

Amendment to the

# HEWLETT PARK OUTLINE PLAN

Submitted to



THE TOWN OF SYLVAN LAKE  
PLANNING AND DEVELOPMENT DEPARTMENT

on behalf of

**The Gingerich Group Ltd.**

Prepared by

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Revised November 04, 2007

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## APPENDIX

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### Appendix A - Traffic Impact Assessment

## 1.0 Introduction

Armin A. Preiksaitis & Associates Ltd. has been retained by The Gingrich Group Ltd. to amend the Hewlett Park Outline Plan in the Town of Sylvan Lake, Alberta. The purpose of this amendment is to change the proposed land uses of the existing Outline Plan. Land designated for Future Development is proposed to be amended to a highway commercial (1.22 hectares) and a multi-family site (6.12 hectares).

## 2.0 Background

*Figure 1 – Approved Hewlett Park Outline Plan* consists of a map showing a land use concept dated July 24, 2006. The Outline Plan area comprises 92.9 hectares (229.6 acres) of land and is bounded by Canadian National Railway Right of Way to the north, 47 Avenue to the south, Highway 20 and Erickson Drive to the east, and by 43 Street and residential development on Willow Street to the west. The applicant has already submitted a Rezoning Application for the amendment area, referred to as 'Amendment Area A' (refer to *Section 3.0 – Proposed Amendment*).

A Geotechnical Evaluation was prepared by Shelby Engineering Ltd. for Amendment Area A. The area was found to be relatively flat and low lying. The subsurface conditions of organic and topsoil overlaying clay till were found to be suitable for the proposed land uses.

A Traffic Impact Assessment (TIA) was prepared by D.A. Watt Consulting for Amendment Area A (attached as *Appendix A*).

A variety of land uses have either been developed or proposed in the current Outline Plan. Low Density Residential development is the predominant land use comprising 23.4% of the total Outline Plan area, or 21.7 hectares (53.6 acres). Narrow Lot General Residential land uses are located in the central-eastern portion of the Outline Plan area comprising 10.8% of the Outline Plan area or 6.0 hectares (14.8 acres) of land. High Density Residential land uses comprise 4.0% of the Outline Plan area or 3.8 hectares (9.4 acres) land. Highway Commercial land uses are located in the south-eastern corner of the Outline Plan area, known as Hewlett Park Landing, comprising 5.8 hectares (14.3 acres) or 6.2% of the Outline Plan area. Retail and Commercial Service Direct Control land use is found adjacent to the southern-central boundary of the Outline Plan area, comprising 0.4 hectares (1.0 acres) or 0.4% of the Outline Plan area. Light Industrial land uses are located in the north-eastern portion of the Outline Plan area, comprising 6.0 hectares (14.8 acres) or 6.5% of the Outline Plan area. Public Facility land use is found in the south-western corner of the Outline Plan area comprising 12.5 hectares (30.9 acres) or 19.3% of the Outline Plan area. Existing Public Facility land uses includes C.P Blakely School, Sylvan Lake & District Family & Community Center, and the Four Season's Park. Refer to *Figure 1 – Approved Hewlett Park Outline Plan* and *Table 1 – Approved Hewlett Park Outline Plan Land Use and Population Statistics*.

The land surrounding the Outline Plan area is developed as a mix of residential, commercial, and industrial land. Sylvan Lake is approximately 400 meters north of the Outline Plan area, across the Canadian National Railway Right of Way.



**FIGURE 1**

**APPROVED HEWLETT  
PARK OUTLINE PLAN**



LAND USES PROPOSED:

- (R1) RESIDENTIAL LOW DENSITY DISTRICT
- (R3) RESIDENTIAL MULTIPLE FAMILY DISTRICT
- (R5) NARROW LOT RESIDENTIAL DISTRICT
- (PF) PUBLIC FACILITY DISTRICT
- (CH) HIGHWAY COMMERCIAL DISTRICT
- (RCS-DC) RETAIL AND COMMERCIAL SERVICE  
DIRECT CONTROL DISTRICT
- (I1) LIGHT INDUSTRIAL DISTRICT
- (PF) PUBLIC FACILITY DISTRICT-EXISTING
- FUTURE DEVELOPMENT
- ROADS AND LANES
- STAGE BOUNDARY

DATE: JULY 24, 2006

*Table 1 - Approved Hewlett Park Outline Plan  
Land Use and Population Statistics*

<b>Land Uses</b>	<b>Area (ha)</b>	<b>Outline Plan Area (%)</b>
Low Density Residential District (R1)	21.73	23.4%
High Density Residential District (R3)	3.76	4.0%
Narrow Lot General Residential District (R5)	10.08	10.8%
Public Facility District (PF)	6.79	7.3%
Highway Commercial District (CH)	5.79	6.2%
Retail and Commercial Service Direct Control (RCS-DC)	0.35	0.4%
Light Industrial District (I1)	6.01	6.5%
Public Facility District (PF) - Existing	12.49	13.4%
Future Development	7.58	8.2%
Roads and Lanes	18.35	19.7%
<b>Total</b>	<b>92.93</b>	<b>100.0%</b>

<b>Density</b>	<b>Units / ha</b>	<b>Units</b>	<b>Persons / Unit</b>	<b>Persons</b>
Low Density Residential District (R1)	17	369	3.4	1255
High Density Residential District (R3)	35	132	3.1	409
Narrow Lot General Residential District (R5)	22	222	3.4	755
<b>Total</b>		<b>723</b>		<b>2419</b>

**Gross Density (2419 / 85.35 ha)                      28.3 Persons / ha**

**Approved Hewlett Park Outline Plan Student Generation Estimate**

Total Population	Student Generation					
	Public			Separate		
	K-6	7-9	10-12	K-6	7-9	10-12
2,419	108	49	64	72	32	43

Total Student Generation:                      368

At full build out, the current approved Outline Plan area could accommodate 723 units and approximately 2419 persons, with an expected enrollment generation of 398 students.

### 3.0 Proposed Amendment

Amendment Area A is generally rectangular in shape and bounded by Highway 20 to the east, Herder Drive to the north, Hinshaw Drive to the west, and Hewlett Park Landing commercial development to the south. Amendment Area A comprises 7.6 hectares (18.8 acres), or 8.2% of the Outline Plan area.

Amendment Area A is designated in the approved Outline Plan as Future Development land use. This amendment proposes 6.1 hectares (15.0 acres) of land in the south portion of Amendment Area A for High Density Residential uses and 1.2 hectares (3.0 acres) of land in the north portion for Highway Commercial uses. An application to rezone the lands to the appropriate Land Use Bylaw districts, as proposed through this amendment, has previously been submitted by the Gingerich Group Ltd.

Refer to *Figure 2 – Proposed Amendment to the Hewlett Park Outline Plan* and *Table 2 – Proposed Hewlett Park Outline Plan Land Use and Population Statistics*.



**FIGURE 2**

**PROPOSED AMENDMENT  
TO THE HEWLETT PARK  
OUTLINE PLAN**



LAND USES PROPOSED:

- LOW DENSITY RESIDENTIAL DISTRICT (R1)
- HIGH DENSITY RESIDENTIAL DISTRICT (R3)
- NARROW LOT GENERAL RESIDENTIAL DISTRICT (R5)
- PUBLIC FACILITY DISTRICT (PF)
- HIGHWAY COMMERCIAL DISTRICT (CH)
- RETAIL AND COMMERCIAL SERVICE  
DIRECT CONTROL DISTRICT (RCS-DC)
- LIGHT INDUSTRIAL DISTRICT (I1)
- PUBLIC FACILITY DISTRICT (PF) – EXISTING
- ROADS AND LANES
- STAGE BOUNDARY
- AMENDMENT BOUNDARY – AREA A



**Table 2 - Proposed Amendment to the Hewlett Park Outline Plan  
Land Use and Population Statistics**

<b>Land Uses</b>	<b>Area (ha)</b>	<b>Percent of Outline Plan Area</b>
Low Density Residential District (R1)	21.73	23.4%
High Density Residential District (R3)	9.88	10.6%
Narrow Lot General Residential District (R5)	10.08	10.8%
Public Facility District (PF)	7.03	7.6%
Highway Commercial District (CH)	7.01	7.5%
Retail and Commercial Service Direct Control (RCS-DC)	0.35	0.4%
Light Industrial District (I1)	6.01	6.5%
Public Facility District (PF) - Existing	12.49	13.4%
Roads and Lanes	18.35	19.7%
<b>Total</b>	<b>92.93</b>	<b>100.0%</b>

<b>Density<sup>1</sup></b>	<b>Units / ha</b>	<b>Units</b>	<b>Persons / Unit</b>	<b>Persons</b>
Low Density Residential District (R1)	17	369	2.9	1071
High Density Residential District (R3)	35	346	2.3	796
Narrow Lot General Residential District (R5)	22	222	2.9	643
<b>Total</b>		<b>937</b>		<b>2510</b>

**Gross Density (2508 / 92.93 ha)                      27.0 Persons / ha**

Proposed Hewlett Park Outline Plan Student Generation Estimate						
Total Population	Student Generation					
	Public			Separate		
	K-6	7-9	10-12	K-6	7-9	10-12
2,508	112	50	66	75	34	44
<b>Total Student Generation:</b>			<b>382</b>			

<sup>1</sup> Densities of Persons / Unit are based upon the 2004 Household Size by Dwelling Type (Owned and Rented) chart, as found in the Town of Sylvan Lake 2004 Municipal Census. The Low Density Residential District (R1) Persons / Unit value is based on the Average Household Size of 2.9 for Single Detached. The High Density Residential District (R3) Persons / Unit value is based on the Average Household Size of 2.3 for Row (Town) House. The Narrow Lot General Residential District (R5) Persons / Unit value is based on the Average Household Size of 2.9 for Single Detached.

This amendment proposes an increase of 214 High Density Residential units. At full build out a population increase of 91 persons is expected over what is projected in the current approved Outline Plan, bringing the total population of the Outline Plan area to 2,510. Student enrollment is expected to increase by 14 students over the current approved Outline Plan for an expected student enrollment of 382 students in the Outline Plan area.

The numbers used to generate the proposed population projections were based on the *Town of Sylvan Lake 2004 Municipal Census*. Household sizes in the Town of Sylvan Lake are smaller since the adoption of the original Hewlett Park Outline Plan. This accounts for smaller proposed population and student generation figures in relation to an increase in the number of units.

## 4.0 Rationale

This amendment conforms to the *Town of Sylvan Lake Municipal Development Plan* (MDP) (Bylaw No. 1111/96, amended March, 2003). *Section 1.1* of the *Land Use and Development* Section of the MDP states:

*"The principal residential growth areas will be Hewlett Park, Fox Run and north of the golf course. There is sufficient land in these areas and Pierview Estates to accommodate approximately 1,825 dwellings with a population of some 5,000 to 6,000 people at densities comparable to the existing town."*

The additional residential land uses proposed by this amendment are in accordance with this policy direction. Proposed land use changes in Amendment Area A are compatible with existing surrounding land uses. Furthermore, the natural amenity of Sylvan Lake is within walking distance (approximately 400 meters) of the Outline Plan area, making the Outline Plan area a desirable location for higher density residential development.

