



# C.C. Tatham & Associates Ltd.

## Consulting Engineers

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January 19, 2018

via email: [sam@greenwoodconst.ca](mailto:sam@greenwoodconst.ca)  
CCTA File 114239

### Sam Greenwood

Greenwood Aggregates  
205467 County Road 109  
Amaranth, ON L9W 0V1

Re: **Violet Hill Gravel Pit, Town of Mono  
Burnside Review Comments**

Dear Sam:

We have received the following peer review comments provided by RJ Burnside:

- *Peer Review - Traffic Study*, dated December 18, 2017; and
- *Peer Review - Municipal Engineering*, dated December 21, 2017.

We have reviewed the comments and offer our responses below (the Burnside comments are attached for ease of reference).

### Peer Review - Traffic Study

#### Truck Size & Traffic Projections

Burnside questioned the average size of trucks employed in the study (34 tonnes), from which the traffic volume projections were employed. This average reflects the following assumptions:

- 20% triaxle dump trucks (23 tonnes);
- 30% triaxle semi-trailers (33 tonnes);
- 30% quad axle semi-trailers (38 tonnes); and
- 20% A or B train trailers (41 tonnes).

The corresponding truck volume estimates are provided in Table 1.

The use of various truck sizes will be dictated by a number of factors, including fleet availability, product and location of project, and thus it is not possible to confirm with all certainty what the average will be. To address the comments, we have prepared projections assuming an average truck size of 30 tonnes, the results of which are illustrated in Table 2.

**Table 1: Site Generated Traffic (loaded trucks) - 34 tonne average truck capacity**

Period	Tonnage	Operating Days	Tonnes/ Day	Loads/ Day	Loads/Hour	
					average	peak
Average (Jan – Dec)	1 000 000	250	4000	117	12	24
Peak Season <sup>1</sup>	800 000	145	5517	162	12.5	25
Off-Peak Season <sup>2</sup>	200 000	105	1905	56	7	14

<sup>1</sup> peak season = May to November (during which it is assumed 80% of the annual tonnage will be extracted)

<sup>2</sup> off-peak season = December to April (during which it is assumed that 20% of annual tonnage will be extracted)

**Table 2: Site Generated Traffic (loaded trucks) - 30 tonne average truck capacity**

Period	Tonnage	Operating Days	Tonnes/ Day	Loads/ Day	Loads/Hour	
					average	peak
Average (Jan – Dec)	1 000 000	250	4000	133	13	27
Peak Season <sup>1</sup>	800 000	145	5517	184	14	28
Off-Peak Season <sup>2</sup>	200 000	105	1905	63	8	16

<sup>1</sup> peak season = May to November (during which it is assumed 80% of the annual tonnage will be extracted)

<sup>2</sup> off-peak season = December to April (during which it is assumed that 20% of annual tonnage will be extracted)

In considering the peak loads per hour, the assumption of an average truck size of 30 tonnes results in 2 to 3 additional loads per hour (or 4 to 6 additional truck trips). This is not considered significant and will have no bearing on the traffic operations or results of our traffic review. It is reiterated that the noted volumes reflect the site operating at 1M tonnes per year.

### **Imported Material**

With respect to imported material (recycled asphalt, concrete and topsoil), we understand the following:

- recycled asphalt will be imported for exclusive use on the internal road system (ie. the road will be constructed of recycled asphalt), which among other benefits, will help limit noise and dust;
- surplus or waste concrete from the Greenwood Construction Alliston concrete plant may be imported for recycling purposes (ie. to be crushed and mixed with virgin aggregate) thus avoiding the need to dispose of it at a landfill; and
- topsoil will be imported for the construction of the berms which are to surround the site and are intended to address concerns relating to visual impact.

While the truck traffic relating to the above operations was not considered in the traffic review, it is not considered excessive. To address any concerns related to associated truck traffic, we understand you

are willing to consider any imported materials as part of the 1M tonne licence. In other words, if 10,000 tonnes of material is imported into the site, you will export no more than 990,000 tonnes of material, thus maintaining a total tonnage not exceeding 1M tonnes (and thus the volume considered in the traffic review will remain appropriate).

### Existing Traffic Volumes

Traffic volumes on Highway 89 were established from the August 2014 peak hour volumes recorded by MTO 0.9 km west of Dufferin Road 18 (in that they were reflected the greatest volumes, higher than those recorded at the noted intersections). The respective count data is provided in Appendix A.

As noted in the review, traffic volumes on the 3<sup>rd</sup> and 4<sup>th</sup> Lines East were estimated - counts were not completed given the minimal traffic volumes anticipated. As per the *Peer Review - Municipal Engineering* comments from Burnside, the 2016 Average Annual Daily Traffic Volumes (AADT) on 3<sup>rd</sup> Line East was noted as 182 vehicles. The peak hour volumes are typically 10% of this, suggesting 18 vehicles. Our assessment reflects peak hour volumes of 20 vehicles and thus is comparable. Given these marginal volumes, any increase in traffic can be readily accommodated.

Figure 6 does not include any site generated traffic. Further to the statement “To reflect operations of the proposed pit, the associated site generated traffic volumes have also been included in the 2017 volumes.” another figure should have been included in the traffic review (see attached Figure 6B).

No operational analyses were conducted for the 2017 horizon, given the realization that operations under 2022 and 2027 would be more critical (and as acceptable under these horizons, so to would they be acceptable under the 2017 horizon). Notwithstanding, 2017 operations have been completed, the results of what are attached (Appendix B) and summarized in Table 3 (along with the 2022 and 2027 results). As noted, operations under 2017 conditions are considered acceptable.

**Table 3: Intersection Operations**

Intersection & Horizon Year		Movement	AM Peak Hour			PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
3 <sup>rd</sup> Line East & Highway 89	2017	NB	16	C	0.11	25	D	0.19
		SB	14	B	0.03	22	C	0.06
3 <sup>rd</sup> Line East & Highway 89	2022	NB	16	C	0.11	27	D	0.20
		SB	14	B	0.03	23	C	0.06
3 <sup>rd</sup> Line East & Highway 89	2027	NB	17	C	0.12	30	D	0.22
		SB	15	B	0.03	25	C	0.06

## Highway 89 & 3<sup>rd</sup> Line East Intersection

Plans 1 and 2 appear to have been omitted from the submission; both are attached.

It is noted that the traffic review has been submitted to the MTO, who have provided comments (dated August 14, 2017). While we appreciate the comments from Burnside, MTO has jurisdiction over Highway 89. In their review, MTO noted that they generally agree with the revised access location (along 3<sup>rd</sup> Line East) and the findings of the *Traffic Review*, subject to clarification of design issues for the highway improvements. All improvements to Highway 89 will be completed to the satisfaction of MTO, in accordance with the study recommendations and MTO requirements, which includes the preparation of engineering drawings to provide the requisite design details (eg. turn lanes, corner radii, sign relocation, etc.).

The operational analyses were not updated to reflect the road improvements in that the critical movements are those on 3<sup>rd</sup> Line East, whose operations will not be significantly improved by the provision of a WB left turn lane and EB right taper on Highway 89. Notwithstanding, operational results are provided in Appendix B and summarized in Table 4 for the critical 2027 horizon. As noted, the results are near identical to those of Table 3 (without the improvements).

**Table 4: Intersection Operations with Improvements**

Intersection & Horizon Year	Movement	AM Peak Hour			PM Peak Hour		
		delay	LOS	v/c	delay	LOS	v/c
3 <sup>rd</sup> Line East & Highway 89	2027 NB	17	C	0.12	29	D	0.22
	SB	15	B	0.03	24	C	0.06

### 3<sup>rd</sup> Line East

To address the Burnside comments, we recommend that as a condition of approval, further investigations be required to investigate the existing road conditions and suitability of such to accommodate future truck traffic. The investigations would consider road structure, road width, road surface and drainage, and provide recommendations accordingly. Should improvements be required, including the need to pave 3<sup>rd</sup> Line East, engineering drawings would be prepared for approval by the Town. Any such recommendations can be a condition of approval or part of the haul route agreement (as could the need for appropriate securities).

The designated haul route should be established as 3<sup>rd</sup> Line East from the site access to Highway 89, with the exception of local deliveries. This is a common approach and thus allows for deliveries to those in the immediate area (which would be subject to any existing or future road restrictions).

### **Pit Driveway & Queueing**

Plans for the driveway and its intersection with 3<sup>rd</sup> Line East will be detailed following Town approval of the application; such are not normally part of a traffic review. Again, this can be established as a condition of approval.

Comments pertaining to fencing and weigh scale are to be addressed through the operations plan.

