Report to:

SHELTER CANADIAN

Phase II & III Environmental Site Assessment
Former Dominion Bridge Facility
Winnipeg, Manitoba

SEPTEMBER 1999

WARDROP | Engineering Inc.

99149401-02

EXECUTIVE SUMMARY

DRAFT

Shelter Canadian Properties Limited retained Wardrop Engineering in February 1999 to undertake a Phase II Environmental Site Assessment (ESA) of the former Dominion Bridge operations yard in Winnipeg, to assess the potential liabilities associated with historical operations at the site. Wardrop was then retained in June 1999 to conduct additional on-site investigations through the completion of a Phase III ESA.

The former Dominion Bridge operations yard is located at 1355 Saskatchewan Avenue in Winnipeg's St. James district. Dublin Avenue borders the site to the north followed by commercial and industrial properties. A Canadian Pacific Railway (CPR) corridor parallels Saskatchewan Avenue to the south of the property, followed by a foundry and Westview Park (a former Municipal landfill). Reliable Tire is present to the east of the subject property and to the west is Westeel Rosco Company. Omands Creek runs along the west property line of the subject site and flows south towards the Assiniboine River, located approximately 3 km to the south of the subject site.

The Dominion Bridge facility was constructed in the early 1910s on virgin prairie. The site currently comprises 11.1 ha of land. The original site comprised 19.5 ha; however, the plant's operations have reduced over the years and portions have been sold or leased to various other businesses. According to former reports, the subject property formerly included the properties to the east (Reliable Tire) and southwest (Government of Manitoba). A 1997 Phase I ESA indicates that the property to the north was also formerly part of the Dominion Bridge plant and was used as a parking lot. In addition, a light manufacturing company currently leases the building located in the southeast corner of the subject property, and portions of the Main Shop have been leased to various industries for storage.

The environmental concerns identified through previous Phase I ESAs of the property primarily pertain to the on-site handling and storage of hazardous materials including vehicle fuel, solvents, paints, and associated waste products (solvents, oil, and paint). In addition, heavy metals were also identified as being an inherent concern due to the nature of the steel fabrication processes on-site.

The Phase II ESA, comprising borehole drilling, monitoring well installations, as well as soil and ground water sampling and analyses, was designed to assess the areas of environmental concern identified. The investigation confirmed the presence of soil and ground water contamination on the property and identified the need to further quantify and assess these identified impacts. The Phase III ESA, comprising additional borehole drilling, monitoring well installations, as well as soil and ground water sampling and analyses was designed to delineate the soil- and ground water-impacted areas identified by the Phase II ESA.

During the Phase II portion of the investigation program, Wardrop supervised the drilling of 28 boreholes on the site by Maple Leaf Enterprises on February 22 and 23, 1999. During Phase III of this investigation Wardrop supervised the drilling of an additional 46 boreholes on the site by Maple Leaf Enterprises on

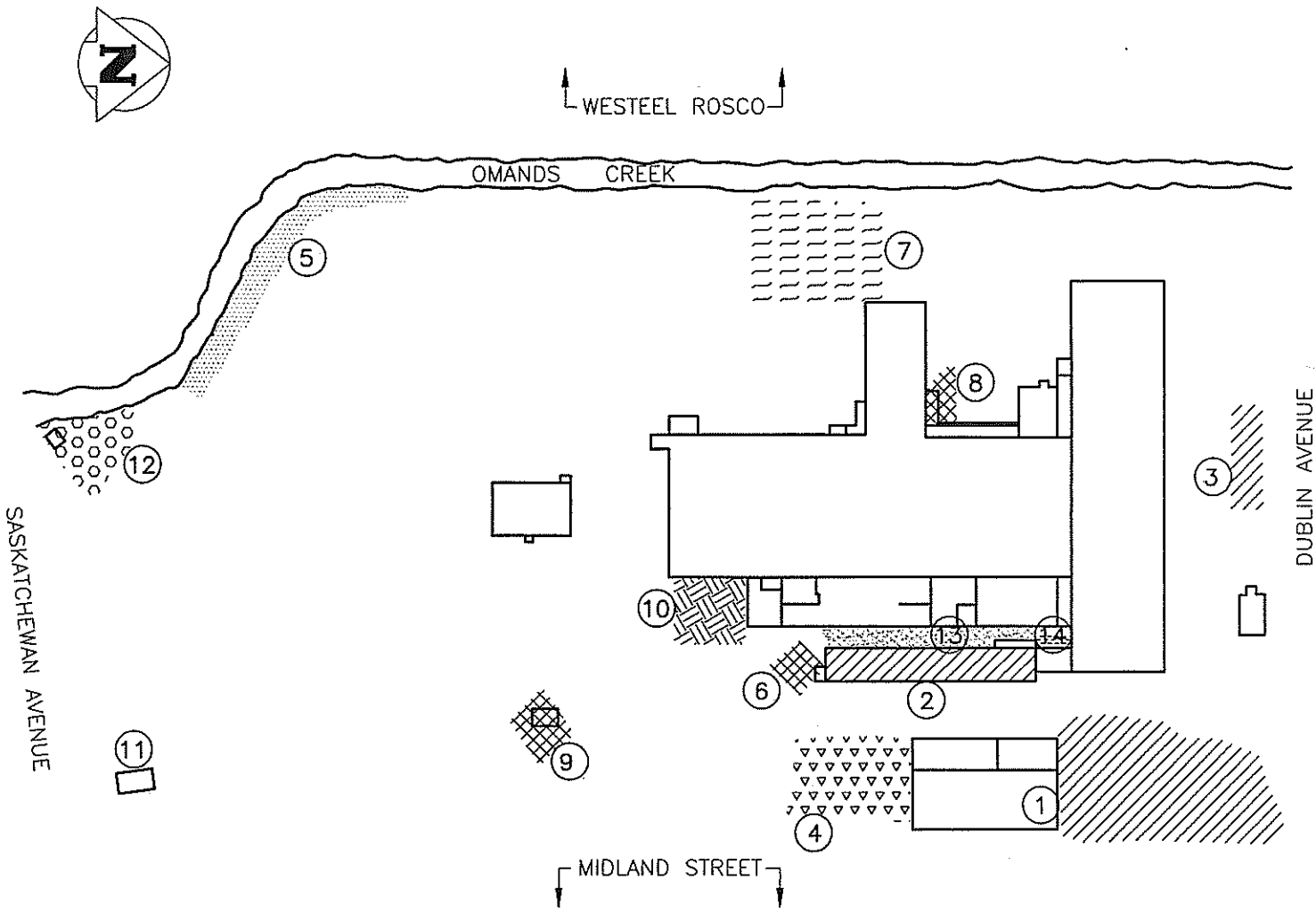
July 6 through 9, 1999. A total of 26 ground water monitoring wells were installed in selected boreholes to assess the ground water at the site for the presence of the identified contaminants during the Phase II and III investigations. The wells were also employed to assess the subsurface concentrations of combustible petroleum hydrocarbon vapours.

The significant results of these investigations and recommendations are summarised in the summary table and figure.

LEGEND

- PCB STORAGE
- LANDFILL AREA
- SULFURIC ACID DRUM STORAGE
- FORMER UST LOCATIONS
- WHEELABRATOR DUST
- AST LOCATIONS (DIESEL, GASOLINE, VARSOL AND SULFURIC ACID)
- WASTE PAINT AREA
- WASTE OIL DUMPING AREA
- WASTE OIL DRUM STORAGE

1. GATE SHOP UST AREA
2. PAINT SHOP UST AREA
3. NORTH PROPERTY LINE UST AREA
4. WASTE OIL DRUM STORAGE AREA
5. LANDFILLING AREA
6. SOLVENT AST AREA
7. SULFURIC ACID DRUM STORAGE AREA
8. SULFURIC ACID AST AREA
9. DIESEL AND GASOLINE AST AREA
10. WASTE PAINT STORAGE AREA
11. FORMER SASKATCHEWAN AVENUE LANDFILL
12. POLYCHLORINATED BIPHENYLS STORAGE AREA
13. WEST OF PAINT SHOP AREA
14. WHEELABRATOR DUST



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CLIENT
SHELTER CANADIAN PROPERTIES LIMITED

DWG. DESCRIPTION
SUMMARY FIGURE SHOWING IDENTIFIED AREAS OF ENVIRONMENTAL CONCERN
PHASE II&III ENVIRONMENTAL SITE ASSESSMENT
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	K.L.M.	DRAWN BY:	M.L.A.G.	DWG. NO.
CHECKED BY:	J.D.N.	DATE:	99/03/10	991494-01-02

ACKNOWLEDGEMENTS

The Wardrop Engineering Study Team acknowledges with appreciation, the contribution of the individuals consulted during the course of this investigation, particularly the following:

- Mr. Bob Mathieson, Vice President, Design & Construction, Shelter Canadian Properties Ltd.
- Mr. Maurice Mazerolle, Environment Officer, Petroleum Storage Program, Manitoba Environment
- Mr. Dale Jones, Environment Officer, Petroleum Storage Program, Manitoba Environment
- Mr. Randy Kulba, CEDA Environmental Services
- Mr. David Brown, former Structural Superintendent for Dominion Bridge
- Mr. Edwin Yee, Manager, Contaminated Sites Program, Manitoba Environment

Wardrop also acknowledges Enviro-Test Laboratories for the laboratory analytical services and Maple Leaf Enterprises Ltd. for the borehole drilling and monitoring well installations.

STUDY TEAM

The following key personnel were directly involved in the investigations leading to the preparation of this report:

- Mr. Ed Wolowich, P.Eng. – Project Advisor
- Mr. Joël Nolin, P.Eng. – Project Manager
- Ms. Eveline Schroth, P.Eng. – Project Engineer
- Ms. Karla Mills, B.Sc. – Hydrogeological Consultant
- Ms. Meredith Gill, C.Tech. – AutoCAD™ Draftsperson
- Ms. Karla Schmidt, C.Tech. – AutoCAD™ Draftsperson

DISCLAIMER

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1.0 INTRODUCTION

Shelter Canadian Properties Limited retained Wardrop Engineering in February 1999 to undertake a Phase II Environmental Site Assessment (ESA) of the former Dominion Bridge operations yard in Winnipeg to assess the potential liabilities associated with historical operations at the site. Wardrop was then retained in June 1999 to conduct additional on-site investigations through the completion of a Phase III ESA.

The Phase II ESA, comprising borehole drilling, monitoring well installations, as well as soil and ground water sampling and analyses, was designed to assess several areas of environmental concern identified during previously undertaken Phase I ESAs of the site. These concerns primarily pertained to the on-site storage and handling of hazardous substances.

The investigation confirmed the presence of site contamination on the property and identified the need to further quantify and assess these identified impacts. The Phase III ESA, comprising additional borehole drilling, monitoring well installations, as well as soil and ground water sampling and analyses, was designed to delineate the soil and ground water impacted areas identified by the Phase II ESA.

The following report presents the results of Wardrop's investigations at the former Dominion Bridge facility. The report contains the results of our Phase I ESA reviews, our Phase II and III investigative methodology and findings, followed by discussions, conclusions, and recommendations for each area of concern.

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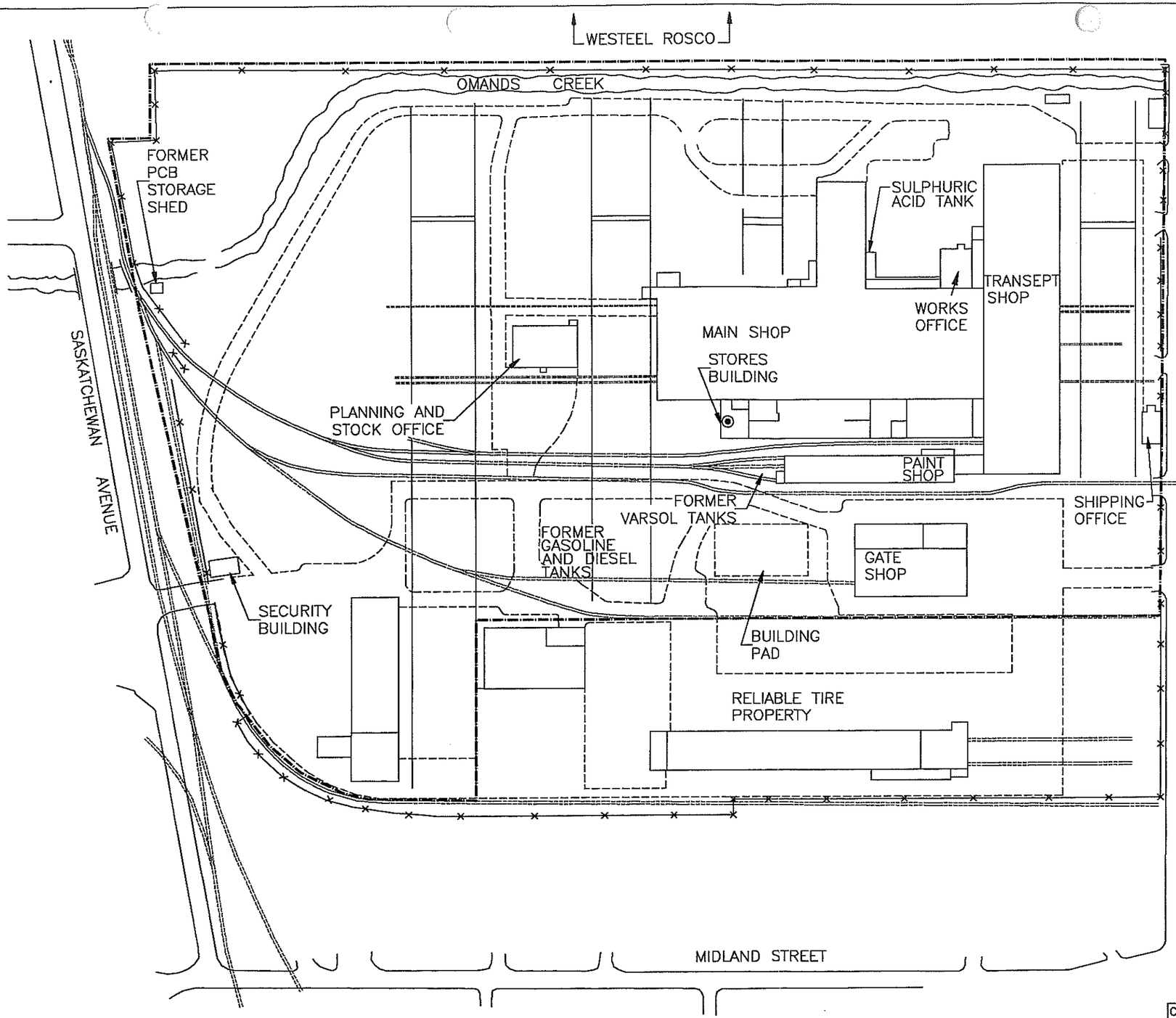

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CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING SUBJECT PROPERTY
PHASE II&III ENVIRONMENTAL SITE ASSESSMENT
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY: E.S.	DRAWN BY: K.A.S.	DWG. NO.	
CHECKED BY: J.D.N.	DATE: 99.08.10	991494-01-02	FIG. 2.1

2.0 PHASE I ESA REVIEW

The following section documents the results of Wardrop's review of the previous environmental work conducted at the site. The previously completed reports reviewed for this project include:

- *Environmental Due Diligence Assessment*, Wardrop Engineering, September 1992;
- *Environmental Audit Phase I*, SNC Lavalin Environment, January 1994; and
- *Phase I Environmental Site Assessment*, Dames & Moore, August 1997.

In addition, the following personnel were interviewed during a site visit on February 17, 1999:

- Mr. Randy Kulba, CEDA Environmental Services; and
- Mr. David Brown, former Structural Superintendent for Dominion Bridge.

The results of these investigations are presented below.

2.1 SITE OVERVIEW

An overview of the subject site's physical and geological setting, and a brief site history are presented in the following sections. The reader is referred to the above-mentioned previously completed reports of the facility for further details regarding the site setting and history.

2.1.1 Physical Setting

The former Dominion Bridge operations yard is located at 1355 Saskatchewan Avenue in Winnipeg's St. James district. Dublin Avenue borders the site to the north followed by commercial and industrial properties. A Canadian Pacific Railway (CPR) corridor parallels Saskatchewan Avenue to the south of the property followed by a foundry and Westview Park (a former Municipal landfill). Reliable Tire is present to the east of the subject property and to the west is Westeel Rosco Company. Omands Creek runs along the west property line of the subject site and flows south towards the Assiniboine River, located approximately 3 km to the south of the subject site. A site plan of the facility is provided as Figure 2.1.

The site is a large industrial property, approximately 11.1 hectares (27.5 acres) in size and is currently occupied by the following buildings:

- The Main Shop, comprising the main shop work area, with attached Works Office, Galvanizing Shop, and Stores Building;
- A Transept Shop, attached to the north side of the Main Shop along with a grit blast room and a Paint Shop;
- A Planning and Stock Office;
- A Gate Shop; and
- A Shipping Office, PCB Shed, and Security Building.

Other current on-site development includes three large overhead cranes and several aboveground storage tanks (ASTs). The majority of the property is surfaced with gravel; with the remainder covered by concrete and asphalt.

2.1.2 Geological Setting

The regional soil stratigraphy of the Winnipeg area generally comprises clay and silt overlying glacial till. This overburden is deposited on carbonate bedrock comprised of dolomite and limestone.

The clays are generally of low permeability and contain some degree of fracturing. Often, these clays are intermixed with layers of silt, which may be water bearing. These soils are lacustrine in origin, having been deposited as lake bottom sediments by former glacial Lake Agassiz. Generally, the clay and silt deposits are 12 to 15 m thick, and are underlain by up to 9 m of glacial tills.

The underlying carbonate bedrock is highly fractured, and constitutes the principal potable water aquifer of the area. The glacial tills may also contain ground water; however, the water quality is less desirable than that of the carbonate bedrock. The tills and limestone are hydraulically connected (the waters from the limestone and tills may mix). Based on available geological information, the bedrock beneath the subject property is part of the Upper Fort Garry Member of the Red River Formation.

In Winnipeg, the aquifer is used primarily for industrial purposes. One water well on the site, located at the south end of the Stores Building, is completed into the limestone aquifer. Residents of Winnipeg obtain drinking water from a municipal water supply derived from Shoal Lake, located 150 km east of the City.

2.1.3 Historical Operations

The Dominion Bridge facility was constructed in the early 1910s on virgin prairie. The site currently comprises 11.1 ha of land. The original site comprised 19.5 ha; however, the plant's operations have reduced over the years and portions have been sold or leased to various other businesses. According to previous reports, the subject property formerly included the properties to the east (Reliable Tire) and southwest (Government of Manitoba). Dames and Moore's 1997 Phase I ESA indicates that the property to the north was also formerly part of the Dominion Bridge plant and was used as a parking lot. In addition, a light manufacturing company currently leases the building located in the southeast corner of the subject property, and portions of the Main Shop have been leased to various industries for storage.

According to Wardrop's 1992 Environmental Due Diligence Audit, Omands Creek was believed to have been rerouted to its present location in the early 1900s and the banks of the creek have since been raised, to prevent flooding of the property. The original channel of Omands Creek reportedly traversed the property in the approximate location of the west wall of the Main Shop building.

2.2 Summary of Environmental Concerns

Numerous potential environmental concerns were identified during the Phase I ESA review and site inspection. These concerns are presented on a site plan of the facility, provided as Figure 2.2.

In summary, the concerns primarily pertain to the on-site handling and storage of hazardous materials including vehicle fuel, solvents, paints, and associated waste products (solvents, oil, and paint). In addition, heavy metals were also identified as being an inherent concern due to the nature of the steel fabrication processes on-site. These concerns are further discussed below.

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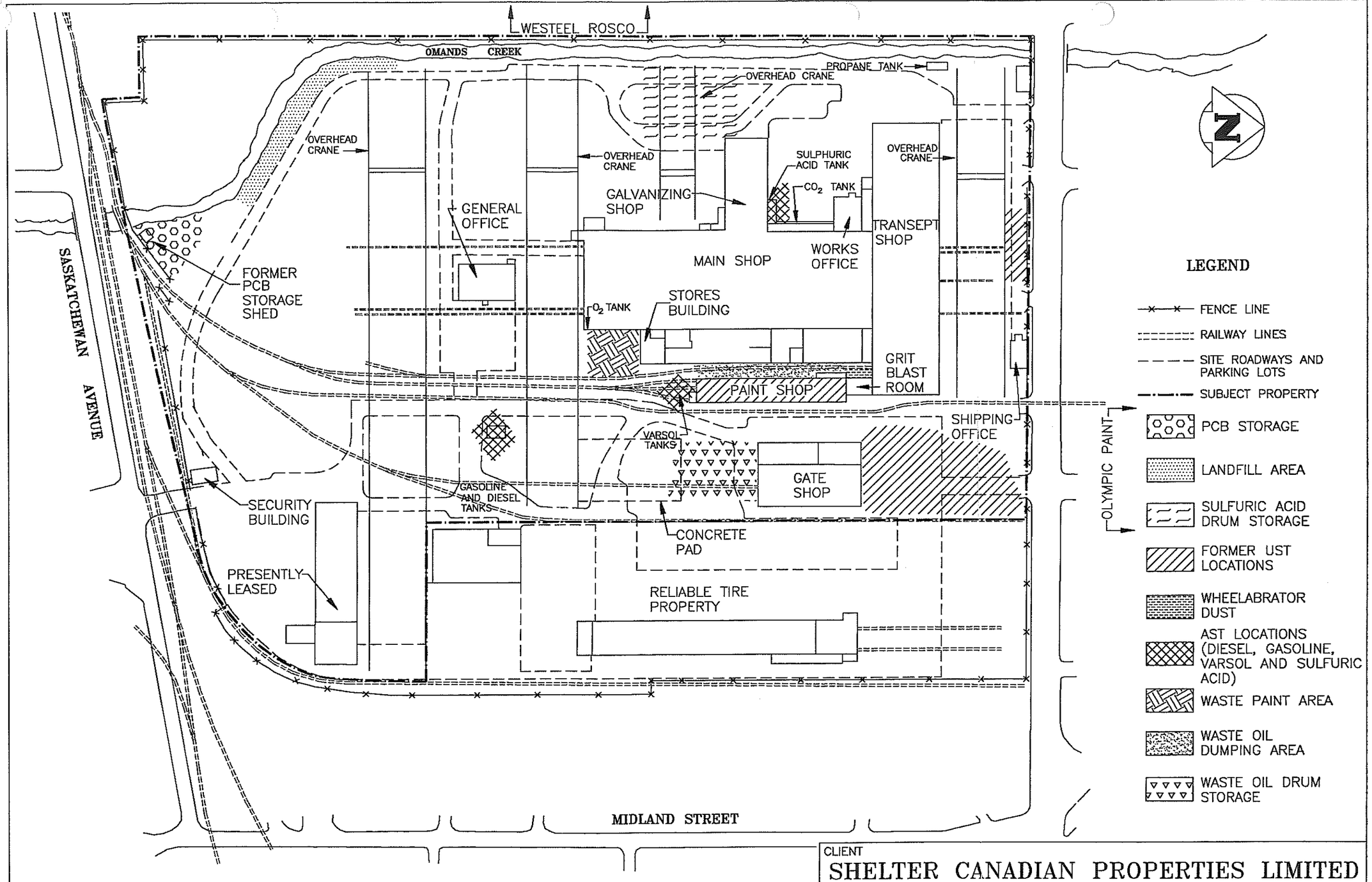

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DWG. DESCRIPTION
SITE PLAN SHOWING IDENTIFIED AREAS OF ENVIRONMENTAL CONCERN
PHASE II&III ENVIRONMENTAL SITE ASSESSMENT
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY: K.L.M.	DRAWN BY: M.L.A.G.	DWG. NO.	
CHECKED BY: J.D.N.	DATE: 99/03/10	991494-01-02	FIG. 2.2

2.2.1 Gate Shop UST Area

There are at least three locations on the subject property which have reportedly contained underground storage tanks (USTs) in the past:

- The location to the north of the Gate Shop;
- Beneath the Paint Shop; and
- At the north property line.

Documentation exists identifying that the USTs to the north of the Gate Shop were removed in 1990. Environmental investigations undertaken at the time of UST removal identified that some leakage had occurred in the tank compound and that soil remediation was required. This soil remediation was undertaken in 1990 by Dominion Bridge through a land-farming process, on-site.

A letter from Manitoba Environment to Dominion Bridge dated July 6, 1990, instructed Dominion Bridge to install a series of piezometers along the proposed Gate Shop location (it was not yet constructed at the time) to monitor the subsurface petroleum hydrocarbon vapour concentrations in the area. Manitoba Environment indicated that the head-space vapour concentrations in all piezometers must remain below 10% of the Lower Explosive Limit (LEL) referenced to hexane. After subsequent investigations by Dominion Bridge, Manitoba Environment indicated, in a follow up letter, that it was their opinion that the subsurface contamination around the former tank site should not adversely affect the construction of the Gate Shop building. Further, Manitoba Environment recommended that the construction of the Gate Shop include at least two piezometers along the north side of the building.

The previous environmental investigations of the site identified the removal of additional USTs from the site in 1971 and 1981; however, no documentation was found to support this or to identify from where any tanks were removed. In addition, no documentation confirming the soil quality following any UST removals during these years was available.

2.2.2 Former UST Areas (Paint Shop and North Property Line)

Historical Fire Insurance maps and previous environmental reports indicate the former presence of USTs in the area beneath the existing Paint Shop, as well as along the north property line. Previous reports indicate that the USTs located beneath the Paint Shop were removed in the 1980s. Conversations with Manitoba Environment revealed no documentation verifying the removal of these tanks. Further, there is currently no documentation indicating the removal of the UST located along the north property line. Therefore, the removal of USTs near the paint shop and north property line cannot be confirmed.

Previous environmental investigations at the site identified a hydrocarbon leak from a 6800 L underground fuel oil storage tank under the present Paint Shop. The tank was installed in the 1950s and was known to have leaked. No known remedial efforts have been undertaken in this area.

2.2.3 Waste Oil Drum Storage

During Wardrop's initial site inspection with Mr. Randy Kulba of CEDA Environmental Services, the area to the south of the Gate Shop was identified as a former outdoor waste product storage location. Drums of waste oil, cutting fluids, and liquid paints were stored in this area. Mr. Kulba noted significant surficial staining in this area during the removal of these drums.

2.2.4 Landfilling Area

To prevent Omands Creek from flooding the property, waste paint, floor sweepings, wheelabrator dust (the material produced during the cleaning of metal objects with a wheelabrator), along with other solid wastes were historically landfilled along the bank of the Creek (primarily in the southwest corner of the property). These materials were believed to contain considerable amounts of heavy metals.

2.2.5 Solvent AST Area

Historical reports indicated the presence of a solvent aboveground storage tank (AST) located directly south of the Paint Shop building. Further, reports indicate that this AST did not have secondary containment and that minor leakage had been observed in the past by previous auditors.

2.2.6 Sulphuric Acid Drum Storage Area

A Sulphuric Acid Drum Storage area is located on the west side of the Main Shop to the south of the Galvanizing Shop. According to CEDA Environmental Services, up to 200 drums were stored in this area at one time. Often metal drums with plastic liners were used to store the waste sulphuric acid. In some instances, the plastic liners within the drum would break. The sulphuric acid would then dissolve the metal drum and leak onto the ground surface. The sulphuric acid stored in these drums is believed to have contained high concentrations of zinc, iron and lead.

2.2.7 Sulphuric Acid AST Area

Historical galvanizing operations required the use of sulphuric acid, which is stored to the north of the Galvanizing Shop in a 27 000 L AST. Former reports indicate that overfilling of the sulphuric acid tank occurs occasionally, although secondary containment is provided for this AST.

2.2.8 Diesel and Gasoline AST Area

Two 2270 L ASTs containing gasoline and diesel fuel were located approximately 150 m south of the Gate Shop building during Phase II ESA of this assessment. Secondary containment was provided for the ASTs; however, evidence of surficial staining in the filling area was noted while on-site. During Phase III of this assessment these tanks were noted to be absent from the site.

2.2.9 Waste Paint Storage Area

Waste paints, which generally include solidified overspray paint collected from a concrete pit beneath the paint booth in the Paint Shop and Gunwash solvent, are openly stored in the gravelled area south of the stores building. Secondary containment is not provided in this area.

2.2.10 Former Saskatchewan Avenue Landfill

Westview Park, a capped, closed municipal landfill is located to the south of the subject site. The potential movement of leachate and landfill gas onto the subject site was identified as being a potential environmental concern.

2.2.11 Polychlorinated Biphenyls (PCBs)

The subsequent site has historically been registered as a PCB storage facility. A storage shed previously used to store PCBs is located at the south side of the property, adjacent to Omands Creek. A potential environmental concern was identified, should any spills have occurred in this area which were not addressed immediately.

2.2.12 West of Paint Shop Area

A significant amount of surficial staining was noted alongside the eastern wall of the Paint Shop. The staining appeared to be a result of oil spillage.

2.2.13 Wheelabrator Dust

A mound of wheelabrator dust was noted beneath the spout where this waste material was historically bagged. This area is located between the Paint Shop and the Stores building. The wheelabrator dust produced during former operations is believed to contain heavy metals.

3.0 INVESTIGATION METHODOLOGY

3.1 BOREHOLE DRILLING

During the Phase II portion of the investigation program, Wardrop supervised the drilling of 28 boreholes (BH-1 to BH-28) on the site on February 22 and 23, 1999. The boreholes were drilled by Maple Leaf Enterprises using a Canterra CT250 and a backhoe rig both equipped with 125 mm diameter solid stem augers. For Phase III of this investigation Wardrop supervised the drilling of an additional 46 boreholes (BH-29 to BH-74) on the site on July 6 through 9, 1999. Maple Leaf Enterprises conducted this drilling using a Mobile B40LX drill rig equipped with a 125 mm diameter solid stem auger, for all but one of the holes. Due to the confined entry space in the Paint Shop, a Mobile B24 drill rig equipped with an 125 mm diameter solid stem auger was used to drill the hole inside this building. Borehole locations and depths were selected to adequately assess the subsurface soils at the locations of concern identified in Section 2.2. Photographs taken during drilling are included in Appendix A.

Soils from each borehole were logged in accordance with the Unified Soil Classification system listing soil type, colour, texture, moisture content, and noticeable inclusions. This information was supplemented with records of any additional observations including discolouration, odours, notable vapours, and soil sampling locations. These borehole logs are provided in Appendix B.

Site services (underground utility corridors) were located and marked by the appropriate utility companies, prior to the initiation of the borehole drilling program.

3.2 MONITORING WELL INSTALLATION

A total of 26 ground water monitoring wells were installed in selected boreholes to further assess the ground water at the site for the presence of the identified contaminants during the Phase II and III investigations. The wells were also to be used as a method for assessing the subsurface concentrations of combustible petroleum hydrocarbon vapours.

Each well was constructed with solid 51 mm diameter PVC riser, followed by No. 10 factory slot well screen to depths selected in the field. The screened portion of each well was wrapped in filter cloth to minimize the inflow of particulates into the well casing. The casing and screen sections were joined by screws. No glues, tapes, or adhesives were used to join the sections. The borehole adjacent to the screened section of the well was backfilled with washed silica sand. A bentonite seal was then placed slightly above the well screen to grade to prevent surface contamination from entering the well. The wells were covered with protective steel casings installed at grade. Detailed well construction details are provided on the borehole logs, contained in Appendix B.

3.3 SOIL SAMPLING AND ANALYSES

3.3.1 Soil Sampling

During the borehole drilling program, soil samples were collected from each borehole at regular intervals, at stratigraphic boundaries, and at any apparent zones of contamination. Observations or abnormalities such as odours, staining, and composition were recorded. Soil samples were divided and placed into laboratory-supplied glass sampling jars, pending possible laboratory analyses, and plastic sampling bags for head-space vapour analyses. All samples were trimmed with stainless steel sampling knives, scrubbed clean, and rinsed with distilled water between samples, and handled with clean, disposable latex gloves, to avoid cross-contamination.

Surficial soil samples were obtained at selected locations by collecting several discrete samples over the area of concern, mixing the soils in a clean bucket, and extracting enough soil to fill plastic sampling bags and duplicate 250 mL laboratory-supplied glass sampling jars. All surficial soil was handled with clean, disposable latex gloves.

3.3.2 Head-space Analyses

In order to obtain a preliminary indication of the presence and severity of petroleum hydrocarbon impacts, soil samples are collected for head-space petroleum hydrocarbon vapour concentration measurements. These measurements are recorded using a portable GMI combustible gas indicator calibrated to hexane (a standard used for gasoline or diesel fuel).

Soil head-space analyses was undertaken on each of the samples placed into the plastic bags. Head-space is the volume of air between the soil and the sampling bag. Head-space measurements provide an indication of the relative concentration of combustible petroleum hydrocarbon compounds within a soil sample. Generally, soils are considered potentially impacted by petroleum hydrocarbons if the head-space hydrocarbon vapour concentration produced is greater than 200 parts per million (ppm). Hydrocarbon vapour concentrations below 50 ppm are typically considered to be background levels and can be attributed to water vapours and natural soil gases. However, laboratory analyses should be undertaken to confirm any suspected contamination.

If the vapour concentrations exceed 1000 ppm, they are measured as a percentage of the Lower Explosive Limit (LEL). One percent (1%) LEL is equal to 125 ppm for hexane. One hundred percent (100%) LEL (12 500 ppm) is the concentration at which hexane vapours could ignite if exposed to a spark or flame.

The results of these analyses were used in conjunction with field observations to identify which soil samples would likely contain the highest concentrations of petroleum hydrocarbons.

3.4 GROUND WATER MONITORING AND SAMPLING

For Phase II of this investigation ground water monitoring was undertaken three days following the monitoring well installations on February 25, 1999. As two of the wells monitored on that date were found to be dry and two could not be located due to snow cover, a return trip to the site was made on March 9, 1999 to obtain ground water samples and to monitor the remaining wells.

The monitoring wells installed during Phase II were remonitored on July 5, 1999, prior to installing additional wells during the Phase III portion of the program. Additional monitoring of all the wells was undertaken on July 13, 1999, four days following the final monitoring well installations.

Well monitoring included measuring the depth to the static ground water level and measuring the well head-space petroleum hydrocarbon vapour concentrations. The wells were purged following ground water monitoring and prior to obtaining ground water samples for laboratory analyses.

Following monitoring and purging, a discrete water sample was obtained from each well and poured into laboratory-supplied sample bottles. In order to maintain sample integrity, sampling was carried out using dedicated disposable bailers and clean latex gloves to minimize the potential for secondary contamination of the samples. All samples were stored in an ice pack-equipped cooler during transportation.

3.5 SWAB SAMPLE COLLECTION

A PCB swab sample was obtained from the concrete floor surface of the PCB storage shed, according to the methodology referenced in the Canadian Council of Ministers of the Environment (CCME) December 1995 Publication entitled *PCB Transformer Decontamination – Standards and Protocols*. The sample was obtained by wiping a laboratory-prepared hexane-soaked gauze pad across a 100 cm^2 area of the concrete floor. The sample was handled with a clean pair of disposable latex gloves, and stored in laboratory supplied glass sampling jars prior to submission to the laboratory.

3.6 LABORATORY ANALYSES

Selected soil and ground water samples from the site were submitted to Enviro-Test Laboratories in Winnipeg, Manitoba for analyses of various parameters including:

- **Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Total Volatile Hydrocarbons (TVH); and Total Semi-Volatile Hydrocarbons (TSH)**: Undertaken at locations where petroleum hydrocarbons in the form of diesel fuel and/or gasoline have been identified as being a potential concern. The BTEX components are typical indicators of petroleum hydrocarbon content at sites impacted by gasoline and diesel fuel. TVH analyses represent the summary total of lighter hydrocarbons, which are typically found at greater concentrations in fuels such as gasoline, than they would be in a heavier product like diesel fuel. TSH represents the summary total of heavier hydrocarbons, which are typically found at greater concentrations in fuels such as diesel, than they would be in a lighter product like gasoline.

- **Volatile Organic Compounds (VOC) Scans**: VOCs represent lighter fractions of petroleum hydrocarbons and include some of the more common elements of solvents and paint products. These compounds are also some of the most mobile in ground water; therefore, VOC analyses are often useful for assessing locations where contaminants might be expected from distant sources. The VOC scan tests for 51 individual compounds within the sample. The completion of a scan on a sample assists the assessor when the specific contaminant at a location is unknown. For example, it is a useful test when it is known that a solvent was used on-site, but not what kind of solvent (toluene, trichlorethylene, etc.) was used.

- **Mineral Oil and Grease (MOG):** This test identifies the concentration of Oil and Grease within a sample. These analyses were primarily used in the waste oil storage areas.

- **Polychlorinated Biphenyls (PCBs):** PCBs are suspected carcinogens and are, therefore, regulated substances. PCB analyses were undertaken in the former PCB storage area and in the landfill area.

- **Organic Halides (AOX):** These parameters include chlorides, bromides, and other halides. These analyses were undertaken at locations where chlorinated solvents had been used in the past.

- **Lead:** Lead was used as an additive in gasoline the early 1980s. Lead contamination is occasionally identified at locations where historical gasoline spills have occurred.

- **Polycyclic Aromatic Hydrocarbons (PAH):** PAH analysis provides the individual concentrations of 15 complex lipophilic hydrocarbon compounds, such as creosote-treated products or petroleum products which are heated to high temperatures without sufficient air for complete oxidation. PAH analysis was undertaken on a sample of cinder-like material.

- **Metals Scans:** Metals scans examining for the presence of 25 different metals were undertaken at several locations throughout the site, as several potential sources of metal impacts were identified, including the galvanizing processes, steel fabrication, and spilled paints, amongst several others. As with the VOCs, metals scans allow for a thorough assessment where the specific parameter of concern cannot be readily identified, or in areas where several metals were present.

- **Toxicity Characteristic Leaching Procedure (TCLP):** TCLP is a process in which a soil sample is "washed" in a known volume of water to leach contaminants into the water. The water sample is then analyzed to determine the concentrations of the contaminants of concern within the water.

4.0 INVESTIGATION RESULTS

4.1 APPLICABLE REGULATORY GUIDELINES

4.1.1 Soil

Two sets of regulatory guidelines are considered to be applicable to the soil investigation activities undertaken during this project:

- The *Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (March 1997)*; and
- Manitoba Environment's *Guideline 96-05, Treatment and Disposal of Petroleum Contaminated Soil (Rev. May 1998).*

The nationally accepted CCME document provides maximum acceptable concentrations for petroleum hydrocarbons, metals, and other parameters in soil according to land use (Agricultural, Residential/Parkland, Commercial, and Industrial). The CCME guidelines considered to be applicable at the subject site are the CCME Industrial Guidelines.

Manitoba Environment initiated the use of the CCME criteria in 1998. The CCME do not currently have criteria for TVH, TSH, and MOG. However, criteria for similar parameters are understood to currently be in development.

Manitoba Environment's Guideline 96-05 contains guideline criteria for TVH, TSH, and MOG, based on site sensitivity. These criteria are classified into Level I, II, and III, with Level I applying to sites of higher sensitivity (i.e., residential/parkland) and Level III applying to sites of lower sensitivity (i.e., industrial).

In order to account for the pending regulations for TVH, TSH, and MOG, Guideline 96-05's Level III criteria has been referenced, as an interim remediation criteria for these parameters.

4.1.2 Ground Water

Since Omands Creek flows parallel to the west side of the subject site, the CCME Freshwater/Aquatic Life (FWAL) criteria have been used for the comparison of ground water sample analytical results. These criteria are considered applicable as the potential exists for shallow ground water at the site to migrate into Omands Creek.

4.2 SOIL STRATIGRAPHY

A total of 74 boreholes were augered to depths between 1.5 and 4.5 m below grade during the Phase II and III investigations. These boreholes are identified as BH-1 to BH-74 on a site plan of the subject site, provided as Figure 4.2. The drilling program revealed the general site stratigraphy to be approximately as follows:

- **Fill** – Fill materials were typically encountered from the surface to depths 1.0 to 2.3 m. The fill typically consisted of black clay with varying amounts of gravel, sand, and silt. Some debris in the form of wood, glass, brick, wheelabrator dust, and other miscellaneous items were encountered within the fill .

- **Silt and Sand** – A saturated light brown, sandy silt unit was typically encountered beneath the surficial fill materials at the site. The thickness of this unit was typically between 0.8 and 1.4 m thick. The amount of silt and sand varied with depth and from borehole to borehole. Some boreholes contained very little silt while others contained very little sand in this unit.

- **Clay** – A grey and brown clay unit was encountered beneath the silt unit at approximately 2.5 to 3.3 m depth in the boreholes drilled to at least these depths. The clay contains varying amounts of silt, is grey and brown in colouration, stiff, plastic-to-semi-solid, and dry-to-moist. This clay was encountered to a depth of 4.5 m in BH-26, the deepest borehole drilled at the site.

The underlying clay unit is expected to continue to approximately 12 to 15 m below grade, where a till unit would likely be encountered. The bedrock surface is expected at 15 to 18 m below grade.

The soil stratigraphy is further detailed on the borehole logs, contained in Appendix B.

4.3 SITE HYDROGEOLOGY

The depth to ground water at the site was found to vary from 0.8 m below grade (BH-63) to 2.1 m below grade (BH-29) on July 13, 1999. The measured depths to ground water were used to determine elevations of the static water table at the site and then to develop computer-generated contours of this surface, provided on a site plan of the facility as Figure 4.3. The generated contours identify a ground water flow direction towards the west-southwest, in the direction of Omands Creek.

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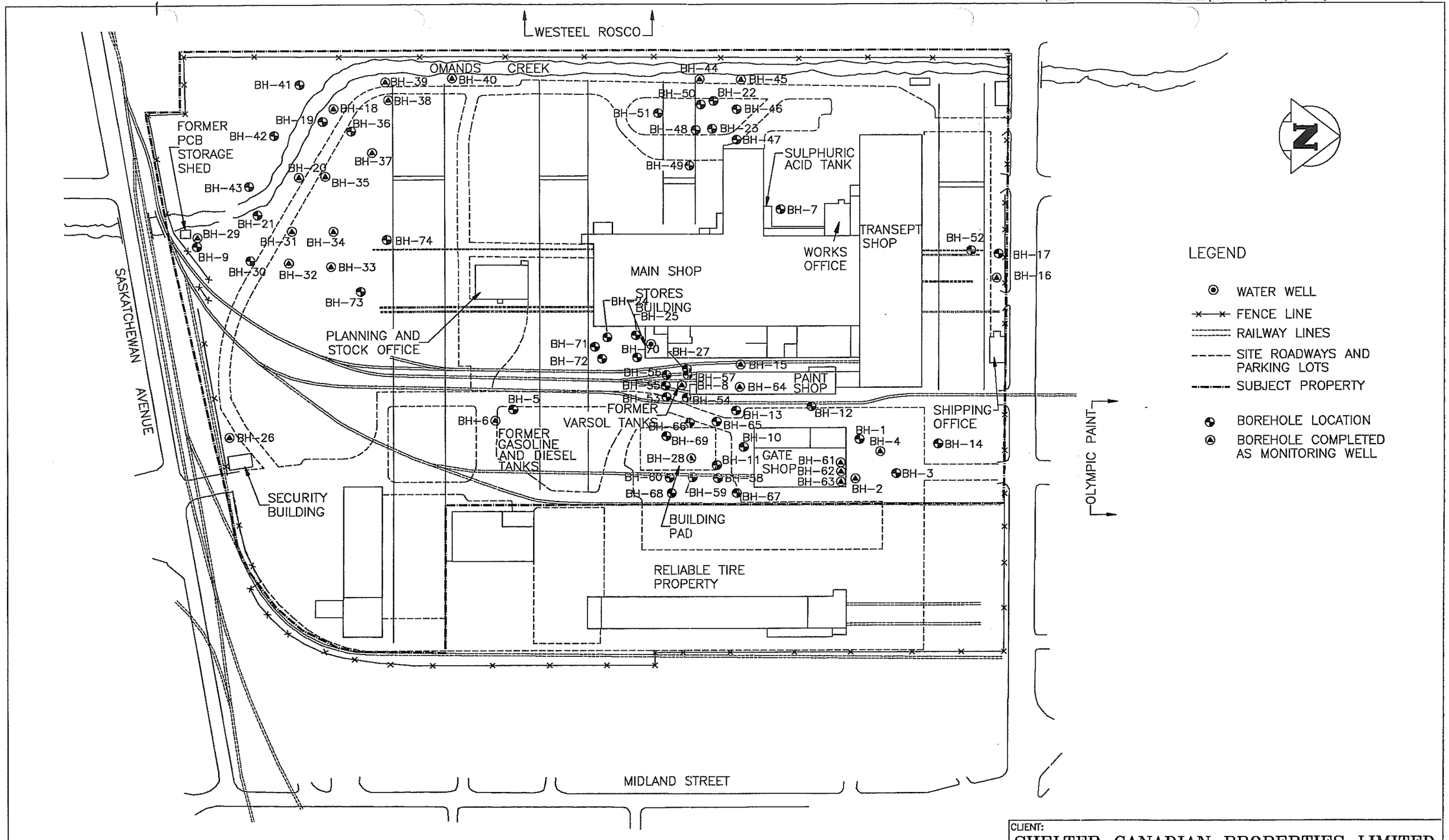

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
PHASE II&III ENVIRONMENTAL SITE ASSESSMENT
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.
CHECKED BY:	J.D.N.	DATE:	99.08.10	991494-01-02 FIG. 4.2

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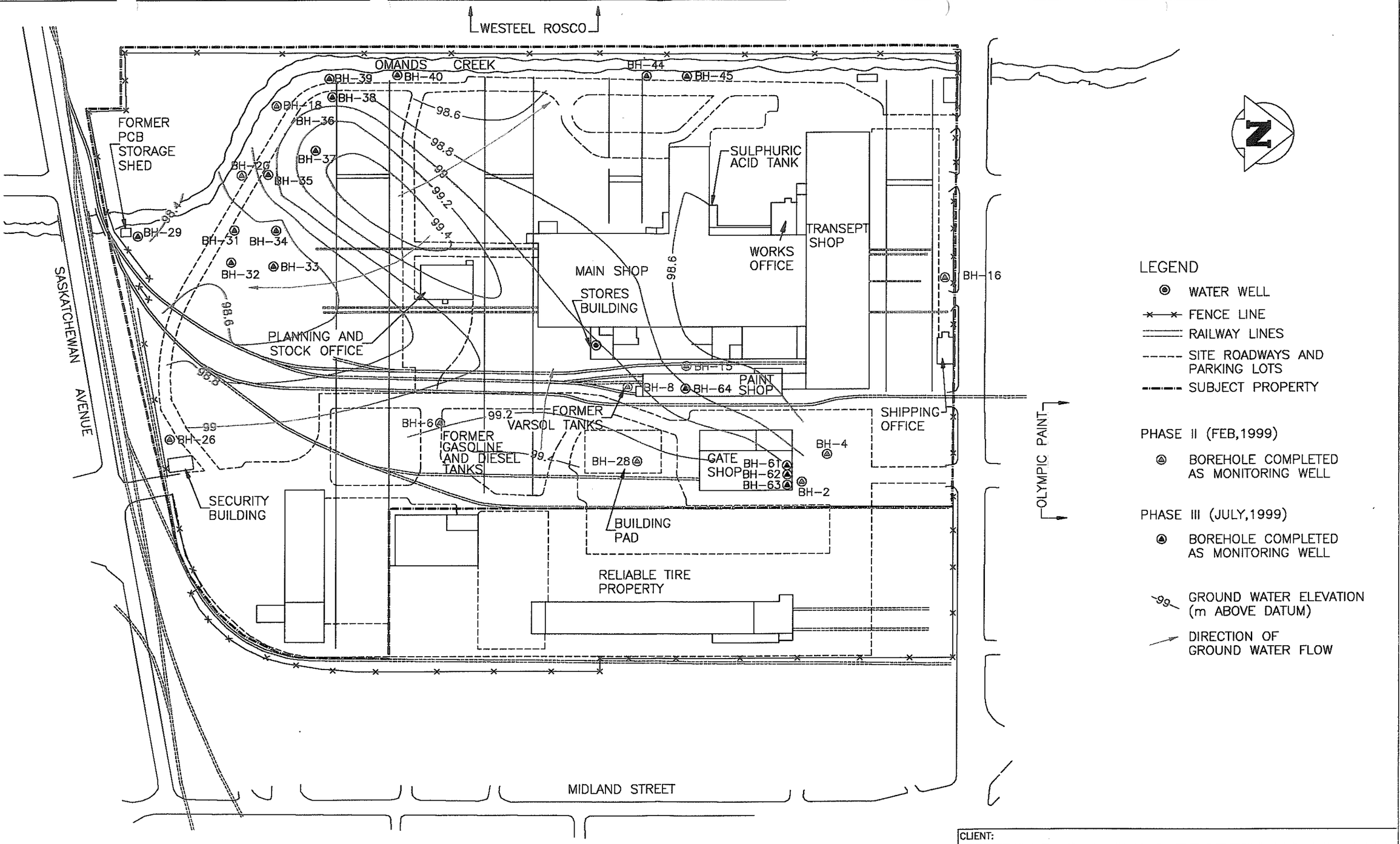

LEGEND

- WATER WELL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE COMPLETED AS MONITORING WELL

PHASE III (JULY,1999)

- BOREHOLE COMPLETED AS MONITORING WELL

- GROUND WATER ELEVATION (m ABOVE DATUM)
- DIRECTION OF GROUND WATER FLOW

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING CONTOURS OF PIEZOMETRIC SURFACE
PHASE II&III ENVIRONMENTAL SITE ASSESSMENT
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY: E.S.	DRAWN BY: K.A.S.	DWG. NO.	
CHECKED BY: J.D.N.	DATE: 99.08.10	991494-01-02	FIG. 4.3

4.4 GATE SHOP UST AREA

4.4.1 Environmental Concern

Historical spills associated with this UST have resulted in environmental concerns associated with petroleum hydrocarbon vapours entering the Gate Shop building.

4.4.2 Investigation Summary

Drilling Observations

A total of eight boreholes were drilled in the Gate Shop UST area: five during the Phase II program (BH-1 through BH-4, and BH-14), and three during the Phase III Program (BH-61 through BH-63). Boreholes BH-2, BH-4, BH-61, BH-62, and BH-63 were completed as monitoring wells. These boreholes are highlighted on a site plan of the Gate Shop UST area, provided as Figure 4.4.2.

Solvent and petroleum odours were identified within the soils of BH-2, BH-3, and BH-4. No indications of petroleum hydrocarbon impacts in the form of odours or staining were observed in the remaining boreholes drilled in this area. Boreholes BH-61 through BH-63 required repeated drilling in order to install monitoring wells due to sloughage of the borehole walls. These observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the drilling program revealed generally low concentrations in the boreholes in this area; however, a combustible vapour concentration of 7.2% LEL (900 ppm) was measured in BH-3 at a 1.2 m depth. Peak vapour concentrations throughout the rest of this area were in the range of 70 to 490 ppm, with the boreholes inside the Gate Shop having notably lower levels than those outside. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

The following soil samples were submitted for the identified laboratory analyses:

Borehole	Depth (m)	Laboratory Analyses		
		BTEX, TVH, TSH	Metals	Lead
BH-2	0.6	X		X
BH-2	2.4	X		X
BH-3	1.2	X		X
BH-3	3.1	X		X
BH-4	0.6	X		X
BH-61	0.6		X	
BH-61	1.2	X		
BH-62	1.8	X		
BH-63	1.8	X		

The results of these analyses are summarized in Tables A and B, in Appendix C. The analyses did not identify the presence of any of the tested parameters at concentrations above the applicable guideline concentrations.

Ground Water Analyses

One ground water sample was obtained from MW-4 and submitted for laboratory analyses of BTEX, TVH, TSH, and lead. The results of these analyses are provided in Table F, in Appendix C. The analyses did not identify the presence of any of the tested parameters at concentrations above the applicable guideline concentrations.

Ground Water Monitoring

Monitoring wells MW-2 and MW-4 were monitored on February 25, 1999. MW-2 was found to be dry and no free-phase petroleum product or ground water discolouration were identified in MW-4. Monitoring wells MW-2 and MW-4 indicated combustible vapour concentrations of greater than 100% LEL and 9% LEL, respectively.

Monitoring wells MW-2, MW-4, and MW-61 through MW-63 were monitored on July 13, 1999. The monitoring results are as follows:

Well I.D.	Depth to Ground Water (m below well casing)	Groundwater Elevation (m)	Petroleum Hydrocarbon Vapour Concentrations (ppm)	Ground Water Observations
MW-2	0.870	98.941	55	None
MW-4	1.040	98.606	55	None
MW-61	0.738	98.995	15	None
MW-62	0.718	99.011	0	None
MW-63	0.677	99.044	0	None

4.4.3 Discussion

The environmental investigations undertaken during this ESA identify the presence of petroleum hydrocarbons in the soil and ground water in the former UST area to north of the Gate Shop. These hydrocarbons were not found at concentrations above the applicable guidelines; therefore, remediation of the area is not required.

A potential concern is presented by the combustible vapour concentration of greater than 100% LEL measured in MW-2, located immediately to the north of the Gate Shop, in February. However, subsequent monitoring of MW-2 and MW-4, as well as MW-61 through MW-63 (located inside the Gate Shop) in July revealed very low vapour concentrations. As identified, previous correspondence with Manitoba Environment has indicated that the subsurface vapour concentrations in the area of the Gate Shop should be monitored and maintained below 10%. The rationale behind maintaining the vapour concentrations at low levels is to mitigate the migration of combustible vapours into the Gate Shop. Elevated combustible vapour concentrations in this area may present a liability to the property owner. Therefore, continued monitoring of these wells would be advisable to ascertain definitively whether hydrocarbon vapour concentrations are a concern in this area.

The measured combustible vapour concentrations within the three wells inside of the Gate Shop building are expected to be lower than actual site conditions as the static water level is above the well screen. These vapour concentrations are still expected to be low, given the low measurement of 55 ppm in MW-2, in July; however, this should be verified by continued well monitoring when the static water level is lower.

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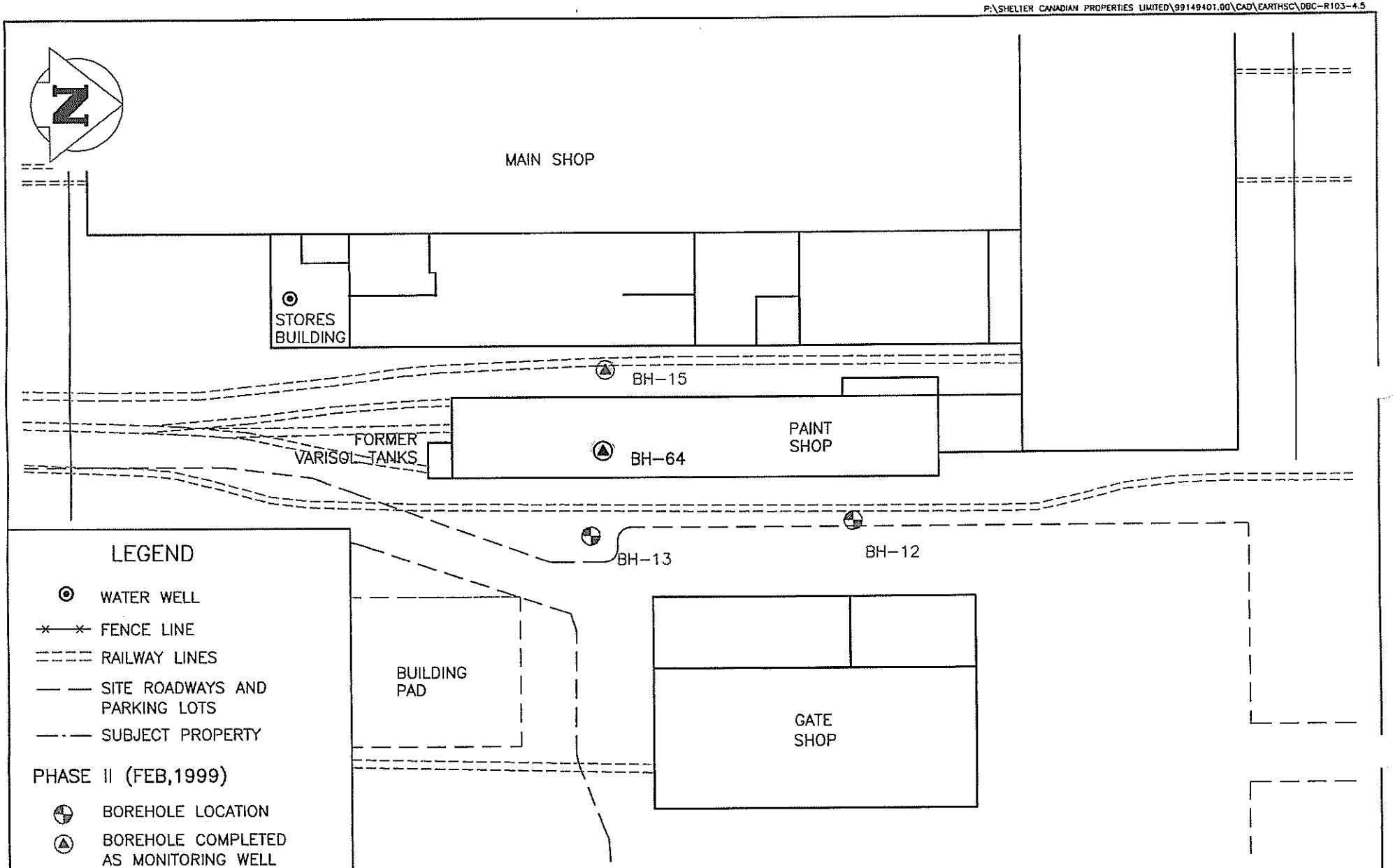

LEGEND

- WATER WELL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

PHASE III (JULY,1999)

- BOREHOLE COMPLETED AS MONITORING WELL

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
PAINT SHOP UST AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.5.2

4.4.4 Conclusions

- A potential for elevated subsurface petroleum hydrocarbon vapour concentrations exists within the surficial soils in close proximity to the Gate Shop. These vapours may pose a health and safety risk to building occupants.

