
5/23/07	21,394,200	14,780.51	3,200	2.52	21.16	6,927,900
6/21/07	21,400,773	14,785.87	6,573	5.36	20.44	6,934,473
6/27/07	21,401,345	14,786.10	572	0.23	41.45	6,935,045
7/3/07	21,405,200	14,790.16	3,855	4.06	15.83	6,938,900
7/31/07	21,529,612	14,947.12	124,412	156.96	13.21	7,063,312
9/7/07	21,532,200	14,948.56	2,588	1.44	29.95	7,065,900
9/12/07	21,651,866	15,065.26	119,666	116.70	17.09	7,185,566
9/20/07	21,767,900	15,256.48	116,034	191.22	10.11	7,301,600
9/26/07	21,786,788	15,351.06	18,888	94.58	3.33	7,320,488
11/17/07	21,860,730	15,518.82	73,942	167.76	7.35	7,394,430
11/20/07	21,873,700	15,591.39	12,970	72.57	2.98	7,407,400
11/28/07	21,896,640	15,782.89	22,940	191.50	2.00	7,430,340
12/5/07	21,919,580	15,950.67	22,940	167.78	2.28	7,453,280
12/10/07	21,935,600	16,074.20	16,020	123.53	2.16	7,469,300
12/18/07	21,964,700	16,261.43	29,100	187.23	2.59	7,498,400
12/27/07	22,125,500	16,477.42	160,800	215.99	12.41	7,659,200
1/2/08	22,218,800	16,624.63	93,300	147.21	10.56	7,752,500
1/9/08	22,307,080	16,758.59	88,280	133.96	10.98	7,840,780
1/17/08	22,371,800	16,822.73	64,720	64.14	16.82	7,905,500
1/23/08	22,421,700	16,855.68	49,900	32.95	25.24	7,955,400

TABLE 5
MDOT Dowagiac
Groundwater Treatment System - Operation Summary

Date	Gallons	Hour	Δ Gallons	Δ hours	Gal/min	Cumulative Gallons
1/30/08	22,503,800	16,971.94	82,100	116.26	11.77	8,037,500
2/8/08	22,583,292	17,187.77	79,492	215.83	6.14	8,116,992
2/14/08	22,597,100	17,331.84	13,808	144.07	1.60	8,130,800
2/21/08	22,597,900	17,500.90	800	169.06	0.08	8,131,600
2/28/08	22,612,400	17,666.96	14,500	166.06	1.46	8,146,100
3/7/08	22,619,500	17,859.05	7,100	192.09	0.62	8,153,200
3/14/08	22,623,300	18,024.73	3,800	165.68	0.38	8,157,000
3/18/08		18,035.84				
3/26/08	22,641,600	18,040.65	18,300	15.92	19.16	8,175,300
3/31/08	22,647,900	18,046.56	6,300	5.91	17.77	8,181,600
4/8/08	22,653,000	18,053.62	5,100	7.06	12.04	8,186,700
4/16/08	22,684,935	18,241.61	31,935	187.99	2.83	8,218,635
4/24/08	22,886,600	18,433.33	201,665	191.72	17.53	8,420,300
4/29/08	22,915,000	18,476.52	28,400	43.19	10.96	8,448,700
5/12/08	22,989,400	18,598.96	74,400	122.44	10.13	8,523,100
5/22/08		18,647.35				
5/30/08	23,280,800	18,846.36	291,400	247.40	19.63	8,814,500
7/27/08	23,345,835	18,955.84	65,035	109.48	9.90	8,879,535
7/30/08	23,382,630	19,027.69	36,795	71.85	8.54	8,916,330
8/6/08	23,482,600	19,196.66	99,970	168.97	9.86	9,016,300
8/14/08	23,593,200	19,393.19	110,600	196.53	9.38	9,126,900
8/20/08	23,665,000	19,535.62	71,800	142.43	8.40	9,198,700
8/25/08	23,721,900	19,655.50	56,900	119.88	7.91	9,255,600
9/2/08	23,806,500	19,847.27	84,600	191.77	7.35	9,340,200
9/8/08	23,880,000	19,988.74	73,500	141.47	8.66	9,413,700
9/15/08	23,974,700	20,126.56	94,700	137.82	11.45	9,508,400
9/23/08	24,199,600	20,274.89	224,900	148.33	25.27	9,733,300
10/3/08	24,312,129	20,408.16	112,529	133.27	14.07	9,845,829
10/14/08	24,312,700	20,408.54	571	0.38	25.04	9,846,400
10/22/08	24,375,700	20,461.72	63,000	53.18	19.74	9,909,400
10/31/08	24,465,200	20,537.09	89,500	75.37	19.79	9,998,900
11/6/08	24,521,700	20,581.73	56,500	44.64	21.09	10,055,400
11/26/08	24,522,700	20,582.44	1,000	0.71	23.47	10,056,400
12/16/08	24,597,500	20,727.45	74,800	145.01	8.60	10,131,200
12/22/08	24,632,800	20,871.28	35,300	143.83	4.09	10,166,500
12/29/08	24,648,700	21,042.94	15,900	171.66	1.54	10,182,400
1/5/09	24,652,100	21,208.81	3,400	165.87	0.34	10,185,800
2/10/09	24,652,740	21,210.08	640	1.27	8.40	10,186,440
2/17/09	24,669,680	21,241.45	16,940	31.37	9.00	10,203,380
3/6/09	24,728,193	21,650.00	58,513	408.55	2.39	10,261,893
3/20/09	24,729,595	21,651.52	1,402	1.52	15.37	10,263,295
3/26/09	24,735,400	21,657.21	5,805	5.69	17.00	10,269,100
4/3/09	24,876,400	21,850.63	141,000	193.42	12.15	10,410,100
4/10/09	24,982,800	22,014.63	106,400	164.00	10.81	10,516,500
4/15/09	25,044,435	22,133.83	61,635	119.20	8.62	10,578,135

