

1

FINAL TECHNICAL REPORT NO. 1

PHASE 2 STAGE 2C

SELECTION OF PREFERRED SITE

TRANSPORTATION ASSESSMENT

GIFFELS ASSOCIATES LIMITED



ENVIRONMENTAL
ASSESSMENT
LANDFILL COMPONENT OF
SOLID WASTE MANAGEMENT

JUNE 1985

SUMMARY

An assessment of the relative effects of hauling waste to the six Site Plan Areas was completed by considering the following two traffic aspects:

- Traffic Safety.
- Traffic Service and Operation.

The Site Plan Areas were compared utilizing these two transportation factors and an overall ranking (most preferred to least preferred) was developed. This ranking stressed the Traffic Safety factor since it is related to the high priority, 'overall' evaluation category of Public Health and Safety.

In order to develop likely or representative travel routes that haulage vehicles will utilize to access each Site Plan Area, the Region was divided into ten waste zones (three each for Burlington and Oakville, two each for Milton and Halton Hills). Routes of travel were identified from the centre of each waste zone to each of the six Site Plan Areas. Entrance locations into each site were selected that would minimize local impacts.

In general, each Site Plan Area is accessible via roads considered appropriate for haulage vehicles (e.g. highways, arterial roads). The exception is Site E which requires the use of local roads for access in the immediate Site Plan Area.

All sites are considered acceptable from a transportation standpoint and the differences with respect to Traffic Safety and Service/Operations are not significant.

A ranking with respect to both of these factors (most preferred to least preferred) is summarized below:

<u>Rank</u>	<u>Site</u>
1	D/F
3	A/B/C
6	E

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1.0 BACKGROUND

1.1 Introduction

The transportation assessment related to the ranking of Sites and the selection of a preferred landfill site has considered two basic evaluation factors:

- Traffic Safety;
- Traffic Service and Operation.

Under the factor Traffic Safety, the assessment concentrated on two main aspects:

- ① use of local roads for haulage;
- ② potential conflicts along main haulage routes.

Under the factor Traffic Service and Operation, the following main aspects were considered in the assessment:

- ① use of local roads;
- ② standard and operating characteristics of the main 'feeder' route to the site;
- ③ travel times and distances.

In all cases, the Site Plan Areas were used in this assessment.

1.2 Waste Zones

In order to predict the likely spatial orientation of haulage vehicles related to any potential landfill site and to calculate comparative haulage travel times and distances, the Region was divided into ten waste zones as follows:

- | | |
|-------------------|-------------------|
| Burlington: | 1. North-West |
| | 2. South |
| | 3. North |
|
Oakville: |
4. North-West |
| | 5. South |
| | 6. North-East |
|
Milton: |
7. South |
| | 8. North |
|
Halton Hills: |
9. West |
| | 10. East |

These waste zones were developed considering the geographical characteristics of each of the area municipalities and their relationship to both the existing (and future) road network and the location of the Candidate Sites. Each of the ten zones has been represented by a zone centre located on the existing road network. The zone centres were used to approximate the origin of waste (start of haulage) from each zone. Waste statistics based on zone population and employment forecasts have been generated for each zone for selected years.

1.3 Waste Disposal Scenario

Three analysis years have been selected for the assessment of transportation aspects of landfilling; 1988, 1996 and 2008. The

approximate waste quantities required to be landfilled from each zone were generated for each of these analysis years.

In 1988, the initial phase of the long term landfilling planning period, a seven month period of operation was assumed (June to December). No alternative method of disposal was assumed to be implemented (i.e, energy from waste) by the Region in the period between June 1988 and December 1996.

In 1996, the Region proposes to initiate their energy from waste program. This will substantially reduce the waste quantities requiring landfilling between 1996 and 2008. The waste quantities for landfill have been generated for 2008 by assuming that fifty percent of the total waste will be disposed of through energy from waste (EFW) facilities. The resultant landfill requirement (ash and non-combustible refuse) of the energy from waste facilities has not been considered in this transportation assessment.

Suppose
no ?!
EFW ?!
what
happens to
projections
NB

2.0 HAULAGE ROUTES

2.1 Introduction

As indicated previously, the Region has been divided into ten waste zones in order to predict the spatial distribution of landfill bound vehicles within Halton. The most likely, or most representative route between zone centre and each Candidate Site has been identified. Consideration has been given to both the existing and future road facilities in determining haulage routes.

The following waste zones and zone centres have been developed:

see Table 9

<u>Zone</u>	<u>Location of Centre</u>
1. Burlington North-West	Highway 403 at Waterdown Road
2. Burlington South	Q.E.W. at Guelph Line
3. Burlington North	Guelph Line at No. 3 Sideroad
4. Oakville North-West	Highway 25 at Dundas Street
5. Oakville South	Trafalgar Road just south of Q.E.W.
6. Oakville North-East	Dundas Street at Trafalgar Road
7. Milton South	Highway 25 at Steeles Avenue
8. Milton North	Guelph Line at No. 10 Sideroad
9. Halton Hills West	Highway 25 at Regional Road 12
10. Halton Hills East	Regional Road 11 at Regional Road 13

In developing haulage routes between these zones and the six Site entrances, all trips were assumed to originate at the zone centres. In fact, these zone centres are representative only of the haulage trip starts. With each zone, the distribution of waste generators with

respect to the designated zone centre will affect the accuracy of the identified haulage route. However, this technique for developing haulage routes is considered appropriate for a comparative assessment of relative transportation aspects among the six alternatives. The routes that have been identified are considered the most likely routes that landfill bound vehicles will be utilizing leaving each zone. In assigning vehicles to specific roads, preference has been given to roads considered more appropriate for haulage (arterials and highways).

2.2 Future Transportation Facilities

Several future additions to the existing road network were considered in the assessment. These were:

1. Waterdown Road/Highway 403 interchange revisions.
2. Brant Street/QEW interchange.
3. Highway 403 (QEW to Dundas Street).
4. Highway 403 (Dundas Street to Trafalgar Road).
5. Highway 403 (Trafalgar Road to Highway 407).

implications of this?

The Waterdown Road/Highway 403 interchange is to be converted to a full interchange that would allow access to and from the east in addition to the west. The reconstruction of this interchange is part of the GO-ALRT Program (Government of Ontario Advanced Light Rail Transit) in this area. Recent uncertainties in this program (timing, technology) have put the status of this interchange in doubt. It is likely that, if the interchange is converted as part of the GO-ALRT Program, it will be late in the planning period and therefore should not be a major consideration in the development and assessment of haulage routes.

The new Brant Street/QEW interchange is on the Ministry of Transportation and Communications (M.T.C.) five-year construction program. Construction is scheduled to be initiated in 1988, and will likely take two years to

complete. Therefore, this new facility was assumed to be 'in place' throughout the landfill planning period.

The M.T.C. is planning on completing Highway 403 in Halton Region in stages. The section east from Trafalgar Road is under construction at this time. The section between the QEW and Dundas Street is currently scheduled for a construction start in 1993 and it is likely that it will be open to traffic by 1996. Therefore, this link (i.e. Highway 403 from the QEW to Dundas Street) was considered 'in place' between 1996 and 2008. It was not identified, however, as a haulage route.

Construction of the remainder of Highway 403 from Dundas Street easterly to Trafalgar Road will likely not be initiated until past 2000 and may be open to traffic by 2008. Therefore, this link was not identified as being available for use by haulage vehicles within the landfill planning period.

Therefore, one road network (related to haulage) was used throughout the planning period for each of the assessment years (1988, 1996, 2008). This was the existing road network with the addition of the new Brant Street/QEW interchange.

For each of the candidate sites, ten representative routes (one from each waste zone) have been identified. These are described in detail in the following text. Haulage routes are shown on Maps 1, 2 and 3.

2.3 Site A

Site A is situated south of Highway 403, east of Trafalgar Road. The site entrance will be off Trafalgar Road. The following highway/road sections are considered the most likely route components for travel between the zone centres and the proposed Site A entrance:

Burlington North-West

- Highway 403/Q.E.W./Highway 25/Dundas Street/Trafalgar Road.

Burlington South

- Q.E.W./Highway 25/Dundas Street/Trafalgar Road.

Burlington North

- Guelph Line/Dundas Street/Trafalgar Road.

Oakville South

- Trafalgar Road.

Oakville North-West

- Dundas Street/Trafalgar Road.

Oakville North-East

- Trafalgar Road.

Milton South

- Steeles Avenue/James Snow Parkway/Highway 401/Trafalgar Road.

Milton North

- Guelph Line/Highway 401/Trafalgar Road.

Halton Hills East

- Regional Road 11/Trafalgar Road.

Halton Hills West

- Highway 25/Highway 401/Trafalgar Road.

2.4 Site B

Site B is situated south of Burnhamthorpe Road west of Trafalgar Road. The site entrance will be off Trafalgar Road. The most likely route components for travel between the zone centres and Site B are identical to Site A.

2.5 Site C

Site C is situated south of Burnhamthorpe Road, east of Trafalgar Road. The site entrance will be off Trafalgar Road. The most likely route components for travel between the zone centres and Site C are identical to Site A.

2.6 Site D

Site D is situated south of Britannia Road, west of Highway 25. The site entrance will be off Highway 25. The following highway/road sections are considered the most likely route components for travel between the zone centres and Site D:

Burlington North-West

- Highway 403/Q.E.W./Highway 25.

Burlington South

- Q.E.W./Highway 25.

Burlington North

- Guelph Line/Derry Road/Tremaine Road/Britannia Road/Highway 25.

Oakville South

- Q.E.W./Highway 25.

Oakville North-West

- Highway 25.

Oakville North-East

- Dundas Street/Highway 25.

Milton South

- Highway 25.

Milton North

- Guelph Line/Highway 401/Highway 25/Steeles Avenue/Highway 25.

Halton Hills East

- Regional Road 11/Trafalgar Road/Steeles Avenue/Highway 25.

Halton Hills West

- Highway 25/Steeles Avenue/Highway 25.

2.7 Site E

Site E is situated west of Tremaine Road, north of Britannia Road. The site entrance will be off Tremaine Road. The following highway/road sections are considered the most likely route components for travel between the zone centres and Site E:

Burlington North-West

- Highway 403/Q.E.W./Highway 25/Britannia Road/Tremaine Road.

Burlington South

- Q.E.W./Highway 25/Britannia Road/Tremaine Road.

Burlington North

- Guelph Line/Derry Road/Tremaine Road.

Oakville South

- Q.E.W./Highway 25/Britannia Road/Tremaine Road.

Oakville North-West

- Highway 25/Britannia Road/Tremaine Road.

Oakville North-East

- Dundas Street/Highway 25/Britannia Road/Tremaine Road.

Milton South

- Highway 25/Britannia Road/Tremaine Road.

Milton North

- Guelph Line/Highway 401/Highway 25/Steeles Avenue/
Highway 25/Britannia Road/Tremaine Road.

Halton Hills East

- Regional Road 11/Trafalgar Road/Steeles Avenue/
Highway 25/Britannia Road/Tremaine Road.

Halton Hills West

- Highway 25/Steeles Avenue/Highway 25/Britannia Road/
Tremaine Road.

2.8 Site F

Site F is located north of the North Service Road, west of King Road. ~~The site entrance will be off the North Service Road.~~ The following highway/road sections are considered the most likely route components for travel between the zone centre and Site F:

Burlington North-West

- North Service Road.

Burlington South

- Q.E.W./Brant Street/North Service Road.

Burlington North

- Guelph Line/Q.E.W./Brant Street/North Service Road.

Oakville South

- Q.E.W./Brant Street//North Service Road.

Oakville North-West

- Highway 25/Q.E.W./Brant Street/North Service Road

Oakville North-East

- Dundas Street/Highway 25/Q.E.W./Brant Street/North Service Road.

Milton South

- Highway 25/Q.E.W./Brant Street/North Service Road.

Milton North

- Guelph Line/Q.E.W./Brant Street/North Service Road.

Halton Hills East

- Regional Road 11/Trafalgar Road/Dundas Street/
Highway 25/Q.E.W./Brant Street/North Service Road.

Halton Hills West

- Highway 25/Steeles Avenue/Highway 25/Q.E.W./Brant Street/
North Service Road.

3.0 SITE ACCESS REQUIREMENTS

3.1 Introduction

Each Candidate Site and then, Site Plan Area, was investigated for off site local improvements required to accommodate vehicles delivering refuse for landfill. This comparative assessment of road improvements assumed a standard "T" intersection requirement at each site access location. In addition, necessary road improvements were identified where haulage vehicles required travel along local roads in the vicinity of each Site.

Main 'feeder' haulage routes to each site were considered appropriate for haulage vehicles only if presently constructed to adequate standards. Generally, these standards require the following:

- ① paved surface (7.5 m in width);
- ② adequate shoulders (2.5 m/.5 m paved);
- ③ sufficient road bed depth (Regional standards);
- ④ adequate road bed drainage.

Specific details of road improvements are contained in Appendix B and summarized on Exhibits 1-6.

3.2 Site A

The original site access location for this alternative was located on Burnhamthorpe Road just west of the Ninth Line. However, due to the resultant requirements to upgrade Burnhamthorpe Road east of Trafalgar Road to the site entrance and the land use/social impacts of utilizing this road as the main access to the Site, it was concluded that a more appropriate access location would be directly off Trafalgar Road via a new east-west entrance road that would extend adjacent to (and south of)

Highway 403. The access off Trafalgar Road would be situated mid-way between Burnhamthorpe Road and the future south ramp terminal intersection of Trafalgar Road with Highway 403. A 30 m right-of-way will be required for this road. (Refer to Exhibit 1).

The following 'external' road improvements have been identified for this site:

Entrance Road (length - 1.6 km)	-	\$235,000.
Trafalgar Road improvements at entrance	-	\$ 60,000.

