

ARCADIS

**Appendix C**

Supplemental Groundwater  
Investigation Supporting Information

**Supporting Information: Corrective Measures Supplemental Groundwater Investigation Report, General Motors Corporation, February 2007**

The information included in this appendix presents the investigation summary for the supplemental groundwater investigation conducted in 2006. The information below is an excerpt from Sections 1.3 and 2.3 of the Corrective Measures Supplemental Groundwater Investigation Report for the General Motors Corporation, February 2007. Tables C-1 and C-2 include the supplemental groundwater results from this investigation and Attachment C-1 includes the boring and well construction logs.

has been covered with a parking surface. GM operates a regional haulaway at the location of the former Moraine Engine plant, which is now referred to as the Vehicle Distribution Center.

Since 1981, Moraine Assembly operations included the manufacture, assembly, and painting of small trucks. Currently Chevrolet TrailBlazers, GM Envoy, Buick Rainier, Isuzu Ascender, and SAAB 9-7X's are produced at this facility.

Former Delphi Thermal Moraine's major operations, which began in 1941, included the machining and assembly of automotive air conditioning compressors, accumulator dehydrators, and miscellaneous air conditioning valves. Delphi Corporation leased the property from GM from January 1999 through October 2003. Operations at the former Delphi Thermal Moraine Building 14 ceased in September 2003 and the building was decommissioned. As of October 1, 2003, management of the building has reverted to GM and GM remains the property owner. Demolition of Building 14 was completed in 2005.

### 1.2 Supplemental Investigation Objectives

The initial objectives of the supplemental investigation were to:

- Refine the characterization of groundwater chemistry and flow direction in the vicinity of upper aquifer well GM-16, and
- Refine the characterization of groundwater chemistry and flow direction on the southeastern side of the Former Oil House Area.

Based upon initial results, these objectives were expanded to include:

- Refine the characterization of groundwater chemistry and flow direction in the vicinity of lower aquifer well GM-41, and
- Refine the characterization of groundwater chemistry and flow direction north and south of Holes Creek.

### 1.3 Technical Approach and Investigation Summary

The technical approach to accomplish the supplemental investigation objectives combined rotosonic drilling, field screening for profiling VOC concentrations in

groundwater, groundwater level measurements, well installation, and groundwater sampling. The investigation was organized to address the four specific study areas. Locations of the wells installed in 2006 are shown on Figure 2. The technical approaches and summary of the work completed (Table 1) for each study area are presented below.

### 1.3.1 GM-16 Study Area

As indicated by the data presented in GM's Site-Wide Groundwater Monitoring Report for 2006 (ARCADIS 2007), an increasing trend in trichloroethene (TCE) and tetrachloroethene (PCE) concentrations has been observed in upper aquifer monitoring well GM-16 over the last several years. This well is screened in the lower portion of the upper aquifer and is located downgradient of the site, north of lower aquifer pumping well DN-13 and west of Landfill L1 (Figure 2). Based on this observed trend, GM sampled two existing wells in this area (WSU-22 and WSU-23) and installed three additional upper aquifer monitoring well pairs to refine the characterization of groundwater chemistry and flow direction between the west edge of RZ-3 and GM-16.

Three upper aquifer well pairs (GM-50/-47, GM-51/-48, and GM-52/-49) were installed in the GM-16 study area. During drilling, the borings were continuously sampled for lithologic characterization and vertical upper aquifer sampling was conducted approximately every 10-15 ft. This groundwater sampling data was used to provide an understanding of the VOC concentration profile, was used to determine whether a permanent well should be installed, and was used to determine screen interval of each monitoring well. As shown on Figure 2, well pair GM-50/-47 is located upgradient of GM-16 along Telhurst Street; well pair GM-51/-48 is west of GM-16 and east of the Great Miami River; and well pair GM-52/-49 is southwest of GM-16 and east of the Great Miami River. The well pair screens were set within the upper aquifer at intermediate and deep depths. Wells GM-47 (well screen 49 to 59 feet below land surface [ft bls]), GM-48 (well screen 63 to 73 ft bls) and GM-49 (well screen 67 to 77 ft bls) were installed in February 2006 and wells GM-50 (well screen 30 to 40 ft bls), GM-51 (well screen 34 to 44 ft bls), and GM-52 (well screen 34 to 44 ft bls) were installed in April 2006. The upper aquifer well pairs GM-50/-47, GM-51/-48, GM-52/-49 were sampled in the spring and fall of 2006 and the samples analyzed for the site-specific VOC parameter list.

In March 2006, the existing wells WSU-22 and WSU-23 were sampled and analyzed for the site-specific VOC parameter list. These wells are located along Hoylake Court and south of the closed South Settling Lagoon. Well WSU-20, also located along

Hoylake Court, was originally selected to be sampled for this supplemental investigation but this well was dry; therefore, WSU-23 was used instead. During the summer of 2006, WSU-22 was damaged. GM is working with local municipalities and applicable parties to schedule the abandonment of wells WSU-20 and WSU-22. In November 2006, WSU-23 was resampled.

As a result of PCE and TCE concentrations present in GM-50/-47 and PCE and TCE concentration trends in GM-16, GM concluded that a western component of the VOC plume has not been treated by the existing RZ-3 West barrier. Using this data obtained from the GM-16 study area, an additional reactive zone barrier (RZ-4) was designed and installed in July 2006 to address VOC concentrations present west of RZ-3 West. The RZ-4 West and East locations are shown on Figure 2 of the Site-Wide Groundwater Monitoring Report for 2006. Well pair GM-63/-64 was installed in August/September 2006, respectively, along Hoylake Court to serve as the performance monitoring wells for RZ-4 West. The well pair screens are set at intermediate and deep depths within the upper aquifer. The GM-63 well screen is 30 to 40 ft bls and GM-64 well screen is 50 to 60 ft bls. These wells were sampled in September and December 2006 and the samples analyzed for the site-specific VOC parameter list and the biogeochemical indicator parameter list.

### 1.3.2 Area Southeast of the Former Oil House Area

In order to refine the characterization of groundwater chemistry and flow direction in the Former Oil House Area, GM installed an upper aquifer monitoring well southeast of the eastern edge of RZ-1 and the source area (currently monitored with well GM-23). In particular, this sampling was conducted to assess VOC concentrations side gradient to RZ-1. The location of this new well, GM-46, is shown on Figure 2. This well was installed at the first encountered clay till (upper clay till) and the well screen set 20 to 30 ft bls. The upper clay till is a localized and continuous unit beneath the Former Oil House Area. During drilling, the boring was continuously sampled for lithologic characterization and vertical upper aquifer sampling was conducted at one interval within the upper aquifer above the upper clay till. Well GM-46 was installed in February 2006 and groundwater samples, analyzed for the site-specific VOC parameter list, were collected in March and November 2006. Using these data from GM-46, it was determined that RZ-1 is effectively treating groundwater above the upper clay till in the Former Oil House Area.

### 1.3.3 GM-41 Study Area

As indicated by the data presented in GM's Site-Wide Groundwater Monitoring Report for 2006 (ARCADIS 2007), elevated TCE concentrations have been observed in lower aquifer monitoring well GM-41 when compared to other lower aquifer wells. In order to further refine the characterization of groundwater chemistry and flow direction in the vicinity of well GM-41, the following four areas were evaluated: north of GM-41 in the area where the former return well was suspected to be present (Well A), south of GM-41 in the parking lot along the site boundary (Well B), northwest of GM-41 toward the Former Oil House Area (Well J), and east of GM-41 in the parking lot along the site boundary (Well I).

During drilling, the borings were continuously sampled for lithologic characterization and vertical aquifer sampling in both the upper and lower aquifers was conducted at approximately every 10-15 ft in the upper aquifer and approximately every 10-15 ft in the lower aquifer to a depth of 115 ft to be consistent with the depth of GM-41's well screen. This groundwater sampling data was used to provide an understanding of the VOC concentration profile, to determine whether a permanent well should be installed, and to determine screen interval of the monitoring wells. As discussed in Section 2, based on the profiling data a permanent well was not installed at the location of Well A. Well pair GM-53/-54 was installed at the location of Well B in July 2006. The well pair screens were set within the upper/lower aquifers, respectively. The well screen for GM-53 is 23 to 33 ft bls at the regional clay till and the well screen for GM-54 is 70 to 80 ft bls, beneath the regional clay till in the upper portion of the lower aquifer. Well GM-58 was installed at the location of Well I in September 2006. This well was set beneath the regional clay till, within the upper portion of the lower aquifer, and screened from 72 to 82 ft bls. Well triplet GM-59/-60/-61 was installed at the location of Well J in August 2006. The well triplet screens were set within the shallow upper/deep upper/shallow lower aquifers, respectively. The well screen for GM-59 is 25 to 35 ft bls, the well screen for GM-60 is 42 to 52 ft bls, and the well screen for GM-61 is 70 to 80 ft bls. These wells were sampled in September 2006 and the samples analyzed for the site-specific VOC parameter list. Based on these data, VOC concentrations were detected at a distance southeast of the Former Oil House Area within the upper aquifer (GM-59/-60) and to a lesser extent in the lower aquifer (GM-61). VOC concentrations in the vicinity of GM-41 indicated no impacts in the upper aquifer (profiling data from Well A shallow and Well GM-58 and groundwater data from GM-53) and PCE and TCE detections in the upper portion of the lower aquifer (GM-54 and GM-58).

### 1.3.4 Holes Creek Study Area

As previously discussed, increasing trends in TCE and PCE concentrations have been observed at deep upper aquifer monitoring well GM-16 over the last several years. Based on this observed trend and the data collected from the GM-16 study area wells GM-47 through GM-52, additional characterization of groundwater chemistry and flow direction and the interaction between groundwater and surface water were completed in the vicinity of Holes Creek. The following areas were evaluated: north of the creek (Wells D and E), south of the creek and paired with deep upper aquifer well GM-26 (Well F), and further north of the creek and east of Dryden Road (Well C) (Figure 2). Due to delay of property access agreements, work at proposed Wells G and H was not completed (east of the Great Miami River and near Holes Creek) during the Corrective Measures Supplemental Groundwater Investigation. If access is granted, these borings/wells will be completed.

During drilling, the borings were continuously sampled for lithologic characterization and vertical upper aquifer sampling was conducted approximately every 10-15 ft. This groundwater sampling data was used to provide an understanding of the VOC concentration profile, was used to determine whether a permanent well should be installed, and was used to determine screen interval of the monitoring well. Well pair GM-55/-56 was installed at the location of Wells D and E in July 2006. The well pair screens were set within the intermediate upper and deep upper aquifer, respectively. The well screen for GM-55 is 25 to 35 ft bls and the well screen for GM-56 is 75 to 85 ft bls. The regional clay till was discontinuous at this location. Well GM-57 was installed at the location of Well F in July 2006. This well was set within the shallow portion of the upper aquifer and the well screen for GM-57 is 25 to 35 ft bls. Well GM-62 was installed at the location of Well C in August 2006. This well was set within the upper aquifer and the well screen for GM-62 is 50 to 60 ft bls. The regional clay till was also discontinuous at this location. These wells were sampled in September 2006 and the samples analyzed for the site-specific VOC parameter list. Based on this data, primarily PCE was detected in the wells in the upper aquifer in this study area.

### 1.4 Site Evaluation Methodologies

The following sections describe the methodologies used to evaluate soil and collect groundwater samples during the Supplemental Groundwater Investigation. The well construction details for the wells installed in 2006 are presented in Table 2 and the boring/sampling logs are presented in Appendix A.

groundwater elevations at these well pairs ranged from 703.19 to 704.41 ft above mean sea level (MSL). The measured surface water elevation near the mouth of Holes Creek (stream gauge SG6) was 708.31 ft MSL and further east (stream gauge SG7) was 717.05 ft MSL. Although, the actual surface water elevation in Holes Creek along the cross section was not measured, this data demonstrates that the surface water elevation in Holes Creek and the hydraulic potential within Holes Creek must be higher than the groundwater elevation and hydraulic potential within the upper aquifer; therefore, Holes Creek is a losing stream in the vicinity of the Site.

The local relationship between the Great Miami River and the upper aquifer is shown graphically on Figure 3 cross section D-D'. September 2006 groundwater elevations at well pair GM-51/-48 ranged from 704.54 to 705.09 ft MSL. The measured surface water elevation in the Great Miami River (stream gauges SG1 and SG5) ranged from 708.10 to 708.33 ft MSL. This demonstrates that, along D-D', the surface water elevation in the Great Miami River and the hydraulic potential within the Great Miami River must be higher than the groundwater elevation and hydraulic potential within the upper aquifer. Therefore, the Great Miami River was a losing stream in this portion of the Site. It should be noted that the gradient between the Great Miami River and the upper aquifer becomes smaller in a northern direction and that the Great Miami River in the northern portion of the Site, in the vicinity of the equalization basins, was expected to be a gaining reach during the September 2006 gauging event.

### **2.3 Characterization of Groundwater Chemistry**

Groundwater at the site was evaluated for the presence of the site-specific list of VOCs in the previously defined study areas. Table 4 presents the VOC profiling results and Table 5 presents the VOC groundwater analytical results from the multiple sampling events completed in 2006 for the upper and lower aquifer wells. The 2006 groundwater analytical data is also presented on Figure 6. The groundwater results are presented in this section for each of the study areas (Table 5). The complete set of groundwater results, including QA/QC samples, is presented in Appendix B.

#### **2.3.1 GM-16 Study Area**

As a result of the increasing trend in TCE and PCE concentrations observed in upper aquifer monitoring well GM-16, groundwater quality was assessed upgradient and downgradient of this well. Groundwater results in well pairs GM-50/-47, GM-51/-48, GM-52/-49, and the WSU wells showed concentrations of PCE and TCE consistent with those detected in GM-16. The newly installed well pairs are screened in the

intermediate and deep intervals, while GM-16 is screened in the deep interval of the upper aquifer above the regional clay till. The vertical concentration profiles indicated higher total VOC concentrations are present in the intermediate depth than in the deeper depth of the upper aquifer.

The VOCs detected in the GM-16 study area included PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, 1,1-DCA, and toluene (Table 5). Total VOC concentrations for the sampling results from wells in the GM-16 study area in 2006 are presented below:

- Well WSU-23 is located southwest of the closed South Settling Lagoon at the western end of Hoylake Court. Total VOC concentrations ranged from 9.59 ug/L to 11.01 ug/L.
- Well WSU-22 is located south of the closed South Settling Lagoon on Hoylake Court. Total VOCs in this well were 208.3 ug/L. Well pair GM-63/-64 was installed along Hoylake Court to replace WSU-22 and serve as the performance monitoring wells for RZ-4 West. Total VOC concentrations in the intermediate well GM-63 ranged from 254.3 ug/L to 291.2 ug/L and in the deeper well GM-64 ranged from 132.2 ug/L to 168.2 ug/L.
- Well pair GM-50/-47 is located upgradient to GM-16 on Telhurst Street. Total VOC concentrations in the intermediate well GM-50 ranged from 251.6 ug/L to 311.1 ug/L and in the deeper well GM-47 ranged from 122.8 ug/L to 140.99 ug/L.
- Well GM-16 is located north of Main Street and east of Interstate-75. The total VOC concentration was 157 ug/L in 2006.
- Well pair GM-51/-48 is located north of Main Street, west of Interstate-75, and west of GM-16 along the Great Miami River. Total VOC concentrations in the intermediate well GM-51 ranged from 12.62 ug/L to 12.82 ug/L and in the deeper well GM-48 ranged from 4.38 ug/L to 5.37 ug/L.
- Well pair GM-52/-49 is located south of Main Street, west of Interstate-75, and southwest of GM-16 along the Great Miami River. Total VOC concentrations in the intermediate well GM-52 ranged from 119.69 ug/L to 141.51 ug/L and in the deeper well GM-49 ranged from 22.31 ug/L to 22.83 ug/L.

As a result of PCE and TCE concentrations present in GM-50/-47 and PCE and TCE concentration trends in GM-16, GM concluded that a western component of the VOC

plume has not been treated by the existing RZ-3 West barrier. Using these data obtained from the GM-16 study area, an additional reactive zone barrier (RZ-4) was designed and installed in July 2006 to address these VOC concentrations present west of RZ-3 West. VOC concentrations downgradient of RZ-4, as well as other operational monitoring data, will continue to be evaluated in 2007 as reducing conditions are established and the desired results are achieved.

### 2.3.2 Area Southeast of the Former Oil House Area

As discussed in Section 1.3.2, upper aquifer well GM-46 is located east of and side gradient to RZ-1. The upper clay till is present in this location. Groundwater data from this well has been evaluated to ensure that all impacted groundwater downgradient of the Former Oil House Area, which is the primary source area of VOCs that is being treated by RZ-1. Total VOC concentrations from the 2006 sampling events in GM-46 (Table 5) are much lower than in the Former Oil House Area and ranged from 33.75 ug/L (March 2006) to 9.3 ug/L (November 2006). Based on these results from GM-46, it is concluded that impacted groundwater migrating from the primary source area is treated by RZ-1; the VOC concentrations side gradient to RZ-1 and above the upper clay till are not significant enough to warrant an expansion of RZ-1 to the east. Additional discussion regarding current groundwater concentrations downgradient of the primary source area and performance of RZ-1 are presented in the Site-Wide Groundwater Monitoring Report for 2006.

### 2.3.3 GM-41 Study Area

As a result of the TCE concentrations observed in lower aquifer monitoring well GM-41, groundwater quality in both the upper and lower aquifers was assessed in the vicinity of this well. Groundwater results in proposed Well A and permanent wells GM-53/-54, GM-58, GM-59/-60/-61 showed concentrations of PCE, TCE, cis-1,2-DCE in the upper aquifer (GM-59/-60) and primarily showed concentrations of PCE and TCE in the upper portion of the lower aquifer. The newly installed lower aquifer wells are screened in the upper portion of the lower aquifer, while GM-41 is screened in the intermediate portion of the lower. With the exception of GM-41, the vertical concentration profiles indicated higher total VOC concentrations are present in the intermediate depth than in the deeper depth of the upper aquifer (based on GM-59/-60) and in the shallow portion of the lower aquifer.

- Using profiling data from the upper and lower aquifers at proposed Well A, located north of GM-41, a permanent well was not installed. Total VOC concentrations in

the upper portion of the lower aquifer were less than those observed at GM-41. Profiling data from Well A in the lower aquifer primarily consisted of PCE, TCE, and cis-1,2-DCE, with TCE concentrations increasing with depth (Table 4).

- Well pair GM-53/-54 is located south and slightly east of GM-41 in the Moraine Assembly Paint Building parking lot. VOCs were not detected in GM-53, which is screened above the regional clay till. The total VOC concentration in GM-54 was 183.2 ug/L. GM-54 is screened below the regional clay till in the upper portion of the lower aquifer and primarily contained PCE.
- GM-58 is located east of GM-41 in the Moraine Assembly Paint Building parking lot. Using the profiling data collected from the upper aquifer at this location, a well was not installed. The total VOC concentrations in GM-58 ranged from 6.25 to 85 ug/L (Table 5); however, the higher total VOC concentration (85 ug/L) was consistent with the profiling data (Table 4). GM-58 is screened below the regional clay till in the upper portion of the lower aquifer and primarily contained PCE.
- Well triplet GM-59/-60/-61 is located northwest of GM-41 and between the Former Oil House Area and GM-41 in the Vehicle Distribution Center (formerly Moraine Engine). Total VOC concentrations in the upper aquifer intermediate well GM-59 were 408 ug/L and in the upper aquifer deeper well GM-60 were 1,300 ug/L. The upper clay till that is present beneath the Former Oil House Area is absent at this well triplet location. The total VOC concentration in GM-61 was 61.74 ug/L. GM-61 is screened below the regional clay till in the upper portion of the lower aquifer. These wells primarily contain PCE, TCE, and cis-1,2-DCE.

Based on the data from the GM-41 study area, the upper aquifer beneath the Moraine Assembly Paint Building has not been impacted (profiling data from Well A shallow and Well GM-58 and groundwater data from GM-53). The upper aquifer northwest of GM-41, contains residual concentrations of VOCs as indicated in the monitoring data collected from wells GM-59/-60 and to a lesser extent in the lower aquifer (GM-61). The upper portion (GM-54, GM-58) of the lower aquifer and the intermediate portion (GM-41) of the lower aquifer beneath the Moraine Assembly Paint Building parking lot, contain PCE and TCE. As discussed in Sections 3 and 4, further evaluation is warranted in the GM-41 study area northwest and northeast of GM-41.

#### 2.3.4 Holes Creek Study Area

Groundwater results north and south of Holes Creek were consistent with results observed in the site-wide groundwater monitoring program. Additionally, the presence of PCE was noted in the vertical concentration profiles and in each monitoring well. Concentrations of PCE have been detected in the off-site downgradient well GM-26, which serves as the point of compliance well for the upper aquifer. In the 1999 baseline sampling event no VOCs were detected, while in 2006, PCE (0.91J ug/L) was detected in GM-26. Well GM-57, screened at an intermediate depth, is paired with upper aquifer well GM-26. This well pair is located south of Holes Creek. Groundwater sampling results from GM-57 had detected concentrations of PCE (1.9 ug/L), ethylbenzene (0.21J ug/L), and toluene (0.48J ug/L). Groundwater sampling results from well pair GM-55/-56 located north of Holes Creek had detected concentrations of PCE (7.4 ug/L) at the intermediate interval and (0.57J ug/L) at the deeper interval within the upper aquifer. All other VOCs were nondetect in this well pair. Well GM-62, located northeast of well pairs GM-55/-56 and GM-57/-26, had detected concentrations of PCE (15 ug/L) and toluene (0.24J ug/L).

As discussed in the Site-Wide Groundwater Monitoring Report for 2006, temporally decreasing concentrations in the wells downgradient of the Facilities, but closer to the site than the Holes Creek study area, (GM-6, TW-2, GM-2, GM-17, GM-18, GM-10, and WSU-24) compared to the RFI data (ARCADIS Geraghty & Miller, Inc. 2000a) in comparison with the 1999 baseline conditions are likely attributable to the effects of corrective measures pumping at TW-2 which began in January 1996, pumping at DN-13, the effects of the RZs and on-going natural attenuation of the VOCs.

**Supporting Information: Corrective Measures Proposal, General Motors Corporation,  
August 2008**

The information included in this appendix presents the investigation objectives and summary of the supplemental groundwater investigation conducted in 2007 and early 2008. The information below is an excerpt from Section 3.6 of the Corrective Measures Proposal for the General Motors Corporation, August 2008. Tables C-1 and C-2 include the supplemental groundwater results from this investigation, Attachment C-1 includes the boring and well construction logs, and Attachment C-2 presents the DN-13 transducer study.

### 3.5.3 Waste Pile/Staging Area

The primary component of the WPSA interim measures was removal of the impacted soil identified for excavation to reduce source material for the protection of groundwater. The soil removal and site restoration activities were completed in 2005. The performance objective of the WPSA corrective measures was to remove a sufficient volume of source material for the protection of groundwater based on a set soil volume limit determined by an evaluation of the existing borings. This objective was met by completing soil removal and offsite disposal and soil confirmation sampling. In addition, utilizing the results of the soil confirmation sampling determined that soil excavation has resulted in post-interim measures routine worker and maintenance worker direct contact risks that meet U.S. EPA's acceptable risk levels. Another component of the WPSA corrective measures is the maintenance of a paved cover over the WPSA in conjunction with institutional controls to reduce the potential for direct contact exposure to soil. The institutional controls for the WPSA will be incorporated as part of the final corrective measures, as discussed in Sections 2 and 6. Additional information is presented in the Waste Pile/Staging Area Interim Measures Work Plan (ARCADIS, Inc. 2004b) and Waste Pile/Staging Area Interim Measures Report (ARCADIS, Inc. 2006).

### 3.6 Summary of Supplemental Groundwater Investigation

Based on the results of the site-wide groundwater monitoring program, GM proposed to collect supplemental groundwater data to provide additional information for evaluating the performance of the ongoing corrective measures. This section presents the results of this supplemental data collection which have been used to refine the corrective measures for the Site.

The additional data collection in 2006 focused on the upper aquifer well GM-16 located downgradient of the Site; the southeastern side of the Former Oil House Area; the lower aquifer well GM-41 located south of the Moraine Assembly Paint Building; and the area north and south of Holes Creek. The scope of these supplemental field data collection activities were presented in several work plans that were submitted to the U.S. EPA (BOW Environmental Solutions, Inc. 2005b, 2006a, 2006b). The summary of the supplemental investigations completed in 2006 has been presented in the Corrective Measures Supplemental Groundwater Investigation Report (ARCADIS, Inc. 2007).

Based on the findings from the 2006 supplemental investigations, GM recommended that further investigation be completed to provide additional characterization of groundwater chemistry and flow direction in the vicinity of Holes Creek, south of RZ-1, and in the general area around lower aquifer well GM-41. In addition, GM recommended a detailed water level study in the lower aquifer pumping well DN-13 to further refine the available information on groundwater fluctuations and any potential interconnections between the upper and lower aquifers. On March 16, 2007, GM submitted a work plan to the U.S. EPA (BOW Environmental Solutions, Inc. 2007a) to complete the field work for this phase of the investigation. Boring logs and well construction logs for the supplemental investigation are presented in Appendix B. A summary of the supplemental investigation completed in 2007 and 2008 is presented in Table 1.

In April 2007, well pair GM-65S/D was installed east of the Great Miami River and south of Holes Creek. This well pair was previously identified in the July 2006 work plan as Well G. During drilling, the boring was continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to a total depth of 108 ft below land surface (bls). Till was not observed at this drilling location. Based on the groundwater profiling data, one upper aquifer well and one lower aquifer well were installed (GM-65S and GM-65D); the wells were screened from 42 to 52 ft bls and 85 to 95 ft bls, respectively.

Boring/well GM-66 was installed in April 2007 to monitor the performance of the RZ-1 barrier. GM-66 was installed at approximately the same location of former temporary monitoring well BD14-01, which was installed during the 2004 Building 14 investigation (ARCADIS, Inc. 2005a). During drilling, the boring was continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to a total depth of 57 ft bls. The upper clay till (36-43 ft bls) and the regional clay till (55 ft bls) were encountered during drilling. Based on the groundwater profiling, one upper aquifer well (GM-66) was installed and screened from 45 to 55 ft bls.

To further characterize groundwater chemistry in the vicinity of lower aquifer monitoring well GM-41, five borings (GM-67 through GM-72) and 8 monitoring wells (GM-67S/D, GM-68S/D, GM-69, GM-70, GM-71, and GM-72) were installed in April 2007. Boring GM-67 (wells GM-67S/D) is located between the Former Oil House Area and wells GM-59/-60/-61, boring GM-68 (wells GM-68S/D) is located between well triplet GM-59/-60/-61 and GM-41, boring/well GM-69 is located southwest of GM-41, boring/well GM-70 is located northeast of GM-41, and boring GM-71/72 (wells GM-71/72) is

located north of GM-41. During drilling, the borings were continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to total depth of the borings. Based on the groundwater profiling, upper aquifer wells GM-67S (well screen 44 to 54 ft bls), GM-68S (well screen 39.5 to 49.5 ft bls), GM-71 (well screen 21 to 31 ft bls), GM-72 (well screen 52 to 62 ft bls) and lower aquifer wells GM-68D (well screen 64 to 74 ft bls), GM-69 (well screen 90 to 100 ft bls), GM-70 (well screen 72 to 82 ft bls) were installed. All of the wells installed in April 2007 were sampled in May 2007 for the site-specific VOC parameter list.

As part of the supplemental groundwater investigation a detailed water level study was completed for pumping well DN-13 in March and April 2007 for a period of 42 days. The results and findings from this study are presented in Appendix C. Transducer data was obtained in the area of lower aquifer capture well DN-13 for refinement of the understanding of groundwater flow downgradient of the site and documentation of responses to specific stresses on the aquifer. Data collected and analyzed for the transducer study has improved the understanding of groundwater flow downgradient of the Site. The transducer study findings are presented below:

- All wells show a similar rapid effect to barometric changes and high barometric efficiency;
- Fluctuations in the well used for determination of background conditions, lower aquifer well GM-41, correlate to the effect of production and fire well pumping. Water levels in the background upper aquifer well GM-53 do not show these responses and are not affected by pumping in the lower aquifer for the duration of this study;
- The Great Miami River adjacent to and downgradient of the site, is primarily a losing river. During low river stages, portions of this section of the river can become a gaining reach. There appears to be some degree of hydraulic separation between the River and the upper aquifer groundwater such that groundwater can flow under the River even in situations when the River level is above or below the upper aquifer groundwater level; and
- The DN-13 pumping effects are maintaining capture in the lower aquifer, but response to pumping influences were not observed in the upper aquifer over the 42 day period of this study.

In June 2007, GM submitted a work plan to the U.S. EPA (BOW Environmental Solutions, Inc. 2007b) to provide additional information to refine the current understanding of geology and provide additional characterization of groundwater chemistry in the upper and lower aquifer in the central portion of the Vehicle Distribution Center (formerly Moraine Engine Plant), the Moraine Assembly Plant, and along the eastern site boundary near the Moraine Assembly Paint Building Parking Lot.

In October 2007 lower aquifer boring/well GM-73 was installed beneath the regional clay till (67 ft bls) to a total depth of 120 ft bls. Monitoring well GM-73 was installed adjacent to upper aquifer well pair GM-71/72. During drilling, the boring was continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft. Based on the groundwater profiling data the screen for GM-73 was installed from 85 to 95 ft bls. GM-73 was sampled in October 2007 for the site-specific VOC parameter list.

Three borings (GM-74 through GM-76) and six monitoring wells (GM-74S/D, GM-75S/D, and GM-76S/D) were installed in July and September 2007. Boring GM-74 (wells GM-74S/D) is located between GM-68S/D and Springboro Pike, boring GM-75 (wells GM-75S/D) is located southwest of the Moraine Assembly Plant, and boring GM-76 (wells GM-76S/D) is located in the southern portion of the Moraine Assembly Plant. During drilling, the borings were continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to the total depth of the borings. Based on the groundwater profiling, upper aquifer wells GM-74S (well screen 40 to 50 ft bls), GM-75S (well screen 42 to 52 ft bls), GM-76S (well screen 27 to 37 ft bls) and lower aquifer wells GM-74D (well screen 69 to 79 ft bls), GM-75D (well screen 85 to 95 ft bls), and GM-76D (well screen 70 to 80 ft bls) were installed. All of the wells installed were sampled in September 2007 for the site-specific VOC parameter list.

Boring GM-77 (wells GM-77S/D) was installed east of lower aquifer well GM-58 and west of Northbound Kettering Boulevard. Boring GM-77 was installed to a total depth of 100 ft bls and was continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to the total depth of the boring. Based on the groundwater profiling data the screen for upper aquifer monitoring well GM-77S was set from 33 to 43 ft bls and lower aquifer monitoring well GM-77D was set from 75 to 85 ft bls. GM-77S and GM-77D were sampled in September 2007 for the site-specific VOC parameter list.

In October and November 2007 and January 2008, GM submitted work plans to the U.S. EPA (BOW Environmental Solutions, Inc. 2007c, 2007d, and 2008a) to provide additional information to refine the current understanding of the geology and hydrogeology and to provide additional characterization of groundwater chemistry in the upper and lower aquifer. The primary focus of this phase of the supplemental investigation was to assess off-site groundwater quality downgradient and cross-gradient of the Site.

Boring/well GM-78 was installed east of Dryden Road, south of the Site, and east of GM-62. GM-78 was drilled to a total depth of 70 ft bls and was continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to the total depth of the boring. Till was not present at GM-78. Based on the groundwater profiling data, GM-78 was set in the upper aquifer from 40 to 50 ft bls. Borings GM-79 and GM-81 were installed west of the Great Miami River and downgradient of well pairs GM-48/51 and GM-49/52. Boring GM-79 was drilled to a total depth of 59 ft bls and boring GM-81 was drilled to a total depth of 90 ft bls. The regional clay till was present at GM-79 at 54 ft bls and was thin at GM-81. During drilling, the borings were continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to the total depth of the borings. Based on the groundwater profiling, upper aquifer well GM-79 (well screen 45 to 55 ft bls) and upper aquifer well pair GM-80 (well screen 15 to 25 ft bls) and GM-81 (well screen 50 to 60 ft bls) were installed. Wells GM-78, GM-79, GM-80, and GM-81 were sampled in October 2007 for the site-specific VOC parameter list.

In January and February 2008, three borings (GM-82, GM-83, and GM-84) and four wells (GM-82, GM-83S, GM-83D, and GM-84) were installed. Boring/well GM-82 was installed to provide additional characterization of groundwater chemistry downgradient of well GM-68D. Boring/wells GM-83 and GM-84 were installed to provide additional understanding of hydrogeology and provide additional characterization of groundwater chemistry to the west and east (cross-gradient) of the Site, respectively.

Boring GM-82 was drilled to a total depth of 120 ft bls and was continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to the total depth of the boring. Based on the groundwater profiling data, the screen for lower aquifer monitoring well GM-82 was set from 85 to 95 ft bls. Boring GM-83 was installed west of the Site, west of Dryden Road and south of East River Road. Boring GM-84 was installed east of the Site, south of well pair GM-77S/D on Blanchard Avenue. Borings

GM-83 and GM-84 were drilled to a total depth of 120 ft bls and were continuously sampled for lithologic characterization and vertical aquifer sampling was conducted approximately every 10-15 ft after groundwater was encountered to the total depth of the boring. Based on the groundwater profiling data the screen for upper aquifer monitoring well GM-83S (well screen 44 to 54 ft bls) and lower aquifer monitoring wells GM-83D (well screen 110-120 ft bls) and GM-84 (well screen 96.5 to 106.5 ft bls) were installed. Wells GM-82, GM-83S, GM-83D, and GM-84 were sampled in February 2008 for the site-specific VOC parameter list.

In addition to the sampling of the newly installed wells, existing wells GM-26, GM-57, GM-65S, GM-65D, GM-78, HR-7, and HR-16 were sampled in January and February 2008 for the site-specific VOC parameter list to confirm prior sampling downgradient and cross-gradient of the Site.

Analytical data for all the supplemental investigation work is presented on Table 4 (groundwater profiling results) and Table 5 (groundwater analytical results). The boring and well construction logs for all of the borings/wells completed as part of the supplemental investigation are included in Appendix B and well construction details summarized in Table 6.

### **3.7 Summary of Investigation Findings and Facility Risks**

Data collected as part of the RFIs and supplemental investigations were evaluated to determine if the detected concentrations of hazardous constituents pose a potentially significant risk to human health or the environment under current and/or reasonably likely land use and groundwater use at and surrounding the facilities. As summarized below, these risk assessments were conducted as part of the RFI, Supplemental RFI, the Box Sewer Investigation, the WPSA Investigation, and the Building 14 Investigation. Additional information on these risk assessments is provided in Appendix G. More detailed discussions are presented in the final RFI Reports (Volume I [ARCADIS Geraghty & Miller, Inc. 2000a and b] and Volume II [ENVIRON Corporation, 2000a and b]), Box Sewer Investigation Summary Report (ARCADIS, Inc. 2002a), Waste Pile/Staging Area Investigation Summary Report (ARCADIS, Inc. 2004a), Waste Pile/Staging Area Interim Measures Report (ARCADIS, Inc. 2006), Former Building 14 Investigation Summary Report (ARCADIS, Inc. 2005a), and the supplemental groundwater investigation conducted in 2006, 2007, and early 2008.

Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-46	GM-47			GM-48		
		20-25 ft 2/25/2006 Upper Aquifer	25-30 ft 2/23/2006 Upper Aquifer	40-45 ft 2/24/2006 Upper Aquifer	55-60 ft 2/24/2006 Upper Aquifer	27-32 ft 2/22/2006 Upper Aquifer	42-47 ft 2/22/2006 Upper Aquifer	65-70 ft 2/23/2006 Upper Aquifer
<b><u>Volatile Organic Compound</u></b>								
1,1,1-Trichloroethane	ug/L	< 1 U	3.1	3.2	2.7	0.48 J	0.87 J	0.94 J
1,1-Dichloroethane	ug/L	8.2	1.6	1.6	1.9	< 1 U	< 1 U	0.92 J
1,1-Dichloroethene	ug/L	0.54 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	11.8	4.6	5.7	9.8	< 1 U	< 1 U	0.86 J
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	2.4	135	143	69	7.2	1.7	< 1 U
Toluene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	0.41 J	1.3	< 1 U
trans-1,2-Dichloroethene	ug/L	0.83 J	1.4	1.4	2.1	< 1 U	< 1 U	< 1 U
Trichloroethene	ug/L	41.9	110	112	49.8	5.2	9.9	2.7
Vinyl chloride	ug/L	5.6	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 2 U	0.73 J	0.69 J	< 2 U	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-49			Boring A			
		24-29 ft	44-49 ft	70-75 ft	30-35 ft	70-75 ft	80-85 ft	95-100 ft
		2/24/2006	2/25/2006	2/25/2006	7/11/2006	7/26/2006	7/26/2006	7/26/2006
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<b><u>Volatile Organic Compound</u></b>								
1,1,1-Trichloroethane	ug/L	2	2.2	2	7.4	< 1 U	0.51 J	< 5.7 U
1,1-Dichloroethane	ug/L	1	1.9	1.8	< 1 U	< 1 U	< 1.7 U	< 5.7 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	0.28 J	< 1 U	< 1.7 U	< 5.7 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1.7 U	< 5.7 U
cis-1,2-Dichloroethene	ug/L	2.4	3	3	< 1 U	0.39 J	1.2 J	7.8
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1.7 U	< 5.7 U
Tetrachloroethene	ug/L	51.5	33.8	3.2	0.22 J	23	9.4	4.4 J
Toluene	ug/L	< 1 U	< 1 U	< 1.2 U	< 1 U	0.2 J	< 1.7 U	< 5.7 U
trans-1,2-Dichloroethene	ug/L	0.68 J	0.59 J	< 1 U	< 1 U	< 1 U	< 1.7 U	< 5.7 U
Trichloroethene	ug/L	50.6	35.1	6.4	< 1 U	11	55	190
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1.7 U	< 5.7 U
Xylene (total)	ug/L	< 2 U	0.6 J	0.65 J	< 2 U	< 2 U	< 3.3 U	< 11 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-53/GM-54				
		25-30 ft 7/25/2006 Upper Aquifer	70-75 ft 7/12/2006 Lower Aquifer	80-85 ft 7/12/2006 Lower Aquifer	95-100 ft 7/12/2006 Lower Aquifer	110-115 ft 7/12/2006 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	< 1 U	< 5 U	0.96 J	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	2.1 J	0.27 J	1.1	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 5 U	< 1 U	0.35 J	< 1 U
Benzene	ug/L	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 1 U	1.9 J	< 1 U	6.2	3.9
Ethylbenzene	ug/L	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	< 1 U	150	3	1	0.95 J
Toluene	ug/L	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/L	< 1 U	< 5 U	< 1 U	0.37 J	0.55 J
Trichloroethene	ug/L	< 1 U	5.5	16	0.42 J	0.33 J
Vinyl chloride	ug/L	< 1 U	< 5 U	< 1 U	0.49 J	0.23 J
Xylene (total)	ug/L	< 2 U	< 10 U	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-62			GM-55/GM-56		
		30-35 ft	40-45 ft	60-65 ft	25-30 ft	35-40 ft	55-60 ft
		8/29/2006	8/30/2006	8/30/2006	7/12/2006	7/12/2006	7/13/2006
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
<b><u>Volatile Organic Compound</u></b>							
1,1,1-Trichloroethane	ug/L	< 1 U	< 1 U	0.22 J	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	7.3	8.4	4.6	8.6	6.9	6.7
Toluene	ug/L	0.35 J	< 1 U	0.22 J	< 1 U	< 1 U	0.17 J
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	ug/L	< 1 U	< 1 U	2.1	< 1 U	< 1 U	< 1 U
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-57		GM-58			
		25-30 ft 7/13/2006	40-45 ft 7/13/2006	25-30 ft 8/22/2006	75-80 ft 8/22/2006	95-100 ft 8/22/2006	110-115 ft 8/22/2006
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<b><u>Volatile Organic Compound</u></b>							
1,1,1-Trichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 3.3 U	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 3.3 U	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 3.3 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 3.3 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 3.3 U	2.4	3.5
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 3.3 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	1.4	1.6	< 1 U	99	0.69 J	0.26 J
Toluene	ug/L	0.19 J	0.2 J	0.38 J	< 3.3 U	0.27 J	0.34 J
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 3.3 U	< 1 U	0.22 J
Trichloroethene	ug/L	< 1 U	< 1 U	< 1 U	1.3 J	0.91 J	< 1 U
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 3.3 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U	< 2 U	< 6.7 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-59/GM-60/GM-61				
		30-35 ft	47-52 ft	70-75 ft	90-95 ft	110-115 ft
		8/23/2006 Upper Aquifer	8/23/2006 Upper Aquifer	8/23/2006 Lower Aquifer	8/24/2006 Lower Aquifer	8/24/2006 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	< 15 U	< 25 U	0.84 J	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 15 U	< 25 U	2.6	1.5	0.42 J
1,1-Dichloroethene	ug/L	< 15 U	< 25 U	< 1.7 U	0.69 J	< 1 U
Benzene	ug/L	< 15 U	< 25 U	< 1.7 U	0.24 J	0.22 J
cis-1,2-Dichloroethene	ug/L	5.8 J	95	2.9	37	7
Ethylbenzene	ug/L	< 15 U	< 25 U	< 1.7 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	400	720	41	1.1	1.2
Toluene	ug/L	< 15 U	< 25 U	< 1.7 U	0.17 J	0.35 J
trans-1,2-Dichloroethene	ug/L	< 15 U	< 25 U	< 1.7 U	1.6	0.21 J
Trichloroethene	ug/L	72	380	56	5.8	6.2
Vinyl chloride	ug/L	< 15 U	< 25 U	< 1.7 U	< 1 U	1.7
Xylene (total)	ug/L	< 31 U	< 50 U	< 3.3 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-65					GM-66	
		25-30 ft	45-50 ft	72-77 ft <sup>(1)</sup>	87-92 ft <sup>(1)</sup>	102-107 ft <sup>(1)</sup>	30-35 ft <sup>(2)</sup>	50-55 ft
		4/10/2007	4/10/2007	4/10/2007	4/13/2007	4/13/2007	4/6/2007	4/6/2007
		Upper Aquifer	Upper Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Upper Aquifer	Upper Aquifer
<b><u>Volatile Organic Compound</u></b>								
1,1,1-Trichloroethane	ug/L	< 1 U	0.68 J	3	0.59 J	3	0.75 J	< 2.5 U
1,1-Dichloroethane	ug/L	0.3 J	1.2	0.59 J	1.6	0.53 J	1.3 J	8.3
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	0.2 J	< 1.7 U	< 2.5 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1.7 U	< 2.5 U
cis-1,2-Dichloroethene	ug/L	0.67 J	2.3	0.53 J	1.7	0.52 J	1.1 J	83
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1.7 U	< 2.5 U
Tetrachloroethene	ug/L	3.9	15	2.1	1.3	0.92 J	9.2	1.6 J
Toluene	ug/L	0.45 J	< 1 U	< 1 U	< 1 U	< 1 U	0.36 J	< 2.5 U
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	0.26 J	< 1 U	0.62 J	3.5
Trichloroethene	ug/L	2.7	9.4	11	1.9	1.5	57	34
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1.7 U	2.8
Xylene (total)	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3.3 U	< 5 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-67				
		22.5-27.5 ft <sup>(2)</sup>	46-51 ft	70-75 ft	90-95 ft	115-120 ft
		3/27/2007 Upper Aquifer	3/28/2007 Upper Aquifer	3/28/2007 Lower Aquifer	3/28/2007 Lower Aquifer	3/29/2007 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	< 2 U	< 6.7 U	0.54 J	< 2.5 U	< 1 U
1,1-Dichloroethane	ug/L	< 2 U	2.5 J	3.1	4.9	< 1 U
1,1-Dichloroethene	ug/L	< 2 U	< 6.7 U	< 2.5 U	1.1 J	< 1 U
Benzene	ug/L	< 2 U	< 6.7 U	< 2.5 U	< 2.5 U	< 1 U
cis-1,2-Dichloroethene	ug/L	15	7.7	24	74	2
Ethylbenzene	ug/L	< 2 U	< 6.7 U	< 2.5 U	< 2.5 U	< 1 U
Tetrachloroethene	ug/L	54	< 6.7 U	64	0.8 J	< 1 U
Toluene	ug/L	0.56 J	< 6.7 U	< 2.5 U	< 2.5 U	< 1 U
trans-1,2-Dichloroethene	ug/L	0.34 J	< 6.7 U	1.2 J	1.9 J	< 1 U
Trichloroethene	ug/L	17	170	44	33	< 1 U
Vinyl chloride	ug/L	1.7 J	< 6.7 U	< 2.5 U	< 2.5 U	1.1
Xylene (total)	ug/L	< 4 U	< 13 U	< 5 U	< 5 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-68					
		22-27 ft <sup>(2)</sup>	44.5-49.5 ft	65-70 ft	85-90 ft	115-120 ft	135-140 ft
		4/2/2007	4/3/2007	4/3/2007	4/3/2007	4/7/2007	4/11/2007
		Upper Aquifer	Upper Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<b><u>Volatile Organic Compound</u></b>							
1,1,1-Trichloroethane	ug/L	< 1.7 U	0.74 J	< 67 U	3.3 J	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1.7 U	< 2.5 U	< 67 U	4.4 J	0.42 J	1
1,1-Dichloroethene	ug/L	< 1.7 U	< 2.5 U	< 67 U	< 13 U	< 1 U	0.26 J
Benzene	ug/L	< 1.7 U	< 2.5 U	< 67 U	< 13 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	2.5	< 2.5 U	< 67 U	21	7.3	12
Ethylbenzene	ug/L	< 1.7 U	< 2.5 U	< 67 U	< 13 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	54	40	2000	33	7.5	1.8
Toluene	ug/L	< 1.7 U	< 2.5 U	< 67 U	< 13 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/L	< 1.7 U	< 2.5 U	< 67 U	< 13 U	0.22 J	0.53 J
Trichloroethene	ug/L	21	89	930	410	4.4	29
Vinyl chloride	ug/L	< 1.7 U	< 2.5 U	< 67 U	< 13 U	1.5	2.3
Xylene (total)	ug/L	< 3.3 U	< 5 U	< 130 U	< 27 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-69				
		30-35 ft 3/29/2007 Upper Aquifer	57-62 ft 3/29/2007 Upper Aquifer	72-77 ft 3/30/2007 Lower Aquifer	92-97 ft 3/30/2007 Lower Aquifer	115-120 ft 3/30/2007 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	4.5	< 1 U	0.27 J	2.4 J	< 4 U
1,1-Dichloroethane	ug/L	0.73 J	1.3	0.28 J	3 J	3.2 J
1,1-Dichloroethene	ug/L	0.27 J	< 1 U	< 1 U	< 6.7 U	< 4 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 6.7 U	< 4 U
cis-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	0.24 J	14	44
Ethylbenzene	ug/L	< 1 U	0.24 J	< 1 U	< 6.7 U	< 4 U
Tetrachloroethene	ug/L	0.6 J	0.38 J	15	23	0.78 J
Toluene	ug/L	< 1 U	0.85 J	< 1 U	< 6.7 U	< 4 U
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 6.7 U	3.4 J
Trichloroethene	ug/L	1.7	0.39 J	12	210	130
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 6.7 U	< 4 U
Xylene (total)	ug/L	< 2 U	0.52 J	< 2 U	< 13 U	< 8 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-70			
		40-45 ft 4/5/2007 Upper Aquifer	73-78 ft 4/5/2007 Lower Aquifer	93-98 ft 4/5/2007 Lower Aquifer	112-117 ft 4/5/2007 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>					
1,1,1-Trichloroethane	ug/L	0.21 J	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	1	2.3
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	4.5	15	2	1.7
Toluene	ug/L	< 1 U	0.19 J	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	ug/L	0.56 J	0.45 J	7.1	1.2
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-71	GM-72		GM-73		
		26-31 ft <sup>(2)</sup> 4/17/2007 Upper Aquifer	42-47 ft 4/24/2007 Upper Aquifer	57-62 ft 4/24/2007 Upper Aquifer	70-75 ft 10/9/2007 Lower Aquifer	95-100 ft 10/9/2007 Lower Aquifer	115-120 ft 10/9/2007 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>							
1,1,1-Trichloroethane	ug/L	< 3.3 U	< 2 U	< 3.3 U	< 2.5 U	0.37 J	< 1 U
1,1-Dichloroethane	ug/L	< 3.3 U	< 2 U	< 3.3 U	< 2.5 U	< 1.7 U	0.24 J
1,1-Dichloroethene	ug/L	< 3.3 U	< 2 U	< 3.3 U	< 2.5 U	< 1.7 U	< 1 U
Benzene	ug/L	< 3.3 U	< 2 U	3.6	< 2.5 U	< 1.7 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 3.3 U	< 2 U	< 3.3 U	< 2.5 U	4.1	5.7
Ethylbenzene	ug/L	< 3.3 U	< 2 U	< 3.3 U	< 2.5 U	< 1.7 U	< 1 U
Tetrachloroethene	ug/L	88	61	80	60	5.2	1.2
Toluene	ug/L	< 3.3 U	0.47 J	0.87 J	< 2.5 U	< 1.7 U	< 1 U
trans-1,2-Dichloroethene	ug/L	< 3.3 U	< 2 U	< 3.3 U	< 2.5 U	< 1.7 U	< 1 U
Trichloroethene	ug/L	2.1 J	12	12	14	48	15
Vinyl chloride	ug/L	< 3.3 U	< 2 U	< 3.3 U	< 2.5 U	0.42 J	0.59 J
Xylene (total)	ug/L	< 6.7 U	< 4 U	< 6.7 U	< 5 U	< 3.3 U	< 2.0 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-74				
		26-31 ft <sup>(2)</sup>	45-50 ft	67-72 ft	90-95 ft	115-120 ft
		8/29/2007 Upper Aquifer	9/17/2007 Upper Aquifer	9/19/2007 Lower Aquifer	9/19/2007 Lower Aquifer	9/19/2007 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	< 2 UJ	< 3.3 U	< 14 U	< 2.5 U	< 1 U
1,1-Dichloroethane	ug/L	< 2 UJ	< 3.3 U	< 14 U	< 2.5 U	0.25 J
1,1-Dichloroethene	ug/L	< 2 UJ	< 3.3 U	< 14 U	< 2.5 U	< 1 U
Benzene	ug/L	1 J	< 3.3 U	< 14 U	< 2.5 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 2 UJ	< 3.3 U	< 14 U	4.9	3
Ethylbenzene	ug/L	0.53 J	< 3.3 U	< 14 U	< 2.5 U	0.21 J
Tetrachloroethene	ug/L	81 J	66	390	21	6.1
Toluene	ug/L	2.6 J	0.64 J	< 14 U	< 2.5 U	0.59 J
trans-1,2-Dichloroethene	ug/L	< 2 UJ	< 3.3 U	< 14 U	< 2.5 U	< 1 U
Trichloroethene	ug/L	39 J	32	110	70	7.4
Vinyl chloride	ug/L	< 2 UJ	< 3.3 U	< 14 U	< 2.5 U	1.3
Xylene (total)	ug/L	2.4 J	< 6.7 U	< 29 U	< 5 U	0.57 J

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-75					
		35-40 ft	47-52 ft	56-61 ft	70-75 ft	90-95 ft	115-120 ft
		8/29/2007 Upper Aquifer	9/13/2007 Upper Aquifer	9/14/2007 Upper Aquifer	9/14/2007 Lower Aquifer	9/14/2007 Lower Aquifer	9/14/2007 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>							
1,1,1-Trichloroethane	ug/L	< 4 U	< 20 U	< 2.5 U	< 2.9 U	< 9.1 U	< 2 U
1,1-Dichloroethane	ug/L	< 4 U	< 20 U	3.7	< 2.9 U	< 9.1 U	3.5
1,1-Dichloroethene	ug/L	< 4 U	< 20 U	< 2.5 U	< 2.9 U	< 9.1 U	< 2 U
Benzene	ug/L	< 4 U	< 20 U	< 2.5 U	< 2.9 U	< 9.1 U	< 2 U
cis-1,2-Dichloroethene	ug/L	1.2 J	< 20 U	4.2	< 2.9 U	5.1 J	8
Ethylbenzene	ug/L	< 4 U	< 20 U	< 2.5 U	< 2.9 U	< 9.1 U	< 2 U
Tetrachloroethene	ug/L	240	600	< 2.5 U	6.4	300	9.5
Toluene	ug/L	0.92 J	< 20 U	0.46 J	0.51 J	< 9.1 U	< 2 U
trans-1,2-Dichloroethene	ug/L	< 4 U	< 20 U	0.56 J	< 2.9 U	< 9.1 U	0.39 J
Trichloroethene	ug/L	23	630	72	81	160	41
Vinyl chloride	ug/L	< 4 U	< 20 U	< 2.5 U	< 2.9 U	< 9.1 U	0.7 J
Xylene (total)	ug/L	2.1 J	< 40 U	< 5 U	< 5.7 U	< 18 U	< 4 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-76				
		32-36 ft <sup>(2)</sup>	48-52 ft	70-74 ft	88-92 ft	116-120 ft
		7/6/2007 Upper Aquifer	7/6/2007 Upper Aquifer	7/9/2007 Lower Aquifer	7/9/2007 Lower Aquifer	7/9/2007 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U	0.28 J	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	0.33 J	< 1 U	0.48 J
cis-1,2-Dichloroethene	ug/L	< 1 U	8.7	< 1 U	2.8	< 1 U
Ethylbenzene	ug/L	< 1 U	< 1 U	0.32 J	< 1 U	< 1 U
Tetrachloroethene	ug/L	1.4	0.51 J	0.76 J	< 1 U	< 1 U
Toluene	ug/L	0.22 J	0.28 J	1.7	0.43 J	1.2
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	ug/L	2.2	6.2	2.7	< 1 U	0.38 J
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	0.23 J	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U	0.73 J	< 2 U	0.53 J

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-77			GM-78		
		35-40 ft	75-80 ft	90-95 ft	20-25 ft	40-45 ft <sup>(1)</sup>	65-70 ft <sup>(1)</sup>
		9/6/2007	9/6/2007	9/7/2007	10/16/2007	10/16/2007	10/16/2007
		Upper Aquifer	Lower Aquifer	Lower Aquifer	Upper Aquifer	Upper Aquifer	Lower Aquifer
<b><u>Volatile Organic Compound</u></b>							
1,1,1-Trichloroethane	ug/L	< 1 U	< 1.7 U	< 1 UJ	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1.7 U	< 1 UJ	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1.7 U	< 1 UJ	< 1 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1.7 U	< 1 UJ	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	0.24 J	< 1.7 U	0.33 J	< 1 U	< 1 U	< 1 U
Ethylbenzene	ug/L	< 1 U	< 1.7 U	< 1 UJ	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	< 1 U	43	2.6 J	6.2	9.0	0.37 J
Toluene	ug/L	0.43 J	0.64 J	< 1 UJ	0.69 J	0.61 J	0.48 J
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1.7 U	< 1 UJ	< 1 U	< 1 U	< 1 U
Trichloroethene	ug/L	< 1 U	< 1.7 U	< 1 UJ	< 1 U	< 1 U	1.6
Vinyl chloride	ug/L	< 1 U	< 1.7 U	< 1 UJ	< 1 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 2 U	< 3.3 U	< 2 UJ	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-79			GM-80/GM-81			
		16-21 ft	35-50 ft	50-55 ft	15-20 ft	35-40 ft	55-60 ft	85-90 ft
		10/15/2007	10/15/2007	10/15/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Lower Aquifer
<b><u>Volatile Organic Compound</u></b>								
1,1,1-Trichloroethane	ug/L	< 1 U	0.34 J	0.48 J	< 1 U	0.23 J	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U	0.33 J	0.28 J	0.85 J	0.85 J	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	1.2	1.3	0.71 J	0.39 J
Ethylbenzene	ug/L	0.36 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	0.38 J	0.39 J	0.32 J	0.79 J	< 1 U	< 1 U	< 1 U
Toluene	ug/L	1.2	< 1 U	0.20 J	0.39 J	0.20 J	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	ug/L	< 1 U	0.95 J	1.1	3.0	0.86 J	0.30 J	< 1 U
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Xylene (total)	ug/L	0.69 J	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-82				
		27-32 ft <sup>(2)</sup> 1/29/2008 Upper Aquifer	49-54 ft 2/15/2008 Upper Aquifer	67-72 ft 2/19/2008 Lower Aquifer	85-90 ft 2/19/2008 Lower Aquifer	115-120 ft 2/19/2008 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	0.63 J	12	0.44 J	< 11 U	< 1 U
1,1-Dichloroethane	ug/L	4.9	20	1.2 J	< 11 U	0.28 J
1,1-Dichloroethene	ug/L	0.3 J	0.33 J	< 2 U	< 11 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	< 2 U	< 11 U	< 1 U
cis-1,2-Dichloroethene	ug/L	6.7	2.2	1.9 J	4.6 J	15
Ethylbenzene	ug/L	< 1 U	< 1 U	< 2 U	< 11 U	< 1 U
Tetrachloroethene	ug/L	0.45 J	0.32 J	23	370	5.2
Toluene	ug/L	0.21 J	0.48 J	0.45 J	< 11 U	0.39 J
trans-1,2-Dichloroethene	ug/L	0.24 J	< 1 U	< 2 U	< 11 U	0.36 J
Trichloroethene	ug/L	0.67 J	0.49 J	55	270	4.1
Vinyl chloride	ug/L	16	6.8	< 2 U	< 11 U	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U	< 4 U	< 22 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-83				
		25-30 ft	49-54 ft	68-73 ft	90-95 ft	114-119 ft
		2/7/2008 Upper Aquifer	2/7/2008 Upper Aquifer	2/8/2008 Lower Aquifer	2/8/2008 Lower Aquifer	2/11/2008 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene	ug/L	0.27 J	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 1 U	1.7	< 1 U	1.7	< 1 U
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Toluene	ug/L	0.59 J	0.3 J	< 1 U	0.18 J	< 1 U
trans-1,2-Dichloroethene	ug/L	< 1 U	0.19 J	< 1 U	< 1 U	< 1 U
Trichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	0.4 J	1.2
Xylene (total)	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

**Table C-1. Groundwater Profiling Results for the 2006 to 2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-84				
		32-37 ft	52-57 ft	68-73 ft	95-100 ft	115-120 ft
		2/1/2008 Upper Aquifer	2/4/2008 Upper Aquifer	2/4/2008 Upper Aquifer	2/5/2008 Lower Aquifer	2/5/2008 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>						
1,1,1-Trichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	1.4	2.1	2.4	< 1 U	< 1 U
Toluene	ug/L	0.42 J	< 1 U	0.51 J	0.36 J	0.49 J
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	ug/L	0.8 J	7	7.1	5.3	3
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown

ft - Feet.

