# BURLINGTON LANDFILL SITE

## REPORT ON POSSIBLE CONTINUED USE

## - REVISED -

DILLON

Consulting Engineers & Planners

Pocock

**Walker, Wright, Young Associates Limited**
Planning Consultants

October 20, 1983

Mr. R. Mohammed, Director
Planning & Development Department
Regional Municipality of Halton
1151 Bronte Road
Oakville, Ontario
L6J 6E1

15 Delisle Avenue
Toronto, Ontario
M4V 1S8
416/968-3511

Re: Proposed Interim Waste Plan

Dear Mr. Mohammed,

Enclosed are 6 copies of the final report on the Waste Quantities Forecast, October 1983 Update. We are submitting the report on behalf of C.N. Watson and Associates Ltd.

The report has been revised to reflect the points discussed at our meeting on Monday, October 17, 1983, including the following:

- addition of waste quantities for September, 1983 in Table 2, 3, and Figure 1;
- addition of Table 8, "Interim Waste Forecast for Halton Region".

Interim Waste Period, 1984-1988

From our recent discussions on October 17, 1983, it is our understanding that the two options will be presented to the Solid Waste Management Committee on October 24, 1983 for solid waste disposal during the interim waste period from June, 1984 - June, 1988. These options are as follows:

**Option 1** - Landfilling of all waste in a consecutive combination of the existing Burlington site and the new landfill site(s).

**Option 2** - Export of 75% of waste to Occidental Chemical
- Landfilling of 25% of waste in the new landfill site(s)

**Peter R. Walker**
B A M Sc MCIP
**James M. Wright**
B Arch MRAIC
**Richard D. Young**
B Sc M Arch MRAIC RIBA

Option 1

The timing of Option 1, as recommended, would involve the completion of Phase A and Phase B of the expansion of the existing Burlington landfill site (April (1985). The continuation of landfilling in Halton to the end of the interim period is to be handled by the new landfill site(s). The new landfill site(s) would have to accept all waste generated in Halton until the start-up of the Energy from Waste facility or facilities.

Landfill Capacity Requirement for Option 1

Additional capacity would be required as part of the Environmental Assessment landfill component, based on completion of only Phase A and Phase B of the proposed Interim Waste Plan. The present estimated capacity for the landfill component is 7.2 million cubic yards. The requirement for additional landfill capacity is as follows:

| | | |
|---|---|---|
| Landfilling of waste in the new landfill site or sites from April 1985 - June 1988 | = | 655,400 tons<br>or 1,310,800 cubic yards<br>plus 15% contingency |
| | = | 1,507,400 cubic yards |

However, we would point out that Option 1, as presented, means that the new landfill site(s) must be in operation by April, 1985. This scenario, in our view, is rather optimistic and if the new landfill is not ready, another method of disposal may be required for some additional portion of the interim period. We will support the general rationale for Option 1, assuming that any waste capacity figures will be fine-tuned in July, 1984 for preparation of the landfill component Environmental Assessment.

Option 2

Option 2, the export of 75% of the waste to Occidental Chemical in Niagara Falls, New York, would be expected to commence in the first quarter of 1984. A proposed three year contract with Occidental would cover the interim period until the end of February, 1987, at which time it is anticipated that the permanent landfill(s) in Halton would be in place, and ready for operation. However, it was agreed that the long-term solid waste management system would commence in 1988, assuming start-up of any Energy from Waste facility or facilities, thus leaving 15 months for the remainder of the interim period, March 1987 - June 1988.

Landfill Requirement for Option 2

We have calculated the landfill capacity required for the 15 months, based on the estimated total waste quantities for 1987 and 1988 as follows:

Estimated Total Waste Quantity for 1987 = 209,540 tons
(from Table 8 of C.N. Watson
Interim Waste Quantities Report)

1988 = 213,425 tons

The annual waste quantity estimates, as shown above, were allocated on a monthly basis to account for the latter part of interim period (15 months) and then combined for a total landfill capacity requirement of 263,500 tons or 527,000 cubic yards. A contingency of 15% will be used as in Option 1 to account for unforeseen wastes, including 5% for source separation and 10% for clean fill. The total interim capacity is increased to 606,050 cubic yards.

