Brooks Road Environmental

Transportation Assessment Report for the Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment

Brooks Road Landfill Site
160 Brooks Road
Haldimand County, Ontario

JULY 2016
REF. NO. 018235 (62)

Table of Contents

Section 1.0 Introduction 1

Section 2.0 Alternative Methods for Vertical Expansion 1

Section 3.0 Transportation Environment Potentially Affected 2

3.1 Study Areas 2
3.2 Methodology 4
3.2.1 Available Secondary Source Information Collection and Review 4
3.2.2 Field Investigations 4
3.2.2 Agency Consultation 4
3.3 Existing Transportation Conditions 4
3.3.1 Road Network 4
3.3.2 Traffic Data 5
3.3.3 Landfill Operations 6
3.3.4 Capacity Analysis 7
3.3.5 Safety Analysis 7
3.3.5.1 Collision Analysis 7
3.3.5.2 Sight Line Analysis 7
3.3.6 Airport Operations 8

Section 4.0 Future Transportation Conditions and Mitigation Measures to be Incorporated into the Alternative Method Designs 8

4.1 Future Transportation Conditions 8
4.1.1 Methodology 8
4.1.1.1 Horizon Year 8
4.1.1.2 Background Volume Growth Rate 9
4.1.1.3 Future Traffic Volumes 9
4.1.2 Capacity Analysis 10
4.1.3 Safety Analysis 11
4.1.3.1 Collision Analysis 11
4.1.3.2 Sight Line Analysis 11
4.1.3.3 Airport Operations 11
4.2 Mitigation Measures 12

Section 5.0 Net Effects Assessment 12

5.1 Net Effects Assessment Methodology 12
5.2 General Assumptions 12
5.3 Criteria/Indicators 12
5.4 Potential Environmental Effects 13
5.5 Mitigation Measures Beyond Those Incorporated into the Design 13
5.6 Net Environmental Effects 13

Section 6.0 Comparative Evaluation 16

6.1 Comparative Evaluation Methodology 16
6.2 Comparative Evaluation Results 16

Section 7.0 Conclusion 18

List of Figures

Figure 3.1	Transportation Study Area and Turning Movement Data Collection
Figure 3.2	Existing Peak Hour Volumes
Figure 4.1	2021 Future Peak Hour Volumes
Figure 4.2	2026 Future Peak Hour Volumes

List of Drawings (Following Text)

Drawing C-01	Existing Conditions Interim Closure
Drawing C-02	Vertical Expansion Alternative 1
Drawing C-03	Vertical Expansion Alternative 1 Details
Drawing C-04	Vertical Expansion Alternative 2
Drawing C-05	Vertical Expansion Alternative 2 Details
Drawing C-06	Vertical Expansion Alternative 3
Drawing C-07	Vertical Expansion Alternative 3 Details

List of Tables

Table 2.1	Comparison of Vertical Expansion Options
Table 3.1	Existing Conditions Capacity Analysis at Peak Operations
Table 4.1	2021 Future Conditions Capacity Analysis at Peak Operations
Table 4.2	2026 Future Conditions Capacity Analysis at Peak Operations
Table 5.1	Alternative Method 1 Transportation Potential Environmental Effects, Mitigation Measures & Net Effects
Table 5.2	Alternative Method 2 Transportation Potential Environmental Effects, Mitigation Measures & Net Effects
Table 5.3	Alternative Method 3 Transportation Potential Environmental Effects, Mitigation Measures & Net Effects
Table 6.1	Transportation Comparative Evaluation

List of Appendices

Appendix A	Turning Movement Data Sheets
Appendix B	Synchro Reports

Section 1.0 Introduction

In July 2015 the Minister of the Environment and Climate Change approved the Terms of Reference (ToR) for the Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment (EA). This report provides an overview of the alternative conceptual vertical capacity expansion designs (i.e., 'Alternative Methods') for the Brooks Road Landfill Site Vertical Capacity Expansion EA (**Section 2.0**) and documents the following with respect to Transportation:

- Describes the Transportation Existing Conditions associated with the EA Study Areas (**Section 3.0**);
- Details the mitigation measures to be incorporated into the Alternative Method designs in order to prevent or minimize effects on Transportation (**Section 4.0**);
- Documents the net effects analysis for each Alternative Method with respect to Transportation (**Section 5.0**); and
- Identifies the Preferred Alternative Method from a Transportation perspective through a comparative evaluation process (**Section 6.0**).

Section 2.0 Alternative Methods for Vertical Expansion

Three vertical expansion alternatives have been developed for comparative analysis. The alternatives were identified in consideration of the criteria and assumptions outlined in the Conceptual Design Report (CDR) and based on public input received during the ToR.

The following aspects will be identical across all three vertical expansion alternatives, including:

- An expansion capacity of 421,000 m^3, including waste, daily cover, and interim cover
- The limit of waste (i.e., landfill footprint)
- Traffic associated with importing waste, daily cover, and interim cover
- The location of the site entrance, scalehouse, and other ancillary supporting features
- The size and location of all buffer areas
- The final cover design (0.6 m of compacted fine-grained soil overlain by a 0.15 m thick vegetative layer)
- The leachate treatment (i.e., batch leachate treatment system)

The three vertical expansion alternatives are illustrated on **Drawings C-02** through **C-07** (following text) and their unique attributes are outlined in **Table 2.1**, below. Further information on the vertical expansion alternatives is found in the CDR.

Table 2.1 Comparison of Vertical Expansion Options			
Attribute	**Alternative 1**	**Alternative 2**	**Alternative 3**
General Description	Expansion capacity with 3H to 1V (33%) side slopes to a crest height of 218.075 m	Expansion capacity with 4H to 1V (25%) side slopes to a crest height of 221.0 m	Expansion capacity with 3H to 1V (33%) side slopes to a crest height of 221.25 m and bench at approx. 210.0 m
Approximate Elevation of Top of Landfill (including final cover)	219.65 m	221.50 m	222.13 m
Approximate Height of Landfill Above Existing Grade of 198.96	20.69 m	22.54 m	23.17 m
Post-Closure Leachate Generation Rate	36 m^3/day	36 m^3/day	36 m^3/day
Number of Vehicles Per Day Associated with Waste and Construction Materials	16	16	16

Section 3.0 Transportation Environment Potentially Affected

The July 2015 Minister-approved ToR includes a preliminary description of the existing environmental conditions within the Study Areas and commits to providing an expanded description of the existing environmental conditions within the Study Areas in the EA. The following section provides a more detailed description and understanding of the Transportation Existing Conditions within the Study Areas for use in the assessment and evaluation of Alternative Methods.

3.1 Study Areas

The following two generic study areas were established for preparation of the EA:

- **Site Study Area**, including all lands (i.e., 14.3 hectares (ha)) within the existing, approved boundaries of the Brooks Road Landfill Site (Site), as defined by Environmental Compliance Approval (ECA) No. A110302, dated July 21, 2014, as amended; and
- **Local Study Area**, including all lands and waters within a 1 kilometre (km) radius of the Site Study Area boundaries

As provided for in the approved ToR, each technical discipline may modify the Local Study Area, as required, during the EA. For Transportation, only the Local Study Area is applicable (see **Figure 3.1**).

Source: MNRF NRVIS, 2014. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016;
Aerial: 2006 Grand River Conservation Authority
Coordinate System: NAD 1983 UTM Zone 17N

figure 3.1

Legend

- Turning Movement Count Observation Area
- Site Location
- Local Study Area (1km Radius)

TRANSPORTATION STUDY AREA AND TURNING MOVEMENT DATA COLLECTION
TRANSPORTATION ASSESSMENT REPORT
BROOKS ROAD LANDFILL
160 Brooks Road, Cayuga, Ontario

018235-20(INT004)GIS-WA004 Jul 08/2016

3.2 Methodology

Information on the Transportation Existing Conditions within the Study Area was gathered from a combination of secondary source research, field investigations and discussions with Haldimand County staff.

3.2.1 Available Secondary Source Information Collection and Review

The following sources of secondary information were collected and reviewed:

- Haldimand County Annual Average Daily Traffic (AADT) data, 2005
- Haldimand County Annual AADT data, 2011

3.2.2 Field Investigations

Turning movement counts were conducted at the intersection of Highway 3 and Brooks Road and at the existing Brooks Road Landfill Site driveway during the weekday a.m., mid-day and p.m. peak periods and Saturday mid-day peak periods. These counts were completed on Saturday, December 5, 2015 and on Monday, December 7, 2015.

3.2.2 Agency Consultation

Discussions with Haldimand County staff took place in December 2015 to confirm AADT data.

3.3 Existing Transportation Conditions

3.3.1 Road Network

The following two major roads provide access to the existing Brooks Road Landfill Site:

- **Highway 3 (Talbot Road)** – within the vicinity of Brooks Road, Highway 3 (Talbot Road) is a two lane road with a posted speed limit of 80 km per hour (km/h). The intersection of Highway 3 and Brooks Road is stop controlled on Brooks Road with both eastbound and westbound right turn taper on Highway 3.
- **Brooks Road** – Brooks Road is a two lane road that extends from Highway 3 (Talbot Road) in the south and terminates at Indiana Road to the north. The speed limit on this road is 50 km/h. Brooks Road is paved from Highway 3 to just north of the Brooks Road Landfill Site driveway access where it changes to a gravel road for the remaining length to Indiana Road.

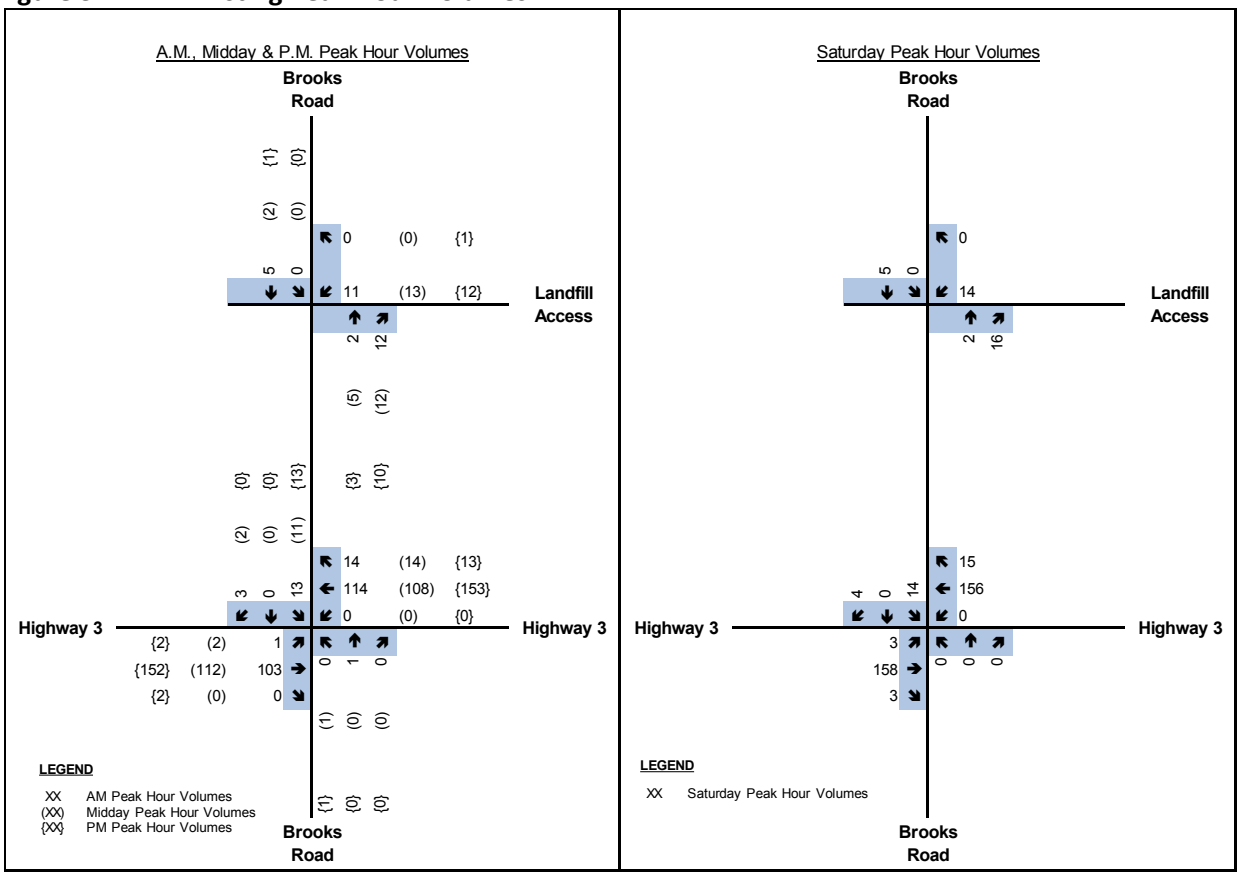
3.3.2 Traffic Data

Historical AADT data was obtained from Haldimand County. The 2005 AADT on Brooks Road, approximately 500 metres (m) north of Highway 3, was 144 two-way trips. In 2011, the AADT was slightly lower at 114 two-way trips. Discussions with staff confirmed that the split is approximately 50/50 between north and south volumes.

Turning movement counts were also conducted on Saturday, December 5, 2015 and on Monday, December 7, 2015 at both the intersection of Highway 3 and Brooks Road and at the existing Brooks Road Landfill Site driveway during the weekday a.m., mid-day and p.m. peak periods and Saturday mid-day peak periods. Detailed turning movement data sheets are found in **Appendix A**. The resulting weekday a.m., mid-day and p.m. peak hour as well as the Saturday peak hour volumes are summarized in **Figure 3.2**.

Traffic on Brooks Road is predominately truck traffic specific to the landfill operation, traffic on Highway 3 is a mix of both commuter and truck traffic.

Figure 3.2 Existing Peak Hour Volumes



3.3.3 Landfill Operations

The Brooks Road Landfill Site is permitted to accept waste during the week and on Saturdays. The Site is capable of handling 300 to 500 tonnes of material per day based on the following five different truck configurations:

- Walking floor – can handle 25 to 40 metric tonnes per load
- Roll-off – can handle 0.5 to 10 metric tonnes per load
- Front End – can handle 3 to 12 metric tonnes per load
- Tri-axle – can handle 14 to 22 metric tonnes per load
- Dump trailer – can handle 34 to 42 metric tonnes per load

The maximum daily truck traffic at the landfill, assuming delivery of 500 tonnes of material per day, is 8 to 12 walking floor trucks, 1 to 2 front end trucks and 1 to 3 roll-offs for a total of 17 inbound and 17 outbound trucks plus another one or two trips for staff. This number can increase slightly if there are certain soil jobs on the site as the walking floor trucks are replaced with dump trailers and tri-axle trucks.

The turning movement counts conducted at the Site driveway on Saturday, December 5 2015 and Monday, December 7, 2015 show the following total volume of trucks entering and exiting the landfill during the peak hours:

- Weekday am peak hour – 12 inbound and 11 outbound
- Weekday mid-day peak hour – 12 inbound and 13 outbound
- Weekday pm peak hour – 10 inbound and 13 outbound
- Saturday mid-day peak hour – 16 inbound and 14 outbound

The traffic volumes confirm that the peak operating times for the landfill occur during both the weekday and Saturday mid-day peak hours when the maximum volumes of inbound and outbound traffic were observed.

Coincidentally, a review of the existing traffic counts confirms that the volume of inbound and outbound traffic from the landfill during the two survey dates was considerably higher than the typically expected volumes provided by the operator. It was confirmed that during the two survey dates, there was a transfer of clean clay to another property that resulted in approximately 75 additional loads throughout both days.

As a result, the analysis includes additional traffic that is not typical and will result in slightly reduced capacity at both the Site driveway on Brooks Road and at the intersection of Brooks Road and Highway 3.

