1999 Ground & Surface Water Monitoring Report Boyne Road Landfill

Prepared for:

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EXECUTIVE SUMMARY

Oliver, Mangione, McCalla & Associates, a Division of Trow Consulting Engineers Limited (Trow/OMM) was retained by the Township of North Dundas to undertake the 1999 ground and surface water monitoring program for the Boyne Road Waste Disposal Site. This report presents the results of the monitoring program.

The Boyne Road Landfill Ground and Surface Water Monitoring Program consists of the collection of groundwater elevations and ground and surface water samples at a frequency established through on-going studies, currently twice per year. The water level information is used to determine local groundwater flow direction and gradients. The groundwater samples are analyzed for a specific suite of parameters by a commercial laboratory, including parameters commonly used to evaluate water quality at landfill sites. The surface water samples are analyzed for a core parameter list contained in the Ministry of Environment (MOE) landfill surface water guidelines.

The monitoring program reveals that the shallow groundwater flow direction near the facility remains towards the north. A groundwater "mound" has built up under the waste over part of the site, causing radial groundwater flow near the waste.

Groundwater quality monitoring indicates that a leachate contaminant plume is being generated by the landfilling operations. This plume, which is characterized by elevated concentrations of most inorganic parameters tested, has been documented in earlier reports. The concentrations of several aesthetic parameters within the on-site plume exceed the MOE maximum limits established for the property boundary. None of these parameters has a health related criteria. Based on computations done in previous years, a computer model predicts that the leachate plume will extend approximately 150 metres beyond the northern site boundary by the year 2007.

Several surface water parameters are elevated in the downstream (SW3) samples as compared to samples collected from SW1, upstream of the facility. Of these, only iron has a Provincial Water Quality Objective (0.3 mg./L).

Recommendations are presented regarding the frequency and nature of the monitoring program exercises, mitigation of the leachate contaminant plume and the extension of the monitoring network.

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1.0 Introduction

1.1 Terms of Reference

Oliver, Mangione, McCalla and Associates, a Division of Trow Consulting Engineers Limited (Trow/OMM) was retained by the Township of North Dundas to conduct the annual ground and surface water monitoring program for the Township's two landfill sites. The following report presents the data collected as well as interpretations, conclusions and recommendations for the Boyne Road facility for the 1999 calendar year. The information collected at the other waste disposal facility (Mountain Landfill) is presented in a separate document.

1.2 Previous Studies

The hydrogeology, site operations and development of the landfill was studied by Oliver, Mangione, McCalla & Associates Limited (OMM) in 1990-1991 and a report was produced in March 1991 (OMM, 1991).

During the period 1992 to 1995 inclusive, the firm of M.S. Thompson & Associates Limited (MST) conducted hydrogeological studies as well as ground and surface water monitoring of the landfill. Reports were produced in December 1992, March 1994, February 1995 and August 1995. The results of the 1995 ground and surface water monitoring program, which was also conducted by MST, were not available for this report.

OMM produced documents in support of the Certificate of Approval for a household hazardous waste transfer facility (OMM, 1996).

Ground and surface water monitoring was again conducted by OMM for the 1996 and 1997 calendar years. Two reports, one for 1996/1997 (OMM, 1997) and one for 1998 (OMM, 1999) were prepared to document the work accomplished during that period.

2.0 Site Description

2.1 Site Location and History

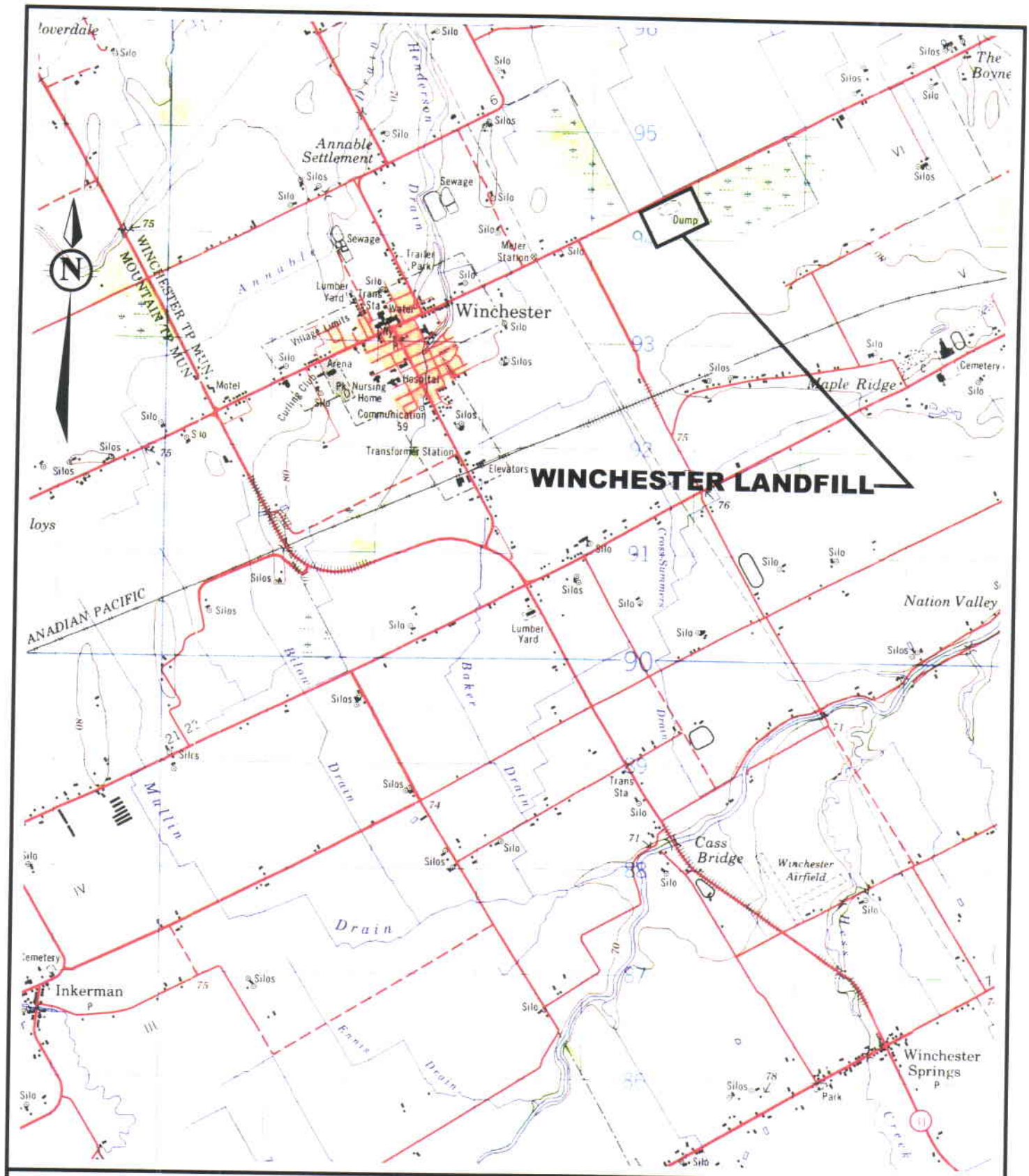
The Boyne Road landfill site is located on Part of Lot 8, Concession IV in Winchester Township, about 1.5 kilometres east of the village of Winchester (Figure 1). The site has been licensed for waste disposal since 1965, and accepts waste from the villages of Winchester and Chesterville, in addition to the former Winchester Township.

The licensed landfill is 8.1 hectares in size. An additional 30 metre wide buffer zone located on the west, east and south sides of the property was purchased in 1992. The site is licensed under Provisional Certificate of Approval A 482101, which was issued in 1989 and amended twice in 1995 and once in 1996. These amendments were issued to clarify the three municipalities which were allowed to use the facility (September 5, 1995), to allow the Township to operate a municipal waste recycling facility (October 2, 1995) and to allow the establishment and operation of a household hazardous waste transfer facility at the site (September 18, 1996). The documents are included as Appendix "A" of this report.

2.2 Site Physiography and Drainage

The Boyne Road Landfill lies in the Black Creek Drainage Basin. Most of the basin is either level or undulating farmland characterised by sandy loam to clay loam soils. The remainder of the basin contains organic soils which are poorly drained. The landfill is located within this latter terrain unit.

Natural drainage on the site is poor. A perimeter drain was constructed along the west, south and east of the property in 1991 and has greatly improved drainage at the site. Surface water drains from these channels into a ditch which runs along the south side of Boyne Road, to the north of the landfill. Ultimately surface water reaches Black Creek to the north-east, and eventually the South Castor River.



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SCALE 1:50,000	CLIENT TOWNSHIP OF WINCHESTER	JOB No. MC12684A
DATE JUNE 2000		
DRAWN RWG	TITLE SITE LOCATION PLAN	FIG 1

2.3 Geology

Surficial materials in the immediate area of the Boyne Road Landfill area consist of deposits of organic material (primarily peat) between 0.5 and 2.0 metres in thickness, which is underlain by a 0.5 to 2.5 metre thick layer of silty, grey/blue marine clay. Beneath the clay is a 2.5 to 4.5 metre thick horizon of glacial till, which is a homogeneous mixture of clay, silt and sand, with pebbles and rocks. The till overlies limestone bedrock of the Ottawa Formation, which is up to 90 metres thick in some locations. No water well records were found for wells completed below the Ottawa Formation in the area, but the existing records for the wells completed within this formation indicate that the formation is in excess of 30 metres in thickness in the Winchester area.

2.4 Hydrogeology

The primary water bearing formation in the landfill area is situated within the glacial till overburden and the fractured upper few metres of the limestone bedrock. The water table is generally found one to two metres below ground surface. Field testing performed on the monitoring wells constructed in 1991 indicated that the hydraulic conductivity of the till materials ranges from 1.3×10^{-3} to 1×10^{-2} cm/sec. Assuming a thickness of 2.5 to 4.5 metres, aquifer transmissivity is calculated to be in the range 3.3×10^{-5} to 4.5×10^{-4} m^2/sec. The horizontal hydraulic gradient in the till varies over the site due to changes in topography, but is in the order of 0.0025 metres per metre.

The upper clay and silty clay deposits are relatively impermeable compared to the underlying glacial till unit. Previous studies (OMM 1991) indicated that the clay has a hydraulic conductivity between 2×10^{-7} and 1×10^{-9} cm/sec. This unit acts as a barrier to downward flow, helping isolate the underlying till from downward leachate movement.

Local water supply wells obtain potable water from fracture zones within the limestone of the Ottawa Formation. Well records indicate that the water bearing zones within these wells is intersected at an average of 25 metres in depth. Groundwater in the deep bedrock aquifer regionally flows south at an average gradient of 0.01 m/m. (OMM, 1991). This aquifer was encountered during the construction of BR-1, at a depth of 21.5 metres below ground surface (MST, 1994).

3.0 Landfill Monitoring Network

3.1 Introduction

A ground and surface monitoring network consisting of overburden and bedrock monitoring wells and surface water monitoring stations was initially established in 1991 and subsequently expanded in 1992 and 1993. The location of the wells and surface water monitoring locations is presented on Figure 2 as shown in Section 4.0.

Since the establishment of the monitoring network, water level measurements and ground and surface water samples have been collected from the wells and surface water stations on a regular basis. This work was carried out by OMM in 1991, by MST from 1992 to 1995 inclusive and by OMM in 1996, 1997 and 1998. Please note that the MST results for the 1995 monitoring program were not available.

3.2 Monitoring Well Construction

Six auger boreholes were constructed as part of the 1991 investigations. Locations were selected to give coverage in all directions on the site. Boreholes were constructed by Marathon Drilling Limited of Gloucester, Ontario utilising a track mounted CME 55 drilling rig equipped with 110 mm ID hollow stem augers. All boreholes were continued to refusal which was inferred as the bedrock surface. Borehole depths ranged from 4.3 to 8.8 metres below existing grade. Details of construction are provided with borehole information for each well in Appendix "B".

The lithology of the overburden material encountered was determined from a visual inspection of material returns on the auger flights. Samples were obtained through the centre of the hollow stem augers at 1.5 metre intervals utilising a split spoon sampling device.

Monitoring wells (MW1 through MW6) were constructed within the granular till unit in each of the six boreholes. The monitoring wells were installed through the centre of the augers. Each well consists of 50 mm ID Schedule 40 threaded PVC pipe with a 1.5 metre length of No. 10 (0.25 mm) slot well screen. The annulus surrounding and above the screened interval to the approximate elevation of the base of the clay unit was gravel packed with clean silica sand material. A hydraulic seal consisting of bentonite clay was placed above the gravel pack to prevent vertical migration of ground and surface water through the borehole.

Each well was equipped with a 150 mm steel casing to an approximate depth of 1.5 metres. The casing was grouted to surface and equipped with a locking well cap. Well development in the form of "stop/start" pumping was completed using a nitrogen driven gas lift pump. This process was continued until the well produced a sediment free supply of groundwater.

Three overburden monitoring wells (MW7, MW8 and MW9) were constructed under the supervision of MST in June 1992, and an additional four overburden wells (MW10 through MW13) were constructed under the supervision of the same firm in July 1993. All boreholes were described as being constructed using a CME-55 hollow stem auger rig. The monitoring wells were completed using 50 mm diameter PVC pipe and were equipped with 1.5 metres of slotted well screen, well seals, steel casing and locking caps. All overburden wells were apparently completed in the glacial till unit. The borehole logs for monitors MW7 through MW10 are presented in Appendix "C". Logs for MW11, MW12 and MW13 were not available.

The overburden monitors MW2, MW3 and MW6 were destroyed by landfilling operations sometime between May and November 1996, and monitor MW11, located to the west of the landfill, was destroyed sometime between November 1996 and August 1997.

Three bedrock wells (BR1, BR2 and BR3) were also constructed by MST. BR1 was constructed in 1992 using an air rotary drilling rig. The initial 203 mm hole was extended to the bedrock surface and 159 mm steel casing was grouted in place. The well was then drilled as a 152 mm diameter open hole to a completion depth of 24.3 metres. BR2 and BR3 were constructed in 1993 using a CME-55 rig equipped with a 51 mm diameter core barrel. Both wells were extended 2.43 metres into bedrock and equipped with 0.76 metres of well screen. The borehole logs for BR1 and BR2 are also presented in Appendix "C". The log for BR3 was not available.

3.3 Monitoring Program

The 1999 ground and surface water monitoring program consisted of the measurement of water level readings at all available monitoring wells in July 1999 and February 2000. Groundwater samples were collected from two bedrock wells and from eight overburden wells in July and from two bedrock and eight overburden monitoring wells in February 2000. Surface water samples were collected from three stations in July and four stations in February. All water samples were submitted to an accredited analytical laboratory for chemical and physical analyses.

The groundwater samples were analysed for a specific suite of parameters based on the chemical characteristics of the leachate contaminant plume generated by the landfill as established by historical monitoring. The parameters are: *Alkalinity, Ammonia-N, BOD_5,*

COD, Calcium, Chloride, Conductivity, Hardness, Iron, Magnesium, Manganese, Nitrate, pH, Potassium, Sodium, Sulphate, Total Nitrogen and Dissolved Organic Carbon. The July samples were also analysed for the bacteriological parameters *total coliform, fecal coliform and fecal streptococcus.* The February samples were analysed for a suite of volatile organic compounds according to the United States Environmental Protection Agency's 624 methodology.

The surface water samples were analysed for a suite of parameters contained in the core parameter list established in the document "Interim Guidelines - Surface Water Quality Assessment for Existing Waste Disposal Sites" (M.O.E.E. 1995). The list includes: *Alkalinity, Ammonia, BOD, Calcium, Chloride, COD, Conductivity, Hardness, Iron, Magnesium, Manganese, Nitrate, Nitrite, pH, Phenols, Potassium, Sodium, Sulphate, Total Nitrogen, Dissolved Organic Carbon, and Total Phosphorous.*

3.4 Sampling Protocols

The monitoring wells were sampled following established scientific practices. Prior to the collection of a sample a minimum of three well volumes of water were flushed from the well. Alternately, if the groundwater was visibly turbid after three volumes, the well was pumped until the water was clear. An electric submersible pump was used to remove the standing water and to collect the samples. After sampling was completed at a particular well, the pump was thoroughly cleaned before being immersed in the next well. Measurements of pH and conductivity were collected in the field.

Surface water samples were collected by either immersing the sample bottle in the water or by immersing a clean collection bottle in the water and then transferring the sample to the proper bottle.

All samples were collected in bottles prepared for the specific parameter or group of parameters, and the samples were refrigerated until delivery to the laboratory. Suitable preserving agents were added to those samples requiring preservation prior to shipment to the laboratory.

4.0 Groundwater Flow

Groundwater static levels were collected at all monitoring well locations during the two sampling sessions. The data, along with the calculated groundwater elevations, are presented in Table 1.

