



January 11, 2013

File No. 11-0434-04

Suite 301A
1001 William Street
Thunder Bay,
Ontario
P7B 6M1
807.623.2195
fax: 807.473.5671
www.kgsgroup.com

Canadian National
MacMillan Yard
4 Welding Way
Concord, Ontario
L4K 1B9

SAULT STE. MARIE
MINISTRY OF ENVIRONMENT

JAN 14 2013

RECEIVED

ATTENTION: Mr. Alexandre Borges
Environmental Officer

RE: CN Hornepayne Yard – 2011 Final Report for the Ministry of Environment
2011 Environmental Program – Hornepayne, Ontario

Dear Mr. Borges:

Please find enclosed one (1) hard copy and one (1) electronic copy of the Final Report for the above noted site. For your convenience, an electronic copy of the final report has been forwarded to both Ms. Seble Afework and Mr. Marc Grenier-Savard. Also, one (1) hard copy of the final report has been forwarded to Mr. Kirk Crosson of the Ministry of Environment.

KGS Group sincerely appreciates the opportunity to have been of service on this project. If you have any further questions regarding this report, please contact Mr. Nick Tropea or the undersigned.

Yours truly,

Tony Gallo, M.Sc.
Project Manager

TG/sla
/Enclosure

cc: Ms. Seble Afework, P.Eng. Environmental Engineer, CN Environment
Mr. Marc Grenier-Savard, Environmental Coordinator, CN Environment
Mr. Kirk Crosson, Sr. Environmental Officer, Ministry of the Environment

TRANSMITTAL No. 11-0434-04-00011

PROJECT : 11-0434-04 2011 Environmental Activities - Hornepayne

TO : Mr. Kirk Crosson
Ministry of the Environment
289 Bay Street
3rd Floor
Sault Ste. Marie ON P6A 1W7

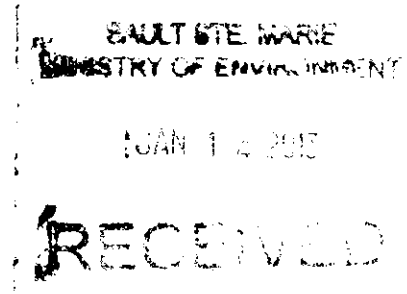
FROM : Nick Tropea
KGS Group

DATE : January 11, 2013

SUBJECT : CN Hornepayne Yard 2011 Final Report

SUBMITTED FOR : ☐ Approval ☒ Your Use
☐ As Requested ☐ Review and Comment

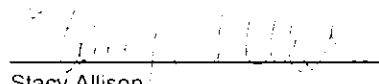
SENT VIA :



ITEM	DESCRIPTION	STATUS
RPT	Title: CN Hornepayne Yard 2011 Environmental Program Report (RPT), Revision: (B, Jan 11, 2013)	Issued for Use

REMARKS : As per the request of Nick Tropea, 1 bound hard copy of the Final Report regarding CN Hornepayne Yard 2011 Environmental Program will be sent to you via courier.

Regards,


Stacy Allison
Document Control



SALT STE MARIE
MINISTRY OF ENVIRONMENT

JAN 14 2013

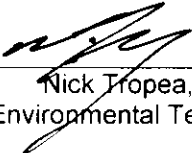
RECEIVED

**Canadian National
Hornepayne Yard
Hornepayne, Ontario
2011 Environmental Program
Ministry of the Environment**

January 2013

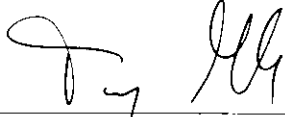
Privileged and Confidential

Prepared By



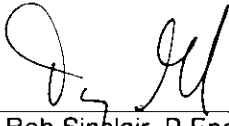
Nick Tropea, B.Sc.
Environmental Technologist

Reviewed By



Tony Gallo, M.Sc.
Project Manager

Approved By



for Rob Sinclair, P.Eng.
Manager, Environmental Services

**KGS Group
Thunder Bay, Ontario**

EXECUTIVE SUMMARY

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was retained by Canadian National (CN) to provide environmental and engineering services for the 2011 Environmental Program at the CN Hornepayne Yard, located in Hornepayne, Ontario. This report details the operation and maintenance activities associated with remedial activities at the Yard. The Hornepayne Yard operates under the Amended Certificate of Approval (C of A) No. 3528-83LQWT.

West End Diesel Recovery System

The West End Diesel Recovery System (DRS) continues to function as per design, passively collecting Light Non-Aqueous Phase Liquids (LNAPL) from the fuelling stand area and preventing the off-site migration of LNAPL. Approximately 5,394 L of LNAPL was collected during the 2011 operating year. Since commissioning in the fall of 1998, the system has recovered approximately 173,711 L.

In 2011, the diesel recovery system was inspected weekly from May to November, and monthly diesel recovery system effluent samples met all criteria outlined in the C of A.

East End Environmental Protection System

Lagoon No.2 Containment System

The Lagoon No.2 Containment System continued to prevent the off-site migration of LNAPL from the Lagoon No.2 and Former Pump House areas to the Little Jackfish River.

The horizontal extent of the LNAPL plume has not changed from previous years, although the measured LNAPL thickness in monitoring wells fluctuates between years. The Lagoon No.2 Containment and Former Pump House System recovered approximately 2,430 L of LNAPL in 2011. Since 1998, approximately 21,554 L of LNAPL has been collected from this area.

Effluent sampled from the Lagoon No.2 outlet met all criteria outlined in the C of A. Lagoon No.2 continues to adequately attenuate impacted effluent from various Yard operations.

Former Shop Track Fuelling Area Diesel Recovery System

The Former Shop Track Fuelling (FSTF) area DRS did not operate in 2011, as CN could not place a tanker car at the Waste Oil Transfer Facility (WOTF). KGS Group and local CN personnel placed approximately 476 L of waste oil within the waste oil tank from various Yard activities. Since 2004, approximately 10,576 L of LNAPL/Waste Oil has been collected at the facility.

Waste Oil Transfer Facility

The WOTF did not operate in 2011, as a tanker car could not be placed at the site. Approximately 12,000 L of total fluids, collected by KGS Group led operations, were taken directly off-site for processing.

Surface Water

The surface water program continues to show that Yard effluent/surface water discharge is not having a measurable or visible effect on off-site surface water, namely the Little Jackfish River.

TABLE OF CONTENTS

	<u>PAGE</u>
1.0 INTRODUCTION.....	1
1.1 SYSTEM DESCRIPTIONS.....	1
1.1.1 West End Fuelling Stand System	1
1.1.2 East End Environmental Protection System.....	1
2.0 OPERATION AND MAINTENANCE	4
2.1 WEST END FUELLING STAND SYSTEM.....	4
2.1.1 Operations and Inspections.....	4
2.1.2 Operation and Maintenance Issues	4
2.1.3 Collected LNAPL	4
2.2 EAST END ENVIRONMENTAL PROTECTION SYSTEM	4
2.2.1 Lagoon No.2 Containment System Operations and Inspections	4
2.2.2 Lagoon No.2 Containment System Operation and Maintenance Issues	5
2.2.3 Lagoon No.2 Collected LNAPL	5
2.2.4 Former Shop Track Fuelling Area Diesel Recovery System Operations and Inspections.....	6
2.2.5 Former Shop Track Fuelling Area Diesel Recovery System Operation and Maintenance Issues	6
2.2.6 Former Shop Track Fuelling Area Diesel Recovery System Collected LNAPL	6
2.2.7 Waste Oil Transfer Facility Operations and Inspections	6
2.2.8 Waste Oil Transfer Facility Operation and Maintenance Issues.....	7
2.2.9 Waste Oil Transfer Facility Collected LNAPL	7
3.0 EFFLUENT SAMPLING.....	8
3.1 WEST END FUELLING STAND SYSTEM.....	8
3.2 EAST END ENVIRONMENTAL PROTECTION SYSTEM	8
4.0 GEOLOGY AND HYDROGEOLOGY.....	10
4.1 GEOLOGY.....	10
4.1.1 West End.....	10
4.1.2 East End.....	10
4.2 HYDROGEOLOGY	10
4.2.1 West End.....	10
4.2.2 East End.....	11
5.0 GROUNDWATER SAMPLING.....	13
5.1 METHODOLOGY.....	13
5.1.1 Groundwater Sampling	13
5.1.2 Assessment Criteria	13
5.2 GROUNDWATER SAMPLING RESULTS	13
5.2.1 Former Pump House Area.....	14
5.2.2 Lagoon No.2 Area	14
5.2.3 Former Shop Track Fuelling Area	16
5.2.4 Roundhouse Area.....	16
6.0 CONCLUSIONS.....	17
6.1 WEST END	17
6.2 EAST END.....	17
6.2.1 Lagoon No.2 Containment System Operation and Maintenance	17
6.2.2 Former Shop Track Fuelling Area	18
6.2.3 Waste Oil Transfer Facility	18

TABLE OF CONTENTS
(CONTINUED)

6.2.4	Surface Water	18
7.0	THIRD PARTY USE AND STATEMENT OF LIMITATIONS	19
7.1	THIRD PARTY USE OF REPORT	19
7.2	STATEMENT OF LIMITATIONS.....	19

TABLES
FIGURES
APPENDICES

P:\Projects\2011\11-0434-04\general\docs\2011 MOE Final Report\RPT_MOE Final Report_2013-01-11_FNL_NT.doc

LIST OF TABLES

1. Surface Water Quality Analysis
2. East End Groundwater Monitoring Data
3. East End Groundwater Laboratory Results
4. East End General Groundwater Field Chemistry

LIST OF FIGURES

1. Site Location Plan
2. West End Yard Plan
3. West End Site Plan and Diesel Recovery System Components
4. Lagoon No.2 Site Plan
5. Lagoon No.2 Containment System Components
6. Former Shop Track Fuelling Area Site Plan
7. Former Shop Track Fuelling Area System Components
8. Waste Oil Transfer Facility Site Plan
9. Waste Oil Transfer Facility System Components
10. 2011 LNAPL Collection Data – West End
11. Historical LNAPL Collection Data – West End
12. 2011 LNAPL Collection Data – Lagoon No.2
13. Historical LNAPL Collection Data – Lagoon No.2
14. 2011 LNAPL Collection Data – Former Shop Track Fuelling Area
15. Historical LNAPL Collection Data Former Shop Track Fuelling Area
16. Surface Water Sampling Locations
17. Groundwater Surface Contours – West End – Spring 2011
18. Groundwater Surface Contours – West End – Fall 2011
19. Groundwater Surface Contours – East End – Spring 2011
20. Groundwater Surface Contours – East End – Fall 2011
21. Groundwater Monitoring Well Sampling Locations

LIST OF APPENDICES

- A. Certificate of Approval No. 3528-83LQWT
- B. Waste Manifest Forms
- C. Drill Logs
- D. Stratigraphic Cross Sections

1.0 INTRODUCTION

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was retained by Canadian National (CN) to provide environmental and engineering services for the 2011 Environmental Program at the CN Hornepayne Yard, located in Hornepayne, Ontario (Figure 1). This report details the operation and maintenance activities associated with both the West End Fuelling Stand System and East End Environmental Protection Systems (PIN # 1000/ONPR/100586, PIN # 1000/ONPR/100587, and PIN # 1000/ONPR/100591), and also details the results of the groundwater and surface water monitoring and sampling program conducted during the 2011 operating year. The East and West End systems operate under the Amended Certificate of Approval (C of A) No. 3528–83LQWT, which was issued on April 29, 2010 (Appendix A).

1.1 SYSTEM DESCRIPTIONS

1.1.1 West End Fuelling Stand System

The location of the West End Diesel Recovery System (DRS) (PIN # 1000/ONPR/100587) within the Hornepayne Yard is shown on Figure 2, while the DRS components are shown on Figure 3. The DRS was originally constructed in 1998 and was composed of eleven (11) underdrains, each at various elevations within the subsurface. Only ten (10) underdrains remain. Underdrain No.7 was destroyed in 1998 during construction of the diesel recovery lagoon (DRL). The underdrains discharge total fluids into the DRL. A skimmer unit, located within the Skimmer Building at the west end of the DRL, collects LNAPL floating on the surface of the water within the DRL. Collected LNAPL is transferred by gravity to a 25,000 L waste oil recovery tank. Effluent from the DRL is discharged to a discharge trench. At the downstream end of the discharge trench is a concrete control structure, through which effluent is discharged to the Little Jackfish River. Flow through the structure is controlled using a manual butterfly valve.

1.1.2 East End Environmental Protection System

Lagoon No.2 Containment System

Figure 4 shows the location of the Lagoon No. 2 containment system relative to the Yard. The general components of the containment system are shown on Figure 5. The containment system consists of a bentonite cut-off wall, ten (10) recovery wells and an interception trench.

Six (6) of the recovery wells were installed in 2006 as part of the containment system upgrade (PW-5 to PW-10). Pumping well PW-1 was damaged during the system upgrade. This pumping well is no longer used as a recovery well, but accumulated LNAPL (when present) is bailed from the well during each system inspection. Five (5), top loading, AP4 pneumatic pumps are utilized to collect total fluids from selected pumping wells. The pneumatic pumps are configured to pump total fluids to a 45 L per minute oil / water separator (OWS). The pneumatic pumps can be transferred between the pumping wells as dictated by both fluctuating water table and LNAPL levels, respectively. LNAPL collected in the OWS is gravity drained to a 4,560 L double walled waste oil tank. Effluent from the OWS gravity drains to Lagoon No.2, which ultimately, discharges to the Little Jackfish River.

An interception trench was installed in the former pump house area of the Yard, located west of Lagoon No.2. The interception trench is equipped with a Myers ½ horsepower sump pump, which transfers total fluids collected within the interception trench to the OWS, located at the Lagoon No.2 Containment System. LNAPL collected in the OWS is gravity drained to a 4,560 L double walled waste oil tank. Effluent from the OWS gravity drains to Lagoon No.2, which ultimately, discharges to the Little Jackfish River.

Former Shop Track Fuelling Area Diesel Recovery System

The location of the Former Shop Track Fuelling area (FSTF) (PIN # 1000/ONPR/100591) is shown on Figure 6, while the general FSTF components are shown on Figure 7. The FSTF DRS consists of a rock filled recovery trench, collection sump and a skimmer unit, located within the Skimmer Building. A Myers ½ horsepower sump pump is used to depress the water table within the sump. Groundwater is pumped directly to the 227 L per minute OWS, located at the Waste Oil Transfer Facility. Effluent from the OWS, gravity discharges to a manhole within the area of the system. Effluent from the manhole gravity discharges to Lagoon No.2 and ultimately, to the Little Jackfish River. The skimmer belt collects LNAPL floating on the surface of the water within the sump. Collected LNAPL is then transferred by gravity to a 5,000 L waste oil recovery tank.

Waste Oil Transfer Facility

The location of the Waste Oil Transfer Facility (WOTF) (PIN # 1000/ONPR/100591) is shown on Figure 8. The WOTF system components are shown on Figure 9. To the south of the WOTF

are drip trays, which drain to a sump equipped with a Myers ½ horsepower sump pump. Any potential spills within the drip trays are pumped from the sump to the 227 L per minute OWS separator situated within the WOTF. A 45,400 L holding tank is located to the west of the WOTF. All collected LNAPL is placed in the waste oil tank and processed through the OWS. Clean water is discharged to Lagoon No.2. Remaining LNAPL is transferred via a Loading Arm to a nearby Tanker car, stationed at the drip trays.

2.0 OPERATION AND MAINTENANCE

2.1 WEST END FUELLING STAND SYSTEM

2.1.1 Operations and Inspections

KGS Group personnel started the skimmer unit on May 10, 2011. Local personnel adjusted the skimmer belt and increased / decreased the blade tension on the skimmer belt on an as required basis during 2011. The skimmer unit was shutdown and winterized on November 7, 2011 by KGS Group personnel.

Monthly and weekly inspections were conducted by KGS Group and local personnel at the West End DRS during the 2011 operating year. KGS Group personnel conducted monthly inspections from May to November, while local personnel conducted weekly inspections from May to November. Inspections were conducted to assess the operation of the DRS, to measure the collection of LNAPL, and to visually inspect the final discharge location. KGS Group personnel also collected an effluent sample from the final discharge location on a monthly basis. Weekly inspection forms for the 2011 operating year can be provided upon request.

2.1.2 Operation and Maintenance Issues

The skimmer unit operated from May to November without any operational interruptions.

2.1.3 Collected LNAPL

The West End DRS recovered a total of approximately 5,394 L of LNAPL during the 2011 operating year (Figure 10). Since the commissioning of the system in the spring of 1998, the West End DRS has collected approximately 173,711 L of LNAPL (Figure 11).

2.2 EAST END ENVIRONMENTAL PROTECTION SYSTEM

2.2.1 Lagoon No.2 Containment System Operations and Inspections

KGS Group personnel installed the pneumatic pumps and the associated system components on June 1, 2011 and started system operation. System operation began slightly later than usual, as the accumulation of iron precipitate in the discharge lines required extensive maintenance prior to the commencement of the system. Monthly and weekly inspections were conducted by KGS Group and local personnel during the 2011 operating year. KGS Group

personnel conducted monthly inspections from May to November, while local personnel conducted weekly inspections from May to November. Inspections were conducted to assess the operation of the Lagoon No.2 Containment System, to measure the collection of LNAPL, and to visually inspect the final discharge location. KGS Group personnel also collected an effluent sample from the final discharge location on a monthly basis. Weekly inspection forms for the 2011 operating year can be provided upon request.

The recovery trench and compressor operated within normal parameters throughout the 2011 operating year. The pneumatic pumps were rotated between five (5) of the recovery wells in 2011 (PW-2, PW-3, PW-6, PW-8, and PW-9). Pumping Wells PW-4, PW-5, PW-6, and PW-10 were not utilized due to insignificant thickness of LNAPL present and low water table levels. LNAPL from within these four (4) pumping wells was manually bailed during each inspection, when present.

2.2.2 Lagoon No.2 Containment System Operation and Maintenance Issues

Operation of the Lagoon No.2 Containment System began on June 1, 2011; however, the majority of the pumping well discharge lines, as well as the discharge line from the OWS to Lagoon No.2, were plugged with the settling of iron precipitate over the course of winter. The system was activated with two (2) pumps (PW-2 and PW-9) being activated. On June 3, the system experienced an automatic shut down. Further observation revealed an issue with the low level float, located in the waste oil transfer drum. Commercial Electric of Thunder Bay replaced the float on June 7, 2011 and the system was activated. By the end of June 2011, all of the discharge lines were cleared and the system operated with four (4) pumps (PW-2, PW-3, PW-8, and PW-9). The system operated for the remainder of the operating year.

2.2.3 Lagoon No.2 Collected LNAPL

The Lagoon No.2 Containment System recovered a total of approximately 2,430 L of LNAPL during the 2011 operating year (Figure 12). Since LNAPL recovery began in the spring of 1998, the Lagoon No.2 Containment System, in its various forms, has collected approximately 21,554 L of LNAPL (Figure 13).

2.2.4 Former Shop Track Fuelling Area Diesel Recovery System Operations and Inspections

As there was no tanker car placed at the WOTF in 2011 (a requirement for operating both the Former Shop Track Fuelling area DRS and the WOTF), the remedial system was not operated in 2011.

Although the remedial system did not operate in 2011, the system components, namely the waste oil tank, were inspected on a monthly basis, as KGS Group and local CN personnel still use the tank to store waste oil from Yard activities.

Monthly and weekly inspections were conducted by KGS Group and local personnel during the 2011 operating year. KGS Group personnel conducted monthly inspections from May to November, while local personnel conducted weekly inspections from May to November. Inspections were conducted to measure the collection of LNAPL placed in the waste oil tank. Weekly inspection forms for the 2011 operating year can be provided upon request.

2.2.5 Former Shop Track Fuelling Area Diesel Recovery System Operation and Maintenance Issues

There were no operation or maintenance issues to report for the FSTF area DRS in 2011.

2.2.6 Former Shop Track Fuelling Area Diesel Recovery System Collected LNAPL

The FSTF DRS did not operate in 2011; therefore, the system did not recover any subsurface LNAPL during the 2011-operating year. Both KGS Group and local CN personnel placed approximately 476 L of waste oil, from various Yard operations, in the waste oil tank. A summary of LNAPL collection for 2011 can be found on Figure 14. Since its commissioning in the spring of 2004, system and manual collection of waste oil has recovered approximately 10,576 L of LNAPL / waste oil. A summary of the historical collection can be found on Figure 15.

2.2.7 Waste Oil Transfer Facility Operations and Inspections

As there was no tanker car placed at the WOTF in 2011 (a requirement for operating both the FSTF area DRS and the WOTF), the transfer system was not operated in 2011.

Although the WOTF system did not operate in 2011, the system components, namely the waste oil holding tank, were inspected on a monthly basis as part of the monthly tank and outfall inspections. Level measurements were also recorded as KGS Group and local CN personnel used the holding tank to store waste oil generated from Yard activities.

Monthly and weekly inspections were conducted by KGS Group and local personnel during the 2011 operating year. KGS Group personnel conducted monthly inspections from May to November, while local personnel conducted weekly inspections from May to November. Inspections were conducted to measure the collection of LNAPL placed in the waste oil holding tank. Weekly inspection forms for the 2011 operating year can be provided upon request.

2.2.8 Waste Oil Transfer Facility Operation and Maintenance Issues

There were no operation or maintenance issues to report for the WOTF in 2011.

2.2.9 Waste Oil Transfer Facility Collected LNAPL

The WOTF did not operate in 2011; therefore, 0 L of total fluids was processed through the WOTF. Green for Life of Thunder Bay processed approximately 12,000 L of total fluids (collected from various LNAPL collection systems in the Yard) off-site. Waste Manifest Forms are provided in Appendix B.

3.0 EFFLUENT SAMPLING

3.1 WEST END FUELLING STAND SYSTEM

As per the requirements of the C of A, effluent samples were collected from the outlet to the Little Jackfish River (Hor-013-05) from May through November 2011, with the exception of August and September 2011, when the final effluent location was found to be dry. The effluent sampling location is shown on Figure 16. KGS Group personnel collected effluent samples during each monthly inspection visit or as part of the surface water-sampling program. Effluent samples were submitted to Maxxam Analytics Inc. in Mississauga, Ontario for the laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), total purgeable hydrocarbons (TPH), total extractable hydrocarbons (TEH), petroleum hydrocarbon fractions (PHC) F1 to F4, methyl-t-butyl-Ether (MTBE), pH, alkalinity, hardness, and lead. The effluent samples were submitted to the laboratory accompanied with pre-filled chain of custody (COC) forms supplied by CN via the SAP program.

Laboratory results show that BTEX, MTBE, lead and pH in the effluent samples were below the applicable C of A criterion. PHC fractions, where analysed, were below applicable C of A criteria. Surface water quality analysis results are presented in Table 1. Laboratory certificates of analysis can be provided upon request.

3.2 EAST END ENVIRONMENTAL PROTECTION SYSTEM

Effluent samples from the Lagoon No.2 discharge to the Little Jackfish River (Hor-002-05) were taken on a monthly basis from May to November 2011. The effluent sampling locations are presented on Figure 16. KGS Group personnel collected effluent samples during each monthly inspection visit or as part of the surface water-sampling program. Effluent samples were submitted to Maxxam Analytics Inc. in Mississauga, Ontario for the laboratory analysis of BTEX, TPH, TEH, PHC fractions F1 to F4, MTBE, pH, alkalinity, hardness, and lead. The effluent samples were submitted to the laboratory accompanied with pre-filled chain of custody (COC) forms supplied by CN via the SAP program.

Laboratory results show that BTEX, MTBE, lead and pH were below the applicable C of A criterion. Where PHC fractions F1 to F4 were analysed, the concentrations were below applicable C of A criteria. Surface water quality analysis results for parameters sampled during

the 2011 operating year are presented in Table 1. Laboratory certificates of analysis can be provided upon request.

4.0 GEOLOGY AND HYDROGEOLOGY

4.1 GEOLOGY

4.1.1 West End

Native soils within the West End are generally silty sands with traces of clay. The shallow soils are typically brown turning to grey-blue at the saturation zone, which is typical of a stable water table. Localized peat layers are also found within this area. Layers of surficial imported fill, where present, range in thickness from 0 to 4 m. Historical drill logs are provided in Appendix C, while stratigraphic cross sections for the West End are presented in Appendix D (Figure D1 and D2, respectively).

4.1.2 East End

The geology of the East End typically consists of fill overtop layers of peat and silty sands. Parallel to the Little Jackfish River, the geology shifts to more coarse granular materials, sands, gravel, cobbles and boulders. Historical drill logs are provided in Appendix C, while stratigraphic cross sections for the East End are presented in Appendix D (Figures D3 and D4, respectively).

4.2 HYDROGEOLOGY

4.2.1 West End

Representative contours for the spring and fall monitoring events are shown on Figures 17 and 18, respectively.

Groundwater elevations ranged from an elevation of 323.27 m (IMW-4) to 326.21 (MW-120) in the spring, and from 323.21 (IMW-4) to 325.73 m (MW-120) in the fall.

Interpreted groundwater flow direction was to the north/northeast, with local flow varying in the area of the DRS due to the influence of the underground drains and the recovery lagoon.

The average hydraulic gradient in the spring was 0.02 m/m, with local variations ranging from 0.01 to 0.04 m/m in the spring, while the average hydraulic gradient in the fall was 0.03 m/m, with local variations ranging from 0.01 to 0.05 m/m. Based on an estimated hydraulic

conductivity of 10^{-8} m/s for silty clay and an effective porosity of 0.25, the estimated groundwater velocity local to the DRS in 2011 ranged from 0.01 to 0.06 m/year.

4.2.2 East End

Groundwater monitoring data for the East End is presented in Table 2. Representative contours for the spring and fall monitoring events are shown on Figures 19 and 20, respectively.

Former Pump House Area

Groundwater elevations in the Former Pump House area ranged from an elevation of 321.75 m (MW-43) to 323.87 m (MW-108) in the spring and from 321.19 m (MW-106) to 322.82 m (MW-108) in the fall.

Interpreted groundwater flow direction was to the north / northeast, generally towards the Little Jackfish River. Hydraulic gradients were variable and the estimated groundwater velocities through the silty sands ranged between 1 m/year to 3 m/year.

LNAPL (0.12 m) was measured in one (1) monitoring well (MW-106) in the Former Pump House area in 2011. Detailed results are presented in Table 2.

Lagoon No.2 Area

Groundwater elevations in the Lagoon No.2 area ranged from an elevation of 321.09 m (OW 5-3) to 321.55 (MW-52) in the spring, and from 320.26 (OW 5-1) to 321.17 m (MW-40) in the fall.

Interpreted groundwater flow direction was to the north / northeast, with local flow varying in the area of Lagoon No.2 due to the influence of underground infrastructure. The average hydraulic gradient in the spring was 0.014 m/m, with local variations ranging from 0.012 to 0.017 m/m in the spring, while the average hydraulic gradient in the fall was 0.023 m/m, with local variations ranging from 0.018 to 0.036 m/m. Based on an estimated hydraulic conductivity of 10^{-6} m/s for silt / silty sands and an effective porosity of 0.30, the estimated groundwater velocity local to Lagoon No.2 in 2011 ranged from 1.26 to 1.79 m/year in the spring and from 1.89 to 3.78 m/year in the fall.

LNAPL was measured in five (5) monitoring wells in 2011 (monitoring well MW-21 – 0.39 m, monitoring well MW-51 – 0.02 m, monitoring well MW-101 – 0.30 m, monitoring well MW-104 – 0.13 m, and monitoring well OW 5-2 – 0.39 m. Detailed results are presented in Table 2.

Former Shop Track Fuelling Area

Groundwater elevations ranged from an elevation of 322.06 m (MW-114) to 324.18 m (MW-126) in the spring and from 321.79 m (MW-114) to 322.98 m (MW-126) in the fall.

Interpreted groundwater flow direction was to the north/northeast towards Lagoon No.2 and the Little Jackfish River. Groundwater flow is locally influenced by the underground sewer networks. The average hydraulic gradients in the spring and fall were variable, with local variations ranging from 0.01 m/m to 0.025 m/m. Based on an estimated hydraulic conductivity of 10^{-6} m/s for silty sands and an effective porosity of 0.30, the estimated groundwater velocity local to the FSTF area in 2011 ranged from 1 to 3 m/year in the spring and fall.

LNAPL was measured in three (3) monitoring wells in 2011 (monitoring well MW-109 – 0.32 m, MW-126 – 0.80 m, and monitoring well OW 3-2 – 0.07 m). Detailed results are presented in Table 2.

Roundhouse Area

Interpreted groundwater flow for June and October are shown on Figures 19 and 20, respectively. Groundwater flow was to the north/northwest. Groundwater gradients were variable, with an estimated groundwater velocity of 1 to 3 m/year through the sandy silts/silts.

LNAPL was not measured within the Roundhouse area in 2011. Detailed results are presented in Table 2.

5.0 GROUNDWATER SAMPLING

5.1 METHODOLOGY

5.1.1 Groundwater Sampling

Groundwater sampling events were conducted on June 27 (spring) and October 5 (fall), 2011. Groundwater samples were obtained using dedicated polyethylene tubing and foot valves. Each monitoring well was purged dry to ensure a representative sample was obtained from the aquifer. Groundwater samples were collected when 40% to 50% of the initial volume had recharged. Each sample was then placed into the appropriate sample bottle and shipped in cooler chests with ice to Maxxam Analytics Inc., an accredited analytical testing facility, in Mississauga, Ontario.

Groundwater samples from monitoring wells located within 30 m of the Little Jackfish River were submitted for the laboratory analysis of BTEX, and PHC fractions F1 to F4 as part of the spring sampling event. Groundwaters sampled from these wells were submitted for the laboratory analysis of PHC fractions F2 to F4 as part of the fall sampling event. All other groundwater samples were submitted for the laboratory analysis of PHC fractions F2 to F4 in October.

5.1.2 Assessment Criteria

Groundwater sampling results were compared to the Ontario Ministry of Environment (MOE) "Soil, Groundwater and Sediment Standards for us under XV.1 of the Environmental Protection Act, dated April 15, 2011. Groundwater results for monitoring wells located within 30 m of the Little Jackfish River were assessed using Table 9 Site Conditions Standards, while results from monitoring wells outside of the 30 m from the Little Jackfish River were assessed using the Table 3 Site Condition Standards.

5.2 GROUNDWATER SAMPLING RESULTS

Figure 21 highlights the monitoring wells which were sampled during the 2011 groundwater monitoring and sampling program, as per C of A requirements. Laboratory results for samples collected during the groundwater monitoring and sampling program are presented on Table 3, while general groundwater field chemistry results are presented on Table 4. Laboratory certificates of analysis can be provided upon request.

5.2.1 Former Pump House Area

Within 30 m of Little Jackfish River – Groundwater was sampled from three (3) monitoring wells (MW-20, MW-43, and MW-46) within 30 m of the Little Jackfish River in 2011. BTEX, PHC fraction F1 to F4 concentrations were non-detectable, or at concentrations below MOE Table 9 Site Condition Standards, and generally similar to 2010 results. PHC fraction F2 concentrations exceeded MOE Table 9 Site Condition Standards as follows:

- **MW-20** – PHC fractions F2 and F3 exceeded in both June and October, with concentrations being similar to 2010 results.
- **MW-43** – PHC fraction F2 exceeded in both June and October, with concentrations being consistent with 2010 results.
- **MW-46** – PHC fraction F2 exceeded in October. F2 concentrations at this monitoring well were non-detectable in June, as well as in 2010.

Outside 30 m from Little Jackfish River – Three (3) monitoring wells (MW-106, MW-107, and MW-108) were sampled from outside the 30 m limit from the Little Jackfish River in 2011. PHC fraction F4 concentrations were non-detectable, or where detectable, below MOE Table 3 Site Condition Standards. PHC fractions F2 and F3 concentrations exceeded MOE Table 3 Site Condition Standards as follows:

- **MW-106, MW-107, and MW-108** – PHC fractions F2 and F3 exceeded in 2011, with concentrations being elevated compared to 2010 results.

Field Chemistry – Groundwater sampled from all wells within the FPH area was impacted to some degree, making comparisons for trends in field chemistry difficult. However, the data does generally show that DO concentrations are slightly lower, and more reduced conditions exist in wells at this location, compared to other locations in the Yard where groundwater is not impacted. These results indicate increased biological activity is occurring within the FPH area.

5.2.2 Lagoon No.2 Area

Within 30 m of Little Jackfish River – Groundwater was sampled from five (5) monitoring wells (MW-40, MW-52, OW5-1, OW5-2, and OW5-3) that are located within 30 m of the Little

Jackfish River in June and October 2011. BTEX concentrations were below method detection limits or below Table 9 Site Condition Standards in all groundwater samples. PHC fractions F1 to F4 were non-detectable or below MOE Table 9 Site Condition Standards with the exception of the following:

- **MW-40** – PHC fractions F2 and F3 concentrations in October exceeded MOE Table 9 Site Condition Standards. Previous results for this location showed these parameters to be non-detectable.
- **MW-52** – PHC fractions F2 and F3 concentrations in 2011 exceeded MOE Table 9 Site Condition Standards and were elevated compared to 2010 results.
- **OW5-1** – PHC fractions F2 and F3 concentrations exceeded MOE Table 9 Site Condition Standards in October 2011, while only F2 exceeded in June. Concentrations of PHC fractions F2 and F3 concentrations in October were elevated compared to 2010.
- **OW5-2** – PHC fraction F1 to F4 concentrations in groundwater exceeded MOE Table 9 Site Condition Standards in 2011, with results being generally similar to October 2010 results, but below June 2010 results.
- **OW5-3** – PHC fraction F1 exceeded MOE Table 9 Site Condition Standards in June 2011, and was elevated compared to the non-detectable results for June 2010. PHC fractions F2 and F3 exceeded MOE Table 9 Site Condition Standards in both June and October 2011. PHC fraction F4 exceeded MOE Table 9 Site Condition Standards in October 2011, and was elevated compared to previous results.

Outside 30 m from Little Jackfish River – Groundwater samples were collected from six (6) monitoring wells (MW-21, MW-51, MW-101, MW-102, MW-103, and MW-104) from outside of the 30 m limit from the Little Jackfish River, in October 2011. PHC Fraction F2 to F4 concentrations in groundwater generally exceeded MOE Table 3 Site Condition Standards at all sampling locations as follows:

- **MW-21** – PHC fractions F2 to F4 exceeded Table 3 Site Condition Standards, and were similar to 2010 results.
- **MW-51, MW-101, and MW-104** – PHC fractions F2 to F4 exceeded Table 3 Site Condition Standards, and were elevated to 2010 results.

- **MW-102 and MW-103** – PHC fractions F2 and F3 exceeded Table 3 Site Condition Standards, and were similar to 2010 results. PHC fraction F4 was non-detectable, similar to 2010.

Field Chemistry – Field chemistry results show a definite trend of low dissolved oxygen and increased reducing conditions in groundwater from impacted wells as compared to non-impacted wells. The data suggests that there is increased biological activity within impacted areas

5.2.3 Former Shop Track Fuelling Area

Groundwater from six (6) monitoring wells was sampled in the FSTF area in October 2011 (MW-49, MW-109, MW-114, MW-115, MW-126, and OW 3-2). PHC Fraction F2 to F4 concentrations in groundwater exceeded MOE Table 3 Site Condition Standards as follows:

- **MW-49, MW-114, MW-126, and OW3-2** – PHC fractions F2 to F4 exceeded MOE Table 3 Site Condition Standards, and were elevated compared to 2010 results.
- **MW-115** – PHC fraction F3 exceeded MOE Table 3 Site Condition Standards and was elevated compared to 2010 results.

Field Chemistry – Field chemistry results show lower dissolved oxygen concentrations and more reduced conditions in groundwater sampled from impacted areas versus non-impacted areas. The data suggest increased biological activity in impacted areas.

5.2.4 Roundhouse Area

Groundwater was sampled from one (1) monitoring well, MW-24, in October 2011. PHC fraction F2 exceeded MOE Table 3 Site Condition Standards. PHC fractions F3 and F4 were elevated compared to previous results.

6.0 CONCLUSIONS

The following conclusions are made based on the 2011-operating year:

6.1 WEST END

- The West End DRS continues to function as per design, passively collecting LNAPL from the fuelling stand area and preventing the off-site migration of LNAPL.
- The skimmer unit operated for one hundred and eighty-three (183) out of a possible one hundred and eighty-three (183) days throughout the 2011-operating year. LNAPL was removed as required from the DRL.
- Approximately 5,394 L of LNAPL was collected during the 2011-operating year. Since commissioning in the fall of 1998, the system has recovered approximately 173,711 L.
- Target parameter concentrations in monthly effluent samples were below their applicable C of A criterion.
- Due to pre-established laboratory reporting protocols between CN and Maxxam Analytics, some of the monthly effluent laboratory results were reported as TPH and TEH, while some of the monthly effluent laboratory results were reported as PHC fractions F1 to F4.
- Weekly inspections were conducted throughout the operating year, which lasted from May 10, 2011 to November 8, 2011.

6.2 EAST END

6.2.1 Lagoon No.2 Containment System Operation and Maintenance

- The Lagoon No.2 containment system continues to prevent the off-site migration of LNAPL from the Lagoon No.2 area to the Little Jackfish River.
- A total of 2,430 L of LNAPL was collected in 2011. Since 1998, approximately 21,554 L of LNAPL has been collected.
- LNAPL was measured in five (5) monitoring wells in 2011 (monitoring well MW-21 – 0.39 m, monitoring well MW-51 – 0.02 m, monitoring well MW-101 – 0.30 m, monitoring well MW-104 – 0.13 m, and monitoring well OW 5-2 – 0.39 m).
- Groundwater from this area was sampled in 2011 and analyzed based on the C of A Criterion. Laboratory analysis showed the continued presence of target parameters in exceedance of applicable MOE Criteria.
- Field chemistry results show a trend of low dissolved oxygen and increased reducing conditions in groundwater from impacted wells as compared to non-impacted wells. The

data continues to suggest that there is increased biological activity within impacted areas.

- Target parameter concentrations in monthly effluent samples were below their applicable C of A criterion.
- Due to pre-established laboratory reporting protocols between CN and Maxxam Analytics, some of the monthly effluent laboratory results were reported as TPH and TEH, while some of the monthly effluent laboratory results were reported as PHC fractions F1 to F4.
- Weekly inspections were conducted throughout the operating year, which lasted from June 1, 2011 to November 8, 2011.

6.2.2 Former Shop Track Fuelling Area

- The FSTF DRS did not operate in 2011. Approximately 10,576 L of LNAPL has been collected since 2004.

6.2.3 Waste Oil Transfer Facility

- Enviro-West of Thunder Bay processed 12,000 L of total fluids, collected from various Yard LNAPL recovery systems, off-site due to the non-operation of the WOTF.

6.2.4 Surface Water

- No hydrocarbon sheen was observed on any of the surface water samples taken in 2011. The 2011 data showed that the Yard activities are not having any measurable or visible effects on the surface water quality of the Little Jackfish River.

7.0 THIRD PARTY USE AND STATEMENT OF LIMITATIONS

7.1 THIRD PARTY USE OF REPORT

This report has been prepared for Canadian National Railway and any use by a third party of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

7.2 STATEMENT OF LIMITATIONS

KGS Group prepared the environmental conclusions and recommendations for this report in a professional manner using the degree of skill and care exercised for similar projects under similar conditions by reputable and competent environmental consultants. As the report is based on the available information, some of its conclusions could be different if the information upon which it is based is determined to be false, inaccurate or contradicted by additional information. KGS Group makes no representation concerning the legal significance of its findings or the value of the property investigated.

TABLES

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample ⁽¹⁾	Date	Parameter (mg/L)																		Comments
		Benzene	Toluene	Ethyl- benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C6-C10)	F2 (C10-C16)	F3 (C16-C34)	F4 (C34-C50)	T.P.H. ($<C_{10}$)	T.E.H. (C10-C24)	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 002 05 (Lagoon No.2)	Nov-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	1.60	0.78	<0.1	<0.1	2.50	<0.5	<0.5	7.8	433	410	<0.05	(4)
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	-	-	-	<0.1	1.00	0.9	<0.5	7.9	327	330	<0.05	(3)
	Sep-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	1.50	0.42	<0.1	<0.1	1.90	<0.5	<0.5	7.9	432	430	<0.05	(4)
	Aug-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	1.60	0.82	<0.1	<0.1	2.40	<0.5	<0.5	8.0	441	430	<0.05	(4)
	Jul-11	0.0008	<0.0002	0.0004	0.0004	<0.0004	<0.001	-	-	-	-	0.32	8.50	<0.5	<0.5	7.6	400	410	<0.05	(3)
	Jun-11	0.0006	<0.0002	0.0004	<0.0002	0.0015	<0.002	-	-	-	-	<0.1	3.70	<0.5	<0.5	7.8	288	300	<0.05	(3)
	May-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	0.12	0.12	<0.1	<0.1	0.24	<0.5	<0.5	8.0	-	250	<0.05	(4)
	Nov-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	0.54	<0.5	<0.5	7.9	-	380	<0.05	(4)
	Oct-10	0.0003	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	0.45	<0.5	<0.5	8.1	362	400	<0.05	(4)
	Sep-10	0.0003	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	0.37	<0.5	<0.5	8.0	366	390	<0.05	(4)
	Aug-10	<0.0002	0.0002	<0.0002	<0.0002	<0.0004	<0.0001	-	-	-	-	<0.1	0.39	1.2	<0.5	7.9	272	250	<0.05	(4)
	Jul-10	<0.0002	0.0002	<0.0002	<0.0002	<0.0004	<0.0001	-	-	-	-	<0.1	1.50	1.9	<0.5	7.8	363	330	<0.05	(3)
	Jun-10	0.0006	<0.0002	0.0002	<0.0002	<0.0004	<0.0004	-	-	-	-	0.15	4.80	4.3	<0.5	7.6	382	360	<0.05	(3)
May-10	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.01	-	-	-	-	<0.1	1.80	<0.5	<0.5	7.8	393	410	<0.05	(3)	
HOR 004 05 (Jackfish River, Down Stream)	Nov-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	129	130	<0.05	
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	127	130	<0.05	
	Oct-11	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	Lab Dup.
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	-	-	<0.5	<0.5	8.0	127	130	<0.05	Field Dup.
	Sep-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.2	160	160	<0.05	
	Aug-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	127	130	<0.05	
	Aug-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	127	130	<0.05	Field Dup.
	Aug-11	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	Lab Dup.
	Jul-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	101	100	<0.05	
	Jun-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	91	100	<0.05	
	Jun-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	Lab Dup.
	Jun-11	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.1	291	300	<0.05	Field Dup.
	May-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	7.9	-	63	<0.05	
	Nov-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	-	100	<0.005	
	Oct-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.90	<0.5	8.0	98	110	<0.005	
	Oct-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	102	110	<0.005	Field Dup.
	Sep-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.7	98	100	<0.005	
	Aug-10	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	121	120	<0.005	Field Dup.
	Aug-10	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	122	120	<0.005	
	Jul-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.80	<0.5	7.9	123	130	<0.005	
	Jun-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.9	109	110	<0.005	Field Dup.
	Jun-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.80	<0.5	7.9	107	110	<0.005	
	May-10	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	98	100	<0.005	
HOR 005 05 (Jackfish River, Mid-Stream)	Nov-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	126	120	<0.05	
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	125	130	<0.05	
	Sep-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.8	156	150	<0.05	
	Aug-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	128	130	<0.05	
	Aug-11	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	Lab Dup.
	Jul-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	99	100	<0.05	
	Jul-11	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	Lab Dup.
	Jun-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	91	96	<0.05	
	Jun-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0	91	-	-	Lab Dup.
	May-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	7.9	-	66	<0.05	

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO
Page 1 of 2

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample ⁽¹⁾	Date	Parameter (mg/L)																		Comments
		Benzene	Toluene	Ethyl- benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C6-C ₁₀)	F2 (C ₁₀ -C ₁₆)	F3 (C ₁₆ -C ₃₄)	F4 (C ₃₄ -C ₅₀)	T.P.H. (<C ₁₀)	T.E.H. (C ₁₀ -C ₂₄)	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 005 05 (cont'd)	Nov-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.8	-	110	<0.005	
	Oct-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.70	<0.5	7.9	102	110	<0.005	
	Sep-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.8	98	100	<0.005	
	Aug-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	122	120	<0.005	
	Jul-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	1.10	<0.5	7.9	123	120	<0.005	
	Jun-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.70	<0.5	7.8	107	110	<0.005	
	May-10	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	102	110	<0.005	
HOR 013 05 (West End)	Nov-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	0.11	<0.1	<0.1	0.24	<0.5	<0.5	8.2	239	240	<0.05	
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0004	-	-	-	-	<0.1	0.24	<0.5	<0.5	8.2	184	200	<0.05	
	Aug-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jul-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	-	-	-	<0.1	0.22	<0.5	<0.5	8.0	267	290	<0.05	⁽⁴⁾
	Jun-11	0.0005	<0.0002	0.0004	<0.0002	0.0005	<0.001	-	-	-	-	<0.1	0.58	<0.5	<0.5	8.0	312	330	<0.05	⁽⁴⁾
	May-11	0.0003	<0.0002	0.0005	<0.0002	0.0006	<0.0005	-	0.18	0.20	<0.1	<0.1	0.36	<0.5	<0.5	7.8	-	130	<0.05	
	Nov-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.004	-	-	-	-	<0.1	0.34	<0.5	<0.5	7.9	-	350	<0.005	
	Oct-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	-	-	-	<0.1	0.28	2.60	<0.5	8.0	278	310	<0.005	
	Sep-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.005	-	-	-	-	<0.1	0.23	3.40	<0.5	8.1	229	250	<0.005	
	Aug-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jul-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jun-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
May-10	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	0.50	<0.5	<0.5	8.1	238	260	<0.005	⁽⁴⁾	
Certificate of Approval ⁽¹⁾																				
C of A Criteria		5	0.8	2	40	32	200	1,000	1,000	-	-	-	-	-	-	6.5-8.5	-	-	⁽²⁾	-

Notes:

"-" = No Data

T.P.H. = Total Purgeable Hydrocarbons

T.E.H. = Total Extractable Hydrocarbons

MTBE = Methyl-t-butyl-Ether

1. Certificate of Approval No. 3528-83LQWT issued for the sets the effluent criteria as listed above.
2. The limit for Lead shall be determined based on the hardness of water. If the hardness is less than 30 mg/L, then the limit is 1 ug/L. If the hardness is between 30 mg/L and 80 mg/L, then the limit is 3 ug/L. When hardness is greater than 80 mg/L, then the limit is 5 ug/L.
3. Due to the level of petroleum hydrocarbon compounds beyond the appropriate range, the sample required dilution. Detection limits were adjusted accordingly.
4. Due to foaming, the sample required dilution. Detection limits were adjusted accordingly.