A property requirement of approximately 4.8 ha will be necessary for the access road. The cost of this will be in addition to the above costs.

3.3 Site B

The original site access location for this alternative was on Burnhamthorpe Road. Due to concerns related to utilizing this road as the main access to the Site, it was concluded that a more appropriate location would be directly off Trafalgar Road. (Refer to Exhibit 2).

The only identified external road improvement associated with this Site is Trafalgar Road widening at the entrance (cost - \$60,000.).

3.4 Site C

The original access location for this alternative was on Burnhamthorpe Road. As with Sites A and B, due to concerns related to utilizing this road as the main access to the Site, it was concluded that a more appropriate location would be directly off Trafalgar Road. (Refer to Exhibit 3).

The only identified external road improvement associated with this alternative is Trafalgar Road widening at the entrance (cost - \$60,000.).

3.5 Site D

Site D access is directly off Highway 25. The only identified external road improvements associated with this alternative is Highway 25 widening at the site (cost - \$75,000.). (Refer to Exhibit 4).

3.6 Site E

Access to Site E is off Tremaine Road. Due to existing road conditions, complete reconstruction and widening of Britannia Road (Highway 25 to Tremaine Road) and Tremaine Road (Britannia Road to just north of the proposed entrance) is recommended along with associated intersection improvements. (Refer to Exhibit 5).

The total cost of these improvements is estimated at \$615,000.

3.7 Site F

Site F access is off the North Service Road at the location of the existing Burlington Landfill entrance. Recent construction of a right turn lane on the North Service Road at this location may lessen the extent of widening that will be necessary. However, to be consistent with the other Sites, standard widening was assumed a requirement.

The total cost of this widening is estimated at \$60,000.

4.0 TRAFFIC VOLUMES AND ARRIVAL CHARACTERISTICS

4.1 Introduction

In order to predict relative differences in the traffic impacts among the Candidate Sites, the approximate number of future arrivals to each Site was estimated. The differences in the distribution of these vehicles on the Region's road network was examined to evaluate the relative impacts of each Site.

It should be stressed that only a relative impact assessment was considered appropriate for this stage of the study. The siting of a landfill does not, in itself, generate vehicles hauling refuse. It redistributes these vehicles throughout the available road network. It is this redistribution of haulage vehicles and the related impacts that was used to evaluate transportation differences among the routes. The impact assessment then concentrated on the use of roads considered inappropriate for haulage vehicles. The data presented in this section of the report was derived for this type of assessment.

It was assumed that to each alternative Site, the same numbers of vehicles would be delivering refuse. It was further assumed that the distribution of vehicle types would also be the same to each Site (i.e., large trucks, pick-ups/vans, cars with trailers and cars). Therefore, for a comparative assessment of transportation aspects related to haulage, similar arrival characteristics will exist for each Site, differing only in arrival orientation. The assessment of likely haulage traffic volumes and arrival characteristics was carried out to give a general indication of haulage vehicle arrival aspects associated with any of the six Sites and the approximate origin (by waste zone) of these vehicles.

4.2 Existing Arrival and Weight Statistics - Burlington Landfill Site

The last complete year of records for the operation of the existing Burlington Landfill Site that was available was used as the basis of assessing arrival characteristics (January through December, 1983). Weekday and Saturday statistics have been summarized separately due to the different nature of arrivals for these two periods.

Tables 1 through 5 summarize the findings.

Table 1 indicates the monthly distribution of the following types of vehicles delivering waste to Burlington (for weekdays only):

- Large Trucks;
- Pick-Up Trucks and Vans;
- Cars with Trailers;
- Cars without Trailers.

Table 2 summarizes the same information for Saturdays. The period from May to August contains the peak weekday deliveries (42% of total arrivals) with the month of June being the highest single month. On Saturdays, the highest noted month was July with a significant drop in arrivals in the winter months (January, February, March, December).

Utilizing the yearly totals, in 1983 the following was the distribution in the types of vehicles arriving at the Burlington Landfill Site:

*coincides
with when
people will
be out the
most as
in Bayview
Park.*

	<u>Weekdays</u>	<u>Saturdays</u>
Large Trucks	47%	7%
Pick-Ups/Vans	36%	41%
Cars with Trailers	3%	14%
Cars	14%	38%
Total	100%	100%

Table 3 summarizes the average number of vehicles arriving per day for weekdays and Saturdays summarized by month during 1983. The months of May through August generally contain the highest average daily arrivals and there is a considerable variance in average arrivals throughout the year on both weekdays and Saturdays.

Table 4 summarizes the total recorded weight processed at the Burlington Landfill Site in 1983, summarized by month. The same general trends of summer peaks and considerable monthly variance are evident.

wasn't that a down year waste wise?

Table 5 indicates weekday and Saturday delivery weight averages.

4.3 Vehicle Arrival Projections - 1988, 1996 & 2008

Table 6 contains the weight of refuse to be delivered directly to the landfill site for the years 1988, 1996, and 2008. Not included in these totals is landfill 'bound' waste from any energy from waste (EFW) facilities that may be in place in the Region in 2008.

Utilizing the same vehicle/weight relationships observed during 1983, Tables 7 and 8 were developed. These tables show approximate haulage vehicle distributions in the Region. These numbers were developed assuming that each waste zone would exhibit identical haulage characteristics (vehicle/weight relationship, yearly distribution). For

each year, the 'average' weekday and Saturday numbers reflect a time of year condition corresponding to the highest delivery periods. For this reason, they are considered to represent a 'design condition' that would represent a high or critical day to be used for impact assessment. As can be seen from these tables, considerable variance exists in the numbers of vehicles generated by each waste zone.

TABLE 1

1983 Arrival Statistics - Burlington Landfill Site

Weekday Arrivals - By Vehicle Classification

Month	Delivery Days	Large Trucks	P/U Trucks & Vans	Cars With Trailers	Cars	Total
January	21	2,593	1,241	74	346	4,254
February	20	2,267	1,061	67	263	3,658
March	23	2,637	1,516	161	421	4,735
April	21	2,657	2,046	259	681	5,643
May	22	3,251	2,576	128	877	6,832
June	22	3,003	2,834	229	1,215	7,281
July	21	2,564	2,878	190	1,453	7,085
August	23	2,807	2,776	184	1,487	7,254
September	22	2,603	2,383	154	1,068	6,208
October	21	2,537	2,133	207	826	5,703
November	22	2,652	2,015	107	603	5,377
December	22	2,313	1,336	68	642	4,359
TOTAL	260	31,884	24,795	1,828	9,882	68,389

1
3251 May 83
22 ~~large~~ trucks a day

10 hours
14.8 large trucks an hour

117 P/U trucks a day
11.7 hours.

Giffels Associates Ltd.
November, 1984

TABLE 2
1983 Arrival Statistics - Burlington Landfill Site
Saturday Arrivals - By Vehicle Classification

Month	Delivery Days	Large Trucks	P/U Trucks & Vans	Cars With Trailers	Cars	Total
January	4	52	293	42	218	605
February	4	62	299	42	182	585
March	4	77	367	92	287	823
April	5	136	957	310	580	1,983
May	4	165	852	302	557	1,876
June	4	110	736	267	731	1,844
July	5	135	750	299	843	2,027
August	4	89	589	248	655	1,581
September	4	109	422	216	588	1,335
October	5	129	837	322	716	2,004
November	4	91	492	207	499	1,289
December	<u>5</u>	<u>112</u>	<u>342</u>	<u>65</u>	<u>546</u>	<u>1,065</u>
TOTAL	52	1,267	6,936	2,412	6,402	17,017

Giffels Associates Ltd.
November, 1984

TABLE 3

1983 Arrival Statistics - Burlington Landfill Site

Average Vehicle Arrivals Per Day

<u>Month</u>	<u>Weekday</u>	<u>Saturday</u>
January	203	151
February	183	146
March	206	206
April	269	397
May	311	469
June	331	461
July	337	405
August	315	395
September	282	334
October	272	401
November	244	322
December	198	213

148 large } 265
117 PB

large trucks
or pickup
trucks
or
Jeno

TABLE 4

1983 Weight Statistics (Tonnes) - Burlington Landfill Site

Weekdays and Saturdays

Month	Total Weight	<u>Total Weekday</u>		<u>Total Saturday</u>	
		<u>Weight</u>	<u>Days</u>	<u>Weight</u>	<u>Days</u>
January	11,169	10,922	21	247	4
February	10,275	10,037	20	238	4
March	12,546	12,279	23	267	4
April	13,129	12,437	21	692	5
May	18,278	17,467	22	811	4
June	16,689	16,215	22	474	4
July	13,520	12,956	21	564	5
August	15,577	15,084	23	493	4
September	14,699	14,225	22	474	4
October	14,262	13,625	21	637	5
November	15,102	14,588	22	514	4
December	<u>12,085</u>	<u>11,616</u>	<u>22</u>	<u>469</u>	<u>5</u>
TOTAL	167,331	161,451	260	5,880	52

↓
in 1983
Halton
generated
186000
tonnes

↓
it.

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November, 1984

TABLE 5

1983 Weight Statistics (Tonnes) - Burlington Landfill Site
Average for Weekdays and Saturdays

<u>Month</u>	<u>Weekday</u>	<u>Saturday</u>
January	520	62
February	502	60
March	534	67
April	592	138
May	794	203
June	737	119
July	617	113
August	656	123
September	647	119
October	649	127
November	663	129
December	528	94

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November, 1984

Table 6
Waste Distribution by Zone (Landfill Component)*
(Tonnes)

Waste Zone	1988 (7 months)		1996 (12 months)		2008 (5 months)	
	Weight	%	Weight	%	Weight	%
<u>Burlington</u>						
North-West	2,298	2%	4,180	2%	1,010	1%
South	52,041	39%	95,337	36%	27,669	36%
North	1,351	1%	2,612	1%	855	1%
<u>Oakville</u>						
South	49,878	37%	96,121	37%	27,280	35%
North-West	270	<1%	522	<1%	621	1%
North-East	3,244	2%	11,754	4%	5,285	7%
<u>Milton</u>						
South	7,975	6%	14,365	6%	4,042	5%
North	1,622	1%	3,135	1%	932	1%
<u>Halton Hills</u>						
East	11,895	9%	24,814	10%	7,849	10%
West	4,596	3%	8,358	3%	2,176	3%
TOTAL	135,170	100%	261,198	100%	77,719	100%

(*) Source: C.N. Watson - December 1984

Table 7

Number of Haulage Vehicle Trips Per Day (Design Condition)*

(includes large trucks, pick-ups, vans, cars with trailers, cars)

Average Weekday - One Way

Source Waste Zone	1988	1996	2008
<u>Burlington</u>			
North-West	9	10	4
South	171	187	133
North	4	5	4
<u>Oakville</u>			
South	163	192	129
North-West	1	1	3
North-East	9	21	26
<u>Milton</u>			
South	26	31	19
North	4	5	4
<u>Halton Hills</u>			
East	40	52	37
West	13	16	11
TOTAL ARRIVALS	440	520	370

(*) Approximate Only - for comparative assessment of alternative sites.

Giffels Associates Limited
December, 1984

Table 8

Number of Haulage Vehicle Trips Per Day (Design Condition)*

(includes large trucks, pick-ups, vans, cars with trailers, cars)

Average Saturday - One Way

Source Waste Zone	1988	1996	2008
<u>Burlington</u>			
North-West	12	14	6
South	237	258	201
North	6	7	6
<u>Oakville</u>			
South	226	267	195
North-West	1	1	5
North-East	13	29	39
<u>Milton</u>			
South	36	43	29
North	6	7	6
<u>Halton Hills</u>			
East	55	72	56
West	18	22	17
TOTAL	610	720	560

(*) Approximate Only - for comparative assessment of alternative sites.

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December, 1984

5.0 TRAVEL TIMES AND DISTANCES

5.1 Introduction

Travel times and distances were calculated along each of the identified haulage routes. Travel times were determined based on representative travel speeds for haulage vehicles assuming appropriate off-peak traffic conditions. The following travel speeds were applied:

1)	Major Provincial highway	90 km/hr	} Hwy 25 / Dundas
2)	Provincial highways	60-70 km/hr	
3)	Arterials, concession roads	30-60 km/hr	

Tables 9 and 10 illustrate the resultant travel times and distances to each site from each waste zone.

The future highway facilities discussed previously (refer to Section 2.2) were assessed to see how their use by haulage vehicles would affect travel times and distances. The following general comments are worthy of note:

- The completion of Highway 403 in the Region will reduce travel times to Sites A, B and C from Burlington (Zones 1 to 4) from between approximately 1 minute to almost 5 minutes, although travel distances will be greater (Refer to Appendix G).
- Highway 403 will be of benefit to 5 out of the 10 zones for haulage to Site F. The average reduction in travel time if Highway 403 is used from these zones is 2.5 minutes. Travel distances would not be significantly different (Refer to Appendix G).
- The main access to Site F via the future Brant Road/Q.E.W. interchange results in a time saving of 1.55 minutes and a

distance reduction of 3.30 km (one-way trip) compared to use of the future Waterdown Road/Q.E.W. interchange. Use of the future Brant Street/Q.E.W. interchange will result in a general reduction in travel time (1.20 minutes) and travel distance (0.6 km) compared to the 'existing' route (Plains Road, Brant Street).

5.2 Service and Operations Index

In order to obtain an indication of driver convenience, a "Service and Operations Index" was developed to describe, in general terms, the relative driver service potential to each Site.

Initially, total vehicle time (minutes x number of vehicles) and distance (distance x number of vehicles) figures were determined for each site based on the average number of haul trips on a weekday for the years 1988, 1996 and 2008. The results are summarized in Tables 11 and 12 respectively.

By utilizing this data, an appropriate time and distance index was then calculated for each candidate Site. The results are outlined in Table 13 and summarized in the following discussion. The differences are not considered significant.

