

BURLINGTON LANDFILL  
1981 MONITORING PROGRAM  
FOR  
THE REGIONAL MUNICIPALITY OF HALTON

PROJECT No: 80-96-B

SEPTEMBER, 1982

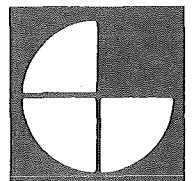
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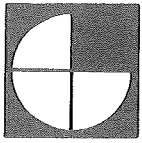
C.C. 8 CLIENT  
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**Gartner Lee  
Associates Limited**

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**Gartner  
Lee  
Associates Limited**

Consulting  
Engineering  
Geologists and  
Hydrogeologists

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September 21, 1982.

The Regional Municipality of Halton,  
1151 Bronte Road,  
Oakville, Ontario.  
L6J 4Z3.

Attention: Mr. D.J. Corbett, P.Eng.

Dear Sirs:

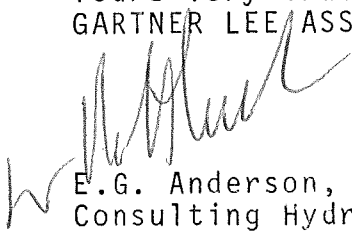
Re: Burlington Landfill, 1981 Monitoring Report  
GLAL 80-96-B

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We respectfully submit the Burlington Landfill 1981 Monitoring Final Report.

Thank you for allowing us to be of service and if you have any questions please contact my office.

Yours very truly,  
GARTNER LEE ASSOCIATES LIMITED

  
E.G. Anderson, P.Eng.,  
Consulting Hydrogeologist.

RCD:dg

## TABLE OF CONTENTS

|                                     | <u>PAGE</u> |
|-------------------------------------|-------------|
| LETTER OF TRANSMITTAL               |             |
| 1.0 CONCLUSIONS AND RECOMMENDATIONS | 1           |
| 2.0 INTRODUCTION                    | 4           |
| 3.0 PROCEDURES                      | 7           |
| 4.0 RESULTS AND DISCUSSION          | 8           |
| 4.1 BACKGROUND                      | 8           |
| 4.2 GROUND WATER                    | 10          |
| 4.3 SURFACE WATER                   | 17          |
| 4.4 LEACHATE COLLECTION SYSTEM      | 21          |

## APPENDICES

### APPENDIX I

BOREHOLE LOGS

GROUND WATER MONITOR CONSTRUCTION  
DETAILS

GROUND WATER ELEVATIONS

HYDROGRAPHS

SURFACE WATER FLOWS

### APPENDIX II

GROUND WATER QUALITY ANALYSES

SURFACE WATER QUALITY ANALYSES

SURFACE WATER BACTERIOLOGICAL ANALYSES

## LIST OF FIGURES

|                                    | <u>PAGE</u> |
|------------------------------------|-------------|
| FIGURE 1 SITE PLAN                 | 6           |
| FIGURE 2 WATER TABLE CONFIGURATION | 11          |
| FIGURE 3 FLOW NET CROSS-SECTIONS   | 12          |
| FIGURE 4 SURFACE WATER QUALITY     | 19          |
| FIGURE 5 SURFACE WATER QUALITY     | 20          |
| FIGURE 6 HYDROGRAPH - BH1          | APPENDIX I  |
| FIGURE 7 HYDROGRAPH - BH12         | APPENDIX I  |

## LIST OF TABLES

|                                                                                                                |             |
|----------------------------------------------------------------------------------------------------------------|-------------|
| TABLE 1 PROPOSED 1982 MONITORING STATIONS                                                                      | 3           |
| TABLE 2 CONCENTRATION RANGES OF "BACKGROUND"<br>GROUND WATER, "DEEP SALINE" GROUND<br>WATER AND "RAW" LEACHATE | 14          |
| TABLE 3 GROUND WATER MONITOR CONSTRUCTION<br>DETAILS                                                           | APPENDIX I  |
| TABLE 4 GROUND WATER ELEVATIONS                                                                                | APPENDIX I  |
| TABLE 5 SURFACE WATER FLOWS                                                                                    |             |
| TABLE 6 GROUND WATER QUALITY ANALYSES                                                                          | APPENDIX II |
| TABLE 7 SURFACE WATER QUALITY ANALYSES                                                                         | APPENDIX II |
| TABLE 8 SURFACE WATER BACTERIOLOGICAL ANALYSES                                                                 | APPENDIX II |

## 1.0 CONCLUSIONS AND RECOMMENDATIONS:

### 1.1 CONCLUSIONS:

Based on the findings of the 1981 monitoring program the following conclusions are drawn.

- The landfill has minimal impact on local ground water due to
  - a) the slow ground water flow rates
  - b) the naturally mineralized (poor quality) "background" ground water which occurs in the shale bedrock underlying the site
  - c) the lack of any ground water usages in the area downgradient of the landfill
- The toe-drain which was installed around the south perimeter of the landfill in 1979-1980 has been successful in greatly reducing leachate discharges from springs along the toe of the landfill. Preliminary flow measurements suggest that the system collects in the order of 48,000 m<sup>3</sup>/year of leachate which is discharged to the Burlington sanitary sewer system.
- The actual distance and depth to which leachate has migrated appears to be less than we originally indicated in our 1080 monitoring report. The occurrence of naturally saline water and resultant interferences in chemical analysis has complicated data interpretation. The presence of saline water does however indicate very slow ground water flow rates in the shale bedrock, and the lack of any potential ground water supply resource in the immediate area.

- Surface water quality data shows no detectable impact on Falcon Creek from the landfill. We do not anticipate any significant impact in the future providing that the toe-drain is extended as planned and surface runoff from the working face is minimized. The Indian Creek tributary channel adjacent to the landfill was not flowing during site visits and hence was not sampled.

## 1.2 RECOMMENDATIONS:

Based on the findings of this study we recommend that the monitoring program be continued but ground water sampling be reduced in frequency from twice a year to once a year. The following tasks will be completed during the 1982 monitoring program

- a) Four times per year
  - Sample 3 surface water stations on Falcon Creek
  - Measure ground water elevations in all monitors
  - Sample leachate from the toe drain collection system
- b) Once per year
  - Sample and analyze ground water quality in the monitors listed in Table 1. All monitors will be redeveloped prior to sampling
- c) The monitoring parameters will remain the same as November 1982 (see Appendix II)
- d) Complete any work required to repair existing monitors

- e) Flow measurements from Falcon Creek and the leachate collection system will be interpreted with climatic data to assess seasonal trends

TABLE: 1

PROPOSED 1982 MONITORING STATIONS

Surface Water - (4 times annually)

|              |                                                                     |
|--------------|---------------------------------------------------------------------|
| Falcon Creek | SW1, SW2, SW3                                                       |
| Indian Creek | sites to be established if flow is encountered during field checks. |

Ground Water - (once annually)

|         |                       |
|---------|-----------------------|
| BH1-I,  | 1-II                  |
| BH2-I,  | 2-II                  |
| BH6-I,  | 6-II                  |
| BH7-I,  | 7-II, 7-III           |
| BH10-I, | 10-II, 10-III         |
| BH12-I, | 12-II, 12-III         |
| BH13-I, | 13-II                 |
| BH14-I, | 14-II                 |
| BH15-I, | 15-II                 |
| BH16-I, | 16-II, 16-III, 16-III |
| BH17-I, | 17-II, 17-III, 17-III |

Leachate - (4 times annually)

- Manhole on toe-drain downgradient of landfill

## 2.0 INTRODUCTION:

Gartner Lee Associates Limited were retained on August 13, 1980 by the Regional Municipality of Halton to carry out a monitoring program at the Burlington Regional Landfill. This program was required by the Ministry of the Environment as part of their provisional certificate of approval No. A210102. This is the second annual monitoring report on data collected at this site. The monitoring program is ongoing as per the recommendations in this report.

Ground water and surface water monitoring was carried out. The ground water program was designed to assess not only the impact of the existing and expanded landfills on the ground water quality, but also to document possible off-site movement of the contaminant plume.

The purpose of the surface water monitoring program was to assess the impact of landfill site operations on the water quality of Falcon Creek, and to determine the effectiveness of the toe-drain collection system in preventing overland leachate flow to the creek.

A considerable amount of hydrogeological work has already been done at this site. Previous reports were reviewed and pertinent data and interpretations are included in this report. For a more detailed analysis of the hydrogeological setting please refer to the October, 1979, Burlington Landfill Site, Hydrogeological Study by Gartner Lee Associates Limited in conjunction with M.M. Dillon Limited.

The previous annual monitoring report was entitled  
"Burlington Landfill Site, Monitoring Program - Interim  
Report, April, 1981.

### 3.0 PROCEDURES:

Ground water samples were collected on April 8th and November 23, 1981 from monitors installed by Gartner Lee Associates between 1978 and 1980. The monitor locations are shown on Figure 1. Samples were collected with a stainless steel bailer or a vacuum pump.

Surface water samples were collected on April 8, May 21, October 20 and November 23, 1981, from 3 locations on Falcon Creek (see Figure 1). Samples were not collected from Indian Creek adjacent to the east side of the landfill because there was no flowing water during site visits. Ground water elevations were measured and surface water flows were estimated during all four monitoring trips. A v-notch weir staff gauging station has been designed to refine stream flow measurements on Falcon Creek. Construction of the weir should be completed in 1982.

All water samples were placed in MOE approved glass bottles and delivered to the MOE laboratory for analysis the same day they were collected.

Observations of general site conditions and leachate springs were made during site visits. Monitors at BH3, BH4 and BH5 were sealed and destroyed during excavation of the expansion area to the north. Monitors BH10 and BH6 have been damaged by heavy equipment or vandalism and will be repaired during 1982. The upper seals have caved on BH1 and BH17 and must also be repaired.

## 4.0 RESULTS AND DISCUSSION:

### 4.1 BACKGROUND:

Regionally the subject lands are situated on the lower slopes of the Niagara Escarpment in an area heavily dissected by gullies and ravines. The lands comprising the site slope moderately towards the south and east, except as altered by the existing fills. A deep ravine, eroded into the shale bedrock, borders the western periphery of the site. In places, along the east slope of this ravine, erosional gullies occur. Falcon Creek flows intermittently to the south along the ravine bottom.

A less pronounced ravine borders the east side of the expansion area. Intermittent drainage channels to the east of the property are part of the Indian Creek drainage basin.

The northern portion of the site is mantled by a relatively dense to very dense clayey silt till. A maximum till thickness of 12.5 m occurs in the vicinity of BH 1, but this till is absent in the southern part of the site. A layer of weathered Queenston shale, varying in thickness up to 5.2 m occurs beneath the till in the northern part of the subject area and at surface in the south. Unweathered Queenston shale forms the bedrock base and it is reported to be about 180 m thick.

Previous reports have indicated that methane gas from the landfill migrates less than 5 metres in the dense till

soils and shale bedrock. Since these geologic materials severely retard lateral gas migration and there are no buildings nearby, no conventional gas monitoring is required at this time.

## 4.2 GROUND WATER:

All ground water elevations taken to date are appended along with two representative hydrographs. Borehole locations are shown on the site plan Figure 1 and a map of the water table configuration in October 1980 is presented on Figure 2. A 1981 water table map is not included because we have less data points than in 1980 (three monitors were destroyed in the expansion area) and the map would be very similar.

Ground water flow is generally to the south with western components of flow towards Falcon Creek. Downward gradients were measured on the landfill and in the upland areas, indicating downward flow (recharge) as well as lateral flow. Along the flood plain of Falcon Creek and near the North Service Road the vertical gradients are very small indicating primarily lateral ground water movement. Ground water velocities range from 1 to 15 metres per year depending on local variations in hydraulic gradient and the permeability of the till and shale. Lateral flow through the saturated refuse at the base of the landfill is likely much faster but this flow is intercepted by the toe-drain leachate collection system. Figure 3 shows the ground water flow system in cross-section.

There is no recorded ground water use in the immediate vicinity of the Burlington Landfill Site. The lands to the east are vacant and Highway 403 crosses south of the site. The property immediately south of Highway 403 is an undeveloped Canadian National Railway corridor. The industries located west of the landfill along the North

Service Road are serviced with city water from Lake Ontario.

All ground water quality analyses done to date are presented in Appendix 2. A number of additional parameters were analyzed during the 1981 monitoring program which have assisted our interpretation of ground water quality at this site. Table 2 summarizes ground water quality by presenting the concentration ranges of "background" ground water, "deep saline" ground water and "raw leachate".

The "background" water quality is represented by analyses of samples from monitors 1-I, 1-II, 2-I and 2-II which are upgradient of the landfill. These monitors range from 7 to 18 metres in depth. Background water quality is generally poor and deteriorates rapidly with depth. High levels of calcium, sodium, sulphate and chloride occur in the deepest samples.

Table 2 also shows the concentration ranges of "raw leachate" samples collected from two standpipes (8A-II and 11A-II) which are screened in the refuse and one sample from the leachate collection system. The raw leachate has elevated concentrations of many organic and inorganic parameters, is typical of southern Ontario landfill leachate. The leachate is of poor quality relative to drinking water standards but the concentration ranges for many leachate parameters are less than or equal to the ranges of "background" ground water.

TABLE: 2

Concentration Ranges of "Background" Ground Water,  
"Deep Saline" Ground Water and "Raw" Leachate

|                                 | Upgradient<br>Background<br>Ground Water | Deep Saline<br>Ground Water | Raw Leachate<br>(8A-II, 11A-II) |
|---------------------------------|------------------------------------------|-----------------------------|---------------------------------|
| Conductance                     | 1500-6000                                | 15,000-57,000               | 3000-8000                       |
| Chloride                        | 5-250                                    | 5,000-27,000                | 500-900                         |
| Sulphate                        | 400-3900                                 | 350-2,200                   | 40-800                          |
| Alkalinity (CaCO <sub>3</sub> ) | 500-700                                  | 50-300                      | 700-900                         |
| Hardness (CaCO <sub>3</sub> )   | 700-2000                                 | 4,000-17,000                | 1200-1700                       |
| Calcium                         | 50-400                                   | 1,000-5,000                 | 250-400                         |
| Magnesium                       | 100-200                                  | 200-1,300                   | 100-200                         |
| Sodium                          | 50-700                                   | 2,000-9,000                 | 200-500                         |
| Potassium                       | 10-50                                    | 80-500                      | 20-30                           |
| Iron                            | 1-30                                     | 1-20                        | 300-500                         |
| Total Kjeldahl<br>Nitrogen(N)   | .5-8                                     | 1-16                        | 5-300                           |
| Ammonia (N)                     | <.1-3                                    | .5-35                       | .3-250                          |
| Total Phosphorous               | .1-.5                                    | .1-.5                       | 1.0-10                          |
| Chemical Oxygen Demand          | 15-50                                    | 100-800                     | 170-5200                        |
| Biochemical Oxygen<br>Demand    | 1-30                                     | 1-10                        | 30-300                          |

The concentration ranges for samples from monitors 13-I, 16-II, 16-III and 17-I, are presented in table 2 under the column entitled deep saline ground water. In our 1980 report monitors 13-I, 16-II and 16-III were interpreted to be affected by leachate because of their high chlorides and chemical oxygen demands. The additional parameters analyzed in 1982 have resulted in a revised interpretation.

The chloride concentrations in these wells greatly exceed the concentrations in raw leachate which suggest they may be due to natural mineralization rather than leachate contamination. Literature research and discussions with the MOE have revealed that high levels of chloride cause a positive interference with chemical oxygen demand analyses. Similarly the high calcium levels present interferes with total Kjeldahl nitrogen and ammonia analyses. Hence the elevated concentrations of COD, TKN and ammonia reported for the "deep saline" ground waters are probably not true and therefore are not reliable indicators of leachate contamination at this site.

The area immediately downgradient from the landfill is used during the winter to dump snow removed from city streets in Halton Region. This snow is mixed with road salt and will probably cause shallow ground water to have abnormally high levels of sodium and chloride, which also complicates our interpretation of the extent of leachate contamination.

Concentrations of hardness, chlorides and sulphates increased dramatically in monitor 17-I. This monitor is nearly 30 metres deep and is located about 350 metres downgradient

from the landfill. The increase in salinity is not likely, due to a breakthrough of the leachate plume but is more likely just naturally mineralized ground water entering the well. It appears that this deep well was insufficiently developed prior to sampling and the ground water flow rates were too slow to flush out fresh water which was injected during drilling in October 1980. All wells will be re-developed prior to sampling in 1982.

In summary it appears that the leachate plume has not moved as far or as deep as originally thought. The landfill has very minimal impact on ground water at this site due to the naturally poor ground water quality, slow ground water flow rates and lack of ground water usages in the area.

#### 4.3 SURFACE WATER:

Water quality and bacteriological analyses for the three sampling locations on Falcon Creek (see Figure 1) are presented in Appendix II. Stream flows which were estimated during sample collection are also appended.

Figures 4 and 5 show the 1981 mean concentrations of various constituents at the Falcon Creek surface water station. Station SW1 is upstream of the landfill and represents background water quality. SW2 is adjacent to the landfill and SW3 is downstream from the landfill just north of the north service road. Most of the inorganic concentrations stay about the same as the creek flows past the landfill. COD and BOD show a slight increase at SW2 but the stream recovers before it reaches SW3. Only total coliform bacteria shows a significant increase as the stream passes the landfill. The October 20th sample from SW3 had 10,900 counts/100 ml exceeding both the upstream levels of total coliforms (SW1 - 2,000 counts/100 mls) and the MOE recommended limit of less than 1000 counts/100 ml. It is not known whether this level is directly attributable to the landfill or is due to another contaminant source.

The mean total phosphorous concentrations slightly exceed the MOE objective of .03 mg/L to prevent excessive plant growth in rivers and streams in all three stations. The levels at the upstream station are generally higher than downstream.

Based on the data collected in this monitoring program

it does not appear that any significant degradation of water quality in Falcon Creek is attributable to the landfill site.

Attempts were made to sample the Indian Creek tributary channel adjacent to the east side of the landfill. The stream was not flowing during site visits and hence was not sampled.