BOLD - Exceedance of C of A Criteria

TABLE 2
EAST END GROUNDWATER MONITORING DATA
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. ⁽¹⁾ (m)	Comments
EAST END								
MW-20	4-Oct-11	324.575	2.147	-	-	322.428	-	
	28-Jun-11	324.575	1.690	-	-	322.885	-	
	5-Oct-10	324.575	1.752	-	-	322.823	-	
	22-Jun-10	324.575	2.179	-	-	322.396	-	
MW-21	4-Oct-11	325.243	4.625	4.335	0.290	320.618	320.908	
	28-Jun-11	324.475	3.701	3.316	0.385	320.774	321.159	
	5-Oct-10	324.475	3.705	3.193	0.512	320.770	321.282	
	22-Jun-10	324.475	3.822	3.435	0.387	320.653	321.040	
MW-24	4-Oct-11	325.870	2.770	-	-	323.100	-	
	28-Jun-11	325.870	2.049	-	-	323.821	-	
	5-Oct-10	325.870	1.838	-	-	324.032	-	
	22-Jun-10	325.870	2.295	-	-	323.575	-	
MW-40	4-Oct-11	324.140	2.965	-	-	321.175	-	
	28-Jun-11	324.140	2.756	-	-	321.384	-	
	5-Oct-10	324.140	2.336	-	-	321.804	-	
	22-Jun-10	324.140	2.961	-	-	321.179	-	
MW-43	4-Oct-11	323.695	2.239	-	-	321.456	-	
	28-Jun-11	323.695	1.937	-	-	321.758	-	
	5-Oct-10	323.695	1.929	-	-	321.766	-	
	22-Jun-10	323.695	2.225	-	-	321.470	-	
MW-46	4-Oct-11	324.385	2.316	-	-	322.069	-	
	28-Jun-11	324.385	2.028	-	-	322.357	-	
	5-Oct-10	324.385	2.022	-	-	322.363	-	
	22-Jun-10	324.385	2.366	-	-	322.019	-	
MW-49	4-Oct-11	325.260	2.338	-	-	322.922	-	
	28-Jun-11	325.260	1.161	-	-	324.099	-	
	5-Oct-10	325.260	1.664	-	-	323.596	-	
	22-Jun-10	325.260	2.370	-	-	322.890	-	
MW-51	4-Oct-11	324.235	3.310	3.290	0.020	320.925	320.945	
	28-Jun-11	324.235	3.016	-	-	321.219	-	
	5-Oct-10	324.235	2.903	2.865	0.038	321.332	321.370	
	22-Jun-10	324.235	3.171	3.165	0.006	321.064	321.070	
MW-52	4-Oct-11	323.575	2.514	-	-	321.061	-	
	28-Jun-11	323.575	2.022	-	-	321.553	-	
	5-Oct-10	323.575	2.050	-	-	321.525	-	
	22-Jun-10	323.575	2.345	-	-	321.230	-	
MW-101	4-Oct-11	324.120	3.367	3.072	0.295	320.753	321.048	
	28-Jun-11	324.120	3.098	2.835	0.263	321.022	321.285	
	5-Oct-10	324.120	2.879	2.697	0.182	321.241	321.423	
	22-Jun-10	324.120	3.242	2.957	0.285	320.878	321.163	
MW-102	4-Oct-11	324.160	3.160	-	-	321.000	-	
	28-Jun-11	324.160	2.892	-	-	321.268	-	
	5-Oct-10	324.160	2.730	-	-	321.430	-	
	22-Jun-10	324.160	3.024	-	-	321.136	-	
MW-103	4-Oct-11	323.570	2.607	-	-	320.963	-	
	28-Jun-11	323.570	2.397	-	-	321.173	-	
	5-Oct-10	323.570	2.150	-	-	321.420	-	
	22-Jun-10	323.570	2.645	-	-	320.925	-	
MW-104	4-Oct-11	323.910	3.026	2.898	0.128	320.884	321.012	
	28-Jun-11	323.910	2.508	-	-	321.402	-	
	5-Oct-10	323.910	2.490	-	-	321.420	-	
	22-Jun-10	323.910	2.761	-	-	321.149	-	

TABLE 2
EAST END GROUNDWATER MONITORING DATA
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. ⁽¹⁾ (m)	Comments
EAST END								
MW-106	4-Oct-11	323.900	2.703	2.581	0.122	321.197	321.319	
	28-Jun-11	323.900	1.874	-	-	322.026	-	
	5-Oct-10	323.900	2.035	-	-	321.865	-	
	22-Jun-10	323.900	2.426	-	-	321.474	-	
MW-107	4-Oct-11	324.010	2.482	-	-	321.528	-	
	28-Jun-11	324.010	1.572	-	-	322.438	-	
	5-Oct-10	324.010	1.863	-	-	322.147	-	
	22-Jun-10	324.010	2.322	-	-	321.688	-	
MW-108	4-Oct-11	324.870	2.042	-	-	322.828	-	
	28-Jun-11	324.870	0.995	-	-	323.875	-	
	5-Oct-10	324.870	1.088	-	-	323.782	-	
	22-Jun-10	324.870	2.374	-	-	322.496	-	
MW-109	4-Oct-11	325.480	2.932	2.890	0.042	322.548	322.590	
	28-Jun-11	325.480	2.210	1.889	0.321	323.270	323.591	
	5-Oct-10	325.480	2.498	-	-	322.982	-	
	22-Jun-10	325.480	2.935	-	-	322.545	-	
MW-114	4-Oct-11	325.410	3.619	-	-	321.791	-	
	28-Jun-11	325.410	3.341	-	-	322.069	-	
	5-Oct-10	325.410	3.171	-	-	322.239	-	
	22-Jun-10	325.410	3.577	-	-	321.833	-	
MW-115	4-Oct-11	325.910	3.037	-	-	322.873	-	
	28-Jun-11	325.910	2.769	-	-	323.141	-	
	5-Oct-10	325.910	2.530	-	-	323.380	-	
	22-Jun-10	325.910	3.037	-	-	322.873	-	
MW-126	4-Oct-11	325.815	3.631	2.833	0.798	322.184	322.982	
	28-Jun-11	325.815	1.919	1.629	0.290	323.896	324.186	
	5-Oct-10	325.815	2.840	1.997	0.843	322.975	323.818	
	22-Jun-10	325.815	4.188	2.850	1.338	321.627	322.965	
OW 3-2	4-Oct-11	325.340	2.874	2.802	0.072	322.466	322.538	
	28-Jun-11	325.340	1.457	-	-	323.883	-	
	5-Oct-10	325.340	2.255	2.108	0.147	323.085	323.232	
	22-Jun-10	325.340	2.938	2.835	0.103	322.402	322.505	
OW 5-1	4-Oct-11	324.365	4.096	-	-	320.269	-	
	28-Jun-11	324.365	2.919	-	-	321.446	-	
	5-Oct-10	324.365	2.766	-	-	321.599	-	
	22-Jun-10	324.365	3.258	-	-	321.107	-	
OW 5-2	4-Oct-11	323.600	2.548	2.470	0.078	321.052	321.130	
	28-Jun-11	323.600	2.607	2.215	0.392	320.993	321.385	
	5-Oct-10	323.600	2.138	-	-	321.462	-	
	22-Jun-10	323.600	2.405	2.374	0.031	321.195	321.226	
OW 5-3	4-Oct-11	323.675	2.817	-	-	320.858	-	
	28-Jun-11	323.675	2.580	-	-	321.095	-	
	5-Oct-10	323.675	2.477	-	-	321.198	-	
	22-Jun-10	323.675	2.708	-	-	320.967	-	

Notes:

"-" = No Data

1. Density correction applied to groundwater elevation for wells where free product exists.

TABLE 3
EAST END GROUNDWATER LABORATORY RESULTS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	Parameter ⁽¹⁾								Comments
		Benzene	Toluene	Ethyl- benzene	Xylenes (o,m,p)	F1 (C ₈ -C ₁₀)	F2 (C ₁₀ -C ₁₆)	F3 (C ₁₆ -C ₃₄)	F4 (C ₃₄ -C ₅₀)	
EAST END GROUNDWATER LABORATORY RESULTS										
MW-20	5-Oct-11	-	-	-	-	-	2,500	1,500	<100	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	2,200	920	<100	
	7-Oct-10	-	-	-	-	-	3,600	1,700	<100	
	22-Jun-10	0.50	<0.2	0.9	2.7	110	2,600	1,100	<100	
MW-40	5-Oct-11	-	-	-	-	-	930	630	<100	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
	7-Oct-10	-	-	-	-	-	<100	<100	<100	
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
MW-43	5-Oct-11	-	-	-	-	-	300	110	<100	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	630	300	<100	
	7-Oct-10	-	-	-	-	-	680	170	<100	
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	740	400	<100	
MW-46	5-Oct-11	-	-	-	-	-	620	350	<100	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
	7-Oct-10	-	-	-	-	-	<100	<100	<100	
	7-Oct-10	-	-	-	-	-	<100	<100	<100	Field Dup.
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
MW-52	5-Oct-11	-	-	-	-	-	33,000	16,000	<100	
	5-Oct-11	-	-	-	-	-	9,700	2,800	<100	Lab Dup.
	5-Oct-11	-	-	-	-	-	17,000	4,800	<100	Field Dup.
	29-Jun-11	6.40	<0.2	52	2.8	280	8,800	1,400	<100	
	29-Jun-11	6.10	<0.2	51	2.3	300	8,900	2,700	<100	Field Dup.
	7-Oct-10	-	-	-	-	-	600	150	<100	
	22-Jun-10	2.90	0.40	24	2.0	<100	670	<100	<100	Field Dup.
	22-Jun-10	2.60	0.30	22	2.1	<100	640	<100	<100	
OW 5-1	5-Oct-11	-	-	-	-	-	3,100	1,800	120	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	210	120	<100	
	7-Oct-10	-	-	-	-	-	880	890	<100	
	22-Jun-10	-	-	-	-	-	1,400	1,000	<100	Lab Dup.
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	1,800	870	<100	
OW 5-2	5-Oct-11	-	-	-	-	-	700,000	340,000	13,000	
	29-Jun-11	4.40	0.50	4.6	73.0	3,100	390,000	160,000	6,700	
	7-Oct-10	-	-	-	-	-	720,000	390,000	<10,000	(4)
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	18,000	3,000,000	1,300,000	33,000	(4)
OW 5-3	5-Oct-11	-	-	-	-	-	11,000	7,600	840	
	29-Jun-11	4.00	<0.2	<0.2	<0.4	480	8,800	3,100	190	
	7-Oct-10	-	-	-	-	-	3,300	1,900	<100	
	22-Jun-10	0.60	<0.2	<0.2	<0.4	<100	10,000	4,400	<100	
EAST END GROUNDWATER LABORATORY RESULTS										
MW-21	5-Oct-11	-	-	-	-	-	1,600,000	680,000	26,000	
	7-Oct-10	-	-	-	-	-	1,600,000	610,000	11,000	(4)
MW-24	5-Oct-11	-	-	-	-	-	290	120	<100	
	5-Oct-11	-	-	-	-	-	270	110	<100	Lab Dup.
MW-49	5-Oct-11	-	-	-	-	-	120,000	130,000	14,000	
	7-Oct-10	-	-	-	-	-	1,500	1,200	<100	
MW-51	5-Oct-11	-	-	-	-	-	3,000,000	1,600,000	100,000	
	7-Oct-10	-	-	-	-	-	230,000	96,000	5,500	(4)
MW-101	5-Oct-11	-	-	-	-	-	2,300,000	1,000,000	44,000	
	7-Oct-10	-	-	-	-	-	1,800,000	620,000	13,000	(4)
MW-102	5-Oct-11	-	-	-	-	-	1,800	840	<100	
	7-Oct-10	-	-	-	-	-	1,700	760	<100	
MW-103	5-Oct-11	-	-	-	-	-	2,100	1,200	<100	
	5-Oct-11	-	-	-	-	-	1,200	580	<100	
	7-Oct-10	-	-	-	-	-	100	190	<100	
MW-104	5-Oct-11	-	-	-	-	-	1,100,000	340,000	3,200	
	7-Oct-10	-	-	-	-	-	17,000	4,600	<100	
MW-106	5-Oct-11	-	-	-	-	-	4,900,000	1,700,000	<100	
	7-Oct-10	-	-	-	-	-	220,000	79,000	210	
MW-107	5-Oct-11	-	-	-	-	-	65,000	31,000	170	
	7-Oct-10	-	-	-	-	-	43,000	19,000	<100	
MW-108	5-Oct-11	-	-	-	-	-	4,500	2,200	140	
	7-Oct-10	-	-	-	-	-	1,600	400	<100	
MW-109	5-Oct-11	-	-	-	-	-	150,000	58,000	1,300	
	7-Oct-10	-	-	-	-	-	42,000	14,000	<100	
MW-114	5-Oct-11	-	-	-	-	-	77,000	44,000	1,100	
	7-Oct-10	-	-	-	-	-	87,000	37,000	1,100	
MW-115	5-Oct-11	-	-	-	-	-	410	130	<100	
	7-Oct-10	-	-	-	-	-	<100	<100	<100	
MW-126	5-Oct-11	-	-	-	-	-	1,300,000	520,000	45,000	
	7-Oct-10	-	-	-	-	-	690,000	260,000	21,000	
OW 3-2	5-Oct-11	-	-	-	-	-	3,000,000	1,200,000	30,000	
	7-Oct-10	-	-	-	-	-	1,000,000	390,000	11,000	
EAST END GROUNDWATER LABORATORY RESULTS										
Method Blank	5-Oct-11	-	-	-	-	-	<100	<100	<100	
Method Blank	29-Jun-11	<0.2	<0.2	<0.2	<0.4	-	-	-	-	
Travel Blank	5-Oct-11	-	-	-	-	-	<100	<100	<100	
Travel Blank	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
Travel Blank	7-Oct-10	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
Travel Blank	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
MOE										
Table 3 ⁽²⁾		(430) 44	(18,000) 18,000	(2,300) 2,300	(4,200) 4,200	(750) 750	(150) 150	(500) 500	(500) 500	-
Table 9 ⁽³⁾		44	14,000	1,800	3,300	420	150	500	500	-

Notes:

"-" = No Data

- All concentrations in micrograms per litre (µg/L).
- MOE 2011 - Ontario Ministry of Environment. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (All Types of Property) Table 3 - Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition () - Criterion value in brackets applies to medium and fine textured soils.
- MOE 2011 - Ontario Ministry of Environment. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (All Types of Property) Table 9 - Non-Potable Groundwater
- Due to the high concentration of target analytes, the sample required dilution. The reporting limits were adjusted accordingly.

BOLD = Parameter exceeds MOE Table 9 Criteria
BOLD = Parameter exceeds MOE Table 3 Criteria

TABLE 4
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-20	5-Oct-11	7.01	665.0	2.30	11.7	-123	beige	turbid	none	h/c odour	
	29-Jun-11	6.55	851.0	3.24	13.4	-98	beige	slightly turbid	none	h/c odour	
	7-Oct-10	6.88	827.0	2.93	15.8	-84	yellow	turbid	none	h/c odour	
	22-Jun-10	6.86	569.0	4.91	9.4	-76	black	turbid	none	h/c odour	
MW-21	5-Oct-11	6.95	352.0	4.35	11.1	-48	clear	clear	h/c sheen	h/c odour	
	7-Oct-10	7.29	590.0	1.51	16.7	under range	clear	clear	h/c sheen	h/c odour	
MW-24	5-Oct-11	7.39	411.0	4.71	9.2	60	beige	turbid	none	none	
	7-Oct-10	7.45	690.0	4.63	15.7	-20	clear	clear	none	none	
MW-40	5-Oct-11	7.13	496.0	3.42	11.3	-13	light yellow	turbid	h/c sheen	h/c odour	
	29-Jun-11	6.78	754.0	7.95	13.3	-54	beige	turbid	none	none	
	7-Oct-10	7.09	914.0	2.58	15.1	-45	white	turbid	none	none	
	22-Jun-10	7.07	504.0	7.49	10.6	115	beige	slightly turbid	none	h/c odour	
MW-43	5-Oct-11	7.25	360.0	1.06	11.2	-123	beige	turbid	h/c sheen	h/c odour	
	29-Jun-11	6.59	568.0	6.89	12.1	-74	beige	turbid	none	none	
	7-Oct-10	7.21	807.0	2.15	14.0	-76	beige	turbid	h/c sheen	h/c odour	
	22-Jun-10	7.08	430.0	3.22	8.6	-51	beige	turbid	none	none	
MW-46	5-Oct-11	7.09	589.0	2.98	10.6	-62	beige	turbid	none	none	
	29-Jun-11	6.41	945.0	3.62	10.6	-78	beige	turbid	none	none	
	7-Oct-10	7.23	901.0	3.39	14.9	-77	beige	turbid	none	none	
	22-Jun-10	6.92	561.0	7.48	12.5	-25	grey	turbid	none	none	

TABLE 4
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-49	5-Oct-11	-	-	-	-	-	-	-	-	-	Insufficient Sample
	7-Oct-10	6.87	984.0	2.36	15.7	14	yellow	clear	h/c sheen	h/c odour	
MW-51	5-Oct-11	6.97	579.0	1.48	10.3	-69	beige	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.94	1,113.0	1.40	15.6	-28	light grey	turbid	h/c sheen	h/c odour	
MW-52	5-Oct-11	6.94	810.0	2.41	9.4	-91	clear	turbid	none	none	
	29-Jun-11	6.81	904.0	3.30	11.6	-72	clear	turbid	none	h/c odour	
	7-Oct-10	6.95	929.0	1.72	14.6	-74	beigr	turbid	none	h/c odour	
	22-Jun-10	6.96	258.0	6.22	9.9	-93	clear	slightly turbid	none	h/c odour	
MW-101	5-Oct-11	7.41	491.0	3.06	10.2	-88	clear	turbid	h/c sheen	h/c odour	
	7-Oct-10	7.02	1,203.0	0.93	15.8	-88	clear	clear	h/c sheen	h/c odour	
MW-102	5-Oct-11	7.22	800.0	1.30	9.6	-100	dark grey	turbid	h/c sheen	h/c odour	
	7-Oct-10	7.15	1,085.0	1.65	13.7	-45	dark grey	turbid	h/c sheen	h/c odour	
MW-103	5-Oct-11	7.07	548.0	6.27	10.7	71	clear	turbid	none	none	
	7-Oct-10	6.91	1,046.0	1.65	15.6	-42	clear	slightly turbid	none	none	
MW-104	5-Oct-11	6.69	384.0	9.26	12.0	-53	yellow	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.81	994.0	2.71	16.2	-32	yellow	turbid	h/c sheen	h/c odour	
MW-106	5-Oct-11	6.98	840.0	2.04	10.8	-80	beige	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.84	945.0	1.39	14.7	-64	clear	turbid	h/c sheen	h/c odour	
MW-107	5-Oct-11	6.94	704.0	2.43	10.7	-73	beige	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.91	900.0	2.74	14.9	-49	light grey	turbid	h/c sheen	h/c odour	

TABLE 4
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-108	5-Oct-11	6.82	850.0	1.91	11.4	-106	beige	turbid	none	none	
	7-Oct-10	6.53	1,575.0	1.98	15.1	-31	grey	turbid	h/c sheen	h/c odour	
MW-109	5-Oct-11	6.79	774.0	1.29	9.9	-75	light grey	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.88	1,073.0	1.86	13.9	-65	clear	clear	h/c sheen	h/c odour	
MW-114	5-Oct-11	7.62	562.0	3.90	10.8	-44	dark grey	turbid	h/c sheen	h/c odour	
	7-Oct-10	7.22	990.0	2.60	15.4	-81	dark grey	turbid	h/c sheen	h/c odour	
MW-115	5-Oct-11	6.79	652.0	3.21	11.2	144	clear	slight turbidity	none	none	
	7-Oct-10	6.74	1,926.0	3.48	17.2	40	yellow	turbid	h/c sheen	h/c odour	
MW-126	5-Oct-11	-	-	-	-	-	-	-	-	-	Insufficient Sample
	7-Oct-10	6.86	874.0	2.33	16.6	-54	clear	clear	h/c sheen	h/c odour	
OW 3-2	5-Oct-11	7.90	465.0	2.40	10.5	-108	clear	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.83	993.0	2.26	16.9	-53	clear	clear	h/c sheen	h/c odour	
OW 5-1	5-Oct-11	7.19	418.0	3.08	9.1	5	beige	turbid	none	h/c odour	
	29-Jun-11	6.46	924.0	2.24	12.5	-14	light brown	turbid	none	none	
	7-Oct-10	7.21	837.0	2.11	13.4	-82	yellow	turbid	none	none	
	22-Jun-10	7.26	459.0	3.66	9.9	-46	beige	slightly turbid	h/c sheen	h/c odour	
OW 5-2	5-Oct-11	7.23	537.0	3.44	10.2	-80	beige	turbid	h/c sheen	h/c odour	
	29-Jun-11	6.77	805.0	1.88	14.4	-79	clear	slightly turbid	h/c sheen	h/c odour	
	7-Oct-10	6.82	1,030.0	1.57	15.5	61	clear	clear	none	none	
	22-Jun-10	7.52	617.0	3.09	11.1	-118	beige	slightly turbid	h/c sheen	h/c odour	

TABLE 4
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. ($\mu\text{S}/\text{cm}$)	D.O. (mg/L)	Temp. ($^{\circ}\text{C}$)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
OW 5-3	5-Oct-11	7.07	643.0	2.89	9.9	-102	grey	turbid	h/c sheen	h/c odour	
	29-Jun-11	6.40	954.0	0.46	12.2	-66	beige	turbid	none	h/c odour	
	7-Oct-10	7.14	836.0	1.51	14.4	-52	dark grey	turbid	h/c sheen	h/c odour	
	22-Jun-10	6.97	629.0	5.52	9.8	-73	berge	turbid	none	none	

Notes:

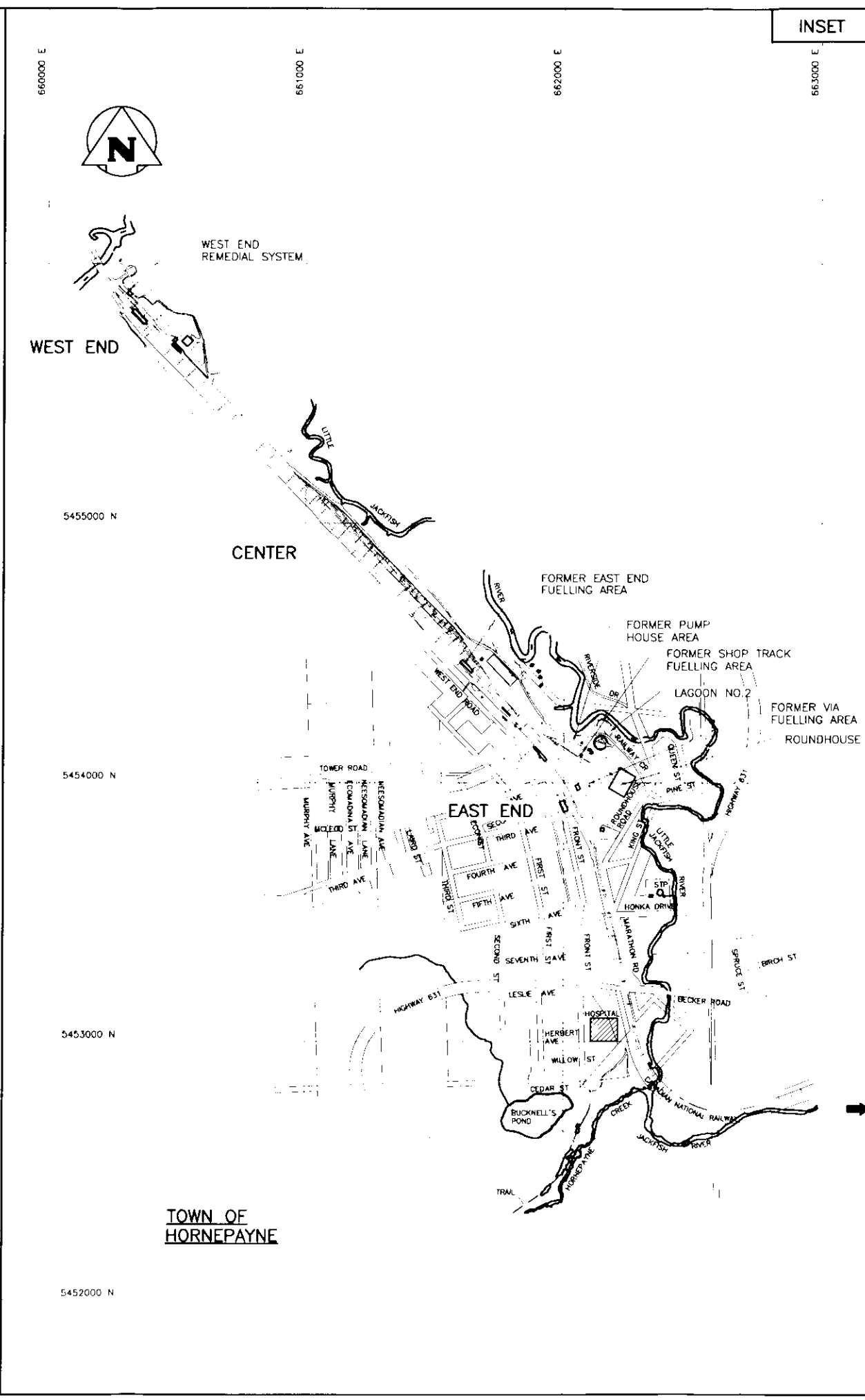
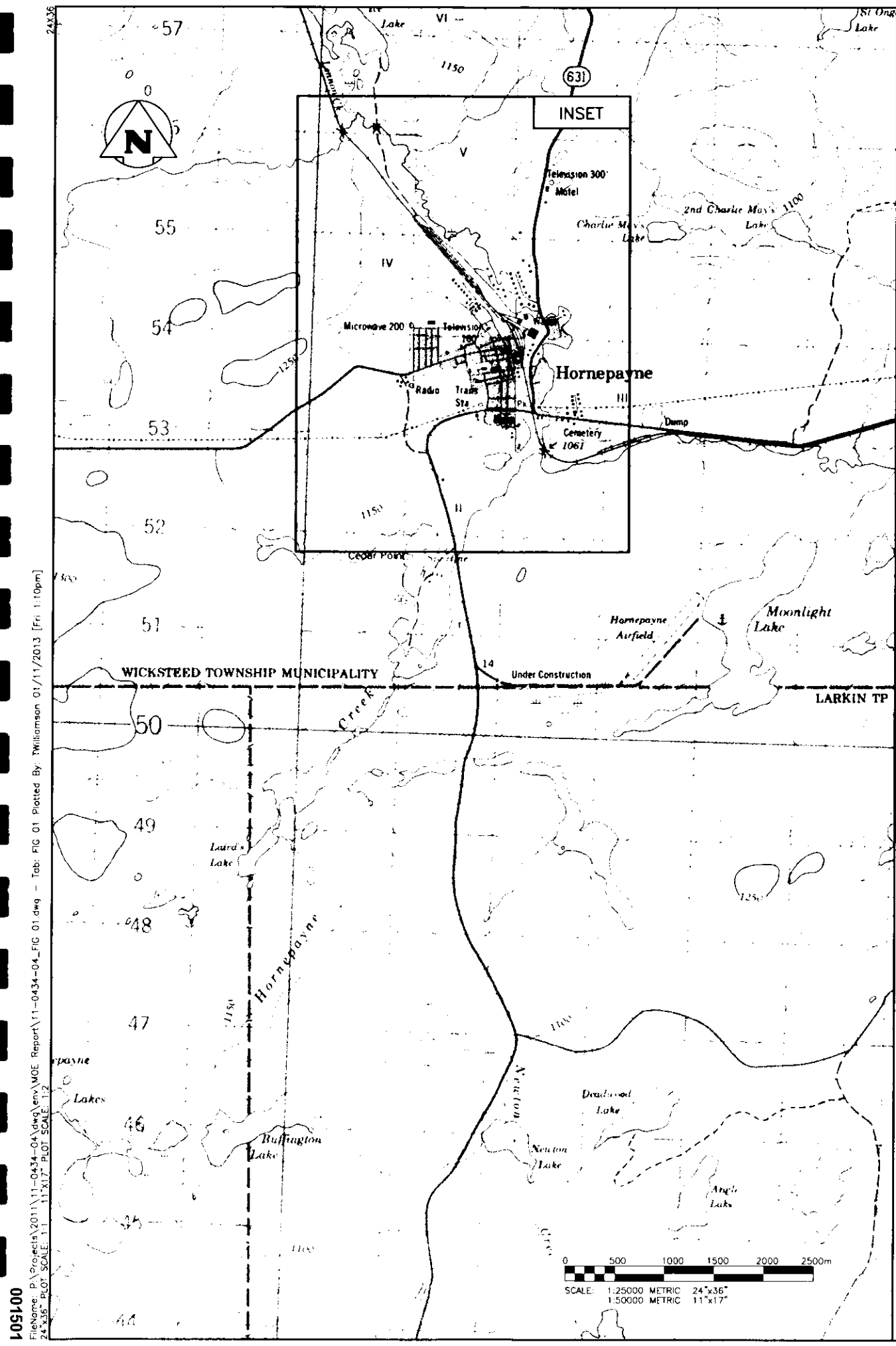
"-" = No Data

D.O. = Dissolved Oxygen

E.C. = Electrical Conductivity

O.R.P. = Oxidation Reduction Potential

FIGURES



INSET

KEY PLAN

APPROXIMATE SCALE

NOTES:

1. LOCATION OF INSET-PLAN IN RELATION TO COORDINATES IS APPROXIMATE

REFERENCE:

BASE MAP: 1:50,000 NTS MAP 42 F/2 (HORNEPAYNE), NAD 1927, EDITION 2, PUBLISHED 1979

0 200 400 600 800 1000m

SCALE: 1:10000 METRIC 24"x36"
1:20000 METRIC 11"x17"

REVISIONS / ISSUE	
B	13/01/11 ISSUED WITH FINAL REPORT TG
A	13/01/09 ISSUED WITH MOE DRAFT REPORT TG

KGS GROUP CONSULTING ENGINEERS

CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100586, 100587
& 100591 - HORNEPAYNE YARD, ON

SITE LOCATION PLAN

JANUARY 2013

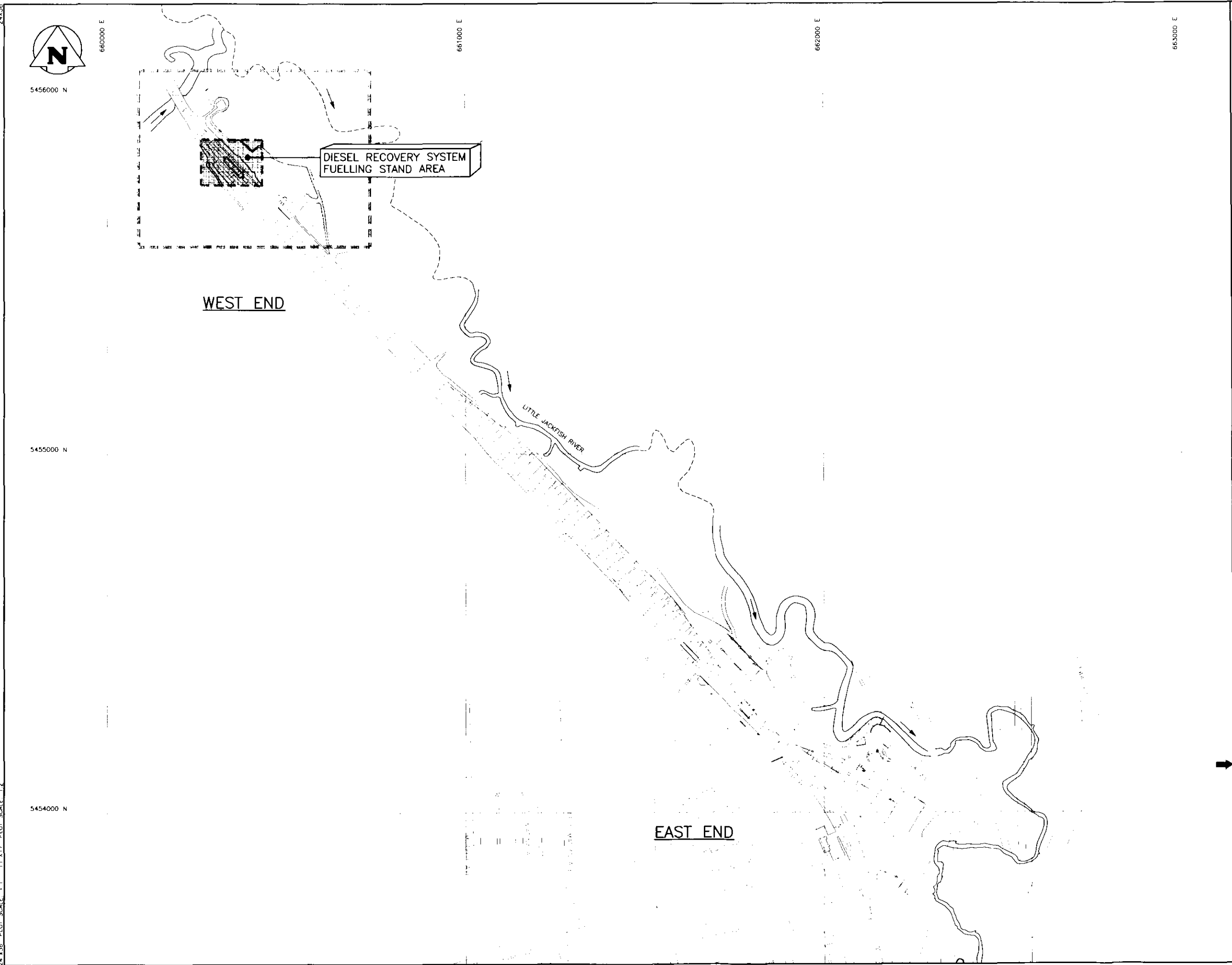
FIGURE 01

B

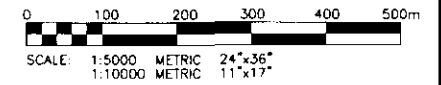
File Name: P:\Projects\2011\11-0434-04\env\MOE Report\11-0434-04-FIG 01.dwg - Tab: FIG 01 Plotted By: Williamson 01/11/2013 [Fri 1:10pm]
24"x36" PLOT SCALE: 1:11,217

001501

24X36
001502
File Name: P:\Projects\2011\11-0434-04\env\MOE Report\11-0434-04_FIG 02.dwg - Tab: FIG 02 Plotted By: TWilliamson 01/11/2013 [Fri 1:11pm]
24"x36" PLOT SCALE: 1:1



- LEGEND**
- PLAN LIMITS
 - DIESEL RECOVERY SYSTEM DETAIL PLANS
 - RIVER FLOW DIRECTION



B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG

REVISIONS / ISSUE

KGS GROUP CONSULTING ENGINEERS

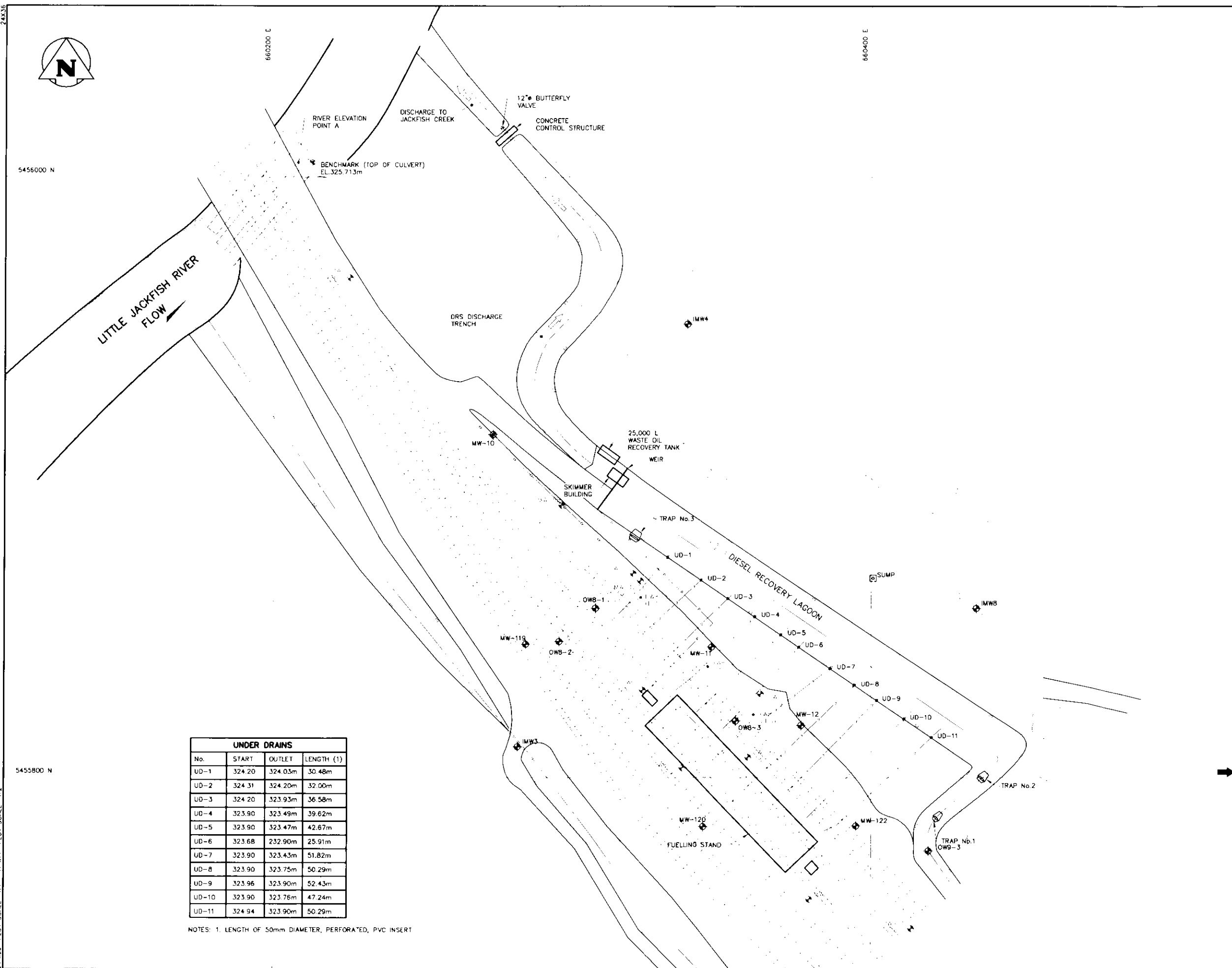
CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587
HORNEPAYNE YARD, ON

WEST END YARD PLAN

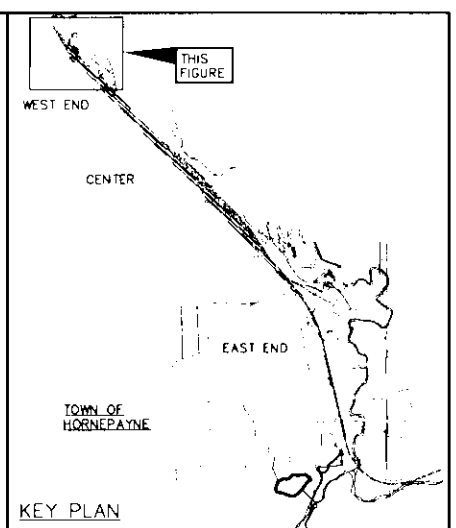
JANUARY 2013	FIGURE 02	B
--------------	-----------	---

File Name: P:\Projects\2011\11-0434-04.dwg,env\MOE Report\11-0434-04_FIG 03.dwg - Tab: FIG A2 Plotted By: Williamson 01/11/2013 [Fri 1 12pm]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2



UNDER DRAINS			
No.	START	OUTLET	LENGTH (1)
UD-1	324.20	324.03m	30.48m
UD-2	324.31	324.20m	32.00m
UD-3	324.20	323.93m	36.58m
UD-4	323.90	323.49m	39.62m
UD-5	323.90	323.47m	42.67m
UD-6	323.68	232.90m	25.91m
UD-7	323.90	323.43m	51.82m
UD-8	323.90	323.75m	50.29m
UD-9	323.96	323.90m	52.43m
UD-10	323.90	323.76m	47.24m
UD-11	324.94	323.90m	50.29m

NOTES: 1. LENGTH OF 50mm DIAMETER, PERFORATED, PVC INSERT



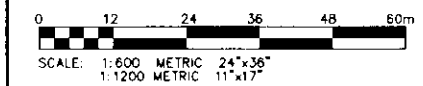
KEY PLAN

LEGEND:

- BERM
- CENTERLINE OF DITCH
- FENCE
- BURIED ELECTRICAL CABLE
- BENCHMARK
- MW-119 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW-20 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- RWB-1 RECOVERY WELL
- SUMP SUMP WELL
- RAILROAD TRACKS
- UNDERGROUND DRAIN
- DESTROYED

NOTES:

- 1. SITE PLAN BASED ON AUTOCAD FILE PROVIDED BY CN.



B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
N	11/01/09	ISSUED WITH MOE DRAFT REPORT	TG

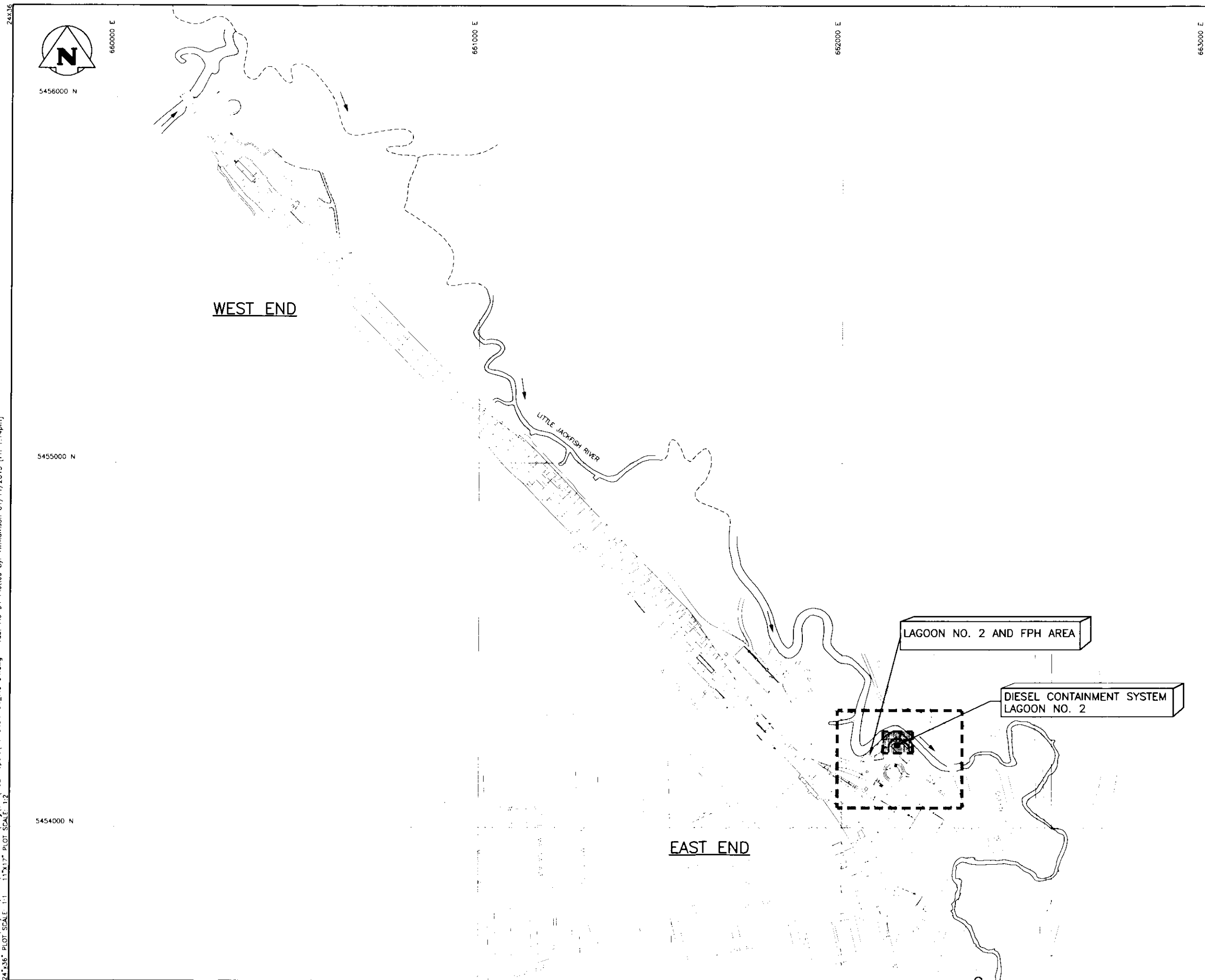
REVISIONS / ISSUE

KGS GROUP CONSULTING ENGINEERS

CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587
HORNEPAYNE YARD, ON
WEST END SITE PLAN AND DIESEL RECOVERY SYSTEM COMPONENTS

File Name: P:\Projects\2011\11-0434-04\dwg\env\MOE Report\11-0434-04_FIG 04.dwg - Tab: FIG D1 Plotted By: Williamson 01/11/2013 [Fri 1:14pm]
24 x 36" PLOT SCALE: 1:1 11 x 17" PLOT SCALE: 1:2



LEGEND

- PLAN LIMITS
- DIESEL RECOVERY SYSTEM DETAIL PLANS
- RIVER FLOW DIRECTION

0 100 200 300 400 500m
SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
NO	13/01/08	ISSUED WITH MOE DRAFT REPORT	BY

REVISIONS / ISSUE

KGS
GROUP
CONSULTING
ENGINEERS

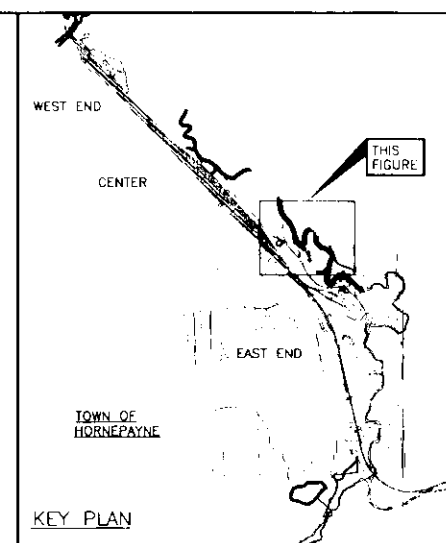
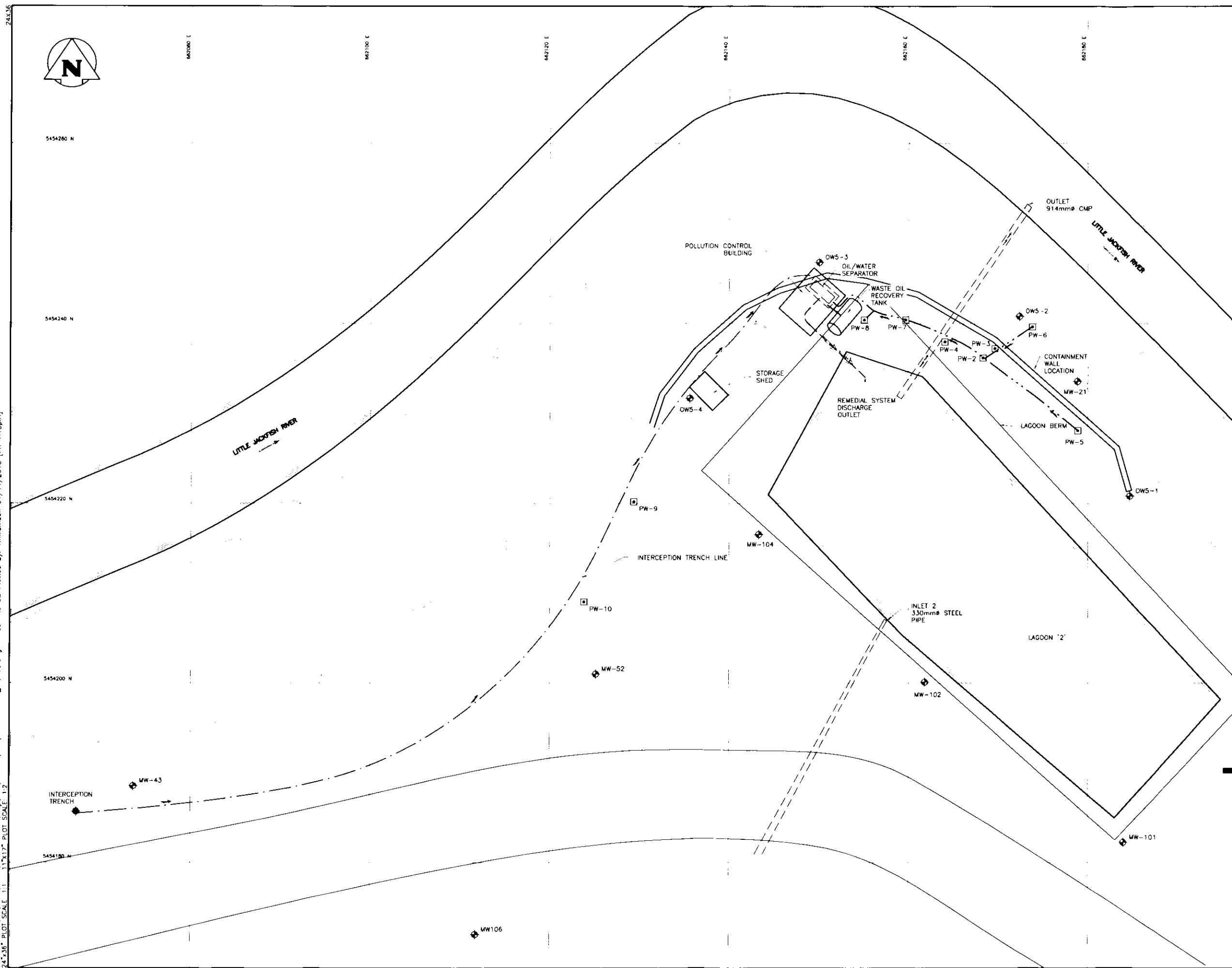
CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON

LAGOON No.2 SITE PLAN

JANUARY 2013 FIGURE 04 B

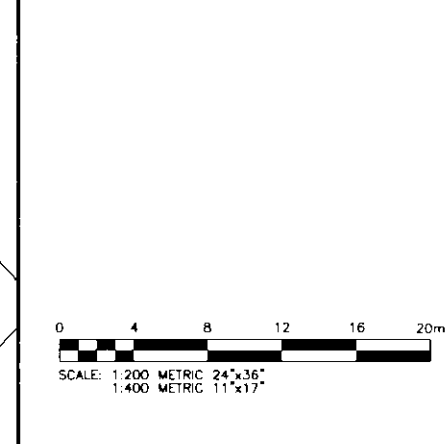
File Name: P:\Projects\2011\11-0434-04\dwg\env\MOE Report\11-0434-04_FIG 05.dwg - Tab: FIG D2 Plotted By: Williamson 01/11/2013 [Fri 1:15pm]
24x36 - PLOT SCALE: 1:1117 PLOT SCALE: 1:2



- KEY PLAN**
- LEGEND**
- APPROXIMATED LIMITS OF TREED AREA
 - EDGE OF WATER
 - CULVERT
 - DISCHARGE LINE
 - INTERCEPTION TRENCH LINE
 - MW-119 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
 - MW-52 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
 - INTERCEPTION TRENCH
 - PW-1 PUMPING WELL
 - CATCHBASIN
 - TOTAL FLUIDS FLOW DIRECTION
 - LPH FLOW DIRECTION
 - WATER FLOW DIRECTION
 - SURFACE WATER FLOW DIRECTION
 - DESTROYED

NOTES:

1. DRAWING BASED ON BIOGENIE ENVIRONMENTAL CN AUTO CAD FILE.



B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
11	11/01/09	ISSUED WITH MOE DRAFT REPORT	TG

REVISIONS / ISSUE

KGS GROUP
CONSULTING ENGINEERS

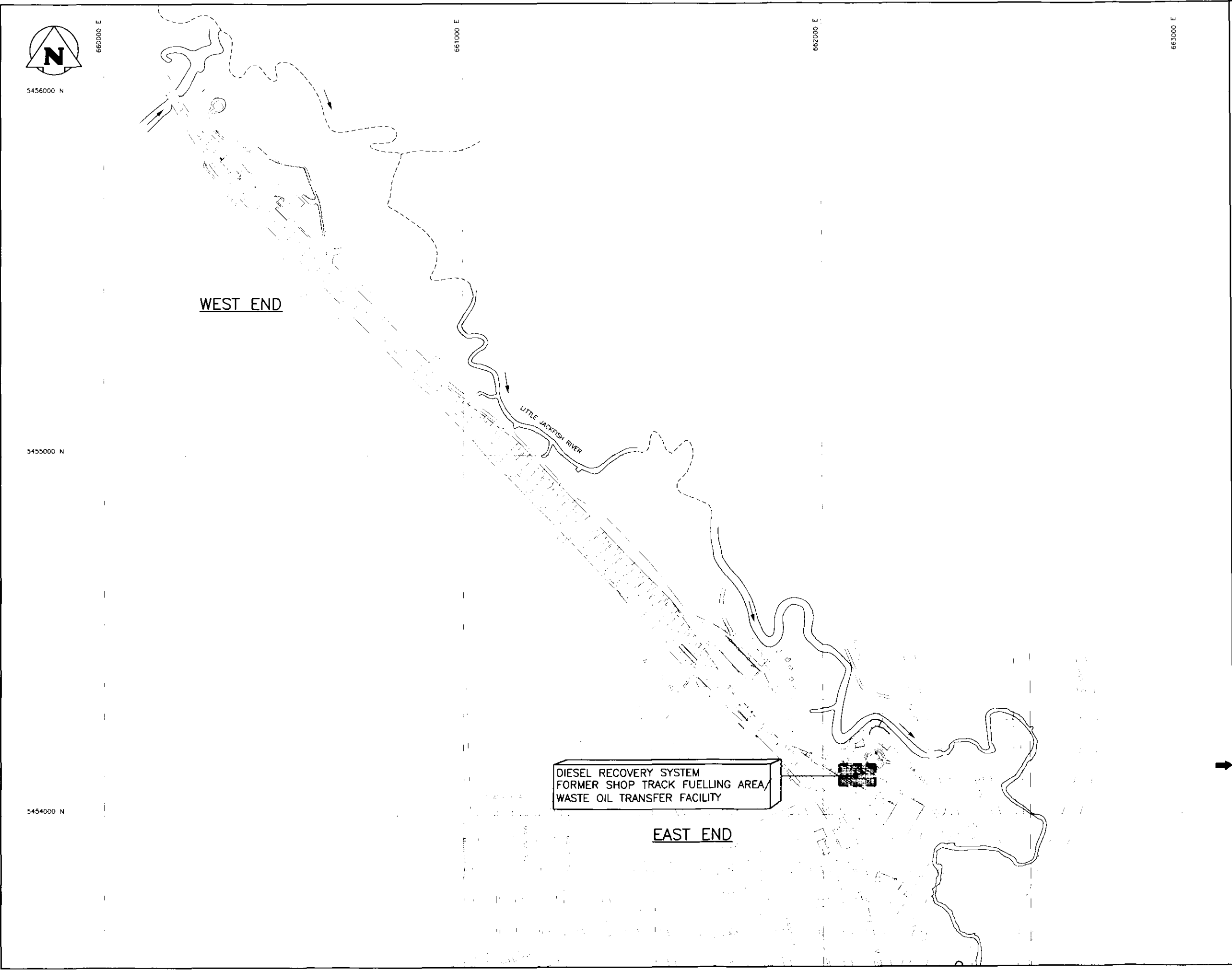
CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON

LAGOON NO.2
CONTAINMENT SYSTEM
COMPONENTS

JANUARY 2013 **FIGURE 05** **B**

001506
File Name: P:\Projects\2011\11-0434-04\dwg\env\MOE Report\11-0434-04_FIG 06.dwg - Tab: FIG E1 Plotted By: TWilliamson 01/11/2013 [Fri 1:16pm]
24"x36" PLOT SCALE: 1:1



LEGEND
 DIESEL RECOVERY SYSTEM DETAIL PLANS
 RIVER FLOW DIRECTION

SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

B	13/01/11	ISSUED WITH FINAL REPORT	TC
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TC
VP	11/04/10	DETAILED DESIGN	VP

KGS
GROUP
CONSULTING
ENGINEERS

CANADIAN NATIONAL

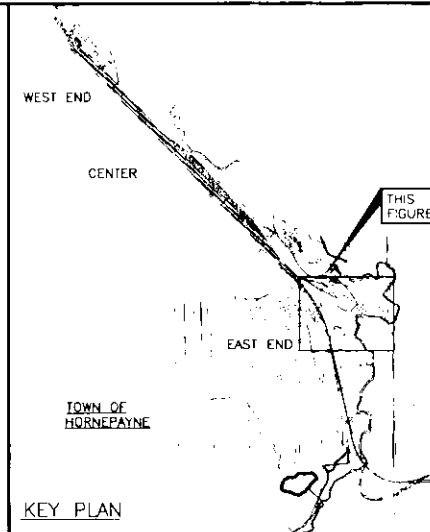
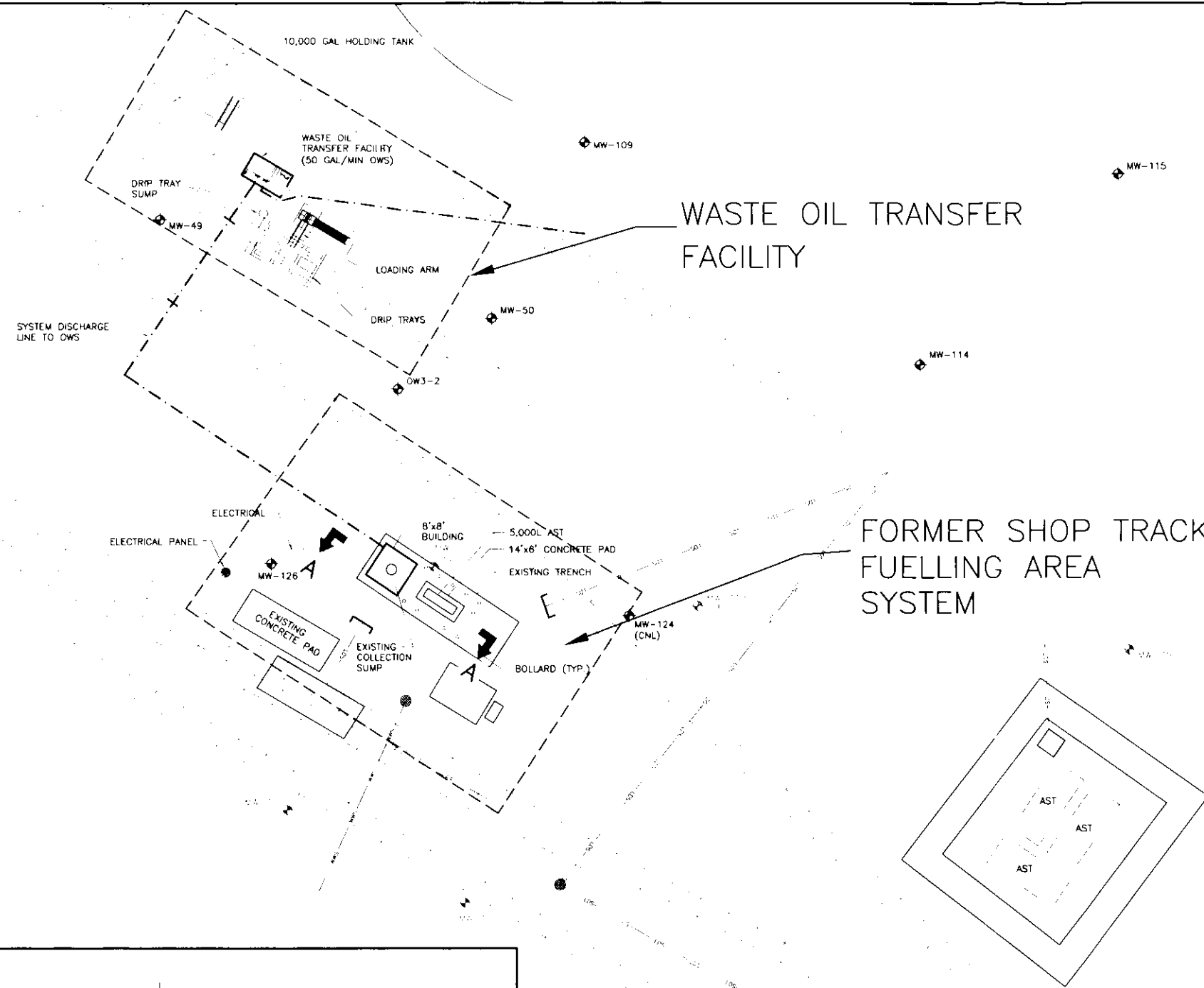
2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON
FORMER SHOP TRACK FUELLING
AREA SITE PLAN

JANUARY 2013	FIGURE 06	B
--------------	-----------	---

File Name: P:\Projects\2011\11-0434-04\dwg\env\MOE_Report\11-0434-04_FIG 07.dwg - Tab: FIG E2 Plotted By: TWilliamson 01/11/2013 [Fri 1:17pm]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2



PARTIAL SITE PLAN
SCALE: 1:250



- LEGEND**
- RAILROAD TRACK
 - SANITARY SEWER
 - STORM SEWER
 - DISCHARGE LINE
 - MW-119 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
 - MW-50 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
 - (CNL) COULD NOT LOCATE
 - DESTROYED
 - MANHOLES

0 5 10 15 20 25m
SCALE: 1:250 METRIC 24"x36"
1:500 METRIC 11"x17"

B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
W	11/01/08	ISSUED WITH MOE DRAFT REPORT	W

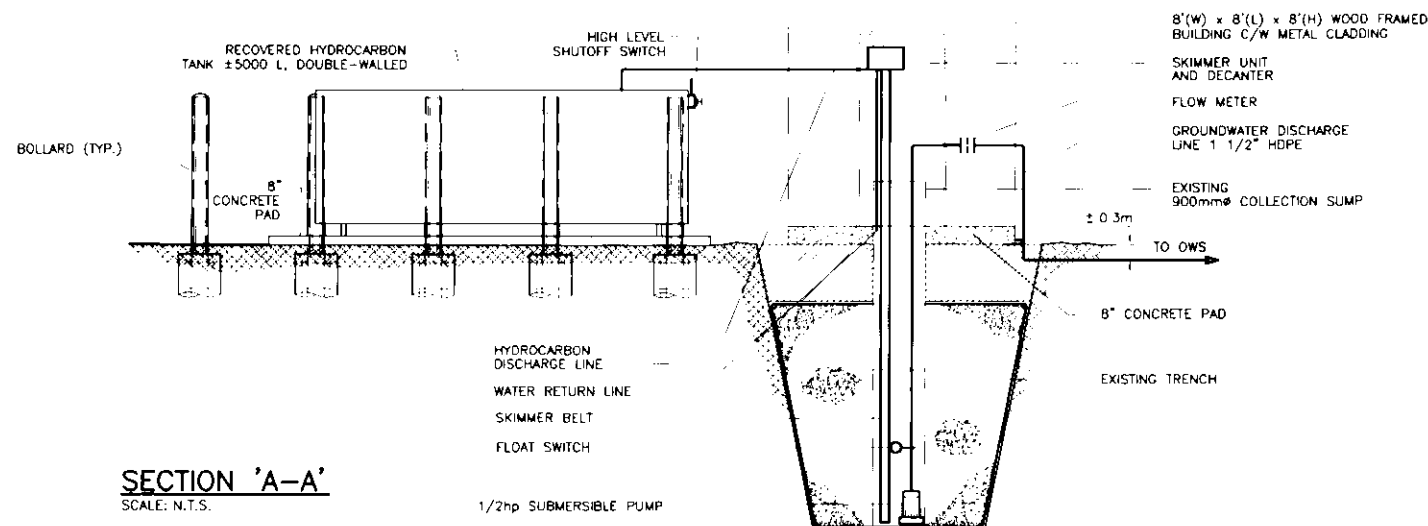
REVISIONS / ISSUE

KGS GROUP **CN CANADIAN NATIONAL**
CONSULTING ENGINEERS

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON
FORMER SHOP TRACK FUELLING
AREA SYSTEM COMPONENTS

JANUARY 2013 FIGURE 07 B

SECTION 'A-A'
SCALE: N.T.S.



24x36
File Name: P:\Projects\2011\11-0434-04.dwg\env\MOE Report\11-0434-04_FIG 08.dwg - Tab: FIG F1 Plotted By: Williamson 01/11/2013 [Fri 1:18pm]
24x36 PLOT SCALE: 1:11'x17' PLOT SCALE: 1:2



5456000 N

660000 E

661000 E

662000 E

663000 E

WEST END

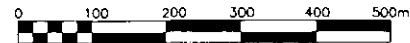
LITTLE JACKFISH RIVER

DIESEL RECOVERY SYSTEM
FORMER SHOP TRACK FUELLING AREA
WASTE OIL TRANSFER FACILITY

EAST END

LEGEND

- PLAN LIMITS
- DIESEL RECOVERY SYSTEM DETAIL PLANS
- RIVER FLOW DIRECTION



SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG

REVISIONS / ISSUE

KGS
GROUP
CONSULTING
ENGINEERS

 **CANADIAN NATIONAL**

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON
WASTE OIL TRANSFER FACILITY
SITE PLAN

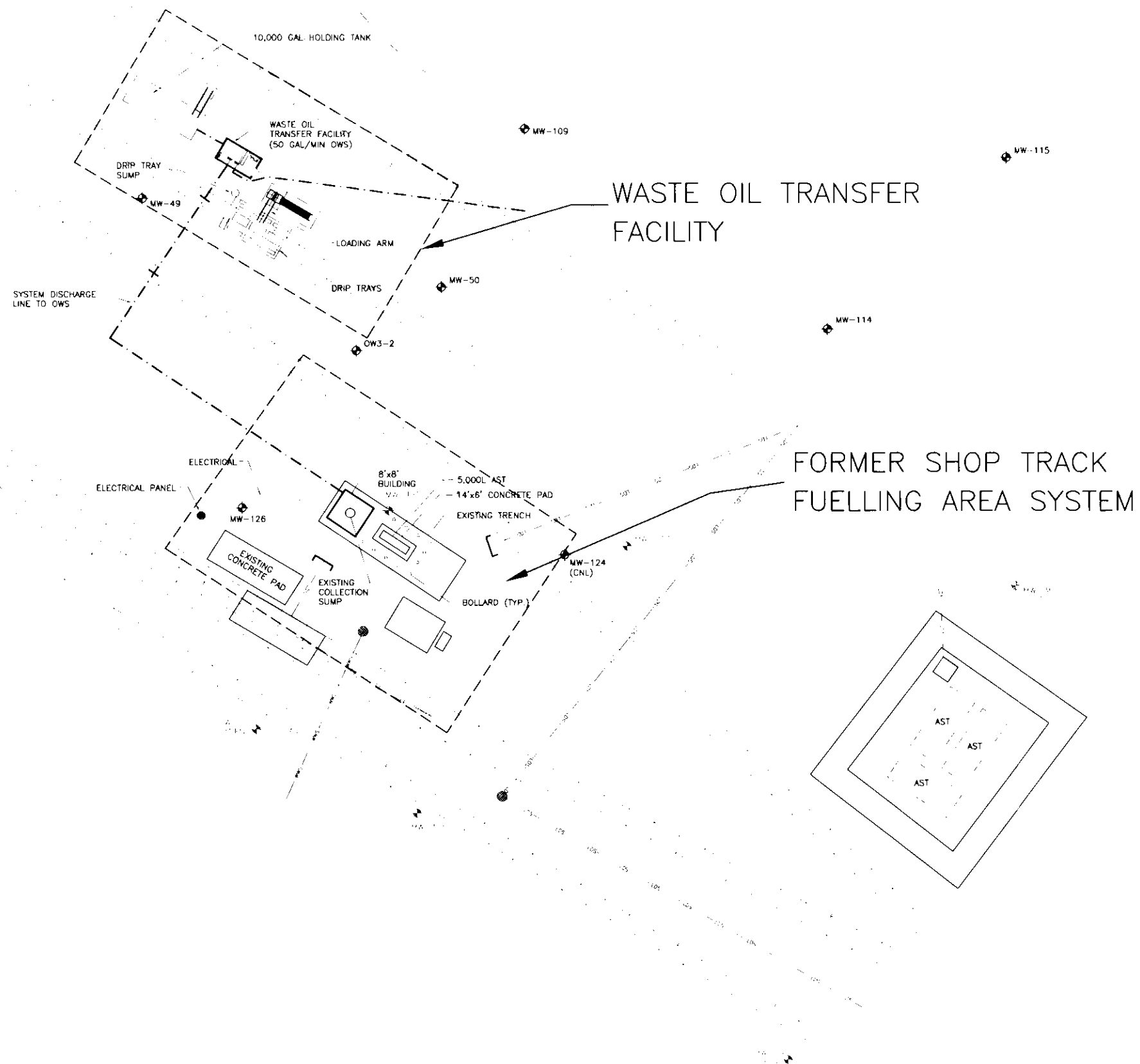
JANUARY 2013 FIGURE 08 B

File Name: P:\Projects\2011\11-0434-04\dwg\env\MOE Report\11-0434-04_FIG 09.dwg - Tab: FIG F2 Plotted By: Williamson 01/11/2013 [Fri 1:19pm]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

001509



PARTIAL SITE PLAN
SCALE: 1:250



KEY PLAN

LEGEND

- RAILROAD TRACK
- SANITARY SEWER
- STORM SEWER
- DISCHARGE LINE
- MW-119 MONITORING WELL (INSTALLED BY KGS)
(MW101-MW133, MW140-MW147)
- MW-50 MONITORING WELL (INSTALLED BY OTHERS)
(ALL OTHER WELLS)
- (CNL) COULD NOT LOCATE
- DESTROYED
- MANHOLES

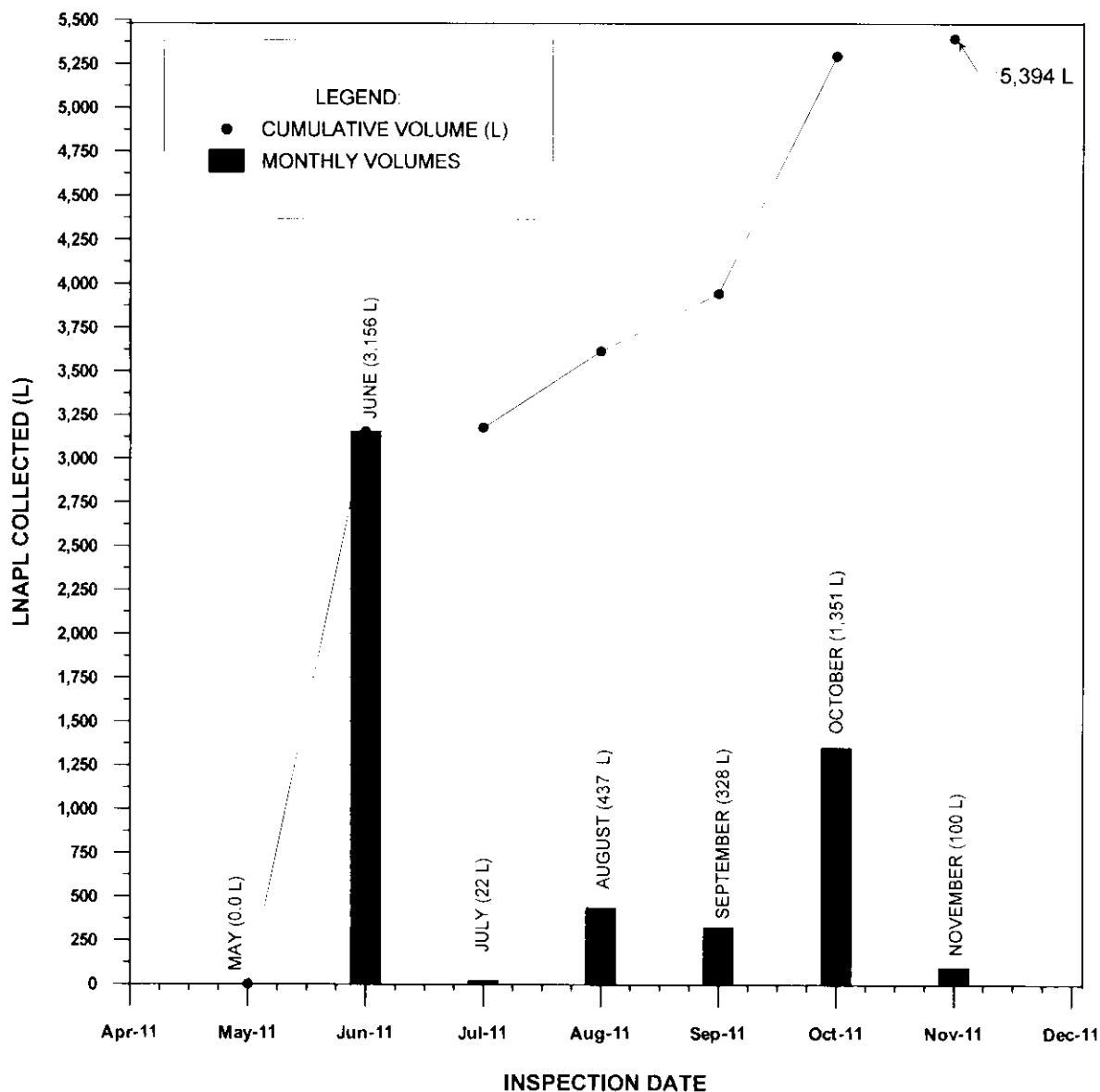
0 5 10 15 20 25m
SCALE: 1:250 METRIC 24"x36"
1:500 METRIC 11"x17"

B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
REV	NO. / DATE	DESCRIPTION	BY

REVISIONS / ISSUE
KGS GROUP CONSULTING ENGINEERS
CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON
WASTE OIL TRANSFER FACILITY
SYSTEM COMPONENTS

JANUARY 2013 FIGURE 09 B



NOTES: 5,394 L OF LNAPL WAS COLLECTED AT THE WEST END IN 2011

May

- Skimmer belt was installed on May 10 and the system was started.
- Skimmer unit operated within normal parameters.

June

- Skimmer unit operated within normal parameters.
- 3,156 L of LNAPL was collected.
- GFL removed approximately 2,750 L of LNAPL from Lagoon No. 5

July

- Skimmer unit operated within normal parameters.
- 22 L of LNAPL collected.

August

- Skimmer unit operated within normal parameters.
- 43 L of LNAPL was collected.

September

- Skimmer unit operated within normal parameters.
- 328 L of LNAPL collected.

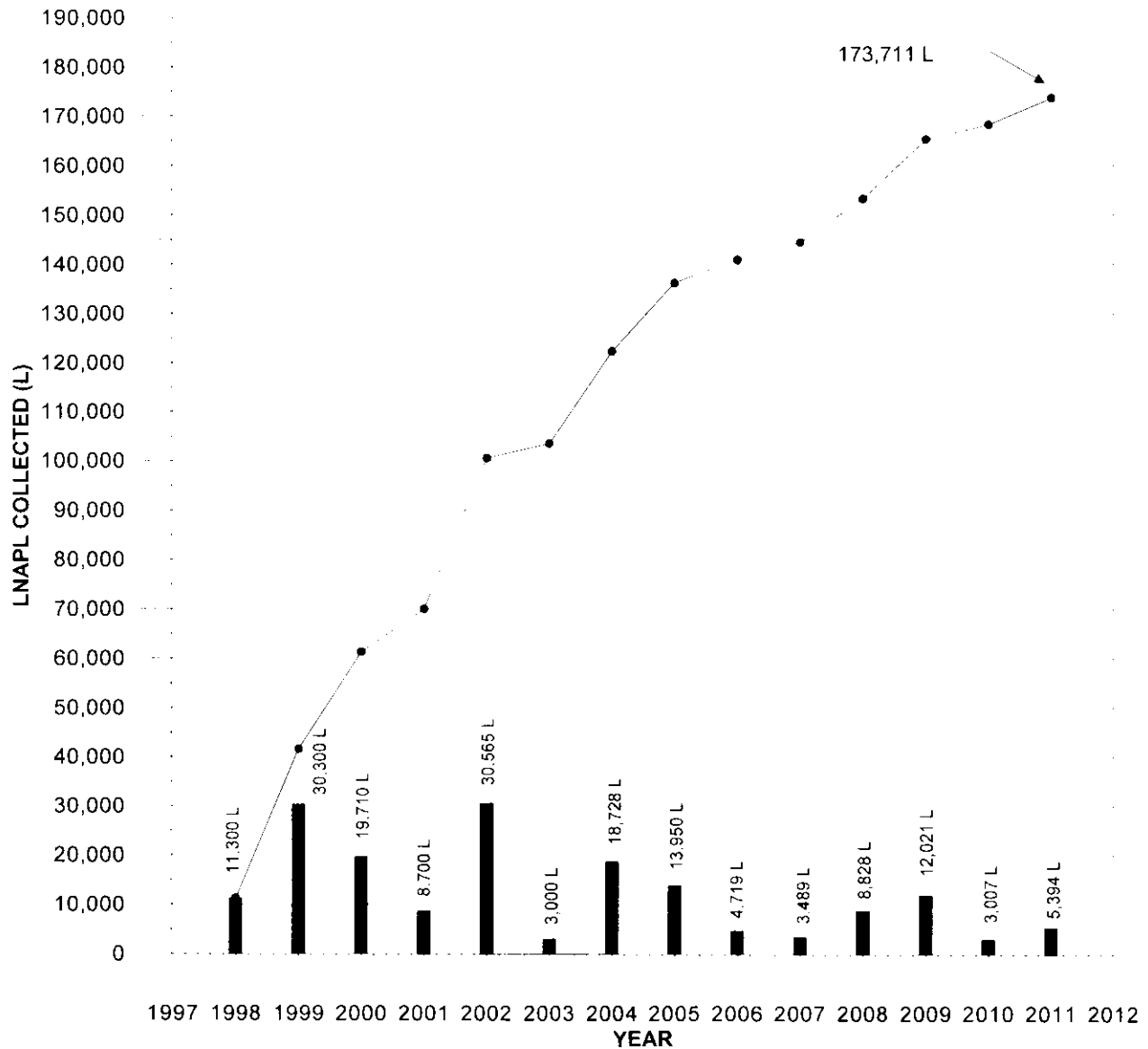
October

- Skimmer unit operated within normal parameters.
- 1,351 L of LNAPL was collected.
- GFL removed 1,200 L of LNAPL from Lagoon No. 5

November

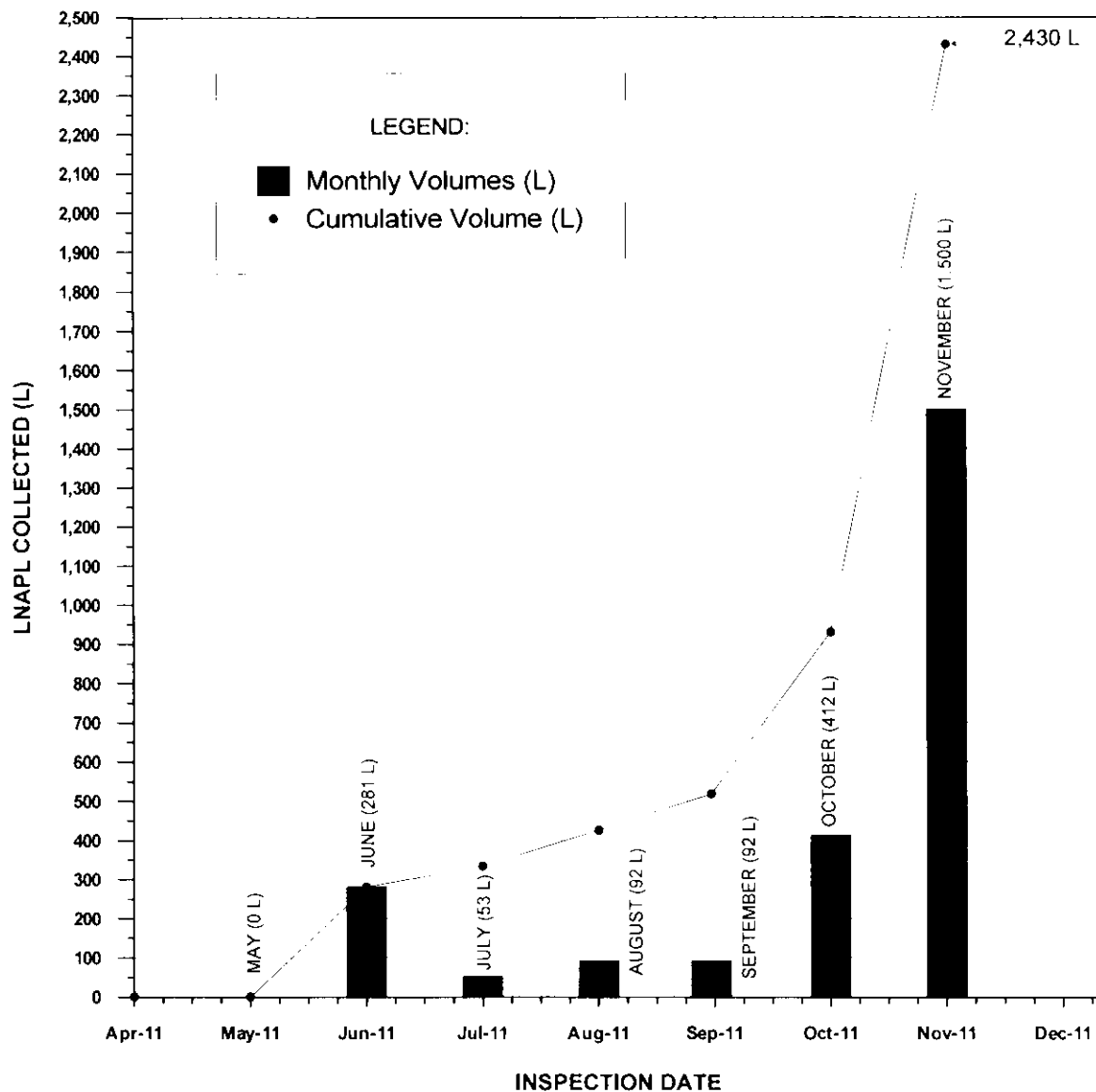
- GFL removed 100L of LNAPL from skimmer unit decanter and the discharge lines
- Skimmer unit shutdown and winterized.
- 100 L of LNAPL was collected.

B	1301/11	ISSUED WITH FINAL REPORT	TG
NO.	1301/11	DESCRIPTION	11
REVISIONS / ISSUE			
KGS GROUP		CN	
CONSULTING ENGINEERS		CANADIAN NATIONAL	
2011 REMEDIAL OPERATIONS			
PIN# 1000/ONPR/100587, 100586			
AND 100591 HORNEPAYNE YARD, ON.			
2011 LNAPL COLLECTION DATA			
WEST END			
JANUARY 2013		FIGURE 10	
		B	



● CUMULATIVE VOLUME (L)
 ■ YEARLY VOLUMES

B 1301/11 11/11/11 11/11/11	ISSUED WITH FINAL REPORT DESCRIPTION REVISIONS / ISSUE	TG BY
KGS GROUP CONSULTING ENGINEERS CN CANADIAN NATIONAL		
2011 REMEDIAL OPERATIONS PIN# 1000/ONPR/100587, 100586 AND 100591 HORNEPAYNE YARD, ON.		
HISTORICAL LNAPL COLLECTION DATA WEST END		
JANUARY 2013	FIGURE 11	B



NOTES:

2,430 L of LNAPL was collected at Lagoon No. 2 in 2011.

June 2011

- System started with two groundwater pumps, and four were operating by the end of the month.
- System operated within normal parameters
- GFL removed 250 L of LNAPL from the system components and Lagoon No. 2.
- 281 L of LNAPL was collected.

July 2011

- System operated within normal parameters.
- 53 L of LNAPL collected.

August 2011

- System operated within normal parameters.
- 92 L of LNAPL collected

September 2011

- System operated within normal parameters.
- 92 L of LNAPL collected

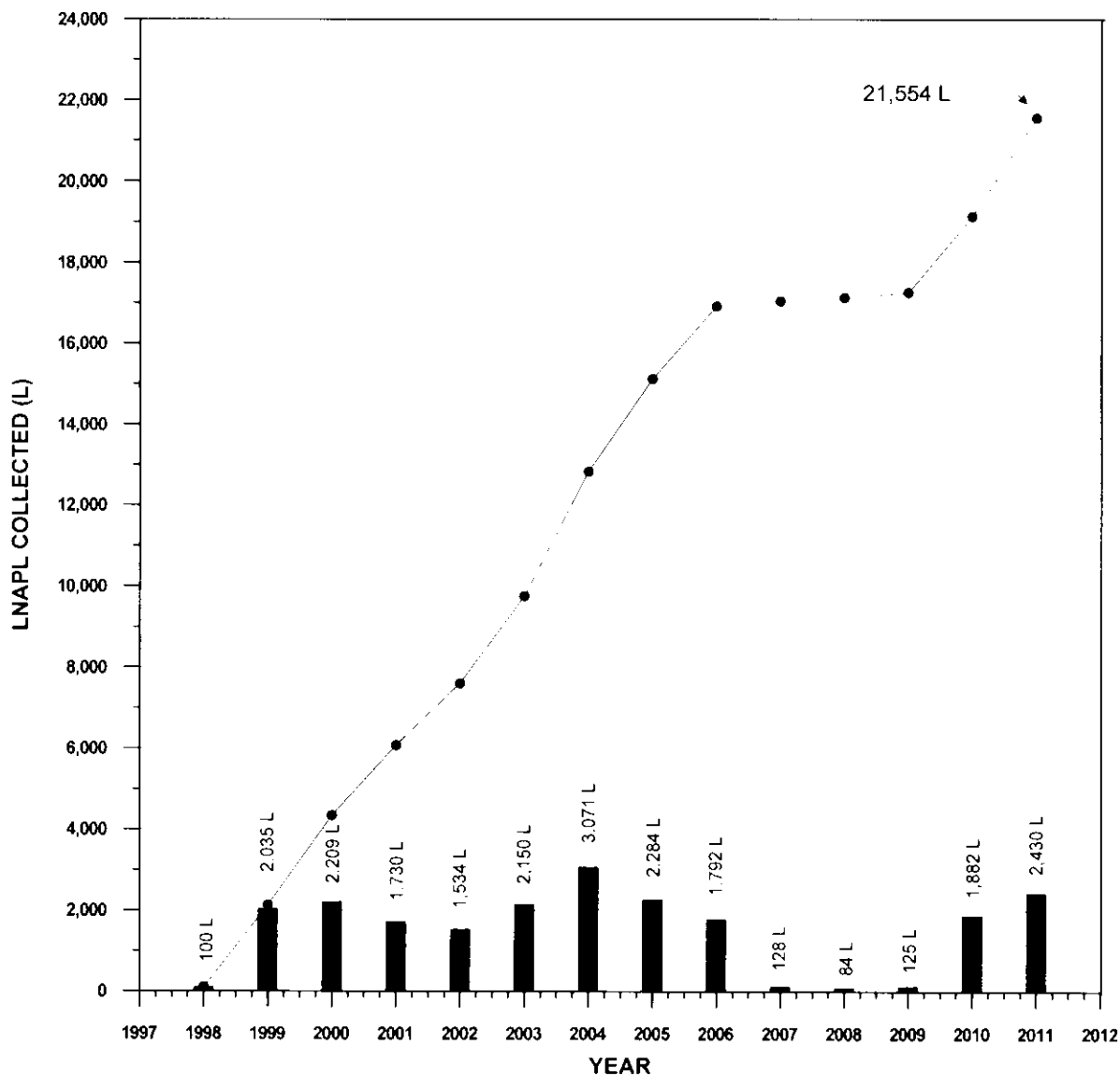
October 2011

- System operated within normal parameters.
- 412 L of LNAPL collected
- GFL removed 400 L of LNAPL from the system components and Lagoon No. 2

November 2011

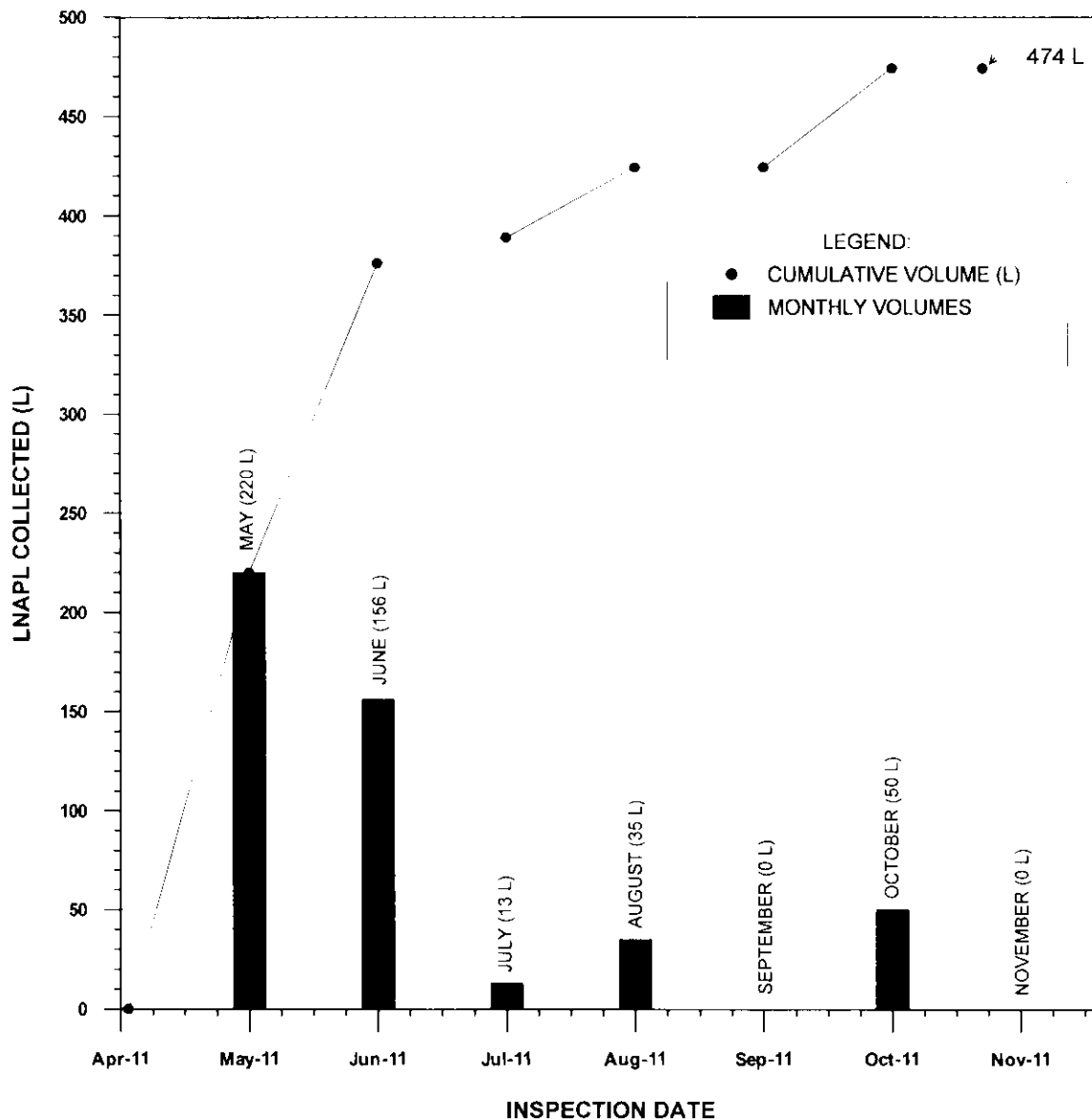
- System shut down and winterized
- GFL removed 1,500 L of LNAPL from the system components and Lagoon No. 2

B	130111	ISSUED WITH FINAL REPORT	TO
NO	130111	DESCRIPTION	BY
REVISIONS / ISSUE			
KGS GROUP		CN	
CONSULTING ENGINEERS		CANADIAN NATIONAL	
2011 REMEDIAL OPERATIONS PIN# 1000/ONPR/100587, 100586 AND 100591 HORNEPAYNE YARD, ON.			
2011 LNAPL COLLECTION DATA LAGOON No 2			
JANUARY 2013		FIGURE 12	
		B	



LEGEND:
 ● CUMULATIVE VOLUME (L)
 ■ YEARLY VOLUMES

B	13017-1	ISSUED WITH FINAL REPORT	10
REVISIONS / ISSUE			
KGS GROUP CONSULTING ENGINEERS		CN CANADIAN NATIONAL	
2011 REMEDIAL OPERATIONS PIN# 1000/ONPR/100587, 100586 AND 100591 HORNEPAYNE YARD, ON.			
HISTORICAL LNAPL COLLECTION DATA LAGOON No. 2			
JANUARY 2013		FIGURE 13	
		B	



NOTES: 474 L of LNAPL was manually collected by KGS Group and local CN personnel in 2011 at the Former Shop Track Fuelling Area. The Shop Track DRS and Waste Oil Transfer Facility did not operate in 2011

May
 - System not activated due to CN tank car not being placed at the site.
 - 220 L of LNAPL collected by CN forces from January to May 2011

June
 - System not activated, 0 L of LNAPL collected
 - 156 L of LNAPL placed in waste oil tank.

July
 - System not activated, 0 L of LNAPL collected
 - 13 L of LNAPL placed in waste oil tank.

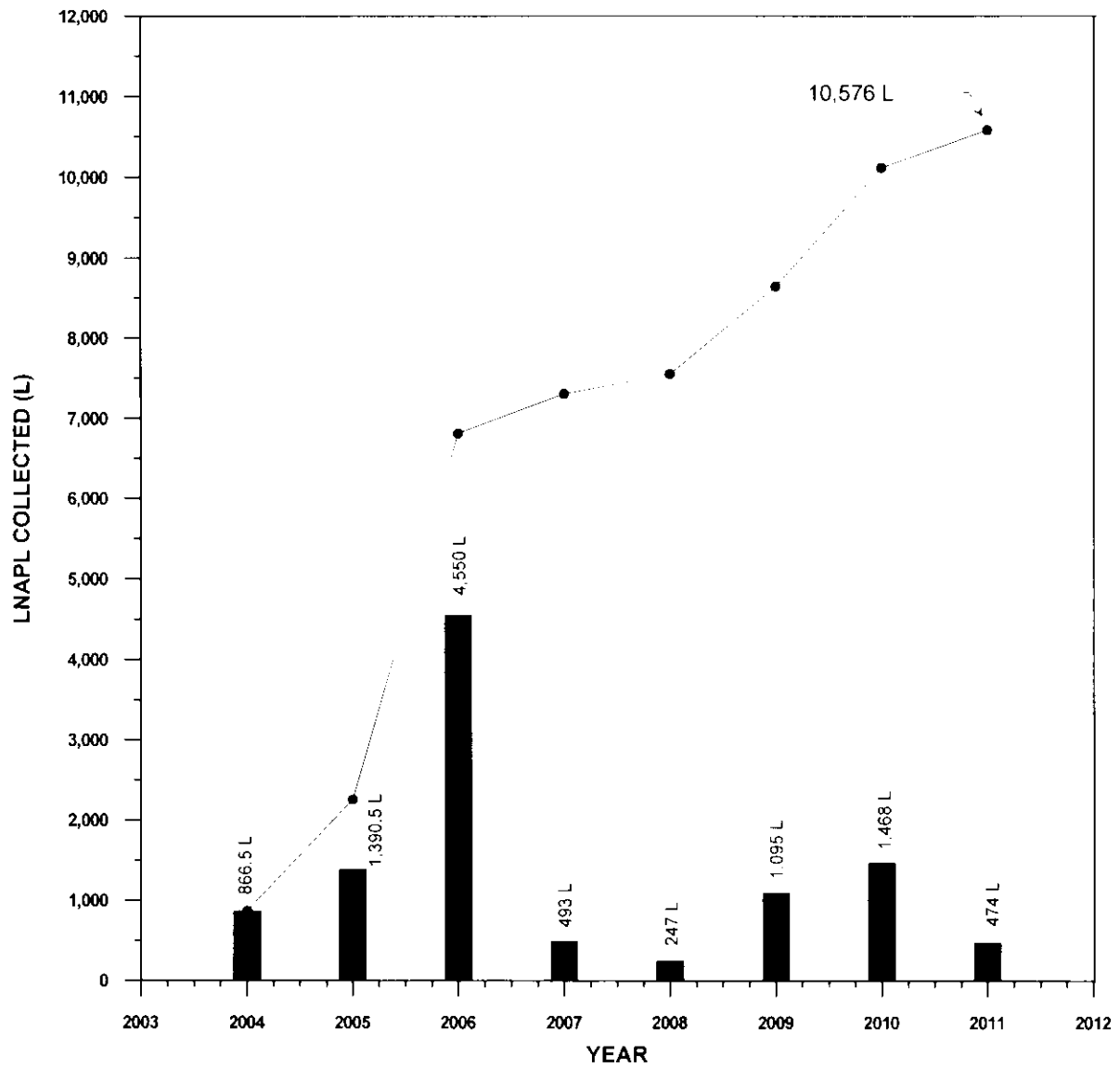
August
 - System not activated, 0 L of LNAPL collected
 - 35 L of LNAPL placed in the waste oil tank.