TABLE 5
MDOT Dowagiac
Groundwater Treatment System - Operation Summary

Date	Gallons	Hour	Δ Gallons	Δ hours	Gal/min	Cumulative Gallons
System changed to single-well pump and treat - restarted 5/19/09						
5/19/09	25,047,823	2.30	3,388	2.30	24.55	10,581,523
5/28/09	25,077,080	29.40	29,257	27.10	17.99	10,610,780
6/3/09	25,107,600	56.80	30,520	27.40	18.56	10,641,300
6/11/09	25,139,300	85.00	31,700	28.20	18.74	10,673,000
6/18/09	25,181,610	126.50	42,310	41.50	16.99	10,715,310
7/1/09	25,318,750	265.40	137,140	138.90	16.46	10,852,450
7/8/09	25,423,100	436.30	104,350	170.90	10.18	10,956,800
7/15/09	25,483,020	544.40	59,920	108.10	9.24	11,016,720
7/22/09	25,484,775	547.00	1,755	2.60	11.25	11,018,475
7/29/09	25,607,435	712.20	122,660	165.20	12.37	11,141,135
8/5/09	25,638,650	781.90	31,215	69.70	7.46	11,172,350
8/12/09	25,692,013	949.00	53,363	167.10	5.32	11,225,713
8/19/09		1,118.50	50,850	169.50	5.00	11,276,563
8/25/09		1,261.30	42,840	142.80	5.00	11,319,403
9/1/09		1,426.50	49,560	165.20	5.00	11,368,963
9/10/09		1,590.30	49,140	163.80	5.00	11,418,103
9/18/09	196,485	1,791.80	48,360	201.50	4.00	11,466,463
9/23/09	220,405	1,900.00	23,920	108.20	3.68	11,490,383
9/30/09	229,800	1,943.40	9,395	43.40	3.61	11,499,778
10/7/09	277,450	2,109.80	47,650	166.40	4.77	11,547,428
10/14/09	306,750	2,279.00	29,300	169.20	2.89	11,576,728
10/21/09	312,589	2,319.40	5,839	40.40	2.41	11,582,567
10/29/09	372,059	2,484.60	59,470	165.20	6.00	11,642,037
11/5/09	382,583	2,520.70	10,524	36.10	4.86	11,652,561
11/10/09	415,340	2,635.00	32,757	114.30	4.78	11,685,318
11/19/09	460,828	2,855.50	45,488	220.50	3.44	11,730,806
11/24/09	484,440	2,969.70	23,612	114.20	3.45	11,754,418
12/3/09	542,780	3,188.40	58,340	218.70	4.45	11,812,758
12/11/09	575,342	3,379.80	32,562	191.40	2.84	11,845,320
12/17/09	616,390	3,521.50	41,048	141.70	4.83	11,886,368
12/22/09	640,950	3,641.90	24,560	120.40	3.40	11,910,928
12/29/09	670,700	3,814.00	29,750	172.10	2.88	11,940,678
1/5/10	712,440	3,971.00	41,740	157.00	4.43	11,982,418
1/11/10	744,148	4,117.00	31,708	146.00	3.62	12,014,126
1/19/10	776,357	4,310.30	32,209	193.30	2.78	12,046,335
1/25/10	807,191	4,454.90	30,834	144.60	3.55	12,077,169
2/1/10	841,362	4,612.10	34,171	157.20	3.62	12,111,340
		Totals	12,111,340	20,758.95		
		P&T Total	1,533,205			9.72 Ave flow

TABLE 6
TIER I RBSL COMPARISON TABLE FOR REMAINING SOIL IMPACTS
CLOSURE REPORT - FORMER MDOT MAINTENANCE GARAGE
DOWAGIAC, MICHIGAN

LAND USE: Non-Residential

EXPOSURE CODES: A. Residential Drinking Water Protection B. Non-Residential Drinking Water Protection C. Volatilization to Indoor Air
D. Groundwater Surface Water Interface Protection E. Direct Contact

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (µg/Kg)	Applicable RBSL for each Exposure Codes*					RBSLs Exceeded
				A	B	C	D	E	
VOLATILES									
Benzene	CS-5	9/21/2011	800	100	100	8,400	4,000	400,000	A, B
Toluene	B-10-F2 (7-7.5')	10/20/2010	37,000	16,000	16,000	250,000	5,400	250,000	A, B, D
Ethylbenzene	B-10-F2 (7-7.5')	10/20/2010	25,000	1,500	1,500	140,000	360	140,000	A, B, D
Xylenes	B-10-F2 (7-7.5')	10/20/2010	180,000	5,600	5,600	150,000	820	150,000	A, B, C, D, E
MTBE	None Detected			800	800	5,600,000	140,000	5,900,000	None
1,3,5-Trimethylbenzene	B-10-B1 (3.5-4')	10/20/2010	29,000	1,800	1,800	94,000	1,100	94,000	A, B, D
1,2,4-Trimethylbenzene	B-10-B1 (3.5-4')	10/20/2010	91,000	2,100	2,100	110,000	570	110,000	A, B, D
PNA's									
Acenaphthene	None Detected			300,000	880,000	350,000,000	8,700	130,000,000	None
Acenaphthylene	GP-11 (5.5')	12/16/2002	2,300	5,900	17,000	3,000,000	ID	5,200,000	None
Anthracene	GP-11 (5.5')	12/16/2002	3,400	41,000	41,000	1,000,000,000	ID	730,000,000	None
Benzo(a)anthracene	GP-11 (5.5')	12/16/2002	5,200	NLL	NLL	NLV	NLL	80,000	None
Benzo(a)pyrene	GP-11 (5.5')	12/16/2002	3,800	NLL	NLL	NLV	NLL	8,000	None
Benzo(b)fluoranthene	GP-11 (5.5')	12/16/2002	3,400	NLL	NLL	NLV	NLL	80,000	None
Benzo(ghi)perylene	GP-11 (5.5')	12/16/2002	2,500	NLL	NLL	NLV	NLL	7,000,000	None
Benzo(k)fluoranthene	GP-11 (5.5')	12/16/2002	3,800	NLL	NLL	NLV	NLL	800,000	None
Chrysene	GP-11 (5.5')	12/16/2002	5,900	NLL	NLL	NLV	NLL	8,000,000	None
Dibenzo(a,h,)anthracene	None Detected			NLL	NLL	NLV	NLL	8,000	None
Fluoranthene	GP-11 (5.5')	12/16/2002	20,000	730,000	730,000	1,000,000,000	5,500	130,000,000	D
Fluorene	GP-11 (5.5')	12/16/2002	4,600	390,000	390,000	1,000,000,000	5,300	87,000,000	None
Indeno(1,2,3-cd)pyrene	GP-11 (5.5')	12/16/2002	2,300	NLL	NLL	NLV	NLL	80,000	None
2-Methylnaphthalene	B-10-B1 (3.5-4')	10/20/2010	9,900	57,000	57,000	4,900,000	4,200	26,000,000	D
Naphthalene	B-10-B1 (3.5-4')	10/20/2010	13,000	35,000	100,000	470,000	730	52,000,000	D
Phenanthrene	GP-11 (5.5')	12/16/2002	25,000	56,000	160,000	5,100,000	2,100	5,200,000	D
Pyrene	GP-11 (5.5')	12/16/2002	12,000	480,000	480,000	1,000,000,000	ID	84,000,000	None