As you know, we are presently applying a figure of 7.2 million cubic yards for the twenty year planning period from 1983-2001. Option 1 would require an additional 1.5 million cubic yards capacity, thus resulting in a total of 8.7 million cubic yards for our landfill component.

With Option 2, the 7.2 million cubic yards will have to be increased by 606,050 cubic yards to 7.8 million cubic yards.

The preferred option should be a direction of Council, but it is appropriate that such a figure be added to the capacity figure which we are currently carrying as our capacity to accommodate sanitary landfill.

We trust this letter is satisfactory for you to incorporate in the recommendations to the Solid Waste Management Committee for Monday, October 24, 1983.

Yours very truly,

Peter R. Walker, M.C.I.P.
Partner

cc: C. Watson

DILLON
Consulting Engineers & Planners

OUR FILE: 9319-01
YOUR FILE:

20 October 1983

The Regional Municipality
of Halton
P.O. Box 7000
1151 Bronte Road
OAKVILLE, Ontario
L6J 6E1

Attention: Mr. G.N. Woodburn, P.Eng.
Manager, Waste Disposal

Burlington Landfill Site -
Possible Continued Use (Revised)

Dear Sirs:

We are pleased to submit our report for the phased continued use of the Burlington Landfill Site. The report replaces our previous one dated 17 June 1983 and provides more up-to-date information, particularly with regard to waste quantity projections. The phases of development and the sequence of the phases remain the same as originally proposed.

Several meetings were held with interest groups. These meetings are listed in this report.

Yours truly,

M.M. DILLON LIMITED

W. F. Wells

WFW:lly

W.F. Wells, P.Eng.
Project Manager

TABLE OF CONTENTS

## 1. BACKGROUND

The Burlington landfill site, located on the North Service Road of Highway 403 in the City of Burlington, has been in operation since 1972. The site property covers 68 ha of which 36 ha is presently approved for landfilling. In April 1980, a public hearing was held before the Environmental Assessment Board to expand the site up to its present size. The additional property acquired through this expansion was 23 ha of which 7 ha was approved for landfilling. The basis for the application and approval are addressed in a Design and Operations Report, January 1980 prepared by M.M. Dillon Limited.

Since 1980, Dillon has carried out successive site updates at this landfill to assess residual waste capacity and to monitor site operations. The latest analyses indicate that presently approved waste capacity will be exhausted by July 1984.

The Environmental Assessment of the landfill component for Halton Region's long-term solid waste management system is presently underway. The current schedule of this work indicates that a formal submission of the Assessment will be made to the Ministry of the Environment (MOE) in October 1984. After submission, the report must be reviewed by all interested agencies, public hearings may be required, and site(s) construction must then take place prior to placement of wastes.

As additional waste disposal capacity would be required beyond Burlington's projected closure date, the Ministry advised the Region to establish an interim plan. Halton, as one possibility for such a plan, authorized Dillon in March

1983 to examine alternatives for continued use of the Burlington landfill as it is the only site presently operating in the Region. Any increase in capacity must be limited to the existing site area. No additional property can be purchased without going through the environmental assessment process. Dillon was also directed to meet with those persons that were parties to the previous hearing before the Environmental Assessment Board, industrial neighbours, ratepayers groups and the Ministry of the Environment (MOE).

To that end, preliminary plans for waste capacity increase were developed. Discussions were then held with the MOE, the City of Burlington, citizens and industries local to the site, National Sewer Pipe representatives and the West Burlington Ratepayers Association. The results of these meetings are summarized in Section 3. In the course of these meetings, a fact sheet was distributed outlining the ideas then being considered and the resulting capacity provided. This sheet is attached as Schedule A. As a result of these meetings, the staging and concept were redefined. The revised program was submitted to the Region and a second round of meetings with interested parties was held. The list of these meetings is also given in Section 3. In the Fall of 1983, further data was available that permitted better definition of waste quantities. Consequently, waste quantity estimates were required to reflect actual waste quantities received to date (September) in 1983 and provide for the best possible short-term estimates of future waste quantities.

Dillon retained Gartner Lee Associates Limited to review the hydrogeological aspects of the preliminary plans. The results of the latest ground and surface water monitoring analyses were examined to determine if the site is "behaving" as predicted. No off-site ground or surface water impacts have been detected.