September
 - System not activated, 0 L of LNAPL collected.
 - 0 L of LNAPL placed in the waste oil tank.

October
 - System not activated 0 L of LNAPL collected
 - 50 L of LNAPL placed in the waste oil tank

November
 - System winterized
 - 0 L of LNAPL placed in the waste oil tank
 - GFL removed approximately 1,500 L of LNAPL

B	13/01/11	ISSUED WITH FINAL REPORT	10
NO	13/01/11	REVISIONS / ISSUE	10
KGS GROUP CONSULTING ENGINEERS		CN CANADIAN NATIONAL	
2011 REMEDIAL OPERATIONS PIN# 1000/ONPR/100587, 100586 AND 100591 HORNEPAYNE YARD, ON.			
2011 LNAPL COLLECTION DATA FORMER SHOP TRACK FUELLING AREA			
JANUARY 2013		FIGURE 14	
		B	



● CUMULATIVE VOLUME (L)
 ■ YEARLY VOLUMES

B	13/01/13	ISSUED WITH FINAL REPORT	20
	REVISIONS / ISSUE		
	 		
2011 REMEDIAL OPERATIONS PIN# 1000/ONPR/100587, 100586 AND 100591 HORNEPAYNE YARD, ON HISTORICAL LNAPL COLLECTION DATA FORMER SHOP TRACK FUELLING AREA			
JANUARY 2013		FIGURE 15	B

File Name: P:\Projects\2011\11-0434-04\dwg\env\MOE Report\11-0434-04_FIG 16.dwg - Tab: FIG 16 Plotted By: T.Williamson 01/11/2013 [Fri 1:25pm]
24"x36" PLOT SCALE 1:1 11"x17" PLOT SCALE 1:2



LEGEND

▽ SURFACE WATER SAMPLING LOCATION
HOR 013 05

→ RIVER FLOW DIRECTION

0 100 200 300 400 500m

SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
N	00/00/00	ASSIGNMENT	MM

REVISIONS / ISSUE

KGS GROUP CONSULTING ENGINEERS

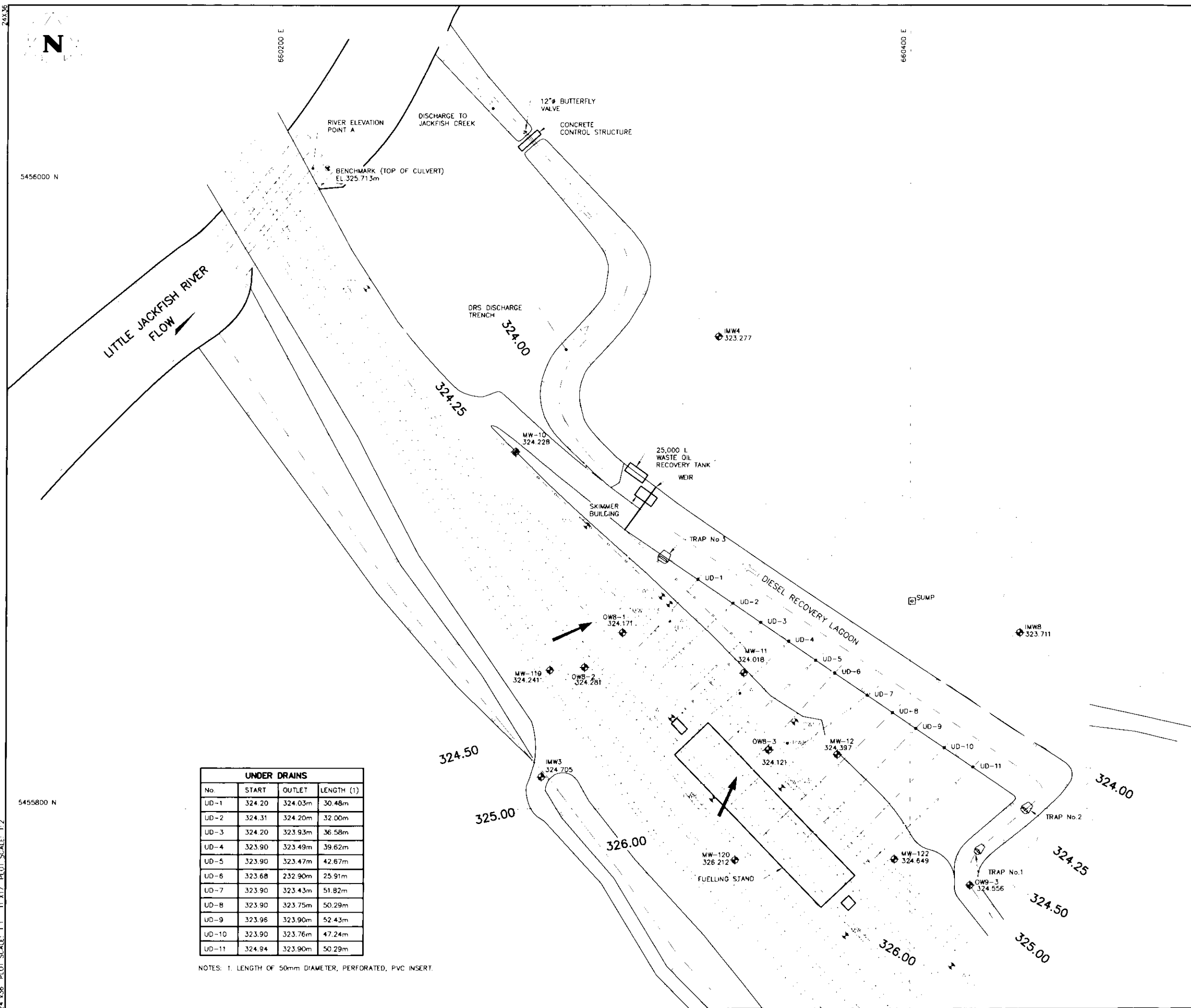
CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587, 100586
AND 100591 HORNEPAYNE YARD, ON

SURFACE WATER SAMPLING LOCATIONS

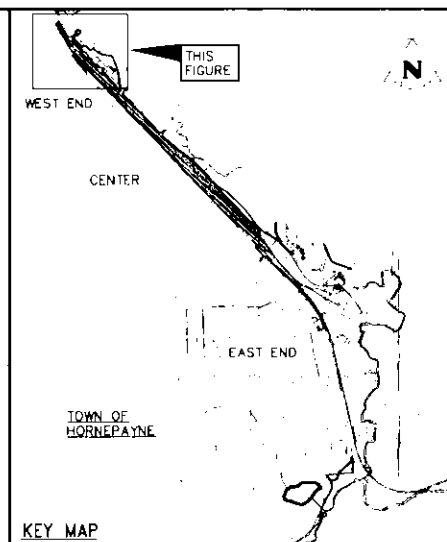
File Name: P:\Projects\2011\11-0434-04\dwg\env\MOE Report\11-0434-04_FIG 17.dwg - Tab: FIG 17 Plotted By: TWilliamson 01/11/2013 [Fri 1:27pm]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

001517



UNDER DRAINS			
No.	START	OUTLET	LENGTH (1)
UD-1	324.20	324.03m	30.48m
UD-2	324.31	324.20m	32.00m
UD-3	324.20	323.93m	36.58m
UD-4	323.90	323.49m	39.62m
UD-5	323.90	323.47m	42.67m
UD-6	323.68	322.90m	25.91m
UD-7	323.90	323.43m	51.82m
UD-8	323.90	323.75m	50.29m
UD-9	323.96	323.90m	52.43m
UD-10	323.90	323.76m	47.24m
UD-11	324.94	323.90m	50.29m

NOTES: 1. LENGTH OF 50mm DIAMETER, PERFORATED, PVC INSERT.



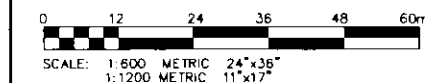
KEY MAP

LEGEND:

- BERM
- CENTERLINE OF DITCH
- FENCE
- BURIED ELECTRICAL CABLE
- BENCHMARK
- MW119 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW20 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- RWB-1 RECOVERY WELL
- SUMP SUMP WELL
- RAILROAD TRACKS
- UNDERGROUND DRAIN
- DESTROYED
- GEODETIC GROUNDWATER CONTOUR (m)
- GROUNDWATER FLOW DIRECTION

NOTES:

- SITE PLAN BASED ON AUTOCAD FILE PROVIDED BY CN.



B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
NO	11/01/00	DESCRIPTION	REV

REVISIONS / ISSUE

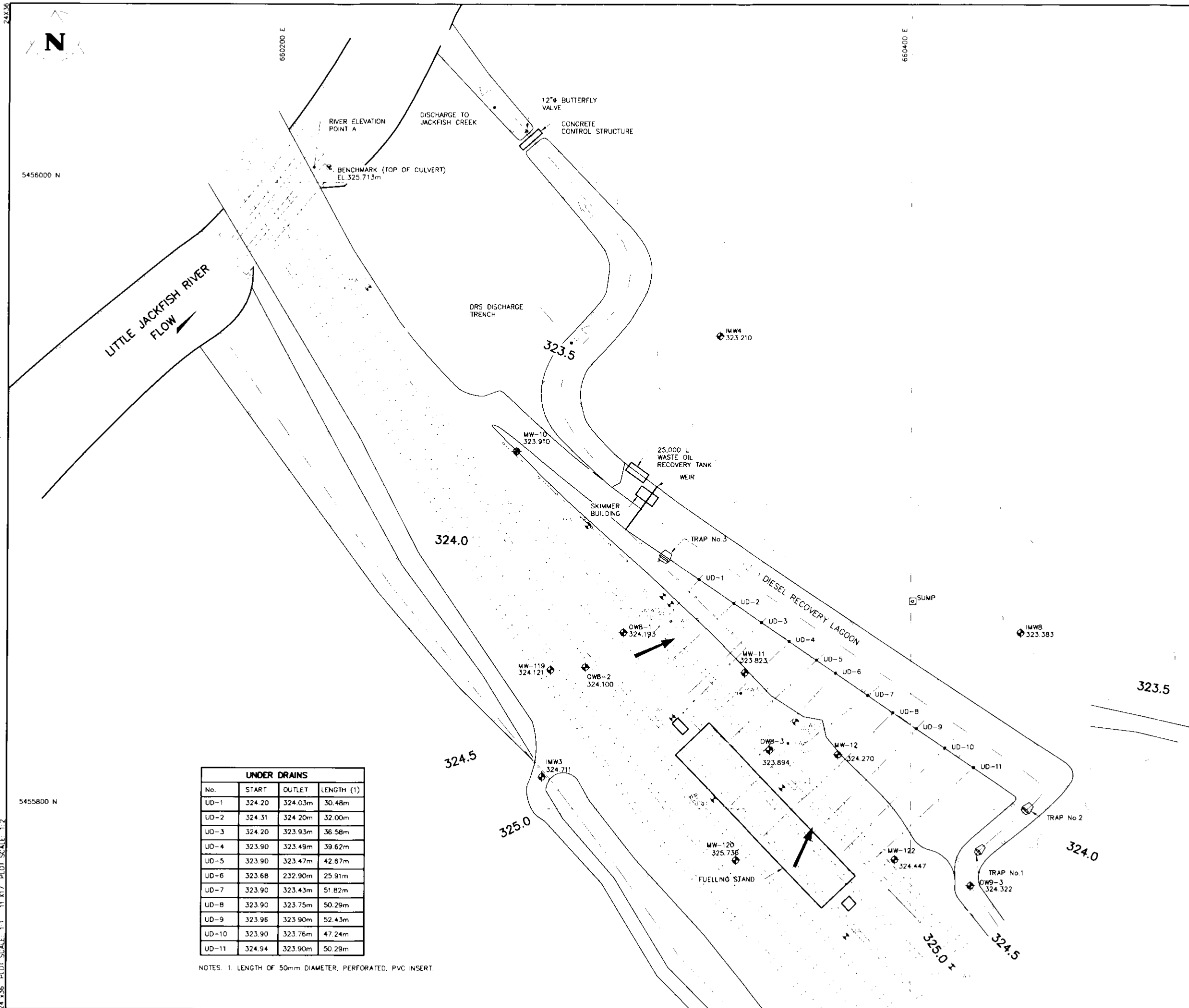
KGS GROUP CONSULTING ENGINEERS

CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587
HORNEPAYNE YARD, ON
GROUNDWATER SURFACE CONTOURS
WEST END - SPRING 2011

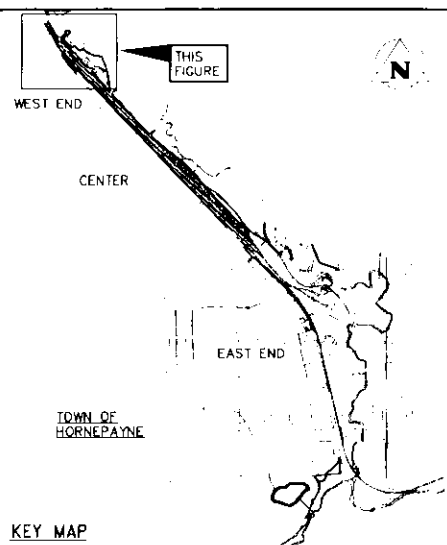
File Name: P:\Projects\2011\11-0434-04\dwg\env\MOE Report\11-0434-04_FIG 18.dwg - Tab: FIG 18 Plotted By: Williamson 01/11/2013 [Fri 1:28pm]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

001518



UNDER DRAINS			
No.	START	OUTLET	LENGTH (1)
UD-1	324.20	324.03m	30.48m
UD-2	324.31	324.20m	32.00m
UD-3	324.20	323.93m	36.58m
UD-4	323.90	323.49m	39.62m
UD-5	323.90	323.47m	42.67m
UD-6	323.68	232.90m	25.91m
UD-7	323.90	323.43m	51.82m
UD-8	323.90	323.75m	50.29m
UD-9	323.96	323.90m	52.43m
UD-10	323.90	323.76m	47.24m
UD-11	324.94	323.90m	50.29m

NOTES: 1. LENGTH OF 50mm DIAMETER, PERFORATED, PVC INSERT.



KEY MAP

LEGEND:

- BERM
- CENTERLINE OF DITCH
- FENCE
- BURIED ELECTRICAL CABLE
- BENCHMARK
- MW117 MONITORING WELL (INSTALLED BY KGS) (MW117-MW133, MW140-MW147)
- MW20 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- RWB-1 RECOVERY WELL
- SUMP SUMP WELL
- RAILROAD TRACKS
- UNDERGROUND DRAIN DESTROYED
- GEODETIC GROUNDWATER CONTOUR (m)
- GROUNDWATER FLOW DIRECTION
- CNL COULD NOT LOCATE

NOTES:

1. SITE PLAN BASED ON AUTOCAD FILE PROVIDED BY CN.



SCALE: 1:600 METRIC 24"x36"
1:1200 METRIC 11"x17"

B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG

REVISIONS / ISSUE

KGS GROUP
CONSULTING ENGINEERS

CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587
WEST END, HORNEPAYNE YARD, ON
GROUNDWATER SURFACE CONTOURS
FALL 2011

APPENDICES

**APPENDIX A
CERTIFICATE OF APPROVAL
No. 3528-83LQWT**

AMENDED CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 3528-83LQWT
Issue Date: April 29, 2010

Canadian National Railway Company
1 Administration Road
PO Box, No. 1000, Concord, Ontario L4K 1B9

Site Location: 58 Front Street - Hornepayne Yard
East and West End Systems
Hornepayne Township, District of Algoma, ON P0M 1Z0

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

the establishment of sewage works for the collection, transmission, treatment and disposal of stormwater, contact stormwater runoff from the CN Hornepayne Yard and industrial sewage generated from the Lagoon Light Non-Aqueous Phase Liquid (LNAPL) Containment System, the Shop Track LNAPL Recovery System, the Waste Oil Transfer Facility and melt water/seepage from the soil contaminated cell, discharging to Little Jackfish River, consisting of the following:

EAST END ENVIRONMENTAL PROTECTION SYSTEM

- A Lagoon System to provide quantity and quality controls for both stormwater runoff, off-site discharge of petroleum hydrocarbon spills and industrial sewage. The lagoon consists of:
 - a rectangular lagoon with an impermeable liner for a total capacity of approximately 1,936 m³, discharging to a 600 mm diameter corrugated steel pipe with an outlet at an elevation of 322.74 m, equipped with a 900 mm diameter concrete manhole acting as an settling basin for hydrocarbon and suspended solids.
 - an increase in the lagoon berm height by 0.8 m, including 0.3 m of freeboard, to increase the volumetric capacity 835 m³ for a total capacity of 2,771 m³, and slopes changes from 3:1 to 4:1.
- A Containment Recovery and Collection System to contain and recover local subsurface LNAPL identified in the area, consisting of:
 - A bentonite / concrete cut-off wall at the northwest corner of the lagoon to prevent the off-site migration of LNAPL into the Little Jackfish River, equipped with ten (10) pumping wells and an interception trench with 4.5 m depth, width of 0.6 to 1.1 m and 78.5 m in length, all located between the former Pump House area and the Little Jackfish River (upgradient and downgradient from the cut-off wall), and discharging into

the oil/water separator.

- An oil/water separator (fiberglass Parkson Model SRM6 OWS, or approved equivalent) located at the Pollution Control Building and discharging into the lagoon, equipped with:

- A transfer tank with a total capacity of 171 L, a transfer pump directing sewage from the transfer tank to a 4,560 L double walled waste oil tank located adjacent to the Pollution Control Building, prior to treatment at the Oil Transfer Facility.

- A Shop Track LNAPL Recovery System to contain and recover local subsurface LNAPL identified in the area, consisting of:

- An oil skimmer, Abinaki Model 8 Oil Grabber, used to collect LNAPL draining to the Recovery Trench.

- A rock filled Recovery Trench (20 m long, 5 m wide and 5 m depth) with a non woven geotextile to collect groundwater and LNAPL to be pumped through a 38 mm diameter HDPE discharge line to the oil water separator located at the waste oil transfer facility. This System is equipped with a collection sump located within the Pollution Control Building, transferring collected LNAPL, by gravity, to the oil recovery tank.

- An oil recovery tank, double walled with a capacity of 5,000 L.

- A Waste Oil Transfer Facility to process petroleum hydrocarbons collected from all LNAPL collection systems within the Yard, as well as waste oil generated from both Yard and remote site operations, consisting of a waste oil holding tank of 38 m³ double walled discharging to the oil water separator and an oil water separator.
- A Soil Containment Cell to contain hydrocarbon impacted soils generated from former and future spills within the Yard and at remote rail locations, consisting of a circular cell with a non permeable liner with a holding capacity of 13,600 m³, equipped with a rubber tire excavator to treat top soil at 0.3 to 0.5 m depth.

All other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned sewage works.

WEST END FUELLING STAND SYSTEM

These works include the West End Fuelling Stand at the Hornepayne Yard and included in Certificate 5146-7F2H6J issued on June 17, 2008, consisting of the following:

- Approximately eleven (11) 50 mm diameter perforated pipe underdrains installed under the trackage adjacent to the West End Fuelling Platform and the contaminated soil stockpile, discharging to the retention lagoon;
- One (1) retention lagoon with a storage capacity of approximately 960 m³ (at the maximum operating water elevation of 324.4 m), including a sheet pile weir and belt oil skimmer seasonally operated

(normally April to November) with product recovery storage tank, discharging to the lined drainage ditch;

- One (1) polyvinyl chloride lined drainage ditch extending from the retention pond to the Little Jackfish River, including the relocation of the existing concrete discharge control structure;

All other controls, electrical equipment, instrumentation, piping, valves and appurtenances essential for the proper operation of the aforementioned sewage works

All in accordance with the following submitted supporting documents:

1. Application for Approval of Industrial Sewage Works submitted by Alexandre Borges, CN Environment Officer of Canadian National Railway Company dated August 4, 2009;
2. Application's appendix A to H prepared by KGS Group Consulting Engineers, dated August 10, 2009.
3. Application for the Approval of Industrial Sewage Works submitted by Mr. Erwin Waldinsperger dated January 1998 and attachments and associated drawings, all prepared by KGS Group Consulting Engineers.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act* , and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act* ;

"District Manager" means the District Manager of the Thunder Bay District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Regional Director" means the Regional Director of the Northern Region of the Ministry;

"Source Protection Plan" means a drinking water source protection plan prepared under the *Clean Water Act, 2006* ;

"Owner" means Canadian National Railway Company and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below :

TERMS AND CONDITIONS

1. GENERAL CONDITION

(1) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this Certificate.

(2) Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

2. CHANGE OF OWNER

(1) The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of Owner or operating authority, or both;

(b) change of address of Owner or operating authority or address of new owner or operating authority;

(c) change of partners where the Owner or operating authority is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Partnerships Registration Act* ;

(d) change of name of the corporation where the Owner or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1, 2 or 3 of O. Reg. 189, R.R.O. 1980, as amended from time to time), filed under the *Corporations Information Act* shall be included in the notification to the District Manager;

(2) In the event of any change in ownership of the works, the Owner shall notify in writing the succeeding owner of the existence of this certificate, and a copy of such notice shall be forwarded to the District Manager.

(3) The Owner shall ensure that all communications made pursuant to this condition will refer to this certificate's number.

3. CHANGES IN PROCESSES OR PROCESS MATERIALS

The Owner shall give written notice to the District Manager of any plans to change the processes or process materials in the Owner's enterprise serviced by the works where the change may significantly

alter the quantity or quality of the influent to or effluent from the works, and no such change(s) shall be made unless with the written concurrence or approval of the District Manager.

4. OPERATIONS MANUAL

(1) The Owner shall prepare an operations manual prior to the commencement of operation of the sewage works, that includes, but not necessarily limited to, the following information:

- (a) operating procedures for routine operation of the works;
- (b) inspection programs, including frequency of inspection, for the works and the methods or tests employed to detect when maintenance is necessary;
- (c) repair and maintenance programs, including the frequency of repair/maintenance;
- (d) contingency plans and procedures for dealing with potential spill, bypasses and any other abnormal situations and for notifying the District Manager; and
- (e) complaint procedures for receiving and responding to public complaints.

(2) The Owner shall maintain the operations manual up to date through revisions undertaken from time to time and retain a copy at the location of the sewage works. Upon request, the Owner shall make the manual available for inspection and copying by Ministry personnel.

5. EFFLUENT LIMITS

(1) The Owner shall design, construct and operate the works that discharge to the Little Jackfish River such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the works.

Table 2 - Effluent Limits	
Effluent Parameter	Concentration Limit (mg/L)
Column 1	Column 2
Petroleum Hydrocarbons (F1+F2)	1000
Petroleum Hydrocarbons (F3+F4)	1000
Benzene	5
Toluene	0.8
Ethylbenzene	2.4
m&p-Xylene	32
o-Xylene	40
Methyl-t-butyl-Ether (MTBE)	200
Lead	See subsection 2
pH of the effluent maintained between 6.5 to 8.5, inclusive, at all times	

(2) The limit for Lead shall be determined based on the hardness of the water. If the hardness is less than 30 mg/L, the limit is 1 µg/L. If the hardness is between 30 mg/L and 80 mg/L, inclusive, the limit is 3 µg/L. If the hardness is greater than 80 mg/L, the limit is 5 µg/L.

(3) For the purposes of determining compliance with and enforcing subsection (1):

(a) non-compliance with respect to a Concentration Limit is deemed to have occurred when any single sample analyzed for a parameter named in Column 1 of subsection (1) is greater than the corresponding maximum concentration set out in Column 2 of subsection (1);

(b) non-compliance with respect to pH is deemed to have occurred when any single measurement is outside of the indicated range.

6. EFFLUENT - VISUAL OBSERVATIONS

Notwithstanding any other condition in this certificate, the Owner shall ensure that the effluent from the works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen or foam on the receiving waters.

7. EFFLUENT MONITORING - SURFACE WATER

(1) All samples and measurements taken for the purposes of this certificate are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) Samples shall be collected and analyzed at the following sampling point(s), at the sampling frequencies and using the sample type specified for each parameter listed:

Table 3 - Effluent Monitoring - Surface Water	
Sample Points: To be established to the satisfaction of the District Manager prior to commencement of operations of the works. Sampling includes estimated flows. Sampling locations at a minimum to include (as per Drawing No. 09-0434-01 H1, Rev. A, Appendix H of the Application package dated August 2009, prepared by KGS Group):	
1. Effluent from Discharge Control Gate;	
2. Little Jackfish River: HOR 005 05 (mid stream); and HOR 004 05 (down stream)	
3. Yard discharge: HOR 002 05 (Lagoon No.2), at the end of the discharge culvert.	
Frequency	Once each month (April to November) in ice-free conditions
Sample Type	Grab
Parameters	Petroleum Hydrocarbons (F1+F2), Petroleum Hydrocarbons (F3+F4), Benzene, Toluene, Ethylbenzene, m&p-Xylene, o-Xylene, Methyl-t-butyl-Ether (MTBE), Lead, pH, hardness, alkalinity, Total Purgeable Hydrocarbons, Total Extractable Hydrocarbons, Total Oil and Grease, and Mineral Oil and Grease

(3) The Owner shall supplement the monitoring program in subsection (1) with visual inspections which shall include, but not be limited to the following:

(a) A weekly inspection (April to November) of the effluent from the Discharge Control Gate and the river during discharge of treated wastewater for any visible oil sheens, colour and odours; and

(b) A weekly inspection (April to November) of the level of material in the recovered product storage tank.

(4) The methods and protocols for sampling, analysis, toxicity testing, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

(b) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition) as amended from time to time by more recently published editions; and,

(c) the Environment Canada publications "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" (July 1990) and "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna" (July 1990);

(5) The measurement frequencies specified in subsection (2) in respect of any parameter are minimum requirements which may, after twelve (12) months of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

(6) A continuous flow measuring device(s) or an alternate method approved by the District Manager shall be installed and maintained to measure the flowrate of the effluent from the sewage works, with an accuracy to within plus or minus twenty per cent (20%) of the actual flowrate for the entire design range of the flow measuring device and the Owner shall measure, record and calculate the flowrate for each effluent stream on each day of sampling.

8. EFFLUENT MONITORING - GROUNDWATER

(1) All samples and measurements taken for the purposes of this certificate are to be taken at a time and in a location characteristic of the quality and quantity of the groundwater over the time period being monitored.

(2) Samples shall be collected and analyzed at the following sampling point(s), at the sampling frequencies, including groundwater levels and thickness of any light non-aqueous phase liquids (LNAPLs) using an interface probe (IP) at all monitoring wells:

Table 3 - Effluent Monitoring - Groundwater Sample Points: Sampling locations as per Drawing No. 09-0434-01 G1, Rev. A. Appendix G of the Application package dated August 2009, prepared by KGS Group).		
Effluent Parameter	Frequency	Sample Location
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), and Hydrocarbon fraction F1	Monitored and sampled once per year	Wells: MW-20, MW-40, MW-43, MW-46, MW-52, OW 5-1, OW 5-2 and OW 5-3
Hydrocarbon fraction F2 to F4	Monitored twice per year (Spring and Fall) and Sampled once per year	Wells: MW-21, MW-24, MW-49, MW-51, MW-52, MW-101, MW-102, MW-103, MW-104, MW-106, MW-107, MW-108, MW-109, MW-114, MW-115, MW-126, and OW 3-2
Hydrocarbon fraction F2 to F4	Monitored and sampled twice per year (Spring and Fall)	Wells: MW-20, MW-40, MW-43, MW-46, MW-52, OW 5-1, OW 5-2 and OW 5-3

Note: Duplicate groundwater samples shall be taken for field monitoring of Dissolved Oxygen, pH, Conductivity, Temperature and Oxidation-reduction potential.

(3) The methods and protocols for sampling, analysis, toxicity testing, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions.

(b) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition) as amended from time to time by more recently published editions.

(5) The measurement frequencies specified in subsection (2) in respect of any parameter are minimum requirements which may, after twelve (12) months of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

9. REPORTING

(1) The Owner shall report to the District Manager or designate, any exceedance of any parameter specified in Condition 6 orally, as soon as reasonably possible, and in writing within seven (7) days of the exceedance.

(2) In addition to the obligations under Part X of the *Environmental Protection Act*, the Owner shall, within 10 working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(4) The Owner shall prepare and submit a performance report to the District Manager on an annual basis within thirty (30) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the works and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

- (a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 5, including an overview of the success and adequacy of the sewage works;
- (b) a description of any operating problems encountered and corrective actions taken;
- (c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works;
- (d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;
- (e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment;
- (f) a site plan illustrating the location of all site infrastructure, environmental protection system components, monitoring wells and surface water monitoring stations;
- (g) a location map illustrating the site relative to nearby potentially sensitive groundwater/surface water features (i.e., lakes, streams, wells);
- (h) a water level contour map for each monitoring event carried out during the previous year;
- (i) stratigraphic cross-sections which clearly illustrate the subsurface distribution of geological materials;
- (j) boreholes logs for all monitoring wells;
- (k) tables illustrating historical chemistry and water level data;
- (l) graphs illustrating historical water quality trends for hydrocarbon parameters at key monitoring wells;

- (m) an assessment of monitoring data to evaluate system effectiveness and compliance with the applicable water quality protection criteria;
- (n) recommendations for future monitoring and/or further remedial actions;
- (o) a section detailing the field sampling protocols and QA/QC measures;
- (p) a copy of the Certificate of Approval and any amendments;
- (q) copies of laboratory reports for all sampling events in that year; and
- (r) all monitoring and sampling data should also be submitted in an electronic format (i.e. a Microsoft Excel spreadsheet).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.
2. Condition 2 is included to ensure that the Ministry records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of the certificate and continue to operate the works in compliance with it.
3. Condition 3 is included to ensure that the works is operated in accordance with the information submitted by the owner relating to the process and materials which are served by the works, and to ensure that any contemplated changes in them which could potentially affect the characteristics of effluent from the works will be properly reviewed and approved.
4. Condition 4 is included to ensure that a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the owner and made available to the Ministry. Such a manual is an integral part of the operation of the works. Its compilation and use should assist the owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the owner's operation of the work.
5. Conditions 5 and 6 are imposed to ensure that the effluent discharged from the works to the Little Jackfish River meets the Ministry's effluent quality requirements thus minimizing environmental impact on the receiver.
6. Conditions 7 and 8 are included to require the owner to demonstrate on a continual basis that the quality and quantity of the effluent from the approved works is consistent with the design and effluent limits specified in the certificate and that the approved works does not cause any impairment to the receiving

watercourse.

7. Condition 9 is included to provide a performance record for future references and to ensure that the Ministry is made aware of problems as they arise, so that the Ministry can work with the Owner in resolving the problems in a timely manner.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 5146-7F2H6J issued on June 17, 2008.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

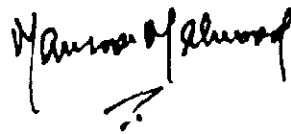
AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 29th day of April, 2010



Mansoor Mahmood, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

ET/

c: District Manager, MOE Sault Ste. Marie Area Office
Tony Gallo, Kontzamanis Graumann Smith MacMillan Inc.

**APPENDIX B
WASTE MANIFEST FORMS**

MOVEMENT DOCUMENT / MANIFEST DOCUMENT DE MOUVEMENT / MANIFESTE

This Movement document manifest conforms to all federal and provincial transport and environmental legislation.
Ce document de mouvement/manifeste est conforme aux législations fédérale et provinciale sur l'environnement et le transport.

HY19825-5

Movement Document / Manifest Reference No.
N° de référence du document de mouvement/manifeste

A Generator / consigneur Producteur / expéditeur Registration No. / Provincial ID No. N° d'immatriculation - d'id. provincial Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal E-mail / Courriel électronique Tel. No. / N° de tél. Shipping site address / Adresse du lieu de l'expédition Intended Receiver / consignee Réceptionnaire / destinataire prévu Mailing address / Adresse postale City / Ville Province Postal code / Code postal E-mail / Courriel électronique Tel. No. / N° de tél. Receiving site address / Adresse du lieu de l'expédition City / Ville Province Postal code / Code postal				B Carrier Transporteur Registration No. / Provincial ID No. N° d'immatriculation - d'id. provincial Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal E-mail / Courriel électronique Tel. No. / N° de tél. Vehicle / Véhicule Registration No. / N° d'immatriculation Prov. Trailer - Rm car No. 1 1 ^{re} remorque - wagon Trailer - Rm car No. 2 2 ^e remorque - wagon Port of entry / Point d'entrée Port of exit / Point de sortie Carrier Certification: I certify that I have received waste or recyclable material from the generator / consigneur for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct. Attestation du transporteur: J'atteste avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets. Name of authorized person (print) Nom de l'agent autorisé (caractères d'imprimé) Year / Année Month / Mois Day / Jour Signature				C Receiver / consignee Réceptionnaire / destinataire Registration No. / Provincial ID No. N° d'immatriculation - d'id. provincial Receiver / consignee information same as in Part A Les renseignements du réceptionnaire / destinataire est la même qu'à la Partie A ☐ Yes / Oui ☐ No, complete the box below / Non, remplir la case ci-dessous Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal E-mail / Courriel électronique Tel. No. / N° de tél. Receiving site address / Adresse du lieu de destination Date received / Date de réception Year / Année Month / Mois Day / Jour Time / Heure ☐ A.M. ☐ P.M. If waste or recyclable material to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire Registration No. / Provincial ID No. N° d'immatriculation / d'id. provincial			
Prov. code / Code prov. Shipping name / Appellation réglementaire Class / Classe Sub-classes / Sous-classes UN No. / N°NU Packing / emballage Gr. / Grade Quantity shipped / Quantité expédiée Units / Lit. ou Kg. / Unités No. / N° Packaging / Conteneur Codes / Codes Lit. - ext. Phys. state / État phys.				Quantity received / Quantité reçue Units / Lit. ou Kg. / Unités Comments / Commentaires Handling Code / Code de manipulation Shipment / Envoi Accepted / Accepté Refused / Refusé Decant / Ven.							
Notice No. / N° de notification Notice Line No. / N° de ligne de la notification Shipment Entry / Entrée OI / De DI or R code / Code E ou R C code / Code C Basel Annex VII or OECD Code / Annexe VII de Bâle ou Code OCDE H code / Code H Y code / Code Y National code in country of / Code du pays Customs code(s) / Code(s) de douanes				If handling code "Other" (specify) / Si code de manipulation « autre » (spécifier) Receiver / consignee certification: I certify that the information contained in Part C is correct and complete. Attestation du réceptionnaire / destinataire: J'atteste que tous les renseignements à la partie C sont exacts et complets. Name of authorized person (print) Nom de l'agent autorisé (caractères d'imprimé) Signature Tel. No. / N° de tél.							
Generator / consigneur certification: I certify that the information contained in Part A is correct and complete. Attestation du producteur / expéditeur: J'atteste que tous les renseignements à la partie A sont exacts et complets. Name of authorized person (print) Nom de l'agent autorisé (caractères d'imprimé) Signature Tel. No. / N° de tél.				Special handling / Manipulation spéciale ☐ Attached / Ci-joint ☐ As follows / Ci-dessous Date shipped / Date d'expédition Year / Année Month / Mois Day / Jour Time / Heure ☐ A.M. ☐ P.M. Scheduled arrival date / Date d'arrivée prévue Year / Année Month / Mois Day / Jour							

001537

**APPENDIX C
DRILL LOGS**



Environmental
Services
Inc.

Log of Well MW-10
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 327.365m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 10/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 10/94

Borehole Diameter: 15.2 cm

Water Level T.O.P.: 3.53m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL: sand and gravel fill, occasional cobbles	Protective cover
SS1		<1	1			Cement
SS2	5/18 27/27	<1	2		SILTY SAND: medium brown grey with stone and cobbles, dry to moist, no odour	Fill
SS3	13/41 58	<1	3		grey, densely packed, gravel, dry	5cm Ø Sch.40 Blank PVC
SS4	8/23 32/24	<1	4		SAND: densely packed coarse and fine grained sand, moist, no odour	Bentonite Pellet Seal
SS5	3/1 3/4	<1	5		dark red brown peat, moist, no odour	11/10/94
SS6	5/11 11/8	<1	6		SILTY SAND: grey, moist to wet, no odour	Silica Sand
SS7	3/5 7/5	<1			COARSE SAND: grey, fine gravel, saturated, no odour	5cm Ø Sch.40 Slotted PVC (1mm)
					END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-11
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94580

G.S. Elevation: 327.184m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 11/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 11/94

Borehole Diameter: 15.2 cm

Water Level T.O.P: 2.82m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Flow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL:sand and gravel fill	Protective cover
					medium brown sand and gravel, dry, no odour	Cement
SS1		1.5	1		dark grey sand and gravel, no odour	Fill
					grey sand and gravel fill, boulders and cobbles	5cm Ø Sch.40 Blank PVC
SS2	refusal	2	2			Bentonite Pellet Seal
SS3	refusal	140	3		grey stained coarse sand with gravel, odours	11/11/94 (free product)
SS4	17/27 15/7	90	4		moist	Silica Sand
SS5	7/21 21/18	58	5		FINE SAND:grey stained, odourous, saturated, free product in split spoon	5cm Ø Sch.40 Slotted PVC (1mm)
SS6	8/12 12/11	135	6		END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-12
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94580

G.S. Elevation: 328.985m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 11/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 11/94

Borehole Diameter: 15.2 cm

Water Level T.O.P: 2.28m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL: medium brown sand and gravel, dry, no odours	Protective cover
SS1		80	1		odorous	Cement
SS2	4/4 8/11	18	2		occasional rocks, cobbles and boulders	Fill
SS3	14/19 11/12	8	3		grey, coarse sand and fine gravel, wet, odorous	5cm Ø Sch.40 Blank PVC
SS4	3/9 4/4	11	4		red brown peat and bits of wood coarse sand and gravel, grey with traces of silt, odorous, wet to saturated	Bentonite Pellet Seal
SS5	4/7 9/8	30	5		red grey oily sand with gravel, odorous	11/11/94
SS6	22 refusal	30/40	6		saturated	Silica Sand
SS7	20/8 5/8	40			SILTY SAND: grey, slight odour	5cm Ø Sch.40 Slotted PVC (1mm)
					END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-18
PHASE 2
CN
FORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94580

G.S. Elevation: 325.474m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 11/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 11/94

Borehole Diameter: 15.2 cm

Water Level T.O.P.: 1.3m

Logged By: P. M.

Checked By: O. P. L.

Sample No.	Blow Counts	H.Nu	Depth (meters)	Graphic Log	Materials Description	Well Completion
						Protective cover
					SILTY SAND: light brown, moist, no odour	Cement Bentonite Pellet Seal
SS1		1.3	1			5cm Ø Sch.40 Blank PVC
					wet to saturated, some iron staining in fractures	11/11/94
SS2	8/13 14/7	2	2			Silica Sand
					END OF BOREHOLE (refusal on bedrock)	5cm Ø Sch.40 Slotted PVC (1mm)
SS3	4 spoon refusal	2	3			
			4			
			5			
			6			



Environmental
Services
Inc.

Log of Well MW-17
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 325.481m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 10/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 10/94

Borehole Diameter: 15.2 cm

Water Level T.O.P: 2.3m

Logged By: P. M.

Checked By: O. P. L.

Sample No.	Blow Counts	HNU	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND:reddish brown, dry	Protective cover
SS1		2	1			Cement
					light brown, coarse sand, dry, moist, no odour	5cm Ø Sch.40 Blank PVC
SS2	3/5 5/8	2	2			Fill
					light brown, fine sand, wet to saturated, no odour	Bentonite Pellet Seal
SS3	3/4 4/2	2	3			11/10/94
					SILTY SAND saturated, no odour	Silica Sand
SS4	4/9 11/11	1	4			5cm Ø Sch.40 Slotted PVC (1mm)
					END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-20
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 324.676m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 12/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 12/94

Borehole Diameter: 15.2 cm

Water Level T.O.P: 1.992m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL: light brown	Protective cover
					SILTY SAND: dark brown black, organic topsoil grey, moist	Cement Fill
AS1		1.5	1		black, organic, topsoil, slight oily odour	5cm Ø Sch.40 Blank PVC Bentonite Pellet Seal
AS2		2.0				
SS3	4/8 8/7	100	2		coarse sand with grey staining, hydrocarbon odours	
					coarse sand, heavily stained, grey oily, saturated	11/12/94
SS4	4/4 7/8	75			light brown grey, saturated, odorous	Silica Sand
SS5		55				5cm Ø Sch.40 Slotted PVC (1mm)
					END OF BOREHOLE	
			4			
			5			
			6			



Environmental
Services
Inc.

Log of Well MW-21
PHASE 2
CV
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 324.549m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 12/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 12/94

Borehole Diameter: 15.2 cm

Water Level T.O.P.: 3.335m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL: light brown grey brown	Protective cover Cement
SS1		3	1			Fill
					sand and gravel fill, red brick, loosely packed, slight hydrocarbon odour	5cm Ø Sch.40 Blank PVC Bentonite Pellet Seal
SS2	3/4 4/4	30	2			
					SILTY SAND: dark brown black, topsoil, slight odour	
SS3	1/2 4/10	95	3		light brown, grey staining, slight odour	
					moist, slight staining and odour	Silica Sand
SS4	12/18 17/12	80				11/12/94 (free product)
					SAND AND GRAVEL: coarse, grey staining, saturated, slight odour	5cm Ø Sch.40 Slotted PVC (1mm)
SS5	11/12 10/10	75	4			
					END OF BOREHOLE	
			5			
			6			



Environmental
Services
Inc.

Log of Well MW-24
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 325.959m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 12/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 12/94

Borehole Diameter: 15.2 cm

Water Level T.O.P: 3.795m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					FILL:slag ballast	Protective cover
					pieces of iron	Cement
SS1		0	1		SILTY SANDlight brown, dry to moist	5cm Ø Sch.40 Blank PVC Fill
					light brown grey, moist to wet, no odour	Bentonite Pellet Seal
SS2	8/10 11/10	0	2			Silica Sand
						5cm Ø Sch.40 Slotted PVC (1mm)
SS3	5/8 5/8	0	3			
					wet to saturated	
SS4	11/12 15/8	0	4			
					saturated	
SS5	4/7 7/8	0	5			
SS6	4/8 5/10	0	5			
					END OF BOREHOLE	
			6			



Environmental
Services
Inc.

Log of Well MW-32
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 326.718m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 14/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 14/94

Borehole Diameter: 15.2 cm

Water Level T.O.P: 3.08m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNU	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL: coarse, dry	Protective cover
SS1		2	1			Cement
					light brown, fine sand and gravel, dry	5cm Ø Sch.40 Blank PVC
SS2	4/8 5/4	<1	2			Fill
					wet, slight odour	Bentonite Pellet Seal
SS3	1/0.5 0.5/1	5.5	3			
					SILTY SAND: light brown grey, moist	
SS4	8/9 8/4	85	4		light brown grey with black grey staining in fractures, slight odour	11/14/94
					grey stained, heavy staining in fractures, wet to saturated, odourous	Silica Sand
SS5	4/7 4/8	45	5			5cm Ø Sch.40 Slotted PVC (1mm)
			6		END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-33
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 326.730m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 14/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 14/94

Borehole Diameter: 15.2 cm

Water Level T.O.P: 2.94m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL: light brown, dry to moist	Protective cover
					TOPSOIL: dark brown, silty clay, moist, slight odour	Cement
SS1		25	1			5cm Ø Sch.40 Blank PVC
					SILTY CLAY: light brown grey, moist, no odour	Fill
SS2	4/8 5/4	2	2			Bentonite Pellet Seal
					slight grey staining, wet, no odour	
SS3	1/2 4/9	8.5	3		red brown, peat, soft, no odour	
					light brown grey green, dry	
					slight dark grey staining in silt fractures, slight odour	11/14/94
SS4	3/7 10/9	45	4			Silica Sand
					black grey staining in fracture, odourous	
SS5	5/8 7/5	25	5			5cm Ø Sch.40 Slotted PVC (1mm)
					grey, saturated, slight odour	
SS6	3/4 4/5	3	6			
					END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-34
PHASE 2
CN
FORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 325.787m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 14/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 14/94

Borehole Diameter: 15.2 cm

Water Level T.O.P: 3.85m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL: medium brown, crushed stone	Protective cover
					SAND: black slag sand, dry	Cement
SS1		2	1		SILTY SAND: light brown, moist	5cm Ø Sch.40 Blank PVC
SS2	8/8 8/8	1	2		SAND AND GRAVEL: light brown, fine gran, moist	Fill
SS3	4/7 11/9	23	3		grey, moist, slight odour black grey stained, fine gravel chips, oily odours	Bentonite Pellet Seal
SS4	4/10 15/10	120	4			11/14/94 (free product)
SS5	5/10 14/10	130	5		SAND: fine sand, grey stained, odourous layered black grey stained sand	Silica Sand
SS6	4/7 18/17	130	6		SAND AND GRAVEL: densely packed sand and coarse gravel	5cm Ø Sch.40 Slotted PVC (1mm)
SS7	15/25 23/23	70				
SS8	8/11 25/21	55			END OF BOREHOLE (SILTY SAND: grey, slight odour)	



Environmental
Services
Inc.

Log of Well MW-38
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 2

Job Number: 94580

G.S. Elevation: 325.912m

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: AD-2 TRACK MOUNTED

Started

NOVEMBER 14/94

Sample Method: STANDARD SPLIT SPOON

Finished

NOVEMBER 14/94

Borehole Diameter: 15.2 cm

Water Level T.O.P.: 3.95m

Logged By: D. G. W.

Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND AND GRAVEL: light brown	Protective cover
					SILTY SAND: light brown, moist	Cement
SS1		1	1			5cm Ø Sch.40 Blank PVC
SS2		<1	2			Fill
SS3		1	3			Bentonite Pellet Casing
SS4		<1	4			
SS5		0	5			11/14/94
SS6		<1	6			Silica Sand
SS7		<1	7		grey, saturated	5cm Ø Sch.40 Slotted PVC (11/14/94)



Environmental
Services
Inc.

Log of Well MW-38
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 2 of 2

Job Number: 94560

G.S. Elevation: 325.912m

Sample No.	Blow Counts	HNU	Depth (meters)	Graphic Log	Materials Description	Well Completion
					END OF BOREHOLE	
			8			
			9			
			10			
			11			
			12			
			13			
			14			



Environmental
Services
Inc.