<sup>(1)</sup> Regional Clay Till is not present.

<sup>(2)</sup> Upper Clay Till is present.

Table C-2. Groundwater Analytical Results for the 2006-2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-41	GM-46		GM-47			GM-48	
		5/3/2007 Lower Aquifer	3/2/2006 Upper Aquifer	11/30/2006 Upper Aquifer	3/1/2006 Upper Aquifer	9/19/2006 Upper Aquifer	11/30/2006 Upper Aquifer	3/1/2006 Upper Aquifer	11/30/2006 Upper Aquifer
<b>Volatile Organic Compound</b>									
1,1,1-Trichloroethane	ug/L	< 6.7 U	< 1 U	< 1 U	2.2	2.2	1.9 J	0.62 J	0.97 J
1,1-Dichloroethane	ug/L	< 6.7 U	2.7	0.43 J	1.8	1.7 J	1.7 J	0.71 J	0.72 J
1,1-Dichloroethene	ug/L	< 6.7 U	< 1 U	< 1 U	< 1 U	< 2 U	< 2 U	< 1 U	< 1 U
Benzene	ug/L	< 6.7 U	< 1 U	< 1 U	< 1 U	< 2 U	< 2 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	15	6.8	5.2	7.2	9.5	8.9	0.7 J	0.83 J
Ethylbenzene	ug/L	< 6.7 U	< 1 U	< 1 U	< 1 U	< 2 U	< 2 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	< 6.7 U	< 1 U	0.67 J	78	64	69	< 1 U	0.26 J
Toluene	ug/L	< 6.7 U	< 1 U	< 1 U	0.29 J	< 2 U	< 2 U	0.25 J	< 1 U
trans-1,2-Dichloroethene	ug/L	< 6.7 U	0.35 J	< 1 U	1.5	1.4 J	1.4 J	< 1 U	0.19 J
Trichloroethene	ug/L	170	22	1.5	50	44	51	2.1	2.4
Vinyl chloride	ug/L	2.4 J	1.9	1.5	< 1 U	< 2 U	< 2 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 13 U	< 2 U	< 2 U	< 2 U	< 4 U	< 4 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.

Table C-2. Groundwater Analytical Results for the 2006-2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-49		WSU-22	WSU-23		GM-50			GM-51	
		3/1/2006 Upper Aquifer	11/30/2006 Upper Aquifer	3/1/2006 Upper Aquifer	3/1/2006 Upper Aquifer	11/30/2006 Upper Aquifer	4/28/2006 Upper Aquifer	9/19/2006 Upper Aquifer	11/30/2006 Upper Aquifer	4/28/2006 Upper Aquifer	11/30/2006 Upper Aquifer
<b>Volatile Organic Compound</b>											
1,1,1-Trichloroethane	ug/L	2.4	1.8	3.1	2.5	2.1	2.4 J	1.4 J	1.6 J	0.9 J	0.76 J
1,1-Dichloroethane	ug/L	3.4	2.6	1.7	0.97 J	0.73 J	1.9 J	1.5 J	1.5 J	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1.7 U	< 1 U	0.2 J	< 5 U	< 5.6 U	< 5 U	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U	< 1.7 U	< 1 U	< 1 U	< 5 U	< 5.6 U	< 5 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	4.7	3.8	4.3	0.44 J	0.46 J	5.2	13	34	0.32 J	0.26 J
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1.7 U	< 1 U	< 1 U	< 5 U	< 5.6 U	< 5 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	2.5	3.1	110	< 1 U	< 1 U	180	150	140	6.7	6.6
Toluene	ug/L	0.25 J	< 1 U	< 1.7 U	< 1 U	< 1 U	< 5 U	< 5.6 U	< 5 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/L	0.66 J	0.53 J	1.2 J	< 1 U	< 1 U	1.6 J	1.7 J	1.5 J	< 1 U	< 1 U
Trichloroethene	ug/L	8.4	11	88	7.1	6.1	120	84	86	4.9	5
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1.7 U	< 1 U	< 1 U	< 5 U	< 5.6 U	< 5 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U	< 3.3 U	< 2 U	< 2 U	< 10 U	< 11 U	< 10 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.

Table C-2. Groundwater Analytical Results for the 2006-2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-52		GM-53	GM-54	GM-54	GM-55	GM-56	GM-57	GM-58	
		4/28/2006 Upper Aquifer	11/30/2006 Upper Aquifer	9/14/2006 Upper Aquifer	9/14/2006 Lower Aquifer	5/2/2007 Lower Aquifer	9/14/2006 Upper Aquifer	9/14/2006 Upper Aquifer	9/14/2006 Upper Aquifer	9/14/2006 Upper Aquifer	9/14/2006 Lower Aquifer
<b>Volatile Organic Compound</b>											
1,1,1-Trichloroethane	ug/L	2	1.3 J	< 1 U	< 6.7 U	< 5 U	< 1 U	0.35 J	< 1 U	< 1 U	< 3.3 U
1,1-Dichloroethane	ug/L	0.94 J	0.93 J	< 1 U	< 6.7 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 3.3 U
1,1-Dichloroethene	ug/L	< 2 U	< 2 U	< 1 U	< 6.7 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 3.3 U
Benzene	ug/L	< 2 U	< 2 U	< 1 U	< 6.7 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 3.3 U
cis-1,2-Dichloroethene	ug/L	1.9 J	2.7	< 1 U	< 6.7 U	< 5 U	< 1 U	< 1 U	< 1 U	0.73 J	< 3.3 U
Ethylbenzene	ug/L	< 2 U	< 2 U	< 1 U	< 6.7 U	< 5 U	< 1 U	< 1 U	0.21 J	< 1 U	< 3.3 U
Tetrachloroethene	ug/L	75	67	< 1 U	180	160	7.4	0.57 J	1.9	4.4	85
Toluene	ug/L	< 2 U	< 2 U	< 1 U	< 6.7 U	< 5 U	< 1 U	< 1 U	0.48 J	0.4 J	< 3.3 U
trans-1,2-Dichloroethene	ug/L	0.67 J	0.76 J	< 1 U	< 6.7 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 3.3 U
Trichloroethene	ug/L	61	47	< 1 U	3.2 J	2.9 J	< 1 U	< 1 U	< 1 U	0.72 J	< 3.3 U
Vinyl chloride	ug/L	< 2 U	< 2 U	< 1 U	< 6.7 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 3.3 U
Xylene (total)	ug/L	< 4 U	< 4 U	< 2 U	< 13 U	< 10 U	< 2 U	< 2 U	< 2 U	< 2 U	< 6.7 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.

Table C-2. Groundwater Analytical Results for the 2006-2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-58	GM-59	GM-60	GM-61	GM-62	GM-63		GM-64		GM-65D	GM-65S
		5/3/2007 Lower Aquifer	9/15/2006 Upper Aquifer	9/15/2006 Upper Aquifer	9/15/2006 Lower Aquifer	9/14/2006 Upper Aquifer	9/14/2006 Upper Aquifer	12/1/2006 Upper Aquifer	9/14/2006 Upper Aquifer	12/1/2006 Upper Aquifer	5/2/2007 Lower Aquifer	5/2/2007 Upper Aquifer
<b>Volatile Organic Compound</b>												
1,1,1-Trichloroethane	ug/L	< 2.9 U	< 14 U	< 25 U	0.5 J	< 1 U	2.3 J	2.3 J	1.8 J	2.1 J	0.4 J	0.62 J
1,1-Dichloroethane	ug/L	< 2.9 U	< 14 U	< 25 U	2.2	< 1 U	1.9 J	1.9 J	1.8 J	2.1 J	1.4	0.78 J
1,1-Dichloroethene	ug/L	< 2.9 U	< 14 U	< 25 U	< 1.7 U	< 1 U	< 5 U	< 4 U	< 2.5 U	< 2.5 U	< 1 U	< 1 U
Benzene	ug/L	< 2.9 U	< 14 U	< 25 U	< 1.7 U	< 1 U	< 5 U	< 4 U	< 2.5 U	< 2.5 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 2.9 U	4 J	220	2.6	< 1 U	5.6	8.8	16	42	1.5	1.7
Ethylbenzene	ug/L	< 2.9 U	< 14 U	< 25 U	< 1.7 U	< 1 U	< 5 U	< 4 U	< 2.5 U	< 2.5 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	82	310	510	20	15	160	140	77	85	< 1 U	11
Toluene	ug/L	< 2.9 U	< 14 U	< 25 U	0.44 J	0.24 J	< 5 U	< 4 U	< 2.5 U	< 2.5 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/L	< 2.9 U	< 14 U	< 25 U	< 1.7 U	< 1 U	1.4 J	1.3 J	1.6 J	2 J	0.21 J	< 1 U
Trichloroethene	ug/L	< 2.9 U	94	570	36	< 1 U	120	100	34	35	1.3	8
Vinyl chloride	ug/L	< 2.9 U	< 14 U	< 25 U	< 1.7 U	< 1 U	< 5 U	< 4 U	< 2.5 U	< 2.5 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 5.7 U	< 29 U	< 50 U	< 3.3 U	< 2 U	< 10 U	< 8 U	< 5 U	< 5 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.

Table C-2. Groundwater Analytical Results for the 2006-2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-66 5/2/2007 Upper Aquifer	GM-67D 5/3/2007 Lower Aquifer	GM-67S 5/3/2007 Upper Aquifer	GM-68D 5/4/2007 Lower Aquifer	GM-68S 5/4/2007 Upper Aquifer	GM-69 5/3/2007 Lower Aquifer	GM-70 5/3/2007 Lower Aquifer	GM-71 5/3/2007 Upper Aquifer	GM-72 5/3/2007 Upper Aquifer	GM-73 10/23/2007 Lower Aquifer	GM-74S 9/27/2007 Upper Aquifer
<b>Volatile Organic Compound</b>												
1,1,1-Trichloroethane	ug/L	< 2.9 U	0.59 J	< 5.7 U	< 50 U	0.62 J	< 12 U	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
1,1-Dichloroethane	ug/L	8.3	3	2.8 J	< 50 U	< 2.5 U	8.7 J	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
1,1-Dichloroethene	ug/L	< 2.9 U	0.36 J	< 5.7 U	< 50 U	< 2.5 U	< 12 U	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
Benzene	ug/L	< 2.9 U	< 1.7 U	< 5.7 U	< 50 U	< 2.5 U	< 12 U	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
cis-1,2-Dichloroethene	ug/L	84	23	5.2 J	< 50 U	< 2.5 U	29	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
Ethylbenzene	ug/L	< 2.9 U	< 1.7 U	< 5.7 U	< 50 U	< 2.5 U	< 12 U	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
Tetrachloroethene	ug/L	< 2.9 U	54	1.1 J	1500	28	6.5 J	11	62	53	160	140
Toluene	ug/L	< 2.9 U	< 1.7 U	< 5.7 U	< 50 U	< 2.5 U	< 12 U	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
trans-1,2-Dichloroethene	ug/L	3.3	0.83 J	< 5.7 U	< 50 U	< 2.5 U	< 12 U	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
Trichloroethene	ug/L	31	45	140	750	78	300	0.32 J	11	0.66 J	22	83
Vinyl chloride	ug/L	4.1	< 1.7 U	< 5.7 U	< 50 U	< 2.5 U	< 12 U	< 1 U	< 2 U	< 1.7 U	< 6.7 U	< 4 U
Xylene (total)	ug/L	< 5.7 U	< 3.3 U	< 11 U	< 100 U	< 5 U	< 24 U	< 2 U	< 4 U	< 3.3 U	< 13 U	< 8 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.

Table C-2. Groundwater Analytical Results for the 2006-2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-74D 9/27/2007 Lower Aquifer	GM-75S 9/26/2007 Upper Aquifer	GM-75D 9/26/2007 Lower Aquifer	GM-76S 9/23/2007 Upper Aquifer	GM-76D 9/23/2007 Lower Aquifer	GM-77S 9/27/2007 Upper Aquifer	GM-77D 9/27/2007 Lower Aquifer	GM-78 10/23/2007 Upper Aquifer	GM-79 10/23/2007 Upper Aquifer	GM-80 10/23/2007 Upper Aquifer	GM-81 10/23/2007 Upper Aquifer
<b>Volatile Organic Compound</b>												
1,1,1-Trichloroethane	ug/L	< 8 U	< 14 U	< 50 U	< 1 U	< 1 U	< 1 U	< 1.4 U	< 1 U	0.66 J	< 1 U	0.22 J
1,1-Dichloroethane	ug/L	< 8 U	< 14 U	< 50 U	< 1 U	0.3 J	< 1 U	< 1.4 U	< 1 U	0.24 J	0.38 J	0.93 J
1,1-Dichloroethene	ug/L	< 8 U	< 14 U	< 50 U	< 1 U	< 1 U	< 1 U	< 1.4 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene	ug/L	< 8 U	< 14 U	< 50 U	< 1 U	< 1 U	< 1 U	< 1.4 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 8 U	< 14 U	24 J	< 1 U	< 1 U	< 1 U	< 1.4 U	< 1 U	< 1 U	1.5	0.98 J
Ethylbenzene	ug/L	< 8 U	< 14 U	< 50 U	< 1 U	< 1 U	< 1 U	< 1.4 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/L	250	490	470	1.2	0.63 J	< 1 U	45	8.9	< 1 U	0.68 J	< 1 U
Toluene	ug/L	< 8 U	< 14 U	< 50 U	< 1 U	< 1 U	< 1 U	< 1.4 U	0.23 J	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/L	< 8 U	< 14 U	< 50 U	< 1 U	< 1 U	< 1 U	< 1.4 U	< 1 U	< 1 U	0.21 J	< 1 U
Trichloroethene	ug/L	130	210	1700 J	1.6	2.7	< 1 U	< 1.4 U	< 1 U	1.6	4.0	0.61 J
Vinyl chloride	ug/L	< 8 U	< 14 U	< 50 U	< 1 U	< 1 U	< 1 U	< 1.4 U	< 1 U	< 1 U	< 1 U	< 1 U
Xylene (total)	ug/L	< 16 U	< 29 U	< 100 U	< 2 U	< 2 U	< 2 U	< 2.9 U	< 2 U	< 2 U	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.

Table C-2. Groundwater Analytical Results for the 2006-2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.

	Unit	GM-26 1/21/2008 Upper Aquifer	GM-57 1/21/2008 Upper Aquifer	GM-65S 1/21/2008 Upper Aquifer	GM-65D 1/21/2008 Lower Aquifer	GM-78 1/21/2008 Upper Aquifer	HR-16 1/21/2008 Upper Aquifer	HR-7 2/26/2008 Upper Aquifer	GM-82 2/26/2008 Lower Aquifer	GM-83S 2/26/2008 Upper Aquifer
<b>Volatile Organic Compound</b>										
1,1,1-Trichloroethane	ug/L	< 1 U	< 1 U	0.58 J	0.32 J	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U	0.54 J	0.94 J	< 1 U	< 1 U	0.26 J	2.3	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U
Benzene	ug/L	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U
cis-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	1.5	1	< 1 U	< 1 U	0.94 J	47	2.9
Ethylbenzene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U
Tetrachloroethene	ug/L	1.2	1.9	13	< 1 U	11	< 1 U	< 1 U	60	< 1 U
Toluene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	0.18 J
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.9 J	0.3 J
Trichloroethene	ug/L	< 1 U	< 1 U	7.9	1.1	< 1 U	1.3	7.3	91	< 1 U
Vinyl chloride	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 4 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.

**Table C-2. Groundwater Analytical Results for the 2006-2008 Supplemental Investigation, RACER Trust, Moraine, Ohio.**

	Unit	GM-83D 2/26/2008 Lower Aquifer	GM-84 2/26/2008 Lower Aquifer
<b><u>Volatile Organic Compound</u></b>			
1,1,1-Trichloroethane	ug/L	< 1 U	< 1 U
1,1-Dichloroethane	ug/L	< 1 U	< 1 U
1,1-Dichloroethene	ug/L	< 1 U	< 1 U
Benzene	ug/L	< 1 U	< 1 U
cis-1,2-Dichloroethene	ug/L	0.28 J	< 1 U
Ethylbenzene	ug/L	< 1 U	< 1 U
Tetrachloroethene	ug/L	< 1 U	< 1 U
Toluene	ug/L	< 1 U	0.57 J
trans-1,2-Dichloroethene	ug/L	< 1 U	< 1 U
Trichloroethene	ug/L	< 1 U	5.5
Vinyl chloride	ug/L	1.5	< 1 U
Xylene (total)	ug/L	< 2 U	< 2 U

ug/L - Micrograms per liter.

J - Value is estimated.

U - Nondetect.

< - Value is not detected above reporting limit shown.


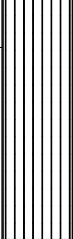
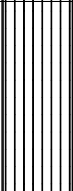
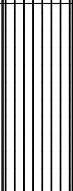
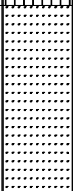
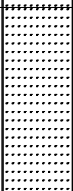

ARCADIS

**Attachment C-1**

Boring and Well Construction Logs

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	N/A	N/A					CONCRETE	
2	N/A	24	0.0				ML	FILL Brown, clayey silt, gravel (25%), low plasticity, hard, dry Same as above	
4	N/A	24	0.0				ML	Same as above	
6	N/A	24	0.0				ML	FILL Gray, clayey silt, sand and gravel (25%), soft, low plasticity, moist	
8	N/A	24	0.0				SW	SAND & GRAVEL Brown, gravel (25%), some silt, trace cobbles, well graded, moist	
10	N/A	24	0.0				SW	Same as above	
12	N/A	24	0.0				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/24/06 @ 1705

Driller: J. Sigler

Total Depth: 32

End Drilling: 2/25/06 @ 1835

Drilling Method: Rotosonic

Surface Elev.: 728.13

Converted to Well: Y Well I.D.: GM-46

Drilling Fluid: Water

North Coord.: 5130.493

East Coord.: 6256.772

Remarks: \_\_\_\_\_

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0				SW	Same as above	
16	N/A	24	0.0				SW	Same as above	
18	N/A	24	0.0				GW	SAND & GRAVEL Gray, sand (25%), well graded, moist-wet	
20	N/A	24	0.0				GW	Same as above	
22	N/A	24	0.0				ML	CLAYEY SILT Gray, gravel (25%), soft, medium plasticity, wet	1
24	N/A	24	0.0				ML	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/24/06 @ 1705

Driller: J. Sigler

Total Depth: 32

End Drilling: 2/25/06 @ 1835

Drilling Method: Rotosonic

Surface Elev.: 728.13

Converted to Well: Y Well I.D.: GM-46

Drilling Fluid: Water

North Coord.: 5130.493

East Coord.: 6256.772

Remarks: \_\_\_\_\_

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	0.0				ML	Water sample collected at 25' for analysis of site-specific VOCs. Same as above	
28	N/A	24	0.0				CL	SILTY CLAY Gray, hard, gravel (25%), moist to dry	
30	N/A	24	0.0				CL	Same as above	
32								End of boring	
34									
36									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/24/06 @ 1705

Driller: J. Sigler

Total Depth: 32

End Drilling: 2/25/06 @ 1835

Drilling Method: Rotosonic

Surface Elev.: 728.13

Converted to Well: Y Well I.D.: GM-46

Drilling Fluid: Water

North Coord.: 5130.493

East Coord.: 6256.772

Remarks: \_\_\_\_\_

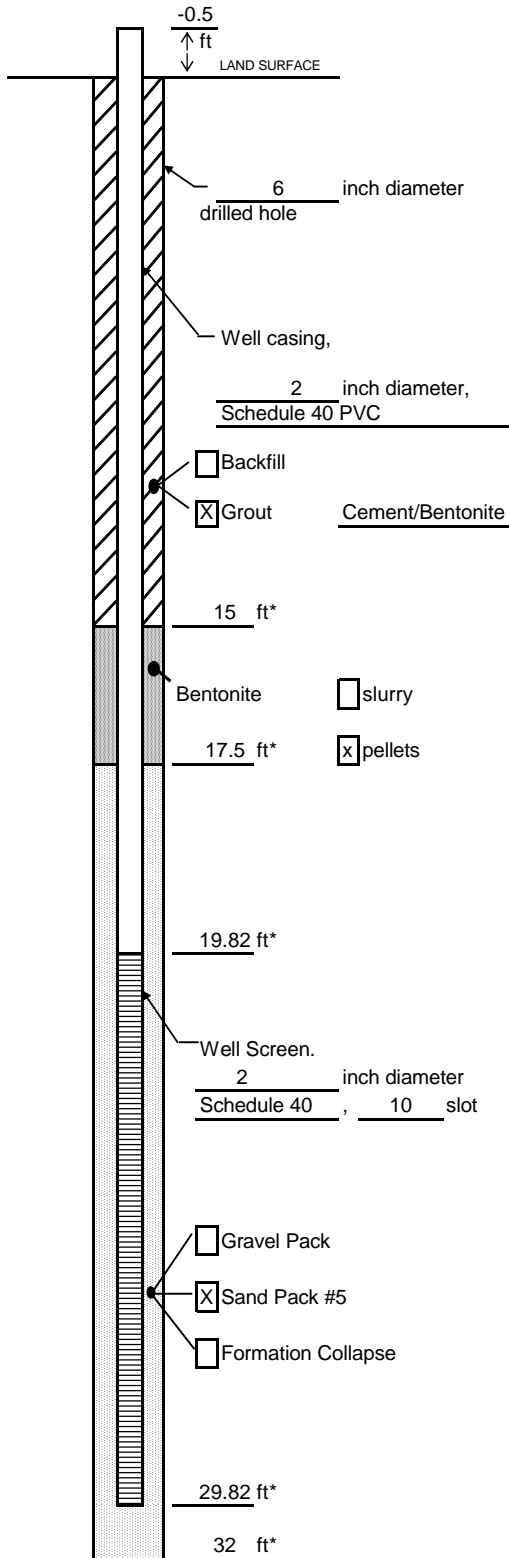
Project No.: OH000294.0008.00002

Datum: TOC Elev. 727.79

Filename: February 2006

# Well Construction Log

(Unconsolidated)



Project General Motors Corporation Well GM-46

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

728.13 feet  Surveyed

Estimated

Installation Date(s) 2/24-2/25/06

Drilling Method Rotosonic

Drilling Contractor Prosonic Corporation

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump 2/25/06

Fluid Loss During Drilling NA gallons

Water Removed During Development 200 gallons

Static Depth to Water 20.27 feet below M.P.

Pumping Depth to Water 20.27 feet below M.P.

Pumping Duration 3.00 hours

Yield 3 gpm Date 2/25/06

Specific Capacity N/A gpm/ft

Well Purpose Monitoring Well

Remarks TOC Elevation = 727.79

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Prepared by J. Manzo

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	12	0.0				GP	GRAVEL Poorly graded, dry	
2	N/A	12	0.0				SW	SAND AND GRAVEL Brown, medium-fine, gravel (20%), little silt, dry	
4	N/A	12	0.0				SW	Same as above	
6	N/A	12	0.0				SW	Same as above	
8	N/A	24	0.0				SW	Same as above	
10	N/A	24	0.0				SW	Same as above	
12	N/A	24	0.0				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: T. Fortner

Begin Drilling: 2/23/06 @ 1650

Driller: J. Sigler

Total Depth: 67

End Drilling: 2/24/06 @ 1126

Drilling Method: Rotosonic

Surface Elev.: 727.03

Converted to Well: Y Well I.D.: GM-47

Drilling Fluid: Water

North Coord.: 1312.270

East Coord.: 4776.411

Remarks: \_\_\_\_\_

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0				GP	GRAVEL Poorly graded, dry	
16	N/A	24	0.0				SW	SAND & GRAVEL Brown, medium-fine sand, gravel (10%), little silt, dry	
18	N/A	8	0.0				SW	Same as above, gravel (30%)	
20	N/A	8	0.0				SW	Same as above	
22	N/A	8	0.0				SW	Same as above	
24	N/A	8	0.0				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: T. Fortner

Begin Drilling: 2/23/06 @ 1650

Driller: J. Sigler

Total Depth: 67

End Drilling: 2/24/06 @ 1126

Drilling Method: Rotosonic

Surface Elev.: 727.03

Converted to Well: Y Well I.D.: GM-47

Drilling Fluid: Water

North Coord.: 1312.270

East Coord.: 4776.411

Remarks: \_\_\_\_\_

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	20	0.0				SW	Same as above, wet at 27'	
28	N/A	20	0.0				GP	GRAVEL Poorly graded, wet	
30	N/A	20	0.0				GW	GRAVEL Brown, coarse sand (40%), wet  Water sample collected at 30' for site specific VOCs.	
32	N/A	20	0.0				GW	Same as above	
34	N/A	20	0.0				GW	Same as above, medium-coarse sand (30%)	
36	N/A	24	1.3				GW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: T. Fortner

Begin Drilling: 2/23/06 @ 1650

Driller: J. Sigler

Total Depth: 67

End Drilling: 2/24/06 @ 1126

Drilling Method: Rotosonic

Surface Elev.: 727.03

Converted to Well: Y Well I.D.: GM-47

Drilling Fluid: Water







North Coord.: 1312.270

East Coord.: 4776.411

Remarks: \_\_\_\_\_

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	1.3				SW	SAND & GRAVEL Brown, medium-coarse sand (50%), fine gravel, wet	
40	N/A	24	1.5				SW	Same as above	
42	N/A	24	1.4				SW	Same as above	
44	N/A	24	1.4				SW	Same as above	
46	N/A	20	1.4				SW	Same as above, gravel (20%)	
48	N/A	20	0.0				SW	Same as above	
50									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: T. Fortner

Begin Drilling: 2/23/06 @ 1650

Driller: J. Sigler

Total Depth: 67

End Drilling: 2/24/06 @ 1126

Drilling Method: Rotosonic

Surface Elev.: 727.03

Converted to Well: Y Well I.D.: GM-47

Drilling Fluid: Water

North Coord.: 1312.270

East Coord.: 4776.411

Remarks: \_\_\_\_\_

Project No.: OH000294.0008.00002

Datum: TOC Elev. 725.75

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
	N/A	20	0.0				SW	Same as above, fine gravel (50%)	
52	N/A	20	0.0				SW	Same as above, gravel (10%)	
54	N/A	20	0.0				SW	Same as above, gravel (20%)	
56	N/A	24	0.0				SW	SAND Brown, medium-coarse, wet	
58	N/A	24	0.0				SP	SAND Brown, medium, little silt, poorly graded, saturated	
60	N/A	24	0.0				CL	SILTY CLAY Gray, gravel (10-20%), stiff-very stiff, low plasticity, 4" gravel layer above silty clay  Water sample collected at 60' for site specific VOCs.	
62	N/A	24	0.0				CL	Same as above, gravel (10%)	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 6

Drilling Co.: Prosonic Corporation

Geologist: T. Fortner

Begin Drilling: 2/23/06 @ 1650

Driller: J. Sigler

Total Depth: 67

End Drilling: 2/24/06 @ 1126

Drilling Method: Rotosonic

Surface Elev.: 727.03

Converted to Well: Y Well I.D.: GM-47

Drilling Fluid: Water

North Coord.: 1312.270

East Coord.: 4776.411

Remarks: \_\_\_\_\_

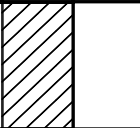
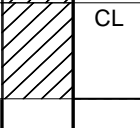
Project No.: OH000294.0008.00002

Datum: TOC Elev. 725.75

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	0.0				CL	Same as above	
66	N/A	12	0.0				CL	Same as above, gravel (20%)	
68								End of boring	
70									
72									
74									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: T. Fortner

Begin Drilling: 2/23/06 @ 1650

Driller: J. Sigler

Total Depth: 67

End Drilling: 2/24/06 @ 1126

Drilling Method: Rotosonic

Surface Elev.: 727.03

Converted to Well: Y Well I.D.: GM-47

Drilling Fluid: Water

North Coord.: 1312.270

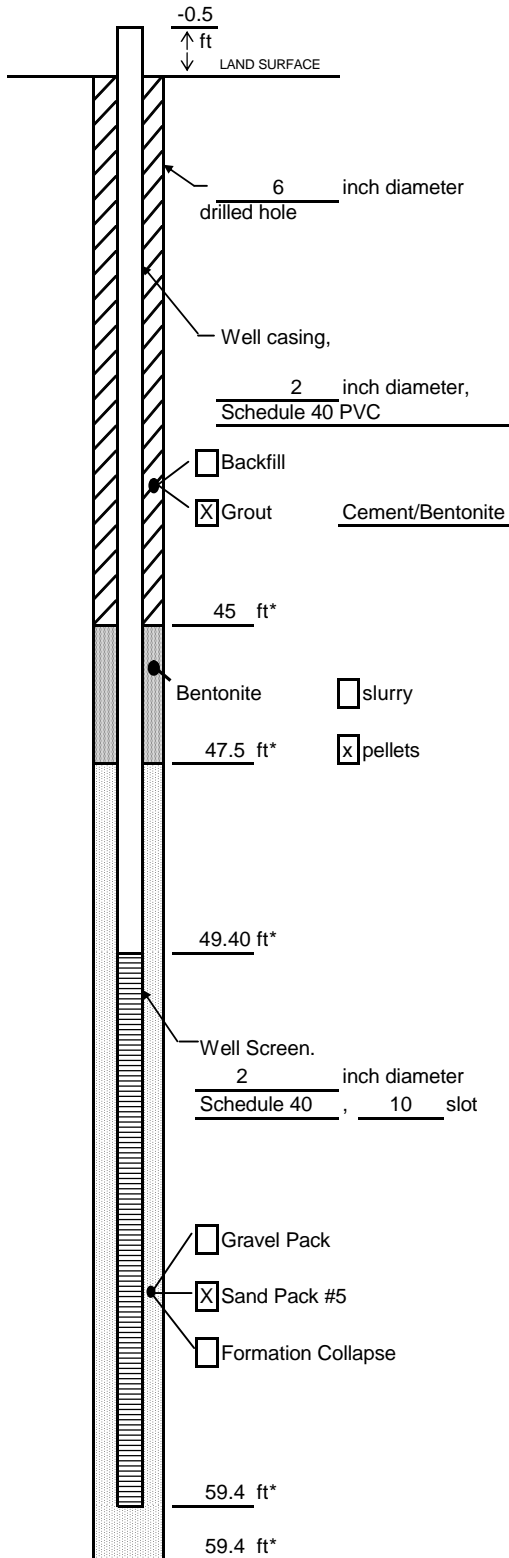
East Coord.: 4776.411

Remarks: \_\_\_\_\_

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Project General Motors Corporation Well GM-47

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

727.03 feet  Surveyed

Estimated

Installation Date(s) 2/24/2006

Drilling Method Rotosonic

Drilling Contractor Prosonic Corporation

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump 2/25/06

Fluid Loss During Drilling NA gallons

Water Removed During Development 600 gallons

Static Depth to Water 21.91 feet below M.P.

Pumping Depth to Water 50-59.5 feet below M.P.

Pumping Duration 4.00 hours

Yield 3 gpm Date 2/25/06

Specific Capacity N/A gpm/ft

Well Purpose Monitoring Well

Remarks TOC Elevation = 726.75

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Prepared by J. Manzo

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	0.0				ML	CLAYEY SILT Brown, sand and gravel (25%), trace large cobbles, low plasticity, hard, dry	
2	N/A	24	0.0				ML	Same as above	
4	N/A	24	0.0				ML	Same as above, gray with brown mottling	
6	N/A	24	0.0				SM	SILTY SAND Brown, some clay, trace cobble, well graded, moist	
8	N/A	24	0.0				SM	Same as above	
10	N/A	24	0.0				GW	GRAVEL Sand (25%), trace cobbles, well graded, dry	
12	N/A	24	0.0				GW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/22/06 @ 1159

Driller: T. Bentz

Total Depth: 73

End Drilling: 2/23/06 @ 1143

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-48

Drilling Fluid: Water

North Coord.: 610.119

East Coord.: 4199.632

Remarks: \_\_\_\_\_

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0				GW	Same as above	
16	N/A	24	0.0				GW	Same as above	
18	N/A	24	0.0				GW	Same as above	
20	N/A	24	0.0				GW	Same as above	
22	N/A	24	0.0				GW	Same as above	
24	N/A	24	0.0				GW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/22/06 @ 1159

Driller: T. Bentz

Total Depth: 73

End Drilling: 2/23/06 @ 1143

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-48

Drilling Fluid: Water

North Coord.: 610.119

East Coord.: 4199.632

Remarks: \_\_\_\_\_

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	0.0				GW	Same as above	
28	N/A	24	0.0				GW	Same as above	
30	N/A	24	0.0				GW	Same as above, coarse sand, wet	▼
32	N/A	24	0.0				GW	Same as above Water sample collected at 32' for analysis of site specific VOCs.	
34	N/A	24	0.0				GW	Same as above	
36	N/A	24	0.0				GW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/22/06 @ 1159

Driller: T. Bentz

Total Depth: 73

End Drilling: 2/23/06 @ 1143

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-48

Drilling Fluid: Water







North Coord.: 610.119

East Coord.: 4199.632

Remarks: \_\_\_\_\_

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	0.0				GW	Same as above	
40	N/A	24	0.0				GW	Same as above	
42	N/A	24	0.0				GW	Same as above	
44	N/A	0	0.0					No recovery	
46	N/A	0	0.0					No recovery	
48	N/A	24	0.0				SW	Same as above, gravel (20%)	
50									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/22/06 @ 1159

Driller: T. Bentz

Total Depth: 73

End Drilling: 2/23/06 @ 1143

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-48

Drilling Fluid: Water

North Coord.: 610.119

East Coord.: 4199.632

Remarks:

Project No.: OH000294.0008.00002

Datum: TOC Elev. 728.67

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
	N/A	24	0.0				SW	Same as above	
52	N/A	24	0.0				SW	Same as above	
54	N/A	24	0.0				SW	Same as above	
56	N/A	24	0.0				SW	Same as above	
58	N/A	16	0.0				GW	Same as above, gravel (75%)	
60	N/A	10	0.0				SW	Same as above, gravel (20%)	
62	N/A	10	0.0				SW	SAND Fine-medium, gravel (10%), little silt, well graded, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/22/06 @ 1159

Driller: T. Bentz

Total Depth: 73

End Drilling: 2/23/06 @ 1143

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-48

Drilling Fluid: Water

North Coord.: 610.119

East Coord.: 4199.632

Remarks:

Project No.: OH000294.0008.00002

Datum: TOC Elev. 728.67

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	16	0.0			[Dotted Pattern]	SW	Same as above	
66	N/A	16	0.0			[Dotted Pattern]	SW	Same as above	
68	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
70	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
72	N/A	12	0.0			[Diagonal Lines]	CL	SILTY CLAY Gray, gravel (10%), dry to moist	
						[Diagonal Lines]	CL	Water sample collected at 71' for analysis of site specific VOCs. Same as above	
								End of boring	
74									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Page 6 of 6

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo

Begin Drilling: 2/22/06 @ 1159

Driller: T. Bentz

Total Depth: 73

End Drilling: 2/23/06 @ 1143

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-48

Drilling Fluid: Water

North Coord.: 610.119

East Coord.: 4199.632

Remarks: \_\_\_\_\_

Project No.: OH000294.0008.00002

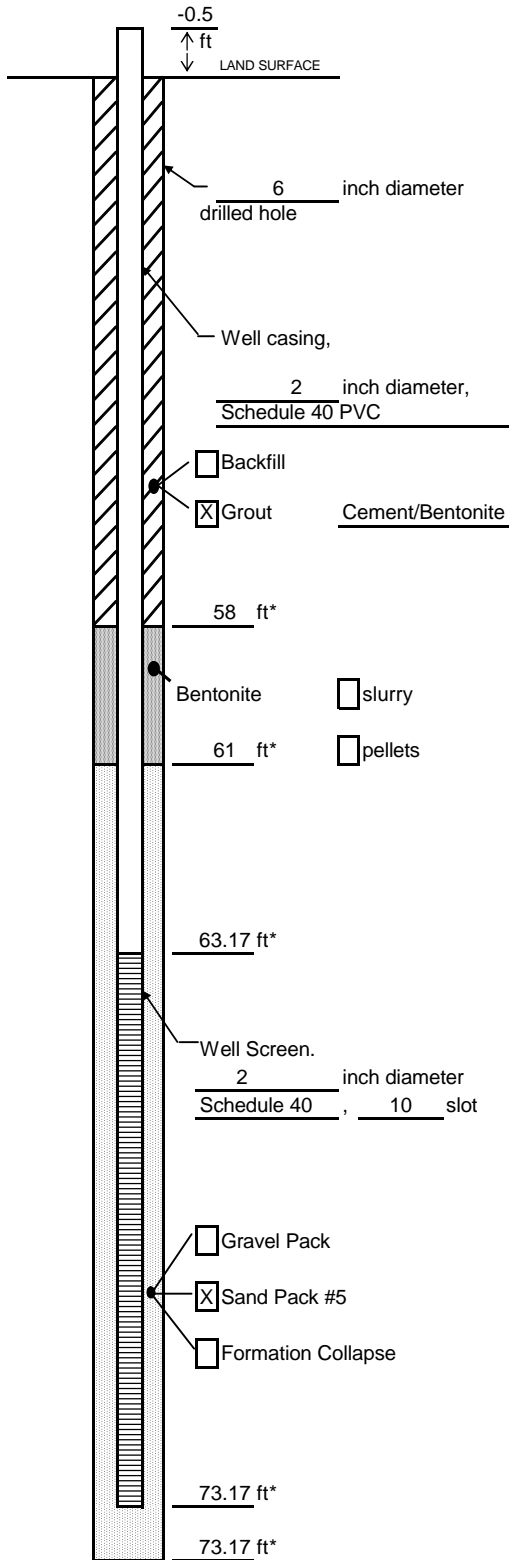
Datum: TOC Elev. 728.67

Filename: February 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Project General Motors Corporation Well GM-48

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

728.98 feet  Surveyed

Estimated

Installation Date(s) 2/22-2/23/06

Drilling Method Rotosonic

Drilling Contractor Prosonic Corporation

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump 2/23-2/24/06

Fluid Loss During Drilling NA gallons

Water Removed During Development 500 gallons

Static Depth to Water 24.39 feet below M.P.

Pumping Depth to Water 24.39 feet below M.P.

Pumping Duration 6.00 hours

Yield 2 gpm Date 2/24/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks TOC Elevation = 728.67

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Prepared by J. Manzo

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	0.0				ML	CLAYEY SILT Brown, sand and gravel (25%), hard, low plasticity, dry	
2	N/A	24	0.0				ML	Same as above	
4	N/A	16	0.0				CL	SILTY CLAY Gray, sand and gravel (25%), hard, low plasticity, dry	
6	N/A	16	0.0				CL	Same as above	
8	N/A	24	0.0				CL	Same as above	
10	N/A	24	0.0				CL	Same as above	
12	N/A	12	0.0				GW	GRAVEL Sand (25%), well graded, trace cobbles, dry	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 7

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo/T. Fortner

Begin Drilling: 2/24/06 @ 10:35

Driller: T. Bentz

Total Depth: 79

End Drilling: 2/25/06 @ 1628

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-49

Drilling Fluid: Water

North Coord.: -222.235

East Coord.: 4383.157

Remarks: TOC elevation 727.88.





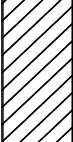
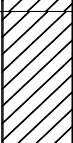
Project No.: OH000294.0008.00002

Datum: \_\_\_\_\_

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0				GW	Same as above	
16	N/A	24	0.0				GW	Same as above	
18	N/A	24	0.0				CL	SILTY CLAY Gray, gravel (25%), hard, dry	
20	N/A	24	0.0				CL	Same as above	
22	N/A	16	0.0				SM	SILTY SAND Gravel (25%), well graded, moist	
24	N/A	16	0.0				SM	Same as above	

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo/T. Fortner

Begin Drilling: 2/24/06 @ 10:35

Driller: T. Bentz

Total Depth: 79

End Drilling: 2/25/06 @ 1628

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-49

Drilling Fluid: Water

North Coord.: -222.235

East Coord.: 4383.157

Remarks: TOC elevation 727.88.

Project No.: OH000294.0008.00002

Datum: \_\_\_\_\_

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	16	0.0				SM	Same as above	
28	N/A	16	0.0				GW	GRAVEL Sand (25%), well graded, moist-wet	
								Water sample collected at 29' for analysis of site specific VOCs.	▼
30	N/A	16	0.0				GW	Same as above, wet	
32	N/A	20	0.0				GW	Same as above	
34	N/A	20	0.0				GW	Same as above	
36	N/A	20	0.0				GW	Same as above	

☒ Composite Sample to Lab

■ Grab Sample to Lab

□ Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo/T. Fortner

Begin Drilling: 2/24/06 @ 10:35

Driller: T. Bentz

Total Depth: 79

End Drilling: 2/25/06 @ 1628

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-49

Drilling Fluid: Water

North Coord.: -222.235

East Coord.: 4383.157

Remarks: TOC elevation 727.88.

Project No.: OH000294.0008.00002

Datum: \_\_\_\_\_

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	20	0.0				GW	Same as above	
40	N/A	20	0.0				GW	Same as above	
42	N/A	20	0.0				SW	SAND Brown, medium-coarse gravel (5%), well graded, wet	
44	N/A	20	0.0				SW	Same as above	
46	N/A	20	0.0				SW	Same as above	
48	N/A	20	0.0				SW	Same as above	
Water sample collected at 49' for analysis of site specific VOCs.									
50									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo/T. Fortner

Begin Drilling: 2/24/06 @ 10:35

Driller: T. Bentz

Total Depth: 79

End Drilling: 2/25/06 @ 1628

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-49

Drilling Fluid: Water

North Coord.: -222.235

East Coord.: 4383.157

Remarks: TOC elevation 727.88.

Project No.: OH000294.0008.00002

Datum: \_\_\_\_\_

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
	N/A	20	0.0				GW	GRAVEL Coarse sand (30%), well graded, wet	
52	N/A	22	0.0				SP	SAND Brown medium-coarse, poorly graded, wet	
54	N/A	22	0.0				SP	Same as above	
56	N/A	22	0.0				GW	GRAVEL Coarse sand (30%), well graded, wet	
58	N/A	22	0.0				GW	Same as above	
60	N/A	22	0.0				SW	SAND Brown, medium-coarse, gravel (10%), poorly graded, wet	
62	N/A	12	0.0				GW	GRAVEL Medium-coarse sand (25%), gravel (75%), well graded, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo/T. Fortner

Begin Drilling: 2/24/06 @ 10:35

Driller: T. Bentz

Total Depth: 79

End Drilling: 2/25/06 @ 1628

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-49

Drilling Fluid: Water

North Coord.: -222.235

East Coord.: 4383.157

Remarks: TOC elevation 727.88.

Project No.: OH000294.0008.00002

Datum: \_\_\_\_\_

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	12	0.0				GW	Same as above	
66	N/A	12	0.0				GW	Same as above	
68	N/A	12	0.0				GW	Same as above	
70	N/A	12	0.0				GW	Same as above	
72	N/A	24	0.0				GW	Same as above	
74	N/A	24	0.0				SP	SAND Gravel (25%), poorly graded, wet	
Water sample collected at 75' for analysis of site specific VOCs.									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 6 of 7

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo/T. Fortner

Begin Drilling: 2/24/06 @ 10:35

Driller: T. Bentz

Total Depth: 79

End Drilling: 2/25/06 @ 1628

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-49

Drilling Fluid: Water

North Coord.: -222.235

East Coord.: 4383.157

Remarks: TOC elevation 727.88.



Project No.: OH000294.0008.00002

Datum: \_\_\_\_\_

Filename: February 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	0.0				CL	SILTY CLAY Gray, gravel (10%), hard, dry	
78	N/A	12	0.0				CL	Same as above	
80								End of boring	
82									
84									
86									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Page 7 of 7

Drilling Co.: Prosonic Corporation

Geologist: J. Manzo/T. Fortner

Begin Drilling: 2/24/06 @ 10:35

Driller: T. Bentz

Total Depth: 79

End Drilling: 2/25/06 @ 1628

Drilling Method: Rotosonic

Surface Elev.: 728.98

Converted to Well: Y Well I.D.: GM-49

Drilling Fluid: Water

North Coord.: -222.235

East Coord.: 4383.157

Remarks: TOC elevation 727.88.

Project No.: OH000294.0008.00002

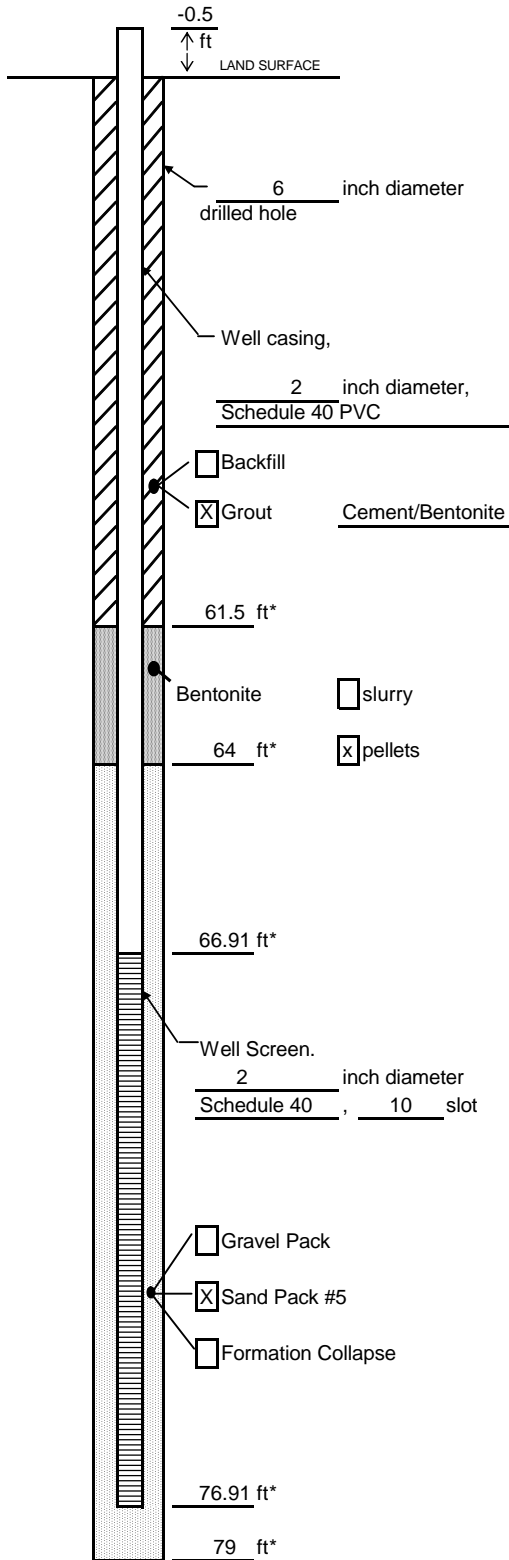
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Filename: February 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Project General Motors Corporation Well GM-49

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

728.28 feet  Surveyed

Estimated

Installation Date(s) 2/24-2/25/06

Drilling Method Rotosonic

Drilling Contractor Prosonic Corporation

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump 2/25/06

Fluid Loss During Drilling NA gallons

Water Removed During Development 500 gallons

Static Depth to Water 24.10 feet below M.P.

Pumping Depth to Water 24.10 feet below M.P.

Pumping Duration 6.00 hours

Yield 2 gpm Date 2/25/06

Specific Capacity 2 gpm/ft

Well Purpose Monitoring Well

Remarks TOC Elevation = 727.88

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Prepared by J. Manzo

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See GM-47 for lithologic description from 0-40'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 4/24/06

Driller: B. Smith

Total Depth: 40

End Drilling: 4/24/06

Drilling Method: Rotosonic

Surface Elev.: 727.034

Converted to Well: Y Well I.D.: GM-50

Drilling Fluid: Water

North Coord.: 1311.64197

East Coord.: 4773.28499

Remarks: Shallow pair to GM-47.

Project No.: OH000294.0008.00002

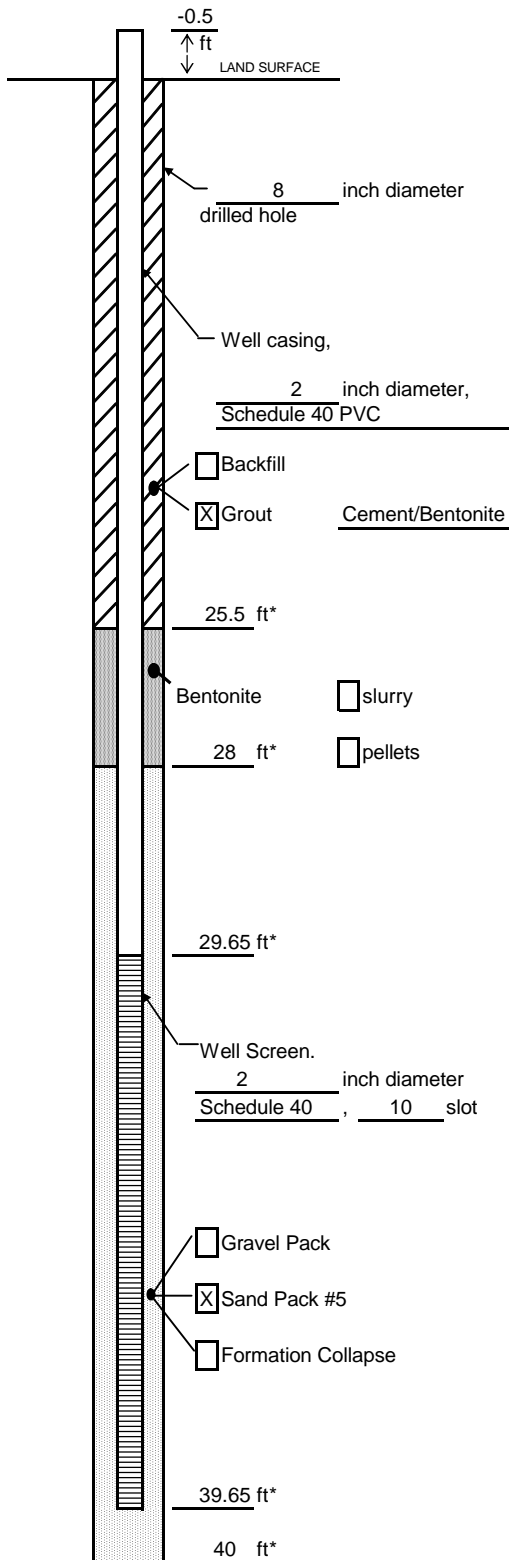
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Filename: July 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Project General Motors Corporation Well GM-50

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

727.034 feet  Surveyed

Estimated

Installation Date(s) 4/24/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 4/26/06

Fluid Loss During Drilling NA gallons

Water Removed During Development 200 gallons

Static Depth to Water 20.39 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 1.50 hours

Yield NM gpm Date 4/26/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks TOC Elevation = 726.555

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Prepared by J. Manzo

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See GM-48 for lithologic description from 0-45'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 4/25/06

Driller: B. Smith

Total Depth: 45

End Drilling: 4/25/06

Drilling Method: Rotosonic

Surface Elev.: 728.825

Converted to Well: Y Well I.D.: GM-51

Drilling Fluid: Water

North Coord.: 614.47441

East Coord.: 4198.06172

Remarks: Shallow pair to GM-48.

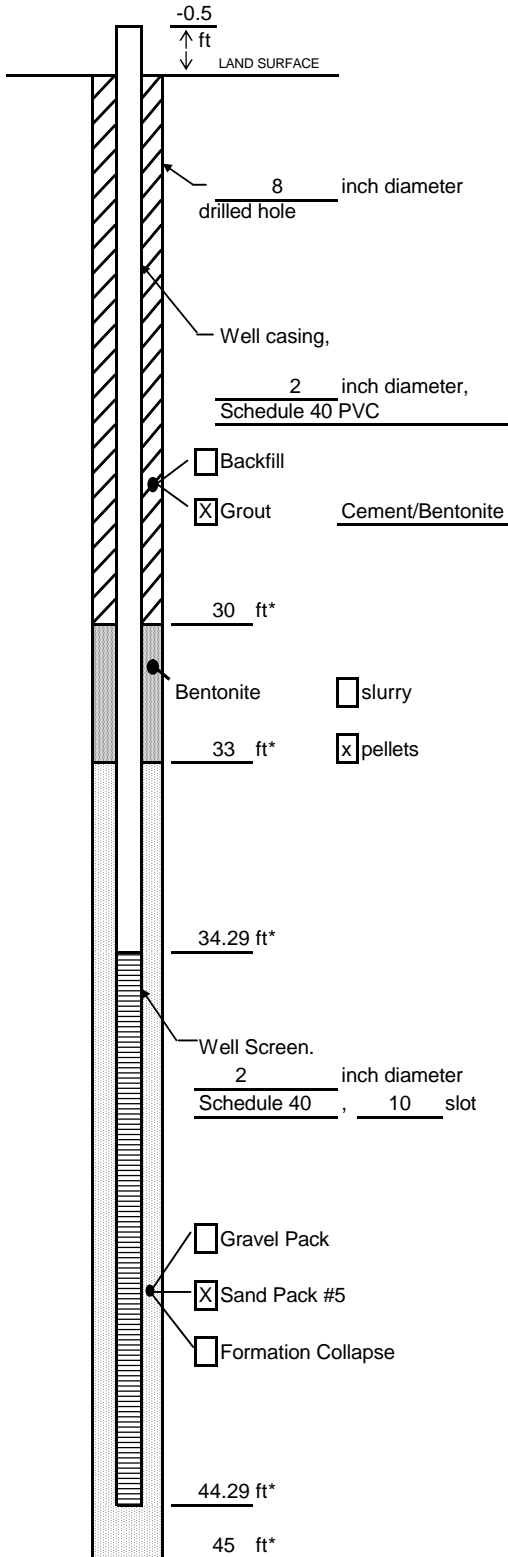
Project No.: OH000294.0008.00002

Datum: TOC elev 728.303

Filename: July 2006

# Well Construction Log

(Unconsolidated)



Measuring Point is  
 Top of Well Casing  
 Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-51

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

728.825 feet  Surveyed

Estimated

Installation Date(s) 4/25/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 4/26/06

Fluid Loss During Drilling NA gallons

Water Removed During Development 200 gallons

Static Depth to Water 22.68 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 1.50 hours

Yield NM gpm Date 4/25/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks TOC Elevation = 728.303

Prepared by J. Manzo

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See GM-49 for lithologic description from 45'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 4/25/06

Driller: B. Smith

Total Depth: 45

End Drilling: 4/25/06

Drilling Method: Rotosonic

Surface Elev.: 728.155

Converted to Well: Y Well I.D.: GM-52

Drilling Fluid: Water

North Coord.: -226.18252

East Coord.: 4383.22583

Remarks: Shallow pair to GM-49.