## 2. WASTE QUANTITIES

Until recently, waste quantities received at the Region's landfill sites had increased, on average, by 2.5% each year. Waste quantities previously used in the ongoing landfill capacity update program were predicted to increase from 15,900 tonnes/month in 1983 to 17,100 tonnes/month in 1986.

Beginning in 1983, however, after the Oakville landfill was closed, refuse quantities began to decrease. The Region originally predicted that on average 15,000 tonnes/month would be received at the Burlington landfill in 1983. Site records for the first nine months of 1983 now indicate the actual tonnage is approximately 13,950 tonnes/month. This is down from 15,800 tonnes/month (12% decrease).

Based on waste quantities received to date, it is projected that the total waste quantity for 1983 will be 167,800 tonnes.

A study was undertaken to attempt to establish the reasons for the drop in waste quantity and to consider whether the lower tonnage rates would continue. The results of that study indicate that there will be growth in waste quantities in the short term, both from in increase in Regional population and from improved economic conditions in the commercial industrial sector. Table 1 gives the expected annual waste quantities to 1988.

TABLE 1
PROJECTED WASTE QUANTITIES
(tonnes)

| Year | 1983 Volume | Increment | Total | Average Tonnes/Month |
|---|---|---|---|---|
| 1984 | 167,800 | 7,150 | 174,950 | 14,600 |
| 1985 | 167,800 | 15,200 | 183,000 | 15,250 |
| 1986 | 167,800 | 18,700 | 186,500 | 15,550 |
| 1987 | 167,800 | 22,250 | 190,050 | 15,850 |
| 1988 | 167,800 | 25,800 | 193,600 | 16,150 |

Anticipated site life and landfill capacities have been calculated based on the average monthly tonnes for each calendar year given. The actual waste quantities received will continue to be received and monitored. The site life for each phase can then be periodically checked against that data.

## 3. STAGING OF CONTINUED USE

Various alternatives for continued use of the Burlington landfill within existing site boundaries were investigated. Four phases are consequently presented: A, B, C and D. The combined waste capacity provided by the four phases represent the maximum attainable capacity from the Burlington site.

Should the capacities provided by these phases be ultimately required, they would be utilized in the order discussed. These phases would only be developed as needed. Should new waste disposal capacity become available to the Region, the Burlington landfill would be closed consistent with proper site design.

Site modifications proposed for the four phases are all within existing property boundaries. No additional property need be acquired by the Region.

Design parameters for the four phases are consistent with those applied to the site as presently developed. Base and final contour changes will be blended in with those presently approved. Existing surface drainage works and leachate control systems will also be extended as necessary.

Drawings and calculations completed to date are preliminary only. They would be finalized as part of a Design and Operations report which would be submitted with any application for a Certificate of Approval.

The projected site capacities for the four phases are premised on all of the Region's waste being directed to the Burlington site. The capacities provided and resulting site closure dates are summarized on Table 2, Section 3.5.

## 3.1 Phase A

Phase A provides seven months of additional site capacity through contour modifications. As shown on Figures 1 and 3, final contours would be raised to fill in the existing depression which accommodates a Bell Canada line. Along this line, contours would be increased by up to 11 m (maximum) to existing surrounding elevations. This will require the Bell line to be raised. No additional landfill area would be required.

The Bell telephone line, referred to as the Hamilton-Hornby Toll line, carries long distance calls from Hamilton. This line crosses the existing site from west to east over a Bell Canada easement as shown on Figure 1. The line has been raised in the past to accommodate landfilling on the easement.

With the exception of an increased site visibility, no additioonal impacts are expected to result from these site changes. This infilling will promote a greater surface runoff in this area with a corresponding decrease in future leachate generation. The presently planned site after-use of passive recreation would still be appropriate.

Construction costs will be incurred by the Region in raising the Bell line and cutting in additional cable as required. Bell presently estimate the costs for this work to be approximately $16,000.

With the contour modifications, cover requirements will also increase. Final cover, where already in-place, will be excavated, stockpiled and re-used where possible. An additional 36,000 $m^3$ of fill would still be needed for Phase A, however, and this fill is not available on-site. Current estimates have determined that a cover material deficit already exists on-site. Although, in the past, fill has been obtained by the Region free of charge, this may not continue. A cost of \$3/$m^3$ was consequently applied to Phase A's projected cover material deficit.