FIGURE 4 . Surface Water Quality - 1981 Mean Values

Concentrations in mg/L unless otherwise noted

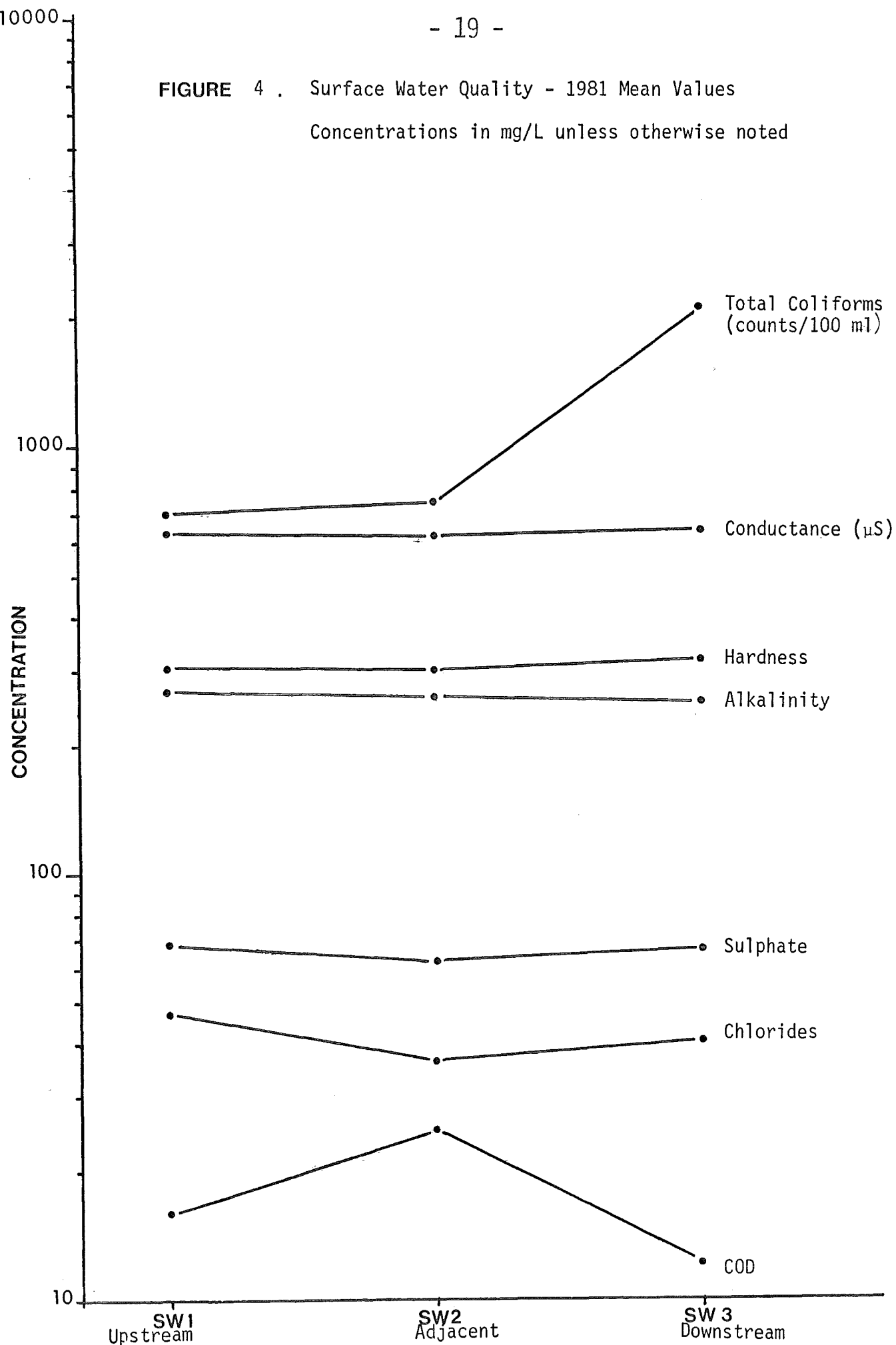
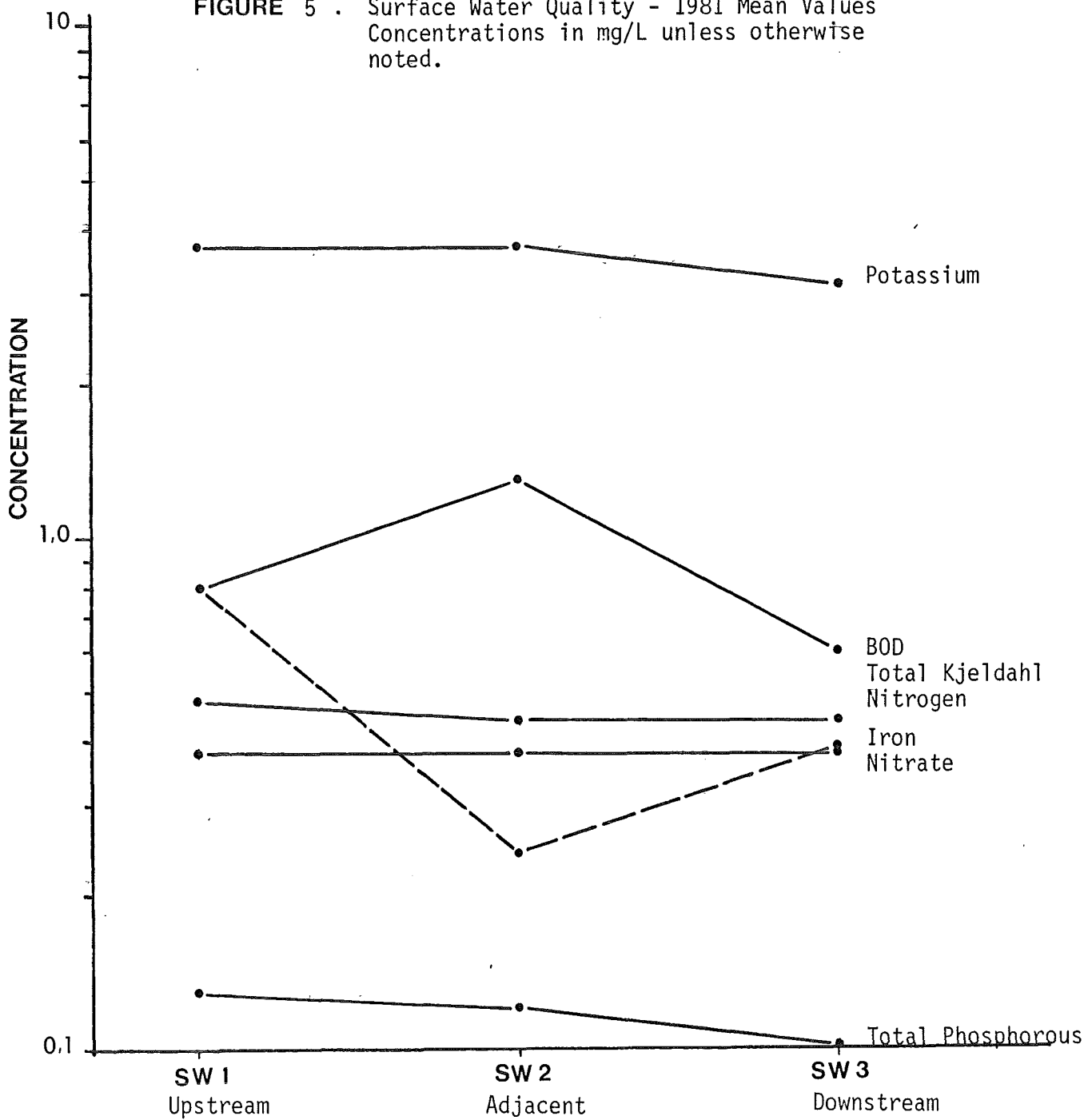


FIGURE 5 . Surface Water Quality - 1981 Mean Values  
Concentrations in mg/L unless otherwise  
noted.



#### 4.4 LEACHATE COLLECTION SYSTEM:

A toe-drain leachate collection system connected to the Burlington sanitary sewer system was installed in 1979-1980 along the perimeter of the existing fill at the south end of the property. The purpose of this toe-drain is to eliminate leachate springs which used to discharge along the toe at the landfill. Visual ground checks for leachate springs during 1980 and 1981 field visits indicate that the toe-drain has been successful in reducing the number of leachate springs at this site.

A flow meter has been installed on the toe-drain down-gradient of the landfill. Only limited flow data has been collected to date due to calibration problems and unreliable readings caused by scum in the partial flume. Sporadic data from February 23, 1982 to March 19, 1982 indicated that flows generally range from 0 to 50 Igpm. Average flows were about 20 Igpm which works out to 47,788 m<sup>3</sup>/year, and correlates reasonably well with the theoretical leachate production calculations presented below. When additional flow data is available a more accurate annual leachate production rate will be calculated and seasonal flow trends will be correlated with precipitation data.

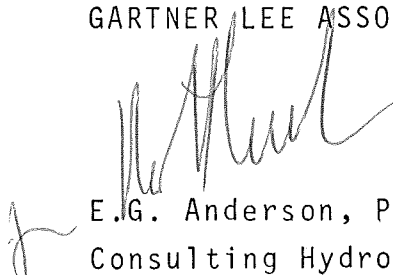
A water budget was prepared for a previous report, based on 20 year normal weather data obtained from the Burlington Climatological Station. The potential evapotranspiration was calculated using the Thornthwaite Method. Following is a summary of the results.

|                                             |                  |
|---------------------------------------------|------------------|
| Average Annual Total Precipitation          | - 76.1 cm        |
| Average Annual Potential Evapotranspiration | - <u>62.5</u> cm |
| Potential Water Surplus                     | - 13.6 cm        |

In this area the actual evapotranspiration is about 10 cm less than the potential calculated by the Thornthwaite Method. Thus, the actual annual water surplus available for infiltration and run-off is about 23.5 cm on the average.

During the operation of the landfill, precipitation is lost through run-off and evaporation, and the remainder infiltrates. It is estimated that the infiltration rate may be about 30 cm per year or 5.7 litres per minute per hectare which equates to 53,926 m<sup>3</sup>/year for the approximately 18 hectares of fill. Once the site is closed, finally covered and vegetated, the infiltration rate should be about 10 cm per year or 1.9 litres per minute per hectare which equates to 17,975 m<sup>3</sup>/year for the filled area.

Respectfully Submitted  
GARTNER LEE ASSOCIATES LIMITED



E.G. Anderson, P.Eng.  
Consulting Hydrogeologist



R.C. Dickin, B.Sc., M.Sc.  
Hydrogeochemist

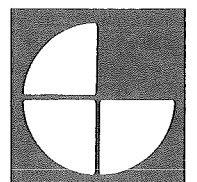
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## APPENDIX I

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**Gartner Lee  
Associates Limited**

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## BOREHOLE LOGS

## LIST OF ABBREVIATIONS

### PENETRATION RESISTANCE

Standard Penetration Resistance 'N' - The number of blows required to advance a standard split spoon sampler 30 cm into the subsoil, driven by means of a 63.5 kg hammer falling freely a distance of 75 cm.

Dynamic Penetration Resistance - The number of blows required to advance a 5 cm, 60 degree cone, fitted to the end of drill rods, 30 cm into the subsoil, the driving energy being 475 J per blow.

### DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described as follows:

| <u>Consistency</u> | <u>'N' Blows</u><br><u>/ . 3 m</u> | <u>Denseness</u> | <u>'N' Blows</u><br><u>/ . 3 m</u> |
|--------------------|------------------------------------|------------------|------------------------------------|
| Very Soft          | 0-2                                | Very Loose       | 0-4                                |
| Soft               | 2-4                                | Loose            | 4-10                               |
| Firm               | 4-8                                | Compact          | 10-30                              |
| Stiff              | 8-15                               | Dense            | 30-50                              |
| Very Stiff         | 15-30                              | Very Dense       | > 50                               |
| Hard               | > 30                               |                  |                                    |

|          |   |                           |
|----------|---|---------------------------|
| W.T.P.L. | - | Wetter than Plastic Limit |
| D.T.P.L. | - | Drier than Plastic Limit  |
| A.P.L.   | - | About Plastic Limit       |

### DESCRIPTION OF ROCK

$$\% \text{ Recovery} = \frac{\text{Total Length of Core Recovered/Run}}{\text{Total Length of Drilling Run}} \times 100$$

#### TYPE OF SAMPLE

|    |   |                        |
|----|---|------------------------|
| SS | - | Split Spoon            |
| AS | - | Auger Sample           |
| ST | - | Shelby Tube Sample     |
| NX | - | Rock Core 56 mm $\phi$ |

#### SYMBOLS

|                                                                                   |   |                                     |
|-----------------------------------------------------------------------------------|---|-------------------------------------|
|  | - | Water Table Monitor (Standpipe Tip) |
|  | - | Piezometer Tip                      |
|  | - | Water Level                         |
|  | - | Piezometric Head                    |

## BOREHOLE NO. 1

PROJECT NAME BURLINGTON LANDFILL SITE

PROJECT NO. 78-92

CLIENT M.M. DILLON LIMITED

~~NX Rock Core~~

DATE JANUARY 23, 1979

BOREHOLE TYPE BOMBADIER 0.1 m I.D. Hollow Stem Augers

GEOLOGIST A.B.

ELEVATION 183.4 m

TECHNOLOGIST\_\_\_\_\_

| DEPTH<br>(m) | STRATIGRAPHY | DESCRIPTION                                                                                                                 | SAMPLE |            |     |            | GROUND WATER | REMARKS |
|--------------|--------------|-----------------------------------------------------------------------------------------------------------------------------|--------|------------|-----|------------|--------------|---------|
|              |              |                                                                                                                             | TYPE   | BLOW/0.3 E | M/C | % RECOVERY |              |         |
| 0.2          |              | TILL: Medium brown clayey silt till becoming grey brown at 9.1 m hard, A.P.L. Fractures to 6.4 m becoming W.T.P.L. at depth |        |            |     |            |              |         |
|              |              |                                                                                                                             | SS     | 70         | 13  |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             | SS     | 33         | 17  |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             | SS     | 30         |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             | SS     | 60         | 11  |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             | SS     | 92         |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
| 12.5         |              |                                                                                                                             |        |            |     |            |              |         |
|              |              | SHALE: Red and green crypto-crystalline, massive bedded shale: weathered, with mud seams to 15.2 m                          |        |            |     |            |              |         |
|              |              |                                                                                                                             | NX     |            |     | 70         |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             | NX     |            |     | 70         |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
|              |              |                                                                                                                             | NX     |            |     | 100        |              |         |
|              |              |                                                                                                                             |        |            |     |            |              |         |
| 18.3         |              | Borehole terminated at 18.3 m in                                                                                            |        |            |     |            |              |         |

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 2

PROJECT NAME BURLINGTON LANDFILL SITE PROJECT NO. 78-92

CLIENT M.M. DILLON LIMITED DATE JANUARY 16, 1979

BOREHOLE TYPE BOMBADIER, 0.1 m I.D. HOLLOW STEM AUGERS, NX GEOLOGIST A.B.

ELEVATION 171.2 m ROCK CORE \_\_\_\_\_ TECHNOLOGIST \_\_\_\_\_

[illegible]

● Piezometer Tip      ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 6

PROJECT NAME BURLINGTON LANDFILL SITE PROJECT NO. 78-92

CLIENT M.M. DILLON LIMITED DATE JANUARY 17, 1979

BOREHOLE TYPE BOMBADIER 0.1 m I.D. HOLLOW STEM AUGERS NX ROCK GEOLOGIST A.B.

ELEVATION 173.7 CORE TECHNOLOGIST \_\_\_\_\_

| DEPTH<br>(m) | STRATIGRAPHY | DESCRIPTION                                                                                                                                | SAMPLE |               |     |               | GROUND<br>WATER | REMARKS                                                   |
|--------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|-----|---------------|-----------------|-----------------------------------------------------------|
|              |              |                                                                                                                                            | TYPE   | BLOW/0.3<br>m | M/C | %<br>RECOVERY |                 |                                                           |
| 0.2          |              | TILL: Medium brown clayey silt till, D.T.P.L. hard, fractures to 2.0 m seepage at 3.4 m becoming grey brown at 6.1 m                       | SS     | 89            | 10  |               |                 | Sample #4<br>1% gravel<br>8% sand<br>47% silt<br>44% clay |
|              |              |                                                                                                                                            |        |               |     |               |                 |                                                           |
|              |              |                                                                                                                                            | SS     | 81            | 9   |               |                 |                                                           |
|              |              |                                                                                                                                            |        |               |     |               |                 |                                                           |
|              |              |                                                                                                                                            | SS     | 60            | 13  |               |                 |                                                           |
|              |              |                                                                                                                                            |        |               |     |               |                 |                                                           |
|              |              |                                                                                                                                            | SS     | 47            | 15  |               |                 |                                                           |
|              |              |                                                                                                                                            |        |               |     |               |                 |                                                           |
| 7.8          |              | SHALE: Red, with green bands and green mottling, cryptocrystalline, massive to thick bedded shale minor fracturing at an angle to the core | NX     |               |     | 100           |                 |                                                           |
|              |              |                                                                                                                                            |        |               |     |               |                 |                                                           |
|              |              |                                                                                                                                            | NX     |               |     | 100           |                 |                                                           |
|              |              |                                                                                                                                            |        |               |     |               |                 |                                                           |
|              |              |                                                                                                                                            | NX     |               |     | 100           |                 |                                                           |
|              |              |                                                                                                                                            |        |               |     |               |                 |                                                           |
| 16.9         |              | Borehole terminated at 16.9 m in shale                                                                                                     |        |               |     |               |                 |                                                           |

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 7

PROJECT NAME BURLINGTON LANDFILL SITE

PROJECT NO. 78-92

CLIENT M.M. DILLON LIMITED

DATE JANUARY 22, 1979

BOREHOLE TYPE BOMBADIER 0.1 m I.D. HOLLOW STEM AUGERS NX ROCK

GEOLOGIST A.B.

ELEVATION 181.1 m

CORE

## TECHNOLOGIST.

| DEPTH | STRATIGRAPHY | DESCRIPTION                                                                                                                          | SAMPLE |             |       |            | GROUND WATER | REMARKS |
|-------|--------------|--------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|-------|------------|--------------|---------|
|       |              |                                                                                                                                      | TYPE   | BLOW/ 0.3 m | M / C | % RECOVERY |              |         |
| 0.2   |              | TOPSOIL                                                                                                                              |        |             |       |            |              |         |
|       |              | TILL: Medium brown clayey silt till with fractures to 6.4 m, becoming grey brown from 7.6 m hard D.T.P.L.                            | SS     | 77          | 12    |            |              |         |
|       |              |                                                                                                                                      | SS     | 89          | 11    |            |              |         |
|       |              |                                                                                                                                      | SS     | 60          | 9     |            |              |         |
|       |              |                                                                                                                                      |        |             |       |            |              |         |
|       |              |                                                                                                                                      | SS     | 52          | 13    |            |              |         |
|       |              |                                                                                                                                      | SS     | 111         | 8     |            |              |         |
|       |              |                                                                                                                                      | SS     | 126         | 5     |            |              |         |
| 10.7  |              | SHALE: Red with green bands and green mottling, cryptocrystalline, thin to medium bedded shale weathered and odd mud seams to 12.2 m | NX     |             |       | 100        |              |         |
|       |              |                                                                                                                                      | NX     |             |       | 100        |              |         |
| 15.2  |              | Borehole terminated at 15.2 m in shale                                                                                               |        |             |       |            |              |         |

**● Piezometer Tip      ▲ Standpipe Tip**

**Gartner Lee Associates Limited**

BOREHOLE NO. 8A

PROJECT NAME\_\_\_\_\_HALTON MONITORING

**CLIENT** \_\_\_\_\_ REGIONAL MUNICIPALITY OF HALTON

BOREHOLE TYPE CME 75, 0.11 m I.D. AUGERS, 0.08 m TRICONE

ELEVATION 155.8 m (Ground)

PROJECT NO 80-96 - B

DATE OCT. 8, 1980

GEOLOGIST A.B.

## TECHNOLOGIST.

| DEPTH<br>(m) | STRATIGRAPHY | DESCRIPTION                                                                                       | SAMPLE |               |     |               | GROUND<br>WATER | REMARKS                                                                |
|--------------|--------------|---------------------------------------------------------------------------------------------------|--------|---------------|-----|---------------|-----------------|------------------------------------------------------------------------|
|              |              |                                                                                                   | TYPE   | BLOW/0.3<br>m | M/C | %<br>RECOVERY |                 |                                                                        |
| 0.0          |              |                                                                                                   |        |               |     |               |                 |                                                                        |
| 1.8          |              | <u>FILL:</u><br>Red brown clayey silt fill,<br>stones, moist                                      |        |               |     |               |                 | - borehole is back-<br>filled with gravel<br>from 15.80 m to<br>0.61 m |
|              |              | <u>GARBAGE:</u><br>Alternate layers of garbage and<br>earth fill, moist<br>- saturated at 11.6 m. |        |               |     |               |                 | - standpipe is slotted<br>from 15.80 to 0.61 m                         |
| 15.8         |              |                                                                                                   |        |               |     |               |                 |                                                                        |
|              |              | <u>SHALE:</u><br>Red brown shale with green<br>layers                                             |        |               |     |               |                 |                                                                        |

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 8A (cont'd)

PROJECT NAME HALTON MONITORING

PROJECT NO. 80-96 - B

CLIENT REGIONAL MUNICIPALITY OF HALTON

DATE OCT. 8, 1980

BOREHOLE TYPE CME 75, 0.11 m I.D. AUGERS, 0.08 m TRICONE

GEOLOGIST A.B.

ELEVATION 155.8 m (Ground)

TECHNOLOGIST\_

[illegible]

# BOREHOLE NO. 10

PROJECT NAME BURLINGTON LANDFILL SITE

PROJECT NO. 78-92

CLIENT M.M. DILLON LIMITED

DATE JANUARY 30, 1979

BOREHOLE TYPE BOMBADIER. 0.1 m I.D. HOLLOW STEM AUGERS

GEOLOGIST A.B.

ELEVATION 134.5 m

TECHNOLOGIST \_\_\_\_\_

| DEPTH<br>(m) | STRATIGRAPHY | DESCRIPTION                                                                      | SAMPLE |               |     |               | GROUND<br>WATER | REMARKS |
|--------------|--------------|----------------------------------------------------------------------------------|--------|---------------|-----|---------------|-----------------|---------|
|              |              |                                                                                  | TYPE   | BLOW/0.3<br>m | M/C | %<br>RECOVERY |                 |         |
| 0.0          |              |                                                                                  |        |               |     |               |                 |         |
| 1.0          |              | FILL: Red brown silty clay<br>fill, D.T.P.L.                                     |        |               |     |               |                 |         |
| 2.4          |              | WEATHERED SHALE                                                                  |        |               |     |               |                 |         |
|              |              | SHALE: Red with green bands,<br>cryptocrystalline shale, green<br>bands are hard |        |               |     |               |                 |         |
| 12.2         |              | Borehole terminated at 12.2 m<br>in shale                                        |        |               |     |               |                 |         |

## BOREHOLE NO. 11A

PROJECT NAME HALTON MONITORING

PROJECT NO. 80-96 - B

CLIENT REGIONAL MUNICIPALITY OF HALTON

DATE OCT. 9, 1980

BOREHOLE TYPE CME 75, 0.11 m I.D. AUGERS

GEOLOGIST A.B.