Table 1. Groundwater Elevations

(All elevations in metres above sea level)

Monitor	May-96	Nov. 1996	Aug. 1997	Nov. 1997	Jul-98	Nov-98	Jul-99	Feb-00
MW1	74.56	74.45	73.98	74.13	74.10	74.04	73.97	74.19
MW4	74.38	74.26	73.73	73.74	73.94	73.98	73.74	74.04
MW5	74.33	74.21	73.55	73.96	73.67	73.70	73.30	73.76
MW7	74.43	74.31	73.76	74.08	73.83	73.85	na	74.09
MW8	74.24	74.19	73.72	74.03	73.81	73.83	74.12	73.97
MW9	74.43	74.13	73.85	74.04	73.99	74.01	74.21	74.12
MW10	74.31	74.29	73.78	74.14	73.90	74.02	na	74.08
MW11	74.52	74.18	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
MW12	74.85	74.73	73.83	74.33	73.75	73.79	73.34	74.85
MW13	74.74	74.61	74.06	74.22	na	74.33	74.09	74.29
BR1	74.63	74.52	73.82	74.20	74.06	74.20	na	74.24
BR2	74.47	74.40	73.97	74.20	74.00	74.03	na	74.15
BR3	74.61	74.52	73.69	74.30	73.74	74.07	73.14	na

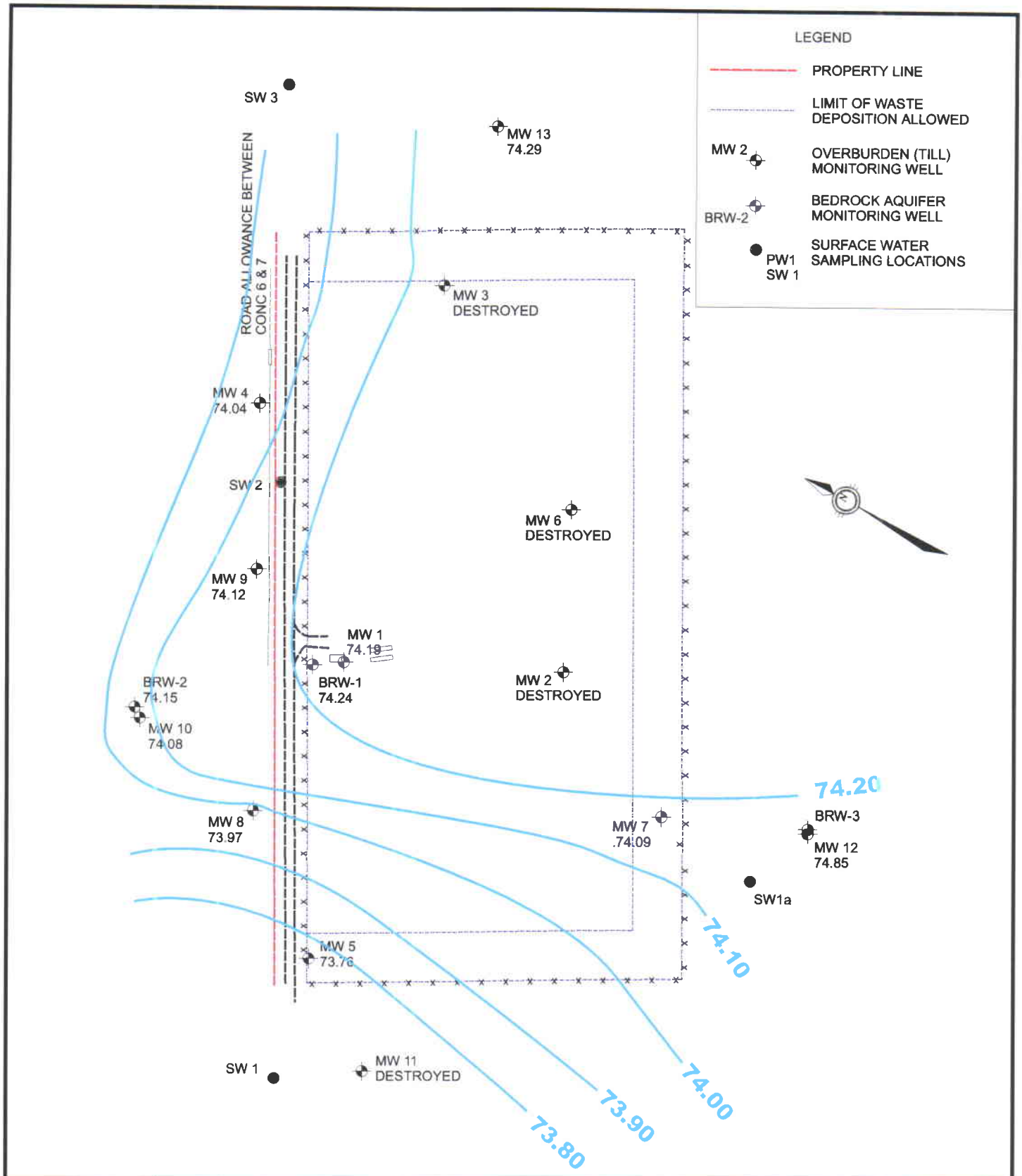
na not available

Groundwater flow in the combined overburden/shallow bedrock aquifer is generally from south to north; i.e. from the landfill property towards Boyne Road. Over the past six to eight years, a groundwater mound has built up under the waste pile towards the southern boundary of the licensed area, and groundwater flow is locally radial from this higher area. The 1999 data indicates that this radial flow pattern is still present.

Water levels in the overburden/shallow bedrock aquifer were collected in July 1999 and February 2000. A plot of the shallow aquifer groundwater potentials February 2000 is presented in Figure 2. The water table was slightly lower (0.1 to 0.2 metres) in February

2000 as compared to November 1998 and remained reasonably constant between July 1998 and July 1999.

The loss of monitors MW2, MW3, MW6, and MW11, three of which were located central to the site, makes the determination of the shallow groundwater flow direction after May 1996 somewhat problematic. It is recommended that two new overburden monitoring wells be constructed on the south side of the property to permit the characterisation of the groundwater flow regime and chemistry in this area.



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SCALE 1:3000	CLIENT TOWNSHIP OF WINCHESTER	JOB No. MC12684A
DATE JUNE 2000		
DRAWN RWG	TITLE GROUNDWATER FLOW - FEB. 2000	FIG 2

5.0 Groundwater Chemistry

5.1 Previous Results and Conclusions

Groundwater sampling was conducted approximately twice annually starting in 1990. The data collected showed that a leachate contaminant plume had built up beneath the landfill and was migrating downgradient, primarily to the north. The plume was characterised by elevated concentrations of chloride, ammonia, iron and manganese. No health related parameters were noted in excess of the Ontario Drinking Water Objectives.

The concentrations of several parameters measured in off site wells were found to be in excess of Ontario Ministry of the Environment and Energy Policy B-7 ("Reasonable Use Policy").

The data from the July 1999 and February 2000 monitoring exercises indicated that the concentrations of the characteristic leachate parameters have neither increased nor decreased from previous years in several of the downgradient monitoring wells.

5.2 Monitoring Results - 1999

Groundwater samples were collected from most monitoring wells in July 1999 and February 2000 (Section 3.3). The groundwater chemistry analyses for the 1999 program are presented in Table 2, along with results from previous years. The actual lab sheets are included in Appendix "C". Figures 3 & 4 show graphically the trends of chloride, sulphate and sodium concentrations in all overburden/shallow bedrock wells over time.

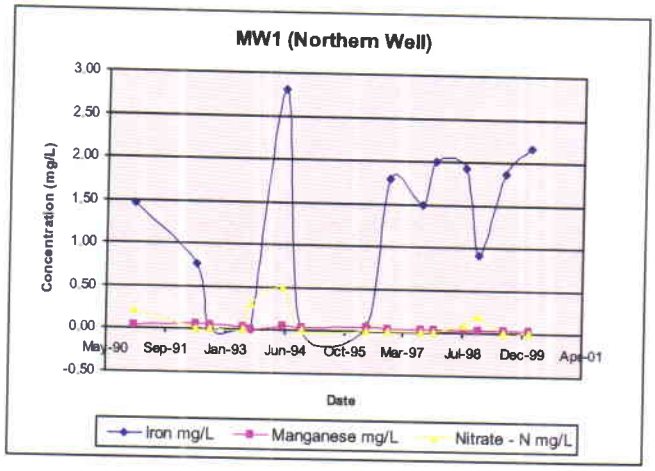
Examination of the data indicates that groundwater quality in the overburden/shallow bedrock aquifer appears to have stabilised or slightly improved in most wells. Monitor MW4 showed a slight decrease in groundwater quality. As expected, elevated concentrations of most inorganic parameters in the overburden/shallow bedrock wells are still present.

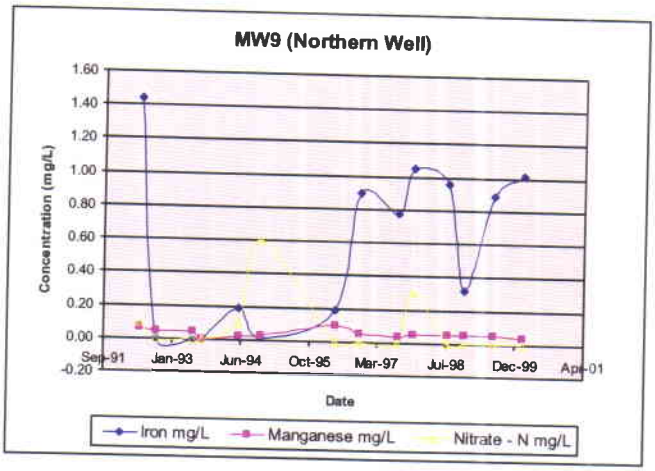
The chemistry at monitor MW12, located to the south east of the fill area, had increasing concentrations of most parameters in July 1999. This well was frozen in February 200 and could not be sampled.

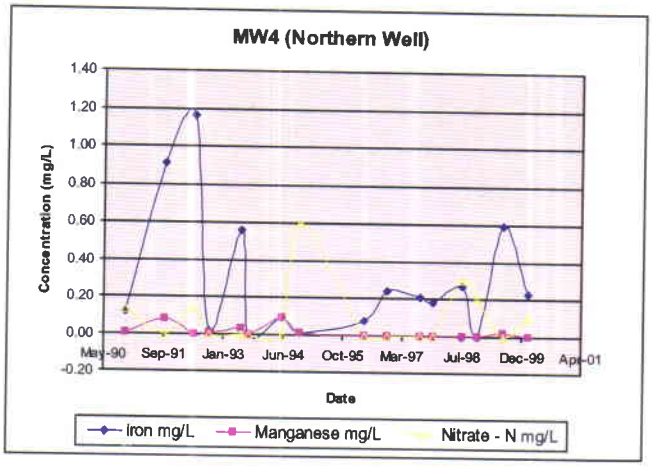
A volatile organic scan (USEPA Method 624) was conducted on groundwater samples collected from all wells. None of the compounds were detected in any of the wells. Based on these results it is recommended that analysis for these compounds be limited once per

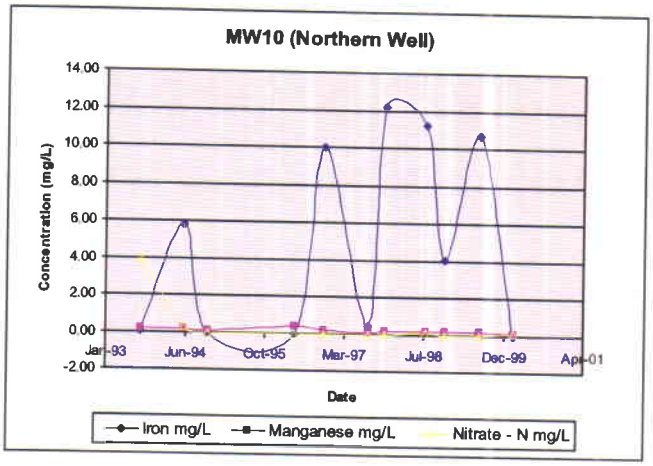
year and to the on-site well MW1, and to the three closest downgradient monitors (MW4, MW8 and MW9).

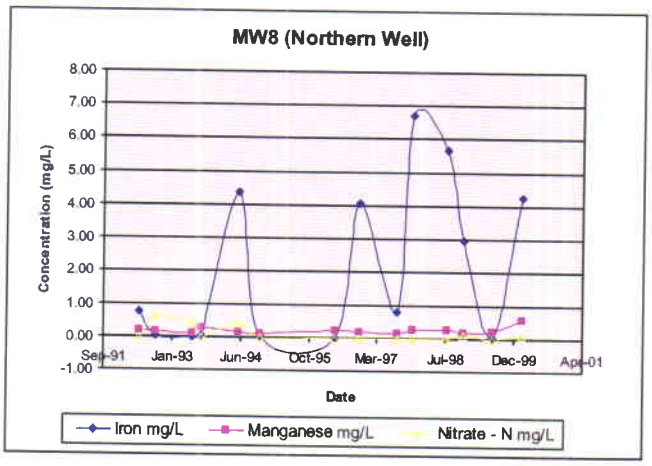
Groundwater quality in the deep bedrock monitor (BR3) remains consistent with earlier analyses and remains unaffected by the landfill operations.

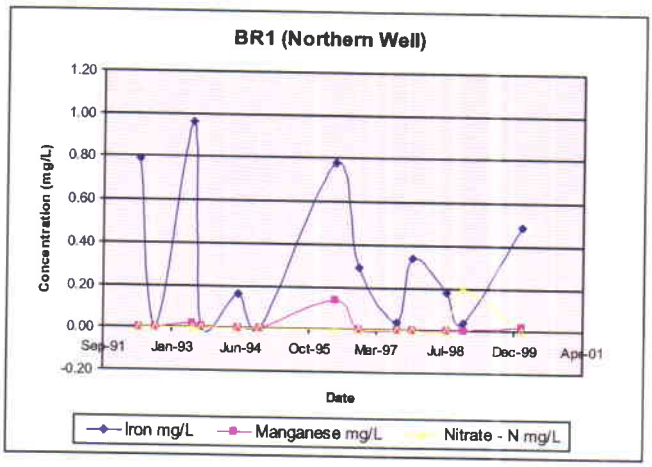












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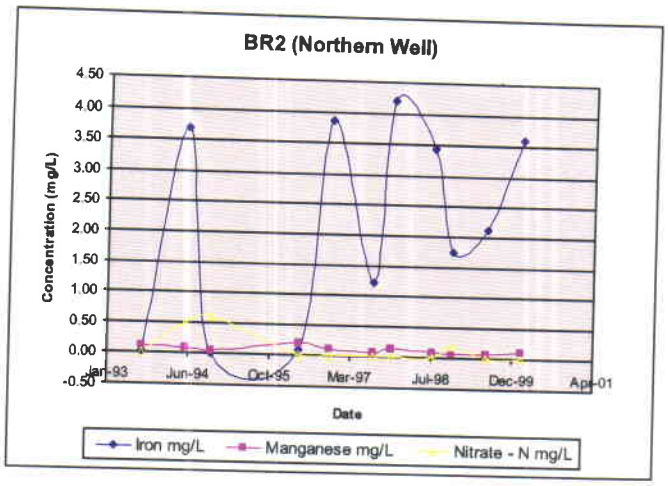
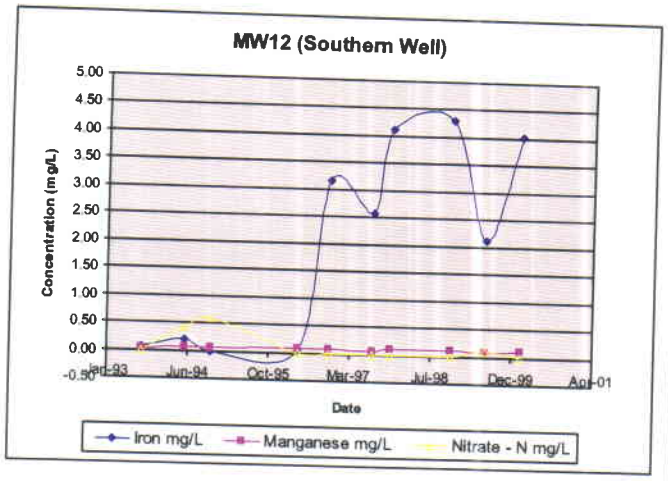
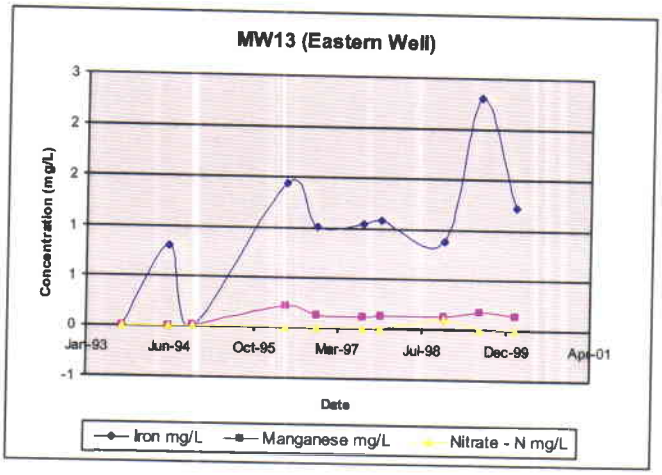
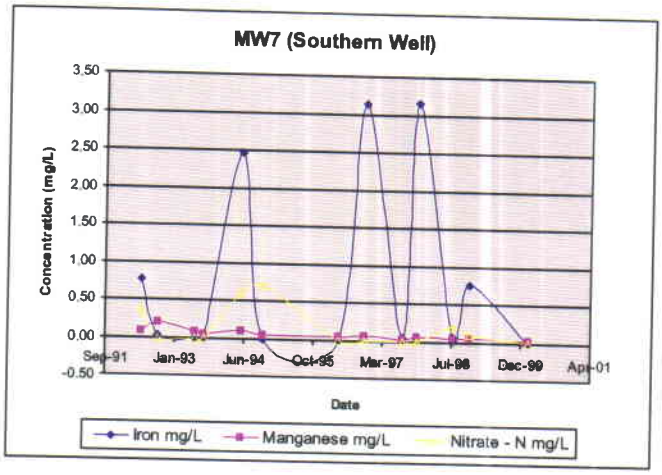
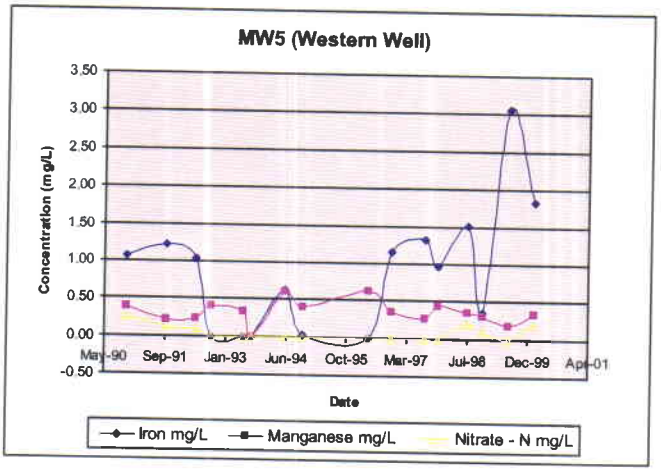
SCALE NA	CLIENT TOWNSHIP OF WINCHESTER	JOB No. MC12684A
DATE JUNE 2000		
DRAWN RWG	TITLE ANALYTICAL RESULTS - NORTHERN WELLS	FIG 3

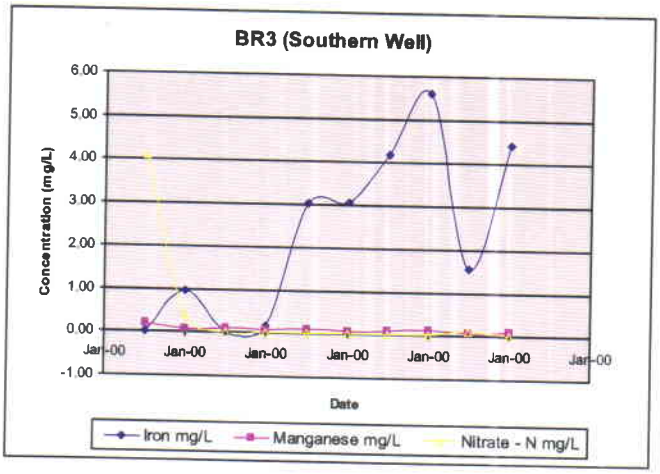












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DRAWN RWG	TITLE ANALYTICAL RESULTS - WESTERN, EASTERN, SOUTHERN WELLS	FIG 4

6.0 Groundwater Impact Assessment

6.1 Background

In order to assess the nature of the chemical impact on the groundwater as a result of waste disposal operations, the concentrations of various parameters in the monitoring well network is compared to background groundwater quality, which is determined through the analysis of samples collected at a point which is unaffected by the waste disposal operations. Initially, MW12 was used to determine background groundwater quality in the overburden aquifer; however, based on analytical data collected over the last six years, the formation of a groundwater mound has lead to leachate impact in MW12. As a result, monitor MW13, located to the east of the waste area, was been used to determine background groundwater quality in the overburden aquifer at the Boyne Road Landfill. The average concentrations of parameters as determined in analyses of samples collected from this well in the period September 1993 to November 1994 were used to determine the background aquifer water quality. The groundwater quality at MW13 has remained consistent over the past six to seven years.