* RBSLs from MDEQ Operational Memorandum No. 4, Attach. 1, Table 3, September 28, 2012

TABLE 7
TIER I RBSL COMPARISON TABLE FOR *REMAINING* GROUNDWATER IMPACTS
CLOSURE REPORT - FORMER MDOT MAINTENANCE GARAGE
DOWAGIAC, MICHIGAN

LAND USE: Non-Residential

EXPOSURE CODES: A. Residential Drinking Water B. Nonresidential Drinking Water C. Groundwater Surface Water Interface
D. Nonresidential GW Volatilization to Indoor Air E. GW Direct Contact

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (µg/l)	Applicable RBSL for each Exposure Codes*					RBSLs Exceeded
				A	B	C	D	E	
VOLATILES									
Benzene	MW-5	7/16/2013	2,200	5	5	200	35,000	11,000	A, B, C
Ethylbenzene	MW-5	7/16/2013	1,300	74	74	18	170,000	170,000	A, B, C
Toluene	MW-5	7/16/2013	1,800	790	790	270	530,000	530,000	A, B, C
Xylenes	MW-5	7/16/2013	4,100	280	280	41	190,000	190,000	A, B, C
MTBE		None Detected		40	40	7,100	47,000,000	610,000	None
1,3,5-Trimethylbenzene	MW-5	7/16/2013	140	72	72	45	61,000	61,000	A, B, C
1,2,4-Trimethylbenzene	MW-5	7/16/2013	810	63	63	17	56,000	56,000	A, B, C
PNAs									
Naphthalene	MW-5	7/16/2013	290	520	1,500	11	31,000	31,000	C
2-Methylnaphthalene	MW-5	7/16/2013	33	260	750	19	25,000	25,000	C

* RBSLs from MDEQ Operational Memorandum No. 4, Attach. 1, Table 1, September 28, 2012

**TABLE 8
GROUNDWATER EXPOSURE PATHWAY CHARACTERIZATION
CLOSURE REPORT - FORMER MDOT MAINTENANCE GARAGE
DOWAGIAC, MICHIGAN**

Nonresidential Exposure Pathway	RBSL Exceeded?¹	Exposure Pathway Relevant?²	RBSL Applicable?³	Pathway of Concern?⁴
Residential Drinking Water	Yes	No	No	No
Nonresidential Drinking Water	Yes	Yes	Yes	Yes
Groundwater/Surface Water Interface	Yes	Yes	Yes	No
Nonresidential GW Volatilization to Indoor Air	No	Yes	No	No
Groundwater Direct Contact	No	Yes	No	No

Notes

RBSL = Risk-Based Screening Level, Part 213, Tier I

1 Does any regulated compound detected at the site exceed the RBSL?

2 Pathway is relevant when exposure can occur (even if exposure controls are relied upon, and even if concentrations are below applicable criteria).

3 Criteria associated with a relevant pathway are applicable unless land use restrictions or institutional controls are relied upon to prevent exposures.

4 Is the pathway a concern, based on contaminant concentrations, relevant pathways, and applicability of the RBSL?

**TABLE 9
SOIL EXPOSURE PATHWAY CHARACTERIZATION
FINAL ASSESSMENT REPORT - FORMER MDOT MAINTENANCE GARAGE
DOWAGIAC, MICHIGAN**

Nonresidential Exposure Pathway	RBSL Exceeded?¹	Exposure Pathway Relevant?²	RBSL Applicable?³	Pathway of Concern?⁴
Residential Drinking Water Protection	Yes	No	No	No
Nonresidential Drinking Water Protection	Yes	Yes	Yes	Yes
GSI Protection	Yes	Yes	Yes	No
Soil Volatilization to Indoor Air Inhalation	No	Yes	Yes	No
Direct Contact	Yes	Yes	Yes	Yes

Notes

RBSL = Risk-Based Screening Level, Part 213, Tier I

1 Does any regulated compound detected at the site exceed the RBSL?

2 Pathway is relevant when exposure can occur (even if exposure controls are relied upon, and even if concentrations are below applicable criteria).

3 Criteria associated with a relevant pathway are applicable unless land use restrictions or institutional controls are relied upon to prevent exposures.

4 Is the pathway a concern, based on contaminant concentrations, relevant pathways, and applicability of the RBSL?

CITY OF DOWAGIAC

MEMO TO: Mayor Lyons and City Council Members

FROM: Kevin P. Anderson, City Manager

DATE: October 25, 2013

SUBJECT: Preliminary Breath Test (PBT) Fees

Over the past several years there has been a large increase in the number of court ordered preliminary breath tests (PBT) for persons who have been convicted of alcohol related offenses and are on probation. The City's Police Department has been administering these tests at no fee. Over 100 PBTs have been administered during the first nine months of 2013.

Attached is a report from Public Safety Director Steve Grinnwald indicating that most other communities in the state charge a fee for administration of the PBTs. His recommendation is that a fee of \$5.00 per test per individual with a maximum of \$15.00 per week per individual be established. I concur with his recommendation.