## 5.0 Policy Compliance

The *Town of Sylvan Lake* MDP specifies objectives and policies pertaining to the growth and development of Sylvan Lake. Listed below are relevant objectives and policies from the Land Use and Development, Commercial and Industrial, and Urban Infrastructure sections of the MDP. This amendment conforms to the objectives and policies of the MDP, as described below.

### *"LAND USE AND DEVELOPMENT*

#### *1. RESIDENTIAL*

##### *1.4. Policies*

- (2) *The Town will co-ordinate the provision of municipal utilities and roads with its management of the subdivision and development approval process to facilitate an adequate and continuous provision of lots for dwelling construction.*
- (3) *The design of proposed residential subdivisions and development will be required to reflect the following guidelines:*

(a) *Streets*

*The layout of the local streets will provide convenient, safe access to all lots and discourage through traffic and excessive traffic movement. The use of cul de sacs of excessive length and long straight streets will be discouraged and intersections will be in excess of 80 m (262.5 ft.) apart.*

*Local streets will be constructed with a width sufficient to allow parking on both sides. The streets will connect with collector roads which will be constructed in accordance with sections 2.4.1 (1) and (3) to carry greater volumes of traffic while providing individual lot access and full on-street parking.*

(b) *Lanes*

*Lanes will be required in all cases, except where lots are to be developed adjacent to a park or recreation area or where lot frontages exceed 15.5 m (50.8 ft.) and development standards are sufficiently high to justify not constructing a lane. The subdivision authority may, at its discretion, relax the frontage requirement based upon the merits of a proposed subdivision.* [Bylaw 1297/2003]

(c) *Sidewalks*

*Sidewalks will be required on one side only of local streets and on both sides of collector and arterial roads. The sidewalk will be separated from the road by a landscaped boulevard.*

(d) *Housing Mix*

*The mix and design of housing in new subdivisions will be determined by the developer, subject to:*

- (i) the Town's acceptance of the housing types in proximity to existing development;*
- (ii) clear separation of different types of housing from one another;*
- (iii) access to roads and open spaces being adequate, in the opinion of the Town.*
- (iv) the density limit established in this Plan;*
- (vi) the standards of the Land Use Bylaw*

(e) *Open Spaces and Trails*

*Open space will be dedicated in accordance with the section 3.3 (1) and the following requirements:*

- (i) open space will be located in a limited number of sites;*
- (ii) open spaces will be linked by a system of hard-surfaced trails.*

*Open space will retain as much of the exiting trees and bushes as possible with the balance being planted with dense native vegetation where not used for active recreation.*

*(f) Location of Land Uses*

*New subdivisions will be developed in a manner which blends with the existing development in the town. Any commercial uses and places of worship will be:*

- (i) located on the periphery of the residential areas;*
- (ii) developed to a standard which contributes to the quality of the entrance to those adjacent areas;*
- (iii) designed so as to screen adjacent dwellings from car parks and servicing facilities.*

*New subdivisions will provide for dwellings to be adequately separated from arterial roads and the railway so that there is sufficient protection from noise, fumes and vibrations. There will be a minimum separation of 30 m (98.4 ft.) between the edge of the active railway right of way and any dwelling.*

- (4) The maximum density of development in the Residential Growth Areas shown on the Plan Map will be limited to 40 people per gross hectare (16.2 people per gross acre). Calculations of density shall be made on the basis of areas defined by collector and arterial roads and the railway rights of way using average household size figures for equivalent subdivision from the preceding census*
- (6) In new developments, innovative housing design to provide for the aged and low income will be encouraged."*

Development will comply with the municipal engineering standards of the Town of Sylvan Lake.

Proposed residential land uses provide a transition of densities, separated by roads or lanes, at a density that should be acceptable to the Town. The amendment provides for a range of housing choice.

## *"2. COMMERCIAL & INDUSTRIAL*

### *2.2 Objective*

- (1) To enhance the commercial and industrial sectors both in terms of quantity and quality*

### *2.3 Policies*

- (2) The Town will allocate land for commercial development in a manner sensitive to varying locational requirements and opportunities. The Town will provide for retail and personal service development outside the downtown and adjacent Lakeshore Drive and 49<sup>th</sup> Avenue area in the following circumstances:*
- (a) the development would provide for a conveniently located small neighbourhood commercial site in a major residential subdivision, or*
- (e) the development will not have any significant adverse impact on the downtown and Lakeshore Drive and is consistent with section 2.3 (2) of these Commercial and Industrial Policies."*

The proposed commercial land uses would serve both the local needs of the increased population of the Outline Plan area as well as the travelling public along Highway 20. It is not anticipated that the proposed commercial uses would adversely impact the downtown or Lakeshore Drive businesses and residents of the Outline Plan area may bring increased business for the downtown and Lakeshore Drive areas.

## *"3. RECREATION & EDUCATION FACILITIES*

### *3.2. Objectives*

- (1) To provide conveniently located active and passive recreation facilities for all residents."*

The amendment area also provides an additional 0.24 hectares (0.59 acres) of Public Facility land over the approved Outline Plan, bringing the total Public Facility land in the Outline Plan area to 19.52 hectares (48.52 acres).

## *"URBAN INFRASTRUCTURE*

### *1. MUNICIPAL UTILITIES*

#### *1.3 Policies*

- (1) Unless it is determined that there is a lack of quantity or quality, the Town will use unfiltered ground water for domestic and non-domestic consumption, expanding the system as necessary to accommodate anticipated growth.*
- (2) The Town will ensure that storm water run-off from the existing town and new development areas is efficiently and safely drained in a manner which will not adversely affect other land and water. The quality of the post-development flows will be required to be comparable to pre-development flows.*
- (3) The Town will upgrade and maintain the sewage treatment facilities and sewerage system as necessary to accommodate anticipated growth at the south end of the lake and to ensure environmentally sound collection, treatment and discharge of waste water.*
- (4) Upon new development, the full proportionate costs of new or expanded municipal utility systems and associated land will be covered by the payment of an off-site levy."*

The servicing of the amendment areas will be an extension of surrounding services, refer to

*Section 9.0 – Utility Facilities.*

## *"2. TRANSPORTATION SYSTEMS*

### *2.3 Policies*

#### *2.3.1 Roads*

- (2) Upon new development, a payment will be required for the construction of roads required to give access to the development*

#### *2.3.2 Railway*

- (3) A new railway crossing will be required to be provided at 39 Street in conjunction with the development of the land to the south side of the railway.*

#### *2.3.4 General*

- (1) Wherever practical, noise attenuation devices, for example earth berms and walls, and visual screens will be required to be installed between new residential development and highways, arterial roads and railways."*



The Canadian National Railway, in a letter dated October 30, 2007, indicated on that they oppose a rail crossing at Hagerman Road and 39 Street. This letter has been submitted to the Town of Sylvan Lake. Residential development in Amendment Area A will be setback by 10 metres and by an earth berm from Highway 20.

## **6.0 Parks and Open Space**

The current Outline Plan satisfies municipal reserve requirements and additional municipal reserve dedication is not required. This amendment, however, proposes an additional 0.24 hectares (0.59 acres) of Public Facility land use (municipal reserve). This additional Public Facility land brings the total Public Facility land in the Outline Plan area to 19.52 hectares (48.23 acres) and contributes to the creation of an interconnected open space network, linking to the regional trail system.

Additional Public Facility land provides enhanced recreational opportunities for current and future residents of the Outline Plan area.

Sylvan Lake is approximately 400 meters north of the Outline Plan area, across the Canadian National Railway Right of Way.

## **7.0 Buffering**

Proposed residential development in Amendment Area A will be buffered from Highway 20 by an earth berm and a 10 metre setback to mitigate noise and other nuisance effects. Proposed residential development adjacent to the existing Hewlett Park Landing commercial development

will be designed to provide appropriate integration between the two land uses at the subdivision stage.

## 8.0 Transportation

Vehicular access to the Outline Plan area is from Highway 20, Erickson Drive, 47 Avenue, 49 Avenue, 43 Street, and 39 Street. Pedestrian access to the Outline Plan area is also provided through Four Season's Park and the regional trail system that traverses the Outline Plan area from west to east.

Amendment Area A can be accessed by Herder Drive and at three (3) residential access points from Hinshaw Drive. The internal road system of Amendment Area A will be determined at the time of subdivision. Construction of new roads will conform to Town of Sylvan Lake standards, having sidewalks on one side of local roads and on both sides of collector roads.

A Traffic Impact Assessment (TIA) (refer to *Appendix A – Traffic Impact Assessment for Amendment Area A*) was prepared by D.A. Watt Consulting for Amendment Area A. The TIA concluded the following:

- The intersections of Herder Drive and Hinshaw Drive (north), Herder Drive and Hinshaw Drive (south) and 47 Avenue and Herder Drive are expected to operate satisfactorily.
- The level of service (LOS) at Highway 20 and Herder Drive is expected to slightly decrease during the afternoon peak hour, and both eastbound left-turning and westbound left-turning lanes will experience a greater decrease in LOS than through traffic will.

- The LOS at Highway 20 and 47 Avenue is expected to slightly decrease in the eastbound left-turning lane, the westbound left-turning lane, and for through traffic during the afternoon peak hour.
- The new all-turns commercial driveways on Herder Drive are expected to operate satisfactorily.
- The three (3) residential driveways on Hinshaw Drive are expected to operate satisfactorily. Road widening is not required on Hinshaw Drive.
- Traffic signals will be installed at Highway 20 and 47 Avenue later this year.
- The intersection of Highway 20 / Herder Drive will also require traffic signals at a later time; it is expected that a set of pedestrian signals would be installed first, followed by a full set of traffic lights;
- The intersection of 47 Avenue / Herder Drive will be signalized in the future.

## 9.0 Municipal Services

The proposed amendments to the Outline Plan do not alter the overall servicing concept for the water distribution, wastewater collection, and stormwater management system. Prior to applying for subdivision, EXH Engineering Services Ltd. will confirm that additional capacity exists for water distribution, wastewater collection, and stormwater management provisions to meet both the Town of Sylvan Lake and Alberta Environment standards.

## 10.0 Public Consultation

A Public Open House was held on October 17, 2007, to explain the rationale and process of the amendment. Twenty-six (26) people attended the Public Open House and eight (8) Comment

Forms were returned. Oral and written comments expressed similar concerns which can be grouped into the following three themes:

#### Railway Crossing at 39 Street and Hagerman Road

- Concerns were raised about a vehicular or pedestrian railway crossing at 39 Street and Hagerman Road (*4 people expressed this in writing and several others orally provided the same concern*).