ELEVATION 134.3 m (Ground)

## TECHNOLOGIST.

| DEPTH<br>(m) | STRATIGRAPHY | DESCRIPTION                                                              | SAMPLE |            |     |            | GROUND WATER | REMARKS                                                      |
|--------------|--------------|--------------------------------------------------------------------------|--------|------------|-----|------------|--------------|--------------------------------------------------------------|
|              |              |                                                                          | TYPE   | BLOW/0.3 m | M/C | % RECOVERY |              |                                                              |
| 0.0          |              |                                                                          |        |            |     |            |              |                                                              |
|              |              | FILL:<br>Red brown clayey silt fill,<br>moist                            |        |            |     |            |              | - borehole is back-filled with gravel from 5.33 m to 0.61 m. |
| 2.8          |              | GARBAGE:<br>Garbage mixed with clayey silt and sand, saturated at 4.6 m. |        |            |     |            |              | - standpipe is slotted from 5.33 m to 0.61 m.                |
| 6.1          |              |                                                                          |        |            |     |            |              |                                                              |
|              |              | SHALE:<br>Red brown shale with green layers                              |        |            |     |            |              |                                                              |
| 12.2         |              |                                                                          |        |            |     |            |              |                                                              |
|              |              | Borehole terminated at 12.2 m in shale.                                  |        |            |     |            |              |                                                              |

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

# BOREHOLE NO. 12

PROJECT NAME BURLINGTON LANDFILL SITE PROJECT NO. 78-92  
 CLIENT M.M. DILLON LIMITED DATE JANUARY 29, 1979  
 BOREHOLE TYPE BOMBADIER, 0.1 m I.D. HOLLOW STEM AUGERS NX ROCK CORE GEOLOGIST A.B.  
 ELEVATION 127.4 m TECHNOLOGIST \_\_\_\_\_

| DEPTH<br>(m) | STRATIGRAPHY | DESCRIPTION                                                                                                     | SAMPLE |               |     |               | GROUND<br>WATER | REMARKS |
|--------------|--------------|-----------------------------------------------------------------------------------------------------------------|--------|---------------|-----|---------------|-----------------|---------|
|              |              |                                                                                                                 | TYPE   | BLOW/0.3<br>m | M/C | %<br>RECOVERY |                 |         |
| 0.1          |              | TOPSOIL                                                                                                         |        |               |     |               |                 |         |
|              |              | WEATHERED SHALE: Red brown weathered shale D.T.P.L.                                                             |        |               |     |               |                 |         |
|              |              |                                                                                                                 | SS     | 32            | 11  |               |                 |         |
| 3.4          |              | hard                                                                                                            |        |               |     |               |                 |         |
|              |              | SHALE: Red and green bands, cryptocrystalline, thick to massive bedded shale vugs and gypsum nodules throughout |        |               |     |               |                 |         |
|              |              |                                                                                                                 | NX     |               |     | 100           |                 |         |
|              |              |                                                                                                                 | NX     |               |     | 100           |                 |         |
|              |              |                                                                                                                 | NX     |               |     | 100           |                 |         |
|              |              |                                                                                                                 | NX     |               |     | 100           |                 |         |
| 12.2         |              | Borehole terminated at 12.2 m                                                                                   |        |               |     |               |                 |         |

BOREHOLE NO. 13

PROJECT NAME BURLINGTON LANDFILL SITE

PROJECT NO. 78-92

CLIENT M.M. DILLON LIMITED

DATE JANUARY 29, 1979

BOREHOLE TYPE BOMBADIER, 0.1 m I.D. HOLLOW STEM AUGERS NX ROCK  
ELEVATION 122.0 CORE

GEOLOGIST A.B.

ELEVATION 122.0 CORE

TECHNOLOGIST\_\_\_\_\_

[illegible]

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 14

PROJECT NAME HALTON MONITORING

PROJECT NO. 80-96 - B

CLIENT REGIONAL MUNICIPALITY OF HALTON

DATE OCT. 10, 1980

BOREHOLE TYPE CME 75, 0.11 m I.D. AUGERS

GEOLOGIST A.B.

ELEVATION 125.27 m (Ground)

## TECHNOLOGIST

[illegible]

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 15

|               |                                 |              |               |
|---------------|---------------------------------|--------------|---------------|
| PROJECT NAME  | HALTON MONITORING               | PROJECT NO.  | 80-96 - B     |
| CLIENT        | REGIONAL MUNICIPALITY OF HALTON | DATE         | OCT. 10, 1980 |
| BOREHOLE TYPE | CME 75, 0.11 m I.D. AUGERS      | GEOLOGIST    | A.B.          |
| ELEVATION     | 121.0 m (Ground)                | TECHNOLOGIST |               |

[illegible]

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

## BOREHOLE NO. 16

PROJECT NAME HALTON MONITORING

PROJECT NO. 80-96 - B

**CLIENT** REGIONAL MUNICIPALITY OF HALTON

DATE OCT. 14, 1980

**BOREHOLE TYPE** CME 75, 0.11 m I.D. AUGERS, 0.08 m TRICONE

**GEOLOGIST**      A.B.

**ELEVATION** (Ground) 123.1 m (I,II) and 123.0 (III,IIII)

## TECHNOLOGIST.

[illegible]

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 16 (cont'd)

PROJECT NAME HALTON MONITORING

PROJECT NO. 80-96 - B

CLIENT REGIONAL MUNICIPALITY OF HALTON

DATE OCT. 14, 1980

BOREHOLE TYPE CME 75, 0.11 m I.D. AUGERS, 0.08 m TRICONE

GEOLOGIST A.B.

ELEVATION (Ground) 123.1 m (I,II) and 123.0 (III,IIII)

## TECHNOLOGIST.

[illegible]

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 17

PROJECT NAME HALTON MONITORING

CLIENT REGIONAL MUNICIPALITY OF HALTON

BOREHOLE TYPE CME 75, 0.11 m I.D. AUGERS, 0.08 m TRICONE

**ELEVATION** (Ground) 114.9 m (I,II) and 115.0 m (III,IIII)

PROJECT NO. 80-96 - B

DATE OCT. 15, 16, 17, 1980

GEOLOGIST \_\_\_\_\_ A.B.

## TECHNOLOGIST.

[illegible]

● Piezometer Tip    ▲ Standpipe Tip

**Gartner Lee Associates Limited**

BOREHOLE NO. 17

PROJECT NAME HALTON MONITORING

PROJECT NO. 80-96 - B

CLIENT REGIONAL MUNICIPALITY OF HALTON

DATE OCT. 15, 16, 17, 1980

BOREHOLE TYPE CME 75, 0.11 m I.D. AUGERS, 0.08 m TRICONE

GEOLOGIST \_\_\_\_\_

**ELEVATION** (Ground) 114.9 m (I,II) and 115.0 m (III,IIII)

TECHNOLOGIST\_\_\_\_\_

[illegible]

● Piezometer Tip    ▲ Standpipe Tip

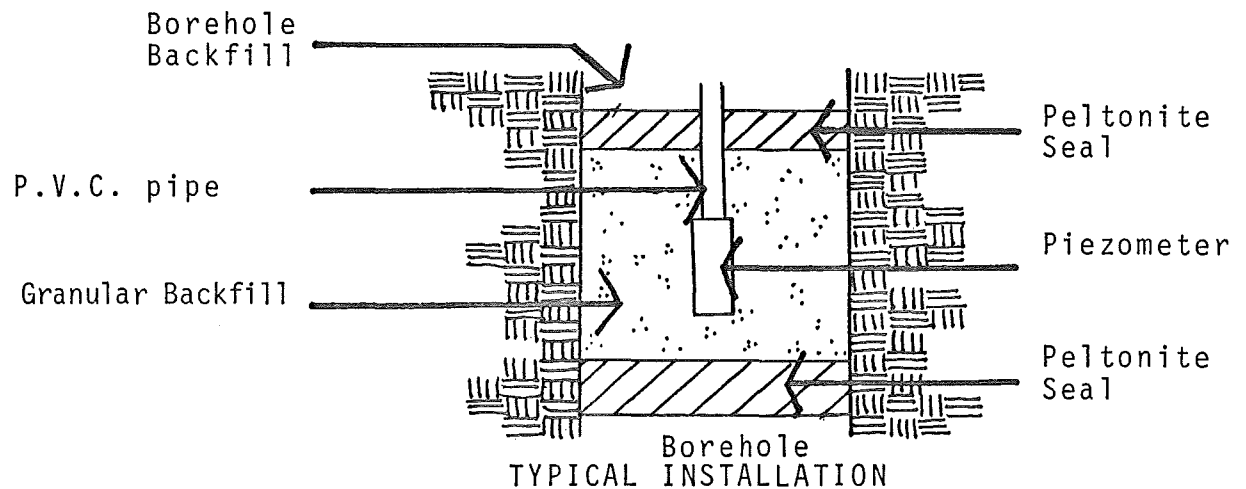
**Gartner Lee Associates Limited**

## GROUND WATER MONITOR DETAILS

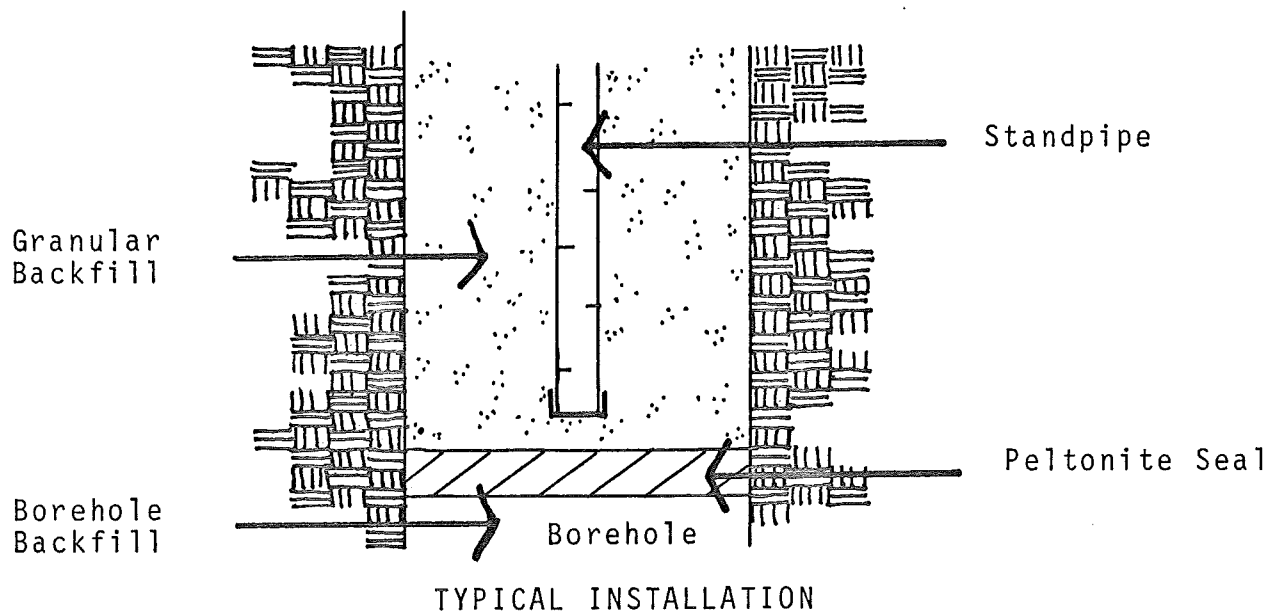
## GROUND WATER MONITOR DETAILS

### INSTALLATION DETAILS

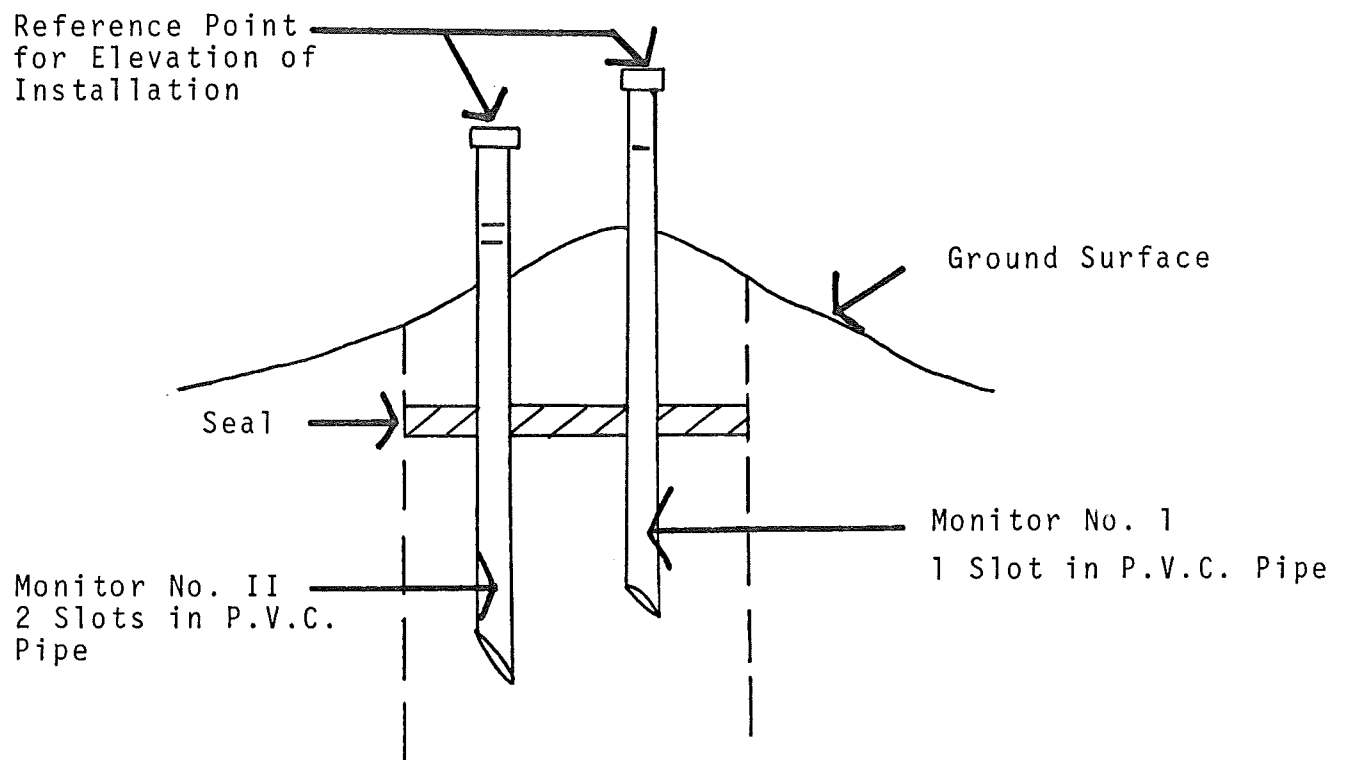
- A. PIEZOMETER: The piezometers consist of PVC pipe slotted and wrapped with fiberglass cloth over .5 m. Piezometers are used to measure the hydrostatic pressure, to obtain ground water samples and to measure in situ permeability.



- B. STANDPIPE: Standpipes consist of P.V.C. pipe with the bottom 2.4 m of each standpipe slotted every .3 m. Standpipes are used to measure the ground water table and to obtain ground water samples. Standpipes in boreholes 8A, 11A, 14, 15, 16 and 17 are slotted from the bottom of the monitor to 0.61 m below the surface.



### SURFACE DETAILS



## GROUND WATER MONITOR DETAILS

| BOREHOLE NO. | *MONITOR |             |        |        | LOCATION OF TIP |        | LOCATION OF SEAL |                       |
|--------------|----------|-------------|--------|--------|-----------------|--------|------------------|-----------------------|
|              | No.      | Diameter mm | Type   | Elev.  | Depth           | Elev.  | Depth            | Elev.                 |
| 1            | I        | 32          | ● trow | 183.7  | 18.6            | 165.1  | 18.0             | 165.7                 |
|              | II       | 32          | ●      | 184.0  | 14.0            | 170.0  | 14.0, 13.4       | 170.0, 170.6          |
|              | III      | 19          | ▲      | 183.7  | 6.1             | 177.6  | 3.1, 0.9         | 180.6, 182.8          |
| 2            | I        | 19          | ●      | 171.7  | 11.2            | 160.5  | 10.6             | 161.1                 |
|              | II       | 19          | ▲      | 171.4  | 7.0             | 164.4  | 4.8, 0.9         | 166.6, 170.5          |
| 3            | I        | 19          | ●      | 168.2  | 10.9            | 157.3  | 10.3             | 157.9                 |
|              | II       | 19          | ▲      | 167.9  | 6.1             | 161.8  | 3.7, 0.9         | 164.2, 167            |
| 4            | I        | 19          | ●      | 174.5  | 14.3            | 160.2  | 13.7             | 160.8                 |
|              | II       | 19          | ▲      | 174.5  | 8.5             | 166.0  | 5.8, 1.2         | 168.7, 173.2          |
| 5            | I        | 32          | ● trow | 164.8  | 12.7            | 152.6  | 11.9             | 153.4                 |
|              | II       | 32          | ●      | 164.8  | 8.0             | 158.1  | 7.4              | 157.7                 |
|              | III      | 19          | ▲      | 165.3  | 5.0             | 160.3  | 5.3, 1.2         | 160.0, 164.1          |
| 6            | I        | 19          | ●      | 174.2  | 17.5            | 156.6  | 16.8             | 157.4                 |
|              | II       | 19          | ▲      | 174.2  | 11.1            | 163.1  | 8.2, 1.1         | 166.0, 173.1          |
| 7            | I        | 32          | ●      | 181.5  | 15.4            | 166.1  | 14.8             | 166.7                 |
|              | II       | 32          | ●      | 181.8  | 10.9            | 170.9  | 10.8, 10.3       | 171.0, 171.5          |
|              | III      | 19          | ▲      | 181.4  | 6.1             | 175.3  | 6.1, 3.1, 0.9    | 175.3, 178.3<br>180.5 |
| 8A           | I        | 31          | ●      | 156.45 | 22.89           | 133.56 | 21.37            | 135.08                |
|              | II       | 31          | ▲      | 157.00 | 17.07           | 139.93 | 17.07<br>1.83    | 139.93<br>155.17      |
| 9            | I        | 32          | ●      | 142.5  | 11.0            | 131.5  | 10.4             | 132.1                 |
|              | II       | 19          | ●      | 142.7  | 8.4             | 134.3  | 8.4, 7.8         | 134.3, 134.9          |
|              | III      | 19          | ▲      | 142.9  | 6.1             | 136.8  | 4.0, 1.6         | 138.9, 141.3          |
| 10           | I        | 32          | ●      | 134.7  | 11.9            | 122.8  | 11.3             | 123.4                 |
|              | II       | 32          | ●      | 134.7  | 5.8             | 128.9  | 5.8, 5.2         | 128.9, 128.5          |
|              | III      | 19          | ▲      | 134.9  | 3.7             | 131.2  | 0.8              | 134.1                 |
| 11A          | I        | 31          | ●      | 135.33 | 13.11           | 122.22 | 12.04            | 123.29                |
|              | II       | 31          | ▲      | 135.00 | 6.10            | 128.9  | 6.10<br>1.37     | 128.90<br>133.63      |
| 12           | I        | 32          | ● trow | 127.9  | 12.7            | 115.2  | 12.0             | 115.9                 |
|              | II       | 32          | ●      | 127.7  | 7.3             | 120.4  | 7.3, 7.0         | 120.4, 120.7          |
|              | III      | 19          | ▲      | 127.9  | 2.5             | 125.4  | 1.1              | 126.8                 |
| 13           | I        | 19          | ●      | 122.6  | 9.8             | 112.8  | 9.1              | 113.5                 |
|              | II       | 19          | ▲      | 122.6  | 6.1             | 116.5  | 3.0, 1.2         | 119.6, 121.4          |

\* All elevations taken from the top of monitor.

## GROUND WATER MONITOR DETAILS

| BOREHOLE NO. | MONITOR |          |      |        | LOCATION OF TIP |        | LOCATION OF SEAL |                |
|--------------|---------|----------|------|--------|-----------------|--------|------------------|----------------|
|              | No.     | Diameter | Type | Elev.  | Depth           | Elev.  | Depth            | Elev.          |
| 14           | I       | 31       | ●    | 125.73 | 10.97           | 114.76 | 9.91             | 115.82         |
|              | II      | 31       | ▲    | 125.74 | 6.10            | 119.64 | 6.10             | 119.64         |
|              |         |          |      |        |                 |        | 1.07             | 124.67         |
| 15           | I       | 31       | ●    | 121.39 | 10.94           | 110.45 | 9.88             | 111.51         |
|              | II      | 31       | ▲    | 121.81 | 6.10            | 115.71 | 6.10             | 115.71         |
|              |         |          |      |        |                 |        | 1.43             | 120.38         |
| 16           | I       | 31       | ●    | 123.61 | 28.86           | 94.75  | 27.04            | 96.57          |
|              | II      | 31       | ●    | 124.03 | 17.74           | 106.29 | 17.74            | 106.29         |
|              |         |          |      |        |                 |        | 16.22            | 107.81         |
|              | III     | 31       | ●    | 123.92 | 9.91            | 114.01 | 8.84             | 115.08         |
|              | IIII    | 31       | ▲    | 123.91 | 6.10            | 117.81 | 6.10, 1.52       | 117.81, 122.39 |
| 17           | I       | 31       | ●    | 115.47 | 29.93           | 85.54  | 28.56            | 86.91          |
|              | II      | 31       | ●    | 115.74 | 17.62           | 98.12  | 17.62            | 98.12          |
|              |         |          |      |        |                 |        | 16.40            | 99.34          |
|              | III     | 31       | ●    | 115.70 | 9.20            | 106.50 | 7.99             | 107.71         |
|              | IIII    | 31       | ▲    | 115.67 | 6.10            | 109.57 | 6.10             | 109.57         |
|              |         |          |      |        |                 |        | 1.28             | 114.39         |

\* All elevations taken from top of monitor.