While the existing Brooks Road Landfill is currently in operation (i.e. accepting waste), it should be noted that landfilling operations at the Site are slowing down, as the landfill continues to reach its current approved capacity.

3.3.4 Capacity Analysis

As a measure of the capacity on the adjacent road network surrounding the Brooks Road Landfill at peak operations (i.e., 500 tonnes of material per day), both the Site access on Brooks Road and the stop controlled intersection of Brooks Road and Highway 3 were analyzed using the peak operations turning movement volumes for the weekday a.m., mid-day, p.m. and Saturday peak hours. A summary of the capacity analysis using Synchro version 8 is summarized in the following table.

Table 3.1 Existing Conditions Capacity Analysis at Peak Operations

Intersection	Movement v/c ratio (LOS) delay			
	A.M. Peak	Mid-Day Peak	P.M. Peak	Sat Peak
Brooks Road & Brooks Road Landfill Site access	WBLR 0.01 LOS A 9 SEC	WBLR 0.01 LOS A 9 SEC	WBLR 0.01 LOS A 9 SEC	WBLR 0.02 LOS A 9 SEC
Brooks Road & Highway 3	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 11 SEC SBLTR 0.02 LOS A 10 SEC	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 11 SEC SBLTR 0.02 LOS A 10 SEC	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 11 SEC SBLTR 0.02 LOS B 11 SEC	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS A 0 SEC SBLTR 0.03 LOS B 11 SEC

The movements at both study intersections currently operate with levels of service 'B' or better during the weekday a.m., mid-day, p.m. and Saturday mid-day peak hours.

The analysis of existing conditions under peak operations confirms no current capacity constraints at either study intersection despite the higher than normal traffic volumes accounted for due to the movement of clean clay off-site.

3.3.5 Safety Analysis

3.3.5.1 Collision Analysis

A review of available data shows that there is no indication that either Highway 3 in the vicinity of Brooks Road or Brooks Road north to the site has experienced significantly higher collision frequency than the historical average accident rate along Highway 3 in Haldimand County.

3.3.5.2 Sight Line Analysis

The site entrance in its current location satisfies the sight distance requirements for trucks approaching and departing from the site. Brooks Road is fairly straight with little deviation in the horizontal or

vertical alignment. Existing sight distances are in excess of 350 m both to the north and south of the driveway access which exceeds the required sight distance, based on the Transportation Association of Canada's (TAC) standard of 85 m for stopping sight distance for a posted speed limit of 50 km/h (60 km/h design speed).

3.3.6 Airport Operations

There are no airports or aerodromes within the Local Study Area. The nearest airports and airfields are as follows: York Aeroclub (a private airfield used for soaring, approximately 7.5 km north of the Site); John C. Munro Hamilton International Airport (approximately 26 km north of the Site); and Niagara District Airport (65 km to the northeast of the Site).

Section 4.0 Future Transportation Conditions and Mitigation Measures to be Incorporated into the Alternative Method Designs

Based on the description of the Alternative Methods provided in **Section 2.0** and the characterization of Transportation Existing Conditions within the Study Area described in **Section 3.0**, the following section provides the Transportation Future Conditions within the Study Area and recommended mitigation measures. The future conditions traffic analysis utilizes the existing conditions as a baseline, and incorporates future projected network volumes as well as additional site truck volumes generated by the proposed Alternative Methods.

As previously presented in **Table 2.1**, all three Alternative Methods are similarly expected to generate an additional 16 site trucks per day. Therefore a single Transportation Future Conditions analysis was conducted in which the results equally apply to all three Alternative Methods.

4.1 Future Transportation Conditions

4.1.1 Methodology

4.1.1.1 Horizon Year

The vertical expansion of the capacity of the existing site is expected to be carried out in 5 to 7 years as per the ToR. Therefore an expected build-out year of 2021 has been assumed. In addition to the proposed build-out year, Haldimand County's Traffic Impact Study Guidelines for developments generating less than 500 peak hour vehicle trips requires Future Conditions traffic analysis be conducted for both the opening year and 5 years after opening. Therefore, horizon years of 2021 and 2026 have been selected for the Transportation Future Conditions analysis.

4.1.1.2 Background Volume Growth Rate

In order to capture any expected background growth in traffic volumes at the study area intersections, a conservative compound annual growth rate of 2.0 percent has been adopted and will be utilized to forecast for 2021 and 2026 background traffic volumes.

4.1.1.3 Future Traffic Volumes

Forecasted 2021 and 2026 turning movement counts were projected at both the intersection of Highway 3 and Brooks Road and at the existing Brooks Road Landfill Site driveway during the weekday a.m., mid-day and p.m. peak periods and Saturday mid-day peak periods. This includes the existing truck traffic (i.e., 17 inbound and 17 outbound trucks plus another one or two trips for staff) corresponding to approximately 500 tonnes per day plus 16 site trucks per day as a result of the proposed vertical expansion conveying an additional 500 tonnes per day, for a peak fill rate of 1,000 tonnes per day. To provide a conservative and worst-case scenario analysis, all 16 of the daily truck trips associated with the vertical expansion were applied to each peak hour (i.e., all 16 would enter/exit the site within the peak hour). The resulting weekday a.m., mid-day and p.m. peak hour as well as the Saturday peak hour volumes are summarized in **Figures 4.1** and **4.2**. The distribution of the 16 truck trips within the Local Study Area is based on existing turning movement patterns.

Figure 4.1 2021 Future Peak Hour Volume

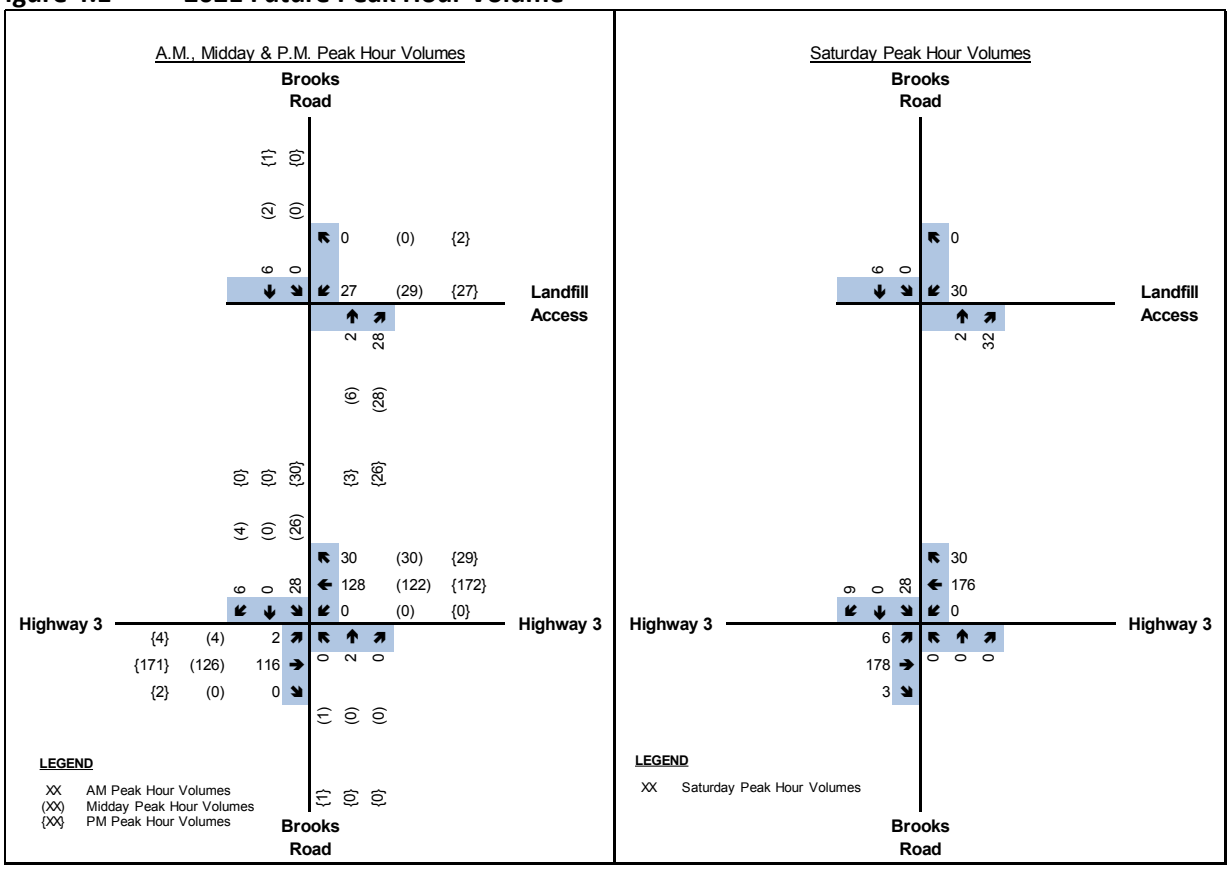
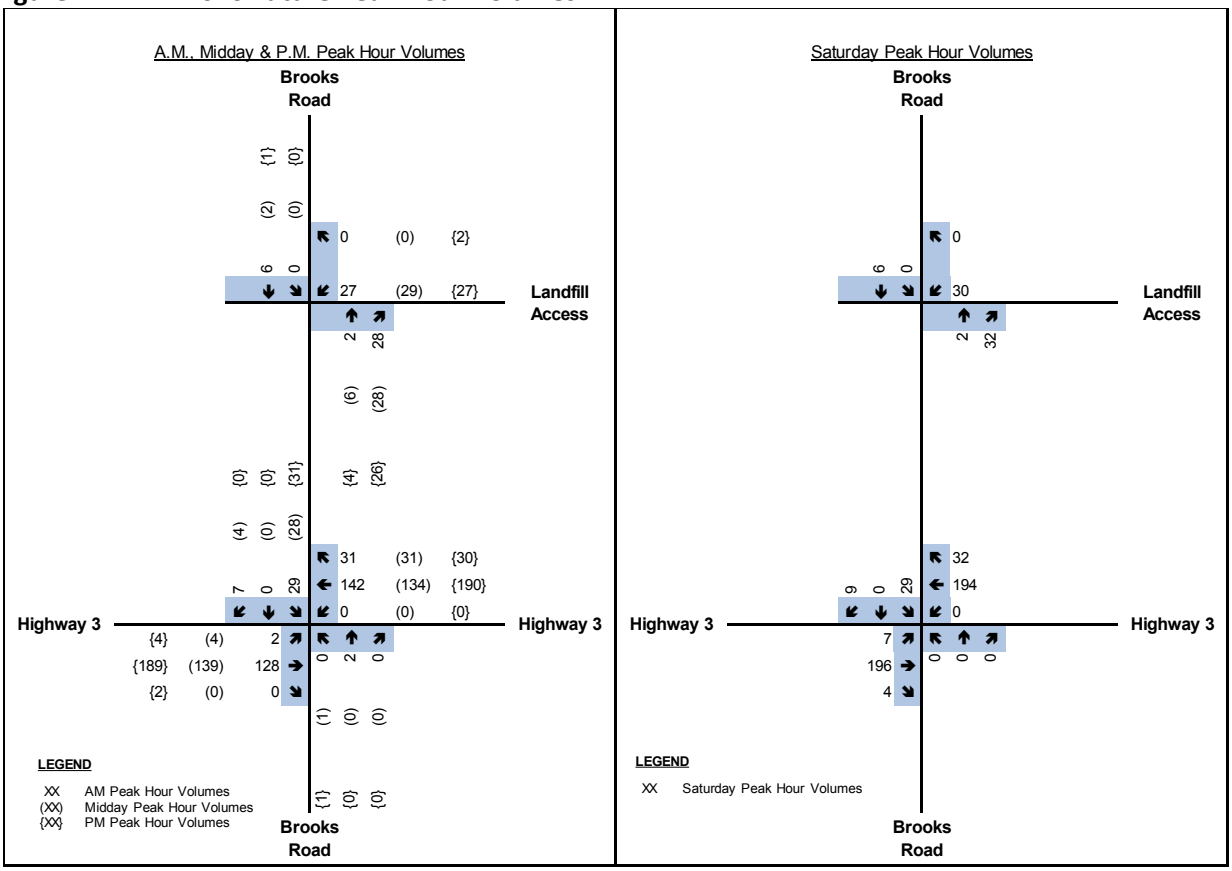


Figure 4.2 2026 Future Peak Hour Volumes



4.1.2 Capacity Analysis

As a measure of the capacity on the adjacent road network surrounding the Brooks Road Landfill at peak operations (i.e., 1,000 tonnes of material per day), both the Site access on Brooks Road and the stop controlled intersection of Brooks Road and Highway 3 were analyzed using the projected 2021 and 2026 peak turning movement volumes for the weekday a.m., mid-day, p.m. and Saturday peak hours. A summary of the capacity analysis using Synchro version 8 is summarized in the **Table 4.1** and **Table 4.2**.

Table 4.1 2021 Future Conditions Capacity Analysis at Peak Operations

Intersection	Movement v/c ratio (LOS) delay			
	A.M. Peak	Mid-Day Peak	P.M. Peak	Sat Peak
Brooks Road & Brooks Road Landfill Site access	WBLR 0.03 LOS A 9 SEC	WBLR 0.03 LOS A 9 SEC	WBLR 0.03 LOS A 9 SEC	WBLR 0.03 LOS A 9 SEC
Brooks Road & Highway 3	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 11 SEC SBLTR 0.05 LOS B 11 SEC	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 11 SEC SBLTR 0.05 LOS B 11 SEC	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 11 SEC SBLTR 0.06 LOS B 12 SEC	EBLTR 0.01 LOS A 1 SEC NBLTR 0.00 LOS A 0 SEC SBLTR 0.07 LOS B 12 SEC

Table 4.2 2026 Future Conditions Capacity Analysis at Peak Operations

Intersection	Movement v/c ratio (LOS) delay			
	A.M. Peak	Mid-Day Peak	P.M. Peak	Sat Peak
Brooks Road & Brooks Road Landfill Site access	WBLR 0.03 LOS A 9 SEC	WBLR 0.03 LOS A 9 SEC	WBLR 0.03 LOS A 9 SEC	WBLR 0.03 LOS A 9 SEC
Brooks Road & Highway 3	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 11 SEC SBLTR 0.06 LOS B 11 SEC	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 11 SEC SBLTR 0.05 LOS B 11 SEC	EBLTR 0.00 LOS A 1 SEC NBLTR 0.00 LOS B 12 SEC SBLTR 0.06 LOS B 12 SEC	EBLTR 0.01 LOS A 1 SEC NBLTR 0.00 LOS A 0 SEC SBLTR 0.08 LOS B 12 SEC

Both intersections overall are expected to operate with minimal delay and substantial excess capacity under future 2021 and 2026 conditions. Individual movements at both study intersections are expected to operate with levels of service 'B' or better representing minimal delay, and volume-to-capacity (v/c) ratios not exceeding 0.08 representing substantial excess capacity, during the weekday a.m., mid-day, p.m. and Saturday mid-day peak hours.

The analysis of future 2021 and 2026 conditions under peak operations confirms no vehicle delay issues or capacity constraints at either study intersection, with the additional 16 site trucks per day as a result of the proposed vertical expansion being negligible.

4.1.3 Safety Analysis

4.1.3.1 Collision Analysis

Existing conditions collision analysis determined no indication that either Highway 3 in the vicinity of Brooks Road or Brooks Road north to the site has experienced significantly higher collision frequency than the historical average accident rate along Highway 3 in Haldimand County. It is expected the additional site traffic generated by the proposed vertical expansion will not deteriorate safety conditions.

4.1.3.2 Sight Line Analysis

Existing conditions sight line analysis determined the site entrance in its current location satisfies the sight distance requirements for trucks approaching and departing from the site. It is expected the additional site traffic generated by the proposed vertical expansion can be safely accommodated by the existing site entrance.

4.1.3.3 Airport Operations

As noted in **Section 3.3.6** above, there are no airports or aerodromes within the Local Study Area.