It was explained to attendees that Canadian National Railway opposes the proposed rail crossing. On October 30, 2007, Canadian National Railway provided an official response to the proposed rail crossing stating their objection. This letter has been submitted to the Town of Sylvan Lake

#### High Density Residential Development

- Concerns were raised about the visual impact of high density (R3) development and the type of people that the development would attract (*2 people expressed this in writing and several others orally provided the same concern*).
- Concern were raised that the land in Amendment Area A was previously 'promised' to be exclusively developed as Highway Commercial (*1 person expressed this in writing and several others orally provided concern*).
- Some people felt that developing the land in question would help complete the neighbourhood (*1 person expressed this in writing and several others orally provided the same concern*).

It was explained to attendees that the High Density Residential (R3) land uses would be designed to a high quality and sited to provide a transition compatible with surrounding land uses.

### Traffic Generation

- Concerns were raised that the proposed amendment would congest the transportation network of the Outline Plan area (*2 people expressed this in writing and several others orally provided the same concern*).

Concerns about traffic generation were addressed by referring attendees to the Traffic Impact Assessment that was conducted for the amendment area. A representative of EXH Engineering Services Ltd. was in attendance to answer specific questions. It was explained to attendees that road widening would not be required on Hinshaw Drive, and that necessary transportation improvements would be provided to maintain an acceptable level of service once the area is built out. For a description of transportation improvements see *Section 8.0 – Transportation*, or refer to *Appendix A – Traffic Impact Assessment*.

## **11.0 Implementation**

### **Staging**

Development within the amendment areas will occur in accordance with the logical extension of existing services and roads, and in response to market demand.

### **Amendments to the Land Use Bylaw**

The applicant has already submitted a Rezoning Application for Amendment Area A.

### **Subdivision**

Following approval of the amendments to the Land Use Bylaw, a Tentative Plan of Subdivision will be submitted for approval by the Subdivision Authority.

## APPENDIX A

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### Traffic Impact Assessment

**TOWN OF SYLVAN LAKE  
RESIDENTIAL AND COMMERCIAL  
DEVELOPMENT**

Traffic Impact Assessment

Prepared for: **The Gingerich Group Ltd.**

Prepared by: **D.A. Watt Consulting, Transportation Division**

File: **2456.T01**

Date: **July 23, 2007**

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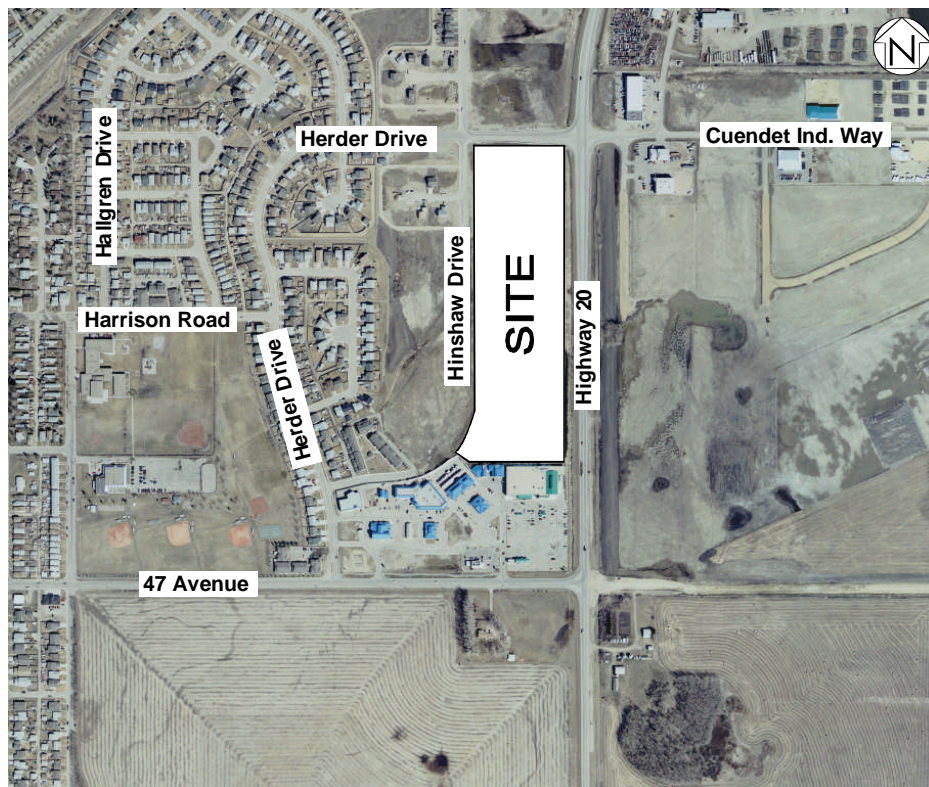
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## 1.0 INTRODUCTION & CONCLUSIONS

### 1.1 Background to this Study

The Gingerich Group Ltd. retained D.A. Watt Consulting (DAW) to undertake a traffic impact assessment (TIA) in support of the proposed residential and commercial development located at the southwest corner of the Highway 20 / Herder Drive intersection in the Town of Sylvan Lake (**Figure 1**). The proposed development will consist of 176 townhouse units and 6,000 ft.<sup>2</sup> of retail space.

The scope of this traffic impact assessment was established from discussions with the Director of Planning & Development of the Town of Sylvan Lake. The confirmed scope of work is attached as **Appendix A**. The primary purpose of this study is to evaluate the short-term impact of the proposed development on the adjacent transportation network. This report outlines the methodology followed in carrying out the traffic study and provides our findings and recommendations.



**FIGURE 1. SITE CONTEXT**

## 1.2 Conclusions

The following are DAW's conclusions:

- Assessment of existing weekday peak hour operating conditions reveals the following:
  - The intersections of Herder Drive / Hinshaw Drive (north), Herder Drive / Hinshaw Drive (south) and 47 Avenue / Herder Drive are currently operating satisfactorily.
  - The intersection of Highway 20 / Herder Drive is operating in good conditions during the a.m. peak hour. However, the westbound left-turn/through movement is currently experiencing some delays in the p.m. peak hour.
  - The intersection of Highway 20 / 47 Avenue is operating in good conditions during the a.m. peak hour. However, the eastbound left-turn/through movement is currently experiencing significant delays in the p.m. peak hour.
- The proposed development will consist of 176 townhouse units and 6,000 ft.<sup>2</sup> of retail space. In total, it will generate approximately 130 vehicle trips in the a.m. peak hour and 186 vehicle trips in the p.m. peak hour.
- Assessment of post-development operating conditions reveals the following:
  - The intersections of Herder Drive / Hinshaw Drive (north), Herder Drive / Hinshaw Drive (south) and 47 Avenue / Herder Drive are expected to operate satisfactorily.
  - The intersection of Highway 20 / Herder Drive is expected to operate at an overall intersection LOS A in the a.m. peak hour and LOS B in the p.m. peak hour. However, the eastbound left-turn/through movement might experience longer delays (LOS E) in the morning and afternoon peak hours. Similar operational problem is also anticipated at the westbound left-turn/through movement in the afternoon peak hour (LOS F).
  - The intersection of Highway 20 / 47 Avenue is expected to operate in good conditions during the a.m. peak hour. However, the eastbound left-turn/through movement will continue to experience significant delays in the p.m. peak hour (LOS F), and the westbound left-turn/through movement might experience longer delays (LOS E).
  - The all-turns commercial driveway intersection on Herder Drive is expected to operate satisfactorily.
  - All three residential driveway intersections on Hinshaw Drive are expected to operate satisfactorily.

- Road widening is not required on Hinshaw Drive to accommodate the proposed development.
- If traffic signals were installed at the highway intersections:
  - The intersection of Highway 20 / Herder Drive would operate at an overall intersection LOS A in both a.m. and p.m. peak hours. The individual traffic movements would operate between LOS A and B.
  - The intersection of Highway 20 / 47 Avenue would operate at an overall intersection LOS A in both a.m. and p.m. peak hours. The individual traffic movements would operate between LOS A and B.
  - Therefore, with the installation of traffic signals at the highway intersections, the proposed development can be accommodated without adversely affecting the level of service on the road network.
- DAW conducted the Transportation Association of Canada's traffic signal warrant analysis for the Highway 20 intersections and the assessment reveals the following:
  - Traffic signals are not warranted at the intersection of Highway 20 / Herder Drive under both existing and post-development scenarios. DAW recommends that the Town of Sylvan Lake monitor this intersection periodically in the future, especially when other new developments to the southeast of this intersection are being built, and consider signalization when the traffic signal warrant calculation results in 100 points or greater.
  - Traffic signals are warranted at the intersection of Highway 20 / 47 Avenue under both existing and post-development scenarios. As a result, DAW recommends that traffic signals should be installed immediately at this intersection to alleviate the existing delay problems on the side street movements. It should be noted that traffic signals are required based on existing conditions, regardless of whether the proposed development will occur in the future or not.
- Through discussions with the Director of Operations of Sylvan Lake, the intersection of Highway 20 / 47 Avenue is planned to have traffic signals installed this year, if the Town gets through the design and approval process in time for this construction season. The intersection of Highway 20 / Herder Drive will also have traffic signals at a later time; it is expected that a set of pedestrian signals would be installed first, follow by the full set of traffic lights later. It has also been stated that the intersection of 47 Avenue / Herder Drive will be signalized in the longer-term. The Town of Sylvan Lake requires the developers to contribute towards the cost of signalization at these intersections, and the charges are likely going to be assessed based on the development area.

## 2.0 EXISTING CONDITIONS

### 2.1 Existing Road Network

The proposed development is located in southeast Sylvan Lake. It is bounded by Highway 20 to the east, Herder Drive to the north, Hinshaw Drive to the west and Hewlett Park Landing (a shopping centre) to the south.

Highway 20 is a paved two-lane highway that is oriented in a north-south direction, and has excellent pavement conditions. The posted speed limit is 70 km/h in the Town, and 100 km/h out of Town. The driving lane width varies between 3.5 m and 4.0 m, and there is adequate shoulder width on the side. Highway 20 connects to Highway 11A further to the north, and to Highway 11 further to the south.

In the immediate vicinity of the site, 47 Avenue is a paved four-lane roadway that is designated as a major east-west collector street in Town. The posted speed limit on 47 Avenue is 40 km/h. The driving lane width varies from 3.0 m to 3.5 m. It should be noted that Hewlett Park Landing has two all-turns accesses on 47 Avenue between Highway 20 and Herder Drive.