Water quality at MW13 has previously been used to compare changes in bedrock groundwater quality, since no upgradient deep bedrock well exists on site. It had also been recommended that a new deep bedrock well be constructed to provide the necessary information. However based on the amount of water quality data available from previous sampling at monitor BR1, and the consistent good quality indicated in these samples, it was and is still felt that there is sufficient information available from this well to assess any future changes to deep bedrock groundwater quality.

6.2 Ontario Policy B-7

The potential impact of the leachate contaminant plume on local groundwater resources is addressed by Ontario Policy B-7, referred to as "Reasonable Use". This policy establishes maximum allowable concentrations of various parameters at the downgradient site boundary. These maximum concentrations are based on the background concentration of a specific compound in the aquifer, the nature of the parameter (whether it has an applicable health or aesthetic criteria) and the present or potential future use of the downgradient groundwater resources. Unless there is specific evidence to the contrary, the assumed downgradient groundwater use is normally assumed to be drinking water.

Table 3 presents the calculated Reasonable Use concentrations for those parameters at the Boyne Road Landfill which have either a health related Maximum Acceptable

Concentration (M.A.C.), an Interim related Maximum Acceptable Concentration (I.M.A.C.) or an Aesthetic Objective (A.O.) in the Ontario Drinking Water Objectives.

Table 3. Reasonable Use Criteria

Parameter	Units	Criteria	Type of Criteria	Background (MW13)	R. Use Limit
Chloride	mg/L	250	Aesthetic	2.33	128
Iron	mg/L	0.3	Aesthetic	0.27	0.28
Manganese	mg/L	0.05	Aesthetic	0.05	0.05
Sodium	mg/L	200	Aesthetic	12	106
Sulphate	mg/L	500	Aesthetic	13	256

Background is average concentration at MW13 for period Sept. 1993 to Nov. 1994. All units are mg/L.

Comparison of the above table to the groundwater quality analysis indicates that concentrations of chloride, iron, manganese and sodium exceeded the above noted concentrations in most wells in 1999, as in previous years. It should be noted that Policy B-7 is concerned with the water quality at the site boundary, and there are no limits for on-site wells. Monitors MW4, MW8, MW9, MW10 and BR2 lie outside the licensed Boyne Road Landfill Property and the site therefore may be considered in violation of the Policy. It is important to note that none of the above noted parameters have a health related criteria.

6.3 Leachate Plume Orientation

Tracking the location and movement of the leachate contaminant plume is usually accomplished by selecting a specific parameter or parameters and observing the concentrations of this parameter as measured in the monitoring well network over time. It is necessary that the selected parameter be elevated in the leachate as compared to background conditions and this elevated concentration should be due primarily to waste disposal operations. At the Boyne Road Landfill, chloride is considered the most useful parameter to track the location of the leachate contaminant plume. Chloride naturally occurs at very low concentrations in the area (historically less than 3 mg/L in MW13) and is chemically very conservative and persistent. There has been some concern that road salting operations may contribute to elevated concentrations of chloride in the overburden aquifer (MST,1995). However, as pointed out by the previous consultant, neither the ground nor

surface water analyses indicated that road salting was causing the elevated chloride concentrations. The 1999 data also support this conclusion.

6.4 Predicted Plume Migration

A numerical groundwater flow/ contaminant transport computer model was used in 1996 and again in 1997 to predict the migration of the leachate plume in the glacial till deposits downgradient of the landfill (OMM, 1998). The position of the 128 mg/L chloride isachem was predicted to be 150 metres north of the landfill boundary by the year 2006. Although the model was not used for 1998 and/or 1999, the groundwater quality in the shallow overburden/bedrock aquifer, based on the 1999 monitoring results, is similar or slightly better. The model is therefore still considered valid and may even be a more conservative prediction since the concentrations of chloride have not changed dramatically within the last two years. Some of the leachate mitigation can be attributed to increased efforts in applying cover to the waste site area.

The predicted extent of the downgradient (northern) buffer area required to permit the waste disposal site to meet Policy B-7 by the year 2007 is therefore less than 43 metres north of MW10 or less than 150 metres north of the current landfill boundary.

6.5 Plume Mitigation Measures

The presence of a leachate contaminant plume in the overburden aquifer downgradient of the landfill has been established. If drinking water is assumed to be the "Reasonable Use" of the downgradient groundwater resources, the site may be in violation of this policy, based on the position of the leachate contaminant plume in both May and November 1996. As noted in the previous section, the plume may reach as far as 43 metres north of MW10 by the year 2007.

There are several methods available to attenuate a leachate contaminant plume. The first method is to allow dilution and/or dispersion to sufficiently reduce the concentrations of various chemical species within the plume to return to acceptable levels. This method generally involves the purchase of downgradient lands, although in some cases it has been possible to buy the "water rights" to the land without actually buying the land itself. The lands to the north are currently owned by the Ontario Ministry of Natural Resources.

The covering of the waste within the landfill with low permeability material (capping) can greatly reduce the volume of liquid (rainfall) percolating through the landfill and therefore reduce the generation of leachate. This process is currently underway at the Boyne Road facility and the latest results suggest that the increased capping efforts are resulting in improved groundwater quality.

It is technically possible to design and construct an active leachate interceptor system. A network of wells and/or drains downgradient of the waste area collect the leachate, which is then pumped either to a treatment system, trucked away, or distributed over the waste pile to start the cycle again. This method is quite effective, but tends to be fairly expensive to design, build and operate, especially for a rural township.

In the previous section, the position of the leachate contaminant plume was predicted to be approximately 40 metres to the north of MW10 by the year 2007. It is recommended that two new monitoring wells be constructed to the northwest and northeast of the landfill respectively. These wells are needed to provide the necessary information to determine the status of the migration of the leachate contaminant plume. The new wells should be located east and west of MW10, approximately 50 metres to the north of the existing well.

7.0 Surface Water Monitoring

7.1 Previous Results

The chemical nature of the surface water adjacent to the landfill has been studied since 1992. Surface water monitoring in the period 1992 to 1996 was undertaken by the previous consultant. In the February 1995 report (MST, 1995), which included data collected up to November 1994, the consultant reported that no impact to surface water as a result from the waste disposal operations could be conclusively determined. Some increases were noted in certain parameters during some sampling periods, but no overall trend was noted.

Data collected during the 1996, 1997 and 1998 monitoring programs indicated that for most parameters, there was little difference between the upgradient (SW1 and SW1a) and downgradient (SW3) water quality. However, the concentrations of iron, manganese and sodium in SW3 were noted to be elevated as compared to the upgradient surface water. An examination of the historical data indicates that this trend appears to have begun in the period 1992 to 1994, and is likely due to the waste disposal operations. Of the four elevated parameters, only iron has a Provincial Water Quality Objective (0.3 mg./L). It should be noted that the iron in the upgradient water was also in excess of the objective.

7.2 1999 Results

In July 1999, samples were collected from three surface water monitoring stations and in February 2000, samples were collected from four surface water monitoring stations. The locations of the stations is shown on Figure 2 The results of chemical and physical analyses conducted on the samples is presented in Table 4.

Data collected during the 1999 monitoring program indicated that many parameters are elevated in the downstream (SW3) samples as compared to samples collected from SW1, upstream of the facility. Again, of the elevated parameters, only iron has a Provincial Water Quality Objective (0.3 mg./L). It should be noted that the iron concentration in the surface water is highly variable and it is frequently found well in excess of Provincial criteria in the upstream location.

7.3 Trigger Mechanisms

The Eastern Region Surface Water Group of the Ministry of the Environment have revised a previously established set of guidelines for surface water monitoring at active waste disposal sites (*Interim Guidance Document – Surface Water Monitoring Trigger*

Mechanism for Waste Disposal Sites, revised March 1998). Included in these guidelines is a three-tiered "trigger" mechanism, which prescribes an increasingly detailed, monitoring program should a decrease in surface water quality be attributed to landfilling operations. The process can ultimately lead to the design and implementation of a contingency plan to actively address surface water quality problems.

Tier I is considered an annual routine monitoring program which includes analysis of conservative tracer and site-specific PWQO parameters as well as a sampling frequency of three to four times annually. This level is considered an "Alert" level for surface water impact.

The Tier II guidelines are initiated should downstream concentrations significantly exceed background levels. The Tier II Trigger is considered a "Confirmation" level. This plan consists of an extended parameter list and increased sampling frequency, both of which are to be established on a site specific basis with input from the MOE. Should an unacceptable reduction in surface water quality be confirmed through the Tier II monitoring plan, a Tier III contingency plan is to be initiated along with a compliance monitoring program.

It is recommended that if any of the Provincial Water Quality Objectives are exceeded, the sampling interval should increase to four times annually in accordance with the Tier I criteria of the MOE Interim Guidelines. Furthermore, the sampling should include a metal scan of samples collected from each location.

8.0 Summary And Recommendations

Ground and surface water monitoring was conducted at the Boyne Road Landfill in July 1999 and February 2000. The monitoring network at the waste disposal site consists of four surface water sampling locations and nine overburden and three bedrock monitoring wells.

Water level measurements were collected at each overburden installation. This information, when corrected for elevation, is used to determine the direction and magnitude of groundwater flow. Groundwater samples were analysed for a suite of parameters based on the known characteristics of the leachate contaminant plume at the landfill site, plus some additional bacteriological and volatile organic compound parameters. Surface water samples were collected from four monitoring stations adjacent to the site and were analyzed for a specific suite of surface water parameters.

Groundwater flow in the overburden near the landfill is towards the north, with a localised groundwater mound beneath the waste within the landfill causing some radial flow to the south, east and west. The regional hydraulic gradient in the overburden is approximately 0.0025 metres per metre.

The groundwater chemical data collected during the monitoring exercises along with historic data indicates that a leachate contaminant plume is being generated by the landfill and is moving within the overburden groundwater. This plume is characterized by elevated concentrations of most inorganic and organic parameters. Chloride has been selected as a marker parameter due to the low natural concentration in the aquifer (2 mg/L in upgradient wells) and the relative persistence of this substance.

The results of the surface water sampling indicate that the downstream water in the drainage ditch has elevated concentrations of most parameters as compared to the background surface water. Of the elevated parameters, only iron has a Provincial Water Quality Objective (0.3 mg./L), and this parameter is commonly in excess of the objective upstream of the site.

The following recommendations are presented for the Townships consideration:

1. Ground and surface water monitoring should proceed according to the established methodology. Samples should be collected from all monitoring wells during the spring or summer 2000 and again in the autumn or early winter. The samples should be analyzed for the same parameter list used in previous exercises.

2. Four new monitoring wells should be constructed near the property. Two multilevel overburden/bedrock monitoring wells should be installed to the north of MW10,

and another two installed to the south and south-west of MW7. These wells will permit the characterisation of the groundwater flow regime in this area, and sampling form the wells will determine the status of the leachate contaminant plume at a distance from the landfill.

3. The downgradient buffer to the north of the landfill should extend a minimum of 50 metres to the north of MW10. Further monitoring will determine if additional buffer lands are required to the east, west and south of the site.

4. Should the surface water quality in the drainage ditch downstream of the landfill continue to lessen, a more intensive surface water monitoring program including Tier I alerts, should be considered.

Oliver, Mangione, McCalla & Associates
a division of Trow Consulting Engineers Ltd.

Jennifer L. Green, B.Sc. (Eng.)
Environmental Engineer in Training
GeoEnvironmental Division

Stephen R. Wilson B.Sc.
Senior Hydrogeologist
GeoEnvironmental Division

References

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Appendix A:
Certificates of Approval

Ontario

Ministry of Environment and Energy
Ministère de l'Environnement et de l'Énergie
250 Davisville Avenue Toronto ON M4S 1H2
250, avenue Davisville Toronto ON M4S 1H2

APPROVALS BRANCH
3rd Floor
Tel: (416) 440-3544
Fax: (416) 440-6973

October 2, 1995

David Sloane
Waste Coordinator
The Corporation of the Township of Winchester
R.R.#4 Winchester,
K0C 2K0

Dear Mr. Sloane:

RE: Provisional Certificate of Approval No. A482101

Please find attached a Notice amending the Certificate of Approval dated December 4, 1989.

This Notice has been issued to allow the Township of Winchester to operate a municipal waste recycling facility at the Township of Winchester Landfill Site.

If you have any questions, please feel free to contact Robert Bruce at (416) 440-3575.

Sincerely,

A. Dominski, P. Eng., Supervisor
Waste Unit

SD/es
Enclosure

cc: B. Ward - Eastern Region
B. Helliar - Cornwall District Office
Paul Scale - Waste Reduction Branch
N. Krisjanis - Township of Winchester
D. Phippen - M.S. Thompson and Associates

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, you may by written notice served upon me, the Environmental Appeal Board and the Environmental Commissioner, Environmental Bill of Rights, S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:

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

In addition to these legal requirements, the Notice should also include:

3. *The name of the appellant;*
4. *The address of the appellant;*
5. *The Certificate of Approval number;*
6. *The date of the Certificate of Approval;*
7. *The name of the Director;*
8. *The municipality within which the waste disposal site is located;*

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

This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario,
M4V 1N3

The Environmental Commissioner,
1075 Bay Street,
Suite 605
6th Floor
Toronto, Ontario
M5S 2W5

The Director,
Section 39, Environmental Protection Act,
Ministry of the Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

This instrument is subject to Section 38 of the Environmental Bill of Rights, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.

DATED AT TORONTO this 5th *day of* September, 1995.

A. Dominski, P. Eng.
Director
Section 39
Environmental Protection Act

Ontario

Ministry of Environment and Energy
Ministère de l'Environnement et de l'Énergie
250 Davisville Avenue Toronto ON M4S 1H2
250, avenue Davisville Toronto ON M4S 1H2

APPROVALS BRANCH
3rd Floor
Tel: (416) 440-3544
Fax: (416) 440-6973

September 5, 1995

David Sloane
Waste Coordinator
The Corporation of the Township of Winchester
R.R.#4 Winchester,
K0C 2K0

Dear Mr. Sloane:

RE: Provisional Certificate of Approval No. A482101

Please find attached a Notice amending the Certificate of Approval dated December 4, 1989.

This Notice has been issued to allow the Township of Winchester landfill site to accept waste from the Village of Chesterville.

The amendment is supported by Regulation 299/94 which amends Regulation 347 under the Environmental Protection Act and a certified copy of the deed naming the Township of Winchester, the Village of Winchester and the Village of Chesterville as co-owners of the landfill property since 1977.

If you have any questions, please feel free to contact Sara Darker at (416) 440-3575.

Sincerely,

A. Dominski, P. Eng., Supervisor
Waste Unit

SD/es
cc: B. Ward, Eastern Region
B. Helliar, Cornwall District Office
N. Krisjanis, Township of Winchester

Ontario

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

TO: The Corporation of the Township of Winchester
R.R. #4 Winchester, Ontario
K0C 2K0

You are hereby notified that Provisional Certificate of Approval No. A 482101 dated December 4, 1989 is amended as follows:

Condition 8 is amended as follows:

8. Provisional Certificate of Approval No. A 482101 dated October 30, 1989 is revoked and replaced by this Provisional Certificate of Approval No. A 482101 dated December 4, 1989.

Condition 9 is added as follows:

9. The landfill site may serve the areas of the Township of Winchester, the Village of Winchester, and the Village of Chesterville.

REASONS

1. The reason for amending condition 8 is to correct the date of the Provisional Certificate of Approval referenced.

2. The reason for adding condition 9 is to clearly identify the municipalities who have co-owned the site since 1977 and who therefore may use the site according to Ontario Regulation 299/94.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:

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

APPROVALS BRANCH
3rd Floor
Tel: (416) 440-3544
Fax: (416) 440-6973

September 5, 1995

David Sloane
Waste Coordinator
The Corporation of the Township of Winchester
R.R.#4 Winchester,
K0C 2K0

Dear Mr. Sloane:

RE: Provisional Certificate of Approval No. A482101

Please find attached a Notice amending the Certificate of Approval dated December 4, 1989.

This Notice has been issued to allow the Township of Winchester landfill site to accept waste from the Village of Chesterville.

The amendment is supported by Regulation 299/94 which amends Regulation 347 under the Environmental Protection Act and a certified copy of the deed naming the Township of Winchester, the Village of Winchester and the Village of Chesterville as co-owners of the landfill property since 1977.

If you have any questions, please feel free to contact Sara Darker at (416) 440-3575.

Sincerely,

ORIGINAL SIGNED BY
A. Dominski

A. Dominski, P. Eng., Supervisor
Waste Unit

SD/es
cc: B. Ward, Eastern Region
B. Helliar, Cornwall District Office
N. Krisjanis, Township of Winchester

Ontario

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

TO: The Corporation of the Township of Winchester
R.R. #4 Winchester, Ontario
K0C 2K0

You are hereby notified that Provisional Certificate of Approval No. A 482101 dated December 4, 1989 is amended as follows:

Condition 8 is amended as follows:

8. Provisional Certificate of Approval No. A 482101 dated October 30, 1989 is revoked and replaced by this Provisional Certificate of Approval No. A 482101 dated December 4, 1989.

