

**JAMES DICK CONSTRUCTION LIMITED**

**TRAFFIC STUDY**

**PROPOSED EXTRACTIVE OPERATION EXPANSION**

**TOWNSHIP OF ORO, COUNTY OF SIMCOE**

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*Our Ref.: 13691*

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## 1.0 INTRODUCTION

James Dick Construction Limited proposes to expand an existing 39.0 hectare gravel pit by an additional 110.0 hectares to create a 149.0 hectare extraction operation in the Township of Oro, County of Simcoe.

Cole, Sherman & Associates Ltd. was retained in October 1991 to undertake a traffic impact assessment of the proposed development expansion.

This study reviews the existing roadway network and traffic volumes in the vicinity of the proposed sites, the vehicular activity generated by the proposed uses, the distribution of site-related traffic, analysis of the impact of site generated traffic on the adjacent roadway network, and presents the findings and recommendations.

Information used in the assessment of the proposed expansion was provided by the Township of Oro, Simcoe County and the Ministry of Transportation. Supplemental information was provided by CSA in-house databases.

## 2.0 PROPOSED DEVELOPMENT EXPANSION

The existing 39.0 hectare gravel pit is located on the East half, part Lot 8 at Oro Concession Road 7. The proposed expansion would encompass the west half, part Lots 7, 8 and 9 of Oro Concession 7. The proposed expansion would consist of 110.0 hectares. The location of the site in relation to Oro Township is shown in Figure 1.

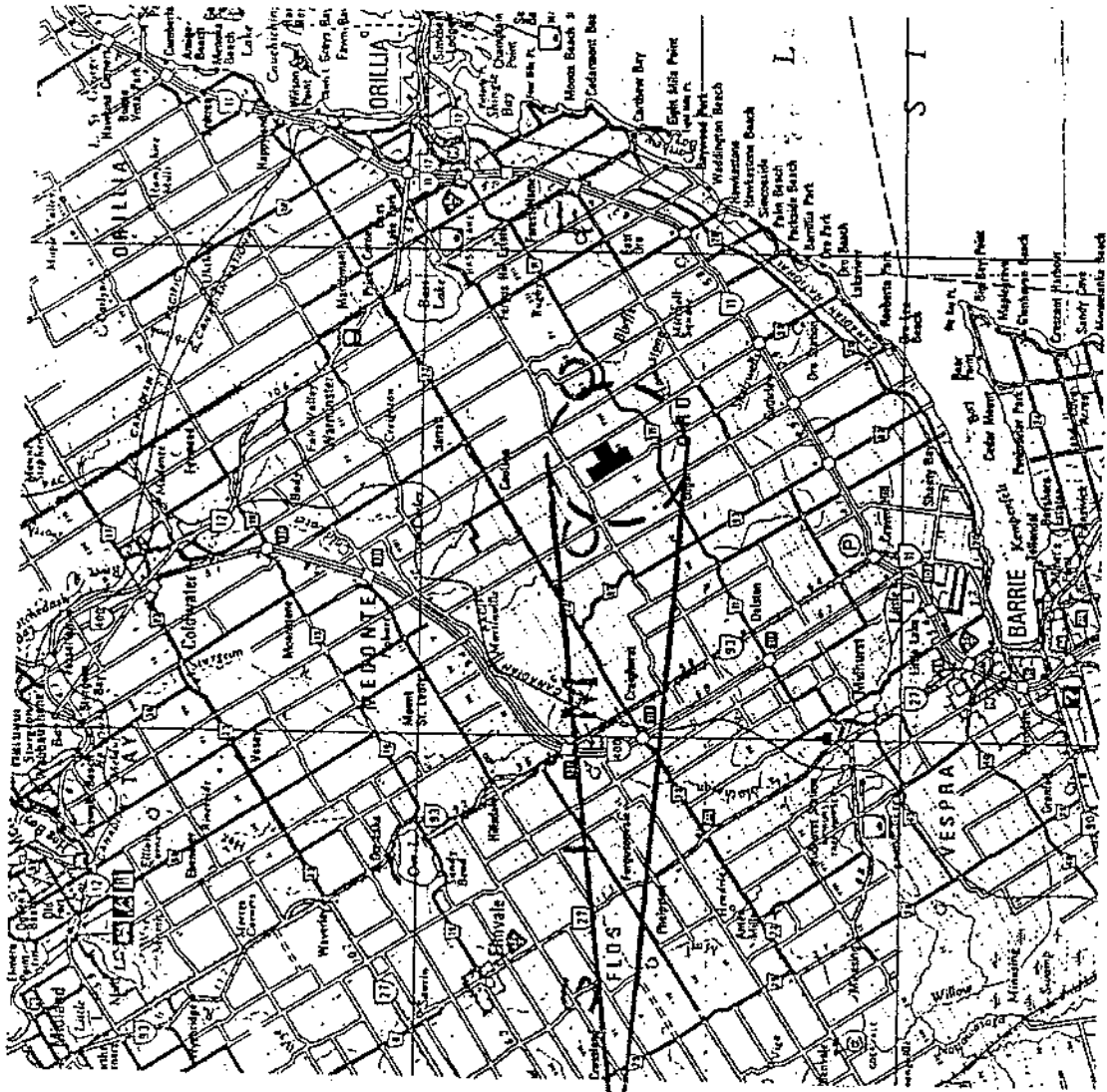
The life expectancy of the pit operation is anticipated to be 50 years under current economic forecasts. Table 1 illustrates the anticipated annual extraction tonnage for the existing and two critical time frames.