4.4.5 Recommendations

- Semiannual monitoring of the wells over the next two years should be sufficient to establish the level of the subsurface vapour concentrations.

4.5 PAINT SHOP UST AREA

4.5.1 Environmental Concern

Historical records indicate that USTs were formerly located beneath the Paint Shop and that these USTs may have had some leakage.

4.5.2 Investigation Summary

Four boreholes were drilled in the Paint Shop UST area: three during the Phase II program (BH-12, BH-13, and BH-15), and one inside the Paint Shop during Phase III (BH-64). BH-15 and BH-64 were completed as monitoring wells. These boreholes are highlighted on a site plan of the Paint Shop area, provided as Figure 4.5.2.

Drilling Observations

Petroleum odours and staining were identified from approximately 1.8 to 2.4 m depth below grade in BH-15. A slight organic or petroleum odour was noted at a depth of 0.6 m in BH-64. No other significant observations relating to petroleum hydrocarbon impacts were noted in these boreholes. The drilling observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

The greatest combustible head-space vapour concentration from soil samples obtained in the Paint Shop area was 590 ppm, in a sample obtained from 0.6 m depth beneath the Paint Shop (BH-64). Peak vapour concentrations outside the Paint Shop measured 435 ppm, 200 ppm, and 185 ppm in BH-15, BH-13, and BH-12 respectively. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

The following soil samples were submitted for the identified laboratory analyses:

- BH-15 at 3.1 m depth: BTEX, TVH, TSH
- BH-64 at 0.6 m depth: BTEX, TVH, TSH, VOCs

The results of these analyses are provided in Tables A and C, in Appendix C. The BTEX, TVH, and TSH analyses of both samples did not identify any parameters above the applicable remediation guideline concentrations.

The VOC analyses of the soil sample obtained from BH-64 identified an Acetone concentration of 11 000 mg/kg, a Methylene Chloride concentration of 24 mg/kg, and nondetectable concentrations of the remaining parameters included in the scan. The CCME and Manitoba Environment do not have an applicable remediation criterion for Acetone; therefore, remediation criteria of 3.8 mg/kg and 200 mg/kg for Acetone and Methylene Chloride respectively are referenced from the Ontario Ministry of the Environment's Guideline for Use at Contaminated Sites (Table B in Appendix C), 1996. This comparison indicates that the detected Acetone concentration is significantly higher than the referenced remediation criteria.

Ground Water Analyses

The following ground water samples were submitted for laboratory analyses:

- MW-15: BTEX, TVH, TSH, Lead
- MW-64: TSH, VOCs

The results of these analyses are provided in Tables F and H, in Appendix C. The Lead concentration in MW-15 exceeded the applicable guideline concentrations. The remaining parameters were present at concentrations below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

Ground Water Monitoring

MW-15 was monitored on February 25, 1999. No free-phase petroleum product or ground water discolouration was identified in the well. MW-15 and MW-64 were monitored on July 13, 1999. The ground water elevations, well head-space petroleum hydrocarbon vapour concentrations, and observations from examining the ground water were as follows:

Well I.D.	Depth to Ground Water (m below well casing)	Ground Water Elevation (m)	Petroleum Hydrocarbon Vapour Concentrations (ppm)	Ground Water Observations
MW-15	1.172	98.681	80	None
MW-64	0.891	98.821	5	Cloudy

4.5.3 Discussion

No documentation has been identified to verify the removal of the Paint Shop UST. The tank would likely have been constructed of steel and, should it remain in the ground and presently contain fuel (likely gasoline and/or diesel), there is a potential for leaks to develop over time. The drilling observations and laboratory analyses indicate only slight petroleum hydrocarbon impacts in the form of slight staining, odours, and low petroleum hydrocarbon concentrations in the soil. Should the USTs or contaminated soil remain beneath the Paint Shop, a potential exists for hydrocarbon vapours to migrate through cracks in the floor slab and into the building at concentrations that may be a safety or health concern.

The identified acetone concentration within the surficial soils (BH-64 at 0.6 m depth) beneath the Paint Shop floor presents a potential health and safety concern. Acetone was found at a concentration well above the Ontario MOE remediation guideline and the USEPA guideline. While chronic low exposure to acetone is not considered to pose a health risk, high concentrations can irritate the eyes and mucous membranes (Harte et al. 1991).

Laboratory analyses of a ground water sample obtained from MW-15, located at the west side of the paint shop, revealed a lead concentration above the CCME FWAL guideline criteria; however, analyses for BTEX, TVH and TSH revealed only a trace level of TSH and nondetectable concentrations of BTEX and TVH. Moderate-to-strong petroleum odours and petroleum staining

were noted in the soils at BH-15; however, laboratory analyses indicate petroleum hydrocarbon concentrations in the soil well below the applicable guideline criteria in this area. It is suspected that the observed petroleum impacts may have resulted from the former tanks beneath the Paint Shop.

Since a potential exists for the USTs and/or contamination to remain on-site at the above location, and as there is a potential for health and safety risk associated with the presence of these items, the potential for the USTs and/or associated contamination to be present at the site may be considered a liability to the property owner.

4.5.4 Conclusions

- Former USTs and/or historical site contamination may exist at the site. There are potential health and safety risks associated with any contaminants which may migrate from these locations.

4.5.5 Recommendations

- It is recommended that continued monitoring of the monitoring well (MW-64) installed within the floor of the paint shop building occur to determine whether hydrocarbon vapour concentrations develop into a concern at this location.

- Manitoba Environment should be consulted to determine whether acetone in the soil beneath the Paint Shop building is a concern that requires mitigation.

- Further due diligence would include conducting geophysical surveys to determine if any USTs remain in this area.

4.6 North Property Line UST Area

4.6.1 Environmental Concern

Historical records indicate that a UST was once located to the north of the Transept Shop. No documentation has been found to indicate that the tank(s) have been removed.

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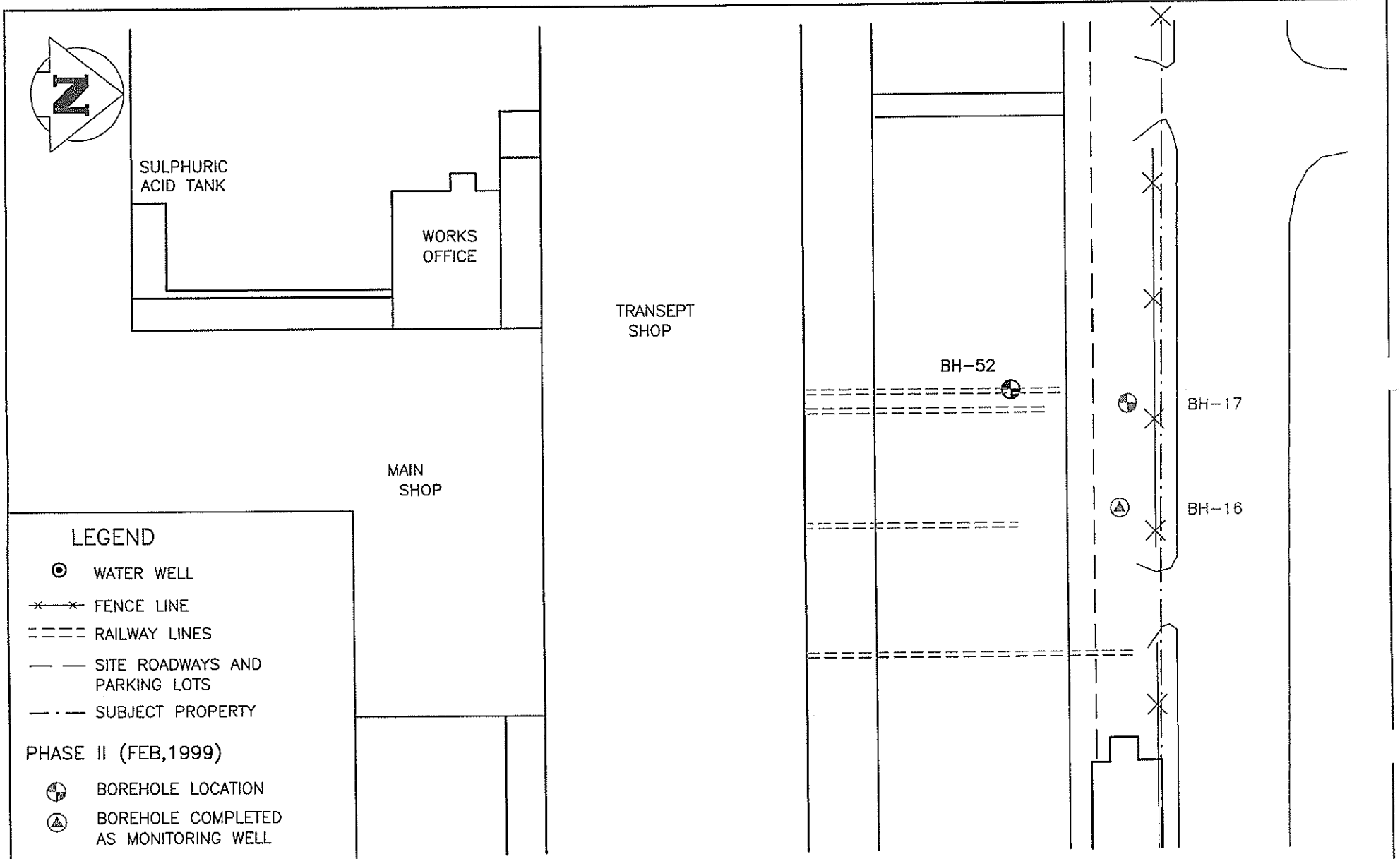

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
NORTH PROPERTY LINE UST AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.6.2

4.6.2 Investigation Summary

Drilling Observations

Three boreholes drilled in the vicinity of the north UST area included: BH-16 and BH-17 during the Phase II program, and BH-52 during the Phase III program. BH-16 was completed as a monitoring well. These boreholes are depicted in Figure 4.6.2, opposite. A significant amount of metal was noted between 0.5 and 1.7 m below grade in BH-17. No visual or olfactory evidence of petroleum impacts were noted within the soils at either of these borehole locations. The drilling observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the borehole drilling program revealed generally low concentrations in the boreholes in the area along the north property line. The maximum vapour concentration of 400 ppm within these three boreholes was recorded on a soil sample obtained from 0.6 m depth in BH-17. The remaining vapour concentrations were found to be below 185 ppm. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

The following soil samples were submitted for the identified laboratory analyses:

- BH-16 at 1.8 m depth: BTEX, TVH, TSH
- BH-17 at 0.6 m depth: Metals

The results of these analyses are provided in Tables A and B, in Appendix C. None of the parameters tested for were identified to be present at concentrations above the applicable soil remediation criteria.

Ground Water Analyses

One ground water sample was collected from MW-16 for laboratory analyses of BTEX, TVH, and TSH content. The results of these analyses are provided in Table F, in Appendix C. The analyses revealed a low TSH concentration and nondetectable concentrations of BTEX and TVH.

4.6.3 Discussion

No documentation has been identified to verify the removal of the UST(s) to the north of the Transept Shop. The UST(s) would likely have been constructed of steel. Should the tank(s) remain in the ground presently and contain fuel (likely gasoline and/or diesel), there is a potential for leaks to develop over time. No visual or olfactory evidence of petroleum hydrocarbon contamination was identified. Moreover, the laboratory analyses did not identify petroleum hydrocarbon concentrations in the soil or ground water above guidelines.

Boreholes BH-16 and BH-17 were drilled in the estimated vicinity of the UST near the north property line. The borehole logs indicate backfill material to depths of 1.8 and 2.1 m in BH-16 and BH-17, respectively, which is slightly deeper than the fill found at most other locations on the site, including BH-52 located in this vicinity. These backfill materials could be backfill from the sides of a former UST excavation. However, given the widespread fill noted across the site, this is not necessarily true.

Should leaks occur from the tank area at the north property line, the off-site migration of petroleum hydrocarbons could occur. A City of Winnipeg sewer line is located to the north of the property line. Should hydrocarbons reach this utility corridor, they would have the potential to migrate away from the property through the granular backfill soils or within the sewer, at a rate much greater than within the on-site silts and clays. In addition, combustible vapours could migrate and accumulate within the sewer pipe leading to a potential safety concern.

Since a potential exists for the USTs and/or contamination to remain on-site at the above location, and as there is a potential for health and safety risk associated with the presence of either of these items, the potential for the USTs and/or associated contamination to be present at the site may be considered a liability to the property owner. However, the environmental investigations in the approximate area of the former tank do not identify any significant petroleum hydrocarbon impacts in this area, which indicates that subsurface contamination is not an environmental concern at this location. Therefore, there are likely no risks associated with spilled fuel in this area.

4.6.4 Conclusions

- USTs may remain in the subsurface to the north of the Transept Shop.
- No significant petroleum impacts are present in the soils and ground water in the areas investigated to the north of the Transept Shop.

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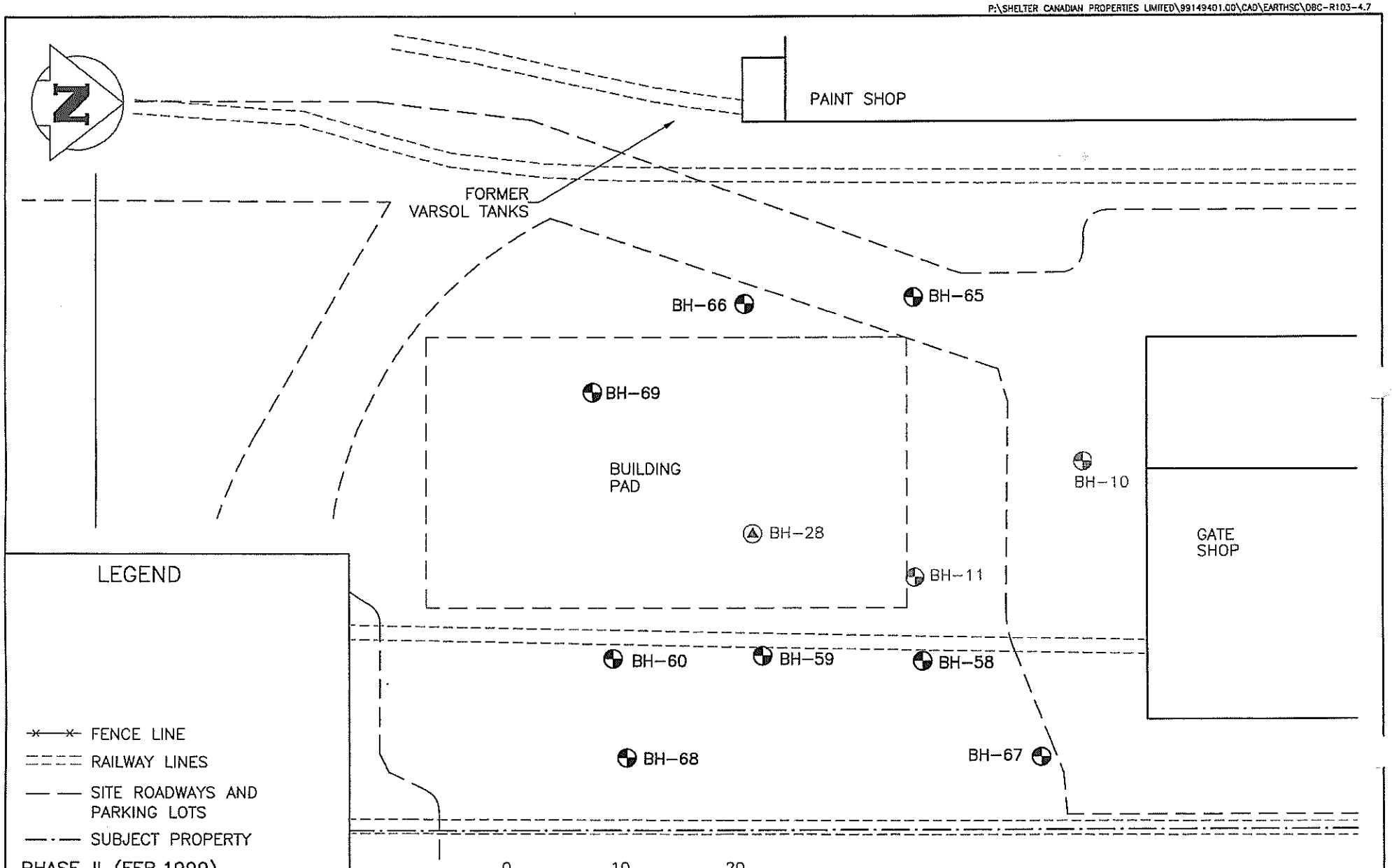

LEGEND

- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

PHASE III (JULY,1999)

- BOREHOLE LOCATION

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
WASTE OIL DRUM STORAGE AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.7.2

4.6.5 Recommendations

- No further investigations are warranted in this area at this time.
- As a matter of due diligence, the property owner could consider conducting an electromagnetic survey to identify whether or not a UST remains at this location.

4.7 WASTE OIL DRUM STORAGE AREA

4.7.1 Environmental Concern

The location south of the Gate Shop was previously used to store waste oil, cutting fluids, and liquid paints. Significant surficial staining was observed in this area in the past.

4.7.2 Investigation Summary

Drilling Observations

A total of eleven boreholes were drilled in the waste oil drum storage area: three (BH-10, BH-11, and BH-28) during Phase II, and eight during Phase III (BH-58 through BH-60, and BH-65 through BH-69). Borehole BH-28 was completed as a monitoring well. These boreholes are shown on Figure 4.7.2.

- Petroleum odours were noted in the surficial soils in BH-10 and BH-28. A petroleum odour accompanied by staining was observed in BH-58 at 0.5 to 1.0 m below grade, and a petroleum odour accompanied by tar-like material was observed in BH-60 at 0.2 to 0.9 m below grade.
- A metallic odour accompanied by possible staining was identified in BH-59 at 0.75 to 1.05 m.
- Wood debris accompanied by a strong wood odour was observed in BH-67 from 0.2 to 0.9 m below grade.
- Cinder-like material was observed in BH-66 (accompanied by a petroleum odour), BH-65, and BH-68.
- Fill material containing wood debris and nails was observed in BH-11.

TABLE 4.7.2

Soil Samples Submitted for Laboratory Analyses in the Waste Oil Drum Storage Area

Borehole	Depth (m)	Laboratory Analyses			
		BTEX, TVH	TSH	Metals	MOG
BH-10	1.2	X	X		X
BH-11	0.6	X	X		X
BH-28	0.6	X	X		X
BH-58	0.6		X		X
BH-58	1.5		X		X
BH-59	0.3		X	X	X
BH-59	0.9	X	X		X
BH-60	0.6		X		X
BH-60	0.9		X		X
BH-65	0.3		X	X	
BH-65	0.9	X	X		
BH-66	0.6		X		X
BH-66	0.9		X		
BH-67	0.9		X		
BH-68	0.6		X	X	X
BH-68	0.9		X		
BH-69	0.3		X	X	X
BH-69	0.6		X		

These observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within soil samples retrieved during the borehole drilling program revealed generally low concentrations in the boreholes in this area. Peak combustible vapour concentrations in this area were in the range of 200 to 355 ppm in boreholes BH-10, BH-11, and BH-28, while the remainder measured generally below 100 ppm. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

Table 4.7.2 summarizes the laboratory analyses undertaken on soil samples obtained from the Waste Oil Drum Storage area. The results of these analyses are provided in Tables A and C, in Appendix C. The following parameters exceeded the applicable guideline concentrations:

Borehole	Depth (m)	Parameters Exceeding Guidelines
BH-28	0.6	TSH, MOG
BH-60	0.6	TSH, MOG
BH-65	0.3	TSH
BH-66	0.6	TSH, MOG

The remaining parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

Ground Water Monitoring

MW-28 was monitored on February 25, 1999 and July 13, 1999. No free-phase petroleum product or ground water discolouration was identified in this well. The well head-space petroleum hydrocarbon vapour concentrations measured at these times were 370 and 165 ppm, respectively. The depth to ground water within MW-28 was found to be 0.893 m below the well casing on July 13, 1999.

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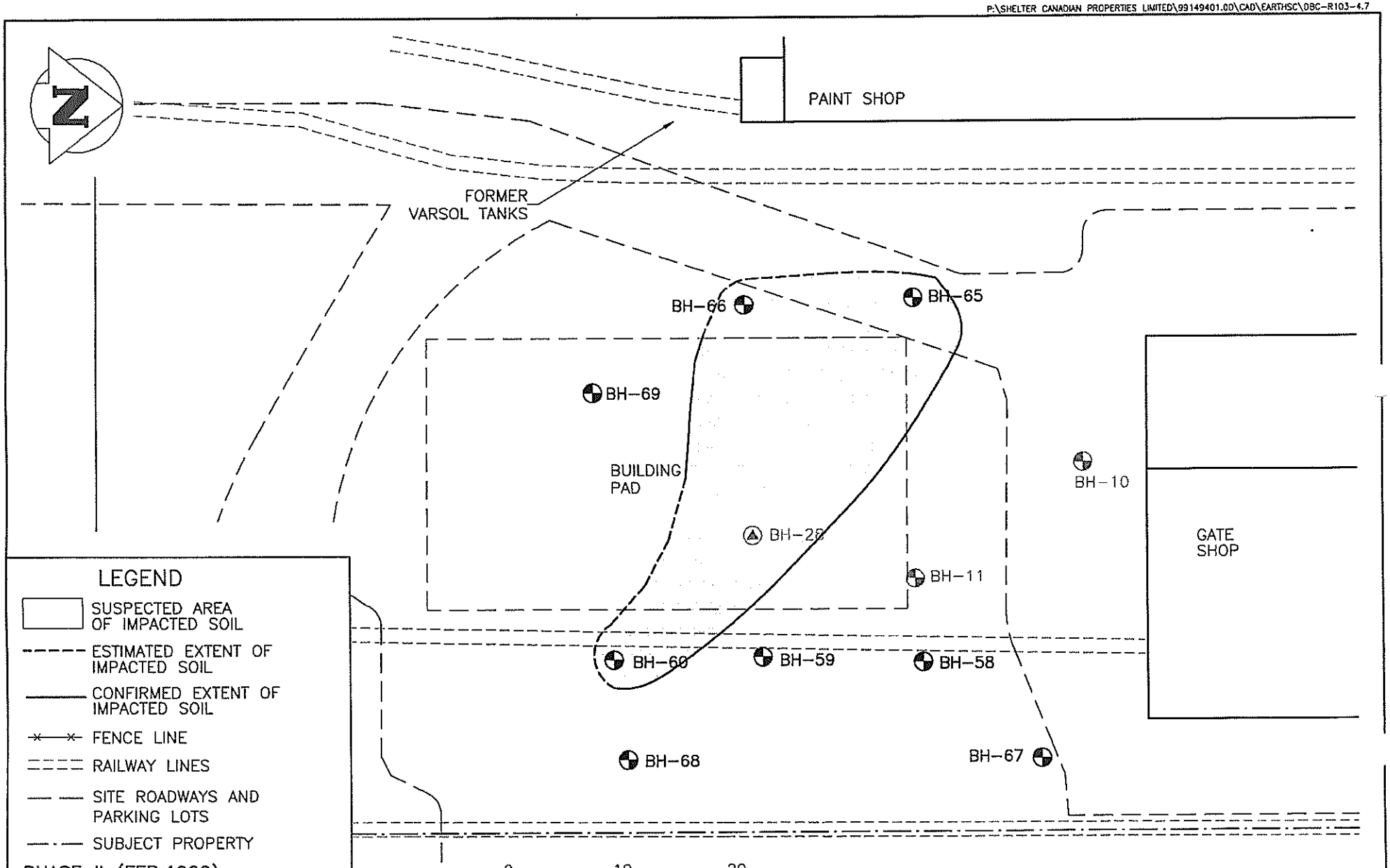

LEGEND

- SUSPECTED AREA OF IMPACTED SOIL
- ESTIMATED EXTENT OF IMPACTED SOIL
- CONFIRMED EXTENT OF IMPACTED SOIL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

PHASE III (JULY,1999)

- BOREHOLE LOCATION

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING EXTENT OF IMPACTED SOIL
WASTE OIL DRUM STORAGE AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	FIG.4.7.3
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	

4.7.3 Discussion

A significant amount of debris was observed in the fill material in this area. The laboratory analyses of four soil samples obtained from at a depth of 0.3 to 0.6 m below grade indicated concentrations of TSH and MOG well above the applicable remediation guidelines. The impacted soil appears mainly to be surficial, and is estimated to total approximately 400 to 500 m^3, as illustrated on Figure 4.7.3.

4.7.4 Conclusions

- The surficial soils in the waste oil area contain concentrations of TSH and MOG above the Manitoba Environment Level III Soil Remediation Criteria.

- These impacted soils pose limited environmental risk for the current land use. Remediation of these soils is not required provided the land use in the immediate vicinity of these impacted soils does no change.

4.7.5 Recommendations

- The requirement for remediation of the impacted soils in the Waste Oil Drum Storage area should be reviewed prior to any changes in land use for this area.

4.8 LANDFILLING AREA

4.8.1 Environmental Concern

Historical landfilling of the southwest corner of the property, including Omands Creek (likely rerouted), with solid wastes resulting from operations on the property, poses a potential environmental concern to biota within Omands Creek.

4.8.2 Investigation Summary

Drilling Observations

A total of 20 boreholes were drilled in the landfilling area: four during the Phase II program (BH-18 through BH-21), and sixteen during the Phase III program (BH-30 through BH-40, BH-73 and BH-74, and BH-41 through BH-43 south of the creek). Boreholes BH-18, BH-20, BH–31 through

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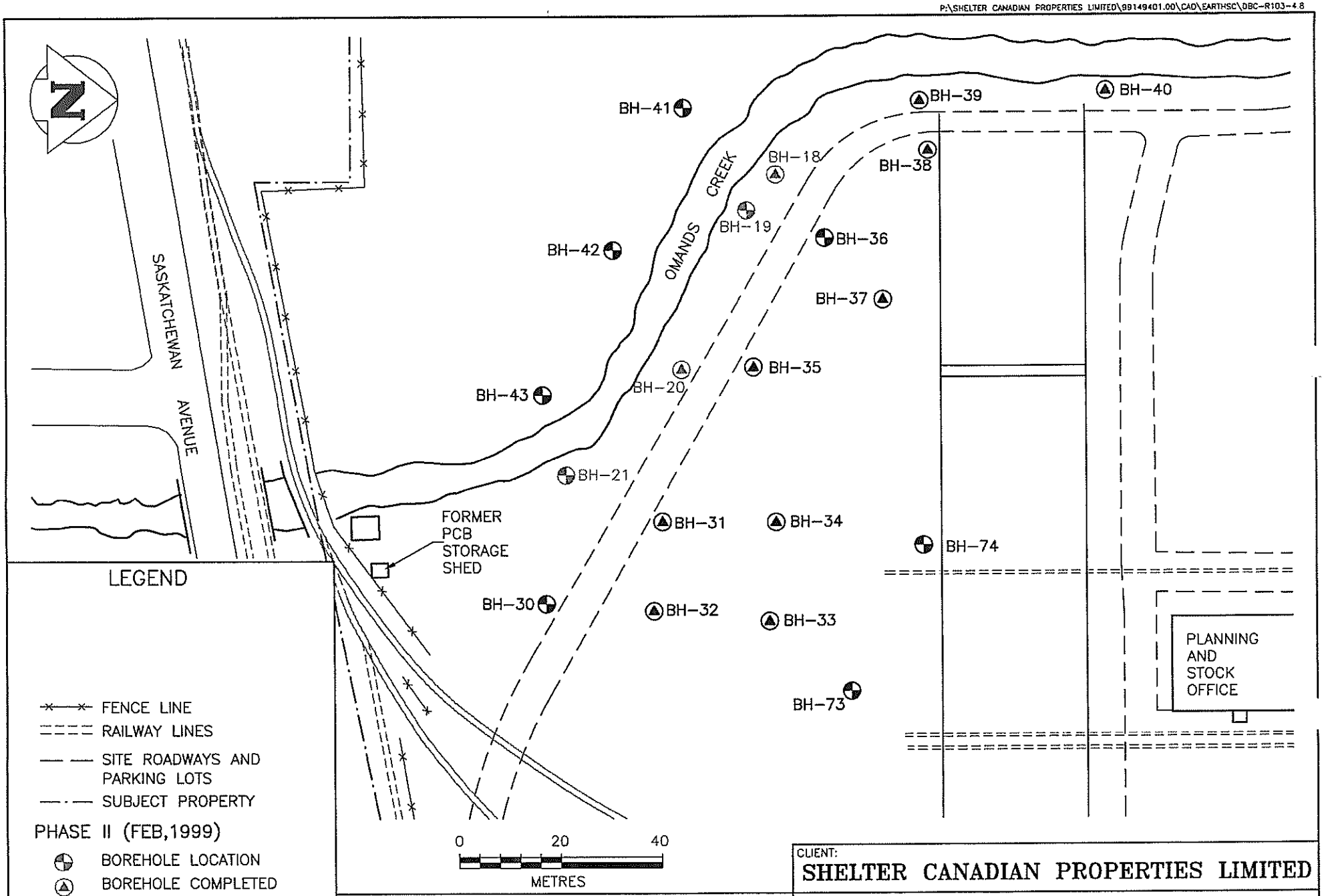

LEGEND

- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

PHASE III (JULY,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
LANDFILLING AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.8.2

BH-35, and BH-37 through BH-40 were completed as monitoring wells. These boreholes are illustrated on Figure 4.8.2.

The significant observations included:

- Fill materials comprising wheelabrator dust, wood, glass, and metal debris were encountered in the boreholes along the roadway including BH-18 through BH-21, BH-30, BH-36, and BH-40.
- Red, "brick-like" particles were identified in several locations in the surficial fill. This material is expected to be paint dust from the metal paint primer used at the site.
- Cinder-like material was encountered in BH-30 through BH-33.
- A petroleum odour was noted in BH-18 to 1.5 m below grade.
- A creosote odour accompanied by staining was noted in the surficial fill material in BH-37.
- A sewage odour was noted at approximately 3.0 m below grade in BH-31 and BH-34. A similar odour was noted at approximately 0.3 m below grade in BH-74. These boreholes are located where Omands Creek is believed to have previously traversed the property.
- A metallic odour accompanied by pieces of metal was observed in BH-74 at 0.7 to 1.1 m below grade.

These observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the borehole drilling program revealed low concentrations in some boreholes and moderate concentrations in others (BH-18, BH-19, BH-34, BH-37) in this area. Peak vapour concentrations in this area ranged from 20 to 190 ppm in low concentration areas, and combustible levels of 495 to 795 ppm (6.4% LEL) in moderate concentration areas. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

TABLE 4.8.2

Soil Samples Submitted for Laboratory Analyses in the Landfilling Area

Borehole	Depth (m)	Laboratory Analyses				
		BTEX, TVH	TSH	VOCs	Metals	PCBs
BH-18	0.6			X	X	
BH-19	0.6			X	X	
BH-20	0.6					X
BH-30	0.6				X[1]	
BH-30	1.2				X	
BH-30	2.4			X		
BH-31	0.6				X	X[2]
BH-31	1.8					X
BH-31	2.4				X	
BH-32	0.6				X	X[2]
BH-33	0.6				X	
BH-34	0.6				X	
BH-34	1.2			X		
BH-34	3.0			X		
BH-35	0.6			X		
BH-35	1.2					X
BH-37	0.6		X	X	X	
BH-37	1.2				X	
BH-38	0.6				X	
BH-39	0.6				X	
BH-39	1.2				X[3]	
BH-40	0.6				X	
BH-42	0.6				X[4]	
BH-43	0.6				X[4]	
BH-73	0.3				X	
BH-74	0.9			X	X	
BH-74	1.2					X
BH-74	1.8	X	X		X	

Notes:
[1] Limited to Chromium, Lead, and Zinc
[2, 4] Composite sample
[3] Limited to Lead, Copper, and Zinc

Soil Sample Analyses

Table 4.8.2 summarizes the laboratory analyses undertaken on soil samples obtained from the Landfilling area. The results of these analyses are provided in Tables A through C, in Appendix C. The following parameters exceeded the applicable guideline concentrations:

Borehole	Depth (m)	Parameters Exceeding Guidelines
BH-18	0.6	Copper, Molybdenum, Nickel, Zinc
BH-19	0.6	Molybdenum, Nickel, Zinc
BH-30	0.6	Chromium, Copper, Molybdenum
BH-31	0.6	Copper
BH-34	0.6	Zinc
BH-35	0.6	Chromium, Copper, Zinc
BH-37	0.6	Chromium, Copper, Molybdenum, Lead, Zinc
BH-38	0.6	Zinc
BH-39	0.6	Copper, Lead, Zinc
BH-40	0.6	Chromium, Copper, Lead, Zinc
BH-74	0.9	Chromium, Copper, Lead, Zinc

The remaining parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

A soil sample from BH-37 at 0.6 m was additionally submitted for leachate analysis. Metals that were determined to be above the CCME FWAL criteria for water included Cadmium, Copper, Iron, Lead, Nickel, and Zinc. The remaining parameters were present at concentrations either below the applicable guideline concentrations.

Ground Water Analyses

The following ground water samples were submitted for the identified laboratory analyses:

Monitoring Well	Laboratory Analyses		
	VOCs	Metals	PCBs
MW-18	X	X	
MW-31	X	X	X
MW-35	X		
MW-37		X	
MW-38		X	
MW-39		X	
MW-40	X	X	

The results of these analyses are provided in Tables F through H, in Appendix C. The following parameters exceeded the applicable guideline concentrations:

- MW-18 : Trichloroethene, Silver, Aluminum, Chromium, Copper, Lead, and Zinc

CCME does not provide a FWAL guideline for PCBs in water; however, the 1997 Ontario Ministry of the Environment's (MOE) Guideline for use at Contaminated Sites in Ontario, non-potable ground water criteria provides a guideline value of 0.0002 mg/L. The PCB concentration in MW-31 was above this reference guideline.

The remaining parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

Ground Water Monitoring

MW-20 was found to be dry when monitored on February 25, 1999. MW-18 had a low head-space petroleum hydrocarbon vapour concentration when monitored on March 9, 1999. No free-phase petroleum product or ground water discolouration was identified in this well.

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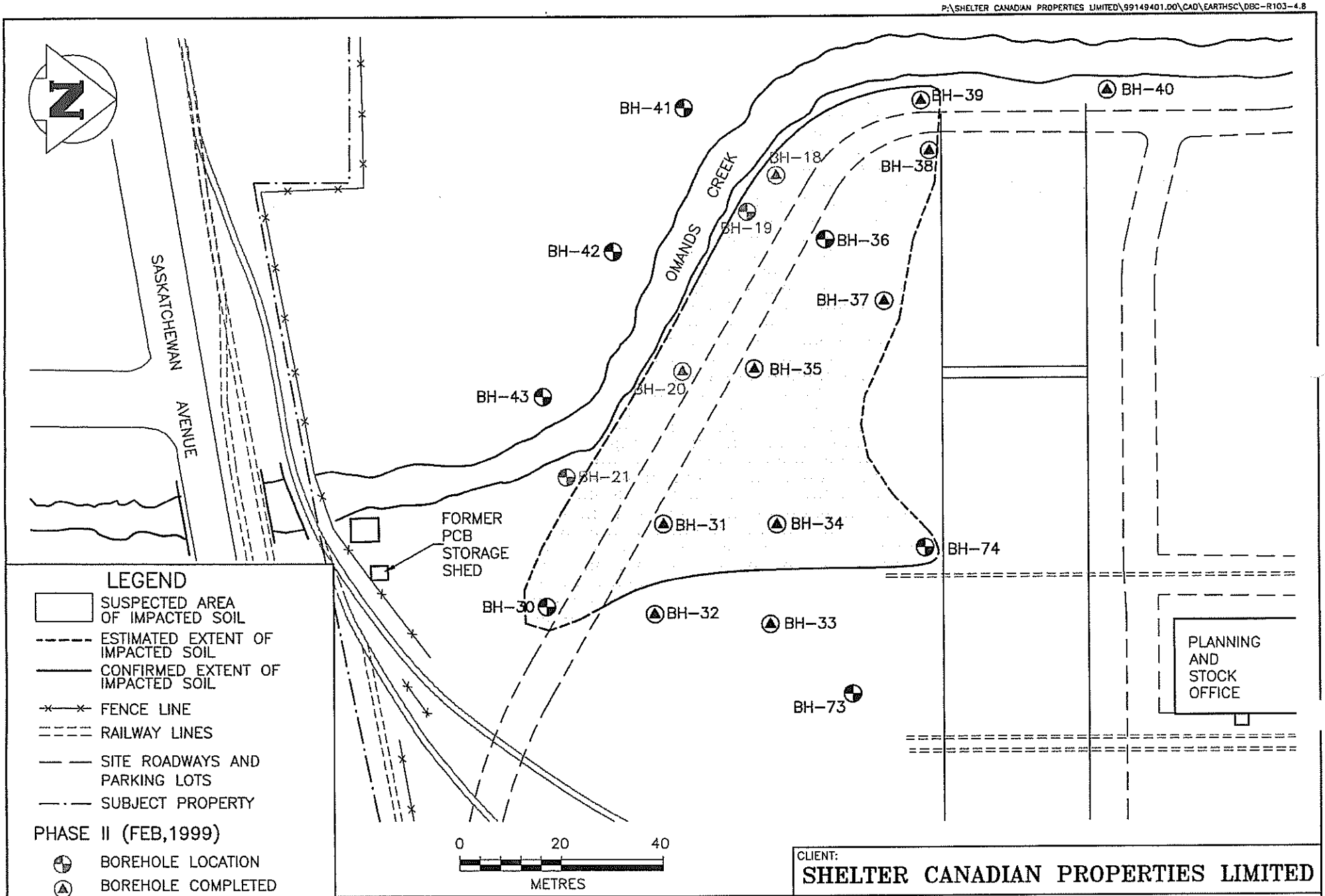

LEGEND

- SUSPECTED AREA OF IMPACTED SOIL
- ESTIMATED EXTENT OF IMPACTED SOIL
- CONFIRMED EXTENT OF IMPACTED SOIL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

PHASE III (JULY,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING EXTENT OF IMPACTED SOIL
LANDFILLING AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO. 991494-01-02 FIG.4.8.3
CHECKED BY:	J.D.N.	DATE:	99.08.20	

Monitoring wells MW-18, MW-31 through MW-35, and MW-37 through MW-40 were monitored on July 13, 1999. The ground water monitoring results were as follows:

Well I.D.	Depth to Ground Water (m below well casing)	Ground Water Elevation (m)	Petroleum Hydrocarbon Vapour Concentrations		Observations
			(ppm)	(%LEL)	
MW-18	1.525	98.780	51		None
MW-31	1.840	98.516		8.3	Cloudy
MW-32	1.677	98.563	60		Cloudy
MW-33	1.750	98.484	55		None
MW-34	1.780	98.514	95		Sewage odour, Dark
MW-35	1.655	N.A.		11	Cloudy
MW-37	0.958	99.340	40		Cloudy
MW-38	1.246	98.902	60		Cloudy
MW-39	1.430	98.638	55		Cloudy
MW-40	1.452	98.495	165		Dark rust colour

Notes: Elevations determined from arbitrary benchmark of 100.000 m
N.A. = not available due to inaccessibility
ppm = parts per million
LEL = lower explosive limit

4.8.3 Discussion

The total landfilled area is over 4500 m^2, with landfill materials present to depths of 3.0 m below grade. The landfill materials identified included wheelabrator dust, brick, cinder-like materials, metals, wood, and glass.

Zinc, copper and lead concentrations, above the applicable guidelines, in each of the soil, leachate, and ground water samples, suggest migration from one zone to the next. At the concentrations present here zinc and lead are toxic to aquatic organisms, particularly fish, and are known to bioaccumulate in animal tissue. Copper is also toxic to aquatic organisms; furthermore, its presence is known to enhance the sublethal toxicity of zinc (McNeely et al. 1979). It should be noted however, that the toxicity of each of these elements varies with water temperature, hardness, and dissolved oxygen levels.

In addition to the heavy metals detected, a trace PCB concentration, and acetone levels above the Ontario MOE remediation guideline were also identified in the soil. Additionally, a Trichlorethene concentration above the CCME FWAL guideline was identified in the ground water. The total amount of impacted soil is estimated to be approximately 4000 m^3, as depicted in Figure 4.8.3.

4.8.4 Conclusions

- Heavy metals have been identified at concentrations above the applicable soil and water remediation guidelines and in the landfilling area adjacent to Omands Creek at the southwest corner of the property. The landfilling area presents an apparent risk to environmental receptors in Omands Creek and corrective actions are required.

- The PCB concentration in the ground water in the landfilling area was identified to be above the MOE nonpotable ground water guideline.

4.8.5 Recommendations

The landfilling area presents an apparent risk to the environmental receptors in Omands Creek and corrective actions are required. In Manitoba, the remediation options for the treatment of soils containing heavy metals are generally limited to one of three practical options:

- The excavation and disposal of the soils at a hazardous waste facility in southwestern Manitoba;

- The encapsulation of the soils either on-site or in another location acceptable to Manitoba Environment; or

- Stabilization of the heavy metals in the soil.

Other locations on-site (the Sulphuric Acid Drum Storage area) also contain soils requiring corrective action as a result of heavy metal contamination. Therefore, it is suggested that the best approach to addressing this liability would be through the construction of an on-site encapsulation cell which would mitigate the migration of heavy metals.

Manitoba Environment should be consulted about the potentially high concentration of PCBs in the groundwater to determine appropriate mitigative action.

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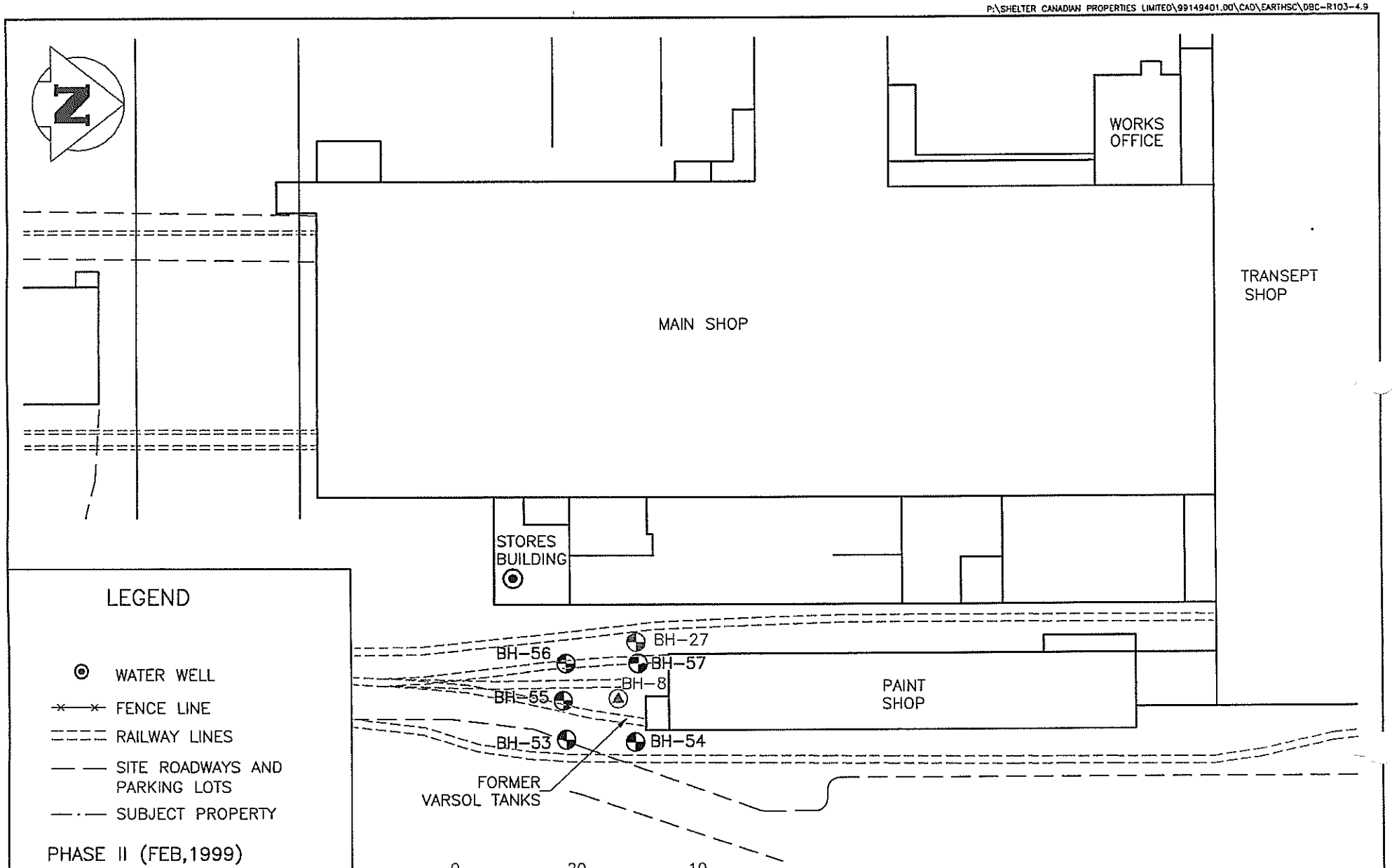

LEGEND

- WATER WELL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

PHASE III (JULY,1999)

- BOREHOLE LOCATION

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT: SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
SOLVENT AST AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY: E.S.	DRAWN BY: K.A.S.	DWG. NO.	
CHECKED BY: J.D.N.	DATE: 99.08.20	991494-01-02	FIG.4.9.2

4.9 SOLVENT AST AREA

4.9.1 Environmental Concern

Historical minor leakage of a Solvent AST, with no secondary containment, occurred in the area south of the Paint Shop, resulting in potential environmental concerns.

4.9.2 Investigation Summary

Drilling Observations

A total of seven boreholes were drilled in the area south of the Paint Shop: two during the Phase II program (BH-8 and BH-27), and five during the Phase III program (BH-53 through BH-57). Borehole BH-8 was completed as a monitoring well. These boreholes are illustrated on Figure 4.9.2.

- Significant amounts of coal and cinder were observed in BH-27, BH-56, and BH-57 located near a former coal bin; and
- A petroleum odour was noted to 1.3 m below grade in BH-54. Black staining accompanied by a moderate petroleum odour was observed in BH-57 at 2.4 to 2.6 m below grade.

These observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the borehole drilling program revealed generally low concentrations in the boreholes in this area. Peak vapour concentrations in this area were in the range of 35 to 345 ppm. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

Table 4.9.2 summarizes the laboratory analyses undertaken on soil samples obtained from the Solvent AST area. The results of these analyses are provided in Tables A through C, and

TABLE 4.9.2

Soil Samples Submitted for Laboratory Analyses in the Solvent AST Area

Borehole	Depth (m)	Laboratory Analyses					
		BTEX, TVH	TSH	PAH	VOCs	Metals	MOG
BH-8	0.3				X		
BH-27	0.6	X	X				X
BH-53	1.8	X	X				
BH-54	0.3	X	X				
BH-54	1.2	X					
BH-55	0.6					X[1]	
BH-56	0.6	X	X	X			
BH-57	0.3	X	X				
BH-57	0.6					X	
BH-57	2.4	X	X				

Note:
[1] Limited to Lead, Copper, and Zinc

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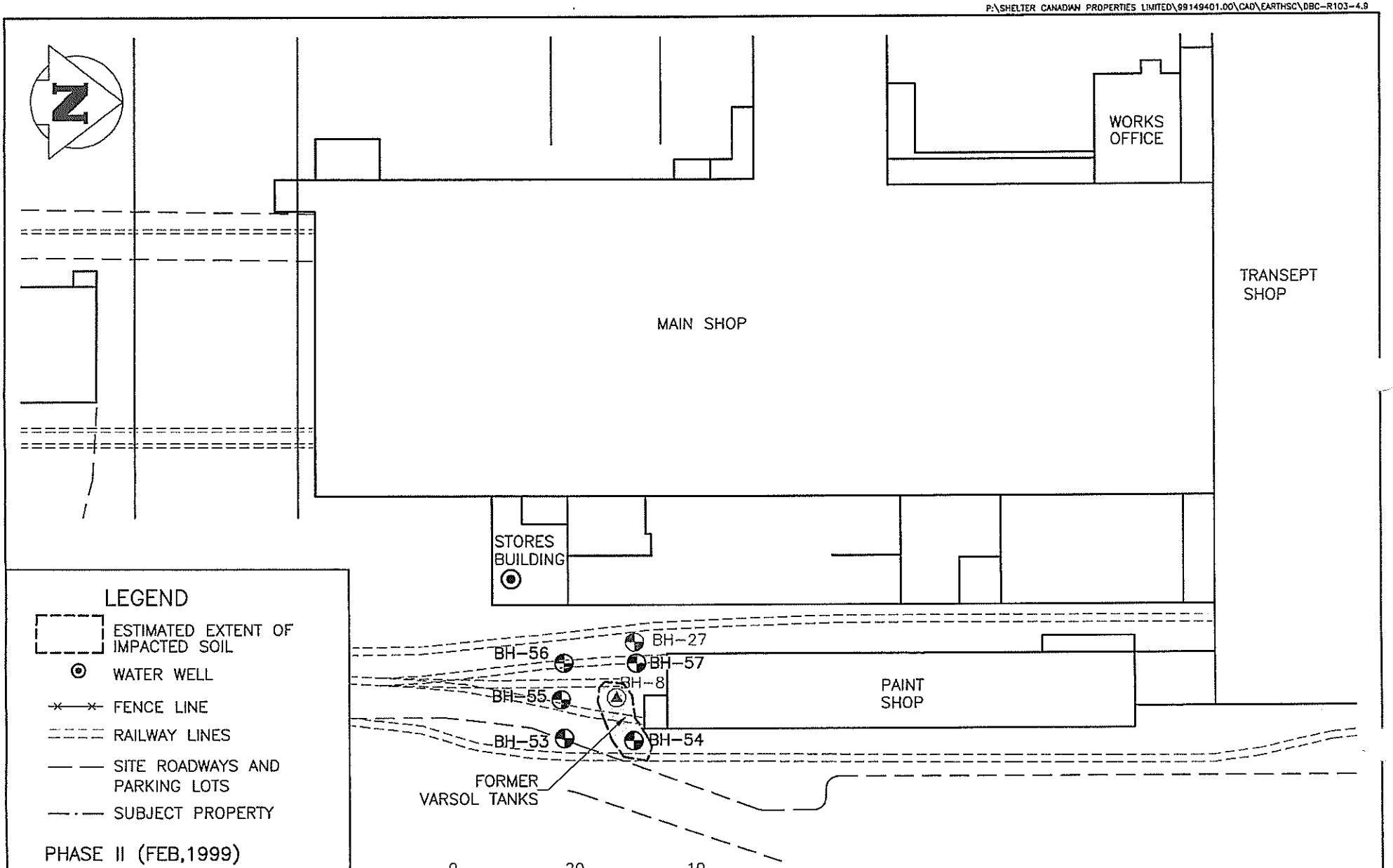

LEGEND

- ESTIMATED EXTENT OF IMPACTED SOIL
- WATER WELL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

PHASE III (JULY,1999)

- BOREHOLE LOCATION

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING EXTENT OF IMPACTED SOIL
SOLVENT AST AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.9.3

Table E, in Appendix C. The following parameters exceeded the applicable guideline concentrations:

- BH-8 at 0.3 m : Toluene, Xylenes
- BH-54 at 0.3 m : Ethylbenzene, Xylenes

The remaining parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

Ground Water Analyses

Based on the results of the field investigations a ground water sample from MW-8 was submitted for analyses of BTEX, TVH, TSH, VOCs, and AOX. The results of these analyses are provided in Tables F and H, in Appendix C. The analyses did not identify the presence of any of the tested parameters at concentrations above the applicable guidelines.

Ground Water Monitoring

MW-8 was monitored on February 25, 1999, and July 13, 1999. No free-phase petroleum product or ground water discolouration was identified in this well. The well head-space petroleum hydrocarbon vapour concentrations measured at these times were 130 and 80 ppm respectively. The depth to ground water within MW-8 was found to be 0.742 m below the well casing on July 13, 1999.

4.9.3 Discussion

Petroleum odours were noted in BH-54 and BH-57. Additionally, coal and cinders were encountered in BH-27, BH-56, and BH-57.

Soil sampling and analyses of a sample of the granular fill from BH-8, drilled in the vicinity of the solvent AST, has identified the presence of Toluene and Xylenes at concentrations above the guideline criteria. Analyses of a sample near the surface in BH-54, drilled immediately south of the Paint Shop, revealed the presence of Ethylbenzene and Xylenes at concentrations above the guideline criteria. The amount of impacted soil in this area is estimated to be approximately 75 to 100 m^3, as depicted in Figure 4.9.3.

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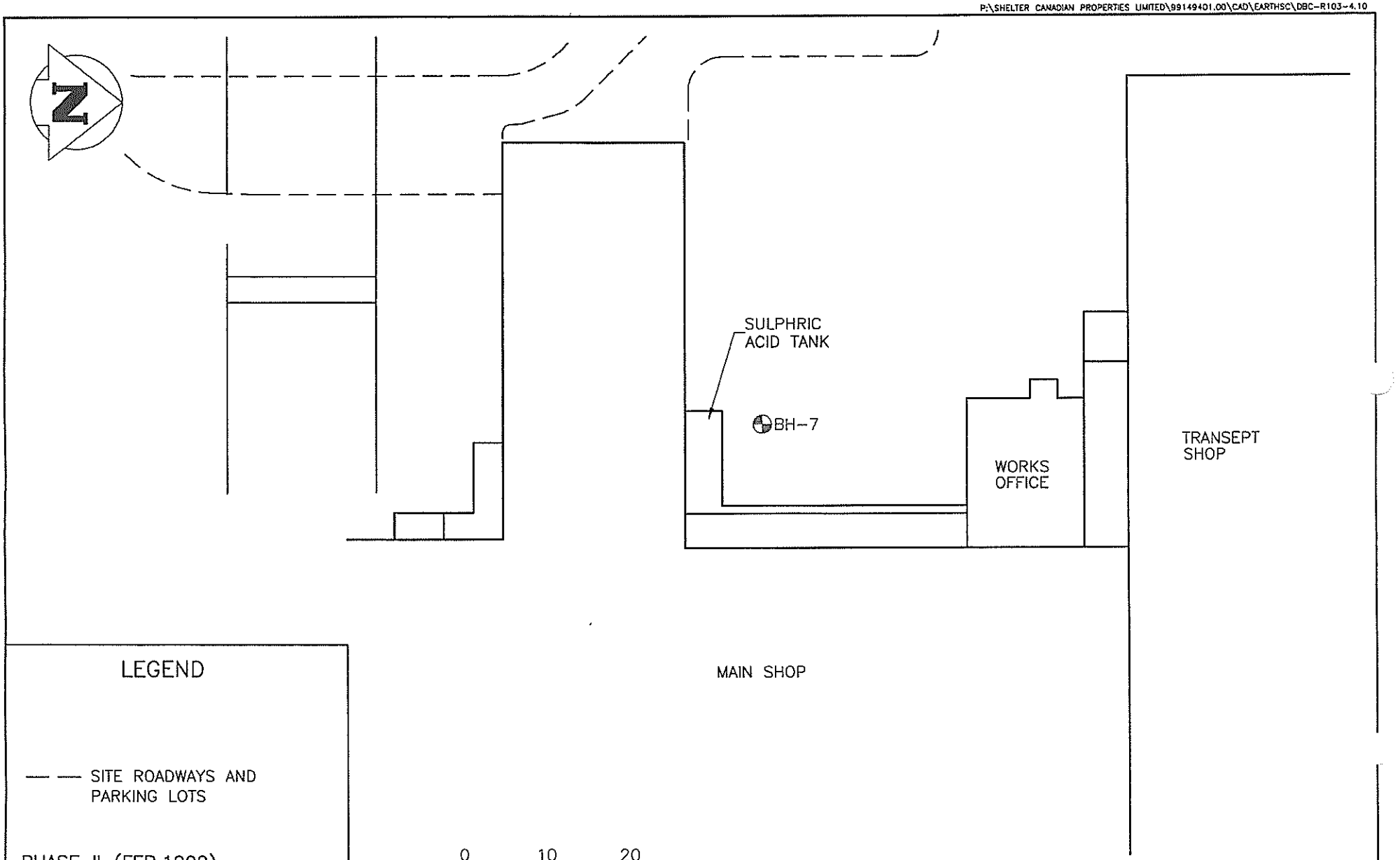

LEGEND

— — SITE ROADWAYS AND PARKING LOTS

PHASE II (FEB,1999)

BOREHOLE LOCATION

0 10 20
METRES

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
SULPHURIC ACID AST AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.10.2

4.9.4 Conclusions

- Some BTEX concentrations in the solvent AST area were determined to be above guidelines; therefore, these areas require remediation.