Condition 9 is added as follows:

9. The landfill site may serve the areas of the Township of Winchester, the Village of Winchester, and the Village of Chesterville.

REASONS

1. The reason for amending condition 8 is to correct the date of the Provisional Certificate of Approval referenced.

2. The reason for adding condition 9 is to clearly identify the municipalities who have co-owned the site since 1977 and who therefore may use the site according to Ontario Regulation 299/94.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:

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

TO: The Corporation of the Township of Winchester
R.R. #4
Winchester, Ontario
K0C 2K0

You are hereby notified that Provisional Certificate of Approval No. A 482101 *dated* December 4, 1989 *is amended as follows:*

Conditions 10 and 11 are added as follows:

Municipal Waste Recycling Facility (Transfer/Processing Station)

10. Except as otherwise provided by Regulation 101/94, the municipal waste recycling site shall be operated and maintained in accordance with:

    a) Application for Approval of a Waste Disposal Site dated June 27, 1995 and signed by David Sloane of the Township of Winchester.

    b) Letter to Mr. Bob Helliar of the Ministry of Environment and Energy from Dale Phippen of M.S. Thompson and Associates Ltd. dated June 28, 1995 regarding the municipal waste recycling facility located at the municipal landfill.

    c) Report entitled "The Township of Winchester Municipal Waste Recycling Facility" dated July 1994 (updated July 1995) by M.S. Thompson and Associates Ltd.

11. The municipal waste recycling site may collect, process and transfer blue box waste from the Township of Winchester; the Village of Winchester; the Village of Chesterville; the United Counties of Stormont, Dundas and Glengarry; Grenville County; the Township of Russell; and the Township of Osgoode.

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

1. The reason for adding Condition 10 is to allow the operation of a municipal waste recycling facility in accordance with the Environmental Protection Act at the Township of Winchester landfill site.

2. The reason for adding condition 11 is to identify the approved service area of the municipal waste recycling facility only. Otherwise, the service area for the Township of Winchester landfill site is limited to the Township of Winchester, the Village of Winchester and the Village of Chesterville.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, you may by written notice served upon me, the Environmental Appeal Board and the Environmental Commissioner, Environmental Bill of Rights, S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:

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

In addition to these legal requirements, the Notice should also include:

3. *The name of the appellant;*
4. *The address of the appellant;*
5. *The Certificate of Approval number;*
6. *The date of the Certificate of Approval;*
7. *The name of the Director;*
8. *The municipality within which the waste disposal site is located;*

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

This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario,
M4V 1N3

The Environmental Commissioner,
1075 Bay Street,
Suite 605
6th Floor
Toronto, Ontario
M5S 2W5

The Director,
Section 39, Environmental Protection Act,
Ministry of the Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

This instrument is subject to Section 38 of the Environmental Bill of Rights, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.

DATED AT TORONTO this 2nd *day of* October, 1995

A. Dominski, P. Eng.
Director
Section 39
Environmental Protection Act

Ministry of the Environment / Ministère de l'Environnement

Ontario

Provisional Certificate of Approval for a Waste Disposal Site

Certificat provisoire d'autorisation du lieu d'élimination des déchets

THIS IS A TRUE COPY OF THE ORIGINAL CERTIFICATE MAILED

ON Dec 12/89

(Signed)

Provisional Certificate of Approval No. / *Certificat provisoire d'autorisation nº* A 482101

Page / *page* 1 of / *de* 2

Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Aux termes de la Loi sur la protection de l'environnement et des règlements y afférents et sous réserve des restrictions qui s'y appliquent, ce Certificat provisoire d'autorisation est délivré à:

The Corporation of the
Township of Winchester
R.R. #4
Winchester, Ontario
K0C 2K0

for the use and operation of a 8.1 hectare (20 acres) landfilling site

all in accordance with the following plans and specifications:

1. Application and Supporting Information

Located: N.1/4 Lot 8, Concession 6
Township of Winchester
County of Dundas

which includes the use of the site only for the disposal of the following categories of waste (NOTE: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) domestic, commercial, non-hazardous solid industrial, and non-hazardous solid (limited to miscellaneous debris from agriculture)

and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

2. Wastes are to be deposited in an orderly manner in the fill area. All waste shall be compacted and covered with 15 cm of cover material on the exposed surfaces of the lifts when they reach a maximum of 2 m in height by 10 m in width or every two weeks, whichever occurs first.

3. The burning of all wastes shall be discontinued immediately.

4. A suitable design report with plans and specifications detailing site development including operation, closure, and schedules shall be submitted for approval by the Township to the Director of Approvals Branch, 250 Davisville Avenue, 3rd Floor Toronto, Ontario M4S 1H2 (the "Director"), by November 30, 1990. The design report shall detail measures for progressive closure and rehabilitation of the site to a natural passive state. The design report shall be implemented forthwith upon written notice of the Director, as amended in writing by the Director.

Dated this / *date ce* 4th day of / *jour de* December 19 89

Director, Section 38
Environmental Protection Act
Directeur, Section 38

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, you may by written notice served upon me, the Environmental Appeal Board and the Environmental Commissioner, Environmental Bill of Rights, S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:

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

In addition to these legal requirements, the Notice should also include:

3. *The name of the appellant;*
4. *The address of the appellant;*
5. *The Certificate of Approval number;*
6. *The date of the Certificate of Approval;*
7. *The name of the Director;*
8. *The municipality within which the waste disposal site is located;*

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

This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario,
M4V 1N3

The Environmental Commissioner,
1075 Bay Street,
Suite 605
6th Floor
Toronto, Ontario
M5S 2W5

The Director,
Section 39, Environmental Protection Act,
Ministry of the Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

This instrument is subject to Section 38 of the Environmental Bill of Rights, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.

DATED AT TORONTO this 5th *day of* September, 1995.

THIS IS A TRUE COPY OF
THE ORIGINAL NOTICE
SIGNED BY

A. DOMINSKI, P. ENG.

MAILED ON Sept. 11/95

BY E.S.

Ministry of the Environment
Ontario

PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE

The following conditions are additional to the conditions shown on Provisional Certificate of Approval Number A 482101 dated December 4, 1989

5. A report outlining the hydrogeology of the site, the extent of the leachate plume, and the potential for future movement of leachate off-site shall be submitted by the Township, to the Director, by November 30, 1990. The hydrogeology report must be prepared by a competent hydrogeologist.

6. The Township shall submit for approval a detailed program for monitoring surface and groundwater including leachate movement, to the Director, by November 30, 1990.

7. A proper rodent control program shall be implemented by having bait set near the exposed waste at all times.

8. Provisional Certificate of Approval No. A 482101 dated October 30, 1989 is revoked and replaced by this Provisional Certificate of Approval No. A 482101 dated November 30, 1989.

Ministry of the Environment
Ontario

Provisional Certificate No. A 482101

PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Township of Winchester,
Moorewood, Ontario.
K0A 2R0

THIS IS A TRUE COPY OF THE ORIGINAL CERTIFICATE MAILED ON July 16/81

(Signed)

for the use and operation of a 8.1 hectare (20 acres) landfilling site

all in accordance with the following plans and specifications:

1. Application and Supporting Information

Located: N.1/4 Lot 8, Concession 6,
Township of Winchester,
County of Dundas

which includes the use of the site only for the disposal of the following categories of waste (NOTE: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) domestic, commercial, non-hazardous solid industrial, and non-hazardous solid (limited to miscellaneous debris from agriculture)

and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

2. Wastes are to be deposited in an orderly manner in the fill area, compacted and adequately covered by cover material once a week between April 15 and November 15 and monthly during the remainder of the year or as directed from time to time by the Director of the Southeastern Region of the Ministry of the Environment.

3. The burning of domestic waste at the site is to be discontinued immediately.

Dated this 10th day of July, 1981.

T. O. Anderson
Director, Section 39,
The Environmental Protection Act, 1971

Ministry of the Environment
Ontario

NOTICE

TO: The Corporation of the
Township of Winchester
R.R. #4
Winchester, Ontario
K0C 2K0

1. A reason for the condition requiring registration of the Certificate is that Section 46 of The Environmental Protection Act, 1971 prohibits any use being made of the lands after they cease to be used for waste disposal purposes within a period of twenty-five years from the year in which such land ceased to be used unless the approval of the Minister for the proposed use has been given. The purpose of this prohibition is to protect future occupants of the site and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by the Certificate being registered on title.

2. The reason for the imposition of condition 2 is to ensure that the development of this landfilling site will be in orderly and systematic manner. The use and operation of the site without such a condition may create a nuisance.

3. The reason for the imposition of condition 3 is that smoke from burning waste has created offensive odours and the continued practice of burning waste at the site may create a nuisance or cause a hazard to the health and safety of any person.

4. The reason for condition 4 is to ensure that an orderly and systematic development of the site is conducted in accordance with the provisions of the Environmental Protection Act. A closure plan is to ensure that the site is closed in a satisfactory manner and maintained and monitored after closure. Operation of the site without such a condition may create a nuisance and would not be in the public interest.

5. The reason for condition 5 is that a hydrogeological study is an integral part of the use and operation of a landfill site. It is necessary to ensure that sufficient pollutant attenuation is taking place on site and contaminants are not migrating off site at an unacceptable level. The use and operation of the site without these conditions may create a nuisance or result in a hazard to the health and safety of any person.

6. The reason for condition 6 is that a monitoring program is an integral part of the use and operation of a waste disposal site. Should monitoring show a significant impact on or off site, corrective measures may be required. The operation of the site without the monitoring program may create a hazard to the health and safety of any person and would not be in the public interest.

7. The reason for condition 8 is to ensure that the rodent population will not result in a hazard to the health and safety of any person or the natural environment.

8. The reason for condition 8 is to clarify that the site is to be used and operated pursuant to the Provisional Certificate of Approval dated November 30, 1989.

You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 122a of the Environmental Protection Act, R.S.O. 1980, c. 141, as amended, provides that the Notice requiring the hearing shall state the portions of each term or condition in the approval in respect of which the hearing is required and the grounds on which you intend to rely at the hearing.

This Notice should be served upon:

The Secretary
Environmental Appeal Board
112 St. Clair Ave. West
Suite 502
Toronto, Ontario M4V 1N3

AND

The Director
Section 38, E.P.A
Ministry of the Environment
250 Davisville Ave.
Toronto, Ontario M4S 1H2

Dated at Toronto this 4th day of December, 1989.

THIS IS A TRUE COPY OF THE ORIGINAL NOTICE MAILED

ON Dec 12/89

Signature

Director,
Section 38, E.P.A.
Ministry of the Environment.

Ministry of the Environment
Ontario

Provisional Certificate No. A 482101

PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Township of Winchester,
Moorewood, Ontario.
K0A 2R0

for the use and operation of a 8.1 hectare (20 acres) landfilling site

all in accordance with the following plans and specifications:

1. Application and Supporting Information

Located: N.1/4 Lot 8, Concession 6,
Township of Winchester,
County of Dundas

which includes the use of the site only for the disposal of the following categories of waste (NOTE: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) domestic, commercial, non-hazardous solid industrial, and non-hazardous solid (limited to miscellaneous debris from agriculture)

and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

2. Wastes are to be deposited in an orderly manner in the fill area, compacted and adequately covered by cover material once a week between April 15 and November 15 and monthly during the remainder of the year or as directed from time to time by the Director of the Southeastern Region of the Ministry of the Environment.

3. The burning of domestic waste at the site is to be discontinued immediately.

Dated this 10th day of July, 1981.

T. O. Cameron
Director, Section 39,
The Environmental Protection Act, 1971

ONTARIO

Department of Energy and Resources Management
Waste Management Branch

APPLICATION FOR A CERTIFICATE OF APPROVAL FOR A WASTE DISPOSAL SITE

TO: THE DEPARTMENT OF ENERGY AND RESOURCES MANAGEMENT
880 Bay Street,
Toronto, Ontario

To be submitted through Regional Waste Management Engineer

(1) Under the Waste Management Act, 1970 and the regulations, this application is made by Township of Winchester

Owner of Facility

Morewood, Ontario

Address

(2) for the Renewal / ~~Issue~~ of a Certificate of Approval for a

Delete item inapplicable

Landfilling Site

Type of Disposal

(3) located North Part Lot Eight, Concession Six

Full particulars of Location

(4) A ~~Certificate~~ / Provisional Certificate of Approval No. 482101 for this site was issued June 4 19 71

Delete item inapplicable

(5) No change in use, operation, or ownership of the site has occurred since the date of the original application.

Dated this 28th day of July 19 71

Glen MacGregor, Clerk
Signature of Applicant

(6) The following changes in use, operation or ownership (have occurred since the date of the original application) (are proposed)

Delete item inapplicable

If necessary, provide additional details on separate sheets and attach to application.

Continued on Attached Sheets ☐

(7) The site will be operated in accordance with The Waste Management Act, 1970 and the regulations by

Name of Operator

Address

The required supporting information to the application is appended hereto.

(8) Notice of this application has been published in the

on and

19 and a copy of the notice is attached.

(9) A certificate that the site does not contravene any of the by-laws of the

To be completed if applicant is

Department of Energy and Resources Management
Waste Management

SUPPORTING INFORMATION TO AN APPLICATION FOR APPROVAL OF A LANDFILL DISPOSAL SITE

For Head Office Use

1. Wastes to be Disposed of Comprise

Domestic	75 %
Commercial	25 %
Industrial Waste	%
Hauled Liquid Industrial Waste	%
Agricultural Waste	%
Hazardous Waste	%
Hauled Sewage	%
*Other	%
	100%

*Describe

Total 5 Tons/Day

Population Served 5,000

2. Origin and Composition of Principal Component: Waste (other than domestic and commercial)

3.

Distance to Nearest Watercourse	1000 Ft.
Distance to Source of Potable Water	5000 Ft.
Distance to Dwelling	5000 Ft.
Distance to Public Road	100 Ft.
Distance to Cemetery	3 mi. Ft.
Total Area of Site	20 Acres
Anticipated Life	10 Years

General Description of Site

situated in bush and swamp area

4.

Maximum Depth of Excavation Below Surface	10
Maximum Height of Fill Above Surface	6

Type(s) of Material Encountered From Surface

muck	10
clay	20

Depth of Watertable Below Surface 10

on July 27, 1971 (Da

5. Proposed Future Land Use

returned to bush

6. Operating Equipment

bulldozer rented when required

Hours of Operation 20 hours per month

7. The Following Documents are Attached

FOR DEPARTMENTAL USE

8. Authorities Consulted:

Health Unit	☐ Objection	☐ No Objec
O.W.R.C.	☐ Objection	☐ No Objec
A.M.B.	☐ Objection	☐ No Objec
Municipality	☐ Objection	☐ No Objec
Conservation Authority	☐ Objection	☐ No Objec

Other

Used with Power
Form 113
Cassels and Gilbert, Limited, Toronto

MINISTRY OF ENVIRONMENT
AND ENERGY

This Indenture

22 1975

CORNWALL, ONTARIO

made in duplicate the 29th day of January
one thousand nine hundred and seventy-seven
In Pursuance of the Short Forms of Conveyances Act:
Between

THE CORPORATION OF THE TOWNSHIP OF WINCHESTER,
Morewood, Ontario.

THE CORPORATION OF THE VILLAGE OF WINCHESTER,
Winchester, Ontario.

hereinafter called the Grantor of the FIRST PART

. . the said CORPORATION OF THE TOWNSHIP OF WINCHESTER,
Morewood, Ontario, and
THE said CORPORATION OF THE VILLAGE OF WINCHESTER,
Winchester, Ontario, and
THE CORPORATION OF THE VILLAGEOF CHESTERVILLE
Chesterville, Ontario. hereinafter called the Grantee of the SECOND PART

WHEREAS the Grantors hereto are the owners of a sanitary land fill site which is now used jointly by the Corporation of the Township of Winchester and the Corporation of the Village of Winchester and the Corporation of the Village xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx of Chesterville and it is desirable that the title to the said land fill site be vested equally in the three said Municipal Corporations.

Nancy Kenyon's Clerk
CERTIFIED TRUE COPY

Witnesseth that in consideration of ----------

ONE THOUSAND & SIXTY SIX 66/100 ($1066.66)---------- dollar of lawful money of Canada now paid by the said grantee to the said grantor (the receipt whereof is hereby acknowledged) xx it the said grantor DO ES GRANT unto the said grantee in fee simple

ALL and Singular that certain parcel or tract of land and premises, situate, lying and being in the TOWNSHIP of WINCHESTER, inthe COUNTY of DUNDAS and being composed of that part of the NORTH half of lot number EIGHT (8) in the SIXTH (6th) Concession of the said Township more particularly described as follows:-

COMMENCING at a point in the NORTH headline of said lot number EIGHT (8), which is distant measured EASTERLY along said NORTH headline from the NORTH WEST corner of said lot, ONE HUNDRED feet (100');

Thence EASTERLY along the NORTH headline of said lot, a distance of EIGHTY (80) rods, or THIRTEEN HUNDRED & TWENTY feet (1320') to a point;

Thence SOUTHERLY in a straight line drawn parallel to the WEST side line of said lot, a distance of FORTY (40) rods or SIX HUNDRED & SIXTY feet (660') to a point;

Thence WESTERLY in a straight line drawn parallel to the NORTH head line of said lot, a distance of EIGHTY (80) rods, or THIRTEEN HUNDRED & TWENTY feet (1320') to a point;

THENCE NORTHERLY in a straight line drawn parallel to the WEST side line of said lot, a distance of FORTY (40) rods or SIX HUNDRED & SIXTY feet (660') to the point of commencement.

TO HAVE AND TO HOLD unto the said grantee its heirs and assigns to and for its and their sole and only use forever,

SUBJECT NEVERTHELESS to the reservations, limitations, provisoes and conditions expressed in the original grant thereof from the Crown.

AND SUBJECT ALSO to the conditions contained in conveyance to the Grantors herein registered as No. 7413B.

The said grantors COVENANT with the said grantee THAT it has the right to convey the said lands to the said grantee notwithstanding any act of the said grantor

AND that the said grantees shall have quiet possession of the said lands free from all encumbrances.

AND the said grantors COVENANT with the said grantee s that it will execute such further assurances of the said lands as may be requisite.

AND the said grantors COVENANT with the said grantees that it has done no act to encumber the said lands.