## GROUND WATER ELEVATIONS

## GROUND WATER ELEVATIONS

| BOREHOLE<br>NUMBER | MONITOR |      | Feb. 26,<br>1979 | Mar. 19<br>1979 | Apr. 4,<br>1979 | Apr. 18,<br>1979 | May 2,<br>1979 | May 16,<br>1979 | June 4,<br>1979 | July 23,<br>1979 |  |  |  |
|--------------------|---------|------|------------------|-----------------|-----------------|------------------|----------------|-----------------|-----------------|------------------|--|--|--|
|                    | No.     | Type |                  |                 |                 |                  |                |                 |                 |                  |  |  |  |
| 1                  | I       | ●    | 173.4            | 173.3           | 173.4           | 173.1            | 173.2          | 173.2           | 173.3           | 173.4            |  |  |  |
|                    | II      | ●    | 181.0            | 181.3           | 181.5           | 181.6            | 181.4          | 181.4           | 181.4           | 181.6            |  |  |  |
|                    | III     | ▲    | 182.8            | 183.2           | 183.3           | 183.2            | 183.0          | 183.2           | 183.0           | 182.4            |  |  |  |
| 2                  | I       | ●    | 168.0            | 168.3           | 168.3           | 168.6            | 168.4          | 168.5           | 168.4           | 167.5            |  |  |  |
|                    | II      | ▲    | Frozen           | Frozen          | 171.3           | 171.1            | 171.2          | 171.3           | 171.3           | 169.9            |  |  |  |
| 3                  | I       | ●    | 163.8            | 163.0           | 163.0           | 163.7            | 163.5          | 163.5           | 163.4           | 162.4            |  |  |  |
|                    | II      | ▲    | 163.3            | 163.8           | 164.8           | 165.0            | 164.6          | 164.6           | 165.2           | 162.9            |  |  |  |
| 4                  | I       | ●    | 171.2            | 170.8           | 170.5           | 167.9            | 167.9          | 166.4           | 166.6           | 166.4            |  |  |  |
|                    | II      | ▲    | 170.8            | 172.3           | 173.3           | 173.2            | 172.8          | 171.9           | 172.5           | 169.5            |  |  |  |
| 5                  | I       | ●    | 163.1            | 163.4           | 163.2           | 161.5            | 155.0          | 154.0           | 154.2           | 154.6            |  |  |  |
|                    | II      | ●    | Frozen           | Frozen          | Flowing         | Flowing          | Flowing        | Flowing         | Flowing         | Destroyed        |  |  |  |
|                    | III     | ▲    | Frozen           | Frozen          | Flowing         | Flowing          | Flowing        | Flowing         | Flowing         |                  |  |  |  |
| 6                  | I       | ●    | 160.5            | 160.2           | 160.8           | 164.7            | 164.7          | 164.7           | 164.7           | 163.9            |  |  |  |
|                    | II      | ▲    | 169.1            | 169.4           | 171.5           | 171.9            | 170.8          | 170.9           | 170.6           | 168.0            |  |  |  |
| 7                  | I       | ●    | 177.8            | 176.8           | 176.9           | 176.8            | 177.8          | 177.0           | 177.4           | 177.5            |  |  |  |
|                    | II      | ●    | 179.0            | 179.7           | 180.0           | 179.3            | 180.2          | 180.3           | 180.2           | 178.0            |  |  |  |
|                    | III     | ▲    | 180.8            | 180.8           | 180.8           | 180.7            | 180.6          | 180.7           | 180.5           | 179.1            |  |  |  |
| 8                  | I       | ●    | 136.9            | 135.5           | 137.2           | 136.0            | 135.3          | 135.7           | 135.3           | 136.5            |  |  |  |
|                    | II      | ▲    | 142.0            | 141.8           | 142.2           | 142.0            | 141.6          | 142.0           | 142.0           | 148.1            |  |  |  |
| 9                  | I       | ●    | Dry              | Dry             | Dry             | 131.8            | Dry            | Dry             | Dry             | Dry              |  |  |  |
|                    | II      | ●    | Dry              | Dry             | Dry             | 135.9            | 135.5          | 134.8           | 135.7           | Dry              |  |  |  |
|                    | III     | ▲    | Dry              | Dry             | Dry             | 137.1            | 137.6          | Dry             | Dry             | Dry              |  |  |  |
| 10                 | I       | ●    | 128.2            | 128.5           | 128.5           | 129.1            | 129.0          | 128.9           | 129.1           | 128.2            |  |  |  |
|                    | II      | ●    | 132.7            | 132.6           | 132.6           | 132.9            | 133.1          | 132.7           | 133.0           | 132.0            |  |  |  |
|                    | III     | ▲    | 132.5            | 132.4           | 133.1           | 133.1            | 134.2          | 133.1           | 133.4           | 132.8            |  |  |  |

● - Piezometer

▲ - Standpipe

Gartner Lee Associates Limited

## GROUND WATER ELEVATIONS

| BOREHOLE<br>NUMBER | MONITOR |      | Feb. 26,<br>1979 | Mar. 19,<br>1979 | Apr. 4,<br>1979 | Apr. 18,<br>1979 | May 2,<br>1979 | May 16,<br>1979 | June 4,<br>1979 | July 23,<br>1979 |  |  |  |
|--------------------|---------|------|------------------|------------------|-----------------|------------------|----------------|-----------------|-----------------|------------------|--|--|--|
|                    | No.     | Type |                  |                  |                 |                  |                |                 |                 |                  |  |  |  |
| 11                 | I       | ●    | 128.5            | 128.6            | 128.9           | 127.2            | 127.3          | 125.9           | 126.3           | 129.6            |  |  |  |
|                    | II      | ▲    | 130.9            | 130.7            | 130.3           | 130.3            | 129.6          | 129.6           | 129.7           | 131.5            |  |  |  |
| 12                 | I       | ●    | 121.4            | 121.5            | 122.1           | 122.3            | 122.2          | 122.1           | 122.0           | 121.2            |  |  |  |
|                    | II      | ●    | 122.3            | 124.9            | 125.8           | 124.6            | 125.2          | 125.3           | 125.2           | 124.3            |  |  |  |
|                    | III     | ▲    | 126.4            | 126.9            | 127.1           | 127.1            | 127.2          | 127.1           | 126.9           | 125.8            |  |  |  |
| 13                 | I       | ●    | 119.5            | 120.0            | 120.6           | 120.5            | 120.0          | 120.0           | 119.9           | 119.2            |  |  |  |
|                    | II      | ▲    | 120.4            | 121.1            | 121.7           | 121.5            | 121.1          | 121.2           | 120.9           | 120.0            |  |  |  |

● - Piezometer

▲ - Standpipe

## GROUND WATER ELEVATIONS

| BOREHOLE<br>NUMBER | MONITOR |      | Nov. 7    | Dec. 6 | Jan. 17 | Feb. 6       | Mar. 7 | Apr. 18 | Oct. 30   | Dec. 9 | Feb. 25   | Apr. 8 | May 25    |
|--------------------|---------|------|-----------|--------|---------|--------------|--------|---------|-----------|--------|-----------|--------|-----------|
|                    | No.     | Type | 1979      | 1979   | 1980    | 1980         | 1980   | 1980    | 1980      | 1980   | 1981      | 1981   | 1981      |
| 1                  | I       | ●    | 173.25    | 172.97 | 173.00  | 173.50       | 173.45 | 174.13  | 173.51    | 172.82 | 172.80    | 173.20 | 173.87    |
|                    | II      | ●    | 179.00    | 178.97 | 179.90  | 181.06       | 180.94 | 181.23  | 179.13    | 178.80 | 180.14    | 181.07 | 181.39    |
|                    | III     | ▲    | 181.27    | 181.11 | 181.66  | 182.62       | 182.51 | 183.10  | 181.56    | 181.45 | 182.68    | 183.00 | 182.74    |
| 2                  | I       | ●    | 166.57    | 166.82 | 166.89  | 168.30       | 167.81 | 168.35  | 166.56    | 166.49 | 166.95    | 168.10 | 168.20    |
|                    | II      | ▲    | 168.63    | 169.42 | 170.29  | 171.37       | 170.08 | 171.37  | 168.95    | 168.54 | 170.02    | 170.82 | 170.81    |
| 3                  | I       | ●    | 161.04    | 160.55 | 160.60  | 162.30       | 161.95 | 162.06  | 161.28    | 160.84 | 160.58    | 161.94 | Sealed    |
|                    | II      | ▲    | 161.77    | 162.02 | 612.86  | 163.52       | 163.00 | 164.50  | -         | -      | 162.35    | 163.08 | Sealed    |
| 4                  | I       | ●    | 166.30    | 166.21 | 166.28  | 166.05       | 166.33 | 166.37  | 166.25    | 165.97 | 165.53    | 165.60 | Destroyed |
|                    | II      | ▲    | 167.38    | 168.07 | 169.73  | 172.00       | 171.00 | 173.37  | 167.57    | 167.40 | 172.77    | 173.87 | Destroyed |
| 5                  | I       | ●    | 154.53    | 154.70 | 154.69  | 154.80       | 154.91 | 155.23  | Destroyed | -      | -         | -      | -         |
|                    | II      | ●    | Destroyed | -      | -       | -            | -      | -       | -         | -      | -         | -      | -         |
|                    | III     | ▲    | 161.90    | 162.16 | 162.97  | 164.25       | 164.25 | 164.68  | 162.35    | 162.82 | Destroyed | -      | -         |
| 6                  | I       | ●    | 160.39    | 160.45 | 160.69  | 160.10       | 160.30 | 160.45  | 160.55    | 160.47 | 160.15    | 160.25 | Broken    |
|                    | II      | ▲    | 166.30    | 167.07 | 168.17  | 169.90       | 168.63 | 171.25  | 166.48    | 166.41 | 169.24    | 170.58 | Bent      |
| 7                  | I       | ●    | 175.26    | 174.98 | 175.20  | 175.00       | 176.67 | 176.85  | 175.28    | 174.72 | 175.23    | 176.28 | 176.34    |
|                    | II      | ●    | 175.62    | 177.69 | 177.80  | 179.10       | 178.60 | 179.50  | 175.78    | 176.12 | 179.35    | 179.52 | 179.52    |
|                    | III     | ▲    | 176.05    | 178.69 | 179.25  | 180.13       | 179.72 | 180.61  | 176.28    | 176.36 | 180.93    | 180.71 | 180.52    |
| 8                  | I       | ●    | 139.50    | 136.55 | 138.96  | Destroyed    | -      | -       | -         | -      | -         | -      | -         |
|                    | II      | ▲    | 147.30    | 142.99 | 144.60  | or<br>Buried | -      | -       | -         | -      | -         | -      | -         |
| 9                  | I       | ●    | Destroyed | -      | -       | -            | -      | -       | -         | -      | -         | -      | -         |
|                    | II      | ●    | Destroyed | -      | -       | -            | -      | -       | -         | -      | -         | -      | -         |
|                    | III     | ▲    | Destroyed | -      | -       | -            | -      | -       | -         | -      | -         | -      | -         |

● - Piezometer

▲ - Standpipe

Gartner Lee Associates Limited

## GROUND WATER ELEVATIONS

| BOREHOLE<br>NUMBER | MONITOR |      | Nov. 7<br>1979 | Dec. 6<br>1979 | Jan. 17<br>1980 | Feb. 11<br>1980 | Mar. 7<br>1980 | Apr. 18<br>1980 | Oct. 30<br>1980 | Dec. 9<br>1980 | Feb. 25<br>1981 | Apr. 8<br>1981 | May 25<br>1981 |
|--------------------|---------|------|----------------|----------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|-----------------|----------------|----------------|
|                    | No.     | Type |                |                |                 |                 |                |                 |                 |                |                 |                |                |
| 10                 | I       | ●    | 127.73         | 128.36         | 128.50          | 128.50          | 128.07         | 128.86          | 127.60          | 127.85         | Blocked         | 128.16         | 128.49         |
|                    | II      | ●    | 132.27         | 132.38         | 132.23          | 132.25          | 131.90         | 132.39          | 131.72          | 131.83         | 131.97          | 132.2          | 132.13         |
|                    | III     | ▲    | 133.12         | 133.50         | 133.42          | 133.42          | 133.08         | 133.59          | 133.25          | Destroyed      | -               | 133.06         | 133.33         |
| 11                 | I       | ●    | 128.25         | 125.70         | 126.37          | 126.75          | -              | -               | -               | -              | -               | -              | -              |
|                    | II      | ▲    | 130.55         | 130.18         | 130.13          | 130.00          | Destroyed      | -               | -               | -              | -               | -              | -              |
| 12                 | I       | ●    | 121.41         | 121.41         | 121.67          | 121.75          | 121.50         | 121.87          | 120.91          | 121.01         | 121.05          | 121.35         | 121.58         |
|                    | II      | ●    | 123.99         | 124.74         | 125.25          | 124.78          | 124.35         | 125.85          | 123.55          | 124.16         | 124.16          | 124.62         | 124.98         |
|                    | III     | ▲    | 127.15         | 125.92         | 127.05          | 126.37          | 125.99         | 127.07          | 126.53          | 127.04         | 127.25          | 126.53         | 126.56         |
| 13                 | I       | ●    | 118.66         | 119.25         | 119.80          | 119.50          | 119.11         | 120.20          | 118.66          | 118.87         | 119.02          | 119.40         | 119.57         |
|                    | II      | ▲    | 119.40         | 120.62         | 121.00          | 120.22          | 119.80         | 121.40          | 119.26          | 119.47         | 119.70          | 120.12         | 120.30         |

● - Piezometer

▲ - Standpipe

## GROUND WATER ELEVATIONS

| BOREHOLE<br>NUMBER | MONITOR |      | Oct.30 | Dec.9  | Feb.25         | Apr.8  | May 25 | Oct.20 | Nov.25 |  |  |  |  |
|--------------------|---------|------|--------|--------|----------------|--------|--------|--------|--------|--|--|--|--|
|                    | No.     | Type | 1980   | 1980   | 1981           | 1981   | 1981   | 1981   | 1981   |  |  |  |  |
| 8A                 | I       | ●    | 136.79 | 135.75 | 136.15         | 137.43 | 136.43 | 136.19 | 136.33 |  |  |  |  |
|                    | II      | ▲    | 140.50 | 140.90 | Blocked<br>Ice | 140.95 | -      | 140.96 | 140.92 |  |  |  |  |
| 11A                | I       | ●    | 125.68 | 128.11 | 126.35         | 126.19 | 127.98 | 126.28 | 126.93 |  |  |  |  |
|                    | II      | ▲    | Dry    | 130.43 | 129.95         | 129.05 | 129.13 | dry    | 130.75 |  |  |  |  |
| 14                 | I       | ●    | 124.18 | 124.31 | 124.47         | 124.34 | 124.38 | 124.34 | 124.39 |  |  |  |  |
|                    | II      | ▲    | 124.53 | 124.88 | 124.97         | 124.85 | 124.78 | 124.87 | 124.90 |  |  |  |  |
| 15                 | I       | ●    | 119.92 | 120.23 | 120.46         | 120.16 | 120.16 | 120.20 | 120.29 |  |  |  |  |
|                    | II      | ▲    | 120.34 | 120.71 | 121.10         | 120.83 | 120.7  | 120.71 | 121.08 |  |  |  |  |
| 16                 | I       | ●    | 115.37 | 115.28 | 115.34         | 115.11 | 114.98 | 114.85 | 115.06 |  |  |  |  |
|                    | II      | ●    | 115.71 | 115.71 | 115.70         | 115.81 | 116.14 | 115.95 | 116.19 |  |  |  |  |
|                    | III     | ●    | 117.17 | 118.75 | 118.73         | 118.94 | 119.19 | 118.94 | 119.32 |  |  |  |  |
|                    | IIII    | ▲    | 121.01 | 121.23 | 121.33         | 121.40 | 121.65 | 121.36 | 121.93 |  |  |  |  |
| 17                 | I       | ●    | 113.89 | 114.09 | 114.06         | 114.01 | 114.06 | 113.72 | 113.93 |  |  |  |  |
|                    | II      | ●    | 113.84 | 114.04 | 114.01         | 114.07 | 114.13 | 113.94 | 114.15 |  |  |  |  |
|                    | III     | ●    | 114.56 | 114.88 | Blocked<br>Ice | 114.88 | 114.90 | 114.82 | 115.09 |  |  |  |  |
|                    | IIII    | ▲    | 114.64 | 114.95 | 114.97         | 114.92 | 114.92 | 114.88 | 115.13 |  |  |  |  |

● - Piezometer

▲ - Standpipe

## GROUND WATER ELEVATIONS

| BOREHOLE<br>NUMBER | MONITOR |      | Oct.20<br>1981 | Nov.23<br>1981 |  |  |  |  |  |  |  |  |
|--------------------|---------|------|----------------|----------------|--|--|--|--|--|--|--|--|
|                    | No.     | Type |                |                |  |  |  |  |  |  |  |  |
| 1                  | 1       | ●    | 173.82         | 173.71         |  |  |  |  |  |  |  |  |
|                    | 11      | ●    | 180.28         | 180.6          |  |  |  |  |  |  |  |  |
|                    | 111     | ▲    | 181.45         | 183.2          |  |  |  |  |  |  |  |  |
| 2                  | 1       | ●    | 167.17         | 167.62         |  |  |  |  |  |  |  |  |
|                    | 11      | ▲    | 169.71         | 170.62         |  |  |  |  |  |  |  |  |
| 6                  | 1       | ●    | bent           | bent           |  |  |  |  |  |  |  |  |
|                    | 11      | ▲    | 160.58         | bent           |  |  |  |  |  |  |  |  |
| 7                  | 1       | ●    | 176.30         | not<br>located |  |  |  |  |  |  |  |  |
|                    | 11      | ●    | 178.89         |                |  |  |  |  |  |  |  |  |
|                    | 111     | ▲    | 180.77         |                |  |  |  |  |  |  |  |  |
| 10                 | 1       | ●    | 128.02         | 128.20         |  |  |  |  |  |  |  |  |
|                    | 11      | ●    | 132.01         | 132.34         |  |  |  |  |  |  |  |  |
|                    | 111     | ▲    | 132.53         | 133.19         |  |  |  |  |  |  |  |  |
| 12                 | 1       | ●    | 121.33         | 121.74         |  |  |  |  |  |  |  |  |
|                    | 11      | ●    | 124.47         | 125.5          |  |  |  |  |  |  |  |  |
|                    | 111     | ▲    | 126.39         | 127.3          |  |  |  |  |  |  |  |  |
| 13                 | 1       | ●    | 119.20         | 121.15         |  |  |  |  |  |  |  |  |
|                    | 11      | ▲    | 119.60         | 121.12         |  |  |  |  |  |  |  |  |