### **30 Sideroad**

As the pit operations proceed to the south of 30 Sideroad, we understand that crossings of 30 Sideroad will be required, a preliminary plan of which is provided in Appendix C (denoted as Figure 1). The extent of crossings will be a function of the pit operations - as a worse case, the total volumes to be generated by the site could be required to cross 30 Sideroad. As site access will remain via 3<sup>rd</sup> Line, traffic will enter the site, travel through the north pit, cross at 30 Sideroad to the south pit, obtain material, cross at 30 Sideroad for the return trip and exit to 3<sup>rd</sup> Line East. Given the limited volumes on 30 Sideroad, and the provision of stop control on the crossing (in both directions), we do not foresee any operational issues at the proposed crossing location. No access to or from the site via 30 Sideroad will be permitted.

As per Figure C1 (provided in Appendix C), the proposed crossing is located in excess of 170 metres west of the 'S' curve to the east, and 480 metres east of 3<sup>rd</sup> Line East. Given this location, and the relatively straight and flat profile of 30 Sideroad (as evident in Figure C2), acceptable sight lines will be provided in both directions such that approaching motorists can readily observe a crossing truck and react accordingly. For a design speed of 80 km/h, the minimum stopping sight distance (the distance required to see a hazard and bring a vehicle to a stop) is 135 metres.

As with the requirements for 3<sup>rd</sup> Line East, we suggest any associated works/improvements to 30 Sideroad be a condition of approval. We do recommend that the crossing be constructed to include a minimum of 2 lifts of asphalt, 150 mm Granular A and 450 mm Granular B. In addition, the approaches on 30 Sideroad should also be paved a minimum of 20 metres in either direction to provide a means of transition between the existing gravel surface and the proposed paved surface of the crossing.

### **MTO Comments**

As noted previously, MTO provided comments on August 14, 2017.

### **Peer Review - Municipal Engineering**

#### **Volumes**

Comments have been addressed above. As a point of clarification, there was no suggestion that the traffic projections were considered to be under estimated, rather the comment sought only to confirm the truck size.

Table 1 of the traffic review presented loads/day and loads/hour to ensure there was no confusion as to what constituted a “truck trip” (in and out is 1 trip, or 2 separate trips). All of the analyses are premised on total truck trips, reflecting 1 trip in and 1 trip out for each load. If one considers the projections of Table 1, the 56 to 162 loads per day will translate to 112 to 324 truck trips per day (1 load = 2 trips). It is unclear as to how Burnside derived daily volumes of 250 to 540 vehicles to be generated.

### **Road Class**

As noted by Burnside, 3<sup>rd</sup> Line East is considered a Class 4 road under O.Reg. 239/02 (daily volume of 182 vehicles and speed limit of 80 km/h). This classification applies up to 999 vehicles per day (under average annual daily conditions). As the future volumes with the proposed pit will not exceed this level, the road classification is not expected to change and hence the minimum maintenance standards will not change.

### **Threshold for Paving**

Burnside noted that the Town’s threshold for paving is 400 to 500 vehicles per day. Given an existing volume of 182 (as noted by Burnside), this allows 218 to 318 additional vehicles to be added on a daily basis, prior to the threshold being surpassed. On average, 117 loads per day is projected provided the pit is operating at the maximum 1M tonnes per year, which equates to 234 trips per day. In this regard, it is unlikely that the threshold would be surpassed (particularly if the site does not operate at its maximum capacity).

Notwithstanding, as per the previous comment and recommendations, the need for improvements to 3<sup>rd</sup> Line East (including the need for paving) is to be further explored. It is also expected that a haul route agreement will be established, which will dictate the need for improvements and royalties which are to fund future road maintenance.

### **Lifecycle Costing**

Such an analysis is not typical of a traffic review. Notwithstanding, we note the following:

- any improvement costs to 3<sup>rd</sup> Line East from the site access to Highway 89 will be the responsibility of the Greenwood Construction;
- any road improvements are to reflect the anticipated truck traffic volumes and are likely to exceed those that would be constructed by the Town under their normal practice; and
- as previously noted, contributions are also expected to the Town in regards to future maintenance as part of the haul route agreement.

### **Road Widening**

It is unclear as to why a widening would be required. While improvements may be required to 3<sup>rd</sup> Line East, the cross section will entail 2 travel lanes, gravel shoulders and ditches, all of which can be accommodated within the existing 20 metre right-of-way (reflective of a standard rural cross-section).

## **4<sup>th</sup> Line**

Existing farm access points can be removed as required.

We see no reason to denote 4<sup>th</sup> Line as a “no haul route”. Rather, the haul route agreement should dictate the agreed upon haul route, with the understanding that other roads may be used to accommodate local deliveries.

## **30 Sideroad**

Existing farm access points can be removed as required.

The intended crossing was addressed in a prior comment. Those crossing 30 Sideroad would operate under stop control. Access would also be gated to restrict access to/from the site at the crossing location.

It is unclear why additional land along 30 Sideroad would be required. The crossing can be readily accommodated and is far removed from the S curve.

It is expected that the scales will remain within the north pit, in close proximity to the proposed 3<sup>rd</sup> Line East access.

## **3<sup>rd</sup> Line South of 30 Sideroad**

Existing farm access points can be removed as required.

Refer to comment above re: designation as a “no haul route”.

## **3<sup>rd</sup> Line Highway 89 to 30 Sideroad**

Refer to comment above re: designation as a “no haul route”.

We believe the recommendation to reduce the speed limit to 50 km/h will be beneficial to the road users, albeit it is not considered necessary to accommodate the proposed pit.

The need for improvements to the section from Highway 89 to the pit access will be further investigated as per the previous comment. We see no reason why the transition to match existing conditions south of the pit access would extend the limit of works to 30 Sideroad. Rather, the transition can likely occur within 20 to 30 metres.

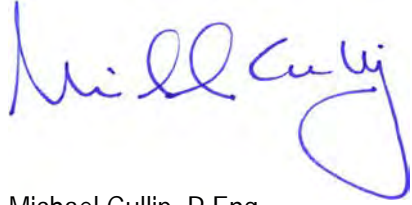
## **Closing**

While there were a number of comments provided through the Burnside reviews, we do not consider any to be critical in regards to the anticipated traffic operations and road system improvements necessary. As mentioned, the need for road improvements to the Town road system should be

addressed through conditions of approval, such that the necessary studies need only be conducted provided approval is forthcoming. Any improvements to Highway 89 will be addressed with MTO.

Should you have any questions or comments on the above, please do not hesitate to contact us.

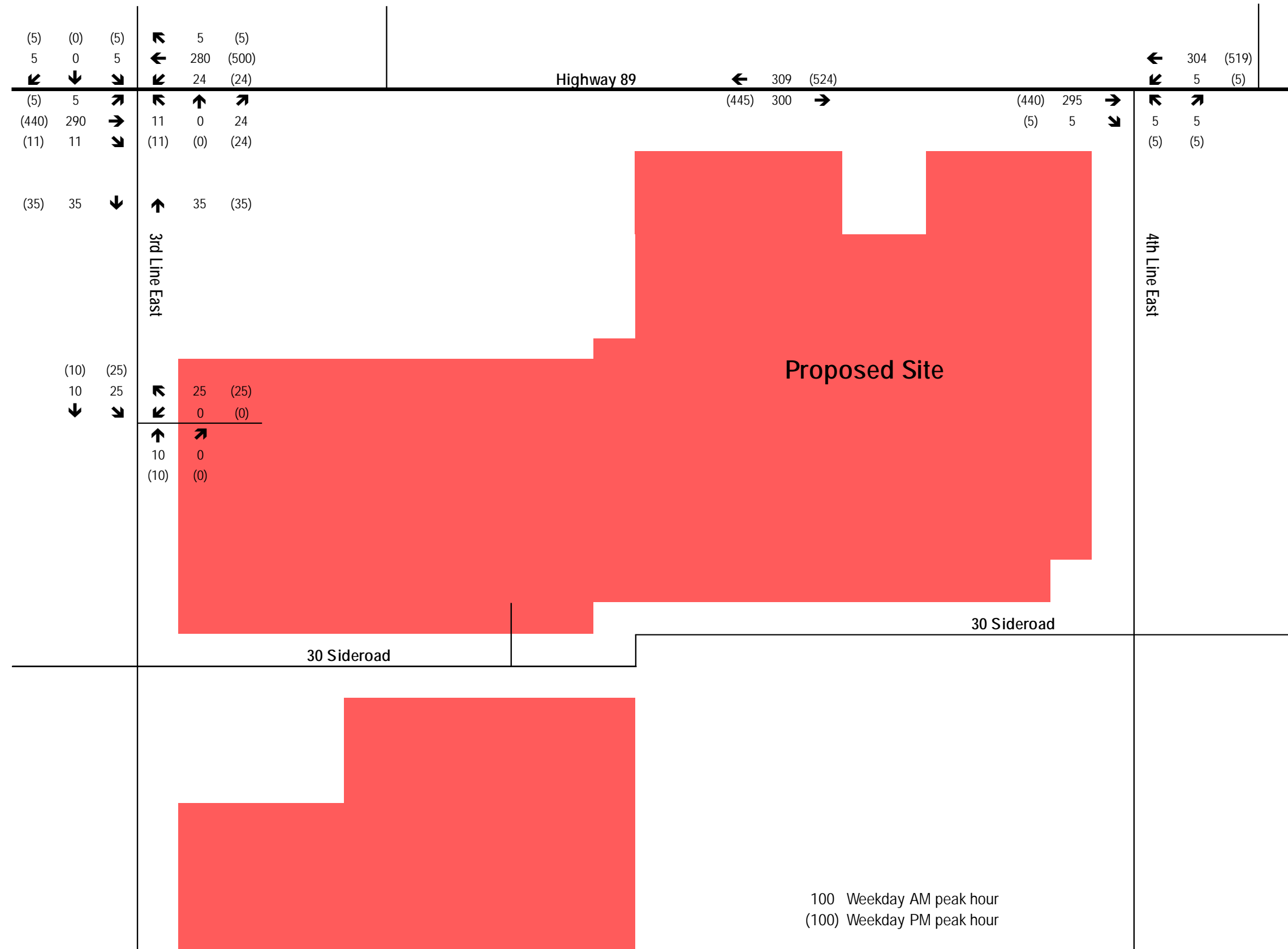
Yours truly,  
C.C. Tatham & Associates Ltd.