4.2 Mitigation Measures

No mitigation measures are recommended to be incorporated into the Alternative Methods designs in order to avoid or minimize impacts on Transportation.

Section 5.0 Net Effects Assessment

This section documents the net effects assessment for the Alternative Methods for the Brooks Road Landfill Site Vertical Capacity Expansion EA from a transportation perspective.

5.1 Net Effects Assessment Methodology

The assessment of the Alternative Methods was conducted in two steps:

- **Step 1: Confirm Evaluation Criteria and Indicators/Measures**
  Prior to undertaking the net effects assessment, the transportation evaluation criteria, indicators, and measures developed in the Minister approved ToR were reviewed and confirmed for application to each of the Alternative Methods.
- **Step 2: Undertake the Net Effects Analysis**
  With the evaluation criteria, indicators and measures confirmed through the preceding step, a net effects analysis of the Alternative Methods was carried out consisting of the following activities:
  - Identify potential effects (based on measures) on the transportation;
  - Develop and apply avoidance/mitigation/compensation/enhancement measures; and
  - Determine net effects on the environment.

5.2 General Assumptions

No additional general assumptions are made beyond those conferred in the sections above.

5.3 Criteria/Indicators

The evaluation criteria, indicators, rationale and data sources for the Transportation environmental component are shown below.

	Environmental Component	Evaluation Criteria	Study Area	Indicators	Rationale	Data Sources
BUILT	Transportation	Effects on airport operations	Local Study Area	• Bird strike hazard to aircraft in Local Study Area	There is the potential for bird strikes for aircraft using nearby airports and airfields.	• Transport Canada data sources
		Effects from truck transportation along access roads	Local Study Area	• Potential for traffic collisions • Disturbance to traffic operations • Potential road improvement requirements	Truck traffic associated with the continued operations of the landfill may adversely affect residents, business, institutions and movement of farm vehicles in the local study area.	• Transport Canada data sources • Previous traffic study

5.4 Potential Environmental Effects

As a result of no airports or aerodromes being situated within the Local Study Area, all three alternative methods are not expected to have any effect on airport operations.

Based on the Future Conditions traffic analysis undertaken in **Section 4.1**, it is expected that all three proposed alternative methods will have a negligible transportation effect at the study area intersections and surrounding road network. Truck traffic associated with the proposed vertical expansion for all three alternative methods is not expected to adversely affect residents, businesses, institutions and movement of farm vehicles in the local study area.

5.5 Mitigation Measures Beyond Those Incorporated into the Design

No mitigation measures beyond those incorporated into the design are recommended for any of the alternative methods.

5.6 Net Environmental Effects

As no mitigation measures beyond those incorporated into the design are recommended, the net environmental impacts for all three alternative methods from a transportation perspective are represented in the Future Transportation Conditions analysis undertaken in **Section 4.1.**

Table 5.1 Alternative Method 1 Transportation Potential Environmental Effects, Mitigation Measures & Net Effects						
	Environmental Component	**Evaluation Criteria**	**Indicator**	**Potential Effects**	**Mitigation Measures**	**Net Effects**
BUILT	Transportation	Effects on Airport Operations	Bird strike hazard to aircraft in Local Study Area	No potential for bird strike hazard to aircraft in Local Study Area.	No mitigation measures required.	No bird strike hazard to aircraft in Local Study Area.
		Effects from Truck Transportation Along Access Roads	Potential for traffic collisions	Minimal potential for traffic collisions in the Local Study Area.	No mitigation measures required.	Minimal potential for traffic collisions in Local Study Area.
			Disturbance to traffic operations	Negligible potential for disturbance to traffic operations in Local Study Area and wider road network.	No mitigation measures required.	Negligible disturbance to traffic operations in Local Study Area and wider road network.
			Potential road improvement requirements	No potential for road improvement requirements.	No mitigation measures required.	No road improvement requirements.

Table 5.2 Alternative Method 2 Transportation Potential Environmental Effects, Mitigation Measures & Net Effects						
	Environmental Component	**Evaluation Criteria**	**Indicator**	**Potential Effects**	**Mitigation Measures**	**Net Effects**
BUILT	Transportation	Effects on Airport Operations	Bird strike hazard to aircraft in Local Study Area	No potential for bird strike hazard to aircraft in Local Study Area.	No mitigation measures required.	No bird strike hazard to aircraft in Local Study Area.
		Effects from Truck Transportation Along Access Roads	Potential for traffic collisions	Minimal potential for traffic collisions in the Local Study Area.	No mitigation measures required.	Minimal potential for traffic collisions in Local Study Area.
			Disturbance to traffic operations	Negligible potential for disturbance to traffic operations in Local Study Area and wider road network.	No mitigation measures required.	Negligible disturbance to traffic operations in Local Study Area and wider road network.
			Potential road improvement requirements	No potential for road improvement requirements.	No mitigation measures required.	No road improvement requirements.

Table 5.3 Alternative Method 3 Transportation Potential Environmental Effects, Mitigation Measures & Net Effects

	Environmental Component	Evaluation Criteria	Indicator	Potential Effects	Mitigation Measures	Net Effects
BUILT	Transportation	Effects on Airport Operations	Bird strike hazard to aircraft in Local Study Area	No potential for bird strike hazard to aircraft in Local Study Area.	No mitigation measures required.	No bird strike hazard to aircraft in Local Study Area.
		Effects from Truck Transportation Along Access Roads	Potential for traffic collisions	Minimal potential for traffic collisions in the Local Study Area.	No mitigation measures required.	Minimal potential for traffic collisions in Local Study Area.
			Disturbance to traffic operations	Negligible potential for disturbance to traffic operations in Local Study Area and wider road network.	No mitigation measures required.	Negligible disturbance to traffic operations in Local Study Area and wider road network.
			Potential road improvement requirements	No potential for road improvement requirements.	No mitigation measures required.	No road improvement requirements.

Section 6.0 Comparative Evaluation

This section documents the comparative evaluation of the Alternative Methods from a transportation perspective based on the net environmental effects identified in **Section 5.0**.

6.1 Comparative Evaluation Methodology

The Minister approved ToR states that the comparative evaluation of the Alternative Methods will be carried out using a Reasoned Argument (or Trade-off) method, with evaluation criteria as the basis for comparison. Under the Reasoned Argument approach, the differences in the net effects associated with each Alternative Method are highlighted. Based on these differences, the advantages and disadvantages of each alternative can be identified according to the evaluation of trade-offs between the various evaluation criteria and indicators. The relative significance of potential impacts is then examined to provide a clear rationale for the selection of a preferred alternative from a transportation perspective. The term *trade-offs* is defined as "*things of value given up in order to gain different things of value*". Each Alternative Method will be compared against the others to distinguish relative differences in impacts to the environment, taking into account possible mitigation measures.

6.2 Comparative Evaluation Results

A comparative evaluation of the three alternative methods was undertaken based on evaluation criteria within the transportation environmental component, as presented in **Table 6.1**. All three alternative methods are similarly expected to generate an additional 16 site trucks per day. Therefore from transportation perspective there is no distinction between the three alternative methods. This has resulted in equal ranking for all three alternative methods on the evaluation criteria and respective indicators presented in **Table 6.1**.

Concerning the effects of the alternative methods on airport operations, no net effect is expected as a result of no airports or aerodromes being situated within the Local Study Area. Therefore all three alternatives are preferred based on this criterion.

Concerning the truck transportation effects of the alternative methods along access roads, minimal effects are expected. There is an expected minimal impact on traffic safety, an expected negligible impact on traffic operations, and no potential road improvements are required or recommended. Therefore all three alternatives are preferred based on these criteria.

Overall, all three alternative methods are equally preferred based on the conducted transportation environmental component ranking.

Table 6.1 Transportation Comparative Evaluation

	Environmental Component	Evaluation Criteria	Indicator	Alternative Method 1 Net Effects	Alternative Method 2 Net Effects	Alternative Method 3 Net Effects
BUILT	Transportation	Effects on Airport Operations	Bird strike hazard to aircraft in Local Study Area	No bird strike hazard to aircraft in Local Study Area. **NO NET EFFECTS**	No bird strike hazard to aircraft in Local Study Area. **NO NET EFFECTS**	No bird strike hazard to aircraft in Local Study Area. **NO NET EFFECTS**
			Criteria Ranking:	**Tied for 1st**	**Tied for 1st**	**Tied for 1st**
			Criteria Rationale:	**There is no distinction between the alternatives in terms of their effects on bird strike hazards to aircraft in the Local Study Area. All three alternatives are preferred as they would result in no effects to bird strike hazards to aircraft.**		
		Effects from Truck Transportation Along Access Roads	Potential for traffic collisions	Minimal potential for traffic collisions in Local Study Area. **LOW NET EFFECTS**	Minimal potential for traffic collisions in Local Study Area. **LOW NET EFFECTS**	Minimal potential for traffic collisions in Local Study Area. **LOW NET EFFECTS**
			Disturbance to traffic operations	Negligible disturbance to traffic operations in Local Study Area and wider road network. **LOW NET EFFECTS**	Negligible disturbance to traffic operations in Local Study Area and wider road network. **LOW NET EFFECTS**	Negligible disturbance to traffic operations in Local Study Area and wider road network. **LOW NET EFFECTS**
			Potential road improvement requirements	No road improvements required. **NO NET EFFECT**	No road improvements required. **NO NET EFFECT**	No road improvements required. **NO NET EFFECT**
			Criteria Ranking:	**Tied for 1st**	**Tied for 1st**	**Tied for 1st**
			Criteria Rationale:	**There is no distinction between the alternatives in terms of their effects from truck transportation along access roads. All three alternatives are preferred as they would result in a minimal impact on traffic safety and a negligible impact on traffic operations in the Local Study Area and surrounding road network. There are no road improvements required.**		
		Environmental Component Ranking:		**Tied for 1st**	**Tied for 1st**	**Tied for 1st**
	RATIONALE			**There is no distinction between the alternatives in terms of their effects on airport operations and effects from truck transportation along access roads. All three alternatives are preferred as they would equally result in minimal impacts to traffic safety, have a negligible impact on traffic operations in the Local Study Area and surrounding road network, and would not require any potential road improvements.**		

Section 7.0 Conclusion

Under existing conditions the site is expected to be acceptable from a traffic operations and safety perspective. The capacity analysis under peak operations confirms no current capacity constraints in the Local Study Area road network. Concerning safety, a review of available data shows the Local Study Area road network has not experienced significantly higher collision frequency than the local historical average accident rate, and a review of the site entrance in its current location satisfies the sight distance requirements. There are no airports or aerodromes within the Local Study Area and therefore no bird strike hazards to aircraft are expected.

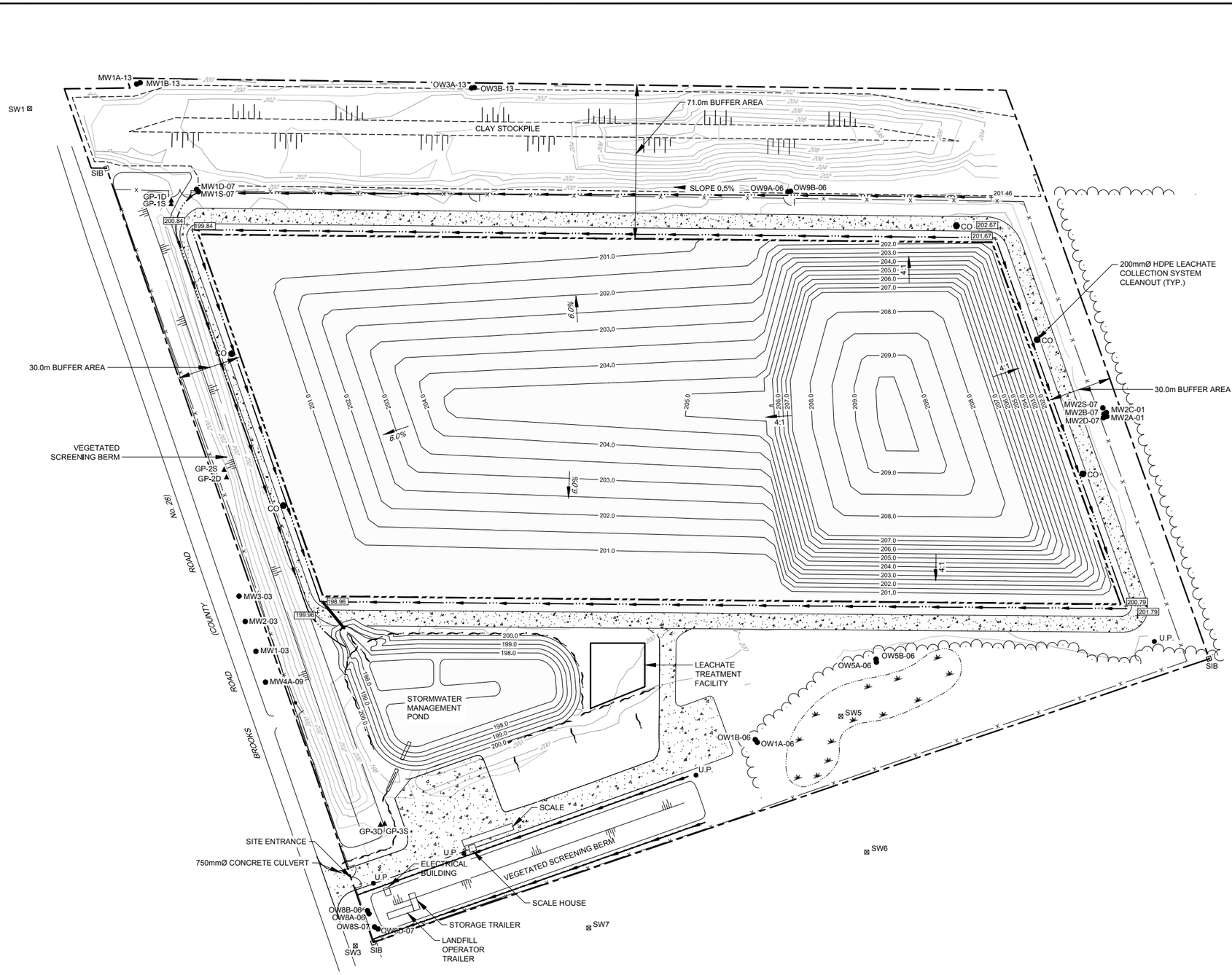
The analysis of future conditions, with the additional 16 site trucks per day as a result of the proposed vertical expansion, indicates the site will continue to be acceptable from a traffic operations and safety perspective. Under peak operations no vehicle delay issues or capacity constraints at either study intersection are expected, with any impact from the additional site truck traffic expected to be negligible. Concerning safety, it is expected the additional site traffic generated by the proposed vertical expansion will not deteriorate safety conditions and can be safely accommodated by the existing site entrance.

No mitigation measures beyond those incorporated into the design are recommended for any of the alternative methods.

As a result of all three alternative methods being expected to generate an equal number of additional site trucks per day, from a transportation perspective there is no distinction between the three alternative methods. Concerning the effects on airport operations, no net effect is expected as a result of any airports or aerodromes not being situated within the Local Study Area. Concerning the truck transportation effects along access roads, minimal effects are expected. There is an expected minimal impact on traffic safety, an expected negligible impact on traffic operations, and no potential road improvements are required or recommended.

In conclusion, all three alternative methods are acceptable, and equally preferred, based on the conducted transportation environmental component ranking.