**TABLE 1**  
**Annual Extraction Tonnages**

| <u>Existing (1990)</u> | <u>1993</u> | <u>2003</u> |
|------------------------|-------------|-------------|
| Minimal                | 250,000     | 1,000,000   |

The existing (1990) tonnage indicates current level of operation. The existing extraction limit is 150,000 tonnes. The 1993 tonnage indicates the extraction level of the future operation for the year the expansion is anticipated to be operational. The 2003 tonnage indicates ultimate extraction levels, approximately 10 years after the expansion becomes operational.

The extractive operation has two accesses. The main access is on the south side of part lot 8 on Oro Concession Road 7, and a service access on the north side of part lot 8 Oro Concession Road 7.



Site

**Site Location**  
**James Dick Construction Limited**  
 Proposed Extractive Operation Expansion

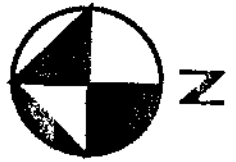


Figure 1.

### 3.0 TRANSPORTATION NETWORK

#### 3.1 EXISTING ROADWAY NETWORK

The existing roadway network in the vicinity of the extractive operation is shown in Figure 2.

A brief description of the roadway network in the vicinity of the proposed expansion is as follows:

##### *Oro Concession Road 7*

Oro Concession Road 7 is a rural route under the jurisdiction of Oro Township. From Simcoe Road 22 north to King's Highway No. 11, Oro Concession Road 7 is a two lane gravel surface road. Abutting land uses along this roadway are mainly farms, rural residential and similar aggregate extraction operations. As well, the newly opened Oro/Barrie/Orillia Airport is located on Oro Concession Road 7 just north of Highway No. 11.

##### *Simcoe Road 11*

Simcoe Road 11 is a secondary link between the Cities of Barrie and Orillia, as is under jurisdiction of Simcoe County. Simcoe Road 11 is a two-lane paved roadway with runs east-west between Highway No. 400 (about 7 kilometres north of Barrie) to the west side of Orillia. The abutting land uses along this roadway are mainly farms and rural residential. Simcoe Road 11 traverses through four small hamlets: Dalston, Edgar, Rugby and Fergus Hill Estate.

Simcoe Road 22

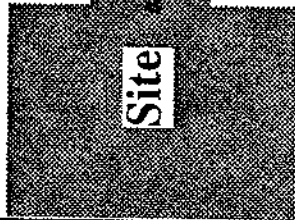
Simcoe Road 11

Highway No. 11

Oro Road 6

Oro Road 7

15th Sideroad



Site

Service Entrance

Main Entrance

Existing Truck Routing



Intersection of Greatest Impact



Future Trucking Route



# Roadway Network

James Dick Construction Limited  
Proposed Extractive Operation Expansion

Figure 2.

### 3.2 FUTURE ROADWAY NETWORK

Currently, the truck route from the James Dick pit is south along Oro Concession Road 7 and right/left at Simcoe Road 11. In the future, Oro Concession Road 7 is expected to be up-graded to a provincial standard from Simcoe Road 22 southward to Highway No. 11. The purpose of this up-grading is to provide a more direct link to the major highway system and significantly reduce truck traffic on Simcoe Road 11 through small residential villages.

