CODRINGTON PIT

FIFTH ANNUAL TRAFFIC & SAFETY REVIEW

FINAL ▪ SEPTEMBER 2021

REPORT PREPARED FOR

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TMIG PROJECT NUMBER 17169

EXECUTIVE SUMMARY

This study represents the fifth (5th) annual Traffic and Safety Review of the now-operating Codrington Pit and its site access to County Road 30.

This report concludes:

- The Pit access continues to operate in accordance with the conditions of the OMB Settlement and the executed Development Agreement, and to the satisfaction of the County of Northumberland.
- Codrington Pit truck activity has again been measured to be less than forecasted in the approved traffic impact study (i.e., much less than the approved annual extraction amount), which is consistent with available shipping activity records obtained from CBM.
- County Road 30 passing traffic was also observed to be less than forecasted in the original traffic study and there has been little growth in traffic along this section of roadway since the last annual traffic and safety review (or even over the last 13 years).
- Intersection analyses indicates good peak hour traffic operations are being experienced at the Pit access, with excess capacity available for future traffic growth and/or increased Pit activity.
- There were no collisions related to pit operations (including aggregate trucks) in the study area since the opening of the Pit access.
- TMIG finds the Codrington Pit access is operating as intended, and given the available information, provides an acceptable degree of efficiency and safety.
- TMIG recommends concluding the practice of safety reviews for Codrington Pit as the site has demonstrated low traffic impact and low collision trends, as shown from the past five safety reviews.

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1 INTRODUCTION

1.1 Retainer and Objective

The Municipal Infrastructure Group, a T.Y. Lin International Company (TMIG) was retained by Votorantim Cimentos (CBM Aggregates) to prepare a fifth annual Traffic and Safety Review for Codrington Pit, herein after referred to as the 'Pit', in Northumberland County. The Pit site is located south of the hamlet of Codrington on the east side of County Road 30, between of County Road No. 27 and Old Wooler Road, as illustrated on **Figure 1-1.**

Figure 1-1 Site Location

This Review has been prepared to ensure that the Codrington Pit entrance and County Road 30 in the vicinity of the Pit access are operating as anticipated. The report includes information on how the operation of the Pit is affecting traffic on County Road 30 from an operational and safety perspective.

The Traffic and Safety Review will address the following items:

- Review traffic volumes generated by Codrington Pit and the forecasted County Road 30 passing traffic.
- Monitor performance of the Pit access during the periods of typical shipping activity.
- Review available collision statistics at the new Pit access.
- Report on any traffic incidents filed (if any) that have been reported by, or to CBM, through the formal reporting system, by independent truckers or by residents / travelling public.

1.2 Study Background

CBM Aggregates operates Codrington Pit, located in Codrington, Municipality of Brighton, Northumberland County known (municipally) as 2851 County Road 30. The existing Pit is permitted to ship a maximum of 650,000 tonnes per year.

As part of the approved and executed Development Agreement with the County (excerpt copied below), CBM Aggregates is to complete an annual traffic and safety review for County Road 30:

"St. Mary's [CBM] *agree that it shall, at its sole cost, provide the County with an annual report with respect to traffic operations and road safety on County Road 30 in the vicinity of the intersection. The report shall be based on traffic and accident information obtained from the Ontario Provincial Police, the County Roads Department and St. Mary's".*

The enclosed report is the fifth annual examination following the opening of the Pit in 2016 and builds on the first, second, third, and fourth annual traffic and safety reviews completed in 2017, 2018, 2019, and 2020 respectively by TMIG. We have also reviewed the approved Traffic Impact Study conducted by Grant A. Bacchus Ltd. (GAB Ltd.) dated June 2007 as well as a Road Safety Assessment conducted by GHD, dated March 2013, and have utilized the information contained in all prior submissions as the basis for the enclosed report and analyses.

1.3 Site Area

The study area includes the following unsignalized intersection:

- County Road 30 at Codrington Pit Access

2 BASELINE TRAFFIC

This section summarizes the proposed haul route, summarizes the data collection program, and presents the existing (2021) traffic volumes conditions at the study intersection (County Road 30 / Codrington Pit Access).

2.1 Haul Route

The 'haul route' for the purposes of this study remains unchanged and includes the Codrington Pit access to County Road 30.

County Road 30 is a north-south provincial highway with a posted speed limit of 80 km/h, a localized two-lane rural cross section, and is a designated haul route as per the Northumberland County Official Plan.

As part of the OMB Settlement for the Pit, as stipulated in the Development Agreement, CBM has constructed the Codrington Pit access to County Road 30 with a northbound auxiliary right turn deceleration and storage lane of approximately 120 metres plus a southbound acceleration lane of approximately 485 metres (excluding tapers). A section of the shoulder on both sides of County Road 30 has also been paved in proximity of the Pit access to facilitate active transportation (pedestrians and cyclists).