Construction and cover material costs for Phase A are estimated at \$155,000 (including a contingency allowance). This cost does not provide for the stripping and stockpiling of final cover or for the re-application of hydroseeding for presently completed areas. Costs would be substantially reduced should cover material be aquired free of charge by the Region.

## 3.2 Phase B

Phase B provides additional site capacity through an extension to the presently approved landfill area. As shown on Figure 1, Phase B extends the northermost section of the site easterly, into existing buffer lands. The northern boundary of the present fill area was originally set by a ground water divide established through hydrogeological investigations. Ground water to the south of this divide was determined to flow predominately southerly towards Highway 403. Ground water to the north of the line would flow towards the ravine slopes and Falcon Creek. This divide is extrapolated

easterly to form Phase B's northerly border. Ground water flow underneath this area would, therefore, remain in a southerly direction.

The revised eastern and southern limits of landfilling are set back 20 m from the site property boundary and 10 m from the ravine slopes, respectively. Approximately 3 additional hectares of the site property would be used for landfill.

A further three months of landfilling capacity is provided by Phase B.

Final and base contours would be blended in with those presently approved. The maximum height of the final contours would be equivalent to those of the existing design. Gartner Lee expect the geology of Phase B's area to be similar to the rest of the Burlington site (i.e. tight clay soils). Shallow soils may occur in the southern part of this area, however, and backhoe test pits are recommended. This will ensure that a 1.5 m overburden is provided between the proposed base contours and the shale bedrock. This overburden depth is a required design parameter for the existing site.

A leachate collection system, consisting of lateral pipes underlying the refuse, will be constructed. This system will be tied into the similarly designed leachate collection works in the present fill area. Collected leachate will be routed through these works which have the hydraulic capacity to handle the additional flow.

Phase B will have only a minor visual impact as the northern section of the Burlington site is not readily visible from surrounding land uses. Drainage and erosion/sedimentation control measures will be employed to minimize off-site impacts. The only vegetation that would be removed would be the hedgerows presently separating the buffer area from the landfill.

The cost to extend the leachate collection system into this area is estimated at $80,000. Additional work would involve the installation of three additional ground water monitors. The access road, perimeter drainage works and fencing associated with the existing site would also be extended to service this area. Total construction costs are estimated at $138,000 (including a contingency allowance).

Excavations in this area would provide a net fill surplus. Approximately 52,000 $m^3$ of cover material would be available, over and above daily, intermediate and final cover needs. This surplus would be applied towards the existing cover material deficit as well as that required for Phase A.

## 3.3 Phase C

Phase C would provide an additional 13 months of landfilling capacity through further contour modifications. As shown on Figures 2 and 3, final contours are increased by 6 m at the site's north end and by 2 m adjacent to the Bell easement. These contour changes would be over the existing fill area as well as that developed as Phase B. No new property would be landfilled.

As with Phase A, the only additional impact resulting from these contour changes is expected to be an increased site visibility. A passive recreation site after-use is still appropriate.

With these modifications, cover requirements will increase above that then available. Final cover, where already in-place, will be excavated and re-used where possible. An additional 71,000 $m^3$ of fill would still be needed and this has been costed at $\$3/m^3$.

Construction and cover material costs, including a contingency allowance, are $251,000 for Phase C. These costs could be significantly reduced should cover material be acquired at no charge to the Region.

### 3.4 Phase D

Phase D, as shown on Figures 2 and 3, entails extending the landfill northerly, over the ground water divide onto existing buffer lands. The northern and western limits of fill would be setback 10 m from ravine slopes. The eastern and southern limits would remain as described for Phase B. Approximately 2.3 ha would be used for the landfill extension providing an additional nine months of refuse capacity.

Final and base contours would be blended in with those presently envisioned for Phase C. The maximum height of final contours would be raised 10 m above the existing landfill design or approximately 4 m above the elevations achieved in Phase C. The geology of this area is anticipated

to be consistent with the remainder of the site. Ample overburden exists to ensure a 1.5 m separation between base contours and bedrock.