A time and distance index of 1.00 was designated for Sites A, B and C for each analysis year since these sites provided the best overall driver service potential. The results are identical for these sites since the Regional travel model assumes a common end point for haulage trips to these sites.

The time and distance index for Site D was slightly higher for each analysis year. This difference was influenced mainly by the increased haulage distances and travel times for drivers from the Oakville area.

Site E had a time index that ranged from 1.32 to 1.34 and a distance index between 1.36 and 1.41. These figures indicated that driver service potential was least, overall, for Site E, influenced mainly by the increased haulage times and distances from both the Oakville and Burlington areas.

Similarly, Site F had higher total haulage times and distances. The time index ranged from 1.10 to 1.18 while the distance index varied between 1.15 and 1.26. The lower time index values reflected the high proportion of freeway travel to Site F that resulted in overall reduction of travel times.

The following ranking of each Site's general driver convenience can be derived based on a combined assessment of the time and distance index for each Candidate Site.

<u>Rank</u>	<u>Site</u>
1	A,B,C
4	D
5	F
6	E

sep. 2-1
↓

Table 9

Time (minutes) From Zone Centres to Sites *

ZONE	A,B,C	D	E	F
1	22.3	19.21	22.98	1.75
2	17.76	14.68	18.45	4.73
3	18.94	16.71	12.94	13.85
4	8.23	5.14	8.91	14.27
5	9.24	15.94	19.71	17.07
6	1.89	11.49	15.26	20.61
7	14.87	7.49	8.69	26.90
8	22.21	17.48	18.68	28.00
9	27.25	22.52	23.72	41.93
10	21.57	25.54	26.74	44.07

* Based on the existing road network with the addition of a Brant Street/QEW interchange.

PM:sgr/S377

Table 10
Distance (km) From Zone Centres to Sites *

ZONE	A,B,C	D	E	F
1	28.7	25.1	29.5	1.7
2	21.9	18.3	22.7	5.2
3	22.1	19.5	15.1	13.5
4	9.6	6.0	10.4	17.5
5	7.2	18.4	22.8	21.9
6	2.2	13.4	17.8	24.9
7	18.3	7.7	9.1	31.2
8	29.6	20.2	21.6	30.0
9	33.3	23.9	25.3	47.4
10	24.7	28.3	29.7	51.8

* Based on the existing road network with the addition of a Brant Street/QEW interchange.

Table 11

Total Haulage Vehicle - Minutes *
(Using the Existing Road Network with a Brant Street/QEW Interchange)

TO		YEAR		
SITE	FROM	1988	1996	2008
A,B,C	Burlington	3,314	3,639	2,527
	Oakville	1,531	1,822	1,266
	Milton	476	572	372
	Halton Hills	1,217	1,558	1,098
	TOTAL	6,358	7,591	5,263
D	Burlington	2,750	3,021	2,096
	Oakville	2,706	3,306	2,370
	Milton	265	319	212
	Halton Hills	1,315	1,688	1,193
	TOTAL	7,036	8,334	5,871
E	Burlington	3,414	3,745	2,598
	Oakville	3,359	4,113	2,967
	Milton	301	362	240
	Halton Hills	1,378	1,770	1,250
	TOTAL	8,452	9,990	7,055
F	Burlington	880	971	691
	Oakville	2,981	3,724	2,781
	Milton	811	974	623
	Halton Hills	2,308	2,963	2,092
	TOTAL	6,980	8,632	6,187

(*) Sum of Travel Times X Average Number of Vehicles on Weekday
(refer to Table 7).

Table 12

Total Haulage Vehicle - Kilometres *
(Using the Existing Road Network with a Brant Street/QEW Interchange)

TO		YEAR		
SITE	FROM	1988	1996	2008
A,B,C	Burlington	4,091	4,492	3,116
	Oakville	1,204	1,438	1,015
	Milton	594	715	466
	Halton Hills	1,421	1,817	1,280
	TOTAL	7,310	8,462	5,877
D	Burlington	3,433	3,770	2,612
	Oakville	3,126	3,820	2,740
	Milton	281	340	227
	Halton Hills	1,443	1,854	1,310
	TOTAL	8,283	9,784	6,889
E	Burlington	4,027	4,615	3,197
	Oakville	3,886	4,762	3,435
	Milton	323	390	259
	Halton Hills	1,517	1,949	1,377
	TOTAL	9,933	11,716	8,268
F	Burlington	958	1,056	753
	Oakville	3,811	4,745	3,524
	Milton	931	1,117	713
	Halton Hills	2,688	3,452	2,438
	TOTAL	8,388	10,370	7,428

(*) Sum of Travel Distances X Average Number of Vehicles on Weekday (refer to Table 7).

Table 13

Service & Operations Index *
 (Using the Existing Road Network with a Brant Street/QEW Interchange)

	YEAR		
	1988	1996	2008
SITES A,B,C			
Time Index	1.00	1.00	1.00
Distance Index	1.00	1.00	1.00
SITE D			
Time Index	1.11	1.10	1.12
Distance Index	1.13	1.16	1.17
SITE E			
Time Index	1.33	1.32	1.34
Distance Index	1.36	1.38	1.41
SITE F			
Time Index	1.10	1.14	1.18
Distance Index	1.15	1.23	1.26

(*) Based on Total Haulage Vehicle-Minutes and Vehicle-Distance Data.
 (Refer to Tables 11 & 12)

6.0 IMPACTS AND EVALUATION

6.1 Introduction

As indicated previously, the transportation component of this assessment considered two basic evaluation factors:

- Traffic Safety;
- Traffic Service and Operations.

Traffic Safety relates primarily to the safe operation of both haulage traffic and other road users on routes identified as transporting haulage vehicles. Since public safety is a prime concern, mitigation measures have been incorporated into each Site, relative to access, which should ensure safe operation on the main 'feeder' route to each Site. This necessitated the following general mitigating measures:

- proper location of the site entrance (to avoid/minimize conflicts with local road traffic and other road users).
- road widenings at site entrances to minimize conflicts with through vehicles.
- general improvements (where appropriate) to upgrade road standards to make critical road links suitable for both haulage vehicles and local traffic.

In general, satisfactory access locations have been identified for most Sites off roads considered appropriate for haulage (Highway 25, Trafalgar Road, North Service Road). Therefore, with the recommended entrance treatments on these roads with Sites A, B, C, D, and F, these roads should continue to function in a safe manner for both haulage, local and other road users. No specific concerns have been identified with respect

to Traffic Safety aspects related to these Sites. Therefore, Traffic Safety differences among these Sites related to haulage are not considered significant.

Certain specific concerns have been expressed regarding the use of roads other than the identified main haulage route to access, in particular, Site F. For example, the use of Brant Street south from Dundas Street for some haulage trucks from Oakville (for example) would introduce additional trucks along a road section with potential conflicts, with local traffic and, with the relatively high number of school children crossing Brant Street. With any of the six Site Plan Areas, the use of alternatives to the identified main haulage route could place truck traffic on roads with greater potential vehicle and pedestrian conflicts (local traffic, agricultural vehicles, pedestrians, etc.).

Due to the relative density of the existing road network in the south Burlington area, more alternative routes exist to Site F (in relation to the other sites) that could be utilized by some haulage vehicles. However, the relative high levels of existing and projected traffic along these road sections (Brant Street, Guelph Line for example) tends to dilute the effect of the possible introduction of additional trucks. Refer to Appendix F for an indication of existing and projected background traffic levels on the Region's road network.

The arterial road classification and standard, the existing (and proposed) width of many of these roads (4 to 6 lanes) and the relatively high levels of background traffic in Burlington are an indication that these roads are generally appropriate for truck traffic and could absorb some additional trucks without a perceptible increase in conflict potential.

However, the majority of haulage trucks accessing each Site will utilize the identified main haulage routes and the relatively low numbers of

trucks on other possible routes, although potentially a concern, are not considered significant enough to increase traffic or pedestrian conflicts.

Only with Site E, which utilizes local roads as the main access, has potential conflicts with local traffic been identified as a concern. However, due to the low volumes of traffic on Britannia and Tremaine Roads and the infrequency of entrances along these roads (Refer to Appendix 5), potential traffic conflicts with haulage vehicles should be relatively low.

An additional aspect related to Traffic Safety is the general distribution of haulage vehicles throughout the Region associated with each Site. Trips from certain specific waste zones may, for portions of the route to the landfill site, require travel along road links not considered appropriate for haulage vehicles. These have been identified for each alternative Site (Refer to Section 6.2).

Traffic Service and Operations relates to the service, provided to, and the operational characteristics of haulage. The assessment identified two main aspects of the site performance:

1) Quality of Main Feeder Routes

(i.e. relatively high speed or high standard arterials involving fewer stops or turns through intersections, will provide a higher level of service for the haulage of waste).

2) Service and Operations Index

(i.e. relative indication of potential driver convenience).

As was the case for Traffic Safety, in general, a relatively high level of service has been ensured for most Sites due to the quality of the main 'feeder' routes to each one. Where appropriate, differences have been noted. However, this transportation factor is not related to Public Health and Safety considerations and therefore its relative weight in the overall evaluation is not as high as the Traffic Safety Factor.

6.2 Site A

The following is a summary of the main transportation aspects associated with Site A:

Traffic Safety

- Some potential conflict with local traffic due to the use of Trafalgar Road as the main 'feeder' route to this site (Trafalgar Road is the main access into Oakville for both local and general traffic from the north).
- No safety concerns identified at the entrance to the site.
- Requires minimal use of local roads for main access.
- There are no identified concerns related to using road links considered inappropriate for haulage vehicles travelling between the waste zones and the site.

Traffic Service and Operations

- Trafalgar Road is generally appropriate for the main access route to the site due to the road standard and classification.
- Good access from majority of Region.

- Minimal use of local roads.
- No operating concerns identified at the entrance to the site.

6.3 Site B

The same comments as Site A.

6.4 Site C

The same comments as Site A.

6.5 Site D

The following is a summary of the main transportation aspects associated with Site D:

Traffic Safety

- ① Requires minimal use of local roads for main access.
- ② No safety concerns identified at the entrance to the Site.
- ③ Some potential conflict with local traffic in Milton's urban area (from Halton Hills and Milton North waste zones).
- ④ Highway 25's role as the main north-south roadway serving the central portion of the Region appears to result in considerable use of this road for local, intra-region trips, particularly to access regional facilities in the general Milton area. Concern has been expressed regarding potential conflicts between this 'local' traffic and haulage vehicles.

Traffic Service and Operations

- Requires travel through the Milton urban area for trips from Halton Hills and Milton North waste zones. *these are minor & would happen if F chosen too*
- Good access from majority of Region.
- Minimal use of local roads for main access.
- No operations concerns identified at the entrance to the Site.
- Difficult access from Burlington North waste zone (low number of trips affected).

6.6 Site E

The following is a summary of the main transportation aspects associated with Site E:

Traffic Safety

- Considerable use of local roads (Britannia, Tremaine) resulting in potential conflict with local traffic.
- Requires truck turning at local road intersections.
- Requires haulage vehicles crossing at-grade railway.
- Some potential conflict with local traffic in Milton's urban area (from Halton Hills and Milton North waste zones).
- Highway 25's role as the main north-south roadway serving the central portion of the Region appears to result in considerable

use of this road for local, intra-region trips, particularly to access regional facilities in the general Milton area. Concern has been expressed regarding potential conflicts between this 'local' traffic and haulage vehicles.

- No safety concerns identified at entrance to Site.

Traffic Service and Operations

- Requires travel through the Milton urban area for trips from Halton Hills and Milton North waste zones.
- Fair access from majority of Region.
- Requires use of local roads.
- No operations concerns identified at the entrance to the Site.
- Difficult access from Burlington North waste zone (low number of trips affected).

6.7 Site F

The following is a summary of the main transportation aspects associated with Site F:

Traffic Safety

- Majority of access via Provincial Highways.
- Minimal use of local roads.
- No safety concerns identified at entrance.

AB

- Some potential conflict with local traffic on Brant Street and on the North Service Road.
- Some potential conflict with local traffic in Milton's urban area for trips from Halton Hills West waste zone.
- Use of Guelph Line is required from Milton North resulting in potential conflicts with local traffic (low number of trips affected).
- Requires use of the existing King Road/North Service Road intersection which has restricted approach widths and reduced sight lines from the south. This is not a major concern due to the existence of traffic signals and relatively good east to west travel characteristics through the intersection.
- Maintains general existing haulage truck routing creating the least amount of change to existing conditions.

ie continue to support them

Traffic Service and Operations

- Majority of access via Provincial Highways.
- Fair access from majority of Region.
- Minimal use of local roads.
- No operations concerns identified at the entrance to the Site.
- Requires use of lower standard road (Guelph Line) for trips from Milton North waste zone (low number of trips affected).

- Requires travel through the Milton urban area for trips from Halton Hills West waste zone.

6.8 General Mitigation Aspects

Typical mitigation measures to reduce negative transportation impacts related to the haulage of waste include the following:

1. Appropriate location of landfill entrance.
2. Improve road geometry (horizontal and vertical alignments) to acceptable standards.
3. Intersection improvements (e.g., lane additions, channelization, signalization, illumination) to accommodate truck traffic.
4. Improve road surface (e.g., pave existing gravel roads).
5. Improve road cross-section (e.g., road widening, shoulder widening).
6. Specify reduced speed limits in potential conflict areas.
7. Designation of haulage routes.
8. Use of transfer stations to reduce vehicle arrivals at landfill site.
9. Use of container stations to reduce vehicle arrivals at landfills site.