RECOMMENDATION

Authorize a resolution adopting a fee schedule for preliminary breath tests to be effective November 1, 2013.

Support Documents:

- Cover Memo-City Mgr.
- Resolution
- Dept. Head Backup

Councilmember _____ offered and moved the adoption of the following resolution;
seconded by Councilmember _____.

WHEREAS, there has been an increase in the number of court ordered preliminary breath tests (PBT) to track alcohol use of persons convicted of alcohol-related offenses; and

WHEREAS, the City of Dowagiac Police Department has administered over 100 PBTs through the first nine months of calendar year 2013; and

WHEREAS, there is a cost of both material and time to administer PBTs; and

WHEREAS, a review by the Dowagiac Public Safety Director indicates that most police departments in the state charge a fee for administering these tests.

NOW, THEREFORE, BE IT RESOLVED that City Council does hereby establish a fee of \$5.00 per court ordered PBT; and

BE IT FURTHER RESOLVED that if the court orders a daily test, the fee will be capped at \$15.00 per week per individual; and

BE IT FURTHER RESOLVED that the fee schedule will begin November 1, 2013.

ADOPTED/REJECTED

DOWAGIAC POLICE DEPARTMENT
MEMORANDUM

TO: Kevin Anderson, City Manager

FROM: Steve Grinnwald, Public Safety Director

REF: Fee for PBT

The Dowagiac Police Department has recently witnessed an increase in the number of court ordered preliminary breath tests (PBT'S) over the last couple of years. It appears that as a form of probation, Judges are ordering that people be given a PBT on a daily basis to track their alcohol use when convicted of alcohol related offenses. This is happening across the State of Michigan. We have administered PBT's to probationers from other cities and locations throughout the state as well as local probationers.

The number of PBT's required of these probationers varies from just a week's worth to up to a month's worth of tests. The officers are requested to administer the test and then sign a form provided by the probationer noting the results for documentation purposes for the court. The officers of the Dowagiac Police Department then complete an incident report of this to document the officer's activity.

A check of the records of the Dowagiac Police Department revealed that this department has administered over 100 of these PBT's through September of 2013. I believe that this may actually be a low count as sometimes officer neglect to document the tests. The administering of these tests takes several minutes to complete. The officers are required to administer the test and sign the court documentation form and enter the incident into the RMS. If the officers are not on-station when the test is requested they have to drive to the station to complete the test. With over 100 of these tests completed to date the department has spent a considerable amount of time in 2013 on the PBT tests. There is also the cost of the PBT straw which is used each time the test is administered.

A check of other police departments throughout the State of Michigan showed that most departments in the state charge a fee for administering these tests due to the increasing number of them. The most common fee amount for these tests is \$5 per test. A check of departments in our area also shows that they charge \$5 per PBT test.

I recommend that the Dowagiac Police Department add the \$5 fee for court ordered PBT tests to the department fee schedule. As previously stated courts have been ordering these tests for weeks to months at a time. I recommend that if a probationer is required to have a PBT administered for a week or more that the fee is \$15 per week. This allows the department to recoup some of the cost for administering these tests as well as allows the probationer to have their court ordered tests completed without an additional financial burden on top of court fees already imposed.

RESPECTFULLY SUBMITTED:

Steven L. Grinnewald
Director of Public Safety

CITY OF DOWAGIAC

MEMO TO: Mayor Lyons and City Council Members

FROM: Kevin P. Anderson, City Manager

DATE: October 25, 2013

SUBJECT: Local Officers' Compensation Commission Recommendations

Three resolutions are on Monday's agenda relating to the recommendations of the Local Officers' Compensation Commission (LOCC). As City Council is aware, in accordance with City Code, the LOCC meets every two years to consider salary adjustments for local elected officials. The Commission separately determines the compensation for each elected official in the City. That determination is considered to be accepted unless the City Council rejects the recommendation by a two-thirds majority. By code, the City Council is to consider each official's salary as a separate resolution and may approve salary recommendations for some officials while rejecting others.

The LOCC met on October 16, 2013 and made the following recommendations:

- A salary increase to the City Treasurer's position should be adjusted by 1.5%, consistent with the percentage increase to the Classification & Compensation System, effective October 1, 2013 to a rate of \$40,251.08 and an annual compensation increase consistent with the average percentage increase of non-union employees effective October 1, 2014.
- A salary increase to the City Clerk's position should be adjusted by 1.5%, consistent with the percentage increase to the Classification & Compensation System, effective October 1, 2013 to a rate of \$49,102.29 and an annual compensation increase consistent with the average percentage increase of non-union employees effective October 1, 2014.
- Annual compensation for the Offices of Mayor and City Council Members should remain at the current annual amount of \$1,200 and \$800 per year, and should continue to receive additional compensation of \$25 for every regular meeting, special meeting and workshop attended. Consistent with prior meetings, the LOCC proposed that the maximum amount for meeting attendance be increased from \$600 to \$800.

A copy of the minutes of the LOCC meeting is attached for your information.

RECOMMENDATION

Approve the recommendations of the Local Officers' Compensation Commission relating to salary adjustments for elected officials.

Support Documents:

Cover Memo-City Mgr.

Resolutions

LOCC Minutes

Councilmember _____ offered and moved the adoption of the following resolution; seconded by Councilmember _____.

WHEREAS, the Local Officers' Compensation Commission (LOCC) of the City of Dowagiac, at its meeting on October 16, 2013 approved a salary range and adjustment to the compensation for the City Clerk; and

WHEREAS, it is the recommendation of the LOCC that the salary range for the City Clerk be adjusted consistent with the 1.5% increase in the non-union Classification and Compensation System effective October 1, 2013 and;

WHEREAS, it is the recommendation of the LOCC that the City Clerk have an annual compensation rate of \$49,102.29 and an annual compensation increase consistent with the average percentage increase of non-union employees effective October 1, 2014 ; and

WHEREAS, it is the determination of the City Council that it is appropriate to adjust the salary range and make salary adjustments as recommended by the LOCC.