The auxiliary lanes were designed and constructed to facilitate safe and efficient access/egress of heavy trucks generated by the Pit in the primary direction of travel to/from the aggregate market (i.e., to/from the south). The original (as approved) traffic studies posited that local deliveries of material (either into or out of the Pit) could very well occur to/from the north, however the vast majority of truck traffic was forecasted to come from, and be destined to, point's south on County Road 30.

2.2 County Road 30 Traffic Growth Review

The 2021 traffic data was reviewed and compared with the historic traffic data collected and presented in the traffic study prepared for the original Pit application, and the four prior traffic and safety reviews in 2017, 2018, 2019, and 2020.

In the p.m., volumes along County Road 30 have increased by about 24% (when compared to 2007 traffic volumes), while the a.m. peak hour flows have actually *decreased* over the last 14 years (when compared to 2007 traffic volumes), by 24% as shown in **Table 2-1**.

Table 2-1 Two-way Traffic Volumes 2007 - 2021

Year	AM Two-way Traffic	PM Two-way Traffic
2007	507	446
2017	368	440
2018	436	470
2019	464	532
2020	425	458
2021	385	552

The original traffic study forecasted growth on County Road 30 at the rate of 2% per year (equating to a compounded 14-year growth of 32%), in excess of what has actually transpired in the period subsequent to the tabling of the 2007 traffic study and the approval of the Pit. It should be noted that a decrease in traffic was observed when comparing 2021 to 2020 a.m. traffic volumes, assumed to be attributed to COVID-19.

We would also note that the recommendations for the Pit access lane configurations and design were partially driven by predicted future County Road 30 traffic volumes. Since the predicted growth has not occurred at the rate predicted back in 2007, the Pit access turn lanes constructed to accommodate the future condition are still more than adequate to handle present day peaks. Furthermore, the as-constructed design elements of the site access continue to exceed the operational requirements of the Pit-related traffic volumes.

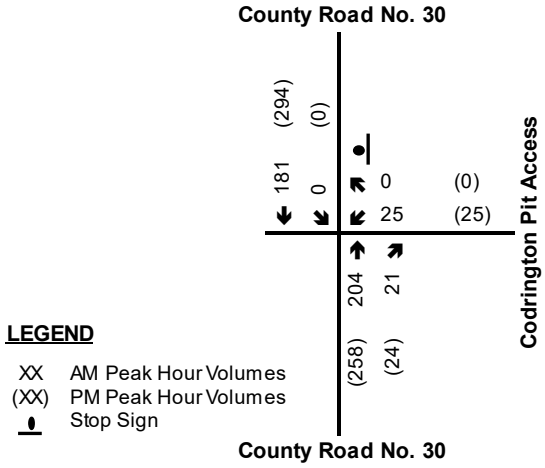
2.3 Traffic Data

A weekday turning movement count was conducted by Ontario Traffic Inc. on June 15, 2021 at the intersection of County Road 30 and the Pit Access during the weekday from 06:00-19:00.

2.3.1 Adjacent Street Traffic

The weekday a.m. and p.m. peak hour existing *adjacent street* traffic volumes are shown in **Figure 2-1**. Please note that aggregate truck movements to/from the site have been removed from the adjacent street peak hour. However, staff passenger vehicles observed to/from the site during the peak hours remain. The complete traffic survey summary is provided in **Appendix A**.

Figure 2-1 2021 Existing Adjacent Street Traffic Volumes



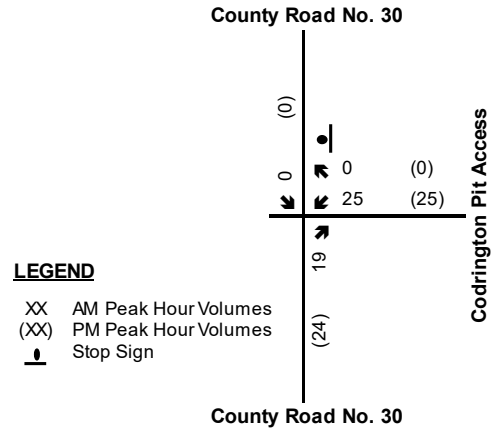
2.3.2 Peak Truck Activity

The peak hour of truck traffic entering and exiting from the site access was extracted from the June 2021 turning movement counts and was used to represent the highest level of subject site traffic. These truck traffic volumes were confirmed as representative of a typical shipping period, based on a review of the shipping activity records provided by CBM.

In the a.m. peak period, 2 passenger vehicles were recorded turning right into the site access, therefore the number of truck trips (19) is 2 less than the number of trips turning northbound right into the site access in **Figure 2-1**.