4.9.5 Recommendations

- The surficial soils in the area of the former Varsol tank should be excavated from the site and disposed of in accordance with the applicable provincial guidelines.

4.10 Sulphuric Acid AST Area

4.10.1 Environmental Concern

Historical overfilling of a Sulphuric Acid AST has resulted in potential environmental concerns in the area north of the Galvanizing Shop.

4.10.2 Investigation Summary

Drilling Observations

One borehole (BH-7) was drilled in the area north of the Galvanizing Shop during the Phase II program. This borehole is depicted in Figure 4.10.2. Fill material was apparent in this borehole to a depth of 1.2 m below grade. Observations on this borehole are detailed in the borehole log included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the borehole drilling program revealed generally low concentrations in the boreholes in this area. The peak vapour concentration in BH-7 adjacent to the Sulphuric Acid AST was 390 ppm at 1.2 m. Peak vapour concentrations in the solvent AST area were in the range of 35 to 345 ppm. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

A soil sample obtained from BH-7 at a depth of 0.6 m below grade was submitted for metals analysis. The results of this analysis are provided in Table B, in Appendix C. The analysis did not identify any metals present at concentrations above the applicable guideline concentrations.

4.10.3 Discussion

Fill material was identified this area to a depth of 1.2 m below grade. No staining or significant odours were detected. Laboratory analyses of the samples taken from this area did not reveal any metals above the applicable guidelines concentrations.

4.10.4 Conclusions

- This area does not pose a concern.

4.10.5 Recommendations

- No remediation is warranted for continued industrial use of land.

4.11 Sulphuric Acid Drum Storage Area

4.11.1 Environmental Concern

Historical sulphuric acid storage in drums that on occasion became partly dissolved, permitting leakage onto the ground surface, is an environmental concern in the area southwest of the Galvanizing Shop.

4.11.2 Investigation Summary

Drilling Observations

A total of ten boreholes were drilled in the Sulphuric Acid Drum Storage area: two during the Phase II program (BH-22 and BH-23), and eight during the Phase III program (BH-44 through

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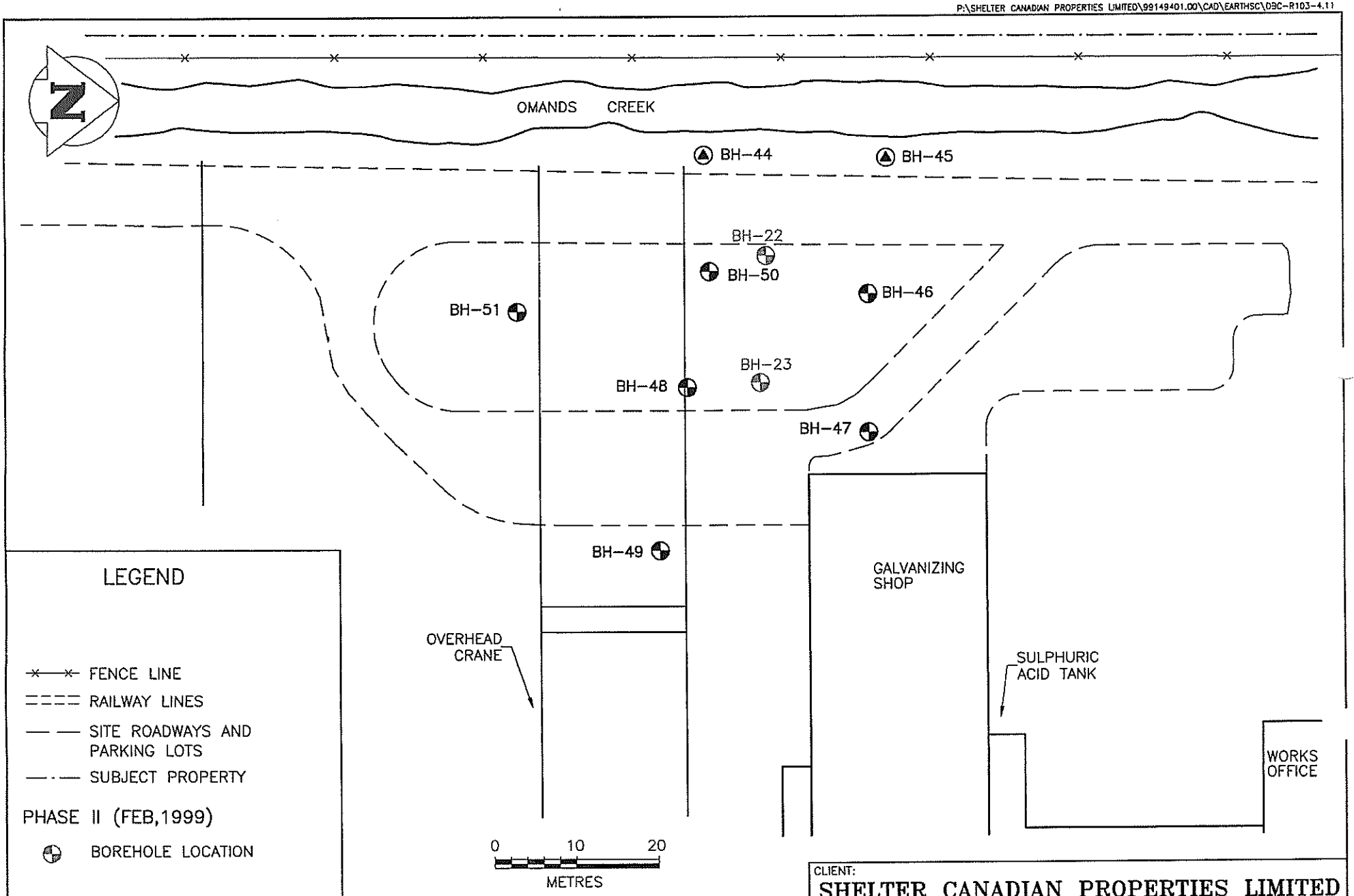

LEGEND

- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION

PHASE III (JULY,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
SULPHURIC ACID DRUM STORAGE AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.11.2

BH-51). Boreholes BH-44 and BH-48 were completed as monitoring wells. These boreholes are depicted in Figure 4.11.2. Orange staining accompanied by a moderate petroleum odour was observed in the surficial soil of BH-50. These observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the borehole drilling program revealed generally low concentrations in the boreholes in this area. Peak vapour concentrations in this area were in the range of 30 to 200 ppm. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

Table 4.11.2 summarizes the laboratory analyses undertaken on soil samples obtained from the Solvent AST area. The results of these analyses are provided in Tables A and B, following the text. The following parameters exceeded the applicable guideline concentrations:

Borehole	Depth (m)	Parameters Exceeding Guidelines
BH-22	0.3	Zinc
BH-44	0.6	Chromium, Lead, Zinc
BH-44	1.2	Zinc
BH-45	0.3	Copper, Zinc
BH-46	0.6	Copper
BH-47	0.3	Zinc
BH-48	0.3	Copper, Zinc
BH-49	0.3	Copper, Zinc
BH-50	0.3	TSH, Copper, Zinc
BH-50	0.6	Zinc
BH-51	0.3	Lead

The remaining parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

A soil sample from BH-48 at 0.3 m was additionally submitted for leachate analysis. Parameters that were determined to be above the CCME FWAL criteria included chromium, iron, lead, nickel, and zinc. The copper concentration equalled the guideline level. The remaining parameters

TABLE 4.11.2

Soil Samples Submitted for Laboratory Analyses in the Sulphuric Acid Drum Storage Area

Borehole	Depth (m)	Laboratory Analyses			
		Metals	BTEX, TVH	TSH	MOG
BH-22	0.3	X			
BH-44	0.6	X			
BH-44	1.2	X[1]			
BH-45	0.3	X[2]			
BH-46	0.6	X[2]			
BH-47	0.3	X[2]			
BH-48	0.3	X[2]			
BH-49	0.3	X[2]			
BH-49	0.6	X[3]			
BH-50	0.3	X[2]	X	X	
BH-50	0.6	X		X	X
BH-51	0.3	X[2]			

Note:
[1] Limited to Lead, Copper, Zinc, and Chromium
[2] Limited to Lead, Copper, and Zinc
[3] Limited to Copper and Zinc

were present at concentrations below the applicable guideline concentrations or were not detected at the laboratory minimum detection level.

Ground Water Analyses

The following ground water samples were submitted for analyses:

- MW-44: VOCs and Metals
- MW-45: Metals

The results of these analyses are provided in Tables G and H, in Appendix C. The following parameters exceeded the applicable guideline concentrations:

- MW-44: aluminum, cadmium, chromium, copper, iron, nickel, selenium, lead, and zinc
- MW-45: aluminum, chromium, copper, iron, selenium, lead, and zinc

The remaining parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

Ground Water Monitoring

MW-44 and MW-45 were monitored on July 13, 1999. The ground water monitoring results are as follows:

Well I.D.	Depth to Ground Water (m below well casing)	Groundwater Elevation (m)	Petroleum Hydrocarbon Vapour Concentrations (ppm)	Ground Water Observations
MW-44	1.265	98.743	45	Transparent lime green
MW-45	0.992	98.669	0	Cloudy, Rust coloured
Notes: Elevations determined from arbitrary benchmark of 100.000 m ppm = parts per million LEL = lower explosive limit				

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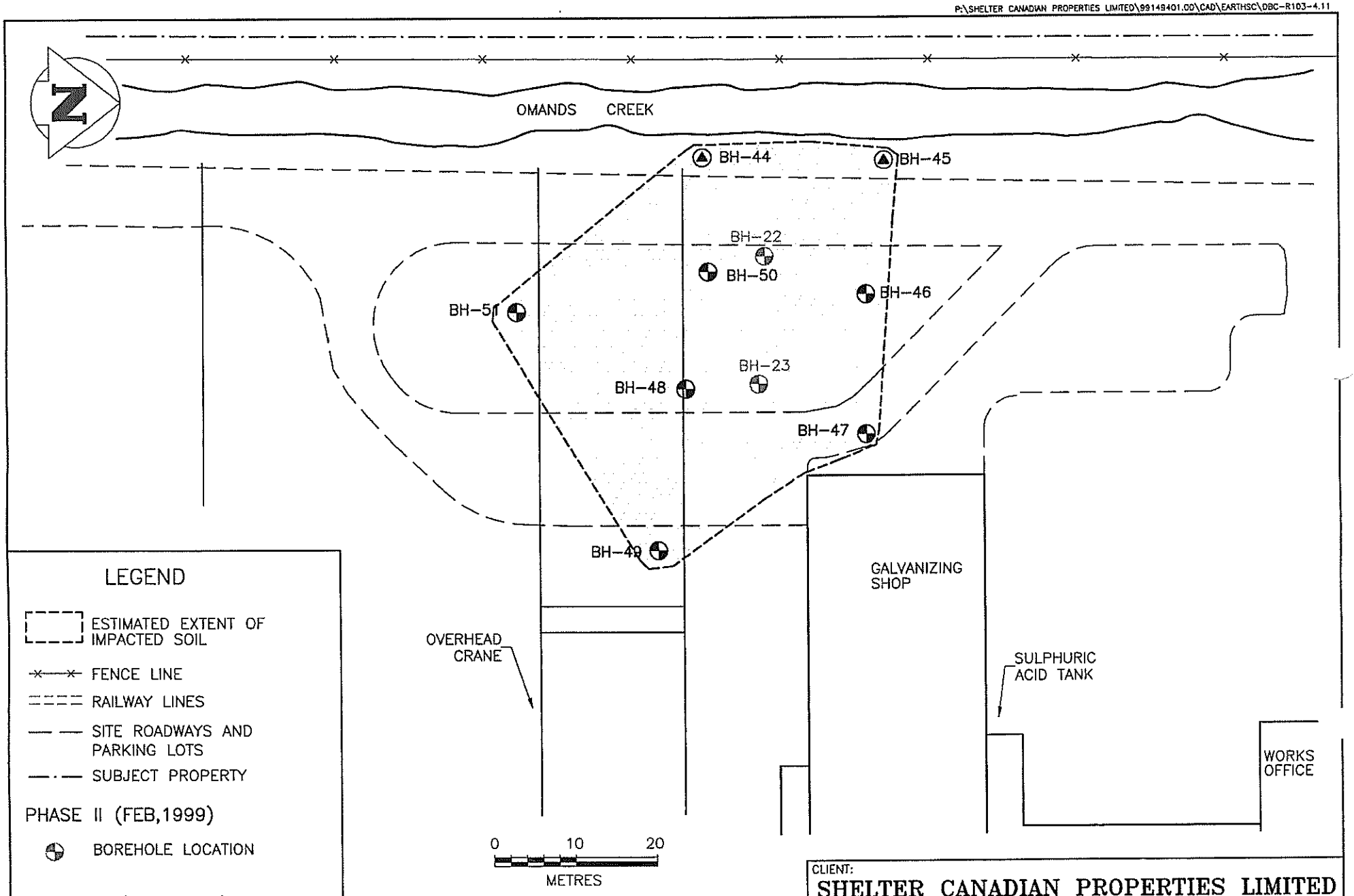

LEGEND

- ESTIMATED EXTENT OF IMPACTED SOIL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION

PHASE III (JULY,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING ESTENT OF IMPACTED SOIL
SULPHURIC ACID DRUM STORAGE AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.11.3

4.11.3 Discussion

Soil, water, and leachate analysis of samples in the granular fill drilled in the sulphuric acid drum storage area, has identified the presence of zinc, chromium, lead, and copper at concentrations above both the CCME soil and FWAL guideline criteria. Additionally, the TSH concentration in the stained fill in BH-50 was above the guideline criteria. Delineation of the metals at this location has not been achieved, but the minimum area of impact is 1750 m^2. The amount of impacted soil in this area is estimated to be approximately 1300 m^3, as depicted in Figure 4.11.3.

4.11.4 Conclusions

- Heavy metals and TSH are present in the surficial soils at the Sulphuric Acid Drum Storage area at concentrations requiring corrective actions.

4.11.5 Recommendations

- Remediation of the surficial soils in this area is required. A remediation plan for this area should be developed in conjunction with the remedial action proposed for the landfill area along Omands Creek. This may involve on site encapsulation of all soils impacted by heavy metals.

4.12 Diesel and Gasoline AST Area

4.12.1 Environmental Concern

Two ASTs containing gasoline and diesel fuel were formerly located approximately 150 m south of the Gate Shop building. Potential environmental concerns arise due to surficial staining noted in this area during the Phase II site investigations.

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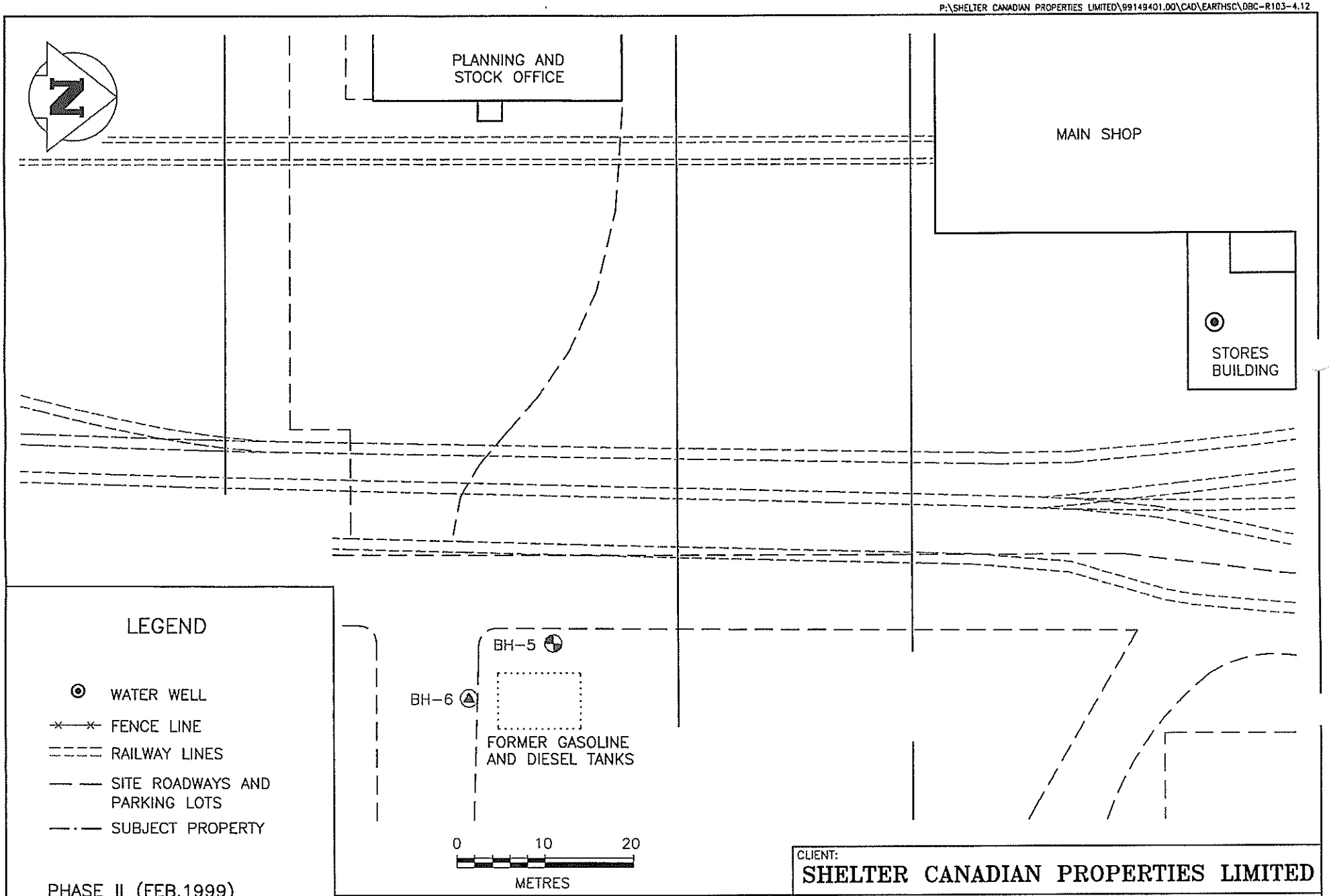


LEGEND

- WATER WELL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION
- BOREHOLE COMPLETED AS MONITORING WELL

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
DIESEL AND GASOLINE AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.12.2

4.12.2 Investigation Summary

Drilling Observations

Two boreholes were drilled in this area (BH-5 and BH-6) during the Phase II program. Borehole BH-6 was completed as a monitoring well. These boreholes are depicted in Figure 4.12.2. An underground utility pipe was encountered when drilling BH-5. The pipe was not thought to have been punctured and the borehole was decommissioned at 1.8 m depth. A petroleum odour was identified in BH-6 to approximately 1.4 m below grade. These observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the borehole drilling program revealed generally low concentrations in the boreholes in this area. Peak vapour concentrations in BH-5 and BH-6 were in 320 and 170 ppm, respectively. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

The following soil samples were submitted for analyses:

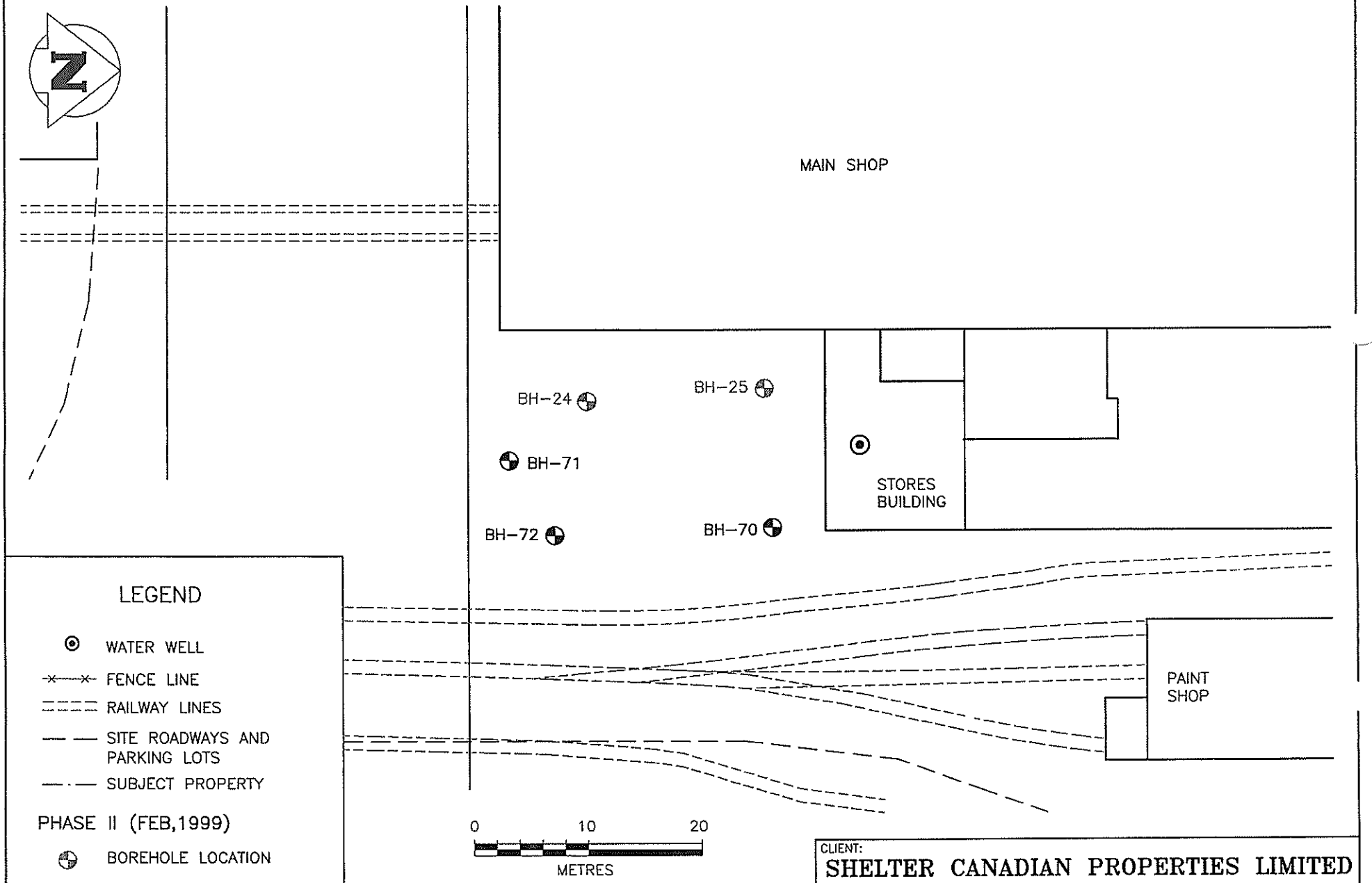
- BH-5: BTEX, TVH, TSH
- BH-6: BTEX, TVH, TSH

The results of these analyses are provided in Table A, in Appendix C. These parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

Ground Water Monitoring

MW-6 was monitored on July 13, 1999. The well was dry, and well head-space petroleum hydrocarbon vapour concentration was 11% LEL.

P:\SHELTER CANADIAN PROPERTIES LIMITED\991494401.00\CAD\EARTHSC\DBC-R103-4.13



LEGEND

- WATER WELL
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION

PHASE III (JULY,1999)

- BOREHOLE LOCATION

WARDROP Engineering Inc.
Winnipeg • Toronto • Thunder Bay • Saskatoon

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
WASTE PAINT STORAGE AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY:	E.S.	DRAWN BY:	K.A.S.	DWG. NO.	
CHECKED BY:	J.D.N.	DATE:	99.08.20	991494-01-02	FIG.4.13.2

4.12.3 Discussion

Two boreholes (BH-5 and BH-6) were drilled in the vicinity of the diesel and gasoline ASTs. The results of this investigation revealed that some surface impacts by petroleum hydrocarbons are evident in this area, although concentrations are below the applicable guidelines.

4.12.4 Conclusions

- Remediation of the former diesel and gasoline AST area is not warranted.

4.12.5 Recommendations

- No further investigations are warranted in this area at this time.

4.13 Waste Paint Storage Area

4.13.1 Environmental Concern

Waste paints and Gunwash solvent previously stored in the gravelled area south of the Stores Building present a potential environmental concern.

4.13.2 Investigation Summary

Drilling Observations

A total of five boreholes were drilled in this area: two during the Phase II program (BH-24 and BH-25), and three during the Phase III program (BH-70 through BH-72). These boreholes are depicted in Figure 4.13.2. Wood and metal debris was observed in the surficial soil of BH-24. Asphalt and red dust was observed in BH-25. These observations are detailed on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the borehole drilling program revealed generally low concentrations in the boreholes in this area. Peak vapour concentrations in this area were in the range of 10 to 335 ppm. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

The following soil samples were submitted for analyses:

Borehole	Depth (m)	Laboratory Analyses		
		Metals	VOC	TSH
BH-24	0.6	X	X	
BH-25	0.3	X	X	
BH-70	0.3	X		
BH-70	0.9	X		
BH-71	0.6	X		
BH-72	0.3	X		X

The results of these analyses are provided in Tables A through C, following the text. The following parameters exceeded the applicable guideline concentrations:

Borehole	Depth (m)	Parameters Exceeding Guidelines
BH-24	0.6	Lead, Zinc
BH-25	0.3	Copper, Lead, Zinc
BH-70	0.3	Zinc
BH-71	0.6	Copper

The remaining parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

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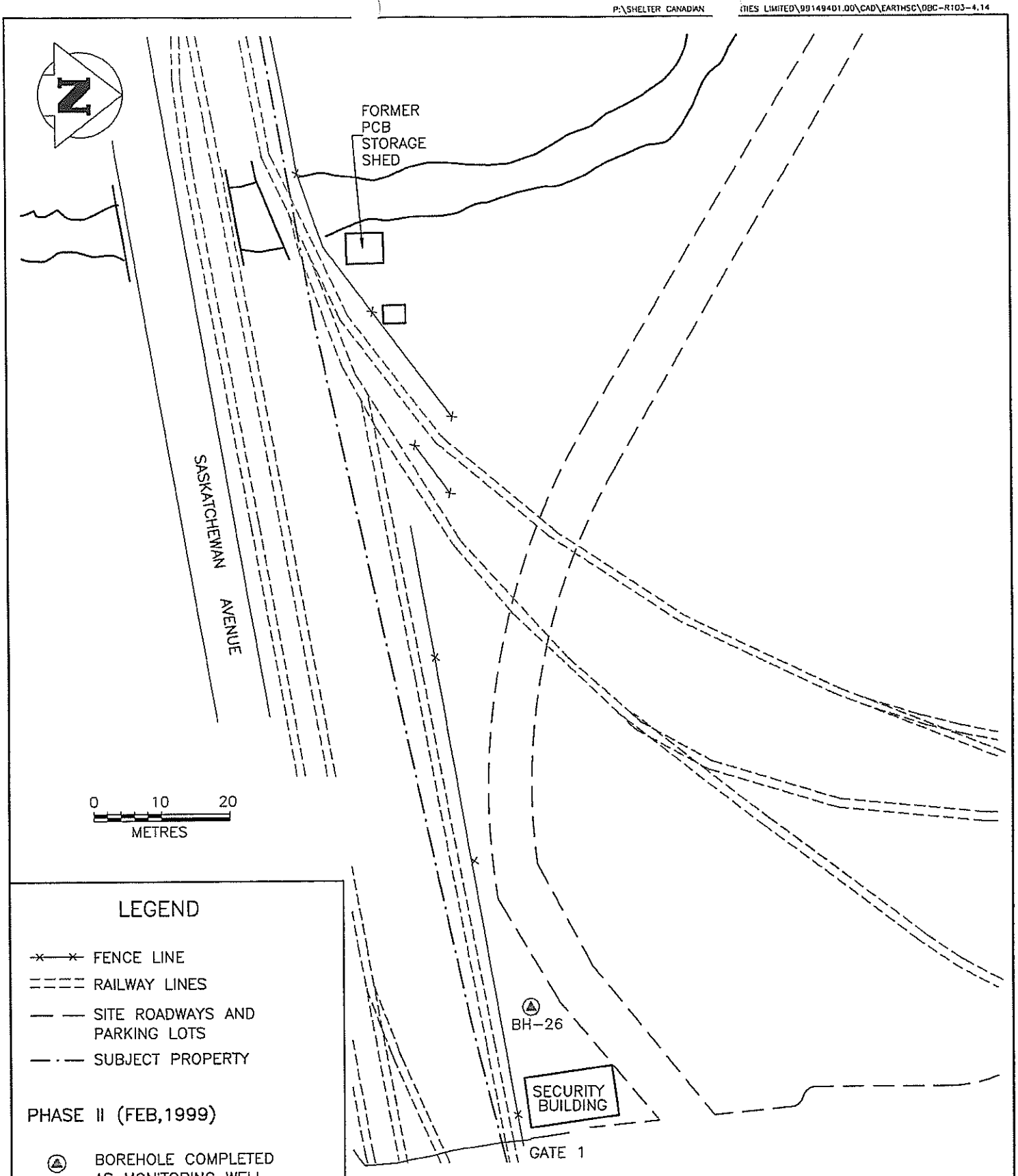

LEGEND

- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

BOREHOLE COMPLETED AS MONITORING WELL

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
FORMER SASKATCHEWAN LANDFILL AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

WARDROP Engineering Inc.
Winnipeg • Toronto •

DESIGNED BY: E.S.	DRAWN BY: K.A.S.	DWG. NO.	
CHECKED BY: J.D.N.	DATE: 99.08.20	991494-01-02	FIG.4.14.2

4.13.3 Discussion

The laboratory analyses of surficial soil samples obtained from BH-24 and BH-25 in the former paint storage area for VOCs and metals concentrations indicate that although some metals (lead, copper, zinc) are above the guideline criteria no significant impacts by these parameters are likely.

4.13.4 Conclusions

- The remediation of the soils in the waste paint storage area due to impacts from VOCs and Metals is not required.

4.13.5 Recommendations

- No further investigations are warranted in this area at this time.

4.14 FORMER SASKATCHEWAN AVENUE LANDFILL

4.14.1 Environmental Concern

Leachate and landfill gas movement from the capped, closed landfill located south of the site is a potential environmental concern.

4.14.2 Investigation Summary

Drilling Observations

One borehole, completed as a monitoring well, was drilled in this area (BH-26) during the Phase II program as depicted in Figure 4.14.2. No significant observations were made on this borehole as shown on the borehole log included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during drilling of BH-26 revealed low concentrations in this borehole. The peak vapour concentration in this borehole was 225 ppm at 0.6 m below grade. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

No soil samples were submitted for analyses at this location.

Ground Water Analyses

A ground water sample was submitted for analyses of VOCs and Metals.

The results of these analyses are provided in Tables G and H, in Appendix C. The parameters that exceeded the applicable guideline concentrations in the ground water at this location were aluminum and iron. The remaining parameters were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

Ground Water Monitoring

Monitoring well MW-26 was monitored on February 25, 1999, and July 13, 1999. No free-phase petroleum product or ground water discolouration was identified in this well. The well head-space petroleum hydrocarbon vapour concentrations measured at these times were 55 and 10 ppm respectively. The depth to ground water within MW-26 was found to be 0.925 m below the well casing on July 13, 1999.

4.14.3 Discussion

Borehole BH-26 was drilled and completed as a monitoring well to investigate the subject site for potential impacts from the former Saskatchewan Avenue landfill. No adverse soil impacts were noted in the natural soils at this location. The laboratory analyses of a ground water sample from this location for VOCs and metals revealed concentrations of aluminum and iron above the CCME FWAL guidelines. The other parameters were either below the guidelines or nondetectable.

It is suspected that the elevated aluminium and iron concentrations arise from historical operations at the subject site and not from the former landfill. It is not expected that remediation of the ground water is likely not required given the industrial nature of the property; however, given the close proximity of Omands Creek (approximately 110 m to the west), it is suggested that the requirement for remediation be discussed with Manitoba Environment.

The measured combustible vapour concentration within the well was low and on-site methane gas impacts from the closed landfill are not considered to be a concern at the subject property.

4.14.4 Conclusions

- The remediation of the soils along the south property line near the former Saskatchewan Avenue landfill area is not required.
- The ground water has been impacted by aluminum and iron at concentrations above the CCME FWAL criteria.

4.14.5 Recommendations

- The aluminum and iron concentrations in the ground water should be reviewed by Manitoba Environment.
- No further investigations are warranted in this area at this time.

4.15 Polychlorinated Biphenyls Storage Area

4.15.1 Environmental Concern

A shed northeast of Omands Creek, along the south perimeter of the property was formerly used to store PCBs. Surficial staining outside and within the shed pose a potential environmental concern.

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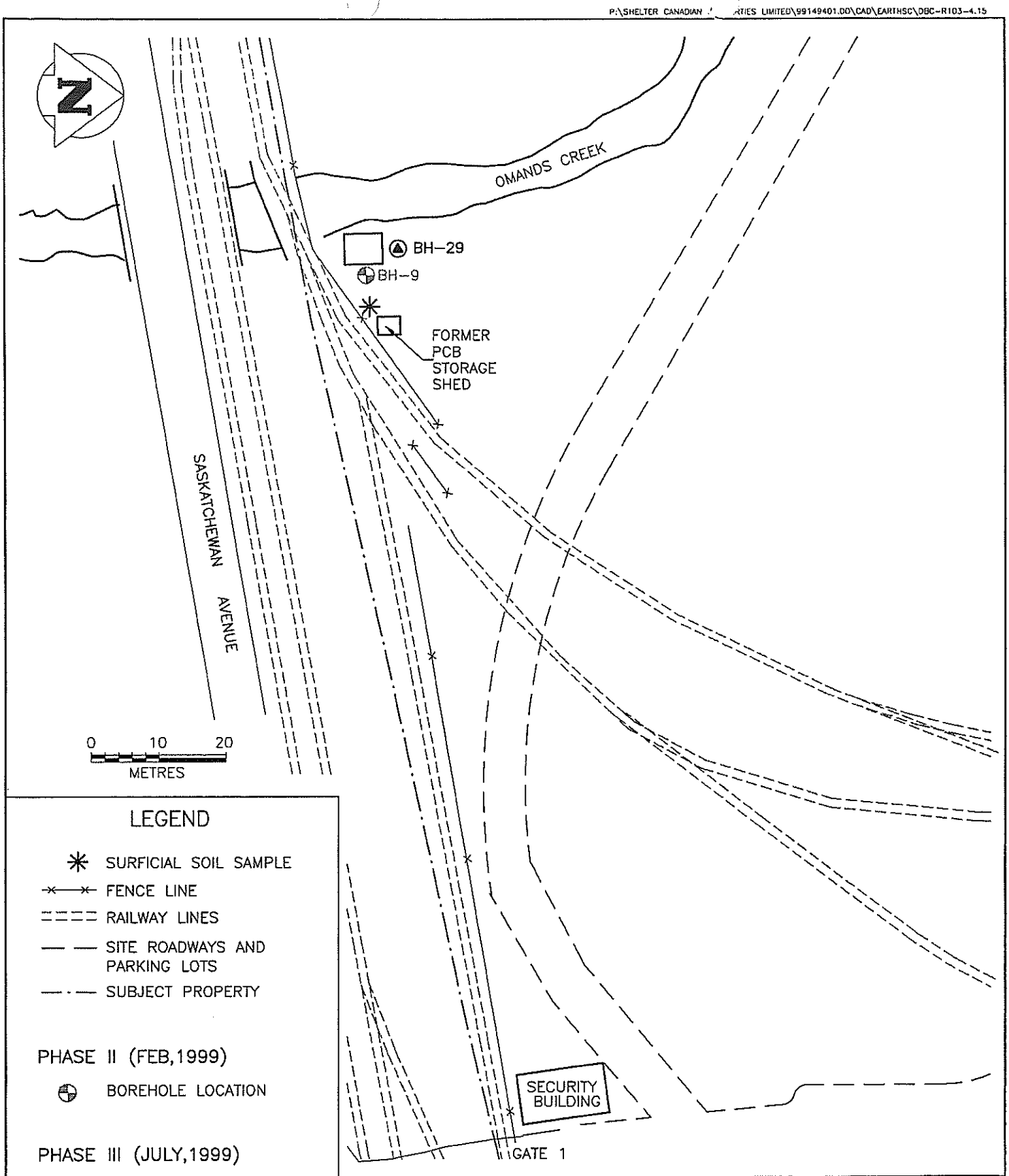

LEGEND

- SURFICIAL SOIL SAMPLE
- FENCE LINE
- RAILWAY LINES
- SITE ROADWAYS AND PARKING LOTS
- SUBJECT PROPERTY

PHASE II (FEB,1999)

- BOREHOLE LOCATION

PHASE III (JULY,1999)

- BOREHOLE COMPLETED AS MONITORING WELL

WARDROP Engineering Inc.
Winnipeg • Toronto •

CLIENT:
SHELTER CANADIAN PROPERTIES LIMITED

DESCRIPTION:
SITE PLAN SHOWING BOREHOLE AND MONITORING WELL LOCATIONS
POLYCHLORINATED BIPHENYLS STORAGE AREA
FORMER DOMINION BRIDGE OPERATIONS YARD – WINNIPEG, MB.

DESIGNED BY: E.S.	DRAWN BY: K.A.S.	DWG. NO.
CHECKED BY: J.D.N.	DATE: 99.08.20	991494-01-02 FIG.4.15.2

4.15.2 Investigation Summary

Drilling Observations

Two boreholes were drilled in the PCB storage area: one (BH-9) during the Phase II program, and one (BH-29) during the Phase III program. These boreholes are shown on Figure 4.15.2. No significant observations were made on these boreholes as shown on the borehole logs included in Appendix B.

Soil Head-Space Vapour Measurements

Head-space petroleum hydrocarbon vapour measurements within the soil samples retrieved during the borehole drilling program revealed low concentrations in the boreholes in this area. Peak vapour concentrations in BH-9 and BH-29 were 120 and 55 ppm, respectively. The vapour concentrations are presented graphically on the borehole logs contained in Appendix B.

Soil Sample Analyses

The following soil samples were submitted for analyses:

- BH-9 at 1.2 m: PCBs
- BH-29 at 0.6 m: PCBs and MOG
- BH- 29 at 1.2 m: Metals

The results of these analyses are provided in Tables F and G, in Appendix C. The parameters analysed in the borehole samples were present at concentrations either below the applicable guideline concentrations or were not present at levels above the laboratory's detection limit.

Additionally, a composite surficial soil sample taken west of the shed was analysed for MOG and PCBs. The MOG concentration in the composite surficial soil sample was 42 000 mg/kg far exceeding the applicable guideline concentration. A trace PCB concentration in the composite surficial soil sample was detected at 2.1 mg/kg, well below the applicable guideline concentration.

Swab Sample Analyses

A swab sample taken from the concrete floor of the shed formerly used to store PCBs was analysed for PCBs. The analytical results revealed concentrations of:

- PCB Arochlor 1242: <0.5 ug/swab
- PCB Arochlor 1254: <0.5 ug/swab
- PCB Arochlor 1260: <0.5 ug/swab

There is no Canadian regulation dealing with surface contamination of PCBs; however, the U.S. Environmental Protection Agency (EPA) has set a guideline of 10 ug/100 cm^2 (CCME EPC-HW-105E, December 1995).

Ground Water Analyses

A ground water sample from MW-29 was submitted for analyses of PCBs. The PCB concentration was above the Ontario MOE guideline for non-potable ground water. The result of this analysis is provided in Table F, in Appendix C.

Ground Water Monitoring

MW-29 was monitored on July 13, 1999. No free-phase petroleum product was identified in this well; however, the water was observed to be cloudy. The well head-space petroleum hydrocarbon vapour concentration measured at this time was 55 ppm. The depth to ground water within MW-29 was found to be 2.036 m below the well casing on July 13, 1999.

4.15.3 Discussion

The results of PCBs analyses of the soils in the PCB storage area identified nondetectable concentrations of PCBs, in this area. The results of the swab sample taken from the concrete floor in the PCB shed are below guidelines set by the EPA and do not likely pose a concern. The MOG concentration in the surficial soil beside the PCB storage shed exceeded the guideline criteria; however, PCB levels were determined to be low. The PCBs concentration in the ground water near the PCB shed was determined to be above the Ontario MOE guideline for non-potable ground water.

4.15.4 Conclusions

- The area of surficial staining outside the PCB storage shed exceeded guidelines for MOG.
- The PCBs concentration in the ground water near the PCB shed exceeded Ontario MOE guidelines for nonpotable ground water.

4.15.5 Recommendations

- Manitoba Environment should be consulted to determine what mitigative action may be required regarding the potentially elevated levels of PCBs in the ground water in this area.

4.16 West of Paint Shop Area

4.16.1 Environmental Concern

Surficial staining on the asphalt west of the Paint Shop poses a potential environmental concern.

4.16.2 Investigation Summary

No further investigation was pursued in this area since the main Winnipeg Hydro utility line that services the property is located beneath the asphalt.

4.16.3 Discussion

It is likely that this area has been impacted, but could not be investigated due to the power line.

4.16.4 Conclusions

- The asphalt area adjacent to the west of the Paint Shop is heavily stained.

4.16.5 Recommendations

- No further investigations are warranted in this area at this time.

4.17 WHEELABRATOR DUST

4.17.1 Environmental Concern

The wheelabrator dust produced during former operations is believed to contain heavy metals. This dust is understood to have been used as a fill material throughout the site.

4.17.2 Investigation Summary

A sample of wheelabrator dust from the pile beneath the spout where this waste material was historically bagged, west of the Paint Shop, was submitted for metals analyses.

The laboratory analyses of the wheelabrator dust revealed concentrations of heavy metals (copper, nickel, and zinc) at levels significantly higher than the guideline concentrations for heavy metals in soil. These results are provided in Table B, in Appendix C.

4.17.3 Discussion

While the CCME guidelines are not directly applicable to the dust, they are applicable to the locations where the dust is contained within the surficial fill soils throughout the subject site.

4.17.4 Conclusions

- The wheelabrator dust exceeded the guideline concentrations for heavy metals in soil.

4.17.5 Recommendations

- The wheelabrator dust should be disposed of as a heavy metal waste.

5.0 RANKING OF ENVIRONMENTAL CONCERNS

The environmental concerns should be assigned priority according to the following strategy:

- **Priority 1:** Correct any situation that is a known or potential threat to human health and safety.
- **Priority 2:** Comply with the law (federal, provincial, or municipal).
- **Priority 3:** Comply with policies, guidelines, codes of practice or the like.
- **Priority 4:** Correct situations that fall outside of the first three priorities, but may be harmful to the environment. Implementation should be considered to demonstrate due diligence.

6.0 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Recommendations	Preliminary Estimated Cost		Priority
• The results of this investigation should be presented to Manitoba Environment for discussion.	Not Applicable		Not Applicable
• Site remediation is required in the Landfilling Area; potential options include: ▪ constructing a clay cutoff trench and capping the landfill area; ▪ excavating the impacted soils and transporting them offsite to an approved soil disposal facility; and ▪ stabilization of the area.	$100 000 to $200 000		2
• Site remediation is required in the Solvent Drum Storage Area. The costs of constructing a clay cutoff trench and capping the impacted area should be compared to the costs of excavating the impacted soils and transporting them offsite to an approved soil disposal facility.	$50 000 to $100 000		2
• Monitoring wells in the Gate Shop UST area should be monitored in the spring and fall for a period of two years to further evaluate the subsurface combustible vapour concentrations.	$2500		2
• The soils should be excavated from the Solvent AST Area and disposed of in accordance with the applicable provincial regulations (assuming volumes in the order of 75 to 100 m^3).	$7500 to $10 000		2
• Manitoba Environment should be consulted to identify if they will consider Acetone to be a concern beneath the Paint Shop. Remedial actions should be undertaken if necessary. This may involve excavation and off-site disposal of the soil, or in situ vapour extraction.	$25 000 to $50 000		2
• Manitoba Environment should be consulted to identify if they will consider PCBs in the ground water in the PCB storage area and Landfilling area to be a concern at the concentrations at which they occur. Remedial actions, which may involve pumping and treating the ground water, should be undertaken if necessary.	$50 000 to $100 000		4

Recommendations	Preliminary Estimated Cost	Priority
• An electromagnetic survey could be undertaken in an attempt to locate and/or confirm the removal of the UST in the Paint Shop area.	$ 5000 to $ 10 000	4
• No further intrusive environmental investigations required in the North UST Area; an electromagnetic survey could be undertaken in an attempt to locate and/or confirm the removal of the UST.	$ 5000 to $ 6000	4
• The impacted soils in the Waste Oil Drum Storage area pose minimal risk for the current land use. No further investigative or remedial actions are warranted; this area may require remediation if the land use changes in the future.	Not Applicable	Not Applicable
• No further investigations or actions required in the Diesel and Gasoline AST areas.	Not Applicable	Not Applicable
• Soil impacts by metals in the Waste Paint Storage Area pose low risk; no further actions are required.	Not Applicable	Not Applicable
• On-site impacts from the former Saskatchewan Avenue Landfill do not appear to be a concern at the subject site; the risks posed by the elevated metals concentrations are low; no further actions are required.	Not Applicable	Not Applicable
• The MOG concentration within a surficial sample outside the PCB shed is above the Manitoba Environment guideline.	Not Applicable	Not Applicable

The cost estimates listed above are preliminary and will be refined further, in a separate correspondence.

7.0 LIMITATIONS

The scope of this report is limited to the matters expressly covered and is intended solely for the client to whom it is addressed. Wardrop makes no warranties, expressed or implied, including without limitation, as to the marketability of the site, or fitness for a particular use. The assessment was conducted using standard engineering and scientific judgement, principles and practices, within a practical scope and budget. It is based on the observations of the assessor during the site visit. Except as provided, Wardrop has made no independent investigations to verify the accuracy or completeness of the information obtained from secondary sources or personal interviews. Generally, the findings, conclusions, and recommendations are based on a limited amount of data (e.g., the number of boreholes drilled, and the number of soil and/or ground water samples submitted for laboratory analyses) interpolated between sampling points, and the actual conditions (e.g., the type, level, and extent of impacted media) on the property may vary from that described above. Any findings regarding site conditions different from those described above upon which this report is based, will consequently change Wardrop's conclusions and recommendations.

8.0 REFERENCES

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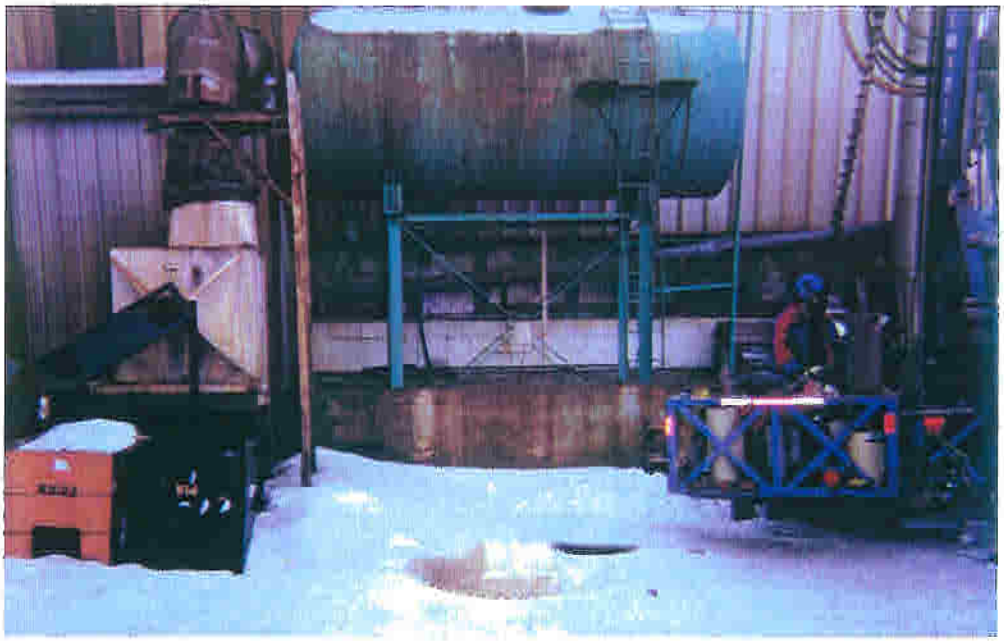
APPENDICES

APPENDIX A

SITE PHOTOGRAPHS




VC502

APPENDIX B

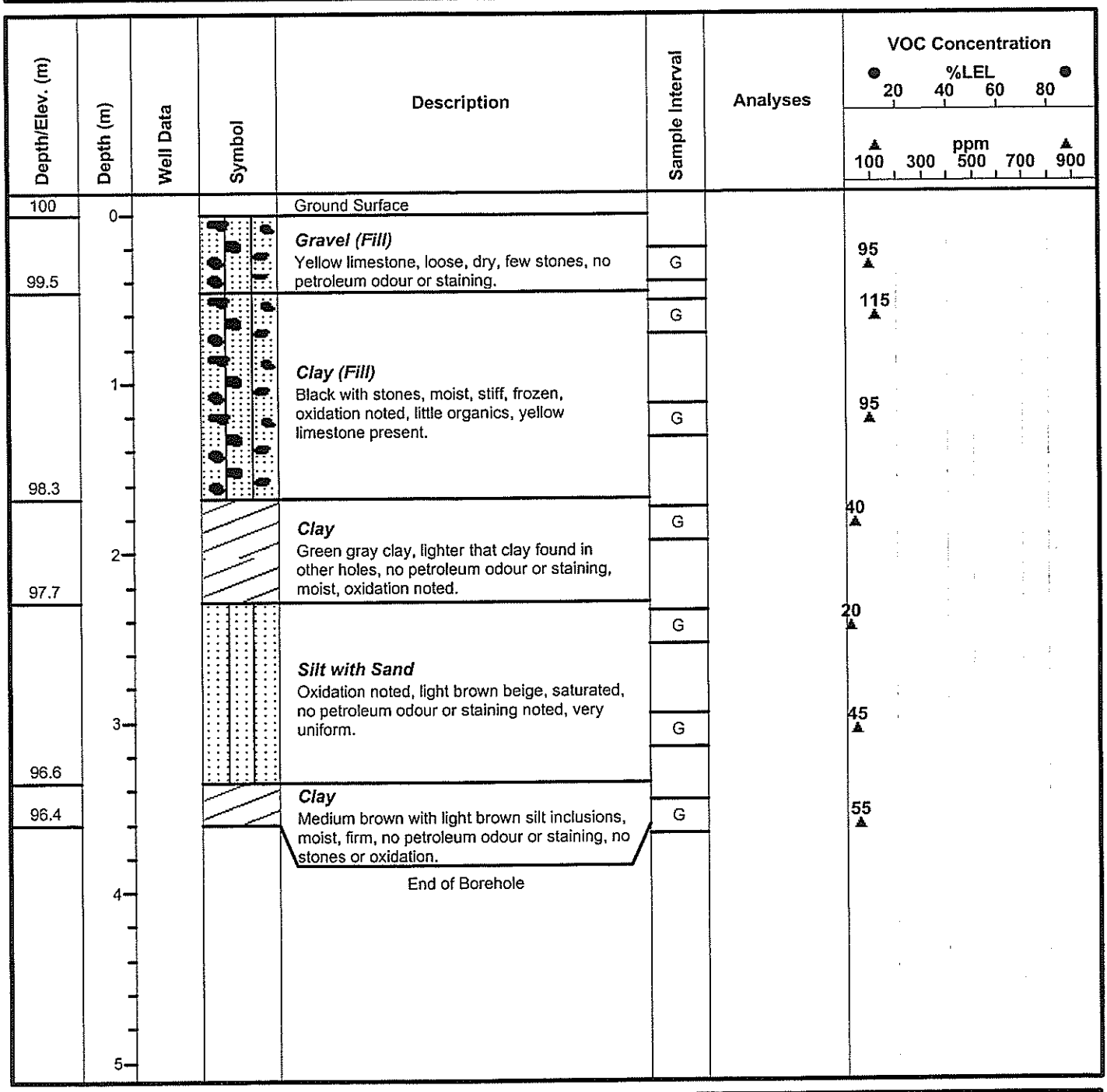
BOREHOLE LOGS

BOREHOLE: BH-1

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: North of Gate Shop, 3 m N of W door.