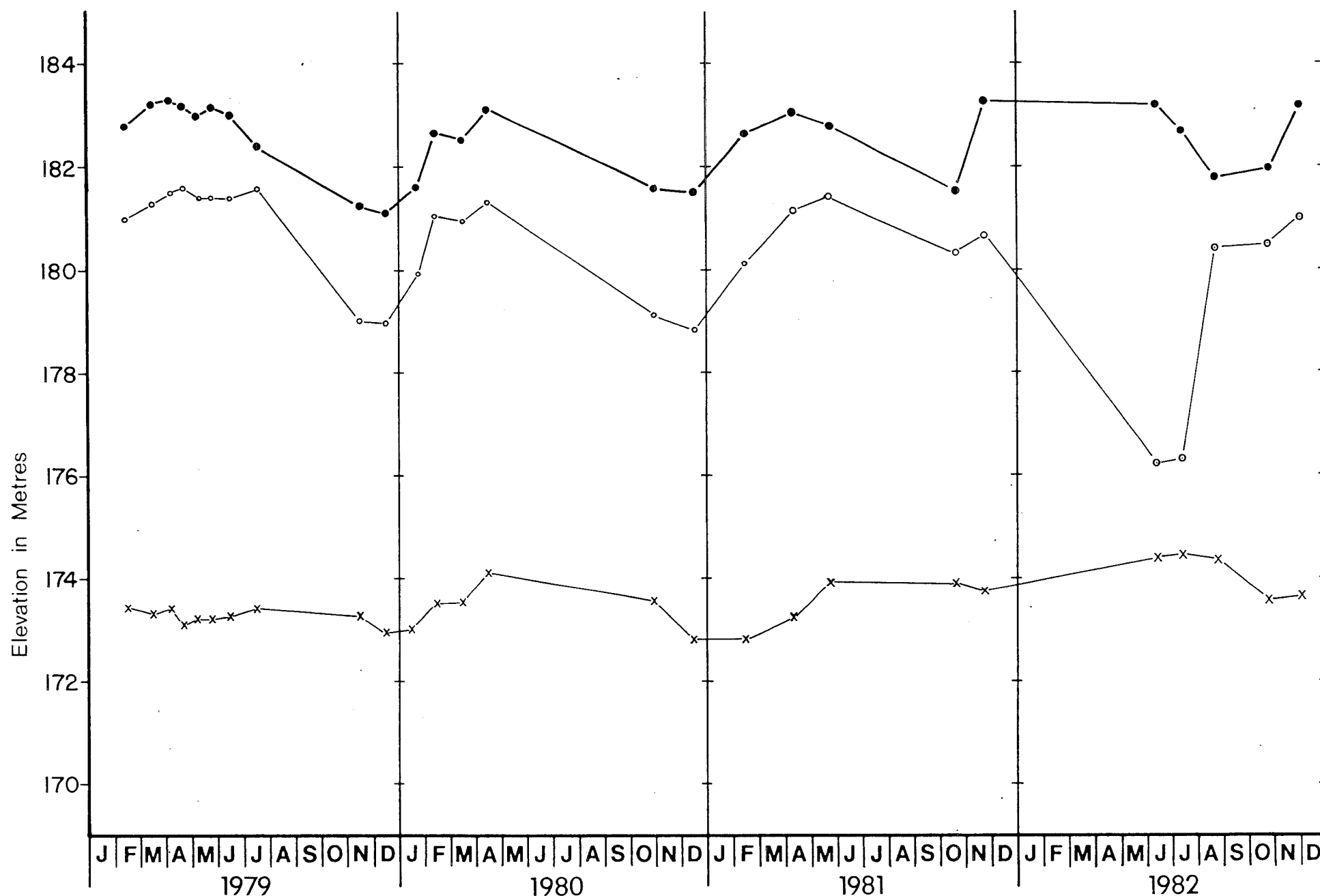
● - Piezometer    ▲ - Standpipe

## HYDROGRAPHS

FIGURE 6

# Hydrograph

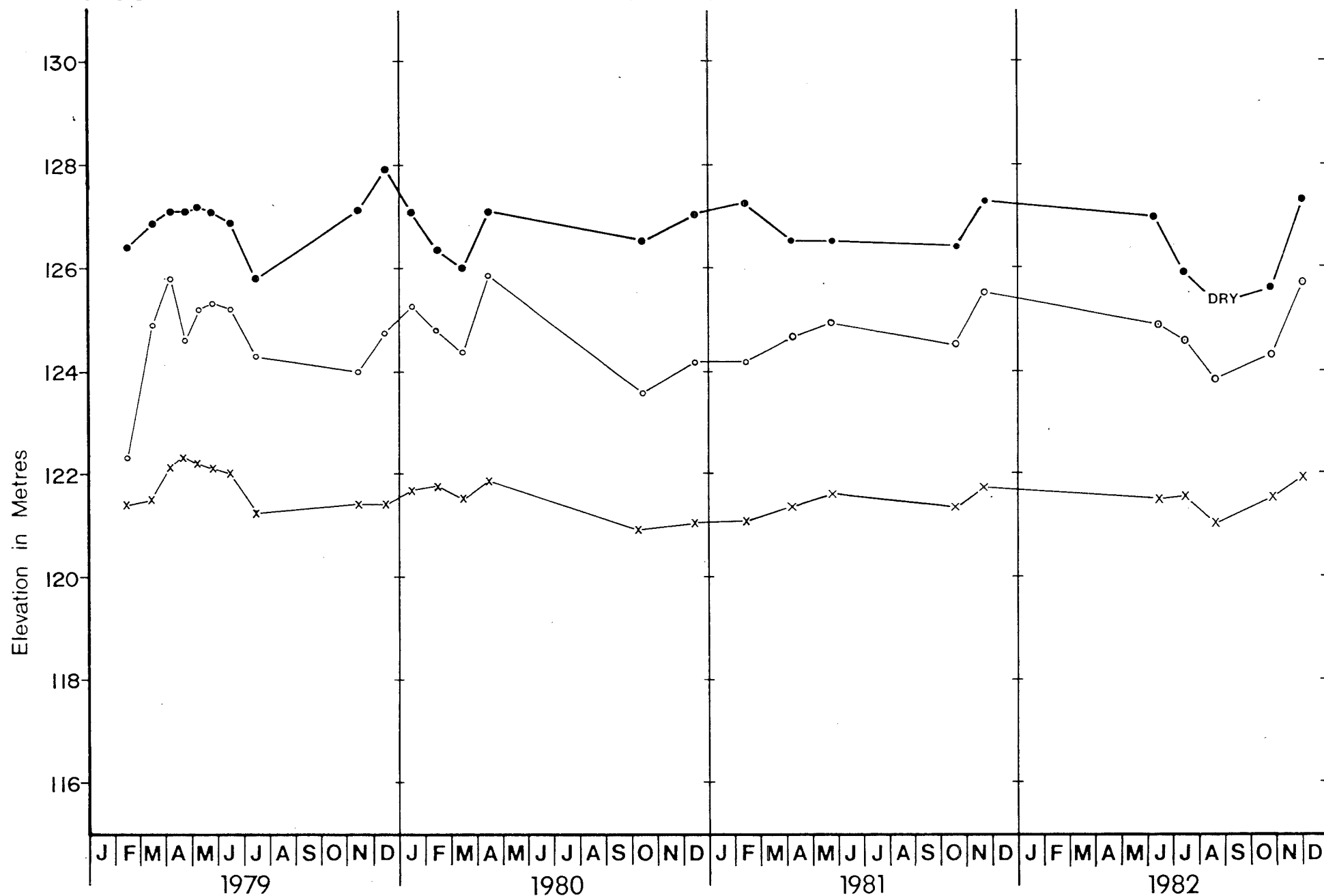
Project 80.96.B



BURLINGTON LANDFILL SITE : Borehole 1 , Monitors I x—x , II o—o , III •—•

FIGURE 7

## Hydrograph



BURLINGTON LANDFILL SITE : Borehole 12 , Monitors I x—x , II o—o , III •—•

## ESTIMATED SURFACE WATER FLOWS

## ESTIMATED SURFACE WATER FLOWS - FALCON CREEK

| Station |                    | Apr. 4<br>1979 | Apr. 18<br>1979 | May 2<br>1979 | May 16<br>1979 | June 4<br>1979 | July 23<br>1979 | Nov. 7<br>1979 | Dec. 6<br>1979 | Jan. 17<br>1980 | Feb. 11<br>1980 | Mar. 7<br>1980 |
|---------|--------------------|----------------|-----------------|---------------|----------------|----------------|-----------------|----------------|----------------|-----------------|-----------------|----------------|
| 1       | Upstream           | 890            | 820             | 890           | 1800           | 680            | Dry             | 100            | 150            | 180             | Dry             | Dry            |
| 2       | Adjacent           |                |                 |               |                |                |                 |                |                |                 |                 |                |
| 3       | Downstream         | 890            | 820             | 890           | 1800           | 740            | Dry             | 180            | 220            | 180             | Dry             | Dry            |
|         | All Flows in L/min |                |                 |               |                |                |                 |                |                |                 |                 |                |

● - Piezometer

▲ - Standpipe

Gartner Lee Associates Limited

## ESTIMATED SURFACE FLOWS - FALCON CREEK

| Station |            | Apr. 18<br>1980 | Oct. 30<br>1980 | Dec. 5<br>1980 | Feb. 25<br>1981 | Apr. 8<br>1981 | May 21<br>1981 | Oct. 20<br>1981 | Nov. 23<br>1981 |  |  |  |
|---------|------------|-----------------|-----------------|----------------|-----------------|----------------|----------------|-----------------|-----------------|--|--|--|
| 1       | Upstream   | 4800            | Dry             | Dry            | 2600            | 500            | 1000           | 200             | 2000            |  |  |  |
| 2       | Adjacent   | -               | Dry             | Dry            | 3000            | 600            | 1500           | 200             | 2300            |  |  |  |
| 3       | Downstream | 4500            | Dry             | Dry            | 4000            | 800            | 2500           | 200             | 2800            |  |  |  |

● - Piezometer

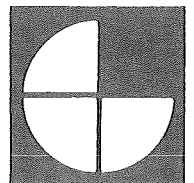
▲ - Standpipe

## APPENDIX II

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**Gartner Lee  
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## GROUND WATER QUALITY ANALYSES

ONTARIO MINISTRY OF THE ENVIRONMENT  
DRINKING WATER QUALITY CRITERIA FOR THE  
SUBSTANCES ANALYZED

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| <u>SUBSTANCE</u>                                        | <u>CONCENTRATION</u><br><u>mg/L</u> |
|---------------------------------------------------------|-------------------------------------|
| Chloride (Cl)                                           | 250.0                               |
| Sulphate (SO <sub>4</sub> )                             | 250.0                               |
| Organic Nitrogen (Total<br>Kjeldahl minus Free Ammonia) | 0.15                                |
| Nitrate (N)                                             | 10.0                                |
| Iron (Fe)                                               | 0.3                                 |
| Phenols                                                 | 0.001                               |

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 1 PIEZOMETER I

| PROPERTY                       |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | Feb.<br>1980 | March<br>1980 | April<br>1980 | Oct.<br>1980 | Dec.<br>1980 | April<br>1981 | Nov.<br>1981 | 1979-80<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|--------------|-----------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 5020         | 5900         | 4900         | 5500         | 5700          | 5600          | 5600         | 5600         | 5750          | 4175         | 5480            |
| pH                             |                |              |              |              |              |               |               | 7.3          | 7.5          | -             | 7.3          | 7.4             |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              |              |              |               |               |              |              | 1945          | 1520         |                 |
| COD                            |                |              |              |              |              |               |               | 58           | 44           | 50            | 25           | 51              |
| CHLORIDES (Cl)                 |                |              |              |              |              |               |               | 210          | 240          | 230           | 187          | 225             |
| SULPHATES (SO <sub>4</sub> )   |                |              |              |              |              |               |               | 3400         | 3600         | 3850          | 2700         | 3500            |
| PHOSPHOROUS<br>AS P            | Total          |              |              |              |              |               |               |              |              | .14           | .5           |                 |
|                                | Soluble        |              |              |              |              |               |               |              |              | .1            | -            |                 |
| NITROGEN (N)                   | Total Kjeldahl |              |              |              |              |               |               |              |              | 1.2           | 8.0          |                 |
|                                | Free Ammonia   |              |              |              |              |               |               |              |              | <.1           | <.1          |                 |
|                                | Nitrite        |              |              |              |              |               |               |              |              | .01           | 1.3          |                 |
|                                | Nitrate        |              |              |              |              |               |               |              |              | <.1           | 9.3          |                 |
| METALS                         | Potassium (K)  | 46           | 51           | 43           | 49           | 49            | 50            |              |              |               | 39.6         | 48              |
|                                | Magnesium (Mg) |              |              |              |              |               |               |              |              |               | 156          |                 |
|                                | Calcium (Ca)   |              |              |              |              |               |               |              |              |               | 352          |                 |
|                                | Sodium (Na)    |              | 880          |              |              |               |               |              |              |               | 680          | 880             |
|                                | Iron (Fe)      | 3.0          | 3.0          | 7.5          | 4.8          | 2.2           | 2.0           |              |              | 4.4           | 1.03         | 3.8             |
| Phenol (ppb)                   |                | 2            | 2            | <1           | 1            | <1            | 1             | <1           | <1           | <1            | -            | 1               |
| BOD                            |                | 12.0         | 6.0          | 44           | 3.0          | 4.0           | 4.5           | 26           | 15           | 9.0           | 28           | 14              |
| DOC or *Alkalinity             |                | 9.2          | 1.8          | 3.2          | 3.4          | 3.4           | 2.0           |              |              |               | 686          | 3.8             |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 1 PIEZOMETER II

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 2600         | 2750         | 2800         | 2075         |  |  |  |  |  |  | 2675         |
| pH                             |                | 7.7          | 7.5          | -            | 7.6          |  |  |  |  |  |  | 7.6          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 696          | 573          |  |  |  |  |  |  |              |
| COD                            |                | 47           | 51           | 21           | 30           |  |  |  |  |  |  | 49           |
| CHLORIDES (Cl)                 |                | 25           | 18           | 17           | 62           |  |  |  |  |  |  | 22           |
| SULPHATES (SO <sub>4</sub> )   |                | 930          | 900          | 875          | 650          |  |  |  |  |  |  | 915          |
| PHOSPHOROUS<br>AS P            | Total          |              |              | .1           | .3           |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .1           | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | .8           | 2.8          |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | .8           | <.1          |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | <.1          | .03          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | .02          | 2.5          |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 10.2         |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 98           |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 68           |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 365          |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 1.23         | 1.27         |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | 2            | 1            | <1           | -            |  |  |  |  |  |  | 1.5          |
| BOD                            |                | 5.0          | 7.5          | 5.0          | 16           |  |  |  |  |  |  | 6.3          |
| Alkalinity                     |                |              |              |              | 650          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITEREMARKS BOREHOLE 2 PIEZOMETER I

| PROPERTY                       |                | Oct.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  |  |  |
|--------------------------------|----------------|--------------|--------------|--------------|--|--|--|--|--|--|--|--|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 1750         | 2020         | 2050         |  |  |  |  |  |  |  |  |
| pH                             |                | 7.7          | -            | 7.4          |  |  |  |  |  |  |  |  |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              | 989          | 1090         |  |  |  |  |  |  |  |  |
| COD                            |                | 83           | 56           | 25           |  |  |  |  |  |  |  |  |
| CHLORIDES (Cl)                 |                | 57           | 22           | 13           |  |  |  |  |  |  |  |  |
| SULPHATES (SO <sub>4</sub> )   |                | 600          | 725          | 900          |  |  |  |  |  |  |  |  |
| PHOSPHOROUS<br>AS P            | Total          |              | .12          | .2           |  |  |  |  |  |  |  |  |
|                                | Soluble        |              | .04          | -            |  |  |  |  |  |  |  |  |
| NITROGEN (N)                   | Total Kjeldahl |              | 3.4          | 3.8          |  |  |  |  |  |  |  |  |
|                                | Free Ammonia   |              | 2.8          | <.1          |  |  |  |  |  |  |  |  |
|                                | Nitrite        |              | .01          | .06          |  |  |  |  |  |  |  |  |
|                                | Nitrate        |              | <.1          | 3.7          |  |  |  |  |  |  |  |  |
| METALS                         | Potassium (K)  |              |              | 44           |  |  |  |  |  |  |  |  |
|                                | Magnesium (Mg) |              |              | 153          |  |  |  |  |  |  |  |  |
|                                | Calcium (Ca)   |              |              | 184          |  |  |  |  |  |  |  |  |
|                                | Sodium (Na)    |              |              | 146          |  |  |  |  |  |  |  |  |
|                                | Iron (Fe)      |              | 7.20         | 6.50         |  |  |  |  |  |  |  |  |
| Phenol (ppb)                   |                | 1            | <1           | -            |  |  |  |  |  |  |  |  |
| BOD                            |                | 10           | 4.0          | 16           |  |  |  |  |  |  |  |  |
| Alkalinity                     |                |              |              | 575          |  |  |  |  |  |  |  |  |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 2 STANDPIPE II

| PROPERTY                       |                | Oct.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  |  |
|--------------------------------|----------------|--------------|--------------|--------------|--|--|--|--|--|--|--|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 1525         | 1600         | 1525         |  |  |  |  |  |  |  |
| pH                             |                | 7.7          | -            | 7.4          |  |  |  |  |  |  |  |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              | 910          | 922          |  |  |  |  |  |  |  |
| COD                            |                | 24           | 27           | 17           |  |  |  |  |  |  |  |
| CHLORIDES (Cl)                 |                | 5            | 4            | 6            |  |  |  |  |  |  |  |
| SULPHATES (SO <sub>4</sub> )   |                | 600          | 395          | 510          |  |  |  |  |  |  |  |
| PHOSPHOROUS<br>AS P            | Total          |              | .44          | .32          |  |  |  |  |  |  |  |
|                                | Soluble        |              | .04          | -            |  |  |  |  |  |  |  |
| NITROGEN (N)                   | Total Kjeldahl |              | 1.0          | .6           |  |  |  |  |  |  |  |
|                                | Free Ammonia   |              | <.1          | <.1          |  |  |  |  |  |  |  |
|                                | Nitrite        |              | .01          | .01          |  |  |  |  |  |  |  |
|                                | Nitrate        |              | <.1          | .1           |  |  |  |  |  |  |  |
| METALS                         | Potassium (K)  |              |              | 22.8         |  |  |  |  |  |  |  |
|                                | Magnesium (Mg) |              |              | 168          |  |  |  |  |  |  |  |
|                                | Calcium (Ca)   |              |              | 92           |  |  |  |  |  |  |  |
|                                | Sodium (Na)    |              |              | 72           |  |  |  |  |  |  |  |
|                                | Iron (Fe)      |              | 24.5         | 19.0         |  |  |  |  |  |  |  |
| Phenol (ppb)                   |                | 2            | <1           | -            |  |  |  |  |  |  |  |
| BOD                            |                | 9.0          | 4.0          | 3.0          |  |  |  |  |  |  |  |
| Alkalinity                     |                |              |              | 688          |  |  |  |  |  |  |  |

NOTE: concentrations in p.p.m. unless otherwise noted.