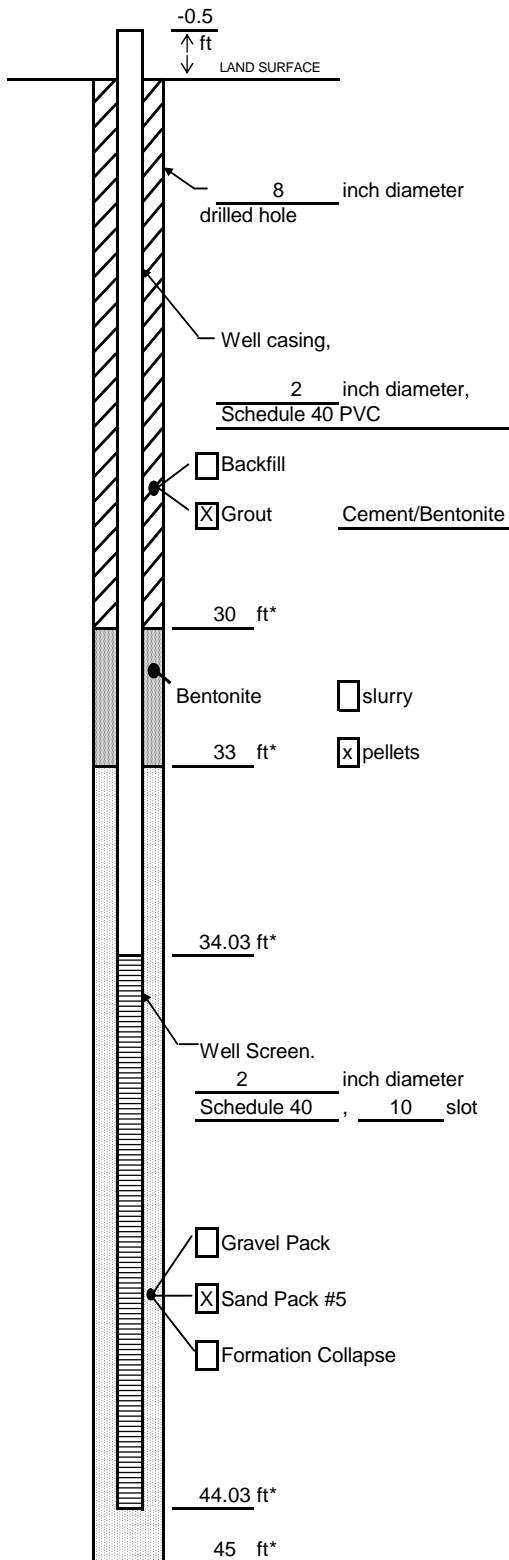
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Datum: TOC Elev 727.615

Filename: July 2006

# Well Construction Log

(Unconsolidated)



Project General Motors Corporation Well GM-52

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

728.155 feet  Surveyed

Estimated

Installation Date(s) 4/25/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 4/25/06

Fluid Loss During Drilling NA gallons

Water Removed During Development 200 gallons

Static Depth to Water 22.34 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 1.50 hours

Yield NM gpm Date 4/26/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks TOC Elevation = 727.615

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Prepared by J. Manzo

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See GM-54 for lithologic description from 0-33'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/25/06

Driller: M. Osterberg

Total Depth: 33

End Drilling: 7/25/06

Drilling Method: Rotosonic

Surface Elev.: 730.530

Converted to Well: Y Well I.D.: GM-53

Drilling Fluid: Water

North Coord.: 2999.31791

East Coord.: 6823.94469

Remarks: Shallow pair to GM-54.

Project No.: OH000294.0008.00002

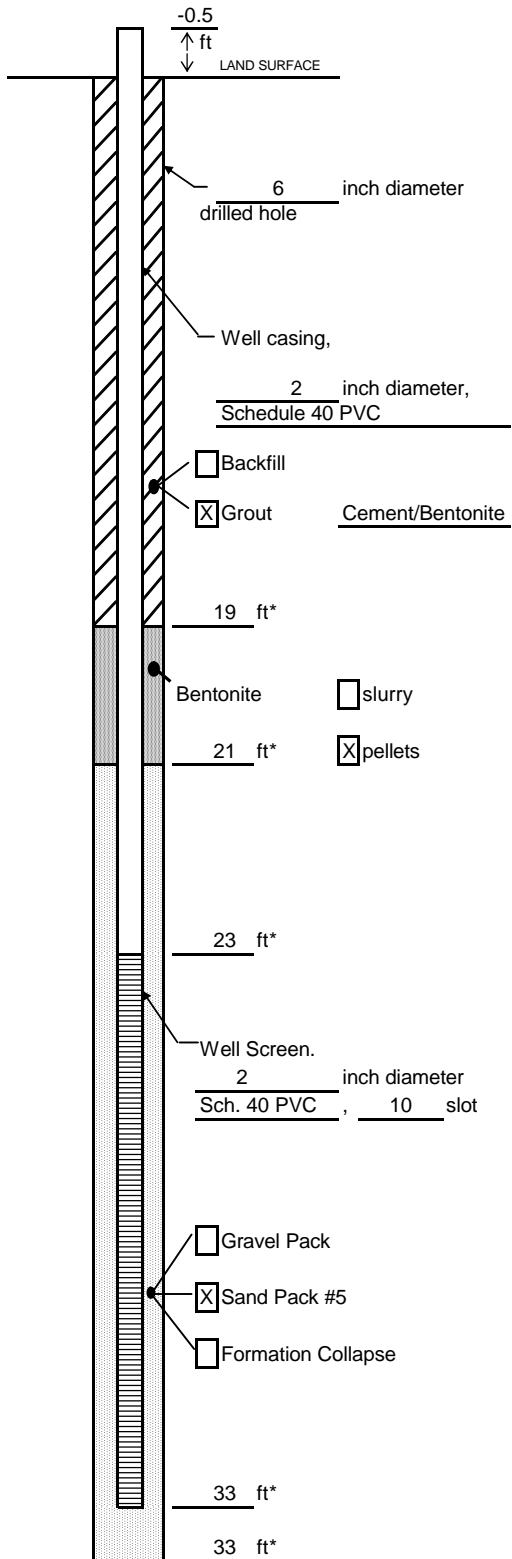
Datum: TOC Elev 730.353

Filename: July 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
 Top of Well Casing  
 Unless Otherwise Noted.  
 Unless Otherwise Noted.  
 \* Depth Below Land Surface

Project General Motors Corporation Well GM-53

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

730.530 feet  Surveyed

Estimated

Installation Date(s) 7/28/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 7/30/06

Fluid Loss During Drilling ~100 gallons

Water Removed During Development 120 gallons

Static Depth to Water 22.87 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.70 hours

Yield 3 gpm Date 7/30/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring well

Remarks TOC Elevation = 730.353

Time 1040, 1043, 1046, 1049, 1052

pH 6.39, 6.49, 6.50, 6.49, 6.50

Conductivity 1.74, 1.66, 1.66, 1.66, 1.66

Turbidity 0, 0, 0, 0, 0 (clear-nonturbid)

Temperature 19.3, 18.8, 17.8, 17.9, 17.8

Prepared by T. Fortner

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	0	N/A					No recovery	
2									
4									
6	N/A	24	3.3				SW	SAND Brown, medium-coarse, medium gravel (20-30%), well graded, dry	
8	N/A	24	8.3				SW	Same as above	
10	N/A	24	1.4				SW	Same as above	
12	N/A	24	0.7				GW	GRAVEL Brown, medium-coarse, medium-coarse sand (30%), well graded, dry	
								GRAVEL Brown, medium-coarse, medium-coarse sand (30%), well graded, dry	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 10

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/11/06 @ 1550

Driller: M. Osterberg

Total Depth: 115

End Drilling: 7/12/06 @ 1300

Drilling Method: Rotosonic

Surface Elev.: 730.513

Converted to Well: Y Well I.D.: GM-54

Drilling Fluid: Water

North Coord.: 2995.14271

East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

Project No.: OH000294.0008.00002

Datum: TOC Elev = 730.287

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	1.6				SW	SAND Brown, medium-coarse, fine-medium gravel (40%), well graded, dry	
16	N/A	24	1.0				GW	GRAVEL Brown, medium-coarse, medium-coarse sand (30%), well graded, dry	
18	N/A	24	2.7				GW	Same as above	
20	N/A	24	1.5				GW	Same as above	
22	N/A	24	1.1				GW	Same as above, wet at 22'	
24	N/A	24	1.2				GW	Same as above	
								Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 2 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 7/11/06 @ 1550  
 Driller: M. Osterberg     Total Depth: 115     End Drilling: 7/12/06 @ 1300  
 Drilling Method: Rotosonic     Surface Elev.: 730.513     Converted to Well: Y Well I.D.: GM-54  
 Drilling Fluid: Water     North Coord.: 2995.14271     East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

Project No.: OH000294.0008.00002     Datum: TOC Elev = 730.287     Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	1.5				SP	SAND Brown, medium grained, fine gravel (5-10%), poorly graded, wet	
28	N/A	24	0.8				SP	Same as above	
30	N/A	24	0.1				SP	Same as above	
32	N/A	24	0.4				GW	GRAVEL Brown, fine-medium, medium-coarse sand (30%), well graded, wet	
34	N/A	24	0.1				CL	SANDY CLAY Brown, stiff, low plasticity with trace gravel, moist	
36	N/A	24	0.5				CL	SILTY CLAY Gray, stiff, brittle, low plasticity with ~5% fine gravel, dry	
								Same as above	
	N/A	24	0.3				CL	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 3 of 10

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/11/06 @ 1550

Driller: M. Osterberg

Total Depth: 115

End Drilling: 7/12/06 @ 1300

Drilling Method: Rotosonic

Surface Elev.: 730.513

Converted to Well: Y Well I.D.: GM-54

Drilling Fluid: Water

North Coord.: 2995.14271

East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

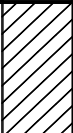
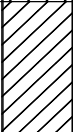
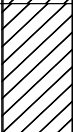
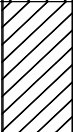
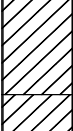
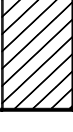
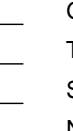
Project No.: OH000294.0008.00002

Datum: TOC Elev = 730.287

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	0.5				CL	Same as above	
40	N/A	24	0.4				CL	Same as above	
42	N/A	24	0.4				CL	Same as above	
44	N/A	24	0.0				CL	Same as above	
46	N/A	24	0.0				CL	Same as above	
48	N/A	24	0.0				CL	Same as above	
50	N/A	24	0.0				CL	Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 4 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 7/11/06 @ 1550  
 Driller: M. Osterberg     Total Depth: 115     End Drilling: 7/12/06 @ 1300  
 Drilling Method: Rotosonic     Surface Elev.: 730.513     Converted to Well: Y Well I.D.: GM-54  
 Drilling Fluid: Water     North Coord.: 2995.14271     East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

Project No.: OH000294.0008.00002     Datum: TOC Elev = 730.287     Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	0.0				CL	Same as above	
54	N/A	24	0.0				CH	SILTY CLAY Gray with some coarse sand, soft, high plasticity, moist-wet	
56	N/A	24	0.0				CL	SILTY CLAY Gray, stiff, brittle, low plasticity, medium gravel (5%), dry	
58	N/A	24	0.0				CL	Same as above	
60	N/A	24	0.0				CL	Same as above	
62	N/A	24	0.0				CL	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/11/06 @ 1550

Driller: M. Osterberg

Total Depth: 115

End Drilling: 7/12/06 @ 1300

Drilling Method: Rotosonic

Surface Elev.: 730.513

Converted to Well: Y Well I.D.: GM-54

Drilling Fluid: Water

North Coord.: 2995.14271

East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

Project No.: OH000294.0008.00002

Datum: TOC Elev = 730.287

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	0.3				CL	Same as above	
							SW	SAND Brown, medium-coarse, coarse gravel (5%), well graded, wet	
66	N/A	24	0.4				SW	Same as above	
68	N/A	24	0.1				SW	Same as above	
70	N/A	24	0.2				GW	GRAVEL Brown, medium-coarse, medium coarse sand (40%), wet	
72	N/A	24	0.0				SM	SILTY SAND Brown, fine, wet	
								Same as above	
74	N/A	24	0.5				SM	Same as above	
	N/A	24	0.0				SM	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 6 of 10

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/11/06 @ 1550

Driller: M. Osterberg

Total Depth: 115

End Drilling: 7/12/06 @ 1300

Drilling Method: Rotosonic

Surface Elev.: 730.513

Converted to Well: Y Well I.D.: GM-54

Drilling Fluid: Water

North Coord.: 2995.14271

East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

Project No.: OH000294.0008.00002

Datum: TOC Elev = 730.287

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	0.1				SP	SAND Brown, fine-medium, poorly graded, wet	
78	N/A	24	0.1				SP	Same as above	
80	N/A	24	0.5				SP	Same as above	
82	N/A	24	0.1				SP	Same as above	
84	N/A	24	14.7				SP	Same as above  (OVA readings from 85-103' were performed during intense rainfall; humidity levels may have produced instrument drift while screening.)	
86	N/A	24	16.8				SW	SAND Brown, fine-coarse, medium-coarse gravel (40%), well graded, wet	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 7 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 7/11/06 @ 1550  
 Driller: M. Osterberg     Total Depth: 115     End Drilling: 7/12/06 @ 1300  
 Drilling Method: Rotosonic     Surface Elev.: 730.513     Converted to Well: Y Well I.D.: GM-54  
 Drilling Fluid: Water     North Coord.: 2995.14271     East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

Project No.: OH000294.0008.00002     Datum: TOC Elev = 730.287     Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
88	N/A	24	8.6			[Dotted Pattern]	SW	Same as above	
90	N/A	24	4.2			[Dotted Pattern]	SW	Same as above	
92	N/A	24	10.7			[Dotted Pattern]	SW	Same as above	
94	N/A	24	6.6			[Dotted Pattern]	SW	Same as above	
96						[Dotted Pattern]		Same as above	
98	N/A	24	18.8			[Dotted Pattern]	SW	SAND Brown, medium-coarse cobbles (20%), well graded, wet	
100	N/A	24	31.1			[Dotted Pattern]	SW	SAND Brown, fine-medium, fine-medium gravel (40%), some silt, well graded, wet	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 8 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 7/11/06 @ 1550  
 Driller: M. Osterberg     Total Depth: 115     End Drilling: 7/12/06 @ 1300  
 Drilling Method: Rotosonic     Surface Elev.: 730.513     Converted to Well: Y Well I.D.: GM-54  
 Drilling Fluid: Water     North Coord.: 2995.14271     East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

Project No.: OH000294.0008.00002     Datum: TOC Elev = 730.287     Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
102	N/A	24	39.2				SW	Same as above	
104	N/A	24	0.0				SW	Same as above	
106	N/A	24	0.0				GM	SAND/GRAVEL/SILT Brown, fine-coarse sand (50%), fine-medium gravel (30%), silt (20%), well graded, wet	
108	N/A	24	0.0				SW	SAND Brown, medium-coarse, medium gravel (10%), well graded, wet	
								Same as above	
110	N/A	24	0.0				SW	Same as above	
112	N/A	24	0.0				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/11/06 @ 1550

Driller: M. Osterberg

Total Depth: 115

End Drilling: 7/12/06 @ 1300

Drilling Method: Rotosonic

Surface Elev.: 730.513

Converted to Well: Y Well I.D.: GM-54

Drilling Fluid: Water

North Coord.: 2995.14271

East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

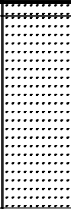
Project No.: OH000294.0008.00002

Datum: TOC Elev = 730.287

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
114	N/A	24	0.0				SW	Same as above	
116								End of boring	
118									
120									
122									
124									

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 10 of 10

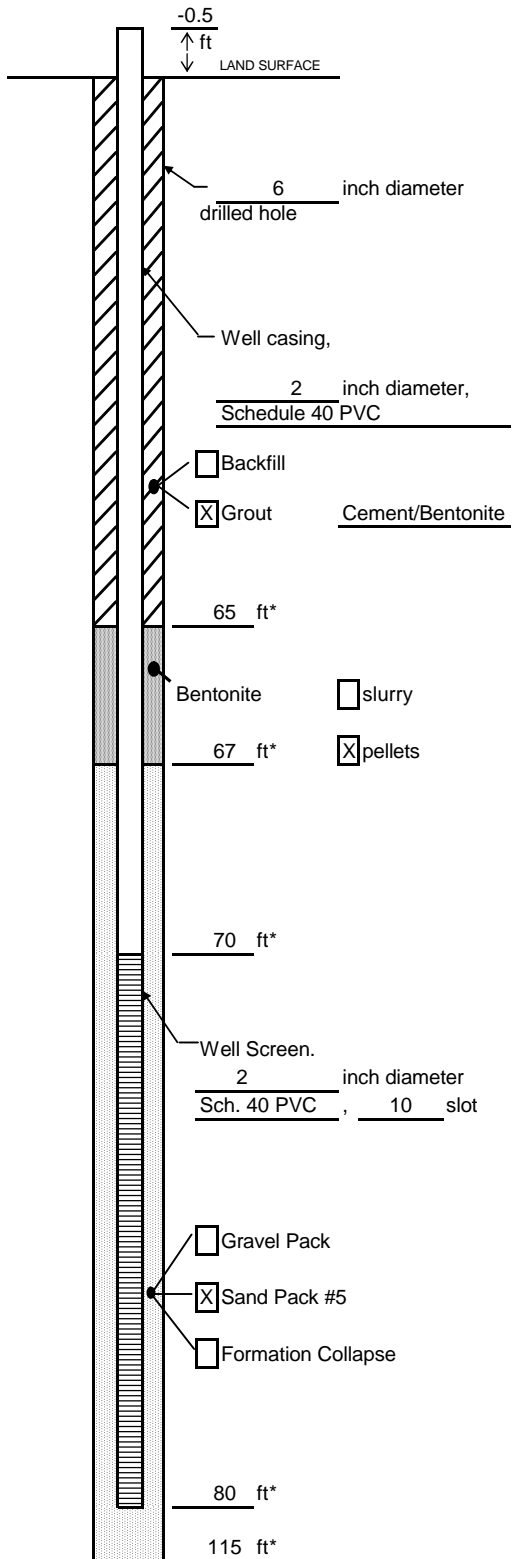
Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 7/11/06 @ 1550  
 Driller: M. Osterberg     Total Depth: 115     End Drilling: 7/12/06 @ 1300  
 Drilling Method: Rotosonic     Surface Elev.: 730.513     Converted to Well: Y Well I.D.: GM-54  
 Drilling Fluid: Water     North Coord.: 2995.14271     East Coord.: 6817.71652

Remarks: Water samples 70-75'; 80-85'; 95-100'; 110-115'

Project No.: OH000294.0008.00002     Datum: TOC Elev = 730.287     Filename: July 2006

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-54  
 Town/City Moraine  
 County Montgomery State Ohio  
 Permit No. NA

Land-Surface (LS) Elevation and Datum:  
730.513 feet  Surveyed  
 Estimated

Installation Date(s) 7/25/2006  
 Drilling Method Rotosonic  
 Drilling Contractor Boart Longyear  
 Drilling Fluid Water

Development Technique(s) and Date(s)  
Pumping - surge with pump 7/30/06

Fluid Loss During Drilling ~300 gallons  
 Water Removed During Development 320 gallons  
 Static Depth to Water 21.68 feet below M.P.  
 Pumping Depth to Water NM feet below M.P.  
 Pumping Duration 1.20 hours  
 Yield 4 gpm Date 7/30/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring well - Well B

Remarks TOC Elevation = 730.287

Time 1110, 1113, 1116, 1119, 1122

pH 6.65, 6.44, 6.46, 6.45, 6.45

Conductivity 1.28, 1.27, 1.27, 1.27, 1.27

Turbidity 0, 0, 0, 0, 0 (clear-nonturbid)

Temperature 19.0, 18.8, 18.7, 18.7, 18.6

Prepared by T. Fortner

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See GM-56 for lithologic description from 0-35'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/26/06

Driller: M. Osterberg

Total Depth: 35

End Drilling: 7/26/06

Drilling Method: Rotosonic

Surface Elev.: 719.900

Converted to Well: Y Well I.D.: GM-55

Drilling Fluid: Water

North Coord.: -645.93943

East Coord.: 5202.05871

Remarks: Shallow well pair to GM-56. Boring previously "Well-D"

Project No.: OH000294.0008.00002

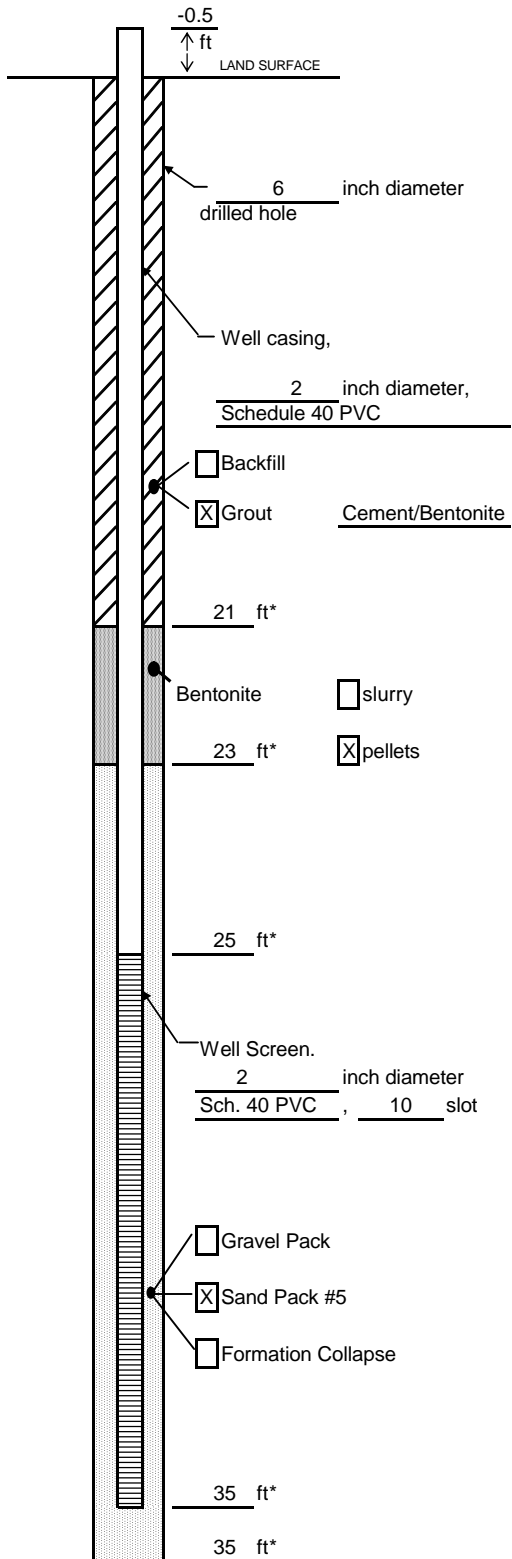
Datum: TOC Elev. 719.857

Filename: July 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-55  
 Town/City Moraine  
 County Montgomery State Ohio  
 Permit No. NA

Land-Surface (LS) Elevation and Datum:  
719.900 feet  Surveyed  
 Estimated

Installation Date(s) 7/27/2006  
 Drilling Method Rotosonic  
 Drilling Contractor Boart Longyear  
 Drilling Fluid Water

Development Technique(s) and Date(s)  
Pumping - surge with pump 7/28/06

Fluid Loss During Drilling ~80 gallons  
 Water Removed During Development 100 gallons  
 Static Depth to Water 15.1 feet below M.P.  
 Pumping Depth to Water NM feet below M.P.  
 Pumping Duration 0.70 hours  
 Yield 3 gpm Date 7/28/06  
 Specific Capacity NM gpm/ft


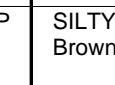
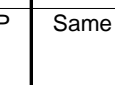
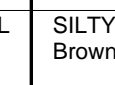
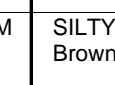
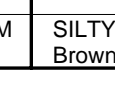
Well Purpose Monitoring well - Well D  
 Remarks TOC Elevation = 719.857

Time 1311, 1314, 1317, 1320, 1323  
 pH 6.29, 6.30, 6.27, 6.28, 6.29  
 Conductivity 1.18, 1.10, 1.10, 1.10, 1.10  
 Turbidity 18.0, 17, 0, 0, 0 (clear-nonturbid)  
 Temperature 18.6, 18.1, 18.0, 18.1, 18.2

Prepared by T. Fortner

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								No recovery	
2	N/A	24	1.6				CL	SILTY CLAY Brown to dark gray, medium gravel to cobble (10%), soft, medium plasticity, moist	
4	N/A	24	3.4				SP	SILTY SAND/GRAVEL Brown, fine-medium sand, fine gravel, poorly graded, wet	
6	N/A	24	5.3				SP	Same as above	
8	N/A	24	5.7				CL	SILTY CLAY Brown, soft, medium plasticity, moist-dry	
10	N/A	24	1.2				SM	SILTY SAND Brown, fine-medium, wet	
12	N/A	24	4.9				SM	SILTY SAND Brown, fine-medium, fine gravel (5%), moist	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/12/06 @ 1518

Driller: M. Osterberg

Total Depth: 85

End Drilling: 7/13/06 @ 0830

Drilling Method: Rotosonic

Surface Elev.: 719.745

Converted to Well: Y Well I.D.: GM-56

Drilling Fluid: Water

North Coord.: -646.38569

East Coord.: 5209.35261

Remarks: Water samples 25-30'; 35-40'; 55-66'

Project No.: OH000294.0008.00002

Datum: TOC Elev. 719.516

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	4.7				SW	Same as above, fine gravel (10%)	
16	N/A	24	6.7				GW	GRAVEL Brown, fine-medium, fine sand (20-30%), well graded, moist	
18	N/A	24	2.9				SW	SAND Brown, medium-coarse, fine-medium gravel (10-20%), well graded, moist	
20	N/A	24	7.0				GW	GRAVEL Fine-medium, medium-coarse sand (20%), well graded, moist	
22	N/A	24	5.5				GW	Same as above, wet	▼
24	N/A	24	3.4				SW	SAND Brown, medium-coarse, medium-coarse gravel (20%), wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/12/06 @ 1518

Driller: M. Osterberg

Total Depth: 85

End Drilling: 7/13/06 @ 0830

Drilling Method: Rotosonic

Surface Elev.: 719.745

Converted to Well: Y Well I.D.: GM-56

Drilling Fluid: Water

North Coord.: -646.38569

East Coord.: 5209.35261

Remarks: Water samples 25-30'; 35-40'; 55-66'

Project No.: OH000294.0008.00002

Datum: TOC Elev. 719.516

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	7.5				SW	Same as above	
28	N/A	24	6.1				SW	Same as above	
30	N/A	24	7.2				GW	GRAVEL Brown, medium-coarse, medium-coarse sand (30%), wet	
32	N/A	24	4.5				GW	Same as above	
34	N/A	24	1.6				SW	SAND Brown, medium-coarse, medium coarse gravel (10%), well graded, wet	
36	N/A	24	2.2				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/12/06 @ 1518

Driller: M. Osterberg

Total Depth: 85

End Drilling: 7/13/06 @ 0830

Drilling Method: Rotosonic

Surface Elev.: 719.745

Converted to Well: Y Well I.D.: GM-56

Drilling Fluid: Water

North Coord.: -646.38569

East Coord.: 5209.35261

Remarks: Water samples 25-30'; 35-40'; 55-66'

Project No.: OH000294.0008.00002

Datum: TOC Elev. 719.516

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	3.9				SW	Same as above	
40	N/A	24	4.1				SW	Same as above	
42	N/A	24	3.6				SW	SAND Brown, medium-coarse, medium coarse gravel (5%), wet	
44	N/A	24	3.4				SW	Same as above, fine gravel (10%)	
46	N/A	24	0.0				SW	Same as above	
48	N/A	24	1.0				SW	Same as above	
50									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 7

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/12/06 @ 1518

Driller: M. Osterberg

Total Depth: 85

End Drilling: 7/13/06 @ 0830

Drilling Method: Rotosonic

Surface Elev.: 719.745

Converted to Well: Y Well I.D.: GM-56

Drilling Fluid: Water

North Coord.: -646.38569

East Coord.: 5209.35261

Remarks: Water samples 25-30'; 35-40'; 55-66'

Project No.: OH000294.0008.00002

Datum: TOC Elev. 719.516

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
	N/A	24	5.2				SW	Same as above	
52	N/A	24	3.2				SW	Same as above	
54	N/A	24	6.2				SW	Same as above	
56	N/A	24	5.7				SW	SAND Brown, fine-medium, medium gravel (20%), well graded, wet	
58	N/A	24	4.9				SW	Same as above	
60	N/A	24	5.7				SW	SAND Brown, fine-coarse, fine gravel (5%), well graded, wet	
62	N/A	24	6.2				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 7

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/12/06 @ 1518

Driller: M. Osterberg

Total Depth: 85

End Drilling: 7/13/06 @ 0830

Drilling Method: Rotosonic

Surface Elev.: 719.745

Converted to Well: Y Well I.D.: GM-56

Drilling Fluid: Water

North Coord.: -646.38569

East Coord.: 5209.35261

Remarks: Water samples 25-30'; 35-40'; 55-66'

Project No.: OH000294.0008.00002

Datum: TOC Elev. 719.516

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	5.4			[Dotted Pattern]	SW	Same as above	
66	N/A	24	3.7			[Dotted Pattern]	SW	Same as above	
68	N/A	24	2.2			[Dotted Pattern]	SW	Same as above	
70	N/A	24	0.5			[Dotted Pattern]	SW	Same as above	
72	N/A	24	1.0			[Dotted Pattern]	SW	Same as above	
74	N/A	24	0.9			[Diagonal Lines]	CL	SILTY CLAY Brown, fine gravel (5%), high plasticity, moist-wet	
						[Dotted Pattern]	SP	SAND	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/12/06 @ 1518

Driller: M. Osterberg

Total Depth: 85

End Drilling: 7/13/06 @ 0830

Drilling Method: Rotosonic

Surface Elev.: 719.745

Converted to Well: Y Well I.D.: GM-56

Drilling Fluid: Water

North Coord.: -646.38569

East Coord.: 5209.35261

Remarks: Water samples 25-30'; 35-40'; 55-66'

Project No.: OH000294.0008.00002

Datum: TOC Elev. 719.516

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	2.7				SP	Brown, medium-coarse, poorly graded, trace fine gravel, wet	
								Same as above	
78	N/A	24	3.2				SP	Same as above	
80	N/A	24	4.2				SP	Same as above	
82	N/A	24	4.7				GP	GRAVEL Brown, medium-coarse, medium-coarse sand (20%), some silt, poorly graded, wet	
84	N/A	12	1.3				SP	SAND Brown, medium-coarse, trace fine gravel, poorly graded, wet	
86								End of boring	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/12/06 @ 1518

Driller: M. Osterberg

Total Depth: 85

End Drilling: 7/13/06 @ 0830

Drilling Method: Rotosonic

Surface Elev.: 719.745

Converted to Well: Y Well I.D.: GM-56

Drilling Fluid: Water

North Coord.: -646.38569

East Coord.: 5209.35261

Remarks: Water samples 25-30'; 35-40'; 55-66'

Project No.: OH000294.0008.00002

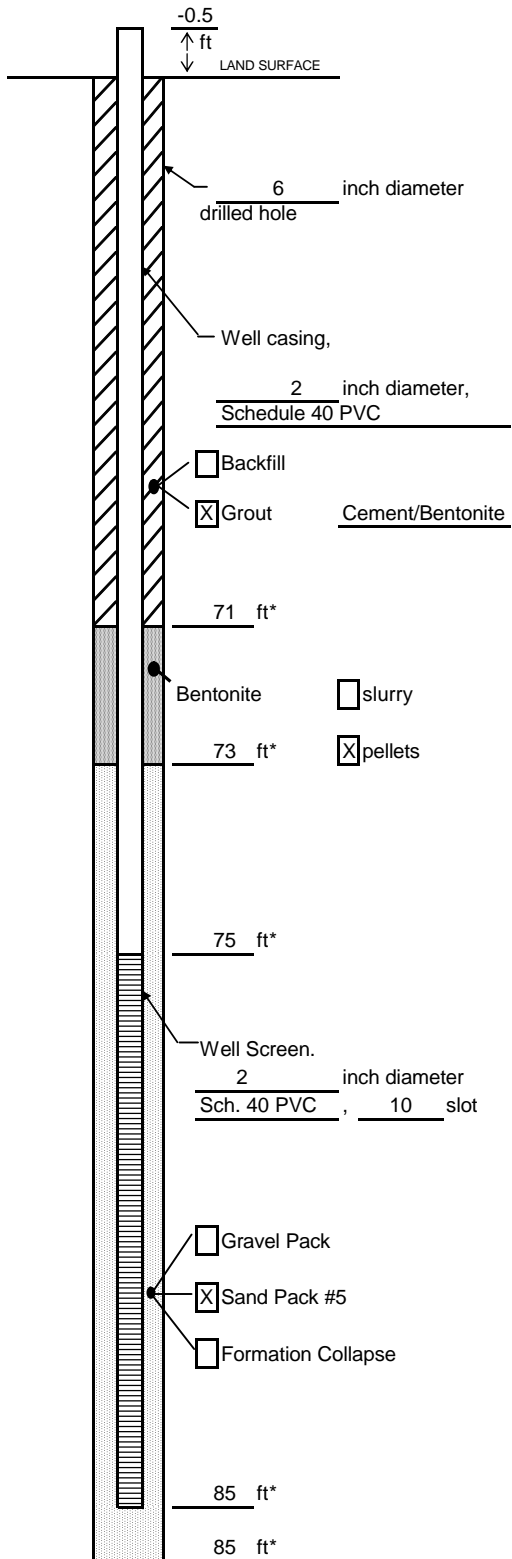
Datum: TOC Elev. 719.516

Filename: July 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-56

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

719.745 feet  Surveyed

Estimated

Installation Date(s) 7/27/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 7/28/06

Fluid Loss During Drilling ~150 gallons

Water Removed During Development 170 gallons

Static Depth to Water 14.5 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.20 hours

Yield 4 gpm Date 7/30/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring well - Well E

Remarks TOC Elevation = 719.516

Time 1425, 1428, 1431, 1434, 1437

pH 6.67, 6.56, 6.35, 6.33, 6.33

Conductivity 1.02, 1.01, 1.01, 1.01, 1.01

Turbidity 19, 14, 6, 1, 0 (clear-nonturbid)

Temperature 19.1, 19.0, 19.2, 19.0, 19.0

Prepared by T. Fortner

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	0	N/A					No recovery	
2									
4									
6	N/A	24	3.5				GW	GRAVEL Brown, fine-medium, medium-coarse sand (15%), some silt, well graded, moist	
8	N/A	24	0.4				GW	Same as above	
10	N/A	24	0.0				GW	Same as above	
12	N/A	24	2.8				SW	SAND Brown, medium-coarse, fine-medium gravel (30%), well graded, moist	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/13/06 @ 1022

Driller: M. Osterberg

Total Depth: 45

End Drilling: 7/13/06 @ 1138

Drilling Method: Rotosonic

Surface Elev.: 719.406

Converted to Well: Y Well I.D.: GM-57

Drilling Fluid: Water

North Coord.: -993.49389

East Coord.: 4965.98684

Remarks: Water sample 25-30'; 40-45'

Project No.: OH000294.0008.00002

Datum: TOC Elev. 721.740

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	1.2			[Dotted Pattern]	SW	Same as above	
16	N/A	24	2.7			[Dotted Pattern]	SW	Same as above	
18	N/A	24	3.0			[Dotted Pattern]	SW	Same as above, fine-medium gravel (40%)	
20	N/A	24	1.5			[Dotted Pattern]	SW	Same as above	
22	N/A	24	3.3			[Dotted Pattern]	SW	Same as above, wet	▼
24	N/A	24	4.2			[Dotted Pattern]	SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/13/06 @ 1022

Driller: M. Osterberg

Total Depth: 45

End Drilling: 7/13/06 @ 1138

Drilling Method: Rotosonic

Surface Elev.: 719.406

Converted to Well: Y Well I.D.: GM-57

Drilling Fluid: Water

North Coord.: -993.49389

East Coord.: 4965.98684

Remarks: Water sample 25-30'; 40-45'

Project No.: OH000294.0008.00002

Datum: TOC Elev. 721.740

Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	3.1				GW	GRAVEL Brown, fine-medium, coarse sand (5%), well graded, wet	
28	N/A	24	4.0				GW	Same as above	
30	N/A	24	4.2				SW	SAND Brown, medium-coarse, fine-medium gravel (10%), wet	
32	N/A	24	2.0				SW	Same as above	
34	N/A	24	0.7				SW	Same as above	
36	N/A	24	0.0				GW	GRAVEL Brown, fine-medium, medium-coarse sand (30%), well graded, wet	
	N/A	24	0.1				GW	Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 3 of 4





Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 7/13/06 @ 1022  
 Driller: M. Osterberg     Total Depth: 45     End Drilling: 7/13/06 @ 1138  
 Drilling Method: Rotosonic     Surface Elev.: 719.406     Converted to Well: Y Well I.D.: GM-57  
 Drilling Fluid: Water     North Coord.: -993.49389     East Coord.: 4965.98684

Remarks: Water sample 25-30'; 40-45'

Project No.: OH000294.0008.00002     Datum: TOC Elev. 721.740     Filename: July 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	0.3						
40	N/A	24	0.0				SW	SAND Brown, medium-coarse, fine gravel (20-30%), little fine sand and silt, well graded, wet	
42	N/A	24	0.5				SW	Same as above	
44	N/A	24	0.5				SW	Same as above	
46								End of boring	
48									
50									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 7/13/06 @ 1022

Driller: M. Osterberg

Total Depth: 45

End Drilling: 7/13/06 @ 1138

Drilling Method: Rotosonic

Surface Elev.: 719.406

Converted to Well: Y Well I.D.: GM-57

Drilling Fluid: Water

North Coord.: -993.49389

East Coord.: 4965.98684

Remarks: Water sample 25-30'; 40-45'

Project No.: OH000294.0008.00002

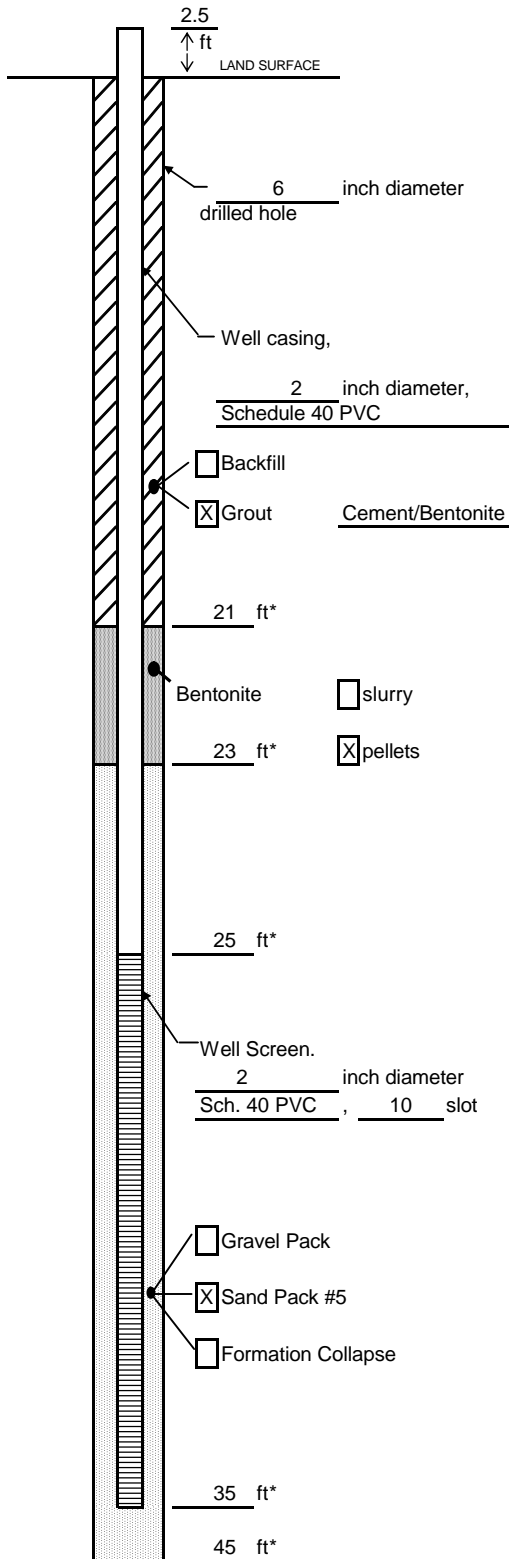
Datum: TOC Elev. 721.740

Filename: July 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-57  
Town/City Moraine  
County Montgomery State Ohio  
Permit No. NA

Land-Surface (LS) Elevation and Datum:  
719.406 feet  Surveyed  
 Estimated

Installation Date(s) 7/27/2006  
Drilling Method Rotosonic  
Drilling Contractor Boart Longyear  
Drilling Fluid Water

Development Technique(s) and Date(s)  
Pumping - surge with pump 7/30/06

Fluid Loss During Drilling ~80 gallons  
Water Removed During Development 90 gallons  
Static Depth to Water 17.16 feet below M.P.  
Pumping Depth to Water 17.16 feet below M.P.  
Pumping Duration 0.50 hours  
Yield 3 gpm Date 7/30/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring well - Well F

Remarks TOC Elevation = 721.740  
Time 820, 823, 826, 829, 832  
pH 5.79, 5.81, 5.94, 5.95, 5.96  
Conductivity 1.10, 1.18, 1.12, 1.10, 1.12  
Turbidity 0, 0, 0, 0, 0 (clear-nonturbid)  
Temperature 18.0, 17.6, 16.4, 16.3, 16.2

Prepared by T. Fortner

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	0	N/A					No recovery	
2									
4									
6									
8	N/A	24	0.0				SW	SAND Brown, medium-coarse, fine-medium gravel (30%), moist	
10	N/A	24	0.0				SW	Same as above, dry	
12	N/A	24	0.0				SW	Same as above	
							SW	Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 1 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/21/06 @ 1648  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/22/06 @ 1630  
 Drilling Method: Rotosonic     Surface Elev.: 735.588     Converted to Well: Y Well I.D.: GM-58  
 Drilling Fluid: Water     North Coord.: 3450.80045     East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009     Datum: TOC Elev=735.462     Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
16	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
18	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
20	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
22	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
24	N/A	24	0.0			[Dotted Pattern]	SW	Same as above, wet	▼
24	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 2 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/21/06 @ 1648  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/22/06 @ 1630  
 Drilling Method: Rotosonic     Surface Elev.: 735.588     Converted to Well: Y Well I.D.: GM-58  
 Drilling Fluid: Water     North Coord.: 3450.80045     East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009     Datum: TOC Elev=735.462     Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	0.0				SW	Same as above	
28	N/A	24	0.0				GW	GRAVEL Brown, fine-medium, medium-coarse sand (30%), well graded, wet	
30	N/A	24	0.0				GW	Same as above	
30	N/A	24	0.0				CL	SANDY CLAY Brown, stiff, moist, medium plasticity, moist	
32	N/A	24	0.0				CL	SILTY CLAY Gray, fine gravel (10%), stiff, dry, low-medium plasticity, moist	
34	N/A	24	0.0				CL	Same as above	
36	N/A	24	1.8				CL	Same as above, fine-medium gravel (40-50%)	
36	N/A	24	0.0				CL	Same as above	
36	N/A	24	2.9				CL	Same as above, very stiff, fine gravel (10%)	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 3 of 10

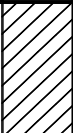
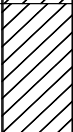
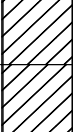
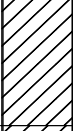
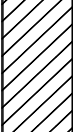
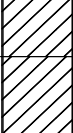
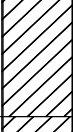
Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/21/06 @ 1648  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/22/06 @ 1630  
 Drilling Method: Rotosonic     Surface Elev.: 735.588     Converted to Well: Y Well I.D.: GM-58  
 Drilling Fluid: Water     North Coord.: 3450.80045     East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009     Datum: TOC Elev=735.462     Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	10.4				CL	Same as above	
40	N/A	24	16.1				CL	Same as above, fine-medium gravel (10%)	
42	N/A	24	17.3				CL	Same as above	
44	N/A	24	15.2				CL	SANDY CLAY Gray, fine sand, medium plasticity, soft, moist, 6 inches fine sand stringer, fine gravel (5%)	
46	N/A	24	14.6				CL	Same as above, 6 inches fine sand stringer, fine gravel (5%)	
48	N/A	24	16.0				CL	Same as above	
50	N/A	24	16.0				CL	Same as above	

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 8/21/06 @ 1648

Driller: K. Gobell

Total Depth: 115

End Drilling: 8/22/06 @ 1630

Drilling Method: Rotosonic

Surface Elev.: 735.588

Converted to Well: Y Well I.D.: GM-58

Drilling Fluid: Water

North Coord.: 3450.80045

East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009

Datum: TOC Elev=735.462

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	17.0				CL	SILTY CLAY Gray, soft, medium plasticity, fine gravel 5%, dry	
							CL	Same as above	
54	N/A	24	17.1				CL	Same as above	
							SP	SAND Gray, fine, poorly graded	
56	N/A	24	16.7				CL	SANDY CLAY Gray, fine-medium sand, stiff, low plasticity, dry	
							CL	Same as above	
58	N/A	24	17.2				CL	SILTY CLAY Dark gray, fine-medium gravel (5%), trace organic material, stiff, low plasticity, dry	
							CL	Same as above	
60	N/A	24	18.2				CL	SILTY CLAY Brown, soft, medium plasticity, moist-dry	
							CL	Same as above	
62	N/A	24	22.4				CL	Same as above	
							CL	Same as above	

Composite Sample to Lab    
 Grab Sample to Lab    
 Split-Spoon Not Analyzed    
 Page 5 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/21/06 @ 1648  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/22/06 @ 1630  
 Drilling Method: Rotosonic     Surface Elev.: 735.588     Converted to Well: Y Well I.D.: GM-58  
 Drilling Fluid: Water     North Coord.: 3450.80045     East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009     Datum: TOC Elev=735.462     Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	17.5				CL	Same as above	
66	N/A	24	17.5				CL	SILTY CLAY Gray, very stiff, low-medium plasticity, fine gravel (5-10%), dry	
68	N/A	24	18.1				CL	Same as above	
70	N/A	24	15.5				CL	Same as above	
70	N/A	24	N/A				SP	SAND Brown, fine-medium, little silt, wet	
72	N/A	24	N/A					No recovery	
72	N/A	24	N/A					No recovery	
74	N/A	24	N/A					No recovery	
74	N/A	24	0.0				GP	GRAVEL	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 8/21/06 @ 1648

Driller: K. Gobell

Total Depth: 115

End Drilling: 8/22/06 @ 1630

Drilling Method: Rotosonic

Surface Elev.: 735.588

Converted to Well: Y Well I.D.: GM-58

Drilling Fluid: Water

North Coord.: 3450.80045

East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009

Datum: TOC Elev=735.462

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	0.0					Brown, fine-medium, coarse sand (10-20%), poorly graded, wet	
78	N/A	24	0.0				SP	SAND Brown, medium-coarse, poorly graded, wet	
80	N/A	24	0.0				SP	Same as above	
82	N/A	24	0.0				GW	GRAVEL Brown, fine, medium-coarse sand (30%), wet	
84	N/A	24	0.0				SW	SAND Brown, medium-coarse, fine gravel (30%), well graded, wet	
86	N/A	24	0.0				SP	SAND Olive gray, fine-medium, poorly graded, wet	
	N/A	24	0.0				SP	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 7 of 10

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 8/21/06 @ 1648

Driller: K. Gobell

Total Depth: 115

End Drilling: 8/22/06 @ 1630

Drilling Method: Rotosonic

Surface Elev.: 735.588

Converted to Well: Y Well I.D.: GM-58

Drilling Fluid: Water

North Coord.: 3450.80045

East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009

Datum: TOC Elev=735.462

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
88	N/A	24	0.0			[Dotted Pattern]	SP	Same as above	
90	N/A	24	0.0			[Dotted Pattern]	SP	Same as above	
92	N/A	24	0.0			[Dotted Pattern]	SP	Same as above	
94	N/A	24	0.0			[Dotted Pattern]	SP	Same as above	
96	N/A	24	0.0			[Dotted Pattern]	SP	Same as above	
98	N/A	24	0.0			[Dotted Pattern]	SP	Same as above, gray	
100	N/A	24	0.0			[Dotted Pattern]	SP	Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 8 of 10







Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/21/06 @ 1648  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/22/06 @ 1630  
 Drilling Method: Rotosonic     Surface Elev.: 735.588     Converted to Well: Y Well I.D.: GM-58  
 Drilling Fluid: Water     North Coord.: 3450.80045     East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009     Datum: TOC Elev=735.462     Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
102	N/A	24	0.0				SW	SAND Brown, fine-coarse, trace fine-medium gravel, well graded, wet	
104	N/A	24	0.0				SW	Same as above	
106	N/A	24	13.1				GW	GRAVEL Gray, fine-medium, fine-coarse sand (30%), well graded, wet	
108	N/A	24	13.2				GW	Same as above	
110	N/A	24	2.4				GW	Same as above	
112	N/A	24	0.7				GW	Same as above	

Composite Sample to Lab     
  Grab Sample to Lab     
  Split-Spoon Not Analyzed     
 Page 9 of 10


Drilling Co.: Boart Longyear      Geologist: T. Fortner      Begin Drilling: 8/21/06 @ 1648  
 Driller: K. Gobell      Total Depth: 115      End Drilling: 8/22/06 @ 1630  
 Drilling Method: Rotosonic      Surface Elev.: 735.588      Converted to Well: Y Well I.D.: GM-58  
 Drilling Fluid: Water      North Coord.: 3450.80045      East Coord.: 7183.08786

Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009      Datum: TOC Elev=735.462      Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
114	N/A	24	2.1				GW	Same as above	
116								End of boring	
118									
120									
122									
124									

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 10 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/21/06 @ 1648  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/22/06 @ 1630  
 Drilling Method: Rotosonic     Surface Elev.: 735.588     Converted to Well: Y Well I.D.: GM-58  
 Drilling Fluid: Water     North Coord.: 3450.80045     East Coord.: 7183.08786

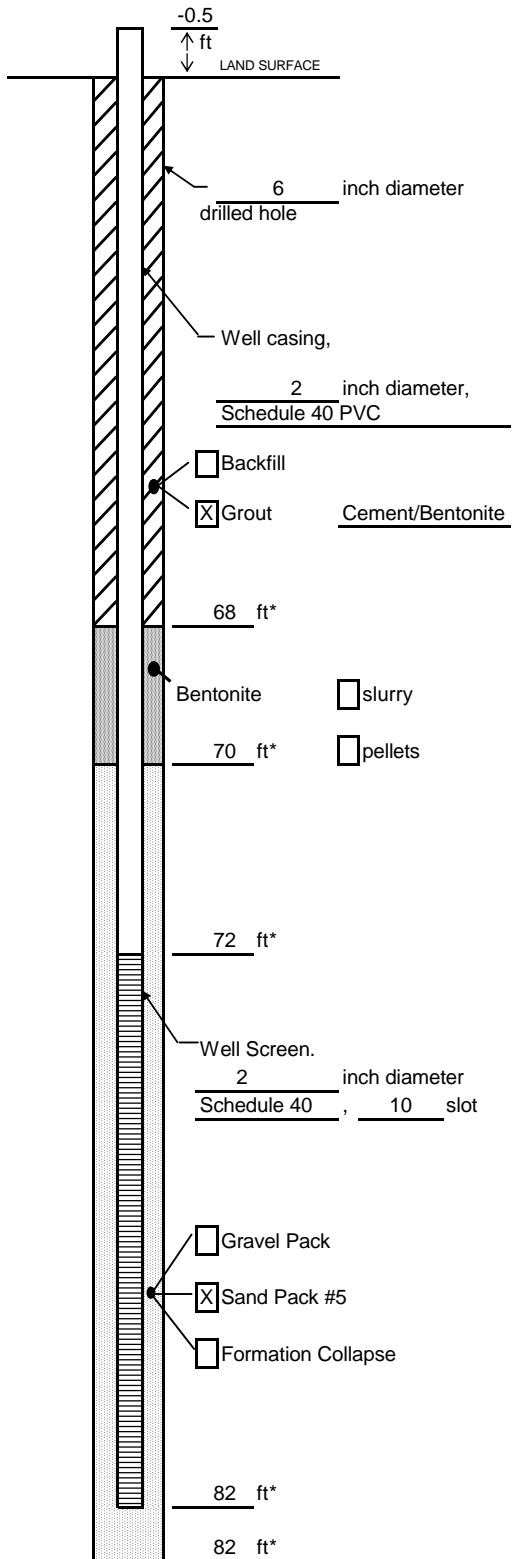
Remarks: Water samples 25-30'; 75-80'; 95-100'

Project No.: OH000294.0009     Datum: TOC Elev=735.462     Filename: August 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-58

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

735.588 feet  Surveyed

Estimated

Installation Date(s) 9/1/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 9/1/06

Fluid Loss During Drilling NM gallons

Water Removed During Development NM gallons

Static Depth to Water 28.32 feet below M.P.

Pumping Depth to Water 79 feet below M.P.

Pumping Duration NM hours

Yield NM gpm Date NA

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well - Well I

Remarks TOC Elevation = 735.462

Time 1600, 1610, 1615, 1620, 1625, 1630

pH 6.78, 6.61, 6.61, 6.58, 6.59, 6.59

Conductivity 1.20, 1.20, 1.20, 1.21, 1.20, 1.20

Turbidity 232, 137, 72, 36, 28, 18

Temp 17.8, 17.3, 17.5, 17.4, 17.3, 17.4

Prepared by J. Manzo/ J. Wallace

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See GM-61 for lithologic description from 0-35'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/30/06

Driller: K. Gobell

Total Depth: 35

End Drilling: 8/30/06

Drilling Method: Rotosonic

Surface Elev.: 732.464

Converted to Well: Y Well I.D.: GM-59

Drilling Fluid: Water

North Coord.: 4501.29894

East Coord.: 6323.48631

Remarks: Shallow nested pair to GM-60.