Where potential traffic safety concerns have been identified, mitigation measures have been incorporated into the conceptual design for the Site

Plan Area wherever possible. For example, with Sites A, B, C and D, originally contemplated site entrance locations were modified to remove them from local roads. Intersection improvements have been recommended at all Site Plan Area entrances to accommodate haulage traffic and to minimize conflicts with 'through' traffic. Road reconstruction is proposed with Site E to minimize conflicts and to make local roads more appropriate for haulage vehicles.

As a result, no major concerns have been identified in the operation of any of the six Sites related to general traffic safety. Therefore, no additional mitigation is proposed (or considered necessary) with respect to traffic safety. However, the overall level of impact associated with the transportation of waste within the Region would be affected with the adoption of certain specific mitigation measures such as the use of transfer and container stations. Use of these stations would influence haulage characteristics by generally reducing the number of haulage vehicles on the Region's road network. This would pertain equally to all Sites.

Use of container stations would generally reduce the number of smaller vehicle trips to the landfill Sites. The adoption of such facilities (e.g., one for each area municipality) would not affect the assessment or relative ranking of the six Sites presented in this report. The general result would be to lower the overall level of impact along the main haulage routes associated with all sites.

6.9 Summary of Evaluation

Essentially, all sites are considered acceptable from a transportation standpoint and the differences with respect to Traffic Safety and Traffic Service/Operations are not significant. A ranking with respect to both of these factors (most preferred to least preferred) is summarized below:

Rank

1
3
6

Site

D/F
A/B/C
E

PM:sgr/S365

H31 - Map 1

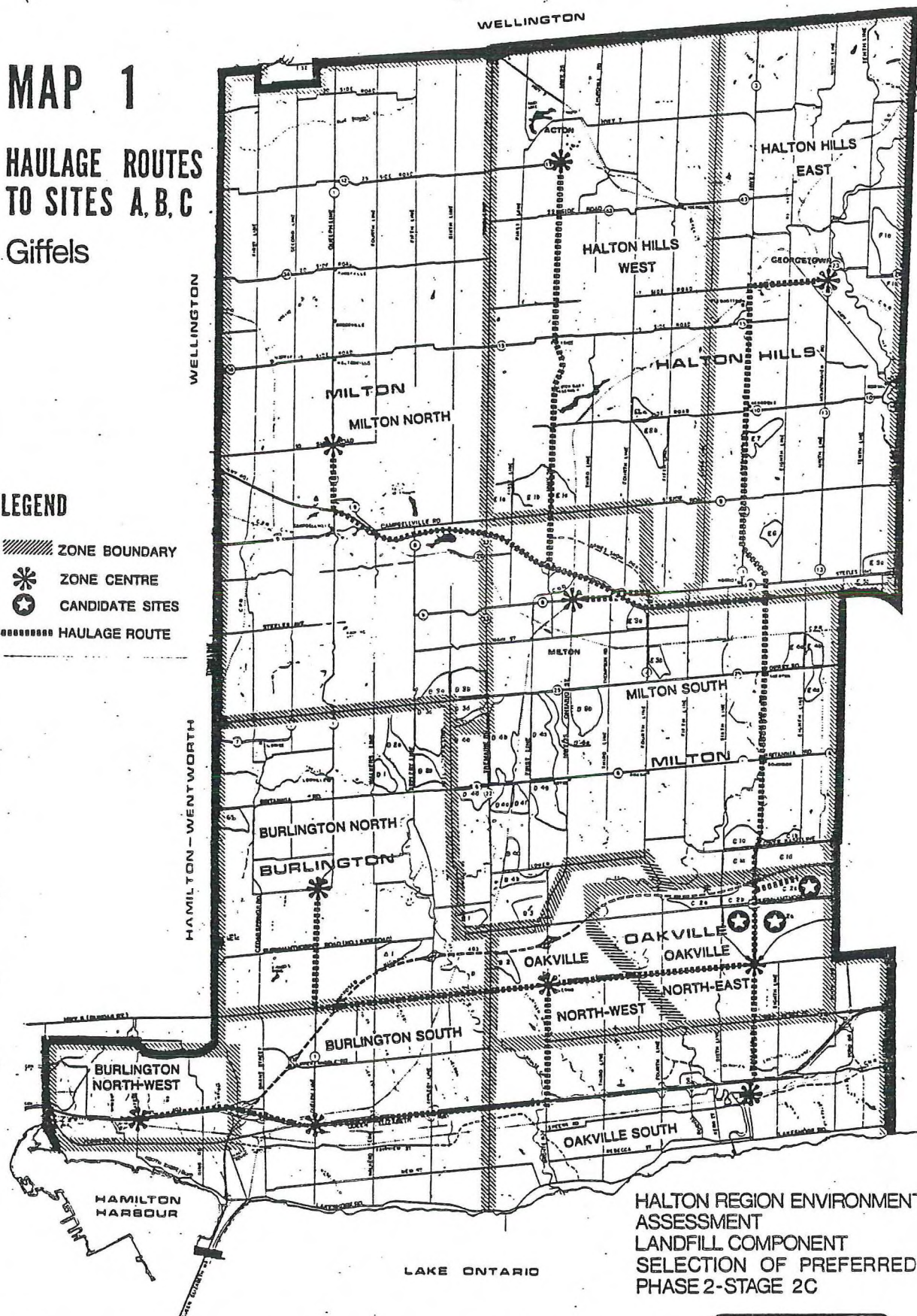
MAP 1

HAULAGE ROUTES TO SITES A, B, C

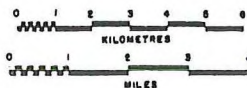
Giffels

LEGEND

-  ZONE BOUNDARY
-  ZONE CENTRE
-  CANDIDATE SITES
-  HAULAGE ROUTE



HALTON REGION ENVIRONMENTAL
ASSESSMENT
LANDFILL COMPONENT
SELECTION OF PREFERRED
PHASE 2-STAGE 2C



NOTE: ALIGNMENT OF HIGHWAY 403
IS AS SHOWN ON GDS MAPS.

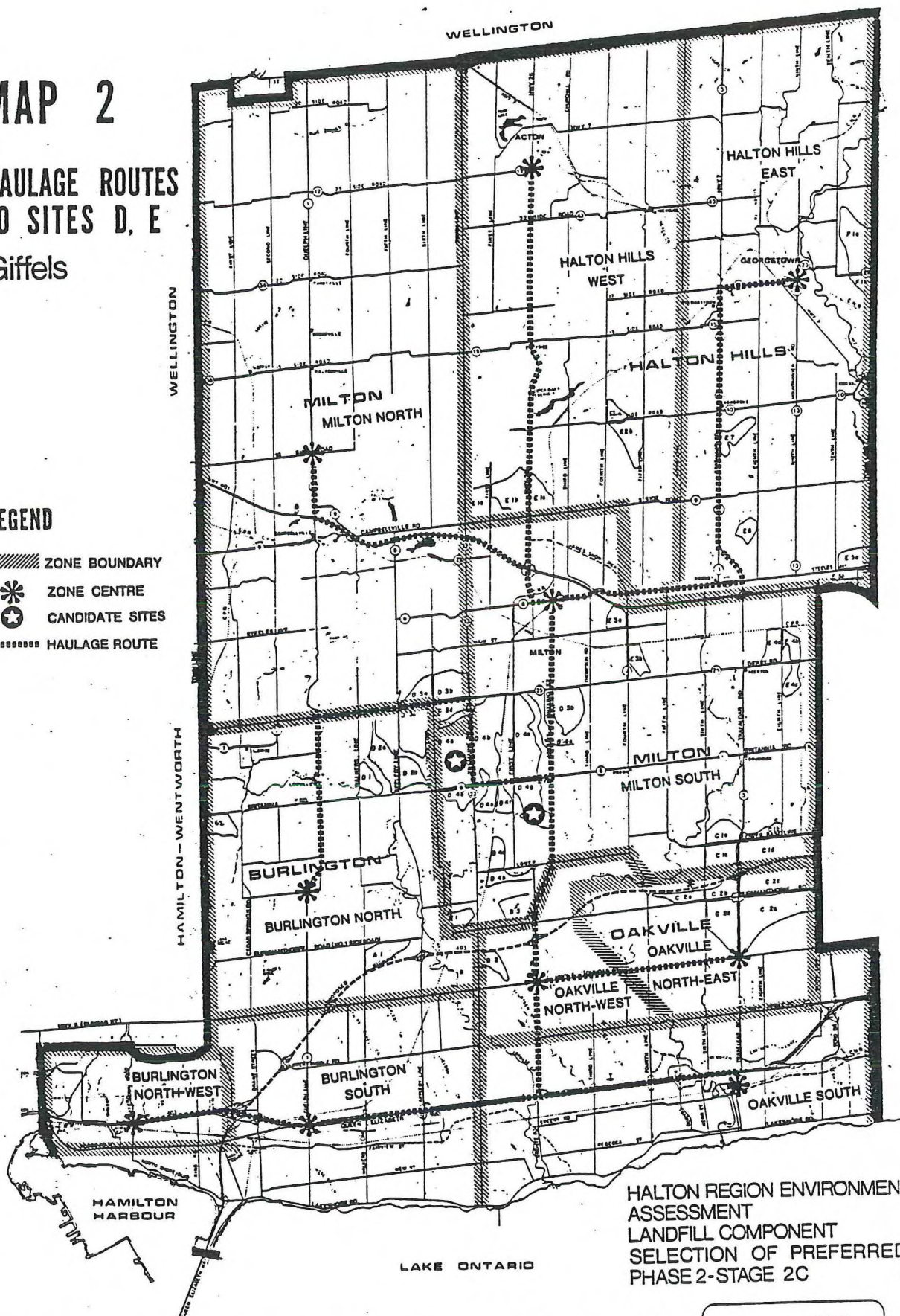


MAP 2

HAULAGE ROUTES TO SITES D, E Giffels

LEGEND

-  ZONE BOUNDARY
-  ZONE CENTRE
-  CANDIDATE SITES
-  HAULAGE ROUTE



HALTON REGION ENVIRONMENTAL
ASSESSMENT
LANDFILL COMPONENT
SELECTION OF PREFERRED
PHASE 2-STAGE 2C



* NOTE: ALIGNMENT OF HIGHWAY #403
IS AS SHOWN ON 0500 MAPS.



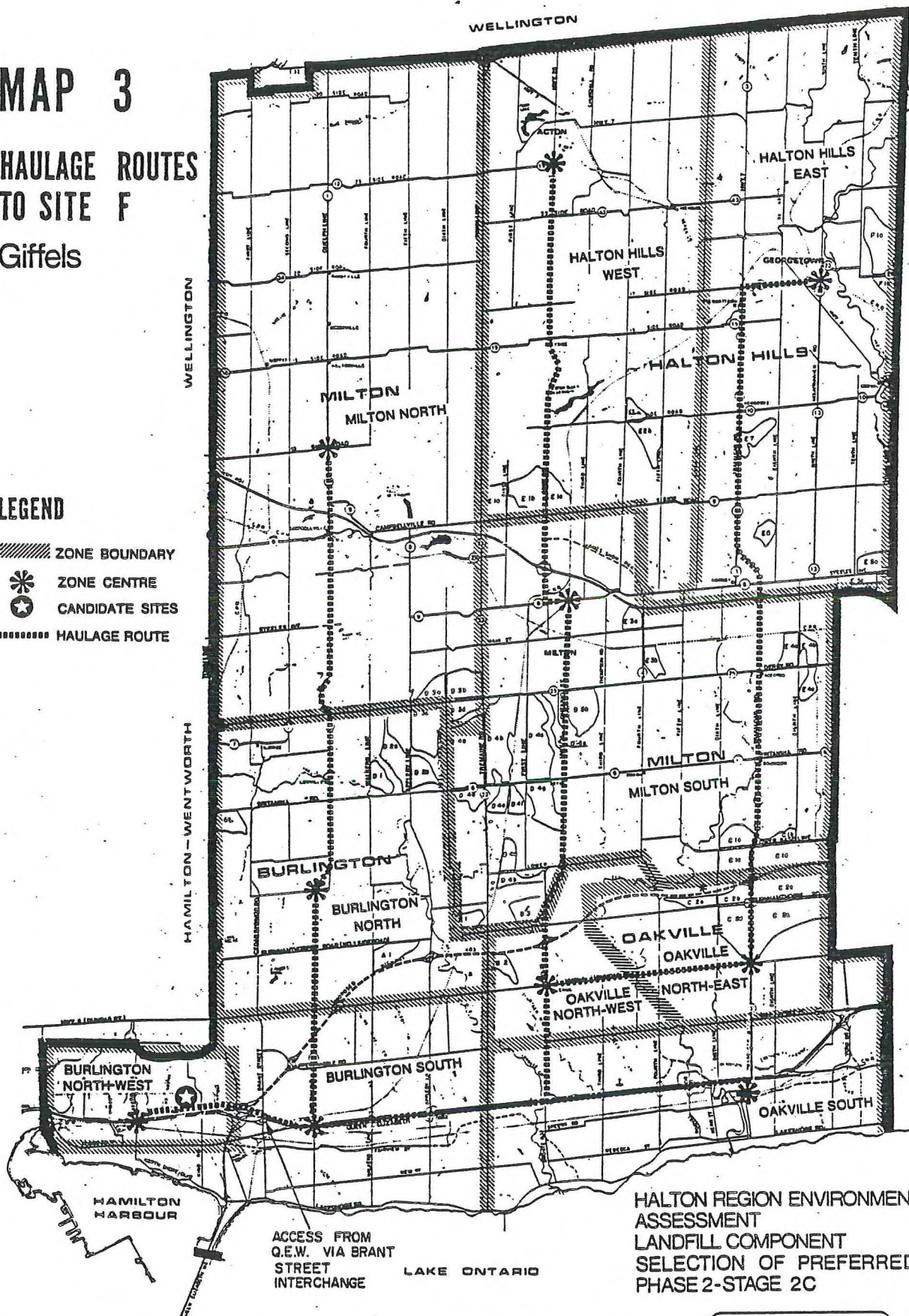
MAP 3

HAULAGE ROUTES TO SITE F

Giffels

LEGEND

-  ZONE BOUNDARY
-  ZONE CENTRE
-  CANDIDATE SITES
-  HAULAGE ROUTE



HALTON REGION ENVIRONMENT
ASSESSMENT
LANDFILL COMPONENT
SELECTION OF PREFERRED
PHASE 2-STAGE 2C

Walker Wright Young Associates Limited/Planning Consultants
15 Denison Avenue Toronto/Ontario M4V 1S8 416/968-3511



NOTE: ALIGNMENT OF HIGHWAY 404
IS SHOWN ON THIS MAP.