A full underdrain leachate collection system would be extended into this area. As a component of leachate flow is expected to exfiltrate through the base, an extension to the leachate collection contingency plan, as designed for the southern reaches of Falcon Creek, may be necessary.

This alternative should not create a significant visual impact. As with Phase B, drainage and erosion/sedimentation measures will be employed. Also, only hedgerow vegetation will be removed.

The required leachate collection works will cost approximately $95,000. Additional work required would involve the placement of ground water monitors (2) and the extension of access roads, fencing and drainage works. Construction costs are estimated at $147,000 (total, including a contingency allowance).

Excavations in this area would provide a net fill (cover material) surplus of 99,000 $m^3$. This excess fill would eliminate Phase C's cover material deficit.

## 3.5 Summary of Capacities Provided

The fact sheet distributed during the discussion groups was premised on the original (escalating) waste quantity projections outlined in Section 2.

As recent trends indicate waste quantities are decreasing, this scenario was abandoned. Waste capacities and site closure dates for each phase were recalculated using constant waste levels of 15,000 tonnes/month and 13,100 tonnes/month. Two sets of site closure dates were consequently generated and published in the report on Continued Use of the Burlington Landfill Site, June 1983.

Revised waste quantity estimates and projections have been used in this report to refine the closure dates for each phase. These are shown on Table 2 which also lists cover material requirements at each stage of continued use.

## TABLE 2
## BURLINGTON LANDFILL SITE
## SUMMARY OF PHASES OF CONTINUED USE

| STAGES OF CONTINUED USE | WASTE CAPACITY PROVIDED* Waste Quantities Constant at (see Table 1) Capacity Provided (months) | Resulting Site Closure Date | COVER MATERIAL REQUIREMENTS** Incremental Surplus (deficit) | Cumulative Surplus (deficit) |
|---|---|---|---|---|
| Site as Presently Approved | 15 | July 1984 | (11,000 $m^3$) | (11,000 $m^3$) |
| Phase A | 6 | January 1985 | (36,000 $m^3$) | (47,000 $m^3$) |
| Phase B | 3 | April 1985 | 52,000 $m^3$ | 5,000 $m^3$ |
| Phase C | 13 | May 1986 | (76,000 $m^3$) | (71,000 $m^3$) |
| Phase D | 9 | February 1987 | 99,000 $m^3$ | 28,000 $m^3$ |

* Assuming all Region's waste directed to Burlington site.

** Based on 4.1 refuse: cover ratio.

## 4. PUBLIC/AGENCY DISCUSSIONS

Each of the meetings generally started off with the Regional staff describing the status of the long-term Environmental Assessment program for the landfill component and the need for an interim waste disposal program and the options available for the Region. One such option is the continued use of the Burlington landfill site. The continued use of the Burlington site was then outlined by Dillon after which a general discussion was held. This section summarizes the comments received during these discussions.

### 4.1 Ministry of the Environment - 1:30 p.m., 18 April 1983 MOE Offices, Toronto

Present
- K. Hogg, MOE
- G. Donnelly, MOE
- H. Paar, MOE
- G. McCarthy, MOE
- B. Moore, Halton Region
- G. Woodburn, Halton Region
- W. Wells, Dillon
- J. Read, Dillon

Ministry representatives reserved judgement on the Region's proposals pending formal application. It was recommended, however, that the design parameters of the proposed changes be consistent with past work at the Burlington site.

4.2 City of Burlington - 4:00 p.m., 4 May 1983
Region Offices, Oakville

Present
D. Brown, Burlington
B. Davy, Burlington
G. Vance, Burlington
D. Perlin, Halton Region
G. Woodburn, Halton Region
J. Corbett, Halton Region
W. Wells, Dillon
J. Read, Dillon

City representatives reserved judgement on the Burlington landfill ideas until Regional plans are finalized.

4.3 Local Citizens - 7:00 p.m., 4 May 1983
Region Offices, Oakville

Note: 21 residences and businesses, all located within 1,200 ft. of the Burlington landfill were served notice of this meeting.