Accordingly, in the periods of highest truck traffic as per the 2021 turning movement counts, there are 44 and 49 truck trips in/out of the site during both the a.m. and p.m. truck peak hours, respectively, as shown in **Figure 2-2**.

Figure 2-2 2021 Peak Truck Activity



The inbound and outbound splits continue to be consistent with the forecasted haulage of material back in the 2007 Traffic Study, which predicted the vast majority of truck trips to be destined to, and originating from, the south along County Road 30. As can be seen from a review of the 2021 traffic data, the counts indicate minimal truck traffic to and from the north which can be attributed to some local delivery of material to destinations north of the site (seen in the midday peak counts in **Appendix A**). As per the 2007 Traffic Study, we have been advised that the predominant market

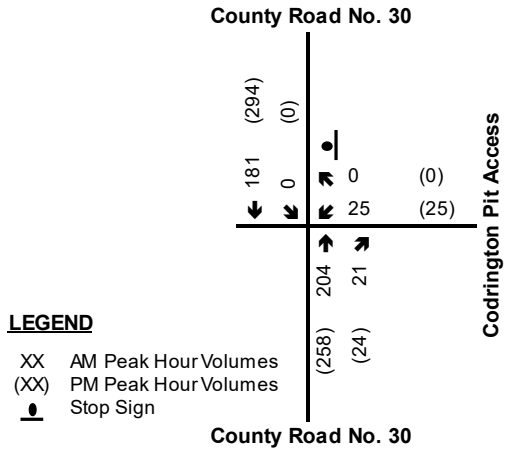
for the movement of aggregate material would be to the south along County Road No. 30 to its connections with Highway No. 401 as reflected in **Figure 2-2**.

2.4 Baseline Traffic Volumes

The baseline traffic conditions for the peak study hours in 2021 were derived by combining the existing adjacent street a.m. and p.m. peak hour traffic and the peak hour of truck traffic to represent a high demand traffic model. It is important to note that this 'hybrid' peak hour was not in evidence during the counts, but we have adopted it to represent a 'worst case' scenario of busiest combined corridor activity.

Figure 2-3 summarizes the total 'hybridized' traffic volume condition during the weekday a.m. and p.m. peak hours.

Figure 2-3 2021 Baseline Traffic Volumes



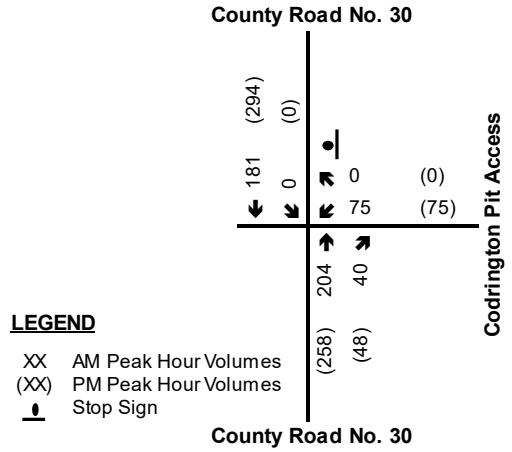
3 CAPACITY ANALYSIS

3.1 Baseline Capacity Analysis

For the purpose of the traffic analysis, we have employed Passenger Car Equivalent (PCE) factors to account for the additional time it takes a heavy vehicle (in this case, different PCE's for each the loaded and empty gravel trucks) to travel through an intersection. Based on our experience, we have adopted a PCE of 3.0 for loaded trucks and a PCE of 2.0 for empty trucks. As a conservative measure, and to provide a consistent comparative analysis between all existing and future traffic scenarios, the PCE adjustment was applied to baseline turning movement volumes to/from the pit access.

The 2021 truck traffic volumes expressed as PCEs are shown in **Figure 3-1**. Note that the two passenger cars turning right into the site access were included in the a.m. northbound right movement, resulting in two trips in addition to the 38 PCE equivalent (i.e., 40 trips total).

Figure 3-1 2021 Baseline Traffic Volumes – PCE Adjusted



The capacity analysis identifies how well an intersection is operating. The analysis contained within this report utilized the Highway Capacity Manual (HCM) 2000 techniques within the Synchro Version 10 Software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Queuing characteristics are reported as the predicted 95th percentile queue for each turning movement. The existing heavy vehicle proportions are included in the intersection analyses. Detailed capacity sheets are attached in **Appendix B**.

The peak hour entrance operations are summarized in **Table 3-1**.