REVISED

APRIL / 95

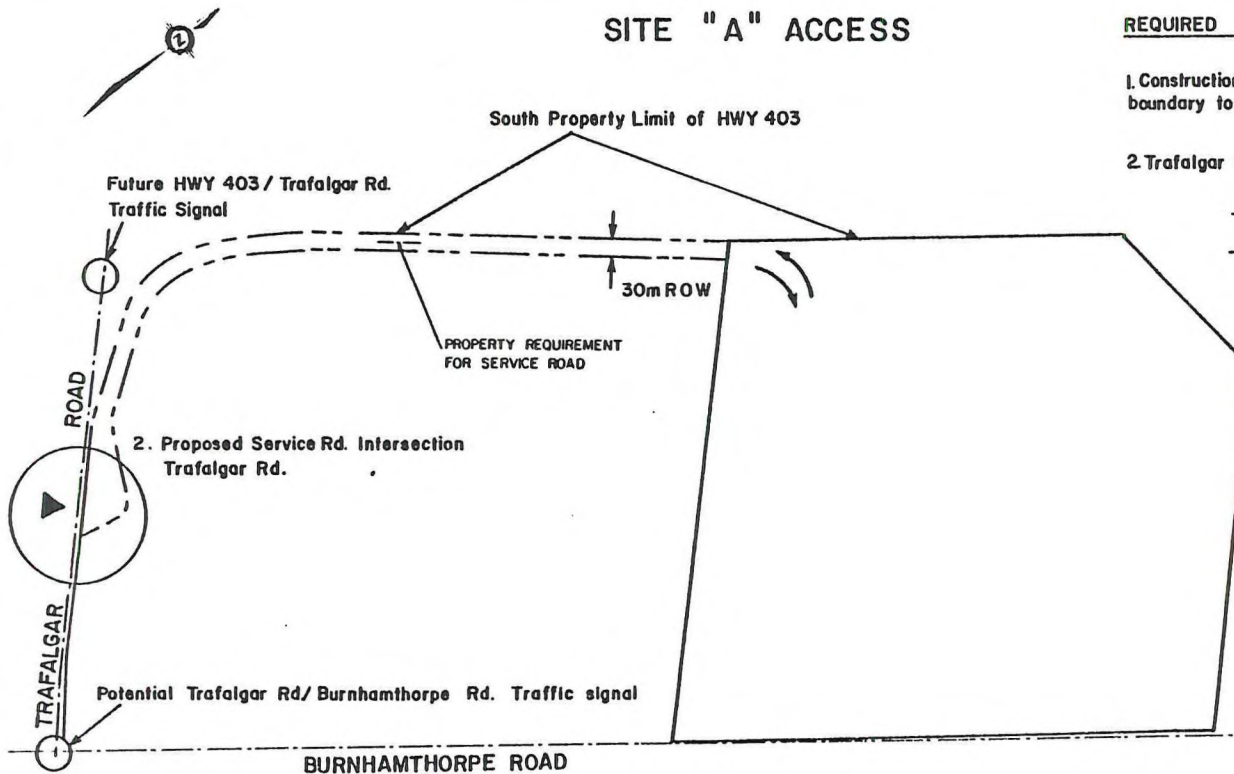
SITE "A" ACCESS

REQUIRED ROAD IMPROVEMENTS:

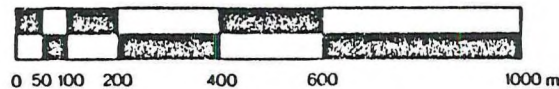
1. Construction of Service Road from North-West corner of site along HWY 403, boundary to connect to Trafalgar Rd.

2. Trafalgar Road

- provision for southbound left turn lane at Service Road entrance.
- traffic signals to be provided at entrance when (and if) warranted.



Scale



HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

SITE PLAN AREA 'A' - ACCESS

Giffels

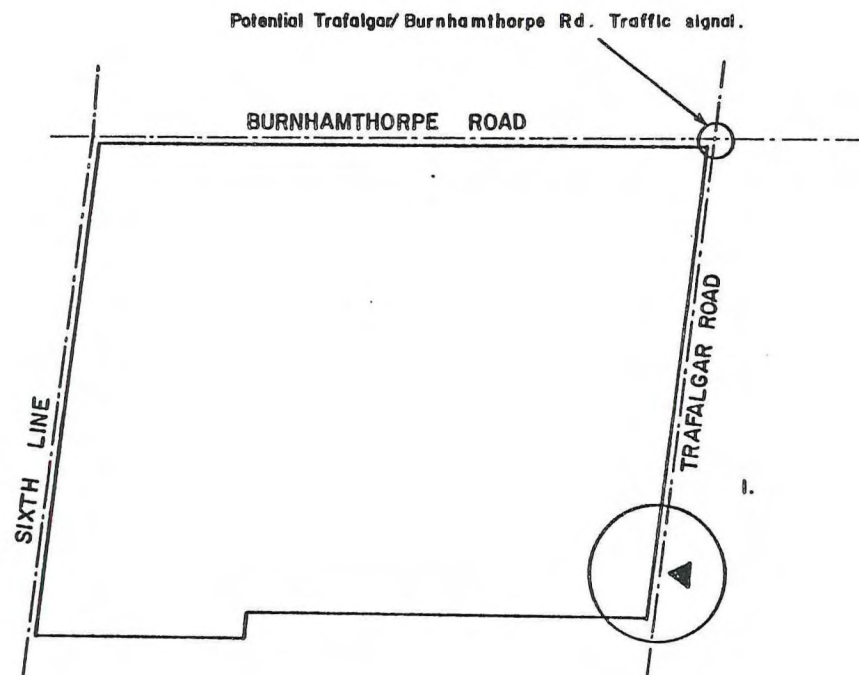
EXHIBIT I



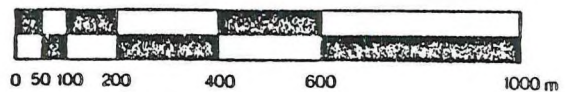
SITE "B" ACCESS

REQUIRED ROAD IMPROVEMENTS:

1. Widen Trafalgar Road to provide for northbound left hand turns at site entrance
2. Traffic signals to be provided at entrance when (and if) warranted.



Scale



HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

SITE PLAN AREA 'B' - ACCESS

Giffels

EXHIBIT 2

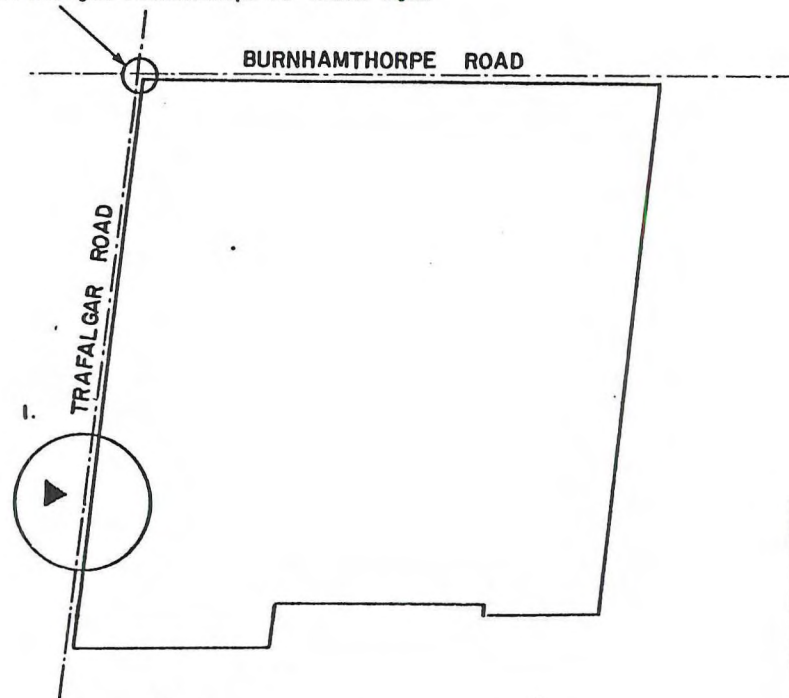


SITE "C" ACCESS

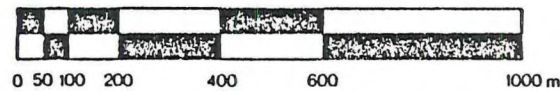
REQUIRED ROAD IMPROVEMENTS:

1. Widen Trafalgar Road to provide for southbound left hand turns at site entrance
2. Traffic signals to be provided at entrance when (and if) warranted

Potential Trafalgar / Burnhamthorpe Rd Traffic signal



Scale



HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

SITE PLAN AREA 'C'- ACCESS

Giffels

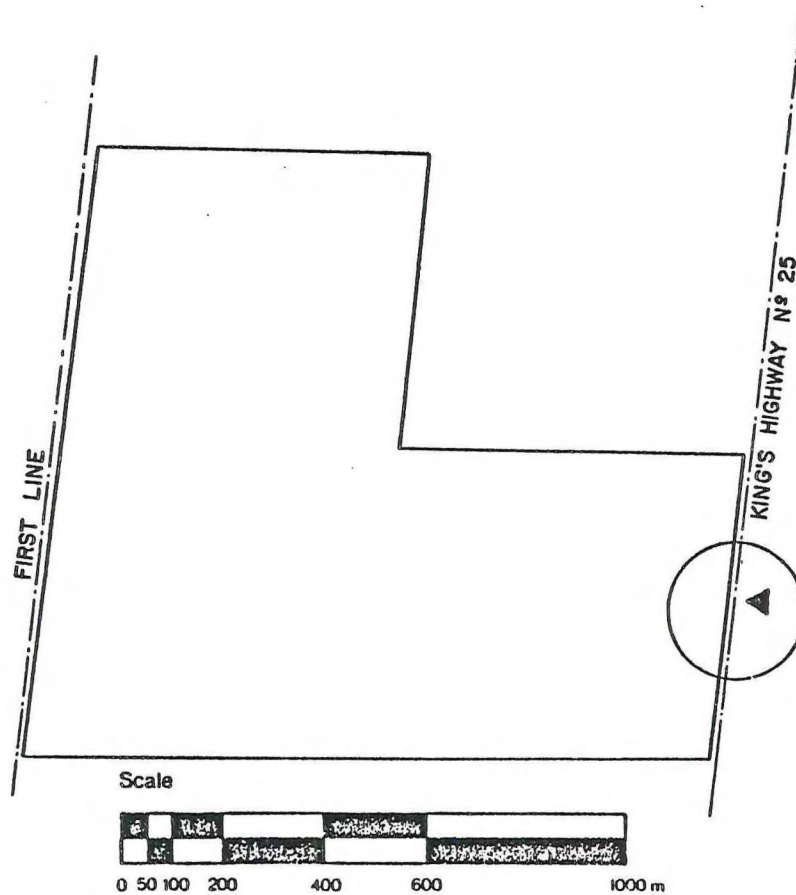
EXHIBIT 3

SITE "D" ACCESS

REQUIRED ROAD IMPROVEMENTS:

Widen HWY 25 to provide for southbound right hand turns and northbound left hand turns at site entrance

Traffic signals to be provided at entrance when (and if) warranted.