A handwritten signature in blue ink, appearing to read "Michael Cullip". The signature is fluid and cursive, with a large loop at the end of the last name.

Michael Cullip, P.Eng  
Director, Manager – Municipal & Transportation Engineering  
MJC:mjc

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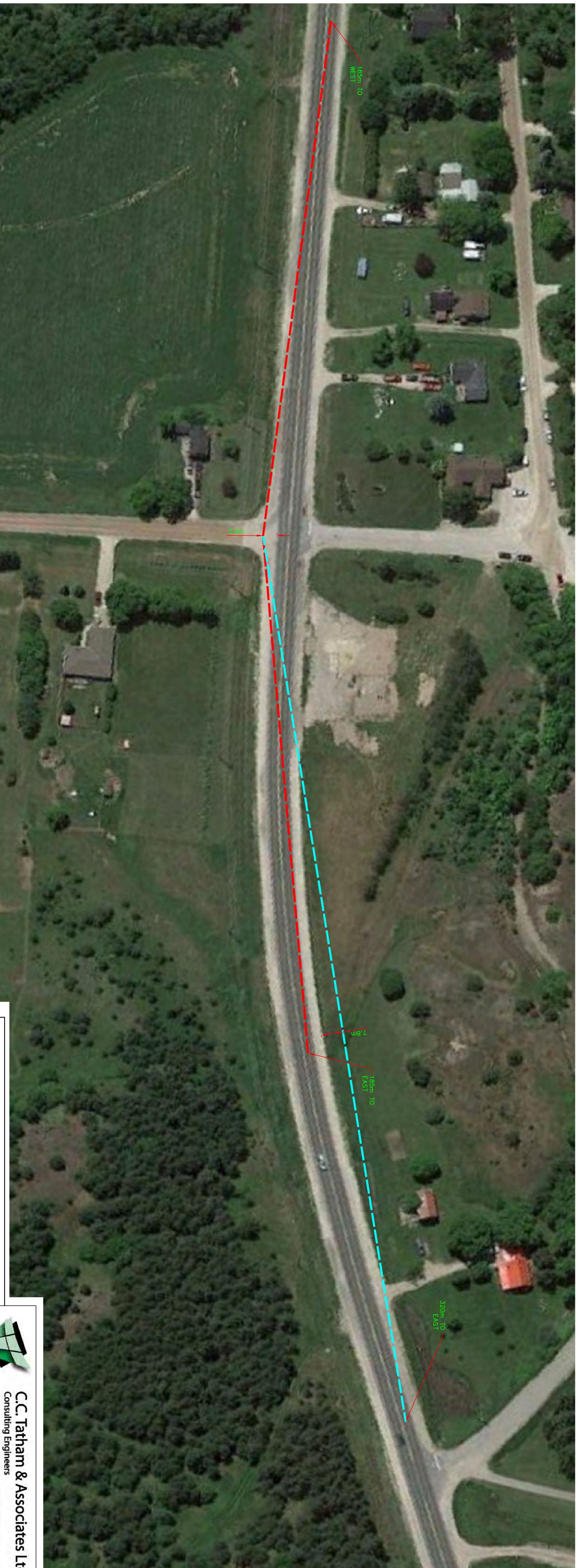













3RD LINE AND HIGHWAY 89  
SIGHTLINES



**C.C. Tatham & Associates Ltd.**  
Consulting Engineers

Collingwood    Brantford    Orlia    Barrie    Ottawa

SCALE: 1:750    JOB NO. 114239  
DRAWN: SBH    DATE: MAR/17    DWG. **PLAN 2**





December 18, 2017

**Via: email**

David Trotman  
Director of Planning  
Town of Mono  
347209 Mono Centre Road  
Mono, ON L9W 6S3

Dear David:

**Re: Greenwood Pit - Town of Mono  
Peer Review – Traffic Study  
Project No.: 300039415.0000**

On behalf of the Town of Mono, R.J. Burnside & Associates Limited ("Burnside") has reviewed the traffic submission that was submitted for an aggregate extraction pit on Part Lots 30, 31, and 32, Concession 4 E.H.S. in Mono. The site is located south of Highway 89 between 4<sup>th</sup> Line East and 3<sup>rd</sup> Line East. The pit also extends south of 30 Side Road. On behalf of Greenwood Aggregates Limited, the following transportation documents were submitted:

- Proposed Violet Hill Gravel Pit, Town of Mono Traffic Review letter, C.C. Tatham & Associates Ltd. ("Tatham"), June 15, 2015
- Violet Hill Gravel Pit, Town of Mono, Site Access Options letter, Tatham, December 22, 2016
- MTO Comments – Greenwood Aggregates Application – Site Access memorandum, Ministry of Transportation ("MTO"), February 8, 2017
- Proposed Violet Hill Gravel Pit, Town of Mono Traffic Review letter, Tatham, July 5, 2017
- Operations Plan, Rollings Hyland Consulting, July 7, 2017
- OPA 2016-01 and ZBA 2016-02 Violet Hill Aggregate Pit, Greenwood Aggregates letter, Upper Grand District School Board, November 22, 2017

Between the 2015 and 2017 submissions, there was consultation with MTO that resulted in the relocation of the driveway for the pit to 3<sup>rd</sup> Line East. That consultation took place prior to the Town deeming the application complete and the Town was copied on the discussions with MTO. Options for access to the pit considered were:

- Direct access via Highway 89;
- Access via 3<sup>rd</sup> Line;
- Access via 4<sup>th</sup> Line; and
- Access via a realigned 4<sup>th</sup> Line

However, the application before us shows access via 3<sup>rd</sup> Line and our comments are based upon that proposal concept.

### Pit Operations and Traffic Generation

Aggregate extraction is proposed at 1,000,000 tonnes per year with 250 operating days. They have adjusted the operating hours and removal rates by season, with peak season being May to November, where 80% of the aggregate limit will be extracted.

The trip generation assumes an average truck capacity of 34 tonnes. In our experience this equates to tractor trailer truck or a triaxle with pup (or pony). The capacity of a truck depends upon a number of factors including box size, number of axles, etc. For general guidelines, trucks can carry loads as follows:

- Single axle dump – 9 tonnes
- Dual axle dump – 14.5 tonnes
- Tri-axle dump – 22 tonnes
- Dual axle dump with pup – 28 – 29 tonnes
- Tri-axle dump with pup – 42 tonnes
- Quad axle trailers – 30 to 40 tonnes

The above is a guideline and weight ranges will vary depending upon the truck. The capacity is dependent on the fleet of trucks. Utilizing smaller trucks will result in more trucks required. The size of the average load assumed is within the range assumed by other studies and the resulting trip generation is reasonable for the average load size assumed. However, the operator should confirm the fleet composition to be utilized.

The Operations plan identifies that recycling of asphalt and concrete will be permitted on site. The trip generation does not identify this and the traffic study should be updated if required to reflect the truck traffic importing and exporting the asphalt and concrete material.

### Existing Traffic Volumes

Traffic counts were completed in 2014 and grown by 1% per annum to 2017 traffic conditions. The 2014 traffic data has not been provided and we can not confirm the projections. The consultant should provide the 2014 traffic data. We note that traffic volumes on Highway 89 over the past few years have remained relatively consistent and a 1% growth rate per annum is reasonable. It is not clear how the traffic volumes on Highway 89 were developed, but it appears that they are within the range of traffic counts provided in the 2015 study. A current traffic count should have been undertaken at the study intersection as a traffic count was not completed at the 3<sup>rd</sup> Line East / Highway 89 intersection. Traffic volumes on 3<sup>rd</sup> Line East were estimated.