Drawings



No.	Revision	Date	Initial

LEGEND

- 202.0 — FINAL CONTOURS BEFORE VERTICAL EXPANSION (1.0m INTERVAL (m AMSL))
- FINAL CONTOURS BEFORE VERTICAL EXPANSION (0.5m INTERVAL (m AMSL))
- 202 — GROUND CONTOUR (2.0m INTERVAL)
- GROUND CONTOUR (1.0m INTERVAL)
- PROPERTY LINE
- APPROVED LIMIT OF WASTE
- x — EXISTING FENCELINE
- CLAY STOCKPILE AREA
- PERIMETER DITCH
- TREELINE
- GRANULAR SURFACE ACCESS ROAD
- SWAMPY AREA
- 201.67 — SPOT ELEVATION (m AMSL)
- CO — LEACHATE COLLECTION SYSTEM CLEAN OUT
- SIB — STANDARD IRON BAR
- OW1B-06 — OBSERVATION WELL
- MW2A-01 — MONITORING WELL
- SW6 — SURFACE WATER MONITORING
- GP-3S — GAS PROBE
- U.P. — UTILITY POLE
- DOUBLE GATE
- SINGLE GATE

SCALE VERIFICATION

THIS BAR MEASURES 50mm ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

BROOKS ROAD LANDFILL SITE
HALDIMAND COUNTRY, ONTARIO

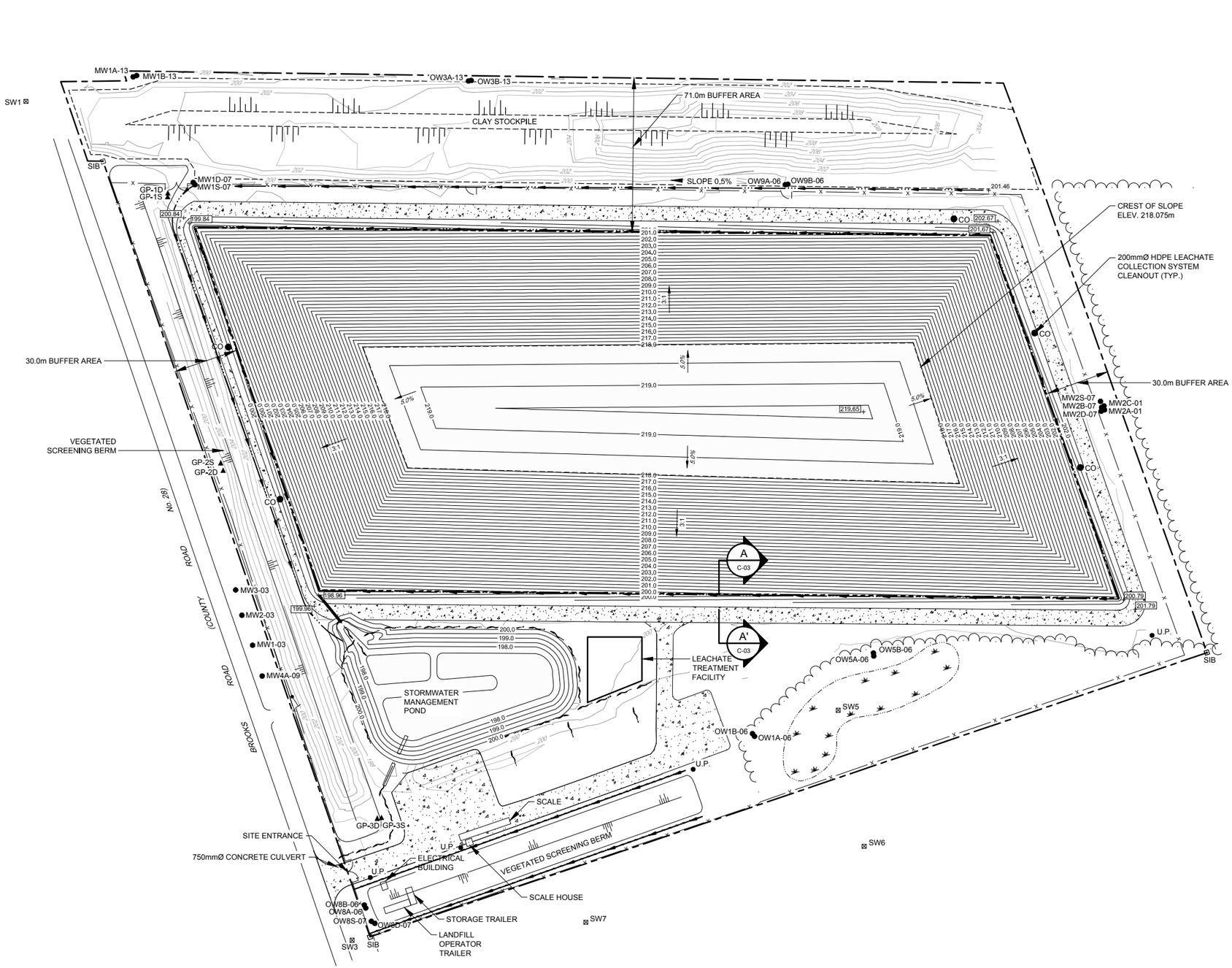
CONCEPTUAL DESIGN REPORT

EXISTING CONDITIONS INTERIM CLOSURE

GHD

Source Reference:
EXISTING GROUND CONTOURS AND TOPOGRAPHIC FEATURES SHOWN ARE BASED ON TERVITA AS-BUILT FOR FINAL CONDITIONS FOR STAGE 2A, 2B AND STAGE 3A, AND NORTH CLAY STOCKPILE SURVEY BY VAN NOSTRAND AND GIBSON SURVEYED JULY-17-2013

Project Manager:	Reviewed By:	Date:	
G.FERRARO	P.KEMP	DECEMBER 2015	
Scale: 1:1000	Project N°: 18235-20	Report N°: 051	Drawing N°: C-01



No.	Revision	Date	Initial

LEGEND

- 202.0 — TOP OF FINAL CONTOUR (1.0m INTERVAL (m AMSL))
- TOP OF FINAL COVER CONTOUR (0.5m INTERVAL (m AMSL))
- 202 — GROUND CONTOUR (2.0m INTERVAL)
- GROUND CONTOUR (1.0m INTERVAL)
- PROPERTY LINE
- APPROVED LIMIT OF WASTE
- x — EXISTING FENCELINE
- CLAY STOCKPILE AREA
- PERIMETER DITCH
- TREELINE
- GRANULAR SURFACE ACCESS ROAD
- SWAMPY AREA
- 201.67 — SPOT ELEVATION (m AMSL)
- CO — LEACHATE COLLECTION SYSTEM CLEAN OUT
- SIB — STANDARD IRON BAR
- OW1B-06 — OBSERVATION WELL
- MW2A-01 — MONITORING WELL
- SW6 — SURFACE WATER MONITORING
- GP-3S — GAS PROBE
- U.P. — UTILITY POLE
- DOUBLE GATE
- SINGLE GATE

SCALE VERIFICATION

THIS BAR MEASURES 50mm ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

BROOKS ROAD LANDFILL SITE
HALDIMAND COUNTRY, ONTARIO

CONCEPTUAL DESIGN REPORT

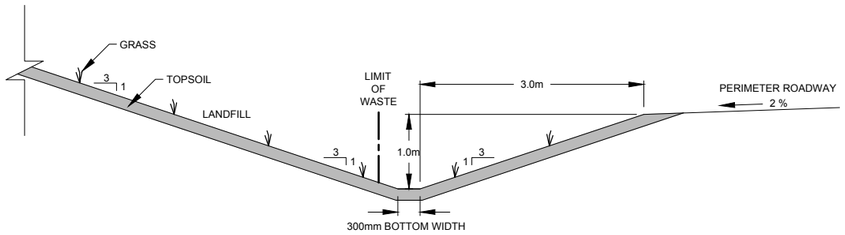
VERTICAL EXPANSION ALTERNATIVE 1

GHD

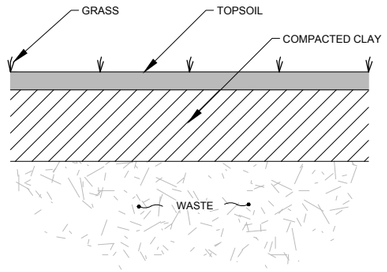
Source Reference:
EXISTING GROUND CONTOURS AND TOPOGRAPHIC FEATURES SHOWN ARE BASED ON TERVITA AS-BUILT FOR FINAL CONDITIONS FOR STAGE 2A, 2B AND STAGE 3A, AND NORTH CLAY STOCKPILE SURVEY BY VAN NOSTRAND AND GIBSON SURVEYED JULY-17-2013

Project Manager:	Reviewed By:	Date:	
G.FERRARO	P.KEMP	DECEMBER 2015	
Scale: 1:1000	Project N°: 18235-20	Report N°: 051	Drawing N°: C-02

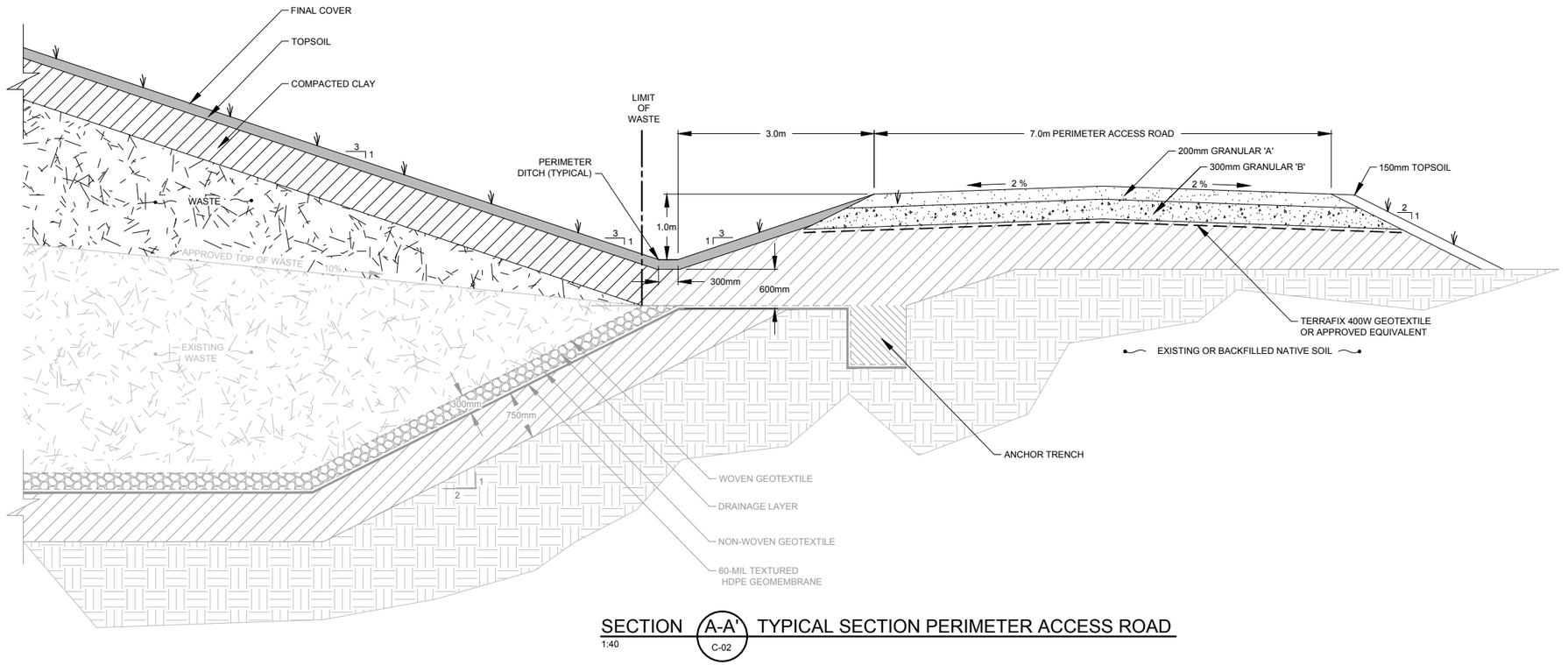
18235-20(051)CI-WA002 JAN 19/2016



DETAIL 1 PERIMETER DITCH (TYPICAL)
1:40 C-03



DETAIL 2 FINAL COVER
1:40 C-03



SECTION A-A' TYPICAL SECTION PERIMETER ACCESS ROAD
1:40 C-02

No.	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 50mm ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

BROOKS ROAD LANDFILL SITE
HALDIMAND COUNTRY, ONTARIO

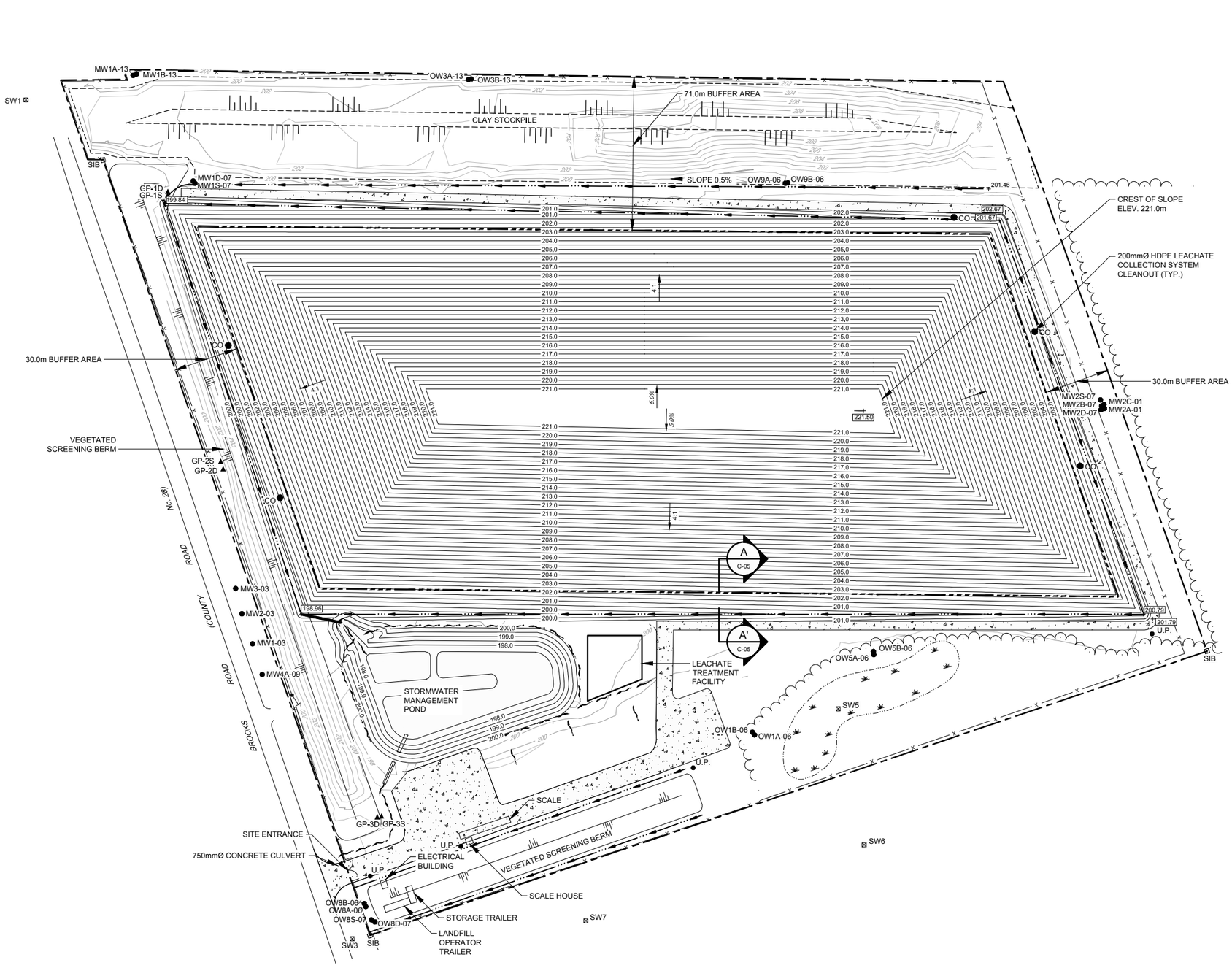
CONCEPTUAL DESIGN REPORT

VERTICAL EXPANSION
ALTERNATIVE 1 DETAILS

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
G.FERRARO	P.KEMP	DECEMBER 2015	
Scale: 1:1000	Project No: 18235-20	Report No: 051	Drawing No: C-03