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PROJECT 80-96-B

TABLE 6 SHEET 5

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 8A PIEZOMETER I

| PROPERTY                       |                | Oct.<br>1980 | Apr.<br>1981 |  |  |  |  |  |  |  |  |
|--------------------------------|----------------|--------------|--------------|--|--|--|--|--|--|--|--|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 2150         | 3060         |  |  |  |  |  |  |  |  |
| pH                             |                | 7.0          | -            |  |  |  |  |  |  |  |  |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              | 1490         |  |  |  |  |  |  |  |  |
| COD                            |                | 1120         | 1190         |  |  |  |  |  |  |  |  |
| CHLORIDES (Cl)                 |                | 71           | 180          |  |  |  |  |  |  |  |  |
| SULPHATES (SO <sub>4</sub> )   |                | 760          | 215          |  |  |  |  |  |  |  |  |
| PHOSPHOROUS<br>AS P            | Total          |              | .70          |  |  |  |  |  |  |  |  |
|                                | Soluble        |              | .16          |  |  |  |  |  |  |  |  |
| NITROGEN (N)                   | Total Kjeldahl |              | 9.0          |  |  |  |  |  |  |  |  |
|                                | Free Ammonia   |              | 2.0          |  |  |  |  |  |  |  |  |
|                                | Nitrite        |              | .06          |  |  |  |  |  |  |  |  |
|                                | Nitrate        |              | <.1          |  |  |  |  |  |  |  |  |
| METALS                         | Potassium (K)  |              |              |  |  |  |  |  |  |  |  |
|                                | Magnesium (Mg) |              |              |  |  |  |  |  |  |  |  |
|                                | Calcium (Ca)   |              |              |  |  |  |  |  |  |  |  |
|                                | Sodium (Na)    |              |              |  |  |  |  |  |  |  |  |
|                                | Iron (Fe)      |              | 28.2         |  |  |  |  |  |  |  |  |
| Phenol (ppb)                   |                | 16           | 500          |  |  |  |  |  |  |  |  |
| BOD                            |                | 360          | 680          |  |  |  |  |  |  |  |  |
|                                |                |              |              |  |  |  |  |  |  |  |  |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 8A STANDPIPE II

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 8600         | 8800         | 7800         |  |  |  |  |  |  | 8700         |
| pH                             |                | 6.3          | 6.4          | -            |  |  |  |  |  |  | 6.4          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 2330         |  |  |  |  |  |  |              |
| COD                            |                | 12000        | 7400         | 5140         |  |  |  |  |  |  | 9700         |
| CHLORIDES (Cl)                 |                | 690          | 733          | 816          |  |  |  |  |  |  | 712          |
| SULPHATES (SO <sub>4</sub> )   |                | 81           | 65           | 40           |  |  |  |  |  |  | 73           |
| PHOSPHOROUS<br>AS P            | Total          |              |              | 10           |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .28          |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | 305          |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | 240          |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | .20          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | <.1          |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 420          |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | 4500         | 3000         | 2860         |  |  |  |  |  |  | 3750         |
| BOD                            |                | 6400         | 6400         | 290          |  |  |  |  |  |  | 6400         |
|                                |                |              |              |              |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 10 PIEZOMETER I

| PROPERTY                       |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | Feb.<br>1980 | March<br>1980 | April<br>1980 | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 | 1979-80<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|-----------------|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 3500         | 3500         | 3040         | 3730         | 3800          | 3600          | 3575         | 3600         | 3800         | 3300         | 3540            |
| pH                             |                |              |              |              |              |               |               | 7.1          | 7.0          | -            | 7.2          | 7.1             |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              |              |              |               |               |              |              | 1634         | 1503         |                 |
| COD                            |                |              |              |              |              |               |               | 240          | 68           | 60           | 30           | 154             |
| CHLORIDES (Cl)                 |                |              |              |              |              |               |               | 348          | 370          | 392          | 351          | 360             |
| SULPHATES (SO <sub>4</sub> )   |                |              |              |              |              |               |               | 1440         | 1420         | 1550         | 1500         | 1430            |
| PHOSPHOROUS<br>AS P            | Total          |              |              |              |              |               |               |              |              | .12          | .08          |                 |
|                                | Soluble        |              |              |              |              |               |               |              |              | <.02         | -            |                 |
| NITROGEN (N)                   | Total Kjeldahl |              |              |              |              |               |               |              |              | 2.4          | 1.6          |                 |
|                                | Free Ammonia   |              |              |              |              |               |               |              |              | 2.0          | <.1          |                 |
|                                | Nitrite        |              |              |              |              |               |               |              |              | .02          | .06          |                 |
|                                | Nitrate        |              |              |              |              |               |               |              |              | <.1          | 1.8          |                 |
| METALS                         | Potassium (K)  | 6.2          | 56           | 135          | 49           | 48            | 46            |              |              |              | 45           | 57              |
|                                | Magnesium (Mg) |              |              |              |              |               |               |              |              |              | 122          |                 |
|                                | Calcium (Ca)   |              |              |              |              |               |               |              |              |              | 400          |                 |
|                                | Sodium (Na)    |              | 330          |              |              |               |               |              |              |              | 350          | 330             |
|                                | Iron (Fe)      | 3.6          | 6.0          | 18           | 4.2          | 2.9           | 3.8           |              |              | 7.4          | 3.3          | 6.4             |
| Phenol (ppb)                   |                | 11           | 1            | <1           | <1           | <1            | 1             | <1           | <1           | <1           | -            | 1               |
| BOD                            |                | >170         | 70           | 80           | 17           | 10            | 8.0           | 32           | 16           | 10           | 9.5          | 50              |
| DOC or Alkalinity*             |                | 82           | 56           | 41           | 12           | 9.8           | 6.2           |              |              |              | *370         | 34.5            |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 10 PIEZOMETER II

| PROPERTY                       |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | Feb.<br>1980 | March<br>1980 | April<br>1980 | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 | 1979-80<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|-----------------|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 2775         | 2750         | 2070         | 3000         | 3160          | 2760          | 2850         | 2675         | 2580         | 1700         | 2755            |
| pH                             |                |              |              |              |              |               |               | 7.7          | 7.8          | -            | 7.3          | 7.8             |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              |              |              |               |               |              |              |              | 732          |                 |
| COD                            |                |              |              |              |              |               |               | 81           | 85           | 57           | 110          | 83              |
| CHLORIDES (Cl)                 |                |              |              |              |              |               |               | 155          | 150          | 139          | 87           | 153             |
| SULPHATES (SO <sub>4</sub> )   |                |              |              |              |              |               |               | 1040         | 1000         | 750          | 490          | 1020            |
| PHOSPHOROUS<br>AS P            | Total          |              |              |              |              |               |               |              |              | .38          | 1.6          |                 |
|                                | Soluble        |              |              |              |              |               |               |              |              | .02          |              |                 |
| NITROGEN (N)                   | Total Kjeldahl |              |              |              |              |               |               |              |              | 1.4          | 11.0         |                 |
|                                | Free Ammonia   |              |              |              |              |               |               |              |              | <.1          | 6.5          |                 |
|                                | Nitrite        |              |              |              |              |               |               |              |              | .02          | .02          |                 |
|                                | Nitrate        |              |              |              |              |               |               |              |              | .3           | <.1          |                 |
| METALS                         | Potassium (K)  | 33           | 31.5         | 30           | 31           | 30            | 28            |              |              |              | 21.8         | 31              |
|                                | Magnesium (Mg) |              |              |              |              |               |               |              |              |              | 90           |                 |
|                                | Calcium (Ca)   |              |              |              |              |               |               |              |              |              | 144          |                 |
|                                | Sodium (Na)    |              | 340          |              |              |               |               |              |              |              | 147          | 340             |
|                                | Iron (Fe)      | 4.5          | 5.0          | 25           | 11.2         | 4.8           | 6.7           |              |              | 15.5         | 1.0          | 9.5             |
| Phenol (ppb)                   |                | 2            | <1           | <1           | 2            | 1             | 1             | 1            | <1           | <1           |              | 1               |
| BOD                            |                | 62           | 34           | 4.0          | 4.0          | 3.0           | 4.5           | 12           | 10           | 4.0          | 46           | 16.7            |
| DOC or Alkalinity *            |                | 27           | 31           | 15           | 12.6         | 12.8          | 11.4          |              |              |              | 506 *        | 18.3            |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 10 STANDPIPE III

| PROPERTY                       |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | Feb.<br>1980 | March<br>1980 | April<br>1980 | Oct.<br>1980 | Dec.<br>1980 |  |  | 1979-80<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|--|--|-----------------|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 1779         | 2150         | 2750         | 2250         | 2730          | 2860          | 1340         | 2675         |  |  | 2320            |
| pH                             |                |              |              |              |              |               |               | 7.8          | 7.8          |  |  | 7.8             |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              |              |              |               |               |              |              |  |  |                 |
| COD                            |                |              |              |              |              |               |               | 180          | 85           |  |  | 133             |
| CHLORIDES (Cl)                 |                |              |              |              |              |               |               | 64           | 150          |  |  | 107             |
| SULPHATES (SO <sub>4</sub> )   |                |              |              |              |              |               |               | 330          | 1000         |  |  | 665             |
| PHOSPHOROUS<br>AS P            | Total          |              |              |              |              |               |               |              |              |  |  |                 |
|                                | Soluble        |              |              |              |              |               |               |              |              |  |  |                 |
| NITROGEN (N)                   | Total Kjeldahl |              |              |              |              |               |               |              |              |  |  |                 |
|                                | Free Ammonia   |              |              |              |              |               |               |              |              |  |  |                 |
|                                | Nitrite        |              |              |              |              |               |               |              |              |  |  |                 |
|                                | Nitrate        |              |              |              |              |               |               |              |              |  |  |                 |
| METALS                         | Potassium (K)  | 25           | 23           | 24           | 18           | 21            | 20            |              |              |  |  | 22              |
|                                | Magnesium (Mg) |              |              |              |              |               |               |              |              |  |  |                 |
|                                | Calcium (Ca)   |              |              |              |              |               |               |              |              |  |  |                 |
|                                | Sodium (Na)    |              | 135          |              |              |               |               |              |              |  |  | 135             |
|                                | Iron (Fe)      | 325          | 105          | 42.5         | 14.5         | 300           | 22            |              |              |  |  | 135             |
| Phenol (ppb)                   |                | <1           | <1           | 5            | 7            | <1            | 70            | 1            | <1           |  |  | 10              |
| BOD                            |                | 80           | 12           | 66           | 20           | 16            | 140           | 18           | 10           |  |  | 45              |
| DOC                            |                | 19.2         | 26           | 120          | 27.5         | 18.8          | 40            |              |              |  |  | 42              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 11A PIEZOMETER I

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 5050         | 3680         | 4480         | 3175         |  |  |  |  |  |  | 4365         |
| pH                             |                | 7.4          | 7.0          | -            | 6.9          |  |  |  |  |  |  | 7.2          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 1382         | 1596         |  |  |  |  |  |  |              |
| COD                            |                | 250          | 130          | 140          | 160          |  |  |  |  |  |  | 190          |
| CHLORIDES (Cl)                 |                | 1420         | 660          | 1010         | 485          |  |  |  |  |  |  | 1040         |
| SULPHATES (SO <sub>4</sub> )   |                | 255          | 1040         | 490          | 750          |  |  |  |  |  |  | 648          |
| PHOSPHOROUS<br>AS P            | Total          |              |              | .88          | 1.20         |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .02          | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | 11           | 9.8          |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | 7.8          | 4.6          |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | .02          | .01          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | <.1          | <.1          |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 18.2         |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 157          |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 380          |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 218          |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              |              | 215          |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | 2            | <1           | <1           | -            |  |  |  |  |  |  | 1            |
| BOD                            |                | 40           | 66           | 11           | 22           |  |  |  |  |  |  | 53           |
| Alkalinity                     |                |              |              |              | 706          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 11A STANDPIPE II

| PROPERTY                       |                | Dec.<br>1980 | Nov.<br>1981 |  |  |  |  |  |  |  |  |
|--------------------------------|----------------|--------------|--------------|--|--|--|--|--|--|--|--|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 4180         | 3345         |  |  |  |  |  |  |  |  |
| pH                             |                | 7.1          | 7.2          |  |  |  |  |  |  |  |  |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              | 1715         |  |  |  |  |  |  |  |  |
| COD                            |                | 210          | 170          |  |  |  |  |  |  |  |  |
| CHLORIDES (Cl)                 |                | 950          | 520          |  |  |  |  |  |  |  |  |
| SULPHATES (SO <sub>4</sub> )   |                | 1040         | 780          |  |  |  |  |  |  |  |  |
| PHOSPHOROUS<br>AS P            | Total          |              | 1.00         |  |  |  |  |  |  |  |  |
|                                | Soluble        |              | -            |  |  |  |  |  |  |  |  |
| NITROGEN (N)                   | Total Kjeldahl |              | 13.0         |  |  |  |  |  |  |  |  |
|                                | Free Ammonia   |              | 10.0         |  |  |  |  |  |  |  |  |
|                                | Nitrite        |              | .01          |  |  |  |  |  |  |  |  |
|                                | Nitrate        |              | <.1          |  |  |  |  |  |  |  |  |
| METALS                         | Potassium (K)  |              | 28.6         |  |  |  |  |  |  |  |  |
|                                | Magnesium (Mg) |              | 186          |  |  |  |  |  |  |  |  |
|                                | Calcium (Ca)   |              | 380          |  |  |  |  |  |  |  |  |
|                                | Sodium (Na)    |              | 235          |  |  |  |  |  |  |  |  |
|                                | Iron (Fe)      |              | 435          |  |  |  |  |  |  |  |  |
| Phenol (ppb)                   |                | <1           | -            |  |  |  |  |  |  |  |  |
| BOD                            |                | 14           | 55           |  |  |  |  |  |  |  |  |
| Alkalinity                     |                |              | 755          |  |  |  |  |  |  |  |  |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 12 PIEZOMETER I

| PROPERTY                       |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | March<br>1980 | April<br>1980 | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  | Mean |
|--------------------------------|----------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|--|------|
| CONDUCTIVITY $\mu$ MHOS CM.    |                | 2888         | 7700         | 7600         | 9350          | 9180          | 9400         | 9500         | 9900         | 9200         |  | 7950 |
| pH                             |                |              |              |              |               |               | 7.2          | 7.2          | -            | 7.0          |  | 7.2  |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              |              |               |               |              |              | 2670         | 2650         |  |      |
| COD                            |                |              |              |              |               |               | 180          | 61           | 68           | 75           |  | 121  |
| CHLORIDES (Cl)                 |                |              |              |              |               |               | 2610         | 2740         | 2760         | 2712         |  | 2675 |
| SULPHATES (SO <sub>4</sub> )   |                |              |              |              |               |               | 1620         | 1540         | 1400         | 1500         |  | 1580 |
| PHOSPHOROUS<br>AS P            | Total          |              |              |              |               |               |              |              | .08          | .06          |  |      |
|                                | Soluble        |              |              |              |               |               |              |              | <.02         | -            |  |      |
| NITROGEN (N)                   | Total Kjeldahl |              |              |              |               |               |              |              | 0.8          | 3.4          |  |      |
|                                | Free Ammonia   |              |              |              |               |               |              |              | <.1          | <.1          |  |      |
|                                | Nitrite        |              |              |              |               |               |              |              | .15          | .57          |  |      |
|                                | Nitrate        |              |              |              |               |               |              |              | .3           | 7.6          |  |      |
| METALS                         | Potassium (K)  | 19           | 65           | 67           | 64            | 65            |              |              |              | 68           |  | 56   |
|                                | Magnesium (Mg) |              |              |              |               |               |              |              |              | 187          |  |      |
|                                | Calcium (Ca)   |              |              |              |               |               |              |              |              | 752          |  |      |
|                                | Sodium (Na)    |              | 1100         |              |               |               |              |              |              | 1290         |  | 1100 |
|                                | Iron (Fe)      | 3.0          | 8.0          | 25           | 3.1           | 1.5           |              |              | 3.0          | .92          |  | 8.1  |
| Phenol (ppb)                   |                | <1           | 1            | <1           | <1            | <1            | 1            | <1           | <1           | -            |  | <1   |
| BOD                            |                | 11           | 8.0          | 3.5          | 4.0           | 4.5           | 20           | 4.0          | 5.0          | 11.0         |  | 7.9  |
| DOC or Alkalinity *            |                | 6.2          |              |              |               |               |              |              |              | *54          |  | 6.2  |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 12 PIEZOMETER II

| PROPERTY                       |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | March<br>1980 | April<br>1980 | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  | 1979-80<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|--|-----------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 3720         | 3600         | 3800         | 4100          | 4000          | 4100         | 4050         | 4200         | 3750         |  | 3910            |
| pH                             |                |              |              |              |               |               | 7.2          | 6.9          | -            | 7.1          |  | 7.1             |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              |              |               |               |              |              | 1882         | 1730         |  |                 |
| COD                            |                |              |              |              |               |               | 120          | 710          | 47           | 40           |  | 415             |
| CHLORIDES (Cl)                 |                |              |              |              |               |               | 338          | 331          | 360          | 354          |  | 335             |
| SULPHATES (SO <sub>4</sub> )   |                |              |              |              |               |               | 1700         | 1580         | 1475         | 1650         |  | 1640            |
| PHOSPHOROUS<br>AS P            | Total          |              |              |              |               |               |              |              | .06          | 1.20         |  |                 |
|                                | Soluble        |              |              |              |               |               |              |              | <.02         | -            |  |                 |
| NITROGEN (N)                   | Total Kjeldahl |              |              |              |               |               |              |              | 1.8          | 1.8          |  |                 |
|                                | Free Ammonia   |              |              |              |               |               |              |              | 1.0          | .8           |  |                 |
|                                | Nitrite        |              |              |              |               |               |              |              | <.01         | .15          |  |                 |
|                                | Nitrate        |              |              |              |               |               |              |              | <.1          | .4           |  |                 |
| METALS                         | Potassium (K)  | 41           | 42           | 45           | 44            | 44            |              |              |              | 45           |  | 43              |
|                                | Magnesium (Mg) |              |              |              |               |               |              |              |              | 13 9         |  |                 |
|                                | Calcium (Ca)   |              |              |              |               |               |              |              |              | 464          |  |                 |
|                                | Sodium (Na)    |              | 380          |              |               |               |              |              |              | 400          |  | 380             |
|                                | Iron (Fe)      | 6.4          | 5.0          | 42           | 7.5           | 4.3           |              |              | 6.8          | 8.6          |  | 13.0            |
| Phenol (ppb)                   |                | <1           | 1            | 1            | <1            | <1            | <1           | 1            | <1           | -            |  | <1              |
| BOD                            |                | 6.0          | 1.4          | 1.4          | 4.5           | 2.5           | 7.5          | 8.0          | 4.0          | 4.0          |  | 4.5             |
| DOC or *Alkalinity             |                | 3.0          | 3.0          | 2.4          | 4.2           | 4.4           |              |              |              | *662         |  | 3.4             |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 12 STANDPIPE III

| PROPERTY                       |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | April<br>1980 | April<br>1981 | Nov.<br>1981 |  |  |  |  | 1979-80<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|---------------|---------------|--------------|--|--|--|--|-----------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 3450         | 3650         | 3700         | 4610          | 2100          | 1130         |  |  |  |  | 3850            |
| pH                             |                |              |              |              |               | -             | 7.5          |  |  |  |  |                 |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              |              |               | 2165          | 613          |  |  |  |  |                 |
| COD                            |                |              |              |              |               | 1220          | 720          |  |  |  |  |                 |
| CHLORIDES (Cl)                 |                |              |              |              |               | 259           | 112          |  |  |  |  |                 |
| SULPHATES (SO <sub>4</sub> )   |                |              |              |              |               | 460           | 250          |  |  |  |  |                 |
| PHOSPHOROUS<br>AS P            | Total          |              |              |              |               | 18            | 11.0         |  |  |  |  |                 |
|                                | Soluble        |              |              |              |               | <.02          | -            |  |  |  |  |                 |
| NITROGEN (N)                   | Total Kjeldahl |              |              |              |               | 31            | 16           |  |  |  |  |                 |
|                                | Free Ammonia   |              |              |              |               | .4            | <.1          |  |  |  |  |                 |
|                                | Nitrite        |              |              |              |               | .06           | .01          |  |  |  |  |                 |
|                                | Nitrate        |              |              |              |               | <.1           | .4           |  |  |  |  |                 |
| METALS                         | Potassium (K)  | 32           | 54           | 52           | 35            |               | 19.8         |  |  |  |  | 43              |
|                                | Magnesium (Mg) |              |              |              |               |               | 66           |  |  |  |  |                 |
|                                | Calcium (Ca)   |              |              |              |               |               | 136          |  |  |  |  |                 |
|                                | Sodium (Na)    |              | 325          |              |               |               | 64           |  |  |  |  | 325             |
|                                | Iron (Fe)      | 153          | 24           | 25           | 3.9           | 1460          | 1270         |  |  |  |  | 51.5            |
| Phenol (ppb)                   |                | <1           | <1           | 1            | 2             | <1            | -            |  |  |  |  | 1               |
| BOD                            |                | 28           | 5.0          | 2.5          | 7.0           | 48            | 50           |  |  |  |  | 10.6            |
| DOC or Alkalinity*             |                | 8.0          | 15.0         | 5.2          | 12.4          |               | *1953        |  |  |  |  | 10.2            |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 13 PIEZOMETER I

| PROPERTY                                 |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | March<br>1980 | April<br>1980 | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  | 1979-80<br>Mean |
|------------------------------------------|----------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|--|-----------------|
| CONDUCTIVITY $\mu\text{MHOS}/\text{CM.}$ |                | 11620        | 14800        | 13700        | 16400         | 14300         | 14800        | 15500        | 16,100       | 14,800       |  | 14450           |
| pH                                       |                |              |              |              |               |               |              |              | -            | 7.5          |  |                 |
| HARDNESS (Ca CO <sub>3</sub> )           |                |              |              |              |               |               |              |              | 5025         | 4418         |  |                 |
| COD                                      |                |              |              |              |               |               | 400          | 470          | 133          | 210          |  | 435             |
| CHLORIDES (Cl)                           |                |              |              |              |               |               | 4880         | 6240         | 5420         | 6000         |  | 5560            |
| SULPHATES (SO <sub>4</sub> )             |                |              |              |              |               |               | 1440         | 1600         | 1680         | 340          |  | 1520            |
| PHOSPHOROUS<br>AS P                      | Total          |              |              |              |               |               |              |              | .16          | .42          |  |                 |
|                                          | Soluble        |              |              |              |               |               |              |              | <.02         | -            |  |                 |
| NITROGEN (N)                             | Total Kjeldahl |              |              |              |               |               |              |              | 4.0          | 9.4          |  |                 |
|                                          | Free Ammonia   |              |              |              |               |               |              |              | 3.9          | 9.4          |  |                 |
|                                          | Nitrite        |              |              |              |               |               |              |              | .02          | .67          |  |                 |
|                                          | Nitrate        |              |              |              |               |               |              |              | .1           | .8           |  |                 |
| METALS                                   | Potassium (K)  | 63           | 77           | 78           | 80            | 71            |              |              |              | 79           |  | 74              |
|                                          | Magnesium (Mg) |              |              |              |               |               |              |              |              | 340          |  |                 |
|                                          | Calcium (Ca)   |              |              |              |               |               |              |              |              | 1208         |  |                 |
|                                          | Sodium (Na)    |              | 2120         |              |               |               |              |              |              | 2100         |  | 2120            |
|                                          | Iron (Fe)      | 7.4          | 11           | 20           | 3.1           | 3.0           |              |              | 13.8         | 10.4         |  | 8.9             |
| Phenol (ppb)                             |                | 8            | <1           | <1           | 1             | <1            | <1           | <1           | <1           | -            |  | 1               |
| BOD                                      |                | 28           | 16           | 13           | 5.0           | 3.5           | 9.0          | 7.0          | 2.5          | 6.0          |  | 11.6            |
| Alkalinity                               |                |              |              |              |               |               |              |              |              | 284          |  |                 |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 13 STANDPIPE II