Tatham indicate "To reflect operations of the proposed pit, the associated site generated traffic volumes have also been included in the 2017 volumes." Figure 6 does not appear to include the proposed site traffic volumes and no operational analysis was provided for 2017. Clarification is required.

### Future Traffic Volumes

Tatham estimated growth on the highway "as per the MTO Provincial Highways Traffic Volumes 1988-2013<sup>1</sup> (which represents the most current published MTO data)." MTO has 1988 to 2016 data available, which may have been published after this study was completed. However, in our review of this data, the 1% per annum growth that was utilized in the study is still reasonable as traffic growth on Highway 89 over the past few years has remained flat.

Operational analysis was provided for 2022 and 2027 horizon years for total conditions based upon existing lane configurations. There will be delays for northbound 3<sup>rd</sup> Line East vehicles to turn onto Highway 89 during the weekday PM peak hour of 27 seconds in 2022 and 30 seconds in 2027, which results in level of service D. There is capacity to accommodate the movement. However, given a full loaded trucking, the truck will take time to make a left turn onto Highway 89 and obtain operating speed.

### Highway 89 / 3<sup>rd</sup> Line East Intersection Improvements

Tatham recommended a westbound left turn on Highway 89 at 3<sup>rd</sup> Line East with an eastbound right turn taper. The improvements were indicated to be shown on Plan 1; however, that plan was not attached. This plan should be provided for review. With provision of the westbound left turn lane, there should also be an eastbound left turn lane provided. We concur with the need to provide the left turn lane and taper. Furthermore, we note that loaded trucks entering Highway 89 from a stopped condition will encounter a lengthy uphill gradient whether they are eastward or westward bound. Residents of the Town will experience delays and a reduced level of service. During the weekday PM peak hour by 2027, there will be a vehicle every 6.5 seconds in the westbound direction and a vehicle every 7.4 seconds in the eastbound direction. Acceleration lanes in both directions should be considered and are recommended for gravel trucks. The design will be subject to Ministry of Transportation of Ontario ("MTO") approval. The operational analysis was not updated to reflect the recommended roadway improvements. An updated operational analysis should be provided for review.

Vehicle turning movement modelling has not been provided at the intersection and should be provided to confirm radii requirements.

Tatham has used stopping sight distance as a measurement for the trucks to turn onto or from Highway 89. However, there are a variety of sight distances that could be required including

- Stopping sight
- Decision sight
- Turning sight distance

Minimum stopping sight allows a driver to see an object and to come to a stop to avoid hitting the object; however, these distances can be "inadequate when drivers must make instantaneous decisions, where information is difficult to perceive, interpret or unexpected manoeuvres are required." (MTO *Geometric Design Standards for Ontario Highways*). Roads need to be designed to this standard as a minimum and this was the criteria that Tatham used

Decision sight allows a driver to have more time to process the information (pre-maneuver and maneuver times) and make a decision as to the action they will take. For a 100 km/h design speed, a 300 m minimum decision sight distance is required.

Turning sight distance allows a vehicle to turn and obtain operating speed before being overtaken by another vehicle in the same direction on the roadway. For a car and design speed of 100 km/h, a turning sight distance of 375 m is required for a vehicle turning left or right from the sideroad. Trucks do not turn and accelerate as quickly as cars and require excessively longer sightlines. In this instance, turning sight distance would not be practical and decision sight distance should be provided. Volumes on Highway 89 are sufficient enough that you don't want cars coming to a stop or near stop for a turning truck.

Tatham indicate that they have in excess of 320 m to/from the west, which exceeds the 300 m minimum decision sight distance. They provide photos in Figures 13 a, b, and c that illustrating looking east and having over 320 m sight distance available, but do recommend relocation of a street name sign located to the east of 3<sup>rd</sup> Line East. Details of where they propose to relocate the sign and any potential changes / mitigation measures should be identified.

### 3<sup>rd</sup> Line East

Tatham has identified that 3<sup>rd</sup> Line East is a gravel road and that additional review is required to determine the adequacy to accommodating the anticipated truck traffic. We concur with that and prior to any approval being granted, the following should be provided:

- Confirmation that 3<sup>rd</sup> Line East is structural sufficient or the upgrades required to accommodate the traffic between Highway 89 and the pit access point.
- Confirmation on how they will deal with dust and mud tracking along 3<sup>rd</sup> Line East.
- Confirmation that two vehicles can pass safely on 3<sup>rd</sup> Line East (i.e. sufficient road width)
- Confirmation that any improvements and drainage can be accommodated within the existing right-of-way
- Arrangements and limitations for haul routes leading to local deliveries in the Town of Mono that are in proximity to the pit.
- Design, securities, and construction of any improvements identified.
- Acceptance of the recommendations, design, securities, and construction by the Town.

### Pit Driveway Design and Queuing

Details have not been provided around the driveway connection to 3<sup>rd</sup> Line East. Plans should be submitted illustrating the driveway design. There is a substantial grade difference of approximately 30 m between 3<sup>rd</sup> Line East and the top elevation along the boundary of the pit. Further detail on the driveway need to be provided to demonstrate the impacts of accommodating the driveway.

The Operation plan identifies "A fence will be erected along the boundary of the licensed area. The fence will be 1.2 m high, heavy post and wire farm type, together with locking heavy duty farm type gates at all entrances. Installation to occur prior to any site disturbance." The plan shows the location of the gate approximately 135 m from 3<sup>rd</sup> Line East.

The weigh scales and house are set back from 3<sup>rd</sup> Line East and as such should not impact 3<sup>rd</sup> Line East. The Operations plan indicates "A scale and scale house will be erected adjacent to the proposed entrance." Clarification is requested on the "adjacent to the proposed entrance" as the location shown on the Operations plan is setback from 3<sup>rd</sup> Line East.

### 30 Side Road

The pit is located on 30 Side Road. No details have been provided on driveway locations to 30 Side Road or the volume of pit crossing traffic or aggregate handling. The only reference provided on the Operations plan is "Material movement from Operation Areas D and E shall only be through Area A, and the main entrance. Site-to-site access shall be by a controlled crossing of 30 Side Road with gates and stop signs." There is a bend in 30 Side Road east of the limit of the pit property on the south side of 30 Side Road. Prior to obtaining approvals for the pit, the following should be provided with respect to the crossing of 30 Side Road:

- Driveway details
- Estimated traffic using the driveway and type of function
- Review of sightlines and incorporation of any mitigation measures deemed necessary
- Confirmation that the road is structurally adequate or implementation of remediation measures
- Acceptance by the Town of findings, recommendations, designs, securities, and construction

### MTO Comments

We have not seen MTO comments on the most recent submission at the time of writing. Comments from MTO are outstanding and will need to be incorporated.

### School Board Comments

The Upper Grand District School Board did not have any objections to the development and only requested "that the applicant be required to erect notice signs at the pit entrances/exits to remind drivers to proceed with caution as local roads are also potential school bus routes."

### Summary

In summary, the following should be provided before any approvals are granted:

- The Operations plan identifies that recycling of asphalt and concrete will be permitted on site. The trip generation does not identify this and the traffic study should be updated if required to reflect the truck traffic importing and exporting the material.
- Plan 1 should be provided that was referenced in the traffic study
- Confirm the composition of fleet to be utilized
- Provide the 2014 traffic counts and obtain current traffic counts to verify assumptions utilized to generate traffic for 3<sup>rd</sup> Line
- Provide details on where they propose to relocate the street name sign on Highway 89 and what mitigation measures might be required
- Highway 89 / 3<sup>rd</sup> Line East Intersection
  - Provision of left turn lanes on Highway 89
  - Provision of acceleration lanes on Highway 89
  - Provision of an eastbound right turn taper
  - Vehicle turning movement modelling for the design



- 3<sup>rd</sup> Line East
  - Confirmation that 3<sup>rd</sup> Line East is structural sufficient or the upgrades required to accommodate the traffic between Highway 89 and the pit access point.
  - Confirmation on how they will deal with dust and mud tracking along 3<sup>rd</sup> Line East.
  - Confirmation that two vehicles can pass safely on 3<sup>rd</sup> Line East (i.e. sufficient road width)
  - Confirmation that any improvements and drainage can be accommodated within the existing right-of-way
  - Arrangements and limitations for haul routes leading to local deliveries in the Town of Mono that are in proximity to the pit.
  - Design, securities, and construction of any improvements identified.
  - Acceptance of the recommendations, design, securities, and construction by the Town.
- Confirmation and acceptance by MTO including any conditions they have
- Provide an updated operational assessment with the road improvements in place
- Provide additional details on the driveway design given the grade difference of approximately 30 m
- 30 Side Road:
  - Driveway details at 30 Side Road
  - Estimated traffic using the driveway and type of function
  - Review of sightlines and incorporation of any mitigation measures deemed necessary
  - Confirmation that the road is structurally adequate or implementation of remediation measures
  - Acceptance by the Town of findings, recommendations, designs, securities, and construction

Please call should you have any questions.