Project No.: OH000294.0008.00002

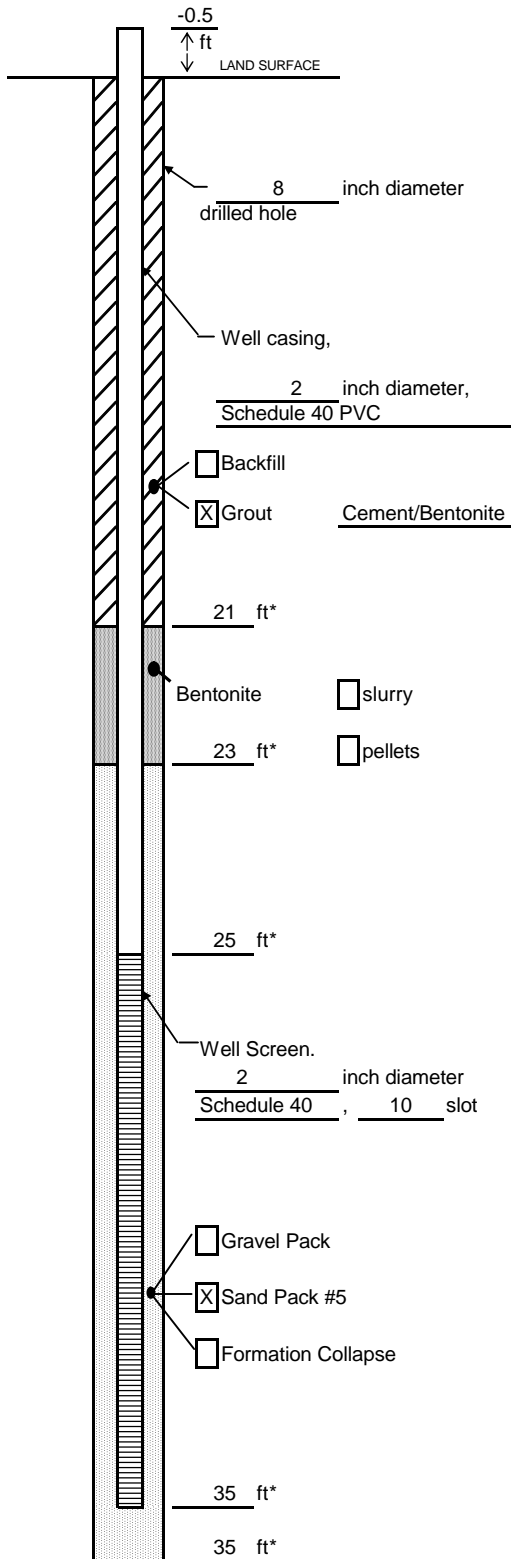
Datum: TOC Elev 732.246

Filename: July 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-59  
 Town/City Moraine  
 County Montgomery State Ohio  
 Permit No. NA

Land-Surface (LS) Elevation and Datum:  
732.464 feet  Surveyed  
 Estimated

Installation Date(s) 8/30/2006  
 Drilling Method Rotosonic  
 Drilling Contractor Boart Longyear  
 Drilling Fluid Water

Development Technique(s) and Date(s)  
Pumping - surge with pump 9/1/06

Fluid Loss During Drilling ~50 gallons  
 Water Removed During Development 56.8 gallons  
 Static Depth to Water 25.8 feet below M.P.  
 Pumping Depth to Water 24.9 feet below M.P.  
 Pumping Duration 35.22 hours  
 Yield 0.62 gpm Date 9/1/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well - Well J (Shallow)

Remarks TOC Elevation = 732.246

Time 10:55, 10:58, 11:01, 11:04

pH 6.69, 6.67, 6.66, 6.67

Conductivity 1.43, 1.34, 1.33, 1.34

Temperature 18.4, 18.4, 18.5, 18.5

Turbidity 76, 53, 35, 27

Prepared by A.Jacobs

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See GM-61 for lithologic description from 0-52'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/30/06

Driller: K. Gobell

Total Depth: 52

End Drilling: 8/30/06

Drilling Method: Rotosonic

Surface Elev.: 732.464

Converted to Well: Y Well I.D.: GM-60

Drilling Fluid: Water

North Coord.: 4701.07762

East Coord.: 6323.54823

Remarks: Intermediate nested pair to GM-59.

Project No.: OH000294.0008.00002

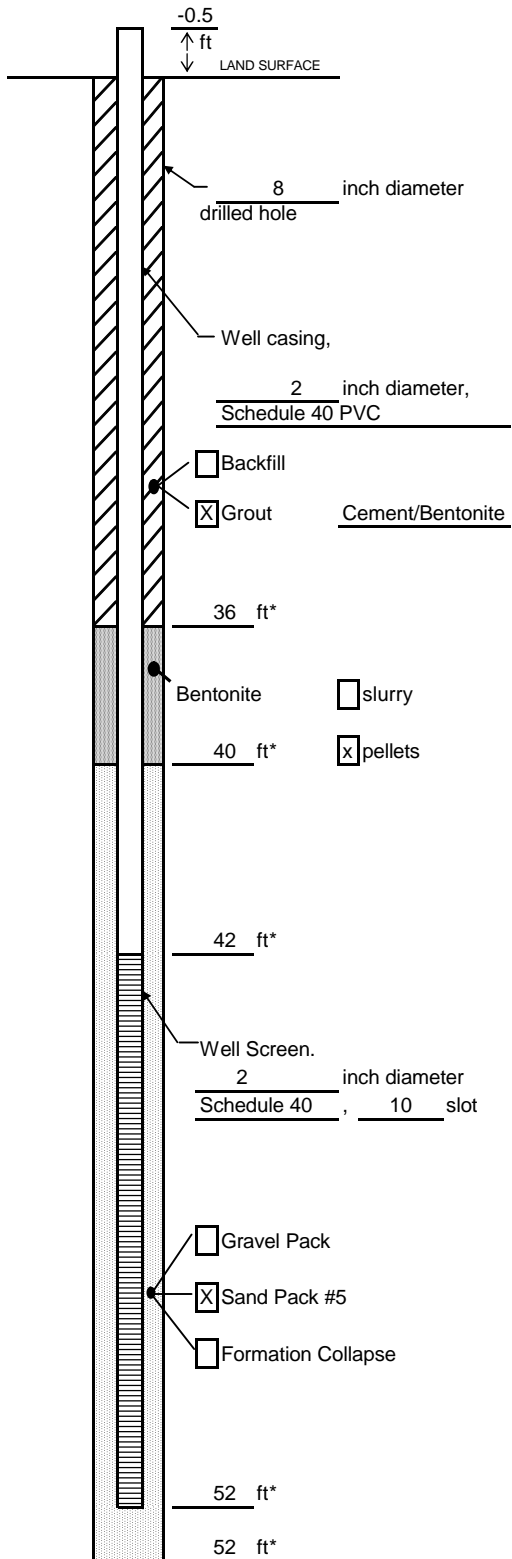
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Filename: July 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-60

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

732.464 feet  Surveyed

Estimated

Installation Date(s) 8/30/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 9/1/06

Fluid Loss During Drilling ~50 gallons

Water Removed During Development ~80 gallons

Static Depth to Water 25.8 feet below M.P.

Pumping Depth to Water 24.8 feet below M.P.

Pumping Duration 0.83 hours

Yield 0.62 gpm Date 9/1/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well-Well J (Intermediate)

Remarks TOC Elevation = 732.237

Time 11:48, 11:52, 11:55, 11:58

Temperature 19.2, 19.1, 19.2, 19.1

Conductivity 1.23, 1.22, 1.22, 1.22

pH 6.66, 6.68, 6.65, 6.67

Turbidity 9, 7, 6, 4

Prepared by A. Jacobs / J. Wallace

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	0.0					ASPHALT/CONCRETE	
2									
4							SW	SAND Brown, fine-coarse, fine-coarse gravel (40%), well graded, wet	
6	N/A	24	0.3				SW	SAND Brown, fine-medium, fine gravel (5%), well graded, moist-dry	
8	N/A	24	1.4				SW	SAND Yellowish brown, fine-coarse, fine-coarse gravel (40%), well graded, dry	
10	N/A	24	0.0				SW	Same as above, fine-medium gravel (30%)	
12	N/A	24	0.0				SW	Same as above	
	N/A	24	0.0				SW	Same as above	
							SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 8/23/06 @ 1015

Driller: K. Gobell

Total Depth: 115

End Drilling: 8/24/06 @ 0940

Drilling Method: Rotosonic

Surface Elev.: 732.483

Converted to Well: Y Well I.D.: GM-61

Drilling Fluid: Water

North Coord.: 4501.21590

East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009

Datum: TOC Elev. 732.225

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
16	N/A	24	0.4			[Dotted Pattern]	SW	Same as above, medium-coarse sand, fine- medium gravel (40%)	
18	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
20	N/A	24	0.0			[Dotted Pattern]	SW	Same as above	
22	N/A	24	0.0			[Dotted Pattern]	SW	SAND/GRAVEL Yellow brown, medium-coarse sand, fine-coarse gravel (50%), well graded, moist	
24	N/A	24	0.0			[Dotted Pattern]	SW	SAND Light gray, fine-medium, fine-coarse gravel (30%), well graded, dry	
						[Dotted Pattern]	SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 8/23/06 @ 1015

Driller: K. Gobell

Total Depth: 115

End Drilling: 8/24/06 @ 0940

Drilling Method: Rotosonic

Surface Elev.: 732.483

Converted to Well: Y Well I.D.: GM-61

Drilling Fluid: Water

North Coord.: 4501.21590

East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009

Datum: TOC Elev. 732.225

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	0.0				GW	GRAVEL Yellow brown, fine-coarse, coarse sand (20%), well graded, wet	
28	N/A	24	0.0				GW	Same as above	
30	N/A	24	0.0				GW	Same as above	
32	N/A	24	6.1				GW	Same as above	
34	N/A	24	3.2				SW	SAND Yellow brown, medium-coarse, fine-coarse gravel (10%), well graded, wet	
36	N/A	24	13.0				GW	Same as above	
	N/A	24	12.8				GW	Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 3 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/23/06 @ 1015  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/24/06 @ 0940  
 Drilling Method: Rotosonic     Surface Elev.: 732.483     Converted to Well: Y Well I.D.: GM-61  
 Drilling Fluid: Water     North Coord.: 4501.21590     East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009     Datum: TOC Elev. 732.225     Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	12.5				GW	Same as above with little silt	
40	N/A	24	11.8				GW	Same as above	
42	N/A	24	5.8				GW	Same as above	
44	N/A	24	15.1				GW	Same as above	
46	N/A	24	14.5				GW	Same as above	
48	N/A	24	13.9				GW	Same as above	
50									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 8/23/06 @ 1015

Driller: K. Gobell

Total Depth: 115

End Drilling: 8/24/06 @ 0940

Drilling Method: Rotosonic

Surface Elev.: 732.483

Converted to Well: Y Well I.D.: GM-61

Drilling Fluid: Water

North Coord.: 4501.21590

East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009

Datum: TOC Elev. 732.225

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	19.7				GW	Same as above	
54	N/A	24	15.3				CL	SILTY CLAY Yellowish orange, trace medium gravel, low plasticity, stiff, dry	
56	N/A	24	0.0				CL	SILTY CLAY Gray, very stiff, dry, low plasticity, fine-medium gravel (5%), dry	
58	N/A	24	0.0				CL	Same as above	
60	N/A	24	0.0				CL	Same as above	
62	N/A	24	0.0				CL	Same as above	

Composite Sample to Lab     
  Grab Sample to Lab     
  Split-Spoon Not Analyzed     
 Page 5 of 10

Drilling Co.: Boart Longyear      Geologist: T. Fortner      Begin Drilling: 8/23/06 @ 1015  
 Driller: K. Gobell      Total Depth: 115      End Drilling: 8/24/06 @ 0940  
 Drilling Method: Rotosonic      Surface Elev.: 732.483      Converted to Well: Y Well I.D.: GM-61  
 Drilling Fluid: Water      North Coord.: 4501.21590      East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009      Datum: TOC Elev. 732.225      Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	0.0				CL	Same as above	
66	N/A	24	0.0				CL	SANDY CLAY Brown, fine sand, very stiff, low plasticity, dry	
68	N/A	24	0.0				SW	SAND Brown, fine-medium, fine gravel (10%), well graded, wet	
70	N/A	24	0.0				SW	Same as above	
72	N/A	24	0.0				SP	Same as above, no gravel	
							SP	Same as above	
74	N/A	24	0.0				SP	Same as above	
	N/A	12	0.0				SW	SAND	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 8/23/06 @ 1015

Driller: K. Gobell

Total Depth: 115

End Drilling: 8/24/06 @ 0940

Drilling Method: Rotosonic

Surface Elev.: 732.483

Converted to Well: Y Well I.D.: GM-61

Drilling Fluid: Water

North Coord.: 4501.21590

East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009

Datum: TOC Elev. 732.225

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	12	0.0					Brown, fine-coarse gravel and cobbles (20%), well graded, wet	
78	N/A	12	0.0				SW	Same as above	
80	N/A	12	0.0				SW	Same as above	
82	N/A	12	0.0				SW	Same as above	
84	N/A	12	0.0				SW	Same as above, gravel and cobbles (25%)	
86	N/A	12	0.0				SW	Same as above	
	N/A	12	0.0				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 8/23/06 @ 1015

Driller: K. Gobell

Total Depth: 115

End Drilling: 8/24/06 @ 0940

Drilling Method: Rotosonic

Surface Elev.: 732.483

Converted to Well: Y Well I.D.: GM-61

Drilling Fluid: Water

North Coord.: 4501.21590

East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009

Datum: TOC Elev. 732.225

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
88	N/A	12	0.0			[Dotted Pattern]	SW	Same as above	
90	N/A	12	0.0			[Dotted Pattern]	SW	Same as above	
92	N/A	12	0.0			[Dotted Pattern]	SW	Same as above	
94	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	
96	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	
98	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	
100	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 8 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/23/06 @ 1015  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/24/06 @ 0940  
 Drilling Method: Rotosonic     Surface Elev.: 732.483     Converted to Well: Y Well I.D.: GM-61  
 Drilling Fluid: Water     North Coord.: 4501.21590     East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009     Datum: TOC Elev. 732.225     Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
102	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	
104	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	
106	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	
108	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	
110	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	
112	N/A	18	0.0			[Dotted Pattern]	SW	Same as above	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 9 of 10

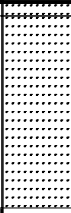
Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/23/06 @ 1015  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/24/06 @ 0940  
 Drilling Method: Rotosonic     Surface Elev.: 732.483     Converted to Well: Y Well I.D.: GM-61  
 Drilling Fluid: Water     North Coord.: 4501.21590     East Coord.: 6318.06175

Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009     Datum: TOC Elev. 732.225     Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
114	N/A	18	0.0				SW	Same as above	
116								End of boring	
118									
120									
122									
124									

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 10 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 8/23/06 @ 1015  
 Driller: K. Gobell     Total Depth: 115     End Drilling: 8/24/06 @ 0940  
 Drilling Method: Rotosonic     Surface Elev.: 732.483     Converted to Well: Y Well I.D.: GM-61  
 Drilling Fluid: Water     North Coord.: 4501.21590     East Coord.: 6318.06175

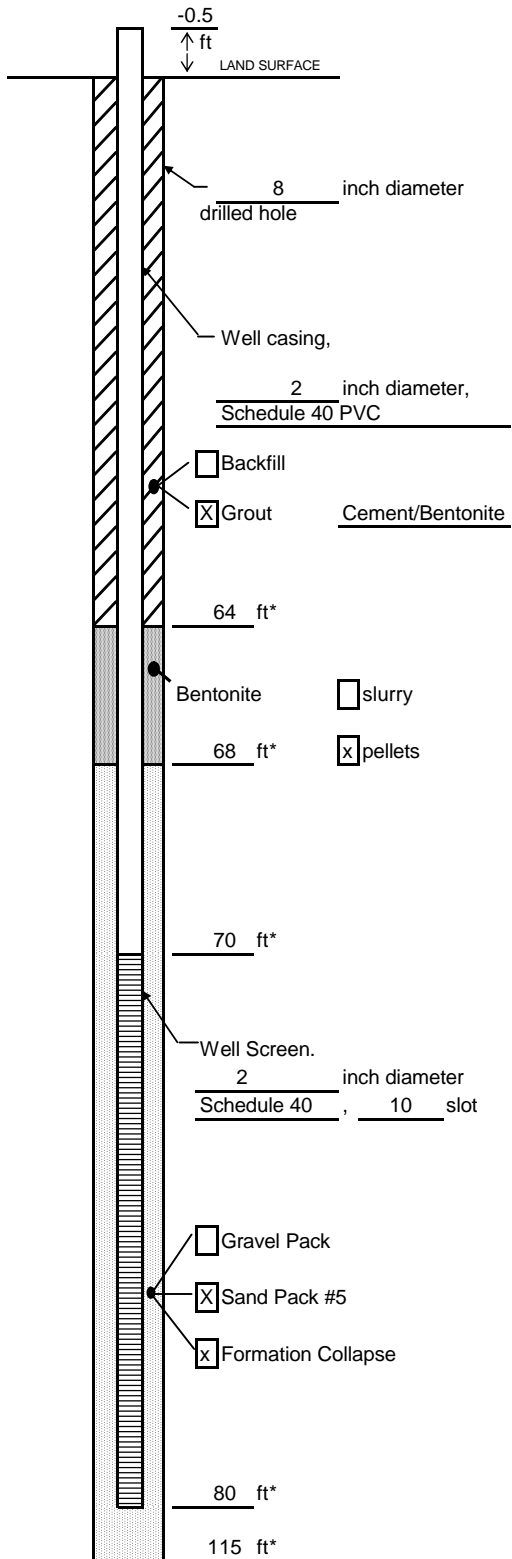
Remarks: Water samples 30-35'; 47-52'; 70-75'

Project No.: OH000294.0009     Datum: TOC Elev. 732.225     Filename: August 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-61

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

732.483 feet  Surveyed

Estimated

Installation Date(s) 8/29/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 9/1/06

Fluid Loss During Drilling 0 gallons

Water Removed During Development 50 gallons

Static Depth to Water 24.87 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.70 hours

Yield NM gpm Date 9/1/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well - Well J (Deep)

Remarks TOC Elevation = 732.225

Time 14:45, 15:00, 15:05, 15:10, 15:15, 15:20

pH 6.75, 6.55, 6.53, 6.51, 6.50, 6.49

Conductivity 1.26, 1.30, 1.30, 1.31, 1.31, 1.31

Temperature 999, 402, 310, 256, 230, 241

Turbidity 18.8, 18.5, 18.4, 18.3, 18.0, 18.0

Prepared by A. Jacobs/ T. Fotner/ J. Wallace

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0		N/A						No recovery	
2									
4									
6									
8									
10	N/A	24	0.0				SW	SAND Brown, fine-coarse, fine-coarse gravel (30%), well graded, dry	
12	N/A	24	15.3				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 7

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/29/06 @ 1530

Driller: K. Gobell

Total Depth: 85

End Drilling: 8/30/06 @ 1330

Drilling Method: Rotosonic

Surface Elev.: 722.172

Converted to Well: Y Well I.D.: GM-62

Drilling Fluid: Water

North Coord.: -189.49099

East Coord.: 5442.96098

Remarks: Water samples 30-35'; 40-45'; 60-65'

Project No.: OH000294.0009

Datum: TOC Elev. 722.109

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	15.0				SW	Same as above, fine-coarse gravel (45%)	
16	N/A	24	14				SW	Same as above	
18	N/A	24	14.2				SW	Same as above	
20	N/A	24	16.6				SW	Same as above	
22	N/A	24	14.8				SP	SAND Brown with few red-orange stringers, fine-medium, fine-medium gravel (35%), poorly graded, moist	
24	N/A	24	12.9				SP	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/29/06 @ 1530

Driller: K. Gobell

Total Depth: 85

End Drilling: 8/30/06 @ 1330

Drilling Method: Rotosonic

Surface Elev.: 722.172

Converted to Well: Y Well I.D.: GM-62

Drilling Fluid: Water

North Coord.: -189.49099

East Coord.: 5442.96098

Remarks: Water samples 30-35'; 40-45'; 60-65'

Project No.: OH000294.0009

Datum: TOC Elev. 722.109

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	10.3				SP	SAND Brown, fine-coarse, poorly graded, wet	
28	N/A	24	16.8				GP	GRAVEL Brown, fine, wet, no plasticity	
30	N/A	24	7.0				GW	GRAVEL Brown, fine-coarse, sand (15%), well graded, wet	
32	N/A	24	3.6				GW	Same as above	
34	N/A	24	15.8				SW	SAND Brown, fine-coarse, medium gravel (20%), well graded, wet	
36	N/A	24	0.0				GW	GRAVEL Brown, fine-medium, fine-coarse sand (20%), well graded, wet	
	N/A	24	0.0				GW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/29/06 @ 1530

Driller: K. Gobell

Total Depth: 85

End Drilling: 8/30/06 @ 1330

Drilling Method: Rotosonic

Surface Elev.: 722.172

Converted to Well: Y Well I.D.: GM-62

Drilling Fluid: Water

North Coord.: -189.49099

East Coord.: 5442.96098

Remarks: Water samples 30-35'; 40-45'; 60-65'

Project No.: OH000294.0009

Datum: TOC Elev. 722.109

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	0.0				GW	Same as above	
40	N/A	24	0.0				SW	SAND Brown, fine-coarse, fine-medium gravel (10%), well graded, wet	
42	N/A	24	0.0				SW	Same as above	
44	N/A	24	0.0				SW	Same as above, fine-coarse gravel (10%)	
46	N/A	24	0.0				SW	Same as above	
48	N/A	24	0.0				SM	SILTY SAND Brown, fine-medium, fine coarse gravel (10%), well graded, wet	
50	N/A	24	0.0				SM	SILTY SAND Brown, fine-medium, fine coarse gravel (10%), well graded, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/29/06 @ 1530

Driller: K. Gobell

Total Depth: 85

End Drilling: 8/30/06 @ 1330

Drilling Method: Rotosonic

Surface Elev.: 722.172

Converted to Well: Y Well I.D.: GM-62

Drilling Fluid: Water

North Coord.: -189.49099

East Coord.: 5442.96098

Remarks: Water samples 30-35'; 40-45'; 60-65'

Project No.: OH000294.0009

Datum: TOC Elev. 722.109

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	0.0				SM	Same as above	
54	N/A	24	0.0				SM	Same as above	
56	N/A	24	10.1				GP	GRAVEL Brown, Medium-coarse with a few cobbles, poorly graded, wet	
58	N/A	24	10.1				GP	Same as above	
60	N/A	24	10.1				GP	Same as above	
60	N/A	24	10.1				SW	SAND Brown, fine-coarse, well graded, wet	
62	N/A	24	25				SW	Same as above	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/29/06 @ 1530

Driller: K. Gobell

Total Depth: 85

End Drilling: 8/30/06 @ 1330

Drilling Method: Rotosonic

Surface Elev.: 722.172

Converted to Well: Y Well I.D.: GM-62

Drilling Fluid: Water

North Coord.: -189.49099

East Coord.: 5442.96098

Remarks: Water samples 30-35'; 40-45'; 60-65'

Project No.: OH000294.0009

Datum: TOC Elev. 722.109

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	2.1				SW	Same as above	
66	N/A	24	5.2				GP	GRAVEL Medium-coarse with few cobbles, poorly graded, wet	
66	N/A	24	5.2				SP	SAND Brown, medium-coarse, coarse gravel (15%), poorly graded, wet	
68	N/A	24	1.1				SP	Same as above	
70	N/A	24	5.6				SP	Same as above	
72	N/A	24	3.1				SP	Same as above, coarse sand, fine-coarse gravel (5%)	
74	N/A	24	2.9				SW	Same as above	
	N/A	24	4.0				GP	GRAVEL	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 6 of 7

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/29/06 @ 1530

Driller: K. Gobell

Total Depth: 85

End Drilling: 8/30/06 @ 1330

Drilling Method: Rotosonic

Surface Elev.: 722.172

Converted to Well: Y Well I.D.: GM-62

Drilling Fluid: Water

North Coord.: -189.49099

East Coord.: 5442.96098

Remarks: Water samples 30-35'; 40-45'; 60-65'

Project No.: OH000294.0009

Datum: TOC Elev. 722.109

Filename: August 2006

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	0.7				SM	Brown, medium-coarse, poorly graded, wet	
							SM	SILTY SAND Gray, fine, poorly graded, wet	
78	N/A	24	4.6				SM	Same as above	
80	N/A	24	2.4				SM	SILTY SAND Gray, fine-coarse, medium-coarse gravel (10%), wet	
82	N/A	24	4.1				SM	Same as above	
84							SM	Same as above	
86								End of boring	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: A. Jacobs

Begin Drilling: 8/29/06 @ 1530

Driller: K. Gobell

Total Depth: 85

End Drilling: 8/30/06 @ 1330

Drilling Method: Rotosonic

Surface Elev.: 722.172

Converted to Well: Y Well I.D.: GM-62

Drilling Fluid: Water

North Coord.: -189.49099

East Coord.: 5442.96098

Remarks: Water samples 30-35'; 40-45'; 60-65'

Project No.: OH000294.0009

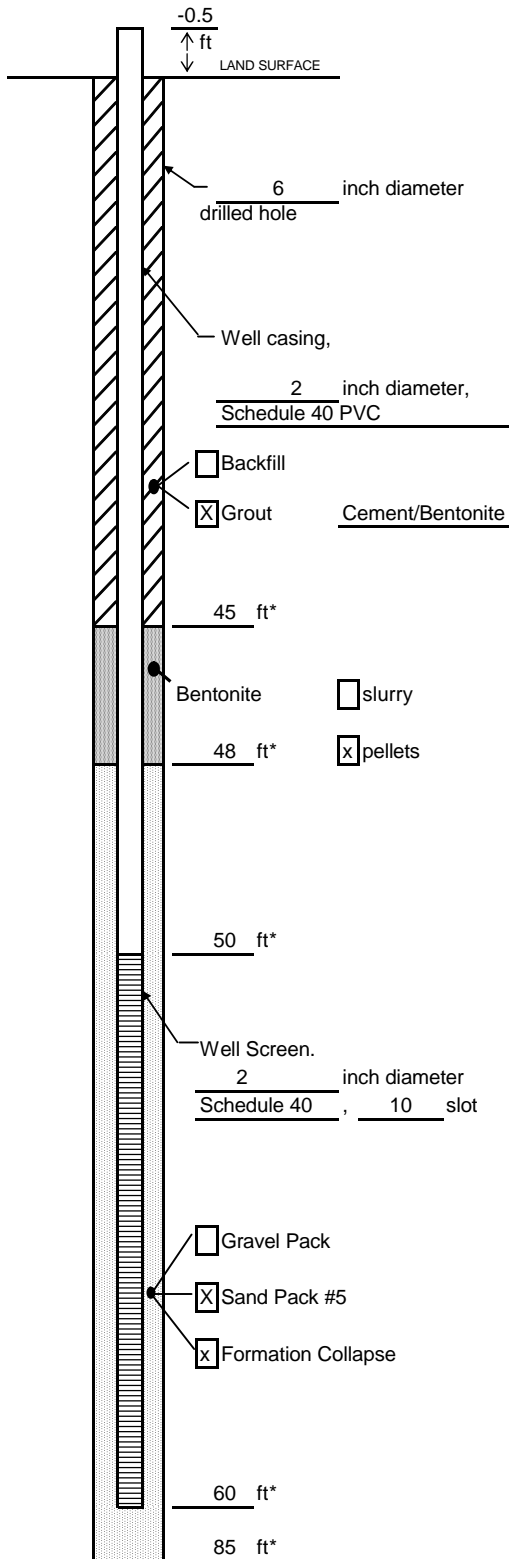
Datum: TOC Elev. 722.109

Filename: August 2006

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-62

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

722.172 feet  Surveyed

Estimated

Installation Date(s) 8/31/2006

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 9/1/06

Fluid Loss During Drilling ~200 gallons

Water Removed During Development 234 gallons

Static Depth to Water 17.4 feet below M.P.

Pumping Depth to Water 17.6 feet below M.P.

Pumping Duration 2.18 hours

Yield 0.61 gpm Date 9/1/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well - Well C

Remarks TOC Elevation = 722.109

Time 9:30, 9:33, 9:35, 9:38

Conductivity 1.09, 1.11, 1.11, 1.11,

Temperature 17.1, 17.1, 17.0, 17.1

pH 6.72, 6.75, 6.75, 6.78

Turbidity 133, 88, 88, 85

Prepared by A. Jacobs

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See RZ-4J for lithologic description from 0-40'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: J. Wallace

Begin Drilling: 8/31/06

Driller: D. Remmler

Total Depth: 40

End Drilling: 8/31/06

Drilling Method: Hollow Stem Auger

Surface Elev.: 726.207

Converted to Well: Y Well I.D.: GM-63

Drilling Fluid: Water

North Coord.: 1625.02787

East Coord.: 4918.82945

Remarks: Shallow pair to GM-64.

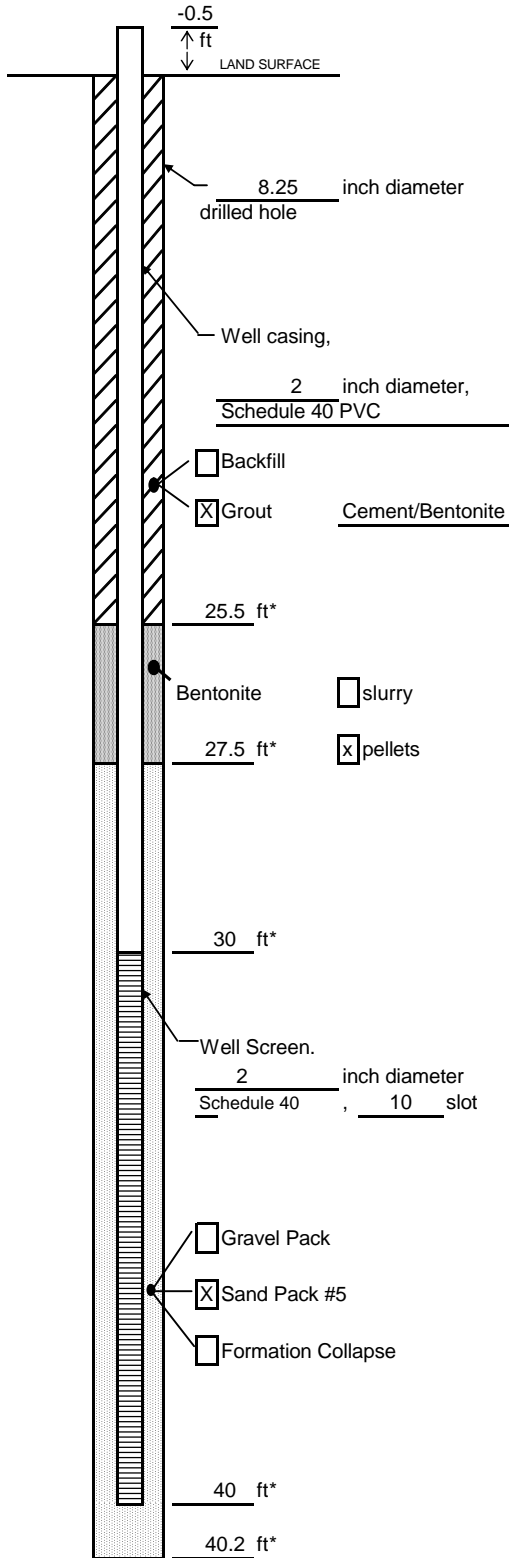
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Datum: TOC Elev. 725.791

Filename: July 2006

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-63

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

726.207 feet  Surveyed

Estimated

Installation Date(s) 9/1/2006

Drilling Method Hollow Stem Auger

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pumping - surge with pump 9/1/06

Fluid Loss During Drilling 15 gallons

Water Removed During Development 50 gallons

Static Depth to Water ~20.2 feet below M.P.

Pumping Depth to Water 38 feet below M.P.

Pumping Duration NA hours

Yield ~1.6 gpm Date 9/1/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

WSU-22 Replacement (Shallow)

Remarks TOC Elevation = 725.791

Time 13:40, 13:45, 13:50, 13:55, 14:00

pH 6.65, 6.58, 6.58, 6.58, 6.59

Conductivity 1.41, 1.41, 1.42, 1.41, 1.41

Turbidity 588, 286, 157, 92, 59

Temperature 18.8, 18.6, 18.6, 18.5, 18.5

Prepared by J. Wallace

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0								See RZ-4J for lithologic description from 0-60'	
2									
4									
6									
8									
10									
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: J. Wallace

Begin Drilling: 8/31/06

Driller: D. Remmler

Total Depth: 60

End Drilling: 8/31/06

Drilling Method: Hollow Stem Auger

Surface Elev.: 726.384

Converted to Well: Y Well I.D.: GM-64

Drilling Fluid: Water

North Coord.: 1624.73847

East Coord.: 4913.72063

Remarks: Shallow pair to GM-54.

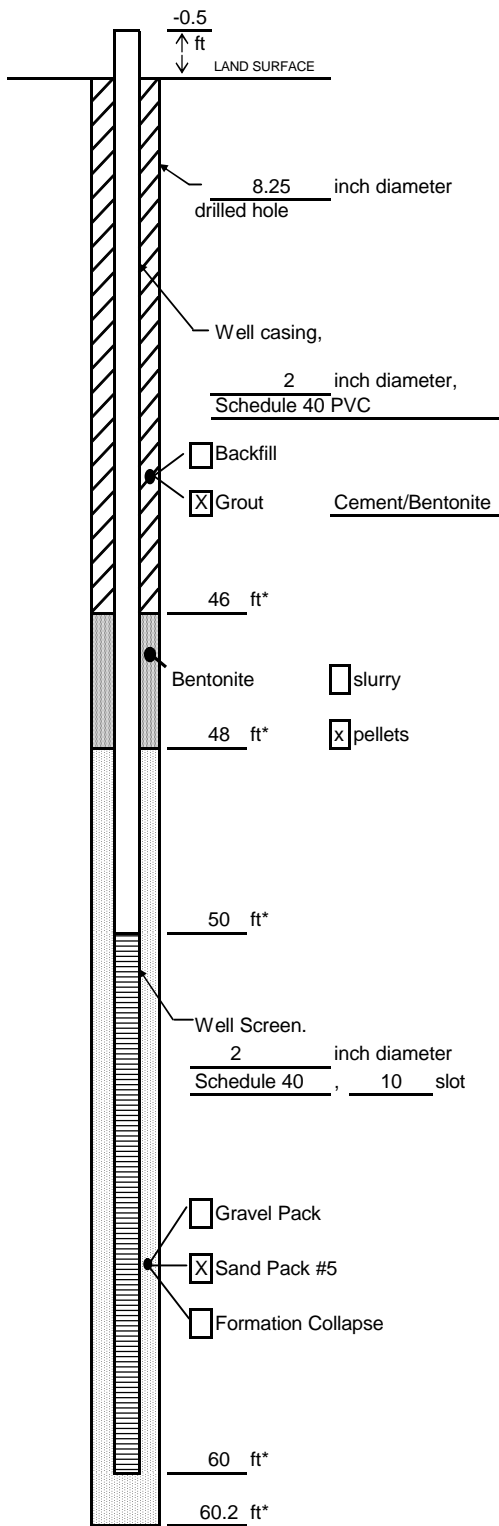
Project No.: OH000294.0008.00002

Datum: TOC Elev. 725.951

Filename: July 2006

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-64

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

726.384 feet  Surveyed

Estimated

Installation Date(s) 8/31/2006

Drilling Method Hollow Stem Auger

Drilling Contractor Boart Longyear

Drilling Fluid None. However, ~25 gallons water

added due to heaving sands

Development Technique(s) and Date(s)

Pumping - surge with pump

Fluid Loss During Drilling 25 gallons

Water Removed During Development 55 gallons

Static Depth to Water 20.4 feet below M.P.

Pumping Depth to Water 58 feet below M.P.

Pumping Duration 0.85 hours

Yield NM gpm Date 8/31/06

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

WSU-22 Replacement (Deep)

Remarks TOC Elevation = 725.951

Time 13:00, 13:05, 13:10, 13:15, 13:20, 13:25

pH 6.78, 6.64, 6.64, 6.67, 6.66, 6.67

Conductivity 1.29, 1.28, 1.28, 1.29, 1.29, 1.29

Turbidity 10+, 10+, 999, 999, 999, 10+

Temperature 19.7, 19.7, 19.6, 19.5, 19.6, 19.6

Pumped 25 gallons prior to taking readings

Prepared by J. Wallace

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	0.0				CL	CLAY Dark yellowish brown (10 yr 4/4), trace gravel, trace silt, medium plasticity, dry	
2	N/A	24	0.0						
4	N/A	24	0.0						
6	N/A	24	0.0						
8	N/A	24	1.2				SP	SAND Brown (10 yr 5/3), poorly graded, medium- coarse, trace gravel, dry	
10	N/A	24	2.2						
12	N/A	24	3.8				SP	Note: 3-4" cobbles @ 12'	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'

Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	1.1						
16	N/A	24	1.2						
18	N/A	24	3.3				GW	GRAVEL WITH SAND Grayish brown (10 yr 5/2), well graded, fine-medium, 30% coarse sand, 5% silt, wet	▼
20	N/A	24	4.7				SP	SAND Grayish brown (10 yr 5/2), poorly graded, medium coarse, 10% gravel (subangular-subround), wet	
22	N/A	24	4.9						
24	N/A	24	5.6						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'

Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	6.2					Water sample 25-30' @ 10:40	
28	N/A	24	7.1						
30	N/A	24	3.4						
32	N/A	24	3.2						
34	N/A	24	3.4						
36	N/A	24	3.2				GP	GRAVEL Light yellowish brown (10 yr 6/4), poorly graded, trace silt, 5% sand, subangular-angular, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'

Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	2.0				SP	SAND Light yellowish brown (10 yr 6/4), poorly graded, coarse, <5% gravel, trace silt	
							GP	GRAVEL Light yellowish brown (10 yr 6/4), poorly graded, trace silt, 5% sand, subangular-angular, wet	
40	N/A	24	0.7				SP	SAND Light yellowish brown (10 yr 4/6), medium-coarse, 10% gravel (subangular-subround), 10% silt, wet	
42	N/A	24	0.6						
44	N/A	24	0.5					Note: No silt @ 44'	
46	N/A	24	0.9					Water sample 45-50' @ 11:40	
48	N/A	24	0.7						
50									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 9

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'

Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
	N/A	24	3.3				SW	SAND Brown (11 yr 5/3), well graded, 20% gravel (subangular-subround), fine-coarse, wet	
52	N/A	24	3.0						
54	N/A	24	3.4						
56	N/A	24	3.4				SP	SAND Grayish brown (10 yr 5/2), poorly graded, 5% gravel, 5% silt, coarse grained, wet	
58	N/A	24	2.4						
60	N/A	24	1.7						
62	N/A	24	1.5				SP	SAND Yellowish brown (10 yr 5/4), poorly graded, fine-coarse, 15% gravel, 5% silt,	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 9

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'

Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	2.2					wet	
66	N/A	24	1.5						
68	N/A	24	0.6				SP	SAND Grayish brown (10 yr 5/2), poorly graded, fine-coarse, 20% gravel (subangular-subround), wet	
70	N/A	24	0.5					Note: gray (10 yr 5/1), 15% fine gravel, trace silt @ 70'	
72	N/A	24	1.3					Water sample 72-77' @ 1345	
74	N/A	24	0.9						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'

Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	1.0						
78	N/A	24	1.8						
80	N/A	24	1.0						
82	N/A	24	0.0						
84	N/A	24	0.8				SP	SAND Brown (10 yr 5/3), poorly graded, fine coarse, 20% gravel (fine-coarse, subangular-subround), trace silt, wet	
86	N/A	24	0.7						
Water sample 87-92' @ 10:10									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 7 of 9

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'








Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
88	N/A	24	0.0				SW	SAND Brown (10 yr 5/3), well graded, fine-coarse, 15% gravel (subangular-subround), wet	
90	N/A	24	0.0						
92	N/A	24	0.0						
94	N/A	24	0.0						
96	N/A	24	0.0						
98	N/A	24	0.5						
100	N/A	24	0.0						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 8 of 9

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'

Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
102	N/A	24	0.0				SW	SAND Grayish brown (10 yr 5/2), well graded, medium-coarse, 5-10% gravel (subround), wet Water sample 102-107' @ 11:00	
104	N/A	24	0.0						
106	N/A	24	0.0						
108								End of boring	
110									
112									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/10/2007

Driller: Gerald Sealey

Total Depth: 108

End Drilling: 4/13/2007

Drilling Method: Rotosonic

Surface Elev.: 723.828

Converted to Well: Y Well I.D.: GM-65D

Drilling Fluid: Water

North Coord.: -1491.41443

East Coord.: 4311.00936

Remarks: Hand auger to 11.5'

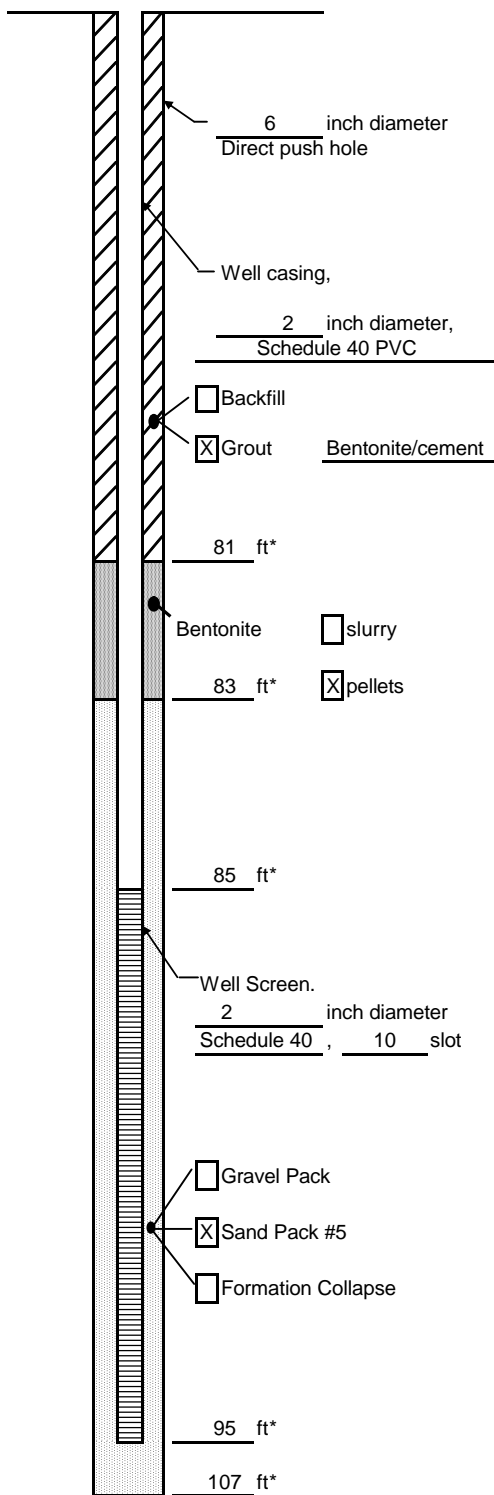
Project No.: OH000294.0010

Datum: TOC: 723.537

Filename: April 2007

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-65D

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

723.828 feet  Surveyed

Estimated

Installation Date(s) 4/18/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water removed during vertical

aquifer profiling

Development Technique(s) and Date(s)

Submersible pump - surge with pump

4/24/07 by Jim Wallace

Fluid Loss During installation NM gallons

Water Removed During Development 80 gallons

Static Depth to Water NM feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 2.50 hours

Yield NM gpm Date 4/24/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Note; formation collapse to 95'

Remarks Time: 1630, 1635, 1640, 1645

pH: 7.30, 7.27, 7.21, 7.21

Conductivity: 1.30, 1.30, 1.31, 1.31

Turbidity: 10, 10, 7, 8

Temperature: 17.7, 16.8, 16.7, 16.3

Prepared by L. Greene

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
50								See boring log GM-65D for lithologic description	
52								End of boring	
54									
56									
58									
60									
62									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/18/2007

Driller: Gerald Sealey

Total Depth: 52

End Drilling: 4/18/2007

Drilling Method: Rotosonic

Surface Elev.: 723.939

Converted to Well: Y Well I.D.: GM-65S

Drilling Fluid: Water

North Coord.: -1488.33143

East Coord.: 4312.28876

Remarks: \_\_\_\_\_

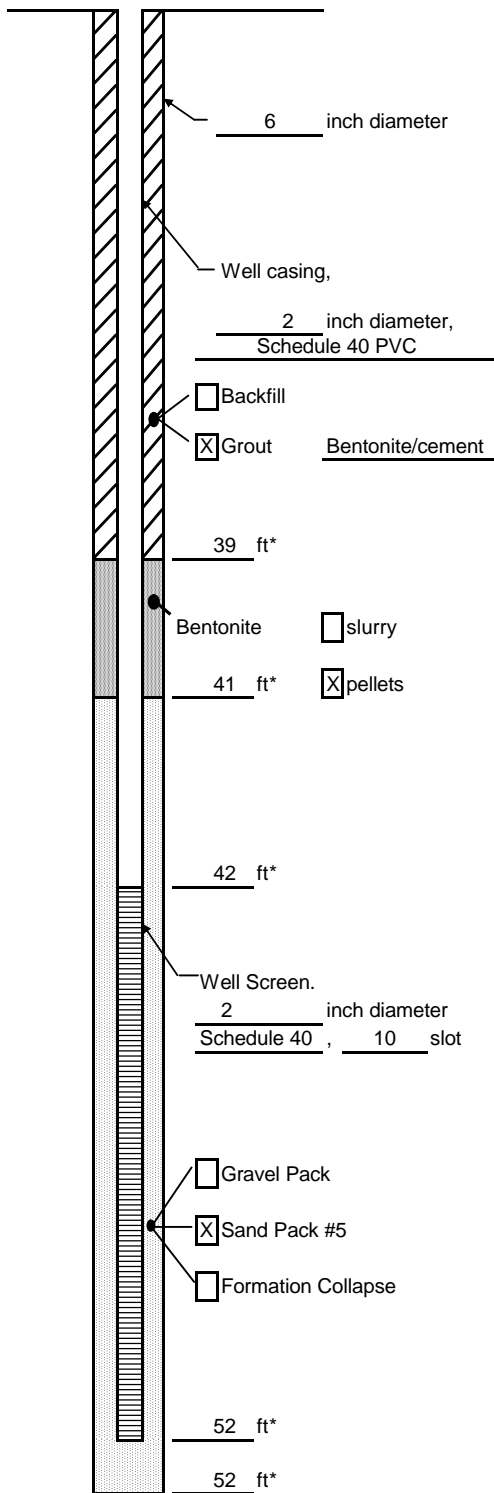
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Datum: TOC: 723.580

Filename: April 2007

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-65S

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

723.939 feet  Surveyed

Estimated

Installation Date(s) 4/18/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water removed during vertical

aquifer profiling

Development Technique(s) and Date(s)

Submersible pump - surge with pump

4/24/07 by Jim Wallace

Fluid Loss During installation NM gallons

Water Removed During Development 55 gallons

Static Depth to Water NM feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.5 hours

Yield NM gpm Date 4/24/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks Time: 1755, 1800, 1805

pH: 7.22, 7.21, 7.19

Conductivity: 1.02, 1.02, 1.01

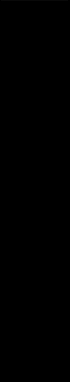
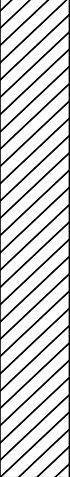
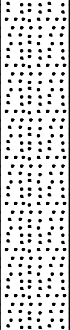
Turbidity: 10, 10, 10

Temperature: 17.3, 17.1, 17.0

Prepared by L. Greene

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	N/A	N/A					CONCRETE	
2									
4	N/A		0.0				CL	SANDY CLAY Yellowish brown, 30% sand, <10% gravel, dry (fill)	
6	N/A	24	0.0						
8	N/A	24	0.0						
10	N/A	24	0.0				SP	SAND Yellowish brown (10 yr 5/4), poorly graded, fine-medium, 15% gravel, dry	
12	N/A	24	0.0						

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/6/2007

Driller: Gerald Sealey

Total Depth: 57

End Drilling: 4/6/2007

Drilling Method: Rotosonic

Surface Elev.: 733.499

Converted to Well: Y Well I.D.: GM-66

Drilling Fluid: Water

North Coord.: 4377.28928

East Coord.: 5714.48647

Remarks: Water sample 30-35' @ 0945; 50-55' @ 1125

Project No.: OH000294.0010

Datum: TOC: 733.220

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0			[Dotted Pattern]			
16	N/A	24	0.0			[Dotted Pattern]			
18	N/A	24	0.0			[Dotted Pattern]		Note: gravel subrounded	
20	N/A	24	0.0			[Dotted Pattern]	SP	SAND Yellowish brown (10 yr 5/4), poorly graded, fine-medium, 15% gravel (subround), dry	
22	N/A	24	0.0			[Dotted Pattern]			
24	N/A	24	0.0			[Dotted Pattern]		Note: black staining @ 23'	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/6/2007

Driller: Gerald Sealey

Total Depth: 57

End Drilling: 4/6/2007

Drilling Method: Rotosonic

Surface Elev.: 733.499

Converted to Well: Y Well I.D.: GM-66

Drilling Fluid: Water

North Coord.: 4377.28928

East Coord.: 5714.48647

Remarks: Water sample 30-35' @ 0945; 50-55' @ 1125

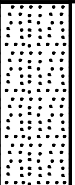
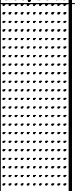
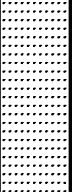
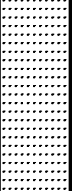
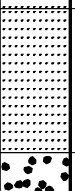

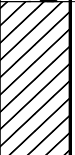
Project No.: OH000294.0010

Datum: TOC: 733.220

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	0.0						
28	N/A	24	0.0				SW	SAND Grayish brown (10 yr 5/2), well graded, fine-coarse, <5% gravel, moist	▼
30	N/A	24	0.0						
32	N/A	24	0.0						
34	N/A	24	0.0				SW	SAND Grayish brown (10 yr 5/2), well graded, fine-coarse, <5% gravel, moist	
36	N/A	24	0.0				GP	GRAVEL WITH SAND Grayish brown (10 yr 5/2), 10% coarse sand	
36	N/A	24	0.0				CL	SILTY CLAY Dark gray (10 yr 4/1), 5% gravel (angular-subangular), very stiff, low plasticity	

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/6/2007

Driller: Gerald Sealey

Total Depth: 57

End Drilling: 4/6/2007

Drilling Method: Rotosonic

Surface Elev.: 733.499

Converted to Well: Y Well I.D.: GM-66

Drilling Fluid: Water

North Coord.: 4377.28928

East Coord.: 5714.48647

Remarks: Water sample 30-35' @ 0945; 50-55' @ 1125

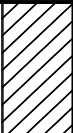
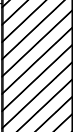
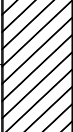
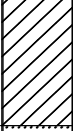
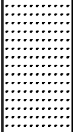
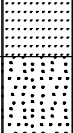
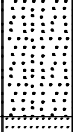
Project No.: OH000294.0010

Datum: TOC: 733.220

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	0.0						
40	N/A	24	0.0						
42	N/A	24	0.0						
44	N/A	24	0.0				SW	SAND WITH GRAVEL Grayish brown (10 yr 5/2), well graded, fine-coarse, 30% gravel (subangular-subround), trace silt, wet	
46	N/A	24	0.0				SP	SAND WITH GRAVEL Grayish brown, poorly graded, fine-coarse, 15% gravel, trace silt, wet	
48	N/A	24	0.0				SW	SAND WITH GRAVEL Grayish brown (10 yr 5/2), well graded, fine-coarse, 30% gravel, trace silt, wet	
50	N/A	24	0.0						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 5

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/6/2007

Driller: Gerald Sealey

Total Depth: 57

End Drilling: 4/6/2007

Drilling Method: Rotosonic

Surface Elev.: 733.499

Converted to Well: Y Well I.D.: GM-66

Drilling Fluid: Water

North Coord.: 4377.28928

East Coord.: 5714.48647

Remarks: Water sample 30-35' @ 0945; 50-55' @ 1125

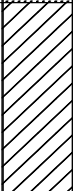
Project No.: OH000294.0010

Datum: TOC: 733.220

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	0.0						
54	N/A	24	0.0						
56	N/A	24	0.0				CL	SILTY CLAY Dark grayish brown (10 yr 4/2), 5% gravel (subangular-angular), stiff, very stiff, dry	
58								End of boring	
60									
62									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Page 5 of 5

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/6/2007

Driller: Gerald Sealey

Total Depth: 57

End Drilling: 4/6/2007

Drilling Method: Rotosonic

Surface Elev.: 733.499

Converted to Well: Y Well I.D.: GM-66

Drilling Fluid: Water

North Coord.: 4377.28928

East Coord.: 5714.48647

Remarks: Water sample 30-35' @ 0945; 50-55' @ 1125

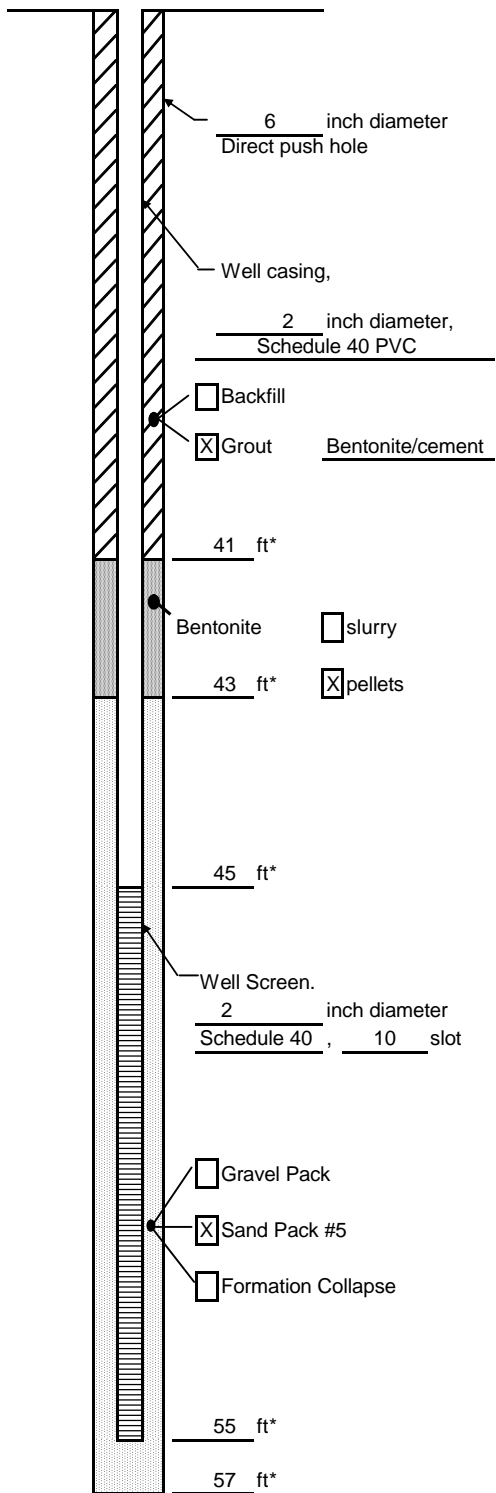
Project No.: OH000294.0010

Datum: TOC: 733.220

Filename: April 2007

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-66

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

733.499 feet  Surveyed

Estimated

Installation Date(s) 4/12/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump - surge with pump

4/12/2007

Fluid Loss During installation 50 gallons

Water Removed During Development 171 gallons

Static Depth to Water 22.3 feet below M.P.

Pumping Depth to Water 52 feet below M.P.