NOW, THEREFORE, BE IT RESOLVED that the City of Dowagiac, by affirmative vote of its City Council, does hereby approve an amendment to the annual compensation of the City Clerk, in conjunction with the requirements established by the Local Officers' Compensation Commission as approved on October 16, 2013. In accordance with said recommendation, the City Clerk will be paid an annual compensation rate of \$49,102.29 and an annual compensation increase consistent with the average percentage increase of non-union employees effective October 1, 2014.

ADOPTED/REJECTED

Councilmember _____ offered and moved the adoption of the following resolution; seconded by Councilmember _____.

WHEREAS, the Local Officers' Compensation Commission (LOCC) of the City of Dowagiac, at its meeting on October 16, 2013 approved an adjustment to the compensation for the City Treasurer; and

WHEREAS, it is the recommendation of the LOCC that the salary range for the City Treasurer be adjusted consistent with the 1.5% increase in the Classification and Compensation System effective October 1, 2013 and;

WHEREAS, it is the recommendation of the LOCC that the City Treasurer have an annual compensation rate of \$40,251.08 effective 30 days following its filing with the city clerk and an annual compensation increase consistent with the average percentage increase of non-union employees effective October 1, 2014; and

WHEREAS, it is the determination of the City Council that it is appropriate to adjust the salary range and make salary adjustments as recommended by the LOCC.

NOW, THEREFORE, BE IT RESOLVED that the City of Dowagiac, by affirmative vote of its City Council, does hereby approve an amendment to the annual compensation paid to the City Treasurer, in conjunction with the requirements established by the Local Officers' Compensation Commission as approved on October 16, 2013. In accordance with said recommendation, the City Treasurer will be paid an annual compensation rate of \$40,251.08 effective 30 days following its filing with the city clerk and an annual compensation increase consistent with the average percentage increase of non-union employees effective October 1, 2014.

ADOPTED/REJECTED

Councilmember _____ offered and moved the adoption of the following resolution; seconded by Councilmember _____.

WHEREAS, the Local Officers' Compensation Commission (LOCC) of the City of Dowagiac, at its meeting on October 16, 2013, approved adjustments to the compensation for the Mayor and City Council members; and

WHEREAS, it is the recommendation of the LOCC that the base pay for the Mayor and City Council members remain at the current annual amount of \$1,200 and \$800 per year; and

WHEREAS, it is also the recommendation of the LOCC that the Mayor and City Council members shall continue to receive additional compensation of \$25.00 for every regular meeting, special meeting and workshop attended, with an annual maximum increase from the current \$600 per year above base pay, to an annual maximum of \$800 per year above base pay; and

WHEREAS, it is the determination of the City Council that it is appropriate to make salary adjustments as recommended by the LOCC.

NOW, THEREFORE, BE IT RESOLVED that the City of Dowagiac, by affirmative vote of its City Council, does hereby approve the amendment to the annual compensation paid to the holders of the positions of Mayor and City Council members, in conjunction with the requirements established by the Local Officers' Compensation Commission as approved on October 16, 2013. In accordance with said recommendation, the base pay for the Mayor and City Council members remain at \$1,200 and \$800 per year respectively and holders of said offices shall continue to receive additional compensation of \$25 for every regular meeting attended, not to exceed \$800 per year above base pay.

ADOPTED/REJECTED

Minutes
LOCAL OFFICERS COMPENSATION COMMISSION
Wednesday, October 16, 2013

Members present: Lois Hall, Rich Frantz, Diane Barrett-Curtis, Leon Anderson, Jr., Assistant City Manager Rozanne Scherr.

Meeting was called to order at 6:00 pm, by Rozanne Scherr.

Minutes of the November 14, 2011, meeting were reviewed. Motion by Rich, support by Diane, to accept. Motion passed.

Officers for this session of the Commission were elected, as follows: Leon Anderson, Jr., Chair; Diane Barrett-Curtis, secretary.

Scherr distributed information on the 2013-2014 classification and compensation system for city positions as well as salary information for comparable communities. The salary adjustment for all City employees including those covered by union contracts (police and public services) for 2013-14 is 1.5%.

City Clerk: Commission recommends a 1.5% increase in current base salary consistent with other city employees with no change to the ombudsman pay of \$2500 annually for fiscal year 2013-14; and an increase consistent with the average percentage increase of non-union employees for fiscal year 2014-15. Motion by Hall, seconded by Frantz.

Treasurer: Commission recommends a 1.5% increase in current base salary consistent with other city employees for fiscal year 2013-14; and an increase consistent with the average percentage increase of non-union employees for fiscal year 2014-15. Motion by Barrett-Curtis, seconded by Hall.

Mayor and Council: Commission recommends no adjustment to base pay for fiscal years 2013-14 and 2014-15 for Mayor and Council Members and a continuation of the attendance per diem of \$25 per meeting with an increase in the maximum from the current \$600 to \$800 annually. Motion by Barrett-Curtis, seconded by Frantz.

Motion by Hall, supported by Frantz, to adjourn. Meeting adjourned at 6:50 pm.

Councilmember _____ offered and moved the adoption of the following resolution;
seconded by Councilmember _____.

WHEREAS, the following information has been reviewed by the City Manager and City
Treasurer and is being presented to City Council with a recommendation to
approve invoices and payroll #1 for the period ending 10/10/13:

Invoices FY2012-13: 7,765.20
Invoices FY 2013-14: 206,313.22
Payroll: 116,892.14
Total: 330,970.56

BE IT RESOLVED that the City Manager and City Treasurer are hereby authorized and
directed to pay the following bills and payroll due:

Invoices	Payroll	Total
\$214,078.42	\$116,892.14	\$330,970.56

ADOPTED/REJECTED

Ayes:

Nays:

Absent:

Abstain:

James E. Snow, City Clerk

Vendor	Invoice #	Description	Amount
AMERICAN ELECTRIC POWER	04950133613	CCWS-VANDALIA TOWER	53.35
AMERICAN ELECTRIC POWER	04461935407	M-62 LIFT STATION	75.47
AMERICAN ELECTRIC POWER	04005021003	VINEYARD PL LIFT STATION	32.45
CASS COUNTY TREASURER	2012 FY	CHARGE BACKS	1,076.47
FED EX	2-433-88585	SHIPPING CHARGES	55.35
FIA CARD SERVICES	0252	MML CONF	148.35
FIA CARD SERVICES	0252	ECON DEV	20.83
FIA CARD SERVICES	0252	MML	78.90
FIA CARD SERVICES	0252	MML	28.74
FIA CARD SERVICES	0252	MML	281.22
FIA CARD SERVICES	0252	IPHONE CLOUD STORAGE	20.00
FIA CARD SERVICES	0252	TRAINING MATERIAL	149.00
FIA CARD SERVICES	0252	TRAINING MATERIAL	149.00
FIA CARD SERVICES	0252	LIFT STATION ALARM	24.99
FIA CARD SERVICES	0252	LABELMAKER LABELS/TAPE	122.49
FIA CARD SERVICES	0252	MML	159.68
FIA CARD SERVICES	0252	MML	191.87
FIA CARD SERVICES	0252	MML	20.94
FIA CARD SERVICES	0252	MML	66.27
FIA CARD SERVICES	0252	MML	34.68
FIA CARD SERVICES	0252	MML	561.74
FIA CARD SERVICES	0252	MML	27.85
JUDD LUMBER COMPANY, INC	2525017	FLOOR ENAMEL	89.07
JUDD LUMBER COMPANY, INC	2525064	FLOOR ENAMEL	157.95
JUDD LUMBER COMPANY, INC	2525190	BRICK SAW RENTAL	55.00
KARNES, EUGENE & BRENDA	10/22/13	HOUSING INCENTIVE AWARD-508 NEW YORK	500.00
NYE UNIFORM COMPANY, INC	436555	UNIFORMS-EVANS	103.00
NYE UNIFORM COMPANY, INC	436559	UNIFORMS-MATTIX	124.87
NYE UNIFORM COMPANY, INC	436560	UNIFORMS-GOLLNICK	106.49
NYE UNIFORM COMPANY, INC	436562	UNIFORMS-NELSON	106.49
NYE UNIFORM COMPANY, INC	436563	UNIFORMS-MCGOWAN	106.49
NYE UNIFORM COMPANY, INC	436565	UNIFORMS-BUNDY	51.50
O'BOYLE COWELL BLALOCK AND ASSOC	51010.03-14	RUSSOM PARK	1,150.03
PETTY CASH	9/30/13	GPS UNIT CHARGER	24.60
PETTY CASH	9/30/13	POSTAGE	3.96
PETTY CASH	9/30/13	BATTERIES	8.80
PETTY CASH	9/30/13	POSTAGE	1.12
PETTY CASH	9/30/13	POSTAGE	11.44
PETTY CASH	9/30/13	PAYROLL REIMBURSEMENT	9.30
PETTY CASH	9/30/13	OPERATING SUPPLIES	39.87
POWERNET GLOBAL COMMUNICATIONS	30378769	LONG DISTANCE SERVICE 9/12-10/12	138.68
ROHDY'S HEATING & COOLING, LLC	3172	AIR CONDITIONER REPAIR-CH	68.00
RUTKOWSKE, JASON	2911323858	CELL PHONE REIMBURSEMENT 9/10/13-10/9/13	60.00
SEMCO ENERGY GAS COMPANY	0147944.500	GAS SERVICE 8/30/13-10/1/13	18.28
SEMCO ENERGY GAS COMPANY	0149077.500	GAS SERVICE 9/3/13-10/2/13	24.95
SEMCO ENERGY GAS COMPANY	0146763.501	GAS SERVICE 8/30/13-10/1/13	66.70
SEMCO ENERGY GAS COMPANY	0148902.500	GAS SERVICE 9/3/13-10/2/13	18.95
SEMCO ENERGY GAS COMPANY	0149138.502	GAS SERVICE 9/3/13-10/2/13	18.28
SEMCO ENERGY GAS COMPANY	0149080.500	GAS SERVICE 9/3/13-10/2/13	23.61
SEMCO ENERGY GAS COMPANY	0148809.501	GAS SERVICE 9/3/13-10/2/13	22.28
SEMCO ENERGY GAS COMPANY	0149089.500	GAS SERVICE 9/3/13-10/2/13	18.28
SHELL OIL COMPANY	065260523310	SEPT FUEL CHARGES	44.57
SOIL AND MATERIALS ENGINEERS, INC	44972	MATERIALS TESTING-RUSSOM PARK	925.00
STATE OF MICHIGAN-ESSD-WTR TESTING	836320	CCWS-LEAD/COPPER TESTING	78.00
WIGGINS, DANIEL	188028025202	CELL PHONE REIMBURSEMENT 7/24-8/23	60.00

INVOICE REGISTER FOR CITY OF DOWAGIAC
POST DATES 09/30/2013 - 09/30/2013
BOTH JOURNALIZED AND UNJOURNALIZED OPEN
BANK CODE: GEN

Vendor	Invoice #	Description	Amount
WIGGINS, DANIEL	188028025202	CELL PHONE REIMBURSEMENT 8/24-9/23	60.00
		Total:	<u>7,675.20</u>