Log of Well MW-40
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-02

G.S. Elevation: 324.34

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mounted CME 75

Started

September 7/95

Sample Method: STANDARD SPLIT SPOON

Finished

September 7/95

Borehole Diameter: 15.2 cm

Water Level T.O.P: 2.45

Logged By: TMM

Checked By: OPL

Sample No.	Blow Counts	HNU	Depth (meters)	Graphic Log	Materials Description	Well Completion
						Protective cover
					SAND: medium to coarse, brown colour, trace of gravel, moist	Cement 5cm Ø Sch.40 Blank PVC Bentonite Pellet Seal
SS1	7/2 3/1	33	1			
SS2	1/8 0/8	34	2		SANDY SILT: fine grained, tan colour, trace of clay and gravel, no odours	
SS3	4/5 0/5	52	3			18/9/95
					saturated at 2.89 metres below ground surface	Silica Sand
SS4	4/4 4/3	23				5cm Ø Sch.40 Slotted PVC (1mm)
SS5	2/3 4/3	29	4			
					END OF BOREHOLE	
			5			
			6			



Environmental
Services
Inc.

Log of Well MW-43
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-02

G.S. Elevation: 323.86

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mounted CME 75

Started

September 8/95

Sample Method: STANDARD SPLIT SPOON

Finished

September 8/95

Borehole Diameter: 15.2 cm

Water Level T.O.P: 2.16

Logged By: TMM

Checked By: OPL

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND: fine to medium, grey brown colour, trace of gravel, moist	Protective cover
SS1	4/5 7/4	300	1			Cement
					saturated at 1.88 metres below ground surface	5cm Ø Sch.40 Blank PVC
SS2	5/8 7/7	53	2			18/9/95
					SANDY SILT: fine grained, grey colour, trace of clay, slight HC odour	Bentonite Pellet Seal
SS3	5/7 8/8	148	3			Silica Sand
SS4	4/4 4/4	83				5cm Ø Sch.40 Slotted PVC (1mm)
SS5	3/3 5/3	92	4			
SS6	1/1 2/1	57	5			
SS7	1/3 4/3	102	6			
					END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-48
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-02

G.S. Elevation: 324.66

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mounted CME 75

Started

September 8/95

Sample Method: STANDARD SPLIT SPOON

Finished

September 8/95

Borehole Diameter: 15.2 cm

Water Level T.O.P: 2.17

Logged By: TMM

Checked By: OPL

Sample No.	Blow Counts	HNU	Depth (meters)	Graphic Log	Materials Description	Well Completion
					SAND: medium dark brown colour, trace of gravel, no odour trace of organic material, becoming coarser with depth	Protective cover Cement 5cm Ø Sch.40 Blank PVC Bentonite Pellet Seal
SS1	5/5 3/5	45	1			
SS2	1/1 1/1	48	2			18/9/95
SS3	1/8 7/8	28	3			Silica Sand 5cm Ø Sch.40 Slotted PVC (1mm)
SS4	1/4 4/5	38	4		SANDY SILT: fine grained, grey mottled, trace of clay, saturated no odour	
			5		END OF BOREHOLE	
			6			



Environmental
Services
Inc.

Log of Well MW-48
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-02

G.S. Elevation: 325.63

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mounted CME 75

Started

September 8/95

Sample Method: STANDARD SPLIT SPOON

Finished

September 9/95

Borehole Diameter: 15.2 cm

Water Level T.O.P.: 1.72

Logged By: TMM

Checked By: OPL

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
						Protective cover
SS1	8/5 4/2	10	1		SAND: medium, tan colour, trace of gravel and cobbles, no HC odour	Cement 5cm Ø Sch.40 Blank PVC Bentonite Pellet Seal
SS2	8/3 3/3	11	2			18/9/95
SS3	4/2 2/1	38	3		becoming finer	
SS4	4/3 2/2	11	4		SANDY SILT: fine grained, grey colour, trace of clay and gravel, slight HC odour, saturated	Silica Sand 5cm Ø Sch.40 Slotted PVC (1mm)
SS5	1/1 1/1	18	5		END OF BOREHOLE	
			6			



Environmental
Services
Inc.

Log of Well MW/PW-50
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-02

G.S. Elevation: 325.61

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mounted CME 75

Started

September 9/95

Sample Method: STANDARD SPLIT SPOON

Finished

September 9/95

Borehole Diameter: 38 cm

Water Level T.O.P: 1.98

Logged By: TMM

Checked By: OPL

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
						Protective Cover
SS1	2/2/2	15	1		SAND: medium to coarse, grey black colour, trace of gravel, moist no odour	Cement 10cm Ø Sch.40 Blank PVC Bentonite Pellet Seal
SS2	2/5/8	80	2		SANDY SILT: fine grained, grey colour, trace of clay, slight HC odour. saturated. HC odour increases with depth	18/9/95
SS3	3/8/7	87	3			Silica Sand
SS4	8/5/5	39	4			10cm Ø Sch.40 Slotted PVC (1mm)
SS6	4/3/3	11	5			
SS7	2/3/2	28	6		END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-51
PHASE 3
CN
FORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-02

G.S. Elevation: 324.26

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mounted CME 75

Started

September 9/95

Sample Method: STANDARD SPLIT SPOON

Finished

September 9/95

Borehole Diameter: 15.2 cm

Water Level T.O.P: 3.09

Logged By: TMM

Checked By: OPL

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
						Protective cover
					SAND: fine, medium and coarse, brown/black colour with slight HC odour	Cement 5cm Ø Sch.40 Blank PVC Bentonite Pellet Seal
SS1	no recovery		1			
SS2	3/2 2/2	29	2			Silica Sand
SS3	3/4 4/7	33	3			
SS4	3/3 7/4	42	4		saturated at 3.04 metres below ground surface.	18/9/95 5cm Ø Sch.40 Slotted PVC (1mm)
SS5	3/2 2/2	15	4			
SS8	5/4 3/2	38	5			
					END OF BOREHOLE	
			6			



Environmental
Services
Inc.

Log of Well MW/PW-52
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-02

G.S. Elevation: 323.91

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mounted CME 75

Started

September 9/95

Sample Method: STANDARD SPLIT SPOON

Finished

September 9/95

Borehole Diameter: 38 cm

Water Level T.O.P: 2.17

Logged By: TMM

Checked By: OPL

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
						Protective cover
			1		SAND: fine, tan grey colour trace of gravel, moist no odour	Cement Bentonite Pellet Seal
SS1	2/4/5	54	2			10cm Ø Sch.40 Blank PVC
			3		FINE SAND AND SILT: saturated at 3.04 mbgs	18/9/95
SS2	3/5/3	19	4		becoming finer with depth	Silica Sand
			5			10cm Ø Sch.40 Slotted PVC (1mm)
SS3	1/1/1	21				
SS4	no recovery					
			6		END OF BOREHOLE	



Environmental
Services
Inc.

Log of Well MW-58
PHASE 3
CN
HCRNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-04

Ground Elevation: 327.63 masl

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mount Hollow Stem Auger, CME 75

Started

May 14, 1996

NA

Sample Method: STANDARD SPLIT SPOON

Finished

May 14, 1996

NA

Borehole Diameter: 38 cm

Water Level:

Logged By: TMM

Checked By: KMM

SAMPLE NO.	BLOW COUNTS	MINIRAE (ppm)	Depth (meters)	Graphic Log	Materials Description	Well Completion
SS1					FILL - Coarse grained sand and gravel.	Protective cover
SS2	20/50	5.5	1		SAND - Grey/green sand and silt, fine grained with pebbles and trace of gravel (till like), moist to wet (partially frozen), dense. - As above, with more fine grained sand, uniform, no odour.	Bentonite Seal
SS3	20/50	14.9	2		- As above, no odour.	Silica Sand
SS4	5/50	8.5	3		No sample recovery in this interval.	05/30/96 water table
SS5	7/9 14/8	7.7	4		SAND AND GRAVEL - Coarse grained, moderately saturated, faint hydrocarbon odour. - Moist to wet.	Well screen Sch. 40 Slotted PVC (1MM)
SS6	4/6 7/9	5.3	5		PEAT SAND AND GRAVEL	
SS7	5/9 8/12	6.7	6		SAND - Tan/grey fine grained, uniform, saturated.	
					End of borehole at 6.10 m.b.g.s.	



Environmental
Services
Inc.

Log of Well MW-59
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-04

Ground Elevation: 327.58 masl

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: Track Mount Hollow Stem Auger, CME 75

Started

May 15, 1996

NA

Sample Method: STANDARD SPLIT SPOON

Finished

May 15, 1996

NA

Borehole Diameter: 38 cm

Water Level:

Logged By: TMM

Checked By: KMM

SAMPLE NO.	BLOW COUNTS	MINIRAE (ppm)	Depth (meters)	Graphic Log	Materials Description	Well Completion
SS1					FILL - Sand and gravel - Brown to tan sand and silt, fine grained, with gravel, some pebbles, dense, frozen.	Protective cover
SS2	10/25 35/50	5.5	1			Backfill
SS3	30/50	4.8	2		SAND AND GRAVEL - Coarse grained sand, moist with some saturated zones. - Dry to moist.	
SS4	3/5 50	21.3	3			
SS5	50/17 21/20	6.4	4			05/30/95 water table
SS6	15/17 14/10	8.2	5		SAND - Fine to medium grained, trace gravel. SAND AND GRAVEL - Tan to brown medium and coarse grained sand.	Bentonite seal
SS7	4/5 8/72	7.5	6		PEAT - Dark brown peat layer, moist, musty odour, soft.	5' ice sand
SS8	11/22 24/20	9.1				Well screen Sch. 40 Slotted PVC (1MM)
SS9	3/5 4/2	9.3			SAND - Grey, fine grained, uniform, saturated. End of borehole at 6.9 m.b.g.s.	



Environmental
Services
Inc.

Log of Well MW-66
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 4057-02-04

Ground Elevation: 326.84 masl

Driller: BOART LONGYEAR DRILLING INC.

Drilling

Date

Time

Drill Method: TRACK MOUNT HOLLOW STEM AUGER, CME 75

Started

May 16, 1996

NA

Sample Method: Standard Split Spoon

Finished

May 16, 1996

NA

Borehole Diameter: 38 cm

Water Level:

Logged By: TMM

Checked By: KMM

SAMPLE NO.

BLOW COUNTS

MINIRAE (ppm)

Depth
(meters)

Graphic Log

Materials Description

Well Completion

Protective casing

Straight auger to 6.10 m.b.g.s.

Backfill

Bentonite seal

05/30/96
water
table AND
Free
Product

Well
screen
5cm.
Sch.40
Slotted
PVC (1MM)

Silica
sand

End of borehole at 6.10 m.b.g.s.



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
160 Franklin Blvd. Suite 10 - St. John, Quebec J9P 4P3
Tel.: (418) 853-4422 Fax.: (418) 853-3683

BOREHOLE LOG

BOREHOLE #: **OW3-2**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **28-09-96** COMPT. DATE: **28-09-96**
LOCATION: **AREA OF PLUME 3** SLOTTED PIPE Ø: **50 mm** TUBING Ø: **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc.** DRILL TYPE: **CME 75** CORE SAMPLER Ø: **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL			SAMPLE					GEOLOGY		OBSERVATIONS		
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION			
0	0.00	325.51			Steel Cap							No Soil Description	ODOR	VISUAL	
					Cap Cement										
					Bentonite										
1					PVC Tubing										
2	2.13	323.38													
					Silica Sand										
3					Screen, Opening 0.05 cm										
4															
5	5.15	320.36			Cap							End of Borehole at a Depth of 5.15 m			
6															
7															
8															
9															

STATE OF SAMPLE:



INTACT DISTURBED LOST CODE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
TW - TURN WALL SAMPLER
CS - CORE SAMPLER

OBSERVATIONS

O - OUBRESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

Σ = WATER TABLE

** = FIELD
DUPLICATE
ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Cement/Bentonite**

SEALANT DEPTH: **1.00 m**

SCREEN LENGTH: **4.00 m**

TUBING LENGTH: **1.15 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **325.51 m**

WATER TABLE LEVEL:

48 HOUR(s) AFTER DRILLING: **323.38**

001562

BOREHOLE LOG

BOREHOLE #: OW5-1

SHEET: 1 OF 1

FILE #: CN-6089

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT:	<u>HORNEPAYNE CN</u>	STARTING DATE:	<u>01-10-96</u>	COMPLT. DATE:	<u>01-10-96</u>
LOCATION:	<u>AREA OF PLUME 8</u>	SLOTTED PIPE Ø :	<u>50 mm</u>	TUBING Ø :	<u>50 mm</u>
CONTRACTOR:	<u>Boart Longyear Drilling Inc</u>	DRILL TYPE:	<u>CME 75</u>	CORE SAMPLER Ø :	<u>---</u>
OPERATOR:	<u>C. Pullen</u>	METHOD (SOIL):	<u>Auger</u>	METHOD (ROCK):	<u>---</u>
TYPE OF TUBING:	<u>PVC</u>	DRILLING FLUID:	<u>---</u>	COMPILED BY:	<u>P. Ouellette</u>

[illegible]

STATE OF SAMPLE:






INTACT UNDISTURBED LOST COIN S.

TYPE OF SAMPLE:

SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS

O — ODDLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED
SA — SATURATED

∇ = WATER TABLE

```

** = FIELD
    DUPLICATE
*  = ANALYZED
    SAMPLE

```

SURFACE PROTECTION: Steel Cap

SURFACE SEALANT: Bentonite

SURFACE SEALANT:

SEALANT DEPTH: 0.90 m

SCREEN LENGTH:

TUBING LENGTH: 1.20 m

ELEVATION:

REFERENCE LEVEL: Real

BEDROCK LEVEL:

GROUND LEVEL: 324.47 m

WATER TABLE LEVEL:

24 HOUR(S) AFTER DRILLING: 321.20



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
260 Promenade Steeles West 10 - 4th Fl., (Corner QIP 401)
Tel.: (416) 650-4422 Fax.: (416) 650-3583

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: **OW5-2**

SHEET: **1** OF **1**

FILE #: **CN-6089**

PROJECT: **HORNEPAYNE CN** STARTING DATE: **01-10-96** COMPLT. DATE: **01-10-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL			SAMPLE				GEOLOGY		OBSERVATIONS	
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	
0	0.00 323.69		Cap Bentonite PVC Tubing	Steel Cap								Light Brown Sand and Gravel, Dry	
1													
1.80	321.89											Grayish Clayey Silt	
2													
2.40	321.29											Brown Clayey Silt	
2.89	320.80												
3	320.69		Screen Opening 0.05 cm									Gray Sandy Silt, Saturated	
4	319.69		Cap									End of Borehole at a Depth of 4.00 m	
5												NOTE: 0.22 m of Free-phase product observed on 02-10-96	
6												0.51 m Top Section of Observation Well installed Aboveground. Elevation of 323.69 m Taken at Ground Level. Water Elevation Measurements Taken from Protective Casing at an Elevation of 324.20 m	
7													
8													
9													

STATE OF SAMPLE: **INTACT** **DISRUPTED** **LOST** **CONE SAMPLE** **---**
O - GOODNESS ** = FIELD
W - WEAK * = ANALYZED
I - INTERMEDIATE SAMPLE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

SURFACE PROTECTION: **Steel Cap** SURFACE SEALANT: **Bentonite**
SEALANT DEPTH: **0.90 m** SCREEN LENGTH: **3.10 m**
TUBING LENGTH: **1.20 m**

ELEVATION: **Real**
REFERENCE LEVEL: **---**
BEDROCK LEVEL: **---**
GROUND LEVEL: **323.69 m**
WATER TABLE LEVEL: **24** HOUR(s) AFTER DRILLING: **320.80**



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
250 Boulevard Saint-Jacques, Suite 100, Québec, Québec G1P 4P3
Tel.: (418) 653-4422 Fax: (418) 653-3683

BOREHOLE LOG

BOREHOLE #: **OW5-3**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **28-09-96** COMPLT. DATE: **28-09-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Hollow Stem Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	
0	0.00 323.75			Steel Cap		SS1	75	N=5	---	---		
				Bentonite		SS2	100	N=8	---	---		
1				PVC Tubing		SS3	100	N=15	---	---		
1.60	322.15					SS4	50	N=8	---	---		
2	2.20 321.55					SS5	100	N=8	---	---		
2.74	321.01					SS6	16	N=16	---	---		
3						SS7	25	N=17	---	---		
3.50	320.25					SS8	60	N=32	---	---		
4	4.25 319.60			Silica Sand		SS9	50	N=57	---	---		
5						SS10	16	N=21	---	---		
6				Screen, Opening 0.05 cm		SS11	50	N=15	---	---		
7	7.20 316.55			Cap		SS12	16	N=35	---	---		
8												
9												

STATE OF SAMPLE:



INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
IW - THIN WALL SAMPLER
CS - CORE SAMPLER

OBSERVATIONS

O - ODORLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

Σ = WATER TABLE

** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Bentonite**

SEALANT DEPTH: **0.80 m**

SCREEN LENGTH: **6.00 m**

TUBING LENGTH: **1.20 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **323.75 m**

WATER TABLE LEVEL:

48 HOUR(S) AFTER DRILLING: **321.01**

001565



BIOGÉNIE Inc
 ENVIRONMENTAL SPECIALISTS
 360 François-Xavier Bédaride St. Ste-Foy, Québec G1P 4P3
 Tel. : (418) 653-4422 Fax : (418) 653-3683

BOREHOLE LOG

BOREHOLE #: **OW5-4**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **28-09-96** COMPT. DATE: **28-09-96**
 LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
 CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
 OPERATOR: **C. Pullen** METHOD (SOIL): **Hollow Stem Auger** METHOD (ROCK): **---**
 TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING		MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS	
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION
0	0.00 324.46			Steel Cap								
			Cap			SS1	79	N=13	---	---		Light Brown Fine to Coarse Sand with Traces of Gravel, Medium Dense, Dry
			Bentonite			SS2	100	N=13	---	---		
1			PVC Tubing			SS3	100	N=20	---	---		
1.90	322.56					SS4	100	N=17	---	---		Gray Fine Sand with Traces of Silt, Medium Dense, Dry to Humid
2						SS5	100	N=12	---	---		
3						SS6	100	N=7	---	---		
3.68	320.78					SS7	75	N=13	---	---		Becoming Loose and Saturated, Sheen of the Water
3.80	320.66					SS8	100	N=8	---	---		Gray Medium to Coarse Sand with Little Gravel, Loose, Saturated
4			Silica Sand			SS9	75	N=12	---	---		Light Brown Coarse Sand with Some Gravel, Medium Dense, Saturated
4.25	320.21					SS10	60	N=16	---	---		
5						SS11	25	N=13	---	---		
6			Screen, Opening 0.05 cm			SS12	0	N=24	---	---		
7												End of Borehole at a Depth 7.20 m
7.20	317.26		Cap									
8												NOTE: 0.29 m of Free-phase product observed on 08-10-96
9												

STATE OF SAMPLE:

INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
 TW - THIN WALL SAMPLER
 CS - CORE SAMPLER

OBSERVATIONS

O - OILLESS
 W - WEAK
 I - INTERMEDIATE
 P - PERSISTENT
 NE - NON EXISTENT
 SC - SCATTERED
 SA - SATURATED

Σ = WATER TABLE

** = FIELD
 DUPLICATE
 = ANALYZED
 SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Bentonite**

SEALANT DEPTH: **0.80 m**

SCREEN LENGTH: **6.00 m**

TUBING LENGTH: **1.20 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **324.46 m**

WATER TABLE LEVEL:

24 HOUR(s) AFTER DRILLING: **320.78**

001566



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
360 Franklin Street, Suite 100, St-Fay, Québec Q1P 4P3
Tel. : (418) 653-4422 Fax. : (418) 653-3583

BOREHOLE LOG

BOREHOLE #: **OW5-6**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **28-09-96** COMPT. DATE: **28-09-96**
LOCATION: **AREA OF PLUME 8** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boert Longyear Drilling Inc** DRILL TYPE: **CME 76** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Hollow Stem Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE						GEOLOGY		OBSERVATIONS	
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	DOOR	VISUAL
0	0.00 324.30			Steel Cap										
				Cap		SS1	4	N = 12	...	...		Light Brown Fine to Coarse Sand, Traces of Silt, Loose, Dry		
				Bentonite		SS2	4	N = 4	...	...				
1				PVC Tubing		SS3	100	N = 12	...	...				
1.50	322.80					SS4	100	N = 16	...	...		Light Brown Clayey Silt with Traces of Sand, Stiff, Humid		
2						SS5	75	N = 18	...	...				
2.80	321.50					SS6	75	N = 8	...	...				
3						SS7	91	N = 11	...	...				
4				Silice Sand		SS8	79	N = 3	...	...				
4.80	319.50					SS9	100	N = 3	...	...		Light Brown Fine Sand to Sandy Silt, Very Loose, Saturated		
6				Screen, Opening 0.05 cm		SS10	100	N = 5	...	...				
6.00	318.30					SS11	25	N = 7	...	...		Light Brown Medium to Coarse Sand, with Traces of Gravel, Loose, Saturated		
7				Cap		SS12		N = 6	...	...				
7.20	317.10											End of Borehole at a Depth of 7.20 m		
8														
9														

STATE OF SAMPLE:

INTACT ☒ DISTURBED ☒ LOST ☒ CORE SAMPLE ☒

TYPE OF SAMPLE:

SS -- SPLIT SPOON SAMPLE
TW -- THIN WALL SAMPLER
CS -- CORE SAMPLER

OBSERVATIONS

O -- ODORLESS
W -- WEAK
I -- INTERMEDIATE
P -- PERSISTENT
NE -- NON EXISTENT
SC -- SCATTERED
SA -- SATURATED

Σ = WATER TABLE

** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE PROTECTION: Steel Cap

SURFACE SEALANT: Bentonite

SEALANT DEPTH: 0.80 m

SCREEN LENGTH: 6.00 m

TUBING LENGTH: 0.70 m

ELEVATION:

REFERENCE LEVEL: Real

BEDROCK LEVEL: ---

GROUND LEVEL: 324.30 m

WATER TABLE LEVEL:

48 HOUR(s) AFTER DRILLING: 321.50

001567

BOREHOLE LOG

BOREHOLE #: **OW6-1**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **30-09-96** COMPLT. DATE: **30-09-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø: **50 mm** TUBING Ø: **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc.** DRILL TYPE: **CME 75** CORE SAMPLER Ø: **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Oullette**

LEVELING		MONITORING WELL			SAMPLE					GEOLOGY		OBSERVATIONS
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	
0	0.00 326.91		Steel Cap	Cap								Black Sandy Silt with Traces of Coal Residues
1	1.20 325.71			Cement								
				Bentonite								Light Brown Clayey Silt, Humid
2	2.26 324.65			PVC Tubing								
3				Silica Sand								End of Borehole at a Depth of 6.00 m
4				Screen, Opening 0.05 cm								
6				Cap								
8	6.00 320.91											
9												

STATE OF SAMPLE:

INTACT DISTURBED LOST CODE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
IW - THIN WALL SAMPLER
CS - CORE SAMPLER

OBSERVATIONS

O - OILLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

∇ = WATER TABLE

** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Cement/Bentonite**

SEALANT DEPTH: **0.90 m**

SCREEN LENGTH: **4.40 m**

TUBING LENGTH: **1.60 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **326.91 m**

WATER TABLE LEVEL:

24 HOUR(s) AFTER DRILLING: **324.65**



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
160 Tranquille Road, Suite 100 - Ste-Foy, Québec G1P 4P3
Tel. : (418) 853-4422 Fax. : (418) 853-3683

BOREHOLE LOG

BOREHOLE #: **OW6-3**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **30-09-96** COMPT. DATE: **30-09-96**
LOCATION: **AREA OF PLUME 8** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc.** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Oullette**

LEVELING			MONITORING WELL		SAMPLE						GEOLOGY		OBSERVATIONS	
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	ODOR	VISUAL
0	0.00 326.61			Steel Cap								Black Silt, Presence of Coal Residues, Dry		
2.45	324.16											Light Brown Sandy Silt, Dry		
2.64	323.97													
3														
4														
5														
6	6.00 320.61													
7														
8														
9														

STATE OF SAMPLE:

INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
TW - THIN WALL SAMPLER
CS - CORE SAMPLER

OBSERVATIONS

O - ODORLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

Δ = WATER TABLE

** = FIELD
DUPLICATE
ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Cement/Bentonite**

SEALANT DEPTH: **1.20 m**

SCREEN LENGTH: **4.50 m**

TUBING LENGTH: **1.50 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **326.61**

WATER TABLE LEVEL:

24 HOUR(s) AFTER DRILLING: **323.97**

001569

BOREHOLE LOG

BOREHOLE #: **OW6-4**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **30-09-96** COMPLT. DATE: **30-09-96**
LOCATION: **AREA OF PLUME 8** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc.** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Oullette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS		
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	REMARKS	DATE
0	0.00 327.26			Steel Cap								Light Brown Sand and Gravel, Dry		
0.60	326.66			Cement								Brown Silt, with Traces of Gravel, Dry		
1	1.20 326.06			Bentonite								Black Sandy Silt with Traces of Gravel, Humid		
2	2.21 325.06			PVC Tubing								Gray-Brown Clayey Silt, Humid		
2.46	324.81											Gray Clayey Silt with Traces of Sand, Humid		
3				Silica Sand										
4														
4.60	322.66			Screen, Opening 0.05 cm										
5														
6	6.00 321.26			Cap								End of Borehole at a Depth of 6.00 m		
7														
8														
9														

STATE OF SAMPLE: **INTACT** **DISTURBED** **LOST** **CORE SAMPLE** OBSERVATIONS: **∇ = WATER TABLE** SURFACE PROTECTION: **Steel Cap** ELEVATION: **---**
SURFACE SEALANT: **Cement/Bentonite** REFERENCE LEVEL: **Real**
SEALANT DEPTH: **0.80 m** BEDROCK LEVEL: **---**
SCREEN LENGTH: **4.60 m** GROUND LEVEL: **327.26 m**
TUBING LENGTH: **1.40 m** WATER TABLE LEVEL: **24** HOUR(s) AFTER DRILLING: **325.05**

TYPE OF SAMPLE: **SS - SPLIT SPOON SAMPLER** **1W - THIN WALL SAMPLER** **CS - CORE SAMPLER**
0 - GIBRLESS **W - WEAK** **I - INTERMEDIATE** **P - PERSISTENT** **NE - NON-EXISTENT** **SC - SCATTERED** **SA - SATURATED**
**** = FIELD DUPLICATE** *** = ANALYZED SAMPLE**



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
340 Transpac Route 10 Ste-Fox, Québec (P.Q.) J1P 4P3
Tel. : (418) 853-4422 Fax. : (418) 853-3583

BOREHOLE LOG

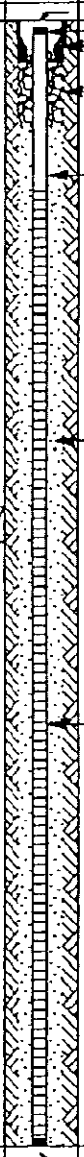
BOREHOLE #: **OW8-1**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **27-09-96** COMPT. DATE: **27-09-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE							GEOLOGY		OBSERVATIONS	
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	ODOR	VISUAL	
0	0.00	327.67										Light Brown to Grey Fine to Coarse Sand with Traces of Gravel, Dry			
3.70	323.97											Grey Clayey to Sandy Silt, Dry			
4.30	323.37														
5.80	321.87											Brown Clayey Silt, Dry			
6.35	321.32											Grey Clayey Silt, Saturated			
8.00	319.67											End of Borehole at a Depth of 8.00 m			

STATE OF SAMPLE:

OBSERVATIONS

▽ = WATER TABLE

SURFACE PROTECTION: **Steel Cap**

ELEVATION:

INTACT DISTURBED LOST CORE SAMPLE

O - DECEASED
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NOT EXISTENT
SC - SCATTERED
SA - SATURATED

** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE SEALANT: **Cement/Bentonite**

REFERENCE LEVEL: **Real**

SEALANT DEPTH: **0.75 m**

BEDROCK LEVEL: **---**

SCREEN LENGTH: **6.80 m**

GROUND LEVEL: **327.67 m**

TUBING LENGTH: **1.20 m**

WATER TABLE LEVEL:

48 HOUR(s) AFTER DRILLING: **323.97**

001571



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
140 Front Street East, Suite 10, New York, Ontario N5Y 4P1
Tel.: (416) 653-4422 Fax.: (416) 653-3583

BOREHOLE LOG

BOREHOLE #: **OW8-2**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **27-09-96** COMPT. DATE: **27-09-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø: **50 mm** TUBING Ø: **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø: **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL			SAMPLE					GEOLOGY		OBSERVATIONS	
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	ODOR	INITIAL
0	0.00 327.56			Steel Cap Cap Cement Bentonite PVC Tubing Silice Sand Screen, Opening 0.05 cm Cap								Light Brown Sand, Dry		
1														
2														
3	3.00 324.56											Light Brown Clayey Silt, Dry		
4	3.60 323.96 3.87 323.69											Dark Brown Clayey Silt, Dry		
5	4.90 322.66											Gray Clayey Silt, Saturated		
6														
7														
8	7.90 319.66											End of Borehole at a Depth of 7.90 m		
9												NOTE: 0.34 m of Free-phase product observed on 29-09-96		

STATE OF SAMPLE:

INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

- SS - SPLIT SPOON SAMPLER
- TW - TWIN WALL SAMPLER
- CS - CORE SAMPLER

OBSERVATIONS

- O - OILLESS
- W - WEAK
- I - INTERMEDIATE
- P - PERSISTENT
- NE - NON PERSISTENT
- SC - SCATTERED
- SA - SATURATED

Σ = WATER TABLE

FIELD DUPLICATE ANALYZED SAMPLE

SURFACE PROTECTION: **Steel Cap** ELEVATION: **---**

SURFACE SEALANT: **Cement/Bentonite** REFERENCE LEVEL: **Real**

SEALANT DEPTH: **0.75 m** BEDROCK LEVEL: **---**

SCREEN LENGTH: **6.70 m** GROUND LEVEL: **327.56 m**

TUBING LENGTH: **1.20 m** WATER TABLE LEVEL: **48** HOUR(S) AFTER DRILLING: **323.69**



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
360 Front Street East, Suite 100, Toronto, Ontario M5E 1B3
Tel.: (416) 853-4422 Fax: (416) 853-3683

BOREHOLE LOG

BOREHOLE #: **OW8-3**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **27-09-96** COMPT. DATE: **27-09-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø: **50 mm** TUBING Ø: **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø: **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS			
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION		ODOR	VISUAL
0	0.00	327.79		Steel Cap								Light Brown Fine Sand, Dry			
				Cap Cement Bentonite											
1				PVC Tubing											
2															
3	3.00	324.79		Silica Sand								Grey Sand and Gravel with Traces of Silt, Dry			
4															
5	4.75	323.04		Screen, Opening 0.05 cm								Grey Clayey Silt, Saturated			
6	6.80	321.89													
7															
8	7.90	319.89		Cap								End of Borehole at a Depth of 7.90 m			
9												NOTE: 2.22 m of Free-phase product observed on 29-09-96			

STATE OF SAMPLE:

INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
TW - THIN WALL SAMPLER
CS - CORE SAMPLER

OBSERVATIONS

0 - FINGERLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

∇ = WATER TABLE

** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Cement/Bentonite**

SEALANT DEPTH: **0.60 m**

SCREEN LENGTH: **6.70 m**

TUBING LENGTH: **1.20 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **327.79 m**

WATER TABLE LEVEL:

48 HOUR(s) AFTER DRILLING: **323.04**

End of Borehole at a Depth of 7.90 m

NOTE: 2.22 m of Free-phase product
observed on 29-09-96



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
2601 Boulevard Saint-Jacques St. Ste-Foy, Québec G1P 4P1
Tel. : (418) 653-4422 Fax. : (418) 653-3587

BOREHOLE LOG

BOREHOLE #: **OW8-4**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **27-09-96** COMPT. DATE: **27-09-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	
0	0.00 327.45			Steel Cap								
			Cap									
			Cement									
			Bentonite									
1			PVC Tubing									
2												
2.40	325.05											
3	3.00 324.45			Silica Sand								
4												
4.71	322.74											
6				Screen, Opening 0.05 cm								
5.80	321.65											
6												
7												
7.90	319.55			Cap								
8												
9												

End of Borehole at a Depth of 7.90 m

NOTE: 1.84 m of Free-phase product
observed on 29-09-96

STATE OF SAMPLE:



INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS

O — ODDLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON EXISTENT
SC — SCATTERED
SA — SATURATED

∇ = WATER TABLE

** = FIELD
DUPLICATE
ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Cement/Bentonite**

SEALANT DEPTH: **0.60 m**

SCREEN LENGTH: **6.70 m**

TUBING LENGTH: **1.20 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **327.45 m**

WATER TABLE LEVEL:

48 HOUR(s) AFTER DRILLING: **322.74**

001574



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
350 Transpac Route 10 Ste-Foy, Québec (G1P 4P3)
Tel. : (418) 853-4422 Fax. : (418) 853-3583

BOREHOLE LOG

BOREHOLE #: **OW8-5**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **27-09-96** COMPT. DATE: **27-09-96**
LOCATION: **AREA OF PLUME 8** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	
0	0.00	327.60		Steel Cap								
				Cap								
				Cement								
				Bentonite								
1				PVC Tubing								
2												
3				Silica Sand								
3.75	323.85											
4												
4.60	323.00											
5				Screen, Opening 0.06 cm								
6												
7												
8	8.00	319.60		Cap								
9												

Grey Sand and Gravel, Dry

Grey Silt with Clay, Saturated

End of Borehole at a Depth of 8.00 m

NOTE: 0.17 m of Free-phase product observed on 29-09-96

STATE OF SAMPLE: OBSERVATIONS ∇ = WATER TABLE

INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
TW - THIN WALL SAMPLER
CS - CORE SAMPLER

O - ODORLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: **Steel Cap** ELEVATION:

SURFACE SEALANT: **Cement/Bentonite** REFERENCE LEVEL: **Real**

SEALANT DEPTH: **0.90 m**

BEDROCK LEVEL: **---**

SCREEN LENGTH: **6.80 m**

GROUND LEVEL: **327.60 m**

TUBING LENGTH: **1.20 m**

WATER TABLE LEVEL:

48 HOUR(s) AFTER DRILLING: **323.85**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT:	HORNEPAYNE CN	STARTING DATE:	27-09-96	COMPLT. DATE:	27-09-96
LOCATION:	AREA OF PLUME 9	SLOTTED PIPE Ø :	50 mm	TUBING Ø :	50 mm
CONTRACTOR:	Boart Longyear Drilling Inc.	DRILL TYPE:	CME 75	CORE SAMPLER Ø :	--
OPERATOR:	C. Pullen	METHOD (SOIL):	Auger	METHOD (ROCK):	--
TYPE OF TUBING:	PVC	DRILLING FLUID:	--	COMPILED BY:	P. Ouellette

[illegible]

STATE OF SAMPLE:

WEACT INSURABLE LOST CODE S

TYPE OF SAMPLE:

SS -- SPLIT SPOON SAMPLER
TW -- THIN WALL SAMPLER
CS -- CORE SAMPLER

OBSERVATIONS

O — ODDLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON EXISTENT
SC — SCATTERED
SA — SATURATED

 = WATER TABLE

" = FIELD
 (MULTIPLY
 " = ANALYZED
 SAMPLE

SURFACE PROTECTION: Steel Cap

SURFACE SEALANT: Cement/B

SEALANT DEPTH: 0.45 m

SCREEN LENGTH: 6.40 m

TUBING LENGTH: 0.60 m

ELEVATION:

REFERENCE LEVEL: Real

BEDROCK LEVEL: ---

GROUND LEVEL: 327.35 m

WATER TABLE LEVEL:
48 HOUR(S) AFTER DRILLING: 324.85



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
780 Avenue du Nord, Suite 100, St. Jovite, Québec J0P 1P0
Tel.: (418) 853-4422 Fax.: (418) 853-3563

BOREHOLE LOG

BOREHOLE #: **RW8-2**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **02-10-96** COMPLT. DATE: **02-10-96**
LOCATION: **AREA OF PLUME 8** SLOTTED PIPE Ø: **100 mm** TUBING Ø: **100 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø: **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS		
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	DATE	TIME
0	0.00 327.33			Steel Cap								Light Brown Fine Sand with Traces of Coarse Sand, Dry		
				Cap Cement										
				Bentonite										
1				PVC Tubing										
2														
3	3.00 324.33			Silica Sand								Black Clayey Silt with Traces of Gravel		
4	3.90 323.43											Brown Sandy Silt with Traces of Gravel, Saturated		
5	4.68 322.65													
6				Screener, Opening 0.05 cm										
7	7.00 320.33			Cap								End of Borehole at a Depth of 7.00 m		
8												NOTE: more than 1.83 m of Free-phase product observed on 12-10-96		
9														

STATE OF SAMPLE: ☒ INTACT ☐ DISTURBED ☐ LOST ☐ CORE SAMPLE

TYPE OF SAMPLE:
SS - SPLIT SPOON SAMPLE
TW - THIN WALL SAMPLE
CS - CORE SAMPLER

OBSERVATIONS
O - ODDLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

▽ = WATER TABLE
** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap** ELEVATION: **---**
SURFACE SEALANT: **Cement/Bentonite** REFERENCE LEVEL: **Real**
SEALANT DEPTH: **0.70 m** BEDROCK LEVEL: **---**
SCREEN LENGTH: **5.60 m** GROUND LEVEL: **327.33 m**
TUBING LENGTH: **1.60 m** WATER TABLE LEVEL: **> 96** HOUR(s) AFTER DRILLING: **322.65**



BIOGÉNIE Inc
 ENVIRONMENTAL SPECIALISTS
 360 Franquet Blvd. Suite 10 Moncton, Québec G1P 4P3
 Tel. : (418) 653-4422 Fax : (418) 653-3683

BOREHOLE LOG

BOREHOLE #: **RW8-3**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **02-10-96** COMPT. DATE: **02-10-96**
 LOCATION: **AREA OF PLUME 8** SLOTTED PIPE Ø : **100 mm** TUBING Ø : **100 mm**
 CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
 OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
 TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING		MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS			
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	DOOR N W E P M T V A	WIND D I R E C T I O N
0	0.00 327.29		Steel Cap	Cap Cement								Light Brown Fine Sand with Traces of Gravel, Dry		
				Bentonite										
1				PVC Tubing										
1.50	325.79											Grey Silty Fine Sand with Traces of Gravel		
2														
3				Silice Sand										
3.90	323.39											Presence of Gravel		
4												Grey Coarse Sand with Little Gravel, Humid		
4.66	322.63													
5														
5.50	321.79											Brown Silt, Humid		
6				Screen, Opening 0.05 cm										
7	7.00 320.29			Cap								End of Borehole at a Depth of 7.00 m		
												NOTE: 1.51 m of Free-phase product observed on 12-10-96		
8														
9														

STATE OF SAMPLE: **INACT** **DISTURBED** **LOST** **CODE SAMPLE** OBSERVATIONS: **0** - OODLESS **W** - WEAK **I** - INTERMEDIATE **P** - PERSISTENT **NE** - NON EXISTENT **SC** - SCATTERED **SA** - SATURATED ****** = FIELD ***** = ANALYZED SAMPLE

SURFACE PROTECTION: **Steel Cap** SURFACE SEALANT: **Cement/Bentonite** SEALANT DEPTH: **0.70 m** SCREEN LENGTH: **5.60 m** TUBING LENGTH: **1.60 m**

ELEVATION: **Real** REFERENCE LEVEL: **---** BEDROCK LEVEL: **---** GROUND LEVEL: **327.29 m** WATER TABLE LEVEL: **>96** HOUR(s) AFTER DRILLING: **322.63**

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 1.5 m East of Southeast Corner of Railing at Lagoon 2
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 324.14 m, Geodetic
TOP OF PVC ELEV. 324.12 m
WATER ELEV. 321.46 m, 26/05/00
DATE DRILLED 09/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photonizable Vapours (ppm)
					0.02			500 1000 1500 2000
323.38			SAND FILL - Brown, damp, loose, poorly graded, fine grained, some fine grained, subangular gravel, trace silt. -slight petroleum hydrocarbon odour		0.77	1		
	1.0		SAND - Grey, damp, loose, poorly graded, fine grained, some fine grained, subangular gravel. -petroleum hydrocarbon odour		1.07	2	25	
	2.0		-dense, strong petroleum hydrocarbon odour below 1.5 m			3	40	
			-saturated below 2.3 m			4	60	
			-dark grey petroleum hydrocarbon staining at 2.6 m					
321.09	3.0		GRAVEL - Grey, saturated, well graded, fine to coarse grained, trace silt. -strong petroleum hydrocarbon odour -dark grey petroleum hydrocarbon staining at 3.35 m			5	40	
	4.0		-sand lense (50 mm thick), dark grey, saturated, dense, poorly graded, fine grained, with oily sheen at 3.81 m			6	20	
	5.0					7	20	
318.81			SAND - Grey, saturated, dense, poorly graded, fine grained, trace silt. -slight petroleum hydrocarbon odour -lense of coarse grained gravel (25 mm ø) and cobbles at 5.5 m		5.57	8	30	
318.04	6.0				6.10			
			END OF HOLE @ 6.1 m					
			Note: 1. Well flush mounted to grade.					

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

DATE 19/06

001579

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 220°, 1.5 m from East to North running Barrier

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

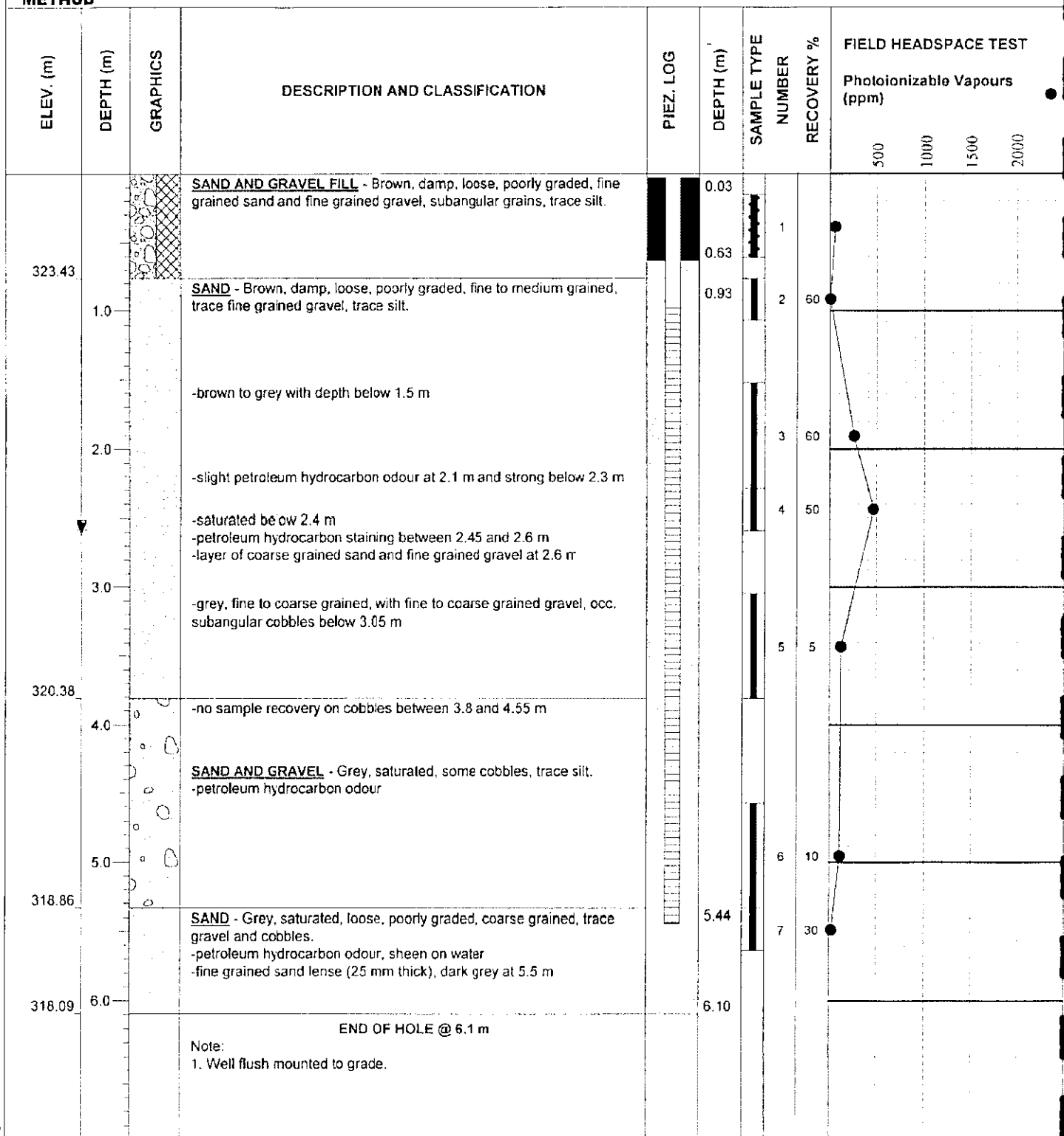
JOB NO. 00-434-08

GROUND ELEV. 324.19 m, Geodetic

TOP OF PVC ELEV. 324.16 m

WATER ELEV. 321.59 m, 26/05/00

DATE DRILLED 09/05/00



SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR T. GALLO

APPROVED

DATE 19/06/

001580

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 154°, 20 m from East-West running Barrier of Lagoon #2
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 323.66 m, Geodetic
TOP OF PVC ELEV. 323.57 m
WATER ELEV. 321.57 m, 26/05/00
DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)			
								500	1000	1500	2000
			<u>SILT AND SAND</u> - Dark brown, moist, soft, non plastic, and fine to medium grained sand, trace fine grained gravel.		0.09 0.12 0.37						
	1.0		-light brown below 0.75 m -damp between 0.75 and 1.5 m		0.67	1					
			-saturated, silt and fine grained sand, trace oxidation below 1.5 m			2					
	2.0					3	70				
						4	80				
	3.0										
	4.0										
319.09					4.57						
	5.0		END OF HOLE @ 4.57 m Note: 1. Well flush mounted just above grade. Flush mount was built up with cuttings to elev. 323.86 m.								
	6.0										

SAMPLE TYPE  AUGER GRAB  SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

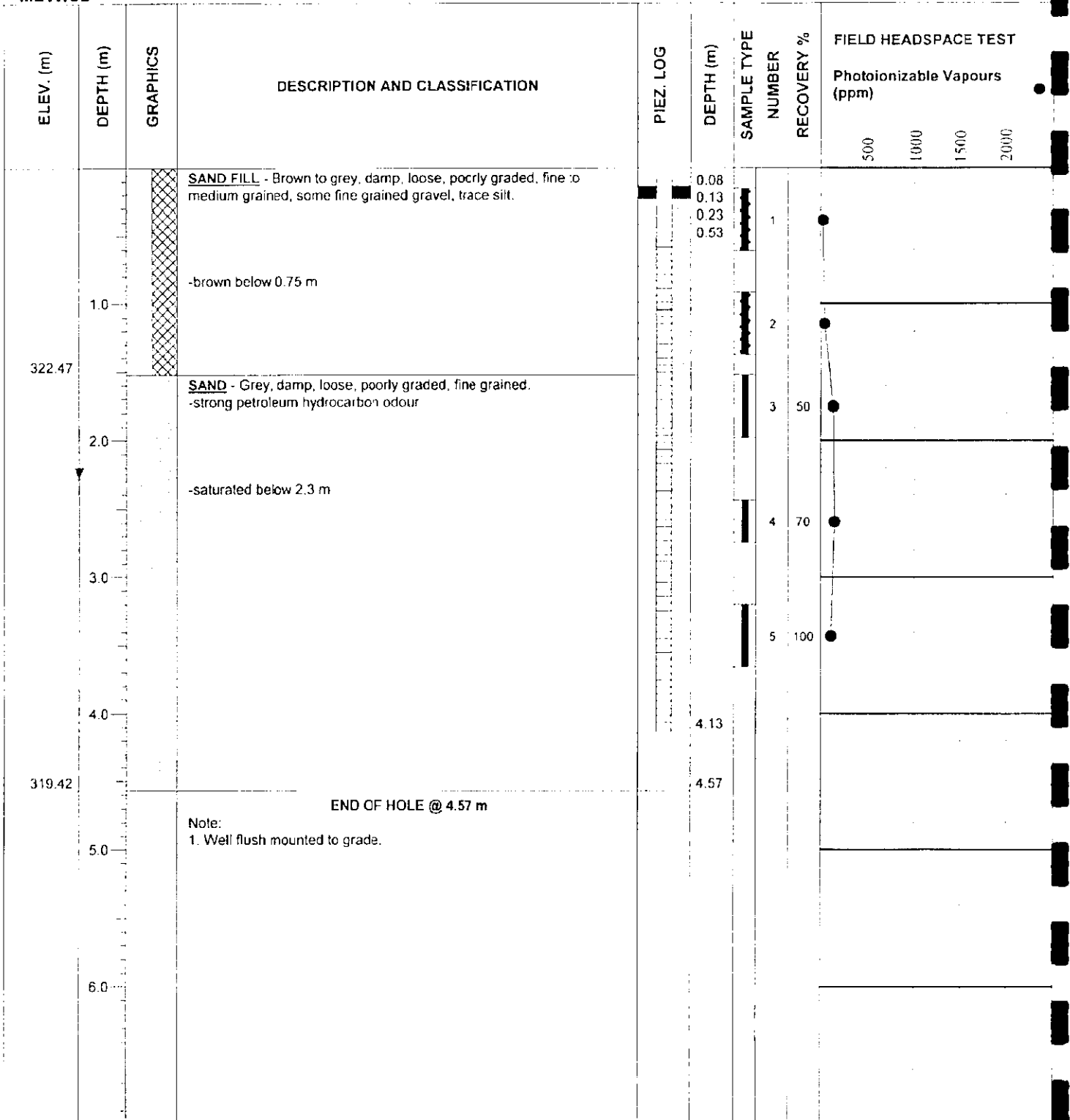
APPROVED

DATE 19/06

001581

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 220°, 8 m from East-West running Barrier of Lagoon #2
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 323.99 m, Geodetic
TOP OF PVC ELEV. 323.91 m
WATER ELEV. 321.72 m, 26/05/00
DATE DRILLED 10/05/00



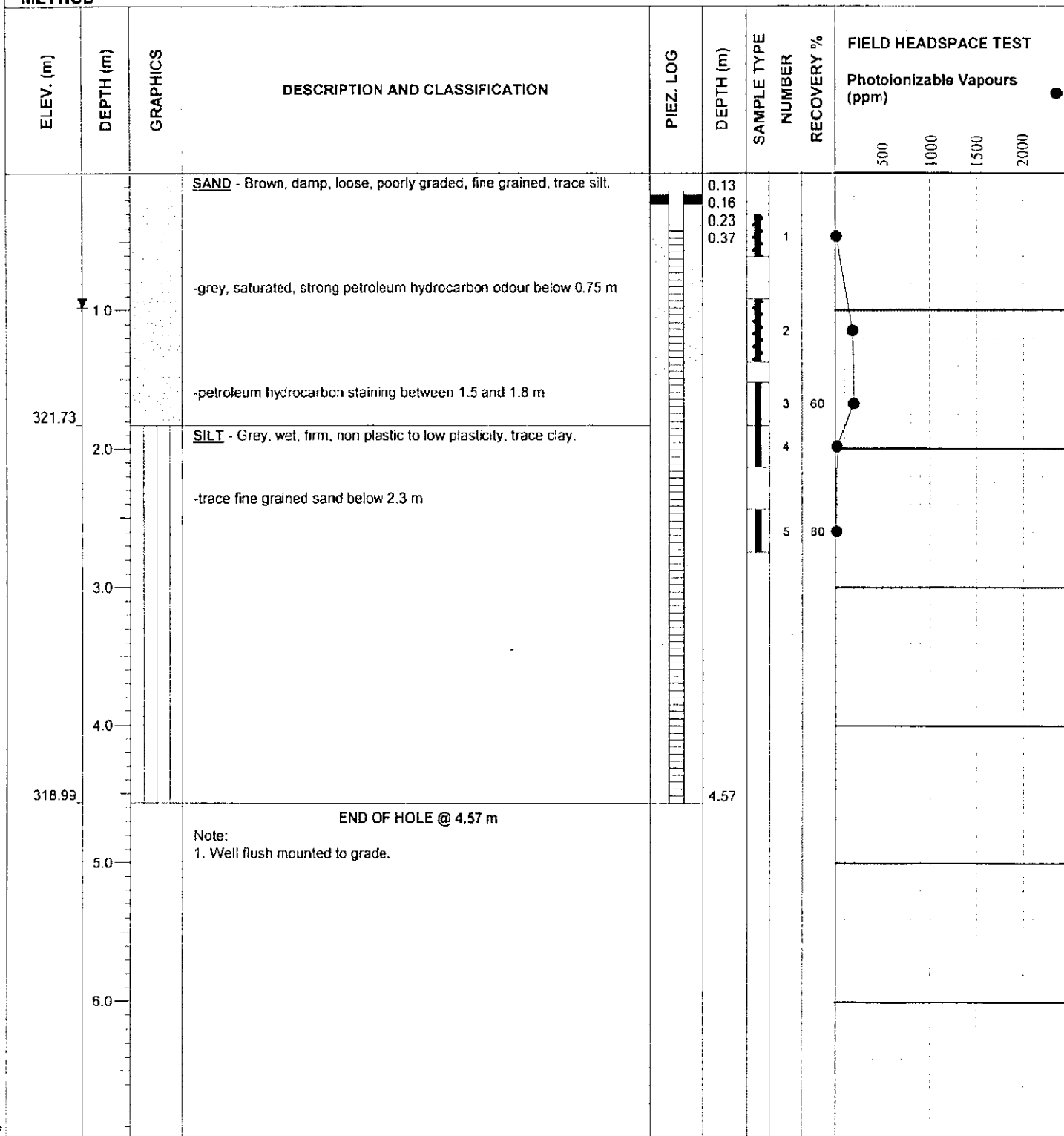
SAMPLE TYPE  AUGER GRAB  SPLIT BARREL

CONTRACTOR Paddock Drilling Ltd. INSPECTOR T. GALLO

APPROVED DATE 19/06/001582

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 173°, 12 m from an exposed rock located 3 m from Jackfish River
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 323.56 m, Geodetic
TOP OF PVC ELEV. 323.43 m
WATER ELEV. 322.58 m, 26/05/00
DATE DRILLED 10/05/00



SAMPLE TYPE ☒ AUGER GRAB ☐ SPLIT BARREL

CONTRACTOR
 Paddock Drilling Ltd.