AND the said grantors RELEASE to the said grantees ALL its claims upon the said lands.

~~AND the said wife of the said Grantor hereby bars her Dower in the said lands~~

IN WITNESS WHEREOF the Grantors have caused their Corporate Seals to be affixed and attested by the hands of their proper officers

~~IN WITNESS WHEREOF the said parties hereto have hereunto set their hands and seals~~

Signed, Sealed and Delivered IN THE PRESENCE OF

CORPORATION OF THE TOWNSHIP OF WINCHESTER by

H. Albert Link Reeve

Glenn Matheson Clerk

CORPORATION OF THE VILLAGE OF WINCHESTER by

[illegible] Reeve

Raymond W. Russell Clerk

Form 1072 (Revised)
Newcombe and Gilbert, Limited, Toronto

IN THE MATTER OF SUBSECTION 3 OF SECTION 6 OF
THE LAND SPECULATION TAX ACT, 1974

Affidavit

I. GLENN. MacGREGOR, ... Clerk ..... of the Township of Winchester
(print name)

....
(print address)

.....

MAKE OATH AND SAY THAT:

1. I verily believe that the disposition of designated land evidenced in the attached instrument or writing is exempt from the tax imposed by subsection 1 of section 2 of the above Act by virtue of the disposition being: conveyance by Municipality to Municipality.

describe nature of disposition

as provided for by section 4 , clause j , subclause of the above Act.

delete this paragraph if inapplicable

~~2. I am authorized in writing by the transferor making the disposition referred to in paragraph 1 hereof to make this affidavit.
Since the acquisition of the interest of the transferor in the designated land that is referred to in paragraph 1 hereof and that is being disposed of to the transferee named in the attached instrument or writing, no disposition with respect to such designated land has occurred prior to the disposition to the said transferee.~~

delete this paragraph if inapplicable

3. I am authorized in writing by the transferor making the disposition referred to in paragraph 1 hereof to make this affidavit.
Since the acquisition of the interest of the transferor in the designated land that is referred to in paragraph 1 hereof and that is being disposed of to the transferee named in the attached instrument or writing, no disposition with respect to such designated land has occurred prior to the disposition to the said transferee.

Sworn before me at the Village
of Chesterville
in the County
of Dundas
this 12TH
day of February 1977

Glenn R MacGregor

A Commissioner, etc.

AFFIDAVIT OF SUBSCRIBING WITNESS

I,
of the
in the

*See footnote

make oath and say:

I am a subscribing witness to the attached instrument and I was present and saw it executed at by

*See footnote

I verily believe that each person whose signature I witnessed is the party of the same name referred to in the instrument.

SWORN before me at the

this day of 19

A COMMISSIONER FOR TAKING AFFIDAVITS, ETC.

* Where a party is unable to read the instrument or where a party signs by making his mark or in foreign characters add "after the instrument had been read to him and he appeared fully to understand it". Where executed under a power of attorney insert "(name of attorney) as attorney for (name of party)"; and for next clause substitute "I verily believe that the person whose signature I witnessed was authorized to execute the instrument as attorney for (name)".

THE LAND TRANSFER TAX ACT, 1974 - AFFIDAVIT OF VALUE OF THE CONSIDERATION

Revised for Jan. 1/76

IN THE MATTER OF THE CONVEYANCE made

(Identify the parties to the conveyance)

by: THE CORPORATION OF THE TOWNSHIP OF WINCHESTER & THE CORPORATION OF THE VILLAGE OF WINCHESTER

to: THE CORPORATION OF THE TOWNSHIP OF WINCHESTER & THE CORPORATION OF THE VILLAGE OF WINCHESTER & THE CORPORATION OF THE VILLAGE OF

on the 29th day of January ,19 77 CHESTERVILLE

I, GLENN MACGREGOR

of the Township of Winchester

in the County of Dundas

MAKE OATH AND SAY THAT:

This affidavit may be made by the purchaser or vendor or by any one acting for them under power of attorney or by an agent accredited in writing by the purchaser or vendor or by the solicitor of either of them or by some other person approved by the Minister of Revenue.

1. I am Clerk of the Grantor Corporation of the Township of Winchester named in the within (or annexed) conveyance.
2. I have a personal knowledge of the facts stated in this affidavit.
3. (1) The total consideration for this transaction has been allocated as follows:

(a) Land, buildings, fixtures and goodwill	$ 166.66
(b) Chattels — items of tangible personal property - (see note)	$ nil
TOTAL CONSIDERATION	$ 166.66

(2) The true consideration for the transfer or conveyance for Land Transfer Tax purposes is as follows:

(a) Monies paid in cash	$ 166.66
(b) Property transferred in exchange (Detail below)	$ nil
(c) Securities transferred to the value of (Detail below)	$ nil
(d) Balances of existing encumbrances with interest owing at date of transfer	$ nil
(e) Monies secured by mortgage under this transaction	$ nil
(f) Liens, legacies, annuities and maintenance charges to which transfer is subject	$ nil
(g) Other (Detail below)	$ nil
TOTAL CONSIDERATION (should agree with 3(1)(a) above)	$ 166.66

All blanks must be filled in.

4. If consideration is nominal, is the transfer for natural love and affection?
5. If so, what is the relationship between Grantor and Grantee?
6. Other remarks and explanations, if necessary

SWORN before me at the Village of
in the County
this 12th day of Dundas February 19 77

Glenn MacGregor

A COMMISSIONER FOR TAKING AFFIDAVITS, ETC.

NOTE TO PARAGRAPH 3(1)(b): Chattels Retail sales tax is payable on the valuation of items shown in 3(1)(b) unless otherwise exempted under the provisions of The Retail Sales Tax Act R.S.O. 1970 C115 as amended. For the purpose of this affidavit insert above only the value of chattels, the total value of which in the opinion of the deponent exceeds $100.00. This does not exonerate a purchaser from the payment of Retail Sales Tax on any tangible personal property as part of this transaction. When chattels are purchased as part of this transaction, with value of less than $100.00, the applicable tax should be paid by the purchaser to the Treasurer of Ontario and remitted to the Minister of Revenue.

AFFIDAVIT AS TO AGE AND MARITAL STATUS

I/WE

of the

in the

make oath and say: When executed the attached instrument,

* If attorney see footnote

I/WE at least eighteen years old.

Strike out inapplicable clauses.

I was married / divorced / widower.

was my wife / husband.

We were married to each other.

We held the land as Joint Tenants / Trustees / Partnership Property.

Resident of Canada, etc.

(SEVERALLY) SWORN before me at the

this day of 19

A COMMISSIONER FOR TAKING AFFIDAVITS, ETC.

* Where affidavit made by attorney substitute: "When I executed the attached instrument as attorney for (name), he/she was (marital status, if married, name of spouse), and when he/she executed the power of attorney, he/she had attained the age of majority".

January 27th 19 77

CORPORATION OF THE TOWNSHIP OF WINCHESTER

and

CORPORATION OF THE VILLAGE OF WINCHESTER

—TO—

CORPORATION OF THE TOWNSHIP OF WINCHESTER

CORPORATION OF THE VILLAGE OF WINCHESTER

CORPORATION OF THE VILLAGE OF CHESTERVILLE

Deed of Land

SITUATE

in the Township of Winchester

Newman and Gilbert, Limited, Toronto

ASSESSMENT ROLL NOS.

ADDRESS OF PROPERTY

CASS & CASS
BARRISTERS AND SOLICITORS
WINCHESTER, ONTARIO
K0C 2K0

No. 299388
Registry Division of Dundas (No. 8)
I CERTIFY that this instrument is registered as of
11 58 A.M.
FEB 16 1977 in the
Registry Office at Morrisburg, Ontario.

A. M. Fader
REGISTRAR

dlpy.

PAID
LAND REGISTRY OFFICE NO. 8

REGISTRATION FEE	10.00
LAND TRANSFER TAX	.50
RETAIL SALES TAX	Nil

Ontario

10645

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

250 Davisville Avenue
Toronto ON M4S 1H2

250, avenue Davisville
Toronto ON M4S 1H2

APPROVALS BRANCH
3rd Floor
Phone: (416) 440-3717
Fax: (416) 440-6973

JAM

- 1996

September 18, 1996

Mr. Dave Salone, Waste Co-ordinator
The Corporation of the Township of Winchester
R.R. #4
Winchester, Ontario
K2E 7J5

Dear Mr. Salone:

Re: Provisional Certificate of Approval No. A 482101, Boyne Road Landfill Site

Enclosed is a Notice of Amendment for the above mentioned Provisional Certificate of Approval. The Notice approves the establishment and operation of a household hazardous waste transfer facility at the Boyne Road Landfill Site.

Please note that all other terms and conditions as outlined in the original Certificate of Approval No. A482101 and subsequent Notices of Amendment remain unchanged.

Should you have any questions or comments concerning the above, please feel free to contact Mr. Osman Ibrahim at (416) 440-3717.

Sincerely,

A. Dominski, P.Eng. Supervisor
Waste Unit

Encl.
OI/es
cc: Brian Ward, Eastern Region
Jeff Columbus, Cornwall District Office

Ontario

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

TO: The Corporation of the Township of Winchester
R.R. #4
Winchester, Ontario
K2E 7J5

You are hereby notified that Provisional Certificate of Approval No. A 482101 *dated* December 4, 1989 *and all subsequent Notices of Amendment are hereby amended to include the approval of the establishment and operation of facilities for the acceptance, storage, packaging, and bulking of household hazardous waste and subsequent transfer of hazardous waste* codes 145, 148, 213, 221, 241, 242, 252, 261, 263, 269, and 331, *as described in the document entitled "Ministry of the Environment New Ontario Waste Classes" January 1986, in accordance with the following plans and specifications:*

i. The application for a Waste Disposal Site dated September 10, 1996 and the supporting information as provided in the document entitled "Boyne Road Landfill Site and Recycling Facility Household Hazardous Waste Transfer Facility Design and Operation Report", prepared by Oliver, Mangione, McCalla & Associates Ltd., dated July 1996.

ii. The letter dated July 25, 1996 from Brenda L. Burrows-Rabb, Oliver, Mangione, McCalla & Associates Ltd. to Wilfred Ng, MOEE Approvals Branch.

In addition, the following conditions are added:

6. (a) The Household Hazardous Waste Transfer Facility shall be operated in accordance with the application for a Waste Disposal Site (Transfer) submitted September 10, 1996 and supporting information as provided in the document entitled "Boyne Road Landfill Site and Recycling Facility Household Hazardous Waste Transfer Facility Design and Operation Report", prepared by Oliver, Mangione, McCalla & Associates Ltd., dated July 1996.

(b) The letter dated July 25, 1996 from Brenda L. Burrows-Rabb, Oliver, Mangione, McCalla & Associates Ltd. to Wilfred Ng, MOEE Approvals Branch.

7. (a) The Township shall ensure that the wastes are stored in a safe and secure manner; that the operation of this facility does not interfere with any other activities associated with this site; and that the wastes are properly handled, packaged or contained so as not to pose any threat to the general public, site personnel and the environment.

(b) No storage facilities other than those approved under this Certificate shall be used and fixed storage facilities shall not be moved, replaced or altered.

(c) Notwithstanding Condition 7 (a), all storage buildings and tanks shall be clearly marked indicating the type and nature of the hazardous waste stored. All points of access to the transfer storage facilities shall be posted to warn that the area contains hazardous materials. Smoking restrictions shall be adhered to and non-smoking signs posted as required by regulation.

(d) All storage buildings shall be properly ventilated and shall be constructed in compliance with fire regulations and municipal by-laws and approvals and in accordance with Ministry of Labour guidelines.

(e) All hazardous waste storage tanks and buildings shall be maintained under lock and key and access to these facilities shall be limited to trained site personnel.

(f) All storage facilities shall be inspected daily during operating hours by site personnel trained in contingency measures and all inspections shall be recorded and these records shall be maintained by the Township for a period of three years.

8. (a) No PCB's shall be accepted at this site. Oil and oil-based paints which have been manufactured prior to 1972; or whose manufacturing date cannot be determined, may contain PCBs and shall be handled in the manner prescribed:

(i) The oil and oil-based paints shall not be mixed (bulked) with other paints prior to testing. Paints which are lab-packed are not considered to be mixed under this Certificate.

(ii) The oil and oil-based paints shall be tested for PCB content and shall be handled in the manner outlined in subcondition (a)(iii) if found to contain PCB.

(iii) If the oil and oil-based paints are found to have PCBs at or above levels identified in subcondition (a)(iv), it shall be forthwith reported to the MOEE District Manager and shall be managed in accordance with Regulation 362/92 and stored or removed from the site to an approved PCB storage site, in accordance with written instructions from the District Manager.

(iv) The oil and oil-based paints shall not be distributed for reuse if they have any measurable PCB content. The oil and oil-based paint is considered to be a PCB waste, if measured levels are equal to or greater than 50 parts per million.

(b) Except as specified in subcondition (a)(iv), paints collected at the site may be returned or sold to the general public for reuse provided all transactions are recorded by invoice. Information on the type and volume of paint returned to the public through this site shall be recorded in the report specified in Condition 9.

9. (a) The Township shall establish a monthly summary of waste received at the site which shall include, but not necessarily be limited to, the documentation of waste types and quantities, source of generation, and ultimate disposal sites; and document of spills and upsets and environmental and other problems encountered in operating this site.

(b) Wastes that are collected and stored shall be in amounts which can be safely handled on the site. In the event that larger amounts are received than anticipated, the Township shall have extra drums and lab-packed containers available on the premises for the storage of the additional waste collected. When site capacity is reached, arrangements for the removal of waste from the site shall be made as soon as possible, but in any event, within five (5) working days. Records shall be maintained each time the capacity is exceeded and submitted in the report specified in subcondition (c).

(c) The information collected under subcondition (a) and (b) shall be submitted in a report to the District Manager on or before the first day of December during each year of operation.

10. The Township shall ensure that only site personnel who are trained are on duty at all times during the operation of the site.

11. (a) Prior to commencing operations on the site, the Township shall have prepared an operation manual for use by site personnel which shall contain, but not necessarily be limited to the following:

(i) an outline of the responsibilities of site personnel;

(ii) personnel training protocols;

(iii) proper receiving and recording procedures (including recording procedures of wastes which are refused at the site);

(iv) paint waste identification, analysis information and separating procedures;

(v) proper storage, handling, sorting and shipping procedures;

(vi) contingency procedures to be followed by personnel in the event of spills, fire or other emergencies.

(b) On commencing the Household Hazardous Waste Collection Program, a copy of the manual shall be placed in a central location on the site and this manual shall be accessible to all site personnel during operating hours.

12. The Township shall ensure that adequate fire fighting and contingency spill cleanup equipment is available at the site and that on-site supervisors are familiar with the use of such equipment and its location(s) on the site.

13. The local police and fire departments shall be informed of this site and this Certificate and shall be notified in writing of operating hours and any changes to scheduled operating hours prior to the changes being made.

14. Any spills shall be forthwith reported directly to the Ministry of Environment and Energy Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately. A record of all spills and upsets, cleanup and corrective action shall be maintained and submitted in the report specified under Condition 9 (c).

15. Except as specified under Conditions 8(a)(iii) and (b), all waste collected shall be transported from the site by an approved waste management system and disposed of at landfill, transfer and processing sites certified to accept these types of wastes.

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

1. Condition 6 is included to ensure that this site is operated in accordance with the application and supporting information submitted by the Township, and not in a manner which the Director has not been asked to consider.

2. Conditions 7 and 8 are included to ensure that this site is used only to collect and handle approved waste from approved site users; and that the waste is stored in a secure and safe manner.

3. Condition 9 is to provide the Township and the Ministry of Environment and Energy with an assessment of the Household Hazardous Waste Collection Program.

4. Condition 10 and 11 is to ensure that the Household Hazardous Waste Collection Program is conducted in an organized manner by adequately trained persons to ensure the safety of the general public, site personnel and the environment.

5. Condition 12 is to ensure that any emergency which may occur on site can be dealt with as expeditiously as possible.

6. Condition 13 is to ensure the police and/or fire department personnel are adequately prepared for and are able to assist with the operation of the site and Household Hazardous Waste Collection Program day should an emergency arise.

7. Condition 14 is to ensure that all spills are reported and properly cleaned up.

8. Condition 15 is to ensure that all waste is transported and disposed of in an environmentally acceptable manner in accordance with legislation governing the handling of waste material.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:

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

In addition to these legal requirements the Notice should also include:

3. *The name of the appellant;*
4. *The address of the appellant;*
5. *The Certificate of Approval number;*
6. *The date of the Certificate of Approval;*
7. *The name of the Director;*
8. *The municipality within which the waste disposal site is located;*

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

This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario,
M4V 1N3

AND

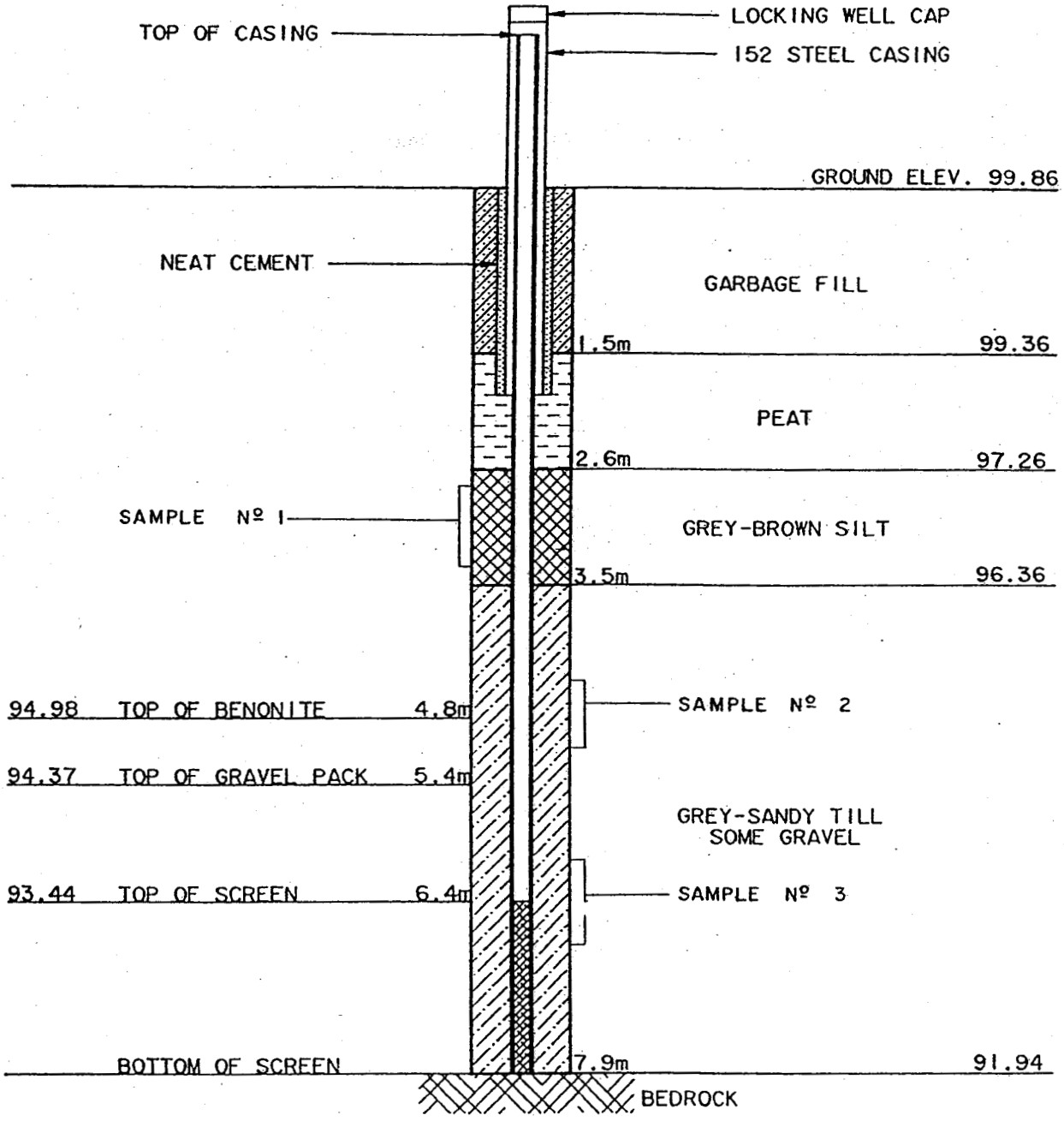
The Director,
Section 39, Environmental Protection Act,
Ministry of Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

DATED AT TORONTO this 18th *day of* September, 1996.