Vendor	Invoice #	Description	Amount
ABSOPURE WATER COMPANY	54262349	H&C COOLER RENTAL	8.00
ABSOPURE WATER COMPANY	54276892	ADMIN CHG-26461 NUBOUR	1.55
ABSOPURE WATER COMPANY	54265211	C&C COOLER RENTAL-25830 NUBOUR	6.00
ACCOUNTING CONSULTANTS, PC	10/15/13	CONSULTING SVC THROUGH 10/15/13	2,407.50
ACQUISITIONS AMERICA LLC	10/16/2013	UB refund for account: 05-1258-2	40.19
AIRGAS GREAT LAKES	9913136325	WELDING SUPPLIES	42.26
ALERT-ALL CORP	213100362	FIRE HATS	114.00
ALTEC NUECO	9557195	#4 ROD/DOOR STOP	212.18
AMERAPLAN	11/13	AMERAPLAN ADMIN FEE	735.00
ARISTOCHEM INC	26021	GLASS CLEANER/HAND WIPES	116.26
ARMSTRONG, JASMINE	10/16/2013	UB refund for account: 16-0352-6	88.40
ARSENEAU, STEVE	10/9/13	TRAVEL REIMBURSEMENT-BAY CITY	461.51
AUTOZONE	2141074774	#PD053 WIPER BLADES	34.18
AVFUEL CORPORATION	005804663	AIRPORT FUEL	14,675.52
BENDER ELECTRIC, INC	16116	CCWS-VALVE REPAIR	160.00
BENDER ELECTRIC, INC	16112	WELLHOUSE #21-METER SOCKET REPLACEMENT	646.00
BLUE CROSS/BLUE SHIELD	11/13	HEALTH INSURANCE PREMIUM-11/13	50,409.02
BRADSHAW, CHERYL	10/15/2013	UB refund for account: 06-1794-7	141.98
BROOKS REAL ESTATE GROUP	10/15/2013	UB refund for account: 13-0543-2	34.89
BROOKS REAL ESTATE GROUP	10/16/2013	UB refund for account: 13-0543-2	200.00
C WIMBERLY AUTOMOTIVE GROUP	214535	#PD121 OIL CHANGE	45.00
CAPITAL TIRE, INC	1430724	TIRES	427.28
CHET NICHOLS, INC	391826	CREEPER	74.95
COLDWELL BANKER RES	10/15/2013	UB refund for account: 03-0716-3	15.03
COMMUNITY ANSWERING SERVICE	262810142013	DISPATCHING SERVICES	155.10
CONSUMERS CONCRETE CORPORATION	111134	CONCRETE	371.25
CREATIVE VINYL SIGNS	25579	SIGNS	535.20
CREATIVE VINYL SIGNS	25613	PLAQUE	515.00
CROSS, AMANDA	10/16/2013	UB refund for account: 09-1389-3	2.29
DAVE'S CONCRETE PRODUCTS, INC	19450	CONCRETE	465.00
DOUBLEDAY OFFICE PRODUCTS, INC	145132I	OFFICE SUPPLIES	94.10
DOUBLEDAY OFFICE PRODUCTS, INC	145166I	OFFICE SUPPLIES	42.99
DUST BUSTERS	11/13	CLEANING SERVICES 11/13	1,725.00
ELHORN ENGINEERING COMPANY	253755	CCWS-CHEMICALS	427.50
FADER EQUIPMENT, INC	109805	EDGER/RADIUS EDGER	36.50
FORREST FINN, LLC	2	REIMBURSEMENT-GRANT ELIGIBLE EXPENSES	17,500.00
FRONTIER	51700117650520115	CCWS DATA LINE 10/10-11/9	107.38
GEMPLER'S	1019776854	EARPLUGS/TREE WATERING BAGS	426.35
GLOBAL TELEMATIC SOLUTIONS, LLC	2697	VEHICLE GPS SUBSCRIPTION	140.00
GRAMES TIRE & BATTERY, INC	2471	#PD091 TIRE REPAIR	16.95
GUNTLE, CHRIS	10/21/2013	UB refund for account: 08-2226-27	71.16
HALE'S HARDWARE, INC	C40997	PAINT TAPE	11.97
HALE'S HARDWARE, INC	C38640	CONDUIT	16.77
HALE'S HARDWARE, INC	C39775	CONDUIT	11.18
HALE'S HARDWARE, INC	C40296	SHIPPING CHARGES	18.95
HALE'S HARDWARE, INC	10086010	IPHONE CASE	17.99
HALE'S HARDWARE, INC	C38395	MERCURY BULB	20.36
HALE'S HARDWARE, INC	C38636	TAMPER PROOF BIT SET	20.36
HALE'S HARDWARE, INC	C39772	CLR/BOWL CLEANER/POLISH	45.19
HALE'S HARDWARE, INC	C40067	SHIPPING CHARGES/TUBING	29.84
HALE'S HARDWARE, INC	C39184	WORKLITE/BULB	36.84
HALE'S HARDWARE, INC	C38615	ALUMINUM BAR	13.09
HALE'S HARDWARE, INC	B37665	FASTENERS	10.88
HALE'S HARDWARE, INC	C38953	UTILITY BRUSHES/QUICK LINK/CHAIN	45.90
HAMPTON INN DETROIT/MADISON HTS	11/24/13	RESERVATION CONFIRMATION 80918342-	197.10