Yours truly,

**R.J. Burnside & Associates Limited**



David Argue, P/Eng., PTOE  
Vice President - Transportation  
DA:

cc: David Germain, Thomson Rogers, (enc.) (Via: email)



**BURNSIDE**

(THE DIFFERENCE IS OUR PEOPLE)

December 21, 2017

**Via: Email**

David Trotman, Director of Planning  
Town of Mono  
347209 Mono Centre Road  
Mono, ON L9W 6S3

Dear David:

**Re: Greenwood Pit - Town of Mono  
Peer Review – Municipal Engineering  
Project No.: 300039415.0000**

On behalf of the Town of Mono, R.J. Burnside & Associates Limited ("Burnside") has reviewed the material that was submitted for an aggregate extraction pit located south of Highway 89 between 4<sup>th</sup> Line East and 3<sup>rd</sup> Line East of Mono. The pit also extends south of 30 Side Road.

Peer review comments have also been provided by Burnside in separate letters pertaining specifically to the areas of Drainage and Slope Hazard; Hydrogeology; and Traffic. The comments contained within this letter relate to general municipal engineering. Consultation has taken place with Mike Dunmore, Director of Public Works for the Town of Mono and his input is gratefully acknowledged. Several of these issues should be dealt with in a development agreement entered into by the proponent and the Town.

- 1. Noise: Letter from Valcoustics Canada Ltd., dated July 6, 2017 and Drawings prepared by Rollings Hyland Consulting page 2 of 5 and page 4 of 5 dated July 7, 2017.**

While complete Sound Impact Analysis comments are being provided by others, the comments in this letter only relate to potential impact to the Town's roads. The design and comments pertaining to the berm heights are generally agreeable. However, in some locations berms are not being proposed and the justification is unclear. The applicant should consider a consistent berming design to better protect the impact of open pit mining.

The potential of increased snow loading on municipal roads caused by berming varies dependent on wind and precipitation amounts. Snow loading caused by these berms could be mitigated using an increased setback like as shown on the west side of 4<sup>th</sup> Line EHS and should be considered throughout and/or justification regarding snow accumulation and the impacts of same should be provided by the applicant.

**2. Dust: Letter from Trinity Consultants, dated June 30, 2017 and Drawing prepared by Rollings Hyland Consulting page 2 of 5 dated July 7, 2017.**

As noted in the Trinity letter the proposed asphalt treatment of the entrance/exit road from the limit of 3<sup>rd</sup> Line EHS to the extraction limit should stand and will reduce dust caused by trucks and vehicles entering and exiting the site. Internal roads being treated with asphalt grindings will serve to further reduce onsite dust however a complete dust suppression plan would formulate part of the applicant's requirements should the application be approved.

**3. Traffic: Letter from C.C. Tatham & Associates Ltd., dated July 5, 2017 and Drawing prepared by Rollings Hyland Consulting page 2 of 5 dated July 7, 2017.**

Full comments on a Town Road by Road section will be dealt with below. General comments on the Tatham letter and specifically with regard to municipal roads are as follow:

**Volumes-** As noted in the peer review letter submitted by David Argue, there are questions about the size of trucks to be used. It is suggested that the Tatham report is based on larger trucks and therefore under estimates the total number of trips.

Furthermore, the Tatham report is focused on the number of trucks per day while the Town is impacted by the truck arriving at the site and again when it leaves. The total number of trips is double the number of trucks, in addition to employee vehicles, service vehicles etc. It is likely that the actual total number of trips added to the Town's road network will be in the range of 250 to 540.

We estimate the existing Average Annual Daily Traffic (AADT) to be 182 vehicles, based on counts that were conducted by the Town in 2008 and 2016. According to Ont. Reg. 239/02 (Minimum Maintenance Standards for Municipal Highways (O.Reg.239)) a volume of 182 vehicles establishes the Level of Service to be provided by the Town as a Class 4 roadway.

Adding an additional 250-540 vehicles will raise the total volumes to a range of 432 to 722 vehicles per day. This will increase all responsibilities of the Town's Works Department with regard to but not limited to patrolling. There will be increased road maintenance requirements due to the type of commercial vehicle usage. The Town of Mono has defined the trigger for paving of gravel roads at about 400 -500 trips per day, so the Greenwood proposal increases the traffic to an amount that requires paving.

**Lifecycle Costing -** The Town of Mono uses an asset management approach in its annual and long term budgets. Expenditures on roads and other infrastructure are based on the optimal time to extend the asset life before it degrades to the point of requiring major reconstruction. The proposal to more the double the total traffic on the 3<sup>rd</sup> Line EHS and to add a significant volume of heavy trucks will shorten the life cycle of the road. Analysis should be provided to assess the Town's financial impact of the proposal.

**Road Widening -** The Town will require several widenings from the applicant's property abutting the municipal rights of way



**4. 4th Line EHS (from Highway 89 to 30 Sideroad) - Public Works Site Visits and Drawings prepared by Rollings Hyland Consulting pages 1,2,3,4,5 of 5 inclusive, dated July 7, 2017.**

The drawings show no access points for the proposed pit along this section of road. However, there are a couple of farm entry points that would require removal and reinstatement to the Town's rural ditch roadway cross section.

The 4<sup>th</sup> Line EHS would have to be denoted as a no haul route as this road is not built to withstand truck traffic and is subject to seasonal half load restrictions.

**5. 30 Sideroad (4th Line EHS to 3rd Line EHS)**

The Drawings provided do not clearly demonstrate entry points along this stretch of road. Any existing access (farm entry points) will require removal and reinstatement to the Town rural ditch road cross section. Further clarification of movement of machinery and material from Area D and E to Area A, B and C is required, inclusive of entry requirements. A grade level road crossing with unrestricted use would be problematic for the Town and should not receive the Town's approval.

The Town's travelled road may not be located entirely on the original road allowance at the jog located at the midway point between the 3<sup>rd</sup> and 4<sup>th</sup> Line. The proponent should deed land to the Town as necessary to accommodate the existing travelled road.

This entire stretch of 30 Sideroad should be denoted as a no haul route.

If scales were to be located in Operating Areas D or E the flow of traffic would be problematic for the Town and we would not recommend approval.

**6. 3rd Line (South of 30 Sideroad)**

No access points are shown on drawings. Existing farm entrances will require removal and reinstatement to the rural ditch road cross section.

This entire stretch should be denoted as a no haul route. Continuous berming along this section should be considered complete with landscape to reduce the visual impacts of open pit mining.

**7. 3rd Line (Highway 89 to 30 Sideroad)**

The entire stretch from the pit entrance to 30 Sideroad should be denoted as a no haul route with no left turns allowed from the pit exit.

To accommodate this proposal the speed limit would have to be reduced to 50 km/hr.

With truck traffic heading from pit entrance in a northern direction only to Highway 89 the stretch of road would require full rehabilitation to eliminate half-load concerns. This construction would cause widenings of platform, tree removal and drainage improvements complete with an asphalt surface application for dust mitigation. Transitioning would require upgrades extending to the 30 Sideroad intersection of 3<sup>rd</sup> Line EHS.

Further comments will be provided as updated information is submitted.

Yours truly,

**R.J. Burnside & Associates Limited**

A handwritten signature in black ink, appearing to read "Gord Feniak". The signature is fluid and cursive, with a long horizontal stroke at the beginning and a wavy tail.