A. Dominski, P. Eng.
Director
Section 39
Environmental Protection Act

Appendix B:
Borehole Logs
Monitoring Wells MW1 through MW6

MONITORING WELL #1 BOREHOLE LOG



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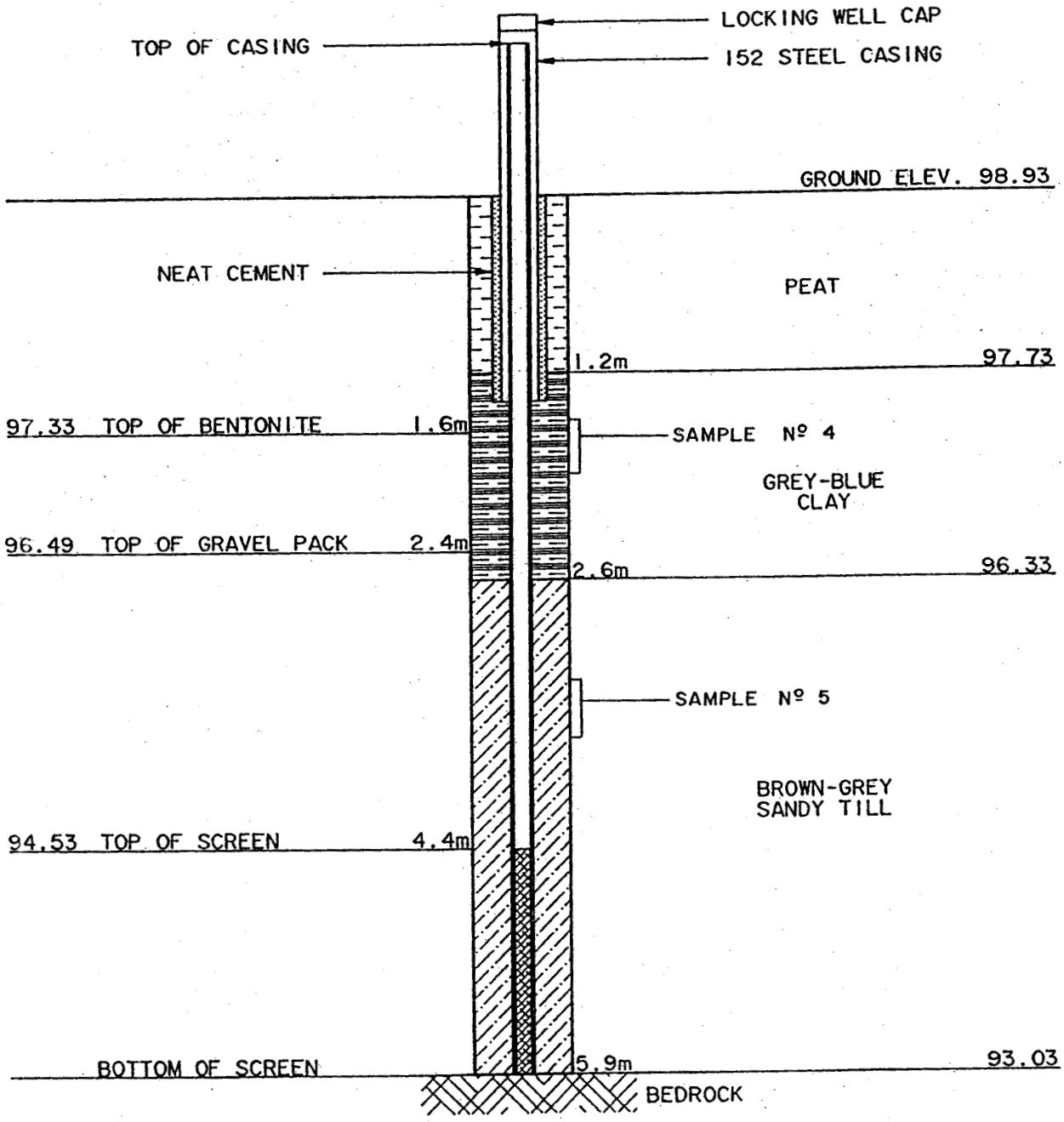
Consulting Engineers
Nepean, Ontario

DATE:	CLIENT:	DRAWING NO.
MARCH, 1991	TOWNSHIP OF WINCHESTER LANDFILL	90-7848
SCALE: N.T.S.	TITLE: MONITORING WELL INSTALLATION	

MONITORING WELL #2 BOREHOLE LOG



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Consulting Engineers
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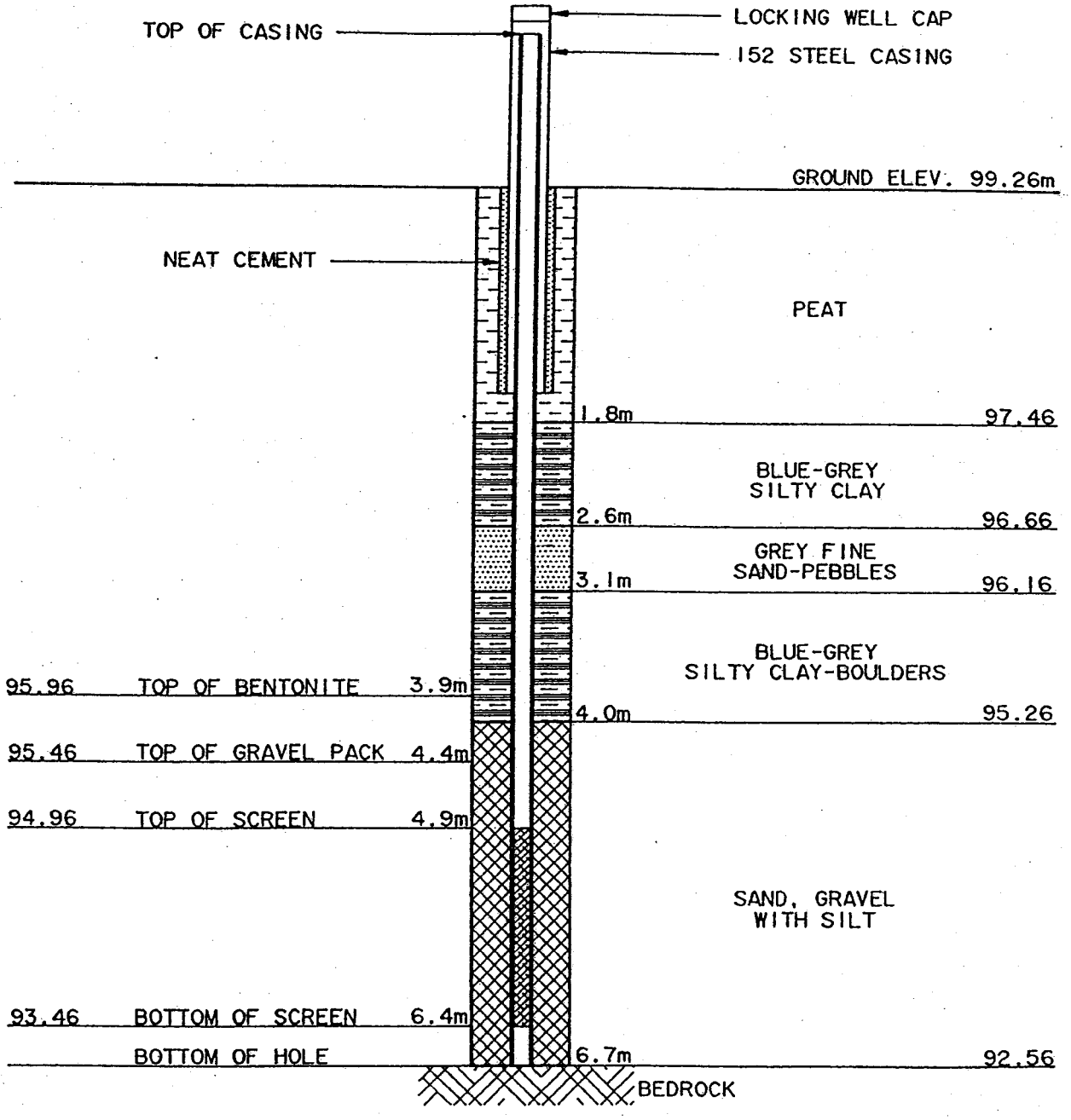
DATE: MARCH, 1991	CLIENT: TOWNSHIP OF WINCHESTER LANDFILL	DRAWING NO. 90-7848
SCALE: N.T.S.	TITLE: MONITORING WELL INSTALLATION	

MONITORING WELL #3 BOREHOLE LOG



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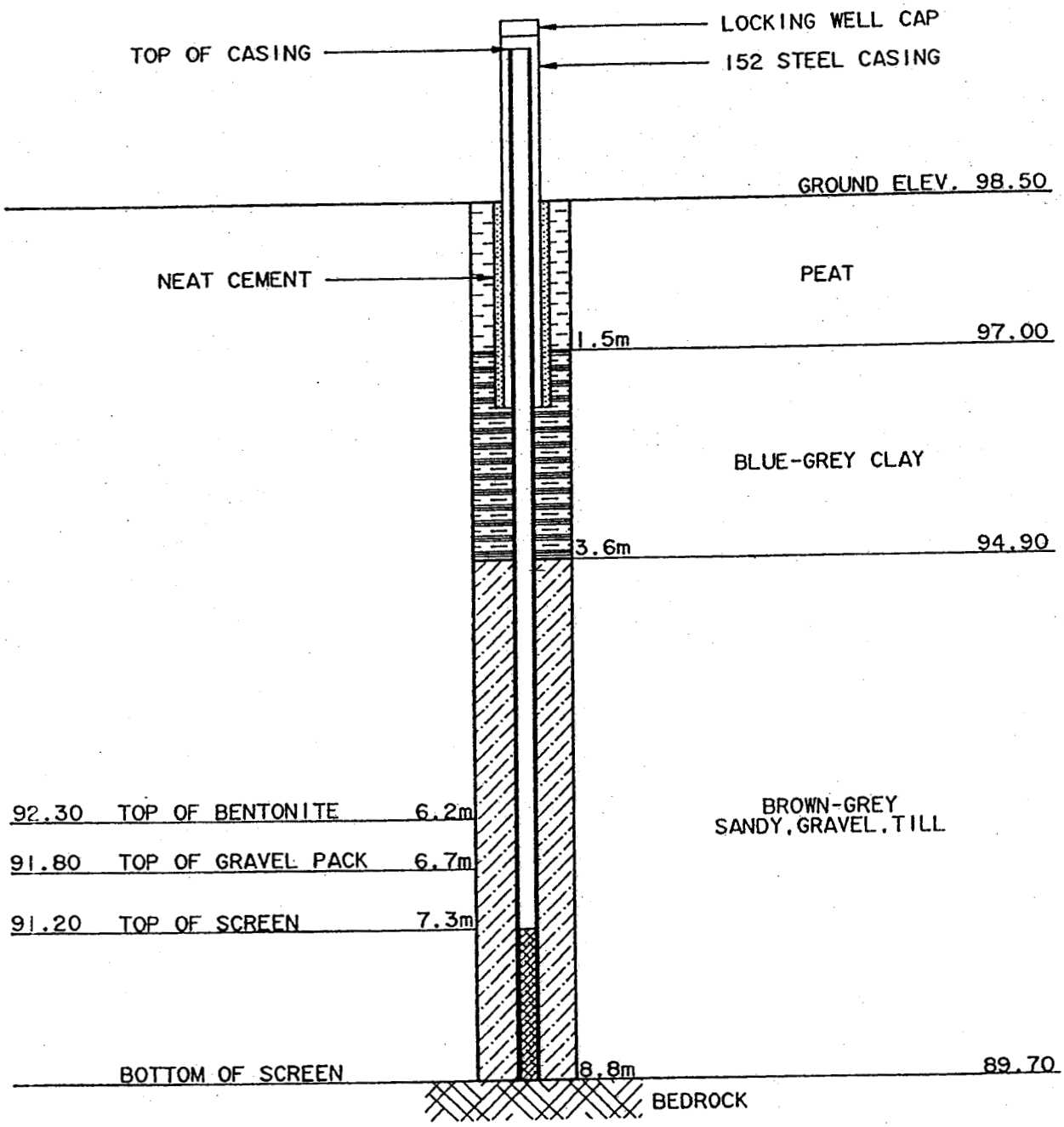
DATE:	CLIENT:	DRAWING NO.
MARCH, 1991	TOWNSHIP OF WINCHESTER LANDFILL	90-7848
SCALE: N.T.S.	TITLE: MONITORING WELL INSTALLATION	

MONITORING WELL #4 BOREHOLE LOG



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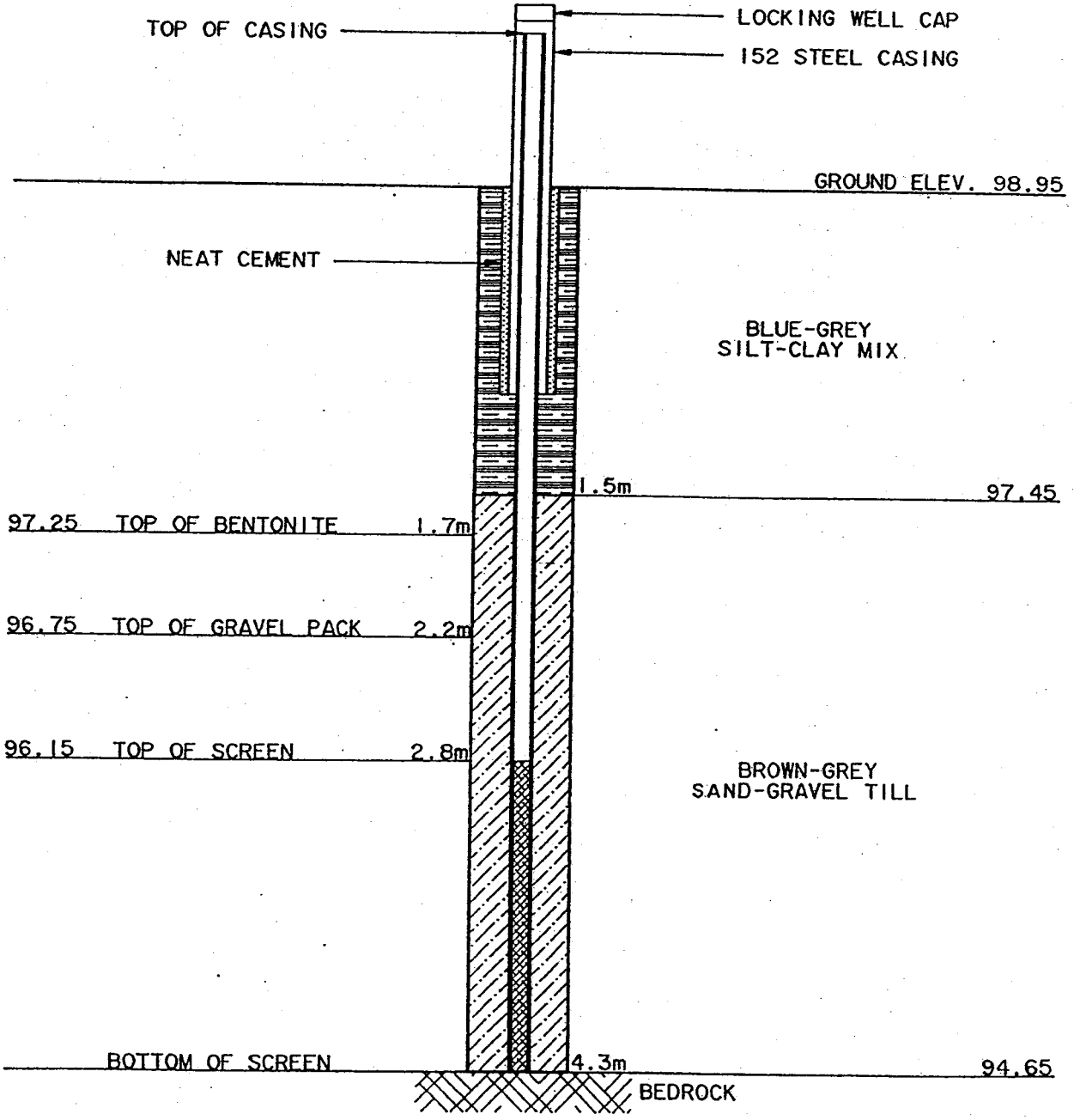
DATE: MARCH. 1991	CLIENT: TOWNSHIP OF WINCHESTER LANDFILL	DRAWING NO. 90-7848
SCALE: N.T.S.	TITLE: MONITORING WELL INSTALLATION	