Table 3-1 Capacity Analysis of Codrington Pit Access and County Road 30

Traffic Condition	Movement: v/c; (LOS); 95th Percentile Queue; Delay in Seconds	
	AM Peak Hour	PM Peak Hour
Baseline 2021	WBLR: 0.14 (B); 1 veh; 12 s SBLT: 0.00 (-); 0 veh; 0 s	WBLR: 0.26 (C); 1 veh; 20 s SBLT: 0.00 (-); 0 veh; 0 s

Under 2021 baseline conditions, the intersection of County Road 30 and the Codrington Pit Access is operating with excellent operational characteristics and reserve capacity during both a.m. and p.m. peak hours. There are no critical movements or queuing issues to report. The outbound (westbound) left and right turns from the Pit are operating at LOS 'B' and 'C' during weekday a.m. and p.m. peak hours respectively. These results indicate the site access design delivered as part of the Pit approval are easily accommodating even the combined 'hybrid' peak hour demands and that substantial excess capacity exists.

3.2 Five-Year Traffic Analysis Summary

The results of the capacity analyses from the previous four annual safety reviews are presented in **Table 3-2.**

Table 3-2 Capacity Summary 2017-2021

Year	Movement											
	WBLR						SBLT					
	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
Baseline 2017	0.06	B	14	0.09	B	15	0.00	A	1	0.02	A	1
Baseline 2018	0.06	B	14	0.07	B	15	0.02	A	1	0.02	A	1
Baseline 2019	0.05	B	12	0.08	C	16	0.00	A	1	0.00	A	0
Baseline 2020	0.08	B	12	0.11	C	12	0.00	A	1	0.00	A	0
Baseline 2021	0.14	B	12	0.26	C	20	0.00	-	0	0.00	-	0

As can be seen from **Table 3-2**, all movements at the intersection have had low v/c ratios, good levels of service, and low delays over the past five years, indicating no operational issues (in fact, there is reserve capacity at all movements). Although the v/c ratio has increased for the a.m. and p.m. westbound left-right movement between 2020 and 2021, and the delay has also increased for the movement in the p.m. peak hour, the values indicate that there is still reserve capacity for the movement during both peak hours. It would be reasonable to assume that these trends would continue in future years, thus there is low cause for concern for road network impacts related to pit operations.

4 INCIDENT REPORTS

4.1 Collision Reports

TMIG have consulted with the County of Northumberland, the agency responsible for collision reports near the site.

According to collision reports, there have been no accidents related to the pit operations nor accidents involving aggregate trucks within the vicinity of the site (approximately 500 metres) within the past year (July 2020 to July 2021). A total of three non-pit-related collisions were identified surrounding the site access during this period, two of which were collisions with wild animals, and the other a single vehicle collision.

4.2 CBM-Reported Incidents

Only one incident occurred at the site access that was reported to CBM since the last safety review. The complaint was reported October 10, 2020 in regard to mud tracked out onto County Road 20 over the previous month; this mud was to be kept under control as per the development agreement. CBM resolved to the following as corrective measures, in addition to reconfirming CBM's commitment to keeping the pit entrance clean:

- CBM would sweep the paved 100 metres of internal road and entrance;
- CBM would apply crushed stone to the haul to assist in knocking mud off truck tires; and,
- CBM would contact County staff when mud was tracked out onto County Road 30.

No further incidents or collisions were reported to this complaint.

4.3 Five-Year Collision and Incident Summary

The number of collisions and incidents reported by CBM within the vicinity of the pit over the past five years are shown below in **Table 4-1**.

Table 4-1 Collision and Incident Summary 2017 - 2021

Year	Number of Collisions		Number of CBM Reported Incidents	
	Pit-Related	Non-Pit-Related	Pit-Related	Non-Pit-Related
2017	0	0	1	0
2018	0	0	1	0
2019	0	0	1	1
2020	0	1	0	0
2021	0	3	1	0

A review of the past 5 years shows that the number of pit-related collisions has consistently remained 0. Additionally, the number of pit-related incidents has been one or fewer per year since 2017. Overall, the pit has had an excellent road safety record, and it would be reasonable to assume that these safety trends will continue in future years as the pit operates.

5 CONCLUSION

The Pit access continues to operate in accordance with the conditions of the OMB Settlement and the executed Development Agreement, and to the satisfaction of the County of Northumberland.

County Road 30 passing traffic was also observed to be less than forecasted in the original traffic study and there has been little growth in traffic along this section of roadway since the last annual traffic and safety review.

The Pit access turn lanes constructed to accommodate the future condition are still more than adequate to handle present day peaks, and continue to exceed the operational requirements of the Pit-related traffic volumes.

County of Northumberland road supervisors confirmed that they have not heard of any traffic concerns in the study area. There have been minimal incidents relating to the pit operations and there were no recorded collisions involving aggregate trucks in this past year.

TMIG finds the Codrington Pit access is operating as intended, and given the available information, provides an acceptable degree of efficiency and safety. TMIG recommends concluding the practice of safety reviews for Codrington Pit as the site has demonstrated low traffic impact and low collision trends, as shown from the past five safety reviews.

APPENDIX A

Traffic Data

APPENDIX B

Capacity Analysis