Pumping Duration 1.00 hours

Yield 3 gpm Date 4/12/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks Time: 1533, 1536, 1539, 1542, 1545, 1548

pH: 8.33, 8.23, 8.10, 8.06, 8.09, 8.09

Conductivity: 1.18, 1.21, 1.24, 1.28, 1.26, 1.26



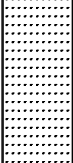
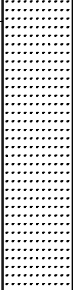
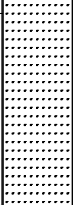
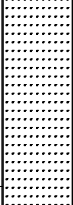
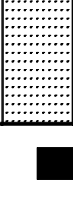

Turbidity: 40, 63, 459, 10+, 10+, 10+

Temperature: 12.9, 12.5, 12.6, 13.6, 13.9, 13.7

Prepared by L. Greene

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	N/A					ASPHALT	
							FILL	CONCRETE WITH REBAR	
2	N/A	24	0.0				SW	SAND WITH GRAVEL Brown, fine-coarse, well graded, subrounded to subangular, 20% fine-coarse gravel, rounded, dry (fill)	
4	N/A	24	0.0						
6									
8	N/A	24	0.0					Note: concrete @ 8'	
10	N/A	24	0.0					Note: Light brown, 10% gravel, damp @ 9'	
12	N/A	24	0.0						

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 1 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 3/27/2007  
 Driller: Gerald Sealey     Total Depth: 121     End Drilling: 3/27/2007  
 Drilling Method: Rotosonic     Surface Elev.: 732.644     Converted to Well: Y Well I.D.: GM-67D  
 Drilling Fluid: Water     North Coord.: 4744.47186     East Coord.: 6082.03970

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 732.188     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0					Note: 5% fine-medium rounded gravel, dry	
16	N/A	24	0.0						
18	N/A	24	0.0						
20	N/A	24	0.0				SW GW	SAND Light brown, fine-coarse, well graded, 10% fine-coarse rounded gravel, moist	
20	N/A	24	0.0					GRAVEL WITH SAND Brown, fine-coarse, well graded, subround to rounded, 45% medium coarse sand, subround-subangular, wet	
22	N/A	24	0.0					GRAVEL WITH SAND Brown, fine-coarse, well graded, subround to rounded, 45% medium coarse sand, subround-subangular, wet	
22	N/A	24	0.0					GRAVEL WITH SAND Brown, fine-coarse, well graded, subround to round, 50% medium-coarse sand, subround-subangular.	
24	N/A	24	0.0					Note: 2" sandy clay @ 22.1' and 22.5', soft, high plasticity, medium sand 30%, wet Water sample 22.5-27.5' @ 1528	
24	N/A	24	0.0					GRAVEL WITH SAND Brown, fine-coarse, well graded, subround to round, 50% medium-coarse sand, subround-subangular	
24	N/A	24	0.0				SW	SAND Brown, medium-coarse, well graded, subangular, 10% fine-medium	







Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 2 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 3/27/2007  
 Driller: Gerald Sealey     Total Depth: 121     End Drilling: 3/27/2007  
 Drilling Method: Rotosonic     Surface Elev.: 732.644     Converted to Well: Y Well I.D.: GM-67D  
 Drilling Fluid: Water     North Coord.: 4744.47186     East Coord.: 6082.03970

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 732.188     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	0.0					subrounded, gravel, wet	
28	N/A	24	0.0					Note: Gravel with subrounded-subangular, 10% fine medium subrounded sand @ 27-27.5' Note: subrounded-subangular sand with 15% fine-medium subrounded gravel @ 27.5-29'	
30	N/A	24	0.0				CL	Note: Cobble fossiliferous limestone 29- 29.5' SILTY CLAY Gray, very stiff, low plasticity, with 10% coarse subangular sand and fine subrounded gravel, dry	
32	N/A	24	0.0						
34	N/A	24	0.0						
36	N/A	24	0.0				CL	SILTY CLAY Gray, stiff, medium plasticity, 5% coarse subangular sand and fine gravel,	

Composite Sample to Lab     
  Grab Sample to Lab     
  Split-Spoon Not Analyzed     
 Page 3 of 10

Drilling Co.: Boart Longyear      Geologist: T. Fortner      Begin Drilling: 3/27/2007  
 Driller: Gerald Sealey      Total Depth: 121      End Drilling: 3/27/2007  
 Drilling Method: Rotosonic      Surface Elev.: 732.644      Converted to Well: Y Well I.D.: GM-67D  
 Drilling Fluid: Water      North Coord.: 4744.47186      East Coord.: 6082.03970

Remarks: \_\_\_\_\_

Project No.: OH000294.0010      Datum: TOC: 732.188      Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38								moist-dry	
	N/A	24	0.0					Note: Gravel fine-medium grained, dry @ 39'	
40									
	N/A	24	0.0						
42									
	N/A	24	0.0						
44									
	N/A	24	0.0				GP	GRAVEL WITH SAND Olive gray, poorly graded, fine-medium, subangular, 25% coarse sand, wet	
46								Water sample 46-51' @ 1043	
	N/A	24	0.0				SW	SAND Olive gray, well graded, medium-coarse, subangular, 10% fine gravel, subrounded, wet	
48									
	N/A	24	0.0					SAND Olive gray, well graded, medium-coarse, subangular, 10% fine gravel, subrounded, wet	
50									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/27/2007

Driller: Gerald Sealey

Total Depth: 121

End Drilling: 3/27/2007

Drilling Method: Rotosonic

Surface Elev.: 732.644

Converted to Well: Y Well I.D.: GM-67D

Drilling Fluid: Water

North Coord.: 4744.47186

East Coord.: 6082.03970

Remarks: \_\_\_\_\_







Project No.: OH000294.0010

Datum: TOC: 732.188

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	0.0				GW	SANDY GRAVEL Olive gray, well graded, fine-coarse, subrounded with 10% medium-coarse subangular sand, wet	
							CL	SILTY CLAY Gray, medium-stiff, medium plasticity, 5% fine-medium gravel, moist	
54	N/A	24	0.0				SP	SAND Olive gray, poorly graded, fine with 5% coarse, wet	
								SAND Olive gray, poorly graded, fine with 5% coarse, wet	
56	N/A	24	0.0				CL	SILTY CLAY Gray, very stiff, medium plasticity, 5% fine-medium subangular gravel, dry	
								SANDY CLAY Gray, very stiff, medium plasticity, 5% fine subangular gravel, sand in fine 20%, moist	
58	N/A	24	0.8					Note: gravel fine-medium, dry @ 59'	
60	N/A	24	1.1						
62	N/A	24	0.3						

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 5 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 3/27/2007  
 Driller: Gerald Sealey     Total Depth: 121     End Drilling: 3/27/2007  
 Drilling Method: Rotosonic     Surface Elev.: 732.644     Converted to Well: Y Well I.D.: GM-67D  
 Drilling Fluid: Water     North Coord.: 4744.47186     East Coord.: 6082.03970

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 732.188     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	0.5					Note: Black organic material @ 64'. Fine sand 40% @ 64-65'.	
66	N/A	24	3.7				GW	GRAVEL WITH SAND Gray, well graded, fine-medium subrounded-rounded, 25% medium-coarse sand, subrounded-subangular, wet	
68	N/A	24	1.9					Note: Olive gray, 40% coarse sand, subangular, wet @ 67'	
70	N/A	24	1.4					Note: Gravel, fine-coarse @ 70' Water sample 70-75' @ 1348	
72	N/A	24	0.7						
74	N/A	24	1.7				GW	GRAVEL WITH SAND Gray, well graded, fine-medium subrounded-rounded, 25% medium-coarse sand, subrounded-subangular, wet	
							SW	SAND WITH GRAVEL	
							GW	Olive gray, well graded, medium coarse, subangular, 40% fine gravel, wet	
								GRAVEL WITH SAND	
								Olive gray, well graded, fine medium, subrounded with 30% medium coarse sand, subangular, wet	
	N/A	24	2.9				SW		

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/27/2007

Driller: Gerald Sealey

Total Depth: 121

End Drilling: 3/27/2007

Drilling Method: Rotosonic

Surface Elev.: 732.644

Converted to Well: Y Well I.D.: GM-67D

Drilling Fluid: Water

North Coord.: 4744.47186

East Coord.: 6082.03970

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.188

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76								SAND Olive gray, well graded medium coarse, subangular with 15% fine subrounded gravel, wet	
	N/A	24	6.3				SC	CLAYEY SAND 10% medium, subrounded, well graded, fine, clay is soft, high plasticity, wet	
78							SW	SAND Olive gray, well graded, medium-coarse subangular, 10% fine subrounded gravel, wet	
80	N/A	24	8.0						
82	N/A	24	1.5						
84	N/A	24	0.4				SM	SILTY SAND Olive gray, fine, poorly graded, wet	
								SILTY SAND Olive gray, medium coarse well graded, subangular with 30% fine-medium subangular gravel, wet	
86	N/A	24	0.4						
	N/A	24	0.0				GW	GRAVEL WITH SAND Olive gray, well graded, fine-medium, subangular, with 20% coarse subangular sand, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 7 of 10

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/27/2007

Driller: Gerald Sealey

Total Depth: 121

End Drilling: 3/27/2007

Drilling Method: Rotosonic

Surface Elev.: 732.644

Converted to Well: Y Well I.D.: GM-67D

Drilling Fluid: Water

North Coord.: 4744.47186

East Coord.: 6082.03970

Remarks: \_\_\_\_\_



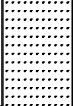
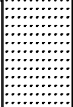
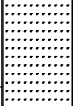
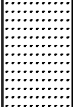
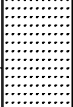
Project No.: OH000294.0010

Datum: TOC: 732.188

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
88	N/A	24	0.5					Note: Coarse gravel @ 88.5'	
90	N/A	24	0.0				SW	SAND WITH GRAVEL Olive gray, well graded, fine-medium, subangular, with 20% coarse subangular sand, wet	
92	N/A	24	0.0					Water sample 90-95' @ 1558	
94	N/A	24	0.8						
96	N/A	24	0.0						
98	N/A	24	0.0				GW	GRAVEL WITH SAND Olive gray-gray, well graded, fine-medium, subrounded-subangular, with 20% medium coarse subangular sand, wet	
100	N/A	24	0.0						

Composite Sample to Lab     
  Grab Sample to Lab     
  Split-Spoon Not Analyzed     
 Page 8 of 10

Drilling Co.: Boart Longyear      Geologist: T. Fortner      Begin Drilling: 3/27/2007  
 Driller: Gerald Sealey      Total Depth: 121      End Drilling: 3/27/2007  
 Drilling Method: Rotosonic      Surface Elev.: 732.644      Converted to Well: Y Well I.D.: GM-67D  
 Drilling Fluid: Water      North Coord.: 4744.47186      East Coord.: 6082.03970

Remarks: \_\_\_\_\_

Project No.: OH000294.0010      Datum: TOC: 732.188      Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
102	N/A	24	0.0						
104	N/A	24	0.0					Note: trace cobbles @ 103'	
106	N/A	24	0.0						
108	N/A	24	0.0				SW	SAND Olive gray, well graded, medium coarse, subangular, 20% fine medium subrounded gravel, wet	
110	N/A	24	0.0						
112	N/A	24	0.0						

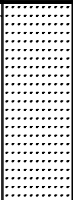




Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 9 of 10

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 3/27/2007  
 Driller: Gerald Sealey     Total Depth: 121     End Drilling: 3/27/2007  
 Drilling Method: Rotosonic     Surface Elev.: 732.644     Converted to Well: Y Well I.D.: GM-67D  
 Drilling Fluid: Water     North Coord.: 4744.47186     East Coord.: 6082.03970

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 732.188     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
114	N/A	24	0.0						
116	N/A	24	0.0				GW	GRAVEL WITH SAND Greenish gray, well graded, fine-medium, subrounded-subangular, 40% medium-coarse subangular sand, wet  Water sample 115-120' @ 0833	
118	N/A	24	0.0						
120	N/A	24	0.0					Note: 10% coarse subangular sand @ 119'	
122							CL	SANDY CLAY Mottled (green, olive, gray, brown) with 20% fine-coarse and fine gravel 20%, stiff, medium plasticity, moist	
124								End of boring	

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Page 10 of 10

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/27/2007

Driller: Gerald Sealey

Total Depth: 121

End Drilling: 3/27/2007

Drilling Method: Rotosonic

Surface Elev.: 732.644

Converted to Well: Y Well I.D.: GM-67D

Drilling Fluid: Water

North Coord.: 4744.47186

East Coord.: 6082.03970

Remarks:

Project No.: OH000294.0010

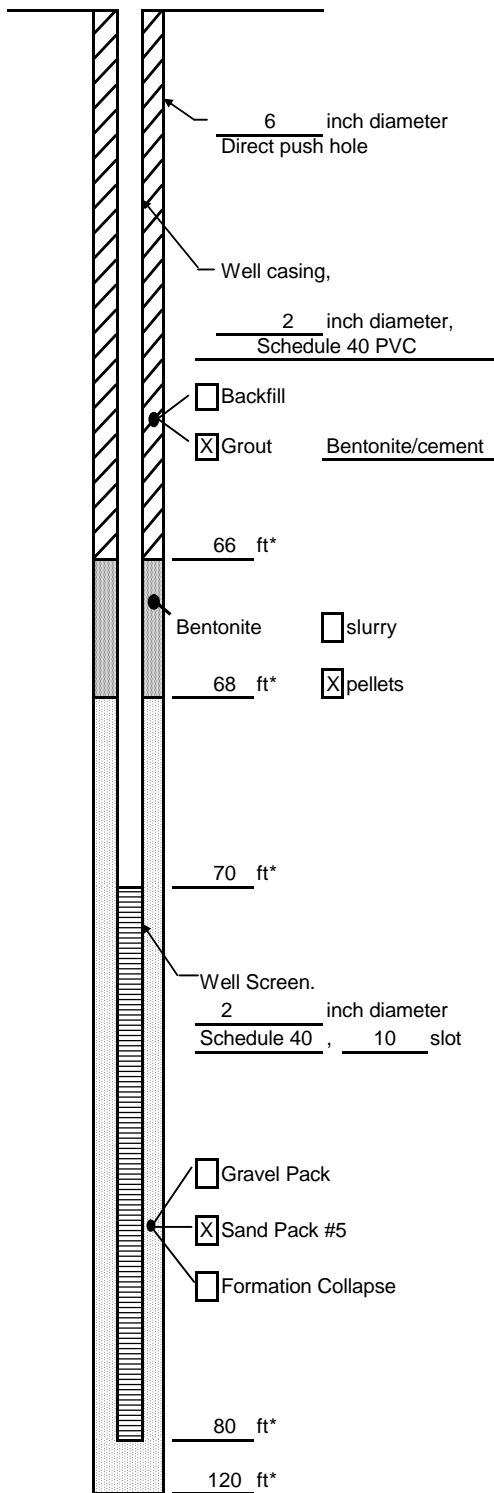
Datum: TOC: 732.188

Filename: April 2007

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-67D

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

732.644 feet  Surveyed

Estimated

Installation Date(s) 4/4/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water-removed during vertical

aquifer profiling

Development Technique(s) and Date(s)

Submersible pump - surge with pump 4/13/07 by

Paul Smith

Fluid Loss During installation 50 gallons

Water Removed During Development 135 gallons

Static Depth to Water 21.4 feet below M.P.

Pumping Depth to Water 77 feet below M.P.

Pumping Duration 0.30 hours

Yield 3 gpm Date 4/11/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Note: formation collapse (120' to 80')

Permanent 6" casing set at RCT

Remarks Time: 1330

pH: 7.48

Conductivity: 1.27

Turbidity: 237

Temperature: 14.1

Well purged dry

Prepared by L. Greene

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
50								See boring log GM-67D for lithologic description	
52									
54								End of boring	
56									
58									
60									
62									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/4/2007

Driller: Gerald Sealey

Total Depth: 54

End Drilling: 4/4/2007

Drilling Method: Rotosonic

Surface Elev.: 732.541

Converted to Well: Y Well I.D.: GM-67S

Drilling Fluid: Water

North Coord.: 4744.20516

East Coord.: 6096.21832

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

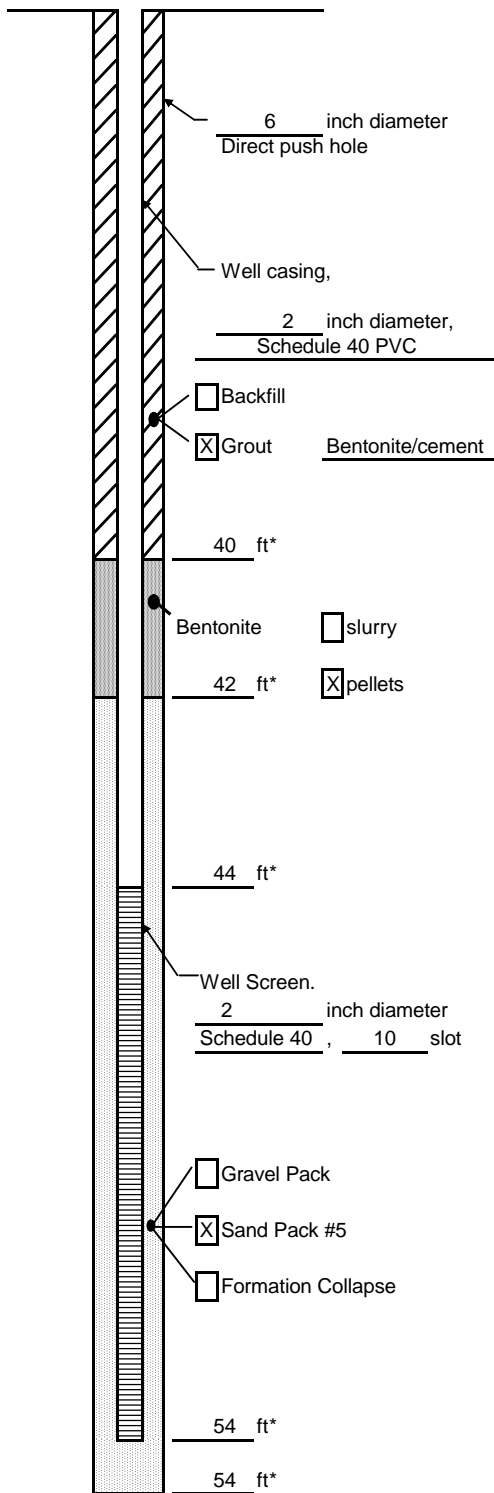
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Filename: April 2007

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-67S

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:  
732.541 feet  Surveyed  
 Estimated

Installation Date(s) 4/4/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water-removed during vertical  
aquifer profiling 50 gallons used during installation of well

Development Technique(s) and Date(s)

Submersible pump - surge with pump

Fluid Loss During installation 50 gallons

Water Removed During Development 108 gallons

Static Depth to Water 20.9 feet below M.P.

Pumping Depth to Water 51 feet below M.P.

Pumping Duration 0.6 hours

Yield 3 gpm Date 4/12/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks Time: 0840, 0843, 0846, 0849, 0852, 0855

pH: 7.45, 7.72, 7.82, 7.83, 7.84, 7.80

Conductivity: 1.45, 1.45, 1.43, 1.44, 1.44, 1.43

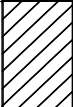
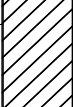



Turbidity: 400, 335, 326, 107, 107, 19

Temperature: 14.5, 14.9, 15.0, 15.0, 15.0, 15.0

Prepared by L. Greene

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	N/A					ASPHALT	
								CONCRETE	
2									
	N/A	24	0.6				CL	SANDY CLAY Brown, fine to medium sand, soft, high plasticity, sand 5-10%, fine coarse subangular gravel (up to 3"), damp Note: Trace coal 3.5' (fill)	
4									
	N/A	24	1.0						
6									
	N/A	24	0.0				GW	GRAVEL WITH SAND Light brown, well graded, fine-coarse subangular with medium sand, dry, (fill)	
8									
	N/A	24	0.0						
10									
	N/A	24	0.0						
12									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Page 1 of 12

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0						
16	N/A	24	0.0						
18	N/A	24	9.9					Note: brown, saturated @ 18'	
20	N/A	24	7.7				GW	GRAVEL WITH SAND Brown, well graded, subangular to angular sand, wet	
22	N/A	24	8.5					Water sample 22-27' @ 1643	
24	N/A	24	1.2						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	0.4						
28	N/A	24	0.2						
28	N/A	24	4.1				SW	SAND Brown, well graded, medium coarse, subangular with 15% fine subangular gravel, wet Note: Reddish brown (2.5 yr 5/3), with 5% subangular gravel	
30	N/A	24	3.0				CL	SILTY CLAY Brown (11 yr 5/3), with 5% gravel (angular), very stiff, dry Note: Silt with clay, grayish brown (10 yr 5/1), trace gravel, brittle @ 30.5'	
32	N/A	24	0.0				CL	SILTY CLAY Dark gray (10 yr 4/1), ? gravel, stiff very stiff, moist Note: Dry @ 32'	
36	N/A	24	7.0						

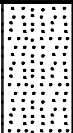
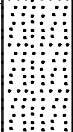
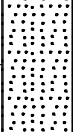
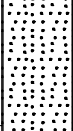
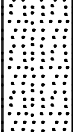
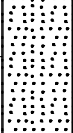
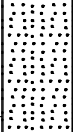
Composite Sample to Lab     
  Grab Sample to Lab     
  Split-Spoon Not Analyzed     
 Page 3 of 12

Drilling Co.: Boart Longyear      Geologist: L. Greene      Begin Drilling: 4/2/2007  
 Driller: Gerald Sealey      Total Depth: 150      End Drilling: 4/2/2007  
 Drilling Method: Rotosonic      Surface Elev.: 732.459      Converted to Well: Y Well I.D.: GM-68D  
 Drilling Fluid: Water      North Coord.: 4063.53205      East Coord.: 6357.84287

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010      Datum: TOC: 732.269      Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	5.7				SP	SAND Brown, poorly graded, medium-coarse, subround with 15% fine gravel, wet	
40	N/A	24	7.6						
42	N/A	24	3.5						
44	N/A	24	2.2					Water sample 44.5-49.5' @ 0905	
46	N/A	24	0.0						
48	N/A	24	0.0						
50	N/A	24	0.0				CL	CLAY Yellowish brown (10 yr 5/4), 5% angular gravel, low plasticity, very stiff, dry	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks:

Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	0.0					Note: Grayish brown (10 yr 5/2) @ 51' Note: 3" silt lense @ 51.5'	
54	N/A	24	0.0						
56	N/A	24	0.0						
58	N/A	24	0.0						
60	N/A	24	0.0						
62	N/A	24	0.0						

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 5 of 12

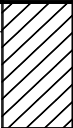
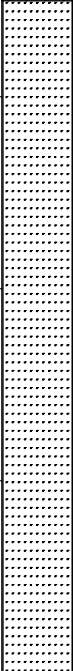
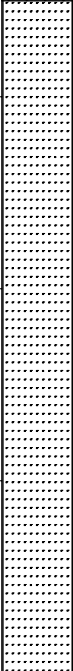
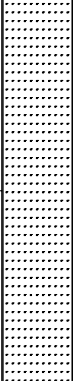
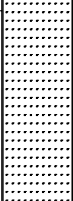
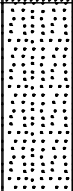
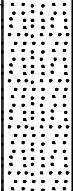

Drilling Co.: Boart Longyear     Geologist: L. Greene     Begin Drilling: 4/2/2007  
 Driller: Gerald Sealey     Total Depth: 150     End Drilling: 4/2/2007  
 Drilling Method: Rotosonic     Surface Elev.: 732.459     Converted to Well: Y Well I.D.: GM-68D  
 Drilling Fluid: Water     North Coord.: 4063.53205     East Coord.: 6357.84287

Remarks: \_\_\_\_\_

Project No.: OH000294.0010     Datum: TOC: 732.269     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	4.4						
64	N/A	24	3.7				SW	SAND Brown (10 yr 5/3), well graded, medium coarse, 25% subangular-subround, wet	
66	N/A	24	3.7					Water sample 65-70' @ 1120	
68	N/A	24	2.1						
70	N/A	24	2.2						
72	N/A	24	6.4				SP	SAND Brown (10 yr 5/3), poorly graded, medium, <5% gravel, wet	
74	N/A	24	0.7						
	N/A	24	5.8						

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	1.8					Note: Yellowish brown (10 yr 5/4), poorly graded, fine @ 75.5' Note: 64'-77' fining downward sequence	
78	N/A	24	1.8				ML	SILT Grayish brown (10 yr 5/2), with 20% clay lamina, high plasticity, soft, moist), dense silt, wet	
80	N/A	24	2.2				SP	SAND Grayish brown (10 yr 5/2), poorly graded, medium-coarse, subangular, wet	
82	N/A	24	5.7				SW	SAND Grayish brown (10 yr 5/2), medium coarse, trace silt, subangular, well graded, 15% fine coarse gravel, wet	
84	N/A	24	8.7					Water sample 85-90' @ 1410	
86	N/A	24	3.6				GW	GRAVEL WITH SAND	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 7 of 12

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_







Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
88	N/A	24	6.9					Grayish brown (10 yr 5/2), well graded, fine coarse, 30% sand (medium coarse, subangular), with some slit, wet	
90	N/A	24	4.8						
92	N/A	24	6.9						
94	N/A	24	4.1						Note: Gray (multi colored gravel), 40% fine coarse grained sand (subangular), trace silt @ 94'
96	N/A	24	4.7						Note: Gray (10 yr 5/1), 30% sand (fine coarse) @ 97'
98	N/A	24	4.5						
100									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Page 8 of 12

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks:

Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
102	N/A	24	4.6						
104	N/A	24	4.7						
106	N/A	24	4.6				SP	SAND WITH GRAVEL Gray (10 yr 5/1), poorly graded, 25% gravel, subangular-subrounded, medium-coarse, sand, wet	
108	N/A	24	4.4						
110	N/A	24	5.5						
112	N/A	24	4.6				GP	GRAVEL WITH SAND Yellowish brown (10 yr 5/6), poorly graded, 15% silt, 15% sand, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
114	N/A	24	5.3						
116	N/A	24	4.7					Water sample 115-120' @ 1615	
118	N/A	24	4.4						
120	N/A	12	4.7						
120	N/A	24	3.2				SM	SILTY SAND Brownish yellow (10 yr 6/6), fine-medium grained, 15% gravel, 20% silt, wet	
122	N/A	24	1.1						
124	N/A	24	2.7				SP	SAND Grayish brown (10 yr 5/2), poorly graded, fine coarse, trace gravel, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
126	N/A	24	2.5						
128	N/A	24	3.4						
130	N/A	24	3.5						
132	N/A	24	2.5						
134	N/A	24	3.1						
136	N/A	24	1.7					Note: 5% silt, trace clay @ 136'	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
138	N/A	24	2.9						
140	N/A	24	2.4				SW	SAND Grayish brown (10 yr 5/2), well graded, fine-coarse, firm, trace gravel, wet	
142	N/A	24	0.8						
144	N/A	24	1.5						
146	N/A	24	2.3				SP	SAND Grayish brown (10 yr 5/2), poorly graded, fine medium grained, trace gravel, wet	
148	N/A	24	1.1						
150								End of boring	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/2/2007

Driller: Gerald Sealey

Total Depth: 150

End Drilling: 4/2/2007

Drilling Method: Rotosonic

Surface Elev.: 732.459

Converted to Well: Y Well I.D.: GM-68D

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_

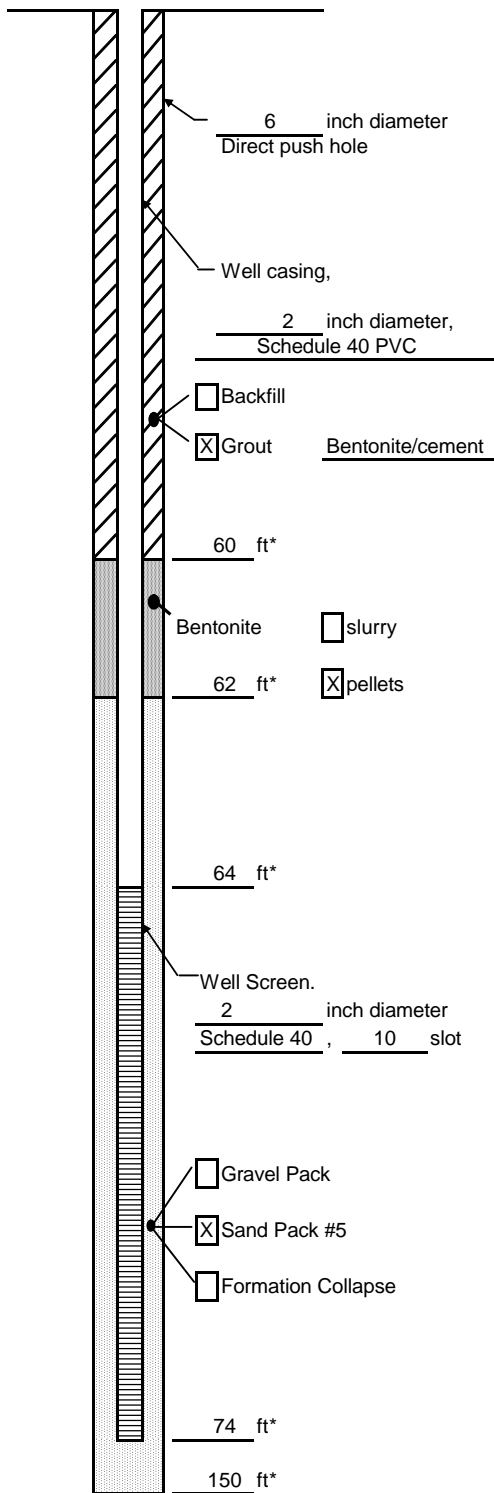
Project No.: OH000294.0010

Datum: TOC: 732.269

Filename: April 2007

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-68D

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

732.459 feet  Surveyed

Estimated

Installation Date(s) 4/19/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water - removed during vertical

aquifer profiling

Development Technique(s) and Date(s)

Submersible pump - surge with pump

4/13/07 Paul Smith

Fluid Loss During installation 700 gallons

Water Removed During Development 135 gallons

Static Depth to Water NM feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 1.00 hours

Yield NM gpm Date 4/13/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks Permanent 6" casing installed to a depth

of 53'. Time: 1115, 1120, 1125, 1130, 1135, 1140

pH: 6.47, 6.63, 6.62, 6.64, 6.65, 6.64

Conductivity: 1.54, 1.44, 1.44, 1.44, 1.41, 1.41

Temperature: 17.0, 16.9, 17.0, 16.9, 17.1, 17.0

Turbidity: 14, 20, 17, 25, 19, 22

Prepared by L. Greene

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
46								See boring log GM-68D for lithologic description	
48									
50								End of boring	
52									
54									
56									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 1

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/12/2007

Driller: Gerald Sealey

Total Depth: 49.5

End Drilling: 4/12/2007

Drilling Method: Rotosonic

Surface Elev.: 732.477

Converted to Well: Y Well I.D.: GM-68S

Drilling Fluid: Water

North Coord.: 4063.53205

East Coord.: 6357.84287

Remarks: \_\_\_\_\_

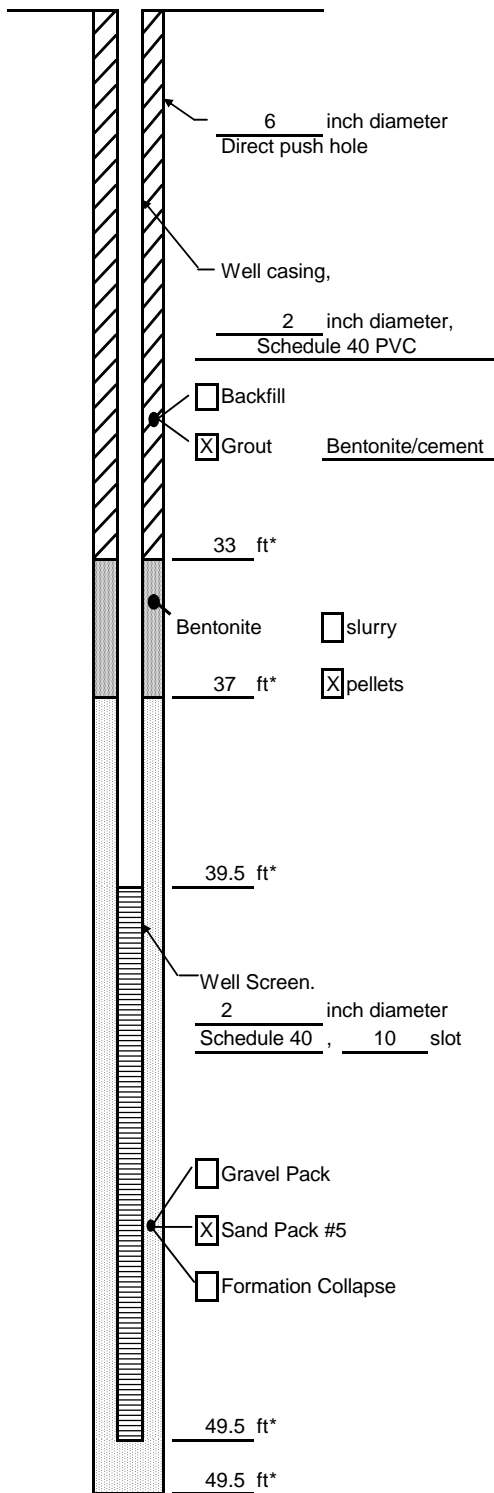
Project No.: OH000294.0010

Datum: TOC: 732.177

Filename: April 2007

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-68S

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

732.477 feet  Surveyed

Estimated

Installation Date(s) 4/12/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump - surge with pump 4/13/07 by

Paul Smith

Fluid Loss During installation 50 gallons

Water Removed During Development 195 gallons

Static Depth to Water 21.9 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 1.25 hours

Yield 3 gpm Date 4/13/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Note: formation collapse (150' to 49.5')

Remarks Time: 1325, 1328, 1331, 1334, 1337, 1340

pH: 12.04, 11.78, 11.39, 11.12, 10.98, 10.81

Conductivity: 0.688, 0.700, 0.721, 0.754, 0.760






Turbidity: 287, 10+, 10+, 10+, 10+, 10+

Temperature: 15.8, 16.0, 16.3, 16.4, 16.4, 16.4

Prepared by L. Greene

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	N/A	N/A					ASPHALT	
								CONCRETE	
2									
4	N/A	24	0.1				GW	GRAVEL Light gray, limestone, fine-coarse gravel with 20% coarse sand, some silt, moist (fill)	
6	N/A	24	0.2						
8	N/A	24	1.7					Note: Dark gray to black 3" layer of wood and metal @ 7.5'	
10	N/A	24	0.8						
12	N/A	24	0.1				SW	SAND WITH GRAVEL Brown, well graded, medium-coarse, subangular-subrounded with 20% fine-coarse subrounded-subangular gravel	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 12

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.080

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	0.0			[Dotted Pattern]			
16	N/A	24	0.1			[Dotted Pattern]			
18	N/A	24	0.0			[Dotted Pattern]		Note: wet @ 17'	
20	N/A	24	0.0			[Dotted Pattern]			
22	N/A	24	0.0			[Dotted Pattern]			
24	N/A	24	0.0			[Dotted Pattern]	SW	SAND Brown, well graded, medium coarse, subangular-subrounded with 5% fine-coarse subrounded gravel (trace cobbles up to 4"), wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks: \_\_\_\_\_







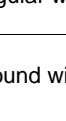
Project No.: OH000294.0010

Datum: TOC: 732.080

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	0.0					SAND WITH GRAVEL Brown, well graded, medium-coarse, subangular with 40% fine-coarse gravel, wet	
28	N/A	24	0.0				SP	SAND Brown, poorly graded, medium subangular with <5% fine subrounded gravel, wet	
28	N/A	24	0.0				GW	GRAVEL WITH SAND Brown, well graded, fine coarse, subround with 30% medium-coarse subangular sand, wet	
30	N/A	24	0.0					Note: Brown to red brown, 10% coarse subangular sand with some silt @ 29'	
30	N/A	24	0.0					Water sample 30-35' @ 1358	
32	N/A	24	0.0				SW	SAND Brown, well graded, medium coarse, subround gravel (trace cobbles up to 4") , wet	
34	N/A	24	0.0						
36	N/A	24	0.0				GW	GRAVEL WITH SAND Yellowish brown (10 yr 5/4), well graded, fine-coarse subangular gravel up	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks:

Project No.: OH000294.0010

Datum: TOC: 732.080

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	0.0					to 2", with 30% medium coarse subangular sand, some silt, wet	
40	N/A	24	0.0						
42	N/A	24	0.0						
44	N/A	24	0.0						
46	N/A	24	0.0					Note: Light brownish gray (10 yr 6/2)	
48	N/A	24	0.0					GRAVEL Light brownish gray, well graded, fine coarse, subrounded-subangular (up to 1.5") with 40% medium-coarse, subangular sand, wet	
50	N/A	24	0.0				GP	GRAVEL WITH SAND Light brown gray, poorly graded, fine, subangular-subrounded with 40% medium-coarse subangular sand, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.080

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	0.0				SP	SAND Light brown gray, poorly graded, medium coarse, subangular, wet	
54	N/A	24	0.0						
56	N/A	24	0.0					Note: Gray, fine-medium @ 55.5'	
58	N/A	24	0.0					Water sample 57-62' @ 1623	
60	N/A	24	0.0				SW	SAND WITH GRAVEL Light brownish gray, well graded, some silt, medium-coarse, subangular, with 30% fine coarse subrounded gravel, wet	
62	N/A	24	0.0				GW	GRAVEL WITH SAND Light brownish gray, well graded, fine, subangular-subrounded with 40%	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 5 of 12

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 3/29/2007  
 Driller: Gerald Sealey     Total Depth: 140     End Drilling: 3/30/2007  
 Drilling Method: Rotosonic     Surface Elev.: 732.416     Converted to Well: Y Well I.D.: GM-69  
 Drilling Fluid: Water     North Coord.: 3021.79146     East Coord.: 6352.18442

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 732.080     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	0.0				CL	medium-coarse sand. Note: Bottom 3" is dark gray with staining and strong odor SILTY CLAY Dark grayish brown (10 yr 4/2), very stiff, medium plasticity with 3% fine subangular gravel, dry	
66	N/A	24	0.0					SILTY CLAY Dark gray (2.5 yr 4/1), high plasticity, with 5% subangular gravel (trace coarse, subangular gravel up to 1.5"), dry	
68	N/A	24	0.0					Note: Medium plasticity	
68	N/A	24	0.0				SM	SILTY SAND	
68	N/A	24	0.0				SP	Mottled brown-gray, dense, wet SAND	
70	N/A	24	0.0				GW	GRAVEL WITH SAND Brown, well graded with trace silt, fine-coarse (cobbles up to 4") with 40% medium coarse subangular sand, wet	
72	N/A	24	0.0					Water sample 72-77' @ 0828	
74	N/A	24	0.0						
74	N/A	24	0.0						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 6 of 12

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.080

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	0.0				GW	Same as above	
78	N/A	24	0.0				SM	SILTY SAND Brownish yellow (10 yr 6/8), fine, dense, some silt, wet	
80	N/A	24	0.0				CL	SILTY CLAY Gray, high plasticity, soft, moist	
82	N/A	24	0.0				SM	SILTY SAND Brownish yellow, fine, dense some silt, wet	
84	N/A	24	0.0				CL	SILTY CLAY Gray, soft, high plasticity, moist	
86	N/A	24	0.0				SM	SILTY SAND Brownish yellow, poorly graded, fine medium, wet	
	N/A	24	0.0				SP	SAND Grayish brown (10 yr 5/2), poorly graded, fine-medium, wet	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 7 of 12

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.080

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
88	N/A	24	0.0				GW	GRAVEL WITH SAND Grayish brown, well graded trace of silt, fine-coarse (up to 2"), subround with medium coarse subangular sand, wet  Water sample @ 92-97' @ 0943	
90	N/A	24	0.0						
92	N/A	24	0.0						
94	N/A	24	0.0						
96	N/A	24	0.0						
98	N/A	24	0.0						
100	N/A	24	0.0						






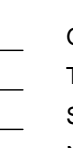
Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 8 of 12

Drilling Co.: Boart Longyear     Geologist: T. Fortner     Begin Drilling: 3/29/2007  
 Driller: Gerald Sealey     Total Depth: 140     End Drilling: 3/30/2007  
 Drilling Method: Rotosonic     Surface Elev.: 732.416     Converted to Well: Y Well I.D.: GM-69  
 Drilling Fluid: Water     North Coord.: 3021.79146     East Coord.: 6352.18442

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 732.080     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
102	N/A	24	0.0					Note: Gravel up 4" @ 101'	
104	N/A	24	0.0						
106	N/A	24	0.0						
108	N/A	24	0.0						
110	N/A	24	0.0						
112	N/A	24	0.0						

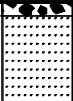
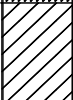
Composite Sample to Lab     
  Grab Sample to Lab     
  Split-Spoon Not Analyzed     
 Page 9 of 12

Drilling Co.: Boart Longyear      Geologist: T. Fortner      Begin Drilling: 3/29/2007  
 Driller: Gerald Sealey      Total Depth: 140      End Drilling: 3/30/2007  
 Drilling Method: Rotosonic      Surface Elev.: 732.416      Converted to Well: Y Well I.D.: GM-69  
 Drilling Fluid: Water      North Coord.: 3021.79146      East Coord.: 6352.18442

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010      Datum: TOC: 732.080      Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
114	N/A	24	0.0				SW	SAND WITH GRAVEL Brown (10 yr 5/3), well graded, medium-coarse, subangular with 30% fine coarse (up to 2") subrounded gravel, wet	
116	N/A	24	0.0					Water sample 115-120' @ 1053	
118	N/A	24	0.0						
120	N/A	12	0.0						
120	N/A	24	0.9				CL	SILTY CLAY Dark gray (10 yr 4/1), <5% gravel (angular), stiff, dry	
122	N/A	24	1.						
124	N/A	24	2.4					Note: 30% sand, <5% gravel (angular), moist @ 124'	

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 732.080

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
126	N/A	24	1.3						
128	N/A	24	4.3					Note: No sand @ 128'	
130	N/A	24	2.2						
132	N/A	24	0.0						
134	N/A	24	0.0						
136	N/A	24	1.4						
							SC	CLAYEY SAND	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks: \_\_\_\_\_


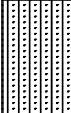
Project No.: OH000294.0010

Datum: TOC: 732.080

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
138								Dark gray (10 yr 4/1), 30% silt, fine sand, moist	
140							SM	SILTY SAND Dark gray (10 yr 4/1), trace clay, trace gravel (angular), moist	
140								End of boring	
142									
144									
146									
148									
150									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: T. Fortner

Begin Drilling: 3/29/2007

Driller: Gerald Sealey

Total Depth: 140

End Drilling: 3/30/2007

Drilling Method: Rotosonic

Surface Elev.: 732.416

Converted to Well: Y Well I.D.: GM-69

Drilling Fluid: Water

North Coord.: 3021.79146

East Coord.: 6352.18442

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

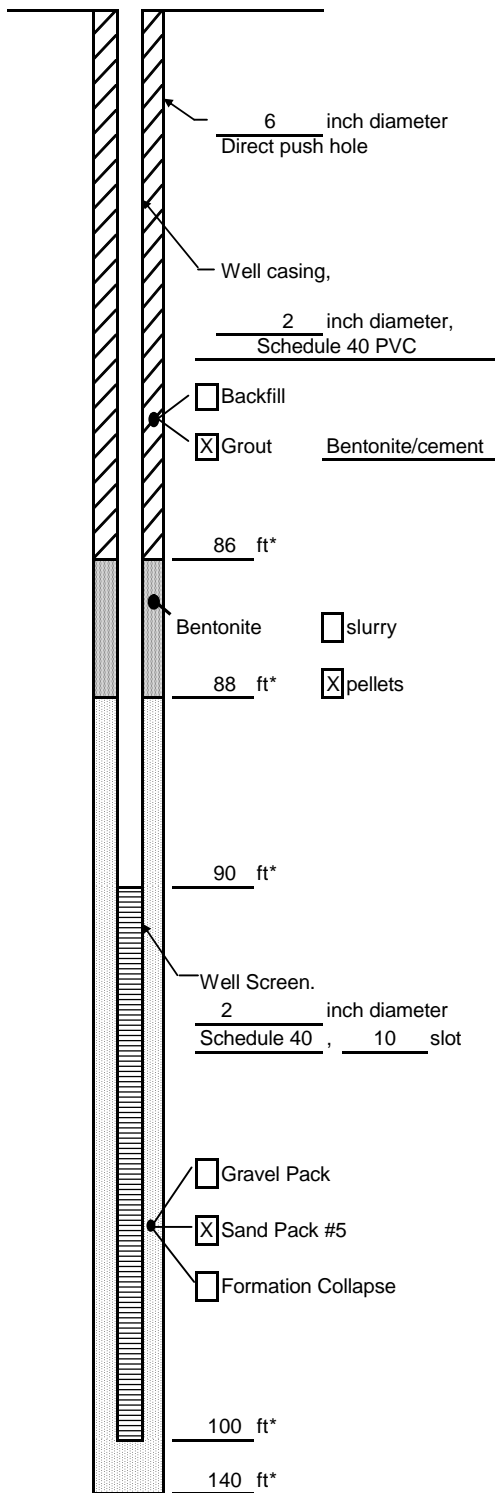
Datum: TOC: 732.080

Filename: April 2007

**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-69

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:  
732.416 feet  Surveyed  
 Estimated

Installation Date(s) 4/9/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water - removed during vertical  
aquifer profiling, 50 gallons used during well installation

Development Technique(s) and Date(s)

Pumping, surge with pump

Fluid Loss During installation 50 gallons

Water Removed During Development 135 gallons

Static Depth to Water 22 feet below M.P.

Pumping Depth to Water 50 feet below M.P.

Pumping Duration 0.75 hours

Yield 3 gpm Date 4/12/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Note: Bentonite chip from 140-120', formation collapse  
from 120-100', permanent 6" casing installed at RCT.

Remarks Time: 1018, 1021, 1024, 1027, 1030

pH: 7.93, 7.91, 7.90, 7.88, 7.75

Conductivity: 1.33, 1.34, 1.33, 1.32, 1.34

Turbidity: 72, 17, 15, 130, 97

Temperature: 14.7, 14.6, 14.6, 14.7, 15.0

Prepared by L. Greene

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	N/A	N/A				FILL	FILL Utility cleared material	
2									
4									
6									
8									
10									
12	N/A	24	7.8				SP	SAND Yellowish brown (10 yr 5/6), poorly graded, trace silt, fine-medium grained, 20% gravel (angular-subround), dry	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/5/2007

Driller: Gerald Sealey

Total Depth: 120

End Drilling: 4/5/2007

Drilling Method: Rotosonic

Surface Elev.: 737.470

Converted to Well: Y Well I.D.: GM-70

Drilling Fluid: Water

North Coord.: 3887.32724

East Coord.: 7282.84039

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 737.186

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	7.0			[Dotted pattern]			
16	N/A	24	7.9			[Dotted pattern]		Note: Coarse sand, yellowish brown (10 yr 5/6), 30% gravel @ 15'	
18	N/A	24	7.2			[Dotted pattern]			
20	N/A	24	9.2			[Dotted pattern]			
22	N/A	24	6.2			[Dotted pattern]			
24	N/A	24	11.4			[Dotted pattern]	SP	SAND Yellowish brown (10 yr 5/4), poorly graded, <5% gravel (subangular-	

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 2 of 10

Drilling Co.: Boart Longyear     Geologist: L. Greene     Begin Drilling: 4/5/2007  
 Driller: Gerald Sealey     Total Depth: 120     End Drilling: 4/5/2007  
 Drilling Method: Rotosonic     Surface Elev.: 737.470     Converted to Well: Y Well I.D.: GM-70  
 Drilling Fluid: Water     North Coord.: 3887.32724     East Coord.: 7282.84039

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 737.186     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	10.2					subround), fine medium, dry Note: Yellowish brown (10 yr 5/6), 30% gravel, coarse, moist	
28	N/A	24	8.7				GP	GRAVEL WITH SAND Yellowish brown (10 yr 5/6), poorly graded, medium grained, 20% sand, subangular-angular, wet	
30	N/A	24	8.0						
32	N/A	24	6.9						
34	N/A	24	7.6						
36	N/A	24	8.0				SP	SAND Yellowish brown (10 yr 5/4), poorly graded, medium coarse, 10% gravel (subangular-subround), wet	
	N/A	24	6.1				GW	GRAVEL WITH SAND Brown (10 yr 5/4), well graded, fine medium 10% sand, subangular-	





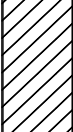

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 3 of 10

Drilling Co.: Boart Longyear     Geologist: L. Greene     Begin Drilling: 4/5/2007  
 Driller: Gerald Sealey     Total Depth: 120     End Drilling: 4/5/2007  
 Drilling Method: Rotosonic     Surface Elev.: 737.470     Converted to Well: Y Well I.D.: GM-70  
 Drilling Fluid: Water     North Coord.: 3887.32724     East Coord.: 7282.84039

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 737.186     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
38	N/A	24	7.5					subround, wet	
40	N/A	24	7.2					Water sample 40-45' @ 1150	
42	N/A	24	6.8					Note: Fine-coarse, sandy gravel, 10% sand	
44	N/A	24	7.4						
46	N/A	24	1.5				CL	SILTY CLAY Dark grayish brown (10 yr 4/2), 5% gravel (angular-subangular), very stiff, low plasticity, dry	
48	N/A	24	4.7						
50									

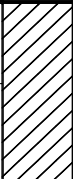
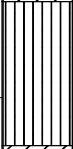
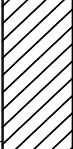
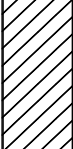
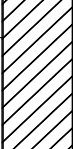
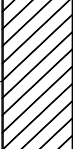
Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 4 of 10

Drilling Co.: Boart Longyear     Geologist: L. Greene     Begin Drilling: 4/5/2007  
 Driller: Gerald Sealey     Total Depth: 120     End Drilling: 4/5/2007  
 Drilling Method: Rotosonic     Surface Elev.: 737.470     Converted to Well: Y Well I.D.: GM-70  
 Drilling Fluid: Water     North Coord.: 3887.32724     East Coord.: 7282.84039

Remarks: \_\_\_\_\_  
 Project No.: OH000294.0010     Datum: TOC: 737.186     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
52	N/A	24	3.9				ML	CLAYEY SILT Dark grayish brown (10 yr 4/2), <5% gravel (subround), moist	
54	N/A	24	4.3				CL	SILTY CLAY Dark grayish brown (10 yr 4/2), 5% gravel (subangular-angular), very stiff, brittle, low plasticity, dry	
56	N/A	24	4.8						
58	N/A	24	5.0						
60	N/A	24	4.6						
62	N/A	24	5.1						

Composite Sample to Lab    
  Grab Sample to Lab    
  Split-Spoon Not Analyzed    
 Page 5 of 10








Drilling Co.: Boart Longyear     Geologist: L. Greene     Begin Drilling: 4/5/2007  
 Driller: Gerald Sealey     Total Depth: 120     End Drilling: 4/5/2007  
 Drilling Method: Rotosonic     Surface Elev.: 737.470     Converted to Well: Y Well I.D.: GM-70  
 Drilling Fluid: Water     North Coord.: 3887.32724     East Coord.: 7282.84039

Remarks: \_\_\_\_\_

Project No.: OH000294.0010     Datum: TOC: 737.186     Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
64	N/A	24	5.6						
66	N/A	24	4.7				SP	SAND Dark grayish brown (10 yr 4/2), poorly graded, fine-medium, <5% fine gravel, moist	
68	N/A	24	3.4				CL	SILTY CLAY Dark grayish brown (10 yr 4/2), 5% gravel, subangular-angular, very stiff, brittle, low plasticity, dry	
70	N/A	24	5.1						
72	N/A	24	4.8						
74	N/A	24	4.4				SP	SAND Yellowish brown (10 yr 5/4), poorly graded, 15% gravel (subangular-angular), medium-coarse, wet	
	N/A	24	4.4					Water sample 73-78' @ 1520	
	N/A	24	5.2						

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Page 6 of 10

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/5/2007

Driller: Gerald Sealey

Total Depth: 120

End Drilling: 4/5/2007

Drilling Method: Rotosonic

Surface Elev.: 737.470

Converted to Well: Y Well I.D.: GM-70

Drilling Fluid: Water

North Coord.: 3887.32724

East Coord.: 7282.84039

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 737.186

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
76	N/A	24	5.2						
78	N/A	24	7.0					Note: 25% gravel (subangular-subround) @ 79'	
80	N/A	24	6.1				ML	CLAYEY SILT Yellowish brown (10 yr 5/4), orange mottling, dry	
82	N/A	24	7.8				SP	SAND Dark gray (10 yr 4/1), poorly graded, fine, wet	
84	N/A	24	4.5					Note: Dark grayish brown (10 yr 4/2), <5% gravel @ 83'	
86	N/A	24	5.6						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/5/2007

Driller: Gerald Sealey

Total Depth: 120

End Drilling: 4/5/2007

Drilling Method: Rotosonic

Surface Elev.: 737.470

Converted to Well: Y Well I.D.: GM-70

Drilling Fluid: Water

North Coord.: 3887.32724

East Coord.: 7282.84039

Remarks: \_\_\_\_\_

Project No.: OH000294.0010

Datum: TOC: 737.186

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
88	N/A	24	7.5					Note: 15-20% gravel @ 88'	
90	N/A	24	7.6					Note: 5% Gravel, trace silt	
92	N/A	24	6.7				SW	SAND Dark grayish brown (10 yr 4/2), well graded, fine-coarse, 5% gravel, moist, trace silt, seams of fine sand <2", wet	
94	N/A	24	3.6					Water sample 93-98' @ 1650	
96	N/A	24	7.0						
98	N/A	24	5.7					Note: 15% gravel, no fine sand seams @ 98'	
100									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 8 of 10

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/5/2007

Driller: Gerald Sealey

Total Depth: 120

End Drilling: 4/5/2007

Drilling Method: Rotosonic

Surface Elev.: 737.470

Converted to Well: Y Well I.D.: GM-70

Drilling Fluid: Water

North Coord.: 3887.32724

East Coord.: 7282.84039

Remarks:

Project No.: OH000294.0010

Datum: TOC: 737.186

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
102	N/A	24	7.1					Note: 25-30% fine gravel, fine-coarse, trace silt @ 102'	
104	N/A	24	6.8						
106	N/A	24	5.4						
108	N/A	24	5.1						
110	N/A	24	4.2				SP	SAND Dark grayish brown (10 yr 4/2), poorly graded, fine-coarse, 5% gravel (subangular-subround), wet	
112	N/A	24	2.1						Water sample 112-117' @ 1810

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 9 of 10

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/5/2007

Driller: Gerald Sealey

Total Depth: 120

End Drilling: 4/5/2007

Drilling Method: Rotosonic

Surface Elev.: 737.470

Converted to Well: Y Well I.D.: GM-70

Drilling Fluid: Water

North Coord.: 3887.32724

East Coord.: 7282.84039

Remarks: \_\_\_\_\_

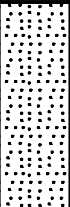
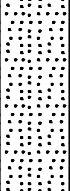
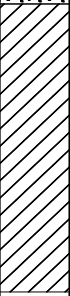

Project No.: OH000294.0010

Datum: TOC: 737.186

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
114	N/A	24	3.7						
116	N/A	24	3.5						
118	N/A	24	5.5				CL	SILTY CLAY Dark gray (10 yr 4/1), trace fine gravel (fossiliferous limestone), stiff, dry	
120	N/A	12	2.2					End of boring	
122									
124									

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Page 10 of 10

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/5/2007

Driller: Gerald Sealey

Total Depth: 120

End Drilling: 4/5/2007

Drilling Method: Rotosonic

Surface Elev.: 737.470

Converted to Well: Y Well I.D.: GM-70

Drilling Fluid: Water

North Coord.: 3887.32724

East Coord.: 7282.84039

Remarks: \_\_\_\_\_

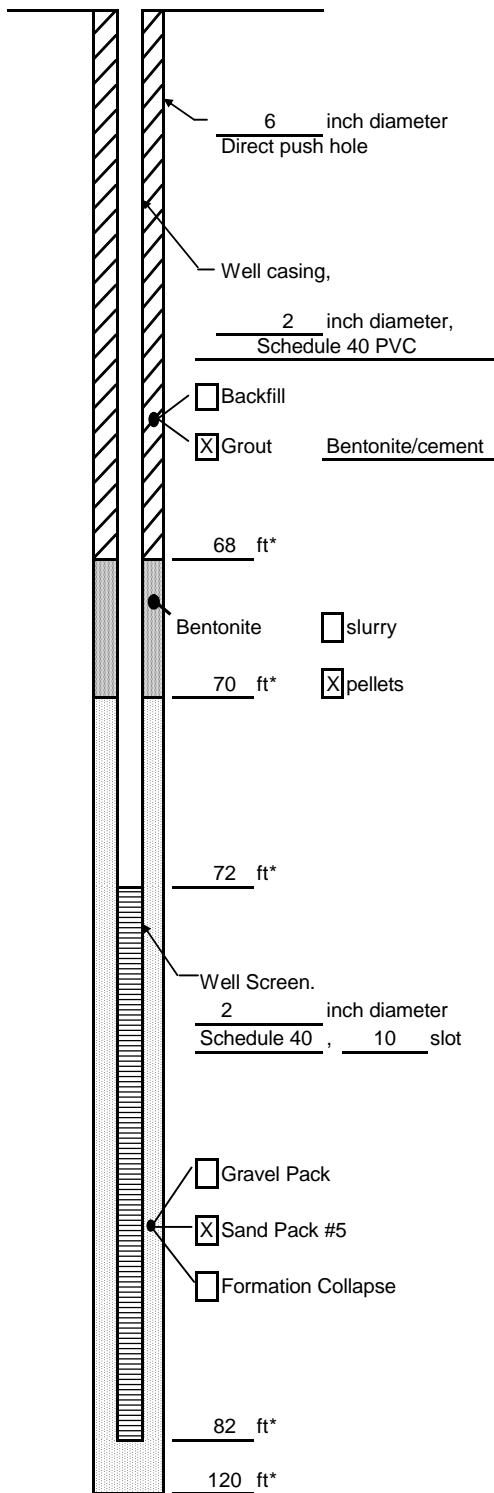
Project No.: OH000294.0010

Datum: TOC: 737.186

Filename: April 2007

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-70

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

737.470 feet  Surveyed

Estimated

Installation Date(s) 4/12/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump, surge with pump