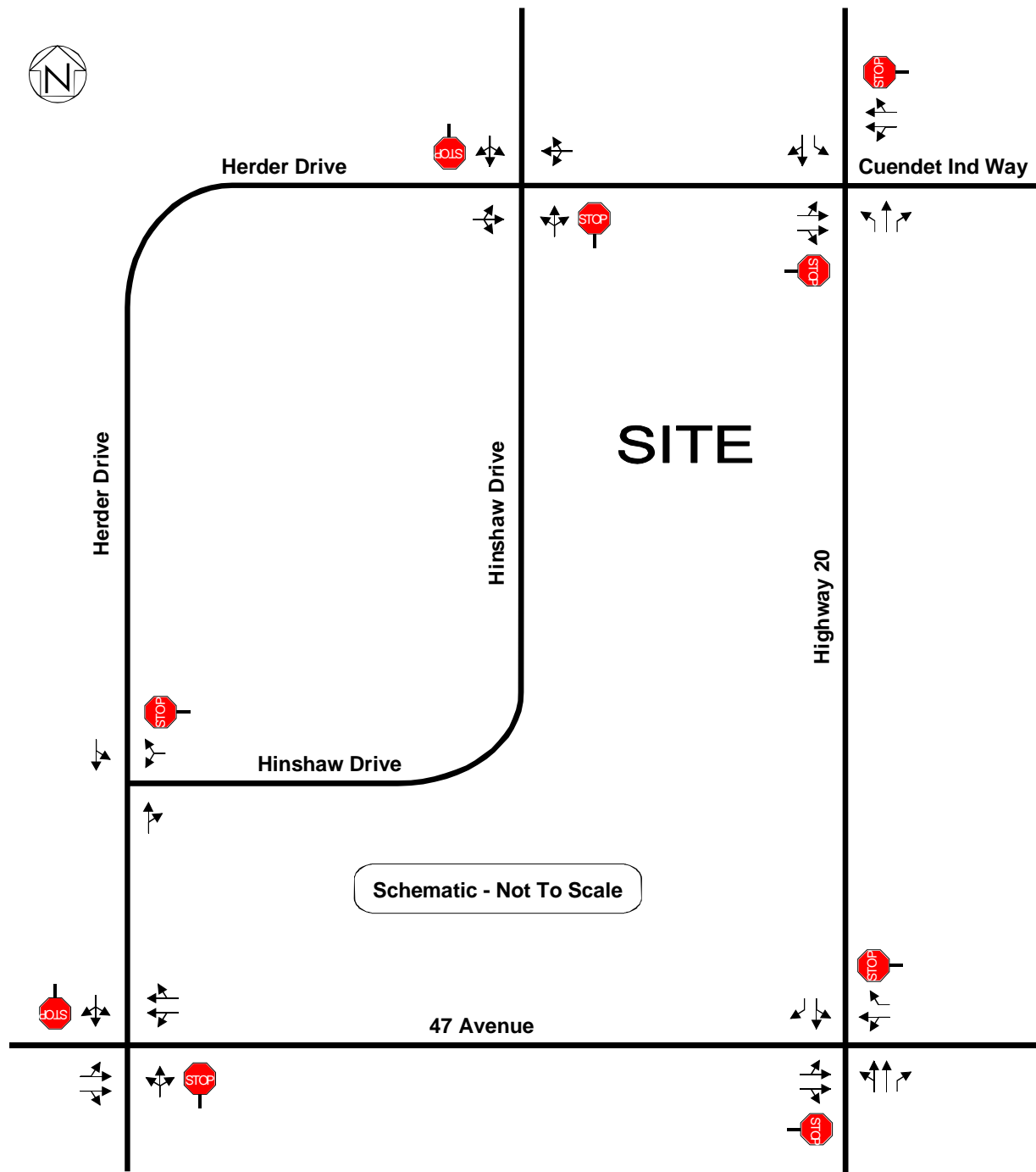
Herder Drive is a two-lane residential collector street with direct residential frontages. Parking is permitted on both sides of Herder Drive. The posted speed limit is 40 km/h. The overall pavement width is about 12 m.

Hinshaw Drive is a two-lane local residential street. It intersects with Herder Drive at its south end and forms a T-intersection. It also crosses Herder Drive further north and forms a four-legged intersection. The section of Hinshaw Drive bounding the west end of the site is currently under construction.

At the intersection of Highway 20 / Herder Drive, separate left-turn and right-turn lanes are provided in the northbound direction, whereas a separate left-turn lane is provided in the southbound direction. Acceleration lanes for left-turning vehicles from Herder Drive and Cuendet Industrial Way are also provided in both travel directions on Highway 20.

The intersection of Highway 20 / 47 Avenue has two northbound through lanes and one southbound through lane, but there are no separate left-turn lanes. On the contrary, right-turn deceleration and acceleration lanes are available in both directions.

The existing lane configuration and traffic control at the key intersections in this study are illustrated in **Figure 2**.



**FIGURE 2. EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL**

## 2.2 Existing Traffic Volumes

DAW carried out traffic surveys on Tuesday June 5, 2007 at the intersections of Highway 20 / Herder Drive, Herder Drive / Hinshaw Drive (north), and Herder Drive / Hinshaw Drive (south). The traffic surveys were conducted during the weekday peak periods of 7:00 a.m. to 9:00 a.m., 11:00 a.m. to 1:00 p.m., and 4:00 p.m. to 6:00 p.m.. DAW has retained ME2 Transportation Data Corp. in early spring 2007 to carry out traffic surveys at the intersections of Highway 20 / 47 Avenue and Herder Drive / 47 Avenue. The existing weekday morning and afternoon peak hours and traffic volumes at the key intersections are summarized in **Figure 3**.

## 2.3 Intersection Performance

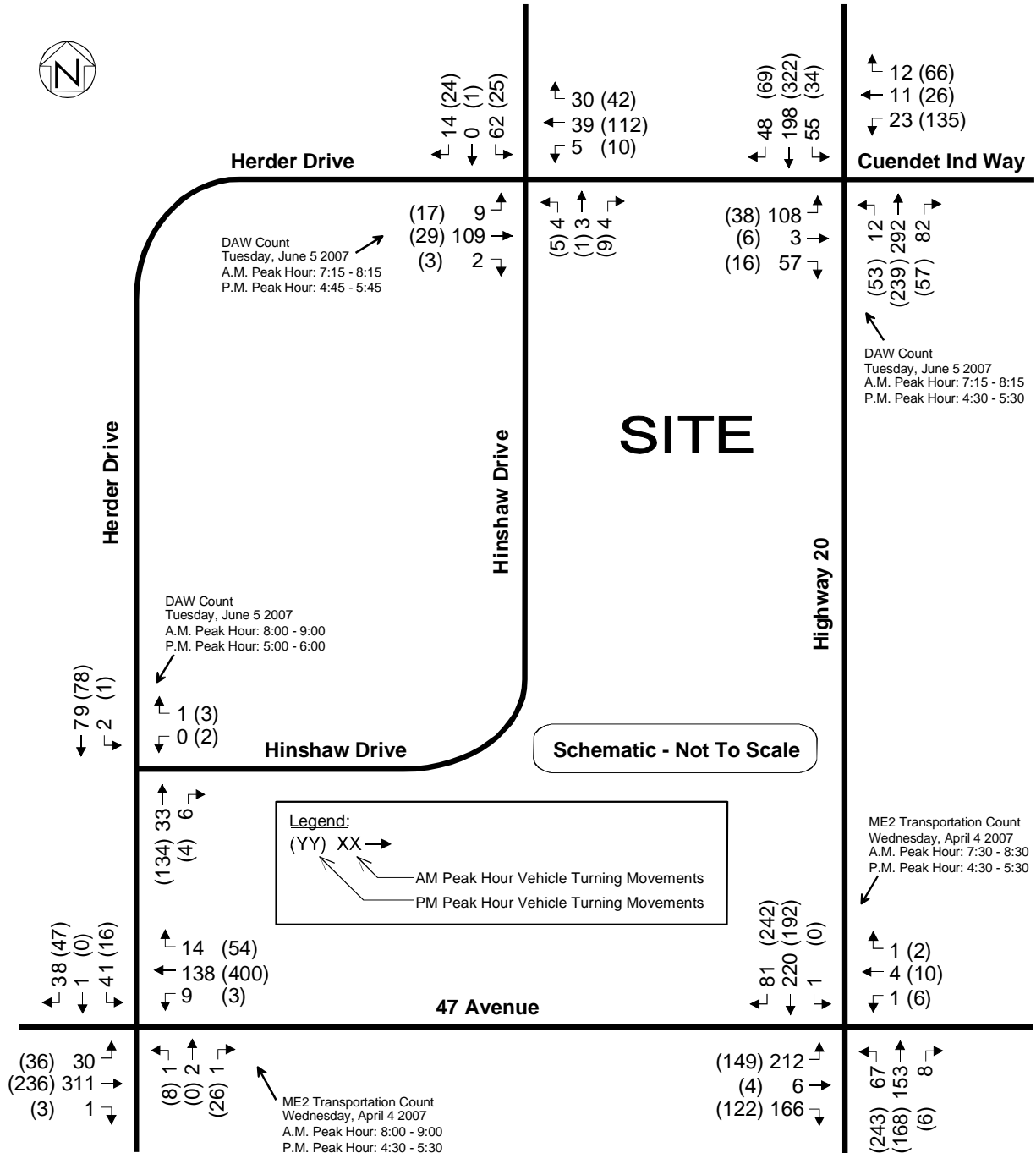
The existing morning and afternoon peak hour operating conditions at the key intersections were evaluated using the Synchro/SimTraffic 6.0 software package (which is based on the methodology outlined in the U.S. Highway Capacity Manual<sup>1</sup>). For unsignalized (stop-controlled or yield-controlled) intersections, the level-of-service (LOS) is based on the computed delays on each of the critical movements. For example, LOS 'A' represents minimal delays for minor street traffic movements, and LOS 'F' represents a scenario with an insufficient number of gaps on the major street for minor street motorists to complete their movements without significant delays. For signalized intersections, the methodology considers the intersection geometry, traffic volumes, traffic signal phasing/timing plan and pedestrian volumes. The average delay for each lane, lane group and the overall intersection are calculated.

The LOS criteria for unsignalized and signalized intersections, as summarized in the Highway Capacity Manual, are illustrated in **Table 1**.

**TABLE 1. LEVEL OF SERVICE CRITERIA**

Level of Service (LOS)	Average Delay for UNSIGNALIZED Intersection Movements	Average Delay for SIGNALIZED Intersection Movements
A	0 – 10 seconds per vehicle	0 – 10 seconds per vehicle
B	> 10 – 15 seconds per vehicle	> 10 – 20 seconds per vehicle
C	> 15 – 25 seconds per vehicle	> 20 – 35 seconds per vehicle
D	> 25 – 35 seconds per vehicle	> 35 – 55 seconds per vehicle
E	> 35 – 50 seconds per vehicle	> 55 – 80 seconds per vehicle
F	> 50 seconds per vehicle	> 80 seconds per vehicle

<sup>1</sup> Transportation Research Board, National Research Council, Highway Capacity Manual 2000, Washington, D.C., 2000.