Present
J. Aitkin
J. Dunford, Tridon Ltd.
R. Elstone
C. Johnson
T. Mayo, Cumis Group
C. Menet
D. Perlin, Halton Region
B. Moore, Halton Region
G. Woodburn, Halton Region
J. Corbett, Halton Region
W. Wells, Dillon
J. Read, Dillon

The citizens attending this meeting were generally sympathetic to the Region's solid waste problems. Although it was understood that Halton could not guarantee the outcome of the National Sewer Pipe (NSP) proposal, some assurances were desired about the status of these lands for future waste disposal. Expropriation of the NSP lands were suggested as was Regional control over any future landfilling that may occur on these properties.

Concerns and/or suggestions relating to the present and future use of the Burlington landfill were as follows:

- the control over unacceptable wastes be increased at the landfill. Any plans for continued use of the site must not allow hazardous waste and chemicals to be received;

- rehabilitation to keep pace with completed portions of the site. Assurances for perpetual care asked for;

- concern over increases in noise and visibility due to corresponding increases to final contours;

- hydrogeological impact of landfilling north of the ground water divide be carefully assessed;

- trees should be planted on completed portions of the site, notably at the front of the site;

- the control over motorbikes on the landfill and adjacent properties be increased;

- the speed limit between Waterdown and King Roads be reduced to match that from King Road to Brant Street;

- a right turn lane be installed for traffic entering the site.

On 12 May, Regional representatives visited Mr. J. Aitkins at his residence and then accompanied him to the landfill site. This visit was held at Mr. Aitkins' request to further relate his concerns to the Region, regarding the landfill's visual and audible impacts. No new concerns were introducted at this time.

4.4 National Sewer Pipe - 6:00 p.m., 12 May 1983
Region Offices, Oakville

Present
B. Tate, Proctor and Redfern
D. Perlin, Halton Region
G. Woodburn, Halton Region
J. Read, Dillon

The ideas for continued use of Burlington were presented to Proctor and Redfern, the consultants representing National Sewer Pipe (NSP). No comments were provided on the proposals; NSP will reserve judgement pending the Region's decision regarding NSP's own landfill project.

Some concern was expressed regarding leachate entering NSP property from the closed Bayview landfill.

## 4.5 West Burlington Ratepayers Association

- 7:00 p.m., 19 May 1983
Region Offices, Oakville

Present

J. Anderson
M.J. Boelhouwer
S. Chumly
A. Coome
J. Deming
R. Huxon
H. Keplin
G. Meakins
R. Meakins
J. McCooey
T. O'Connor
D. Pocock
J. Cowman, Alderman
W. Mulkewich, Regional Councillor
D. Perlin, Halton Region
G. Woodburn, Halton Region
J. Corbett, Halton Region
W. Wells, Dillon
J. Read, Dillon

The Ratepayers group, realizing the Region's waste disposal problems, expressed a willingness to help where it could. They do not want, however, to become the Region's "dumping grounds". While it was recognized that the latest Burlington landfill ideas might allow sufficient time to properly complete the Environmental Assessment, they are generally opposed to temporary solutions to the solid waste problems. The high costs of alternatives to those options (i.e. Hooker Chemical proposal) were considered and it was felt there may be some merit in incurring these additional costs if it would lead Council to expedite and complete the current studies.

The Association also did not feel protected against the establishment for further landfill sites (i.e. National Sewer Pipe) in their area. Expropriation of NSP lands and the effect of the Burlington landfill ideas on NSP's own landfill project were discussed. Other comments and/or suggestions provided by the Association were as follows:

- more emphasis be put on solid waste incineration;

- concern expressed over methane gas migration from the landfill to the urban areas;

- timing for implementation of the Bayview Park leachate collection system questioned;

- Halton's solid wastes should be spread among a series of smaller sites;

- the Association asked for a future public meeting when Council decides its course of action;

- action also wanted on 2 illegal, closed sites in Aldershot.

## 4.8 Additional Meetings

As a result of the meetings listed in Sections 4.1 to 4.7, the concepts and staging were revised and additional meetings held to explain these revisions. These included:

| | | |
|---|---|---|
| 12 August | - | Individual meetings were held with the Cumis Group, Tridon Limited, and National Sewer Pipe |
| 18 August | - | Citizens meeting at home of R. Elstone |
| 28 September | - | Public meeting at Aldershot Collegiate with West Burlinton Ratepayers Association (approximately 125 persons) |