INSPECTOR
 T. GALLO

APPROVED _____ **DATE** 19/06

001583

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 250°, 3.5 m from a hydro pole
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 323.95 m, Geodetic
TOP OF PVC ELEV. 323.90 m
WATER ELEV. 322.18 m, 26/05/00
DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)			
									500	1000	1500	2000
323.19			SAND FILL - Dark brown, damp, loose, poorly graded, fine to medium grained, and silt. -petroleum hydrocarbon odour		0.05 0.08 0.11 0.40		1					
	1.0		SAND AND SILT - Dark grey, moist, loose, poorly graded, fine grained, and silt. -petroleum hydrocarbon odour -wet below 1.2 m				2					
322.43			SILT AND SAND - Grey, saturated, firm, non plastic, and fine grained sand. -petroleum hydrocarbon staining at 1.5 m -sand lense (50 mm thick), fine grained, stained with petroleum hydrocarbons at 1.83 m				3	60				
	2.0						4					
321.66			SAND AND SILT - Grey, saturated, dense, poorly graded, fine grained, and silt. -petroleum hydrocarbon staining and odour at 2.44 m -with silt below 3.05 m				5	70				
	3.0						6	60				
	4.0											
319.38			END OF HOLE @ 4.57 m Note: 1. Well flush mounted to grade.		4.45 4.57							
	5.0											
	6.0											

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

DATE

19/06.001584

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 226°, 14 m from a yellow painted metal well, and 1.5 m from Road
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 324.10 m, Geodetic
TOP OF PVC ELEV. 324.01 m
WATER ELEV. 322.43 m, 26/05/00
DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)
									500 1000 1500 2000
323.19	1.0		SAND FILL - Brown to black, damp, loose, poorly graded, fine to medium grained, trace silt, trace fine grained gravel. -petroleum hydrocarbon odour		0.09 0.12 0.29 0.59		1		
322.58	2.0		SILT - Brown, wet, soft, non plastic, some fine grained sand. -petroleum hydrocarbon staining and odour				2		
321.66	3.0		SAND - Brown, saturated, poorly graded, fine grained, trace silt. -petroleum hydrocarbon staining and odour below 2.3 m				3	75	
321.05	4.0		SILT - Brown, saturated, non plastic, trace clay.				4	75	
319.83	5.0		SAND AND SILT - Grey, saturated, loose, poorly graded, fine grained, and silt. -petroleum hydrocarbon odour, sheen on water between 3.05 and 3.8 m -some silt below 3.8 m				5		
319.53	6.0		SILT - Grey, saturated, soft, non plastic, some fine grained sand.		4.49 4.57		6	80	
			END OF HOLE @ 4.57 m Note: 1. Well flush mounted to grade.				7	100	

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR
 Paddock Drilling Ltd.

INSPECTOR
 T. GALLO

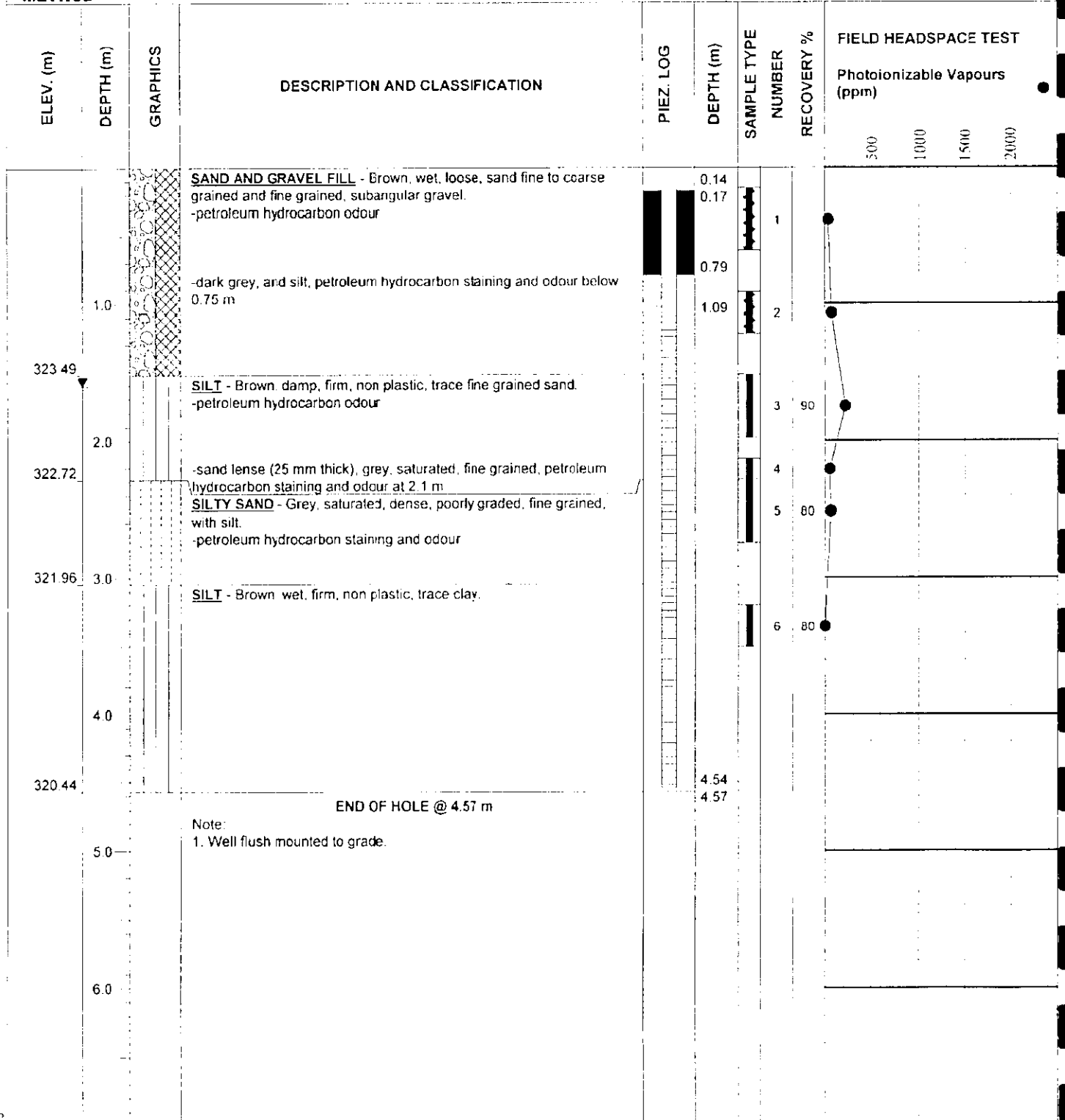
APPROVED

DATE 19/06

001585

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 1.5 m from concrete conduite running West from Roundhouse
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 325.01 m, Geodetic
TOP OF PVC ELEV. 324.87 m
WATER ELEV. 323.40 m, 26/05/00
DATE DRILLED 10/05/00



SAMPLE TYPE ☒ AUGER GRAB ☐ SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

DATE 19/06 001586

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 60°, 3 m from mark on track that holds emergency derailment supply and bunk/cook cars
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 326.63 m, Geodetic
TOP OF PVC ELEV. 326.47 m
WATER ELEV. 324.58 m, 26/05/00
DATE DRILLED 11/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)			
									500	1000	1500	2000
			<u>SAND AND GRAVEL</u> - Brown to black, wet, loose, poorly graded, fine to medium grained sand, and fine grained, subangular gravel, and silt.		0.16 0.19		1					
					0.91 1.20		2					
			<u>SILT</u> - Brown, moist to wet, firm, non plastic.				3	70				
			-organic lense (10 mm thick) at 1.8 m -grey to brown, wet below 1.8 m				4	75				
							5	70				
			-trace clay, trace oxidation below 3.05 m									
					4.50 4.57							
			END OF HOLE @ 4.57 m									
			Note: 1. Well flush mounted to grade.									

SAMPLE TYPE  AUGER GRAB  SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED _____ DATE 19/06 001587

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 335°, 2 m from yellow post marking concrete underground Oil/Water Separator
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 325.88 m, Geodetic
TOP OF PVC ELEV. 325.81 m
WATER ELEV. 323.12 m, 26/05/00
DATE DRILLED 11/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	FIELD HEADSPACE TEST			
								Photoionizable Vapours (ppm)			
								500	1000	1500	2000
325.27			SAND FILL - Brown, damp, loose, poorly graded, fine to medium grained, some fine to medium grained gravel, trace silt.		0.07 0.10	1					
	1.0		SILT - Grey, moist, soft, non plastic, trace clay, trace fine grained sand. -petroleum hydrocarbon staining and odour		0.86						
			-no sample recovery between 1.52 and 2.29 m		1.16	2					
323.59			SAND - Grey, saturated, dense, poorly graded, fine grained, some silt. -petroleum hydrocarbon staining and odour -silt content decreased with depth			3	80				
322.71	3.0		-trace silt below 3.05 m SILT - Brown to grey, wet, firm, non plastic. -clay lense (10 mm thick) at 3.35 m			4	80				
	4.0		-light brown at bottom of hole		4.46	5	80				
321.31			END OF HOLE @ 4.57 m		4.57						
	5.0		Note: 1. Well flush mounted to grade.								
	6.0										

SAMPLE TYPE  AUGER GRAB  SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

DATE 29/06 001588

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 90°, 20 m from hydro pole, and 14°, 24 m from Waste Oil/Water Separator Building
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 325.62 m, Geodetic
TOP OF PVC ELEV. 325.48 m
WATER ELEV. 323.08 m, 26/05/00
DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)
325.01			SAND AND GRAVEL FILL - Brown, damp, loose, with red brick fragments. -petroleum hydrocarbon odour		0.14 0.17		1		
	1.0		SAND - Brown, wet, loose, poorly graded, fine grained, trace to some silt. -petroleum hydrocarbon staining and odour		0.92 1.23		2		>2,000
324.10			SAND AND SILT - Grey, wet, loose, fine grained sand and silt.				3	80	
323.33	2.0		SAND - Grey, moist, loose, poorly graded, fine grained, trace silt.				4	60	
	3.0		-saturated, strong petroleum hydrocarbon odour and staining between 3.05 and 3.35 m				5	70	
322.27			SILT - Brown, saturated, firm, non plastic, trace fine grained sand, trace clay.				6		
	4.0						7	60	
	5.0								
319.52	6.0				6.03 6.10				
			END OF HOLE @ 6.1 m						
			Note: 1. Well flush mounted to grade.						

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

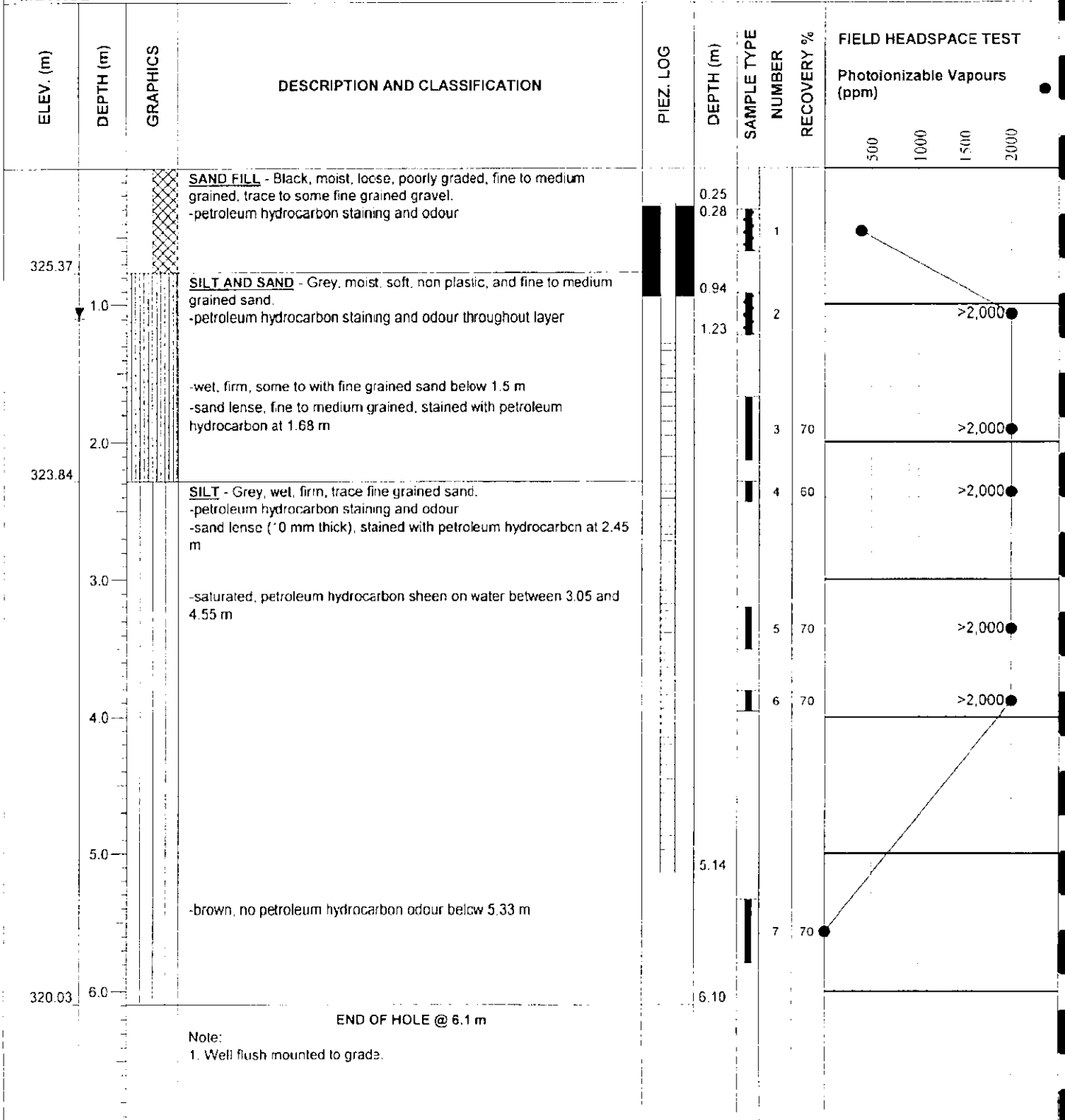
APPROVED

DATE 19/06

001589

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 236°, 1.5 m from track entering South-West train door in Roundhouse
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 326.13 m, Geodetic
TOP OF PVC ELEV. 325.88 m
WATER ELEV. 325.04 m, 26/05/00
DATE DRILLED 11/05/00



SAMPLE TYPE ☒ AUGER GRAB ☐ SPLIT BARREL

CONTRACTOR **Paddock Drilling Ltd.** INSPECTOR **T. GALLO**

APPROVED

DATE **19/06/001590**



BIOGÉNIE Inc
 ENVIRONMENTAL SPECIALISTS
 160 Highway 99, Suite 100, St. John's, New Brunswick A1A 4P2
 Tel.: (418) 653-4422 Fax: (418) 653-3583

BOREHOLE LOG

BOREHOLE #: **RW6-1**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **03-10-96** COMPT. DATE: **03-10-96**
 LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø: **100 mm** TUBING Ø: **100 mm**
 CONTRACTOR: **Boart Longyear Drilling Inc.** DRILL TYPE: **CME 75** CORE SAMPLER Ø: **---**
 OPERATOR: **C. Pullan** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
 TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Oullette**

LEVELING			MONITORING WELL		SAMPLE				GEOLOGY		OBSERVATIONS			
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	OTHER	VISUAL
0	0.00	326.70		Steel Cap								Black Silt, with Coal Residues		
				Cep										
				Cement										
				Bentonite										
1				PVC Tubing										
	1.50	325.20												
2												Light Brown Clayey Silt with Traces of Gravel, Humid		
3				Silice Sand										
	3.25	323.45												
	3.40	323.30												
4												Grey Clayey Silt, Saturated		
				Screen, Opening 0.05 cm										
6														
7	7.00	319.70		Cep								End of Borehole at a Depth of 7.00 m		
8												NOTE: 0.09 m of Free-phase product observed on 06-10-96		
9														

STATE OF SAMPLE: OBSERVATIONS ☒ = WATER TABLE

INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
 FW - THIN WALL SAMPLER
 CS - CORE SAMPLER

O - OILLESS
 W - WEAK
 I - INTERMEDIATE
 P - PERSISTENT
 NE - NON EXISTENT
 SC - SCATTERED
 SA - SATURATED

.. = FIELD
 .. = COMPLICATE
 .. = ANALYZED
 .. = SAMPLE

SURFACE PROTECTION: **Steel Cap** ELEVATION: **---**
 SURFACE SEALANT: **Cement/Bentonite** REFERENCE LEVEL: **Real**
 SEALANT DEPTH: **0.95 m** BEDROCK LEVEL: **---**
 SCREEN LENGTH: **6.50 m** GROUND LEVEL: **326.70 m**
 TUBING LENGTH: **1.50 m** WATER TABLE LEVEL: **---**
72 HOUR(S) AFTER DRILLING: **323.30**



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
360 Tranquille Blvd. Suite 100, St-Fey, Québec, H1P 1P9
Tel.: (418) 653-4422 Fax: (418) 653-3583

BOREHOLE LOG

BOREHOLE #: **RW8-1**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **02-10-96** COMPT. DATE: **02-10-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø: **100 mm** TUBING Ø: **100 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø: **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE						GEOLOGY		OBSERVATIONS	
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	DOOR	VISUAL
0	0.00 327.24			Steel Cap Cap Cement Bentonite PVC Tubing Silica Sand Screen, Opening 0.05 cm Cap								Light Brown Fine Sand with Traces of Coarse Sand, Dry		
3	3.00 324.24											Black Clayey Silt with Traces of Gravel		
4	3.96 323.29											Grey Sandy Silt, Humid		
6	6.41 321.83											Grey Sandy Silt, Saturated, Presence of Free Phase Hydrocarbons		
6	6.05 321.19													
8	8.23 319.01											End of Borehole at a Depth of 8.23 m		
													NOTE: 2.59 m of Free-phase product observed on 12-10-96	

STATE OF SAMPLE:



INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
TW - TURN WALL SAMPLER
CS - CORE SAMPLER
O - OILLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

OBSERVATIONS

Σ = WATER TABLE

** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE PROTECTION:

Steel Cap
Cement/Bentonite

SEALANT DEPTH:

0.80 m

SCREEN LENGTH:

6.73 m

TUBING LENGTH:

1.50 m

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL:

GROUND LEVEL:

327.24 m

WATER TABLE LEVEL:

> 96 HOUR(s) AFTER DRILLING: 321.83



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
160 Tranquille Road Suite 100 - St. John's, New Brunswick A1B 4P3
Tel.: (418) 653-4422 Fax: (418) 653-3583

BOREHOLE LOG

BOREHOLE #: **OW57**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **03-10-96** COMPT. DATE: **03-10-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø: **50 mm** TUBING Ø: **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc** DRILL TYPE: **CME 75** CORE SAMPLER Ø: **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE							GEOLOGY		OBSERVATIONS	
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION		DATE	INITIAL
0	0.00	327.09		Steel Cap								No Soil Description			
				Cap Cement											
				Bentonite											
1				PVC Tubing											
2															
3				Silica Sand											
4															
5															
6	6.37	321.72													
6				Screen, Opening 0.05 cm											
7															
8	7.90	319.19		Cap								End of Borehole at a Depth of 7.90 m			
												NOTE: 2.80 m of Free-phase product observed on 12-10-96			
9															

STATE OF SAMPLE:

INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
TW - THIN WALL SAMPLER
CS - CORE SAMPLER

OBSERVATIONS

D - ODORLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

▽ = WATER TABLE

** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Bentonite**

SEALANT DEPTH: **0.80 m**

SCREEN LENGTH: **6.70 m**

TUBING LENGTH: **1.20 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **326.96 m**

WATER TABLE LEVEL:

> 96 HOUR(s) AFTER DRILLING: **321.72**



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
140 Tranquille Road Suite 10 - St-Foy, Québec (G1P 4P7)
Tel : (418) 863-4422 Fax : (418) 863-3083

BOREHOLE LOG

BOREHOLE #: **OW60**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **03-10-96** COMPT. DATE: **03-10-96**
LOCATION: **AREA OF PLUME 8** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc.** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Oullette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	
											SOIL/ROCK DESCRIPTION	
0	0.00 327.82			Steel Cap								
				Cap Cement								
				Bentonite								
1				PVC Tubing								
2												
2.35	325.47											
3				Silica Sand								
4												
4.60	323.22			Screen, Opening 0.05 cm								
5												
5.44	322.38											
6												
6.06	321.77											
7												
7.90	319.92			Cap								
8												
9												

STATE OF SAMPLE: **INTACT** **DISTURBED** **LOST** **CORE SAMPLE**
OBSERVATIONS: **W** = WATER TABLE **SS** = SPLIT SPOON SAMPLER **W** = WEAK **I** = INTERMEDIATE **P** = PERSISTENT **NE** = NON EXISTENT **SC** = SCATTERED **SA** = SATURATED
SURFACE PROTECTION: **Steel Cap** SURFACE SEALANT: **Cement/Bentonite**
SEALANT DEPTH: **0.60 m** SCREEN LENGTH: **6.70 m** TUBING LENGTH: **1.20 m**
ELEVATION: **Real** REFERENCE LEVEL: **---** BEDROCK LEVEL: **---** GROUND LEVEL: **327.61 m** WATER TABLE LEVEL: **> 90** HOUR(S) AFTER DRILLING: **322.38**



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
750 Tranquille Road, Suite 10 - Ste-Foy, Québec G1P 4P3
Tel. : (418) 653-4422 Fax : (418) 653-3593

BOREHOLE LOG

BOREHOLE #: **OW9-3**
SHEET: **1** OF **1**
FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **29-09-96** COMPT. DATE: **29-09-96**
LOCATION: **AREA OF PLUME 9** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc.** DRILL TYPE: **CME 75** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS			
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	ODOR	VISUAL	
0	0.00	325.52		Steel Cap								Light Brown Clayey Silt, Saturated			
				Cap											
				Bentonite											
1	1.18	324.34		PVC Tubing								Greyish Clayey Silt, Saturated			
2												Refusal of Auger to Penetration at a Depth of 6.10 m			
3				Silice Sand								Refusal of Auger to Penetration at a Depth of 6.10 m			
4	3.60	321.92										Refusal of Auger to Penetration at a Depth of 6.10 m			
5				Screen, Opening 0.06 cm								Refusal of Auger to Penetration at a Depth of 6.10 m			
6	6.10	319.42		Cap								Refusal of Auger to Penetration at a Depth of 6.10 m			
7												Refusal of Auger to Penetration at a Depth of 6.10 m			
8												Refusal of Auger to Penetration at a Depth of 6.10 m			
9												Refusal of Auger to Penetration at a Depth of 6.10 m			

STATE OF SAMPLE:

INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
TW - THIN WALL SAMPLER
CS - CORE SAMPLER

OBSERVATIONS

O - ODORLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

▽ = WATER TABLE

** = FIELD
DUPLICATE
ANALYZED
SAMPLE

SURFACE PROTECTION: **Steel Cap**

SURFACE SEALANT: **Cement/Bentonite**

SEALANT DEPTH: **0.70 m**

SCREEN LENGTH: **4.60 m**

TUBING LENGTH: **1.50 m**

ELEVATION:

REFERENCE LEVEL: **Real**

BEDROCK LEVEL: **---**

GROUND LEVEL: **325.52 m**

WATER TABLE LEVEL:

72 HOUR(s) AFTER DRILLING: **324.34**

001595



BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
160 Tranquille Street Suite 10 St-Jay, Quebec G1P 4P3
Tel.: (418) 853-4422 Fax.: (418) 853-3693

BOREHOLE LOG

BOREHOLE #: **OW53**

SHEET: **1** OF **1**

FILE #: **CN-6089**

CONFIDENTIAL AND PRIVILEGED DOCUMENT

PROJECT: **HORNEPAYNE CN** STARTING DATE: **03-10-96** COMPT. DATE: **03-10-96**
LOCATION: **AREA OF PLUME B** SLOTTED PIPE Ø : **50 mm** TUBING Ø : **50 mm**
CONTRACTOR: **Boart Longyear Drilling Inc.** DRILL TYPE: **CME 76** CORE SAMPLER Ø : **---**
OPERATOR: **C. Pullen** METHOD (SOIL): **Auger** METHOD (ROCK): **---**
TYPE OF TUBING: **PVC** DRILLING FLUID: **---** COMPILED BY: **P. Ouellette**

LEVELING			MONITORING WELL		SAMPLE					GEOLOGY		OBSERVATIONS
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	
0	0.00	327.09		Steel Cap								No Soil Description, Evidences of Hydrocarbons During Drilling
				Cap								
				Cement								
				Bentonite								
1				PVC Tubing								
2												
3				Silice Sand								
4												End of Borehole at a Depth of 7.90 m NOTE: 2.97 m of Free-phase product observed on 12-10-96
5				Screen, Opening 0.05 cm								
6	6.82	321.27										
7												
8	7.90	319.19		Cap								
9												

STATE OF SAMPLE:

OBSERVATIONS

▽ = WATER TABLE

SURFACE PROTECTION: **Steel Cap**

ELEVATION:

INTACT UNDISTURBED LOST CORE SAMPLE

O - ODORLESS
W - WEAK
I - INTERMEDIATE
P - PERSISTENT
NE - NON EXISTENT
SC - SCATTERED
SA - SATURATED

** = FIELD
DUPLICATE
* = ANALYZED
SAMPLE

SURFACE SEALANT: **Bentonite**

REFERENCE LEVEL: **Real**

SEALANT DEPTH: **0.70 m**

BEDROCK LEVEL: **---**

SCREEN LENGTH: **6.70 m**

GROUND LEVEL: **327.09 m**

TUBING LENGTH: **1.20 m**

WATER TABLE LEVEL:

> 96 HOURS AFTER DRILLING: **321.27**

TYPE OF SAMPLE:

SS - SPLIT SPOON SAMPLER
TW - THIN WALL SAMPLER
CS - CORE SAMPLER

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 46°, 5.5 m from furthest Northeast track running into Roundhouse
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 325.93 m, Geodetic
TOP OF PVC ELEV. 325.77 m
WATER ELEV. 324.18 m, 26/05/00
DATE DRILLED 11/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)
							500 1000 1500 2000
325.32			SAND FILL - Black, wet, loose, poorly graded, fine to medium grained, trace fine grained gravel, trace silt, oiy.		0.16 0.19 0.36 0.66	1	
	1.0		SAND - Brown, saturated, loose, poorly graded, fine grained, trace to some silt.			2	
324.41			SILT - Brown wet, firm, non plastic, trace oxidation. -sand lense (25 mm thick), grey, fine grained, stained with petroleum hydrocarbon at 1.68 m			3	60
	2.0		-grey below 2.3 m				
			-sand lense (13 mm thick), grey, fine grained, stained with petroleum hydrocarbon at 2.44 m			4	70
	3.0		-sand lense (50 mm thick), grey, fine grained, stained with petroleum hydrocarbon at 2.6 m			5	75
	4.0						
321.36			END OF HOLE @ 4.57 m		4.56 4.57		
	5.0		Note: 1. Well flush mounted to grade.				
	6.0						

SAMPLE TYPE  AUGER GRAB  SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

DATE 19/06 001597

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 223°, 18 m from concrete lid on Manhole #1

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 325.45 m, Geodetic

TOP OF PVC ELEV. 325.41 m

WATER ELEV. 322.41 m, 26/05/00

DATE DRILLED 12/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	FIELD HEADSPACE TEST			
								Photoionizable Vapours (ppm)			
								500	1000	1500	2000
			SAND FILL - Black, moist, loose, poorly graded, fine to medium grained, and fine grained, subangular gravel.		0.04 0.07 0.24 0.54	1					
324.54	1.0		SILTY SAND - Grey, moist, loose, poorly graded, fine grained, and silt, with oxidation.			2					
323.93			GRAVEL AND SAND - Grey, damp to moist, fine to coarse grained gravel and fine to medium grained sand.			3	40				
323.16	2.0		SAND - Grey to brown, moist, loose, poorly graded, fine grained.			4	40				
			-sand and fine grained gravel below 2.45 m								
322.40	3.0		GRAVEL - Saturated, petroleum hydrocarbon staining and odour, with oily sheen on water.			5	30				
			-some cobbles below 3.8 m			6	10				
321.18	4.0		AUGER REFUSAL ON POSSIBLE BOULDER @ 4.27 m		4.15 4.27						
			Note: 1. Well flush mounted to grade.								
	5.0										
	6.0										

SAMPLE TYPE  AUGER GRAB

 SPLIT BARREL

CONTRACTOR

Paddock Drilling Ltd.

INSPECTOR

T. GALLO

APPROVED

DATE

12/06/001598



SUMMARY LOG

HOLE NO.

MW-115

SHEET 1 of 1

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 56°, 14 m from Manhole #1

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

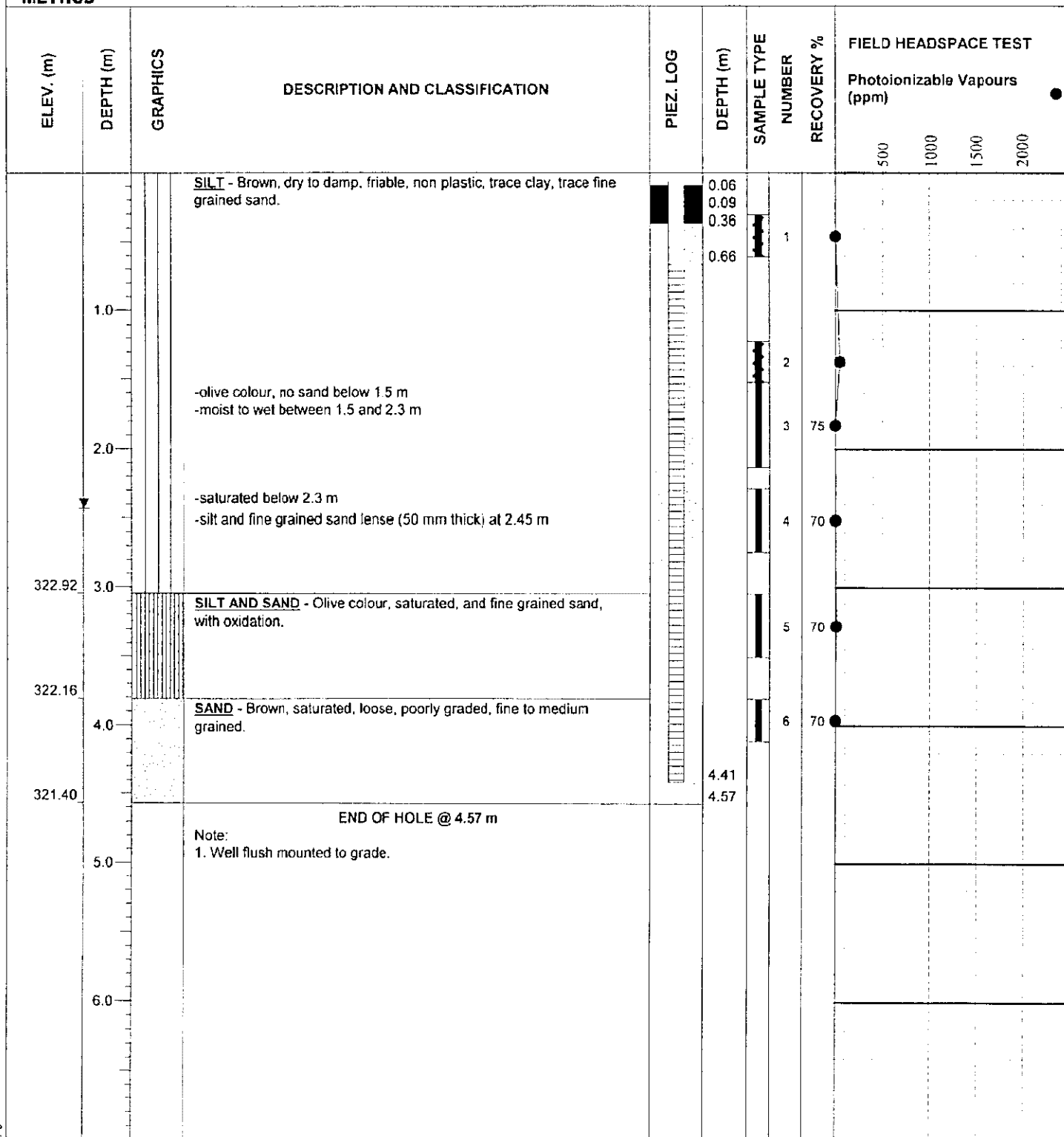
JOB NO. 00-434-08

GROUND ELEV. 325.97 m, Geodetic

TOP OF PVC ELEV. 325.91 m

WATER ELEV. 323.54 m, 26/05/00

DATE DRILLED 12/05/00



SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR T. GALLO

APPROVED

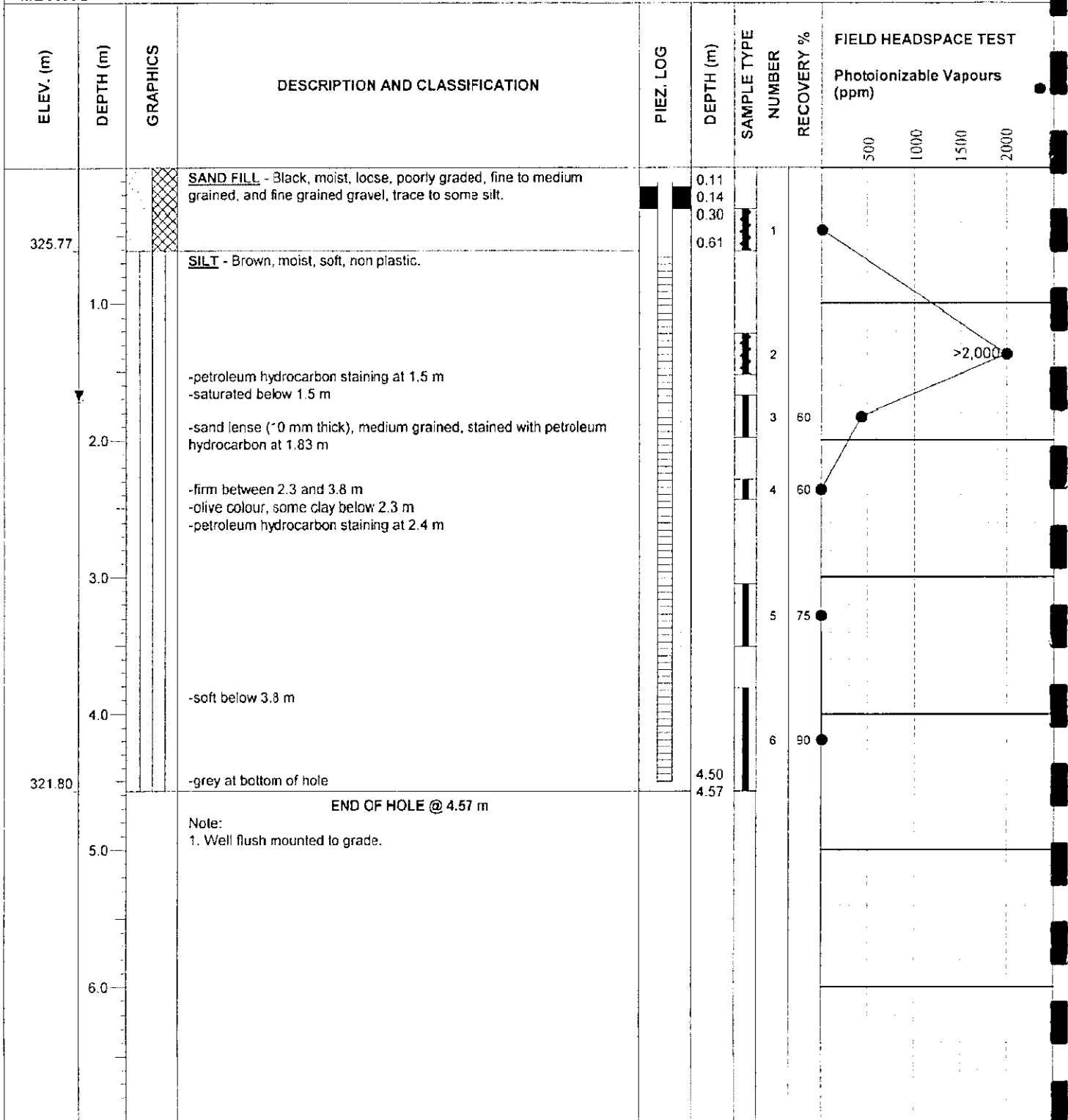
DATE 19/06

001599

XXX 0043408 GPJ

CLIENT CN ENGINEERING LINE OPERATION EAST
PROJECT CN HORNEPAYNE YARD DRILLING
SITE CN HORNEPAYNE YARD, EAST END
LOCATION 120°, 3 m from concrete wall on Northeast corner of Roundhouse
DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 326.38 m, Geodetic
TOP OF PVC ELEV. 326.27 m
WATER ELEV. 324.67 m, 26/05/00
DATE DRILLED 12/05/00



SAMPLE TYPE  AUGER GRAB  SPLIT BARREL

CONTRACTOR
 Paddock Drilling Ltd.