**FIGURE 3. EXISTING TRAFFIC VOLUMES**



## 2.4 Existing Operating Conditions

The existing weekday peak hour traffic conditions were assessed in Synchro and the results are summarized in **Table 2**. The intersections were analyzed using the current lane arrangements, traffic volumes and traffic controls. The Synchro software outputs for this and all subsequent analysis are provided in **Appendix B**.

**TABLE 2. EXISTING OPERATING CONDITIONS**

INTERSECTION / MOVEMENT			AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (secs/veh)	LOS	Delay (secs/veh)
Highway 20 / Herder Drive (unsignalized)	EB	Left/Through	D	32.7	D	32.2
		Through/Right	B	10.5	B	12.4
	WB	Left/Through	C	22.0	E	47.8
		Through/Right	B	12.9	B	12.5
	NB	Left	A	8.0	A	8.4
		Through	A	0.0	A	0.0
		Right	A	0.0	A	0.0
	SB	Left	A	8.5	A	8.1
		Through/Right	A	0.0	A	0.0
	Intersection Summary		A	6.2	A	9.7
Herder Drive / Hinshaw Drive (north) (unsignalized)	EB	Left/Through/Right	A	0.6	A	2.7
	WB	Left/Through/Right	A	0.5	A	0.5
	NB	Left/Through/Right	B	10.4	A	9.4
	SB	Left/Through/Right	B	11.2	B	10.1
	Intersection Summary		A	3.8	A	3.1
Herder Drive / Hinshaw Drive (south) (unsignalized)	WB	Left/Right	A	8.5	A	9.3
	NB	Through/Right	A	0.0	A	0.0
	SB	Left/Through	A	0.2	A	0.1
	Intersection Summary		A	0.2	A	0.3

INTERSECTION / MOVEMENT			AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (secs/veh)	LOS	Delay (secs/veh)
47 Avenue / Herder Drive (unsignalized)	EB	Left/Through	A	1.5	A	2.2
		Through/Right	A	0.0	A	0.0
	WB	Left/Through	A	1.0	A	0.1
		Through/Right	A	0.0	A	0.0
	NB	Left/Through/Right	B	14.2	B	10.9
	SB	Left/Through/Right	B	12.7	B	12.5
	Intersection Summary		A	2.4	A	1.8
Highway 20 / 47 Avenue (unsignalized)	EB	Left/Through	D	27.1	F	65.3
		Through/Right	B	11.9	B	10.7
	WB	Left/Through	C	16.2	D	31.1
		Right	A	0.0	A	0.0
	NB	Left/Through	A	5.0	A	8.1
		Through	A	0.0	A	0.0
		Right	A	0.0	A	0.0
	SB	Left/Through	A	0.0	A	0.0
		Right	A	0.0	A	0.0
	Intersection Summary		A	9.3	B	12.4

The Synchro results indicate the following:

- The intersections of Herder Drive / Hinshaw Drive (north), Herder Drive / Hinshaw Drive (south) and 47 Avenue / Herder Drive are currently operating satisfactorily. The intersections are operating at an overall LOS A with individual traffic movements operating between LOS A and B.
- The intersection of Highway 20 / Herder Drive is operating in good conditions during the a.m. peak hour. However, the westbound left-turn/through movement is currently experiencing some delays in the p.m. peak hour (LOS E).
- The intersection of Highway 20 / 47 Avenue is operating in good conditions during the a.m. peak hour. However, the eastbound left-turn/through movement is currently experiencing significant delays in the p.m. peak hour (LOS F).

Improvement options at the two Highway 20 intersections will be discussed in later section of this report.

### 3.0 NEW DEVELOPMENT TRAFFIC

#### 3.1 The Proposed Development

The subject site has a total area of 18 acres, of which the commercial development at the north end will occupy 3 acres and the residential development will take up the remaining 15 acres. The proposed development will consist of **176 townhouse units** and **6,000 ft.<sup>2</sup> of retail space**.

The townhouse project will consist of 2 duplex units, 31 fourplex units and 8 sixplex units. There will be three driveways on Hinshaw Drive serving the townhouse development traffic, and the driveways are to be located opposite of Holsworth Place, Hodgestreet Place and Hendrickson Bay.

The commercial development is expected to be a neighbourhood strip mall and it may contain uses such as light retail, convenience store, drycleaner and video store. The client does not anticipate major traffic generators such as a fast-food restaurant or a bank as future tenants. There will be an all-turns driveway on Herder Drive serving the commercial traffic, located approximately midway between Highway 20 and Hinshaw Drive.

The proposed site plan (supplied by Barry Johns Architecture Limited) is shown in **Figure 4**.

#### 3.2 Trip Generation

In assessing the trip-generating potential of the land uses within the proposed development, DAW reviewed published Institute of Transportation Engineers (ITE) trip generation data, City of Calgary data and DAW's historical data on other similar projects. The widely used publication *Trip Generation*<sup>2</sup> provides a good database of trip generation data (based on studies of existing developments) for a wide variety of uses. The following points summarize DAW's approach to establishing the trip generation of the development:

- The **townhouse development** was assessed at the ITE (Land Use 231: Low-Rise Residential Condominium/Townhouse) trip generation rate of 0.67 vehicle trips per hour (vph) per unit (25% inbound / 75% outbound) for the street a.m. peak hour, and 0.78 vph per unit (58% inbound / 42% outbound) for the street p.m. peak hour. This translates to a trip generation estimate of 118 vehicle trips (30 inbound and 88 outbound) in the a.m. peak hour and 138 vehicle trips (80 inbound and 58 outbound) in the p.m. peak hour.

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<sup>2</sup> Institute of Transportation Engineers., *Trip Generation – 7th Edition*., Washington, D.C., 2003.



- For the **commercial** development, DAW has selected a trip generation rate that reflects a blend of retail-commercial uses. DAW's past experience on similar projects and sources from ITE suggest that a trip rate of approximately 2.0 vph per 1,000 ft.<sup>2</sup> GFA in the a.m. peak hour (when the majority of commercial uses are still closed) with an even split of directional traffic (50% inbound / 50% outbound) is typical for commercial development of this size. For the p.m. peak hour, a trip generation rate of 8.0 vph per 1,000 ft.<sup>2</sup> GFA (50% inbound / 50% outbound) is used in the analysis. This translates to a trip generation estimate of 12 vehicle trips (6 inbound and 6 outbound) in the a.m. peak hour and 48 vehicle trips (24 inbound and 24 outbound) in the p.m. peak hour.

There are three types of trips generated by a commercial/retail development - primary trips, pass-by trips and diverted-linked trips:

- **Primary trips** are new trips completely devoted to the development, and they only result because of the development.
- **Pass-by trips** are trips caused by existing traffic on the road network that already pass by the development and decide to enter the development.
- **Diverted-linked trips** are trips attracted from the traffic on roadways within the vicinity of the development area but require diversion from that roadway to another roadway in order to gain access to the site.

This proposed commercial development is expected to attract a large percentage of 'pass-by' traffic because of its unique location (near the major Highway 20 / Herder Drive intersection) in the development plan. The market area for the commercial site will primarily be the adjacent neighbourhoods; that is, the customers will mainly be residents of the area, stopping by the commercial site to/from work during the peak hours.

While the commercial uses may also attract diverted-linked trips, the extent of these is often difficult to identify. Therefore, in the context of this study, diverted-linked trips were assumed to be accounted for in the primary trips. DAW selected a split of 70% primary trips to 30% pass-by trips for the commercial traffic in the assessment.

A trip generation summary for the proposed development is provided in **Table 3**. As shown, it was estimated that the site would generate a total of about **130** vehicle trips in the **a.m. peak hour** and **186** vehicle trips in the **p.m. peak hour**.

**TABLE 3. TRIP GENERATION SUMMARY**

Land Use	A.M. Peak Hour			P.M. Peak Hour		
	Total Trips	Inbound	Outbound	Total Trips	Inbound	Outbound
Townhouse	118	30	88	138	80	58
Commercial (Primary Trips)	8	4	4	34	17	17
Commercial (Pass-By Trips)	4	2	2	14	7	7
<b>Total</b>	<b>130</b>	<b>36</b>	<b>94</b>	<b>186</b>	<b>104</b>	<b>82</b>

### 3.3 Trip Distribution and Assignment

DAW estimated the trip distribution patterns of the **townhouse** traffic by reviewing the existing trip distribution patterns exhibited by the adjacent residential subdivisions, as well as the potential locations of employment for the townhouse residents based on the 2004 Sylvan Lake Municipal Census<sup>3</sup>. **Table 4** summarizes the employment locations of Sylvan Lake residents (including full-time, part-time and seasonal employment).

**TABLE 4. TOWN OF SYLVAN LAKE – 2004 EMPLOYMENT BY LOCATION**

Location	Number of People	Percentage of Total
In Sylvan Lake	1,497	33.2%
At Own Residence	166	3.7%
No 'Usual Place'	712	15.8%
Another Alberta Municipality	2,035	45.2%
Outside Alberta	41	0.9%
Unknown	53	1.2%
<b>Total</b>	<b>4,504</b>	<b>100.0%</b>