### 3.3 EXISTING TRAFFIC VOLUMES

Existing roadway peak hour turning movement traffic volumes at Simcoe Road 11 and concession Road 7 were determined from Annual Average Daily Traffic (AADT) volumes supplied by Simcoe County. The AADT of the roadway segment in the vicinity of Oro Concession Road 7 is 1,250 vehicles. Typically, the peak roadway hour volume is 8 to 12 percent of the AADT. For analysis purposes, the peak period would be conservatively estimated at 12 percent which would be approximately 150 vehicles (two-way). Since Oro Concession Road 7 is approximately halfway between Orillia and Barrie, and both cities are relatively the same size, the 150 vehicles can be split by 50 percent per direction, or 75 vehicles per direction. Also, the AADT of Oro Concession Road 7 is 75 vehicles as reported by Oro Township. A nominal traffic volume is added to Oro Concession Road 7. Figure 3 illustrates anticipated traffic volumes. As well, the a.m. peak period would be used because higher truck volumes are anticipated during the a.m. peak rather than the p.m. peak hour. This will be explained in greater detail in Section 4.0.

A capacity analysis using the unsignalized intersection technique outlined in the Highway Capacity Software (HCS version 1.1) was undertaken at the intersection in order to determine the existing level of service. Based upon the anticipated vehicular movements, the



overall level of service at Simcoe Road 11 and Oro Concession Road 7 during the a.m. peak hour is "A" with an average reserved capacity in excess of 700 vehicles.

On the basis of the existing anticipated volumes, the intersection analyzed currently operates at an overall level of service considered very satisfactory for a rural environment.

#### 4.0 TRAFFIC ANALYSIS

##### 4.1 NATURE OF AGGREGATE TRUCK TRAFFIC

The truck traffic produced from aggregate pit operations is unlike typical residential commuter or industrial traffic. The aggregate industry has a strong relationship to the construction industry. Both industries tend to be seasonal in nature with the peak season being from March - April to October - November. Therefore, extraction and haulage are responsive to demand, and monthly demand can be as high as 150 percent above the average. The off-season traffic could be approximately 50 percent below average monthly demand, and can even be as low as zero as some pits operations close for the winter months.

The daily truck traffic produced from aggregate pit operations is not constant throughout the day. Typically, higher volumes occur during the a.m. peak period (6:00 a.m. to 10:00 a.m.) which could amount to as much as 50 percent of the truck traffic in the first four hours. This variation is accounted for by the on-site demand of construction sites and delivery distances.

##### 4.2 TRAFFIC GENERATION

The generation rates for aggregate operations vary from operation to operation. Beginning at first principles, the following outlines the method of determining a worst case scenario for the a.m. peak hour:

- Volumes:
- determine the annual extraction tonnage
  - divide by average tonnage per truck
  - divide by the total number of operation days per year
  - multiply by seasonal peaking factor

- multiply by 15% for a.m. peak hour factor
- the result is outbound trips, the same number would be used for empty inbound trips since loading a truck usually takes less than 1 hour

Specifically, for the James Dick operation, the following numbers are used:

- 250,000 tonnes per year for 1993.  
1,000,000 tonnes per year for 2003.
- 36.5 tonnes per average truckload
- 210 days per year - typically a full year operation is 250 days, however, James Dick reduces the pit operation during the winter season
- 190% seasonal peaking factor as determined from other operations
- 15% a.m. peak hour factor

Therefore, the anticipated traffic generation is:

$$1993 - \frac{250,000}{36.5} / 210 * 1.9 \times 0.15 = 9 \text{ inbound} \\ 9 \text{ outbound}$$

$$2003 - \frac{1,000,000}{36.5} / 210 * 1.9 \times 0.15 = 37 \text{ inbound} \\ 37 \text{ outbound}$$

It is estimated that 10 people are employed at the gravel pit. Even with future expansions and employment increases, the employee trips generally occur well before the a.m. peak hour and well after the p.m. peak hour. Extractive operations generally begin around 6:00 a.m. and

conclude around 6:00 p.m. with staff arriving before 6:00 a.m. and leaving after 6:00 p.m.

#### 4.3 TRIP DISTRIBUTION AND ASSIGNMENT

The distribution used in this report is based upon market areas of the extraction operation. The majority of the market potential is located to the west and south with some potential to the east and less so to the north.