| PROPERTY                                 |                | Nov.<br>1979 | Dec.<br>1979 | Jan.<br>1980 | March<br>1980 | April<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  | Mean |
|------------------------------------------|----------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|--|--|--|------|
| CONDUCTIVITY $\mu\text{MHOS}/\text{CM.}$ |                | 4160         | 2250         | 2750         | 2440          | 2050          | 2660         | 2250         |  |  |  | 2730 |
| pH                                       |                |              |              |              |               |               | -            | 7.5          |  |  |  |      |
| HARDNESS (Ca CO <sub>3</sub> )           |                |              |              |              |               |               | 1096         | 894          |  |  |  |      |
| COD                                      |                |              |              |              |               |               | 45           | 75           |  |  |  |      |
| CHLORIDES (Cl)                           |                |              |              |              |               |               | 462          | 344          |  |  |  |      |
| SULPHATES (SO <sub>4</sub> )             |                |              |              |              |               |               | 420          | 320          |  |  |  |      |
| PHOSPHOROUS<br>AS P                      | Total          |              |              |              |               |               | .20          | 5.4          |  |  |  |      |
|                                          | Soluble        |              |              |              |               |               | <.02         | -            |  |  |  |      |
| NITROGEN (N)                             | Total Kjeldahl |              |              |              |               |               | 1.2          | 33           |  |  |  |      |
|                                          | Free Ammonia   |              |              |              |               |               | .4           | 20           |  |  |  |      |
|                                          | Nitrite        |              |              |              |               |               | .03          | .02          |  |  |  |      |
|                                          | Nitrate        |              |              |              |               |               | .6           | <.1          |  |  |  |      |
| METALS                                   | Potassium (K)  | 22           | 11.4         | 13           | 10            | 9.1           |              | 14.6         |  |  |  | 13.1 |
|                                          | Magnesium (Mg) |              |              |              |               |               |              | 96           |  |  |  |      |
|                                          | Calcium (Ca)   |              |              |              |               |               |              | 212          |  |  |  |      |
|                                          | Sodium (Na)    |              |              |              |               |               |              | 163          |  |  |  |      |
|                                          | Iron (Fe)      | 63           | 8.9          | 15           | 8.0           | 3.4           | 9.6          | 68           |  |  |  | 19.7 |
| Phenol (ppb)                             |                | <1           | 1            | <1           | <1            | <1            | <1           | -            |  |  |  | <1   |
| BOD                                      |                | 11           | 4.0          | 3.5          | 5.0           | 2.0           | 2.5          | 170          |  |  |  | 5.1  |
| DOC or Alkalinity*                       |                |              | 7.4          | 4.1          | 7.0           | 4.0           |              | *554         |  |  |  | 5.6  |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 14 STANDPIPE II

| PROPERTY                                 |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|------------------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu\text{MHOS}/\text{CM.}$ |                | 3400         | 2925         | 2860         | 2650         |  |  |  |  |  |  | 3160         |
| pH                                       |                | 7.4          | 7.3          | -            | 7.3          |  |  |  |  |  |  | 7.4          |
| HARDNESS ( $\text{Ca CO}_3$ )            |                |              |              | 1214         | 1186         |  |  |  |  |  |  |              |
| COD                                      |                | 71           | 110          | 51           | 60           |  |  |  |  |  |  | 91           |
| CHLORIDES (Cl)                           |                | 428          | 256          | 227          | 500          |  |  |  |  |  |  | 342          |
| SULPHATES ( $\text{SO}_4$ )              |                | 1080         | 1100         | 870          | 1000         |  |  |  |  |  |  | 1090         |
| PHOSPHOROUS<br>AS P                      | Total          |              |              | 1.8          | .72          |  |  |  |  |  |  |              |
|                                          | Soluble        |              |              | .02          | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                             | Total Kjeldahl |              |              | 2.2          | 1.0          |  |  |  |  |  |  |              |
|                                          | Free Ammonia   |              |              | .2           | <.1          |  |  |  |  |  |  |              |
|                                          | Nitrite        |              |              | .02          | .01          |  |  |  |  |  |  |              |
|                                          | Nitrate        |              |              | .1           | .1           |  |  |  |  |  |  |              |
| METALS                                   | Potassium (K)  |              |              |              | 19           |  |  |  |  |  |  |              |
|                                          | Magnesium (Mg) |              |              |              | 135          |  |  |  |  |  |  |              |
|                                          | Calcium (Ca)   |              |              |              | 252          |  |  |  |  |  |  |              |
|                                          | Sodium (Na)    |              |              |              | 275          |  |  |  |  |  |  |              |
|                                          | Iron (Fe)      |              |              | 87           | 72           |  |  |  |  |  |  |              |
| Phenol (ppb)                             |                | 1            | 1            | <1           |              |  |  |  |  |  |  | 1            |
| BOD                                      |                | 12           | 4.5          | 4.0          | 4.0          |  |  |  |  |  |  | 8.3          |
| Alkalinity                               |                |              |              |              | 520          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 15 PIEZOMETER I

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 3575         | 3500         | 3870         | 3350         |  |  |  |  |  |  | 3540         |
| pH                             |                | 7.3          | 7.4          | -            | 7.6          |  |  |  |  |  |  | 7.4          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 1058         | 997          |  |  |  |  |  |  |              |
| COD                            |                | 260          | 74           | 92           | 55           |  |  |  |  |  |  | 167          |
| CHLORIDES (Cl)                 |                | 947          | 957          | 990          | 903          |  |  |  |  |  |  | 952          |
| SULPHATES (SO <sub>4</sub> )   |                | 270          | 320          | 280          | 290          |  |  |  |  |  |  | 295          |
| PHOSPHOROUS<br>AS P            | Total          |              |              | .10          | .10          |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .1           | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | 3.4          | 2.6          |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | 2.8          | 2.1          |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | <.01         | .19          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | <.1          | .2           |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 68           |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 87           |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 256          |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 405          |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 4.80         | 1.44         |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | 1            | 1            | <1           | -            |  |  |  |  |  |  | 1            |
| BOD                            |                | 28           | 17           | 10           | 7            |  |  |  |  |  |  | 22.5         |
| Alkalinity                     |                |              |              |              | 249          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 14 PIEZOMETER I

| PROPERTY                                 |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|------------------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu\text{MHOS}/\text{CM.}$ |                | 5800         | 5825         | 6000         | 5800         |  |  |  |  |  |  | 5810         |
| pH                                       |                | 7.1          | 7.3          | -            | 7.3          |  |  |  |  |  |  | 7.2          |
| HARDNESS (Ca CO <sub>3</sub> )           |                |              |              | 1848         | 1832         |  |  |  |  |  |  |              |
| COD                                      |                | 270          | 150          | 120          | 70           |  |  |  |  |  |  | 210          |
| CHLORIDES (Cl)                           |                | 1390         | 1313         | 1350         | 1310         |  |  |  |  |  |  | 1352         |
| SULPHATES (SO <sub>4</sub> )             |                | 1440         | 1480         | 1560         | 1500         |  |  |  |  |  |  | 1460         |
| PHOSPHOROUS<br>AS P                      | Total          |              |              | .16          | .08          |  |  |  |  |  |  |              |
|                                          | Soluble        |              |              | <.02         | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                             | Total Kjeldahl |              |              | 4.6          | 4.6          |  |  |  |  |  |  |              |
|                                          | Free Ammonia   |              |              | 4.4          | 4.3          |  |  |  |  |  |  |              |
|                                          | Nitrite        |              |              | .01          | .01          |  |  |  |  |  |  |              |
|                                          | Nitrate        |              |              | .1           | <.1          |  |  |  |  |  |  |              |
| METALS                                   | Potassium (K)  |              |              |              | 74           |  |  |  |  |  |  |              |
|                                          | Magnesium (Mg) |              |              |              | 110          |  |  |  |  |  |  |              |
|                                          | Calcium (Ca)   |              |              |              | 552          |  |  |  |  |  |  |              |
|                                          | Sodium (Na)    |              |              |              | 720          |  |  |  |  |  |  |              |
|                                          | Iron (Fe)      |              |              | 9.70         | 106          |  |  |  |  |  |  |              |
| Phenol (ppb)                             |                | <1           | <1           | <1           | -            |  |  |  |  |  |  | <1           |
| BOD                                      |                | 26           | 15           | 8.0          | 16.0         |  |  |  |  |  |  | 20.5         |
| Alkalinity                               |                |              |              |              | 144          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 15 STANDPIPE II

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 2225         | 2200         | 1970         | 1480         |  |  |  |  |  |  | 2213         |
| pH                             |                | 7.2          | 7.0          | -            | 7.5          |  |  |  |  |  |  | 7.1          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 906          | 704          |  |  |  |  |  |  |              |
| COD                            |                | 34           | 780          | 72           | 30           |  |  |  |  |  |  | 407          |
| CHLORIDES (Cl)                 |                | 207          | 200          | 171          | 120          |  |  |  |  |  |  | 204          |
| SULPHATES (SO <sub>4</sub> )   |                | 590          | 680          | 435          | 320          |  |  |  |  |  |  | 635          |
| PHOSPHOROUS<br>AS P            | Total          |              |              | 1.9          | .62          |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .08          | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | 3.2          | 1.6          |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | .4           | <.1          |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | .03          | .01          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | .3           | .3           |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 22.4         |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 64           |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 176          |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 100          |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 110          | 42           |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | <1           | 1            | <1           | -            |  |  |  |  |  |  | 1            |
| BOD                            |                | 3.0          | 7.0          | 7.0          | 5.0          |  |  |  |  |  |  | 5.0          |
| Alkalinity                     |                |              |              |              | 428          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 16 PIEZOMETER I

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 500          | 440          | 500          | 540          |  |  |  |  |  |  | 470          |
| pH                             |                | 7.4          | 7.5          | -            | 7.7          |  |  |  |  |  |  | 7.5          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 196          | 209          |  |  |  |  |  |  |              |
| COD                            |                | 760          | 320          | 715          | 720          |  |  |  |  |  |  | 540          |
| CHLORIDES (Cl)                 |                | <1           | 43           | 50           | 46           |  |  |  |  |  |  | 22           |
| SULPHATES (SO <sub>4</sub> )   |                | 49           | 52           | 50           | 64           |  |  |  |  |  |  | 51           |
| PHOSPHOROUS<br>AS P            | Total          |              |              | .16          | .12          |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .06          | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | .8           | .6           |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | <.1          | <.1          |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | .01          | <.01         |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | <.1          | <.1          |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 3.8          |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 10           |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 68           |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 31.5         |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 3.5          | 2.0          |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | 17           | 21           | 12           | -            |  |  |  |  |  |  | 19           |
| BOD                            |                | 36           | 36           | 37           | 34           |  |  |  |  |  |  | 36           |
| Alkalinity                     |                |              |              |              | 139          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 16 PIEZOMETER II

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 460          | 16100        | 26,500       | 17,750       |  |  |  |  |  |  | 8280         |
| pH                             |                | 7.3          | 7.1          | -            | 7.2          |  |  |  |  |  |  | 7.2          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 4635         | 3318         |  |  |  |  |  |  |              |
| COD                            |                | 460          | 440          | 330          | 340          |  |  |  |  |  |  | 450          |
| CHLORIDES (Cl)                 |                | <1           | 6440         | 9240         | 6600         |  |  |  |  |  |  | 3220         |
| SULPHATES (SO <sub>4</sub> )   |                | 43           | 700          | 2150         | 1740         |  |  |  |  |  |  | 372          |
| PHOSPHOROUS<br>AS P            | Total          |              |              | -            | .08          |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .06          | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | -            | 8            |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | 12           | 9            |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | .01          | .01          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | .2           | .1           |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 122          |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 238          |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 936          |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 3350         |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 2.1          | 1.76         |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | 2            | 1            | 4            |              |  |  |  |  |  |  | 2            |
| BOD                            |                | 14           | 11           | 6.0          | 2.5          |  |  |  |  |  |  | 12.5         |
| Alkalinity                     |                |              |              |              | 96           |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 16 PIEZOMETER III

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 52700        | 50600        | 57,000       | 51,000       |  |  |  |  |  |  | 51650        |
| pH                             |                | 6.9          | 7.0          | -            | 6.8          |  |  |  |  |  |  | 7.0          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 16,420       | 16,110       |  |  |  |  |  |  |              |
| COD                            |                | 1400         | 56           | 560          | 760          |  |  |  |  |  |  | 728          |
| CHLORIDES (Cl)                 |                | 27840        | 25400        | 24,700       | 26,600       |  |  |  |  |  |  | 26620        |
| SULPHATES (SO <sub>4</sub> )   |                | 1400         | 1500         | 2000         | 1800         |  |  |  |  |  |  | 1450         |
| PHOSPHOROUS<br>AS P            | Total          |              |              | -            | .04          |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .06          | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | -            | 16           |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | 30           | 33           |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | .01          | .01          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | .1           | .1           |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 430          |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 1266         |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 4360         |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 8700         |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 1.71         | 1.33         |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | 3            | 9            | <1           | -            |  |  |  |  |  |  | 6            |
| BOD                            |                | 9.0          | 6.0          | 4.0          | 1.2          |  |  |  |  |  |  | 7.5          |
| Alkalinity                     |                |              |              |              | 56           |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 16 STANDPIPE IIII

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 3900         | 2950         | 3500         | 1800         |  |  |  |  |  |  | 3425         |
| pH                             |                | 7.5          | 7.2          | -            | 7.6          |  |  |  |  |  |  | 7.3          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 1244         | 673          |  |  |  |  |  |  |              |
| COD                            |                | 47           | 56           | 68           | 65           |  |  |  |  |  |  | 52           |
| CHLORIDES (Cl)                 |                | 496          | 346          | 406          | 201          |  |  |  |  |  |  | 421          |
| SULPHATES (SO <sub>4</sub> )   |                | 820          | 900          | 890          | 350          |  |  |  |  |  |  | 860          |
| PHOSPHOROUS<br>AS P            | Total          |              |              | .70          | .18          |  |  |  |  |  |  |              |
|                                | Soluble        |              |              | .2           |              |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              | 1.6          | 1.4          |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              | .4           | <.1          |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              | .02          | .01          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              | <.1          | .4           |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 18.8         |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 61           |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 168          |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 179          |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 78           | 11.9         |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | 1            | 1            | <1           |              |  |  |  |  |  |  | 1            |
| BOD                            |                | 3.5          | 3.5          | 2.0          | 3.0          |  |  |  |  |  |  | 3.5          |
| Alkalinity                     |                |              |              |              | 418          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 17 PIEZOMETER I

| PROPERTY                                 |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|------------------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu\text{MHOS}/\text{CM.}$ |                | 585          | 535          | 1460         | 21,750       |  |  |  |  |  |  | 560          |
| pH                                       |                | 7.6          | 7.6          | -            | 7.2          |  |  |  |  |  |  | 7.6          |
| HARDNESS (Ca CO <sub>3</sub> )           |                |              |              | 301          | 5560         |  |  |  |  |  |  |              |
| COD                                      |                | 550          | 120          | 235          | 490          |  |  |  |  |  |  | 335          |
| CHLORIDES (Cl)                           |                | 86           | 80           | 337          | 8300         |  |  |  |  |  |  | 83           |
| SULPHATES (SO <sub>4</sub> )             |                | 48           | 50           | 84           | 1600         |  |  |  |  |  |  | 49           |
| PHOSPHOROUS<br>AS P                      | Total          |              |              | .08          | .06          |  |  |  |  |  |  |              |
|                                          | Soluble        |              |              | .04          |              |  |  |  |  |  |  |              |
| NITROGEN (N)                             | Total Kjeldahl |              |              | 1.0          | 8.4          |  |  |  |  |  |  |              |
|                                          | Free Ammonia   |              |              | .6           | 12           |  |  |  |  |  |  |              |
|                                          | Nitrite        |              |              | .01          | .01          |  |  |  |  |  |  |              |
|                                          | Nitrate        |              |              | <.1          | .1           |  |  |  |  |  |  |              |
| METALS                                   | Potassium (K)  |              |              |              | 115          |  |  |  |  |  |  |              |
|                                          | Magnesium (Mg) |              |              |              | 379          |  |  |  |  |  |  |              |
|                                          | Calcium (Ca)   |              |              |              | 1600         |  |  |  |  |  |  |              |
|                                          | Sodium (Na)    |              |              |              | 4300         |  |  |  |  |  |  |              |
|                                          | Iron (Fe)      |              |              | 3.1          | 1.59         |  |  |  |  |  |  |              |
| Phenol (ppb)                             |                | 1            | 4            | <1           | -            |  |  |  |  |  |  | 3            |
| BOD                                      |                | 16           | 12           | 8.0          | 3.0          |  |  |  |  |  |  | 14           |
| Alkalinity                               |                |              |              |              | 142          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 17 PIEZOMETER II

| PROPERTY                                 |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|------------------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu\text{MHOS}/\text{CM.}$ |                | 555          | 1220         | 2640         | 3225         |  |  |  |  |  |  | 890          |
| pH                                       |                | 7.6          | 7.7          | -            | 7.8          |  |  |  |  |  |  | 7.7          |
| HARDNESS (Ca CO <sub>3</sub> )           |                |              |              | 490          | 618          |  |  |  |  |  |  |              |
| COD                                      |                | 170          | 120          | 67           | 65           |  |  |  |  |  |  | 145          |
| CHLORIDES (Cl)                           |                | 73           | 209          | 535          | 751          |  |  |  |  |  |  | 141          |
| SULPHATES (SO <sub>4</sub> )             |                | 57           | 160          | 295          | 390          |  |  |  |  |  |  | 109          |
| PHOSPHOROUS<br>AS P                      | Total          |              |              | .06          | .04          |  |  |  |  |  |  |              |
|                                          | Soluble        |              |              | .02          | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                             | Total Kjeldahl |              |              | 2.4          | 2.2          |  |  |  |  |  |  |              |
|                                          | Free Ammonia   |              |              | 2.0          | <.1          |  |  |  |  |  |  |              |
|                                          | Nitrite        |              |              | .01          | .47          |  |  |  |  |  |  |              |
|                                          | Nitrate        |              |              | <.1          | .6           |  |  |  |  |  |  |              |
| METALS                                   | Potassium (K)  |              |              |              | 37.5         |  |  |  |  |  |  |              |
|                                          | Magnesium (Mg) |              |              |              | 60           |  |  |  |  |  |  |              |
|                                          | Calcium (Ca)   |              |              |              | 148          |  |  |  |  |  |  |              |
|                                          | Sodium (Na)    |              |              |              | 550          |  |  |  |  |  |  |              |
|                                          | Iron (Fe)      |              |              | 2.15         | .54          |  |  |  |  |  |  |              |
| Phenol (ppb)                             |                | <1           | <1           | <1           | -            |  |  |  |  |  |  | <1           |
| BOD                                      |                | 6.0          | 4.0          | 5.0          | 2.0          |  |  |  |  |  |  | 5.0          |
| Alkalinity                               |                |              |              |              | 280          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 17 PIEZOMETER III

| PROPERTY                                 |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|------------------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu\text{MHOS}/\text{CM.}$ |                | 1600         | 1510         | 1600         | 1625         |  |  |  |  |  |  | 1555         |
| pH                                       |                | 7.5          | 6.9          | -            | 7.7          |  |  |  |  |  |  | 7.2          |
| HARDNESS (Ca CO <sub>3</sub> )           |                |              |              | 668          | 671          |  |  |  |  |  |  |              |
| COD                                      |                | 120          | 76           | 43           | 40           |  |  |  |  |  |  | 98           |
| CHLORIDES (Cl)                           |                | 237          | 230          | 220          | 246          |  |  |  |  |  |  | 234          |
| SULPHATES (SO <sub>4</sub> )             |                | 240          | 260          | 230          | 240          |  |  |  |  |  |  | 250          |
| PHOSPHOROUS<br>AS P                      | Total          |              |              | .08          | .10          |  |  |  |  |  |  |              |
|                                          | Soluble        |              |              | .02          | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                             | Total Kjeldahl |              |              | .4           | 1.0          |  |  |  |  |  |  |              |
|                                          | Free Ammonia   |              |              | <.1          | .2           |  |  |  |  |  |  |              |
|                                          | Nitrite        |              |              | .02          | .01          |  |  |  |  |  |  |              |
|                                          | Nitrate        |              |              | .3           | .2           |  |  |  |  |  |  |              |
| METALS                                   | Potassium (K)  |              |              |              | 14.6         |  |  |  |  |  |  |              |
|                                          | Magnesium (Mg) |              |              |              | 66           |  |  |  |  |  |  |              |
|                                          | Calcium (Ca)   |              |              |              | 160          |  |  |  |  |  |  |              |
|                                          | Sodium (Na)    |              |              |              | 107          |  |  |  |  |  |  |              |
|                                          | Iron (Fe)      |              |              | 2.7          | .36          |  |  |  |  |  |  |              |
| Phenol (ppb)                             |                | <1           | <1           | <1           | -            |  |  |  |  |  |  | <1           |
| BOD                                      |                | 3.0          | 2.0          | 7.5          | 3.0          |  |  |  |  |  |  | 2.5          |
| Alkalinity                               |                |              |              |              | 337          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS BOREHOLE 17 STANDPIPE IIII

| PROPERTY                       |                | Oct.<br>1980 | Dec.<br>1980 | Apr.<br>1981 | Nov.<br>1981 |  |  |  |  |  |  | 1980<br>Mean |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 1800         | 1900         | 1660         | 1625         |  |  |  |  |  |  | 1850         |
| pH                             |                | 7.7          | 7.8          | -            | 7.5          |  |  |  |  |  |  | 7.8          |
| HARDNESS (Ca CO <sub>3</sub> ) |                |              |              | 716          | 549          |  |  |  |  |  |  |              |
| COD                            |                | 110          | 69           | 72           | 70           |  |  |  |  |  |  | 90           |
| CHLORIDES (Cl)                 |                | 222          | 235          | 229          | 203          |  |  |  |  |  |  | 229          |
| SULPHATES (SO <sub>4</sub> )   |                | 365          | 380          | 250          | 230          |  |  |  |  |  |  | 373          |
| PHOSPHOROUS<br>AS P            | Total          |              |              |              | .34          |  |  |  |  |  |  |              |
|                                | Soluble        |              |              |              | -            |  |  |  |  |  |  |              |
| NITROGEN (N)                   | Total Kjeldahl |              |              |              | .6           |  |  |  |  |  |  |              |
|                                | Free Ammonia   |              |              |              | <.1          |  |  |  |  |  |  |              |
|                                | Nitrite        |              |              |              | .01          |  |  |  |  |  |  |              |
|                                | Nitrate        |              |              |              | .4           |  |  |  |  |  |  |              |
| METALS                         | Potassium (K)  |              |              |              | 11.6         |  |  |  |  |  |  |              |
|                                | Magnesium (Mg) |              |              |              | 65           |  |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |              |              | 112          |  |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |              |              | 148          |  |  |  |  |  |  |              |
|                                | Iron (Fe)      |              |              | 201          | 30           |  |  |  |  |  |  |              |
| Phenol (ppb)                   |                | <1           | <1           | <1           | -            |  |  |  |  |  |  | <1           |
| BOD                            |                | 7.5          | 3.0          | 4.0          | 9.5          |  |  |  |  |  |  | 5.3          |
| Alkalinity                     |                |              |              |              | 366          |  |  |  |  |  |  |              |