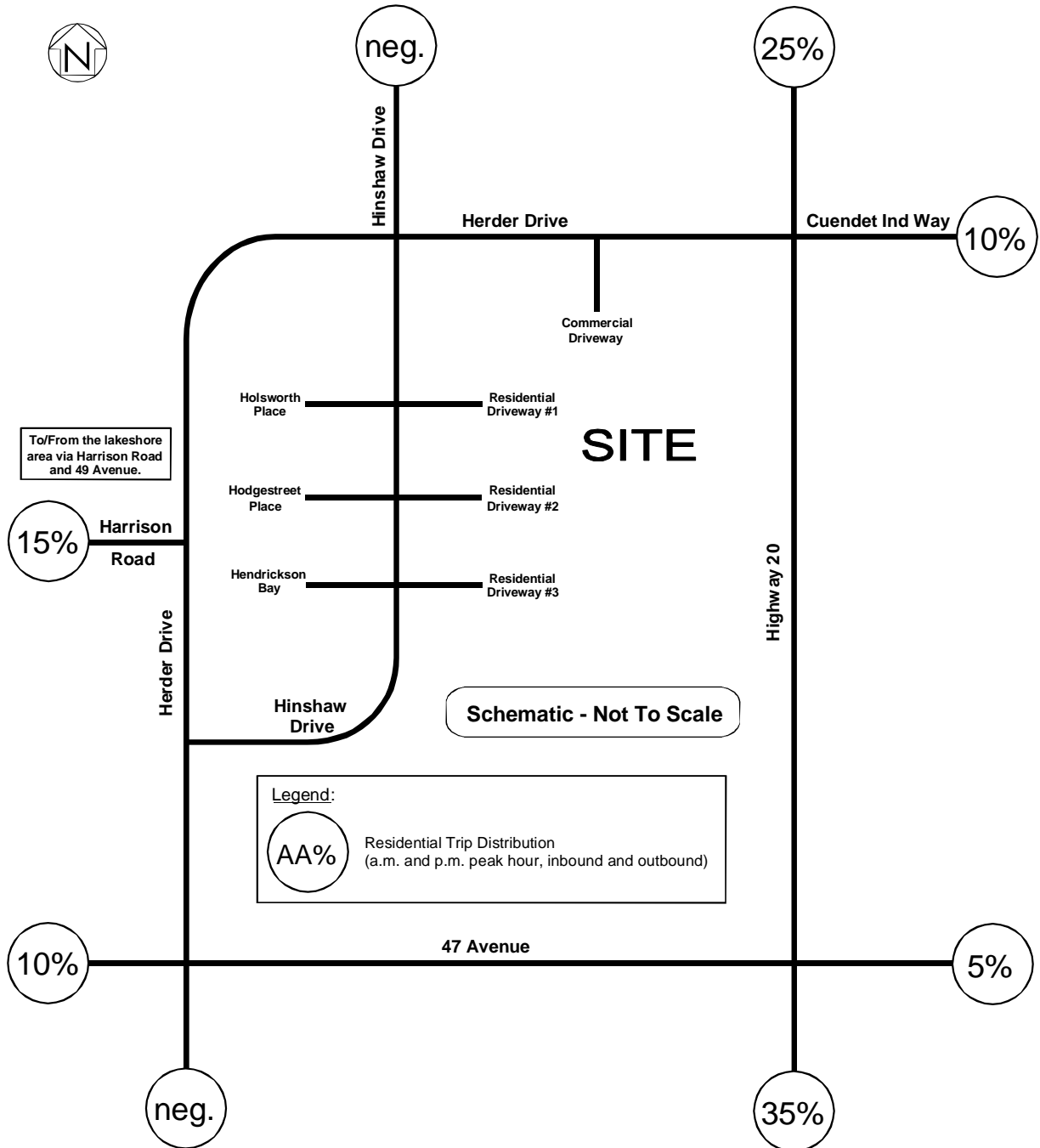
<sup>3</sup> Parkland Community Planning Services, Town of Sylvan Lake – 2004 Municipal Census, Alberta, 2004.

Based on the Census information, one could expect that about 40% of the work trips generated by the townhouse development would stay within Sylvan Lake, while the remaining 60% would be associated with some other Alberta municipalities. DAW also considered where residents would go for education, shopping and entertainment in the trip distribution estimates. In addition, other factors such as the connectivity of adjacent roadways, driving conditions and speed limits have also been accounted for in this assessment. **Figure 5** illustrates the anticipated trip distribution patterns for the townhouse traffic.

Trip distribution patterns for the new **primary trips** generated by the proposed **commercial** development were based on the location of residents in the study area. It was estimated that 40% of the primary trips are from/to the residential neighbourhoods along Herder Drive, Harrison Road, Hagerman Road and Hallgren Drive, 15% from/to the neighbourhoods along Hinshaw Drive north of Herder Drive, and 15% from/to the neighbourhoods along Hinshaw Drive south of Herder Drive. The remaining 30% of the primary trips are expected to come from/go to other areas of the Town. The primary trip distribution patterns are illustrated in **Figure 6**.

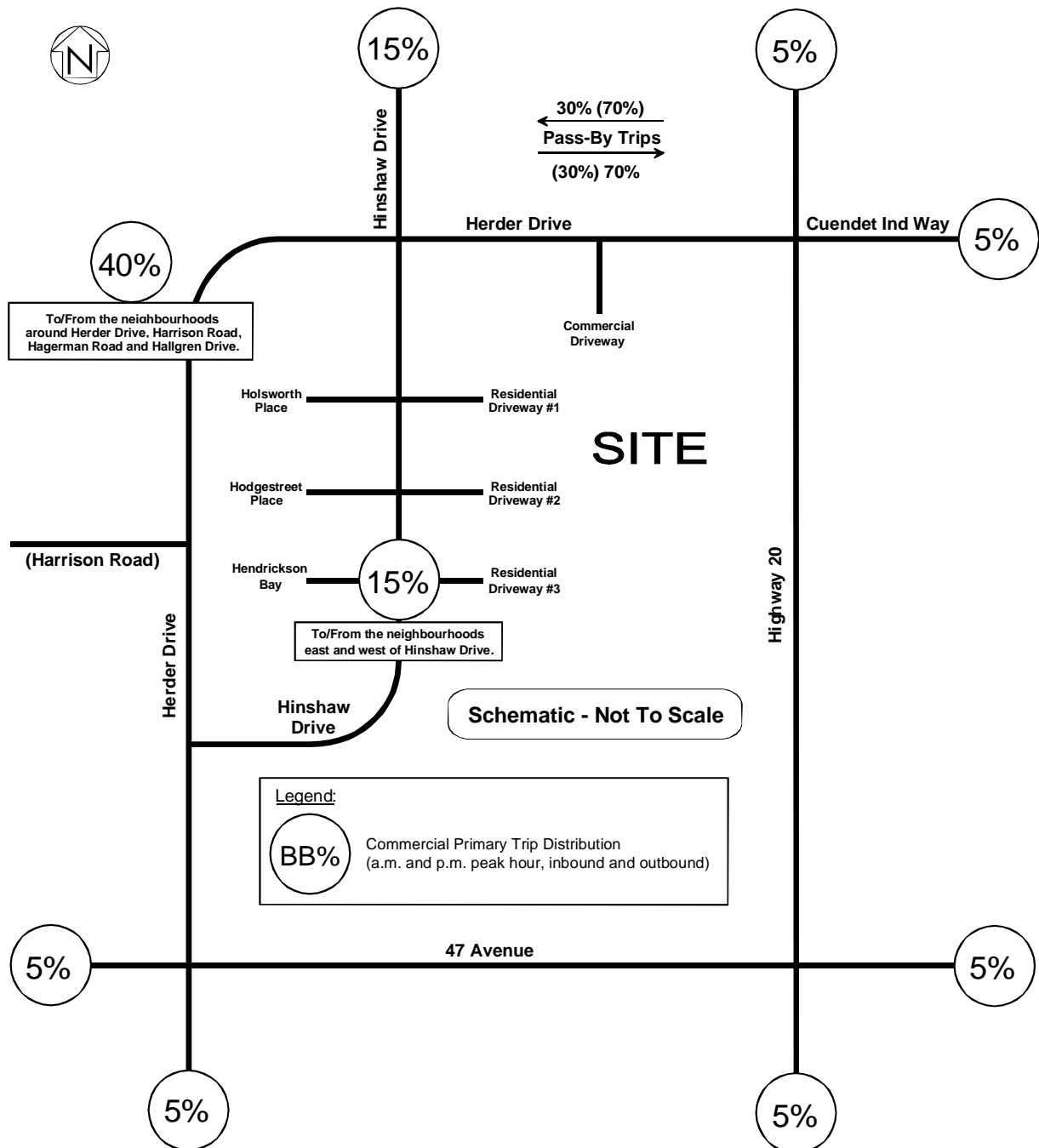
Trip distribution patterns for the **pass-by trips** generated by the **commercial** development were based on the relative traffic volumes on Herder Drive. DAW estimated that 70% of the pass-by trips will originate from the eastbound traffic movement on Herder Drive and 30% originate from the westbound traffic movement on Herder Drive in the morning peak hour. It was expected that the reverse pattern would hold true in the afternoon peak hour. The pass-by trip distribution patterns are also shown in **Figure 6**.

Based on the trip generation levels outlined in the previous section and the trip distribution patterns as discussed above, the proposed development's traffic was manually assigned to the area road network. The resulting trip assignment patterns are illustrated in **Figures 7, 8, 9 and 10**.