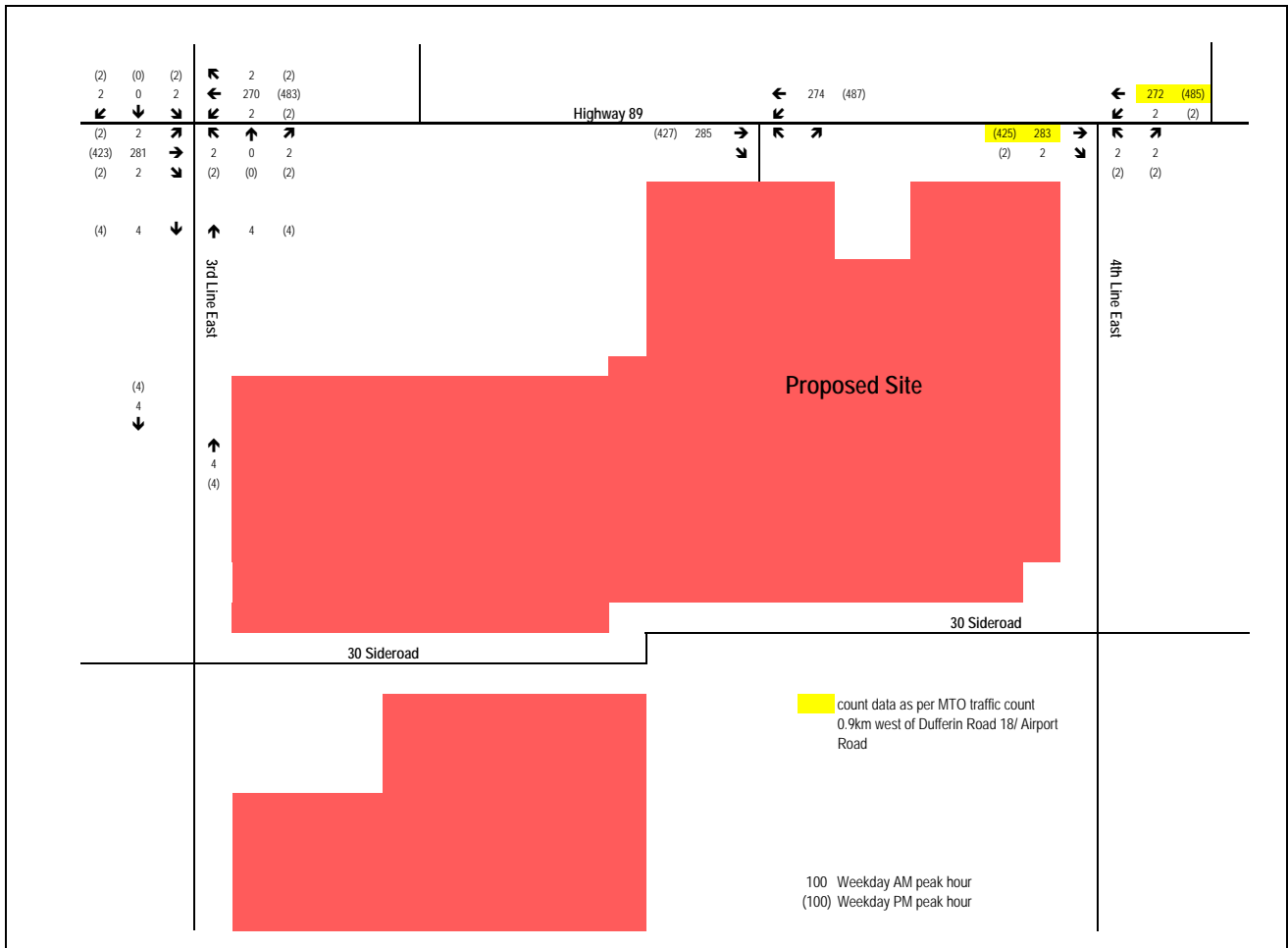
Gord Feniak  
GF:js

cc: Mike Dunmore, Town of Mono (enc.) (Via: Email)

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**Appendix A:  
Traffic Counts**



## 2014 COUNT DATA

<table border="0" style="width: 100%;"> <tr><td>(18)</td><td>(34)</td><td>(13)</td><td>↖</td><td>21</td><td>(4)</td><td>(321)</td></tr> <tr><td>19</td><td>52</td><td>3</td><td>↙</td><td>135</td><td>(235)</td><td>238</td></tr> <tr><td>(15)</td><td>18</td><td>↘</td><td>↗</td><td>82</td><td>(82)</td><td>↖</td></tr> <tr><td>(144)</td><td>154</td><td>↘</td><td>↗</td><td>197</td><td>20</td><td>41</td></tr> <tr><td>(231)</td><td>377</td><td>↘</td><td>↗</td><td>(485)</td><td>(48)</td><td>(79)</td></tr> </table>	(18)	(34)	(13)	↖	21	(4)	(321)	19	52	3	↙	135	(235)	238	(15)	18	↘	↗	82	(82)	↖	(144)	154	↘	↗	197	20	41	(231)	377	↘	↗	(485)	(48)	(79)	<table border="0" style="width: 100%;"> <tr><td>3-6pm</td><td>(371)</td><td>(485)</td><td>(398)</td></tr> <tr><td>7-10am</td><td>177</td><td>272</td><td>242</td></tr> <tr><td></td><td>↖</td><td>↙</td><td>↘</td></tr> <tr><td></td><td>↗</td><td>↘</td><td>↖</td></tr> <tr><td>7-10am</td><td>235</td><td>283</td><td>237</td></tr> <tr><td>3-6pm</td><td>(290)</td><td>(425)</td><td>(331)</td></tr> <tr><td></td><td>Apr 23/12</td><td>Aug 2014</td><td>Jan 29/13</td></tr> </table>	3-6pm	(371)	(485)	(398)	7-10am	177	272	242		↖	↙	↘		↗	↘	↖	7-10am	235	283	237	3-6pm	(290)	(425)	(331)		Apr 23/12	Aug 2014	Jan 29/13	<table border="0" style="width: 100%;"> <tr><td>(327)</td><td>(26)</td><td>(67)</td><td>(25)</td><td>↖</td><td>13</td><td>(42)</td></tr> <tr><td>190</td><td>45</td><td>118</td><td>26</td><td>↙</td><td>125</td><td>(279)</td></tr> <tr><td>↖</td><td>↗</td><td>↘</td><td>↗</td><td>↖</td><td>30</td><td>(18)</td></tr> <tr><td>↘</td><td>(41)</td><td>20</td><td>↘</td><td>↖</td><td>↗</td><td>↖</td></tr> <tr><td>237</td><td>(211)</td><td>171</td><td>↘</td><td>↗</td><td>20</td><td>47</td></tr> <tr><td>(265)</td><td>(13)</td><td>46</td><td>↘</td><td>(22)</td><td>(127)</td><td>(23)</td></tr> </table>	(327)	(26)	(67)	(25)	↖	13	(42)	190	45	118	26	↙	125	(279)	↖	↗	↘	↗	↖	30	(18)	↘	(41)	20	↘	↖	↗	↖	237	(211)	171	↘	↗	20	47	(265)	(13)	46	↘	(22)	(127)	(23)
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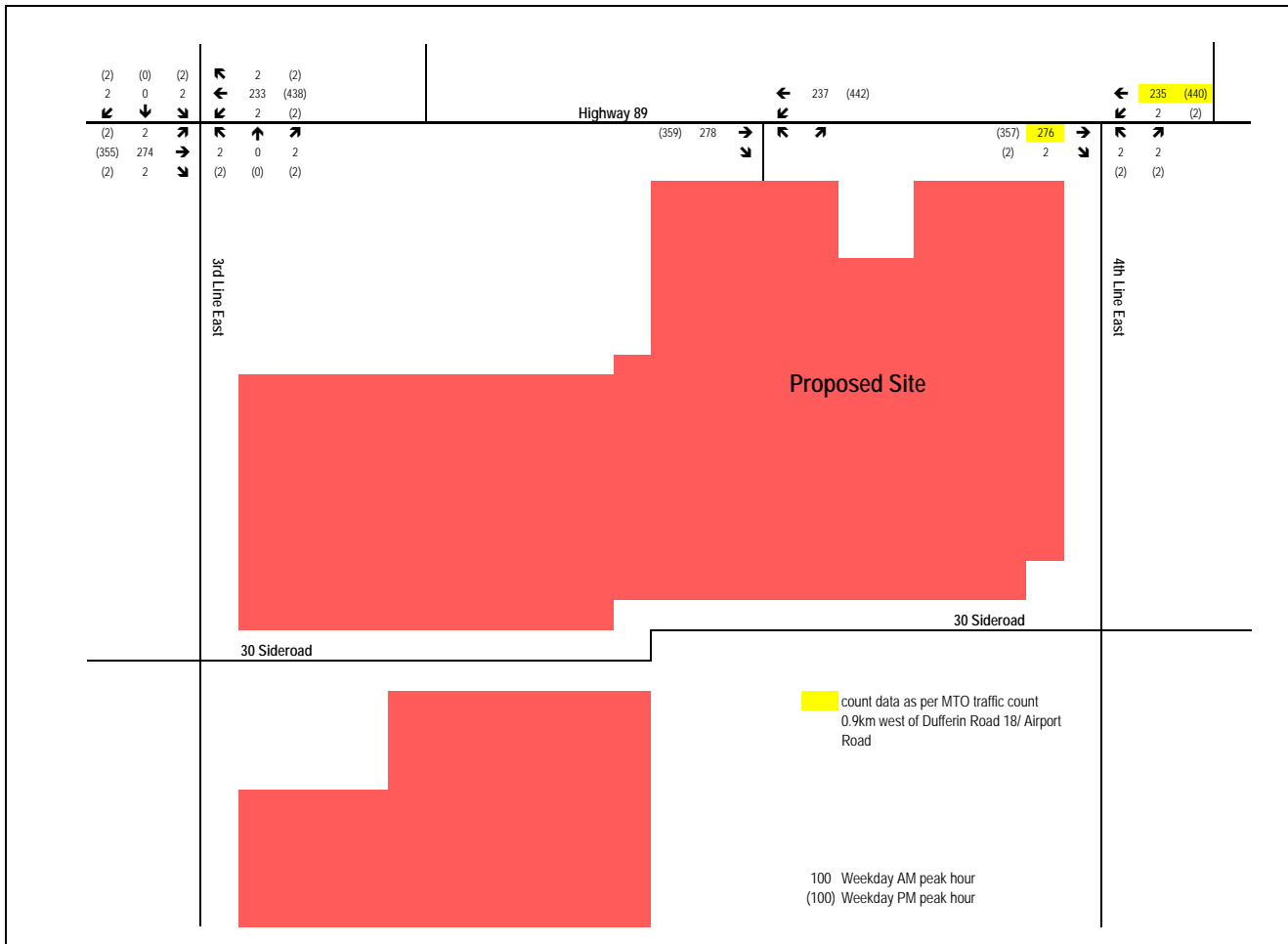
Hwy 10 at E Junction Hwy 89 Primrose  
April 23, 2014  
from MTO (attached to their initial TIS review comments)