MONITORING WELL #5 BOREHOLE LOG



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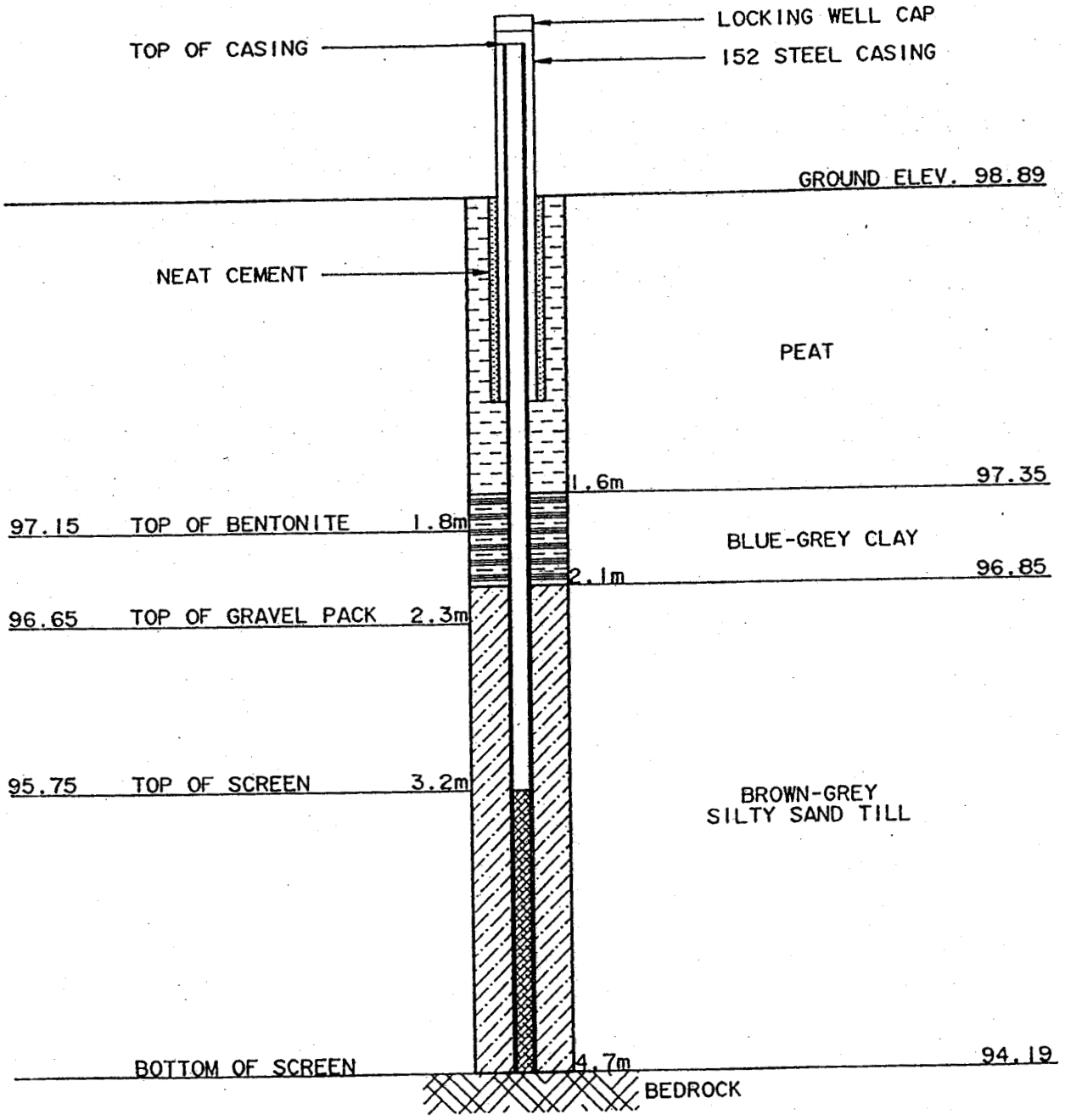
DATE: MARCH, 1991	CLIENT: TOWNSHIP OF WINCHESTER LANDFILL	DRAWING NO. 90-7848
SCALE: N.T.S.	TITLE: MONITORING WELL INSTALLATION	

MONITORING WELL #6 BOREHOLE LOG



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Consulting Engineers
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DATE: MARCH. 1991	CLIENT: TOWNSHIP OF WINCHESTER LANDFILL	DRAWING NO. 90-7848
SCALE: N.T.S.	TITLE: MONITORING WELL INSTALLATION	

Appendix C:
Borehole Logs - Monitoring Wells MW7 through MW10, BR1 and BR2

STRATIGRAPHIC DESCRIPTION AND OVER-BURDEN MONITORING WELL INSTALLATION

WINCHESTER TOWNSHIP LANDFILL SITE

ONITORING WELL NUMBER: MW 7

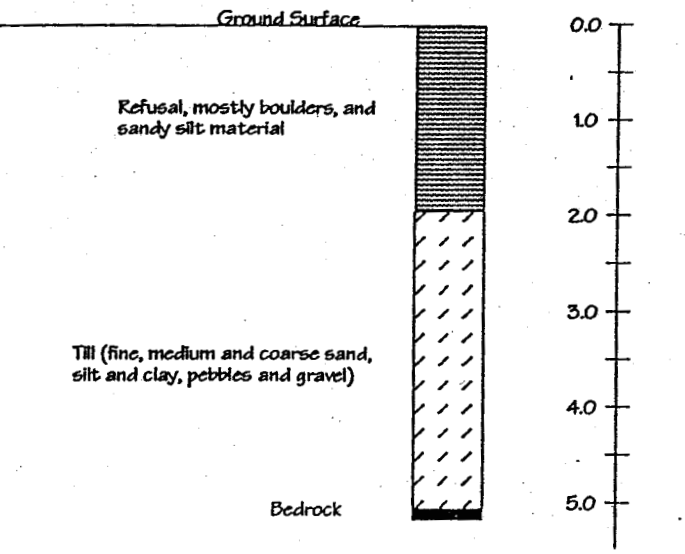
RILL TYPE: CME 55 HOLLOW STEM AUGER

RILLER: MARATHON

LOCATION: CONCESSION VII, LOT 8

DATE: JUNE 9, 1992

SOIL DESCRIPTION	STRAT.	DEPTH (m)	ELEV. (m)	PIEZOMETER INSTALLATION



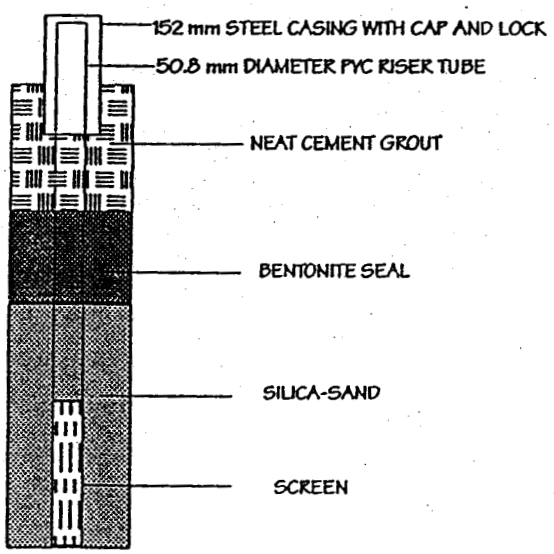


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FIGURE TITLE

SOIL PROFILE AND PIEZOMETER CONSTRUCTION

JOB

WINCHESTER TOWNSHIP LANDFILL SITE

DATE	JUNE 1992
SCALE	AS SHOWN
DRAWN	MHM
JOB No.	92094
FIGURE:	

STRATIGRAPHIC DESCRIPTION AND OVER-BURDEN MONITORING WELL INSTALLATION

WINCHESTER TOWNSHIP LANDFILL SITE

MONITORING WELL NUMBER: MW 8

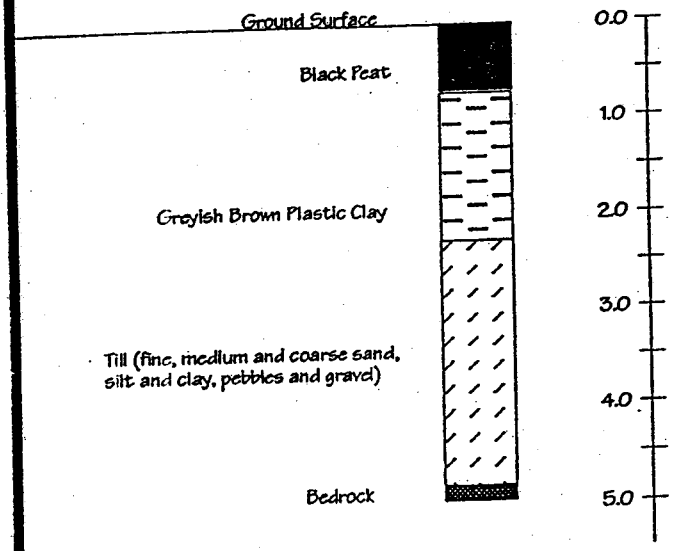
LOCATION: CONCESSION VII, LOT 8

DRILL TYPE: CME 55 HOLLOW STEM AUGER

DATE: JUNE 9, 1992

DRILLER: MARATHON

SOIL DESCRIPTION	STRAT.	DEPTH (m)	ELEV. (m)	PIEZOMETER INSTALLATION



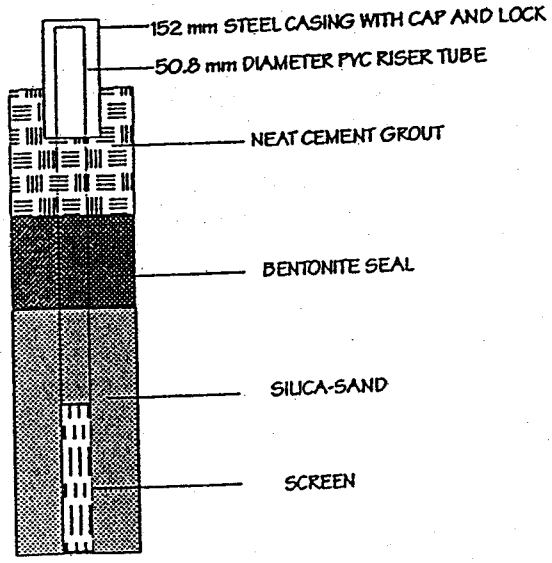


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FIGURE TITLE

SOIL PROFILE AND PIEZOMETER CONSTRUCTION

JOB

WINCHESTER TOWNSHIP LANDFILL SITE

DATE	JUNE 1992
SCALE	AS SHOWN
DRAWN	MHM
JOB No.	92094
FIGURE:	

STRATIGRAPHIC DESCRIPTION AND OVER-BURDEN MONITORING WELL INSTALLATION
WINCHESTER TOWNSHIP LANDFILL SITE

MONITORING WELL NUMBER: MW 9

LOCATION: CONCESSION VII, LOT 8

DRILL TYPE: CME 55 HOLLOW STEM AUGER

DATE: JUNE 9, 1992

DRILLER: MARATHON

SOIL DESCRIPTION	STRAT.	DEPTH (m)	ELEV. (m)	PIEZOMETER INSTALLATION
Ground Surface		0.0		152 mm STEEL CASING WITH CAP AND LOCK
				50.8 mm DIAMETER PVC RISER TUBE
Black Peat		1.0		NEAT CEMENT GROUT
		2.0		
Greyish Brown Plastic Clay		3.0		NATIVE BACKFILL
		4.0		
		5.0		BENTONITE SEAL
		6.0		
Till (fine, medium and coarse sand, silt and clay, pebbles and gravel)		7.0		SILICA-SAND
		8.0		SCREEN
Bedrock		9.0		

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FIGURE TITLE: SOIL PROFILE AND PIEZOMETER CONSTRUCTION

JOB: WINCHESTER TOWNSHIP LANDFILL SITE

DATE: JUNE 1992

SCALE: AS SHOWN

DRAWN: MHM

JOB No.: 92094

FIGURE:

MONITORING WELL NUMBER: MW10 & BRW-1
DRILL TYPE: CME 55 HOLLOW STEM AUGER
DRILLER: MARATHON

LOCATION: WINCHESTER TOWNSHIP
WASTE DISPOSAL SITE
DATE: JULY 1993

SOIL DESCRIPTION	STRAT.	DEPTH (m)	ELEV. (m)
GROUND SURFACE		0.0	74.54
DARK, SILTY, ORGANIC SOIL			
GREYISH TO BLUISH BROWN MOIST, PLASTIC CLAY		1.0	73.54
		2	72.54
		3.0	71.54
GREYISH PURPLE, SANDY SILT WITH CLAY, PEBBLES AND GRAVEL		4.0	70.54
		5.0	69.54
FRACTURED LIMESTONE		6.0	68.54
		7.0	67.54
		8.0	66.54

PIEZOMETER INSTALLATION

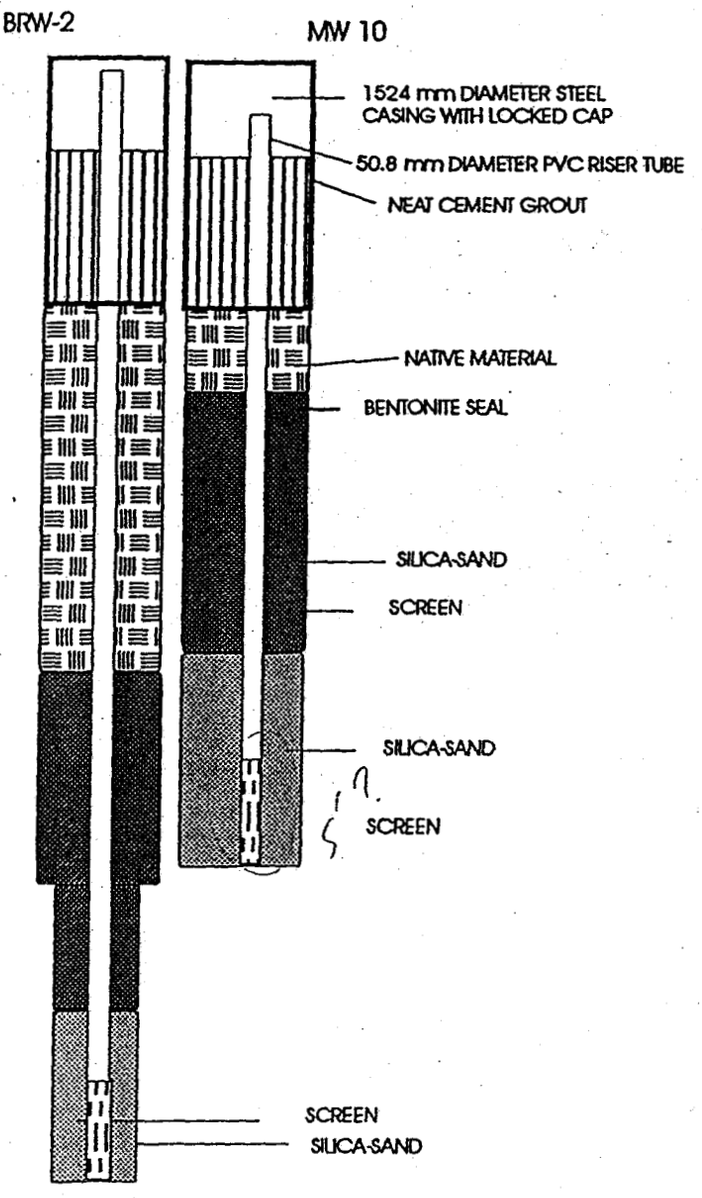

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FIGURE TITLE
SOIL PROFILE AND PIEZOMETER CONSTRUCTION

JOB
WINCHESTER TOWNSHIP
WASTE DISPOSAL SITE

DATE	MARCH 1993
SCALE	AS SHOWN
DRAWN	MHM
JOB No.	92094

STRATIGRAPHIC DESCRIPTION AND OVER-BURDEN MONITORING WELL INSTALLATION

WINCHESTER TOWNSHIP LANDFILL SITE

MONITORING BEDROCK WELL: BRW-1

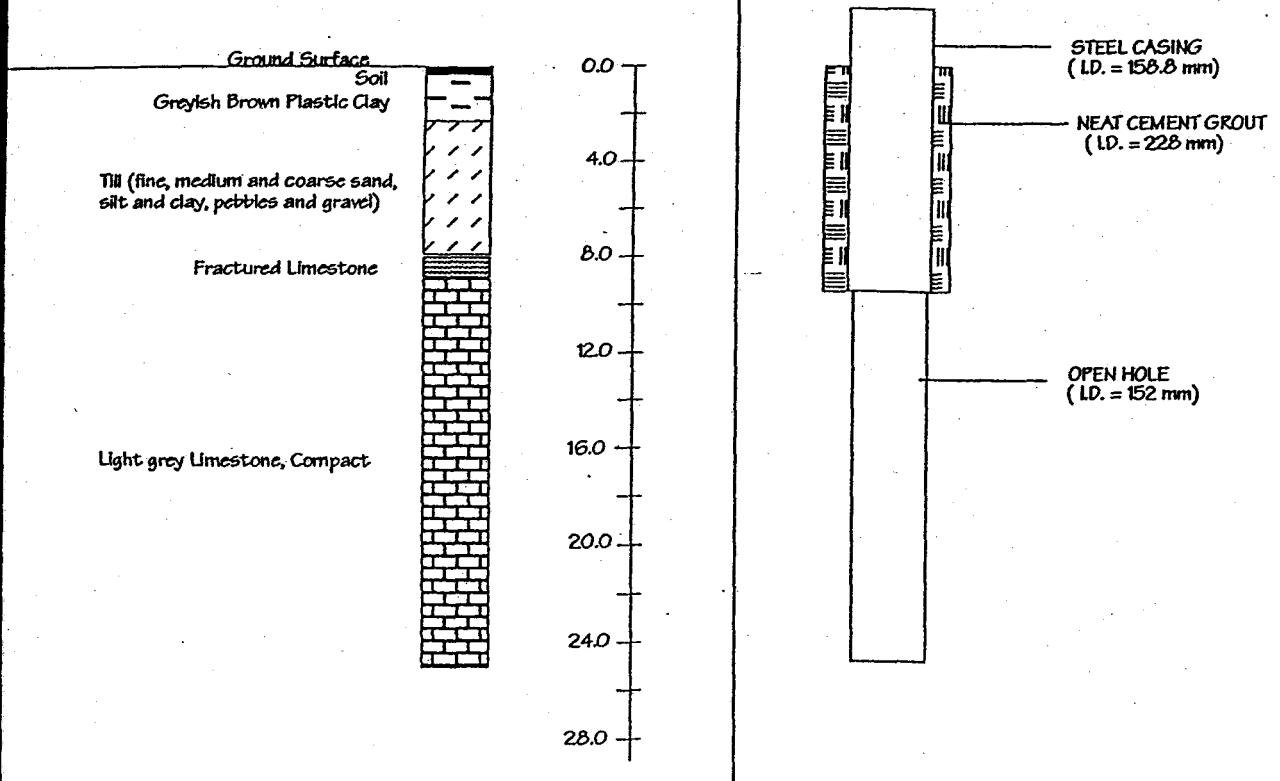
LOCATION: CONCESSION VII, LOT 8

DRILL TYPE: CME 55 HOLLOW STEM AUGER

DATE: JUNE 10, 1992

DRILLER: MARATHON

SOIL DESCRIPTION	STRAT.	DEPTH (m)	ELEV. (m)	PIEZOMETER INSTALLATION



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1345 ROSEMOUNT AVE. CORNWALL K6J 3E5