No.	Revision	Date	Initial

LEGEND

- 202.0 — TOP OF FINAL COVER CONTOUR (1.0m INTERVAL (m AMSL))
- TOP OF FINAL COVER CONTOUR (0.5m INTERVAL (m AMSL))
- 202 — GROUND CONTOUR (2.0m INTERVAL)
- GROUND CONTOUR (1.0m INTERVAL)
- PROPERTY LINE
- APPROVED LIMIT OF WASTE
- x — EXISTING FENCELINE
- CLAY STOCKPILE AREA
- PERIMETER DITCH
- TREELINE
- GRANULAR SURFACE ACCESS ROAD
- SWAMPY AREA
- 201.67 — SPOT ELEVATION (m AMSL)
- CO — LEACHATE COLLECTION SYSTEM CLEAN OUT
- SIB — STANDARD IRON BAR
- OW1B-06 — OBSERVATION WELL
- MW2A-01 — MONITORING WELL
- SW6 — SURFACE WATER MONITORING
- GP-3S — GAS PROBE
- U.P. — UTILITY POLE
- DOUBLE GATE
- SINGLE GATE

SCALE VERIFICATION

THIS BAR MEASURES 50mm ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

BROOKS ROAD LANDFILL SITE
HALDIMAND COUNTRY, ONTARIO

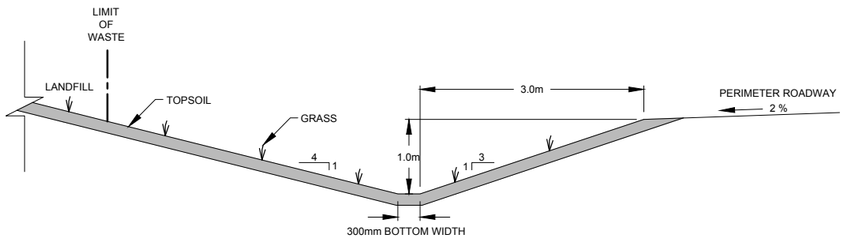
CONCEPTUAL DESIGN REPORT

VERTICAL EXPANSION ALTERNATIVE 2

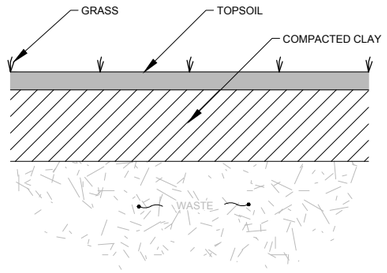
GHD

Source Reference:
EXISTING GROUND CONTOURS AND TOPOGRAPHIC FEATURES SHOWN ARE BASED ON TERVITA AS-BUILT FOR FINAL CONDITIONS FOR STAGE 2A, 2B AND STAGE 3A, AND NORTH CLAY STOCKPILE SURVEY BY VAN NOSTRAND AND GIBSON SURVEYED JULY-17-2013

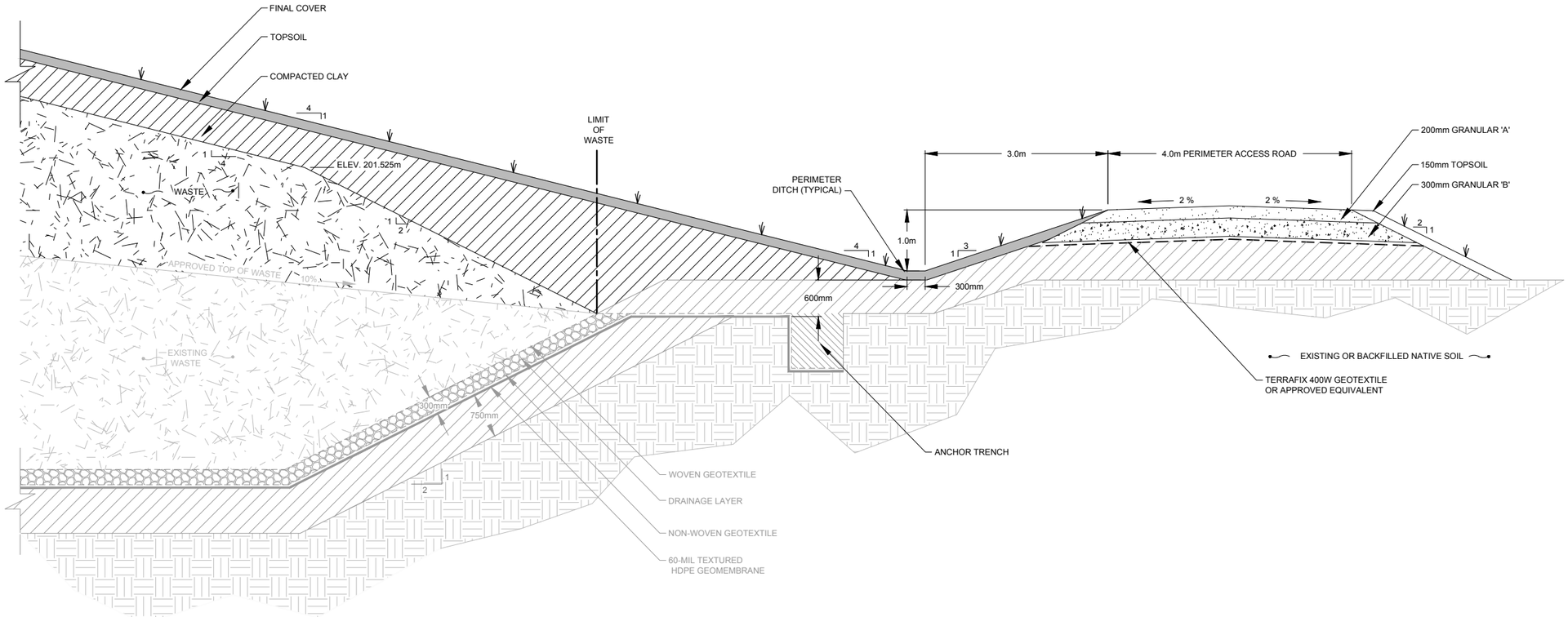
Project Manager:	Reviewed By:	Date:	
G.FERRARO	P.KEMP	DECEMBER 2015	
Scale: 1:1000	Project N°: 18235-20	Report N°: 051	Drawing N°: C-04



DETAIL 1 PERIMETER DITCH (TYPICAL)
1:40 C-05



DETAIL 2 FINAL COVER
1:40 C-05



SECTION A-A' TYPICAL SECTION PERIMETER ACCESS ROAD
1:40 C-04

No.	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 50mm ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

BROOKS ROAD LANDFILL SITE
HALDIMAND COUNTRY, ONTARIO

CONCEPTUAL DESIGN REPORT

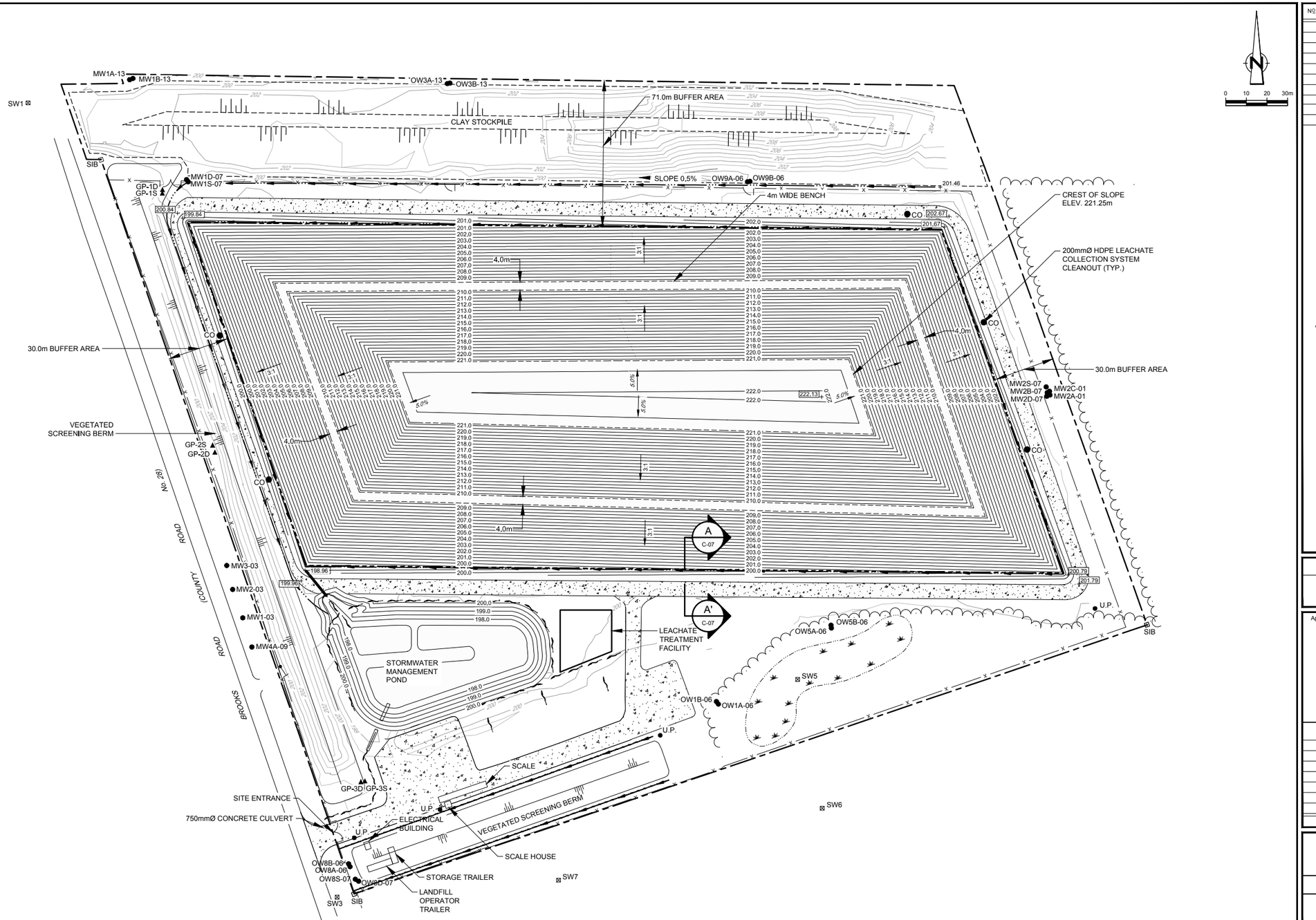
VERTICAL EXPANSION
ALTERNATIVE 2 DETAILS

.

Source Reference:

Project Manager:	Reviewed By:	Date:	
G.FERRARO	P.KEMP	DECEMBER 2015	
Scale: 1:1000	Project No: 18235-20	Report No: 051	Drawing No: C-05

18235-20(051)CI-WA005 DEC 11/2015



No.	Revision	Date	Initial

LEGEND

- 202.0 — TOP OF FINAL COVER CONTOUR (1.0m INTERVAL (m AMSL))
- TOP OF FINAL COVER CONTOUR (0.5m INTERVAL (m AMSL))
- 202 — GROUND CONTOUR (2.0m INTERVAL)
- GROUND CONTOUR (1.0m INTERVAL)
- PROPERTY LINE
- APPROVED LIMIT OF WASTE
- x — EXISTING FENCELINE
- CLAY STOCKPILE AREA
- PERIMETER DITCH
- TREELINE
- GRANULAR SURFACE ACCESS ROAD
- SWAMPY AREA
- 201.67 — SPOT ELEVATION (m AMSL)
- CO — LEACHATE COLLECTION SYSTEM CLEAN OUT
- SIB — STANDARD IRON BAR
- OW1B-06 — OBSERVATION WELL
- MW2A-01 — MONITORING WELL
- SW6 — SURFACE WATER MONITORING
- GP-3S — GAS PROBE
- U.P. — UTILITY POLE
- DOUBLE GATE
- SINGLE GATE

SCALE VERIFICATION

THIS BAR MEASURES 50mm ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

BROOKS ROAD LANDFILL SITE
HALDIMAND COUNTRY, ONTARIO

CONCEPTUAL DESIGN REPORT

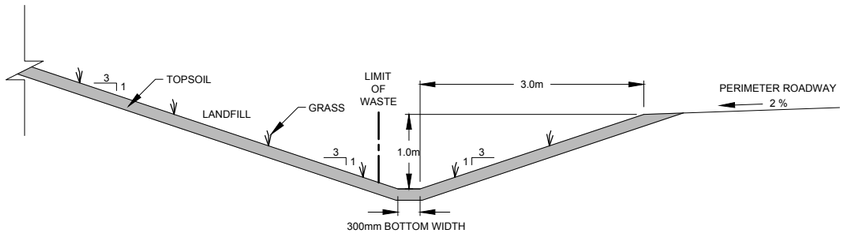
VERTICAL EXPANSION
ALTERNATIVE 3

GHD

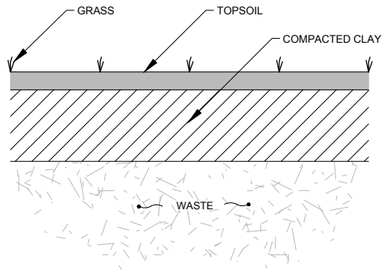
Source Reference:
EXISTING GROUND CONTOURS AND TOPOGRAPHIC FEATURES SHOWN ARE BASED ON TERVITA AS-BUILT FOR FINAL CONDITIONS FOR STAGE 2A, 2B AND STAGE 3A, AND NORTH CLAY STOCKPILE SURVEY BY VAN NOSTRAND AND GIBSON SURVEYED JULY-17-2013

Project Manager:	Reviewed By:	Date:	
G.FERRARO	P.KEMP	DECEMBER 2015	
Scale: 1:1000	Project N°: 18235-20	Report N°: 051	Drawing N°: C-06

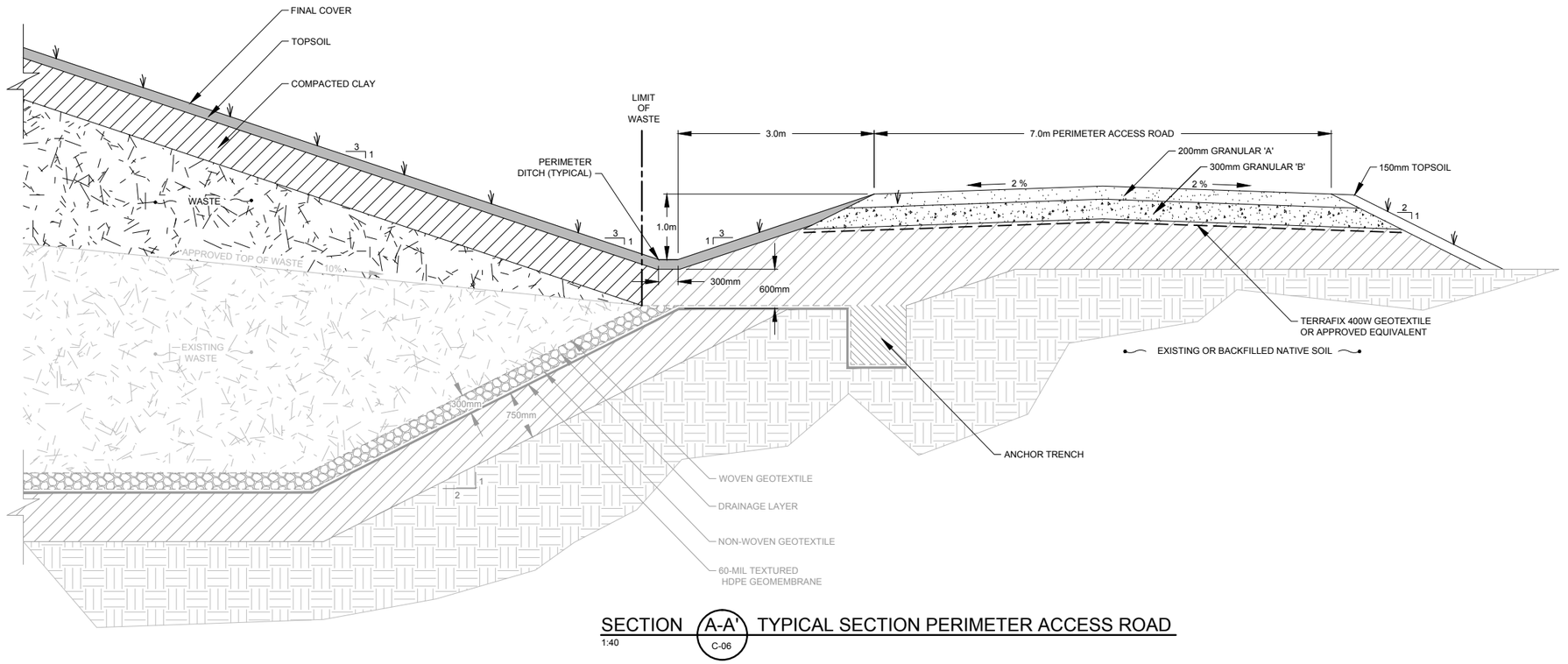
18235-20(051)CI-WA006 JAN 19/2016



DETAIL 1 PERIMETER DITCH (TYPICAL)
1:40 C-07



DETAIL 2 FINAL COVER
1:40 C-07



SECTION A-A' TYPICAL SECTION PERIMETER ACCESS ROAD
1:40 C-06

No.	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 50mm ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

BROOKS ROAD LANDFILL SITE
HALDIMAND COUNTRY, ONTARIO

CONCEPTUAL DESIGN REPORT

VERTICAL EXPANSION
ALTERNATIVE 3 DETAILS

.