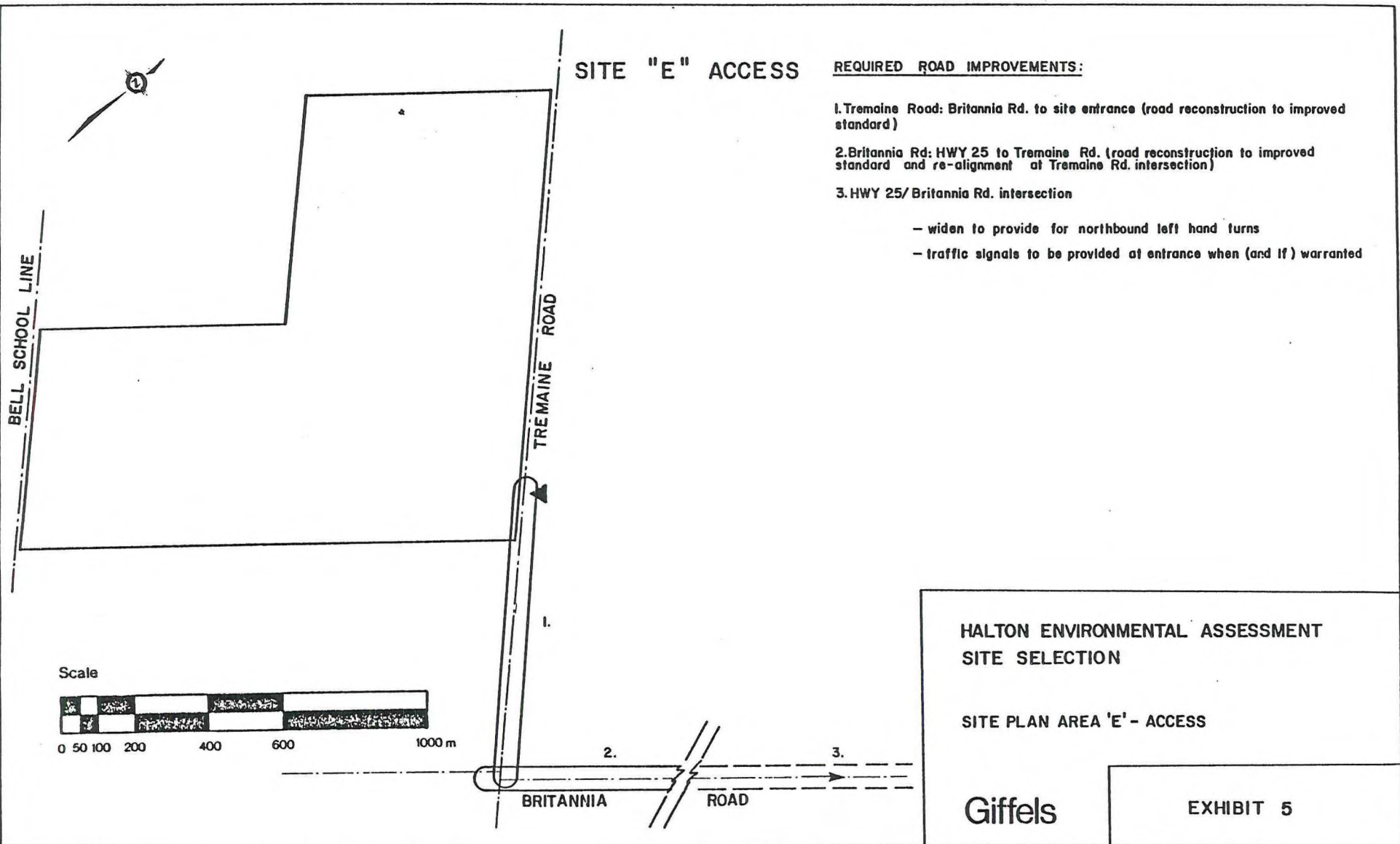


HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

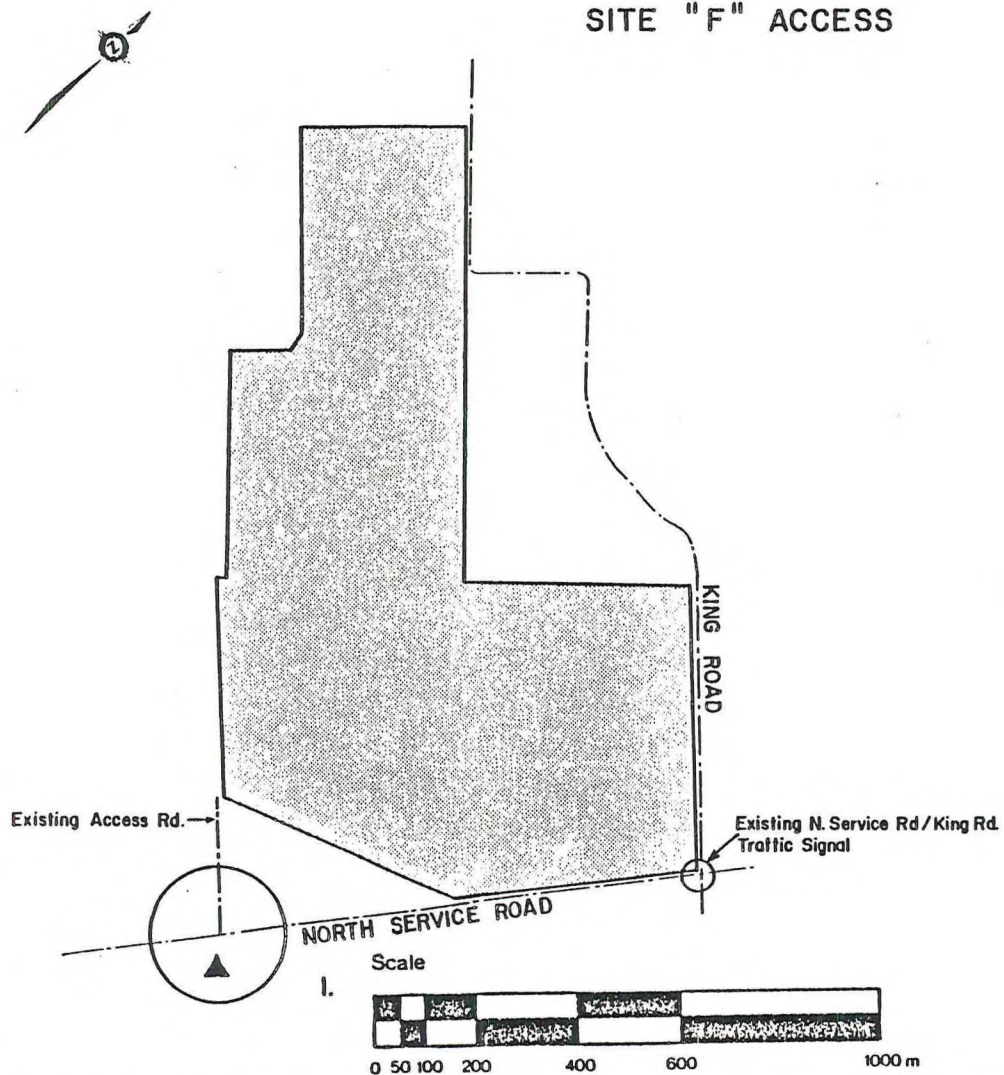
SITE PLAN AREA 'D' - ACCESS

Giffels

EXHIBIT 4



SITE "F" ACCESS



REQUIRED ROAD IMPROVEMENTS:

1. Existing access road Intersection at North Service Road - general modifications only
2. Traffic signals to be provided at entrance when (and if) warranted.

HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

SITE PLAN AREA 'F' - ACCESS

Giffels

EXHIBIT 6

APPENDIX A

Preliminary Cost Estimates for Road Improvements

DATE: December 11, 1984

TO: Project File W825904

FROM: D.R. Ivany

RE: Halton Environmental Assessment
Landfill Component
Stage 2C
Transportation Analysis
Giffels' Project No. W825904

Preliminary Cost Estimates for Road Improvements

SUMMARY

Site A	\$295,000.	1. New Service Road - \$235,000.
		2. Trafalgar Road - \$ 60,000.
Site B	\$.60,000.	
Site C	\$ 60,000.	
Site D	\$ 75,000.	
Site E	\$615,000.	1. Tremaine Road - \$120,000.
		2. Britannia Road - \$420,000.
		3. Highway 25 - \$ 75,000.
Site F	\$ 60,000.	

<u>SITE A</u>		<u>\$ Amount</u>
1.	Service Road Construction - 1.6 km	
	a) Excavation: 4,800 m ³ @ \$3.00/m ³	= \$ 14,400.
	b) Sub-Base: Supply & place Granular B 14,400 Tonnes @ \$4.50/T	= \$ 64,800.
	c) Base: 150 mm Asphalt 8,064 Tonnes @ \$6.00/T	= \$ 48,384.
	d) Pavement: 150 mm Asphalt 2,940 Tonnes @ \$20.00/T	= \$ 58,800.
	Sub-Total	\$186,384.
	e) Engineering & Contingencies: (25% of Sub-Total)	\$ 46,596.
	TOTAL	\$232,982.
	SAY	\$235,000.
2.	Trafalgar Road	
	Length of Construction (Widened Roadway)	
	300 m @ \$150/m	= \$ 45,000.
	Engineering & Contingencies: (25% of Sub-Total)	\$ 11,250.
	TOTAL	\$ 56,250.
	SAY	\$ 60,000.

SITES B & C

\$ Amount

1.	Trafalgar Road		
	Length of Construction (Widened Roadway)		
	300 m @ \$150/m	=	\$ 45,000.
	Engineering & Contingencies: (25% of Sub-Total)		\$ 11,250.
	TOTAL		\$ 56,250.
	SAY		\$ 60,000.

SITE D

\$ Amount

1.	Highway 25		
	Length of Construction (Widened Roadway)		
	400 m @ \$150/m	=	\$ 60,000.
	Engineering & Contingencies: (25% of Sub-Total)		\$ 15,000.
	TOTAL		\$ 75,000.

<u>SITE E</u>		<u>\$ Amount</u>
1.	Tremaine Road Reconstruction	
	Length of Construction	
	800 m @ \$120/m	= \$ 96,000.
	Engineering & Contingencies: (25% of Sub-Total)	\$ 24,000.
	TOTAL	<u>\$120,000.</u>
2.	Britannia Road Reconstruction & Realignment	
	Length of Construction	
	2,800 m @ \$120/m	= \$336,000.
	Engineering & Contingencies: (25% of Sub-Total)	\$ 84,000.
	TOTAL	<u>\$420,000.</u>
3.	Highway 25	
	Length of Construction (Widened Roadway)	
	400 m @ \$150/m	= \$ 60,000.
	Engineering & Contingencies: (25% of Sub-Total)	\$ 15,000.
	TOTAL	<u>\$ 75,000.</u>

I.O.C. to File W825904
December 11, 1984
Page 5

SITE F

\$ Amount

1.	North Service Road	
	Length of Construction (Widened Roadway)	
	300 m @ \$150/m	= \$ 45,000.
	Engineering & Contingencies:	\$ 11,250.
	(25% of Sub-Total)	
	TOTAL	\$ 56,250.
	SAY	\$ 60,000.