Project: Phase II ESA
Date Drilled: February 23, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

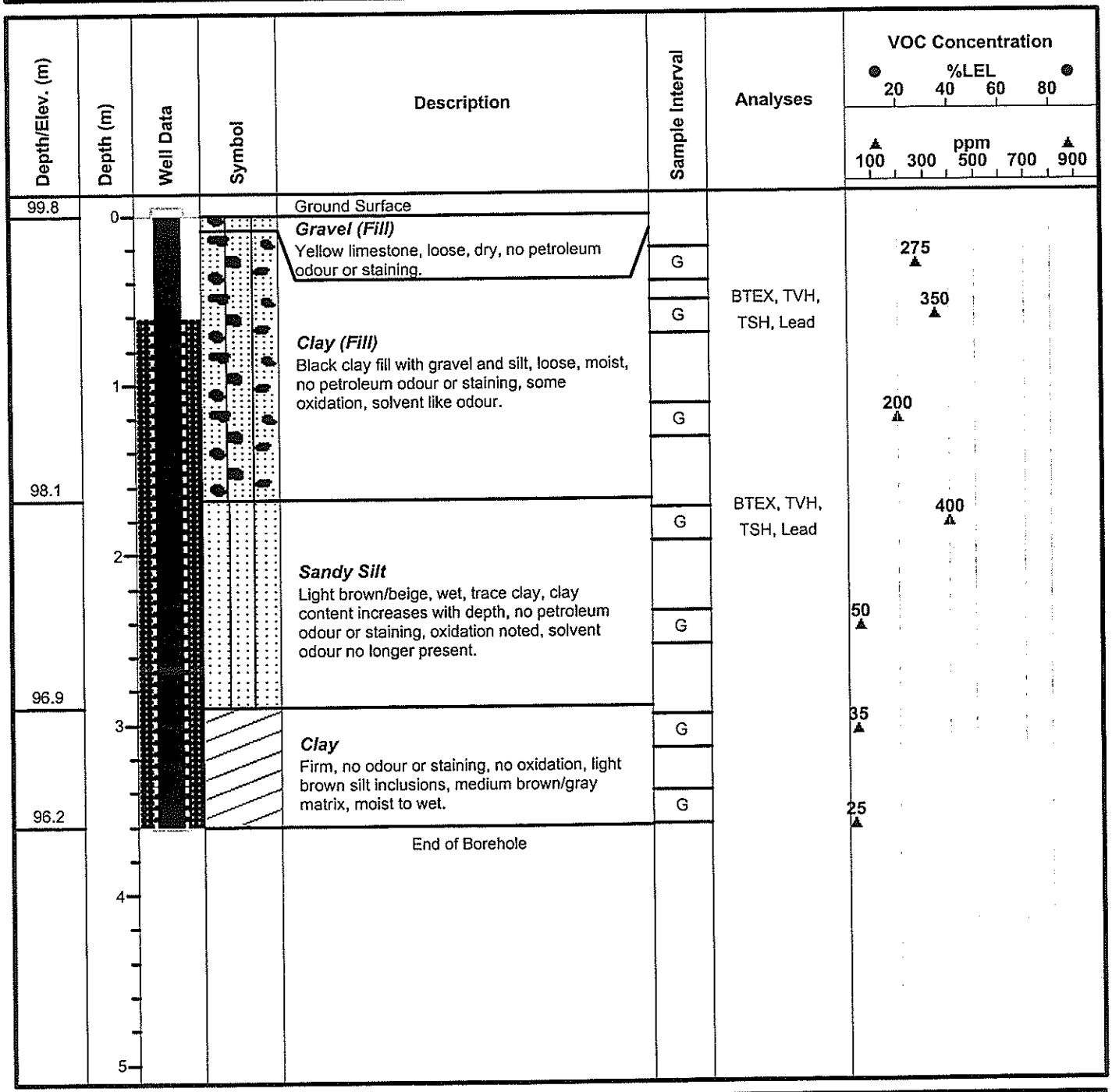
Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-2

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: N of Gate Shop, in front of E O/H door

Project: Phase II ESA
Date Drilled: February 23, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.821 m

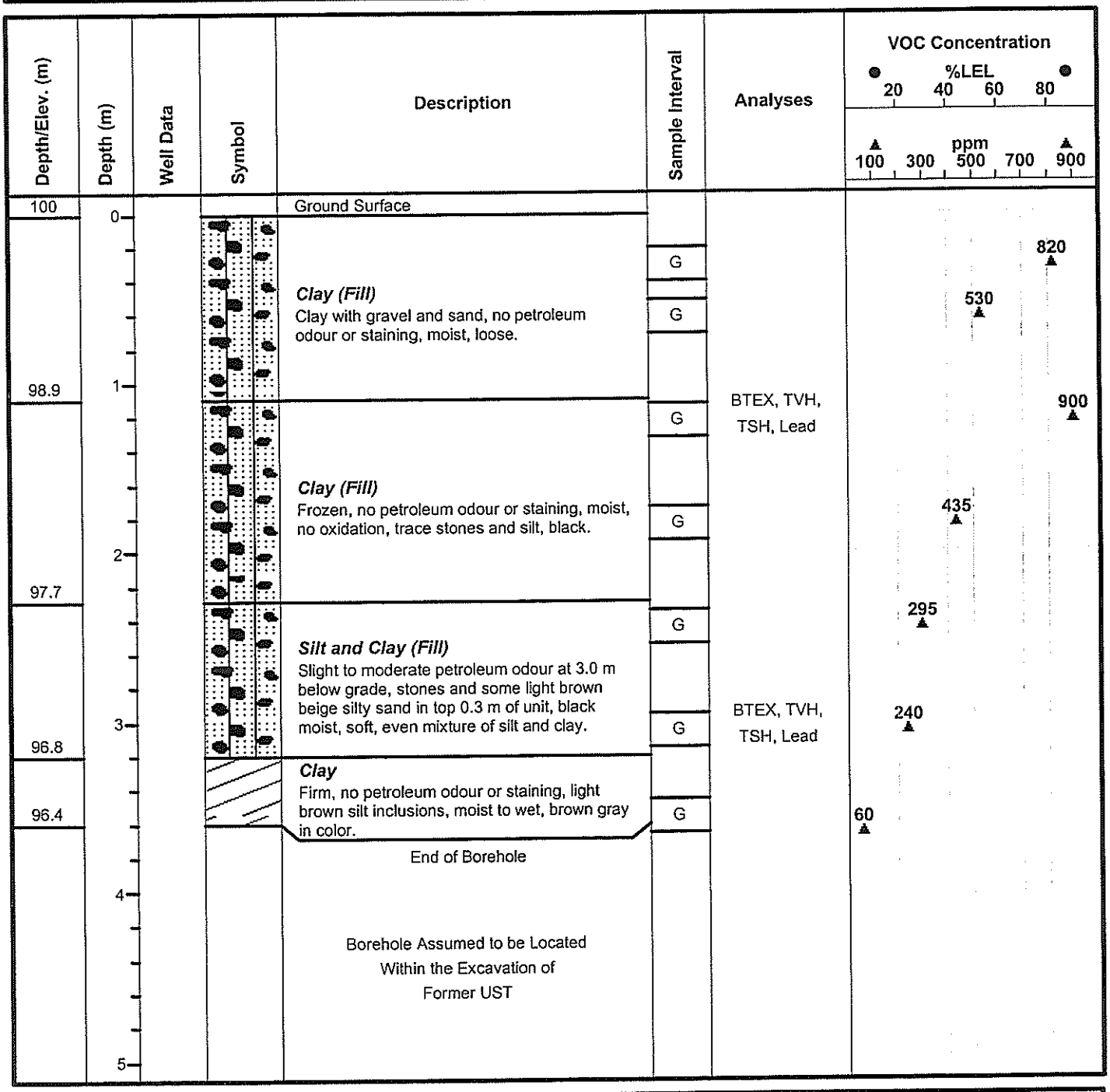
Water Table Elevation: Well Dry
Date Measured: February 25, 1999
Well Materials: 50 mm dia. Sch 40 PCV

BOREHOLE: BH-3

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: 15 m N and 2 m E of BH-2

Project: Phase II ESA
Date Drilled: February 23, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

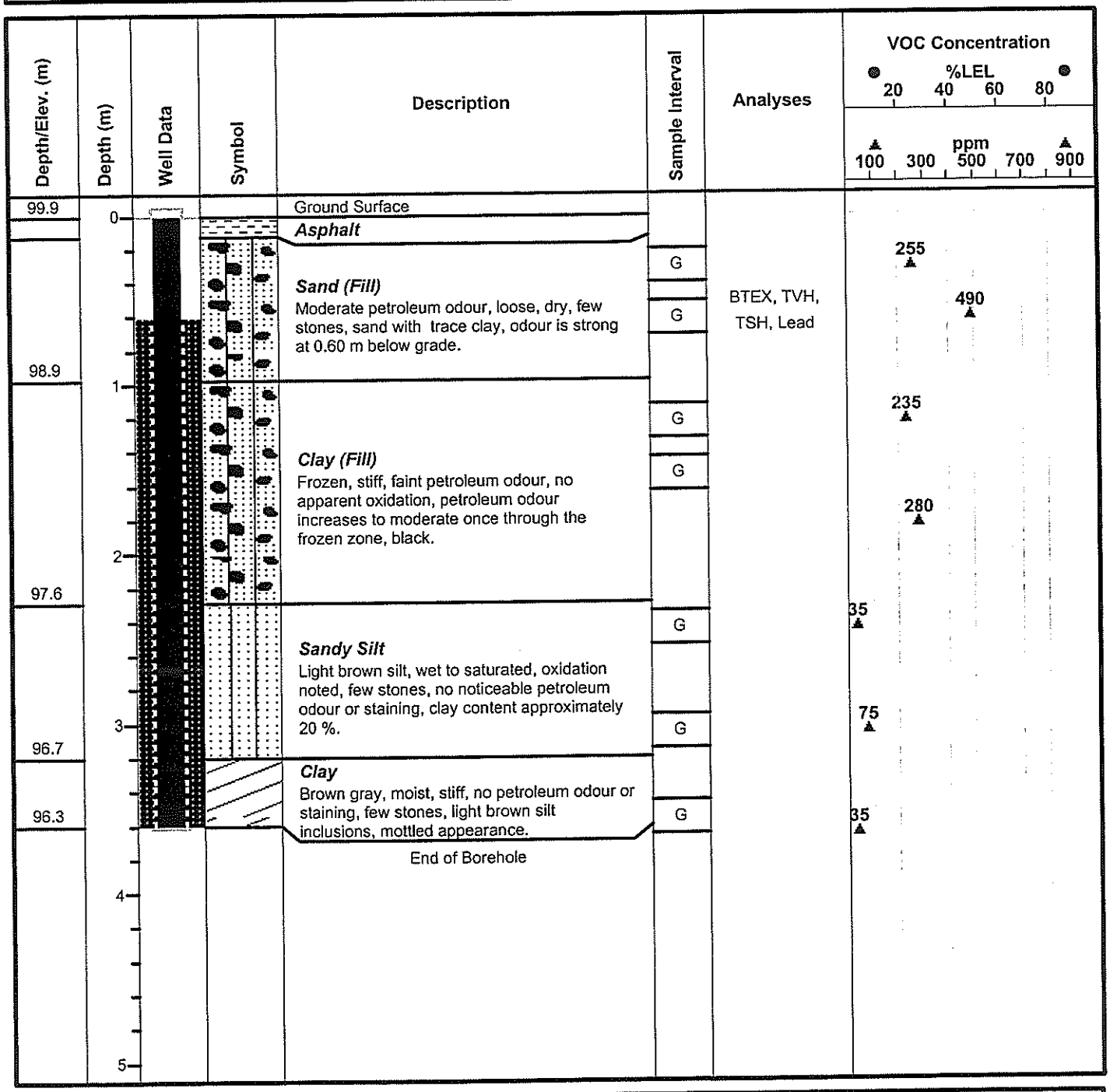
Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-4

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: W of BH-3, W of assumed UST excavation

Project: Phase II ESA
Date Drilled: February 23, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.886 m

Water Table Elevation: 97.840 m
Date Measured: February 25, 1999
Well Materials: 50 mm dia. Sch. 40 PVC

BOREHOLE: BH-5

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: E side of USTs, beside gasoline tank

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0	Ground Surface			
		Gravel (Fill) Fill material, loose, no petroleum odour or staining, gravel and sand, dry.	G		220
99.5			G		140
	1	***Clay (Fill)*** With silt and gravel, trace sand, frozen, no petroleum odour or staining, loose, dry, glass and asphalt debris.	G	BTEX, TVH, TSH	320
98.2			G		95
	2	End of Borehole Pipe encountered at 1.80 m below grade. Type of pipe unknown.			
	3				
	4				
	5				

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

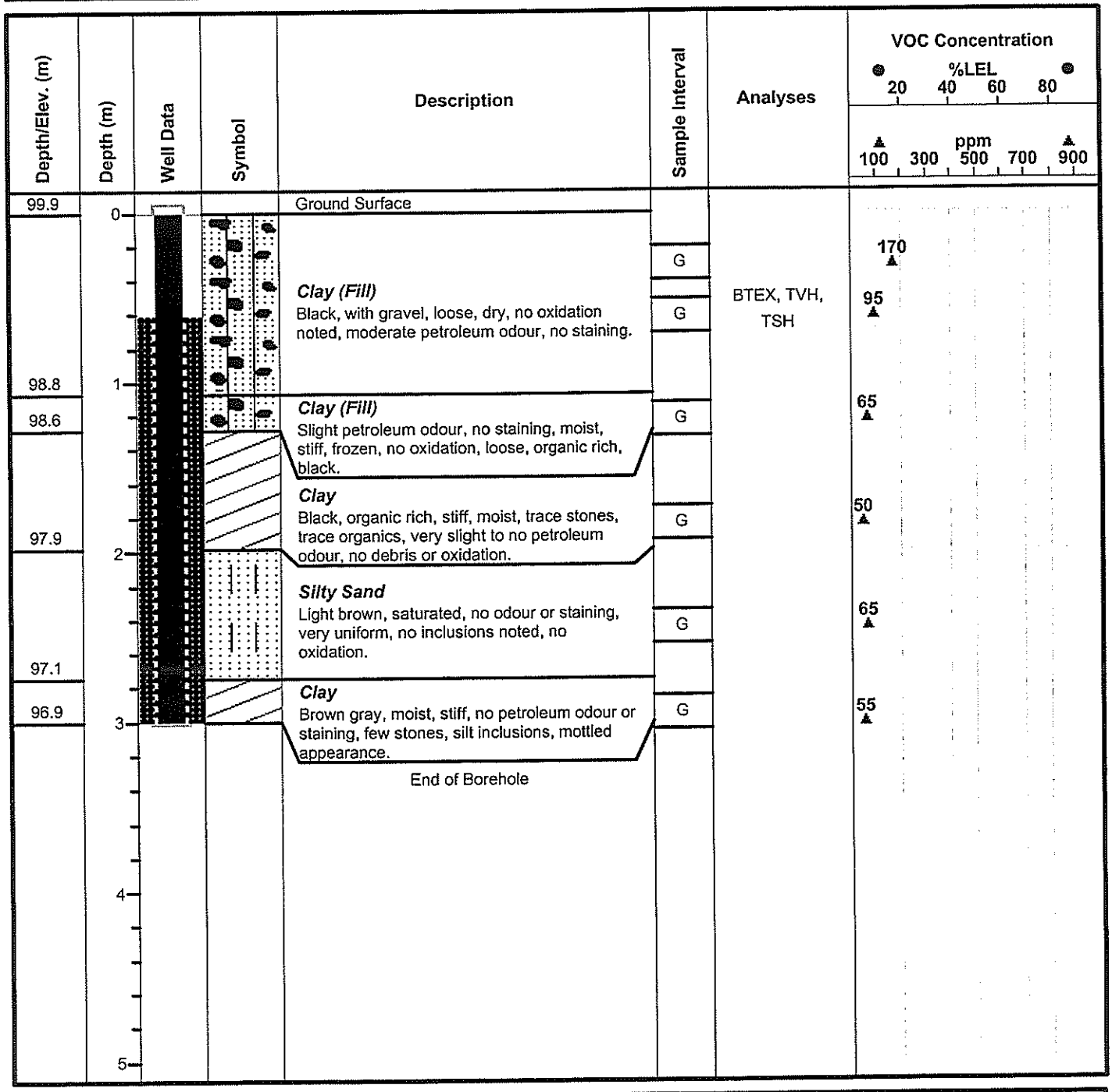
Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-6

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: S side of diesel and gasoline ASTs

Project: Phase II ESA
Date Drilled: February 22, 1999

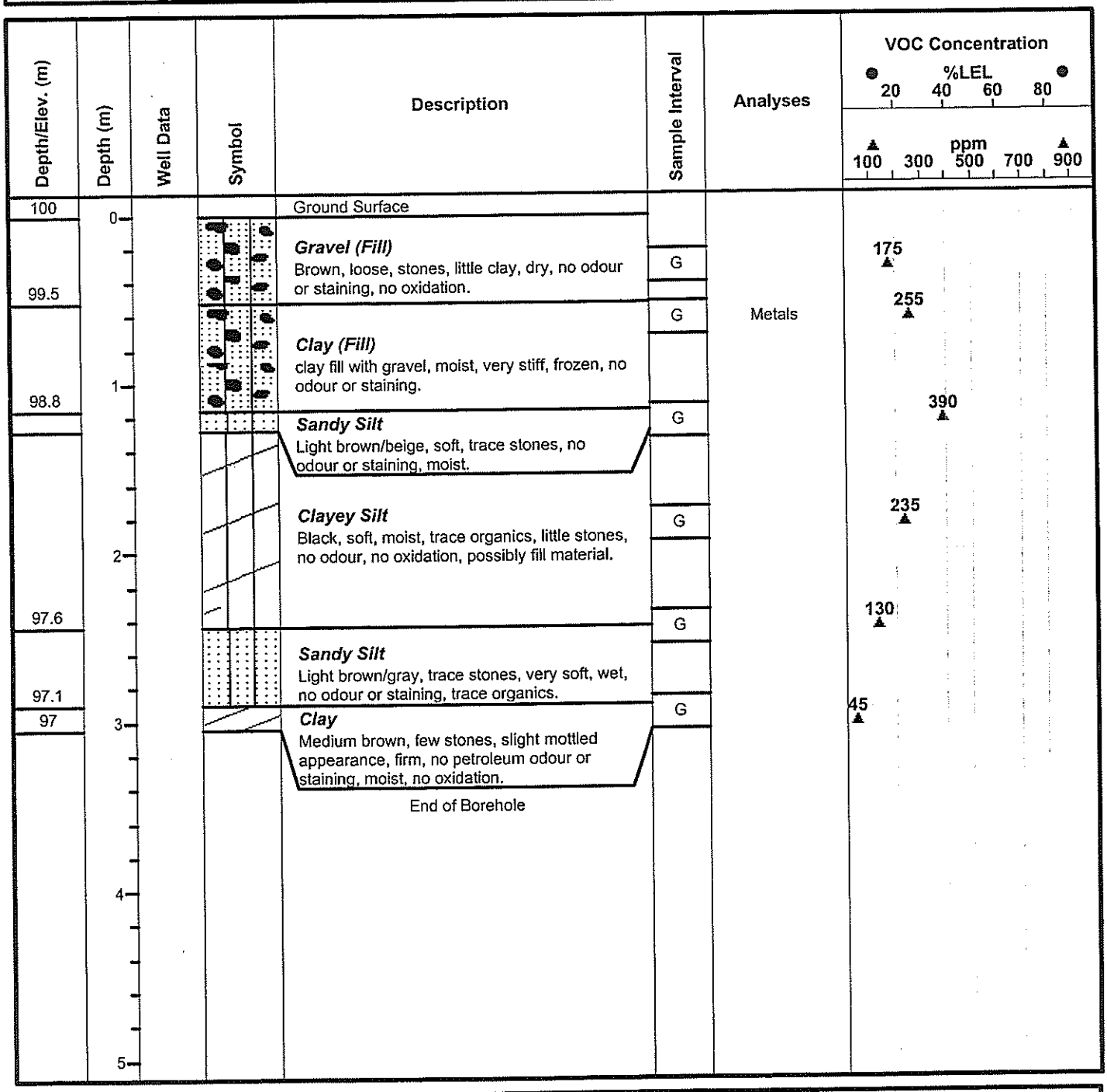


Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.871 m

Water Table Elevation: Dry
Date Measured: February 25, 1999
Well Materials: 50 mm dia. Sch. 40 PVC

BOREHOLE: BH-7

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.
Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Adjacent to Sulphuric Acid AST
Project: Phase II ESA
Date Drilled: February 22, 1999



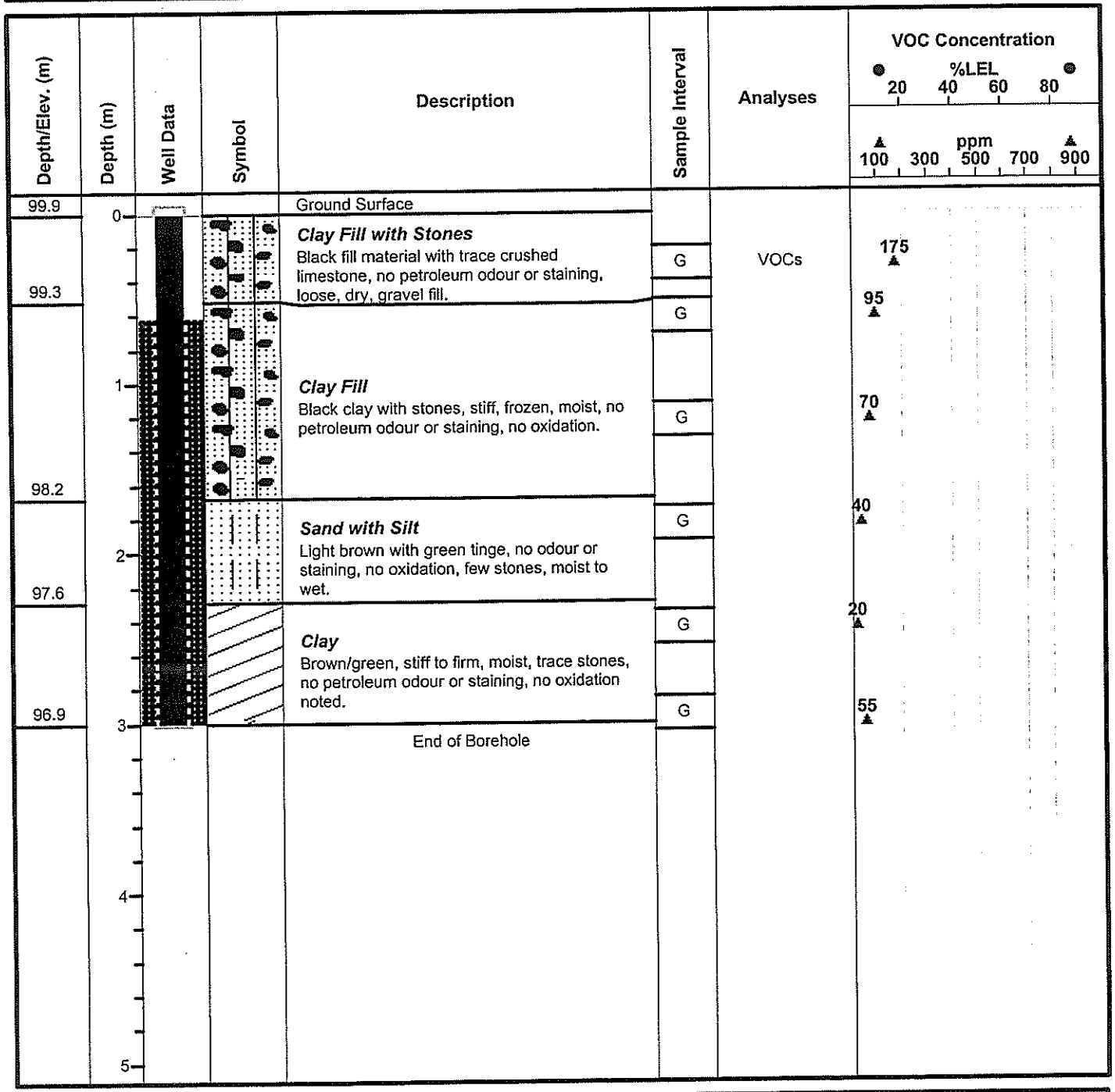
Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed
Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-8

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: At former varsol AST location

Project: Phase II ESA
Date Drilled: February 22, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.862 m

Water Table Elevation: 97.884 m
Date Measured: February 25, 1999
Well Materials: 50 mm dia, Sch. 40 PVC

BOREHOLE: BH-9

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: N of PCB Storage Shed

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Well Data	Symbol	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0			Ground Surface			
				Clay (Fill) Clay, with gravel, black, no petroleum odour or staining, trace sand, little glass, loose, moist to dry.	G		45
					G		35
98.9	1				G	PCBs	120
				Silt Light brown, dry, frozen, some of overlying unit encountered, moisture content increses with depth (below 1.7 m), no petroleum odour or staining, some oxidation, organic material noted.	G		70
	2				G		80
97.4							
				Clay Stiff, no odour or staining, gray, moist, compact.	G		130
97	3			End of Borehole			
	4						
	5						

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

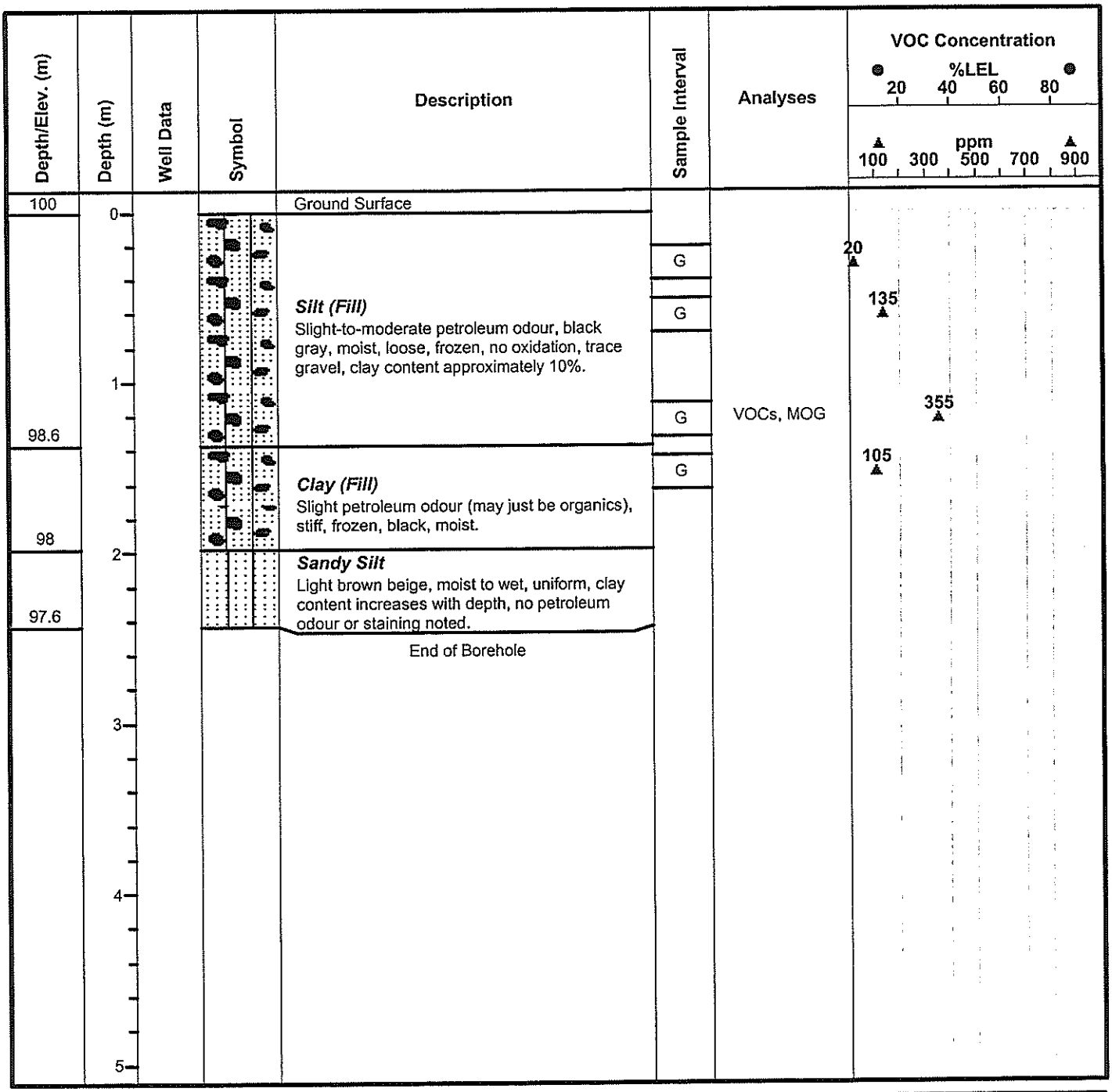
Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

BOREHOLE: BH-10

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Acid Drum Storage Area

Project: Phase II ESA
Date Drilled: February 23, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-11

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Acid Drum Storage Area

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0	Ground Surface			
		Sand and Gravel (Fill) Gravel and sand fill, loose, organic odour, trace wood debris, and nails, no petroleum staining, oxidation, brownish red.	G		90
99.6			G	VOCs, MOG	230
	1	***Clay (Fill)*** Black, no petroleum odour, stones and sand, frozen, stiff, trace wood debris, moist and loose.	G		215
					140
98	2	***Silt with Sand*** Brown beige, wet-to-saturated, oxidation noted, few stones, no noticeable petroleum odour or staining.	G		
97.6		End of Borehole			
	3				
	4				
	5				

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-12

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: E side of Paint Shop

Project: Phase II ESA
Date Drilled: February 23, 1999

Depth/Elev. (m)	Depth (m)	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0	Ground Surface			
99.5		***Silty Clay (Fill)*** Black clay with silt, few stones and sand, loose, moist.	G		185
98.9	1	***Clay (Fill)*** Black, frozen, no petroleum odour or staining, moist, loose, few stones, no oxidation noted.	G		75
97.9	2	***Clay*** Medium brown, no petroleum odour or staining, no oxidation, few stones, firm-to-stiff, moist.	G		65
96.9	3	***Sandy Silt*** Brown beige, no odour or staining, wet-to-saturated, no stones or oxidation, loose, sand content increases with depth.	G		40
96.4		***Clay*** Natural clay, medium brown with light brown silt inclusions, moist, firm, no petroleum odour or staining, no stones or oxidation noted.	G		15
	4	End of Borehole			55
	5				25

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-13

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: E side of Paint Shop, S of BH-12

Project: Phase II ESA
Date Drilled: February 23, 1999

Depth/Elev. (m)	Depth (m)	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0	Ground Surface			
		Clay (Fill) Brown clay fill material, no petroleum odour or staining, few stones and sand.	G		160
99.4			G		200
	1	***Clay (Fill)*** Frozen, black, no petroleum odour or staining, few stones, stiff, moist.	G		125
98.4					
	2	***Sandy Silt*** Trace clay, moist to wet, uniform, light brown beige, no petroleum odour or staining, no oxidation, soft.	G		70
			G		40
97.1	3	***Clay*** Natural clay, moist to wet, black mottling, light brown silt inclusions, no oxidation, medium brown, no petroleum odour or staining.	G		30
96.4			G		90
		End of Borehole			
	4				
	5				

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-14

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: 25 m N of Gate Shop

Project: Phase II ESA
Date Drilled: February 23, 1999

Depth/Elev. (m)	Depth (m)	Well Data	Symbol	Description	Sample Interval	Analyses	VOC Concentration (%LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)
100	0			Ground Surface			
				Gravel (Fill) Loose, dry, no petroleum odour or stainiing, no oxidation.	G		25
99.6							
					G		125
	1			***Clay (Fill)*** Black, loose, some frozen, no petroleum odour or staining, no oxidation, stones noted, primarily clay.	G		75
					G		45
	2						
97.7					G		65
				Sandy Silt Light brown, wet to saturated, oxidation noted, no petroleum odour or staining, clay content up to 20 % at base of unit.	G		25
	3						
96.8				***Clay*** Gray brown with light brown silt inclusions, moist, firm, no petroleum odour or staining, no stones or oxidation noted.	G		35
96.4				End of Borehole			
	4			Concrete pad encountered just below 1.0 m so borehole moved over 1.5 m east.			
	5						

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-15

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: 30 m N. of SW corner of paint shop.

Project: Phase II ESA
Date Drilled: February 23, 1999

Depth/Elev. (m)	Depth (m)	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
99.9	0	Ground Surface			
		Asphalt			
99.6		***Railway Tie***			
		Clay (Fill) Black fill material, some wood debris, no petroleum odour or staining, no oxidation, dry to moist, loose, very dark black.	G		435 ppm
99.2	1	***Clay (Fill)*** Black clay with light brown silt inclusions, no staining, firm, moist, moisture content increases with depth, diesel fuel odour at 1.8 m below grade, brick and coral-like debris noted.	G		40 ppm
			G		110 ppm
97.8	2	***Sandy Silt*** Petroleum staining between 2.1 and 2.4 m depth, wet, gray staining, soil is a light brown, stones, strong petroleum odour, no oxidation, sand content increases with depth, saturated below 2.4 m.	G		80 ppm
96.9	3		G	BTEX, TVH, TSH	280 ppm
		Clay Firm clay, moist to wet, black mottling, few silt inclusions, no oxidation noted, medium brown, no petroleum odour or staining.	G		30 ppm
96.3		End of Borehole			
	4				
	5				

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.920 m

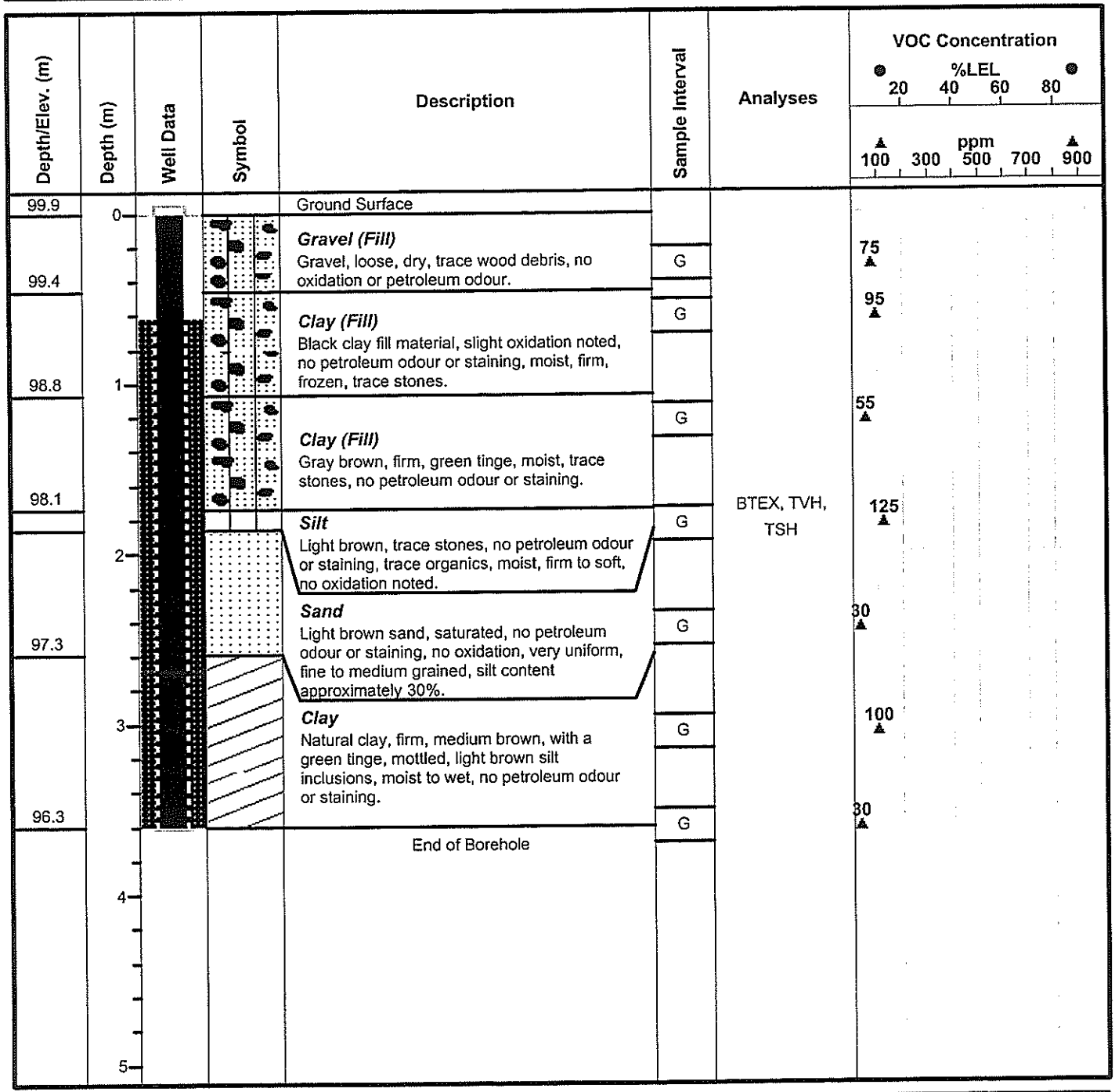
Water Table Elevation: 97.982 m
Date Measured: February 25, 12999
Well Materials: 50 mm dia, Sch 40 PVC

BOREHOLE: BH-16

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Along N fence in former UST area.

Project: Phase II ESA
Date Drilled: February 22, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.875 m

Water Table Elevation: 97.620 m
Date Measured: February 25, 1999
Well Materials: 50 mm dia Sch 40 PVC

BOREHOLE: BH-17

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Former north UST area.

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Well Data	Symbol	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0			Ground Surface			
99.8				***Concrete***			
99.5				***Gravel (Fill)*** Crushed limestone gravel	G		130
					G	Metals	400
	1			***Silt (Fill)*** Red crushed material, dust like size, oxidized, trace gravel, loose, dry, no odour, significant amount of metal debris.	G		185
98.3							
97.9	2			***Clay (Fill)*** Black, significant oxidation, no petroleum odour or staining, moist, firm, few stones and metals.	G		85
97.2				***Sand*** Light brown, saturated, no evidence of petroleum hydrocarbons, very uniform, few stones, fine-to-medium grained sand matrix.	G		80
	3			***Clay*** Brown/gray, moist, firm, few stones, black mottling (organics), no petroleum odour or staining.	G		75
96.4					G		55
	4			End of Borehole			
	5						

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-18

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Omands Creek Backfill Area

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0	Ground Surface			
		Fill Very black, very fine (dust like), similar to that seen around wheelabrator spout, metal and plastic debris noted, slight to moderate petroleum odour, trace red brick material.	G, G	VOCs, Metals	750, 145
99.1	1	***Clay (Fill)*** Black, with gravel, slight petroleum odour, moist, stiff, organic material and oxidation noted, few stones noted.	G		100
98.4		***Sandy Silt*** Light brown gray, fine grained, moist, soft, black mottling and inclusions of organics, no petroleum odour or staining, looks like natural material	G		180
97.7	2	***Sand*** Gradational change from overlying unit, light brown, moist, soft, orgainc material noted, no petroleum odour or staining, no oxidation.	G		40
97.4		***Clay*** Natural clay, dark gray, no petroleum odour or staining, few stones, no apparent oxidation, soft, moist.	G		70
97	3	End of Borehole			
	4				
	5				

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: NA

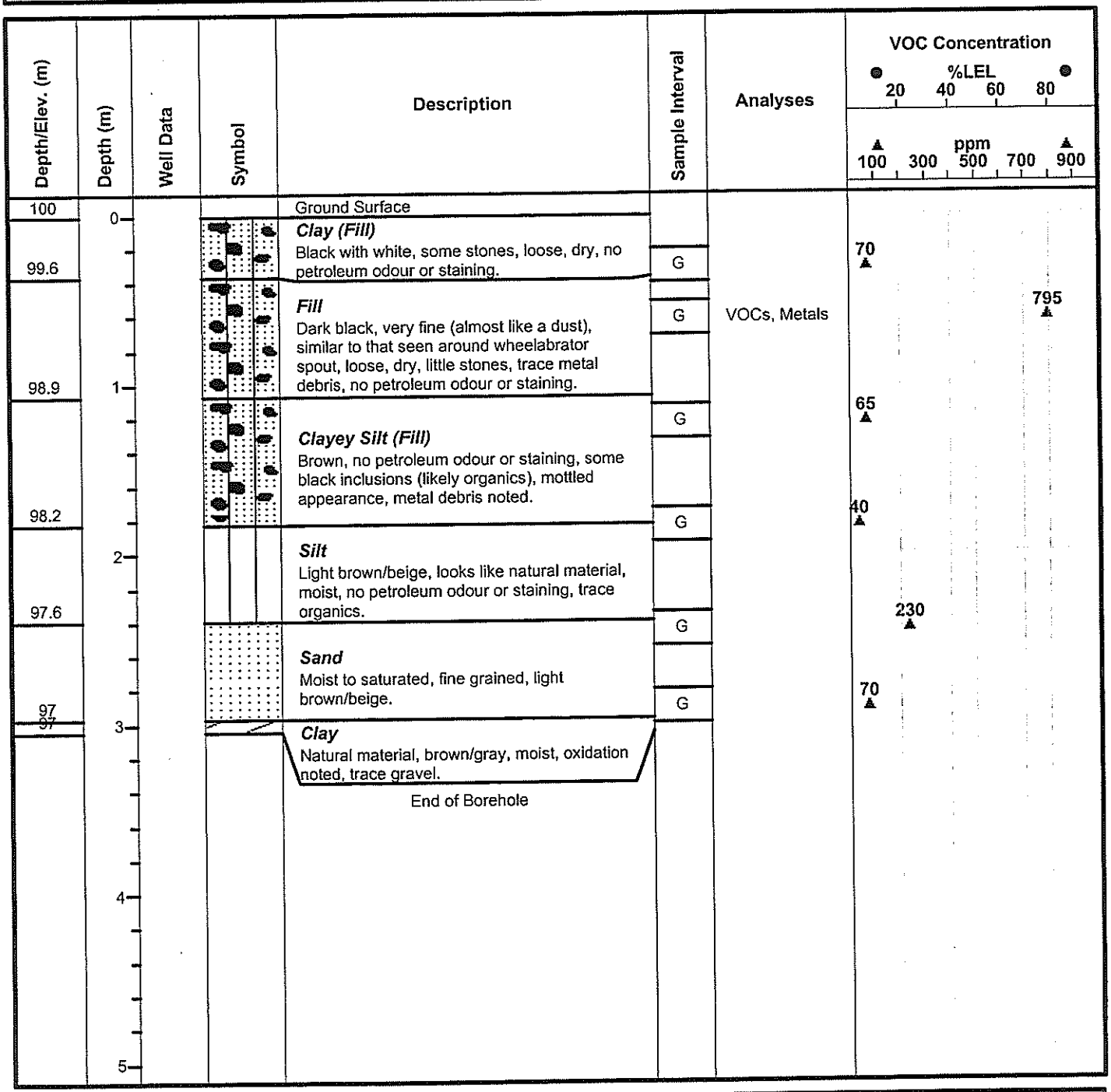
Water Table Elevation: NA
Date Measured: NA
Well Materials: 50 mm dia, Sch 40 PVC

BOREHOLE: BH-19

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Omands Creek backfill area

Project: Phase II ESA
Date Drilled: February 22, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

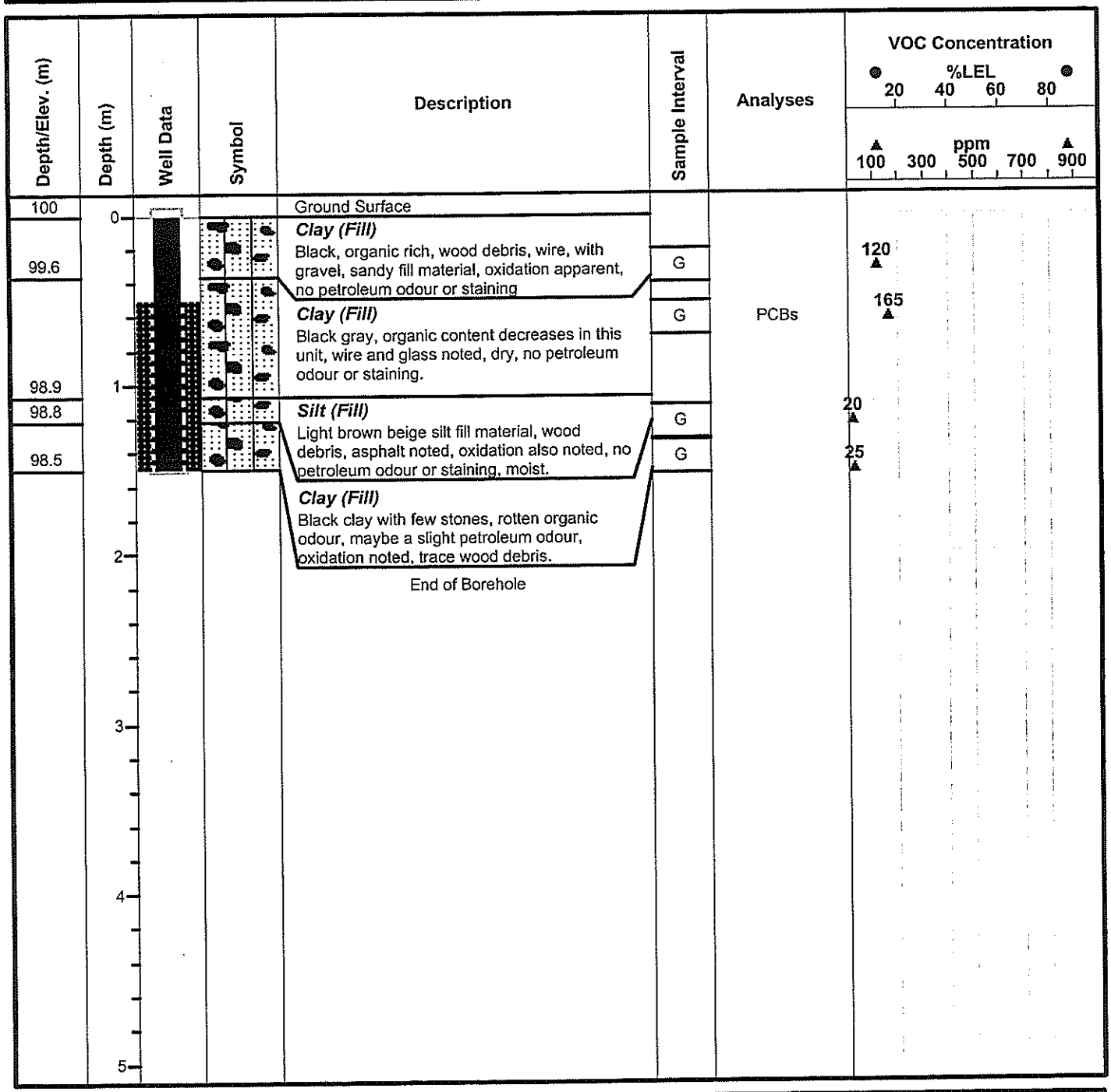
Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-20

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Omands Creek backfill area.

Project: Phase II ESA
Date Drilled: February 22, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.330 m

Water Table Elevation: Dry
Date Measured: February 25, 1999
Well Materials: 50 mm dia, Sch 40 PVC

BOREHOLE: BH-21

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Omands Creek backfill area

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Well Data	Symbol	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0			Ground Surface			
				Gravel (Fill) Bright orange gravel fill material, dry, no odour or staining, loose.	G		80
99.6				***Clay (Fill)*** Black, stiff, frozen, some bright red bricking material intermixed, no petroleum odour or staining.	G		85
	1			***Clay (Fill)*** Light brown/beige with black silty clay intermixed, wire and metal remnants, mixture of everything including silt, clay, sand, and gravel, matrix appears to be a clay.	G		115
98.5					G		90
				End of Borehole			
	2						
	3						
	4						
	5						

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: No well installed

Water Table Elevation: No well installed
Date Measured: No well installed
Well Materials: No well installed

BOREHOLE: BH-22

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Sulphuric Acid Drum Storage Area

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Well Data	Symbol	Description	Sample Interval	Analyses	VOC Concentration (%LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)
100	0			Ground Surface			
				Gravel (Fill) No petroleum odour or staining, trace red brick material, loose, dry.	G	Metals	85
99.5							
				Clay (Fill) Black, primarily clay, frozen, moist, no petroleum odour or staining, stones and sand, becomes slightly softer with depth (below freezing zone).	G		105
	1				G		65
98.6							
98.5				***Sandy Silt*** Light brown, no odour or staining, no oxidation, moist, trace stones.	G		95
				End of Borehole			
	2						
	3						
	4						
	5						

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not insatlled.

BOREHOLE: BH-23

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Sulphuric Acid Drum Storage Area

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Well Data	Symbol	Description	Sample Interval	Analyses	VOC Concentration (%LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)
100	0			Ground Surface			
				Clay (Fill) Organic rich, black with white gravel, dry, loose, little clay, no petroleum odour or staining.	G G		115 200
99	1			***Silty Clay*** Gray brown silty clay, moist, greenish tinge, no petroleum odour or staining, frozen, stiff.	G G		75 50
98.6				***Sandy Silt*** Light brown, no petroleum odour or staining, natural material, moist, soft, little organics.			
97.6	2			End of Borehole			
	3						
	4						
	5						

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-24

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: In paint storage area, 5 m S of BH-25

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Well Data	Symbol	Description	Sample Interval	Analyses	VOC Concentration (%LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)
100	0			Ground Surface			
				Clay (Fill) Black, with stones, loose, no odour, oxidation noted, stones, wood, and metal debris, oxidation significant between 0.3 and 0.4 m below grade, clay content increases with depth.	G		165
					G	VOCs, Metals	225
	1						
98.7					G		95
98.5				***Sandy Silt*** Light brown beige, some organic material noted, mottled appearance, no petroleum odour or staining, no oxidation.	G		140
	2			End of Borehole			
	3						
	4						
	5						

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-25

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Waste paint area, S of Stores Building

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0	Ground Surface			
99.8		***Concrete***			
99.6		***Clay (Fill)*** With sand and gravel, dry, loose, no odour or staining.	G	VOCs, Metals	335
			G		25
98.9	1	***Clay (Fill)*** With silty sand and gravel, trace asphalt, trace red dust like material, loose, dry, no petroleum odour or staining.	G		30
98.5		***Silty Sand*** Light brown with organics, mottled appearance, moist, soft, few stones, no odour or staining.	G		100
	2	End of Borehole			
	3				
	4				
	5				

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

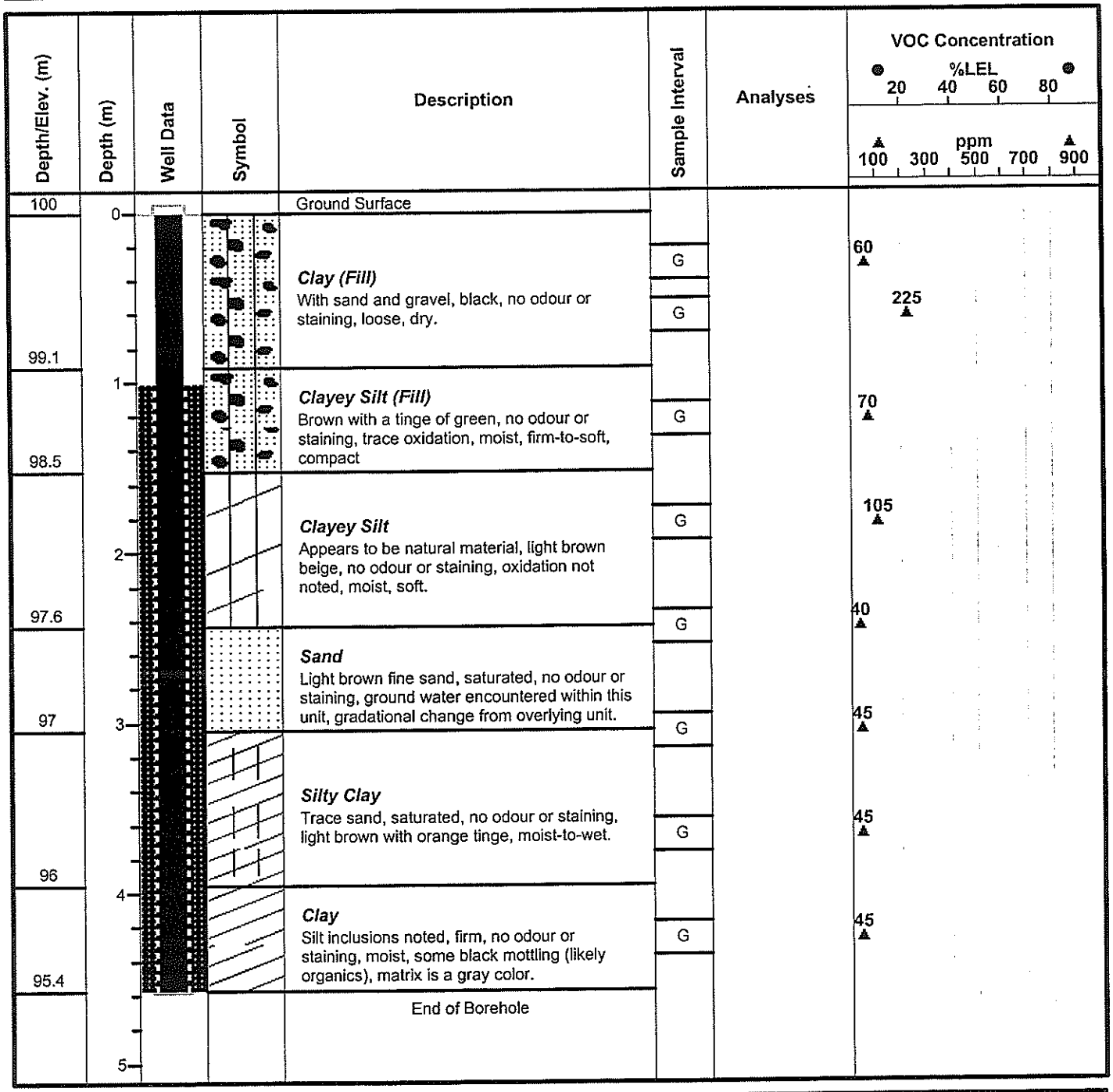
Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-26

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: SW of Security Bldg., along S fence.

Project: Phase II ESA
Date Drilled: February 22, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.000 m

Water Table Elevation: 97.496 m
Date Measured: February 25, 1999
Well Materials: 50 mm dia, Sch 40 PVC

BOREHOLE: BH-27

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: Opening between Paint Shop & Stores

Project: Phase II ESA
Date Drilled: February 22, 1999

Depth/Elev. (m)	Depth (m)	Well Data	Symbol	Description	Sample Interval	Analyses	VOC Concentration (%LEL / ppm)
100	0			Ground Surface			
				Asphalt	G		245
99.6				***Gravel (Fill)*** Loose, dry, no petroleum odour or staining, trace clay and silt.	G	BTEX, TVH, TSH, MOG	345
	1			***Clay (Fill)*** Black with light brown silt, no petroleum odour or staining, trace organics, little debris.	G		160
98.7				***Silt (Fill)*** Light brown beige silt, significant coal noted, no odour or staining, black organic mottling, moist.	G		75
98.5				End of Borehole			
	2			BH is Adjacent to Former Coal Bin			
	3						
	4						
	5						

VOC Concentration: %LEL (20, 40, 60, 80); ppm (100, 300, 500, 700, 900)

Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Canterra CT250 c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring well not installed

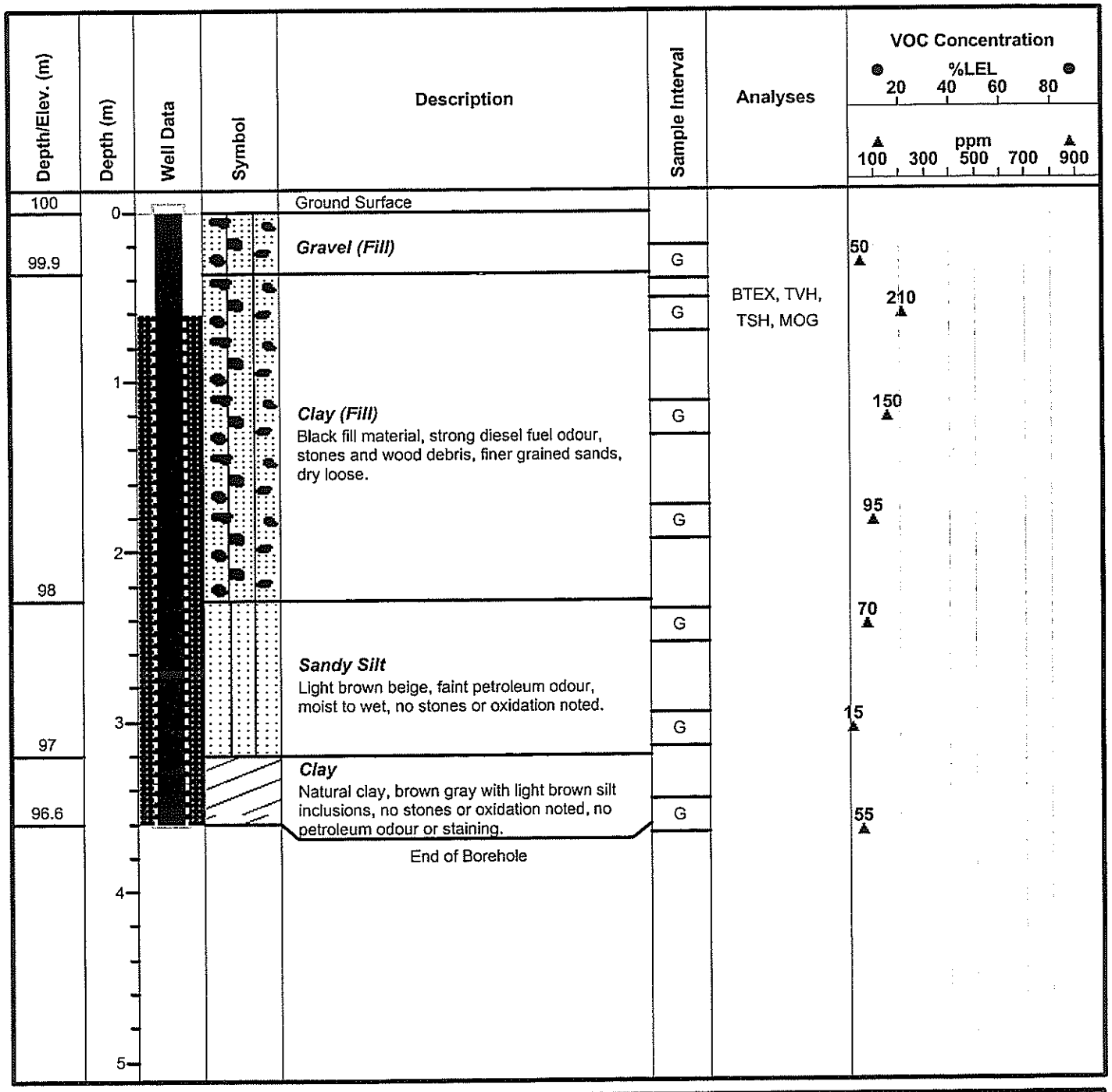
Water Table Elevation: Monitoring well not installed
Date Measured: Monitoring well not installed
Well Materials: Monitoring well not installed

BOREHOLE: BH-28

Logged By: K.L.M.
Drawn By: K.L.M.
Checked By: J.D.N.