Source Reference:

Project Manager:	Reviewed By:	Date:	
G.FERRARO	P.KEMP	DECEMBER 2015	
Scale: 1:1000	Project No: 18235-20	Report No: 051	Drawing No: C-07

Appendix A

Turning Movement Data Sheets

Ontario Traffic Inc

Morning Peak Diagram

Specified Period
From: 8:30:00
To: 10:30:00

One Hour Peak
From: 9:30:00
To: 10:30:00

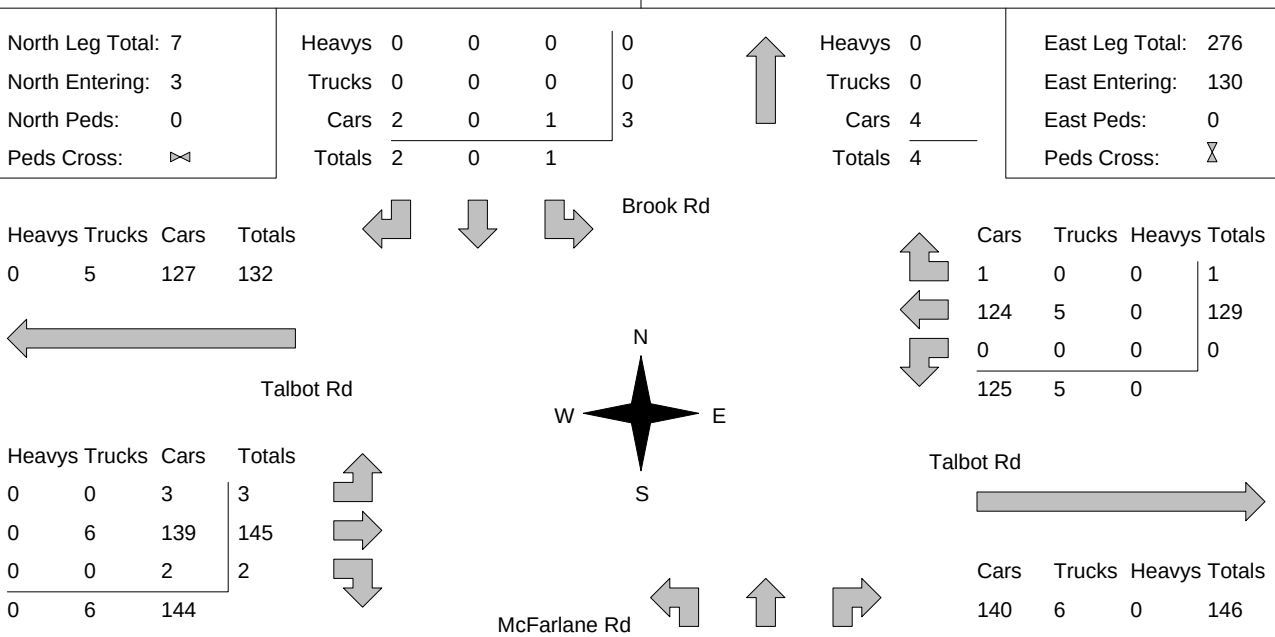
Municipality: Cayuga
Site #: 1533100001
Intersection: Talbot Rd & Brook Rd
TFR File #: 1
Count date: 5-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Talbot Rd runs W/E



Comments

Ontario Traffic Inc

Mid-day Peak Diagram

Specified Period
From: 11:30:00
To: 14:30:00

One Hour Peak
From: 11:30:00
To: 12:30:00

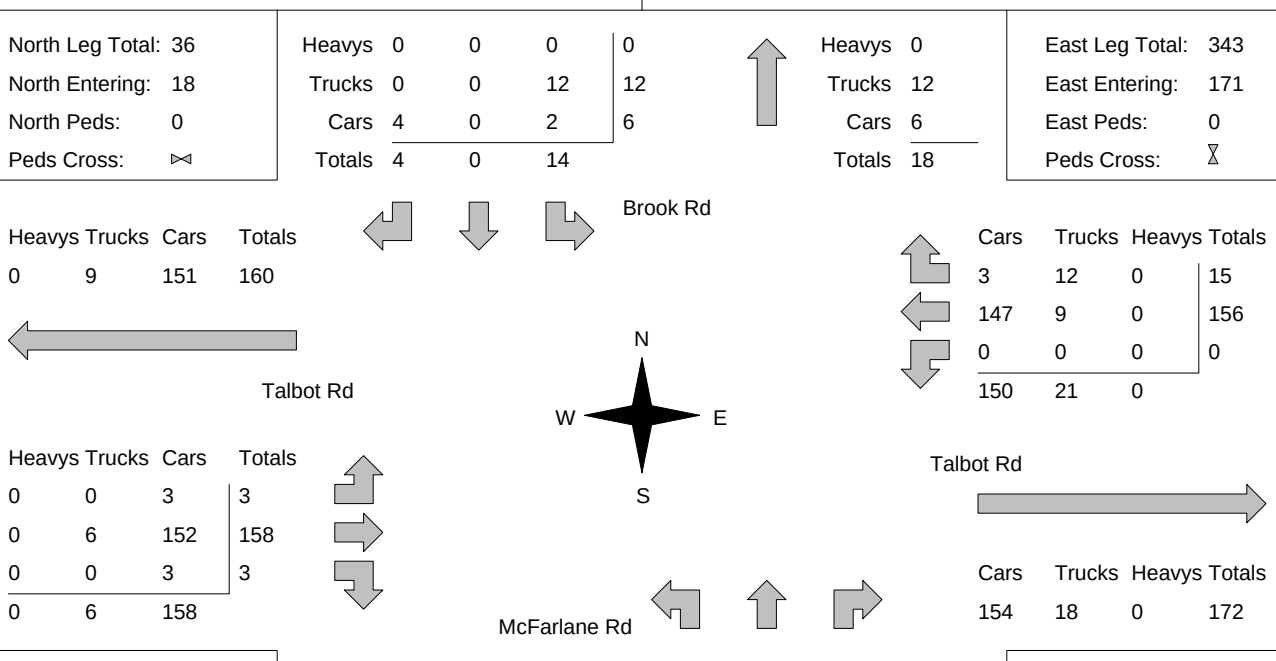
Municipality: Cayuga
Site #: 1533100001
Intersection: Talbot Rd & Brook Rd
TFR File #: 1
Count date: 5-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Talbot Rd runs W/E



Comments

Ontario Traffic Inc

Total Count Diagram

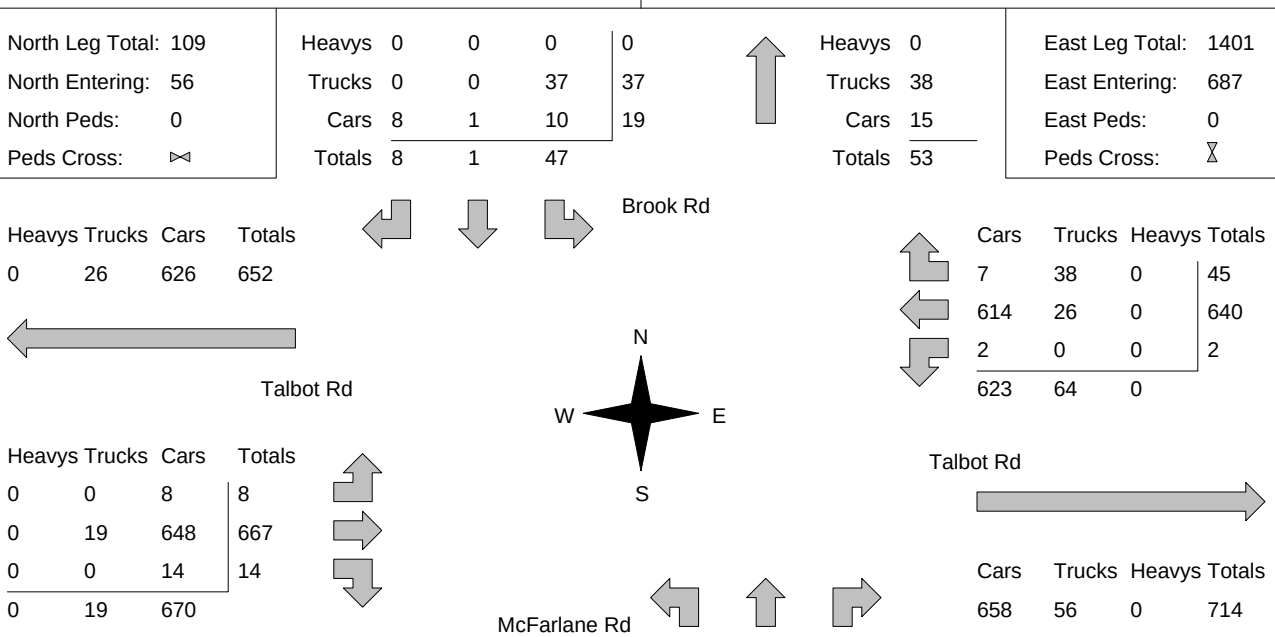
Municipality: Cayuga
Site #: 1533100001
Intersection: Talbot Rd & Brook Rd
TFR File #: 1
Count date: 5-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Talbot Rd runs W/E



Comments

Ontario Traffic Inc

Morning Peak Diagram

Specified Period
From: 8:30:00
To: 10:30:00

One Hour Peak
From: 8:30:00
To: 9:30:00

Municipality: Cayuga
Site #: 1533100002
Intersection: Brooks Rd & Landfill Access
TFR File #: 1
Count date: 5-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

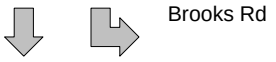
Major Road: Brooks Rd runs N/S

North Leg Total: 10
North Entering: 6
North Peds: 0
Peds Cross: ⋈

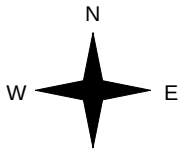
Heavys	0	0	0
Trucks	0	0	0
Cars	6	0	6
Totals	6	0	

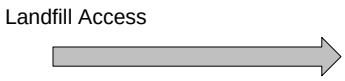
Heavys	0
Trucks	0
Cars	4
Totals	4

East Leg Total: 0
East Entering: 0
East Peds: 0
Peds Cross: ⋈



Cars	Trucks	Heavys	Totals
0	0	0	0
0	0	0	0
0	0	0	





Cars	Trucks	Heavys	Totals
0	0	0	0

Cars	6
Trucks	0
Heavys	0
Totals	6

Cars	4	0	4
Trucks	0	0	0
Heavys	0	0	0
Totals	4	0	

Peds Cross: ⋈
South Peds: 0
South Entering: 4
South Leg Total: 10

Comments

Ontario Traffic Inc

Mid-day Peak Diagram

Specified Period
From: 11:30:00
To: 14:30:00

One Hour Peak
From: 12:15:00
To: 13:15:00

Municipality: Cayuga
Site #: 1533100002
Intersection: Brooks Rd & Landfill Access
TFR File #: 1
Count date: 5-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Brooks Rd runs N/S

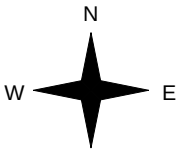
North Leg Total: 7
North Entering: 5
North Peds: 0
Peds Cross: ⋈

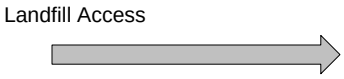
Heavys	0	0	0
Trucks	0	0	0
Cars	5	0	5
Totals	5	0	

Heavys	0
Trucks	0
Cars	2
Totals	2

East Leg Total: 30
East Entering: 14
East Peds: 0
Peds Cross: ⋈

Cars	Trucks	Heavys	Totals
0	0	0	0
0	14	0	14
0	14	0	





Cars	Trucks	Heavys	Totals
0	16	0	16

Brooks Rd

Cars	5
Trucks	14
Heavys	0
Totals	19

Cars	2	0	2
Trucks	0	16	16
Heavys	0	0	0
Totals	2	16	

Peds Cross: ⋈
South Peds: 0
South Entering: 18
South Leg Total: 37

Comments

Ontario Traffic Inc

Total Count Diagram

Municipality: Cayuga
Site #: 1533100002
Intersection: Brooks Rd & Landfill Access
TFR File #: 1
Count date: 5-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Brooks Rd runs N/S