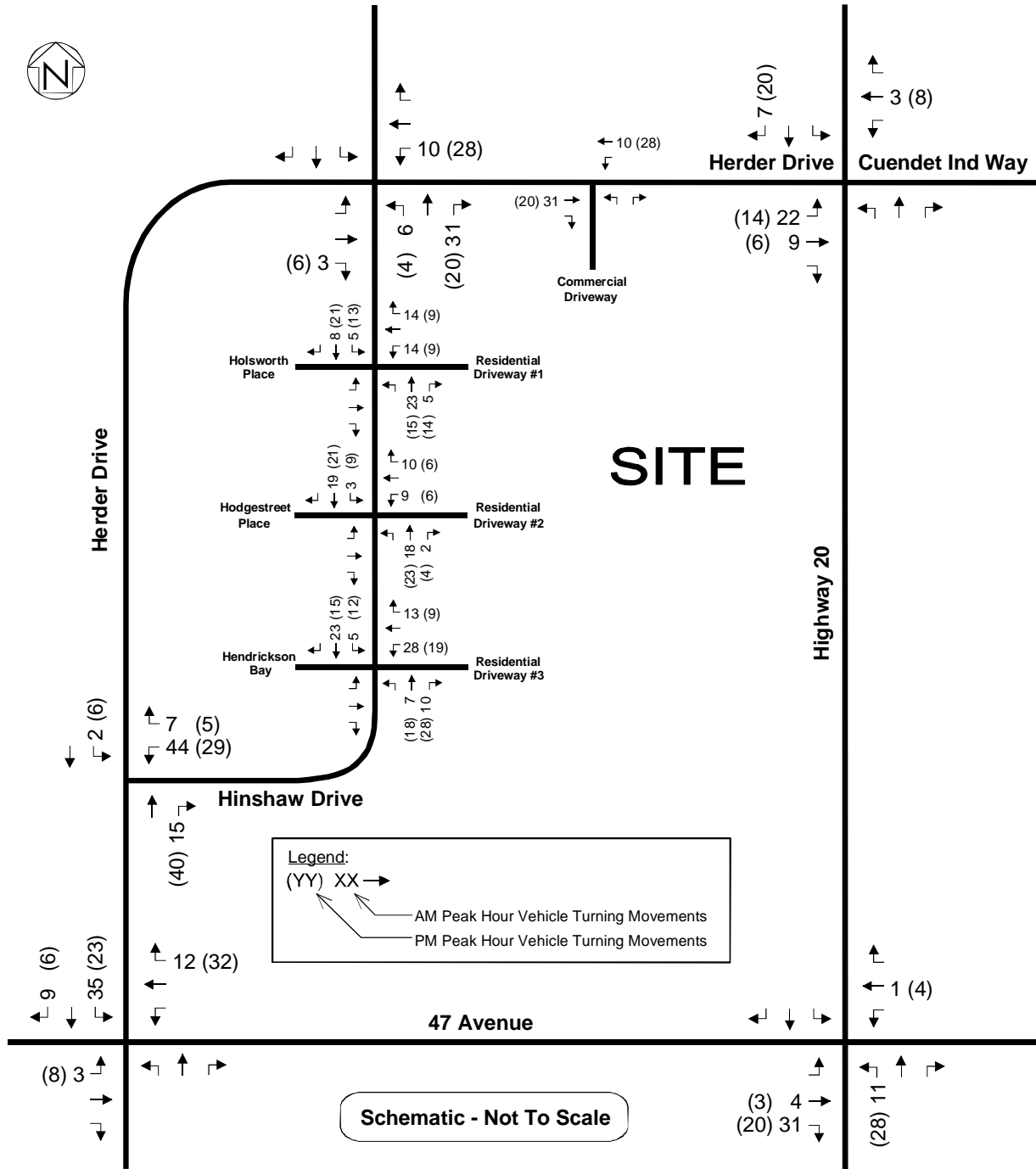


**FIGURE 5. RESIDENTIAL TRIP DISTRIBUTION**

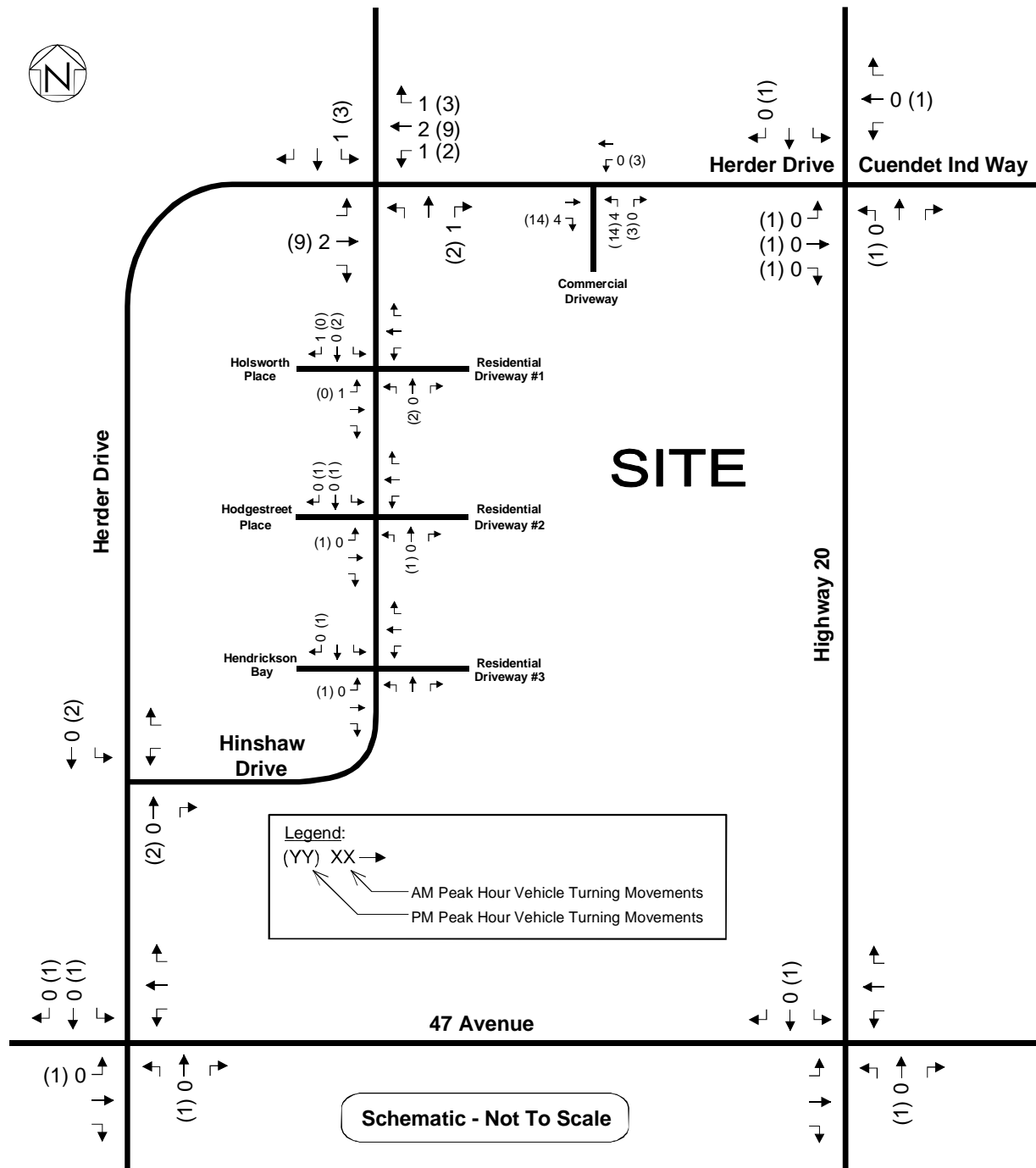




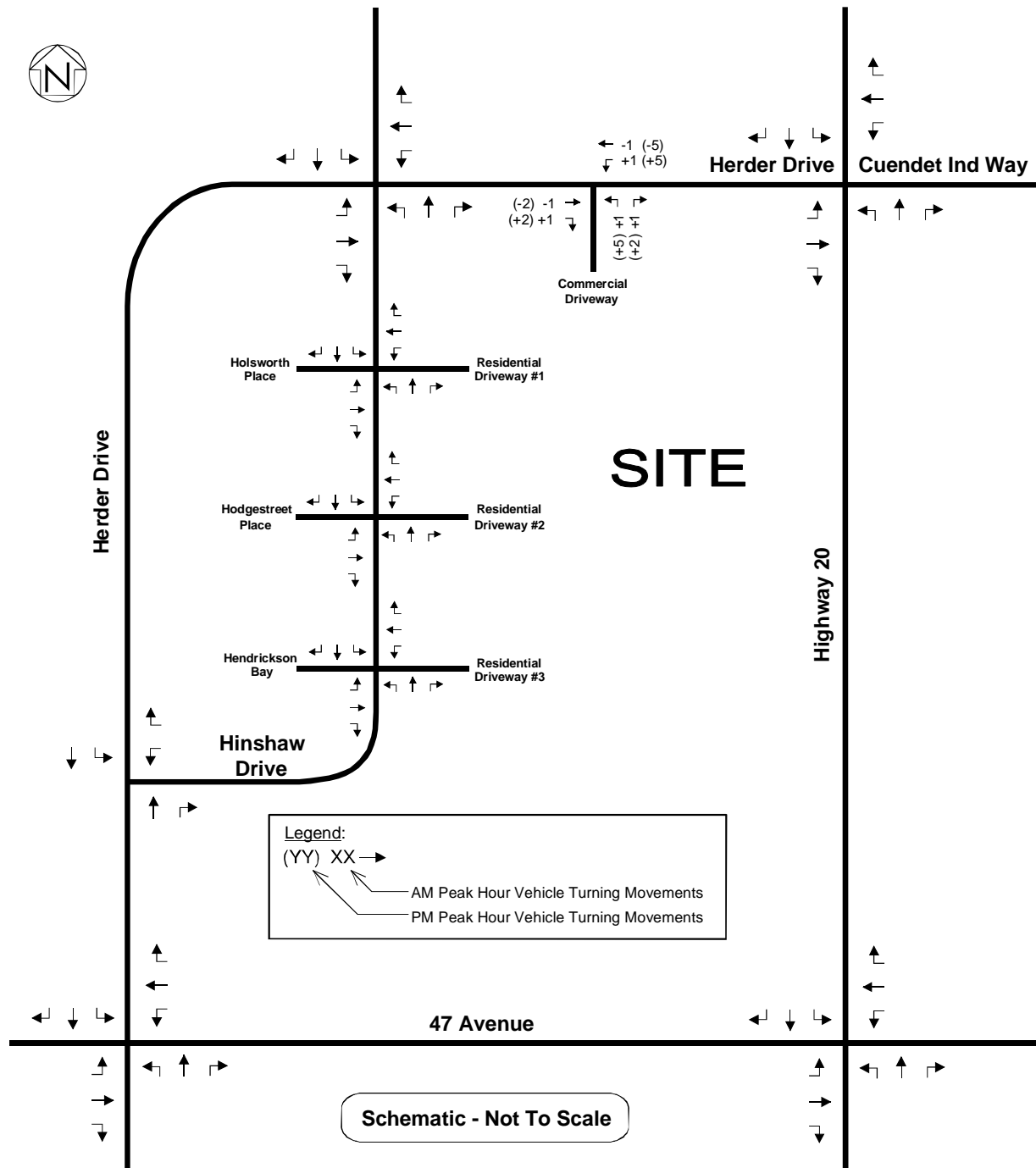
**FIGURE 6. COMMERCIAL TRIP DISTRIBUTION**



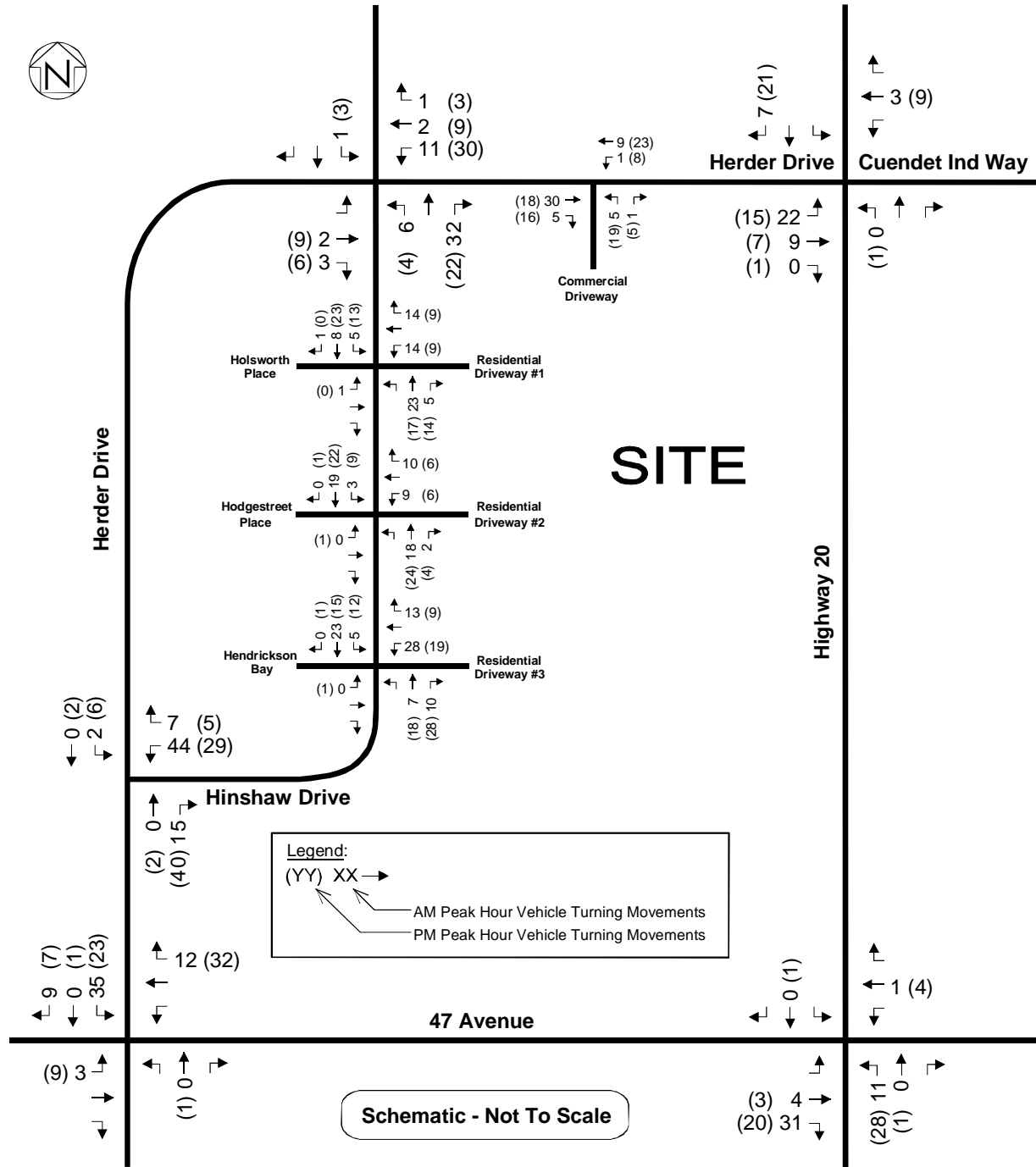
**FIGURE 7. RESIDENTIAL TRIP ASSIGNMENT**