INSPECTOR
 T. GALLO

APPROVED

DATE 19/06 **001600**

CLIENT CN CORPORATE ENVIRONMENT EAST

PROJECT ENVIRONMENTAL INVESTIGATION

SITE HORNEPAYNE YARD

LOCATION 4m S of Tracks and 3 m W of MW66

DRILLING METHOD 110 mm ø Hollow Stem Auger, ACKER SX Drill Rig

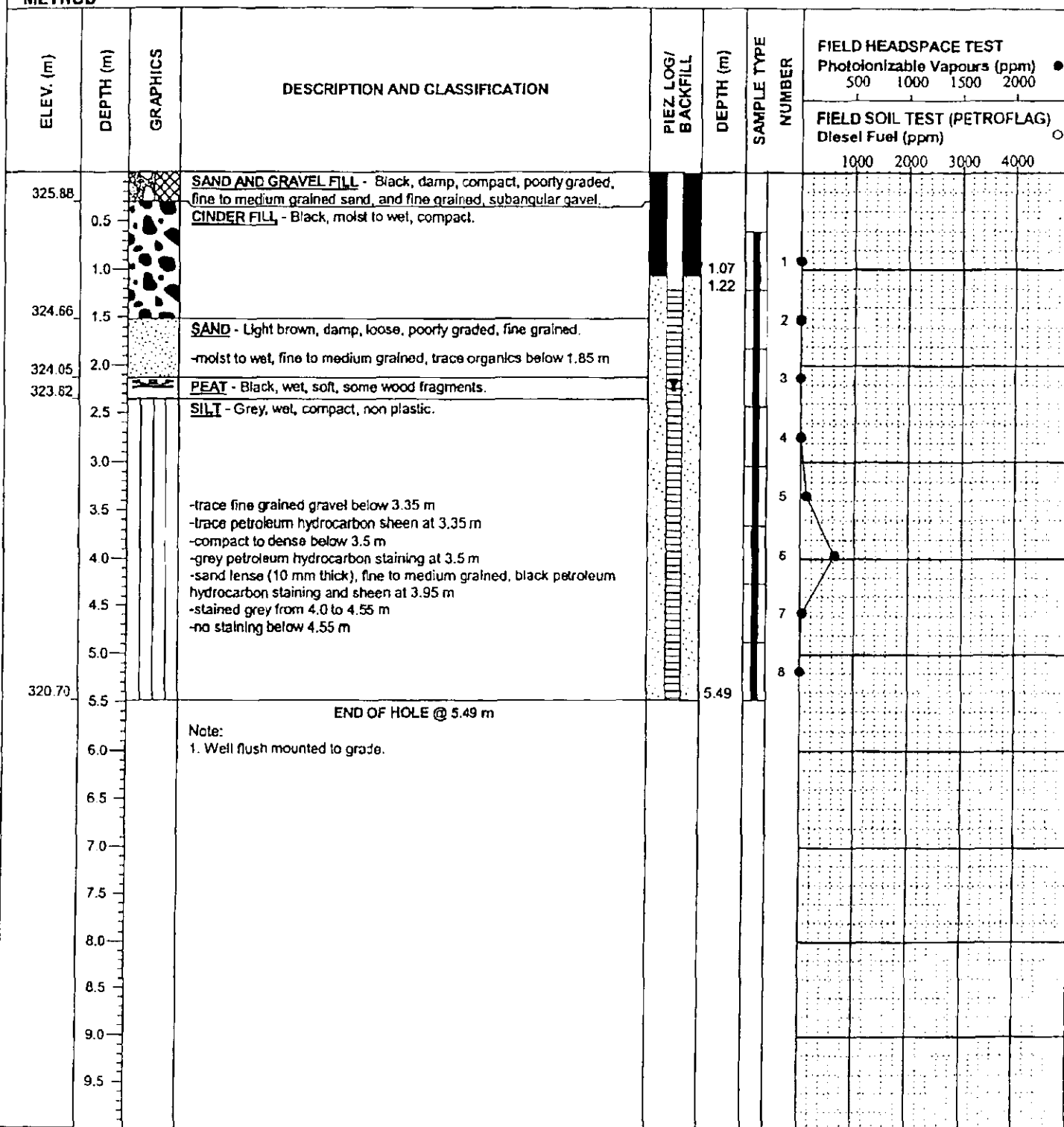
JOB NO. 01-434-07

GROUND ELEV. 326.18 m, Geodetic

TOP OF PVC ELEV. 326.42 m

WATER ELEV. 323.93 m, 09/10/01

DATE DRILLED 25/07/01



SAMPLE TYPE SPLIT BARREL

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. B. KASUR

APPROVED

DATE 16/05/03

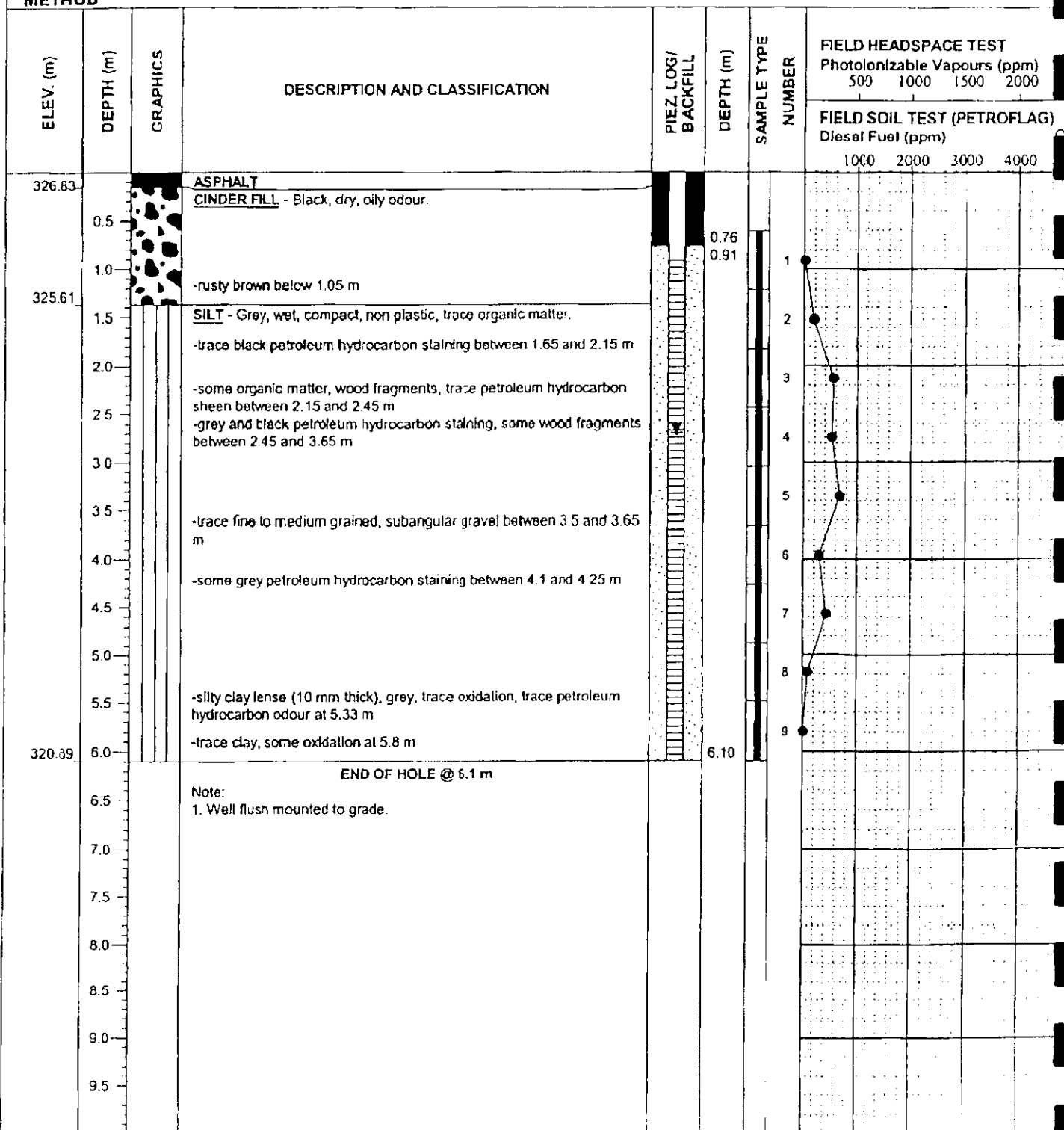
001601

**KGS
GROUP****SUMMARY LOG**

HOLE NO

MW118

SHEET 1 of 1

CLIENT CN CORPORATE ENVIRONMENT EAST**PROJECT** ENVIRONMENTAL INVESTIGATION**SITE** HORNEPAYNE YARD**LOCATION** 3 m W of MW33 between Rails**DRILLING METHOD** 110 mm ø Hollow Stem Auger, ACKER SX Drill Rig**JOB NO.** 01-434-07**GROUND ELEV.** 326.98 m, Geodetic**TOP OF PVC ELEV.** 327.11 m**WATER ELEV.** 324.29 m, 09/10/01**DATE DRILLED** 25/07/01

SAMPLE TYPE SPLIT BARREL

CONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

DATE 16/05/02

001602

**KGS
GROUP****SUMMARY LOG**

HOLE NO.

MW119

SHEET 1 of 1

CLIENT CN CORPORATE ENVIRONMENT EAST**PROJECT** ENVIRONMENTAL INVESTIGATION**SITE** HORNEPAYNE YARD**LOCATION** 7.5 m S of OW8-2 and 3.5 m W of OW8-2**DRILLING METHOD** 125 mm ø Solid Stem Auger, Acker SX Drill Rig**JOB NO.** 01-434-07**GROUND ELEV.** 327.76 m, Geodetic**TOP OF PVC ELEV.** 327.64 m**WATER ELEV.** 323.72 m, 22/08/01**DATE DRILLED** 26/07/01

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE	NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ●				FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○			
								500	1000	1500	2000	1000	2000	3000	4000
326.85	0.5		SAND AND GRAVEL FILL - Brown, damp, loose, poorly graded, fine grained sand, and fine to coarse grained, subangular gravel.				1								
326.09	1.0		SILTY SAND - Brown, moist to wet, loose, poorly graded, fine to medium grained, some silt, trace fine to coarse grained, subangular gravel.		1.22		2								
	1.5		-occ. cobbles at 1.2 m		1.52										
325.33	2.0		SILT - Grey, damp, dense, non plastic, trace fine grained sand and fine grained, subangular gravel.				3								
	2.5		SILTY SAND - Grey, damp, dense, poorly graded, fine grained, some fine grained gravel.				4								
324.72	3.0		PEAT - Black, moist to wet, compact, some wood fragments.				5								
324.56	3.5		SILTY SAND - Grey, moist to wet, dense, poorly graded, medium to coarse grained, some silt, some fine to medium grained gravel.				6								
	4.0		-trace clay between 3.35 and 3.8 m		3.96										
323.50	4.5		SILT - Grey, wet, dense, non plastic, trace fine grained sand.				7								
	5.0						8								
	5.5				5.49										
321.67	6.0		END OF HOLE @ 6.1 m		6.10										
	6.5		Note: 1. Well flush mounted to grade.												
	7.0														
	7.5														
	8.0														
	8.5														
	9.0														
	9.5														

SAMPLE TYPE AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

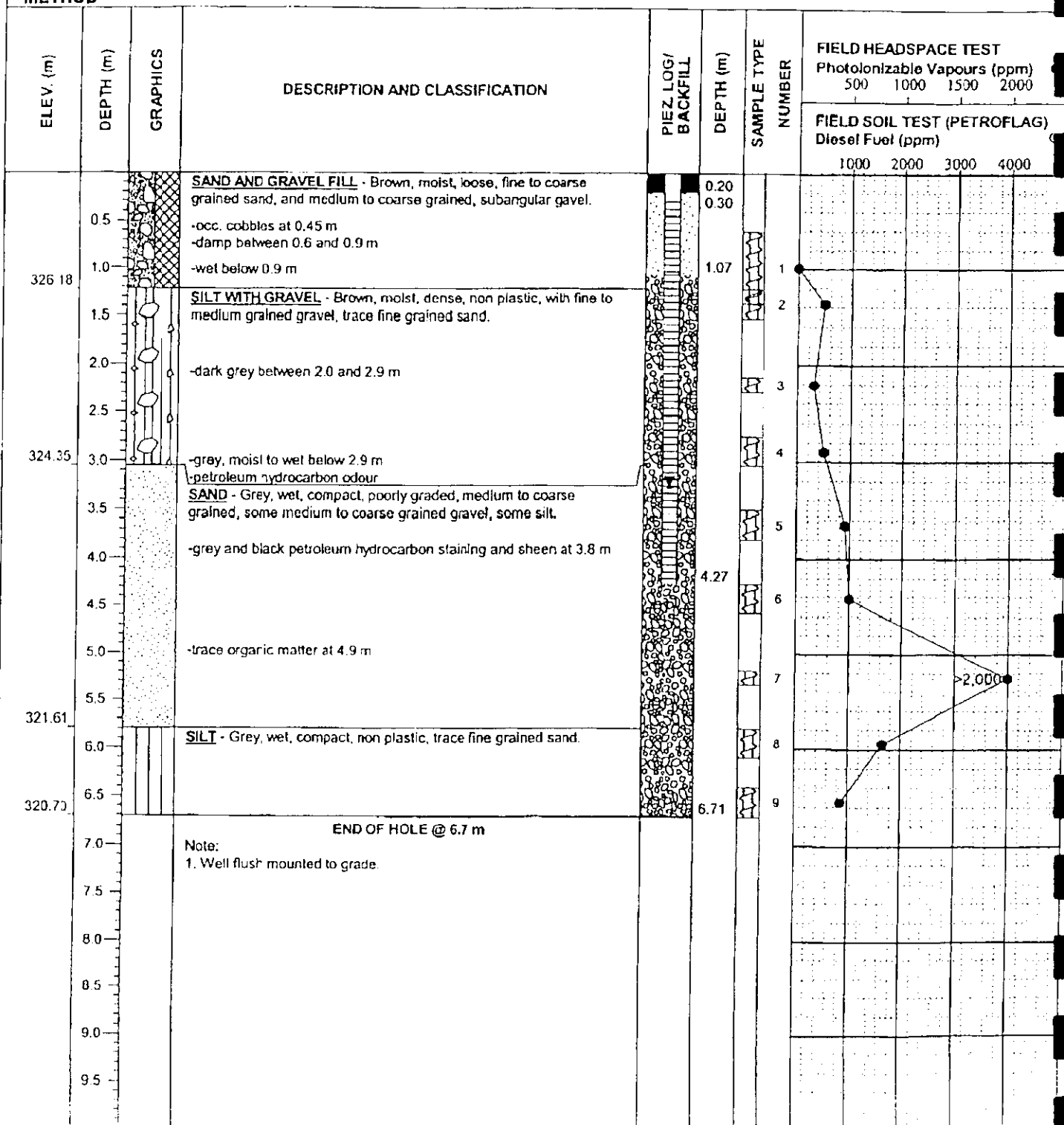
DATE 16/05/001603

**KGS
GROUP****SUMMARY LOG**

HOLE NO.

MW120

SHEET 1 of 1

CLIENT CN CORPORATE ENVIRONMENT EAST**PROJECT** ENVIRONMENTAL INVESTIGATION**SITE** HORNEPAYNE YARD**LOCATION** Halfway between Ends of Concrete Pad, 2 Tracks South of Fuelling Stand**DRILLING METHOD** 125 mm ø Solid Stem Auger, Acker SX Drill Rig**JOB NO.** 01-434-07**GROUND ELEV.** 327.40 m, Geodetic**TOP OF PVC ELEV.** 327.33 m**WATER ELEV.** 324.14 m, 22/08/01**DATE DRILLED** 26/07/01

SAMPLE TYPE AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

DATE 16/05/02 001604

VAPOURS ET M 0143407 GPJ

**KGS
GROUP****SUMMARY LOG**

HOLE NO.

MW121

SHEET 1 of 1

CLIENT CN CORPORATE ENVIRONMENT EAST**PROJECT** ENVIRONMENTAL INVESTIGATION**SITE** HORNEPAYNE YARD**LOCATION** 1.5 m S and 20 m E of SE Corner of Fuelling Stand Concrete Pad**DRILLING METHOD** 125 mm ø Solid Stem Auger, Acker SX Drill Rig**JOB NO.** 01-434-07**GROUND ELEV.** 327.45 m, Geodetic**TOP OF PVC ELEV.** 327.31 m**WATER ELEV.** 323.31 m, 22/08/01**DATE DRILLED** 26/07/01

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ●					FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○				
							500	1000	1500	2000		1000	2000	3000	4000	
326.08	0.5		SAND AND GRAVEL FILL - Brown, damp, compact, poorly graded, fine to medium grained sand, and medium to coarse grained, subangular gravel, some silt, trace cobbles.		0.46 0.61	1										
	1.0		-moist to wet, petroleum hydrocarbon odour at 0.9 m			2										
	1.5		SILT - Grey, moist, dense, non plastic, some fine grained sand and gravel.			3										
	2.0		-brown, damp between 1.5 and 2.45 m			4										
	2.5		-very dense below 1.5 m			5										
	3.0		-grey, moist to wet, petroleum hydrocarbon odour below 2.45 m			6										
324.25	3.5		PEAT - Dark brown, wet, dense, some wood fragments.			7										
323.79	4.0		INTERLAYERED SILTY SAND AND SANDY SILT - Grey, moist to wet, compact, interlayered sandy silt and medium to coarse grained sand, with fine to coarse grained gravel, layers 50-125 mm thick.			8										
323.03	4.5		PEAT - Dark brown, wet, dense, some wood fragments.			9										
322.88	5.0		SILT - Grey, wet, dense, non plastic, trace fine grained sand, traces of clay.			10										
322.27	5.5		SILTY SAND - Grey, wet, loose, poorly graded, medium to coarse grained, some silt, trace fine to medium grained gravel.		5.18	11										
321.35	6.0		END OF HOLE @ 6.1 m		6.10	12										
	6.5		Note: 1. Well flush mounted to grade.													
	7.0															
	7.5															
	8.0															
	8.5															
	9.0															
	9.5															

SAMPLE TYPE AUGER GRAB

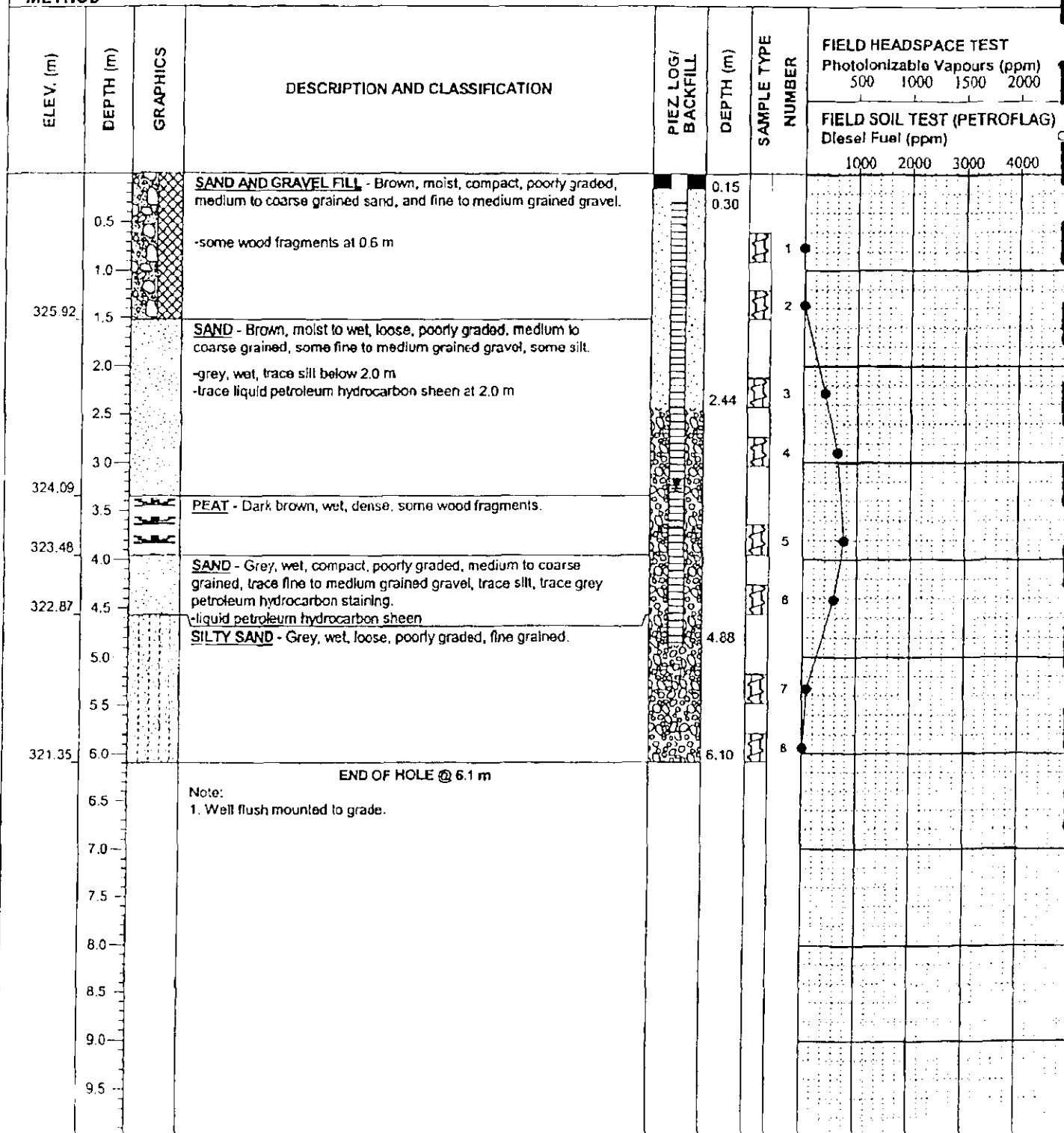
CONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

DATE 16/0001605

CLIENT CN CORPORATE ENVIRONMENT EAST
PROJECT ENVIRONMENTAL INVESTIGATION
SITE HORNEPAYNE YARD
LOCATION 1.5 m N of N Track and 1.25 m W of SE Corner of Concrete Pad Fueling Stand
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 01-434-07
GROUND ELEV. 327.45 m, Geodetic
TOP OF PVC ELEV. 327.34 m
WATER ELEV. 324.17 m, 22/08/01
DATE DRILLED 26/07/01



SAMPLE TYPE AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

DATE 16/05/02

001606

CLIENT CN CORPORATE ENVIRONMENT EAST
PROJECT ENVIRONMENTAL INVESTIGATION
SITE HORNEPAYNE YARD
LOCATION 1.5 m S of 2nd Post on Fence and 0.5 m E of OW8-1
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 01-434-07
GROUND ELEV. 327.40 m, Geodetic
TOP OF PVC ELEV. 327.31 m
WATER ELEV. 323.23 m, 22/08/01
DATE DRILLED 26/07/01

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photolionizable Vapours (ppm) ●				FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○			
							500	1000	1500	2000	1000	2000	3000	4000
	0.5		SAND AND GRAVEL FILL - Brown, moist, dense, poorly graded, fine to medium grained sand, and medium to coarse grained, subangular gravel.		0.15									
326.33	1.0		SAND - Dark brown, damp, compact, poorly graded, fine grained, trace fine to medium grained gravel, some organics to 1.4 m depth.		0.91	1								
	1.5		-grey below 1.4 m			2								
325.57	2.0		SILT - Grey, damp, dense, non plastic, trace fine grained sand.			3								
	2.5		-brown below 2.45 m			4								
324.35	3.0		SILTY SAND - Grey, moist to wet, dense, poorly graded, medium to coarse grained, some silt, some fine to medium grained gravel.			5								
	3.5		-wet, black petroleum hydrocarbon staining, trace sheen below 3.5 m			6								
323.43	4.0		PEAT - Dark brown, moist to wet, compact, some wood fragments.			7								
	4.5					8								
322.37	5.0		SILT - Grey, wet, dense, non plastic, trace fine grained sand, petroleum hydrocarbon staining.		4.88	9								
	5.5					10								
321.60	6.0		SAND - Grey, wet, compact, poorly graded, medium to coarse grained, trace fine grained gravel, trace silt, petroleum hydrocarbon staining.		6.10									
	6.5													
320.69	7.0		SILT - Grey, wet, dense, non plastic, trace fine to medium grained gravel.											
	7.5													
319.78	7.62		END OF HOLE @ 7.62 m		7.62									
	8.0		Note: 1. Well flush mounted to grade											
	8.5													
	9.0													
	9.5													

SAMPLE TYPE AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

DATE 16/001607

CLIENT CN CORPORATE ENVIRONMENT EAST

PROJECT ENVIRONMENTAL INVESTIGATION

SITE HORNEPAYNE YARD

LOCATION 41 m E of OW3-2, 23.5 m E of small Hydro Post and Light, 0.5 m from Rail

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 01-434-07

GROUND ELEV. 325.97 m, Geodetic

TOP OF PVC ELEV. 325.79 m

WATER ELEV. 323.06 m, 09/10/01

DATE DRILLED 27/07/01

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)				FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm)			
							500	1000	1500	2000	1000	2000	3000	4000
325.36	0.5		<u>SAND AND GRAVEL FILL</u> - Brown, damp, dense, poorly graded, medium to coarse grained sand, and medium to coarse grained, subangular gravel.		0.46	1								
	1.0		<u>SILT</u> - Brown, moist, compact, non plastic, trace fine grained sand.		0.61	2								
	1.5		-wet below 1.5 m											
	2.0		-compact to dense between 1.5 and 3.5 m											
	2.5		-sand lense (25 mm thick), fine to medium grained, wet, loose at 2.15 m			3								
	3.0					4								
	3.5		-dense, trace sand seams (1-5 mm thick), trace oxidation below 3.5 m			5								
	4.0					6								
	4.5		-trace clay below 4.25 m		4.57	7								
	5.0					8								
	5.5				5.18	9								
	6.0					10								
	6.5													
	7.0													
318.35	7.5		END OF HOLE @ 7.62 m		7.62									
	8.0		Note: 1. Well flush mounted to grade.											
	8.5													
	9.0													
	9.5													

SAMPLE TYPE  AUGER GRABCONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

DATE

16/06/02

001608

CLIENT CN CORPORATE ENVIRONMENT EAST

PROJECT ENVIRONMENTAL INVESTIGATION

SITE HORNEPAYNE YARD

LOCATION 10 m E of MW110, 3.5 m S of Rail

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

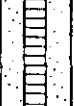
JOB NO. 01-434-07

GROUND ELEV. 326.08 m, Geodetic

TOP OF PVC ELEV. 325.86 m

WATER ELEV. 321.52 m, 09/10/01

DATE DRILLED 27/07/01

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)				
							500	1000	1500	2000	
							FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm)				
							1000	2000	3000	4000	
325.31	0.5		SAND AND GRAVEL FILL - Brown, damp, dense, poorly graded, medium to coarse grained sand, and medium to coarse grained, subangular gravel.		0.46 0.61						
	1.0		SILT - Grey, moist, compact to dense, non plastic, trace fine grained sand, some grey and black petroleum hydrocarbon staining.			1					
	1.5		-wet below 1.5 m								
	2.0					2					
	2.5		-silty clay layer (50 mm thick), low plasticity, soft at 2.3 m -trace oxidation at 2.45 m								
	3.0										
	3.5		-brown between 3.5 and 5.35 m -dense between 3.5 and 6.7 m -silty clay layer (25 mm thick), intermediate plasticity, soft at 3.65 m		3.66	3					
	4.0										
	4.5				4.57						
	5.0										
	5.5		-grey below 5.35 m			4					
	6.0										
	6.5										
	7.0		-loose to compact, some fine grained sand between 6.7 and 7.3 m			5					
318.46	7.5		-dense, trace sand below 7.3 m		7.62						
	8.0		END OF HOLE @ 7.62 m								
	8.5		Note: 1. Well flush mounted to grade.								
	9.0										
	9.5										

SAMPLE TYPE  AUGER GRABCONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

DATE 16/001609

CLIENT CN CORPORATE ENVIRONMENT EAST

PROJECT ENVIRONMENTAL INVESTIGATION

SITE HORNEPAYNE YARD

LOCATION 2 m North of NW Corner of Concrete Pad

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

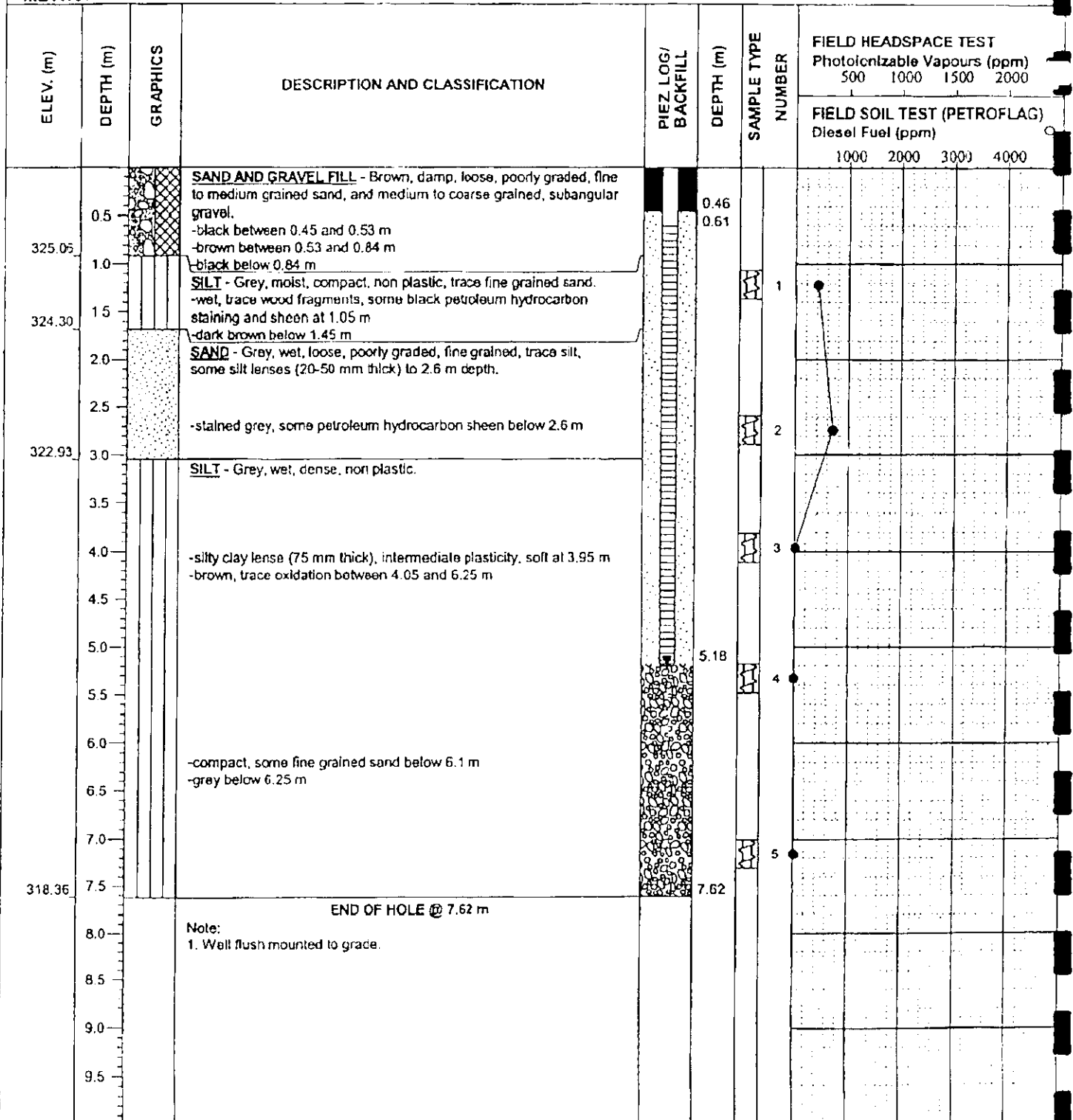
JOB NO. 01-434-07

GROUND ELEV. 325.98 m, Geodetic

TOP OF PVC ELEV. 325.82 m

WATER ELEV. 320.77 m, 09/10/01

DATE DRILLED 27/07/01



SAMPLE TYPE AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.INSPECTOR
D. B. KASUR

APPROVED

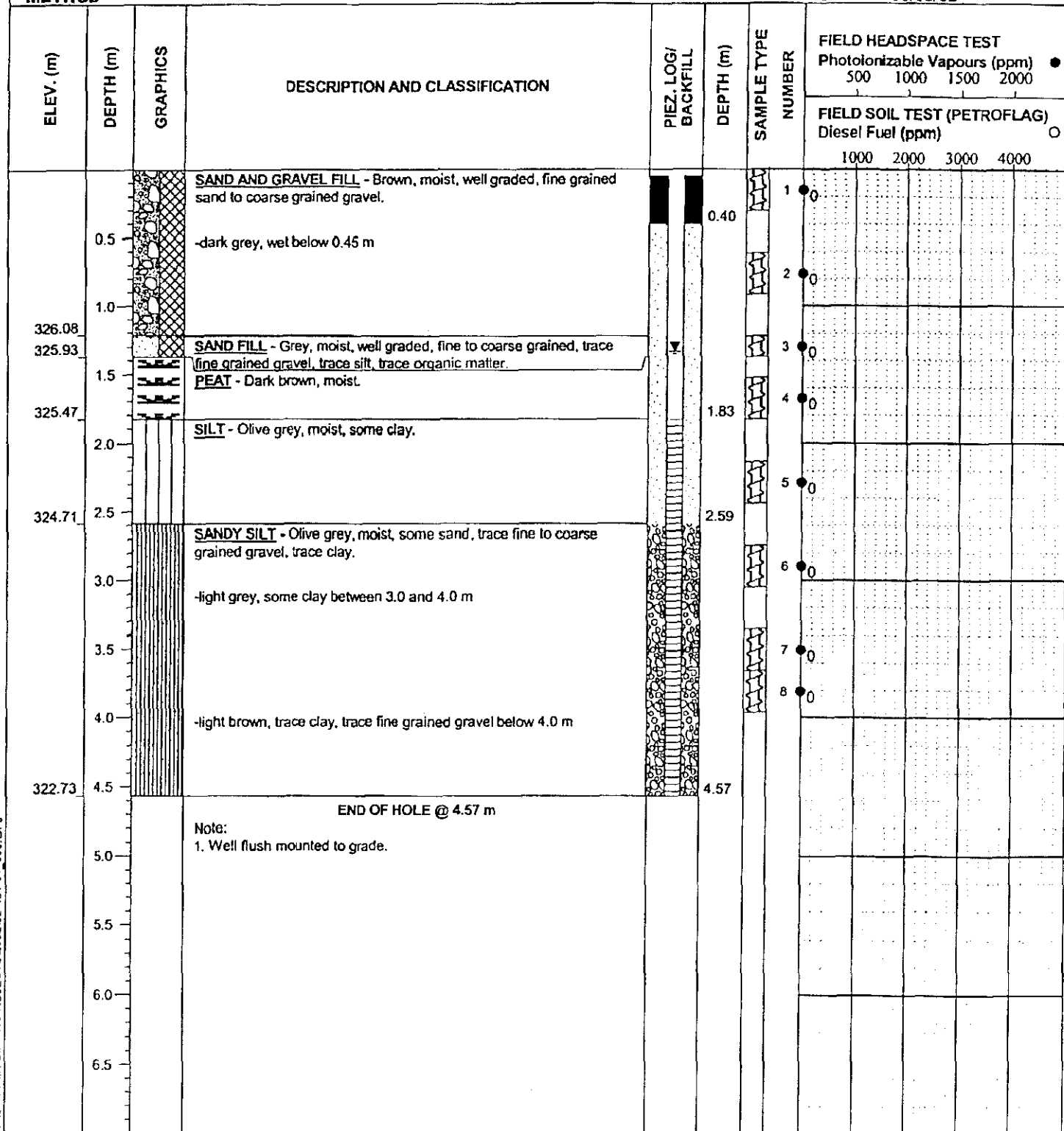
DATE 15/05/02
001610

CLIENT CANADIAN NATIONAL
PROJECT CN HORNEPAYNE YARD - EAST END DRILLING
SITE HORNEPAYNE YARD
LOCATION See Site Plan

JOB NO. 02-434-04.600
GROUND ELEV. 327.30 m, Geodetic
TOP OF PVC ELEV. 327.20 m
WATER ELEV. 325.97 m, 16/08/02

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

DATE DRILLED 01/08/02



SAMPLE TYPE AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.

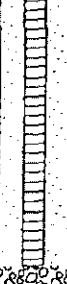
INSPECTOR
T. GALLO

APPROVED

DATE 06/03/0001611

CLIENT CANADIAN NATIONAL
PROJECT CN HORNEPAYNE YARD - EAST END DRILLING
SITE HORNEPAYNE YARD
LOCATION See Site Plan
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 02-434-04.600
GROUND ELEV. 327.25 m, Geodetic
TOP OF PVC ELEV. 327.10 m
WATER ELEV. 326.48 m, 16/08/02
DATE DRILLED 01/08/02

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE	NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)				FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm)			
								500	1000	1500	2000	1000	2000	3000	4000
326.49	0.5		SAND AND GRAVEL FILL - Brown, wet, well graded, fine grained sand to coarse grained gravel.		0.41		1	0							
	1.0		SILT - Brown, moist, trace clay.		0.77		2	0							
325.73	1.5		CLAYEY SILT - Light brown, wet, soft, with clay.		2.90		3	0							
	2.0		-with clay, with fine to coarse grained sand between 2.1 and 2.4 m				4	0							
	2.5		-saturated, silt and clay, some fine to coarse grained sand below 2.4 m				5	0							
324.21	3.0		END OF HOLE @ 3.05 m		3.05										
	3.5		Note: 1. Well flush mounted to grade.												
	4.0														
	4.5														
	5.0														
	5.5														
	6.0														
	6.5														

SAMPLE TYPE  AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

DATE 25/02/03

001612

CLIENT CANADIAN NATIONAL
PROJECT CN HORNEPAYNE YARD - EAST END DRILLING
SITE HORNEPAYNE YARD
LOCATION See Site Plan

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 02-434-04.600
GROUND ELEV. 327.26 m, Geodetic
TOP OF PVC ELEV. 327.18 m
WATER ELEV. 326.47 m, 16/08/02
DATE DRILLED 01/08/02

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ●				FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○			
							500	1000	1500	2000	1000	2000	3000	4000
326.50	0.5		<u>SAND AND GRAVEL FILL</u> - Dark brown, moist, well graded, fine grained sand to coarse grained gravel.		0.61	1 ● 0								
	1.0		<u>SILT</u> - Grey to brown, moist. -oxidized between 1.2 and 1.5 m -light grey, wet, trace clay below 1.5 m		0.77	2 ● 0								
	1.5					3 ● 0								
	2.0					4 ● 0								
	2.5					5 ● 0								
324.21	3.0		END OF HOLE @ 3.05 m		2.90									
	3.05				3.05									
	3.5		Note: 1. Well flush mounted to grade.											
	4.0													
	4.5													
	5.0													
	5.5													
	6.0													
	6.5													

SAMPLE TYPE  AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

DATE 25/02/0001613

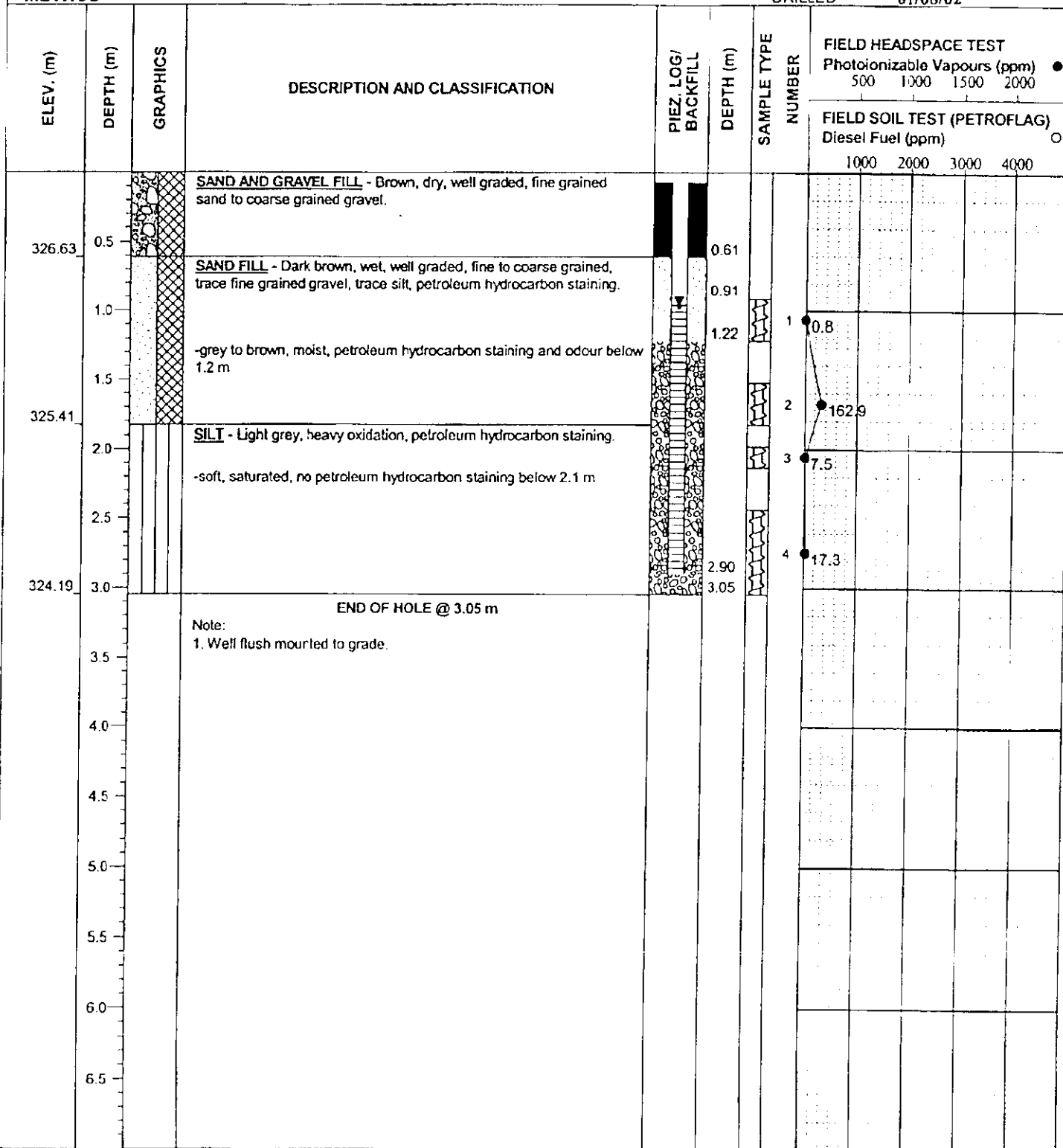
CLIENT CANADIAN NATIONAL
PROJECT CN HORNEPAYNE YARD - EAST END DRILLING
SITE HORNEPAYNE YARD
LOCATION See Site Plan

JOB NO. 02-434-04.600
GROUND ELEV. 327.24 m, Geodetic
TOP OF PVC ELEV. 327.17 m

WATER ELEV. 326.27 m, 16/08/02

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

DATE DRILLED 01/08/02



SAMPLE TYPE AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

DATE 06/03/03

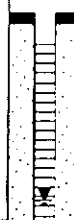
001614

CLIENT CANADIAN NATIONAL
PROJECT CN HORNEPAYNE YARD - EAST END DRILLING
SITE HORNEPAYNE YARD
LOCATION See Site Plan

JOB NO. 02-434-04.600
GROUND ELEV. 327.21 m, Geodetic
TOP OF PVC ELEV. 327.10 m
WATER ELEV. 326.09 m, 16/08/02

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

DATE DRILLED 01/08/02

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ●					FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○				
							500	1000	1500	2000		1000	2000	3000	4000	
325.99	0.5		<u>SAND AND GRAVEL FILL</u> - Brown, moist, fine grained sand to coarse grained gravel.		0.17											
	1.0		-dark grey, trace silt below 0.75 m		0.28											
	1.5		<u>SILT</u> - Light grey, moist, trace clay.													
324.16	2.0		-some clay, oxidized below 1.5 m		2.13											
	2.5															
	3.0				2.92											
	3.05		END OF HOLE @ 3.05 m		3.05											
	3.5		Note: 1. Well flush mounted to grade.													
	4.0															
	4.5															
	5.0															
	5.5															
	6.0															
	6.5															

SAMPLE TYPE  **AUGER GRAB**

CONTRACTOR
 Paddock Drilling Ltd.

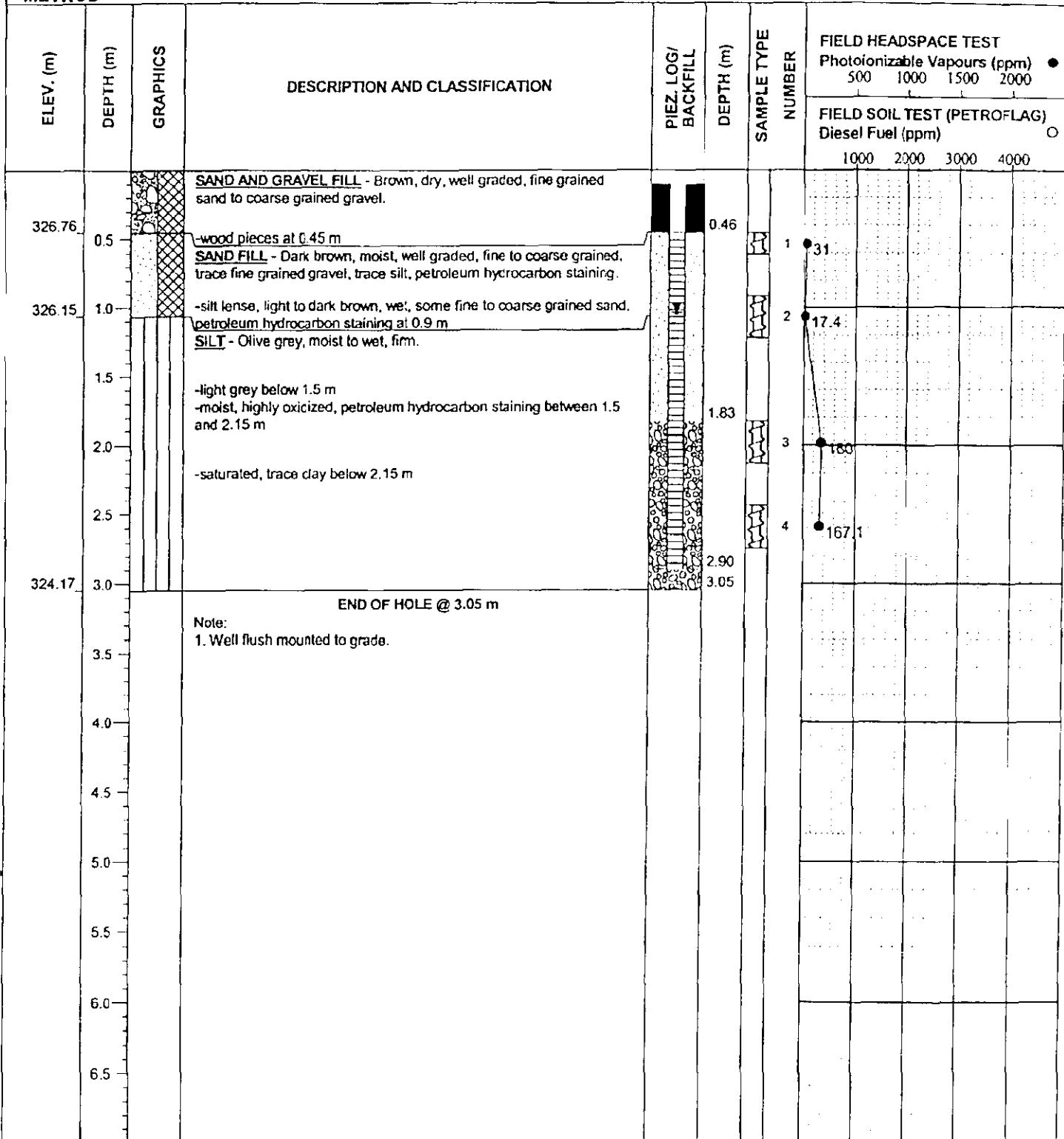
INSPECTOR
 T. GALLO

APPROVED

DATE 06/03/001615

CLIENT CANADIAN NATIONAL
PROJECT CN HORNEPAYNE YARD - EAST END DRILLING
SITE HORNEPAYNE YARD
LOCATION See Site Plan
DRILLING METHOD 125 mm ø Solid Stem Auger, Ackor SX Drill Rig

JOB NO. 02-434-04.600
GROUND ELEV. 327.22 m, Geodetic
TOP OF PVC ELEV. 327.12 m
WATER ELEV. 326.18 m, 16/08/02
DATE DRILLED 01/08/02



SAMPLE TYPE AUGER GRAB

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED

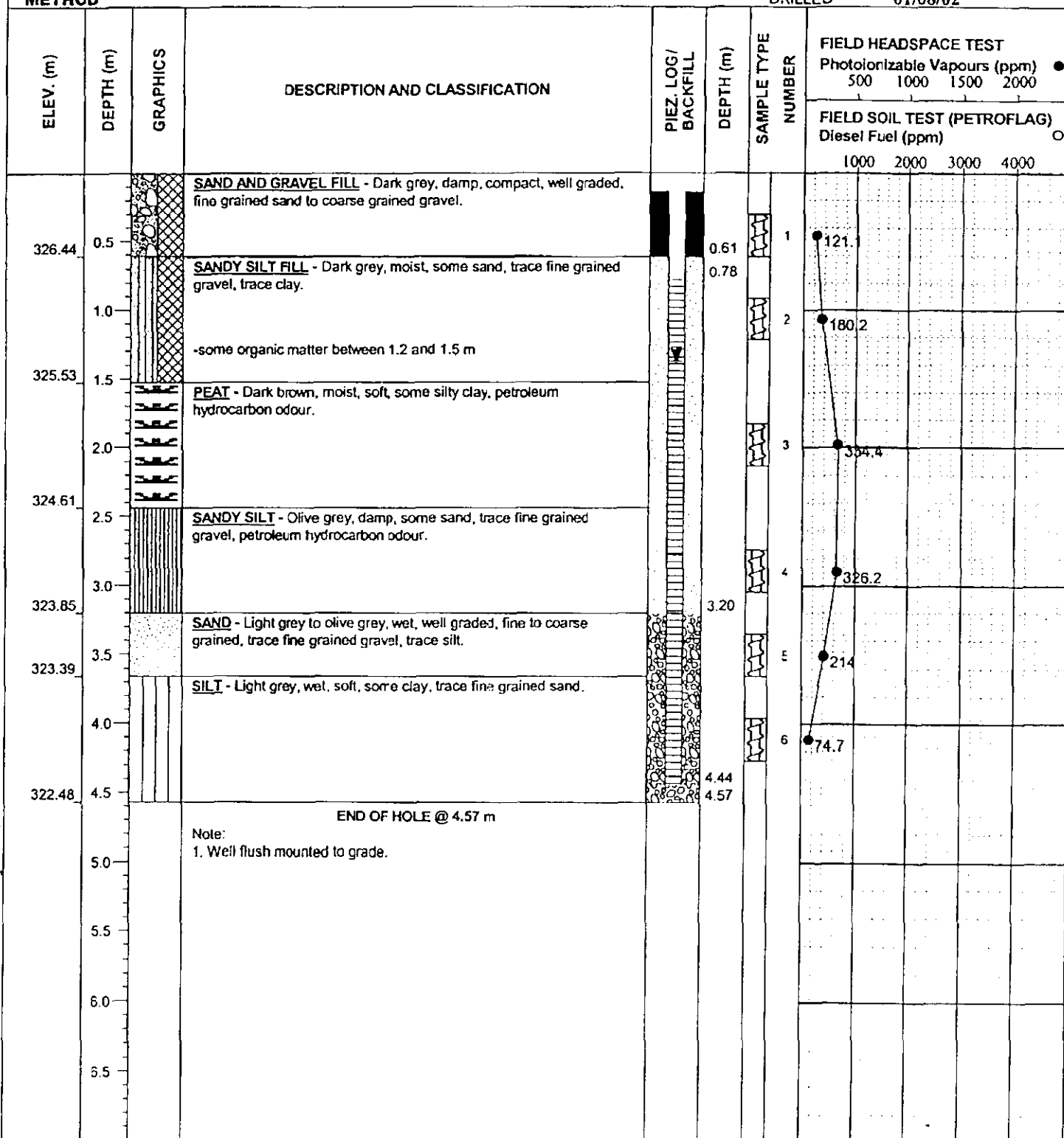
DATE 25/02/03

001616

CLIENT CANADIAN NATIONAL
PROJECT CN HORNEPAYNE YARD - EAST END DRILLING
SITE HORNEPAYNE YARD
LOCATION See Site Plan

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 02-434-04.600
GROUND ELEV. 327.05 m, Geodetic
TOP OF PVC ELEV. 326.91 m
WATER ELEV. 325.68 m, 16/08/02
PRODUCT ELEV. 325.70 m, 16/08/02
DATE DRILLED 01/08/02



SAMPLE TYPE AUGER GRAB

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR T. GALLO

APPROVED

DATE 06/03/03

001617

CLIENT CANADIAN NATIONAL
PROJECT HORNEPAYNE YARD RAP
SITE HORNEPAYNE, ONTARIO
LOCATION FORMER EAST END FUELLING STAND AREA
DRILLING METHOD 100 mm ø Solid Stem Auger, Acker SX Skidder Mounted Rig

JOB NO. 03-434-04
GROUND ELEV. 327.90 m, Geodetic
TOP OF PVC ELEV. 327.83 m
WATER ELEV. 326.89 m (25-Sep-03)
PRODUCT ELEV.
DATE DRILLED 23 Sep 03

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ● 200 400 600 800 FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○ 1000 2000 3000 4000
	0.5		SAND AND GRAVEL FILL - Brown to grey with depth, dry to wet with depth, loose. Sand is fine to medium grained and poorly graded. Gravel is fine grained and subangular. Petroleum hydrocarbon staining and odour with depth		0.15 0.23	1	55.3
326.38	1.5		SAND - Brown, saturated, loose, fine to medium grained, poorly graded, dark grey petroleum hydrocarbon staining and odour.			2	170
325.77	2.0		SILT - Olive to grey, wet, soft, <1.0 cm fine sand lenses throughout, petroleum hydrocarbon staining within sand lenses.			3	162
325.00	2.5					4	239
	3.0		PEAT - Brown, wet, fibrous to decomposed			5	49.9
	3.5						
	4.0				4.20		
323.33	4.5		END OF HOLE AT 4.57 m		4.57		
	5.0		Notes: 1. Well installed with geosock and lockable flush mount protective cover.				
	5.5						
	6.0						
	6.5						
	7.0						
	7.5						

SAMPLE TYPE  Auger Grab

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED _____ DATE 22/01/04

SUMMARY LOG

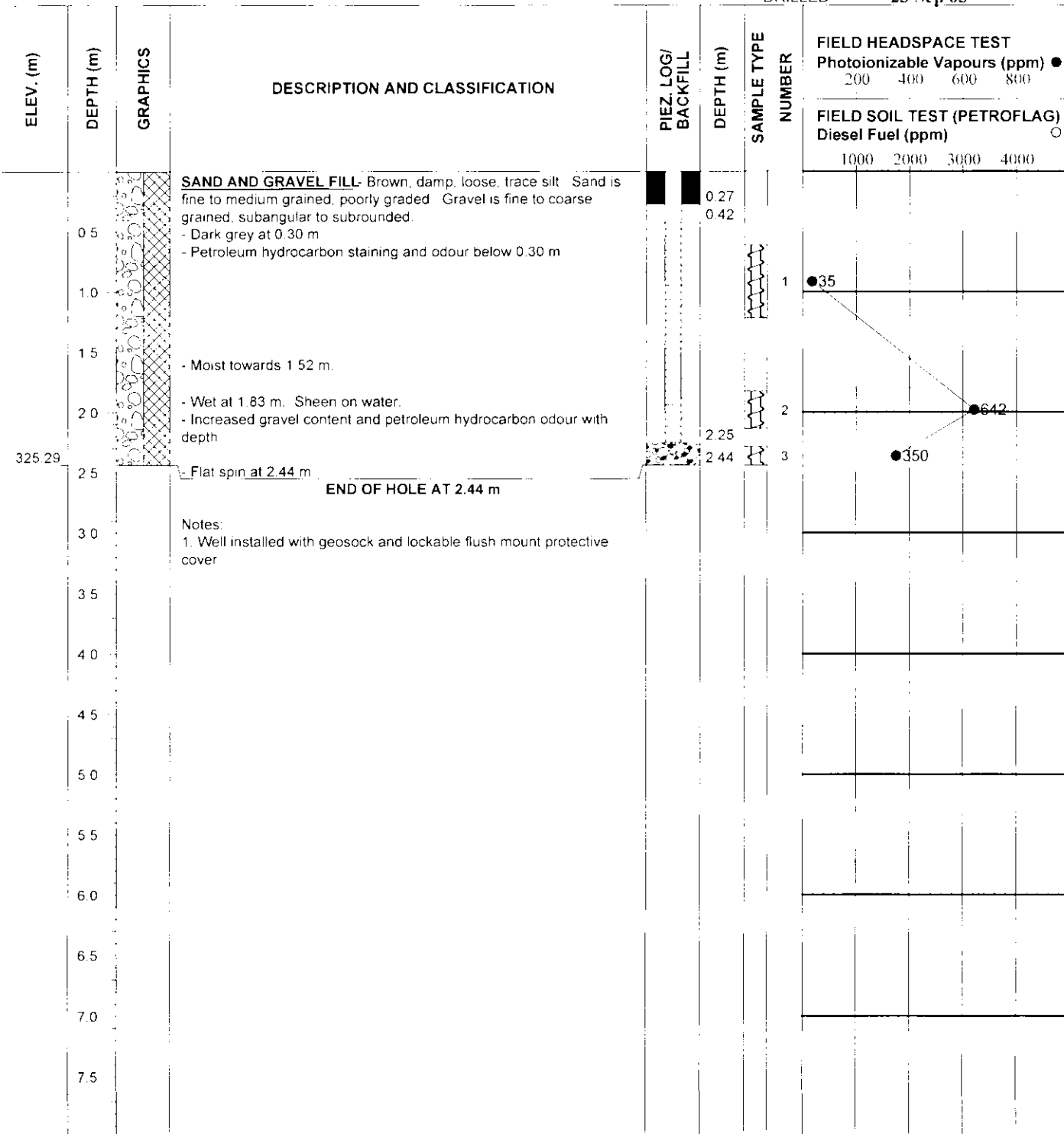
HOLE NO.