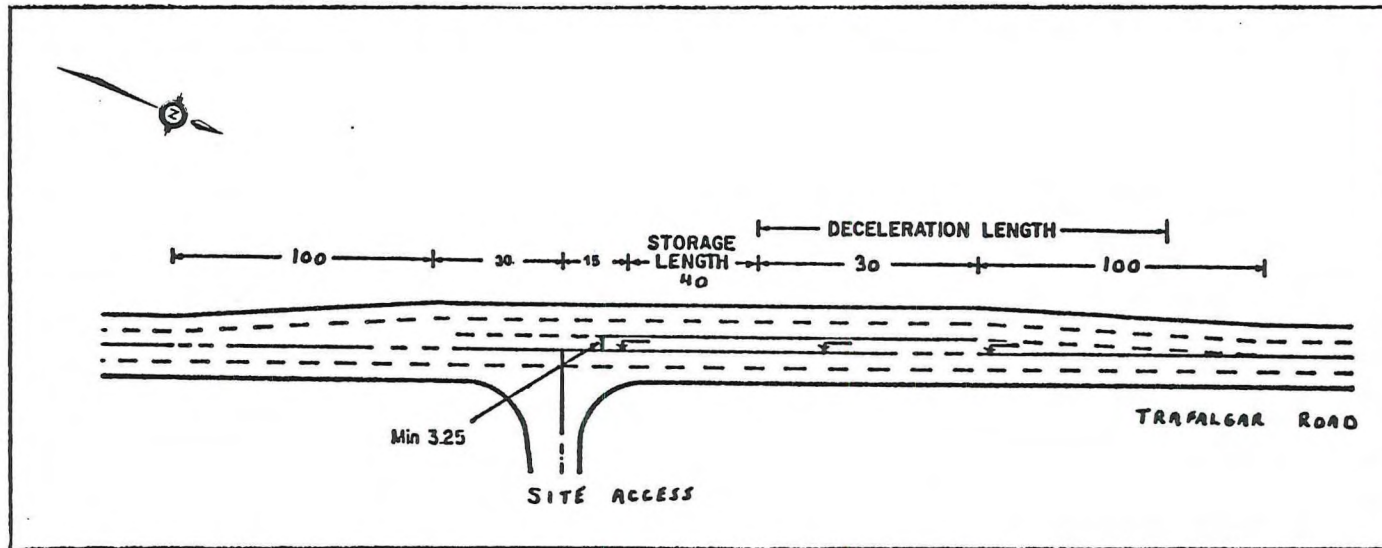


DRI:sgr/S375

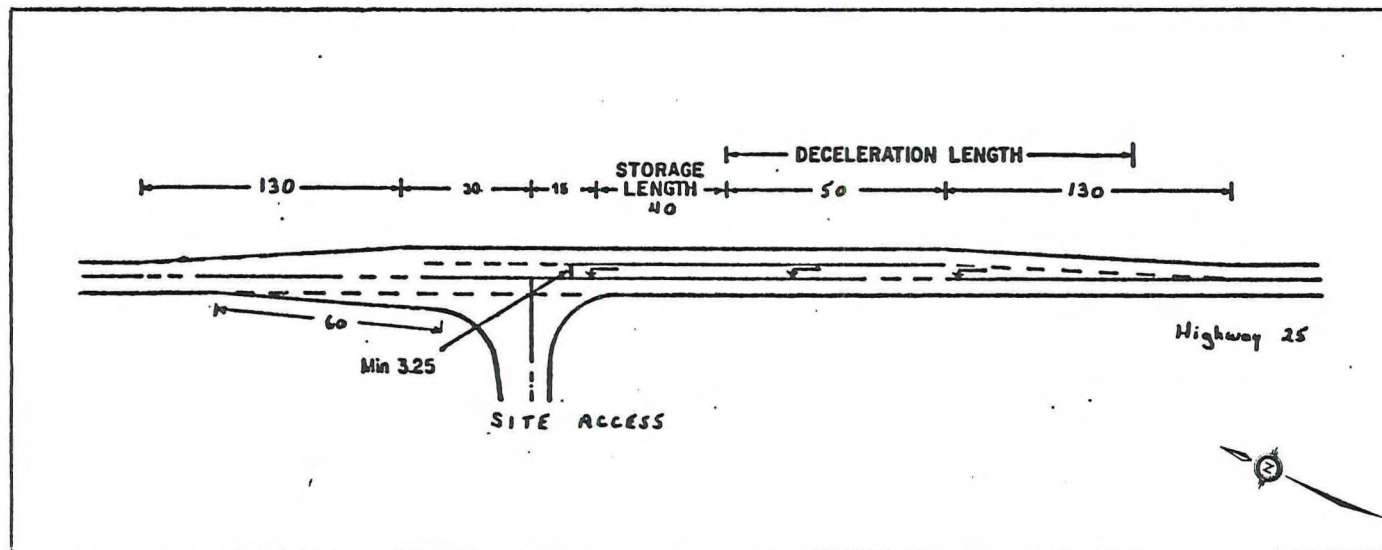
APPENDIX B

Assumed Road Improvements at Site Access Location

ASSUMED ROAD IMPROVEMENTS AT SITE ACCESS

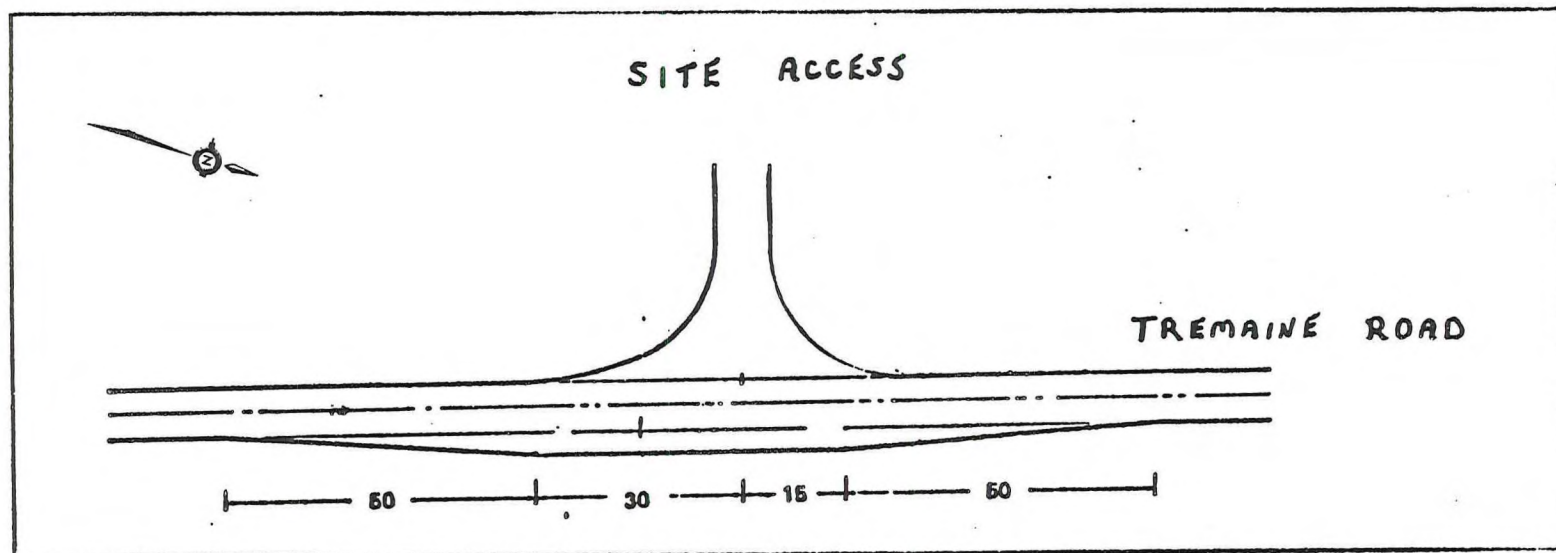


SITES A, B & C

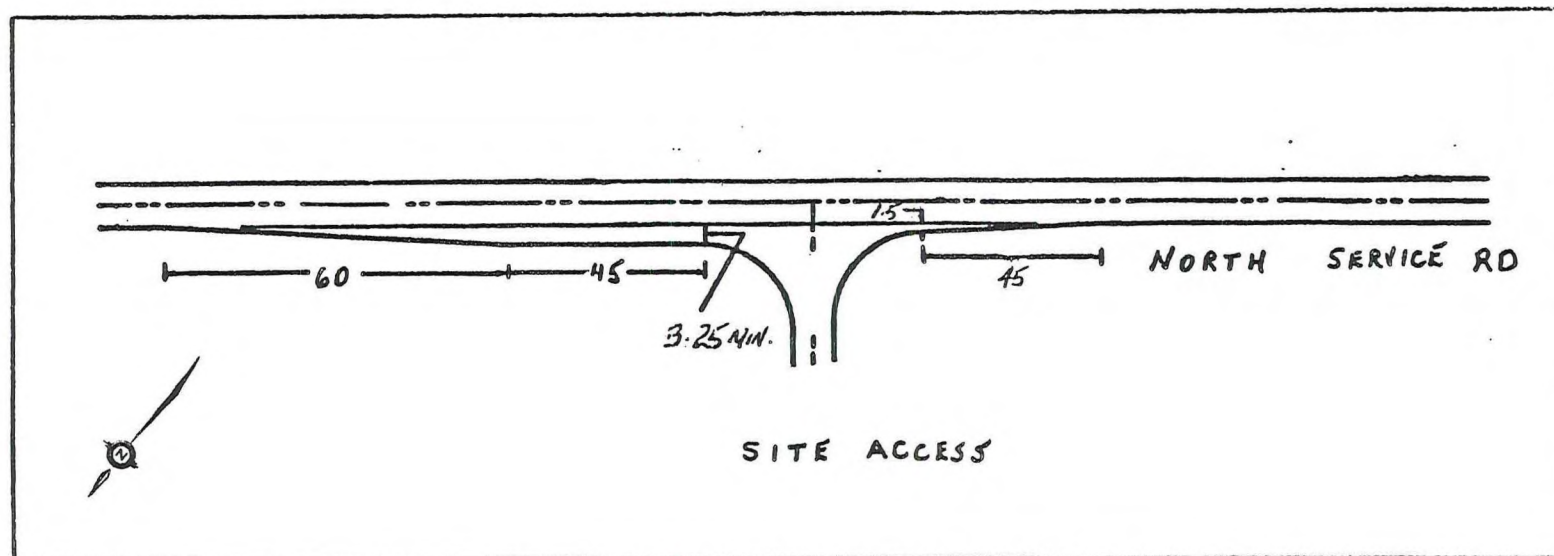


SITE D

ASSUMED ROAD IMPROVEMENTS AT SITE ACCESS



SITE E



SITE F

APPENDIX C
Road Maintenance Costs

DATE: December 11, 1984

TO: Project File W825904

FROM: D.R. Ivany

RE: Halton Environmental Assessment
Stage 2C
Transportation Analysis
Giffels' Project No. W825904
Road Maintenance Costs

Annual Surface Maintenance = \$4,827/km average
(1985 Dollars) (rural type)

Range from \$500/km (new road) to \$15,730/km (poor condition).

Source: T. Finelli, Region of Halton provided the above figures from the Pavement Management System Network Analysis Project for the Region of Halton; Report #3, Present Status Update and Priority Analysis, March 1984 by Pavement Management Systems Inc.

Average Annual Winter Maintenance = \$1,600/km

Source: B. Marshall, Regional of Halton provided above figure based on 1985 Winter Budget.

Based on the above information, a cost figure of \$2,500/km/yr was provided to C.N. Watson & Associates as an annual maintenance cost for the proposed new access road to Candidate Site A.

DRI:sgr/373

APPENDIX D

School Bus Assessment

DATE: December 11, 1984

TO: Project File W825904

FROM: D. R. Ivany

RE: Halton Environmental Assessment
Stage 2C
Landfill Component
Transportation Analysis
Giffels' Project No. W825904
School Bus Assessment

All school bus routes in the vicinity of the candidate landfill sites were reviewed with representatives of the Halton School Board and Separate School Board.

The major concern identified was the increased potential for accidents during the loading and unloading of school children on roads that presently do not experience high levels of traffic volume. In rural areas, buses are required to pick up children at their homes, therefore, any route with residential frontage is a potential school bus route. Haulage traffic should therefore be designated to other routes, if possible.

Residential frontage also exists on the major highways (e.g. Trafalgar Road and Highway 25) however, the traffic volumes on these roadways are at a level that designation of the roadway as a haul route would be relatively insignificant to the existing safety condition.

During the development of access routes to the candidate sites, local collector roads were avoided where possible. An additional means to mitigate the potential school bus/haulage traffic conflict would be to schedule landfill operations to avoid the times when school buses are on the road (i.e. 7:30 to 8:30 AM, 3:30 to 5:00 PM).

DRI:sgr/374

APPENDIX E

Local Entrances on Main Haul Route (Site E)

Local Entrances on Main Haul Route

Use of Local Roads (Site 'E')

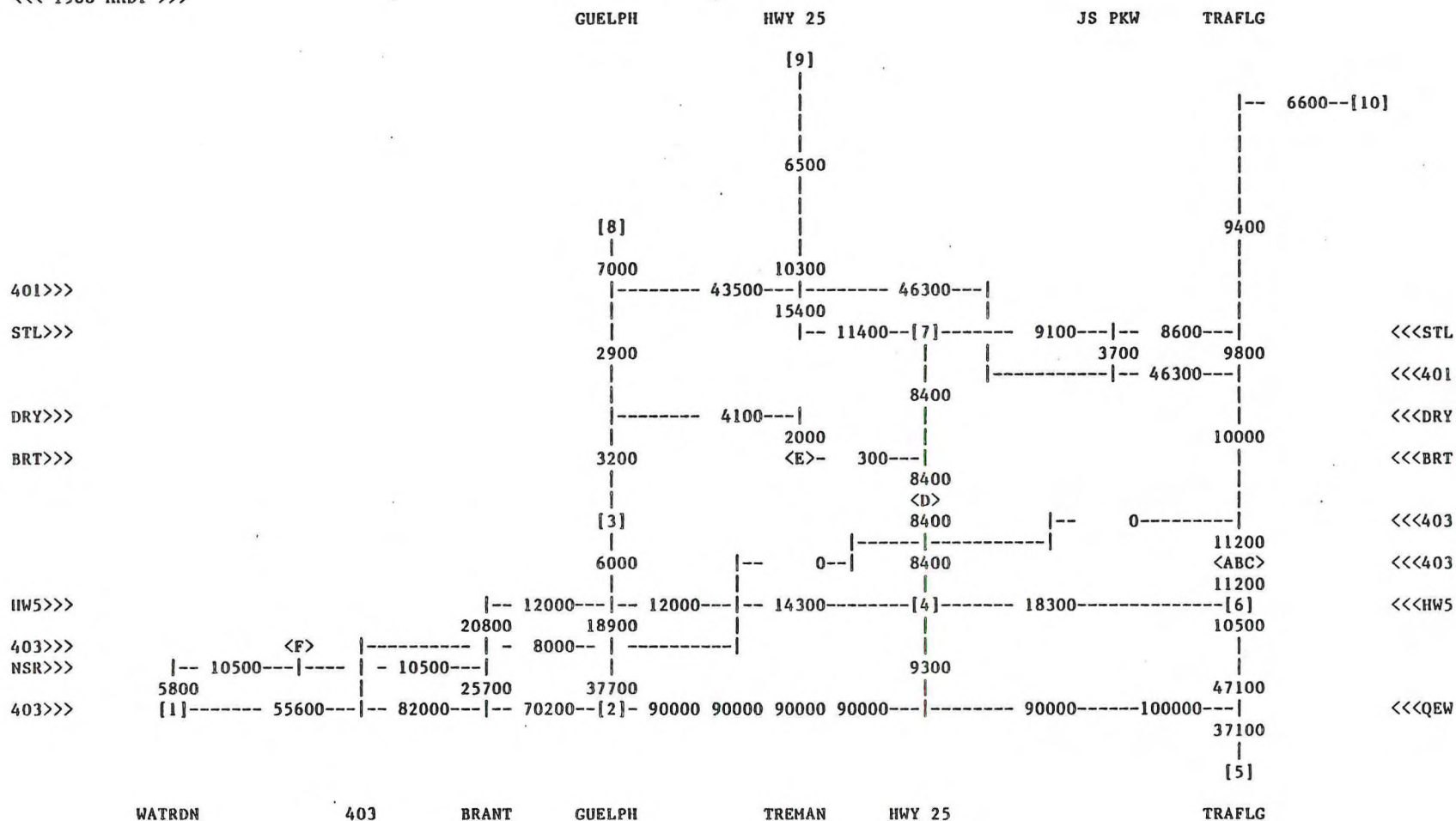
Location	Rural Residential Entrances	LAND USE		Notes
		Residential/ Residential/ Farm Bldgs. Entrances		
Tremaine North of Site Access	2	2		Auto Repair Yard
Tremaine South of Site Access	0	2		
Tremaine Total	2	4		
Britannia: Tremaine - Highway 25	0	0		
First Line (close proximity to Britannia)	0	2		
East Side of Britannia/Highway 25 Intersection	2	0		Excavation Equipment Store