Client: Shelter Canadian Properties Ltd.
Project No.: 991494-01-00
Borehole Location: N of Former Construction Shed

Project: Phase II ESA
Date Drilled: February 23, 1999



Drilling Contractor: Maple Leaf Enterprises Ltd.
Drill Type: Backhoe Rig c/w 200 mm SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.249 m

Water Table Elevation: 97.846 m
Date Measured: February 25, 1999
Well Materials: 50 mm dia, Sch 40 PVC

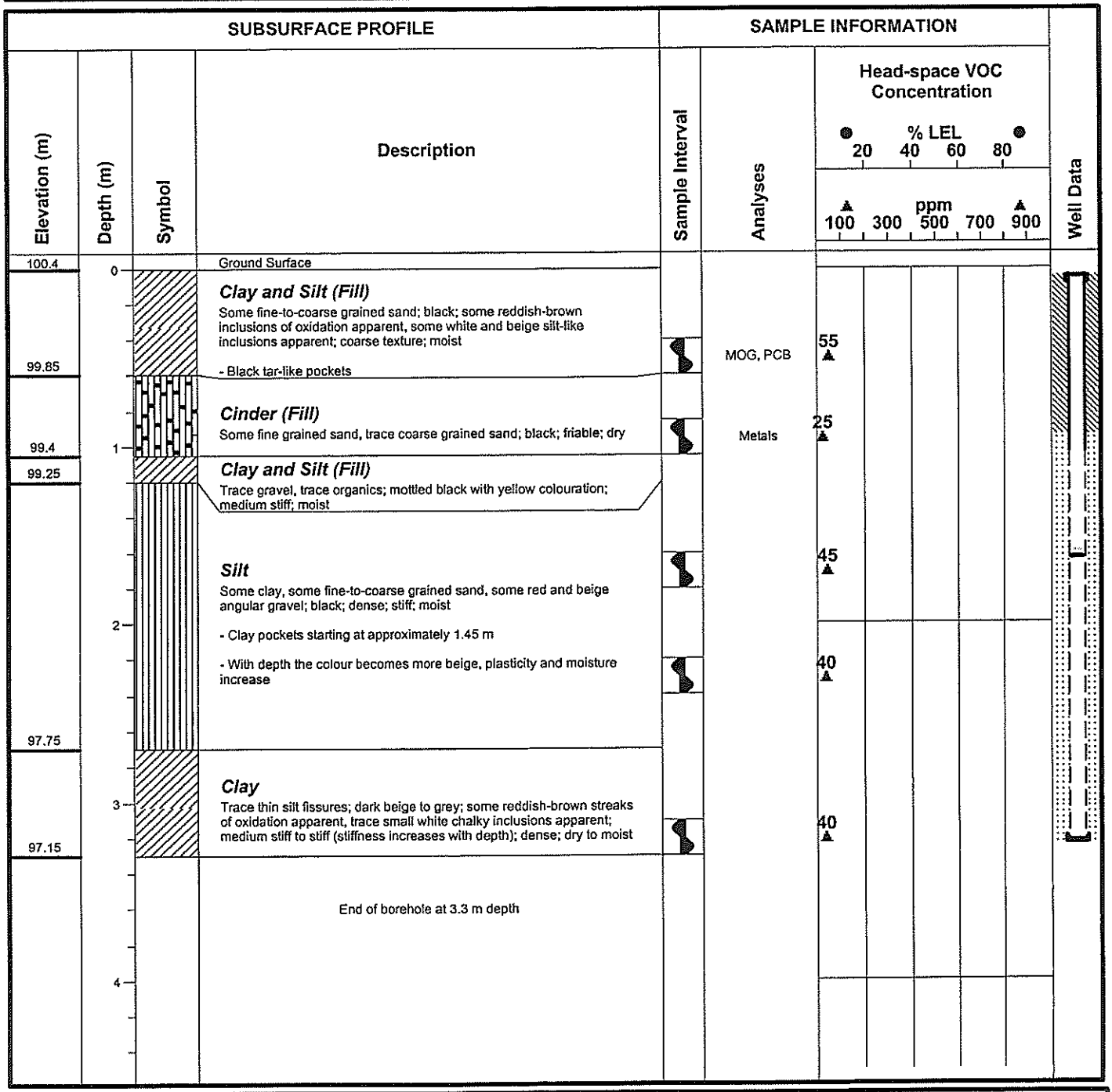
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-29

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: NW of west shed

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.403 m

Water Table Elevation: 98.367 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP Engineering Inc.

BOREHOLE LOG: BH-30

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: North of PCB shed
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06

Elevation (m)	Depth (m)	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL / ppm)
100.4	0	Ground Surface			
		Sand (Fill) Trace organics (wood), trace brick pieces; dark brown; granular; dry to moist			
		-0.1 m thick band of black, wet, cinder-like material at 0.45 m		Metals	30 ppm
99.84		- No odour			
		Sand (Fill) Fine-to-medium grained, trace clay, trace brick-like pieces, nail, black; white and yellow silt-like inclusions; semi-solid; moist			
99.46	1				
		Clay (Fill) With silt; black, some reddish-brown inclusions of oxidation apparent, trace yellow powdery inclusions apparent; stiff; dry-to-moist		Zinc	80 ppm
99.24		- Appears more natural with depth; stiffness increases			
		- No odour			130 ppm
		Silt Green-grey; soft; very consistent texture; moist			
	2	- With depth the colour changes to tan and dark beige; black and blue horizontal streaks become apparent; plasticity decreases		VOC	190 ppm
98.04					
		Clay With silt; beige to light grey; white silt-like inclusions apparent; medium stiff; plastic; dry to moist			
	3				25 ppm
97.14					
		End of borehole at 3.3 m depth			
	4				

Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

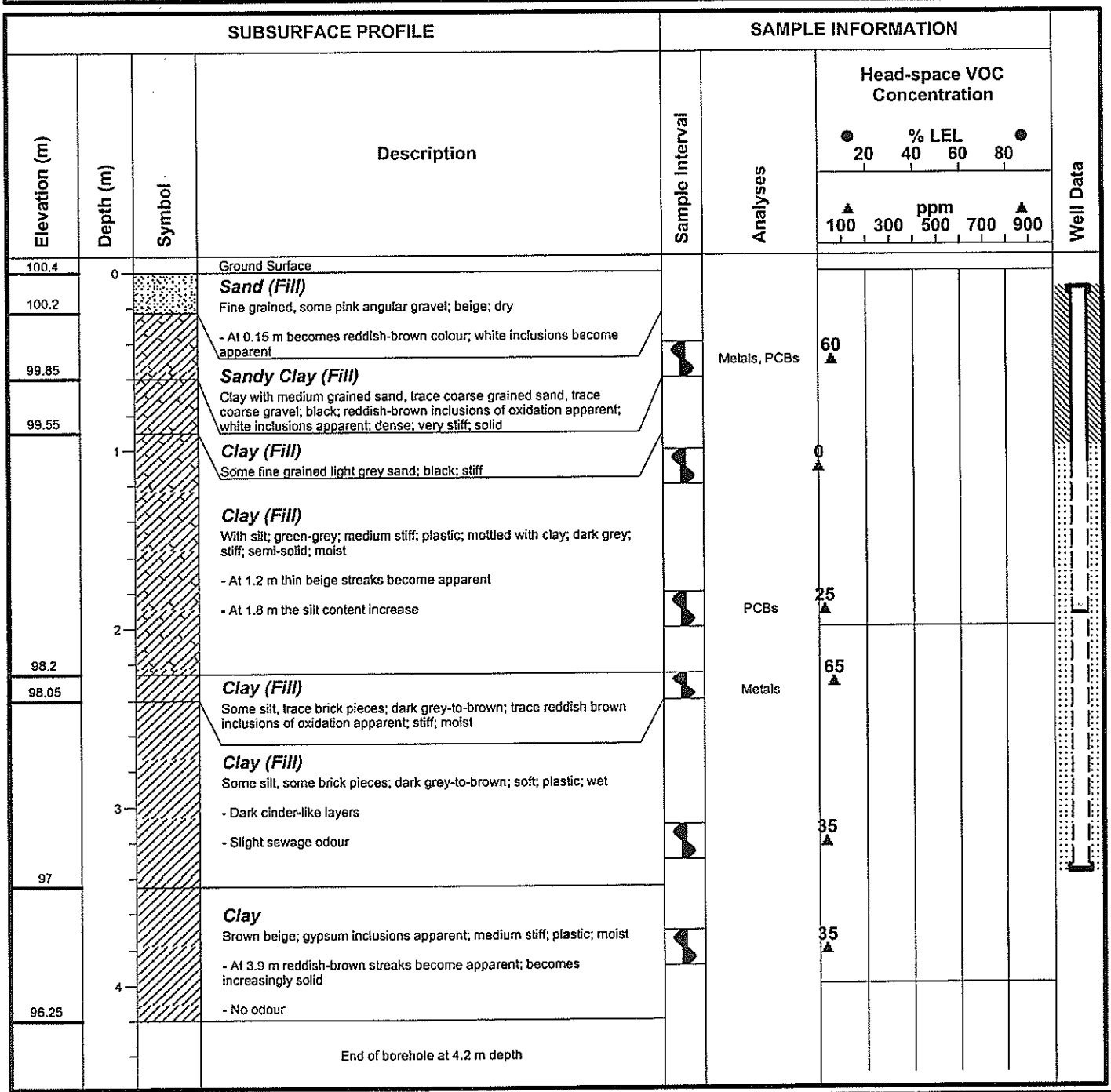
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-31

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: Possibly in former creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



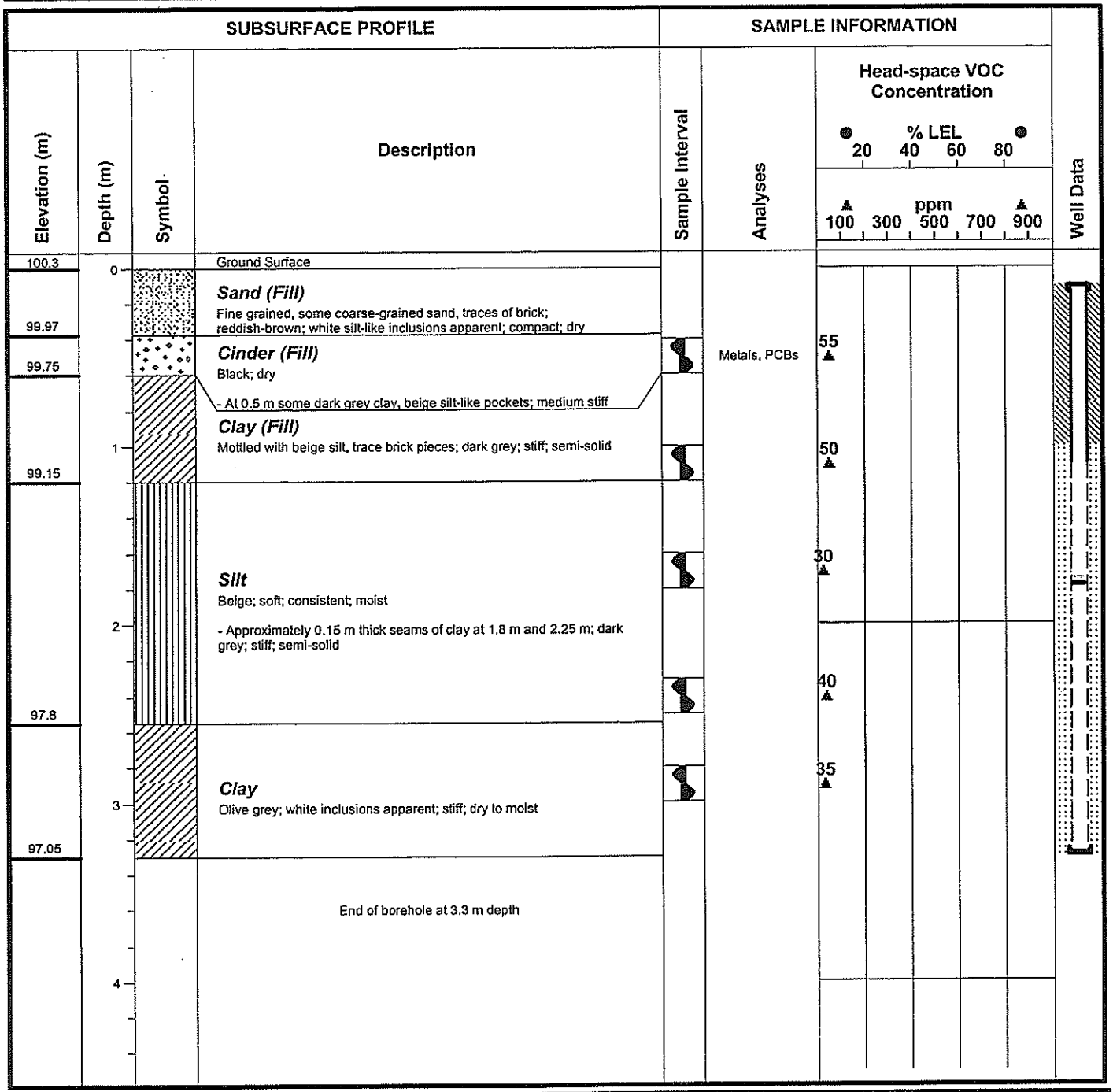
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.356

Water Table Elevation:
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-32

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: North of Omands Creek
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



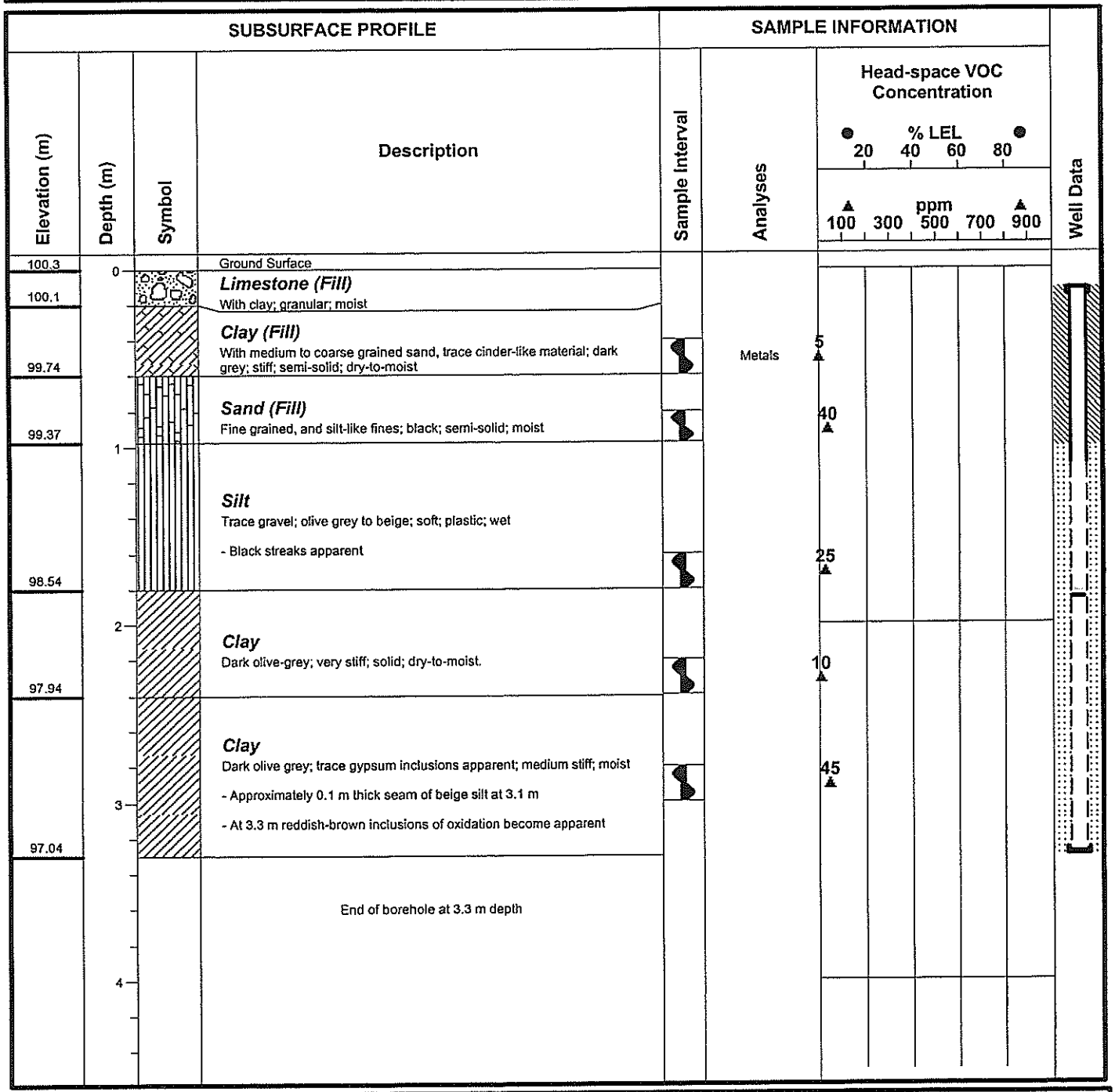
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.240 m

Water Table Elevation: 98.563 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-33

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: North of Omands Creek
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



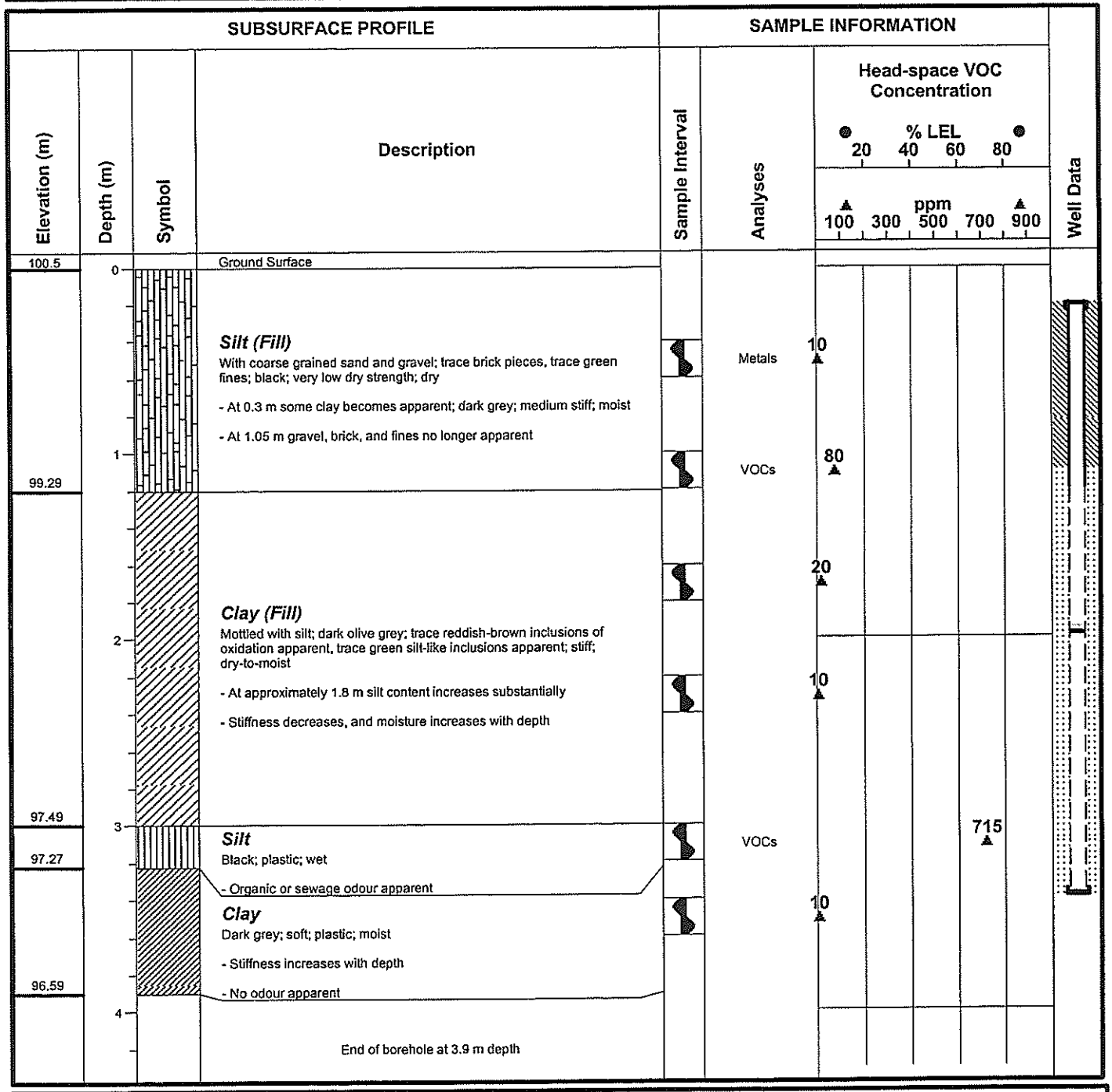
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.234 m

Water Table Elevation: 98.484 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-34

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: Possibly in former creek
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



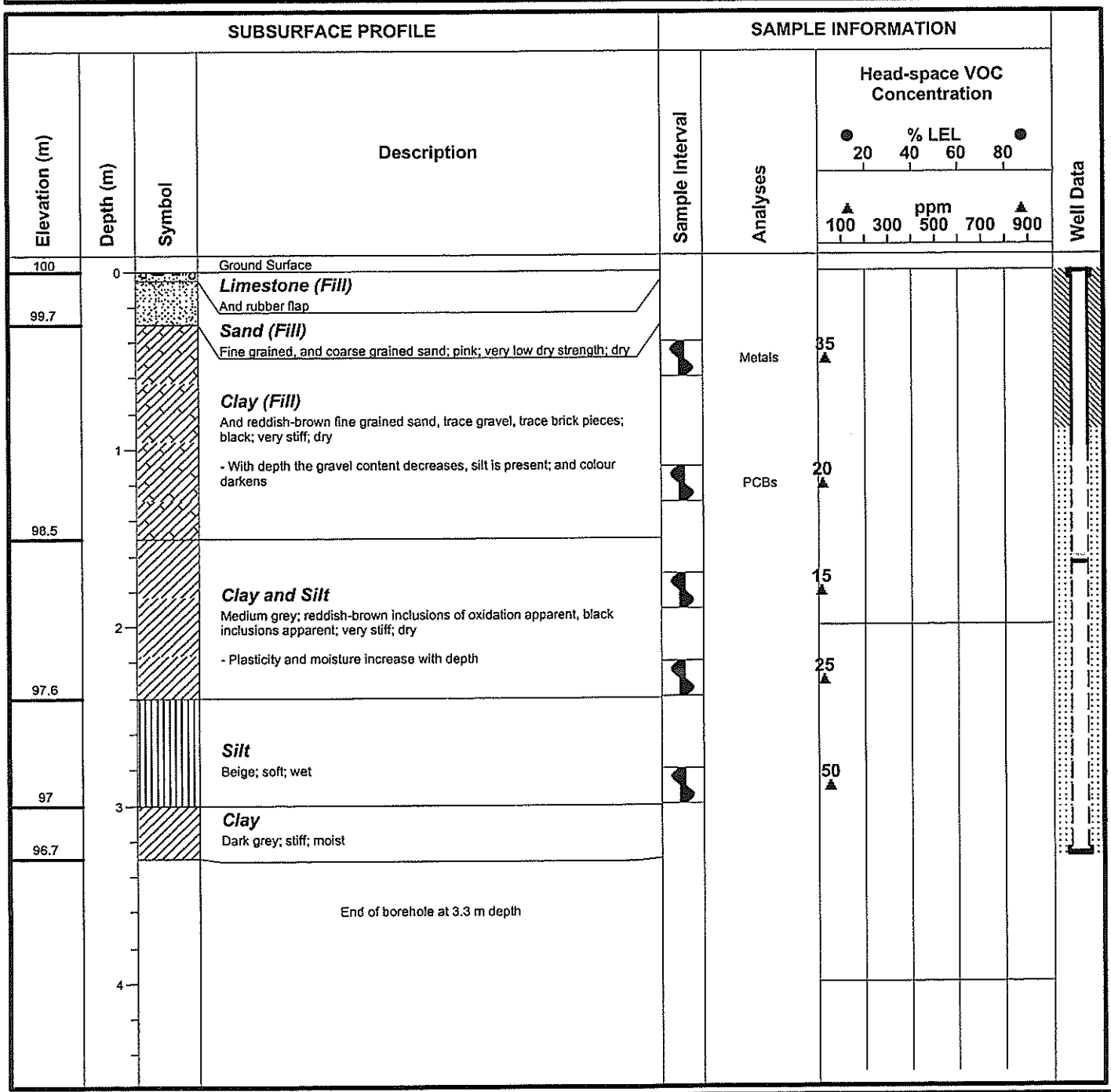
Drilling Contractor: Maple Leaf Enterprises
Drill Type: Drill c/w 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.294 m

Water Table Elevation: 98.514 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP Engineering Inc.

BOREHOLE LOG: BH-35

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: North of Omands Creek
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Well not surveyed

Water Table Elevation: 98.645 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-36

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: North of Omands Creek
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06

SUBSURFACE PROFILE				SAMPLE INFORMATION			
Elevation (m)	Depth (m)	Symbol	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)	Well Data
100.3	0		Ground Surface				
			Gravel (Fill) Fine grained, some coarse grained sand, some silt, some clay, trace reddish-brown coarse grained gravel; beige to black; granular; low dry strength, dry				
99.97							
99.73			***Sand (Fill)*** Fine grained; mixed black and blue colouration; loose; dry			10	
			Sand and silt (Fill) Fine grained sand and silt, pieces of metal, wire, and wood; black; loose; dry				
99.28	1						
98.98			***Clay (Fill)*** Mixed with overlying unit; dark grey; very stiff; dry			5	
			Silt and Clay Beige; stiff; plastic; wet - Becoming more solid with depth			0	
	2						
97.86						30	
			Clay Beige to grey; very stiff; semi-solid; moist			20	
97.03	3						
			End of borehole at 3.3 m depth				
	4						

Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

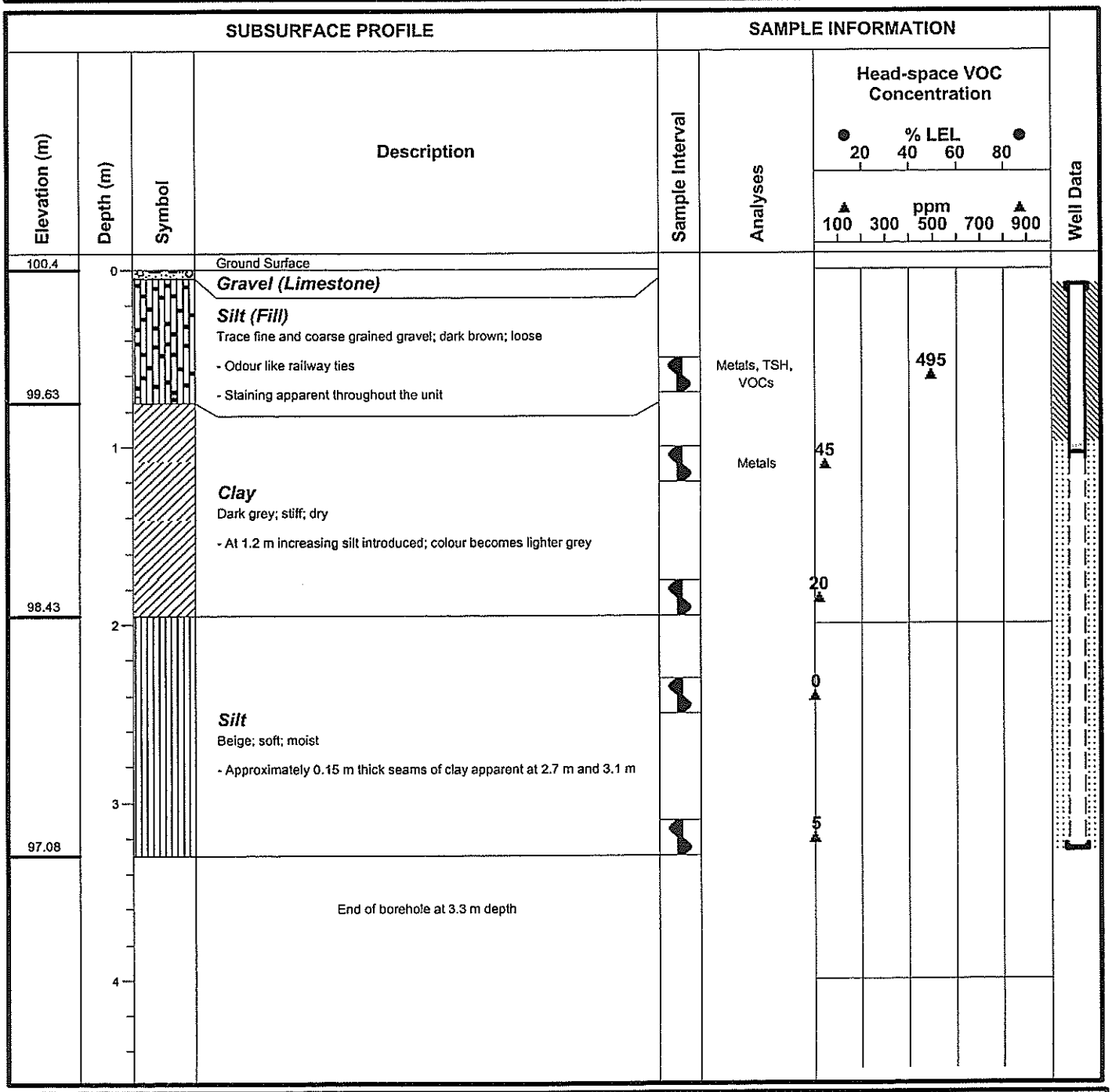
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-37

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: North of Omands Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.298 m

Water Table Elevation: 99.340 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

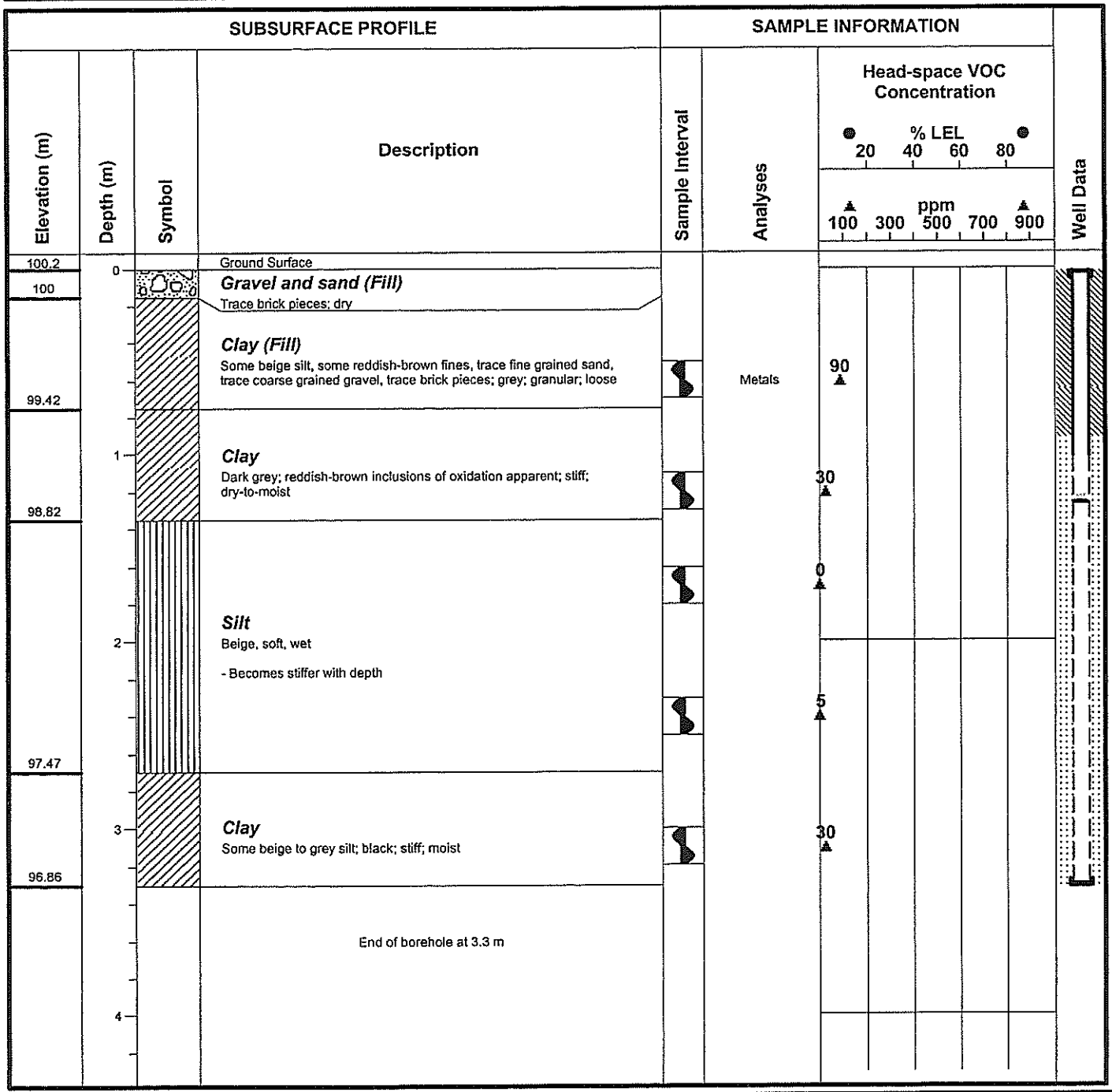
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-38

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: NE of Omands Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.148 m

Water Table Elevation: 98.902 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

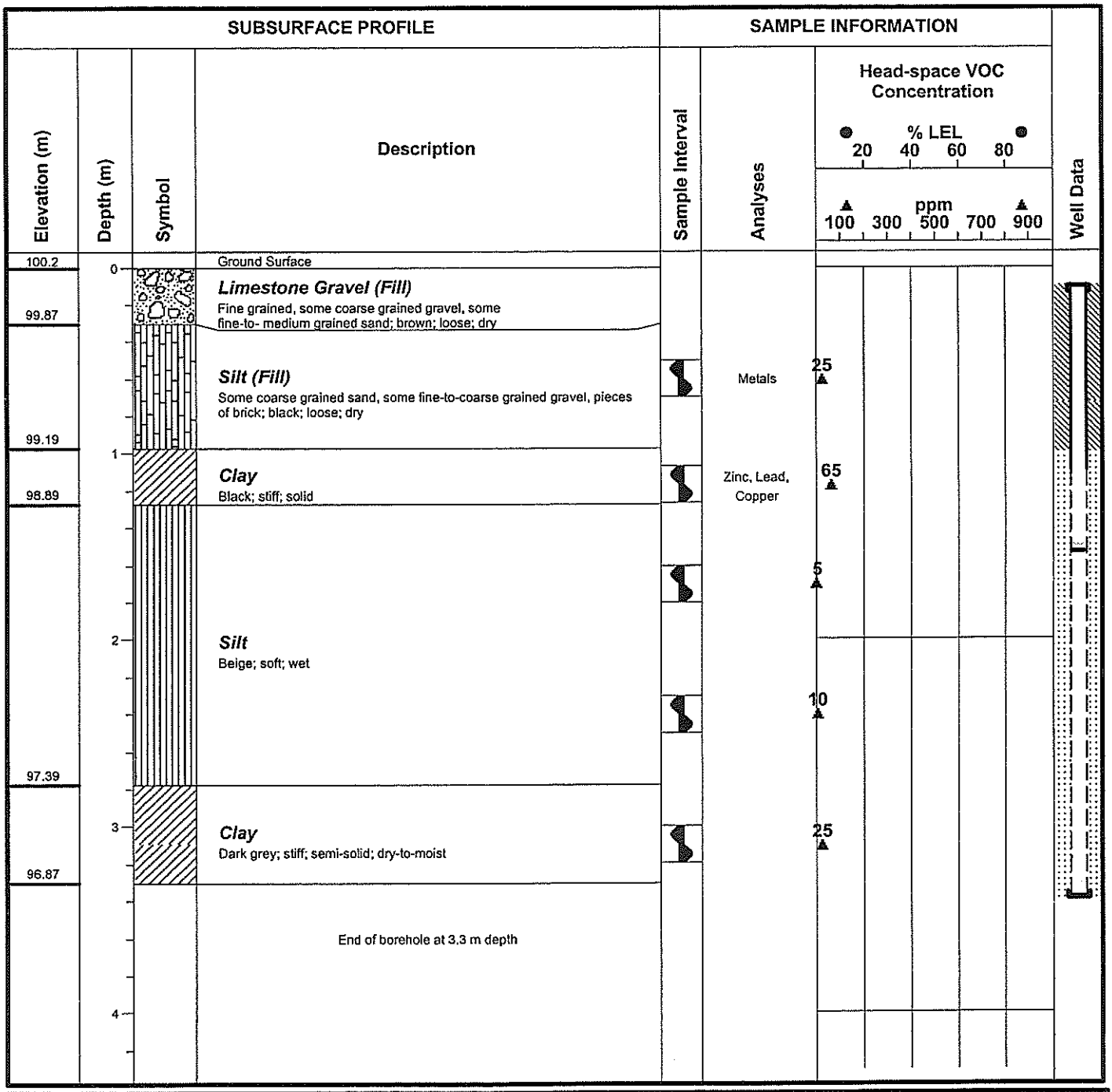
WARDROP Engineering Inc.

BOREHOLE LOG: BH-39

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: NE of Omands Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.068 m

Water Table Elevation: 98.638 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

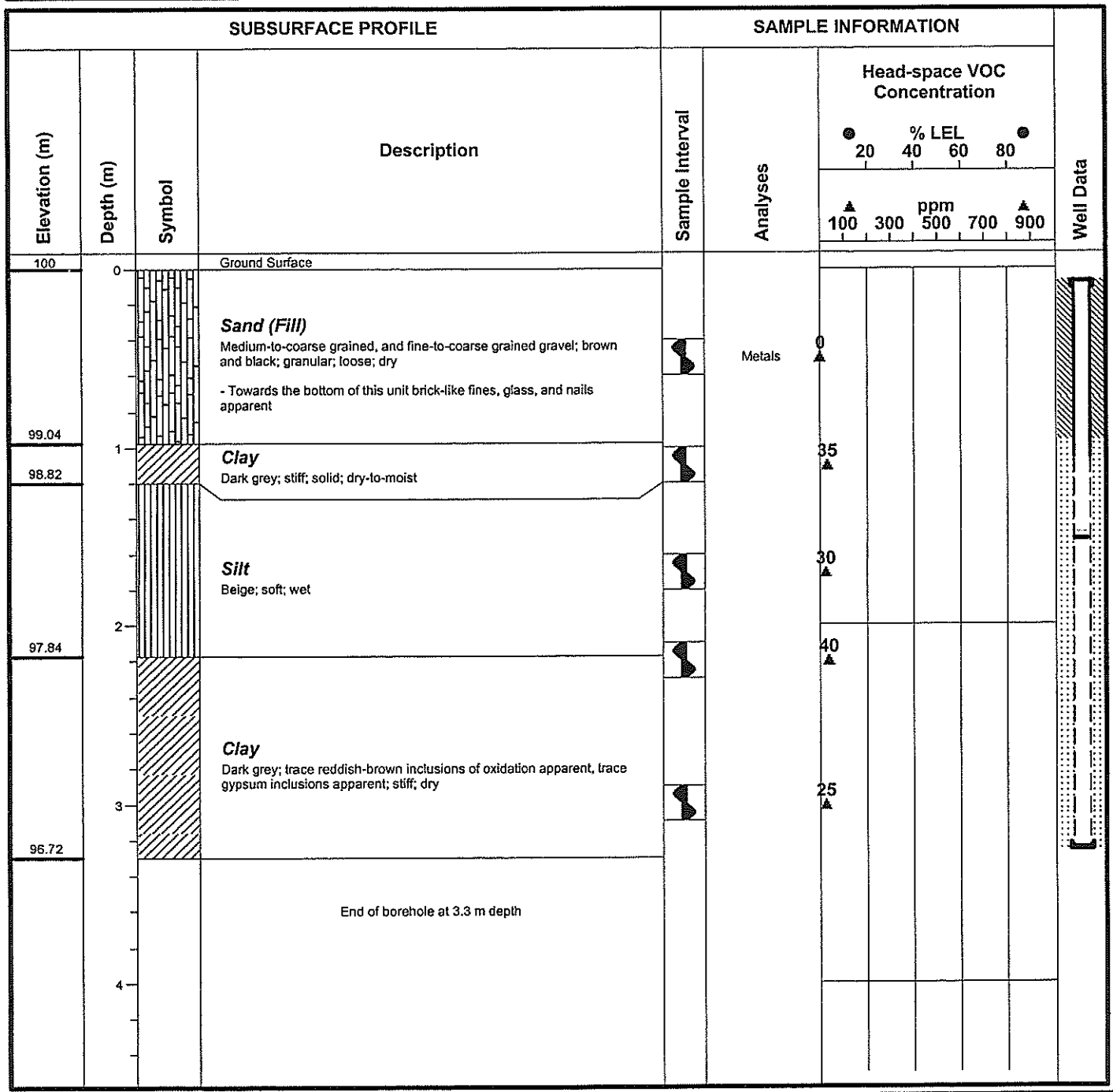
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-40

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: NE of Omands Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/06



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.947 m

Water Table Elevation: 98.495 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

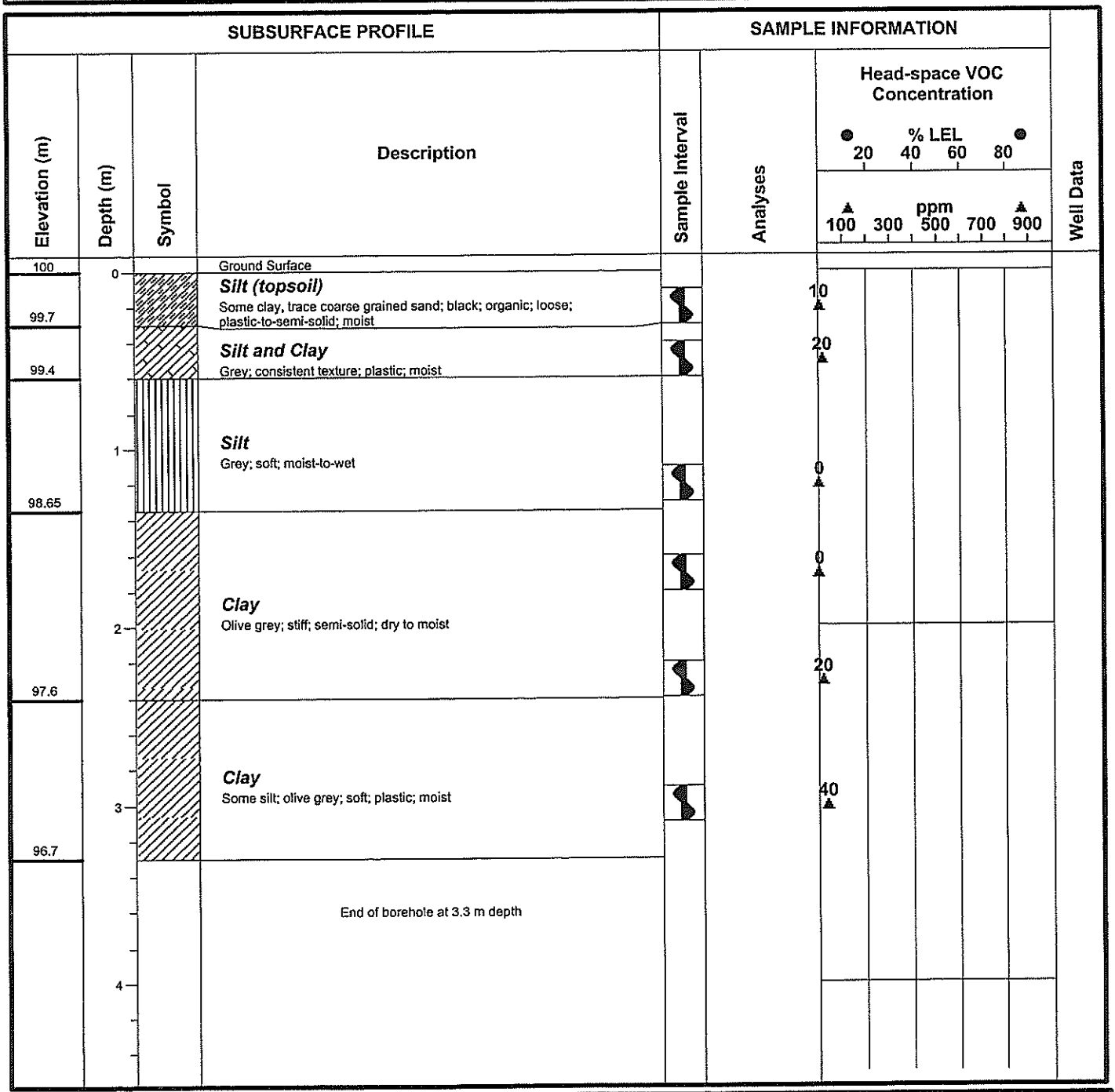
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-41

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: SW of Omands Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m, Not Surveyed
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-42

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: SW of Omands Creek
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07

Elevation (m)	Depth (m)	Symbol	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)	Well Data
100	0		Ground Surface				
99.7			***Silt (topsoil)*** Some clay, trace coarse grained sand; black; organic; loose; plastic-to-semi-solid; moist			15	
99.4			***Silt and Clay*** Grey; consistent texture; plastic; moist		Metals	10	
	1		***Silt*** Grey; soft; moist-to-wet - Clay seam of approximately 5 cm thickness at 1.5 m			5	
98.35						5	
	2		***Clay*** Olive grey; stiff; semi-solid; dry-to-moist			40	
97.6							
			Clay Some silt; olive grey; soft; plastic; moist - Silt seam of approximately 3 cm thickness at 2.7 m			30	
96.7	3						
			End of borehole at 3.3 m depth				
	4						

Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m, Not Surveyed
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

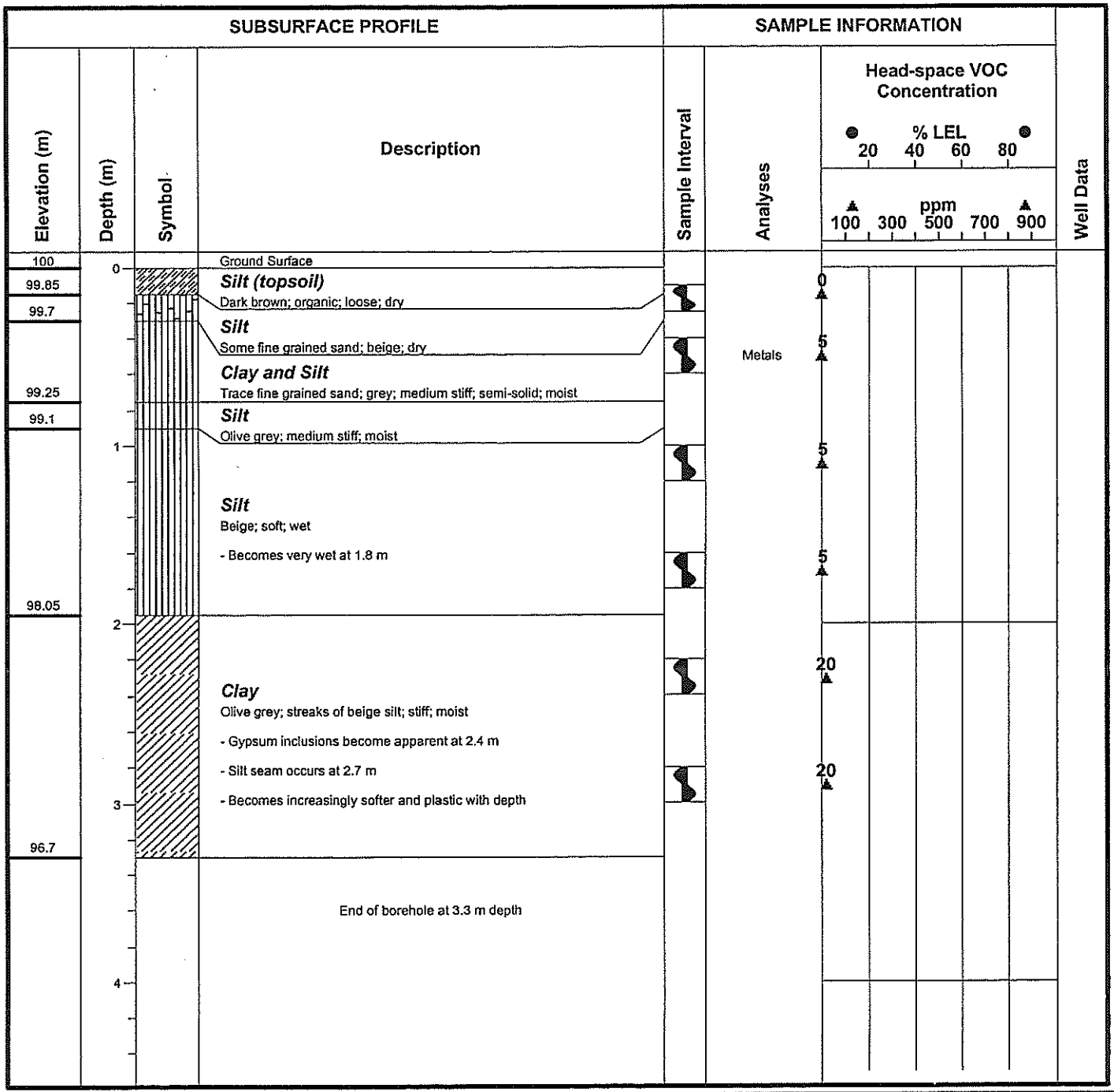
WARDROP Engineering Inc.

BOREHOLE LOG: BH-43

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: SW of Omands Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m, Not Surveyed
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

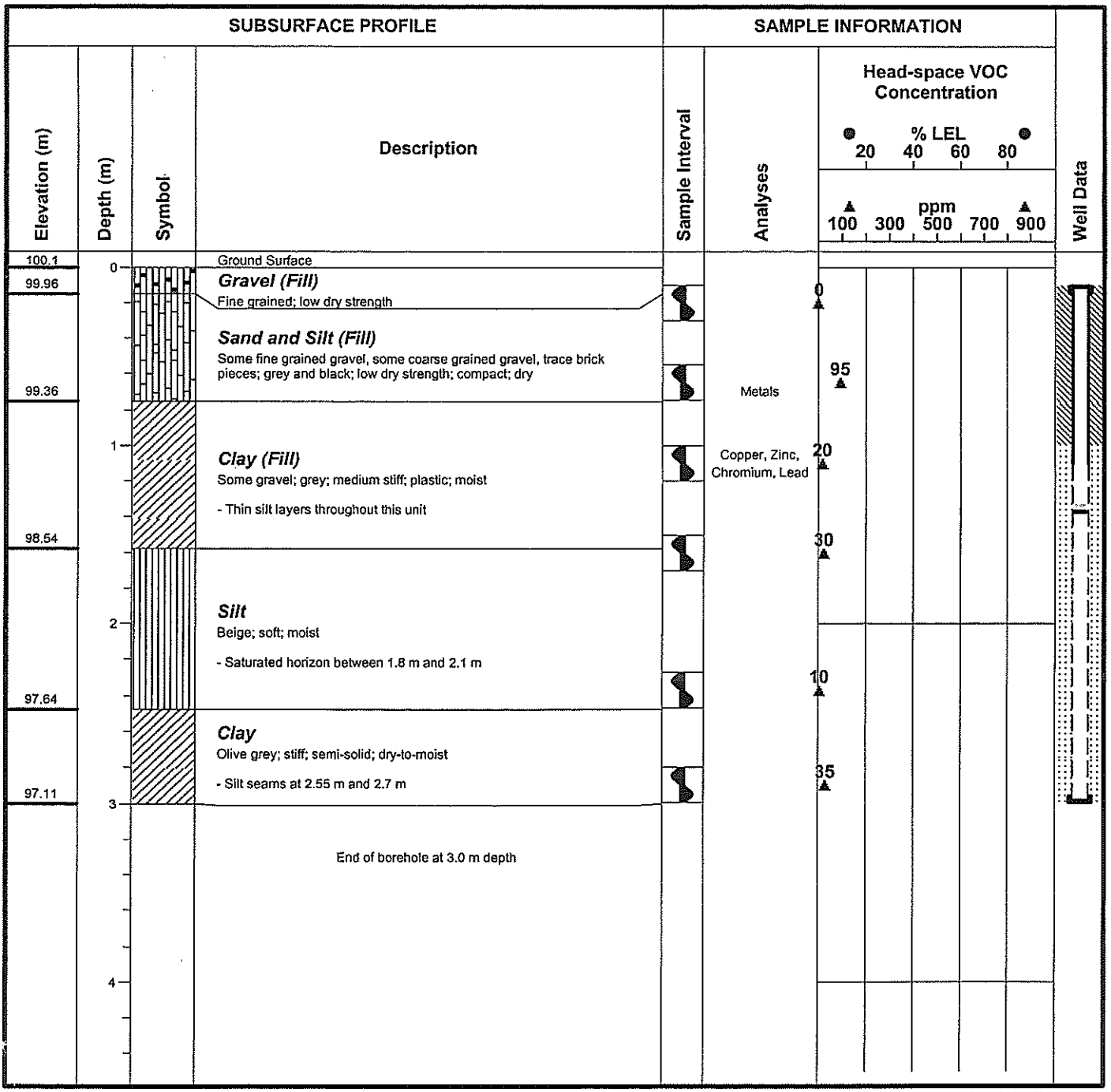
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-44

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Acid Drum Storage Area: Near Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 100.008 m

Water Table Elevation: 98.743 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

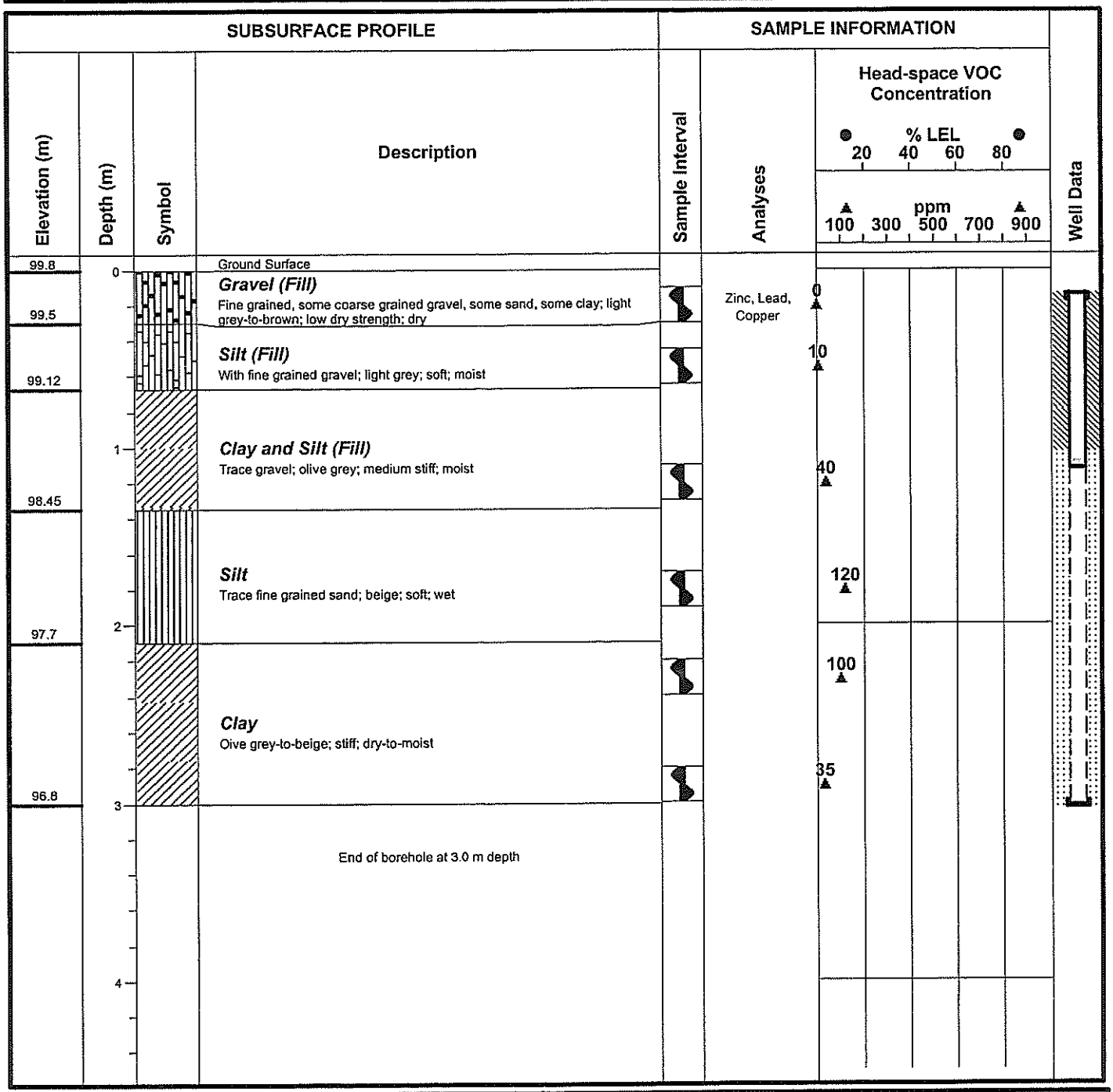
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-45

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Acid Drum Storage Area: Near Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.661 m

Water Table Elevation: 98.669 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-46

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Acid Drum Storage Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07

SUBSURFACE PROFILE				SAMPLE INFORMATION			
Elevation (m)	Depth (m)	Symbol	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)	Well Data
99.87	0		Ground Surface				
			Silt (Fill) Some coarse grained sand, some coarse grained gravel; blue grey; loose; granular consistency; dry			0	
99.57			***Clay*** Black; very stiff; solid; dry		Zinc, Lead, Copper	90	
99.07						85	
	1		***Clay*** Trace sand, trace fine grained gravel; dark grey; stiff; dry - Black streaks apparent throughout this unit			55	
98.37			End of borehole at 1.5 m depth				
	2						
	3						
	4						

Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

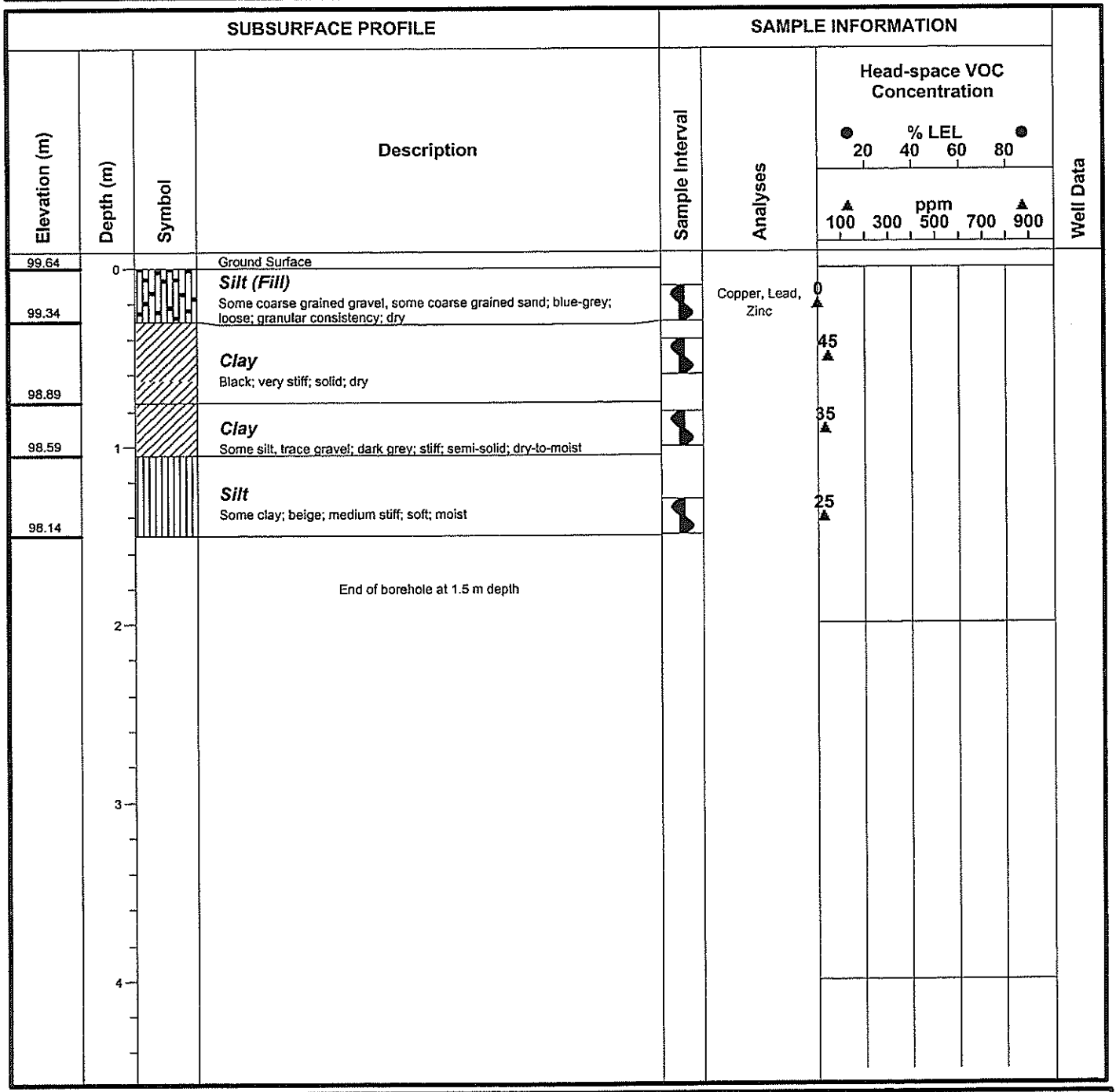
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-47

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Acid Drum Storage Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-48

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Acid Drum Storage Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07

SUBSURFACE PROFILE				SAMPLE INFORMATION			
Elevation (m)	Depth (m)	Symbol	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)	Well Data
99.72	0		Ground Surface				
			Sand (Fill) Fine-to-coarse grained, trace silt, trace coarse grained gravel; brown, becoming lighter in colour with depth; loose		Zinc, Lead, Copper	15	
			- 7 cm thick clay band of at 0.2 m depth; stiff; dry			20	
98.95							
	1		***Clay (Fill)*** Some silt, trace gravel; dark grey-to-brown; medium stiff; dry			30	
98.52							
			Silt Beige; soft; moist			30	
98.22							
			End of borehole at 1.5 m depth				
	2						
	3						
	4						

Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

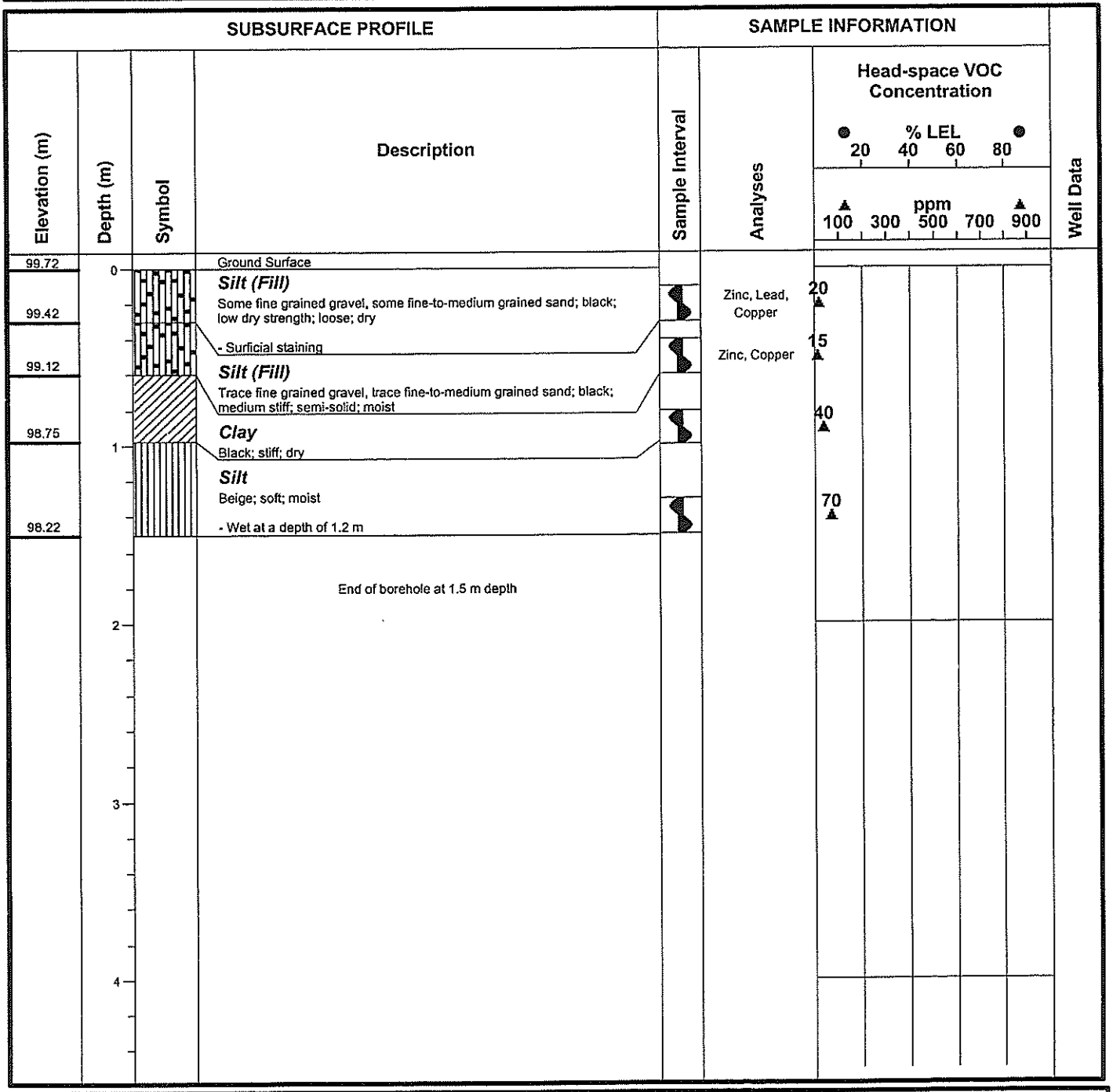
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-49

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Acid Drum Storage Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

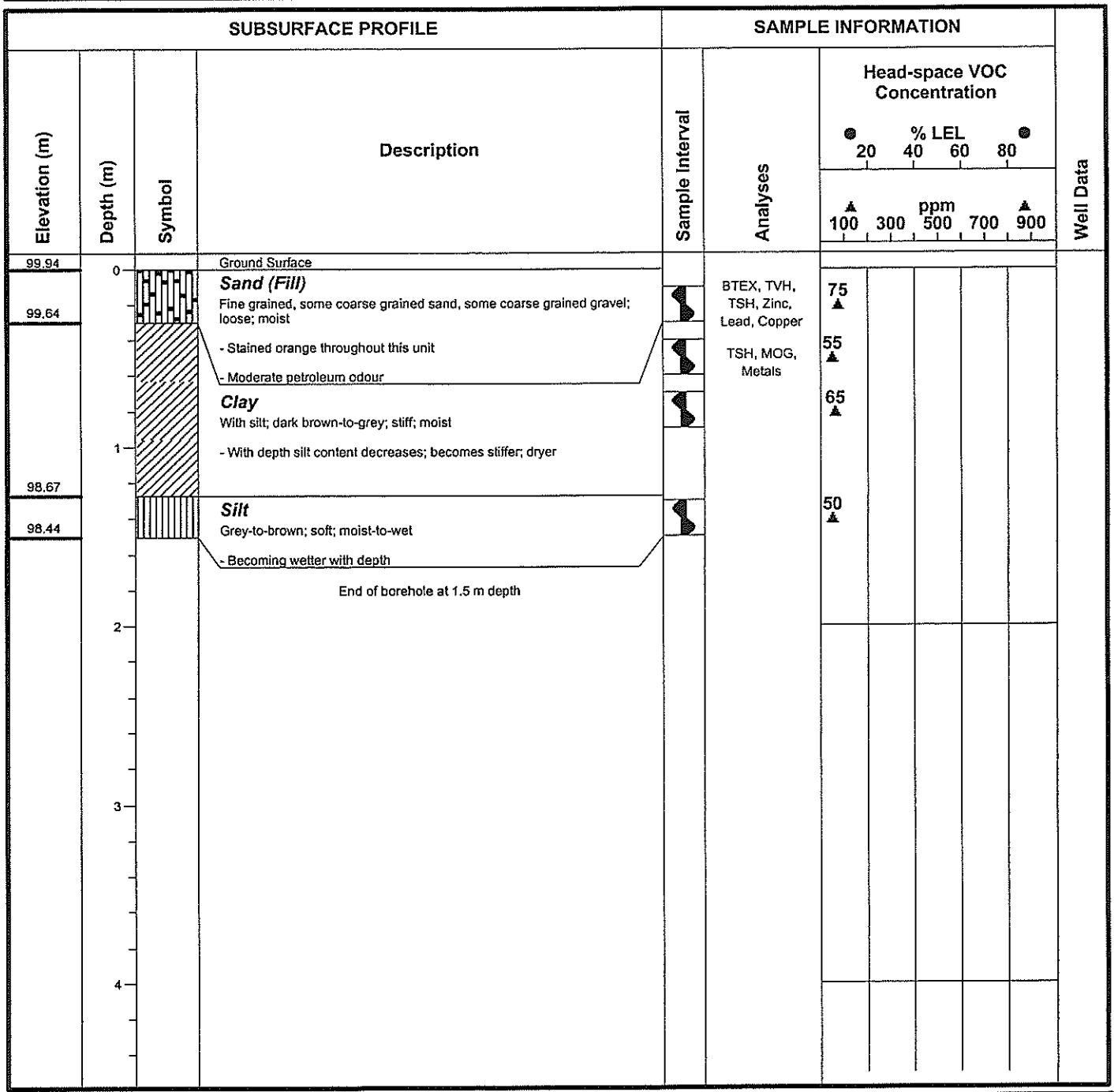
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-50

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Acid Drum Storage Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-51

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Acid Drum Storage Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07

SUBSURFACE PROFILE				SAMPLE INFORMATION			
Elevation (m)	Depth (m)	Symbol	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)	Well Data
99.8	0		Ground Surface				
			Sand (Fill) Fine-to-medium grained, some limestone gravel, some brick pieces, trace silt, trace wood pieces; grey; low dry strength; granular; loose; dry		Zinc, Lead, Copper	5 5 55	
98.98	1		***Clay*** Dark grey-to-brown; stiff; semi-solid; moist			65	
98.3			***Silt*** Beige; soft; moist				
98	2		End of borehole at 1.8 m depth				
	3						
	4						

Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

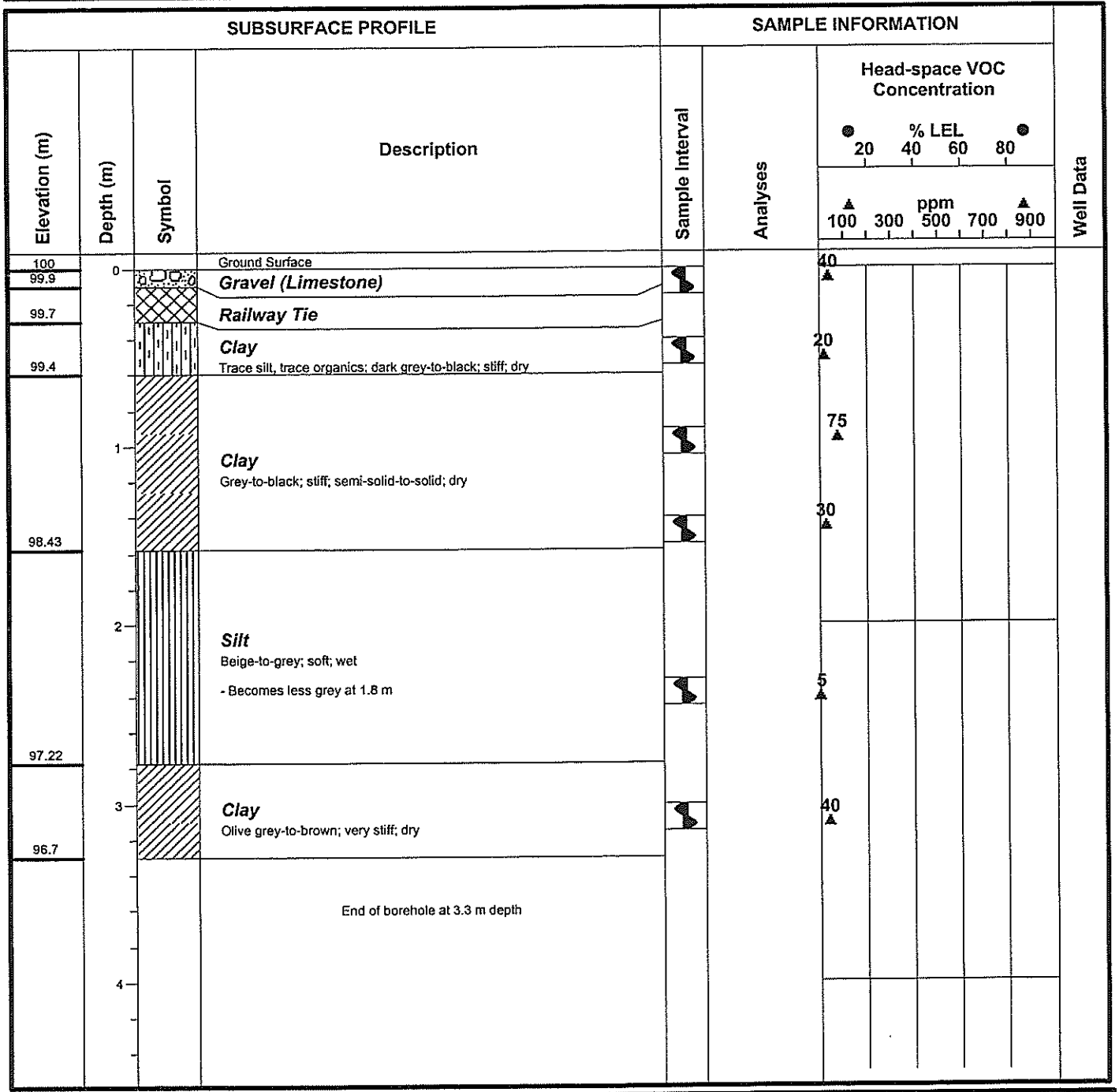
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-52

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: UST Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/07



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

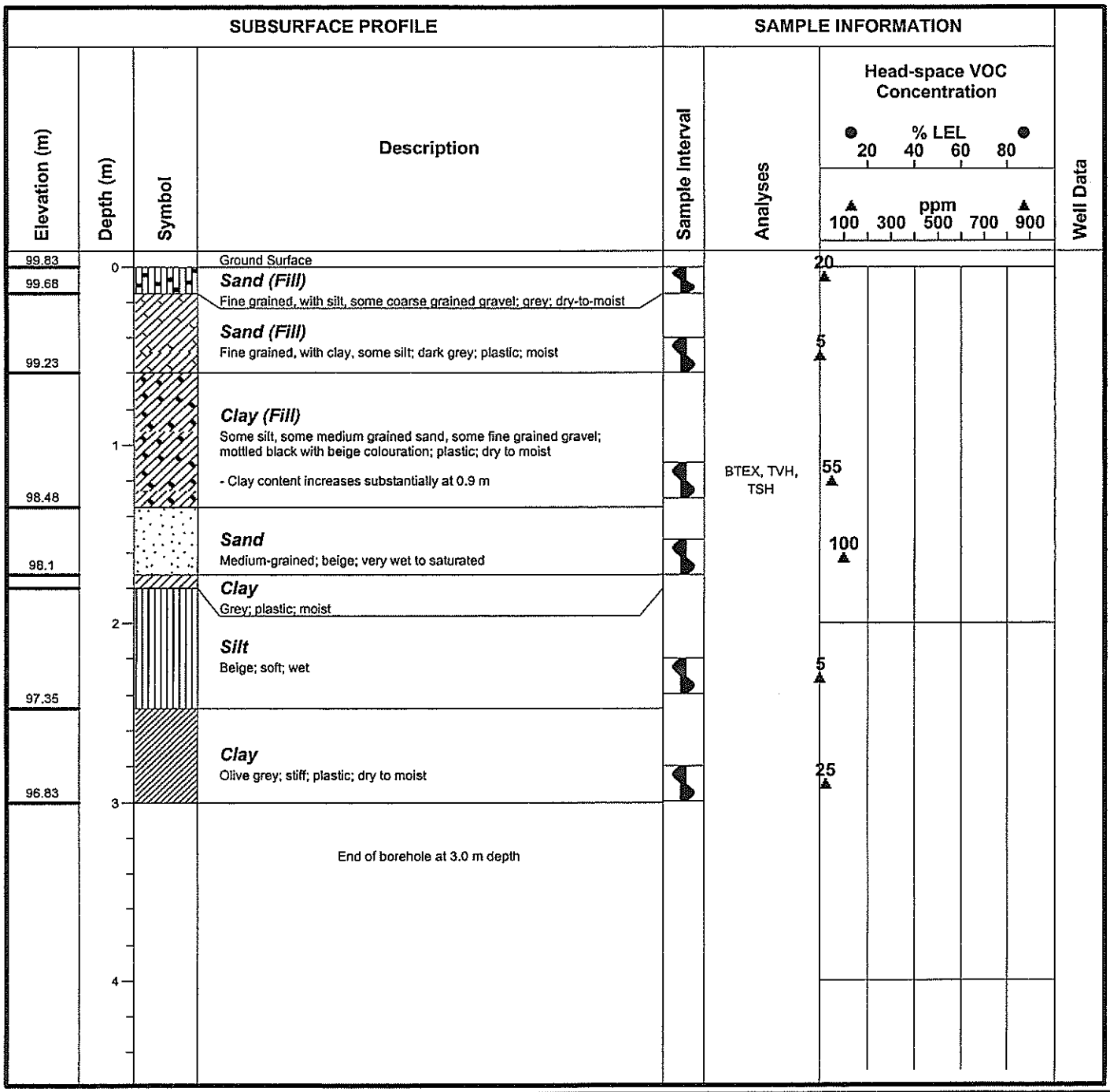
WARDROP Engineering Inc.

BOREHOLE LOG: BH-53

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Solvent AST Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

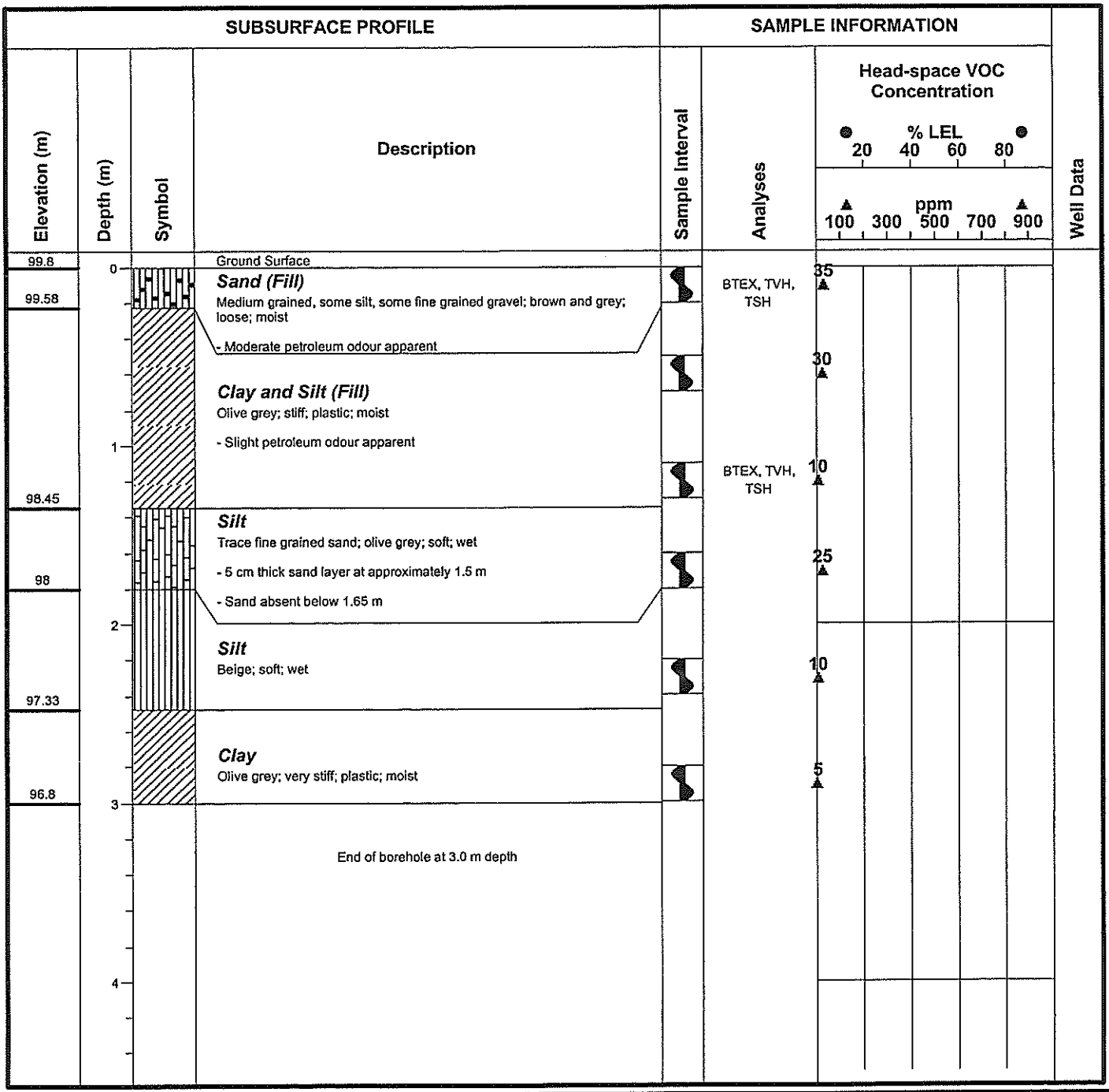
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-54

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Solvent AST Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

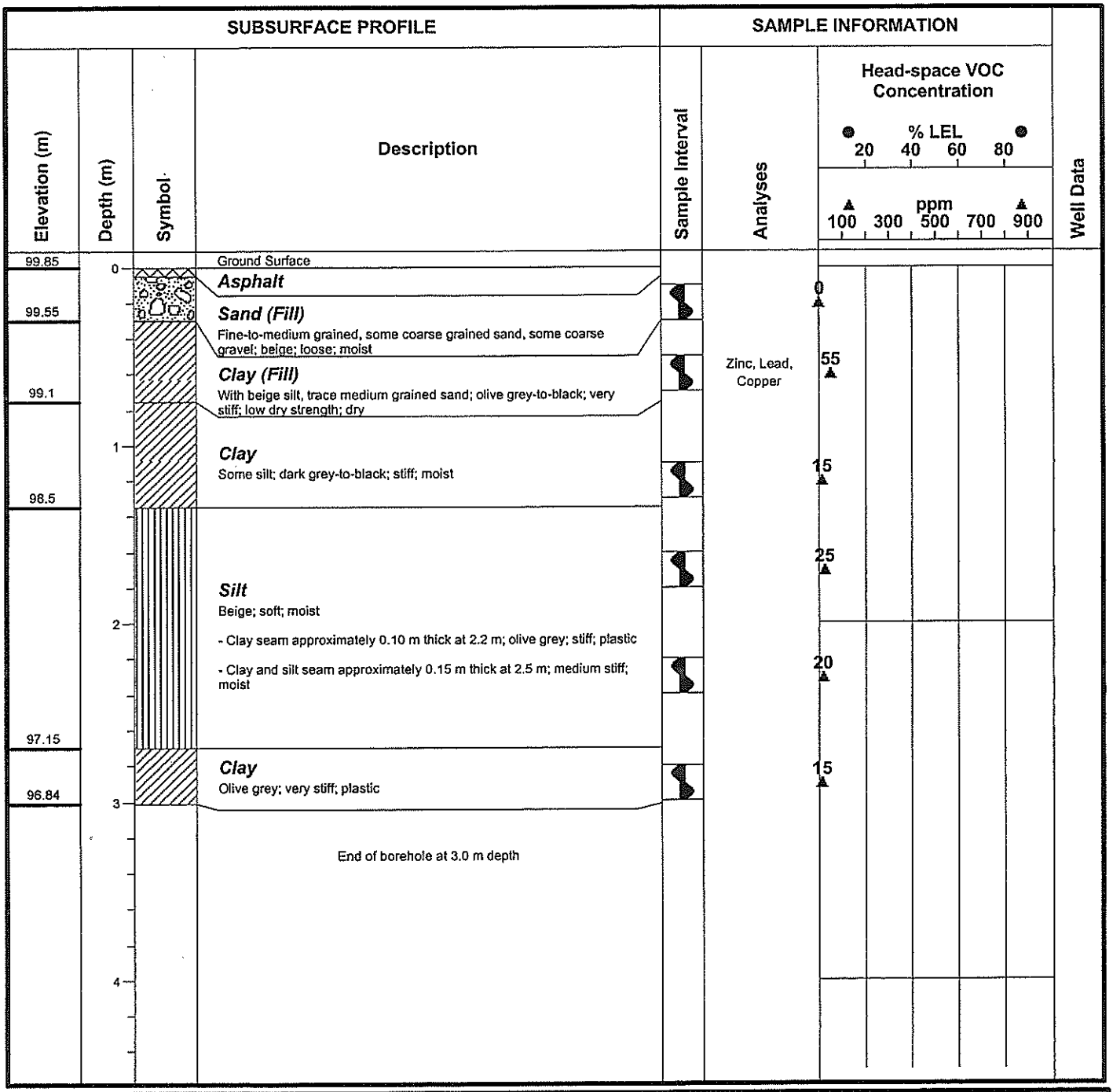
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-55

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Solvent AST Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

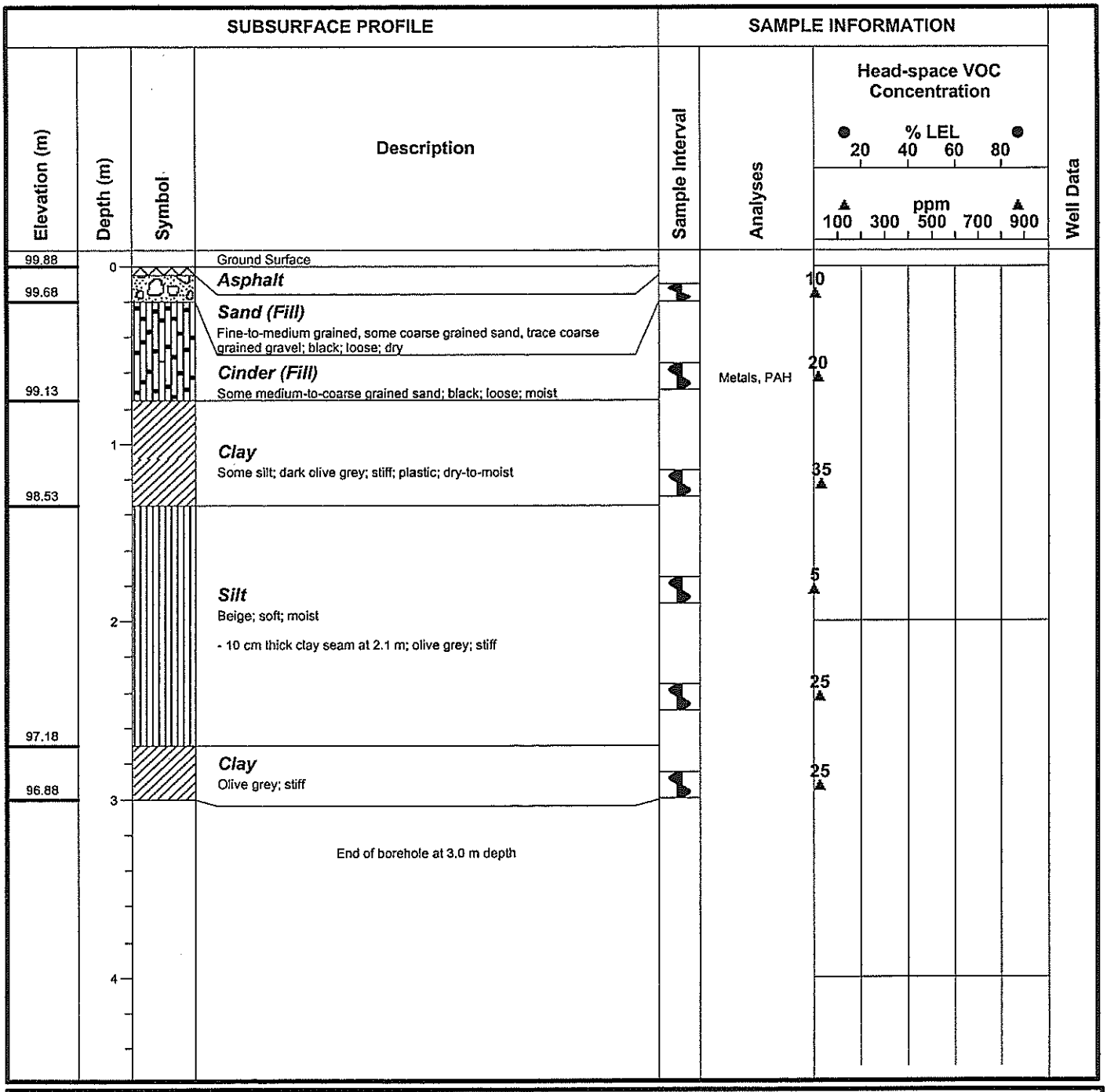
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-56

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Solvent AST Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-57

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Solvent AST Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08

Elevation (m)	Depth (m)	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL / ppm)
99.85	0	Ground Surface			
99.73		***Asphalt***		BTEX, TVH, TSH	85
		Silt (Fill) Some fine-to-medium grained, some coarse grained sand; dark grey; loose; granular; low dry strength; moist			
99.1		***Cinder (Fill)*** Some medium-to-coarse grained sand; black; loose; moist		Metals	35
	1	***Clay*** Trace silt; black; stiff; plastic; dry			
98.5		- Colour begins to lighten at approximately 1.0 m			0
		Silt Olive grey; soft; moist			10
	2	- Silt becomes more beige with depth			
		- Clay seam approximately 0.15 m thick at 2.1 m; olive grey; stiff; wet			
		- Black staining approximately 0.20 m thick at 2.4 m; wet; moderate petroleum odour		BTEX, TVH, TSH	5
97.15		***Clay*** Olive grey; stiff; plastic; wet			20
96.85	3	- Black silt-like streaks apparent			
		End of borehole at 3.0 m depth			
	4				

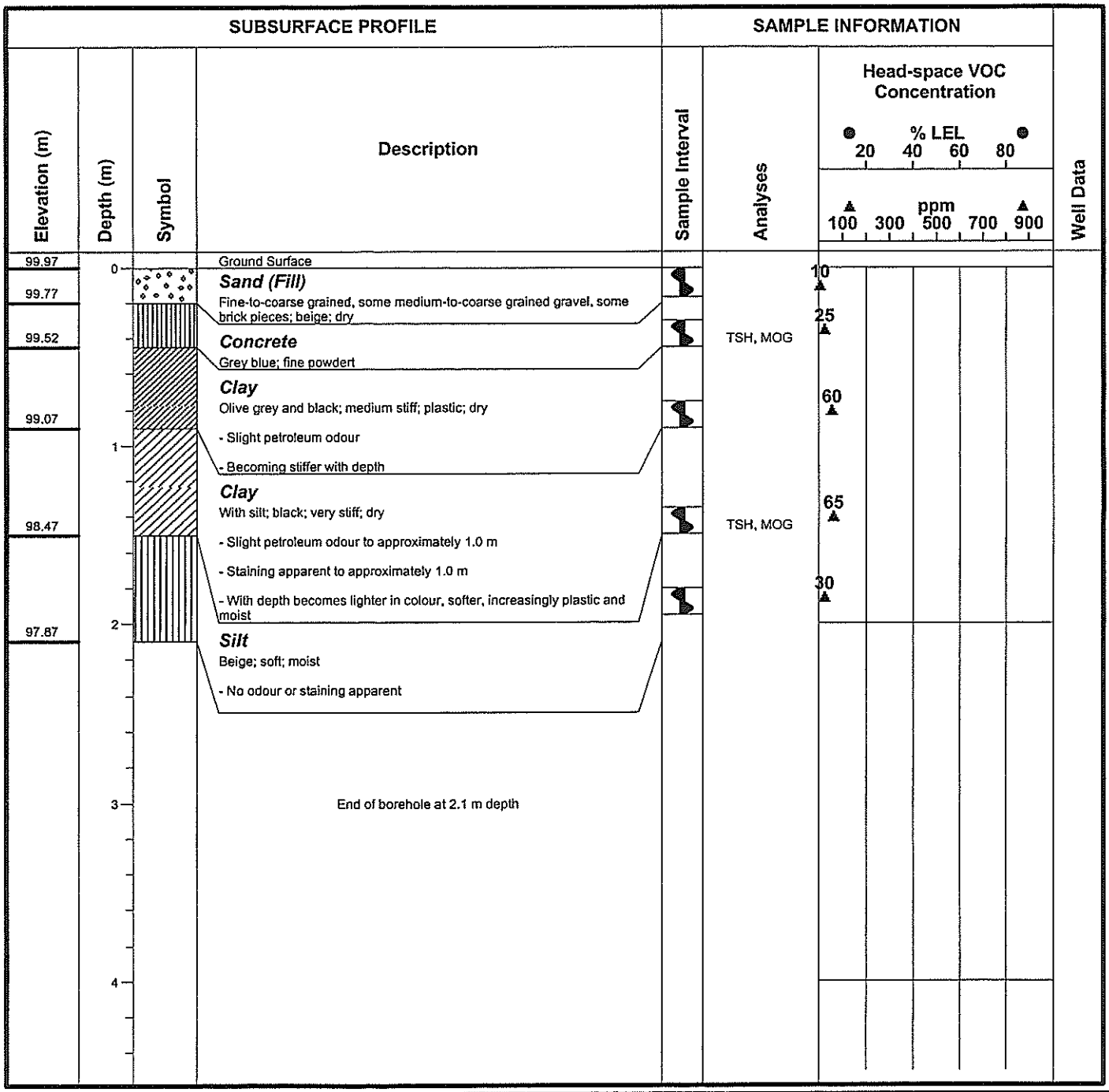
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-58

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Oil Drum Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-59

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Oil Drum Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08

Elevation (m)	Depth (m)	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL / ppm)	Well Data
100	0	Ground Surface				
99.88		***Sand (Fill)*** Fine-to-coarse grained, some medium-to-coarse grained gravel; beige; dry		TSH, MOG, Metals	15	
99.58		***Silt (Fill)*** Some coarse grained sand, some medium-to-coarse grained sand; black; compact; moist			10	
		- No odour		BTEX, TVH, TSH, MOG	105	
	1	***Clay*** Olive grey; medium stiff; dry-to-moist				
		- Colour black between 0.75 and 1.05 m; metallic odour apparent				
98.53		- Clay becomes darker in colour; stiffer, and less plastic below 1.0 m			75	
	2	End of borehole at 1.5 m depth				
	3					
	4					

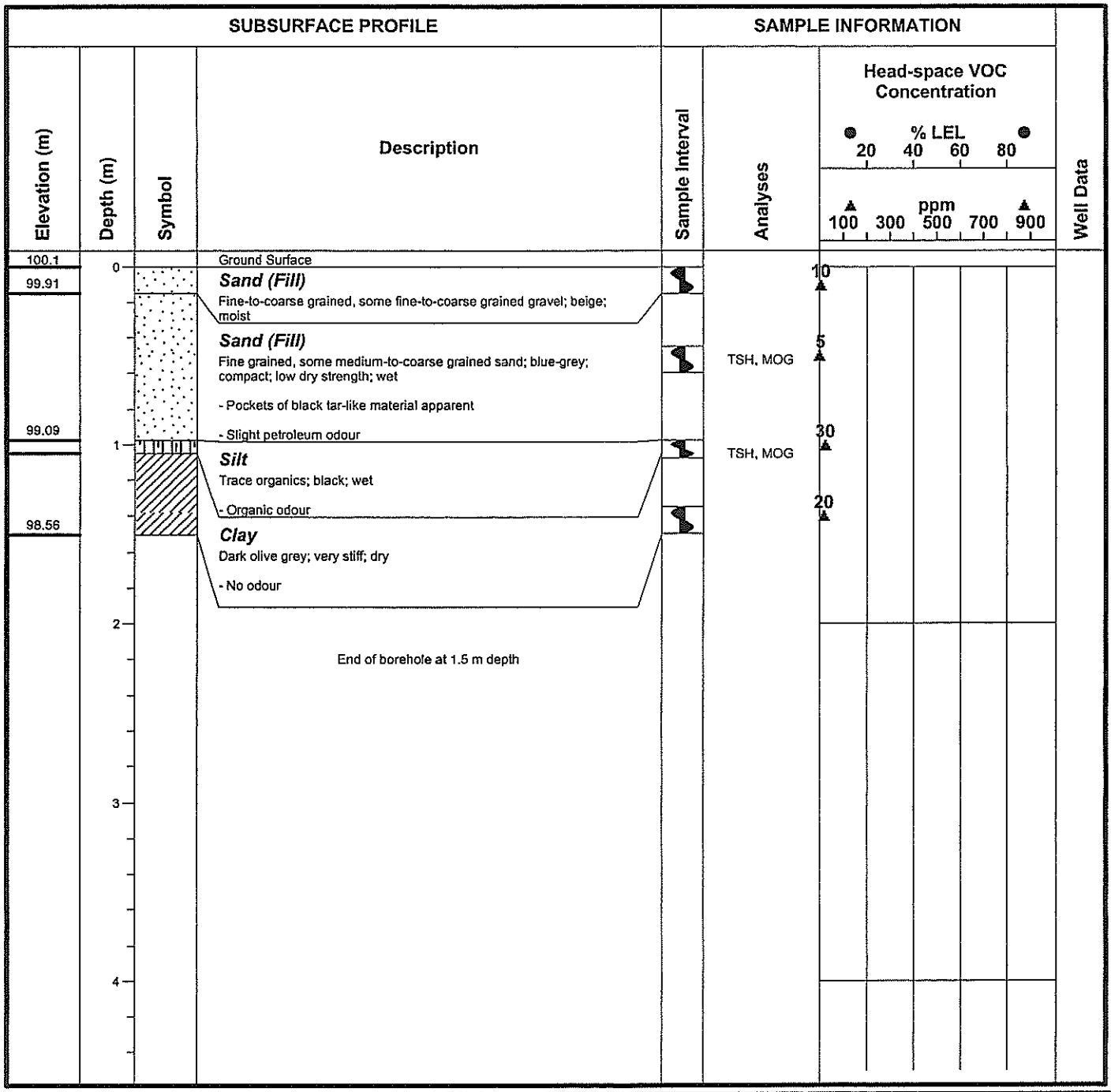
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-60

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Oil Drum Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



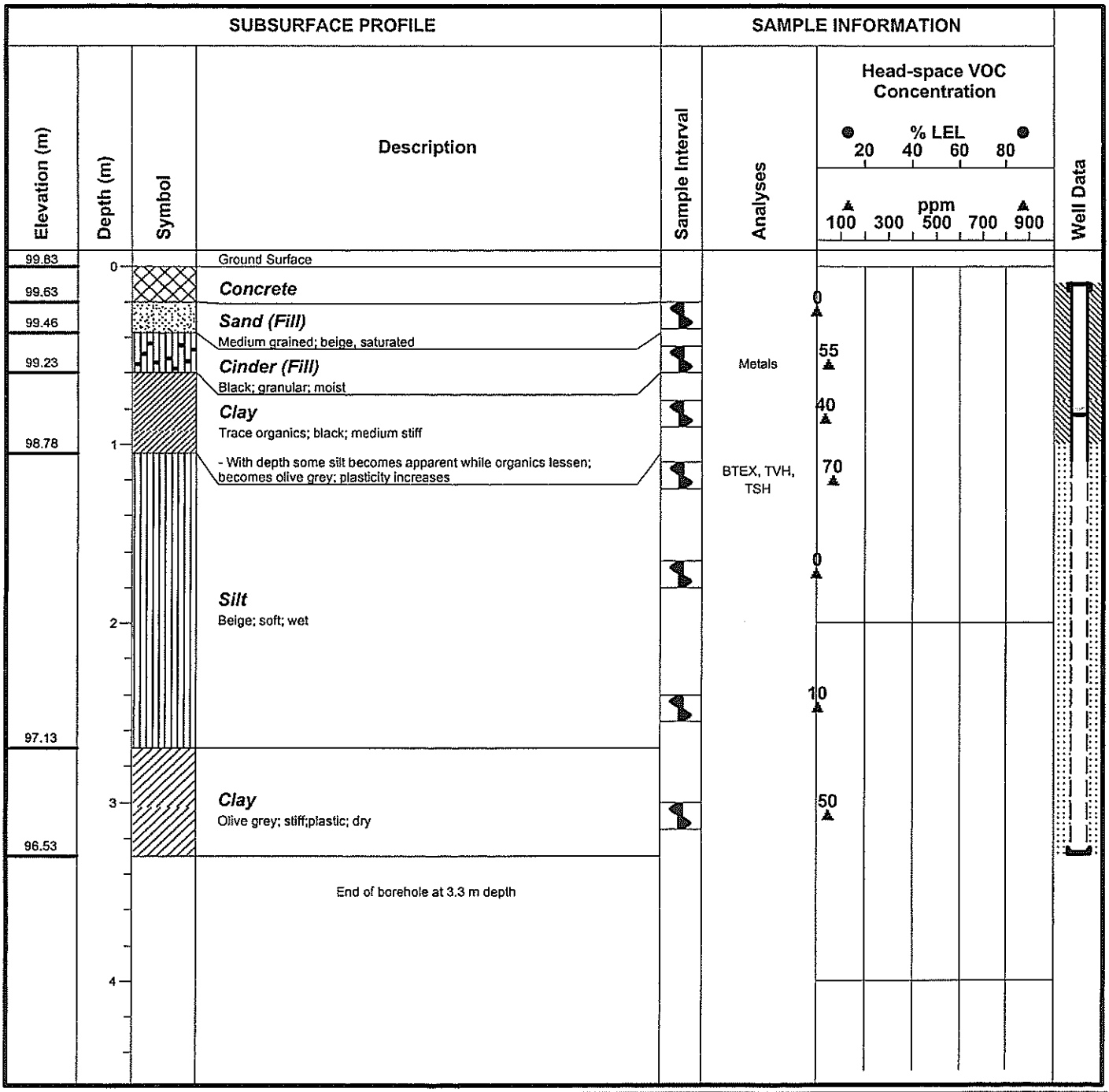
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-61

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Inside north end of Gate Shop
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



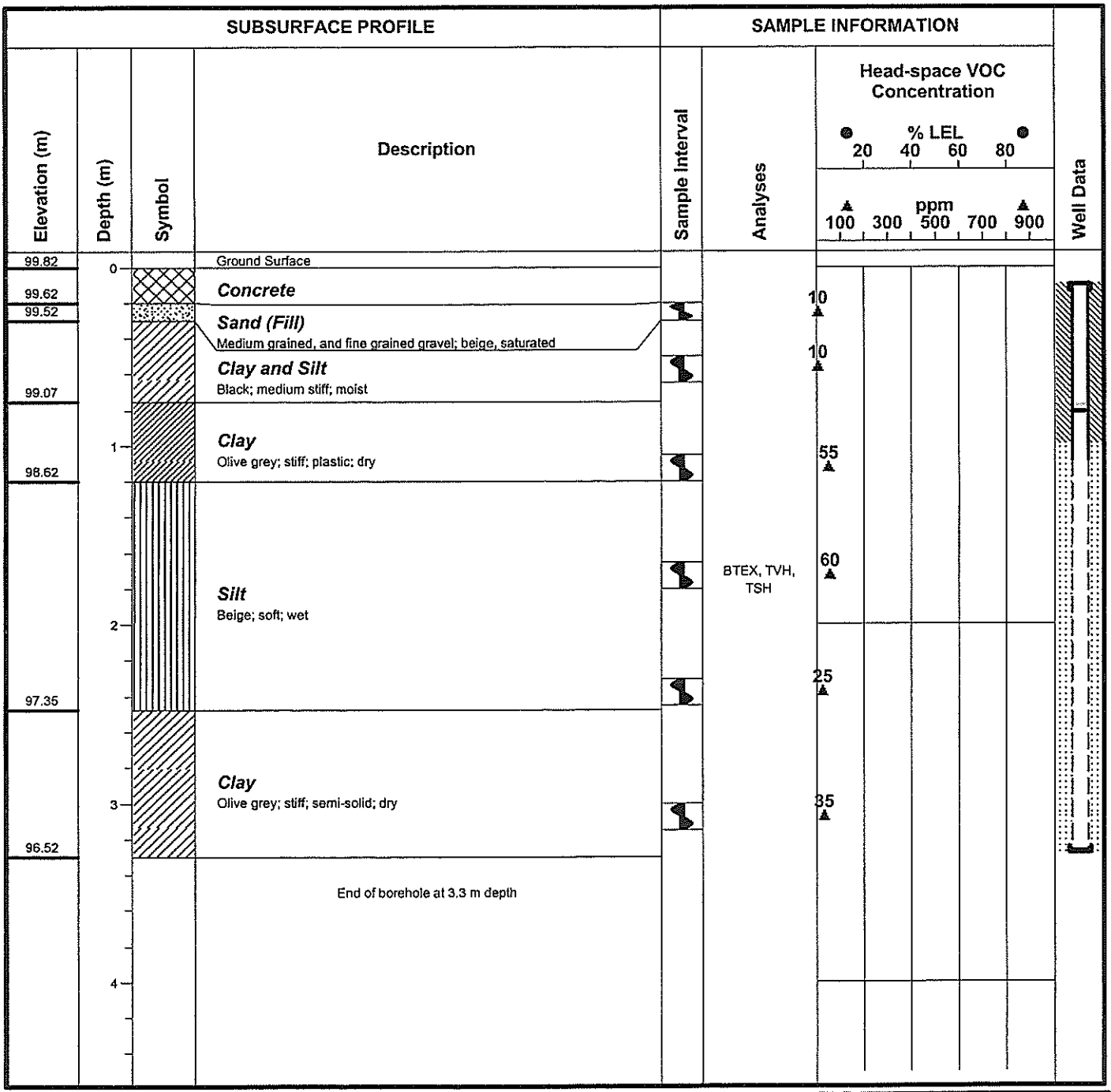
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.733 m

Water Table Elevation: 98.995 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-62

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Inside north end of Gate Shop
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.729 m

Water Table Elevation: 99.011 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

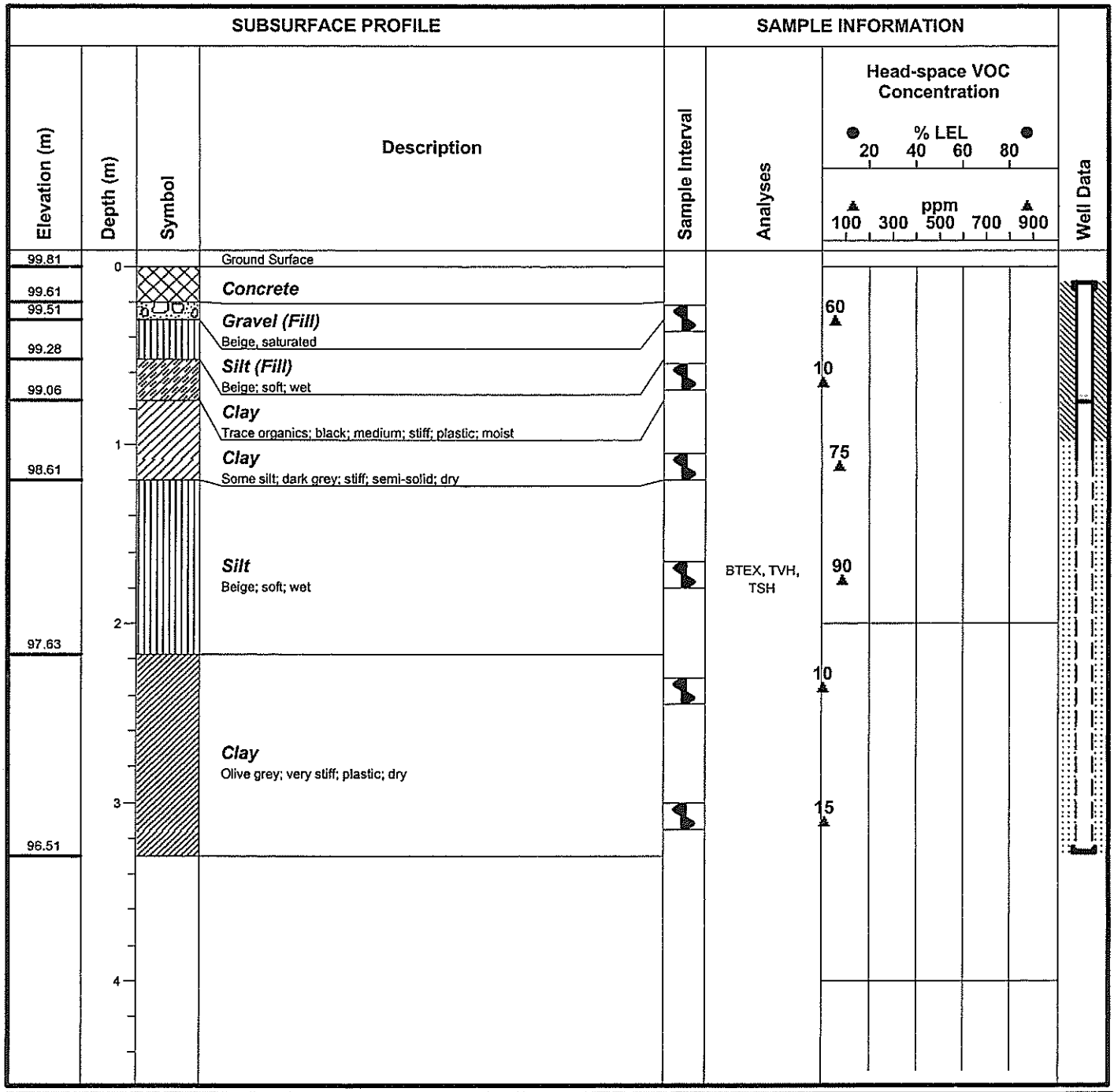
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-63

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Inside north end of Gate Shop

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.721 m

Water Table Elevation: 99.044 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

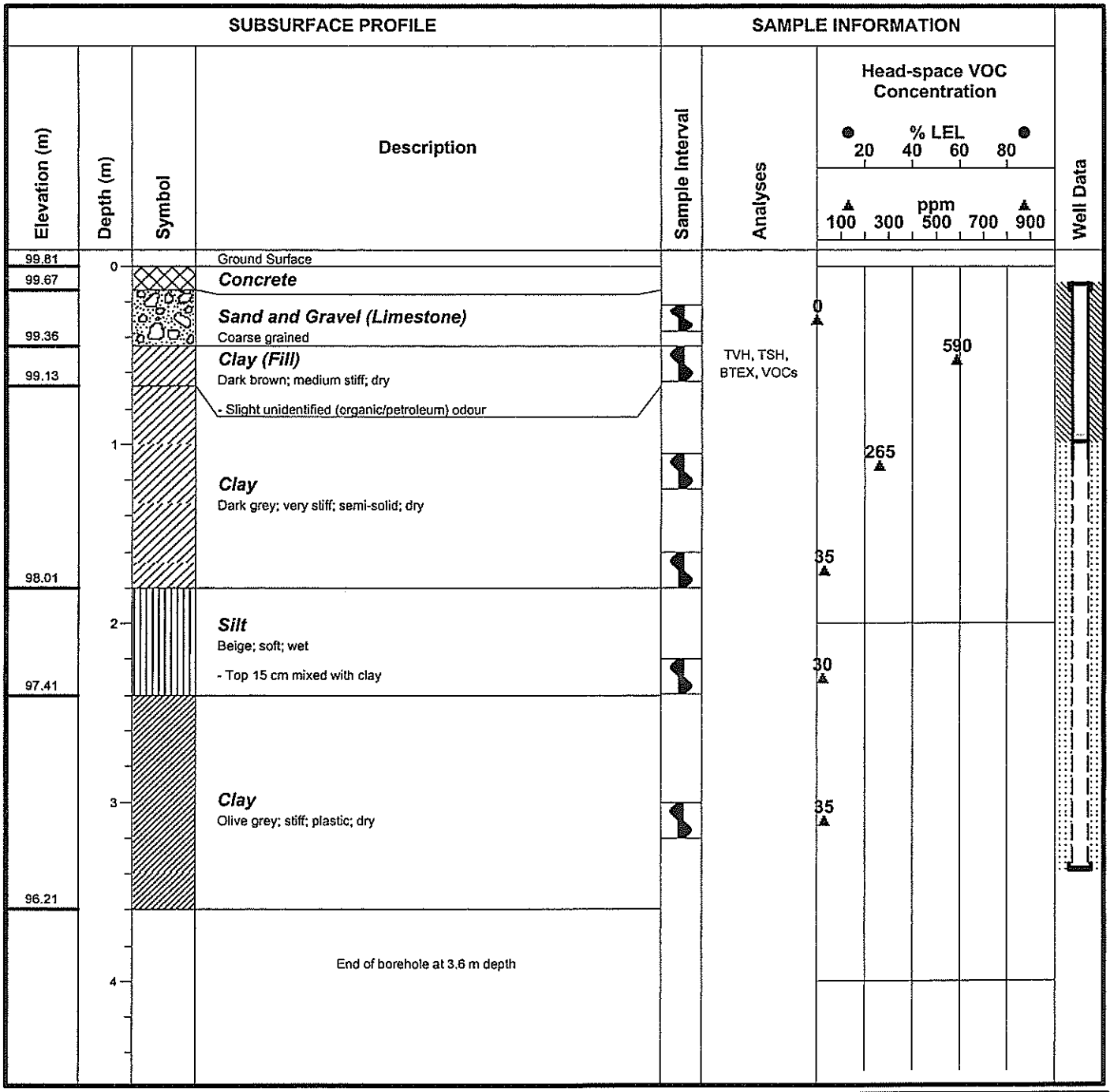
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-64

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Inside south end of Paint Shop

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/08



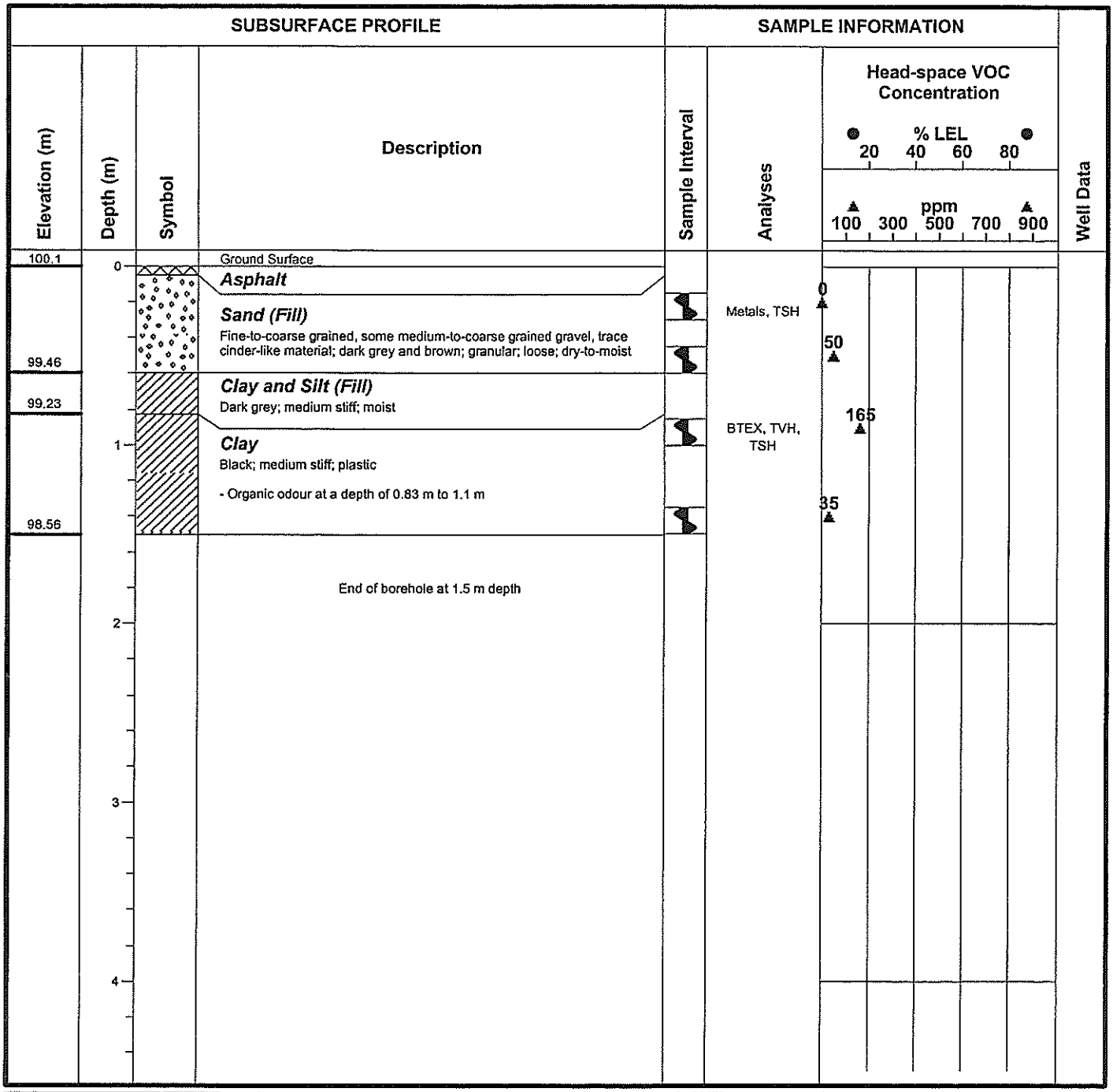
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: 99.712 m

Water Table Elevation: 98.821 m
Date Measured: 99/07/13
Well Materials: 50 mm dia. Sch. 40 PVC

WARDROP Engineering Inc.