Vendor	Invoice #	Description	Amount
HANSON BEVERAGE SERVICE	732371	DISTILLED WATER	40.50
HARDING'S MARKET, INC	337017	OPERATING SUPPLIES	50.64
HARDING'S MARKET, INC	337012	OPERATING SUPPLIES	16.18
HD SUPPLY POWER SOLUTIONS, LTD	2387642-00	BATTERY	12.50
HOGER, DAVID E	10/15/2013	UB refund for account: 10-0575-2	11.59
HOLBEN PROFESSIONAL EH SERVICES	4240	PUMPS & MOTORS TRAINING-COX/GRIGGS	300.00
ICKES GRADING, LLC	10/13/13	FINE GRADING-MUSEUM PKG LOT	450.00
JOHN & CURT'S BRAKE & ALIGNMENT	10/14/13	#PD131 BRAKE PADS	289.98
JOHNSON, NICHOLAS	10/15/2013	UB refund for account: 07-1344-12	121.72
JUDD LUMBER COMPANY, INC	2526419	RENTAL-SOD CUTTER	55.00
JUDD LUMBER COMPANY, INC	2526465	PINE BOARD/SHOVEL	280.27
JUDD LUMBER COMPANY, INC	2526483	REINFORCING ROD	103.50
JUDD LUMBER COMPANY, INC	2526507	SHOVELS	25.98
JUDD LUMBER COMPANY, INC	2526508	KNEE PADS	17.99
JUDD LUMBER COMPANY, INC	2526579	REDI-MIX GRAVEL	29.94
JUDD LUMBER COMPANY, INC	2526617	3/4 GLV PLUGS	6.58
KIESLER'S POLICE SUPPLY, INC	00714438	UNIFORM/EQUIPMENT	361.60
KLUG, PATRICIA	10/16/13	MILEAGE REIMBURSEMENT-16 MILES	9.04
KUBLICK, CARMEN	10/15/2013	UB refund for account: 11-1580-7	48.84
KURZHAL, JUDITH	10/15/2013	UB refund for account: 13-0101-2	8.52
LAGROW, CINDY	11/13	ECONOMIC DEVELOPMENT SERVICES 11/13	2,060.00
LAKE MICHIGAN MAILERS, INC	289043	POSTAGE	5,000.00
MACON, BRENDA	10/15/2013	UB refund for account: 12-2668-5	83.41
MI MUNICIPAL RISK MANAGEMENT	R0001210	RETENTION FUND PRORATION	5,000.00
MI MUNICIPAL RISK MANAGEMENT	M0001210	LIABILITY INS 11/24/13	36,233.75
MICHIGAN CAT	ER3502883	FUEL CHARGE-EQUIPMENT DEMO	119.00
MICHIGAN STATE POLICE-CASHIERS OFC	551-401837	NARCOTICS SCHOOL #6031/6026	700.00
MROCZEK SOD FARM	09285	SOD	89.10
NATIONAL FIRE PROTECTION ASSOC	5948480X	ANNUAL MEMBERSHIP	165.00
NEW WORLD SYSTEMS	10/7/13	SOFTWARE SUPPORT 11/13-10/14	9,267.00
PETTY CASH	10/21/13	RECORD DEEDS	34.00
PETTY CASH	10/21/13	MILEAGE REIMBURSEMENT-STEVENSON	5.09
PETTY CASH	10/21/13	OPERATING SUPPLIES-DART	14.84
PETTY CASH	10/21/13	OPERATING SUPPLIES-CITY HALL	12.90
PETTY CASH	10/21/13	LUNCH-DPS CREW	17.50
PETTY CASH	10/21/13	LUNCH-DPS CREW	17.50
PETTY CASH	10/18/13	OPERATING SUPPLIES	8.88
PHILLIPSON, VICKIE	10/3/13	REIMBURSEMENT-OFFICE SUPPLIES	53.47
POSITIONING SOLUTIONS COMPANY	1105904	MARKING SUPPLIES	168.00
POSITIONING SOLUTIONS COMPANY	1105905	MARKING SUPPLIES	292.50
POWER LINE SUPPLY, INC	5771383	TESTING GLOVES	163.00
POWER LINE SUPPLY, INC	5771582	350 MCM CABLE	21,540.00
POWER LINE SUPPLY, INC	5771790	LED ROADWAY FIXTURES	800.00
PRECISION DATA PRODUCTS	I0000391561	NETWORK CABLES	23.39
PRECISION DATA PRODUCTS	I0000392450	BATTERY BACKUP	94.62
PRIORITY COMPUTER SERVICES, INC	200914	BACKUP SOFTWARE	785.00
PUBLIC AGENCY TRAINING COUNCIL	11/25/13	FIRE & ARSON FATALITY FIRE SCENE INV-	275.00
QUILL CORPORATION	6289772	OFFICE SUPPLIES	60.27
QUILL CORPORATION	5634684	CREDIT-RETURN MERCHANDISE	(38.40)
REAL PRO SOLUTIONS, LLC	PC1624	BLIGHT CLEANUP-315 W RAILROAD	230.00
REAL PRO SOLUTIONS, LLC	LM2086	CODE MOWING-315 W RAILROAD	29.00
RENFROE, JACK L	10/15/2013	UB refund for account: 05-0657-4	6.26
RIETH-RILEY CONSTRUCTION COMPANY	7169206	ASPHALT	194.86
RIETH-RILEY CONSTRUCTION COMPANY	7169220	ASPHALT	107.49
RODARTE, KAYLA	10/15/2013	UB refund for account: 10-0410-16	123.56

Vendor	Invoice #	Description	Amount
ROHDY'S HEATING & COOLING, LLC	3210	CHANGE OUT COMPRESSOR	728.00
SAMPLEY, JOANN	10/15/2013	UB refund for account: 10-3066-4	24.02
SCHERER, JOE DBA LONELY PI	11/13	11/13 INT PMT ACCT 7508450033	6,174.53
SOUTH BEND UNIFORM	833	UNIFORMS	59.85
SOUTH BEND UNIFORM	832	UNIFORMS	237.40
SOUTHWESTERN MICHIGAN COLLEGE	1113A	FIRE CLASS MATERIALS	120.00
SPRINGHILL SUITES	10/11/13	LODGING CONF#90547-ERICKSON/PHILLIPS	73.14
STATELINE DIESEL SERVICE	W2-2044	#132 LEAF TRAILER MOUNT-TESTING	365.38
THE RIDGE COMPANY	532576	PRIMARY WIRE/FUSE HOLDER	23.53
THE RIDGE COMPANY	532964	#145 AIR/FUEL/OIL FILTERS	56.05
THE RIDGE COMPANY	532965	#107 FUEL/OIL FILTERS	60.65
TIM PITCHER, INC	1515	REPAIR WATER CLOSET-PD	126.25
TIM PITCHER, INC	1523	REPLACE FILL VALVE-PD	14.99
TOURTELLOTTE WELDING	10/2/13	#105 GAUGES	120.00
TYRAKOWSKI, DORA	10/15/2013	UB refund for account: 05-1198-5	50.26
UNEMPLOYMENT INSURANCE AGENCY	0804609	2012 UNEMPLOYMENT COSTS	16,682.46
UNUM LIFE INSURANCE CO OF AMERICA	11/13	LIFE INSURANCE-11/13	1,079.22
WADE, SHANE M	10/15/2013	UB refund for account: 07-1183-13	61.23
WEST SIDE TRACTOR SALES	U12815	#150 SEALING WASHERS	27.75
ZBATTERY.COM, INC	I165063	BATTERIES	27.26
Total:			206,313.22