Source: Walker Wright Young
December, 1984

DRI:sgr/S377

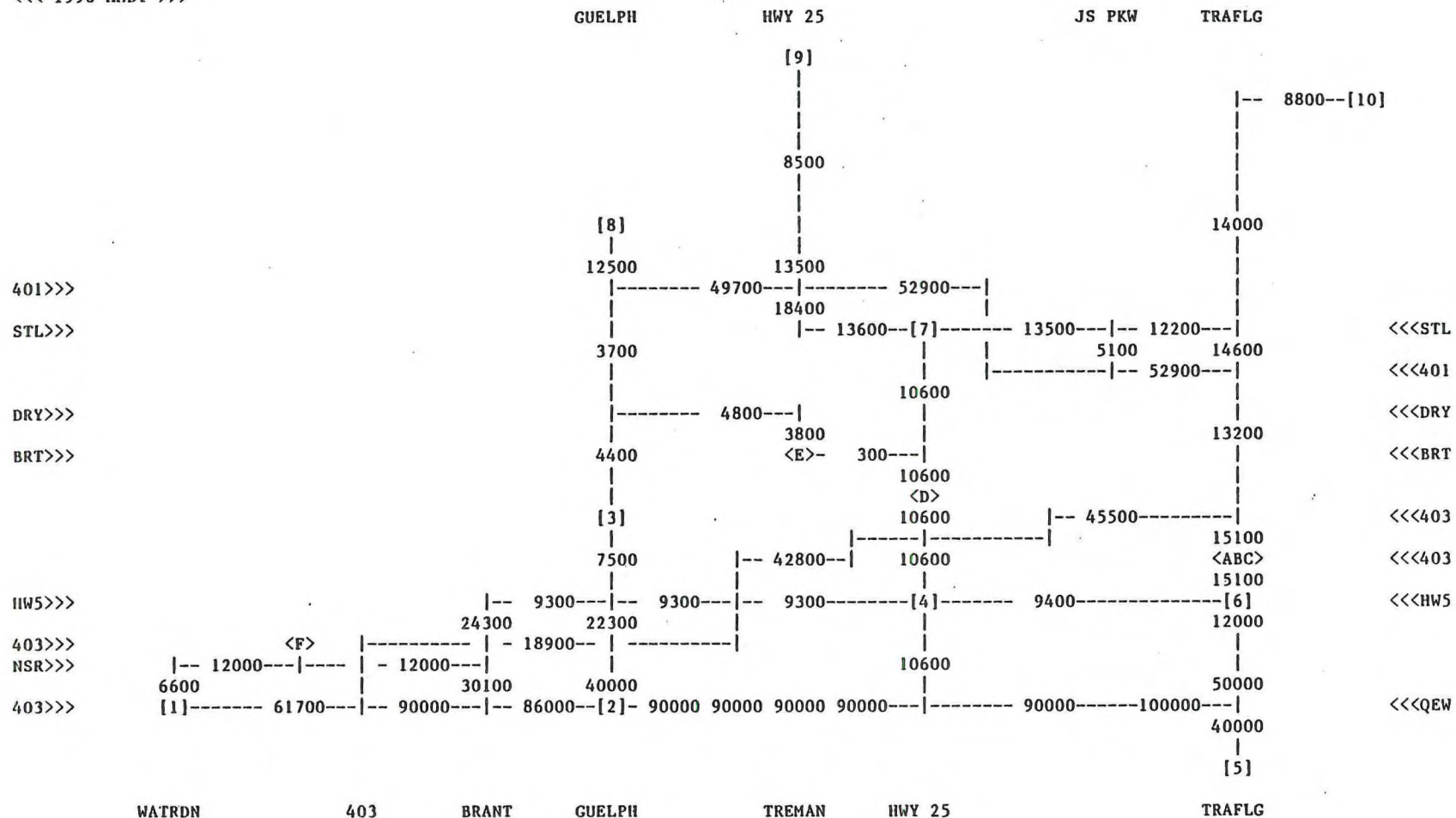
APPENDIX F
Background Traffic

<<< 1988 AADT >>>



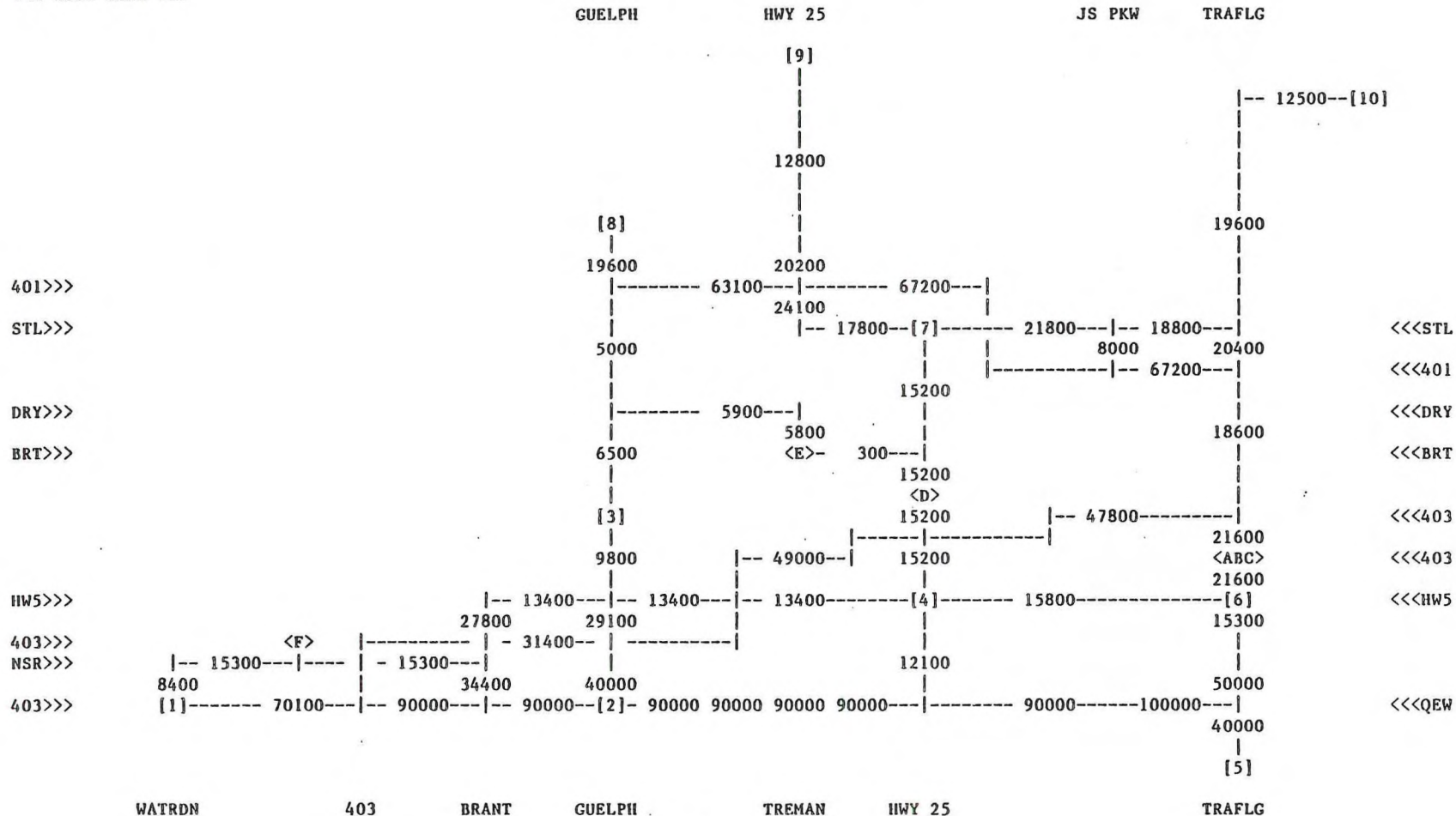
DATA SOURCES: 1984 OAKVILLE TRANSPORTATION STUDY UPDATE (FOR ROADS SOUTH OF HWY 5)
 1979 NORTH BURLINGTON TRANSPORTATION STUDY (FOR ROADS SOUTH OF HWY 5)
 REGIONAL PUBLIC WORKS ROAD NEEDS 10-YR PROJECTIONS (FOR ROADS NORTH OF HWY 5)

<<< 1996 AADT >>>



DATA SOURCES: 1984 OAKVILLE TRANSPORTATION STUDY UPDATE (FOR ROADS SOUTH OF HWY 5)
 1979 NORTH BURLINGTON TRANSPORTATION STUDY (FOR ROADS SOUTH OF HWY 5)
 REGIONAL PUBLIC WORKS ROAD NEEDS 10-YR PROJECTIONS (FOR ROADS NORTH OF HWY 5)

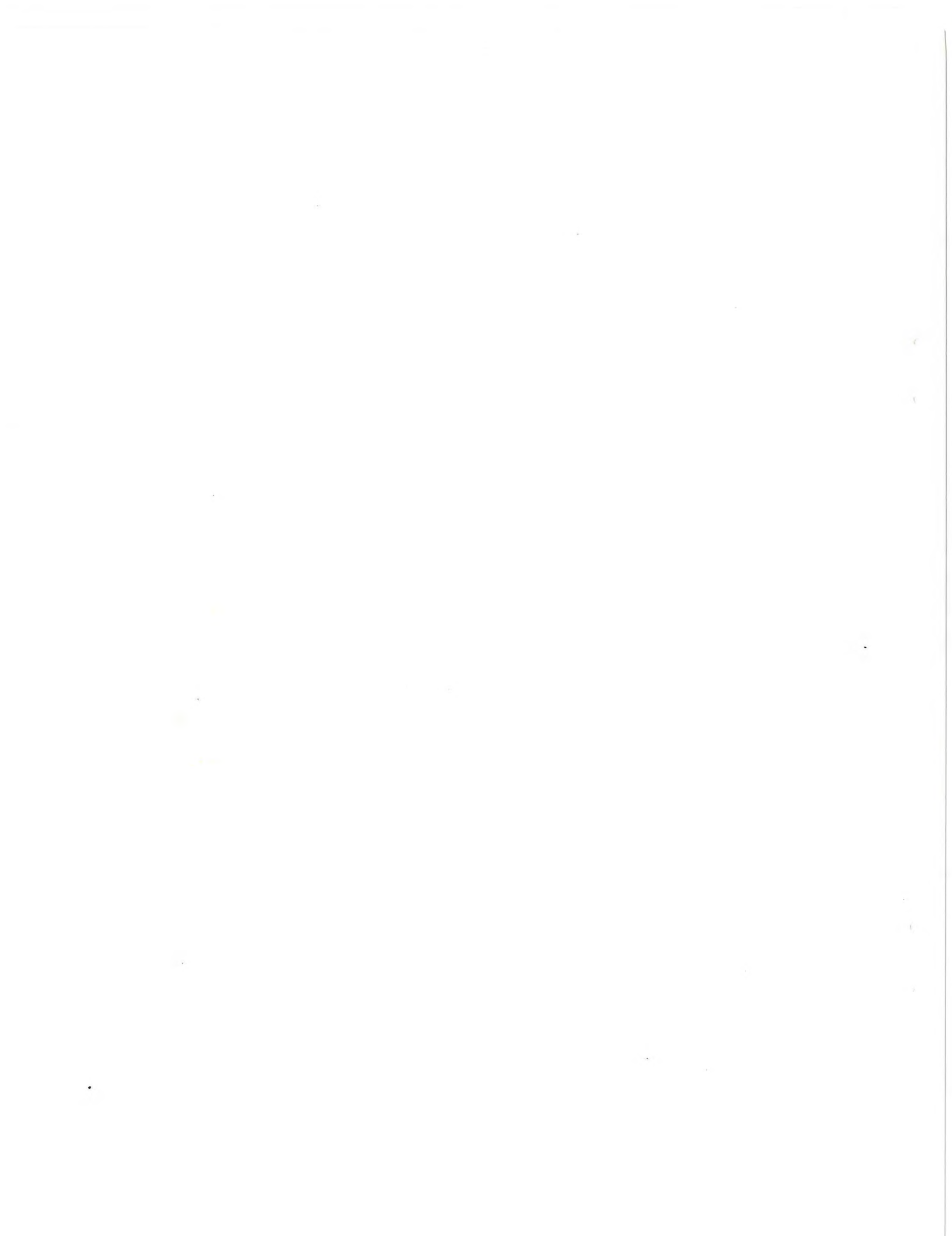
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DATA SOURCES: 1984 OAKVILLE TRANSPORTATION STUDY UPDATE (FOR ROADS SOUTH OF HWY 5)
 1979 NORTH BURLINGTON TRANSPORTATION STUDY (FOR ROADS SOUTH OF HWY 5)
 REGIONAL PUBLIC WORKS ROAD NEEDS 10-YR PROJECTIONS (FOR ROADS NORTH OF HWY 5)

APPENDIX G

Effect of Highway 403 (Time & Distance)



APPENDIX 'G'

Table 1 - Effect of Highway 403* on Travel Times

Time (minutes) From Zone Centres to Sites *

Existing Road Network with a Brant Street/QEW Interchange
(Effect of Highway 403 Shown in Brackets Where Applicable)

ZONE	A,B,C	D	E	F
1	22.3 (17.55)	19.21 (15.39)	22.98 (19.16)	1.75
2	17.76 (16.84)	14.68	18.45	4.73
3	18.94 (15.70)	16.71	12.94	13.85 (12.17)
4	8.23 (7.30)	5.14	8.91	14.27
5	9.24	15.94	19.71	17.07
6	1.89	11.49	15.26	20.61
7	14.87	7.49	8.69	26.96 (24.63)
8	22.21	17.48	18.68	28.00 (26.31)
9	27.25	22.52	23.72	41.93 (39.66)
10	21.57	25.54	26.74	44.07 (39.50)

* Highway 403 complete in Region (including new Waterdown Road interchange).

PM:sgr/S377

APPENDIX 'G'

Table 2 - Effect of Highway 403* on Travel Distances

Distance (km) From Zone Centres to Sites *

Using the Existing Road Network with a Brant Street/QEW Interchange
(Effect of Highway 403 shown in Brackets Where Applicable)

ZONE	A,B,C	D	E	F
1	28.7	25.1	29.5	1.7
2	21.9	18.3	22.7	5.2
3	22.1	19.5	15.1	13.5 (15.9)
4	9.6	6.0	10.4	17.5
5	7.2	18.4	22.8	21.9
6	2.2	13.4	17.8	24.9
7	18.3	7.7	9.1	31.2 (31.2)
8	29.6	20.2	21.6	30.0 (32.4)
9	33.3	23.9	25.3	47.4 (47.4)
10	24.7	28.3	29.7	51.8 (50.9)

* Highway 403 complete in Region (including new Waterdown Road interchange).