FIGURE TITLE

SOIL PROFILE AND PIEZOMETER CONSTRUCTION

JOB

WINCHESTER TOWNSHIP LANDFILL SITE

DATE	JUNE 1992
SCALE	AS SHOWN
DRAWN	MHM
JOB No.	92094
FIGURE:	

Appendix D:
Groundwater Chemistry Lab Sheets

Seprotech Laboratories

Certificate of Analysis

Client:
Oliver, Mangione, McCalla
154 Colonnade Rd. South
Nepean, Ontario
K2E 7J5
Attention: Steve Wilson

page 1 of 6

Report: 200000782
Project: MC 12684
Submitted by: February 02, 2000
Date submitted: February 02, 2000
Date printed: March 03, 2000

Matrix: groundwater

Parameter	Units	Det. Limit	MW1	MW4	MW5	MW7
calcium	mg/L	0.03	130	34.8	182	190
iron	mg/L	0.02	2.17	0.23	1.84	<0.02
magnesium	mg/L	0.01	96.3	61.6	122	176
manganese	mg/L	0.01	0.04	<0.01	0.34	0.03
potassium	mg/L	0.4	7.2	6.2	1.0	5.3
sodium	mg/L	0.2	84.3	38.0	70.4	135
chloride	mg/L	0.1	154	92.9	184	430
nitrate-N	mg/L	0.1	<0.1	0.1	0.2	<0.1
sulphate	mg/L	1	13	26	94	155
pH	units		7.54	8.08	7.52	7.52
conductivity	µMho/cm	1	1660	840	1910	2690
D.O.C.	mg/L	0.2	22.5	1.8	12.7	19.5
$B.O.D._5$	mg/L	1	<1	<1	<1	4
hardness as $CaCO_3$	mg/L	1	726	344	963	1210
ammonia-N	mg/L	0.01	0.45	0.30	0.11	1.27
chemical oxygen demand	mg/L	3	42	<3	36	58
total nitrogen	mg/L	0.05	1.07	0.47	1.01	3.10
alkalinity as $CaCO_3$	mg/L	1	759	312	817	813

Seprotech Laboratories
2378 Holly Lane, Ottawa, Ontario, K1V 7P1, Canada
Tel: (613)523-1641, Fax: (613)731-0851

Dave Peeler, Lab Supervisor

Seprotech Laboratories

Certificate of Analysis

Client:
Oliver, Mangione, McCalla
154 Colonnade Rd. South
Nepean, Ontario
K2E 7J5
Attention: Steve Wilson
page 2 of 6

Report: 200000782
Project: MC 12684
Submitted by: February 02, 2000
Date submitted: February 02, 2000
Date printed: March 03, 2000
Matrix: groundwater

Parameter	Units	Det. Limit	MW8	MW9	MW10	MW13
calcium	mg/L	0.03	320	144	248	84.8
iron	mg/L	0.02	4.27	1.01	<0.02	1.22
magnesium	mg/L	0.01	155	93.5	154	30.6
manganese	mg/L	0.01	0.56	0.04	0.12	0.14
potassium	mg/L	0.4	<0.4	2.4	2.4	1.2
sodium	mg/L	0.2	205	50.0	153	11.6
chloride	mg/L	0.1	315	142	355	1.7
nitrate-N	mg/L	0.1	0.1	<0.1	0.1	<0.1
sulphate	mg/L	1	73	90	133	18
pH	units		7.28	7.55	7.48	7.95
conductivity	µMho/cm	1	2960	1590	2780	616
D.O.C.	mg/L	0.2	38.4	7.3	29.0	24.8
$B.O.D._5$	mg/L	1	6	<1	6	<1
hardness as $CaCO_3$	mg/L	1	1450	750	1260	340
ammonia-N	mg/L	0.01	0.37	0.40	0.26	0.07
chemical oxygen demand	mg/L	3	126	14	85	58
total nitrogen	mg/L	0.05	5.22	0.71	3.62	1.02
alkalinity as $CaCO_3$	mg/L	1	1300	656	978	346

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Dave Peeler, Lab Supervisor

Seprotech Laboratories

Certificate of Analysis

Client:
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154 Colonnade Rd. South
Nepean, Ontario
K2E 7J5
Attention: Steve Wilson

Report: 200000782
Project: MC 12684
Submitted by:
Date submitted: February 02, 2000
Date printed: March 03, 2000

Matrix: groundwater

Parameter	Units	Det. Limit	BR1	BR2	SW1	SW2
calcium	mg/L	0.03	11.3	239	282	134
iron	mg/L	0.02	0.49	3.61	17.9	17.3
magnesium	mg/L	0.01	8.21	149	139	47.1
manganese	mg/L	0.01	0.02	0.11	7.14	1.79
potassium	mg/L	0.4	4.0	0.6	14.1	2.7
sodium	mg/L	0.2	168	183	210	34.7
chloride	mg/L	0.1	39.5	326	442	66.0
nitrate-N	mg/L	0.1	<0.1	<0.1	0.1	1.2
sulphate	mg/L	1	36	93	185	122
pH	units		8.40	9.44	7.57	7.67
conductivity	µMho/cm	1	820	2830	3180	1020
D.O.C.	mg/L	0.2	1.6	37.8	40.1	23.4
$B.O.D._5$	mg/L	1	<1	<1	15	5
hardness as $CaCO_3$	mg/L	1	62	1220	1280	531
ammonia-N	mg/L	0.01	0.38	0.39	4.21	0.69
chemical oxygen demand	mg/L	3	4	106	126	53
total nitrogen	mg/L	0.05	0.48	3.05	6.86	3.48
alkalinity as $CaCO_3$	mg/L	1	359	1140	1140	344

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K2E 7J5
Attention: Steve Wilson
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Report: 200000782
Project: MC 12684
Submitted by: B.C.
Date submitted: February 02, 2000
Date printed: March 03, 2000

Matrix: groundwater

Parameter	Units	Det. Limit	MW1	BR2		
benzene	mg/L	0.0005	nd	nd		
bromodichloromethane	mg/L	0.0001	nd	nd		
bromoform	mg/L	0.0001	nd	nd		
bromomethane	mg/L	0.002	nd	nd		
carbon tetrachloride	mg/L	0.0002	nd	nd		
chlorobenzene	mg/L	0.0002	nd	nd		
chloroethane	mg/L	0.003	nd	nd		
chloroform	mg/L	0.0003	nd	nd		
chloromethane	mg/L	0.002	nd	nd		
dibromochloromethane	mg/L	0.0001	nd	nd		
1,2-dibromoethane	mg/L	0.0001	nd	nd		
m-dichlorobenzene	mg/L	0.0001	nd	nd		
o-dichlorobenzene	mg/L	0.0001	nd	nd		
p-dichlorobenzene	mg/L	0.0002	nd	nd		
1,1-dichloroethane	mg/L	0.0001	nd	nd		
1,2-dichloroethane	mg/L	0.0001	nd	nd		
1,1-dichloroethylene	mg/L	0.0001	nd	nd		
c-1,2-dichloroethylene	mg/L	0.0001	nd	nd		
t-1,2-dichloroethylene	mg/L	0.0001	nd	nd		
1,2-dichloropropane	mg/L	0.0001	nd	nd		
c-1,3-dichloropropene	mg/L	0.0001	nd	nd		
t-1,3-dichloropropene	mg/L	0.0001	nd	nd		
ethylbenzene	mg/L	0.0005	nd	nd		
methylene chloride	mg/L	0.003	nd	nd		
styrene	mg/L	0.0006	nd	nd		
1,1,2,2-tetrachloroethane	mg/L	0.0004	nd	nd		

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K2E 7J5
Attention: Steve Wilson
page 6 of 6

Report: 200000782
Project: MC 12684
Submitted by: February 02, 2000
Date submitted: February 02, 2000
Date printed: March 03, 2000

Matrix: groundwater

Parameter	Units	Det. Limit	MW1	BR2		
tetrachloroethylene	mg/L	0.0002	nd	nd		
toluene	mg/L	0.0005	nd	nd		
1,2,4-trichlorobenzene	mg/L	0.002	nd	nd		
1,1,1-trichloroethane	mg/L	0.0001	nd	nd		
1,1,2-trichloroethane	mg/L	0.0001	nd	nd		
trichloroethylene	mg/L	0.0001	nd	nd		
trichlorofluoromethane	mg/L	0.0001	nd	nd		
1,3,5-trimethylbenzene	mg/L	0.0001	nd	nd		
vinyl chloride	mg/L	0.0003	nd	nd		
m/p-xylene	mg/L	0.001	nd	nd		
o-xylene	mg/L	0.0005	nd	nd		

nd= not detected

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Attention: Blaine Coons

page 1 of 2

Report: 992007205
Project: mc126854a
Submitted by: B. Coons
Date submitted: July 16, 1999
Date printed: September 23, 1999

Matrix: ground water

Parameter	Units	Det. Limit	MW1	MW4	MW5	MW8	MW9
D.O.C.	mg/L	0.2	12.6	1.70	17.0	54.6	7.50
$B.O.D._5$	mg/L	1	<1	<1	<1	6	<1
C.O.D.	mg/L	3	38	10	48	190	23
chloride	mg/L	0.1	170	105	187	363	144
nitrate-N	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
sulphate	mg/L	1	15	28	104	71	96
total nitrogen	mg/L	0.05	0.05	0.20	0.26	4.13	0.69
hardness as $CaCO_3$	mg/L	1	778	367	1160	1430	856
alkalinity as $CaCO_3$	mg/L	1	714	282	834	1330	652
conductivity	µMho/cm	1	1710	869	2120	3240	1620
calcium	mg/L	0.03	136	39.4	215	299	159
iron	mg/L	0.02	1.87	0.59	3.06	0.02	0.89
magnesium	mg/L	0.01	105	64.4	150	163	110
manganese	mg/L	0.01	0.04	0.02	0.18	0.21	0.05
potassium	mg/L	0.4	7.6	8.2	2.9	9.2	8.2
sodium	mg/L	0.2	89.1	38.0	76.6	238	46.7
pH	units		6.88	7.57	6.94	7.00	7.24

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Tel: (613)523-1641, Fax: (613)731-0851

Dave Peeler, Lab Supervisor

Seprotech Laboratories

Certificate of Analysis

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Nepean, Ontario
K2E 7J5
Attention: Blaine Coons

page 2 of 2

Report: 992007205
Project: mc126854a
Submitted by: B. Coons
Date submitted: July 16, 1999
Date printed: September 23, 1999
Matrix: ground water

Parameter	Units	Det. Limit	MW10	MW12	MW13	BR12	BR13
D.O.C.	mg/L	0.2	30.0	18.1	28.9	22.0	17.1
$B.O.D._5$	mg/L	1	3	3	13	<1	3
C.O.D.	mg/L	3	82	55	92	69	56
chloride	mg/L	0.1	395	371	8.2	248	382
nitrate-N	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
sulphate	mg/L	1	120	149	23	97	81
total nitrogen	mg/L	0.05	2.79	2.34	1.07	1.49	2.44
hardness as $CaCO_3$	mg/L	1	1340	1080	364	1080	1080
alkalinity as $CaCO_3$	mg/L	1	980	700	310	810	678
conductivity	µMho/cm	1	2840	2390	619	2180	2450
calcium	mg/L	0.03	266	197	93.4	200	198
iron	mg/L	0.02	10.7	4.02	2.31	2.13	4.44
magnesium	mg/L	0.01	161	140	31.3	140	141
manganese	mg/L	0.01	0.17	0.10	0.18	0.07	0.11
potassium	mg/L	0.4	2.8	9.1	2.3	7.5	10.4
sodium	mg/L	0.2	158	130	9.2	108	137
pH	units		6.92	7.06	7.40	6.92	7.00

Seprotech Laboratories
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Dave Peeler, Lab Supervisor

Appendix E:
Surface Water Chemistry Lab Sheets

Seprotech Laboratories

Certificate of Analysis

Client:
Oliver, Mangione, McCalla
154 Colonnade Rd. South
Nepean, Ontario
K2E 7J5
Attention: Steve Wilson
page 3 of 6

Report: 200000782
Project: MC 12684
Submitted by: February 02, 2000
Date submitted: February 02, 2000
Date printed: March 03, 2000

Matrix: groundwater

Parameter	Units	Det. Limit	BR1	BR2	SW1	SW2
calcium	mg/L	0.03	11.3	239	282	134
iron	mg/L	0.02	0.49	3.61	17.9	17.3
magnesium	mg/L	0.01	8.21	149	139	47.1
manganese	mg/L	0.01	0.02	0.11	7.14	1.79
potassium	mg/L	0.4	4.0	0.6	14.1	2.7
sodium	mg/L	0.2	168	183	210	34.7
chloride	mg/L	0.1	39.5	326	442	66.0
nitrate-N	mg/L	0.1	<0.1	<0.1	0.1	1.2
sulphate	mg/L	1	36	93	185	122
pH	units		8.40	9.44	7.57	7.67
conductivity	µMho/cm	1	820	2830	3180	1020
D.O.C.	mg/L	0.2	1.6	37.8	40.1	23.4
$B.O.D._5$	mg/L	1	<1	<1	15	5
hardness as $CaCO_3$	mg/L	1	62	1220	1280	531
ammonia-N	mg/L	0.01	0.38	0.39	4.21	0.69
chemical oxygen demand	mg/L	3	4	106	126	53
total nitrogen	mg/L	0.05	0.48	3.05	6.86	3.48
alkalinity as $CaCO_3$	mg/L	1	359	1140	1140	344

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Dave Peeler, Lab Supervisor

Seprotech Laboratories

Certificate of Analysis

Client:
Oliver, Mangione, McCalla
154 Colonnade Rd. South
Nepean, Ontario
K2E 7J5
Attention: Steve Wilson

Report: 200000782
Project: MC 12684
Submitted by: February 02, 2000
Date submitted: February 02, 2000
Date printed: March 03, 2000

Matrix: groundwater

Parameter	Units	Det. Limit	SW3	SW4		
calcium	mg/L	0.03	105	88.0		
iron	mg/L	0.02	59.0	24.3		
magnesium	mg/L	0.01	35.0	27.4		
manganese	mg/L	0.01	1.73	2.33		
potassium	mg/L	0.4	4.6	0.3		
sodium	mg/L	0.2	28.1	7.6		
chloride	mg/L	0.1	40.8	12.9		
nitrate-N	mg/L	0.1	1.0	1.7		
sulphate	mg/L	1	102.	97.		
pH	units		7.60	7.60		
conductivity	µMho/cm	1	805	609		
D.O.C.	mg/L	0.2	30.5	36.6		
$B.O.D._5$	mg/L	1	31	23		
hardness as $CaCO_3$	mg/L	1	580	491		
ammonia-N	mg/L	0.01	0.49	0.09		
chemical oxygen demand	mg/L	3	62	82		
total nitrogen	mg/L	0.05	13.0	28.2		
alkalinity as $CaCO_3$	mg/L	1	271	202		

Dave Peeler, Lab Supervisor

Seprotech Laboratories

Certificate of Analysis

Client:
Oliver, Mangione, McCalla
154 Colonnade Rd. S.
Nepean, Ontario
K2E 7J5
Attention: Blaine Coons

page 1 of 1

Report: 992007206
Project: mc126854a
Submitted by: B. Coons
Date submitted: July 16, 1999
Date printed: September 23, 1999

Matrix: surface water

Parameter	Units	Det. Limit	SW1	SW2	SW3		
D.O.C.	mg/L	0.2	20.3	26.0	27.3		
$B.O.D._5$	mg/L	1	61	23	24		
C.O.D.	mg/L	3	128	168	100		
chloride	mg/L	0.1	10.0	88.9	78.2		
nitrate-N	mg/L	0.1	0.2	0.4	0.2		
sulphate	mg/L	1	3	28	53		
total nitrogen	mg/L	0.05	22.3	7.99	5.08		
total phosphorus	mg/L	0.01	4.55	2.94	1.48		
hardness as $CaCO_3$	mg/L	1	560	490	732		
alkalinity as $CaCO_3$	mg/L	1	182	390	360		
conductivity	µMho/cm	1	417	1020	1020		
calcium	mg/L	0.03	164	125	184		
iron	mg/L	0.02	39.4	5.97	68.7		
magnesium	mg/L	0.01	35.9	42.5	65.2		
manganese	mg/L	0.01	5.35	0.67	9.21		
potassium	mg/L	0.4	7.8	<0.4	4.4		
sodium	mg/L	0.2	10.9	43.6	44.1		
pH	units		6.86	7.54	7.31		
phenols	mg/L	0.001	0.004	<0.001	0.003		
background bacteria	/100mL	2	>20000	>20000	>20000		
fecal streptococcus	/100mL	2	9500	1480	50000		
total coliforms	/100mL	2	2600	2300	4800		
fecal coliforms	/100mL	1	700	400	2900		

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