ATRs 0.9km west of Dufferin Road 18  
(just east of 5th Line)

Hwy 89 at Dufferin Rd 18 (Airport Road)  
April 16, 2014  
from MTO (attached to their initial TIS review comment)

**NOTES**  
     greatest volumes: to be employed in study as representative of volumes across the front of the pit  
 turning volumes on 3rd and 4th Line intersections estimated





## 2012/2013 COUNT DATA

(31)	(30)	(23)	↖	25	(11)	(262)
35	53	13	↙	109	(197)	198
↘	↗	↖	↙	64	(54)	↖
(33)	32	↗	↖	↖	↗	↗
(226)	108	↗	168	26	37	158
(226)	333	↘	(425)	(33)	(54)	(303)

3-6pm	(371)	(440)	(398)
7-10am	177	235	242
↖	↖	↖	↖
↗	↗	↗	↗
7-10am	235	276	237
3-6pm	(290)	(357)	(331)
Apr 23/12	Aug 8/12	Jan 29/13	

(283)	(16)	(63)	(28)	↖	17	(35)
176	36	137	28	↙	126	(238)
↖	↙	↘	↙	↙	29	(15)
↗	(29)	18	↗	↖	↖	↖
198	(174)	135	↗	14	40	8
(216)	(13)	45	↘	(29)	(96)	(29)

Hwy 10 at E Junction Hwy 89 Primrose  
October 31, 2013  
from MTO

ATRs 0.9km west of Dufferin Road 18  
(just east of 5th Line)

Hwy 89 at Dufferin Rd 18 (Airport Road)  
October 31, 2012  
from MTO

### NOTES

greatest volumes: to be employed in study as representative of volumes across the front of the pit  
turning volumes on 3rd and 4th Line intersections estimated

**Appendix B:  
Traffic Operations**

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	290	11	24	280	5	11	1	24	5	1	5
Future Vol, veh/h	5	290	11	24	280	5	11	1	24	5	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	10	100	100	10	5	100	5	100	5	5	5
Mvmt Flow	6	330	13	27	318	6	13	1	27	6	1	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	324	0	0	342	0	0	726	725	336	737	729	321
Stage 1	-	-	-	-	-	-	347	347	-	376	376	-
Stage 2	-	-	-	-	-	-	379	378	-	361	353	-
Critical Hdwy	4.15	-	-	5.1	-	-	8.1	6.55	7.2	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	3.1	-	-	4.4	4.045	4.2	3.545	4.045	3.345
Pot Cap-1 Maneuver	1219	-	-	826	-	-	241	348	529	330	346	713
Stage 1	-	-	-	-	-	-	506	629	-	639	611	-
Stage 2	-	-	-	-	-	-	484	610	-	651	626	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1219	-	-	826	-	-	230	332	529	301	330	713
Mov Cap-2 Maneuver	-	-	-	-	-	-	230	332	-	301	330	-
Stage 1	-	-	-	-	-	-	503	625	-	635	587	-
Stage 2	-	-	-	-	-	-	460	586	-	613	622	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.7			15.8			14		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	374	1219	-	-	826	-	-	413
HCM Lane V/C Ratio	0.109	0.005	-	-	0.033	-	-	0.03
HCM Control Delay (s)	15.8	8	0	-	9.5	0	-	14
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.1

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	440	11	24	500	5	11	1	24	5	1	5
Future Vol, veh/h	5	440	11	24	500	5	11	1	24	5	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	10	100	100	10	5	100	5	100	5	5	5
Mvmt Flow	6	500	13	27	568	6	13	1	27	6	1	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	574	0	0	513	0	0	1147	1146	506	1158	1150	571
Stage 1	-	-	-	-	-	-	518	518	-	626	626	-
Stage 2	-	-	-	-	-	-	629	628	-	532	524	-
Critical Hdwy	4.15	-	-	5.1	-	-	8.1	6.55	7.2	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	3.1	-	-	4.4	4.045	4.2	3.545	4.045	3.345
Pot Cap-1 Maneuver	984	-	-	695	-	-	115	197	413	171	196	515
Stage 1	-	-	-	-	-	-	398	528	-	467	472	-
Stage 2	-	-	-	-	-	-	339	471	-	526	525	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	984	-	-	695	-	-	108	184	413	151	183	515
Mov Cap-2 Maneuver	-	-	-	-	-	-	108	184	-	151	183	-
Stage 1	-	-	-	-	-	-	394	523	-	463	445	-
Stage 2	-	-	-	-	-	-	315	444	-	486	520	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.5			25.3			21.7		
HCM LOS							D			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	218	984	-	-	695	-	-	228
HCM Lane V/C Ratio	0.188	0.006	-	-	0.039	-	-	0.055
HCM Control Delay (s)	25.3	8.7	0	-	10.4	0	-	21.7
HCM Lane LOS	D	A	A	-	B	A	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0.1	-	-	0.2

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↘			↕			↕	
Traffic Vol, veh/h	5	320	11	24	310	5	11	1	24	5	1	5
Future Vol, veh/h	5	320	11	24	310	5	11	1	24	5	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	10	100	100	10	5	100	5	100	5	5	5
Mvmt Flow	6	364	13	27	352	6	13	1	27	6	1	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	358	0	0	364	0	0	788	788	364	799	785	355
Stage 1	-	-	-	-	-	-	375	375	-	410	410	-
Stage 2	-	-	-	-	-	-	413	413	-	389	375	-
Critical Hdwy	4.15	-	-	5.1	-	-	8.1	6.55	7.2	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	3.1	-	-	4.4	4.045	4.2	3.545	4.045	3.345
Pot Cap-1 Maneuver	1184	-	-	808	-	-	216	320	508	300	321	682
Stage 1	-	-	-	-	-	-	487	612	-	613	590	-
Stage 2	-	-	-	-	-	-	461	588	-	629	612	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1184	-	-	808	-	-	207	307	508	275	308	682
Mov Cap-2 Maneuver	-	-	-	-	-	-	207	307	-	275	308	-
Stage 1	-	-	-	-	-	-	484	608	-	609	570	-
Stage 2	-	-	-	-	-	-	441	568	-	591	608	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.7			16.8			14.7		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	347	1184	-	-	808	-	-	382
HCM Lane V/C Ratio	0.118	0.005	-	-	0.034	-	-	0.033
HCM Control Delay (s)	16.8	8.1	0	-	9.6	-	-	14.7
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.1