4/13/07 Paul Smith

Fluid Loss During installation 50 gallons

Water Removed During Development 60 gallons

Static Depth to Water 26.5 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.50 hours

Yield 3 gpm Date 4/13/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Note: formation collapse 120-82'

Remarks Time: 1219, 1222, 1225, 1228, 1231

pH: 7.49, 7.84, 7.94, 7.99, 8.01

Conductivity: 1.09, 1.08, 1.06, 1.05, 1.06



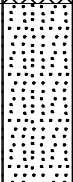
Turbidity: 17, 4, 10+, 10+, 10+

Temperature: 15.7, 15.7, 15.8, 15.9, 15.8

Prepared by L. Greene

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	NM					CONCRETE	
2							FILL	FILL Sand and gravel, fill	
4									
6									
8									
10	N/A	24	10.4				SP	SAND Dark yellowish brown (10 yr 4/4), poorly graded, medium, 30% gravel (subround), dry	
12	N/A	24	5.9						

 Composite Sample to Lab

 Grab Sample to Lab

 Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/16/2007

Driller: Chris

Total Depth: 36

End Drilling: 4/16/2007

Drilling Method: Rotosonic

Surface Elev.: 737.194

Converted to Well: Y Well I.D.: GM-71

Drilling Fluid: Water

North Coord.: 4493.83914

East Coord.: 6849.32868

Remarks: Water sample 26-31' @ 1020

Project No.: OH000294.0010

Datum: TOC: 736.817

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
14	N/A	24	3.8						
16	N/A	24	8.6						
18	N/A	24	5.0				SW	SAND Yellowish brown (10 yr 5/4), well graded, fine-coarse, 20% gravel/cobbles (angular-subround), dry	
20	N/A	24	21.0						
22	N/A	24	8.1						
24	N/A	24	5.4						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 2 of 3

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/16/2007

Driller: Chris

Total Depth: 36

End Drilling: 4/16/2007

Drilling Method: Rotosonic

Surface Elev.: 737.194

Converted to Well: Y Well I.D.: GM-71

Drilling Fluid: Water

North Coord.: 4493.83914

East Coord.: 6849.32868

Remarks: Water sample 26-31' @ 1020

Project No.: OH000294.0010

Datum: TOC: 736.817

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
26	N/A	24	1.5						
28	N/A	24	8.0				SP	GRAVEL WITH SAND Brown (10 yr 5/3), poorly graded, fine medium gravel, (subround-subangular), 10% sand, wet	▼
30	N/A	24	1.7				CL	SILTY CLAY Grayish brown (10 yr 5/2), 5% gravel (angular-subround), dry	
32	N/A	24	2.2						
34	N/A	24	0.9						
36								End of boring	

☒ Composite Sample to Lab

■ Grab Sample to Lab

□ Split-Spoon Not Analyzed

Page 3 of 3

Drilling Co.: Boart Longyear

Geologist: L. Greene

Begin Drilling: 4/16/2007

Driller: Chris

Total Depth: 36

End Drilling: 4/16/2007

Drilling Method: Rotosonic

Surface Elev.: 737.194

Converted to Well: Y Well I.D.: GM-71

Drilling Fluid: Water

North Coord.: 4493.83914

East Coord.: 6849.32868

Remarks: Water sample 26-31' @ 1020

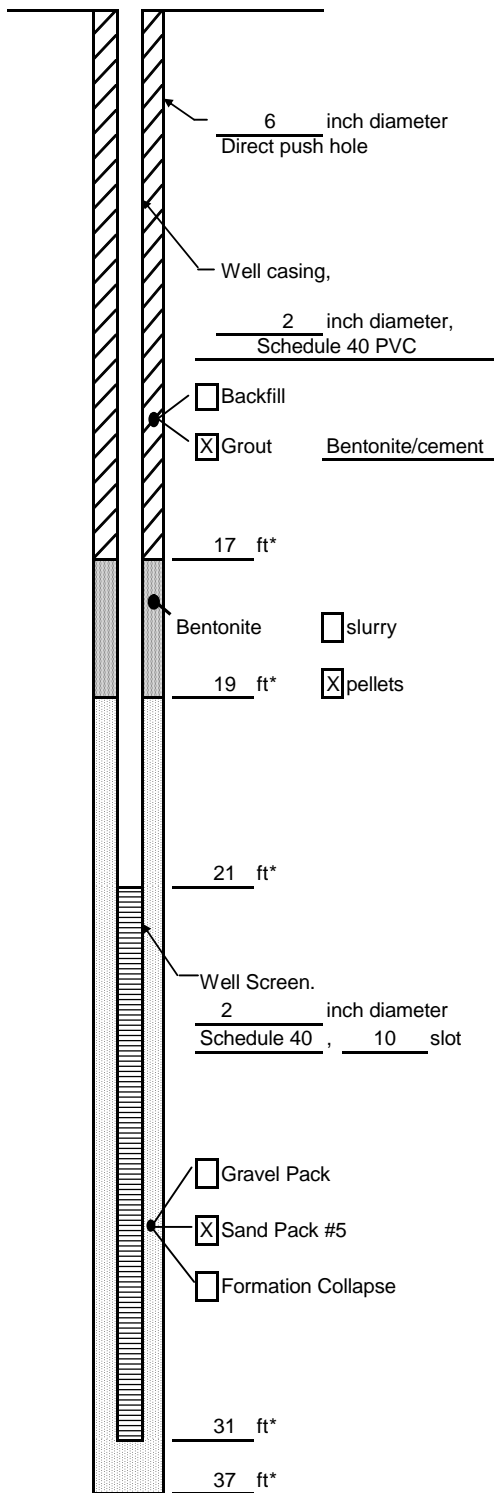
Project No.: OH000294.0010

Datum: TOC: 736.817

Filename: April 2007

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-71

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

737.194 feet  Surveyed

Estimated

Installation Date(s) 4/20/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump, surge with pump

4/26/07 Jim Wallace

Fluid Loss During Drilling 200 gallons

Water Removed During Development 60 gallons

Static Depth to Water 25.62 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 1 hours

Yield 1 gpm Date 4/26/07

Specific Capacity NM gpm/ft

Well Purpose Monitoring well

Remarks Time: 1125, 1130, 1135, 1140, 1145

pH: 6.81, 6.80, 6.74, 6.78, 6.80

Conductivity: 2.21, 214, 2.12, 2.12, 2.12



Turbidity: 58, 17, 10, 6, 10

Temperature: 17.2, 17.9, 17.8, 17.8, 17.7

Prepared by L. Greene

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0-30								0-30 feet see boring log GM-71 for lithologic description	
30	N/A	24	2.3				CL	CLAY Light brown (10 yr 5/7), hard, 10% gravel, dry	
32	N/A	24	4.7					Note: Olive gray (10 yr 5/1) @ 32'	
34	N/A	24	3.1						
36	N/A	24	5.9						
38	N/A	24	6.2				SW	SAND WITH GRAVEL Light brown (10 yr 6/4), medium-coarse, with 40% gravel (gravel up to 2"), loose, wet	
40	N/A	24	5.4						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 4

Drilling Co.: Boart Longyear

Geologist: J. Wallace

Begin Drilling: 4/24/2007

Driller: Chris

Total Depth: 68

End Drilling: 4/24/2007

Drilling Method: Rotosonic

Surface Elev.: 737.050

Converted to Well: Y Well I.D.: GM-72

Drilling Fluid: Water

North Coord.: 4496.04384

East Coord.: 6860.84485

Remarks: Water sample 42-47' @ 0930; 57-62' @ 1325

Project No.: OH000294.0010

Datum: TOC: 736.778

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
42	N/A	24	5.9						
44	N/A	24	7.0						
46	N/A	24	3.6				GW	GRAVEL WITH SAND Light brown, loose, gravel up to 3", 20% sand, wet	
48	N/A	24	6.6				GP	GRAVEL Light brown to gray (10 yr 6/4), poorly graded, fine to medium gravel, loose, well rounded, with 10% sand, wet	
50	N/A	24	2.6					Note: Gravel up 1", 10% sand @ 50'	
52	N/A	24	5.1					Note: No gravel larger than 0.5" @ 52'	
54									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 2 of 4

Drilling Co.: Boart Longyear

Geologist: J. Wallace

Begin Drilling: 4/24/2007

Driller: Chris

Total Depth: 68

End Drilling: 4/24/2007

Drilling Method: Rotosonic

Surface Elev.: 737.050

Converted to Well: Y Well I.D.: GM-72

Drilling Fluid: Water

North Coord.: 4496.04384

East Coord.: 6860.84485

Remarks: Water sample 42-47' @ 0930; 57-62' @ 1325

Project No.: OH000294.0010

Datum: TOC: 736.778

Filename: April 2007

### General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
56	N/A	24	5.6				GW	GRAVEL Light brown (10 yr 6/4) with fine sand, silt and some clay, wet	
	N/A	24	9.4					Note: No clay @ 56'	
58	N/A	24	26.4				SP	SAND Light brown (10 yr 4/4), fine to medium sand, loose, <10% gravel, wet	
60	N/A	24	7.7				GW	GRAVEL Light brown with 30% fine to medium sand, loose, wet	
62	N/A	24	4.7				SP	SAND Light brown (10 yr 5/2), medium sand with 30% gravel, loose, wet	
								Note: Fine sand @ 61'	
64	N/A	24	4.1				CL	CLAY Gray (10 yr 4/1), hard, with <10% gravel, dry	
66	N/A	12	4.1						

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: J. Wallace

Begin Drilling: 4/24/2007

Driller: Chris

Total Depth: 68

End Drilling: 4/24/2007

Drilling Method: Rotosonic

Surface Elev.: 737.050

Converted to Well: Y Well I.D.: GM-72

Drilling Fluid: Water

North Coord.: 4496.04384

East Coord.: 6860.84485

Remarks: Water sample 42-47' @ 0930; 57-62' @ 1325

Project No.: OH000294.0010

Datum: TOC: 736.778

Filename: April 2007

General Motors Corporation

Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
68								End of boring	
70									
72									
74									
76									
78									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Drilling Co.: Boart Longyear

Geologist: J. Wallace

Begin Drilling: 4/24/2007

Driller: Chris

Total Depth: 68

End Drilling: 4/24/2007

Drilling Method: Rotosonic

Surface Elev.: 737.050

Converted to Well: Y Well I.D.: GM-72

Drilling Fluid: Water

North Coord.: 4496.04384

East Coord.: 6860.84485

Remarks: Water sample 42-47' @ 0930; 57-62' @ 1325

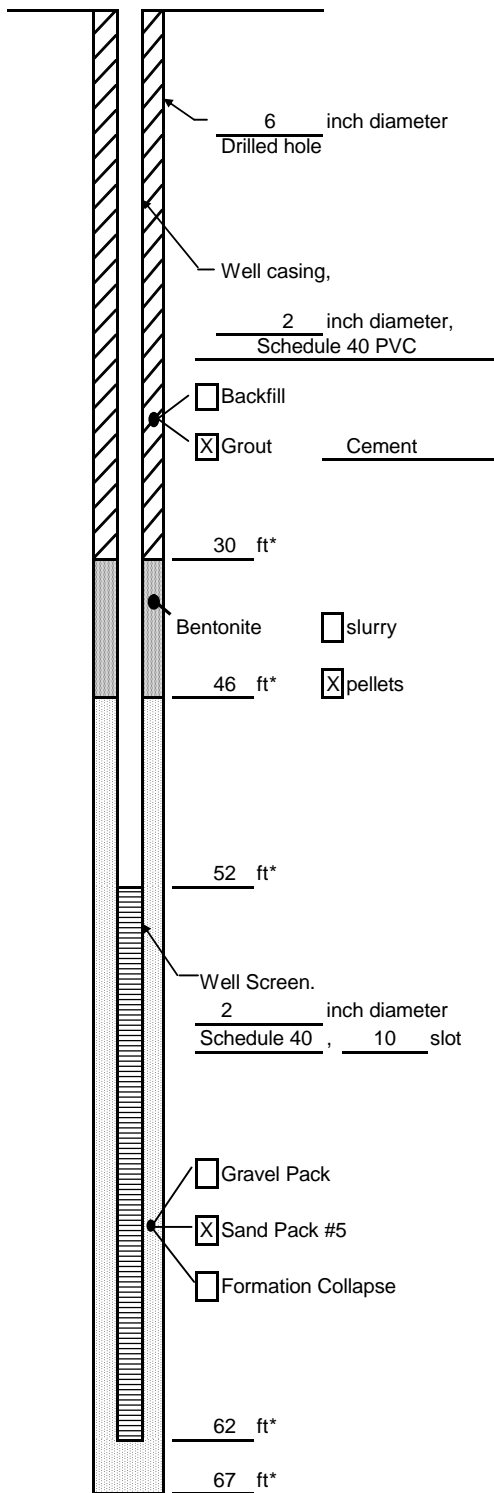
Project No.: OH000294.0010

Datum: TOC: 736.778

Filename: April 2007

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-72

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

737.050 feet  Surveyed

Estimated

Installation Date(s) 4/26/2007

Drilling Method Sonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Fluid Loss During Drilling 15 gallons

Water Removed During Development \_\_\_\_\_ gallons

Static Depth to Water \_\_\_\_\_ feet below M.P.

Pumping Depth to Water \_\_\_\_\_ feet below M.P.

Pumping Duration \_\_\_\_\_ hours

Yield \_\_\_\_\_ gpm Date \_\_\_\_\_

Specific Capacity \_\_\_\_\_ gpm/ft

Well Purpose Monitoring well

Remarks \_\_\_\_\_

Prepared by J. Wallace



Boring No.: GM-73

# Soil Boring Log

Sheet: 1 of 8

Project Name: General Motors Corporation

Date Started: 10/09/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 10/09/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Cloudy, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							See GM-71 and GM-72 logs for 0 to 67 feet.	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Drilling Co.: Frontz

Sampling Method: Core Barrel

Driller: Dave S.

Sampling Interval: 10 feet

Drilling Method: Rotosonic

Water Level Start: NA

Drilling Fluid: Water

Water Level Finish: NA

Remarks: SD=Sonic Drilling

Converted to Well:  Yes  No

Surface Elev.: 734.34 TOC=736.97

North Coord: 4494.3

East Coord: 6842.5

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-73

# Soil Boring Log

Sheet: 2 of 8

Project Name: General Motors Corporation

Date Started: 10/09/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 10/09/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Cloudy, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
							See GM-71 and GM-72 logs for 0 to 67 feet.	
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-73

# Soil Boring Log

Sheet: 3 of 8

Project Name: General Motors Corporation

Date Started: 10/09/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 10/09/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Cloudy, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
32							See GM-71 and GM-72 logs for 0 to 67 feet.	
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-73

# Soil Boring Log

Sheet: 4 of 8

Project Name: General Motors Corporation

Date Started: 10/09/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 10/09/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Cloudy, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
48							See GM-71 and GM-72 logs for 0 to 67 feet.	
49								
50								
51								
52								
53								
54								
55								
56								
57								
58								
59								
60								
61								
62								
63								

Remarks:

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Boring No.: GM-73

# Soil Boring Log

Sheet: 5 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/09/2007      Date Completed: 10/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Cloudy, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
64							See GM-71 and GM-72 logs for 0 to 67 feet.	
65								
66								
67								
67			12		0.0		CLAY (CL), gray, hard, low plasticity, trace sand and gravel, dry.	
68		24			1.2			
69								
70		24			0.9		SAND (SW), brown, well graded, loose, fine-coarse, trace subangular gravel, moist.	
71							Note: Trace silt at 71 feet.	
72		24			1.6		GRAVELLY SAND (SW), brown, well graded, loose, trace silt, wet.	
73								
74		24			2.2		SAND WITH GRAVEL (SW), brown, well graded, loose, trace silt, wet.	
75								
76		24			1.9		SANDY GRAVEL (GW), grayish brown, well graded, loose, trace silt, wet.	
77								
78		24			3.0			
79								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-73

# Soil Boring Log

Sheet: 6 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/09/2007      Date Completed: 10/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Cloudy, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
80			24		2.5	SAND (SW), brown, well graded, fine-coarse, medium loose, wet.		
81						SAND (SP), brown, poorly graded, medium loose-medium dense, fine grained, moist.		
82			24	SD	3.6			
83								
84			24		5.2			
85								
86			24		4.8			
87								
88			24		3.6			
89								
90			24		5.6			
91						Note: 3 inch silt seam at 91 feet.		
92			24		3.2	GRAVELLY SAND (SW), brown, well graded, loose, fine-coarse, wet, medium gravel.		
93								
94			24		2.8	Note: Cobbles present at 94 - 96 feet.		
95								

Remarks:

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Boring No.: GM-73

# Soil Boring Log

Sheet: 7 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/09/2007      Date Completed: 10/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Cloudy, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
96			24		3.2		GRAVELLY SAND (SW), brown, well graded, loose, fine-coarse, wet, medium gravel. Note: Medium-coarse gravel at 96 feet.	
97								
98			24	GM-73, 95 to 100 feet, 10/11/07, 15:15	4.7			
99								
100			24		2.9			
101								
102			24	SD	0.5		SANDY GRAVEL (GW), grayish brown, well graded, loose, trace silt, wet.	
103								
104			24		2.3			
105								
106			24		3.0			
107								
108			24		2.9			
109								
110			24		1.7			
111								

Remarks:

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Boring No.: GM-73

# Soil Boring Log

Sheet: 8 of 8

Project Name: General Motors Corporation

Date Started: 10/09/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 10/09/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Cloudy, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
112			24		2.2		SANDY GRAVEL (GW), grayish brown, well graded, loose, trace silt, wet.	
113								
114			24		3.1			
115								
116			24		1.2			
117								
118			24	GM-73, 115 to 120 feet, 10/11/07, 17:50  SD	2.8			
119								
120								
121								
122								
123								
124								
125								
126								
127								

Remarks:

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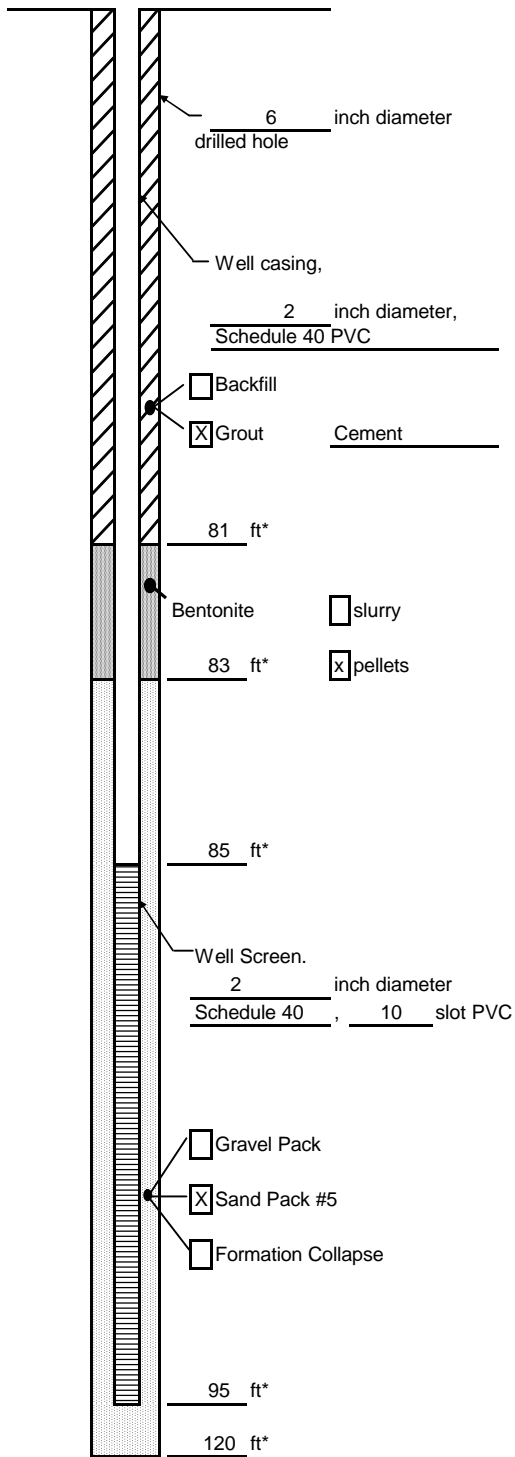
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# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-73

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

737.34 feet  Surveyed

Estimated

Installation Date(s) 9/21/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Driling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump and surge 10/22/07

Fluid Loss During Drilling 120 gallons

Water Removed During Development 142.3 gallons

Static Depth to Water 30.18 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 1.00 hours

Yield NM gpm Date 10/22/07

Specific Capacity NM gpm/ft

Well Purpose GW monitoring

Remarks Formation collapse from 120' to 95' ;

permanent casing set at 63'

1V 2V 3V 4V 5V

Ph 6.83 6.87 6.90 6.89 6.88

Conductivity 1.82 1.82 1.83 1.82 1.84

Turbidity 1.9 1.2 0.9 1.8 1.1

Temperature: 18.5 18.4 18.4 18.3 18.3

Prepared by L. Greene



Boring No.: GM-74D

# Soil Boring Log

Sheet: 1 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/17/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							Utility clearance with water knife (8-27-07). CONCRETE	
2								
3								
4								
5			0				Material excavated	
6								
7			24	GP	>2000		SAND (SP), brownish gray, poorly graded, fine to medium, trace silt; medium dense, dry, cobbles present.	
8							No return.	
9			0	GP				
10							No return, cobble in tooling shoe.	
11			0	GP				
12								
13			12	GP	906		SAND (SP), brown, poorly graded, fine to medium, trace medium gravel, medium dense, dry.	
14								
15								

Drilling Co.: Frontz      Sampling Method: 10 feet x 4 inch Core Barrel  
 Driller: Dave S.      Sampling Interval: 10 feet  
 Drilling Method: Direct push/Rotosonic      Water Level Start: 26 feet  
 Drilling Fluid: Water      Water Level Finish: --  
 Remarks: Permanent casing (10 inch) installed to 30.5 feet.      Converted to Well:  Yes       No  
                  GP=Geoprobe      Surface Elev.: 732.5  
                  SD=Sonic Drilling      North Coor: 4203.3  
                       East Coor: 6417.2

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-74D

# Soil Boring Log

Sheet: 2 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/17/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
16			24	GP	570		SAND (SP), brown, poorly graded, fine to medium, trace medium gravel, medium dense, dry.	
17			6	GP	1024		No return.	
18							SAND (SP), brown, poorly graded, fine to medium, trace medium gravel, dense, dry. Note: broken up cobbles.	
19			24	GP	1201			
20								
21			3	GP	473			
22								
23			24	GP	512		SAND (SW), grayish brown, well graded, fine to coarse, trace silt, medium dense, dry; silt is oxidized.	
24								
25			12	GP	37.0		SAND (SW), grayish brown, well graded, fine to coarse, trace silt, medium dense, dry; wet at 26 feet; silt is oxidized.	
26								
27			24		269		SAND (SW), grayish brown, well graded, fine to coarse, trace silt, medium dense, dry silt is oxidized.	
28								
29			24	GP GM-74, 26 to 31 feet, 8/29/07, 17:30	0.0		SILT (ML), dark gray, very stiff, hard, trace angular gravel, trace clay, dry.	
30								
31			12	GP	0.0			

Remarks:

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Boring No.: GM-74D

# Soil Boring Log

Sheet: 3 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/17/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
32			12		0.0		CLAYEY SILT (ML), dark gray, very stiff to hard, low plasticity, trace angular gravel, dry.	
33								
34			24		0.3			
35								
36			24	SD	0.5		SAND (SW), orangish brown, well graded, fine to coarse, little gravel, loose, damp.	
37								
38			24		1.6			
39								
40								
41			24		0.0		SANDY GRAVEL (GW), gray, well graded, fine to coarse, loose, wet.	
42			24		0.0			
43								
44			24		0.0			
45								
46			24		0.7		SAND (SW), brown, well graded, fine to coarse, medium loose, trace subrounded gravel, wet.	
47								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-74D

# Soil Boring Log

Sheet: 4 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/17/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
48			24	GM-74, 45 to 50 feet, (9/17/07, 14:34)	1.7		SAND (SW), brown, well graded, fine to coarse, medium loose, trace subrounded gravel, wet.	
49								
50			24		0.0		SILTY SAND (SW), orangish brown, well graded, trace clay, cohesive, very stiff to hard, dry.	
51								
52			24		0.0		CLAYEY SILT (ML), dark gray, very stiff, no plasticity, trace angular gravel, trace sand, dry.	
53								
54			24		0.0			
55				SD			3 inch silt seam at 55 feet.	
56			24		0.0		SILT (ML), gray, cohesive, trace clay, medium stiff, dry.	
57								
58			24		0.0		CLAYEY SILT (ML), dark gray, very stiff, no plasticity, trace angular gravel, trace sand, dry.	
59								
60			24		0.0		CLAYEY SILT (ML), dark gray, very stiff hard, very low plasticity, trace angular gravel, trace sand, and organic material, dry.	
61								
62			24		0.0			
63								

Remarks:

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Boring No.: GM-74D

# Soil Boring Log

Sheet: 5 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/17/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class			Description	Construction Details
64									CLAYEY SILT (ML), dark gray, very stiff hard, very low plasticity, trace angular gravel, trace sand, and organic material, dry.	
65				SD					Wood at 65 feet (6 inches)..	
66			24		2.0					
67										
68			24		1.8				SAND (SW), orangish brown, well graded, fine to coarse, some gravel (subround), loose, wet.	
69										
70			24		0.0					
71										
72			24		0.0					
73										
74			24		0.0					
75				SD						
76			24		0.0					
77									SAND (SW), orangish brown, poorly graded, fine to medium grained, cohesive, medium loose, damp.	
78			24		0.0					
79									SILT (ML), gray, medium soft, dry.	

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-74D

# Soil Boring Log

Sheet: 6 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/17/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
80							SILT (ML), gray, medium soft, dry.	
81		24			1.7		SAND (SP), gray, poorly graded, fine grained, trace silt, medium loose, wet.	
82		24			8.2			
83							SILT (ML), gray, medium soft to stiff, dry.	
84		24			12.6		SAND (SW), dark gray, well graded, fine to coarse, trace silt, loose, wet.	
85				SD				
86		24			13.8			
87								
88		24			6.1		Note: Some subrounded gravel at 88 feet.	
89								
90							Note: trace small cobbles.	
91		24			2.0			
92		24			1.7			
93								
94		24			0.5		SAND (SW), brownish gray, well graded, fine to coarse, trace gravel, loose, wet.	
95				SD				

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS.GDT 2/13/08

Boring No.: GM-74D

# Soil Boring Log

Sheet: 7 of 8Project Name: General Motors CorporationDate Started: 08/29/2007Logger: L. GreeneProject Number: OH000294.0010.00002Date Completed: 09/17/2007Editor: J. HuntProject Location: Moraine, OhioWeather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
96			24		1.1		SAND (SW), brownish gray, well graded, fine to coarse, trace gravel, loose, wet.  Note: trace small cobbles and some gravel.	
97								
98			24		1.4			
99								
100								
101			24		1.0			
102			24		0.0			
103								
104			24		0.0			
105				SD				
106			24		0.0			
107								
108			24		0.1			
109								
110			24		0.0	SAND (SW), dark gray, well graded, fine to medium, trace gravel, medium loose, wet.		
111								

Remarks:

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Boring No.: GM-74D

# Soil Boring Log

Sheet: 8 of 8

Project Name: General Motors Corporation

Date Started: 08/29/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/17/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
112			24	SD	0.7	SANDY GRAVEL (SW), gray, fine to coarse, well graded, loose, wet.		
113								
114			24		0.5			
115								
116			24		0.0	CLAYEY SAND (SW), brown, well graded, little gravel, fine to coarse, cohesive, medium loose to dense, wet.		
117								
118			24		0.0			
119								
120								
121								
122								
123								
124								
125								
126								
127								

Remarks:

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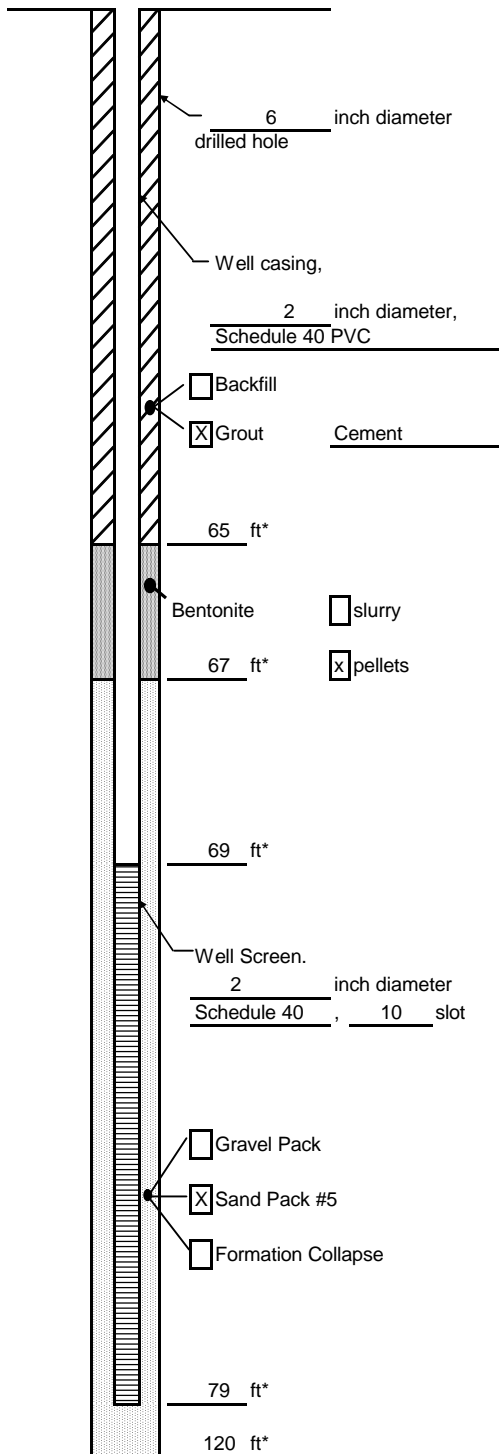


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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-74D

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

732.49 feet  Surveyed

Estimated

Installation Date(s) 9/21/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump & surge - 9/24/2007.

Fluid Loss During Drilling \_\_\_\_\_ gallons

Water Removed During Development \_\_\_\_\_ gallons

Static Depth to Water \_\_\_\_\_ feet below M.P.

Pumping Depth to Water \_\_\_\_\_ feet below M.P.

Pumping Duration \_\_\_\_\_ hours

Yield \_\_\_\_\_ gpm Date \_\_\_\_\_

Specific Capacity \_\_\_\_\_ gpm/ft

Well Purpose Monitoring Well

Remarks 8" permanent casing to 30.5 feet

north well at GM-74 location

Prepared by L. Greene



Boring No.: GM-74S

# Soil Boring Log

Sheet: 1 of 1

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 09/21/2007      Date Completed: 09/21/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

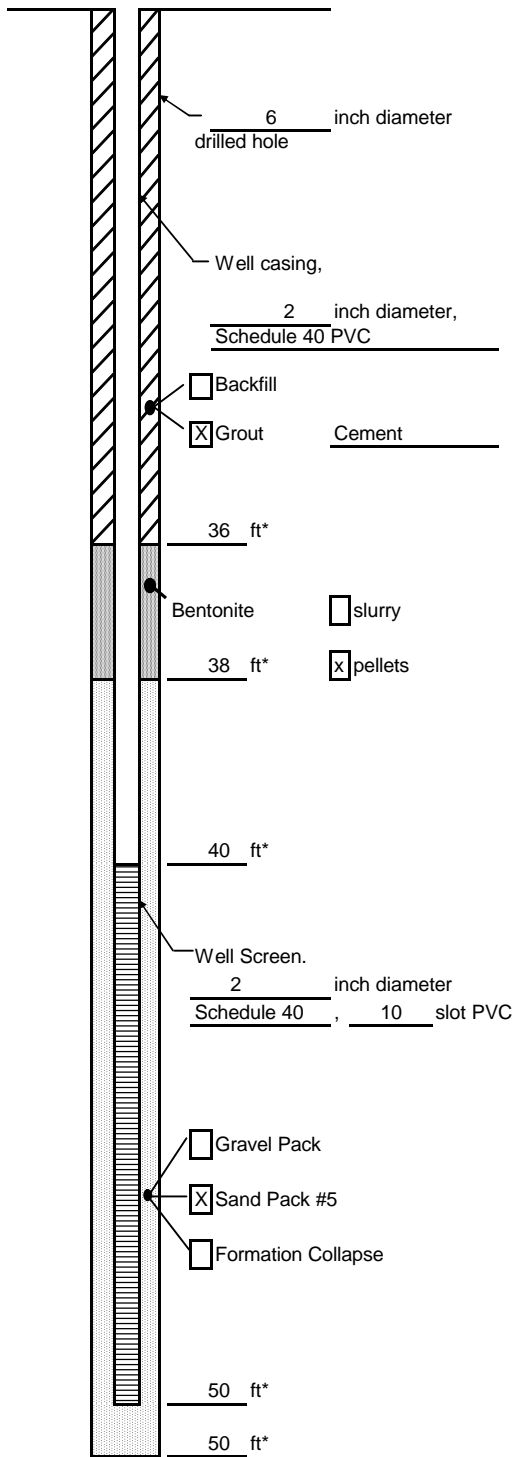
Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							See boring log GM-74D for lithologic description.	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
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41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

Drilling Co.: Frontz      Sampling Method: Core Barrel  
 Driller: Dave S.      Sampling Interval: 10 feet  
 Drilling Method: Rotosonic      Water Level Start: NA  
 Drilling Fluid: Water      Water Level Finish: NA  
 Remarks: \_\_\_\_\_      Converted to Well:  Yes       No  
 Surface Elev.: 732.52 TOC=732.17  
 North Coord: 4197.6  
 East Coord: 6416.5

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-74S

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

732.52 feet  Surveyed

Estimated

Installation Date(s) 9/21/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump & surge - 9/24/2007. All drilling fluid removed during VAS.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 25.01 feet below M.P.

Pumping Depth to Water 45 feet below M.P.

Pumping Duration 0.30 hours

Yield 3 gpm Date 9/24/07

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks South well @ GM-74 location

Time: 16:20, 16:23, 16:26, 16:29

pH: 6.66, 6.65, 6.62, 6.60

Conductivity: 2.17, 1.99, 2.01, 1.94

Turbidity: 78, 64, 60, 62

Temperature: 22.3, 22.6, 22.4, 22.0

Prepared by L. Greene



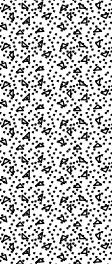
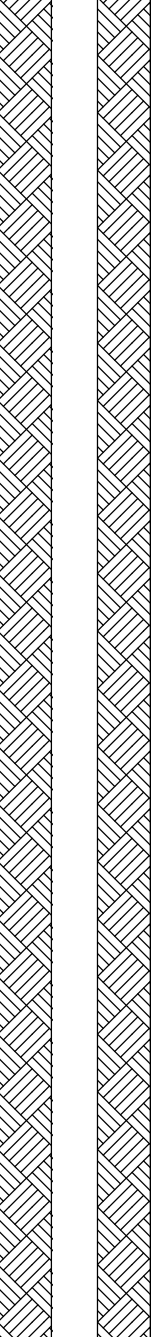
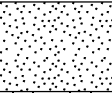
Boring No.: GM-75D

# Soil Boring Log

Sheet: 1 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007 Logger: L. Greene  
 Date Completed: 09/12/2007 Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							Utility clearing with water knife (8-27-07). CONCRETE	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11			12	GP	2000		SAND (SP), dark brown, poorly graded, fine to medium, trace silt and clay, medium dense, dry.	
12							No return.	
13			10	GP				
14								
15								

Drilling Co.: Frantz Sampling Method: 10 feet x 4 inch Core Barrel  
 Driller: Dave S. Sampling Interval: 10 feet  
 Drilling Method: Direct push/Rotosonic Water Level Start: 31.5 feet  
 Drilling Fluid: Water Water Level Finish: --  
 Remarks: GP=Geoprobe Converted to Well:  Yes  No  
SD=Sonic Drilling Surface Elev.: 738.13 TOC=737.68  
 North Coor: 4604.3  
 East Coor: 6622.7

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-75D

# Soil Boring Log

Sheet: 2 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/12/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
16			12	GP	1150		GRAVELLY SAND (SP), brownish gray, poorly graded, medium to coarse, medium loose, 30% gravel (subangular to subrounded), dry.	
17			0	GP			No return.	
18								
19			24	GP	364		GRAVELLY SAND (SP), brownish gray, poorly graded, medium to coarse, medium loose, 30% gravel (subangular to subrounded), dry at 19.5 feet trace of silt, yellowish brown.	
20								
21			0	GP			No return.	
22								
23			24	GP	>2000		GRAVELLY SAND (SP), brownish gray, poorly graded, medium to coarse, medium loose, 30% gravel (subangular to subrounded), dry.	
24								
25			0	GP			No return.	
26								
27			24	GP	>2000		SAND (SP), with gravel, dark yellowish brown, poorly graded, fine to coarse, 15% gravel, medium loose, dry.	
28								
29			0	GP			No return.	
30								
31				GP				

Remarks:

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Boring No.: GM-75D

# Soil Boring Log

Sheet: 3 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/12/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
32			18		1043		SAND (SP), dark yellowish brown, fine to coarse, 5% to 10% gravel, poorly graded, medium loose, dry, wet at 31.5 feet.	
33			0	GP			No return.	
34								
35			15		>2000		SAND (SW), grayish brown well graded, fine to coarse, some gravel (10%), medium loose, wet.	
36							No return.	
37			0	GP GM-75, 35 to 40 feet, 8/29/07, 14:00				
38								
39			12	GP	155		SAND (SW), grayish brown well graded, fine to coarse, some gravel (10%), medium loose, wet.	
40								
41			24		1.0		GRAVELLY SAND (SW), brownish gray, well graded, trace cobbles, medium coarse, loose, wet.	
42			24		0.7			
43								
44			24		0.3			
45				SD				
46			24		0.2		Note: Trace of silt at 46 feet.	
47								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS.GDT 2/13/08



Boring No.: GM-75D

## Soil Boring Log

Sheet: 4 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 08/29/2007      Date Completed: 09/12/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
48			24		1.1	SAND (SW), brownish gray, well graded, trace cobbles, medium to coarse, loose, wet.		
49						GRAVELLY SAND (SW), brownish gray well graded, trace cobbles, medium to coarse, loose, wet.		
50			24		0.8			
51								
52			24		0.0	SILT (ML), dark gray, trace gravel, stiff to very stiff, dry (till), trace clay.		
53								
54			24		0.1			
55						SILT (ML), dark gray, black mottling (organic), medium loose to medium dense, dry.		
56			24		0.6	SAND (SP), brown, poorly graded, fine to coarse, medium loose, wet.		
57								
58			24		1.1			
59				GM-75, 56 to 61 feet, 9/14/07, 12:00				
60			24		0.0	Note: Brownish gray and damp at 60 feet.		
61								
62			24		0.0			
63								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS.GDT 2/13/08



Boring No.: GM-75D

# Soil Boring Log

Sheet: 5 of 8

Project Name: General Motors Corporation

Date Started: 08/29/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/12/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
64			24		0.0		CLAYEY SILT (ML), dark gray, very stiff; hard, trace gravel and sand, dry.	
65			SD					
66			24		0.0			
67								
68			24		1.7			
69							GRAVELLY SAND (SW), yellowish brown, well graded, fine to coarse, loose, wet.	
70			24		0.0			
71								
72			24		0.0			
73								
74			24		0.0			
75				SD				
76			24		0.0			
77								
78			24		0.3			
79							SAND (SW), brownish gray, well graded, (20% gravel), medium loose, wet.	

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-75D

## Soil Boring Log

Sheet: 6 of 8

Project Name: General Motors Corporation

Date Started: 08/29/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/12/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
80							SAND (SW), brownish gray, well graded, (20% gravel), medium loose, wet.	
81			24		39.7		SAND (SW), brown, poorly graded, fine to medium, medium loose, damp.	
82			24		59.2		Note: Brownish gray, and oxidation at 82 feet.	
83								
84			24		5.6		SILTY SAND (SW), gray, fine grained, medium loose to medium dense, damp.	
85				SD				
86			24		11.6		Note: Clayey silt seam at 86 feet (3 inches).	
87								
88			24		1.1		SAND (SP), brownish gray, poorly graded, medium loose, damp.	
89							SAND (SW), brownish gray, well graded, fine to coarse, trace clay and gravel, dense, damp.	
90							GRAVELLY SAND (SW), brownish gray, fine to coarse, loose, wet.	
91			24		1.0		SANDY GRAVEL (GW), gray, well graded, fine to coarse, loose, wet.	
92			24		2.7			
93								
94			24		3.4			
95				SD				

Remarks:



Boring No.: GM-75D

# Soil Boring Log

Sheet: 7 of 8

Project Name: General Motors Corporation

Date Started: 08/29/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/12/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
96			24		3.0		SANDY GRAVEL (GW), gray, well graded, fine to coarse, loose, wet.  Note: cobbles present at 100 feet.	
97								
98			24		1.2			
99								
100								
101			24		0.0			
102			24		0.9			
103								
104			24		0.0			
105				SD				
106			24		0.0			
107								
108			24		0.0			
109								
110			24		0.0			
111								

Remarks:

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Boring No.: GM-75D

# Soil Boring Log

Sheet: 8 of 8

Project Name: General Motors Corporation

Date Started: 08/29/2007      Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/12/2007      Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
112			24		0.7	[Dotted pattern]	SAND (SW), gray, well graded, fine to coarse, trace gravel, medium loose, wet.	[Stippled pattern]
113								
114			24		1.0		SAND (SW), grayish brown, poorly graded, fine grained, medium loose, damp.	
115				SD				
116			24		0.3			
117								
118			24		0.0		Note: Trace large gravel at 118 feet.	
119								
120								
121								
122								
123								
124								
125								
126								
127								

Remarks: \_\_\_\_\_

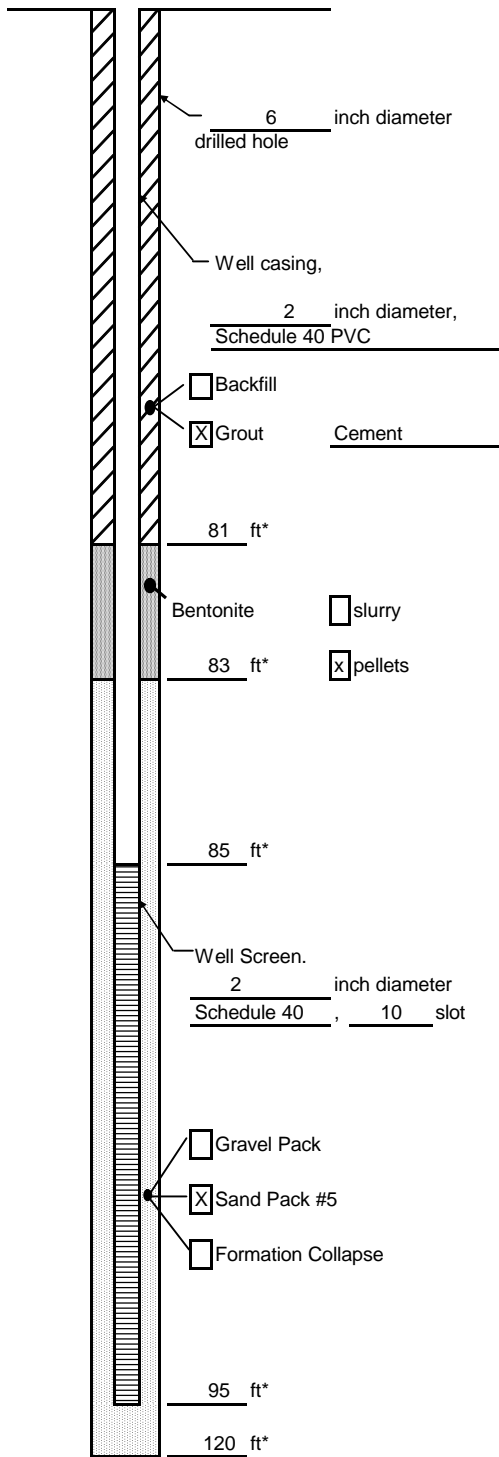
\_\_\_\_\_

\_\_\_\_\_

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08

# Well Construction Log

(Unconsolidated)



Measuring Point is  
 Top of Well Casing  
 Unless Otherwise Noted.  
 \* Depth Below Land Surface

Project General Motors Corporation Well GM-75D

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:  
738.13 feet  Surveyed  
 Estimated

Installation Date(s) 9/20/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump & surge - 9/25/2007. All drilling fluid removed during VAS.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 30.53 feet below M.P.

Pumping Depth to Water 90 feet below M.P.

Pumping Duration 0.30 hours

Yield 3 gpm Date 9/25/07

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks West well at GM-75 location

Time: 11:30, 11:33, 11:36, 11:39

pH: 6.34, 6.34, 6.31, 6.33

Conductivity: 1.70, 1.80, 1.77, 1.79

Turbidity: 338, 210, 10, 198

Temperature: 18.7, 18.7, 18.7, 18.5

Prepared by L. Greene



Boring No.: GM-75S

# Soil Boring Log

Sheet: 1 of 1

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 09/18/2007      Date Completed: 09/18/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 70's

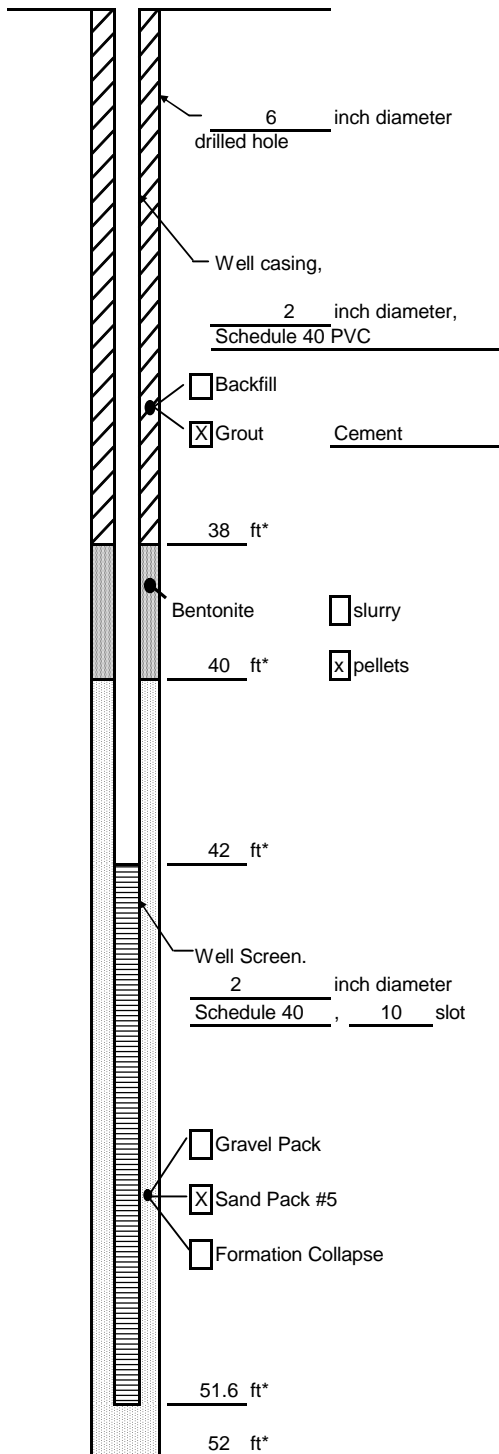
Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							See boring log GM-75D for lithologic description.	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								

Drilling Co.: Frantz      Sampling Method: Core Barrel  
 Driller: Dave S.      Sampling Interval: 10 feet  
 Drilling Method: Rotosonic      Water Level Start: NA  
 Drilling Fluid: Water      Water Level Finish: NA  
 Remarks: \_\_\_\_\_      Converted to Well:  Yes       No  
 Surface Elev.: 738.26      TOC=737.69  
 North Coord.: 4604.6  
 East Coord.: 6634.7

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08

# Well Construction Log

(Unconsolidated)



Measuring Point is  
 Top of Well Casing  
 Unless Otherwise Noted.  
 \* Depth Below Land Surface

Project General Motors Corporation Well GM-75S

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

738.26 feet  Surveyed

Estimated

Installation Date(s) 9/18/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump & surge - 9/25/2007. All drilling fluid removed during VAS.

Fluid Loss During Drilling NA gallons

Water Removed During Development 60 gallons

Static Depth to Water 30.44 feet below M.P.

Pumping Depth to Water 47 feet below M.P.

Pumping Duration 0.30 hours

Yield 3 gpm Date 9/25/07

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks East well @ GM-75 location

Time: 10:50, 10:53, 10:56, 10:59

pH: 6.52, 6.57, 6.50, 6.51

Conductivity: 1.45, 1.39, 1.37, 1.36

Turbidity: 435, 222, 113, 87

Temperature: 20.2, 20.1, 19.8, 19.8

Prepared by L. Greene



Boring No.: GM-76D

# Soil Boring Log

Sheet: 1 of 8

Project Name: General Motors Corporation Date Started: 07/06/2007 Logger: L. Greene  
 Project Number: OH000294.0010.00002 Date Completed: 07/09/2007 Editor: J. Hunt  
 Project Location: Moraine, Ohio Weather Conditions: Indoor

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1						CONCRETE		
2						SAND WITH GRAVEL (SP), brown, poorly graded, medium-coarse, 25-30% gravel (subrounded), fine-coarse, dry.		
3								
4								
5								
6								
7								
8								
9								
10								
11			24		0.3	SAND WITH GRAVEL (SP), dark brown, poorly graded, fine-coarse, 15% gravel (subrounded), medium-loose, dry.		
12			24		2.5			
13								
14			24		11.9			
15								

Drilling Co.: Boart Longyear Sampling Method: Core Barrel  
 Driller: Walter Tidwell Sampling Interval: 10 feet  
 Drilling Method: Rotosonic Water Level Start: 34 feet  
 Drilling Fluid: Water Water Level Finish: --  
 Remarks: Non-invasive water knife/vac used to elevation to 10 feet. Converted to Well:  Yes  No  
SD=Sonic Drilling Surface Elev.: 739.48 TOC=738.94  
 North Coord.: 5391.8  
 East Coord.: 6729.9

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-76D

# Soil Boring Log

Sheet: 2 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 07/06/2007      Date Completed: 07/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Indoor

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
16			24	SD	10.0	[Stippled pattern]	SAND WITH GRAVEL (SP), dark brown, poorly graded, fine-coarse, 15% gravel (subrounded), medium-loose, dry.	[Hatched pattern]
17							Note: pale brown (10 YR 6/3) at 17 feet.	
18			12		5.1			
19							No return.	
20								
21								
22								
23								
24								
25				SD				
26			24		6.0	[Stippled pattern]	SAND (SP), pale brown (10 YR 6/3), poorly graded, fine-coarse, trace gravel, medium-loose, dry.	[Hatched pattern]
27								
28			24		2.5			
29								
30								
31			24		1.5	[Stippled pattern]	CLAYEY SAND (SP), grayish brown, poorly graded (10 YR 5/2), low plasticity, fine-medium grained, 20% clay, medium-soft, moist.	[Hatched pattern]

Remarks:

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Boring No.: GM-76D

# Soil Boring Log

Sheet: 3 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 07/06/2007      Date Completed: 07/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Indoor

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
32			24	GM-76, 32 to 36 feet, 7/6/07, 12:33	0.8	CLAYEY SAND (SP), grayish brown, poorly graded (10 YR 5/2), low plasticity, fine-medium grained, 20% clay, medium-soft, moist.		
33			0.7		SAND (SP), dark gray (10 YR 4/1), poorly graded, trace clay and gravel, damp.			
34			24		0.7	SAND AND GRAVEL (GW), gray (10 YR 5/1), well graded, fine-medium, 15% coarse sand, wet.		
35								
36			24		0.7	SILTY SAND (SP), brown (10 YR 5/3), poorly graded, fine, cohesive, slight dense, moist.		
37								
38			24	0.6	SAND (SP), dark gray 910 YR 4/1), poorly graded, trace clay and gravel, damp.			
39								
40			24	8.9	CLAYEY SILT (ML), gray (10 YR 5/1), very stiff, trace gravel, low plasticity, dry.			
41								
42			24	3.1				
43								
44			24	0.7				
45								
46			24	1.7				
47								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-76D

# Soil Boring Log

Sheet: 4 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 07/06/2007      Date Completed: 07/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Indoor

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
48			12		0.8		CLAYEY SILT (ML), gray (10 YR 5/1), very stiff, trace gravel, low plasticity, dry.	
49							SAND (SP), very dark grayish brown (10 YR 3/2), poorly graded, fine-medium, loose, damp.	
50			24	GM-76, 48 to 52 feet, 7/6/07, 18:45	1.1			
51							CLAYEY SAND (SP), very dark grayish brown (10 YR 3/2), poorly graded, fine, trace gravel, damp.	
52			24		0.2			
53								
54			24		0.7			
55				SD			SILT (ML), very dark grayish brown (10 YR 3/2), trace sand and gravel, stiff-very stiff, dry.	
56			24		1.7			
57							CLAYEY SILT, very dark grayish brown (10 YR 3/2), trace sand and gravel, stiff-very stiff, low plasticity, dry.	
58			24		2.3			
59								
60			24		32			
61								
62			24		50.1			
63								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS.GDT 2/13/08



Boring No.: GM-76D

# Soil Boring Log

Sheet: 5 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 07/06/2007      Date Completed: 07/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Indoor

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
64			24		50.8		CLAYEY SILT, very dark grayish brown (10 YR 3/2), trace sand and gravel, stiff-very stiff, low plasticity, dry.	
65			SD					
66			24		48.7			
67								
68			24		35.1			
70								
71			24		13.5		SANDY GRAVEL (GW), grayish brown (10 YR 5/2), well graded, 30% sand, wet.	
72			24	GM-76, 70 to 74 feet, 7/9/07, 08:55	2.6		SAND WITH GRAVEL (SW), grayish brown (10 YR 5/2), well graded, fine-coarse, wet.	
73								
74			24		7.6		GRAVEL (GP), grayish brown (10 YR 5/2), poorly graded, coarse, round-subround, wet.	
75							SAND (SP), grayish brown (10 YR 5/2), poorly graded, fine-medium grained, wet.	
76			24		1.4			
77								
78			24		11.7			
79								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-76D

# Soil Boring Log

Sheet: 6 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 07/06/2007      Date Completed: 07/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Indoor

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
80							SAND (SP), grayish brown (10 YR 5/2), poorly graded, fine-medium grained, wet.	
81			24		25.9		SILTY SAND (SP), grayish brown (10 YR 5/2), poorly graded, fine, dense, damp.	
82			24		27.9		SAND (SP), grayish brown (10 YR 5/2), poorly graded, fine-medium, medium dense, damp.	
83								
84			24		31.8			
85								
86			24		33.3			
87								
88			24		33.7			
89								
90				GM-76, 88 to 92 feet, 7/9/07, 11:58			No return.	
91								
92								
93								
94								
95				SD				

Remarks:

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Boring No.: GM-76D

## Soil Boring Log

Sheet: 7 of 8

Project Name: General Motors Corporation

Date Started: 07/06/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 07/09/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Indoor

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
96			24		1.7		No return.	
97							SANDY GRAVEL (GW), gray (10 YR 5/1), well sorted, medium-coarse, wet.	
98			24		0.9			
99								
100								
101							No return.	
102								
103								
104								
105				SD				
106			24		24.8		SAND (SW), dark grayish brown (10 YR 4/2), well sorted, fine-coarse, trace gravel, damp.	
107								
108			24		21.9			
109								
110			24		28.3		Note: Little gravel at 110 feet.	
111								

Remarks:



Boring No.: GM-76D

# Soil Boring Log

Sheet: 8 of 8

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 07/06/2007      Date Completed: 07/09/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Indoor

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
112			24		31.1		SAND (SW), dark grayish brown (10 YR 4/2), well sorted, fine-coarse, trace gravel, damp.	
113							GRAVELLY SAND (SP), grayish brown (10 YR 5/2), poorly graded, medium loose, damp.	
114			24		30.3			
115							SILTY SAND (SP), brown (10 YR 5/3), poorly graded, fine, medium dense, damp.	
116			24		25.6			
117								
118			24	GM-76, 116 to 120 feet, 7/9/07, 18:08	27.7			
119								
120								
121								
122								
123								
124								
125								
126								
127								

Remarks:

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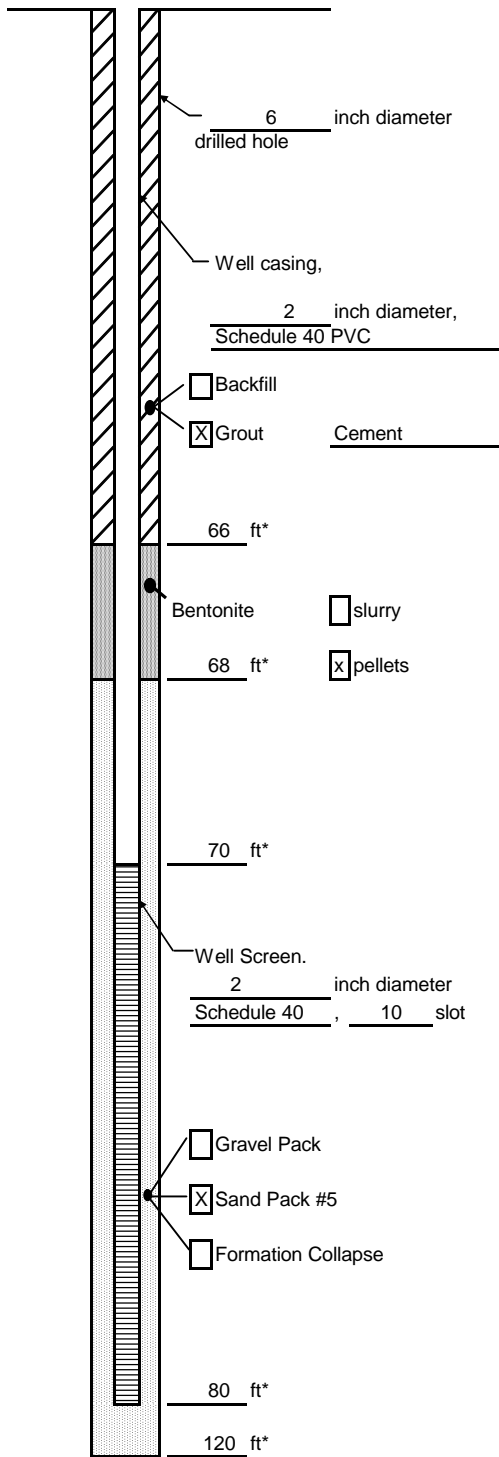


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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-76D

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

739.48 feet  Surveyed

Estimated

Installation Date(s) 7/10/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pump and surge - 7/10/07

Fluid Loss During Drilling N/A gallons

Water Removed During Development ~45 gallons

Static Depth to Water 29.55 feet below M.P.