BOREHOLE LOG: BH-65

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Oil Drum Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09



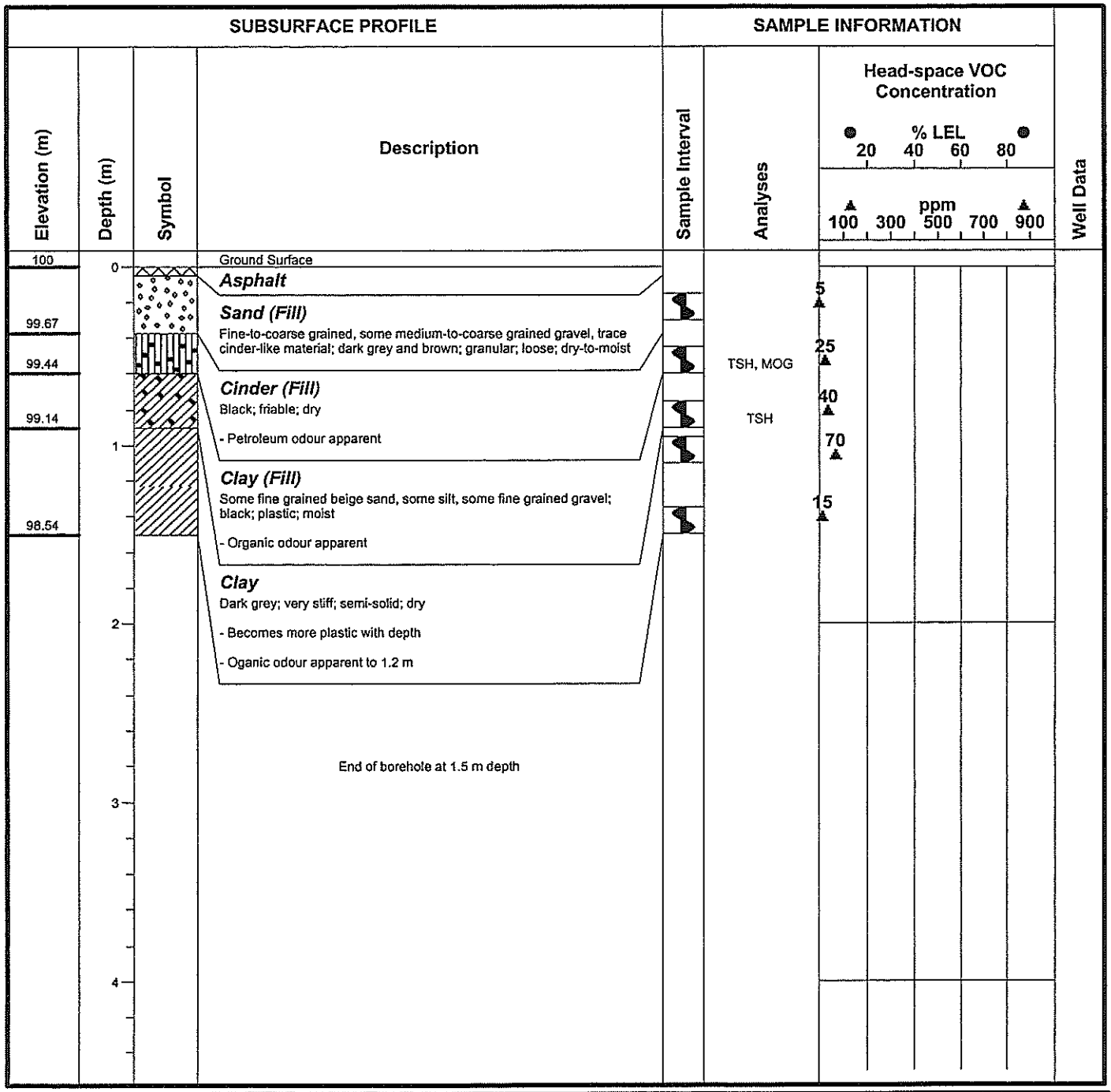
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-66

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Oil Drum Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-67

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Oil Drum Storage Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09

SUBSURFACE PROFILE				SAMPLE INFORMATION			
Elevation (m)	Depth (m)	Symbol	Description	Sample Interval	Analyses	Head-space VOC Concentration (% LEL: 20, 40, 60, 80; ppm: 100, 300, 500, 700, 900)	Well Data
99.98	0		Ground Surface				
			Gravel (Fill) Fine-to-coarse grained, some medium-to-coarse grained sand; grey; loose; moist			0	
99.53			- Wood chips apparent at 0.2 m			30	
			Clay (Fill) With silt, some wood chips; grey; soft; plastic; moist				
99.08			- Wood odour apparent		TSH	45	
	1		***Clay*** Trace silt, trace organics; dark grey; stiff; plastic-to-semi-solid; dry				
98.48			- Slight organic odour to 1.35 m			45	
			- With depth colour becomes lighter; plasticity increases; moisture increases				
	2		End of borehole at 1.5 m depth				
	3						
	4						

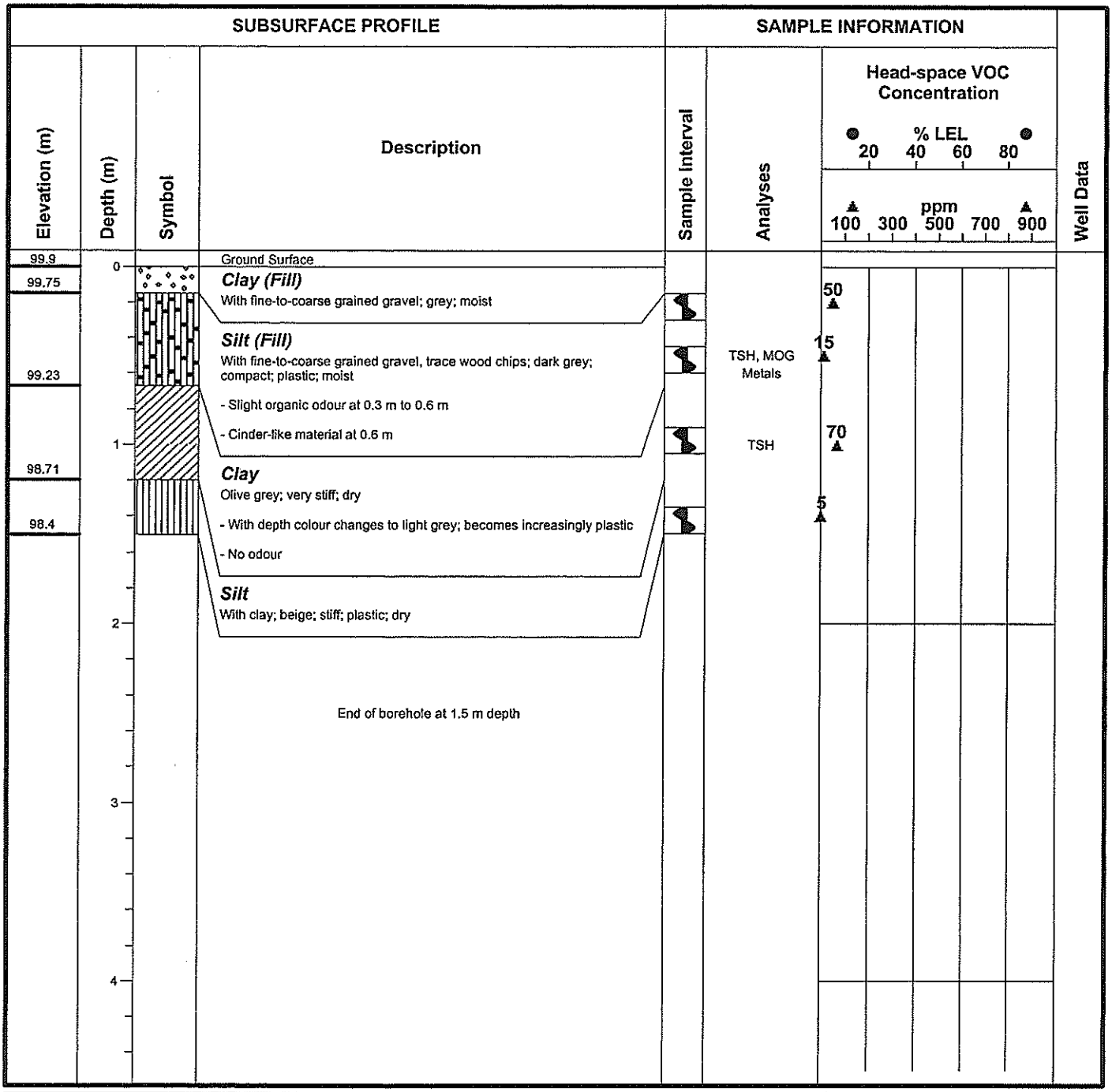
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-68

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Oil Drum Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

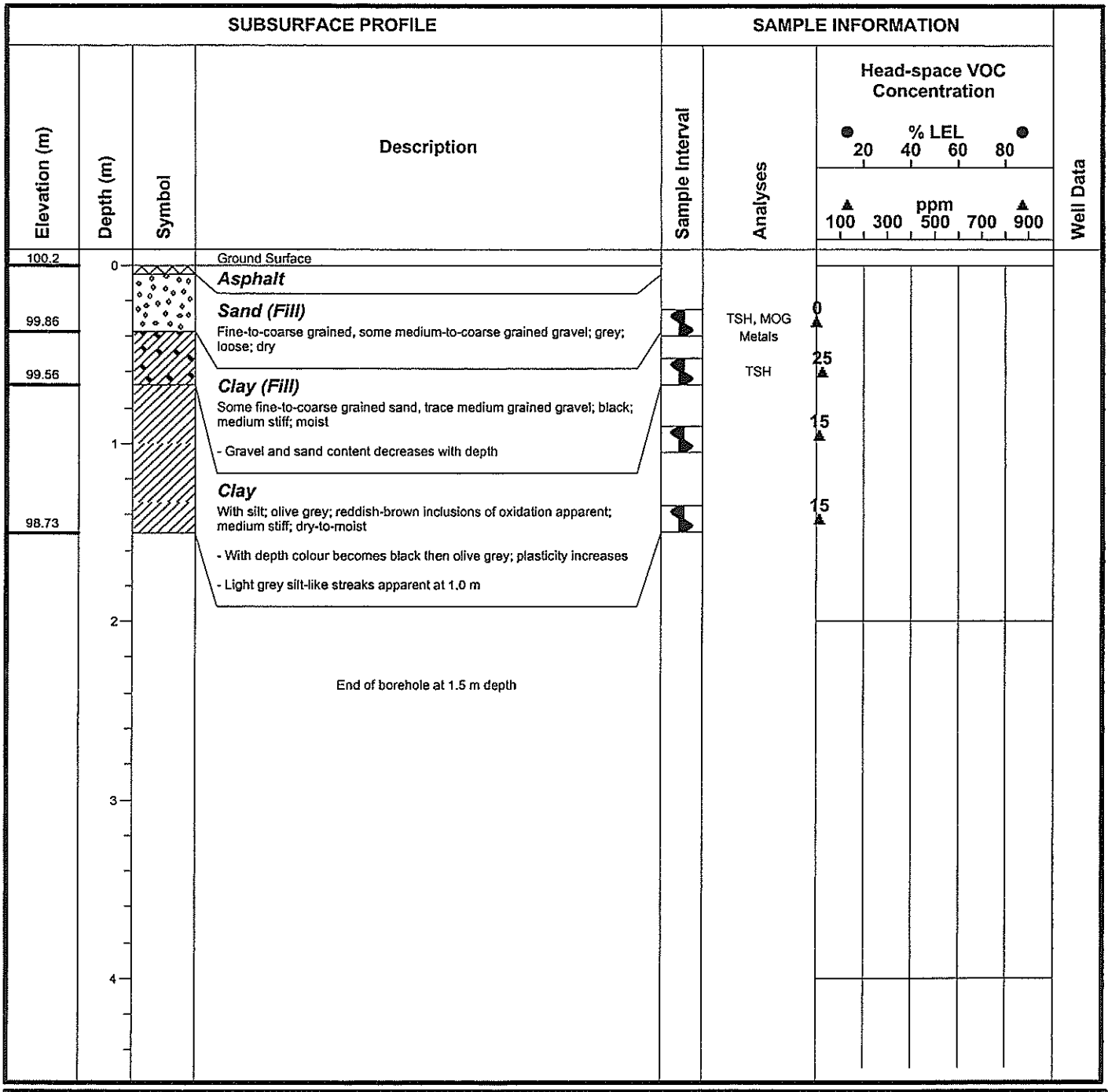
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-69

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Oil Drum Storage Area

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09



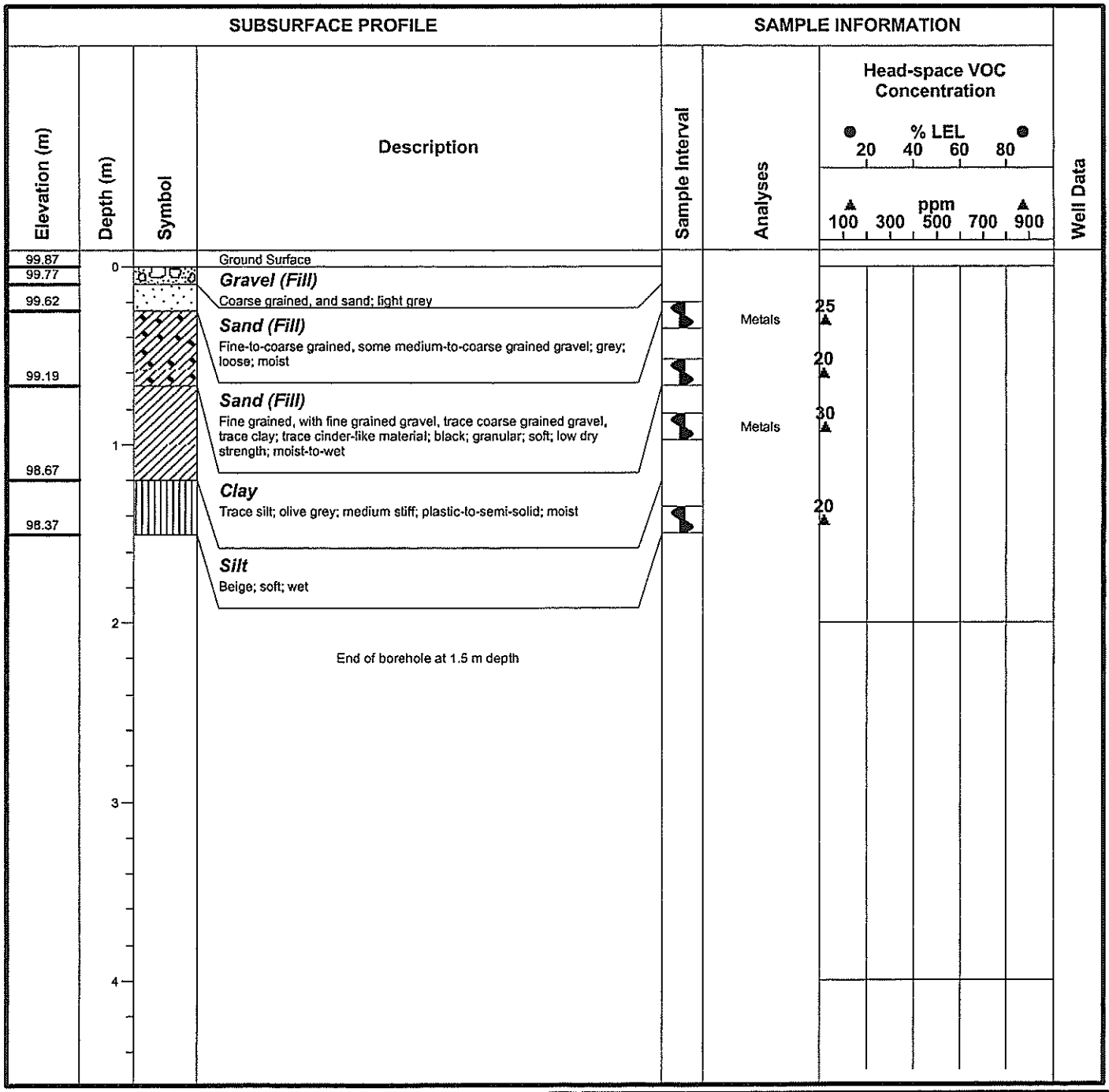
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-70

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Paint Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09



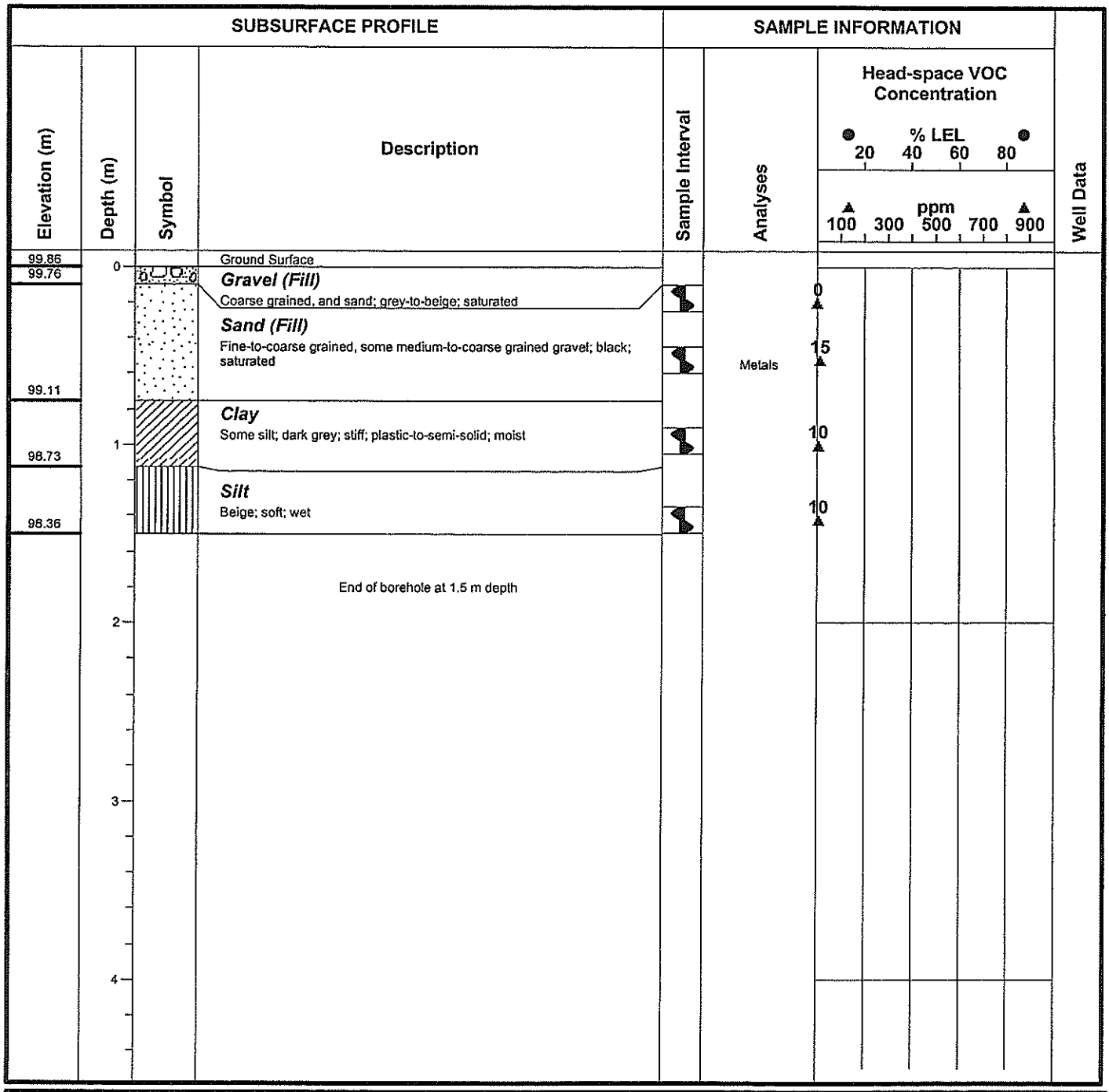
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-71

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Paint Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09



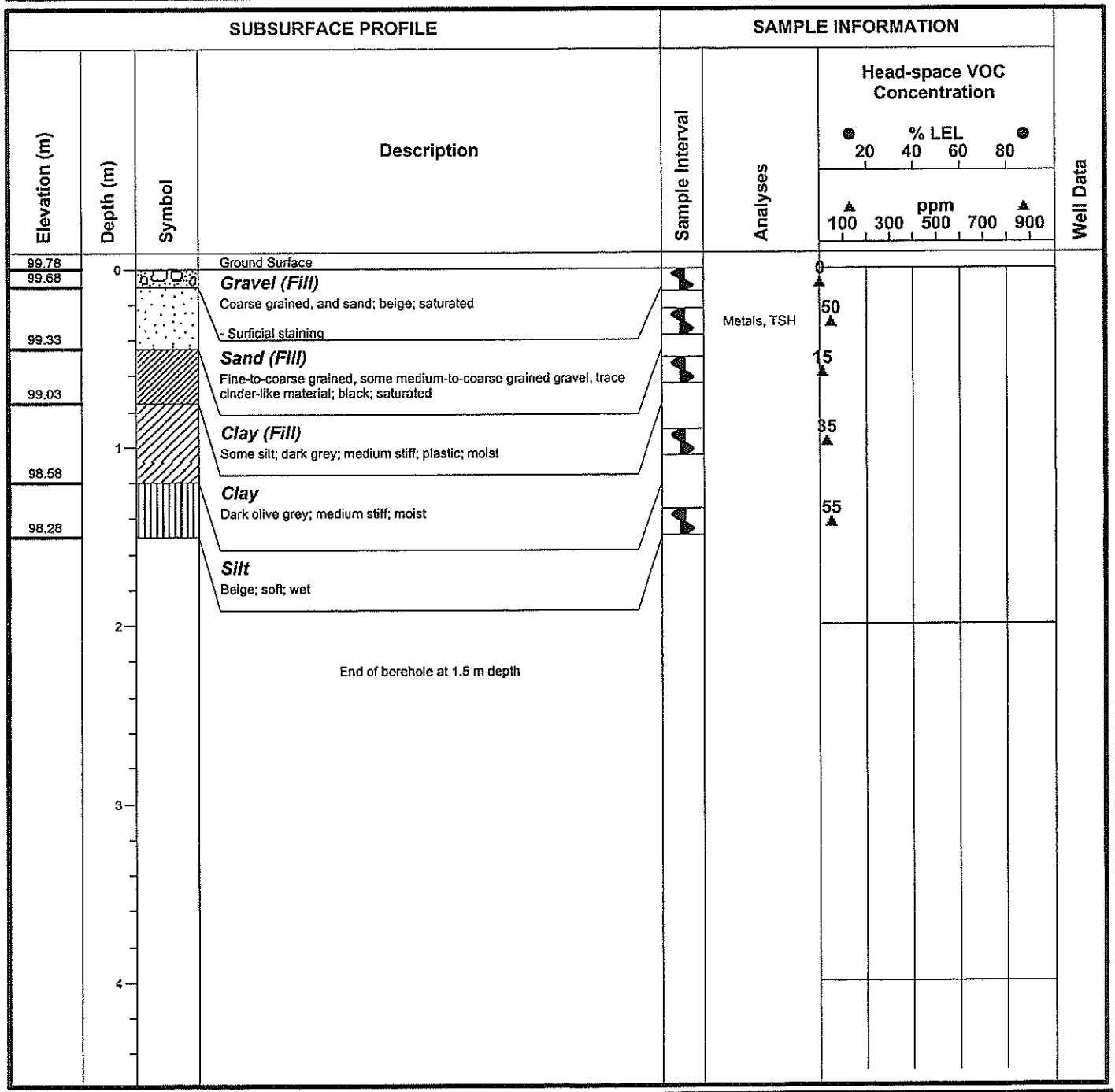
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP
Engineering Inc.

BOREHOLE LOG: BH-72

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.
Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Waste Paint Storage Area
Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

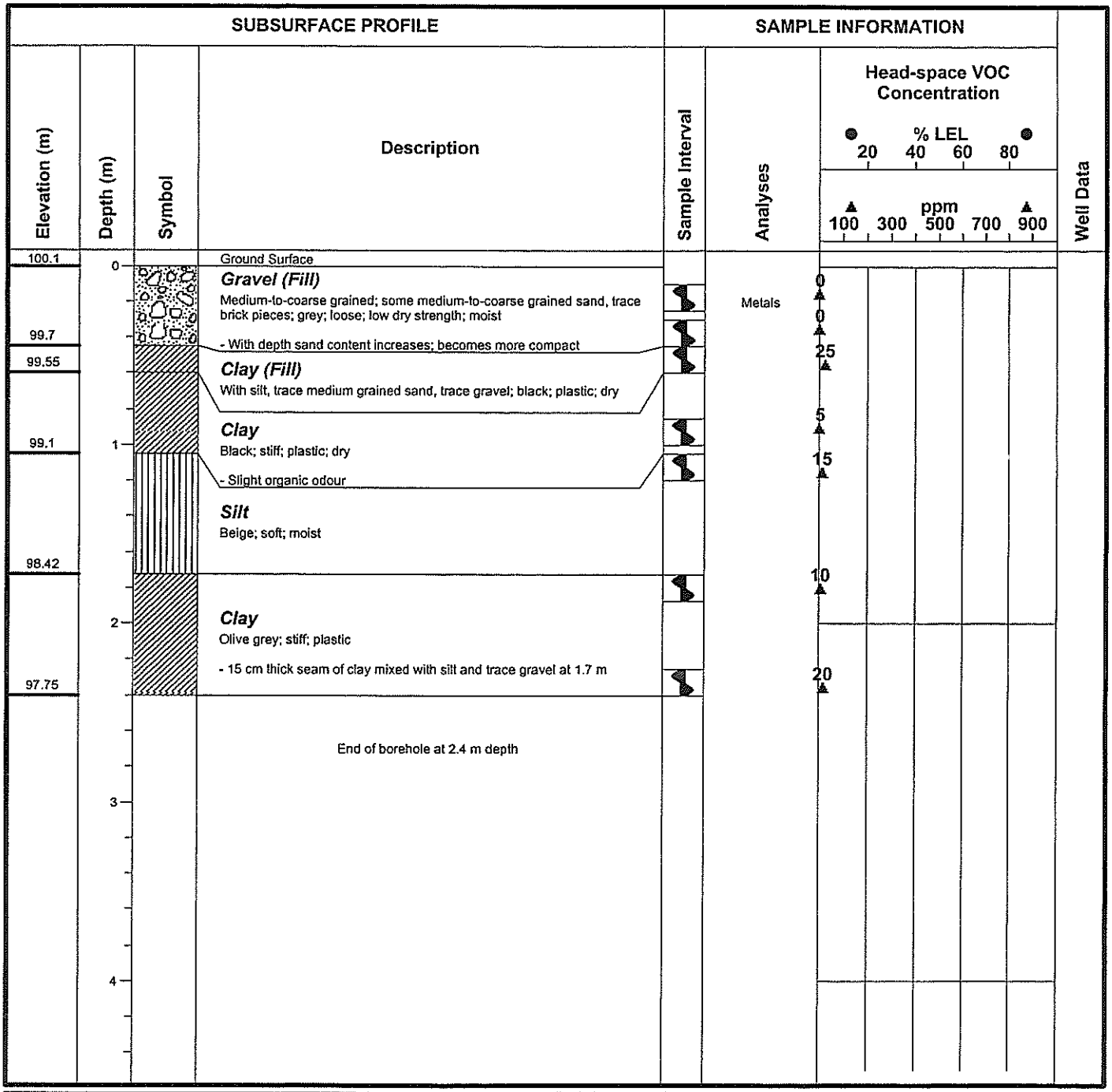
WARDROP
Engineering Inc.

BOREHOLE LOG: BH-73

Logged By: E.S.
Drawn By: E.S.
Checked By: J.D.N.

Client: Shelter Canadian Properties Limited
Project No.: 99149401-02
Borehole Location: Landfill Area: North of Omands Creek

Project: Dominion Bridge - Phase III ESA
Date Drilled: 99/07/09



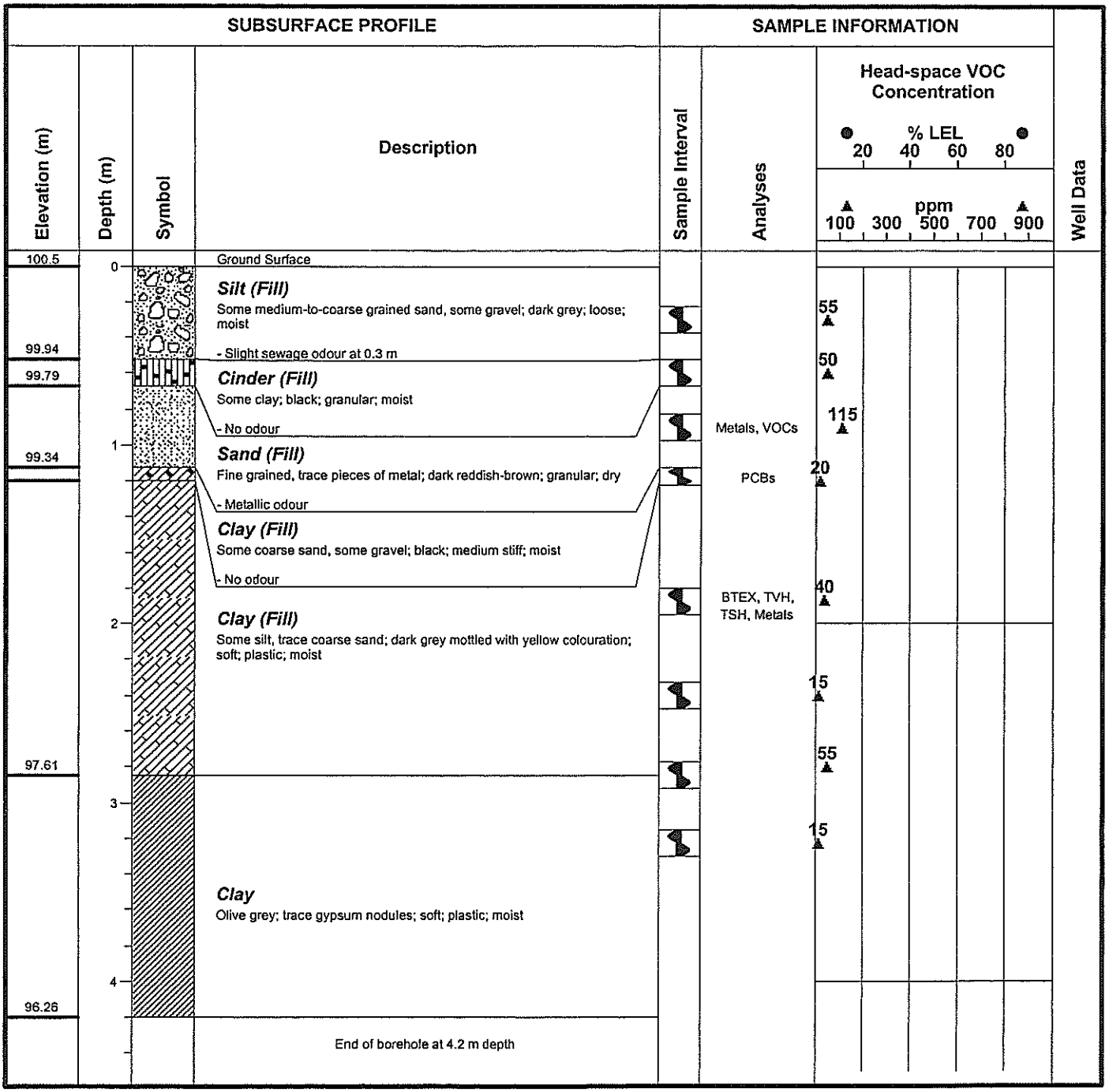
Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

WARDROP Engineering Inc.

BOREHOLE LOG: BH-74

Logged By: E.S. **Client:** Shelter Canadian Properties Limited **Project:** Dominion Bridge - Phase III ESA
Drawn By: E.S. **Project No.:** 99149401-02 **Date Drilled:** 99/07/09
Checked By: J.D.N. **Borehole Location:** Landfill Area: North of Omands Creek



Drilling Contractor: Maple Leaf Enterprises
Drill Type: 150 mm Dia. SS Augers
Datum: 100.000 m
Well Casing Elevation: Monitoring Well Not Installed

Water Table Elevation: Monitoring Well Not Installed
Date Measured: Monitoring Well Not Installed
Well Materials: Monitoring Well Not Installed

APPENDIX C

DATA TABLES

List of Tables

TABLE A

Soil Sample Analytical Results - Petroleum Hydrocarbons
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter	Analytical Results (mg/kg)												CCME Guidelines[1] (mg/kg)
	BH-2 0.6 m	BH-2 2.4 m	BH-3 1.2 m	BH-3 3.1 m	BH-4 0.6 m	BH-5 1.2 m	BH-6 0.6 m	BH-9 1.2 m	BH-10 1.2 m	BH-11 0.6 m	BH-15 3.1 m	BH-16 1.8 m	
BTEX:													
Benzene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	N.A.	<0.02	<0.02	<0.02	<0.02	5
Toluene	0.11	<0.02	<0.02	<0.02	<0.02	0.08	0.17	N.A.	<0.02	<0.02	<0.02	<0.02	0.8
Ethylbenzene	0.05	<0.03	<0.03	<0.03	<0.03	0.06	0.18	N.A.	<0.03	<0.03	<0.03	<0.03	20
Xylenes[2]	0.19	0.01	0.01	0.01	<0.01	0.18	1.01	N.A.	0.02	0.02	<0.02	<0.02	20
Total Volatile Hydrocarbons	<5	<5	<5	<5	8	<5	<0.5	N.A.	<5	<5	<5	<5	800[3]
Total Semi-Volatile Hydrocarbons	55	<5	47	220	480	1400	170	N.A.	82	310	18	<5	2000[3]
Mineral Oil and Grease	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<100	1300	N.A.	N.A.	5000[3]
Lead	26	<10	140	95	54	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	400
Total PCBs	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<0.2	N.A.	N.A.	N.A.	N.A.	33

Parameter	Analytical Results (mg/kg)												CCME Guidelines[1] (mg/kg)
	BH-20 0.6 m	BH-27 0.6 m	BH-28 0.6 m	BH-29 0.6 m	BH-31 0.6 m*	BH-31 1.8 m	BH-35 1.2 m	BH-37 0.6 m	BH-42 0.6 m*	BH-43 0.6 m	BH-45 0.3 m		
BTEX:													
Benzene	N.A.	<0.02	<0.02	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		5
Toluene	N.A.	<0.02	0.1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		0.8
Ethylbenzene	N.A.	<0.03	0.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		20
Xylenes[2]	N.A.	0.06	1.05	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		20
Total Volatile Hydrocarbons	N.A.	<5	28	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		800[3]
Total Semi-Volatile Hydrocarbons	N.A.	37	26000	N.A.	N.A.	N.A.	N.A.	150	N.A.	N.A.	N.A.		2000[3]
Mineral Oil and Grease	N.A.	170	32000	260	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		5000[3]
Lead	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	133		400
Total PCBs	0.5	N.A.	N.A.	2.5	1.5	11	1.3	N.A.	<0.1	<0.1	N.A.		33

Parameter	Analytical Results (mg/kg)												CCME Guidelines[1] (mg/kg)
	BH-46 0.6 m	BH-47 0.3 m	BH-48 0.3 m	BH-49 0.3 m	BH-50 0.3 m	BH-50 0.6 m	BH-51 0.3 m	BH-53 1.8 m	BH-54 0.3 m	BH-54 1.2 m	BH-57 0.3 m	BH-57 2.4 m	
BTEX:													
Benzene	N.A.	N.A.	N.A.	N.A.	< 0.02	N.A.	N.A.	< 0.02	<0.02	<0.02	< 0.02	< 0.02	5
Toluene	N.A.	N.A.	N.A.	N.A.	< 0.02	N.A.	N.A.	< 0.02	0.2	<0.02	0.1	< 0.02	0.8
Ethylbenzene	N.A.	N.A.	N.A.	N.A.	0.04	N.A.	N.A.	0.03	87	< 0.03	0.08	< 0.03	20
Xylenes[2]	N.A.	N.A.	N.A.	N.A.	0.07	N.A.	N.A.	0.03	334	0.05	0.34	<0.01	20
Total Volatile Hydrocarbons	N.A.	N.A.	N.A.	N.A.	8	N.A.	N.A.	< 5	380	< 5	< 5	< 5	800[3]
Total Semi-Volatile Hydrocarbons	N.A.	N.A.	N.A.	N.A.	140000	2900	N.A.	71	900	N.A.	690	< 5	2000[3]
Mineral Oil and Grease	N.A.	N.A.	N.A.	N.A.	N.A.	570	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	5000[3]
Lead	39	79	157	65	185	N.A.	401	N.A.	N.A.	N.A.	N.A.	N.A.	400
Total PCBs	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	33

Parameter	Analytical Results (mg/kg)												CCME Guidelines[1] (mg/kg)
	BH-58 0.6 m	BH-58 1.5 m	BH-59 0.3 m	BH-59 0.9 m	BH-60 0.6 m	BH-60 0.9 m	BH-61 1.2 m	BH-62 1.8 m	BH-63 1.8 m	BH-64 0.6 m	BH-65 0.3 m	BH-65 0.9 m	
BTEX:													
Benzene	< 0.02	< 0.02	N.A.	< 0.02	< 0.02	N.A.	< 0.02	< 0.02	<0.02	< 0.02	N.A.	<0.02	5
Toluene	< 0.02	< 0.02	N.A.	< 0.02	< 0.02	N.A.	< 0.02	< 0.02	<0.02	< 0.02	N.A.	<0.02	0.8
Ethylbenzene	< 0.03	< 0.03	N.A.	< 0.03	< 0.03	N.A.	< 0.03	< 0.03	<0.03	0.03	N.A.	<0.03	20
Xylenes[2]	<0.01	<0.01	N.A.	< 0.01	0.04	N.A.	< 0.01	< 0.01	<0.01	0.05	N.A.	<0.01	20
Total Volatile Hydrocarbons	< 5	< 5	67	< 5	< 5	N.A.	< 5	< 5	<5	5	N.A.	<5	800[3]
Total Semi-Volatile Hydrocarbons	230	6	N.A.	19	67000	64	< 5	< 5	6	970	16000	<5	2000[3]
Mineral Oil and Grease	400	200	800	160	13000	< 100	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	5000[3]
Lead	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	400
Total PCBs	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	33

Parameter	Analytical Results (mg/kg)												CCME Guidelines[1] (mg/kg)
	BH-66 0.6 m	BH- 66 0.9 m	BH-67 0.9 m	BH-68 0.6 m	BH-68 0.9 m	BH-69 0.3 m	BH-69 0.6 m	BH-72 0.3 m	BH-72 0.3 m	BH-74 1.2 m	BH-74 1.8 m		
BTEX:													
Benzene	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<0.02		5
Toluene	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<0.02		0.8
Ethylbenzene	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<0.03		20
Xylenes[2]	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<0.01		20
Total Volatile Hydrocarbons	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<5		800[3]
Total Semi-Volatile Hydrocarbons	430000	130	<5	1000	<5	1300	310	1600	1600	N.A.	<5		2000[3]
Mineral Oil and Grease	19000	N.A.	N.A.	2300	N.A.	1600	N.A.	N.A.	N.A.	N.A.	N.A.		5000[3]
Lead	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		400
Total PCBs	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<0.1	N.A.		33

Notes:

[1]Canadian Council of Ministers of the Environment Recommended Soil Quality Guidelines, Industrial (March 1997)
[2]Summation of m, p, and o Xylene concentration.
[3]Manitoba Environment Level I & II criteria for TSH and TVH, while not required by law, have been used for comparison.
*Composite of this borehole and the next numerical borehole
N.A. = Not Analyzed
Concentrations in excess of the CCME Commercial/Industrial Guideline Criteria are presented in BOLD

TABLE B

Soil Sample Analytical Results - Metals
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter		Analytical Results (mg/kg)										CCME Commercial/Industrial Guideline Concentration[1]
		BH-7 0.6 m	BH-17 0.6 m	BH-18 0.6 m	BH-19 0.6 m	BH-22 0.3 m	BH-24 0.6 m	BH-25 0.3 m	BH-29 1.2 m	BH-30 0.6 m	BH-30 1.2 m	
Head-Space Vapour Measurement		255 ppm	400 ppm	145 ppm	795 ppm	85 ppm	225 ppm	335 ppm	25 ppm	30 ppm	80 ppm	
Metals Concentrations												
Silver	(Ag)	<1	<1	<1	<1	<1	<1	<1	<1	<1	N.A.	40
Aluminum	(Al)	17700	3430	5930	1490	9510	5530	9140	32100	430	N.A.	N.G.
Barium	(Ba)	147	73	77.9	58.1	112	262	471	181	22.1	N.A.	2000
Beryllium	(Be)	<1	<1	<1	<1	<1	<1	<1	<1	<1	N.A.	8
Calcium	(Ca)	34200	55100	48700	14400	84300	89000	66800	9360	600	N.A.	N.G.
Cadmium	(Cd)	<0.5	6.3	14.4	21.6	<0.5	3.4	1.8	<0.5	<0.5	N.A.	27
Cobalt	(Co)	8	22	36	55	2	7	11	12	40	N.A.	300
Chromium	(Cr)	36.4	36.4	**2930**	**458**	50.7	62.9	68.5	52.5	**780**	62.3	87
Copper	(Cu)	27	86	**510**	**467**	24	98	**229**	23	**744**	34	100
Iron	(Fe)	25200	225000	386000	553000	17400	72300	43200	29300	666000	N.A.	N.G.
Potassium	(K)	4520	780	1070	300	3030	1420	1560	6350	50	N.A.	N.G.
Magnesium	(Mg)	19300	27300	14000	4650	43400	48100	19900	9620	270	N.A.	N.G.
Manganese	(Mn)	327	1300	6130	7370	331	528	411	333	5680	N.A.	N.G.
Mercury	(Hg)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	30
Molybdenum	(Mo)	4	6	**61**	**81**	<1	10	8	<1	**126**	< 1	40
Sodium	(Na)	400	100	300	200	1200	200	800	200	<100	N.A.	N.G.
Nickel	(Ni)	38	<200	**633**	**512**	28	57	47	32	355	N.A.	500
Lead	(Pb)	32	149	280	353	**555**	**687**	**701**	17	73	N.A.	400
Phosphorus	(P)	510	910	1580	250	370	410	810	510	110	N.A.	N.G.
Tin	(Sn)	<5	<5	<5	7	<5	<5	<5	<5	34	N.A.	300
Strontium	(Sr)	58	45	32	12	73	67	278	58	2	N.A.	N.G.
Titanium	(Ti)	51	93	438	353	251	132	380	340	17	N.A.	N.G.
Thallium	(Tl)	<1	<1	<1	<1	<1	<1	<1	<1	<1	N.A.	N.G.
Vanadium	(V)	37	7	<1	<1	23	10	24	71	53	N.A.	130
Zinc	(Zn)	123	84.9	**15600**	**1720**	**23000**	**673**	**470**	84.2	73.6	N.A.	380

Notes:

[1]Canadian Council of Ministers of the Environment, Commercial Recommended Soil Quality Guidelines (March 1997)

N.A. = Not Analysed

N.G. = No Guideline criteria established

Concentrations in excess of the CCME Commercial/Industrial Guideline Criteria are presented in BOLD

TABLE B continued

Soil Sample Analytical Results - Metals
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter		Analytical Results (mg/kg)									CCME Commercial/Industrial Guideline Concentration[1]
		BH-31 0.6 m	BH-31 2.4 m	BH-32 0.6 m	BH-33 0.6 m	BH-34 0.6 m	BH-35 0.6 m	BH-37 0.6 m	BH-37 1.2 m	BH-38 0.6 m	
Head-Space Vapour Measurement		60 ppm	65 ppm	55 ppm	5 ppm	10 ppm	35 ppm	495 ppm	45 ppm	90 ppm	
Metals Concentrations											
Silver	(Ag)	<1	<1	<1	<1	<1	<1	<1	<1	<1	40
Aluminum	(Al)	23200	24200	20400	22100	19700	19200	3310	53300	20000	N.G.
Barium	(Ba)	327	172	424	159	344	292	883	299	198	2000
Beryllium	(Be)	<1	<1	<1	<1	<1	<1	<1	<1	<1	8
Calcium	(Ca)	60300	74800	35700	57200	62200	50200	15300	11500	69500	N.G.
Cadmium	(Cd)	0.6	<0.5	0.5	<0.5	<0.5	0.5	4.9	<0.5	<0.5	27
Cobalt	(Co)	11	8	10	8	13	20	36	15	8	300
Chromium	(Cr)	63.2	41.3	44.7	38.3	78.9	**99.3**	**714**	78.6	37.4	87
Copper	(Cu)	**137**	22	45	26	70	**156**	**591**	35	36	100
Iron	(Fe)	41100	20000	25500	24200	53200	79600	507000	39600	26400	N.G.
Potassium	(K)	5310	4860	4670	5310	3970	3630	500	9930	4040	N.G.
Magnesium	(Mg)	27700	43700	18200	28100	31100	25000	5700	15100	36600	N.G.
Manganese	(Mn)	558	388	345	540	645	1060	6310	577	409	N.G.
Mercury	(Hg)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.21	N.A.	N.A.	30
Molybdenum	(Mo)	3	<1	1	<1	5	5	**65**	< 1	<1	40
Sodium	(Na)	500	600	600	300	400	600	300	500	400	N.G.
Nickel	(Ni)	40	27	26	25	48	102	252	49	26	500
Lead	(Pb)	355	16	134	29	469	367	**5620**	48	114	400
Phosphorus	(P)	780	420	650	720	450	490	160	510	480	N.G.
Tin	(Sn)	<5	<5	<5	<5	<5	<5	18	<5	<5	300
Strontium	(Sr)	114	78	133	97	102	96	24	72	77	N.G.
Titanium	(Ti)	231	533	218	403	251	269	933	514	268	N.G.
Thallium	(Tl)	<1	<1	<1	<1	<1	<1	<1	<1	<1	N.G.
Vanadium	(V)	51	60	42	46	47	51	51	117	44	130
Zinc	(Zn)	300	**61.1**	199	172	**866**	**953**	**14300**	183	**885**	380

Notes:

[1]Canadian Council of Ministers of the Environment, Commercial Recommended Soil Quality Guidelines (March 1997)

N.G. = No Guideline criteria established

Concentrations in excess of the CCME Commercial/Industrial Guideline Criteria are presented in BOLD

TABLE B continued

Soil Sample Analytical Results - Metals
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter		Analytical Results (mg/kg)										CCME Commercial/Industrial Guideline Concentration[1]
		BH-39 0.6 m	BH-39 1.2 m	BH-40 0.6 m	BH-44 0.6 m	BH-44 1.2 m	BH-45 0.3 m	BH-46 0.6 m	BH-47 0.3 m	BH-48 0.3 m	BH-49 0.3 m	
Head-Space Vapour Measurement		25 ppm	65 ppm	0 ppm	95 ppm	20 ppm	0 ppm	90 ppm	0 ppm	15 ppm	20 ppm	
Metals Concentrations												
Silver	(Ag)	<1	N.A.	<1	<1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	40
Aluminum	(Al)	14000	N.A.	5950	16600	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Barium	(Ba)	336	N.A.	102	249	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	2000
Beryllium	(Be)	<1	N.A.	<1	<1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	8
Calcium	(Ca)	47300	N.A.	64100	71700	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Cadmium	(Cd)	1.3	N.A.	3.4	1.0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	27
Cobalt	(Co)	22	N.A.	22	10	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	300
Chromium	(Cr)	21.8	N.A.	**331**	**181**	45.3	N.A.	N.A.	N.A.	N.A.	N.A.	87
Copper	(Cu)	**260**	28	**287**	87	N.A.	**124**	**128**	26	**102**	**1860**	100
Iron	(Fe)	199000	N.A.	292000	38900	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Potassium	(K)	2730	N.A.	1270	3490	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Magnesium	(Mg)	23800	N.A.	25100	34700	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Manganese	(Mn)	1880	N.A.	2210	855	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Mercury	(Hg)	N.A.	N.A.	0.09	0.85	N.A.	N.A.	N.A.	N.A.	N.A.	0.18	30
Molybdenum	(Mo)	29	N.A.	38	2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	40
Sodium	(Na)	400	N.A.	500	400	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Nickel	(Ni)	127	N.A.	123	72	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	500
Lead	(Pb)	**1170**	20	**537**	**970**	55	133	39	79	157	65	400
Phosphorus	(P)	710	N.A.	260	400	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Tin	(Sn)	<5	N.A.	<5	<5	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	300
Strontium	(Sr)	53	N.A.	44	83	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Titanium	(Ti)	176	N.A.	217	333	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Thallium	(Tl)	<1	N.A.	<1	<1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Vanadium	(V)	40	N.A.	24	46	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	130
Zinc	(Zn)	**6620**	103	**2430**	**9030**	**840**	**1680**	136	**1770**	**2570**	**947**	380

Notes:

[1]Canadian Council of Ministers of the Environment, Commercial Recommended Soil Quality Guidelines (March 1997)

N.A. = Not Analysed

N.G. = No Guideline criteria established

Concentrations in excess of the CCME Commercial/Industrial Guideline Criteria are presented in BOLD

TABLE B continued

Soil Sample Analytical Results - Metals
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter		Analytical Results (mg/kg)										CCME Commercial/Industrial Guideline Concentration[1]
		BH-49 0.6 m	BH-50 0.3 m	BH-50 0.6 m	BH-51 0.3 m	BH-55 0.6 m	BH-56 0.6 m	BH-57 0.6 m	BH-59 0.3 m	BH-61 0.6 m	BH-65 0.3 m	
Head-Space Vapour Measurement		15 ppm	75 ppm	55 ppm	5 ppm	55 ppm	20 ppm	35 ppm	15 ppm	55 ppm	0 ppm	
Metals Concentrations												
Silver	(Ag)	N.A.	N.A.	<1	N.A.	N.A.	<1	<1	<1	<1	<1	40
Aluminum	(Al)	N.A.	N.A.	36700	N.A.	N.A.	8270	11400	20500	7120	4460	N.G.
Barium	(Ba)	N.A.	N.A.	233	N.A.	N.A.	159	158	416	603	39.1	2000
Beryllium	(Be)	N.A.	N.A.	<1	N.A.	N.A.	<1	<1	<1	<1	<1	8
Calcium	(Ca)	N.A.	N.A.	25100	N.A.	N.A.	21200	26300	40100	12100	165000	N.G.
Cadmium	(Cd)	N.A.	N.A.	< 0.5	N.A.	N.A.	< 0.5	< 0.5	1.8	< 0.5	< 0.5	27
Cobalt	(Co)	N.A.	N.A.	10	N.A.	N.A.	9	9	15	5	3	300
Chromium	(Cr)	N.A.	N.A.	58.2	N.A.	N.A.	20.7	28.3	46.3	10.5	12	87
Copper	(Cu)	33	**203**	34	53	21	48	53	66	39	19	100
Iron	(Fe)	N.A.	N.A.	28100	N.A.	N.A.	30300	33600	32000	11600	11000	N.G.
Potassium	(K)	N.A.	N.A.	7100	N.A.	N.A.	1330	2330	4020	570	1530	N.G.
Magnesium	(Mg)	N.A.	N.A.	17100	N.A.	N.A.	8630	13000	16900	3440	66200	N.G.
Manganese	(Mn)	N.A.	N.A.	306	N.A.	N.A.	229	345	444	94.5	276	N.G.
Mercury	(Hg)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	30
Molybdenum	(Mo)	N.A.	N.A.	< 1	N.A.	N.A.	2	< 1	1	2	<1	40
Sodium	(Na)	N.A.	N.A.	600	N.A.	N.A.	300	300	400	300	300	N.G.
Nickel	(Ni)	N.A.	N.A.	34	N.A.	N.A.	23	29	35	20	9	500
Lead	(Pb)	N.A.	186	40	401	40	171	175	300	122	42	400
Phosphorus	(P)	N.A.	N.A.	560	N.A.	N.A.	310	320	960	870	220	N.G.
Tin	(Sn)	N.A.	N.A.	< 5	N.A.	N.A.	< 5	< 5	< 5	< 5	< 5	300
Strontium	(Sr)	N.A.	N.A.	67	N.A.	N.A.	90	80	223	227	66	N.G.
Titanium	(Ti)	N.A.	N.A.	487	N.A.	N.A.	303	275	113	263	261	N.G.
Thallium	(Tl)	N.A.	N.A.	< 1	N.A.	N.A.	<1	< 1	<1	<1	<1	N.G.
Vanadium	(V)	N.A.	N.A.	92	N.A.	N.A.	26	34	50	20	11	130
Zinc	(Zn)	102	**1720**	**398**	209	60.2	88.4	**115**	233	91.1	96.2	380

Notes:

[1]Canadian Council of Ministers of the Environment, Commercial Recommended Soil Quality Guidelines (March 1997)

N.A. = Not Analysed

N.G. = No Guideline criteria established

Concentrations in excess of the CCME Commercial/Industrial Guideline Criteria are presented in BOLD

TABLE B continued

Soil Sample Analytical Results - Metals
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter		Analytical Results (mg/kg)										CCME Commercial/Industrial Guideline Concentration[1]
		BH-68 0.6 m	BH-69 0.3 m	BH-70 0.3 m	BH-70 0.9 m	BH-71 0.6 m	BH-72 0.3 m	BH-73 0.3 m	BH-74 0.9 m	BH-74 1.8 m	Wheelabrator Dust	
Head-Space Vapour Measurement		15 ppm	0 ppm	25 ppm	30 ppm	15 ppm	50 ppm	0 ppm	115 ppm	40 ppm	N.A.	
Metals Concentrations												
Silver	(Ag)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	40
Aluminum	(Al)	27400	7720	7520	39200	8500	7370	8210	9800	13900	300	N.G.
Barium	(Ba)	229	101	311	237	254	363	203	321	132	1110	2000
Beryllium	(Be)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	8
Calcium	(Ca)	58500	149000	97100	32200	44400	42700	145000	31900	85000	4630	N.G.
Cadmium	(Cd)	< 0.5	< 0.5	0.7	< 0.5	< 0.5	0.7	< 0.5	1.9	< 0.5	23	27
Cobalt	(Co)	10	2	4	14	11	8	5	17	6	70	300
Chromium	(Cr)	31.3	9.2	18.9	54.4	41.1	32.6	16.8	**142**	24.9	**978**	87
Copper	(Cu)	33	9	61	29	**129**	88	17	**631**	16	**1950**	100
Iron	(Fe)	21600	6630	17900	31200	108000	48200	13400	211000	14600	577000	N.G.
Potassium	(K)	5130	1850	1520	7240	1540	1170	2990	2220	3350	80	N.G.
Magnesium	(Mg)	28500	60200	52100	17800	18000	18300	71400	15400	40900	1620	N.G.
Manganese	(Mn)	378	192	224	485	721	384	255	3020	335	5620	N.G.
Mercury	(Hg)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.11	N.A.	30
Molybdenum	(Mo)	<1	<1	2	<1	3	3	< 1	9	<1	**278**	40
Sodium	(Na)	600	600	400	400	500	400	700	200	300	100	N.G.
Nickel	(Ni)	28	7	15	41	39	26	14	122	18	**1250**	500
Lead	(Pb)	86	18	201	23	377	383	200	**4900**	19	64	400
Phosphorus	(P)	540	240	350	450	500	480	290	380	540	910	N.G.
Tin	(Sn)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	22	300
Strontium	(Sr)	97	81	100	89	140	131	123	84	132	27	N.G.
Titanium	(Ti)	84	211	141	220	310	265	101	178	366	123	N.G.
Thallium	(Tl)	<1	<1	<1	<1	<1	< 1	< 1	<1	<1	<1	N.G.
Vanadium	(V)	46	12	16	77	27	24	16	28	36	<1	130
Zinc	(Zn)	106	50	**460**	83	268	**412**	179	**582**	40.3	**88400**	380

Notes:

[1]Canadian Council of Ministers of the Environment, Commercial Recommended Soil Quality Guidelines (March 1997)

N.A. = Not Analysed

N.G. = No Guideline criteria established

Concentrations in excess of the CCME Commercial/Industrial Guideline Criteria are presented in BOLD

TABLE C

Soil Sample Analytical Results - Volatile Organic Compounds (VOCs)
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter	Analytical Results (mg/kg)											CCME Guideline Concentrations[1]
	BH-8 0.3 m	BH-18 0.6 m	BH-19 0.6 m	BH-24 0.6 m	BH-25 0.3 m	BH-30 2.4 m	BH-34 1.2 m	BH-34 3.0 m	BH-37 0.6 m	BH-64 0.6 m	BH-74 0.9 m	
Head-Space Vapour Measurement	175 ppm	145 ppm	795 ppm	225 ppm	335 ppm	190 ppm	80 ppm	715 ppm	495 ppm	590 ppm	115 ppm	N.G.
EPA Volatile Target Compounds 624/8240												
Dichlorodifluoromethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Chloromethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Vinyl Chloride	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Bromomethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Chloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Ethanol	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Trichlorofluoromethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Acrolein	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Acetone	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	3100	N.D.	3200	11000	N.D.	N.G.
1,1-Dichlorethene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	50
Iodomethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Carbon Disulfide	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Methylene chloride	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	100	34	24	41	N.G.
Acrylonitrile	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
trans-1,2-Dichloroethene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Vinyl Acetate	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
1,1- Dichoroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	50
2-Butanone (MEK)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Chloroform	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
1,1,1-Trichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	50
Carbon Tetrachloride	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Benzene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	5[2]
1,2-Dichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	50
Trichloroethene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	50
1,2-Dichloropropane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	50
Bromodichloromethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Dibromomethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
2-Chloroethylvinylether	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
4-Methyl-2-pentanone (MIBK)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
cis-1,3-Dichloropropane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Toluene	40	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	0.8[2]
Ethyl methacrylate	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
trans-1,3-Dichloropropene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
2-Hexanone	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
1,1,2-Trichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	50
Tetrachloroethylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Dibromomethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Ethylene dibromide	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Chlorobenzene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	10
Ethylbenzene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	20[2]
m+p-Xylenes	21	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	20[3]
o-Xylenes	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	20[3]
Styrene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G
cis-1,4-Dichloro-2-butent	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Bromoform	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
1,1,2,2-Tetrachloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	50
1,2,3-Trichloropropane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
trans-1,4-Dichloro-2-butene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
1,3-Dichlorobenzene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	10
1,4-Dichlorobenzene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	10
1,2-Dichlorobenzene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.	N.D.	N.D.	10

Notes:

[1]Canadian Council of Ministers of the Environment, Industrial Recommended Soil Quality Guidelines (March 1997)
[2]Canadian Council of Ministers of the Environment, Interim Remediation Criteria for Soil, 1991
[3]Summation of m, p, and o Xylenes concentrations
N.G. = No Guideline criteria established
Concentrations in excess of the CCME Guideline Criteria are presented in BOLD text

TABLE D

Soil Sample Analytical Results - Total Leachable Metals
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter		Analytical Results (mg/L) BH-37 0.6 m	BH-48 0.3 m	CCME Commercial/Industrial Guideline Criteria[1] (mg/L)
Metals Concentrations				
Aluminum	(Al)	N.A.	**0.15**	0.005 - 0.100
Antimony	(Sb)	N.D.	0.001	N.G.
Arsenic	(As)	N.D.	N.D.	0.05
Barium	(Ba)	1.88	0.934	N.G.
Beryllium	(Be)	N.D.	N.D.	N.G.
Bismuth	(Bi)	N.A.	N.D.	N.G.
Boron	(B)	0.42	0.28	N.G.
Calcium	(Ca)	N.A.	803	N.G.
Cadmium	(Cd)	**0.096**	N.D.	0.0002 - 0.0018
Cesium	(Cs)	N.A.	N.D.	N.G.
Chromium	(Cr)	N.D.	**0.009**	0.002 - 0.020
Cobalt	(Co)	0.2	0.0735	N.G.
Copper	(Cu)	**0.22**	**0.002**	0.002 - 0.004
Iron	(Fe)	**30.2**	**19.9**	0.3
Lead	(Pb)	**3.67**	**0.142**	0.001 - 0.007
Lithium	(Li)	N.A.	0.015	N.G.
Magnesium	(Mg)	N.A.	169	N.G.
Manganese	(Mn)	31.4	5.07	N.G.
Mercury	(Hg)	N.D.	N.A.	0.0001
Molybdenum	(Mo)	N.D.	0.0011	N.G.
Nickel	(Ni)	**0.59**	**0.237**	0.025 - 0.150
Phosphorus	(P)	N.A.	0.08	N.G.
Potassium	(K)	N.A.	9.81	N.G.
Rubidium	(Rb)	N.A.	0.0021	N.G.
Selenium	(Se)	N.D.	N.D.	0.001
Silver	(Ag)	N.D.	N.D.	0.0001
Sodium	(Na)	N.A.	8.52	N.G.
Strontium	(Sr)	N.A.	1.13	N.G.
Tellurium	(Te)	N.A.	N.D.	N.G.
Thallium	(Tl)	N.D.	N.D.	N.G.
Tin	(Sn)	N.A.	N.D.	N.G.
Titanium	(Ti)	N.A.	0.0008	N.G.
Tungsten	(W)	N.A.	N.D.	N.G.
Uranium	(U)	N.D.	0.0027	N.G.
Vanadium	(V)	N.D.	0.006	N.G.
Zinc	(Zn)	**168**	**57.6**	0.03
Zirconium	(Zr)	N.D.	0.0002	N.G.