North Leg Total: 29
North Entering: 18
North Peds: 0
Peds Cross: ⋈

Heavys	0	0	0
Trucks	1	0	1
Cars	17	0	17
Totals	18	0	

Heavys	0	
Trucks	0	
Cars	11	
Totals	11	

East Leg Total: 77
East Entering: 41
East Peds: 0
Peds Cross: ⋈

Brooks Rd

Cars	Trucks	Heavys	Totals
0	0	0	0
1	40	0	41
1	40	0	

N
W E
S

Landfill Access

Cars	Trucks	Heavys	Totals
0	36	0	36

Brooks Rd

Cars	18
Trucks	41
Heavys	0
Totals	59

Cars	11	0	11
Trucks	0	36	36
Heavys	0	0	0
Totals	11	36	

Peds Cross: ⋈
South Peds: 0
South Entering: 47
South Leg Total: 106

Comments

Ontario Traffic Inc

Morning Peak Diagram

Specified Period
From: 7:30:00
To: 10:30:00

One Hour Peak
From: 7:30:00
To: 8:30:00

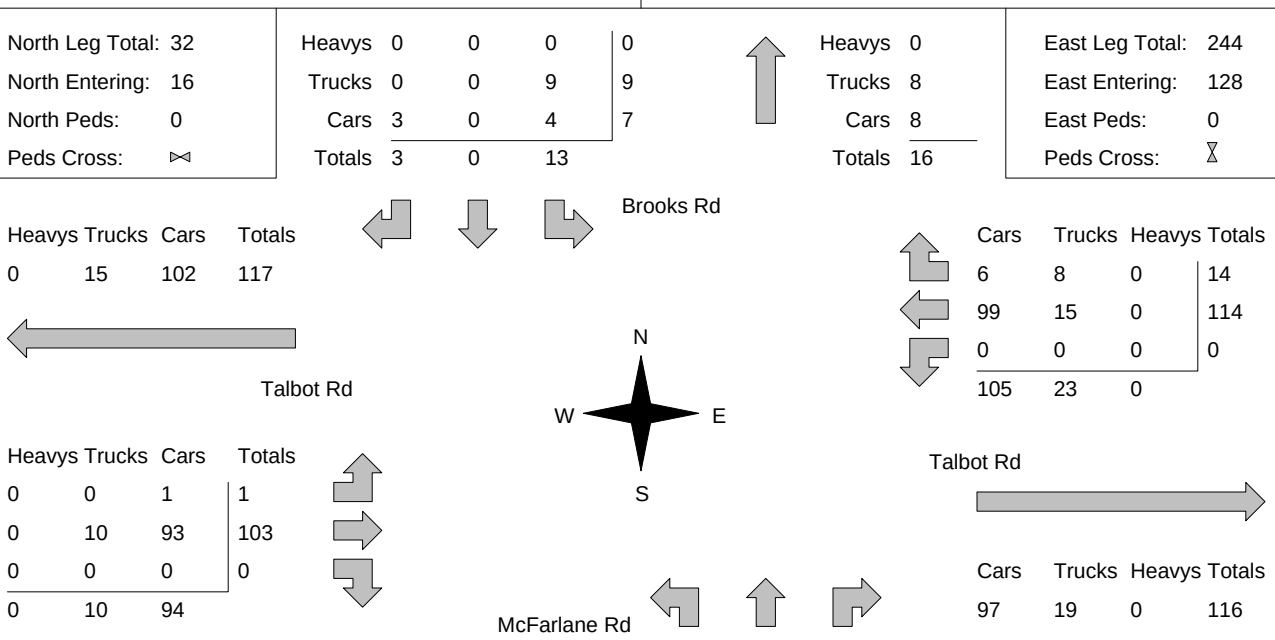
Municipality: Cayuga
Site #: 1533100003
Intersection: Talbot Rd & Brooks Rd
TFR File #: 2
Count date: 7-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Talbot Rd runs W/E



Comments

Ontario Traffic Inc

Mid-day Peak Diagram

Specified Period
From: 11:30:00
To: 13:30:00

One Hour Peak
From: 12:30:00
To: 13:30:00

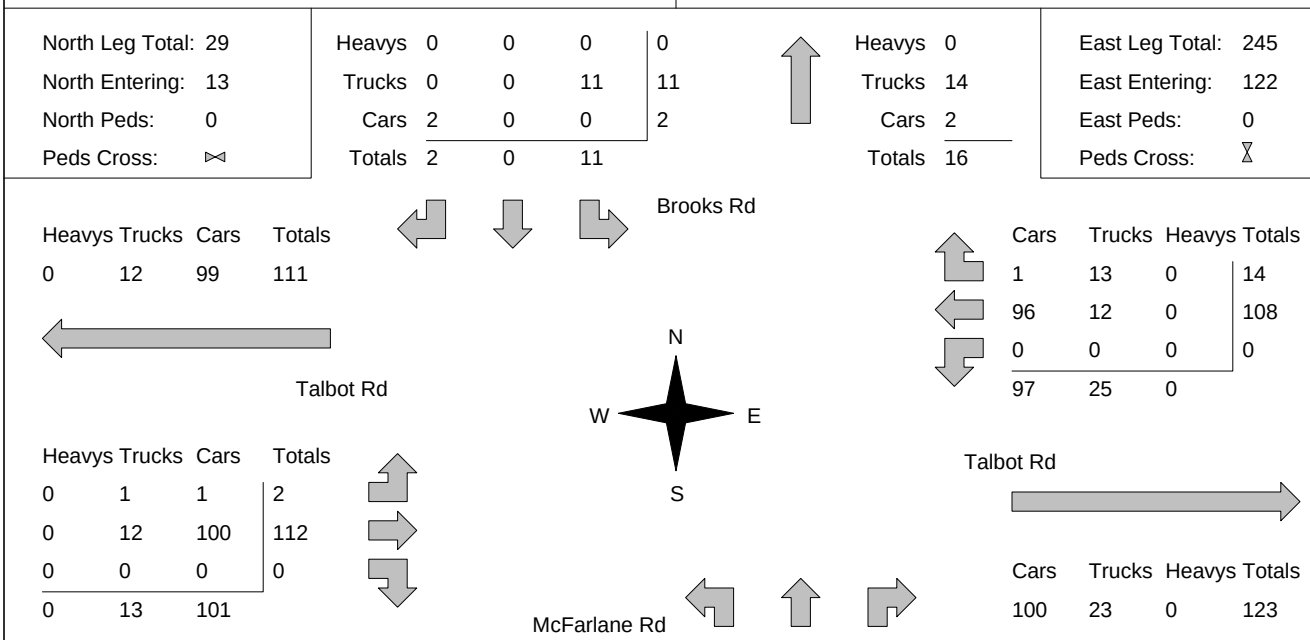
Municipality: Cayuga
Site #: 1533100003
Intersection: Talbot Rd & Brooks Rd
TFR File #: 2
Count date: 7-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Talbot Rd runs W/E



Comments

Ontario Traffic Inc

Afternoon Peak Diagram

Specified Period
From: 14:00:00
To: 16:30:00

One Hour Peak
From: 15:30:00
To: 16:30:00

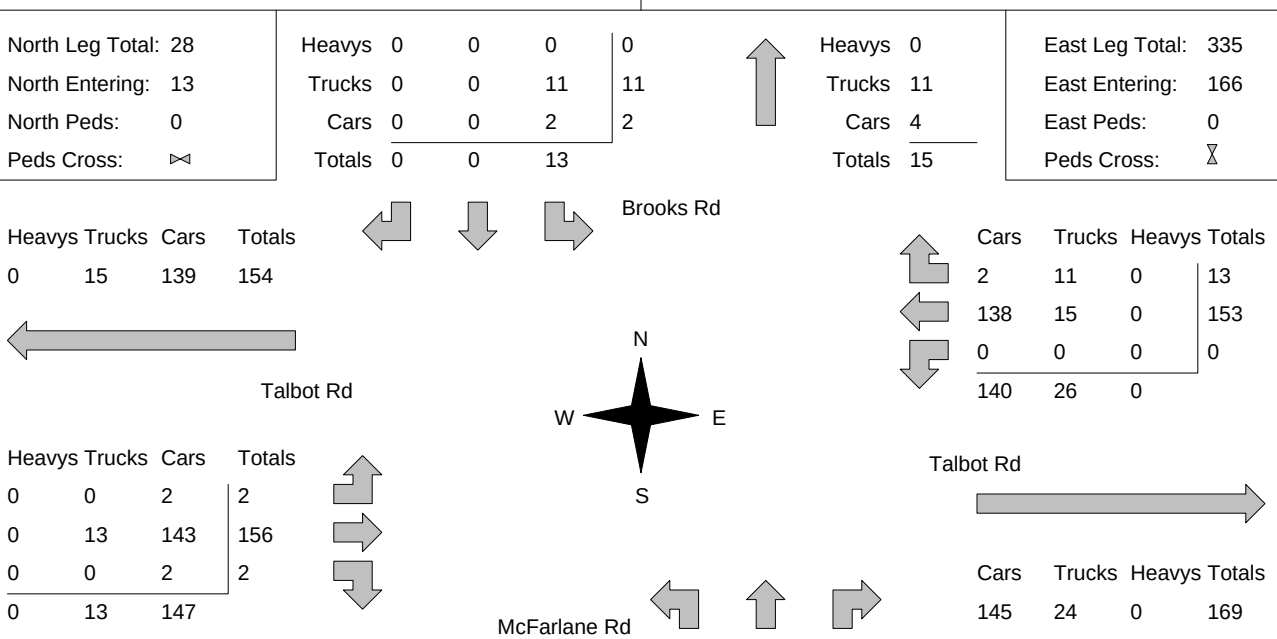
Municipality: Cayuga
Site #: 1533100003
Intersection: Talbot Rd & Brooks Rd
TFR File #: 2
Count date: 7-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Talbot Rd runs W/E



Comments

Ontario Traffic Inc

Total Count Diagram

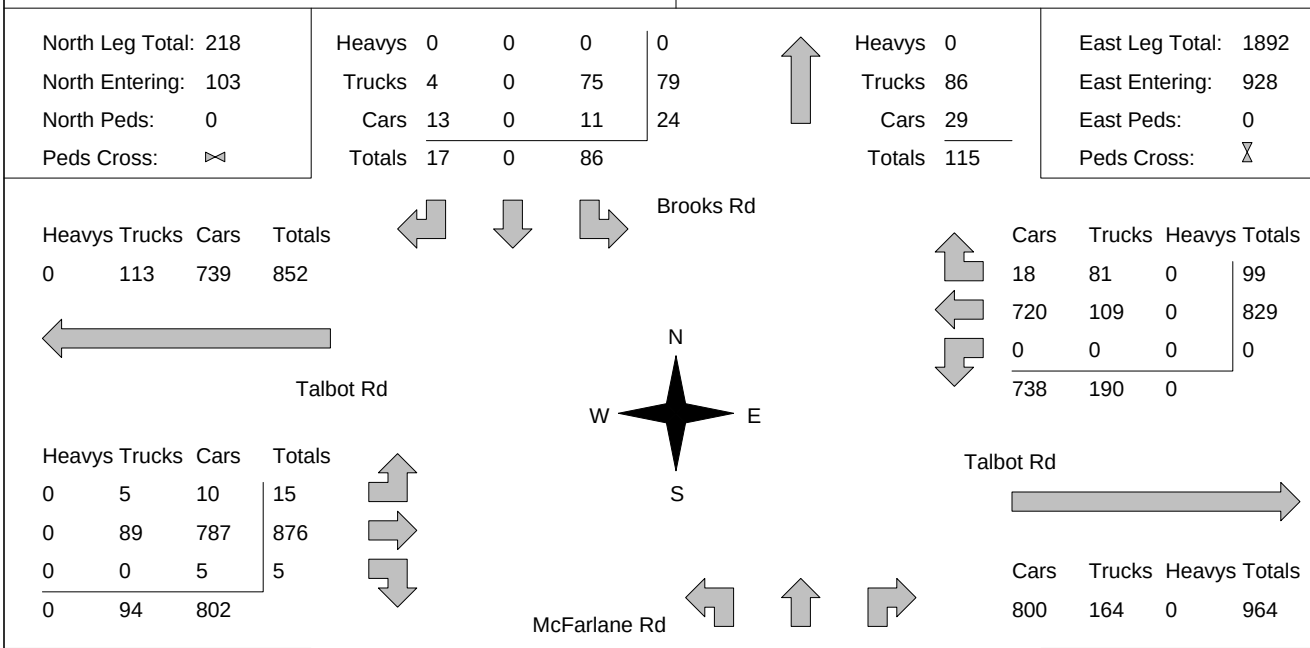
Municipality: Cayuga
Site #: 1533100003
Intersection: Talbot Rd & Brooks Rd
TFR File #: 2
Count date: 7-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Talbot Rd runs W/E



Comments

Ontario Traffic Inc

Morning Peak Diagram

Specified Period
From: 7:30:00
To: 10:30:00

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: Cayuga
Site #: 1533100004
Intersection: Brooks Rd & Landfill Access
TFR File #: 2
Count date: 7-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Brooks Rd runs N/S

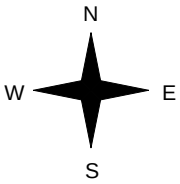
North Leg Total: 7
North Entering: 5
North Peds: 0
Peds Cross: ⋈

Heavys	0	0	0
Trucks	0	0	0
Cars	5	0	5
Totals	5	0	

Heavys	0
Trucks	0
Cars	2
Totals	2

East Leg Total: 23
East Entering: 11
East Peds: 0
Peds Cross: ⋈

Cars	Trucks	Heavys	Totals
0	0	0	0
3	8	0	11
3	8	0	



Landfill Access

Cars	Trucks	Heavys	Totals
3	9	0	12

Brooks Rd

Cars	8
Trucks	8
Heavys	0
Totals	16

Cars	2	3	5
Trucks	0	9	9
Heavys	0	0	0
Totals	2	12	

Peds Cross: ⋈
South Peds: 0
South Entering: 14
South Leg Total: 30

Comments

Ontario Traffic Inc

Mid-day Peak Diagram

Specified Period
From: 11:30:00
To: 13:30:00

One Hour Peak
From: 12:30:00
To: 13:30:00

Municipality: Cayuga
Site #: 1533100004
Intersection: Brooks Rd & Landfill Access
TFR File #: 2
Count date: 7-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Brooks Rd runs N/S

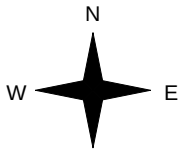
North Leg Total: 8
North Entering: 3
North Peds: 0
Peds Cross: ⋈

Heavys	0	0	0
Trucks	0	0	0
Cars	3	0	3
Totals	3	0	

Heavys	0
Trucks	1
Cars	4
Totals	5

East Leg Total: 25
East Entering: 13
East Peds: 0
Peds Cross: ⋈

Cars	Trucks	Heavys	Totals
0	0	0	0
1	12	0	13
1	12	0	



Landfill Access

Cars	Trucks	Heavys	Totals
0	12	0	12

Brooks Rd

Cars	4
Trucks	12
Heavys	0
Totals	16

Cars	4	0	4
Trucks	1	12	13
Heavys	0	0	0
Totals	5	12	

Peds Cross: ⋈
South Peds: 0
South Entering: 17
South Leg Total: 33

Comments

Ontario Traffic Inc

Afternoon Peak Diagram

Specified Period
From: 14:00:00
To: 16:30:00

One Hour Peak
From: 15:15:00
To: 16:15:00

Municipality: Cayuga
Site #: 1533100004
Intersection: Brooks Rd & Landfill Access
TFR File #: 2
Count date: 7-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

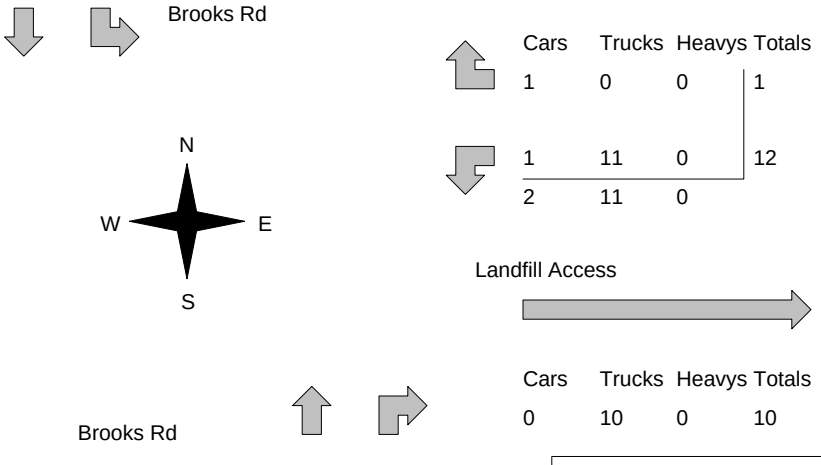
Major Road: Brooks Rd runs N/S

North Leg Total: 5
North Entering: 1
North Peds: 0
Peds Cross: ⋈

Heavys	0	0	0
Trucks	0	0	0
Cars	1	0	1
Totals	1	0	

Heavys	0
Trucks	0
Cars	4
Totals	4

East Leg Total: 23
East Entering: 13
East Peds: 0
Peds Cross: ⋈



Cars	2	Cars	3	0	3
Trucks	11	Trucks	0	10	10
Heavys	0	Heavys	0	0	0
Totals	13	Totals	3	10	