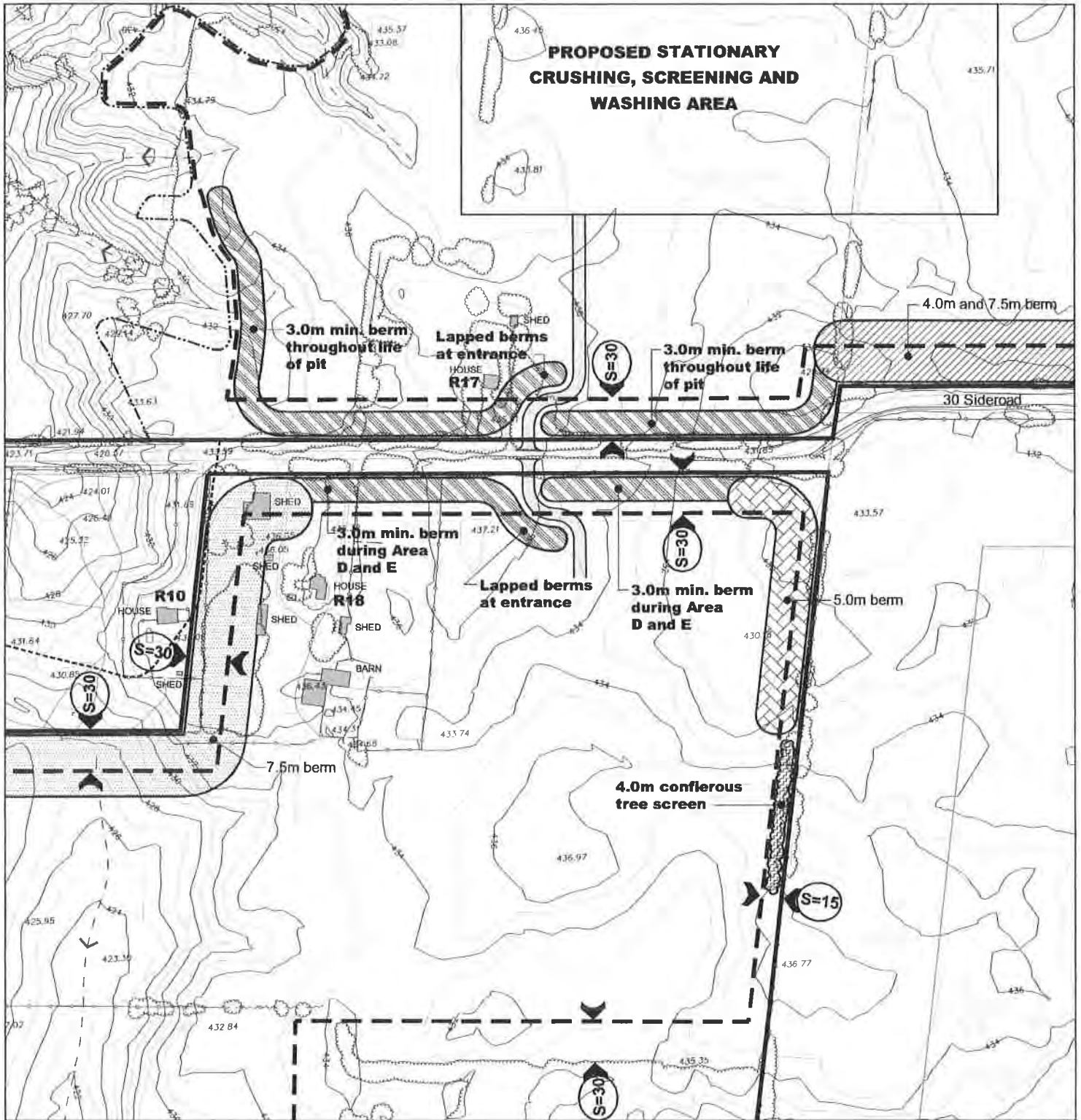
Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↘			↕			↕	
Traffic Vol, veh/h	5	485	11	24	550	5	11	1	24	5	1	5
Future Vol, veh/h	5	485	11	24	550	5	11	1	24	5	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	10	100	100	10	5	100	5	100	5	5	5
Mvmt Flow	6	551	13	27	625	6	13	1	27	6	1	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	631	0	0	551	0	0	1249	1248	551	1259	1245	628
Stage 1	-	-	-	-	-	-	563	563	-	682	682	-
Stage 2	-	-	-	-	-	-	686	685	-	577	563	-
Critical Hdwy	4.15	-	-	5.1	-	-	8.1	6.55	7.2	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	3.1	-	-	4.4	4.045	4.2	3.545	4.045	3.345
Pot Cap-1 Maneuver	937	-	-	668	-	-	96	171	386	145	172	477
Stage 1	-	-	-	-	-	-	373	504	-	435	445	-
Stage 2	-	-	-	-	-	-	312	444	-	497	504	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	937	-	-	668	-	-	91	163	386	129	164	477
Mov Cap-2 Maneuver	-	-	-	-	-	-	91	163	-	129	164	-
Stage 1	-	-	-	-	-	-	370	499	-	431	427	-
Stage 2	-	-	-	-	-	-	295	426	-	457	499	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.4			29.1			24.3		
HCM LOS							D			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	190	937	-	-	668	-	-	199
HCM Lane V/C Ratio	0.215	0.006	-	-	0.041	-	-	0.063
HCM Control Delay (s)	29.1	8.9	0	-	10.6	-	-	24.3
HCM Lane LOS	D	A	A	-	B	-	-	C
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	0.2

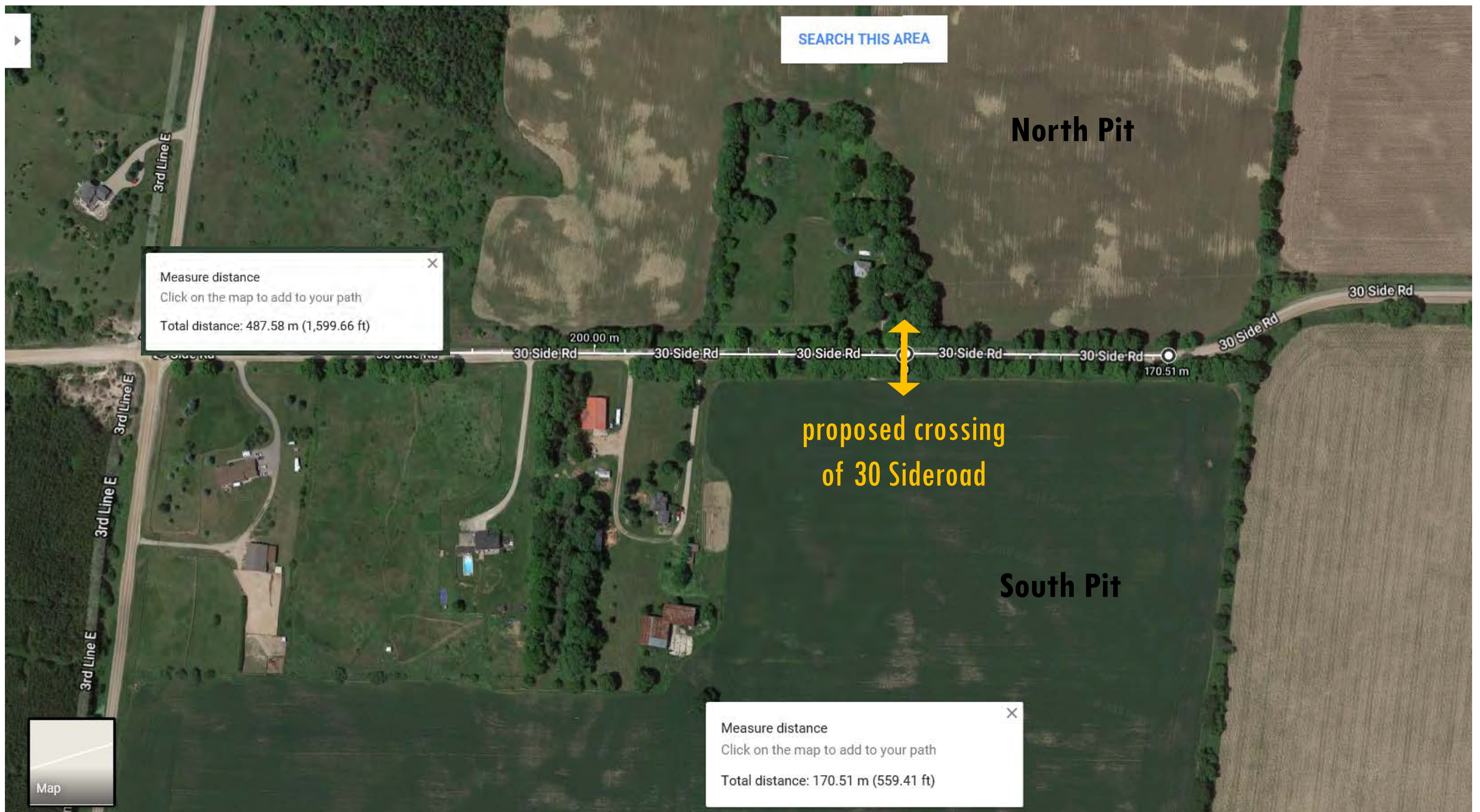
**Appendix C:**  
**30 Sideroad Crossing**



**VIOLET HILL PROPERTY**  
 Part Lots 30, 31 & 32, Conc. 4 E.H.S. Town of Mono Dufferin County

**FIGURE 1**









looking west on 30 Sideroad from the proposed crossing



looking east on 30 Sideroad from the proposed crossing