Notes:

[1]Canadian Council of Ministers of the Environment (CCME) Freshwater Aquatic Life Remediation Criteria for Water

N.A. = Not Analysed

N.D. = Not Detected (below detection limit)

N.G. = No Guideline criteria established

Concentrations in excess of the CCME Guideline Criteria are presented in BOLD text

TABLE E

Soil Sample Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs)
Phase II & III ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter	Analytical Results (mg/kg) BH-56 0.6 m	CCME Guideline Concentrations[1]
PAH in Solid Samples		
Napthalene	3.0	22 [2]
Methyl napthalenes	8.9	N.G.
Acenapthylene	0.2	N.G.
Acenaphthene	0.3	N.G.
Fluorene	0.3	N.G.
Phenanthrene/Anthracene	5.1	50
Fluoranthene	3.7	N.G.
Pyrene	3.3	100
Benzo(a)anthracene/Chrysene	3.3	10
Benzo(b or k)fluoranthene	2.2	10
Benzo(a)pyrene	1.2	1.4 [2]
Indeno(1,2,3-cd)pyrene	1.1	10
Dibenzo(a,h)anthracene	0.2	10
Benzo(g,h,i)perylene	1.5	N.G.

Notes:

[1]Canadaian Council of Ministers of the Environment Interim Canadian Environmental Quality Criteria for Contaminated Sites (Sept. 1991)

[2]Canadian Council of Ministers of the Environment, Industral Recommended Soil Quality Guidelines (March 1997)

N.G. = No Guideline criteria established

Concentrations in excess of the CCME Guideline Criteria are presented in BOLD text

TABLE F

Water Quality Analyses - Petroleum Hydrocarbons, PCBs, and Halides
Phase II ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter	Analytical Results (mg/L)							CCME Guidelines[1] (mg/L)
	MW-4	MW-8	MW-15	MW-16	MW-29	MW-31	MW-64	
BTEX:								
Benzene	<0.0005	<0.0005	<0.0005	<0.0005	N.A.	N.A.	N.A.	0.3
Toluene	<0.0005	0.0074	<0.0005	<0.0005	N.A.	N.A.	N.A.	0.09 [2]
Ethylbenzene	<0.0005	<0.0005	<0.0005	<0.0005	N.A.	N.A.	N.A.	0.002 [2]
Xylenes[2]	<0.0005	<0.0005	<0.0005	<0.0005	N.A.	N.A.	N.A.	N.G.
Total Volatile Hydrocarbons	<0.1	<0.1	<0.1	<0.1	N.A.	N.A.	N.A.	N.G.
Total Semi-Volatile Hydrocarbons	0.25	<0.1	2.5	0.34	N.A.	N.A.	120	N.G.
Lead	0.0007	N.A.	**0.0049**	N.A.	N.A.	N.A.	N.A.	0.001 - 0.007
PCBs	N.A.	N.A.	N.A.	N.A.	**0.0065**	**0.0035**	N.A.	0.0002 [3]
Extractable Organic Halides (AOX)	N.A.	0.082	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.

Notes:

[1] Canadian Council of Ministers of the Environment (CCME) Freshwater Aquatic Life Remediation Criteria for Water, September 1991

[2] Health and Welfare Canada Canadian Water Quality GuidelinesWater Quality Update, April 1996

[3] Ontario Ministry of the Environment's Guideline for use at Contaminated Sites in Ontario, non-potable ground water criteria, February 1997

N.A. = Parameter not analyzed by laboratory

NG = No Guideline

Concentrations expressed in **BOLD** typeface are in excess of the guideline criteria

TABLE G

Water Quality Analyses - Metals
Phase II ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter		Measured Concentrations (mg/L)									CCME Guideline Criteria[1]
		MW-18	MW-26	MW-31	MW-37	MW-38	MW-39	MW-40	MW-44	MW-45	
Silver	(Ag)	**0.0013**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0001
Aluminum	(Al)	**2.48**	**0.42**	**44.1**	**2.25**	**2.66**	**0.32**	**18.3**	**20.1**	**1.94**	0.005 - 0.100
Antimony	(Sb)	N.A.	N.A.	0.002	0.001	N.A.	0.001	0.004	0.001	0.001	N.G.
Arsenic	(As)	N.A.	N.A.	0.0165	0.0021	0.0011	0.0006	0.0123	0.0054	0.0017	0.05
Bismuth	(Bi)	0.0002	0.0172	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Boron	(B)	0.12	0.600	0.22	0.41	0.19	0.23	0.21	0.23	0.33	N.G.
Barium	(Ba)	0.0596	0.0172	0.462	0.0613	0.0775	0.0711	0.184	0.21	0.0868	N.G.
Beryllium	(Be)	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	N.G.
Cadmium	(Cd)	0.0005	0.0004	**0.0007**	**0.0004**	< 0.0002	< 0.0002	**0.0018**	**0.0006**	< 0.0002	0.0002 - 0.0018
Calcium	(Ca)	176	101	285	93.1	140	116	202	226	124	N.G.
Cesium	(Cs)	0.0003	<0.0001	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Cobalt	(Co)	0.0057	0.0011	0.0223	0.0021	0.001	0.0003	0.0199	0.0074	0.0027	N.G.
Chromium	(Cr)	**0.642**	0.016	**0.089**	**0.008**	**0.01**	**0.005**	**0.112**	**7.15**	**0.011**	0.002 - 0.020
Copper	(Cu)	**0.057**	0.003	**0.073**	**0.015**	**0.008**	**0.006**	**0.31**	**0.032**	**0.009**	0.002 - 0.004
Iron	(Fe)	20.8	**0.55**	**47.5**	**3.52**	**2.68**	**1.02**	**48.5**	**17.6**	**1.79**	0.3
Lithium	(Li)	0.502	0.164	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Magnesium	(Mg)	203	178	527	210	109	110	275	259	225	N.G.
Manganese	(Mn)	1.46	0.117	1.11	0.192	0.0664	0.0212	2.67	0.303	0.41	N.G.
Molybdenum	(Mo)	0.014	0.0055	0.0066	0.0058	0.0044	0.0027	0.0252	0.006	0.0036	N.G.
Nickel	(Ni)	0.056	0.01	**0.062**	0.011	0.006	0.004	**0.078**	**0.026**	0.013	0.025 - 0.150
Phosphorus	(P)	0.72	0.1	0.87	0.13	0.18	0.06	0.44	0.41	0.14	N.G.
Potassium	(K)	8.22	3.87	22.2	1.15	3.12	1.17	8.13	8.65	1.96	N.G.
Rubidium	(Rb)	0.0065	0.0019	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Selenium	(Se)	N.A.	N.A.	**0.005**	**0.007**	< 0.002	< 0.002	**0.003**	**0.004**	**0.003**	0.001
Sodium	(Na)	151	408	250	118	31.6	35.2	256	189	96.7	N.G.
Strontuim	(Sr)	0.934	0.885	0.609	0.841	0.734	0.787	0.925	1.45	0.942	N.G.
Thallium	(Tl)	0.0001	<0.0001	0.0007	<0.0001	<0.0001	<0.0001	0.0002	0.0003	<0.0001	N.G.
Tin	(Sn)	0.013	0.0029	0.004	0.0008	0.0008	0.0006	0.0065	0.0035	0.0007	N.G.
Tellurium	(Te)	<0.001	<0.001	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Titanium	(Ti)	0.108	0.0173	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Tungsten	(W)	0.0005	<0.0002	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Lead	(Pb)	**0.0275**	<0.0005	**0.494**	**0.0588**	**0.0077**	**0.0142**	**0.551**	**0.093**	**0.0052**	0.001 - 0.007
Uranium	(U)	0.0148	0.02	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Vanadium	(V)	<0.001	0.003	0.119	0.012	0.009	0.003	0.045	< 0.001	0.01	N.G.
Zirconium	(Zr)	0.0078	0.0015	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.G.
Zinc	(Zn)	**1.19**	0.02	**1.84**	**0.97**	**0.06**	**0.14**	**2.06**	**0.89**	**0.42**	0.03

Notes:

[1] Canadian Council of Ministers of the Environment (CCME) Freshwater Aquatic Life Remediation Criteria for Water (September 1991)
N.A. = Not Analysed
N.G. = No Guideline
Concentrations expressed in BOLD typeface are in excess of the guideline criteria

TABLE H

Water Quality Analyses - Volatile Organic Compounds (VOCs)
Phase II ESA of Former Dominion Bridge Operations Yard
Shelter Canadian Properties Limited

Parameter	Measured Concentrations (ug/L)								CCME Guideline Criteria[1] (ug/L)
	MW-8	MW-18	MW-26	MW-31	MW-35	MW-40	MW-44	MW-64	
EPA Volatile Target Compounds 624/8240									
Acetone	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Acrolein	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.G.
Acrylonitrile	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Benzene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	300
Bromodichloromethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Bromoform	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Bromomethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
2-Butanone (MEK)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Carbon disulfide	N.D.	N.D.	2	N.D	N.D	N.D	N.D	N.D	N.G.
Carbon Tetrachloride	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Chlorobenzene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	15
Chloroethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
2-Chloroethylvinyl ether	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Chloroform	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Chloromethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
cis-1,3-Dichloropropene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
cis-1,4-Dichloro-2-butene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Dibromomethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
1,1-Dichlorethene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
1,1-Dichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	100
1,2-Dichlorobenzene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	2.5
1.2-Dichlorethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
1,2-Dichloropropane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
1,3-Dichlorobenzene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	2.5
1,4-Dichlorobenzene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	4
Dibromochloromethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Dichlorodifluoromethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Ethanol	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Ethyl methacrylate	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Ethylbenzene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	2[2]
Ethylene dibromide	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
2-Hexanone	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Iodomethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
4-Methyl-2-pentanone (MIBK)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Methylene chloride	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Styrene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Tetrachloroethylene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	260
Toluene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	90[2]
Trichloroethene	N.D	**310**	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20
1,1,1-Trichloroethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
1,1,2-Trichloroethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
1,2,3-Trichloropropane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Trichlorofluoromethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
1,1,2,2-Tetrachloroethane	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
trans-1,2-Dichloroethene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
trans-1,3-Dichloropropene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
trans-1,4-Dichloro-2-butene	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Vinyl Acetate	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Vinyl Chloride	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.
Xylenes (m,p, & o)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.G.

Notes:

[1] Canadian Council of Ministers of the Environment (CCME) Freshwater Aquatic Life Remediation Criteria for Water (September 1991)
[2] Health and Welfare Canada Canadian Water Quality GuidelinesWater Quality Update, April 1996
NG = No Guideline
Concentrations expressed in **BOLD** typeface are in excess of the guideline criteria

APPENDIX D

LABORATORY ANALYTICAL RESULTS

ETL Enviro-Test MTC
LABORATORIES
Manitoba Technology Centre Ltd.

RECEIVED

FAX: 957 5389
Mail and Manual FAX

WARDROP

CHEMICAL ANALYSIS REPORT

Wardrop Engineering Inc
400 386 Broadway Ave
Winnipeg MB R3C 4M8

DATE: August 9 1999

ATTN: SCHROTH E

Lab Work Order #: W990712266 Submitted By: Schroth E

Project Reference: 991494-01-02

Project P.O. #: Date Received: 99/ 7/28

Comments:

APPROVED BY: Paul Nicolas

Paul Nicolas
Project Manager

ACCREDITATIONS: STANDARDS COUNCIL OF CANADA (SCC), IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL): FOR SPECIFIC TESTS AS REGISTERED BY THE COUNCIL (EDMONTON, CALGARY, WINNIPEG)
AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA): FOR INDUSTRIAL HYGIENE ANALYSIS (EDMONTON, WINNIPEG)
AGRICULTURE CANADA: UNDER THE CANADIAN FERTILIZER QUALITY ASSURANCE PROGRAM (SASKATOON)

ENVIRO-TEST ANALYSIS REPORT

Mail and Manual FAX

LAB ID SAMPLE ID TEST DESCRIPTION	RESULT	D.L.	UNITS	METHOD #	ANALYZED	ANALYST
99-A39980 BH-56 @ 2 ft Wardrop Engineering Sample Type: Soil Collected: 99/ 7/ 6						
Other Analysis Miscellaneous Analysis	See Attached	***		A999.01	99/ 8/ 9	JCD
99-A39981 BH-37 @ 2 ft Wardrop Engineering Sample Type: Soil Collected: 99/ 7/ 6						
Other Analysis Miscellaneous Analysis	See Attached	***		A999.01	99/ 8/ 9	JCD
99-A39982 BH-57 @ 8 ft Wardrop Engineering Sample Type: Soil Collected: 99/ 7/ 6						
Other Analysis						
Benzene	< 0.02	0.02	mg/kg DWt*	A751.04	99/ 8/ 3	PGR
Ethyl Benzene	< 0.03	0.03	mg/kg DWt*	A751.04	99/ 8/ 3	PGR
Extracted Date BTEX & TVH	Done On	***			99/ 8/ 3	TSG
Extracted Date TEH	Done On	***			99/ 8/ 3	TSG
Hydrocarbons Total Ext.	< 5	5.	mg/Kg DWt*	A782.03	99/ 8/ 3	PGR
Moisture Content	19.57	0.01	%		99/ 8/ 4	PGR
Toluene	< 0.02	0.02	mg/kg DWt*	A751.04	99/ 8/ 3	PGR
Volatile Hydrocarbons Tot	< 5	5.	mg/kg DWt*	A751.04	99/ 8/ 3	PGR
Xylene - meta and para	< 0.01	0.01	mg/kg DWt*	A751.04	99/ 8/ 3	PGR
Xylene - ortho	< 0.01	0.01	mg/kg DWt*	A751.04	99/ 8/ 3	PGR

ENVIRO-TEST ANALYSIS REPORT

Mail and Manual FAX

LAB ID SAMPLE ID TEST DESCRIPTION	RESULT	D.L.	UNITS	METHOD #	ANALYZED	ANALYST

COMMENTS FOR LAB NUMBER 99-A39982

SAMPLE COMMENT (ORGANIC)

* DWt = Dry Weight

LAB COMMENT

Sample was over 14 Day analytical holding time.

ENVIRO-TEST LABORATORIES TEST METHODOLOGIES

BTEX and TVH in Soil

ETL Method Number: A751.04 Reference: Modified EPA SW-846 Method 5021/8015 and 8020

Principle of Method:

Extracts are prepared by weighing 8-10 grams into a 20 mL vial and extracting with methanol. An aliquot of the methanol is injected into water along with an internal standard. The headspace is analyzed by a gas chromatograph equipped with a Tekmar 7000/7050 autosampler and photoionization detector (PID) flame ionization detector (FID) in series. The benzene, toluene, ethyl benzene, meta, para and ortho xylene compounds are identified by their retention times and quantified by internal standard methods using the measurement of peak area relative to calibration standards using the PID responses. The total volatile hydrocarbons are a semi-quantitative result based on the sum of peak areas in the C5-C10 carbon range using the FID response.

Total Extractable Hydrocarbons in Water, Soil and Sediment

ETL Method Number: A782.03 Reference: Modified EPA SW-846 Methods 3510, 3550A and 8000A

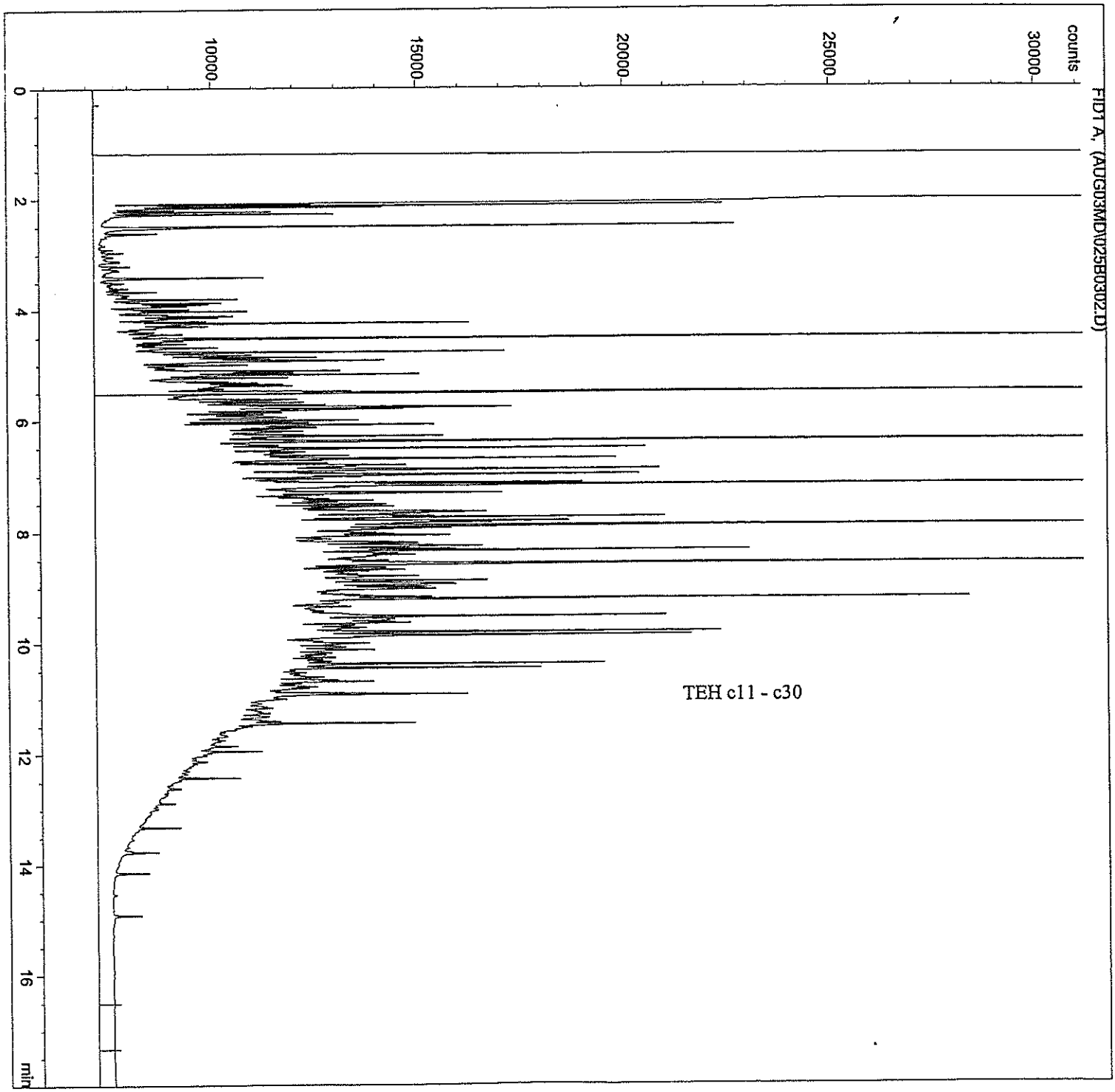
Principle of Method:

This is the semi-quantitative determination of total extractable hydrocarbons (TEH) C11-C30 in water, soil and sediment samples. A water sample volume of 240 mLs in a 250 mL glass amber bottle is shaken with 2-4 mL hexane for one hour on a wrist action shaker, then sonicated for 5 minutes. A soil/sediment sample of 25 grams is weighed out with sodium sulphate and extracted with 10 mLs hexane/acetone for one hour on a wrist action shaker, then sonicated for 5 minutes. After extraction, the solvent layer is drawn off and analysed against a calibrated diesel standard on a gas chromatograph equipped with a flame ionization detector. All results are reported on a dry weight basis. By special request, the result can be calculated on C10-C24 to meet specific regulations.

Data File C:\HPCHEM\2\DATA\AUG03MD\025B0302.D Sample Name: Diesel Ref

Injection Date : 8/3/99 7:31:11 PM Seq. Line : 3
Sample Name : Diesel ~~Ref~~ work mg STD 990504 R Vial : 25
Acq. Operator : Mark Dalmaijer Inj : 2
Inj Volume : 1 µl

Sequence File : C:\HPCHEM\2\SEQUENCE\AUG03MD1.S
Acq. Method : C:\HPCHEM\2\METHODS\TEHSOIL.M
Last changed : 8/3/99 5:05:46 PM by Mark Dalmaijer
Analysis Method : C:\HPCHEM\2\METHODS\TEH.M
Last changed : 8/4/99 9:07:36 AM by Mark Dalmaijer
Method for analysis of TEH (C11-C30) in soils and waters using DB1 capillary column with modified temperature program.(40 C for 2 min. 20 C/min to 300 C for 4 min)



Data File C:\HPCHEM\2\DATA\AUG03MD\003B0801.D Sample Name: Gas Qual Std
ID: Gasoline Working St (C154B)
1000 uL of C154A (Gasoline Stock Std) diluted to 10 mL
of hexane.

==========

Injection Date	: 8/3/99 9:50:00 PM	Seq. Line	: 8
Sample Name	: Gas Qual Std	Vial	: 3
Acq. Operator	: Mark Dalmaijer	Inj	: 1
		Inj Volume	: 1 µl

Sequence File : C:\HPCHEM\2\SEQUENCE\AUG03MD1.S
Acq. Method : C:\HPCHEM\2\METHODS\TEHSOIL.M
Last changed : 8/3/99 5:05:46 PM by Mark Dalmaijer
Analysis Method : C:\HPCHEM\2\METHODS\TEH.M
Last changed : 8/4/99 9:07:36 AM by Mark Dalmaijer
Method for analysis of TEH (C11-C30) in soils and waters using DB1 capillary column with modified temperature program.(40 C for 2 min. 20 C/min to 300 C for 4 min)

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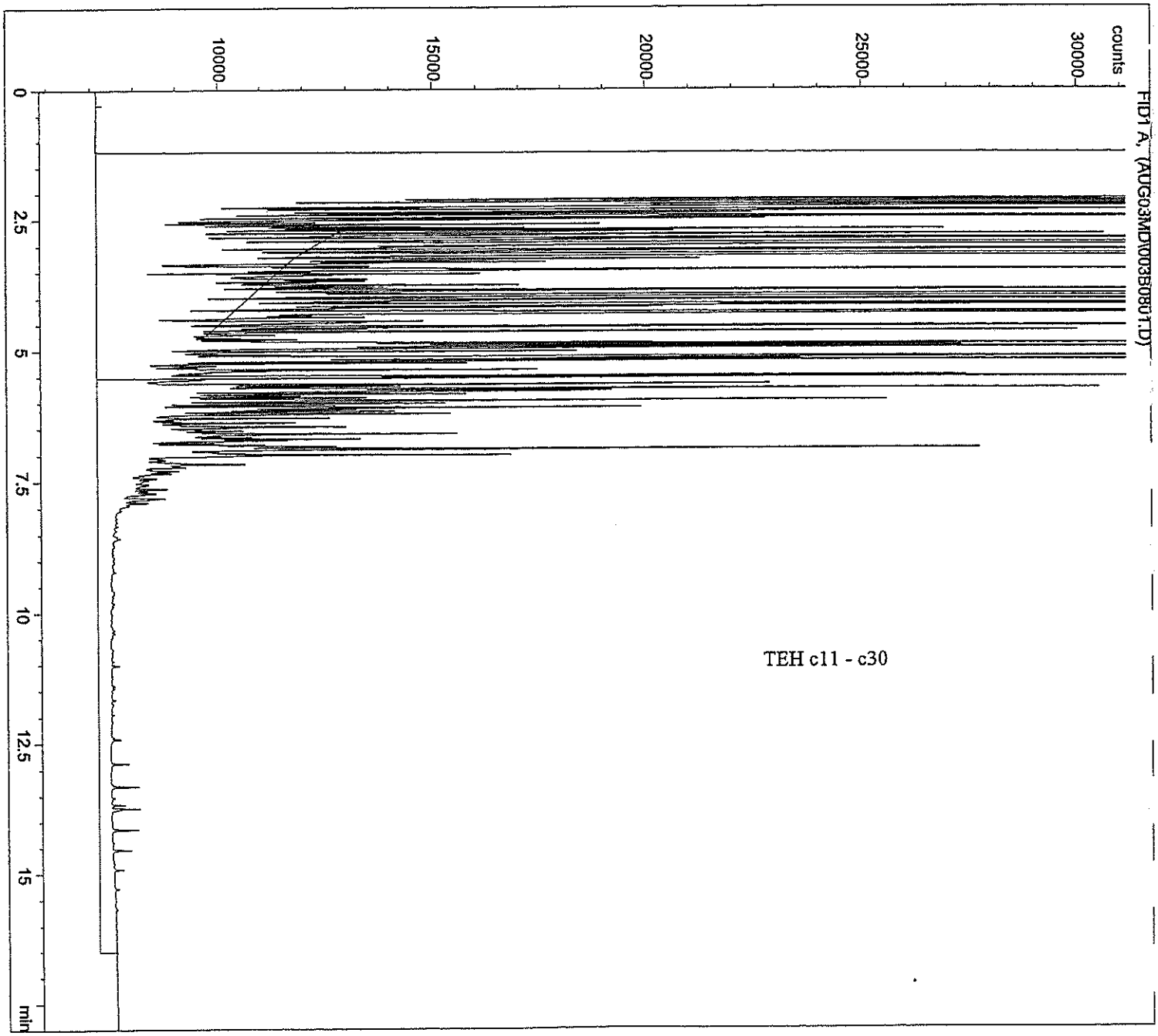
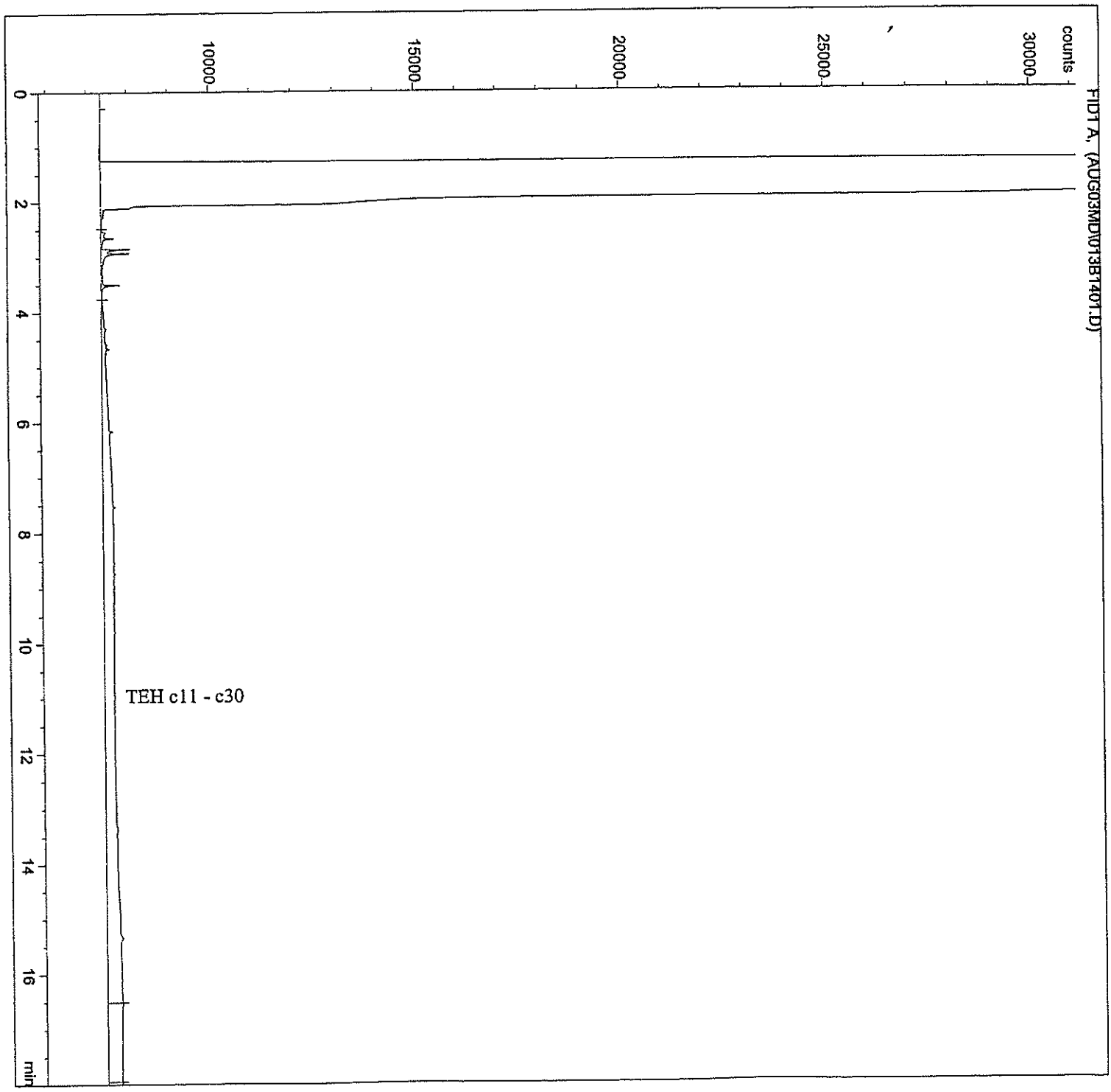


Data File C:\HPCHEM\2\DATA\AUG03MD\013B1401.D

Injection Date : 8/4)9 12:34:31 AM
Sample Name : 99-A39982
Acq. Operator : Mark Dalmaijer

Seq. Line : 14
Vial : 13
Inj : 1
Inj Volume : 1 µl

Sequence File : C:\HPCHEM\2\SEQUENCE\AUG03MD1.S
Acq. Method : C:\HPCHEM\2\METHODS\TEHSOIL.M
Last changed : 8/3/99 5:05:46 PM by Mark Dalmaijer
Analysis Method : C:\HPCHEM\2\METHODS\TEH.M
Last changed : 8/4/99 9:07:36 AM by Mark Dalmaijer
Method for analysis of TEH (C11-C30) in soils and waters using DB1 capillary column with modified temperature program.(40 C for 2 min. 20 C/min to 300 C for 4 min)



ENVIRO-TEST CHEMICAL ANALYSIS REPORT ATTACHMENT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
W99071226	BH-56 @ 2 FT							
Sample Type:SOIL								
Collected:07/06/99	11:05							
		PAH in Solid Samples						EDM
		Naphthalene	3.0	0.2	ug/g	07/29/99	08/05/99	EDM
		Methyl naphthalenes	8.9	0.2	ug/g	07/29/99	08/05/99	EDM
		Acenaphthylene	0.2	0.2	ug/g	07/29/99	08/05/99	EDM
		Acenaphthene	0.3	0.2	ug/g	07/29/99	08/05/99	EDM
		Fluorene	0.3	0.2	ug/g	07/29/99	08/05/99	EDM
		Phenanthrene/Anthracene	5.1	0.2	ug/g	07/29/99	08/05/99	EDM
		Fluoranthene	3.7	0.2	ug/g	07/29/99	08/05/99	EDM
		Pyrene	3.3	0.2	ug/g	07/29/99	08/05/99	EDM
		Benzo(a)anthracene/Chrysene	3.3	0.2	ug/g	07/29/99	08/05/99	EDM
		Benzo(b or k)fluoranthene	2.2	0.2	ug/g	07/29/99	08/05/99	EDM
		Benzo(a)pyrene	1.2	0.2	ug/g	07/29/99	08/05/99	EDM
		Indeno(1,2,3-cd)pyrene	1.1	0.2	ug/g	07/29/99	08/05/99	EDM
		Dibenzo(a,h)anthracene	0.2	0.2	ug/g	07/29/99	08/05/99	EDM
		Benzo(g,h,i)perylene	1.5	0.2	ug/g	07/29/99	08/05/99	EDM
W99071226	BH-37 @ 2 FT							
Sample Type:SOIL								
Collected:07/06/99	16:45							
		TEH in Soil						
		% Moisture	9.9	0	%		07/29/99	EDM
		Total Extractables (Soil)	150	5	ug/g (ppm)	07/29/99	08/04/99	EDM

N.D. - NOT DETECTED, LESS THAN THE DETECTION LIMIT
THIS PORTION OF REPORT ANALYZED AT THE EDMONTON FACILITY
THIS IS THE FINAL PAGE OF THE REPORT ATTACHMENT
NOT INCLUDING APPENDICES

ETL Enviro-Test MTC
LABORATORIES
Manitoba Technology Centre Ltd.

FAX TRANSMITTAL

PLEASE DELIVER AS SOON AS POSSIBLE

TO: EVELINE

FAX # 957-5389

Date and Time

Contact Sender

Contact for Technical Questions

OF PAGES 6 INCLUDING THIS ONE

MESSAGE:

EDM. RESULTS

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ENVIRO-TEST CHEMICAL ANALYSIS REPORT ATTACHMENT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
W99081280	BH-35							
Sample Type:WATER								
Collected:08/04/99	09:00							
		Volatile Organics (MS):H2O						EDM
		Dichlorodifluoromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Chloromethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Vinyl chloride	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromomethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Chloroethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Ethanol	< 300	300	ug/L	08/10/99	08/10/99	EDM
		Trichlorofluoromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrolein	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Acetone	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Iodomethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon disulfide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Methylene chloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrylonitrile	< 100	100	ug/L	08/10/99	08/10/99	EDM
		trans-1,2-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Vinyl acetate	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Butanone (MEK)	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Chloroform	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,1,1-Trichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon tetrachloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Benzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Trichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloropropane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromodichloromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromomethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		2-Chloroethylvinylether	< 10	10	ug/L	08/10/99	08/10/99	EDM
		4-Methyl-2-pentanone (MIBK)	< 10	10	ug/L	08/10/99	08/10/99	EDM
		cis-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Toluene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethyl methacrylate	< 10	10	ug/L	08/10/99	08/10/99	EDM
		trans-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Hexanone	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,1,2-Trichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Tetrachloroethylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromochloromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Ethylene dibromide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Chlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethylbenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		m + p-Xylenes	< 1	1	ug/L	08/10/99	08/10/99	EDM
		o-Xylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Styrene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		cis-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Bromoform	< 3	3	ug/L	08/10/99	08/10/99	EDM
		1,1,2,2-Tetrachloroethane	< 20	20	ug/L	08/10/99	08/10/99	EDM
		1,2,3-Trichloropropane	< 5	5	ug/L	08/10/99	08/10/99	EDM
		trans-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,3-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,4-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
W99081280	BH-31							
Sample Type:WATER								
Collected:08/04/99	09:15							
		PCB's in Water						EDM
		Aroclor 1254	3.5	0.05	ug/L	08/06/99	08/13/99	EDM
		Volatile Organics (MS):H2O						EDM
		Dichlorodifluoromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Chloromethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Vinyl chloride	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromomethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Chloroethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Ethanol	< 300	300	ug/L	08/10/99	08/10/99	EDM
		Trichlorofluoromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrolein	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Acetone	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Iodomethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon disulfide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Methylene chloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrylonitrile	< 100	100	ug/L	08/10/99	08/10/99	EDM
		trans-1,2-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM

ENVIRO-TEST CHEMICAL ANALYSIS REPORT ATTACHMENT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
W990812808	BH-31							
Sample Type:WATER								
Collected:08/04/99 09:15								
		Vinyl acetate	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Butanone (MEK)	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Chloroform	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,1,1-Trichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon tetrachloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Benzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Trichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloropropane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromodichloromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromomethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		2-Chloroethylvinylether	< 10	10	ug/L	08/10/99	08/10/99	EDM
		4-Methyl-2-pentanone (MIBK)	< 10	10	ug/L	08/10/99	08/10/99	EDM
		cis-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Toluene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethyl methacrylate	< 10	10	ug/L	08/10/99	08/10/99	EDM
		trans-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Hexanone	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,1,2-Trichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Tetrachloroethylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromochloromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Ethylene dibromide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Chlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethylbenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		m + p-Xylenes	< 1	1	ug/L	08/10/99	08/10/99	EDM
		o-Xylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Styrene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		cis-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Bromoform	< 3	3	ug/L	08/10/99	08/10/99	EDM
		1,1,2,2-Tetrachloroethane	< 20	20	ug/L	08/10/99	08/10/99	EDM
		1,2,3-Trichloropropane	< 5	5	ug/L	08/10/99	08/10/99	EDM
		trans-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,3-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,4-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
W990812808	BH-40							
Sample Type:WATER								
Collected:08/04/99 09:40								
		Volatile Organics (MS):H2O						EDM
		Dichlorodifluoromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Chloromethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Vinyl chloride	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromomethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Chloroethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Ethanol	< 300	300	ug/L	08/10/99	08/10/99	EDM
		Trichlorofluoromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrolein	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Acetone	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Iodomethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon disulfide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Methylene chloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrylonitrile	< 100	100	ug/L	08/10/99	08/10/99	EDM
		trans-1,2-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Vinyl acetate	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Butanone (MEK)	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Chloroform	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,1,1-Trichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon tetrachloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Benzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Trichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloropropane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromodichloromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromomethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		2-Chloroethylvinylether	< 10	10	ug/L	08/10/99	08/10/99	EDM
		4-Methyl-2-pentanone (MIBK)	< 10	10	ug/L	08/10/99	08/10/99	EDM
		cis-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Toluene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethyl methacrylate	< 10	10	ug/L	08/10/99	08/10/99	EDM
		trans-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM

ENVIRO-TEST CHEMICAL ANALYSIS REPORT ATTACHMENT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
W99081280	BH-40							
Sample Type:WATER								
Collected:08/04/99	09:40							
		2-Hexanone	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,1,2-Trichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Tetrachloroethylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromochloromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Ethylene dibromide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Chlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethylbenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		m+p-Xylenes	< 1	1	ug/L	08/10/99	08/10/99	EDM
		o-Xylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Styrene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		cis-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Bromoform	< 3	3	ug/L	08/10/99	08/10/99	EDM
		1,1,2,2-Tetrachloroethane	< 20	20	ug/L	08/10/99	08/10/99	EDM
		1,2,3-Trichloropropane	< 5	5	ug/L	08/10/99	08/10/99	EDM
		trans-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,3-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,4-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
W99081280	BH-44							
Sample Type:WATER								
Collected:08/04/99	09:45							
		Volatile Organics (MS):H20						EDM
		Dichlorodifluoromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Chloromethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Vinyl chloride	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromomethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Chloroethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Ethanol	< 300	300	ug/L	08/10/99	08/10/99	EDM
		Trichlorofluoromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrolein	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Acetone	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Iodomethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon disulfide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Methylene chloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrylonitrile	< 100	100	ug/L	08/10/99	08/10/99	EDM
		trans-1,2-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Vinyl acetate	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Butanone (MEK)	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Chloroform	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,1,1-Trichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon tetrachloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Benzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Trichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloropropane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromodichloromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromomethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		2-Chloroethylvinylether	< 10	10	ug/L	08/10/99	08/10/99	EDM
		4-Methyl-2-pentanone (MIBK)	< 10	10	ug/L	08/10/99	08/10/99	EDM
		cis-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Toluene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethyl methacrylate	< 10	10	ug/L	08/10/99	08/10/99	EDM
		trans-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Hexanone	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,1,2-Trichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Tetrachloroethylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromochloromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Ethylene dibromide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Chlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethylbenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		m+p-Xylenes	< 1	1	ug/L	08/10/99	08/10/99	EDM
		o-Xylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Styrene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		cis-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Bromoform	< 3	3	ug/L	08/10/99	08/10/99	EDM
		1,1,2,2-Tetrachloroethane	< 20	20	ug/L	08/10/99	08/10/99	EDM
		1,2,3-Trichloropropane	< 5	5	ug/L	08/10/99	08/10/99	EDM
		trans-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,3-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,4-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM

ENVIRO-TEST CHEMICAL ANALYSIS REPORT ATTACHMENT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
W990812808	BH-44							
Sample Type:WATER								
Collected:08/04/99	09:45							
W990812808	BH-64							
Sample Type:WATER								
Collected:08/04/99	10:05							
		Volatile Organics (MS):H20						EDM
		Dichlorodifluoromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Chloromethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Vinyl chloride	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromomethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Chloroethane	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Ethanol	< 300	300	ug/L	08/10/99	08/10/99	EDM
		Trichlorofluoromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrolein	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Acetone	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Iodomethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon disulfide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Methylene chloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Acrylonitrile	< 100	100	ug/L	08/10/99	08/10/99	EDM
		trans-1,2-Dichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Vinyl acetate	< 100	100	ug/L	08/10/99	08/10/99	EDM
		1,1-Dichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Butanone (MEK)	< 100	100	ug/L	08/10/99	08/10/99	EDM
		Chloroform	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,1,1-Trichloroethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Carbon tetrachloride	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Benzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Trichloroethene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichloropropane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Bromodichloromethane	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromomethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		2-Chloroethylvinylether	< 10	10	ug/L	08/10/99	08/10/99	EDM
		4-Methyl-2-pentanone (MIBK)	< 10	10	ug/L	08/10/99	08/10/99	EDM
		cis-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Toluene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethyl methacrylate	< 10	10	ug/L	08/10/99	08/10/99	EDM
		trans-1,3-Dichloropropene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		2-Hexanone	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,1,2-Trichloroethane	< 2	2	ug/L	08/10/99	08/10/99	EDM
		Tetrachloroethylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Dibromochloromethane	< 3	3	ug/L	08/10/99	08/10/99	EDM
		Ethylene dibromide	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Chlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Ethylbenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		m+p-Xylenes	< 1	1	ug/L	08/10/99	08/10/99	EDM
		o-Xylene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		Styrene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		cis-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		Bromoform	< 3	3	ug/L	08/10/99	08/10/99	EDM
		1,1,2,2-Tetrachloroethane	< 20	20	ug/L	08/10/99	08/10/99	EDM
		1,2,3-Trichloropropane	< 5	5	ug/L	08/10/99	08/10/99	EDM
		trans-1,4-Dichloro-2-butene	< 10	10	ug/L	08/10/99	08/10/99	EDM
		1,3-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,4-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
		1,2-Dichlorobenzene	< 1	1	ug/L	08/10/99	08/10/99	EDM
W990812808	BH-29							
Sample Type:WATER								
Collected:08/04/99	10:10							
		PCB's in Water						EDM
		Aroclor 1254/60	6.5	0.05	ug/L	08/06/99	08/13/99	EDM

N.D. - NOT DETECTED, LESS THAN THE DETECTION LIMIT
THIS PORTION OF REPORT ANALYZED AT THE EDMONTON FACILITY
THIS IS THE FINAL PAGE OF THE REPORT ATTACHMENT
NOT INCLUDING APPENDICES

EDMONTON TEST METHODOLOGIES

PCB's in Water

Preparation Method: Extraction with dichloromethane

Instrument Method: GC/ECD analysis

Method Reference: Extraction Method: EPA 3510 (modified)
Analytical Method: EPA 8082 (modified)

Minimum Detection Limit (MDL) - 0.050 ppb for all Aroclors

QA/QC Statement:

Accuracy is 93% (expressed as the average % recovery of PCB in water at a 5 ppb level).

Precision is +/- 16% (expressed as the relative standard deviation or RSD).

Volatile Organics (MS):H20

Preparation Method: Automated headspace

Instrument Method: GC/MS analysis

Method Reference: Extraction Method: EPA 5021 (modified)
Analytical Method: EPA 8240 (modified)

Interferences: *** Values for 1,1,2,2-tetrachloroethane and trichloroethene may not accurately reflect concentrations present in the sample(s) due to the decomposition of the former to the latter when exposed to heat and pressure. (See MOEE Method PETHC-E3132A, 1.5.1.5 Dehydrohalogenation)

THIS IS THE LAST PAGE OF THE EDMONTON METHODOLOGIES.

APPENDIX E

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Aquifer

Any geological unit such as sand, gravel, silt or clay, or any combination thereof, or fractured bedrock which contains ground water. Use of the term, however, is generally restricted to those units where enough water can be drawn at a reasonable rate and cost for the required purpose. Clay and silt units are not generally considered as aquifers.

Bentonite

A colloidal clay, largely made up of the mineral sodium montmorillonite, a hydrated aluminum silicate. When exposed to water, it exhibits a volume increase of up to 20% and is thus used as a sealant (i.e., around the upper solid casing portion of a monitoring well).

Benzene

Benzene is a clear, colourless, highly flammable liquid in the C_6 hydrocarbon range (C_6H_6) with a characteristic colour. It is obtained in the coking of coal and in the production of illuminating gas from coal. It is used in the manufacturing of artificial leather, varnishes, solvents, and other organic compounds. If ingested or inhaled, it can irritate the mucous membranes and could potentially result in death from respiratory failure. It is also a suspected carcinogen.

Chromatography

Chromatography is a general term applied to a wide variety of separation techniques based upon components in a sample partitioning between a moving phase, which can be a gas or liquid, and a stationary phase which may be either a liquid or a solid.

Ethylbenzene

Ethylbenzene is a colourless, flammable liquid in the C_8 carbon range ($C_6H_5C_2H_5$), prepared from acetophenone. It is a chief constituent of volatile fuels, such as gasoline. It is irritating to eyes, skin, and mucous membranes and in high concentrations can be narcotic.

Gas Chromatography

Is used to separate volatile and semi-volatile compounds which are then individually detected, identified, and quantified.

Geosock

A geotextile filter cloth which inhibits the movement of the fine sand and silt into a well screen.

Gravimetric Analysis

A method of determining the concentration of oil and grease where the solvent solution from the extraction step is evaporated and the residue weighed to calculate the oil and grease content. Evaporation may cause losses of volatile components.

Hardness

Hardness is a term used to describe the quality of water. Total hardness is defined as the sum of the calcium and magnesium concentrations, both expressed as calcium carbonate.

GLOSSARY OF TERMS (cont'd)

Hexane

A colourless gas in the C_6 hydrocarbon range, $CH_3(CH_2)_4CH_3$ with a faint, peculiar odour. It is the chief constituent of volatile fuels, such as gasoline and is thus used as a reference standard. Hexane may be irritating to the respiratory track and in high concentrations, narcotic.

Lead

Lead is a common heavy metal which can be a serious, cumulative, body poison. It can originate in the ground water from industrial, mine, and smelter discharges or from the dissolution of old lead plumbing.

Limestone

A sedimentary rock consisting chiefly of calcium carbonate, primarily in the form of the mineral calcite.

Lower Explosive Limit (LEL)

The minimum concentration of combustible vapours in air that will propagate a flame when an ignition source is presented. Below this concentration the mixture is considered too lean to burn.

Methane

A colourless, odourless, nonpoisonous flammable gas in the C_1 carbon range (CH_4). It is a natural byproduct of decomposition and is also produced by the fermentation of cellulose and sewage sludge. Methane is a major component of natural gas and is used for heating and appliances. It is a simple asphyxiant in the absence of oxygen, and narcotic in high concentrations.

Oil and Grease

Oil and Grease is a typical analytical parameter, used to determine total hydrocarbon content of a sample less that portion which is volatile. In the determination of Oil and Grease, groups of substances with similar physical characteristics are determined quantitatively on the basis of their common solubility. The analysis includes other material extracted by the solvent from an acidified sample (such as sulphur compounds, certain organic dyes, and chlorophyll), and not volatilized during the test.

Overburden

The loose soil (i.e., clay, silt, sand, gravel, or other unconsolidated material) overlying bedrock, either transported or formed in place.

Parts Per Million (ppm)

One part in one million or 0.0001 percent.

Percent LEL

The ratio of measured vapours to the LEL vapour concentration. Vapours greater than or equal to 100% LEL may, therefore, be combustible. For Hexane concentrations in air, 1% LEL equals 125 ppm and 100% LEL equals 12,500 ppm. For Methane concentrations in air, 1% LEL equals 500 ppm and 100% LEL equals 50,000 ppm.

pH

A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with alkalinity and decreasing with increasing acidity. Originally stood for the term potential of hydrogen.

GLOSSARY OF TERMS (cont'd)

Polyvinyl Chloride (PVC)

A near inert, plastic, solid hydrocarbon generally used as a rubber substitute (chloroethylene polymer) for textiles, sheeting and piping.

Shale

A fine-grained sedimentary rock, formed by the consolidation of clay, silt, or mud. It is characterized by finely laminated structure and is sufficiently indurated so that it will not fall apart on wetting.

Stratigraphic Unit

A layer of soil or rock demonstrating similar composition and properties, and different from those above and/or below.

Till

A well-graded, heterogeneous material (containing near equal portions of clay, silt, sand, gravel, and sometimes boulders), formed and deposited by the processes of glaciation.

Total Semi-Volatile Hydrocarbons (TSH)

Sometimes referred to as Total Extractable Hydrocarbons (TEH), it is the summation of the heavier carbon isomers in the C_7 to C_{30} range (including Toluene, Ethylbenzene and Xylenes), and is calculated against a calibrated diesel fuel or gasoline standard.

Total Volatile Hydrocarbons (TVH)

Sometimes referred to as Total Purgeable Organics (TPO), it is the summation of the light aromatic hydrocarbons in the C_3 to C_6 range (including Benzene), and is calculated against a calibrated gasoline standard.

Toluene

Toluene is a flammable, refractive liquid with a benzene-like odour in the C_7 carbon range (C_7H_8). It is used in the manufacturing of benzoic acid, explosives, dyes, solvents, and many other organic compounds. It may cause mild macrocytic anemia and is narcotic in high concentrations to humans.

Water Table

The level at which ground water is found in an unconfined aquifer formation.

Xylene

Xylene is a mobile, flammable liquid in the C_8 carbon range ($C_6H_4(CH_3)_2$). The most common form of Xylene is a mixture of the three isomers o-, m-, and p-Xylene. It is used as a solvent, dye or other organics and may be narcotic to humans in high concentrations.