Pumping Depth to Water 87 feet below M.P.

Pumping Duration ~.5 hours

Yield ~1.5 gpm Date 7/10/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks GW Parameters (1V = 8.1 gallons)

	1V	2V	3V	4V	5V
pH:	7.64	7.17	7.10	7.11	7.01
Conductivity:	1.40	1.42	1.41	1.40	1.39
Turbidity:	0	37	0	5	6
Temperature:	20.8	20.5	20.9	20.4	20.4

Prepared by L. Greene



Boring No.: GM-76S

# Soil Boring Log

Sheet: 1 of 1

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 07/08/2007      Date Completed: 07/08/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Indoors

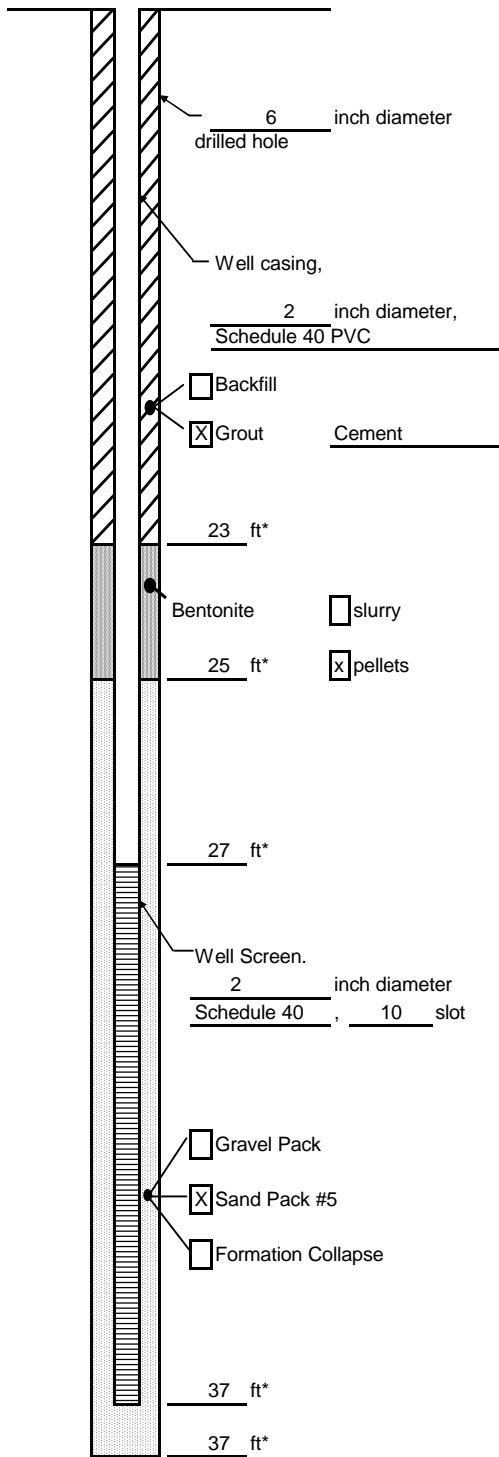
Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							See boring log GM-76D for lithologic description.	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								

Drilling Co.: Frontz      Sampling Method: Core Barrel  
 Driller: Dave S.      Sampling Interval: 10 feet  
 Drilling Method: Rotosonic      Water Level Start: NA  
 Drilling Fluid: Water      Water Level Finish: NA  
 Remarks: \_\_\_\_\_      Converted to Well:  Yes       No  
 Surface Elev.: 739.49      TOC=739.00  
 North Coord.: 5396.6  
 East Coord.: 6730.8

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-76S

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

739.49 feet  Surveyed  
 Estimated

Installation Date(s) 7/8/2007

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Water

Development Technique(s) and Date(s)

Pump & surge - 7/10/07

Fluid Loss During Drilling 50 gallons

Water Removed During Development 50 gallons

Static Depth to Water 29.44 feet below M.P.

Pumping Depth to Water 35' feet below M.P.

Pumping Duration 7.00 hours

Yield ~1.5 gpm Date 9/25/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks GW Parameters (IV = 1.2 gallons)

	1V	2V	3V	4V	5V	6V
pH -	8.52	8.01	8.60	7.90	7.79	7.69
Conductivity:	.718	.619	.589	.640	.653	.651
Turbidity:	1	0	999	1	0	0
Temperature:	23.3	22.0	22.5	21.8	21.7	21.7

Prepared by L. Greene



Boring No.: GM-77D

# Soil Boring Log

Sheet: 1 of 7

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 09/05/2007 Logger: L. Greene  
 Date Completed: 09/07/2007 Editor: J. Hunt  
 Weather Conditions: Sunny 80's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							Sand and Gravel - utility clearance with water knife (9/4/07).	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11							SAND WITH GRAVEL (SW), light grayish brown, well graded, fine to coarse, fine to coarse gravel, medium loose, dry.	
12			24		0.0			
13								
14			24		0.0			
15								

Drilling Co.: Frontz Sampling Method: 10 feet x 6 inch Core Barrel  
 Driller: Dave S. Sampling Interval: 10 feet  
 Drilling Method: Rotosonic Water Level Start: 34 feet  
 Drilling Fluid: Water Water Level Finish: --  
 Remarks: SD=Sonic Drilling Converted to Well:  Yes  No  
 Surface Elev.: 741.52 TOC=740.93  
 North Coord.: 3615.4  
 East Coord.: 7740.8

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-77D

# Soil Boring Log

Sheet: 2 of 7

Project Name: General Motors Corporation

Date Started: 09/05/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/07/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 80's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
16			24	SD	0.0		SAND WITH GRAVEL (SW), light grayish brown, well graded, fine to coarse, fine to coarse gravel, medium loose, dry.  Note: Cobbles present at 20 feet.	
17								
18			24		0.0			
19								
20			24		0.0			
21								
22			24		0.0			
23								
24			24		0.0			
25				SD				
26			24		0.0			
27								
28			24		0.0			
29								
30			24		0.0			
31								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-77D

# Soil Boring Log

Sheet: 3 of 7

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 09/05/2007      Date Completed: 09/07/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 80's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
32			24		0.0		SAND WITH GRAVEL (SW), light grayish brown, well graded, fine to coarse, fine to coarse gravel, medium loose, dry.	
33								
34			24		0.0		SANDY GRAVEL (GW), brown, well graded, medium grained, medium loose, wet.	
35								
36			24		0.0		SAND (SP), brown, poorly graded, fine to coarse, medium loose, some gravel, wet.	
37								
38			24		0.0			
39								
40								
41			24		0.0		SANDY GRAVEL (GW), well graded, medium to coarse, loose, wet.	
42			24		0.0			
43								
44			24		0.0		SANDY SILT (ML), brownish gray, little gravel, medium stiff, very moist.	
45				SD				
46			24		0.0		SILT (ML), grayish brown with orange mottling, trace sand and gravel, stiff to very stiff, dry.	
47								

GM-77, 35 to 40 feet, 9/6/07, 8:42

Remarks:

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Boring No.: GM-77D

# Soil Boring Log

Sheet: 4 of 7

Project Name: General Motors Corporation

Date Started: 09/05/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/07/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 80's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
48			24		0.0		CLAYEY SILT (ML), gray, trace coarse sand, clay and gravel (angular to subrounded), very stiff to hard, dry.	
49								
50			24		0.0			
51								
52			24		0.0			
53								
54			24		0.0			
55				SD				
56			24		0.0			
57								
58			24		0.0			
59								
60			24		0.0			
61								
62			24		0.0			
63								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS.GDT 2/13/08



Boring No.: GM-77D

# Soil Boring Log

Sheet: 5 of 7

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 09/05/2007      Date Completed: 09/07/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny 80's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
64			24	SD	0.0		CLAYEY SILT (ML), gray, trace coarse sand, clay and gravel (angular to subrounded), very stiff to hard, dry.	
65			0.0					
66		24	0.0					
67			0.0					
68			24	SD	0.0		SAND (SP), brown, poorly graded, medium to coarse, trace gravel and trace silt, loose, wet.	
69			0.0					
70		24	0.0					
71			0.0					
72			24	SD	0.0		SAND (SP), brown, medium to coarse, some gravel and trace silt, well graded, loose, wet.	
73			0.0					
74		24	0.0					
75			0.0					
76			24	SD	0.0		SAND (SP), brown, well graded, medium to coarse, with coarse gravel and trace cobbles (70 to 80 feet exhibits upward fining) trace silt, loose, wet.	
77			0.0					
78		24	0.0					
79			0.0					

Remarks:

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Boring No.: GM-77D

# Soil Boring Log

Sheet: 7 of 7

Project Name: General Motors Corporation

Date Started: 09/05/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/07/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 80's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details		
96			24		0.0		SAND (SW), dark gray, well graded, fine to coarse, loose, wet.			
97							SILT (ML), dark gray with black mottling, trace gravel, medium stiff to soft, dry, organic material and odor.			
98			24				0.0			
99									SILT (ML), dark gray, trace sand and clay and gravel, stiff, dry.	
100										
101										
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										

Remarks:

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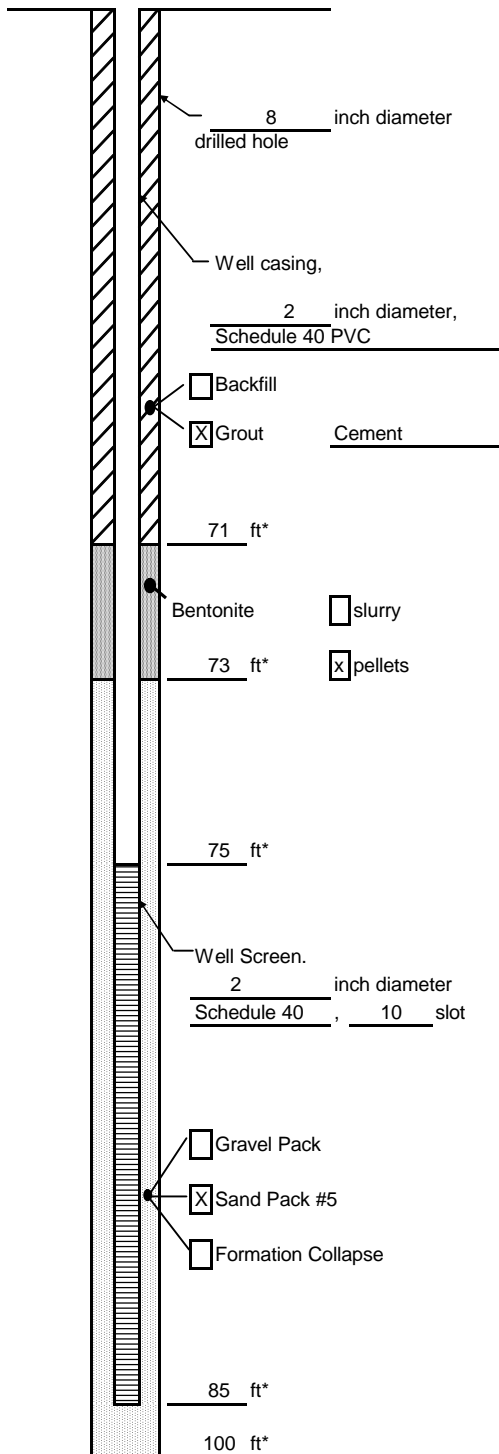
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# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-77D

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

741.52 feet  Surveyed

Estimated

Installation Date(s) 9/11/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Driling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump & surge - 9/25/2007. All drilling fluid removed during VAS.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 40 gallons

Static Depth to Water 33.98 feet below M.P.

Pumping Depth to Water 80 feet below M.P.

Pumping Duration 0.30 hours

Yield 3 gpm Date 9/25/07

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks Collapse from 100' to 85'

Time: 9:05, 9:08, 9:11, 9:14

pH: 6.81, 6.74, 6.73, 6.77

Conductivity: 1.37, 1.29, 1.28, 1.35

Turbidity: 999, 672, 547, 77

Temperature: 17.6, 17.5, 17.2, 17.2

Prepared by L. Greene



Boring No.: GM-77S

# Soil Boring Log

Sheet: 1 of 1

Project Name: General Motors Corporation

Date Started: 09/12/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 09/12/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny 80's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							See boring log GM-75D for lithologic description.	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								

Drilling Co.: Frontz

Sampling Method: Core Barrel

Driller: Dave S.

Sampling Interval: 10 feet

Drilling Method: Rotosonic

Water Level Start: NA

Drilling Fluid: Water

Water Level Finish: NA

Remarks:

Converted to Well:  Yes  No

Surface Elev.: 741.49 TOC=741.14

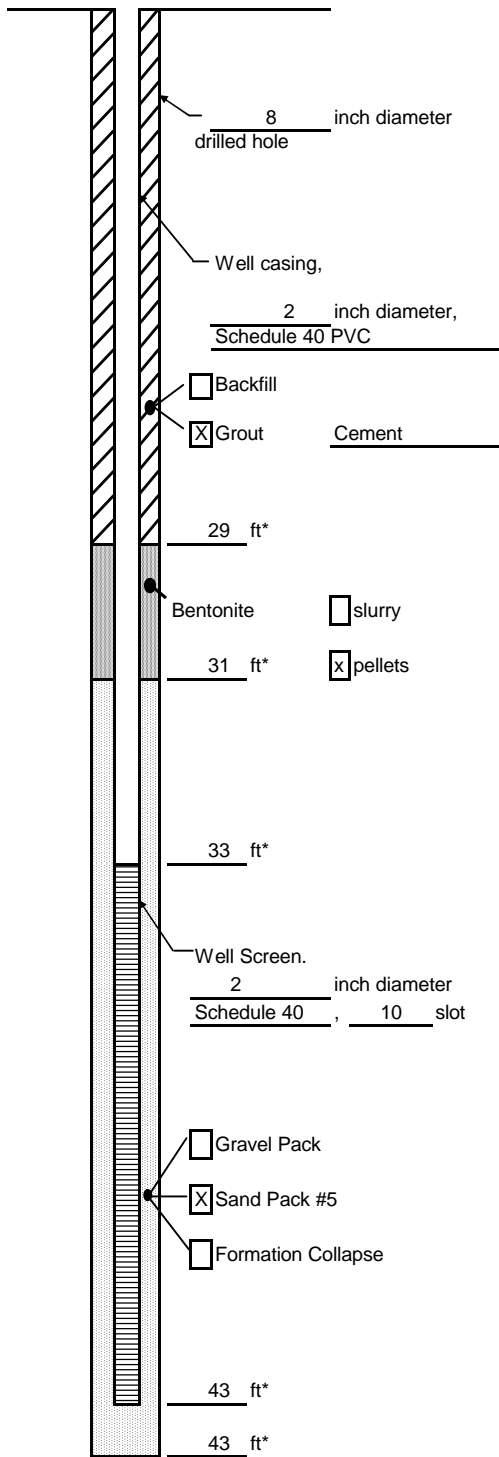
North Coord: 3618.3

East Coord: 7743.0

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08

# Well Construction Log

(Unconsolidated)



Measuring Point is  
 Top of Well Casing  
 Unless Otherwise Noted.  
 \* Depth Below Land Surface

Project General Motors Corporation Well GM-77S

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

741.49 feet  Surveyed

Estimated

Installation Date(s) 9/12/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Driling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump & surge - 9/25/2007. All drilling fluid removed during VAS.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 30 gallons

Static Depth to Water 33.71 feet below M.P.

Pumping Depth to Water 38 feet below M.P.

Pumping Duration 0.20 hours

Yield 3 gpm Date 9/25/07

Specific Capacity NM gpm/ft

Well Purpose Monitoring Well

Remarks \_\_\_\_\_

Time: 9:40, 9:43, 9:46, 9:49

pH: 7.66, 7.64, 7.70, 7.59

Conductivity: 0.526, 1.09, 0.99, 1.02

Turbidity: 999, 999, 680, 10

Temperature: 20.8, 2.05, 21.0, 20.7

Prepared by L. Greene



Boring No.: GM-78

# Soil Boring Log

Sheet: 1 of 5

Project Name: General Motors CorporationDate Started: 10/16/2007Logger: L. GreeneProject Number: OH000294.0010.00002Date Completed: 10/16/2007Editor: J. HuntProject Location: Moraine, OhioWeather Conditions: Rain, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							Utility clearance with water knife (10/10/07).	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11			12		0.5		SAND (SW), brown, well graded, fine-medium grained, trace medium gravel, loose, dry.	
12			24		0.7			
13								
14			24		1.0			
15								

Drilling Co.: FrantzSampling Method: 10 feet x 4 inch Core BarrelDriller: Dave S.Sampling Interval: 10 feetDrilling Method: RotosonicWater Level Start: --Drilling Fluid: WaterWater Level Finish: --Remarks: SD=Sonic DrillingConverted to Well:  Yes  NoSurface Elev.: 721.58 TOC=721.18North Coord.: -267.0East Coord.: 5722.8



Boring No.: GM-78

# Soil Boring Log

Sheet: 2 of 5

Project Name: General Motors Corporation  
Project Number: OH000294.0010.00002  
Project Location: Moraine, Ohio

Date Started: 10/16/2007      Date Completed: 10/16/2007  
Logger: L. Greene      Editor: J. Hunt  
Weather Conditions: Rain, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
16			24	SD	0.9		SAND (SW), brown, well graded, fine-medium grained, trace medium gravel, loose, dry.	
17							Note: 3 inch fine gravel seam at 17 feet.	
18			12		1.8		Note: Wet at 18 feet.	
19			12		2.0			
20			24		1.8		GRAVELLY SAND (GW), grayish brown, well graded, medium loose, trace silt, wet.	
21			24		1.3			
22			24	GM-78, 20 to 25 feet, 10/16/07, 9:20	1.3			
23			24		0.5			
24			24		2.4			
25			24		1.9			
26			12		1.5			
27			12		1.5			
28			24		1.3		GRAVEL (GP), gray, poorly graded, medium-coarse, loose, wet.	
29			24		1.3			
30			24		1.3			
31			24		1.3			

Remarks:



Boring No.: GM-78

# Soil Boring Log

Sheet: 3 of 5

Project Name: General Motors Corporation  
Project Number: OH000294.0010.00002  
Project Location: Moraine, Ohio

Date Started: 10/16/2007      Date Completed: 10/16/2007  
Logger: L. Greene      Editor: J. Hunt  
Weather Conditions: Rain, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
32			24		1.7	GRAVEL (GP), gray, poorly graded, medium-coarse, loose, wet.		
33						SAND (SW), grayish brown, well graded, fine-coarse, some gravel, medium loose, wet.		
34			24		1.4			
35				SD				
36			24		1.7			
37								
38			12		1.9			
39			12		2.0			
40						SAND (SP), brown, poorly graded, fine-coarse, trace gravel and silt, medium loose, wet.		
41			24		2.1			
42			24		1.7		Note: 2 inch gravel seam at 41.5 feet.	
43				GM-78, 40 to 45 feet, 10/16/07, 10:40				
44			24		2.1			
45								
46			24		1.9			
47								

Remarks:



Boring No.: GM-78

# Soil Boring Log

Sheet: 4 of 5

Project Name: General Motors CorporationDate Started: 10/16/2007 Logger: L. GreeneProject Number: OH000294.0010.00002Date Completed: 10/16/2007 Editor: J. HuntProject Location: Moraine, OhioWeather Conditions: Rain, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
48			12		2.1		SAND (SP), brown, poorly graded, fine-coarse, trace gravel and silt, medium loose, wet.	
49			12		1.7		Note: Grayish brown, no trace gravel and silt, medium dense at 49 feet.	
50			24		1.2			
51			24		1.5			
52			24		0.9			
53			24		1.1			
54			24		0.9			
55			24	SD	0.7			
56			24		1.1			
57			24		0.9			
58			12		0.9		GRAVEL (GP), grayish brown, poorly graded, trace sand, loose, wet .	
59			12		0.7		SAND (SP), brown, poorly graded, fine-medium, loose, moist.	
60			24		1.2			
61			24		1.5			
62			24		1.5		SAND (SW), brown, well graded, fine-coarse, some gravel, loose, wet.	
63								

Remarks:



Boring No.: GM-78

# Soil Boring Log

Sheet: 5 of 5

Project Name: General Motors Corporation

Date Started: 10/16/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 10/16/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Rain, 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
64			24		1.3		SAND (SW), brown, well graded, fine-coarse, some gravel, loose, wet.	
65							SAND (SP), brown, poorly graded, fine-coarse, loose, wet.	
66			24		1.9			
67								
68			24	GM-78, 65 to 70 feet, 10/16/07	1.1			
69								
70								
71								
72								
73								
74								
75								
76								
77								
78								
79								

Remarks:

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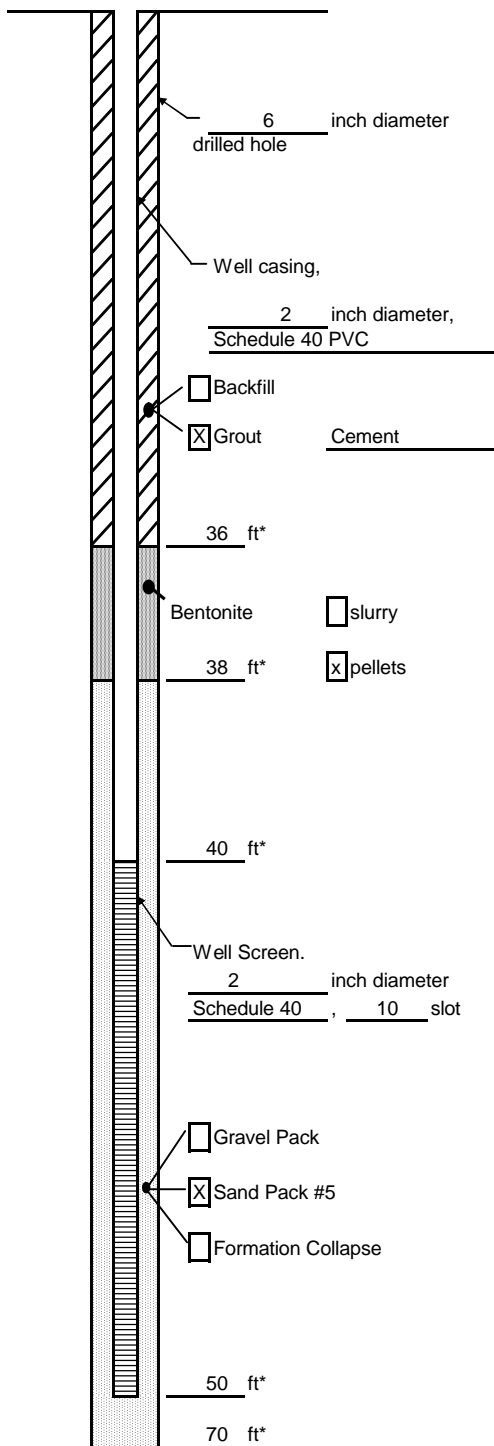
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# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-78

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

721.58 feet  Surveyed

Estimated

Installation Date(s) 10/18/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Driling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump & surge - 10/18/07

Fluid Loss During Drilling 80 gallons

Water Removed During Development 106 gallons

Static Depth to Water 17.1 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.75 hours

Yield 4 gpm Date 10/18/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks IV = 1 well volume = 5.16 gallons

	1V	2V	3V	4V	5V
Ph	7.38	7.39	7.36	7.36	7.35
Conductivity:	1.50	1.48	1.48	1.49	1.48
Turbidity:	211	239	125	185	179
Temperature:	14.4	14.4	14.3	14.3	14.3

Prepared by L. Greene



Boring No.: GM-79

# Soil Boring Log

Sheet: 1 of 4

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/15/2007 Logger: L. Greene  
 Date Completed: 10/15/2007 Editor: J. Hunt  
 Weather Conditions: Sunny, 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							Utility clearance with water knife (10/11/07).	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11			24		0.4		SAND (SW), brown, well graded, fine-medium grained, trace coarse gravel, dry, loose.	
12			24		0.7			
13								
14			24		0.6			
15								

Drilling Co.: Frontz Sampling Method: 10 feet x 4 inch Core Barrel  
 Driller: Dave S. Sampling Interval: 10 feet  
 Drilling Method: Rotosonic Water Level Start: 16 feet  
 Drilling Fluid: Water Water Level Finish: --  
 Remarks: SD=Sonic Drilling Converted to Well:  Yes  No  
 Surface Elev.: 718.54 TOC=717.91  
 North Coord.: -28.8  
 East Coord.: 3623.2

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-79

## Soil Boring Log

Sheet: 2 of 4

Project Name: General Motors Corporation

Date Started: 10/15/2007

Logger: L. Greene

Project Number: OH000294.0010.00002

Date Completed: 10/15/2007

Editor: J. Hunt

Project Location: Moraine, Ohio

Weather Conditions: Sunny, 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	
16			24	GM-79, 16 to 21 feet, 10/15/07, 11:15	0.5		SAND (SW), grayish brown, well graded, medium-coarse, some gravel, trace silt, moist, loose.		
17									
18			12		0.5				
19			12	SD	0.0		GRAVEL (GP), gray, poorly graded, coarse grained, loose, wet.		
20			0						
21			0				No recovery.		
22			0						
23			0						
24			0				GRAVEL (GP), brownish gray, poorly graded, coarse, loose, wet, trace sand. Note: cobbles present.		
25			0						
26			0						
27			0						
28			0						
29			12		0.3				
30			12						
31									

Remarks:



Boring No.: GM-79

# Soil Boring Log

Sheet: 3 of 4

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/15/2007      Date Completed: 10/15/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny, 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
32			0				No recovery.	
33								
34			0					
35								
36			0					
37								
38			0	GM-79, 35 to 40 feet, 10/15/07, 13:30				
39			12		0.7		SANDY GRAVEL (GW), orangish brown, well graded, fine-medium, trace silt, loose wet.	
40			24		0.5		GRAVELLY SAND (SW), orangish brown, well graded, fine-coarse, trace silt, medium loose, wet.	
41								
42			24		0.8			
43								
44			24		0.5		SANDY GRAVEL (GW), grayish brown, well graded, fine-coarse, loose, wet.	
45				SD				
46			24		1.2			
47							SAND (SW), brown, well graded, fine-coarse, little gravel, loose, moist.	

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-79

# Soil Boring Log

Sheet: 4 of 4

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/15/2007      Date Completed: 10/15/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Sunny, 70's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
48			24		1.1	SAND (SW), brown, well graded, fine-coarse, little gravel, loose, moist.		
49				0.7				
50							Note: Silt seam at 49.8 feet.	
51			24		0.5	GRAVELLY SAND (SW), brown, well graded, fine-coarse, medium loose, wet.		
52			24		0.3			
53								
54			24	SD	0.1	SILT (ML), gray, medium soft, damp. Note: Orange staining at interface (54 feet).		
55								Note: Very stiff-hard, dry at 55 feet.
56			24		0.2			
57								
58			12		0.0			
59								
60								
61								
62								
63								

Remarks:

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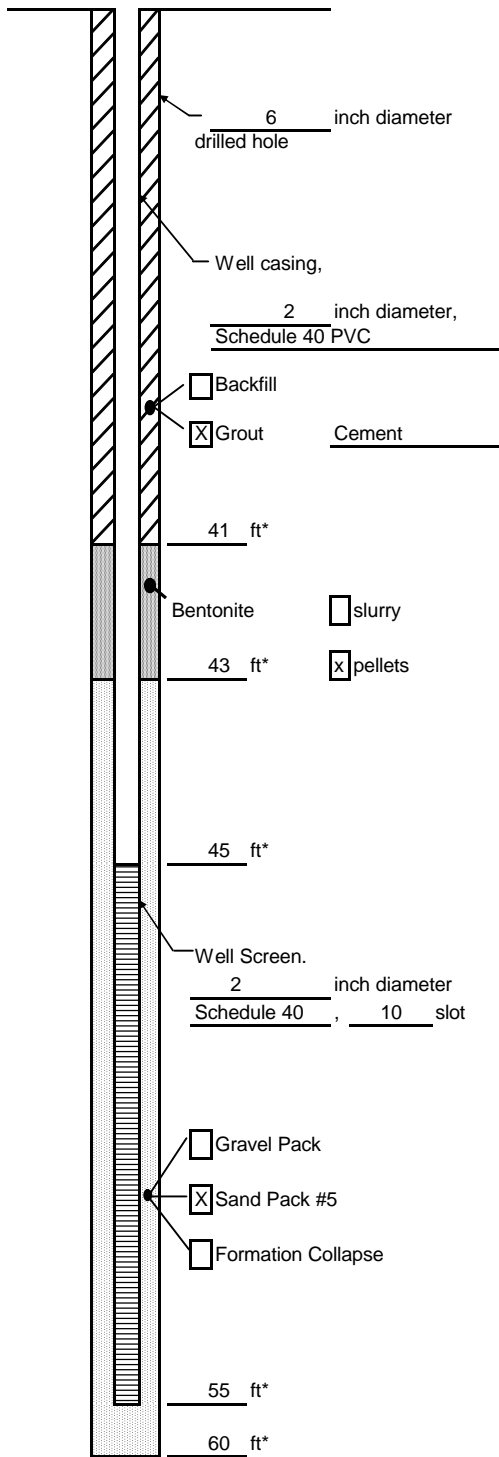
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# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project General Motors Corporation Well GM-79

Town/City Moraine

County Montgomery State Ohio

Permit No. NA

Land-Surface (LS) Elevation and Datum:

718.54 feet  Surveyed

Estimated

Installation Date(s) 10/17/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Pump and surge 10/22/07

Fluid Loss During Drilling 100 gallons

Water Removed During Development 111 gallons

Static Depth to Water 15.00 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 1 hours

Yield 4 gpm Date 10/22/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks IV = 1 well volume = 6.25 gallons

1V 2V 3V 4V 5V

pH 6.69 6.92 6.93 6.94 6.95

Conductivity 1.44 1.44 1.44 1.43 1.44

Turbidity 232 111 97.7 90.1 98.4

Temperature 17.1 17.1 17.1 17.1 17.1

Prepared by L. Greene



Boring No.: GM-80

# Soil Boring Log

Sheet: 1 of 1

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/16/2007      Date Completed: 10/16/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: \_\_\_\_\_

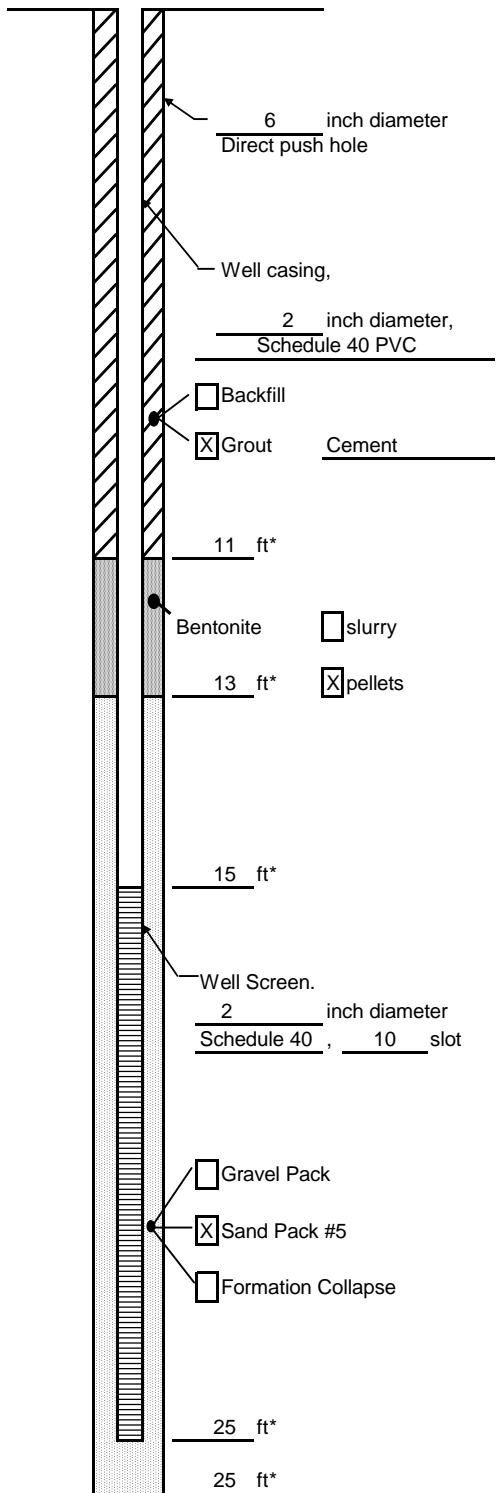
Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
1							See boring log GM-81 for lithologic description.	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Drilling Co.: Frontz      Sampling Method: Core Barrel  
 Driller: Dave S.      Sampling Interval: 10 feet  
 Drilling Method: Rotosonic      Water Level Start: NA  
 Drilling Fluid: Water      Water Level Finish: NA  
 Remarks: \_\_\_\_\_      Converted to Well:  Yes       No  
 Surface Elev.: 716.23 TOC=715.82  
 North Coord.: -1045.7  
 East Coord.: 7352.9

SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08

# Well Construction Log

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-80

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

716.230 feet  Surveyed

Estimated

Installation Date(s) 10/16/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump - surge with pump

10/18/2007

Fluid Loss During installation 60 gallons

Water Removed During Development ~100 gallons

Static Depth to Water 13.27 feet below M.P.

Pumping Depth to Water ~20' feet below M.P.

Pumping Duration 0.4 hours

Yield 4 gpm Date 10/18/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks Time: 1110 1113 1116 1119 1122

pH: 7.27 7.32 7.34 7.35 7.39

Conductivity: .844 .809 .808 .805 .801

Turbidity: -10 -10 -10 -10 -10

Temperature: 15.1 15.0 14.9 14.9 14.9

Prepared by L. Greene





Boring No.: GM-81

# Soil Boring Log

Sheet: 2 of 6

Project Name: General Motors CorporationDate Started: 10/11/2007 Logger: L. GreeneProject Number: OH000294.0010.00002Date Completed: 10/11/2007 Editor: J. HuntProject Location: Moraine, OhioWeather Conditions: Overcast 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
16				GM-80, 15 to 20 feet, 10/11/07, 11:55			Note: No recovery cobble in shoe.	
17								
18								
19								
20								
21		24		SD	0.4		SAND (SW), grayish brown, loose, well graded, with gravel (fine-coarse), fine-coarse grained, wet.	
22		24			0.5			
23								
24		24			0.7			
25								
26		24			0.6			
27								
28		24			0.8			
29								
30								
31		24			1.2			

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-81

# Soil Boring Log

Sheet: 3 of 6

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/11/2007      Date Completed: 10/11/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Overcast 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
32			24		0.7	GRAVELLY SAND (SW), brown, well graded, fine-coarse, loose, wet.		
33								
34			24		1.3	GRAVELLY SAND (SW), brown, well graded, fine-coarse, loose, wet.		
35								
36			24		1.3	SANDY GRAVEL (GW), brown, well graded, loose, trace silt, wet.		
37						SAND (SW), brown, well graded, loose, some gravel, wet.		
38			24	GM-80, 35 to 40 feet, 10/11/07, 14:50	0.9			
39						SAND (SW), brown, well graded, loose, some gravel, wet.		
40								
41			24		0.7	SAND (SW), brown, well graded, loose, some gravel, wet.		
42			24		0.5			
43						SANDY GRAVEL (GW), orangish brown, well graded, fine-coarse, loose, wet.		
44			24		0.3			
45				SD		SANDY GRAVEL (GW), orangish brown, well graded, fine-coarse, loose, wet.		
46			24		0.4			
47								

Remarks:

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SOIL BORING LOG BORING LOG.GPJ ARCADIS GDT 2/13/08



Boring No.: GM-81

# Soil Boring Log

Sheet: 4 of 6

Project Name: General Motors Corporation  
Project Number: OH000294.0010.00002  
Project Location: Moraine, Ohio

Date Started: 10/11/2007      Date Completed: 10/11/2007  
Logger: L. Greene      Editor: J. Hunt  
Weather Conditions: Overcast 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
48			24		0.3		GRAVELLY SAND (SW), orangish brown, well graded, fine-coarse, trace silt, loose, wet.	
49								
50			24		0.1			
51								
52			24		0.8		GRAVEL (GP), orangish brown, poorly graded, loose, trace sand, wet.	
53								
54			24		0.7		SAND (SP), gray, poorly graded, fine-coarse, medium loose, trace gravel, moist.	
55								
56			24		1.0			
57								
58			24		0.4			
59								
60			24		0.1		SAND (SW), gray, well graded, coarse, loose, wet.	
61								
62			24		0.0			
63								

GM-80, 55 to 60 feet, 10/11/07, 16:50

Remarks:



Boring No.: GM-81

# Soil Boring Log

Sheet: 5 of 6

Project Name: General Motors CorporationDate Started: 10/11/2007Logger: L. GreeneProject Number: OH000294.0010.00002Date Completed: 10/11/2007Editor: J. HuntProject Location: Moraine, OhioWeather Conditions: Overcast 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
64			24	SD	0.5	[Dotted pattern]	SAND (SW), gray, well graded, coarse, loose, wet.	[Cracked pattern]
65								
66			24					
67								
68			24					
69								
70			24	SD	0.8	[Diagonal lines]	SILTY CLAY (CL), dark gray, very stiff-hard, trace gravel, low plasticity, dry.	[Cracked pattern]
71								
72			24			[Dotted pattern]	GRAVELLY SAND (SW), gray, well graded, loose, wet.	
73								
74			24			[Dotted pattern]	SAND (SW), gray, well graded, loose, some gravel, wet.	
75								
76			24					
77								
78			24		0.3	[Dotted pattern]		
79								

Remarks:



Boring No.: GM-81

# Soil Boring Log

Sheet: 6 of 6

Project Name: General Motors Corporation  
 Project Number: OH000294.0010.00002  
 Project Location: Moraine, Ohio

Date Started: 10/11/2007      Date Completed: 10/11/2007  
 Logger: L. Greene      Editor: J. Hunt  
 Weather Conditions: Overcast 60's

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details
80							SAND (SW), gray, well graded, loose, some gravel, wet.	
81			24		1.0		SAND (SP), gray, poorly graded, medium loose, trace gravel, wet.	
82			24		0.1		SANDY GRAVEL (SW), gray, well graded, loose, wet (medium-coarse gravel).	
83								
84			24		0.0			
85								
86			24		0.7		SAND (SW), gray, well graded, loose, some gravel, fine-coarse, wet.	
87								
88			24	GM-80, 85 to 90 feet, 10/11/07, 18:50	1.6			
89								
90								
91								
92								
93								
94								
95								

Remarks:

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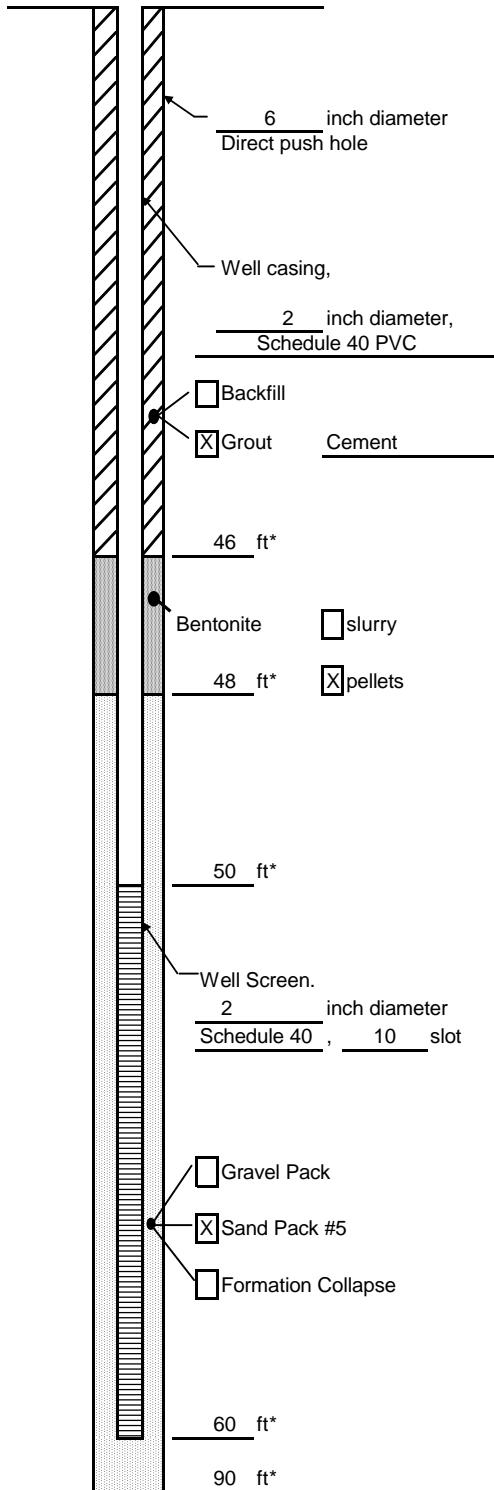


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**ARCADIS**

**Well Construction Log**

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.

\* Depth Below Land Surface

Project General Motors Corporation Well GM-81

Town/City Moraine

County Montgomery State Ohio

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

715.800 feet  Surveyed

Estimated

Installation Date(s) 10/16/2007

Drilling Method Rotosonic

Drilling Contractor Frontz Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Submersible pump - surge with pump

10/18/2007

Fluid Loss During installation 100 gallons

Water Removed During Development ~140 gallons

Static Depth to Water 13.02 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.7 hours

Yield 4 gpm Date 10/18/07

Specific Capacity NM gpm/ft

Well Purpose GW Monitoring

Remarks \_\_\_\_\_

Time: 1150 1153 1156 1159 1202

pH: 7.45 7.47 7.48 7.49 7.49

Conductivity: .858 .867 .866 .867 .868

Turbidity: 901 467 348 257 109

Temperature: 14.8 14.1 14.0 13.9 13.8

Prepared by L. Greene



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-82**

TOTAL DEPTH: **119.50**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joseph Rumschlag**  
 DATE STARTED: **1/28/2008**  
 DATE COMPLETED: **2/19/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
 Northing: **3639.74**  
 Easting: **6107.09**  
 Elevation: **732.55**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
0		Asphalt				8-inch Steel Protective Casing (0 to 56 feet)
		Concrete Plug				
0		Sand and Gravel: (SW)				2-inch PVC Schedule 40 Casing (0 to 85 feet)
0		Sand with Gravel: (SW), brown, well graded, medium to coarse, 20% gravel, subrounded, loose, moist	GM-82(11-12)		0	
0.9			GM-82(12-14)		0.9	
14		Concrete Plug	GM-82(14-16)		0	
15		Sand with Gravel: (SW), brown, well graded, medium to coarse, 20% gravel, trace cobbles (4-inch), subrounded, loose, moist	GM-82(16-18)		0.6	
18			GM-82(18-20)		0.9	
20		Silty Gravel: (GM), brown, poorly graded, coarse, 20% silt and clay, trace sand, subrounded, loose, moist	GM-82(20-22)		0	
22			GM-82(22-24)		0.3	
24			GM-82(24-26)		1.1	
25						



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-82**

TOTAL DEPTH: **119.50**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joseph Rumschlag**  
 DATE STARTED: **1/28/2008**  
 DATE COMPLETED: **2/19/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3639.74**  
**Easting: 6107.09**  
**Elevation: 732.55**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
25		Sand with Gravel: (SW), brown, well graded, medium to coarse, 15% gravel (2-inch), 5% silt, loose, moist	GM-82 (26-28)		1.5	
		Sand with Gravel: (SW-SM), brown, well graded, medium to coarse, 25% gravel, 10% silt, trace cobbles, loose, moist	GM-82 (28-30)		41.5	
		Sand with Gravel: (SW), very dark gray (5Y 3/1), well graded, coarse, 15% gravel, sheen, odor, loose, wet	GM-82 (30-32)		37.8	
		Sand: (SP), grayish brown (10YR 5/2), poorly graded, medium to coarse, 10% gravel (1.5-inch), loose, wet	GM-82 (32-34)		1.9	
		Sand with Gravel: (SW), very dark gray, well graded, medium to coarse, 20% gravel (2-inch), sheen, loose, wet	GM-82 (34-36)		1.8	
35		Silt: (ML), brownish yellow (10YR 6/8), gray mottling, very stiff, moist	GM-82 (36-38)		0.7	
		Silt: Same As Above with very dark gray mottling. NOTE: At 34.5 feet, 3-inch seam of sand, very dark gray, poorly graded, coarse, loose, wet	GM-82 (38-40)		0.5	
		Sand: (SP), very dark gray, poorly graded, medium to coarse, loose, wet	GM-82 (40-42)		0.6	
40		Silty Clay: (CL), very dark gray, 15% silt, trace sub-angular, fine gravel, medium to high plasticity, very stiff, moist	GM-82 (42-44)		0.8	
			GM-82 (44-46)		1.6	
45			GM-82 (46-48)		1.5	
			GM-82 (48-50)		1.1	
		Sand with Gravel: Silty (SM), brown (10YR 4/3),				



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-82**

TOTAL DEPTH: **119.50**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joseph Rumschlag**  
 DATE STARTED: **1/28/2008**  
 DATE COMPLETED: **2/19/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3639.74**  
**Easting: 6107.09**  
**Elevation: 732.55**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
50		well graded, medium to coarse, 20% silt, 15% fine gravel, subrounded, loose, wet. NOTE: At 51 ft, 1-inch seam of sandy silt.	GM-82(50-52)		0.8	
		Silty Clay: (CL), olive gray (5Y 4/2), 15% silt, trace subangular fine gravel, high plasticity, very stiff, moist	GM-82(52-54)		0.9	
		Sand: (SP), brown, poorly graded, fine, very loose, wet	GM-82(54-56)		2.0	
55		Silty Clay: (CL), olive gray, 15% silt, trace subangular fine gravel, high plasticity, very stiff, moist	GM-82(56-58)		1.2	
			GM-82(58-60)		1.5	
60			GM-82(60-62)		0.3	
		Silty Clay: (CL), olive gray, 25% silt, high plasticity, medium stiff, moist	GM-82(62-64)		0.3	
		Silty Clay: (CL), olive gray, 15% silt, trace subangular fine gravel, high plasticity, medium stiff to stiff, moist. NOTE: At 64.5 ft, 0.5-inch sand pocket, fine, wet. At 65.5 ft, 0.5-inch sand seam, fine, wet.	GM-82(64-66)		0.6	
65		Silty Clay: Same As Above with yellowish brown (10YR 5/8)	GM-82(66-68)		1.5	
		Sand with Gravel: (SW-SM), yellowish brown, well graded, medium to coarse, 20% fine gravel, trace coarse gravel (2.5-inch), 10% silt, very loose, wet	GM-82(68-70)		1.3	
70		Sand with Gravel: Same As Above with brown	GM-82(70-72)		1.2	
		Sand with Gravel: Same As Above with 30% fine gravel	GM-82(72-74)		2.3	
			GM-82(74-76)		2.3	



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-82**

TOTAL DEPTH: **119.50**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joseph Rumschlag**  
 DATE STARTED: **1/28/2008**  
 DATE COMPLETED: **2/19/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3639.74**  
**Easting: 6107.09**  
**Elevation: 732.55**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
75		Silty Sand: (SM), brown, poorly graded, fine, 25% silt, loose to medium dense, wet	GM-82 (76-78)		0.9	
		Sandy Silt: (SM) brown, 15% sand, trace clay, rapid dilatency, low plasticity, laminated, loading structure at 78.25 ft, medium stiff to soft, wet. Clay content increases to 40% at depth (78.25 ft)	GM-82 (78-80)		2.7	
80		Silty Sand: (SM), brown, poorly graded, fine, 25% silt, loose to medium dense, wet	GM-82 (80-82)		2.2	
			GM-82 (82-84)		3.8	Bentonite Pellets
			GM-82 (84-86)		4.1	
85		Gravel: (GW), brown, well graded, fine, 30% coarse sand, 10% coarse gravel (3-inch), trace silt, sub-rounded, very loose, wet	GM-82 (86-88)		12.2	2-inch PVC Screen, 0.010 slot (85 to 95 feet)
		Sand: (SP), brown, poorly graded, fine, trace fine gravel, loose, wet	GM-82 (88-90)		3.3	
		Sand with Gravel: (SW), brown, well graded, coarse, 15% fine gravel, trace coarse gravel (1.5-inch), very loose, wet	GM-82 (90-92)		8.7	Sand Pack #5
90		Sand with Gravel: Same As Above with yellowish brown (10YR 5/6) staining on gravel	GM-82 (92-94)		5.2	
		Sand with Gravel: Note: Color change to light yellowish brown (10YR 6/4) and trace cobbles (3.5-inch)	GM-82 (94-96)		1.6	
		Silty Gravel: (GM), light yellowish brown, poorly graded, fine, 15% silt, trace coarse sand, subrounded, loose, wet	GM-82 (96-98)		1.1	
95		Silty Gravel: Note: Color change to brown	GM-82 (98-100)		1.8	
		Sand: (SP), brown, poorly graded, fine, 15% gravel (2-inch), trace silt, very loose, wet				
		Sand: Same As Above with medium to coarse sand				
		Sand: (SP), brown, poorly graded, fine, very loose,				



**SOIL BORING/WELL CONSTRUCTION LOG**

WELL NO.: **GM-82**

TOTAL DEPTH: **119.50**

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joseph Rumschlag**  
 DATE STARTED: **1/28/2008**  
 DATE COMPLETED: **2/19/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3639.74**  
**Easting: 6107.09**  
**Elevation: 732.55**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
100		wet; gradual coarsening downward, fine to coarse gravel, poorly graded	GM-82(100-102)		1.9	
		Sand with Gravel: (SW), brown, w. graded, fine, 20% fine gravel, trace coarse gravel (3-inch), trace silt, very loose, wet.	GM-82(102-104)		1.5	
		Sand with Gravel: Same As Above with coarse sand	GM-82(104-106)		1.7	
105		Gravel: (GW), brown, well graded, fine, 40% coarse to medium sand, trace coarse gravel (1.5-inch), trace silt, sub-rounded to rounded, very loose, wet	GM-82(106-108)		2.0	
		Sand with Gravel: (SW), brown, well graded, fine, 15% fine gravel, trace silt, very loose wet	GM-82(108-110)		1.9	
110		Sand with Gravel: Same As Above with 25% fine gravel and coarse sand	GM-82(110-112)		1.5	
			GM-82(112-114)		1.4	
			GM-82(114-116)		1.3	
115		Sand with Gravel: (SW), brown, well graded, medium, 20% fine gravel, trace coarse gravel (3-inch), trace silt, very loose, wet	GM-82(116-118)		1.3	
			GM-82(118-120)		1.3	



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-83D**

TOTAL DEPTH: **120**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/07/2008**  
 DATE COMPLETED: **2/11/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
 Northing: **3718.85**  
 Easting: **3844.34**  
 Elevation: **726.41**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
0		SAND and GRAVEL: No Recovery				2-inch PVC Schedule 40 Casing (0 to 110 feet)
12-14		SILTY SAND: (SM), brown (10YR 5/3), well graded gravel, medium to coarse, 20% fine to coarse gravel, 15% with silt, trace cobbles, loose, dry	GM-83D(12-14)		0	
14-16		SAND WITH GRAVEL: (SW), brown, well graded, fine to medium, 20% fine gravel, trace silt, very loose, wet	GM-83D(14-16)		0	
16-18		SILTY SAND: (SM), brown, well graded, medium to coarse, 20% fine to coarse gravel, 15% silt, trace cobbles, loose, dry	GM-83D(16-18)		0	
18-20		SAND WITH GRAVEL: (SW), brown, well graded, fine to medium, 20% fine gravel, 10% coarse gravel (1.5-inch), trace silt, very loose, wet	GM-83D(18-20)		0	
20-120		SAND WITH GRAVEL: (SW), brown, well graded, medium to coarse, 30% fine gravel, trace coarse gravel (2-inch), trace silt, subround, very loose, wet  No Recovery				