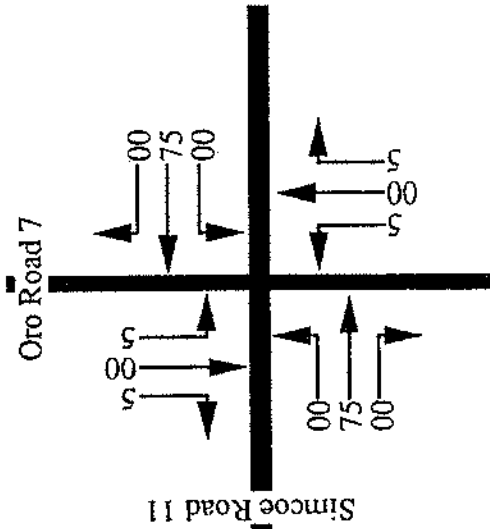
Based on the distribution and the fact that the trucking road directs the majority of the trucks to Simcoe Road 11, the assignment pattern anticipated is 90 percent of the truck volume would utilize Simcoe Road 11 to/from the west to Barrie area and 10 percent to/from the east to the Orillia area.

#### 4.4 FUTURE BACKGROUND TRAFFIC

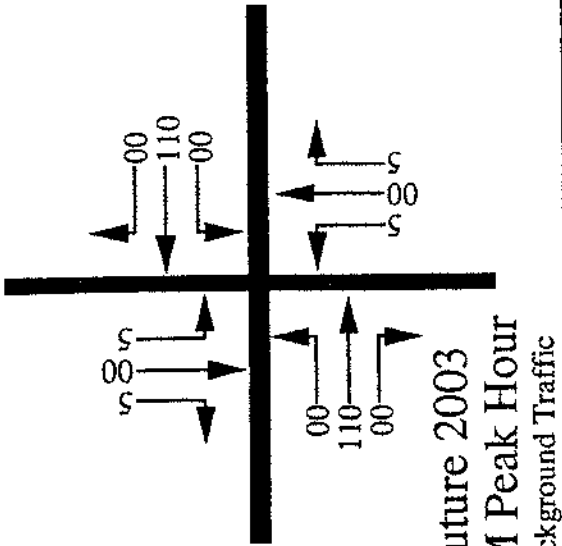
Estimated future traffic levels along Simcoe Road 11 were determined by examining the historical traffic volumes of the roadway. By examining the AADT for the years of 1984 to 1990, the annual increase per year fluctuates greatly from -25.0 percent to +40.0 percent. By analyzing the last seven years, a conservative estimate of 3 percent per year was rationalized.

The overall level of service for the intersection of Simcoe Road 11 and Oro Concession Road 7 is 'A' for 1993 and 2003. The combined reserve capacity for the intersection is over 650 vehicles for 1993, and over 550 vehicles for 2003. The intersection level of service is still satisfactory for both 1993 and 2003 for a rural environment.

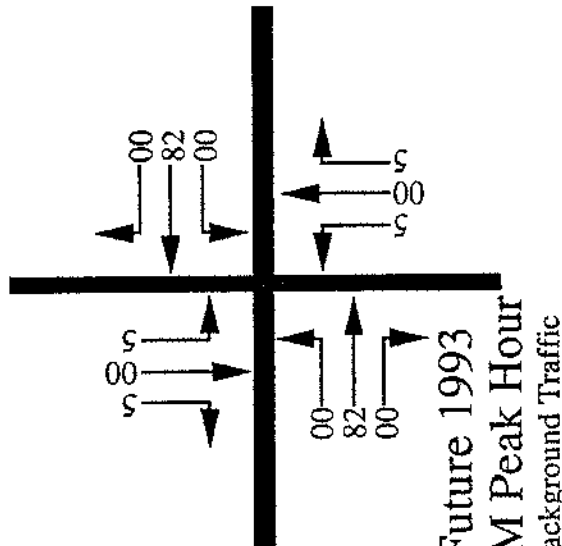
Existing 1990  
AM Peak Hour



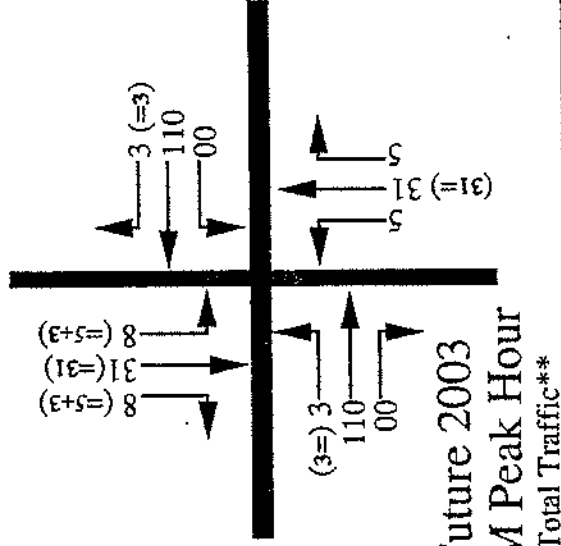
Future 2003  
AM Peak Hour  
Background Traffic