Peds Cross: ⋈
South Peds: 0
South Entering: 13
South Leg Total: 26

Comments

Ontario Traffic Inc

Total Count Diagram

Municipality: Cayuga
Site #: 1533100004
Intersection: Brooks Rd & Landfill Access
TFR File #: 2
Count date: 7-Dec-15

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Brooks Rd runs N/S

North Leg Total: 43
North Entering: 23
North Peds: 1
Peds Cross: ⋈

Heavys	0	0	0
Trucks	1	0	1
Cars	22	0	22
Totals	23	0	

Heavys	0
Trucks	1
Cars	19
Totals	20

East Leg Total: 163
East Entering: 85
East Peds: 0
Peds Cross: ⋈

Brooks Rd

	Cars	Trucks	Heavys	Totals
	1	0	0	1
	7	77	0	84
	8	77	0	

N
W E
S

Landfill Access

Cars	Trucks	Heavys	Totals
4	74	0	78

Brooks Rd

Cars	29	Cars	18	4	22
Trucks	78	Trucks	1	74	75
Heavys	0	Heavys	0	0	0
Totals	107	Totals	19	78	

Peds Cross: ⋈
South Peds: 0
South Entering: 97
South Leg Total: 204

Comments

Appendix B

Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	128	0	0	142	31	0	2	0	29	0	7
Future Volume (Veh/h)	2	128	0	0	142	31	0	2	0	29	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	139	0	0	154	34	0	2	0	32	0	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	188			139			322	331	139	315	314	171
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188			139			322	331	139	315	314	171
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	95	100	99
cM capacity (veh/h)	1386			1445			624	588	909	635	601	873

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	141	188	2	40
Volume Left	2	0	0	32
Volume Right	0	34	0	8
cSH	1386	1445	588	672
Volume to Capacity	0.00	0.00	0.00	0.06
Queue Length 95th (m)	0.0	0.0	0.1	1.4
Control Delay (s)	0.1	0.0	11.1	10.7
Lane LOS	A		B	B
Approach Delay (s)	0.1	0.0	11.1	10.7
Approach LOS			B	B

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	24.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	27	0	2	28	0	6
Future Volume (Veh/h)	27	0	2	28	0	6
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	0	2	30	0	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	24	17			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	24	17			32	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	992	1062			1580	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	29	32	7
Volume Left	29	0	0
Volume Right	0	30	0
cSH	992	1700	1580
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.7	0.0	0.0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	139	0	0	134	31	1	0	0	28	0	4
Future Volume (Veh/h)	4	139	0	0	134	31	1	0	0	28	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	151	0	0	146	34	1	0	0	30	0	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	180			151			326	339	151	322	322	163
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180			151			326	339	151	322	322	163
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	95	100	100
cM capacity (veh/h)	1396			1430			623	581	895	630	594	882

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	155	180	1	34
Volume Left	4	0	1	30
Volume Right	0	34	0	4
cSH	1396	1430	623	651
Volume to Capacity	0.00	0.00	0.00	0.05
Queue Length 95th (m)	0.1	0.0	0.0	1.3
Control Delay (s)	0.2	0.0	10.8	10.8
Lane LOS	A		B	B
Approach Delay (s)	0.2	0.0	10.8	10.8
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	20.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	29	0	6	28	0	2
Future Volume (Veh/h)	29	0	6	28	0	2
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	0	7	30	0	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	24	22			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	24	22			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	992	1055			1574	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	37	2
Volume Left	32	0	0
Volume Right	0	30	0
cSH	992	1700	1574
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.8	0.0	0.0
Control Delay (s)	8.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.8	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	189	2	0	190	30	1	0	0	31	0	0
Future Volume (Veh/h)	4	189	2	0	190	30	1	0	0	31	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	205	2	0	207	33	1	0	0	34	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	240			207			438	454	206	438	438	224
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	240			207			438	454	206	438	438	224
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	94	100	100
cM capacity (veh/h)	1327			1364			528	500	835	528	511	816

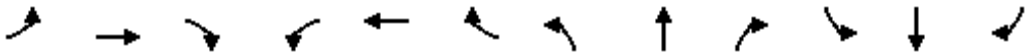
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	211	240	1	34
Volume Left	4	0	1	34
Volume Right	2	33	0	0
cSH	1327	1364	528	528
Volume to Capacity	0.00	0.00	0.00	0.06
Queue Length 95th (m)	0.1	0.0	0.0	1.6
Control Delay (s)	0.2	0.0	11.8	12.3
Lane LOS	A		B	B
Approach Delay (s)	0.2	0.0	11.8	12.3
Approach LOS			B	B

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	23.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	27	2	4	26	0	1
Future Volume (Veh/h)	27	2	4	26	0	1
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	2	4	28	0	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	19	18			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	19	18			32	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	998	1061			1580	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	31	32	1
Volume Left	29	0	0
Volume Right	2	28	0
cSH	1002	1700	1580
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.7	0.0	0.0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	158	3	0	156	15	0	0	0	14	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	172	3	0	170	16	0	0	0	15	0	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	186			175			362	366	173	358	359	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	186			175			362	366	173	358	359	178
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	97	100	99
cM capacity (veh/h)	1389			1401			590	561	870	597	566	865

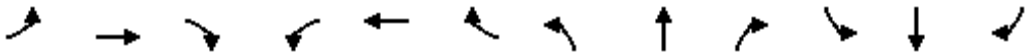
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	178	186	0	20
Volume Left	3	0	0	15
Volume Right	3	16	0	4
cSH	1389	1401	1700	641
Volume to Capacity	0.00	0.00	0.00	0.03
Queue Length 95th (m)	0.1	0.0	0.0	0.7
Control Delay (s)	0.2	0.0	0.0	10.8
Lane LOS	A		A	B
Approach Delay (s)	0.2	0.0	0.0	10.8
Approach LOS			A	B

Intersection Summary					
Average Delay	0.6				
Intersection Capacity Utilization	20.9%	ICU Level of Service	A		
Analysis Period (min)	15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	0	2	16	0	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	0	2	17	0	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	16	11			20	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	16	11			20	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	1002	1070			1597	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	15	20	5
Volume Left	15	0	0
Volume Right	0	17	0
cSH	1002	1700	1597
Volume to Capacity	0.02	0.01	0.00
Queue Length 95th (m)	0.4	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	103	0	0	114	15	0	1	0	13	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	112	0	0	124	16	0	1	0	14	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	140			112			249	254	112	247	246	132
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	140			112			249	254	112	247	246	132
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	98	100	100
cM capacity (veh/h)	1443			1478			701	649	941	706	656	917

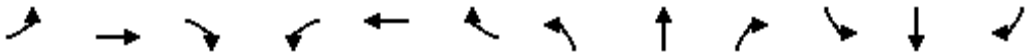
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	113	140	1	17
Volume Left	1	0	0	14
Volume Right	0	16	0	3
cSH	1443	1478	649	738
Volume to Capacity	0.00	0.00	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.6
Control Delay (s)	0.1	0.0	10.6	10.0
Lane LOS	A		B	A
Approach Delay (s)	0.1	0.0	10.6	10.0
Approach LOS			B	A

Intersection Summary					
Average Delay	0.7				
Intersection Capacity Utilization	21.1%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	11	0	2	12	0	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	2	13	0	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	14	9			15	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	14	9			15	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	1005	1073			1603	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	12	15	5
Volume Left	12	0	0
Volume Right	0	13	0
cSH	1005	1700	1603
Volume to Capacity	0.01	0.01	0.00
Queue Length 95th (m)	0.3	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	112	0	0	108	14	1	0	0	11	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	122	0	0	117	15	1	0	0	12	0	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	133			122			253	259	122	251	251	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	133			122			253	259	122	251	251	125
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	98	100	100
cM capacity (veh/h)	1452			1466			698	645	929	702	651	926

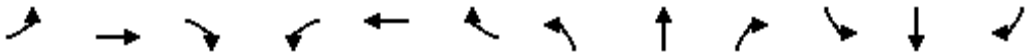
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	124	133	1	14
Volume Left	2	0	1	12
Volume Right	0	15	0	2
cSH	1452	1466	698	729
Volume to Capacity	0.00	0.00	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.5
Control Delay (s)	0.1	0.0	10.2	10.0
Lane LOS	A		B	B
Approach Delay (s)	0.1	0.0	10.2	10.0
Approach LOS			B	B

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	17.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	13	0	5	12	0	3
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	0	5	13	0	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	15	12			18	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	15	12			18	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	1003	1069			1598	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	14	18	3
Volume Left	14	0	0
Volume Right	0	13	0
cSH	1003	1700	1598
Volume to Capacity	0.01	0.01	0.00
Queue Length 95th (m)	0.3	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	156	2	0	153	13	1	0	0	13	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	170	2	0	166	14	1	0	0	14	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	180			172			348	355	171	348	349	173
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180			172			348	355	171	348	349	173
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	98	100	100
cM capacity (veh/h)	1395			1405			605	569	873	605	574	870

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	174	180	1	14
Volume Left	2	0	1	14
Volume Right	2	14	0	0
cSH	1395	1405	605	605
Volume to Capacity	0.00	0.00	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.5
Control Delay (s)	0.1	0.0	11.0	11.1
Lane LOS	A		B	B
Approach Delay (s)	0.1	0.0	11.0	11.1
Approach LOS			B	B

Intersection Summary					
Average Delay	0.5				
Intersection Capacity Utilization	19.9%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	1	3	10	0	1
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	1	3	11	0	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	10	9			14	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	10	9			14	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	1010	1073			1604	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	14	14	1
Volume Left	13	0	0
Volume Right	1	11	0
cSH	1015	1700	1604
Volume to Capacity	0.01	0.01	0.00
Queue Length 95th (m)	0.3	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	178	3	0	176	30	0	0	0	28	0	9
Future Volume (Veh/h)	6	178	3	0	176	30	0	0	0	28	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	193	3	0	191	33	0	0	0	30	0	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	224			196			426	432	194	416	418	208
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	224			196			426	432	194	416	418	208
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	94	100	99
cM capacity (veh/h)	1345			1377			530	513	847	545	523	833

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	203	224	0	40
Volume Left	7	0	0	30
Volume Right	3	33	0	10
cSH	1345	1377	1700	596
Volume to Capacity	0.01	0.00	0.00	0.07
Queue Length 95th (m)	0.1	0.0	0.0	1.6
Control Delay (s)	0.3	0.0	0.0	11.5
Lane LOS	A		A	B
Approach Delay (s)	0.3	0.0	0.0	11.5
Approach LOS			A	B

Intersection Summary					
Average Delay	1.1				
Intersection Capacity Utilization	24.4%	ICU Level of Service	A		
Analysis Period (min)	15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	0	2	32	0	6
Future Volume (Veh/h)	30	0	2	32	0	6
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	2	35	0	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26	20			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	20			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	989	1058			1574	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	33	37	7
Volume Left	33	0	0
Volume Right	0	35	0
cSH	989	1700	1574
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.8	0.0	0.0
Control Delay (s)	8.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.8	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	116	0	0	128	30	0	2	0	28	0	6
Future Volume (Veh/h)	2	116	0	0	128	30	0	2	0	28	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	126	0	0	139	33	0	2	0	30	0	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	172			126			292	302	126	286	286	156
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	172			126			292	302	126	286	286	156
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	95	100	99
cM capacity (veh/h)	1405			1460			654	610	924	663	623	890

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	128	172	2	37
Volume Left	2	0	0	30
Volume Right	0	33	0	7
cSH	1405	1460	610	697
Volume to Capacity	0.00	0.00	0.00	0.05
Queue Length 95th (m)	0.0	0.0	0.1	1.3
Control Delay (s)	0.1	0.0	10.9	10.5
Lane LOS	A		B	B
Approach Delay (s)	0.1	0.0	10.9	10.5
Approach LOS			B	B

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	23.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	27	0	2	28	0	6
Future Volume (Veh/h)	27	0	2	28	0	6
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	0	2	30	0	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	24	17			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	24	17			32	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	992	1062			1580	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	29	32	7
Volume Left	29	0	0
Volume Right	0	30	0
cSH	992	1700	1580
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.7	0.0	0.0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	126	0	0	122	30	1	0	0	26	0	4
Future Volume (Veh/h)	4	126	0	0	122	30	1	0	0	26	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	137	0	0	133	33	1	0	0	28	0	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	166			137			298	311	137	294	294	150
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	166			137			298	311	137	294	294	150
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	96	100	100
cM capacity (veh/h)	1412			1447			649	602	911	656	615	897

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	141	166	1	32
Volume Left	4	0	1	28
Volume Right	0	33	0	4
cSH	1412	1447	649	679
Volume to Capacity	0.00	0.00	0.00	0.05
Queue Length 95th (m)	0.1	0.0	0.0	1.1
Control Delay (s)	0.2	0.0	10.6	10.6
Lane LOS	A		B	B
Approach Delay (s)	0.2	0.0	10.6	10.6
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	19.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	29	0	6	28	0	2
Future Volume (Veh/h)	29	0	6	28	0	2
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	0	7	30	0	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	24	22			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	24	22			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	992	1055			1574	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	37	2
Volume Left	32	0	0
Volume Right	0	30	0
cSH	992	1700	1574
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.8	0.0	0.0
Control Delay (s)	8.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.8	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	171	2	0	172	29	1	0	0	30	0	0
Future Volume (Veh/h)	4	171	2	0	172	29	1	0	0	30	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	186	2	0	187	32	1	0	0	33	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	219			188			398	414	187	398	399	203
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	219			188			398	414	187	398	399	203
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	94	100	100
cM capacity (veh/h)	1350			1386			561	527	855	561	537	838

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	192	219	1	33
Volume Left	4	0	1	33
Volume Right	2	32	0	0
cSH	1350	1386	561	561
Volume to Capacity	0.00	0.00	0.00	0.06
Queue Length 95th (m)	0.1	0.0	0.0	1.4
Control Delay (s)	0.2	0.0	11.4	11.8
Lane LOS	A		B	B
Approach Delay (s)	0.2	0.0	11.4	11.8
Approach LOS			B	B

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	22.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	27	2	3	26	0	1
Future Volume (Veh/h)	27	2	3	26	0	1
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	2	3	28	0	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	18	17			31	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	18	17			31	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	1000	1062			1582	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	31	31	1
Volume Left	29	0	0
Volume Right	2	28	0
cSH	1004	1700	1582
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.7	0.0	0.0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	196	4	0	194	32	0	0	0	29	0	9
Future Volume (Veh/h)	7	196	4	0	194	32	0	0	0	29	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	213	4	0	211	35	0	0	0	32	0	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	246			217			470	477	215	460	462	228
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246			217			470	477	215	460	462	228
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	94	100	99
cM capacity (veh/h)	1320			1353			496	484	825	510	494	811

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	225	246	0	42
Volume Left	8	0	0	32
Volume Right	4	35	0	10
cSH	1320	1353	1700	559
Volume to Capacity	0.01	0.00	0.00	0.08
Queue Length 95th (m)	0.1	0.0	0.0	1.8
Control Delay (s)	0.3	0.0	0.0	12.0
Lane LOS	A		A	B
Approach Delay (s)	0.3	0.0	0.0	12.0
Approach LOS			A	B

Intersection Summary					
Average Delay	1.1				
Intersection Capacity Utilization	26.2%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	0	2	32	0	6
Future Volume (Veh/h)	30	0	2	32	0	6
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	2	35	0	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26	20			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	20			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	989	1058			1574	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	33	37	7
Volume Left	33	0	0
Volume Right	0	35	0
cSH	989	1700	1574
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.8	0.0	0.0
Control Delay (s)	8.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.8	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		