**SOIL BORING/WELL CONSTRUCTION LOG**

WELL NO.: **GM-83D**

TOTAL DEPTH: **120**

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/07/2008**  
 DATE COMPLETED: **2/11/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3718.85**  
**Easting: 3844.34**  
**Elevation: 726.41**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
25						
			GM-83D (28-30)		0.2	
		SILTY SAND: (SM), brown, poorly graded, fine, 20% silt, trace cobbles, very loose, wet				
30			GM-83D (30-32)		0.6	
		SAND WITH GRAVEL: (SW), trace coarse gravel, brown, well graded, coarse, 25% fine gravel, subround, very loose, wet				
			GM-83D (32-34)		0.8	
			GM-83D (34-36)		0.3	
35			GM-83D (36-38)		0.8	
		GRAVEL: (GM), 4-inch seam of fine gravel with trace silt and coarse sand				
			GM-83D (38-40)		0.7	
		GRAVEL: with SAND (SW), brown, well graded, coarse, 25% fine gravel, trace coarse gravel and cobbles, subround, very loose, wet				
40			GM-83D (40-42)		0.4	
		GRAVEL WITH SAND: (GW-GM), brown, well graded, fine, 25% coarse sand, 10% silt, very loose, wet				
			GM-83D (42-44)		0.4	
		GRAVEL WITH SAND: Red staining on gravel (3-inch seam)				
			GM-83D (44-46)		0.5	
45			GM-83D (46-48)		0.2	
		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 20% coarse gravel (2.5-inch), 10% fine gravel subround, very loose, wet				
			GM-83D (48-50)		1.5	
		GRAVEL WITH SAND: (GW-GM), pale brown (10YR 6/3), well graded, fine, 30% coarse sand, 10% silt, trace coarse gravel (3 inches), subround, very				



**SOIL BORING/WELL CONSTRUCTION LOG**

WELL NO.: **GM-83D**

TOTAL DEPTH: **120**

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/07/2008**  
 DATE COMPLETED: **2/11/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3718.85**  
**Easting: 3844.34**  
**Elevation: 726.41**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
50		loose, wet	GM-83D(50-52)		0.9	
		SAND WITH GRAVEL: (SW), brown, well graded, fine, 15 to 20% fine gravel, very loose, wet	GM-83D(52-54)		0.8	
		SAND WITH GRAVEL: (SW), same as above except sand is becoming coarse, 4-inch cobble at 52.5 feet	GM-83D(54-56)		0.2	
55		SILTY GRAVEL: (GM), brown, well graded, fine, 20% silt, 10% coarse sand, subround, very loose, wet	GM-83D(56-58)		0.4	
		SILTY CLAY: (CL), brown, 20% silt, trace fine gravel, high plasticity, stiff, moist	GM-83D(58-60)		0.3	
		SILTY CLAY: (CL), dark gray (7.5YR 4/), 15% silt, trace subangular gravel, high plasticity, very stiff, moist	GM-83D(60-62)		0.2	
60		NOTE: at 63.5 ft - woody debris, moist	GM-83D(62-64)		0.1	
			GM-83D(64-66)		0.2	
65		CLAY: (CL), 1-inch seam of sandy clay, 25% fine sand, medium dense, moist	GM-83D(66-68)		0.3	
		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 25% fine gravel, trace coarse gravel (1.5-inch), trace silt, subround, very loose, wet	GM-83D(68-70)		0.2	
		SAND WITH GRAVEL: Becoming finer with depth	GM-83D(70-72)		0.4	
70		SAND: (SP), brown, poorly graded, fine, trace fine gravel, loose, wet	GM-83D(72-74)		0	
		SILTY SAND: (SM), brown, poorly graded, fine, 35% silt, rapid dilatency, loose, wet	GM-83D(74-76)		0	



**SOIL BORING/WELL CONSTRUCTION LOG**

WELL NO.: **GM-83D**

TOTAL DEPTH: **120**

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/07/2008**  
 DATE COMPLETED: **2/11/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3718.85**  
**Easting: 3844.34**  
**Elevation: 726.41**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
75		SANDY SILT: (ML), brown, 20% fine sand, trace clay, rapid dilatency, none to low plasticity, laminations, soft, wet	GM-83D(76-78)		0	
		SAND: (SP), brown, poorly graded, fine, loose, wet	GM-83D(78-80)		0.4	
80		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 15% fine gravel, trace coarse gravel (2.5-inch), subround to subangular, very loose, wet	GM-83D(80-82)		0.6	
		GRAVEL WITH SAND: (GW), brown, well graded, fine to coarse (3-inch), 30% coarse sand, trace silt, trace cobbles, subround, very loose, wet	GM-83D(82-84)		0.9	
		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 15% fine gravel, 10% coarse gravel (3-inch), round, very loose, wet	GM-83D(84-86)		0.4	
85		GRAVEL WITH SAND: (GW), brown, well graded, fine grained, 20% medium to coarse sand, trace coarse gravel (1.5-inch), subround, very loose, wet	GM-83D(86-88)		0.5	
		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 15% fine gravel, 10% coarse gravel (3-inch), round, very loose, wet	GM-83D(88-90)		0.6	
90		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 10% fine gravel, 15% coarse gravel (3-inch), round, very loose, wet	GM-83D(90-92)		1.2	
		SAND: (SP), brown, poorly graded, medium to coarse, trace coarse gravel (2-inch), trace fine gravel, very loose, wet	GM-83D(92-94)		0.5	
		SAND WITH GRAVEL: (SW), brown, well graded, medium, 10% fine gravel, 5% coarse gravel (2.5-inch), subround, very loose, wet	GM-83D(94-96)		0.1	
95		SAND WITH GRAVEL: (SW), brown, well graded, medium, 10% fine gravel, 5% coarse gravel (2.5-inch), subround, very loose, wet	GM-83D(96-98)		0.6	
		GRAVEL WITH SAND: (GW), brown, well graded, fine to coarse (2.5-inch), 30% coarse sand, trace silt, subround, very loose, wet	GM-83D(98-100)		0.9	



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-83D**

TOTAL DEPTH: **120**

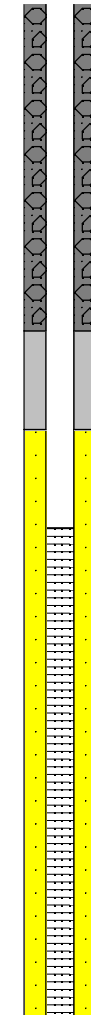
## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/07/2008**  
 DATE COMPLETED: **2/11/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3718.85**  
**Easting: 3844.34**  
**Elevation: 726.41**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
100		SAND: (SP), brown, poorly graded, fine, loose, wet	GM-83D(100-102)		0.2	
		SAND WITH GRAVEL: (SW), brown, well graded, medium to coarse, 35% fine gravel, trace coarse gravel (2.5-inch), trace silt, subround, very loose, wet	GM-83D(102-104)		0	
			GM-83D(104-106)		0.1	
		SAND WITH GRAVEL: (SW), same as above except 10% coarse gravel (2.5-inch)	GM-83D(106-108)		0.2	
			GM-83D(108-110)		0.2	Sand Pack #5
110		SAND: (SP), brown, poorly graded, fine to medium, very loose, wet	GM-83D(110-112)		0.4	
		SAND: (SP), same as above, except coarsens downward to coarse sand with trace fine gravel	GM-83D(112-114)		0.5	
		GRAVEL WITH SAND: (GW), brown, well graded, fine, 40% medium to coarse sand, 10% coarse gravel (2-inch), trace silt, subround, very loose, wet	GM-83D(114-116)		0.5	
115		SAND WITH GRAVEL: (SW), brown, well graded, fine to medium, 20% fine gravel, trace coarse gravel (1.5-inch), very loose, wet	GM-83D(116-118)		0.4	
		SAND WITH GRAVEL: (SW), same as above, except sand is becoming coarser	GM-83D(118-120)		0.3	
120		SAND: (SP), brown, poorly graded, fine grained, trace fine gravel, very loose, wet				







# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-83S**

TOTAL DEPTH: **54.0**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/20/2008**  
 DATE COMPLETED: **2/20/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
 Northing: **3717.849**  
 Easting: **3837.048**  
 Elevation: **726.44**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
25						
30		SILTY SAND: (SM), brown, poorly graded, fine, 20% silt, trace cobbles, very loose, wet				
35		SAND WITH GRAVEL: (SW), trace coarse gravel, brown, well graded, coarse, 25% fine gravel, subround, very loose, wet				
40		GRAVEL: (GM), 4-inch seam of fine gravel with trace silt and coarse sand				
40		GRAVEL: with SAND (SW), brown, well graded, coarse, 25% fine gravel, trace coarse gravel and cobbles, subround, very loose, wet				
40		GRAVEL WITH SAND: (GW-GM), brown, well graded, fine, 25% coarse sand, 10% silt, very loose, wet				
40		GRAVEL WITH SAND: Red staining on gravel (3-inch seam)				
45		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 20% coarse gravel (2.5-inch), 10% fine gravel subround, very loose, wet				
54.0		GRAVEL WITH SAND: (GW-GM), pale brown (10YR 6/3), well graded, fine, 30% coarse sand, 10% silt, trace coarse gravel (3 inches), subround, very				
						Bentonite Pellets
						Sand Pack #5
						2-inch PVC Screen, 0.010 slot (44 to 54 feet)



**SOIL BORING/WELL CONSTRUCTION LOG**

WELL NO.: **GM-83S**

TOTAL DEPTH: **54.0**

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/20/2008**  
 DATE COMPLETED: **2/20/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 3717.849**  
**Easting: 3837.048**  
**Elevation: 726.44**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
50		<p>loose, wet</p> <p>SAND WITH GRAVEL: (SW), brown, well graded, fine, 15 to 20% fine gravel, very loose, wet</p> <p>SAND WITH GRAVEL: (SW), same as above except sand is becoming coarse, 4-inch cobble at 52.5 feet</p> <p>SILTY GRAVEL: (GM), brown, well graded, fine, 20% silt, 10% coarse sand, subround, very loose, wet</p>				



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-84**

TOTAL DEPTH: **120.0**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/1/2008**  
 DATE COMPLETED: **2/5/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 2580.278**  
**Easting: 7605.892**  
**Elevation: 740.44**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
0		GRAVEL: Soil samples were not collected from 0 to 13 feet				2-inch PVC Schedule 40 Casing (0 to 96.5 feet)
13		SAND WITH GRAVEL: (SW), brown (10YR 5/3), well graded, medium to coarse, 20% gravel (2-inch), trace silt, subround to subangular, loose, moist	GM-84 (13-14) GM-84 (14-16)		0.7 0.9	
16		SILTY SAND: (SM), brown (10YR 5/3), poorly graded, fine, 35% silt, trace gravel, medium dense, moist	GM-84 (16-18)		1.4	
18		SAND WITH GRAVEL: (SW-SM), brown (10YR 5/3), well graded, medium, 25% gravel, 10% silt, subround, loose, moist	GM-84 (18-20)		0.5	
20		SAND WITH GRAVEL: (SW-SM), brown (10YR 5/3), well graded, medium, 25% gravel, 10% silt, subround, loose, moist	GM-84 (20-22)		2.2	
22			GM-84 (22-24)		2.3	Bentonite Cement
24			GM-84 (24-26)		2.4	



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-84**

TOTAL DEPTH: **120.0**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/1/2008**  
 DATE COMPLETED: **2/5/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
 Northing: **2580.278**  
 Easting: **7605.892**  
 Elevation: **740.44**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
25			GM-84 (26-28)		1.8	
			GM-84 (28-30)		2.7	
			GM-84 (30-32)		1.1	
			GM-84 (32-34)		1.6	
			GM-84 (34-36)		1.4	
35		SAND WITH GRAVEL: (SW-SM), brown (10YR 5/3), well graded, medium, 25% gravel, 15% silt, trace cobbles, subround, loose, wet	GM-84 (36-38)		1.3	
		SAND WITH GRAVEL: (SW), brown (10YR 5/3), well graded, medium, 25% gravel, trace silt, loose, moist	GM-84 (38-40)		1.8	
		SAND WITH GRAVEL: (SP), brown, poorly graded, coarse, 15% fine gravel, subangular, loose, wet	GM-84 (40-42)		2.5	
		SILTY GRAVEL: with Sand (GM), brown, well graded, coarse, 35% coarse sand, 20% silt, trace clay, medium dense, subrounded, wet	GM-84 (42-44)		1.6	
45			GM-84 (44-46)		0.7	
			GM-84 (46-48)		0.8	
		SAND: (SP), brown, poorly graded, fine, loose, wet	GM-84 (48-50)		0.8	
		SAND: Same As Above with trace silt				



**SOIL BORING/WELL CONSTRUCTION LOG**

WELL NO.: **GM-84**

TOTAL DEPTH: **120.0**

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/1/2008**  
 DATE COMPLETED: **2/5/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 2580.278**  
**Easting: 7605.892**  
**Elevation: 740.44**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
50			GM-84 (50-52)		0.1	
			GM-84 (52-54)		0.6	
			GM-84 (54-56)		0.2	
55			GM-84 (56-58)		0.6	
		GRAVEL: 3-inch fine gravel seam	GM-84 (58-60)		0.6	
		SAND: (SP), brown, poorly graded, fine, trace silt, loose, wet	GM-84 (60-62)		0.8	
60		SAND WITH GRAVEL: (SW-SM), brown, well graded, coarse, 25% fine gravel, 10% silt, subangular, loose, wet	GM-84 (62-64)		0.6	
			GM-84 (64-66)		0.5	
65		SAND WITH GRAVEL: (SW-SM), very dark brown (10YR 2/2), well graded, coarse, 25% fine gravel, 10% silt, subangular, loose, wet	GM-84 (66-68)		1.8	
			GM-84 (68-70)		2.6	
70		SILTY GRAVEL: (GM), gray (10YR 6/1), poorly graded, fine to coarse, 25% silt, 10% clay, trace cobbles, subrounded, medium dense, wet	GM-84 (70-72)		4.7	
		SILTY SAND: with Gravel (SM), yellowish brown (10YR 5/8), medium to coarse, well graded, 20% silt, 15% fine to coarse gravel, loose, wet	GM-84 (72-74)		3.9	
		SILTY SAND: with Gravel (SM), Same As Above with silt increase to 30% and trace clay	GM-84 (74-76)		3.2	
		CLAYEY SILT: (ML), olive brown (2.5YR 4/3),				



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-84**

TOTAL DEPTH: **120.0**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
 LOGGED BY: **Joe Rumschlag**  
 DATE STARTED: **2/1/2008**  
 DATE COMPLETED: **2/5/2008**

DRILLING CO.: **Frontz Drilling**  
 DRILLER: **Dave S.**  
 DRILLING METHOD: **Rotosonic**  
**COORDINATES:**  
**Northing: 2580.278**  
**Easting: 7605.892**  
**Elevation: 740.44**

DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
75		15% clay, trace fine gravel, low plasticity, stiff, dry				
		CLAY: (CL), gray (10YR 5/1), 10% silt, trace fine gravel, trace cobbles, medium to high plasticity, very stiff, dry	GM-84 (76-78)		2.6	
			GM-84 (78-80)		3.5	
80			GM-84 (80-82)		3	
			GM-84 (82-84)		2.9	
			GM-84 (84-86)		0.9	
85			GM-84 (86-88)		1.3	
			GM-84 (88-90)		2.5	
90		SILTY CLAY: (CL), dark to grayish brown (10YR 4/2), 20% silt, trace coarse sand and fine gravel, low plasticity, laminations, dry. Subverticle structure present @ 91.25 ft, light grayish brown (10YR 6/2)	GM-84 (90-92)		0.2	
		SAND: (SP), brown (10YR 4/3), poorly graded, fine to medium, trace silt, trace coarse sand, subangular, very loose, wet	GM-84 (92-94)		0.4	Bentonite Pellets
		SAND WITH GRAVEL: (SW), brown (10YR 4/3), well graded, medium to coarse, 15% gravel, trace silt, very loose, wet. NOTE: at 96 feet 2-inch iron stained seem, yellow (10YR 7/8)	GM-84 (94-96)		0.6	Sand Pack #5
95			GM-84 (96-98)		0.5	
		SAND: (SP), brown (10YR 4/3), poorly graded, medium, trace coarse sand, very loose, wet	GM-84 (98-100)		0.5	2-inch PVC Screen, 0.010 slot (96.5 to 106.5 feet)
		SAND WITH GRAVEL: (SW), brown (10YR 4/3),				



# SOIL BORING/WELL CONSTRUCTION LOG

WELL NO.: **GM-84**

TOTAL DEPTH: **120.0**

## PROJECT INFORMATION

## DRILLING INFORMATION

PROJECT: **GM/REALM**  
 SITE LOCATION: **Moraine, Ohio**  
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**Elevation: 740.44**

















DEPTH	SOIL SYMBOLS	SOIL DESCRIPTION	SAMPLE ID	SUDAN IV	PID (ppm)	WELL CONSTRUCTION DETAILS
100		well graded, medium to coarse, 15 to 20% gravel, trace silt, very loose, wet.	GM-84(100-102)		0.5	
		SAND WITH GRAVEL: (SW), brown (10YR 5/3), well graded, medium to coarse, 20 to 25% fine gravel, trace coarse gravel (2-inch), trace silt, subrounded, very loose, wet	GM-84(102-104)		0.3	
		SAND WITH GRAVEL: (SW), Same As Above with coarse sand	GM-84(104-106)		0.2	
105		SAND WITH GRAVEL: Note: fining downwards to 105.5	GM-84(106-108)		0.3	
		SAND: (SP), brown, poorly graded, fine, trace gravel, trace silt, very loose, wet	GM-84(108-110)		0.3	
110		SAND WITH GRAVEL: (SW), brown, well graded, medium to coarse, 20 to 25% fine gravel, trace coarse gravel (3-inch), trace silt, sub-angular, very loose, wet	GM-84(110-112)		0.5	
		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 30 to 35% fine gravel, 10% coarse gravel, trace silt, very loose, wet	GM-84(112-114)		1.1	
115		GRAVEL WITH SAND: (GW-GM), brown, well graded, fine to coarse, 20% coarse sand, 10% silt, loose, wet	GM-84(114-116)		0.9	
		SAND WITH GRAVEL: (SW), brown, well graded, coarse, 30 to 35% fine gravel, 10% coarse gravel (1.5-inch), trace silt, very loose, wet	GM-84(116-118)		0.5	
		SAND WITH GRAVEL: (SW), Note: fining downwards to 118.5 with trace coarse gravel	GM-84(118-120)		1.2	
120		SAND WITH GRAVEL: (SW), brown, well graded, medium to coarse, 20% fine gravel, trace coarse gravel, sub-rounded, very loose, wet				
		GRAVEL: (GW), Note: 3-inch coarse gravel seam				

















# KEY TO SYMBOLS

Symbol Description

Symbol Description

Strata symbols

	High plasticity clay (CH -- C)
	Inorganic silts and clays (CH-MH -- MC)
	Low plasticity clay (CL -- O)
	Low-high plasticity clays (CL-CH -- CO)
	Silty low plasticity clay (CL-ML -- CZ)
	Fill (FILL -- F)
	Clayey gravel (GC -- O8)
	Clayey sand and gravel (GC-SC -- DO8)
	Silty gravel (GM -- Z8)
	Silty clayey gravel (GM-GC -- ZO8)
	Silty sand and gravel (GM-SM -- O8)
	Poorly graded gravel (GP -- G)
	Poorly graded gravel with clay (GP-GC -- DGO3)
	Poorly graded gravel with silt (GP-GM -- DGZ3)
	Poorly graded gravel and sand (GP-SP -- :G)
	Well graded gravel (GW -- 83)

















	Well graded gravel with clay (GW-GC -- 83O)
	Well graded gravel with silt (GW-GM -- 83Z)
	Well graded gravel/clayey gravel (GW-GP -- 83G)
	Well graded gravel and sand (GW-SW -- 83D)
	Elastic silt (MH -- M)
	Silt (ML -- Z)
	High plasticity organic clays (OH -- 5)
	Low plasticity organic silts (OL -- 4)
	Basalt (or generic rock) (ROCK -- ])
	Clayey sand (SC -- DO)
	Silty sand (SM -- 0)
	Poorly graded clayey silty sand (SM-SC -- :ZO)
	Poorly graded silty fine sand (SM-ML -- :Z)
	Poorly graded sand (SP -- :)
	Poorly graded sand with clay (SP-SC -- :R)
	Poorly graded sand with silt (SP-SM -- :=)



















# KEY TO SYMBOLS

Symbol Description

Symbol Description

## Strata symbols

	Well graded sand (SW -- D)
	Well graded sand with clay (SW-SC -- DR)
	Well graded sand with silt (SW-SM -- D=)
	Interlayered well/poorly graded sand (SW-SP -- D:)
	Silty sandy clay (VC -- 0C)
	Variable gravel and silty sand mix (VG -- 0G)
	Variable sand and silt mix (VS -- 0Y)
	Agglomerate (\)
	Blank (E)
	CH fraction (U)
	CL fraction (R)
	Claystone (H)
	Cobble frac (A)
	Cobbles (B)
	Competent (K)
	Dolomite (())



























	Extra fine gravel (3)
	Fine gravel (Y)
	Frac rock (X)
	Granite (/)
	Gravel (8)
	Gravel frac (9)
	Intrusive (V)
	Limestone (L)
	Metamorphic rocks ( )
	MH fraction (?)
	ML fraction (=)
	Mudstone (7)
	Organics (J)
	Paving (P)
	Peat (Q)
	Sand (S)
	Sandstone (N)
	Schist (\$)

# KEY TO SYMBOLS

Symbol Description

Symbol Description

## Strata symbols














	<b>Sediment</b> (2)		<b>EXTRA:</b> very narrow cross-hatching (!)
	<b>Shale</b> (>)		<b>EXTRA:</b> dashed lines with 3 dots above each dash (.)
	<b>Shell fragments</b> (&)		<b>EXTRA:</b> large widely-spaced dots (*)
	<b>Siltstone</b> (I)		<b>EXTRA:</b> small filled triangles ([])
	<b>Topsoil</b> (T)		<b>EXTRA:</b> semi-random dot pattern (:)
	<b>Weathered</b> (W)		<b>EXTRA:</b> semi-random triangle pattern (')
	<b>EXTRA:</b> alternating dot-dash pattern ( )		<b>EXTRA:</b> zigzag lines (#)
	<b>EXTRA:</b> dashed horizontal lines (%)		<b>EXTRA:</b> grass pattern ({)
	<b>EXTRA:</b> medium closely- spaced dots (6)		<b>EXTRA:</b> tilde sign (})
	<b>EXTRA:</b> narrow-spaced horizontal dashed lines (-)		<b>EXTRA:</b> randomly arranged square boxes (;)
	<b>EXTRA:</b> random dot pattern (1)	<b>Misc. Symbols</b>	
	<b>EXTRA:</b> regularly spaced "V"'s (<)		<b>Drill rejection</b> (BOTTOM)
			<b>Boring continues</b> (CONTINUE)
			<b>Water table during drilling</b> (LWATERNF)
			<b>Water table at boring completion</b> (LWATER)

# KEY TO SYMBOLS




Symbol Description

















Symbol Description

Misc. Symbols

-  Water table during drilling (WATER)
-  Water table at boring completion (FWATER)
-  Water table during drilling (RWATERNF)
-  Water table at boring completion (RWATER)
-  (RTARROW)
-  Depth to caving (CAVED)
-  (CIRCLE)
-  (FCIRCLE)
-  (HATCHED)
-  (XHATCHED)
-  (FILLED)
-  (BARGRAPH)
-  (NOMARKER)

Soil Samplers

-  Auger (A)
-  Bulk sample taken from 6 in. auger (B)
-  California sampler (C)

-  Direct Push (D)
-  Corps of Engineers sampler (E)
-  Bulk/Grab sample (F)
-  Piston (I)
-  Pitcher (L)
-  Denison (O)
-  Standard penetration test (P)
-  Rock core (R)
-  Undisturbed thin wall Shelby tube (S)
-  No recovery (X)
-  EXTRA: (downward pointing white triangle on black background) (G)
-  EXTRA: (double vertical lines) (H)
-  EXTRA: (downward pointing outline arrow) (J)
-  EXTRA: (downward pointing filled arrow) (K)
-  EXTRA: (split diagonally left to right, white on left, black on right) (N)
-  EXTRA: (diagonal line from right to left) (T)

# KEY TO SYMBOLS

Symbol Description

Symbol Description

## Soil Samplers

EXTRA: (generic sampling interval)  
(U)

EXTRA: (generic sampling interval)  
(V)

## Monitor Well Details

flush-mount cover  
(COVER -- FLUSH, )

riser with cover and protective casing  
(CASED RISER -- PROTECT, )

pipe riser  
(RISER -- BLANKPVC, )

covered riser  
(COVERED RISER -- CAPPED, )

recessed cover set in concrete  
(RECESSED -- RECESSED, 13)

top of well, recessed pipe  
(SUNKEN -- SUNKEN, 13)

protective casing set in concrete  
(CASED -- CASED, 13)

concrete seal  
(CONCRETE -- BLANKPVC, 13)

gravel backfill  
(GRAVEL -- BLANKPVC, \*1)

pipe set in cement grout w/ protective casing  
(CEMENT CASED -- CASED, E)

unknown backfill type, blank PVC  
(INDETERMINATE -- BLANKPVC, E)

assorted cuttings  
(CUTTINGS -- BLANKPVC, O)

bentonite slurry  
(BENTONITE -- BLANKPVC, P)

bentonite pellets  
(PELLETS -- BLANKPVC, I)

silica sand, blank PVC  
(SAND -- BLANKPVC, 6)

slotted pipe w/ sand  
(SLOTTED -- SLOTDPVC, 6)

slotted pipe, unknown backfill  
(SLOT/NO FILL -- SLOTDPVC, E)

stylized slotted pipe with no backfill  
(STYLIZED SLOT -- ALTSLOT, E)

endcap on pipe packed in sand  
(ENDCAP -- ENDCAP, 6)

no pipe, filler material  
(END -- , I)

no pipe, sealed  
(SEALED -- , P)

silica sand, no pipe (end plug)  
(SAND PLUG -- , 6)

end of well installation  
(BLANK -- , E)

## Sample Destinations

Composite Sample to Lab  
(C)

Grab Sample to Lab  
(G)

Split-Spoon not Analyzed  
(S)

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**Attachment C-2**

Transducer Study

**Introduction**

Transducer data has been obtained in the area of lower aquifer capture well DN-13 for refinement of the understanding of groundwater flow downgradient of the Site and documentation of responses to specific stresses on the aquifer as stated in the Supplemental Groundwater Investigation DN-13 Area Detailed Water Level Study Work Plan for the Former Delphi Harrison Thermal Systems, General Motors Truck Group Moraine Assembly Plant, and the former General Motors Powertrain Group Moraine Engine Plant in Moraine Ohio, dated January 15, 2007. The transducer study covered the period of March 8, 2007 to April 19, 2007 (42 days). Details of the study and preliminary results are presented below.

**Summary of Study**

Non-vented transducers were deployed in eight monitoring wells, 5 to 10 feet below the top of the water column, and set to continuously record at 15 minute intervals on March 8, 2007 in the wells listed below and shown on Figure 1. The recording interval was shortened during initial pumping and recovery tests for greater resolution of data. The barometric transducer was installed in the surface casing of well GM-19D.

Well	Aquifer Unit	Screened Depth (feet bls)	Direction from DN-13	Distance from DN-13 (feet)	Specific Function
GM-13	Middle of lower aquifer	90-100	NE	179	Monitor response to DN-13 pumping (close well)
GM-14	Lower portion of lower aquifer	140-150	NE	164	Monitor response to DN-13 pumping (close well)
GM-18	Lower portion of upper aquifer	45-55	NE	160	Monitor response to DN-13 pumping (close well)
GM-15	Middle of lower aquifer	90-100	NW	382	Monitor response to DN-13 pumping (distant well)

Well	Aquifer Unit	Screened Depth (feet bls)	Direction from DN-13	Distance from DN-13 (feet)	Specific Function
GM-16	Lower portion of upper aquifer	48-58	NW	382	Monitor response to DN-13 pumping (distant well)
GM-51	Middle of upper aquifer	34-44	NW	729	Monitor upper aquifer background and effect of the Great Miami River
GM-41	Middle of lower aquifer	104-114	NE	3,200	Monitor lower aquifer background (GM production well/fire well pumping and eastern valley boundary)
GM-53	Lower Portion of Upper Aquifer	23-33	NE	3,220	Monitor upper aquifer background

Water levels from the above wells and stream gauge levels from SG-1, SG-3, SG-4, and SG-6 were obtained before deployment. Measurements from SG-7, the Holes Creek stream gauge were obtained periodically during deployment. Barometric pressure and temperature were monitored and recorded onsite throughout the transducer study inside the surface casing at well GM-19D. Pumping information for the two active production wells at the GM Moraine facility (11B and 12A) was obtained. The locations of these wells are shown on Figure 1.

River stage and precipitation were monitored by downloading real time data from the United States Geological Survey (USGS) National Water Information System. Stream gauge USGS 03270500 (Great Miami River at Dayton, OH) located at river mile 80.1 (Figure 2) was used for upstream information. Stream gauge USGS 03271500 (Great Miami River at Miamisburg, OH) located at river mile 66.2 was used for downstream information. River stage data was not available for the inactive USGS gauge on Holes Creek. The GM site stream gauge (SG-4) used for correlation to the USGS stream gauges is located adjacent to the Site at river mile 73.2.

DN-13 (screened from approximately 105 to 165 feet below land surface) was under maintenance by Montgomery County during the initial transducer deployment and non-pumping conditions of the upper and lower aquifers were initially obtained in this area. Montgomery County performed a brief pump test during installation of the new DN-13 pump on March 27, 2007 at approximately 12:30 PM. DN-13 was turned on for continuous pumping by ARCADIS on March 28, 2007 at 07:30 AM. For the recovery study, DN-13 was shut off on April 13, 2007 at 3:05 PM and then was restarted for normal operation on April 14, 2007 at 2:00 PM. Pumping well DN-13 was monitored with a transducer after pump installation was complete, but periods of maximum drawdown resulted in water levels beneath the depth of the stilling tube and transducer elevation.

## **Preliminary Results**

### **Data Analysis**

Transducer data was downloaded throughout the study to confirm proper operation. The data was adjusted for barometric pressure using data obtained from the onsite barometric/temperature sensor. A calculation was performed using software provided by the manufacturer to assign a correction factor for barometric pressure to the transducer readings resulting in corrected data. Also, the data was corrected for absolute depth to water after water level gauging events when the transducer was disturbed by manual measurements. All wells show a similar rapid effect to barometric changes and high barometric efficiency.

### **Background Analysis**

Background water level information was obtained from wells located northeast of the DN-13 area at GM-41 (lower aquifer) and GM-53 (upper aquifer). Pumping schedules for the fire wells near GM-41 (FW-2 and FW-3) were obtained from the Moraine Assembly Plant. Fire well test pumping was conducted on Saturdays during the transducer study. Production well 12A was the only active production well in use during the transducer study. As shown in Figure 3, GM-41 water levels respond to the Saturday fire well test pumping and other fluctuations in GM-41 appear to be the effect of production well pumping. However, GM-53 water levels do not show these responses and are not affected by pumping in the lower aquifer.

### **River Effect**

Transducer responses to large changes in river stage were observed during the transducer study. Major precipitation events on March 14-15, 2007 (including snow melt) and March 22-23, 2007 resulted in increased flow in the Great Miami River. The March 22-23, 2007 event resulted in approximately a 5.6-foot rise in river stage north of the site (at the Dayton Gauge – Figures 2 and 4) and approximately 8.6-foot rise in river stage south of the site (at the Miamisburg Gauge – Figures 2 and 4). Correlation to SG-4, near DN-13, approximates the relationship between groundwater level rise and increase in river stage.

Groundwater contour maps, obtained from field measurements during the June 21-22, 2006; September 12-13, 2006 and April 30-May 1, 2007 water level measurement events, show that the Great Miami River reach adjacent to and downgradient of the Site was a losing river on these dates. The only field measurement indicating that the river was gaining was at the northernmost gauge (SG-2) which is located near the equalization basins.

Correlating the USGS river gauges north and south of the Site to SG-4 adjacent to the Site (Figure 4) and interpolating river levels at the Site indicated a losing reach during the majority of the study. After the large precipitation event (March 22-23, 2007), the river appeared to be a temporarily gaining reach.

A discussion of the Great Miami River and Holes Creek was presented in the Revised Three-Dimensional Steady-State Flow Model Construction and Calibration Report dated May 1994 (Modeling Report). The river stage data obtained during the transducer study are consistent with the conditions described in the Modeling Report. The following text contains an excerpt from Section 2.5 of the Modeling Report.

*“Within the study area, the Great Miami River significantly affects groundwater flow directions in the upper aquifer. In the vicinity of Harrison, the observed water table in the upper aquifer slopes away from the Great Miami River indicating that it is losing water to the aquifer.”*

### **DN-13 Pumping Effect**

During the period that the DN-13 pump was shut down, April 13, 2007 at 3:05 PM to April 14, 2007 at 2:00 PM, responses in several monitoring wells were recorded. Figure 5 is a hydrograph displaying all nine wells including DN-13 during this period. The DN-13 pumping well transducer was dewatered during the test resulting in a measurement of over 30 feet of drawdown, which was beyond the depth of the stilling tube. The lower aquifer monitoring wells near DN-13 (GM-13, GM-14, GM-15) displayed instantaneous response to DN-13 pumping. Whereas, upper aquifer wells (GM-16, GM-18, GM-51) near DN-13 showed minimal to no response (less than 0.3 feet) to pumping. When DN-13 was pumping over 1 foot of drawdown was observed in lower aquifer wells GM-13, GM-14, and GM-15. This response demonstrates that DN-13 effectively captures groundwater in the lower aquifer.

Background wells GM-41 and GM-53 also were not affected by DN-13 pumping; however, GM-41 showed pumping effects from both the fire and production wells. The different responses in the upper and lower aquifers in the vicinity of DN-13 and GM-41, confirms that these are separate aquifer units.

### **Other Effects**

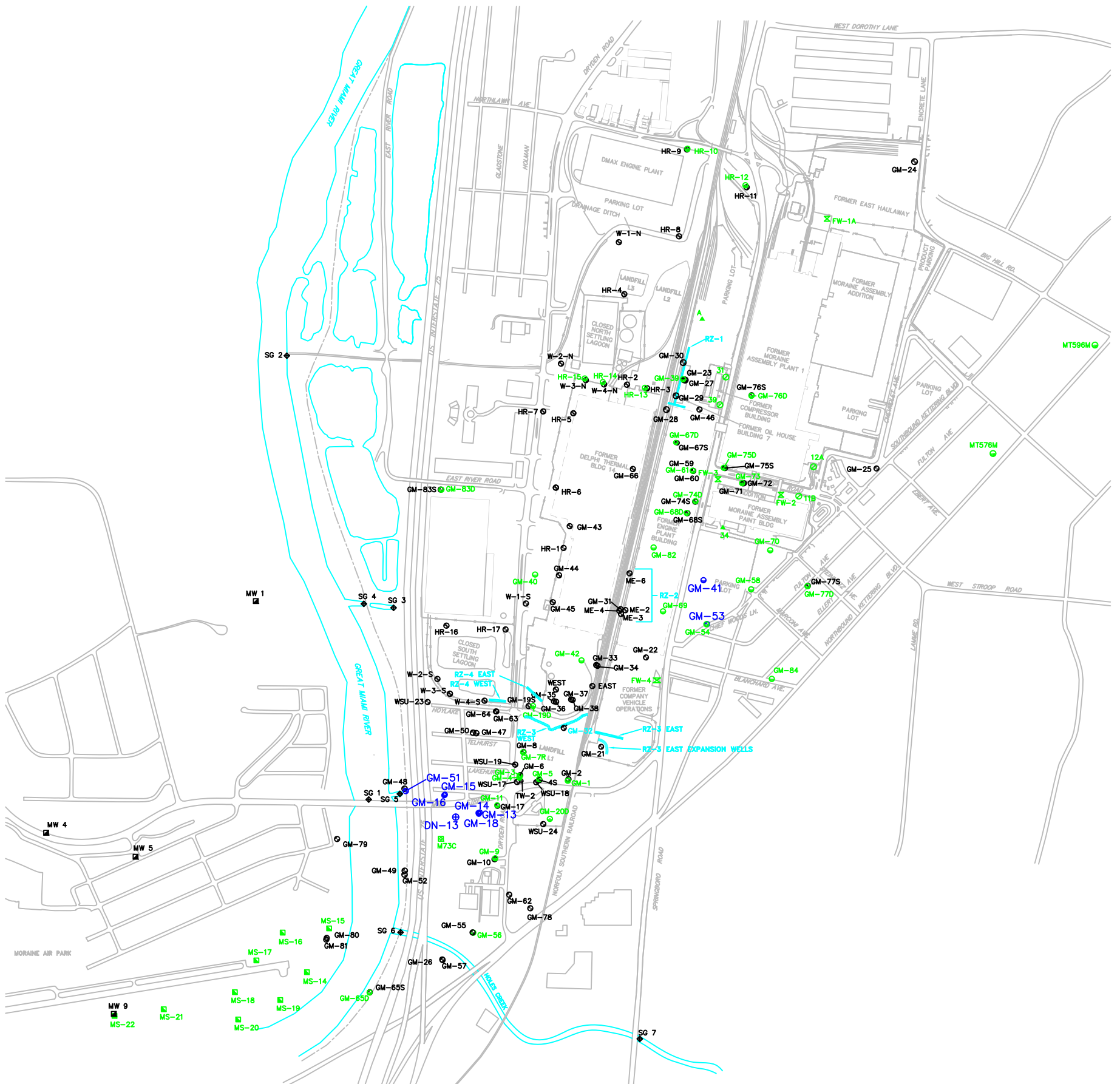
No direct correlation of effects was determined from precipitation or from Holes Creek. Precipitation responses are masked by the more rapid river effect. Based upon no observed response to small stage

changes in the Great Miami River, noticeable changes to the stage variations in Holes Creek are not expected.

## Findings

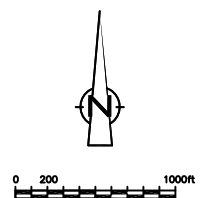
The DN-13 area transducer study was conducted to further refine the available information on groundwater fluctuations in various portions of the upper and lower aquifer in the area of DN-13. Data collected and analyzed for the transducer study has improved the understanding of groundwater flow downgradient of the Site. The transducer study findings are presented below:

- All wells show a similar rapid effect to barometric changes and high barometric efficiency;
- Fluctuations in the well used for determination of background conditions, lower aquifer well GM-41, correlate to the effect of production and fire well pumping. Water levels in the background upper aquifer well GM-53 do not show these responses and are not affected by pumping in the lower aquifer for the duration of this study;
- The Great Miami River adjacent to and downgradient of the site, is primarily a losing river. During low river stages, portions of this section of the river can become a gaining reach; and
- The DN-13 pumping effects are maintaining capture in the lower aquifer, but pumping influences were not observed in the upper aquifer over the 42 day period of this study.



- NOTES:**
1. DARK BLUE INDICATES MONITORING WELLS USED IN WATER LEVEL STUDY.
  1. GREEN INDICATES LOWER AQUIFER WELLS.
  2. BLACK INDICATES UPPER AQUIFER WELLS.

- LEGEND**
- MONITORING WELL (UPPER AQUIFER)
  - RECOVERY WELL (TW-2)
  - MONITORING WELL (LOWER AQUIFER)
  - PIEZOMETER
  - CARBON SOURCE INTRODUCTION WELLS, REACTIVE ZONES (RZ-1, RZ-3, AND RZ-4)
  - ⊗ FIRE WELL
  - ▲ PRODUCTION WELL CONVERTED TO MONITORING WELL (34, A)
  - ⊕ INACTIVE PRODUCTION WELL (31, 39, 11B, 12A)
  - ⊕ MONTGOMERY COUNTY WELL (USED BY RACER TRUST FOR PUMP TO WASTE PROGRAM)
  - MONTGOMERY COUNTY WELL (INACTIVE MIAMI SHORES WELL FIELD - DAYTON PRIMARY PUBLIC SUPPLY BACKUP)
  - ◆ STREAM GAUGE
  - RIVER LEVEE
  - CITY OF MORAINÉ MONITORING WELL
  - FORMER BUILDING FOOTPRINT
  - SURFACE WATER FEATURE

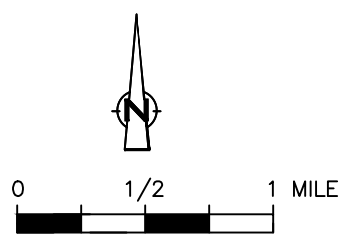
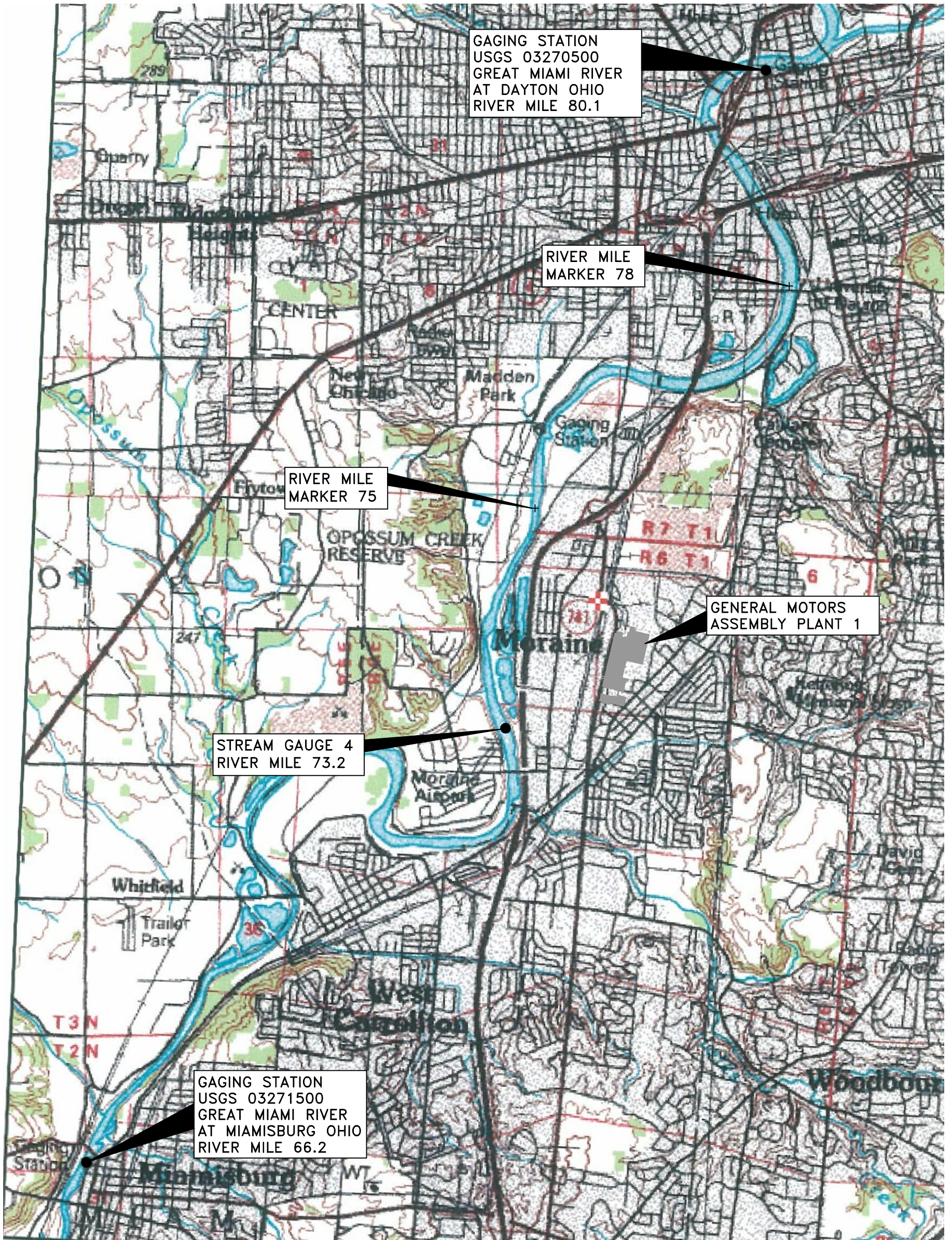


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**DN-13 AREA DETAILED WATER  
 LEVEL STUDY**

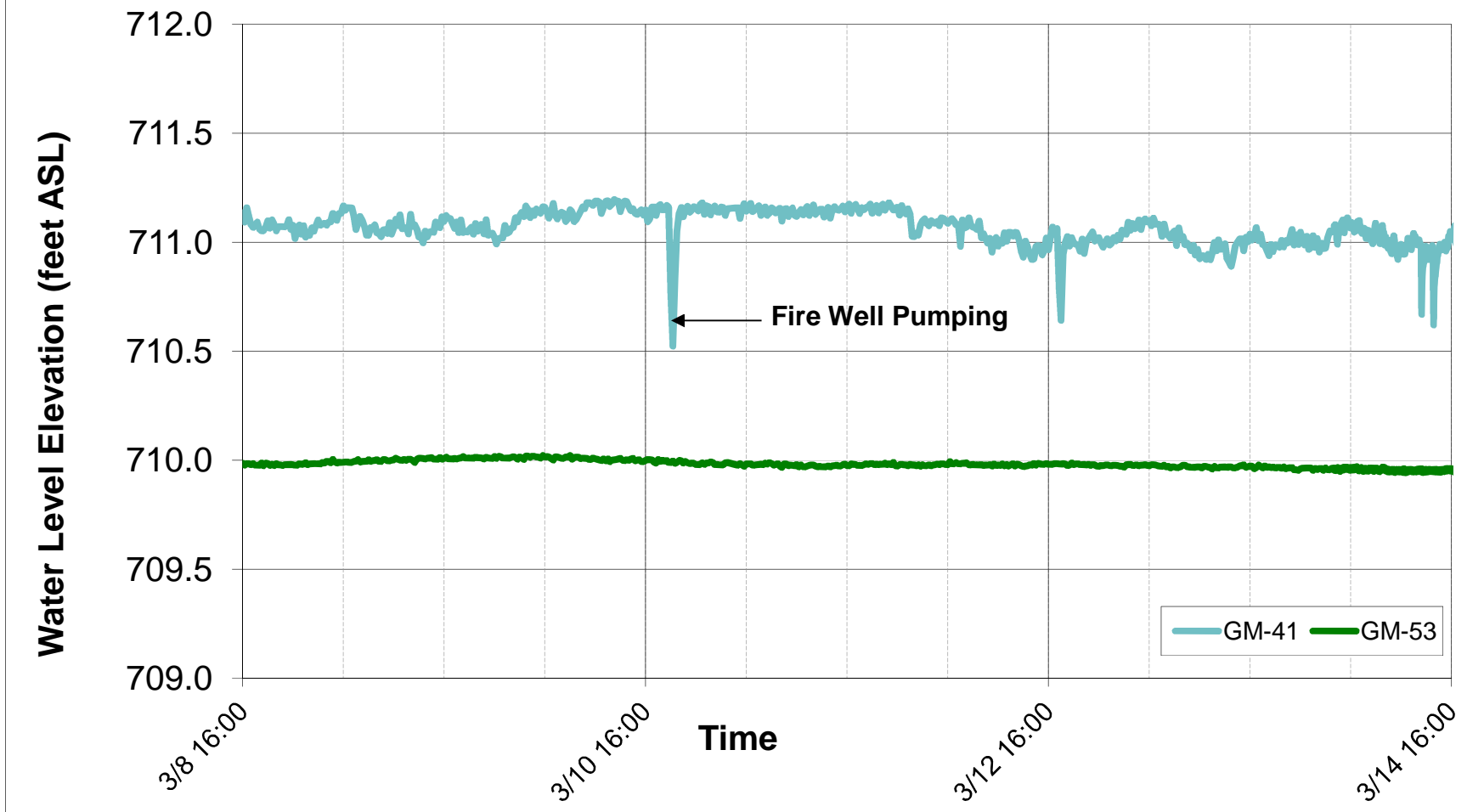
**ARCADIS**

FIGURE  
**1**



RACER TRUST MORAINE, OHIO OH000294.2012	
<b>GAGING STATIONS USED IN DN-13 WATER LEVEL STUDY</b>	
	FIGURE <b>2</b>

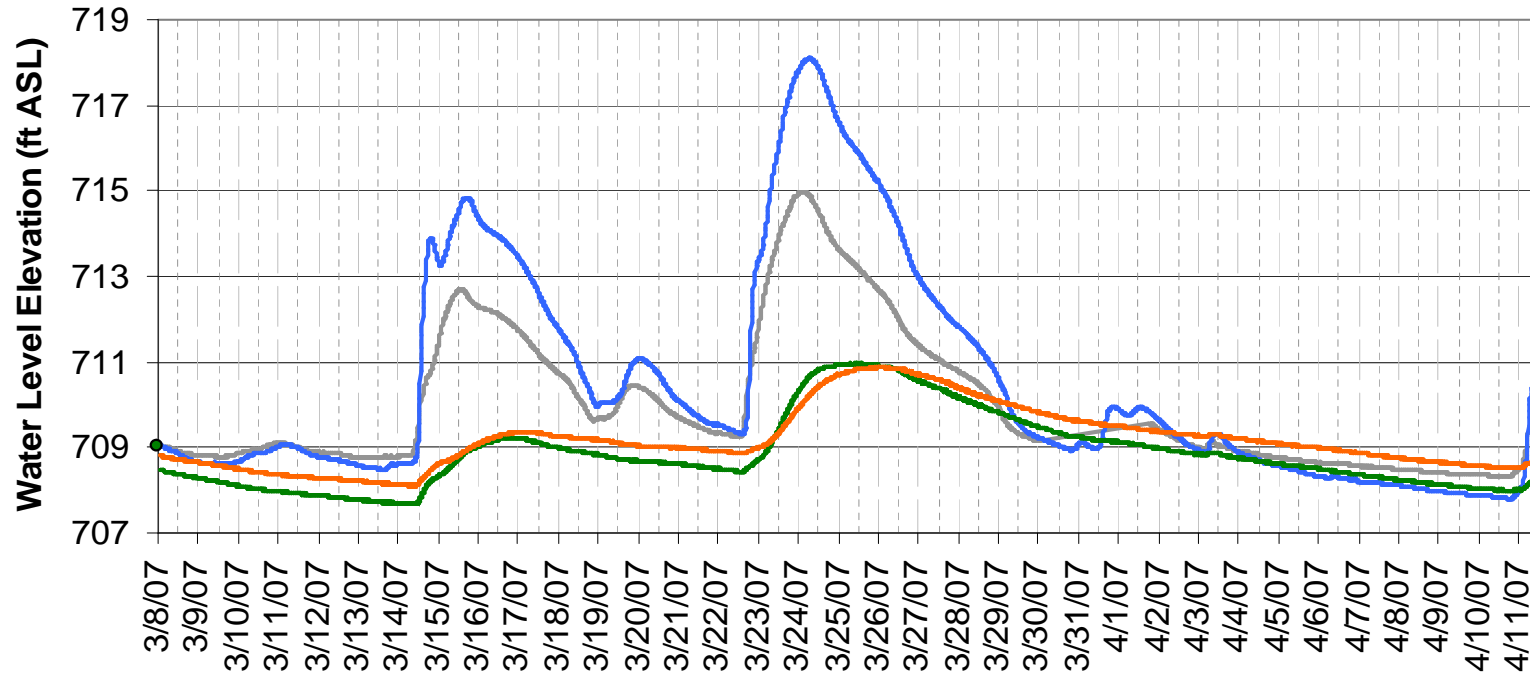
## GM- 41 and GM-53 Water Level Elevation



GENERAL MOTORS CORPORATION  
MORaine, OHIO

DRAWN T. FORTNER	DATE 8/19/08	PROJECT MANAGER N. GILLOTTI	FILE NAME GRAPHS081908
		LEAD DESIGN PROF. J. HUNT	CHECKED T. FORTNER
		PROJECT NUMBER	FIGURE NUMBER
		OH000294.2012	3

### River Stage Effect



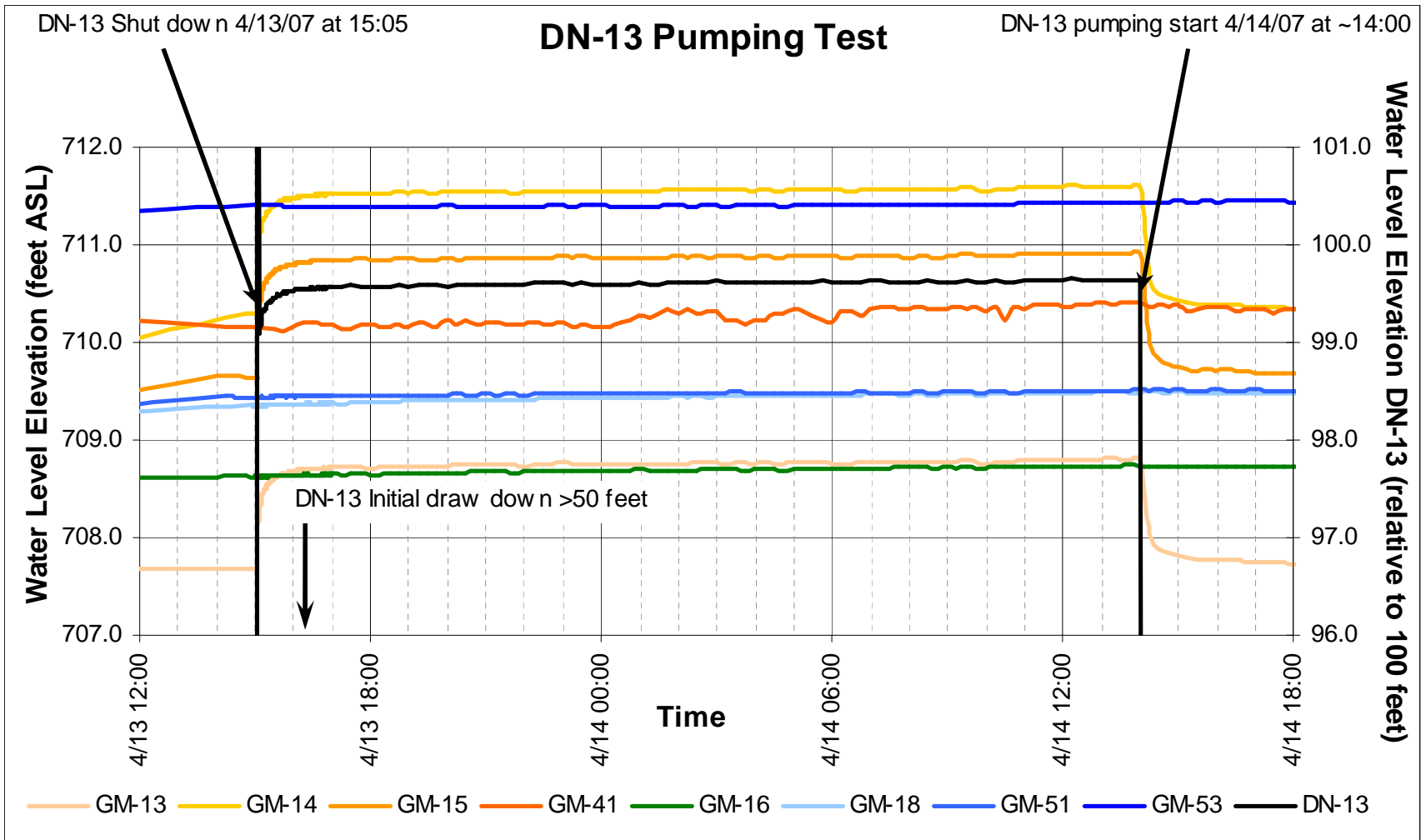
● Site Correlation with Stream Gauge 3/8/07 15:00 SG-4 709.07  
 Great Miami Gauge at Dayton USGS 03270500 = 727.07 (ft, MSL)  
 Great Miami Gauge at Miamisburg USGS 03271500= 685.27 (ft, MSL)

- River Stage (up stream)
- River Stage (down stream)
- GM-51
- GM-18



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MORaine, OHIO

DRAWN T. FORTNER	DATE 8/19/08	PROJECT MANAGER N. GILLOTTI	FILE NAME GRAPHS081908
		LEAD DESIGN PROF. J. HUNT	CHECKED T. FORTNER
		PROJECT NUMBER	FIGURE NUMBER
		OH000294.2012	4



GENERAL MOTORS CORPORATION  
MORaine, OHIO

DRAWN T. FORTNER	DATE 8/19/08	PROJECT MANAGER N. GILLOTTI	FILE NAME GRAPHIS081908
		LEAD DESIGN PROF. J. REID	CHECKED T. FORTNER
		PROJECT NUMBER	FIGURE NUMBER
		OH000294.2012	5