MW142

SHEET 1 of 1

CLIENT CANADIAN NATIONAL
PROJECT HORNEPAYNE YARD RAP
SITE HORNEPAYNE, ONTARIO
LOCATION FORMER EAST END FUELLING STAND AREA
DRILLING METHOD 100 mm ø Solid Stem Auger, Acker SX Skidder Mounted Rig

JOB NO. 03-434-04
GROUND ELEV. 327.73 m, Geodetic
TOP OF PVC ELEV. 327.66 m
WATER ELEV. 326.83 m (25-Sep-03)
PRODUCT ELEV.
DATE DRILLED 23 Sep 03



SAMPLE TYPE Auger Grab

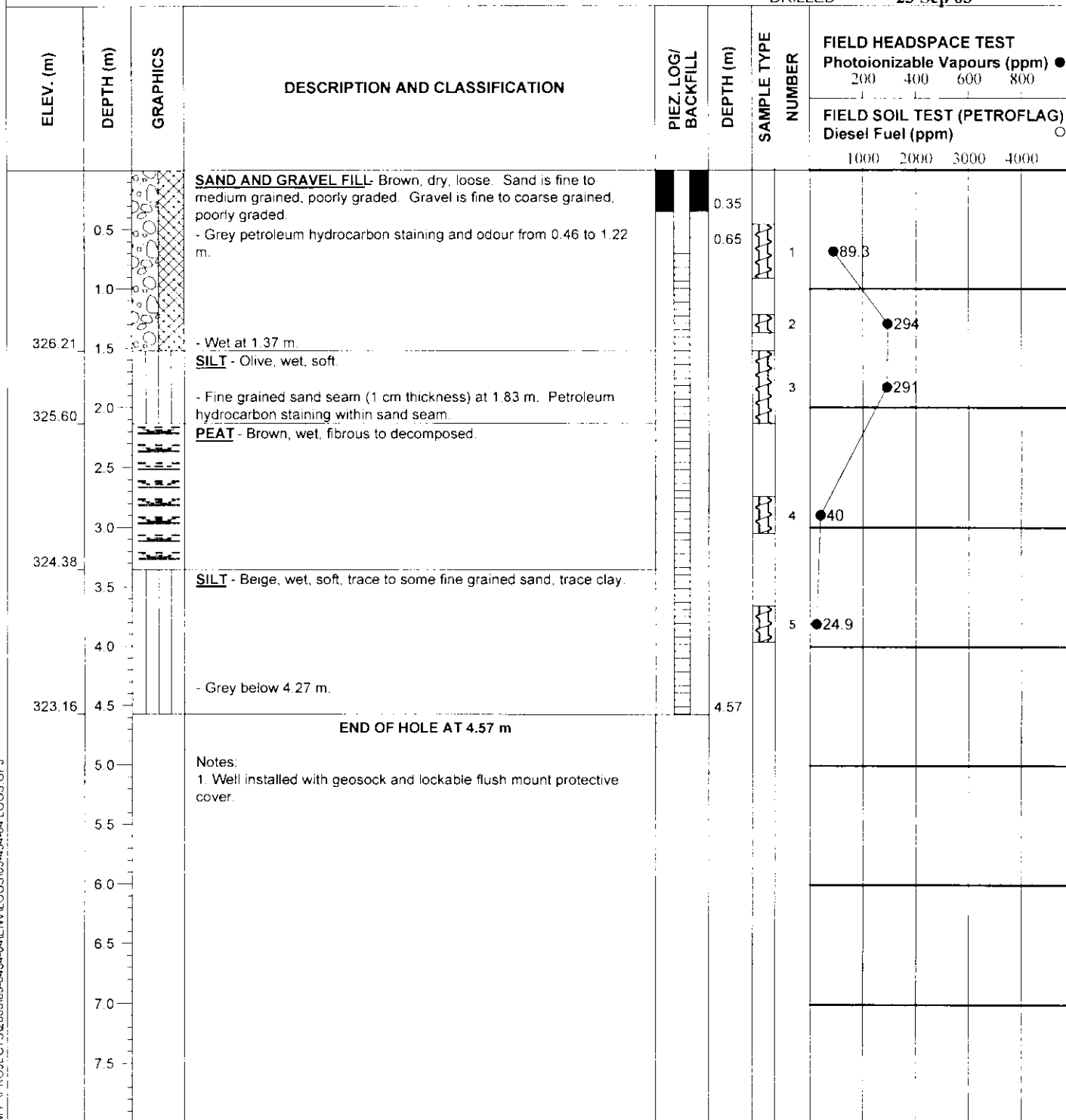
CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED _____ DATE 22/01/04

CLIENT CANADIAN NATIONAL
PROJECT HORNEPAYNE YARD RAP
SITE HORNEPAYNE, ONTARIO
LOCATION FORMER EAST END FUELLING STAND AREA
DRILLING METHOD 100 mm ø Solid Stem Auger, Acker SX Skidder Mounted Rig

JOB NO. 03-434-04
GROUND ELEV. 327.74 m, Geodetic
TOP OF PVC ELEV. 327.66 m
WATER ELEV. 326.69 m (25-Sep-03)
PRODUCT ELEV.
DATE DRILLED 23 Sep 03



SAMPLE TYPE:  Auger Grab

CONTRACTOR
 Paddock Drilling Ltd.

INSPECTOR
 T. GALLO

APPROVED

DATE 22/01/04

CLIENT CANADIAN NATIONAL
PROJECT HORNEPAYNE YARD RAP
SITE HORNEPAYNE, ONTARIO
LOCATION FORMER EAST END FUELLING STAND AREA
DRILLING METHOD 100 mm ø Solid Stem Auger, Acker SX Skidder Mounted Rig

JOB NO. 03-434-04
GROUND ELEV. 327.69 m, Geodetic
TOP OF PVC ELEV. 327.64 m
WATER ELEV. 326.50 m (25-Sep-03)
PRODUCT ELEV.
DATE DRILLED 23 Sep 03

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ● 200 400 600 800	FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○ 1000 2000 3000 4000
	0.5		SAND AND GRAVEL FILL - Brown, dry, loose, petroleum hydrocarbon odour. Sand is fine to medium grained, poorly graded. Gravel is fine to coarse grained, subangular to subrounded. - Grey/brown between 0.30 to 0.91 m.		0.27 0.57			
	1.0		- Dark grey petroleum hydrocarbon staining between 0.91 and 1.52 m.			1	243	
	1.5		- Damp towards 1.52 m.			2	330	
325.56	2.0		- Wet at 1.83 m.					
	2.5		PEAT - Brown, moist to wet, soft, fibrous to decomposed.			3	36.4	
324.34	3.0					4	96.2	
	3.5		SILT - Olive/brown, wet, soft, and fine grained sand, uniform. Increased medium to coarse grained sand and fine to coarse grained gravel content with depth. Trace clay with depth. - Saturated at 3.66 m.					
	4.0					5	182	
323.12	4.5		END OF HOLE AT 4.57 m		4.54 4.57			
	5.0		Notes: 1. Well installed with geosock and lockable flush mount protective cover.					
	5.5							
	6.0							
	6.5							
	7.0							
	7.5							

SAMPLE TYPE  Auger GrabCONTRACTOR
Paddock Drilling Ltd.INSPECTOR
T. GALLO

APPROVED _____ DATE 22/01/04

CLIENT CANADIAN NATIONAL
PROJECT HORNEPAYNE YARD RAP
SITE HORNEPAYNE, ONTARIO
LOCATION FORMER EAST END FUELLING STAND AREA
DRILLING METHOD 100 mm ø Solid Stem Auger, Acker SX Skidder Mounted Rig

JOB NO. 03-434-04
GROUND ELEV. 327.68 m, Geodetic
TOP OF PVC ELEV. 327.59 m
WATER ELEV. 326.53 m (25-Sep-03)
PRODUCT ELEV. 326.54 m (25-Sep-03)
DATE DRILLED 23 Sep 03

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ●				FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○			
							200	400	600	800	1000	2000	3000	4000
325.70	0.5		SAND AND GRAVEL FILL - Brown, damp, loose, trace silt. Sand is fine to medium grained, poorly graded. Gravel is fine grained, subangular.		0.33	1	47.7							
	1.0				0.63									
	1.5		- Wet at 1.37 m. - Purple colour between 1.37 to 1.52 m. - Saturated below 1.52 m. - Petroleum hydrocarbon odours between 1.52 and 1.83 m.			2	112							
	2.0		PEAT - Brown, wet, soft, decomposed to organic.			3	131							
325.39	2.5		SILT - Grey/olive, wet, firm, trace fine to coarse grained sand. Increased moisture content with depth. Decreased sand and gravel content with depth. Increase clay content with depth.			4	46.3							
	3.0		- Saturated below 3.05 m.			5	43.4							
323.11	4.5		END OF HOLE AT 4.57 m		4.57									
	5.0		Notes: 1. Well installed with geosock and lockable flush mount protective cover.											
	5.5													
	6.0													
	6.5													
	7.0													
	7.5													

SAMPLE TYPE Auger Grab

CONTRACTOR
 Paddock Drilling Ltd.

INSPECTOR
 T. GALLO

APPROVED _____ **DATE** 22/01/04

VAPOURS_FT_M_P\PROJECTS\2003\03-04\ENV\LOGS\03-434-04 LOGS.GPJ

CLIENT CANADIAN NATIONAL
PROJECT HORNEPAYNE YARD RAP
SITE HORNEPAYNE, ONTARIO
LOCATION FORMER EAST END FUELLING STAND AREA
DRILLING METHOD 100 mm ø Solid Stem Auger, Acker SX Skidder Mounted Rig

JOB NO. 03-434-04
GROUND ELEV. 327.66 m, Geodetic
TOP OF PVC ELEV. 327.61 m
WATER ELEV. 326.70 m (25-Sep-03)
PRODUCT ELEV.
DATE DRILLED 23 Sep 03

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ● 200 400 600 800	FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○ 1000 2000 3000 4000
325.83	0.5		SAND AND GRAVEL FILL - Brown, dry, loose. Sand is fine to medium grained, poorly graded. Gravel is fine grained and subangular.		0.15 0.23	1	10.9	
	1.0		- Black cinders from 0.91 to 1.07 m. - Dark grey petroleum hydrocarbon staining and odour between 1.07 and 1.37 m. - Wet below 1.37 m.			2	141	
	1.5					3	31.3	
324.76	2.0		PEAT - Brown, wet, soft, fibrous to decomposed.			4	36.5	
324.68	2.5					5	27	
	3.0		SAND AND SILT - Brown, wet, firm. Sand is fine grained and uniform.					
	3.5		SILT - Olive to beige, wet, soft, trace to some fine grained sand and gravel.					
	4.0							
323.08	4.5		END OF HOLE AT 4.57 m		4.57			
	5.0		Notes: 1. Well installed with geosock and lockable flush mount protective cover.					
	5.5							
	6.0							
	6.5							
	7.0							
	7.5							

SAMPLE TYPE Auger Grab

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
T. GALLO

APPROVED _____ **DATE** 22/01/04

CLIENT CANADIAN NATIONAL
PROJECT HORNEPAYNE YARD RAP
SITE HORNEPAYNE, ONTARIO
LOCATION FORMER EAST END FUELLING STAND AREA
DRILLING METHOD 100 mm ø Solid Stem Auger, Acker SX Skidder Mounted Rig

JOB NO. 03-434-04
GROUND ELEV. 326.68 m, Geodetic
TOP OF PVC ELEV. 326.60 m
WATER ELEV. 323.89 m (25-Sep-03)
PRODUCT ELEV.
DATE DRILLED 23 Sep 03

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) ● 200 400 600 800	FIELD SOIL TEST (PETROFLAG) Diesel Fuel (ppm) ○ 1000 2000 3000 4000
325.30	0.5		SAND AND GRAVEL FILL - Brown, dry, loose, trace silt. Sand is fine to medium grained, poorly graded. Gravel is fine grained, subangular. Mottled grey/dark brown with depth.			1	32.9	
	1.0		- Brown, damp, soft silt layer from 0.76 to 0.84 m.		1.01			
	1.5		SILT - Brown, moist, soft, trace clay, trace fine grained sand.		1.31	2	12.9	
324.85	2.0		CINDERS - Black, dry, loose.			3	46.3	
324.54	2.5		SAND - Brown, damp to moist, loose, fine to coarse grained, poorly graded, trace fine to coarse grained gravel			4	21.6	
	3.0		- Wet towards 3.05 m.			5	23.7	
323.32	3.5		PEAT - Brown, damp, fibrous to decomposed.					
323.17	4.0		SILT - Black, moist, firm, trace clay. Trace to some oxidation with depth. Increase clay content with depth.			6	220	
	4.5		- Olive to beige below 3.58 m.					
	5.0		- Sand seam (1-2 cm thick) at 4.50 m. Fine grained, uniform sand, petroleum hydrocarbon staining and odour within the seam.					
	5.5							
320.58	6.0		END OF HOLE AT 6.1 m		5.89	7	18.6	
	6.5		Notes: 1. Well installed with geosock and lockable flush mount protective cover		6.10			
	7.0							
	7.5							

SAMPLE TYPE: Auger Grab

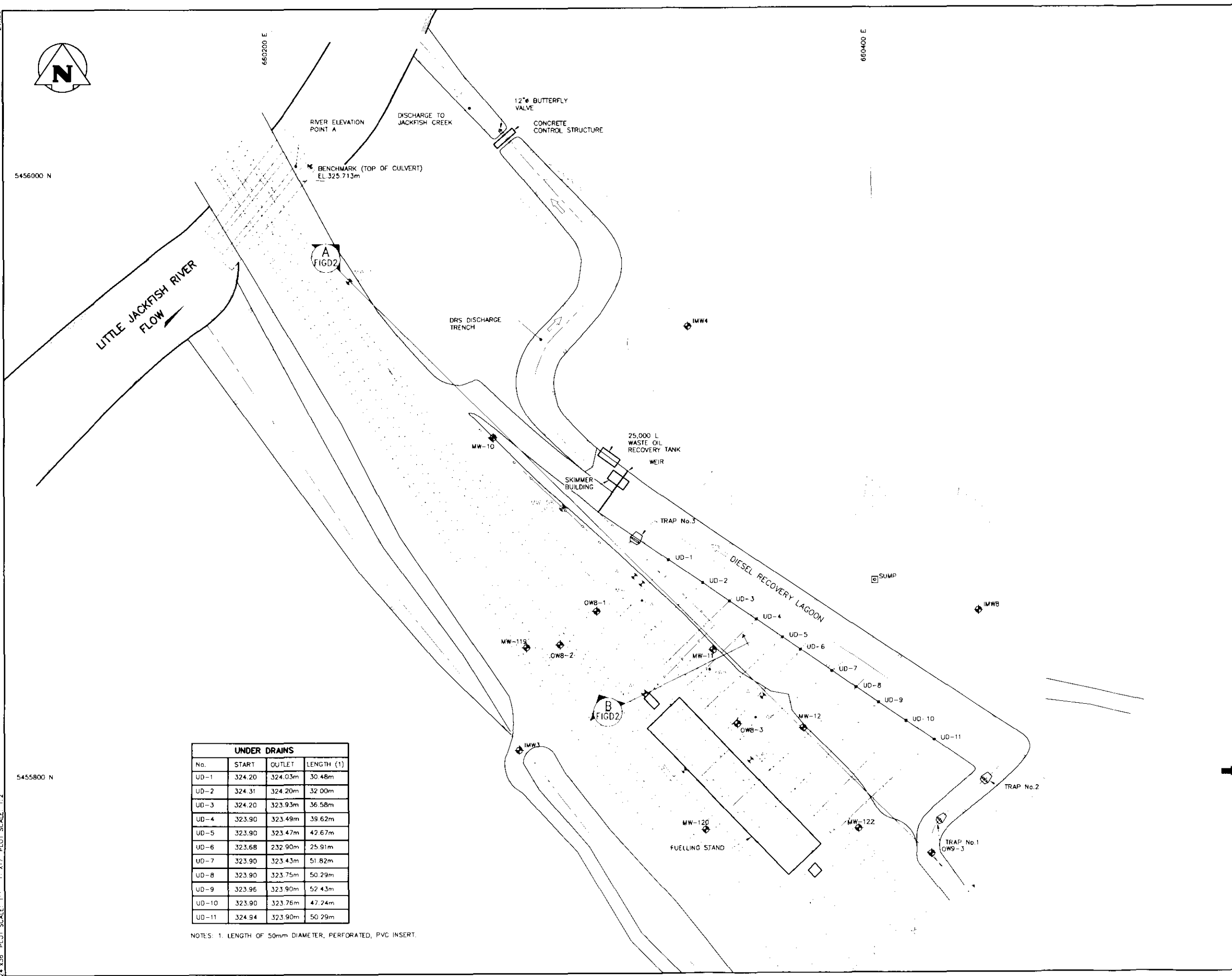
CONTRACTOR
Paddock Drilling Ltd.INSPECTOR
T. GALLO

APPROVED

DATE 22/01/04

**APPENDIX D
STRATIGRAPHIC CROSS SECTIONS**

File Name: p:\Projects\2011\11-04\34-04\dwg\env\MOE Report\Cross Section Drawing\11-04\34-04_FIG D1.dwg - Tab: FIG D1 Plotted By: Williamson 01/11/2013 [Fri 1:33pm]
24"x36" PLOT SCALE: 1"=11' PLOT SCALE: 1:2



UNDER DRAINS			
No.	START	OUTLET	LENGTH (1)
UD-1	324.20	324.03m	30.48m
UD-2	324.31	324.20m	32.00m
UD-3	324.20	323.93m	36.58m
UD-4	323.90	323.49m	39.62m
UD-5	323.90	323.47m	42.67m
UD-6	323.68	232.90m	25.91m
UD-7	323.90	323.43m	51.82m
UD-8	323.90	323.75m	50.29m
UD-9	323.96	323.90m	52.43m
UD-10	323.90	323.76m	47.24m
UD-11	324.94	323.90m	50.29m

NOTES: 1. LENGTH OF 50mm DIAMETER, PERFORATED, PVC INSERT.

THIS FIGURE

WEST END

CENTER

EAST END

TOWN OF HORNEPAYNE

KEY PLAN

LEGEND:

- BERM
- CENTERLINE OF DITCH
- FENCE
- BURIED ELECTRICAL CABLE
- BENCHMARK
- MW-119 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW-20 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- RWB-1 RECOVERY WELL
- SUMP SUMP WELL
- RAILROAD TRACKS
- UNDERGROUND DRAIN DESTROYED

NOTES:

1. SITE PLAN BASED ON AUTOCAD FILE PROVIDED BY CN.

0 12 24 36 48 60m

SCALE: 1:600 METRIC 24"x36"
1:1200 METRIC 11"x17"

B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG

REVISIONS / ISSUE

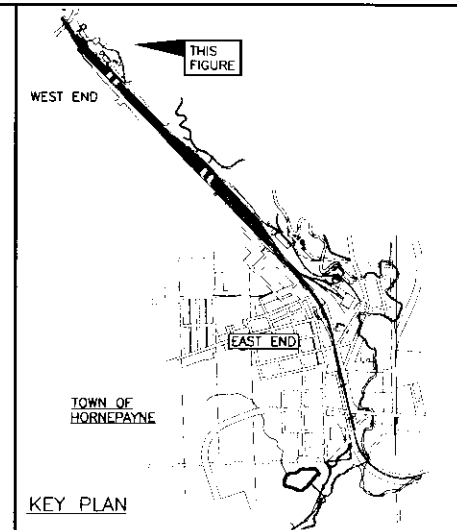
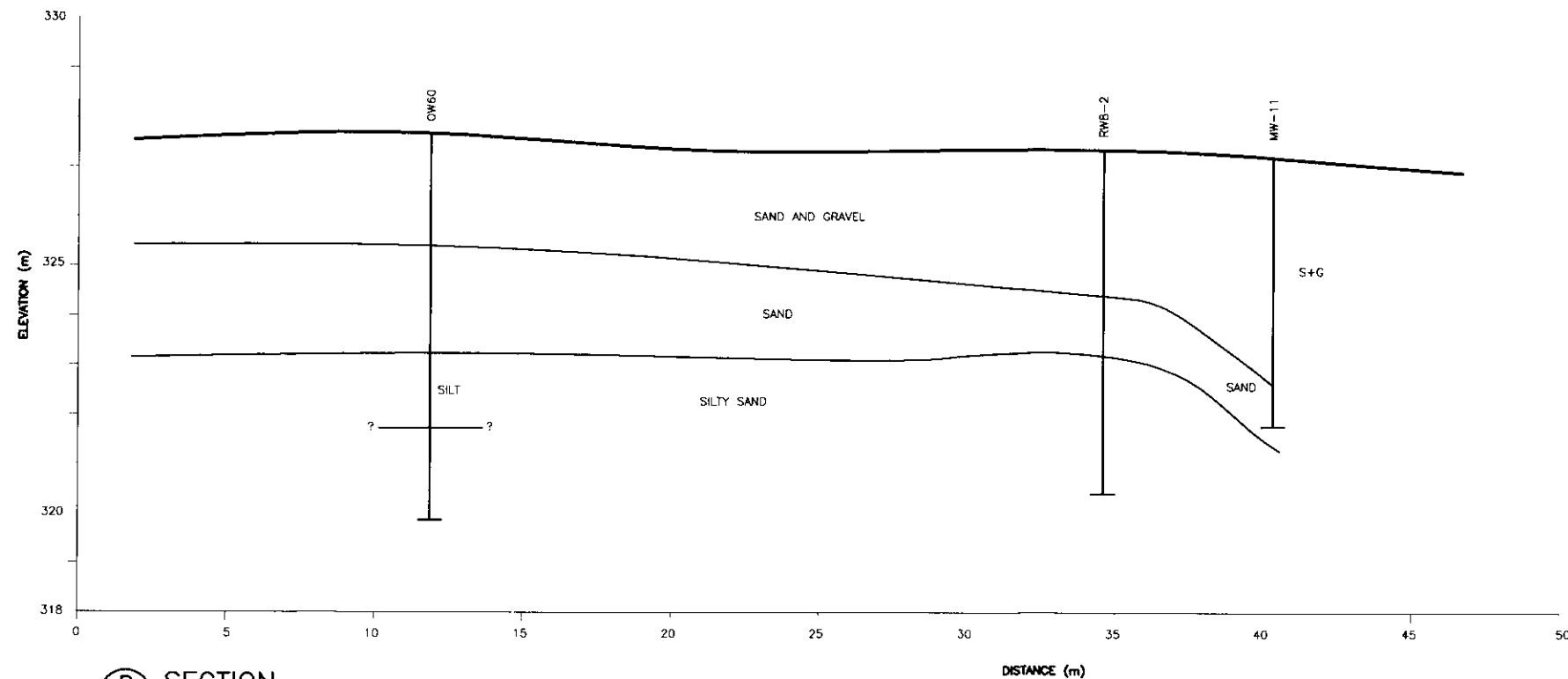
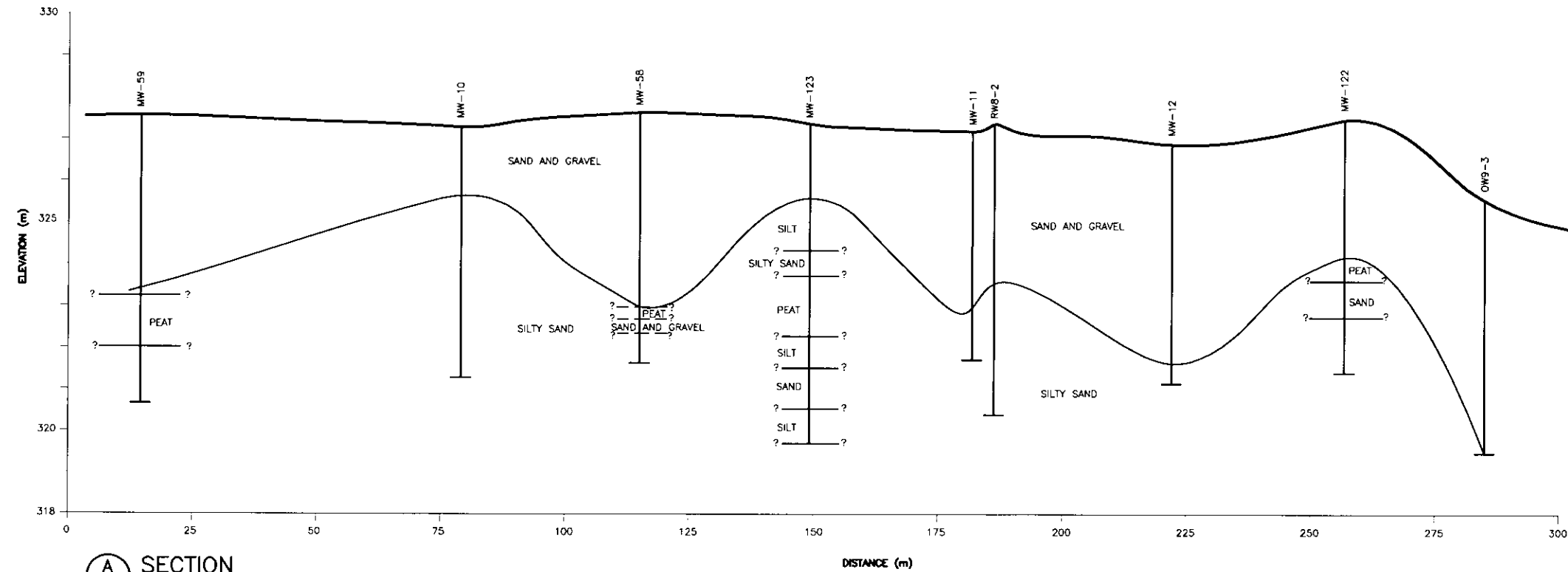
KGS GROUP CONSULTING ENGINEERS

CN CANADIAN NATIONAL

2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587
HORNEPAYNE YARD, ON

STRATIGRAPHIC CROSS SECTION
REFERENCE - WEST END

JANUARY 2013	FIGURE D1	B
--------------	-----------	---



KEY PLAN

LEGEND:

MONITORING WELL OFFSET DISTANCE FROM CROSS SECTION A:

MW-59 = 0.0m
MW-10 = 3.5m WEST
MW-58 = 3.8m WEST
MW-123 = 3.0m WEST
MW-11 = 2.0m EAST
RWB-2 = 7.0m WEST
MW-12 = 0.0m
MW-122 = 10.7m WEST
OWB-3 = 0.0m

MONITORING WELL OFFSET DISTANCE FROM CROSS SECTION B:

OWB-60 = 0.0m
RWB-2 = 3.2 m SOUTH
MW-11 = 3.2m NORTH

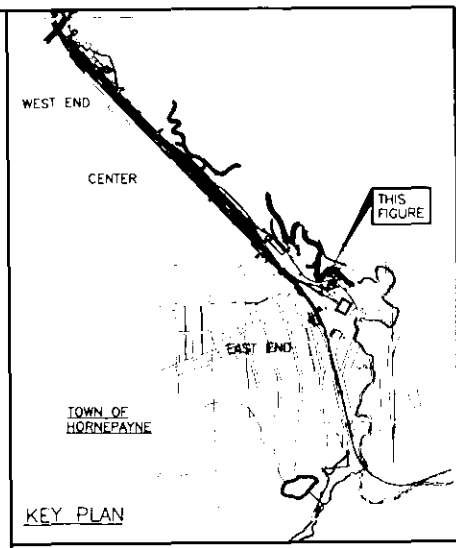
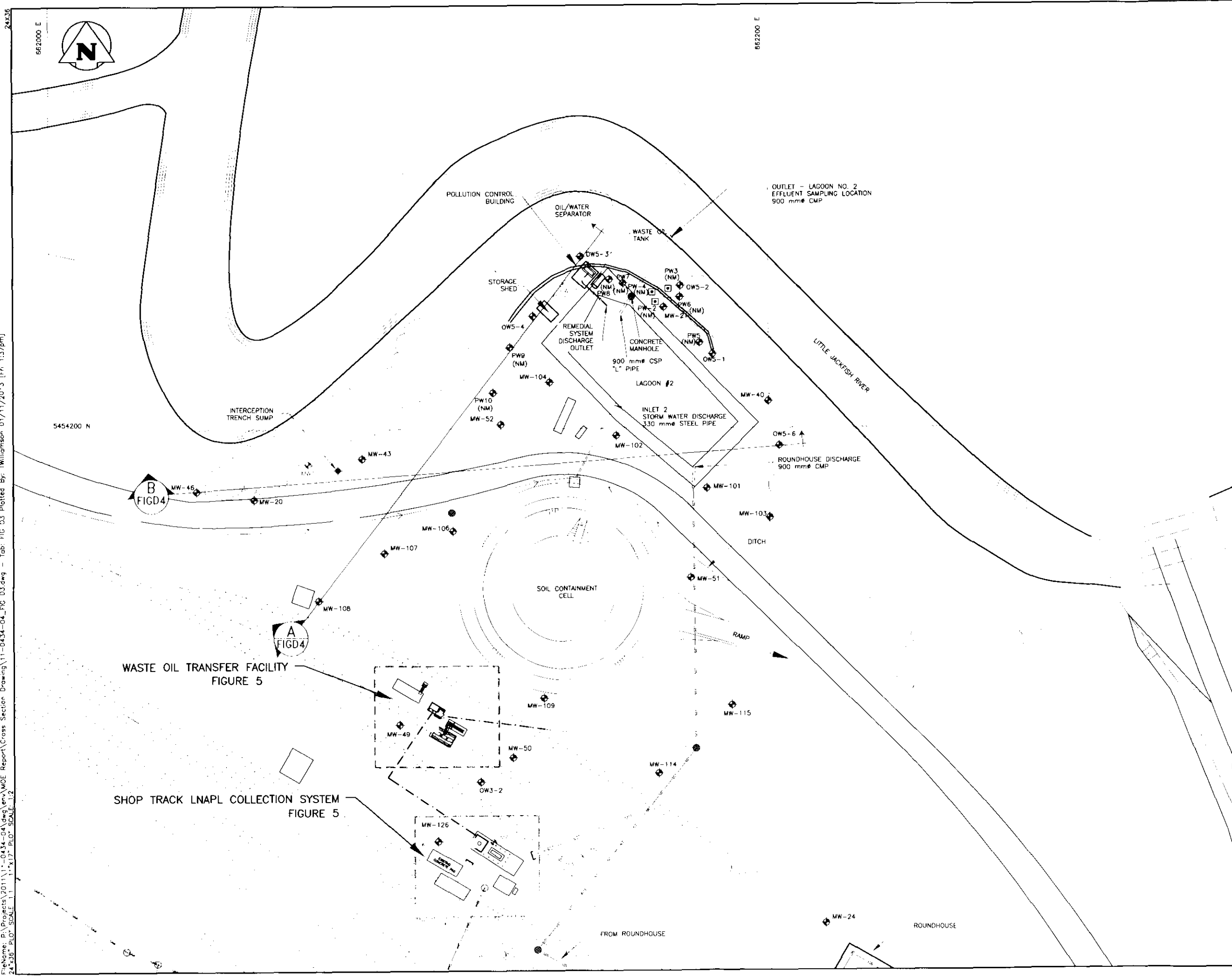
B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
NC	11/04/02	DESCRIPTION	WT

REVISIONS / ISSUE



2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587
HORNEPAYNE YARD, ON
STRATIGRAPHIC CROSS SECTIONS
WEST END

File Name: P:\Projects\2011\11-0434-04.dwg User: MOE Report\Cross Section Drawing\11-0434-04_FIG D3.dwg - Tab: FIG D3 Plotted By: TWilkinson 01/11/2013 [Fri 1:37pm]
24x36 PLO SCALE 1:1 11"x17" PLO SCALE 1:2



LEGEND

- RAILROAD TRACK
- CULVERT
- CENTERLINE OF DITCH
- SANITARY SEWER
- STORM SEWER
- FENCE
- DISCHARGE LINE
- TREES/ SHRUBS
- MANHOLES
- SURFACE WATER FLOW DIRECTION
- MW-119 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW-20 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- PW-1 PUMPING WELL
- DESTROYED
- CROSS SECTION LOCATION AND REFERENCE

NOTE:

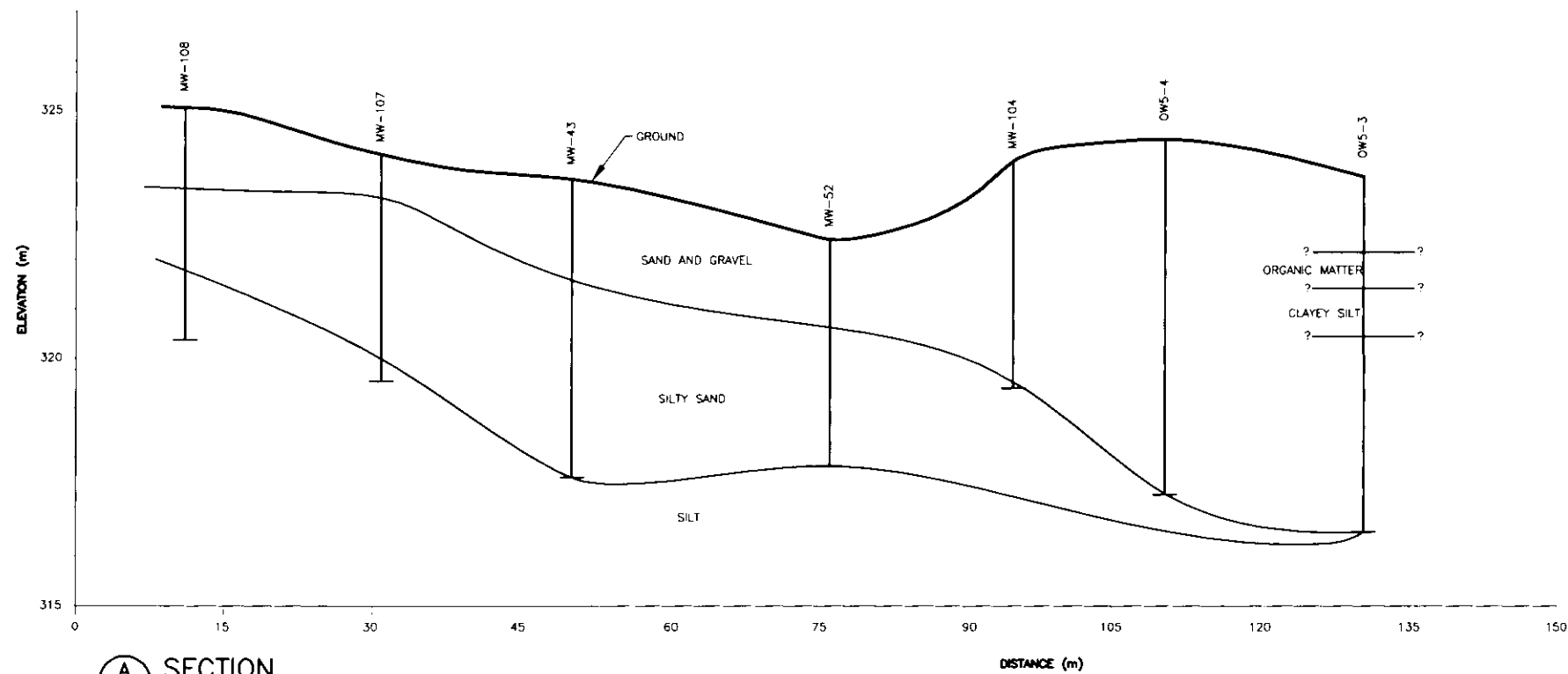
1. REFERENCE JACQUES WHITFORD ENVIRONMENTAL LIMITED PROJECT 31004, DRAWING NO. 2, 1996.

SCALE:

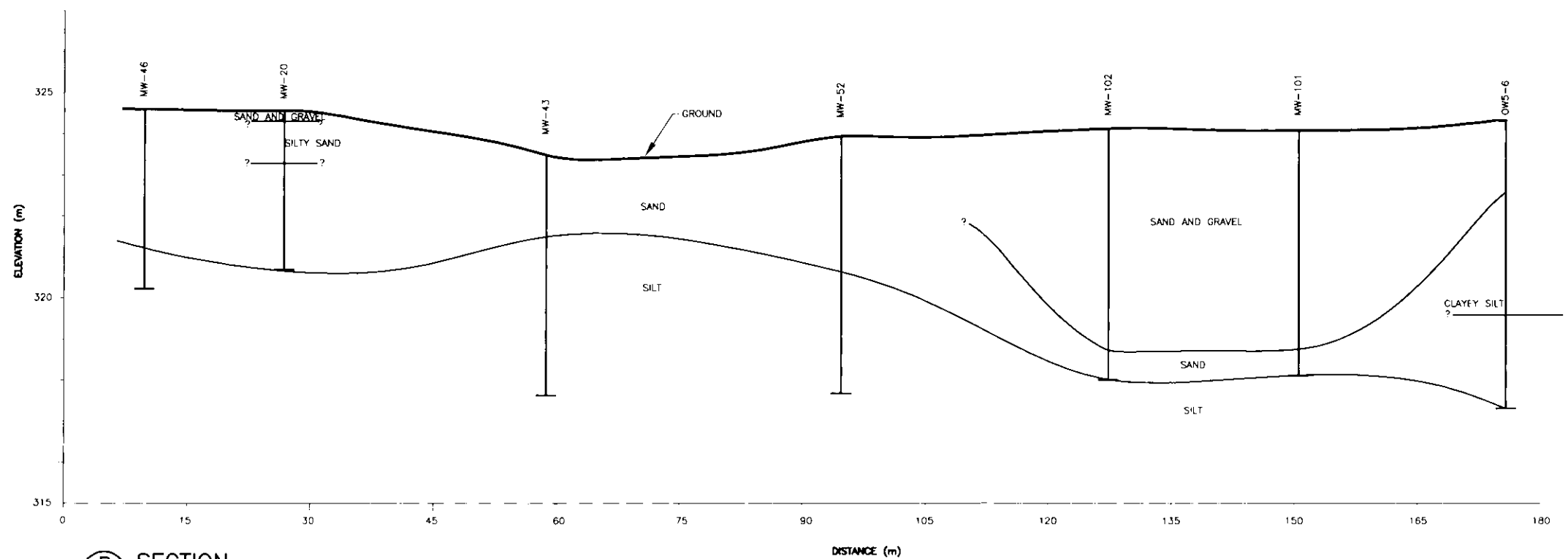
1:500 METRIC 24"x36"
1:1000 METRIC 11"x17"

0 10 20 30 40 50m

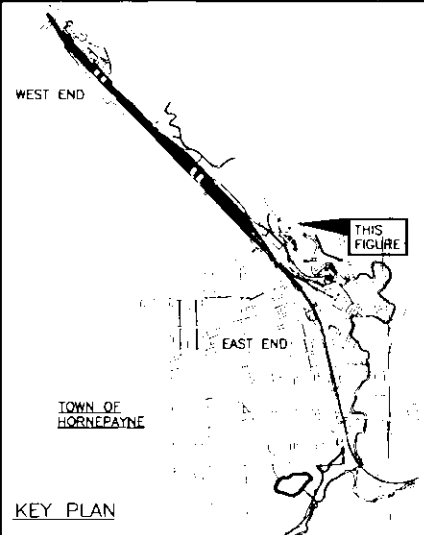
B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG
REVISIONS / ISSUE			
KGS GROUP CONSULTING ENGINEERS			
CN CANADIAN NATIONAL			
2011 REMEDIAL OPERATIONS PIN# 1000/ONPR/100591 HORNEPAYNE YARD, ON			
STRATIGRAPHIC CROSS SECTION REFERENCE - LAGOON 2			
JANUARY 2013		FIGURE D3	B



SECTION A - CROSS SECTION (NORTH TO SOUTH)



SECTION B - CROSS SECTION (WEST TO EAST)



LEGEND:

MONITORING WELL OFFSET DISTANCE FROM CROSS SECTION A:

MW-108 = 0.0m
MW-107 = 7.4m EAST
MW-43 = 18.7m WEST
MW-52 = 10m EAST
MW-104 = 12.6m EAST
OWS-4 = 0.0m
OWS-3 = 0.0m

MONITORING WELL OFFSET DISTANCE FROM CROSS SECTION B:

MW-46 = 0.0m
MW-20 = 3.6m SOUTH
MW-43 = 5.0m NORTH
MW-52 = 11.0m NORTH
MW-102 = 6.6m NORTH
MW-101 = 10.3m SOUTH
OWS-6 = 0.0m

B	13/01/11	ISSUED WITH FINAL REPORT	TG
A	13/01/09	ISSUED WITH MOE DRAFT REPORT	TG

REVISIONS / ISSUE



2011 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587
HORNEPAYNE YARD, ON
STRATIGRAPHIC CROSS SECTIONS
LAGOON 2

JANUARY 2013 FIGURE D4 B