Future 1993  
AM Peak Hour  
Background Traffic



Future 2003  
AM Peak Hour  
Total Traffic\*\*



Future 1993  
AM Peak Hour  
Total Traffic\*\*

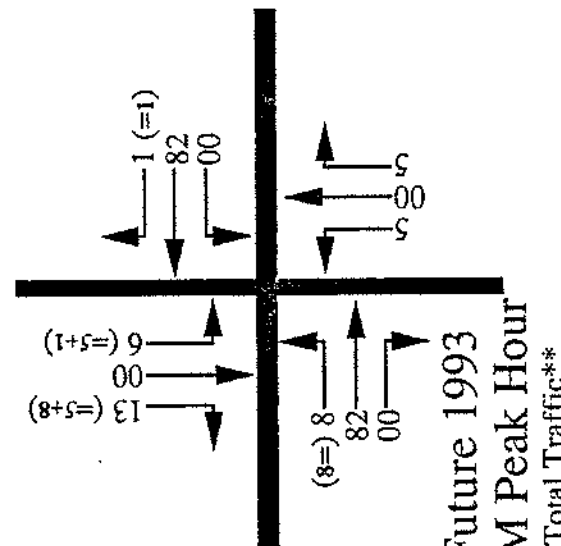


Figure 3.

\*\* 15 (=10+5)

\* 15 = Total Traffic Volume

\* 10 = Background Traffic Volume

\* 5 = Site-Generated Traffic Volume



**Traffic Volumes**  
**James Dick Construction Limited**  
Proposed Extractive Operation Expansion

## 4.5 TRAFFIC IMPACT

### 4.5.1 Roadway Capacity

In order to analyze the impact of site generated traffic on the future roadway network, the estimated site generated trips were added to the 1993 and 2003 time frames with their respective anticipated annual extraction tonnages

Even with the additional site traffic on the future roadway network, the intersection of Simcoe Road 11 and Oro Concession Road 7 operates at a level of service 'A' for both 1993 and 2003. The combined reserve capacity for 1993 is above 550 vehicles, and for 2003 is above 400 vehicles.

### 4.5.2 Safety

The current condition and design standard of Oro Concession Road 7 is adequate to meet the current low-usage traffic demand. In order to accommodate the anticipated higher truck volumes, the condition of the roads and sight distances for stopping must be improved as proposed by the Town of Oro.

The Simcoe County Public School Board reports that 6 bus routes utilize Oro Concession Road 7 and Simcoe County Road 11. Three routes are destined to high schools within Barrie, one to a high school in Orillia and, two routes to an elementary school in Guthrie. The Simcoe County Separate School Board reports that one bus route utilizes Oro Concession Road 7 and is destined to three different schools in Barrie.

As an added feature to safety, the improvement of Oro Concession Road 7, as previously mentioned, would drastically reduce the volume of trucks on Simcoe Road 11. By designating Oro Concession Road 7 as a truck route and by placing prohibitive or restrictive signage on Simcoe Road 11, the safety margin would increase along Simcoe Road 11, especially in the small residential clusters situated on Simcoe Road 11.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of the analysis are as follows:

- The proposed future expansion of the extractive operation can be accommodated by the future anticipated roadway network even at ultimate extraction production.
- The very low volumes along Simcoe Road 11 and even lower volumes on Oro Concession Road 7 attribute to the intersections very good level of service.
- During the a.m. peak hour, the extractive operation is expected to generate 9 inbound and 9 outbound truck trips for the production levels at 1993, and 37 inbound and 37 outbound trips for 2003.
- Up-grading the roadway and providing a direct link to Highway No. 11 on Oro Concession Road 7 would not effect the traffic operations at the intersection significantly, but would provide a safer alternative truck route so as the trucks would not enter any of the small hamlets situated on Simcoe Road 11.