NOTE: concentrations in p.p.m. unless otherwise noted.

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PROJECT 80-96-B

TABLE 6 SHEET

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS MANHOLE - LEACHATE COLLECTION SYSTEM

| PROPERTY                                 |                | Nov.<br>1981 |  |  |  |  |  |  |  |  |  |  |
|------------------------------------------|----------------|--------------|--|--|--|--|--|--|--|--|--|--|
| CONDUCTIVITY $\mu\text{MHOS}/\text{CM.}$ |                | 3750         |  |  |  |  |  |  |  |  |  |  |
| pH                                       |                | 6.7          |  |  |  |  |  |  |  |  |  |  |
| HARDNESS (Ca CO <sub>3</sub> )           |                | 1250         |  |  |  |  |  |  |  |  |  |  |
| ALKALINITY (Ca CO <sub>3</sub> )         |                | 320          |  |  |  |  |  |  |  |  |  |  |
| CHLORIDES (Cl)                           |                | 784          |  |  |  |  |  |  |  |  |  |  |
| SULPHATES (SO <sub>4</sub> )             |                | 500          |  |  |  |  |  |  |  |  |  |  |
| PHOSPHOROUS<br>AS P                      | Total          | 4.3          |  |  |  |  |  |  |  |  |  |  |
|                                          | Soluble        | -            |  |  |  |  |  |  |  |  |  |  |
| NITROGEN (N)                             | Total Kjeldahl | 6.0          |  |  |  |  |  |  |  |  |  |  |
|                                          | Free Ammonia   | .3           |  |  |  |  |  |  |  |  |  |  |
|                                          | Nitrite        | .01          |  |  |  |  |  |  |  |  |  |  |
|                                          | Nitrate        | <.1          |  |  |  |  |  |  |  |  |  |  |
| METALS                                   | Potassium (K)  | 23           |  |  |  |  |  |  |  |  |  |  |
|                                          | Magnesium (Mg) | 124          |  |  |  |  |  |  |  |  |  |  |
|                                          | Calcium (Ca)   | 296          |  |  |  |  |  |  |  |  |  |  |
|                                          | Sodium (Na)    | 475          |  |  |  |  |  |  |  |  |  |  |
|                                          | Iron (Fe)      | 300          |  |  |  |  |  |  |  |  |  |  |
| Phenol                                   |                | -            |  |  |  |  |  |  |  |  |  |  |
| BOD                                      |                | 30           |  |  |  |  |  |  |  |  |  |  |
| Alkalinity                               |                | 894          |  |  |  |  |  |  |  |  |  |  |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## SURFACE WATER QUALITY ANALYSES

ONTARIO MINISTRY OF THE ENVIRONMENT  
PROVINCIAL WATER QUALITY OBJECTIVES <sup>1</sup>  
and  
DRINKING WATER QUALITY CRITERIA <sup>2</sup> FOR  
THE SUBSTANCES ANALYZED

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| <u>SUBSTANCE</u>            | <u>CONCENTRATION</u>                                       |
|-----------------------------|------------------------------------------------------------|
| pH                          | 6.5-8.5 <sup>1</sup>                                       |
| Dissolved Oxygen (DO)       | >4 mg/L (minimum) <sup>1</sup><br>dependent on temperature |
| Chloride (Cl)               | 250 mg/L <sup>2</sup>                                      |
| Sulphate (SO <sub>4</sub> ) | 250 mg/L <sup>2</sup>                                      |
| Total Phosphorous (P)       | 0.3 mg/L <sup>1</sup>                                      |
| Free Ammonia (N)            | dependent on pH<br>and Temperature                         |
| Nitrate (N)                 | 10 mg/L <sup>2</sup>                                       |
| Iron (Fe)                   | 0.3 mg/L <sup>2</sup>                                      |
| Phenols                     | 0.001 mg/L <sup>2</sup>                                    |

## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS SW 1 - FALCON CREEK (UPSTREAM)

| PROPERTY                       |                | Apr. 4<br>1979 | May 2<br>1979 | June 4<br>1979 | Nov. 7<br>1979 | Dec. 6<br>1979 | Jan. 17<br>1980 | Apr. 18<br>1980 | Feb. 26<br>1981 | Apr. 18<br>1981 | May 21<br>1981 | Oct. 20<br>1981 |
|--------------------------------|----------------|----------------|---------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 300            | 500           | 540            | 799            | 740            | 490             | 450             | 423             | 630             | 700            | 840             |
| pH                             |                |                |               |                |                |                |                 |                 | 8.0             | -               | -              | 7.9             |
| HARDNESS (Ca CO <sub>3</sub> ) |                |                |               |                |                |                |                 |                 | 203             | 295             | 352            | 398             |
| COD                            |                |                |               |                |                |                |                 |                 | <10             | 10              | 13             | 18              |
| CHLORIDES (Cl)                 |                |                |               |                |                |                |                 |                 | 38              | 44              | 37             | 49              |
| SULPHATES (SO <sub>4</sub> )   |                |                |               |                |                |                |                 |                 | 45              | 60              | 85             | 96              |
| PHOSPHOROUS<br>AS P            | Total          |                |               |                |                |                |                 |                 | .04             | .10             | .04            | .36             |
|                                | Soluble        |                |               |                |                |                |                 |                 | <.02            | <.02            | <.02           | .16             |
| NITROGEN (N)                   | Total Kjeldahl |                |               |                |                |                |                 |                 | .4              | .4              | .6             | .4              |
|                                | Free Ammonia   |                |               |                |                |                |                 |                 | <.1             | <.1             | <.1            | <.1             |
|                                | Nitrite        |                |               |                |                |                |                 |                 | <.01            | .01             | <.1            | <.01            |
|                                | Nitrate        |                |               |                |                |                |                 |                 | .5              | <.1             | <.1            | .2              |
| METALS                         | Potassium (K)  |                |               |                | 5.4            | 3.8            | 2.2             | 2.4             |                 |                 |                | 5.0             |
|                                | Magnesium (Mg) |                |               |                |                |                |                 |                 |                 |                 |                |                 |
|                                | Calcium (Ca)   |                |               |                |                |                |                 |                 |                 |                 |                |                 |
|                                | Sodium (Na)    |                |               |                |                |                |                 |                 |                 |                 |                | 32              |
|                                | Iron (Fe)      |                |               |                | 2.0            | .2             | 1.4             | 0.5             | .17             | .08             | .05            | 2.3             |
| Phenol (ppb)                   |                |                |               |                | <1             | <1             | 4               | 1               | <1              | <1              | <1             | -               |
| BOD                            |                |                |               |                | 2.5            | 0.6            | 0.8             | 3.0             | <.2             | .6              | .6             | 2.0             |
| DOC or Alkalinity *            |                |                |               |                | 9.4            | 4.6            | 2.7             | 3.2             |                 |                 |                | 322*            |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS SW 2 FALCON CREEK

| PROPERTY                       |                | Feb.<br>1981 | Apr.8<br>1981 | May 21<br>1981 | Oct.20<br>1981 | Nov.23<br>1981 |  |  |  |  |  | 1981<br>Mean |
|--------------------------------|----------------|--------------|---------------|----------------|----------------|----------------|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.    |                | 454          | 655           | 660            | 740            | 600            |  |  |  |  |  | 621.8        |
| pH                             |                | 7.9          | -             | -              | 8.2            | 8.3            |  |  |  |  |  | 8.1          |
| HARDNESS (Ca CO <sub>3</sub> ) |                | 212          | 303           | 340            | 350            | 299            |  |  |  |  |  | 300.8        |
| COD                            |                | 14           | 40            | 40             | 10             | 20             |  |  |  |  |  | 24.8         |
| CHLORIDES (Cl)                 |                | 36           | 44            | 33             | 40             | 28             |  |  |  |  |  | 36.2         |
| SULPHATES (SO <sub>4</sub> )   |                | 50           | 62            | 69             | 70             | 62             |  |  |  |  |  | 62.6         |
| PHOSPHOROUS<br>AS P            | Total          | .04          | .04           | .04            | .40            | .06            |  |  |  |  |  | .12          |
|                                | Soluble        | <.02         | <.02          | <.02           | -              | .02            |  |  |  |  |  | <.02         |
| NITROGEN (N)                   | Total Kjeldahl | .4           | .2            | .6             | .6             | .4             |  |  |  |  |  | .44          |
|                                | Free Ammonia   | <.1          | <.1           | <.1            | <.1            | <.1            |  |  |  |  |  | <.1          |
|                                | Nitrite        | <.01         | .01           | <.01           | <.01           | .01            |  |  |  |  |  | <.01         |
|                                | Nitrate        | .5           | <.1           | <.1            | .4             | .8             |  |  |  |  |  | .38          |
| METALS                         | Potassium (K)  |              |               |                | 4.4            | 3.0            |  |  |  |  |  | 3.7          |
|                                | Magnesium (Mg) |              |               |                |                |                |  |  |  |  |  |              |
|                                | Calcium (Ca)   |              |               |                |                |                |  |  |  |  |  |              |
|                                | Sodium (Na)    |              |               |                | 26             | 19.5           |  |  |  |  |  | 22.8         |
|                                | Iron (Fe)      | .21          | .12           | .13            | .42            | .34            |  |  |  |  |  | .24          |
| Phenol (ppb)                   |                | <1           | <1            | <1             | -              | -              |  |  |  |  |  | <1           |
| BOD                            |                | .8           | 3.5           | 1.0            | .8             | .6             |  |  |  |  |  | 1.3          |
| Alkalinity                     |                |              |               |                | 284            | 234            |  |  |  |  |  | 259          |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS SW 3 FALCON CREEK (DOWNSTREAM)

| PROPERTY                        |                | Apr.4<br>1979 | May 2<br>1979 | June 4<br>1979 | Nov.7<br>1979 | Dec.6<br>1979 | Jan.17<br>1980 | Apr.18<br>1980 | Feb.26<br>1981 | Apr.8<br>1981 | May 21<br>1981 | Oct.20<br>1981 |
|---------------------------------|----------------|---------------|---------------|----------------|---------------|---------------|----------------|----------------|----------------|---------------|----------------|----------------|
| CONDUCTIVITY $\mu$ MHOS/CM.     |                | 540           | 630           | 690            | 970           | 820           | 580            | 496            | 492            | 760           | 600            | 705            |
| pH                              |                | 7.9           | 8.0           | 8.4            |               |               |                |                | 8.0            |               |                | 8.2            |
| HARDNESS (Ca CO <sub>3</sub> )  |                | 254           | 314           | 351            |               |               |                |                | 251            | 362           | 324            | 330            |
| ALKALINITY (CaCO <sub>3</sub> ) |                | 185           | 245           |                |               |               |                |                |                |               |                | 267            |
| CHLORIDES (Cl)                  |                | 35            | 35            | 28             |               |               |                |                | 34             | 46            | 34             | 41             |
| SULPHATES (SO <sub>4</sub> )    |                | 53            |               | 61             |               |               |                |                | 65             | 84            | 55             | 61             |
| PHOSPHOROUS<br>AS P             | Total          |               |               |                |               |               |                |                | .04            | .04           | .04            | .32            |
|                                 | Soluble        |               |               |                |               |               |                |                | <.02           | <.02          | <.02           | -              |
| NITROGEN (N)                    | Total Kjeldahl | 0.6           |               | 0.4            |               |               |                |                | .4             | .4            | .4             | .6             |
|                                 | Free Ammonia   |               |               |                |               |               |                |                | <.1            | <.1           | <.1            | <.1            |
|                                 | Nitrite        |               |               |                |               |               |                |                | .01            | 0.1           | <.01           | <.01           |
|                                 | Nitrate        |               |               |                |               |               |                |                | .4             | <.1           | <.1            | .6             |
| METALS                          | Potassium (K)  |               |               | 3.3            | 7.4           | 3.9           | 2.9            | 2.7            |                |               |                | 3.2            |
|                                 | Magnesium (Mg) |               |               |                |               |               |                |                |                |               |                |                |
|                                 | Calcium (Ca)   |               |               |                |               |               |                |                |                |               |                |                |
|                                 | Sodium (Na)    | 18            |               | 23             |               |               |                |                |                |               |                | 25             |
|                                 | Iron (Fe)      | .95           | 0.40          | 0.27           | 1.20          | .95           | 1.4            | .7             | .7             | .25           | .13            | .24            |
| Phenol (ppb)                    |                | <1            | 1.0           |                | <1            | <1            | 4              | 1              | <1             | <1            | <1             | -              |
| BOD                             |                | 0.6           |               | 1.40           | 2.5           | 0.8           | 0.6            | 2.5            | .8             | .8            | .4             | .8             |
| DOC or *(COD)                   |                |               |               |                | 10.2          | 4.6           | 2.2            | 4.4            | *10            | *12           | *11            | *18            |

NOTE: concentrations in p.p.m. unless otherwise noted.

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## WATER ANALYSIS RESULTS

LOCATION BURLINGTON LANDFILL SITE

REMARKS SW3 FALCON CREEK (Downstream)

| PROPERTY                         |                | Nov.24<br>1981 |  |  |  |  |  |  |  |  | 1981<br>Mean |
|----------------------------------|----------------|----------------|--|--|--|--|--|--|--|--|--------------|
| CONDUCTIVITY $\mu$ MHOS/CM.      |                | 620            |  |  |  |  |  |  |  |  | 635          |
| pH                               |                | 8.3            |  |  |  |  |  |  |  |  | 8.2          |
| HARDNESS (Ca CO <sub>3</sub> )   |                | 310            |  |  |  |  |  |  |  |  | 315          |
| ALKALINITY (Ca CO <sub>3</sub> ) |                | 240            |  |  |  |  |  |  |  |  | 253          |
| CHLORIDES (Cl)                   |                | 46             |  |  |  |  |  |  |  |  | 40.2         |
| SULPHATES (SO <sub>4</sub> )     |                | 67             |  |  |  |  |  |  |  |  | 66.4         |
| PHOSPHOROUS<br>AS P              | Total          | .06            |  |  |  |  |  |  |  |  | 0.10         |
|                                  | Soluble        | <.02           |  |  |  |  |  |  |  |  | <.02         |
| NITROGEN (N)                     | Total Kjeldahl | .4             |  |  |  |  |  |  |  |  | .44          |
|                                  | Free Ammonia   | <.1            |  |  |  |  |  |  |  |  | <.1          |
|                                  | Nitrite        | .01            |  |  |  |  |  |  |  |  | .01          |
|                                  | Nitrate        | .7             |  |  |  |  |  |  |  |  | .38          |
| METALS                           | Potassium (K)  | 3.0            |  |  |  |  |  |  |  |  | 3.1          |
|                                  | Magnesium (Mg) |                |  |  |  |  |  |  |  |  |              |
|                                  | Calcium (Ca)   |                |  |  |  |  |  |  |  |  |              |
|                                  | Sodium (Na)    | 20             |  |  |  |  |  |  |  |  | 22.5         |
|                                  | Iron (Fe)      | .65            |  |  |  |  |  |  |  |  | .39          |
| Phenol                           |                | -              |  |  |  |  |  |  |  |  | <1           |
| BOD                              |                | .4             |  |  |  |  |  |  |  |  | .6           |
| COD                              |                | 10             |  |  |  |  |  |  |  |  | 12.2         |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

## SURFACE WATER BACTERIOLOGICAL ANALYSES

SURFACE WATER  
BACTERIOLOGICAL ANALYSES (counts/100 ml)  
FALCON CREEK

TABLE: 8

| Station        | Date      | Total Coliforms | Coliform Background | Fecal Coliform | Fecal Strep | Pseudomonas Aeruginosa | Pseudomonas Background |
|----------------|-----------|-----------------|---------------------|----------------|-------------|------------------------|------------------------|
| SW1            | Feb.26/81 | 280             | 1900                | A20            | 120         | <10                    | <10                    |
|                | Apr.18/81 | A50             | 400                 | <10            | <10         | <4                     | <4                     |
|                | May21/81  | 1300            | 5400                | A10            | 8           | <4                     | <4                     |
|                | Oct.20/81 | 2000            | 31,000              | A10            | 390         | <10                    | <10                    |
|                | Nov.24/81 | 4500            | 12,000              | 950            | 420         | 4                      | <4                     |
| GEOMETRIC MEAN |           | <u>696</u>      | <u>4,333</u>        | <u>44</u>      | <u>69</u>   | <u>&lt;10</u>          | <u>&lt;10</u>          |
| SW2            | Feb.26/81 | 300             | 1250                | <10            | A40         | <10                    | <10                    |
|                | Apr.18/81 | A220            | 4400                | A10            | <10         | <4                     | <4                     |
|                | May 21/81 | A690            | 12,000              | A10            | 32          | <4                     | <4                     |
|                | Oct.20/81 | 1500            | 32,000              | A90            | 1042        | 4                      | <4                     |
|                | Nov.24/81 | 3200            | 10,000              | 470            | 150         | <4                     | <4                     |
| GEOMETRIC MEAN |           | <u>738</u>      | <u>7,327</u>        | <u>34</u>      | <u>72</u>   | <u>&lt;10</u>          | <u>&lt;10</u>          |
| SW3            | Feb.26/81 | 1,600           | 4,000               | <10            | A40         | <10                    | <10                    |
|                | Apr.18/81 | A420            | 4,100               | <10            | <10         | <4                     | <4                     |
|                | May 21/81 | 1300            | 10,900              | A70            | 32          | <4                     | <4                     |
|                | Oct.20/81 | 10,900          | 89,000              | A90            | 1040        | <4                     | <4                     |
|                | Nov.24/81 | 4,200           | 14,000              | 230            | 150         | <4                     | <4                     |
| GEOMETRIC MEAN |           | <u>2,091</u>    | <u>11,737</u>       | <u>43</u>      | <u>72</u>   | <u>&lt;10</u>          | <u>&lt;10</u>          |