**FIGURE 8. COMMERCIAL PRIMARY TRIP ASSIGNMENT**



**FIGURE 9. COMMERCIAL PASS-BY TRIP ASSIGNMENT**

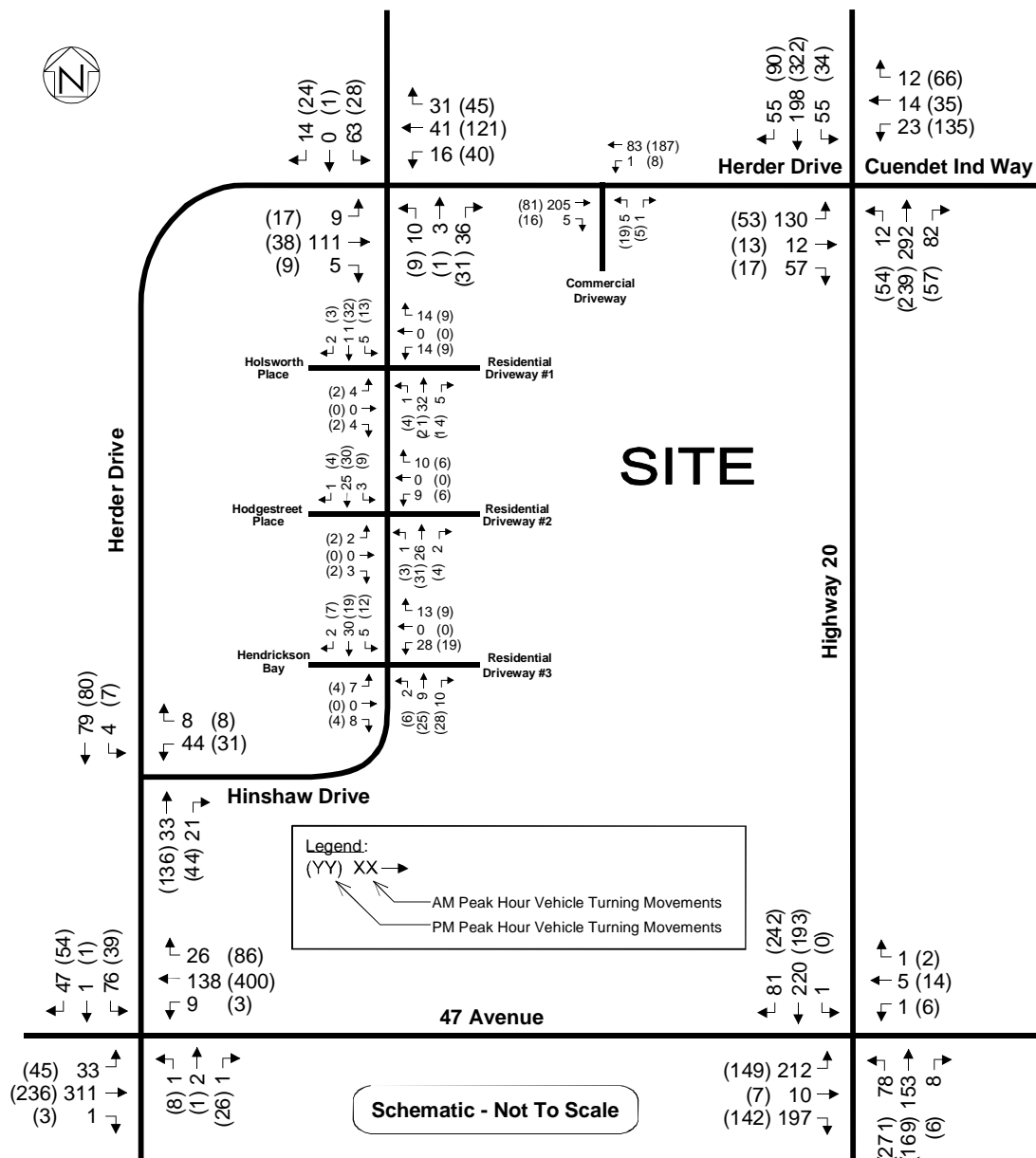


**FIGURE 10. TOTAL SITE-GENERATED TRAFFIC VOLUMES**

## 4.0 POST-DEVELOPMENT CONDITIONS

### 4.1 Post-Development Traffic Volumes and Operating Conditions

The site-generated traffic (Figure 10) was superimposed onto the 2007 existing traffic volumes (Figure 3) to obtain the post-development traffic volumes, as illustrated in **Figure 11**.



**FIGURE 11. POST-DEVELOPMENT TRAFFIC VOLUMES**

The post-development weekday peak hour traffic conditions were assessed in Synchro and the results are summarized in **Table 5** (following pages). The intersections were analyzed using the current lane arrangements and traffic controls.

The Synchro results indicate the following:

- The intersections of Herder Drive / Hinshaw Drive (north), Herder Drive / Hinshaw Drive (south) and 47 Avenue / Herder Drive are expected to operate satisfactorily following the development. The intersections are expected to operate at an overall LOS A with individual traffic movements operating between LOS A and C.
- The intersection of Highway 20 / Herder Drive is expected to operate at an overall intersection LOS A in the a.m. peak hour and LOS B in the p.m. peak hour. However, the eastbound left-turn/through movement might experience longer delays (LOS E) in the morning and afternoon peak hours, due to insufficient gaps available on the highway through traffic. Similar operational problem is also anticipated at the westbound left-turn/through movement in the afternoon peak hour (LOS F).
- The intersection of Highway 20 / 47 Avenue is expected to operate in good conditions during the a.m. peak hour. However, the eastbound left-turn/through movement will continue to experience significant delays in the p.m. peak hour (LOS F), and the westbound left-turn/through movement might experience longer delays (LOS E) as well.
- The new all-turns commercial driveway intersection on Herder Drive and the three residential driveway intersections on Hinshaw Drive are expected to operate satisfactorily. The intersections are expected to operate at an overall LOS A with individual traffic movements operating between LOS A and B. Therefore, we concluded that Hinshaw Drive would function satisfactorily as a two-lane local residential street.

Improvement options at the Highway 20 / Herder Drive and Highway 20 / 47 Avenue intersections are discussed in the next section.

**TABLE 5. POST-DEVELOPMENT OPERATING CONDITIONS**

INTERSECTION / MOVEMENT			AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (secs/veh)	LOS	Delay (secs/veh)
Highway 20 / Herder Drive (unsignalized)	EB	Left/Through	E	42.4	E	40.3
		Through/Right	B	11.4	B	13.9
	WB	Left/Through	C	22.8	F	55.3
		Through/Right	B	13.4	B	13.4
	NB	Left	A	8.0	A	8.5
		Through	A	0.0	A	0.0
		Right	A	0.0	A	0.0
	SB	Left	A	8.5	A	8.1
		Through/Right	A	0.0	A	0.0
	Intersection Summary		A	8.5	B	11.7
Herder Drive / Hinshaw Drive (north) (unsignalized)	EB	Left/Through/Right	A	0.6	A	2.1
	WB	Left/Through/Right	A	1.5	A	1.6
	NB	Left/Through/Right	B	10.3	A	9.7
	SB	Left/Through/Right	B	13.0	B	11.4
	Intersection Summary		A	5.0	A	4.1
Herder Drive / Hinshaw Drive (south) (unsignalized)	WB	Left/Right	A	9.7	B	10.3
	NB	Through/Right	A	0.0	A	0.0
	SB	Left/Through	A	0.4	A	0.7
	Intersection Summary		A	2.8	A	1.5
47 Avenue / Herder Drive (unsignalized)	EB	Left/Through	A	1.6	A	2.7
		Through/Right	A	0.0	A	0.0
	WB	Left/Through	A	1.0	A	0.1
		Through/Right	A	0.0	A	0.0
	NB	Left/Through/Right	B	14.7	B	11.5
	SB	Left/Through/Right	C	15.0	C	15.8
	Intersection Summary		A	3.6	A	2.6



INTERSECTION / MOVEMENT			AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (secs/veh)	LOS	Delay (secs/veh)
Highway 20 / 47 Avenue (unsignalized)	EB	Left/Through	D	30.8	F	103.0
		Through/Right	B	12.5	B	11.1
	WB	Left/Through	C	17.0	E	37.2
		Right	A	0.0	A	0.0
	NB	Left/Through	A	5.3	A	8.4
		Through	A	0.0	A	0.0
		Right	A	0.0	A	0.0
	SB	Left/Through	A	0.0	A	0.0
		Right	A	0.0	A	0.0
	Intersection Summary		B	10.4	C	17.4
Herder Drive / Commercial Driveway (unsignalized)	EB	Through/Right	A	0.0	A	0.0
	WB	Left/Through	A	0.1	A	0.4
	NB	Left/Right	B	10.8	B	10.3
	Intersection Summary		A	0.2	A	1.0
Hinshaw Drive / Residential Driveway #1 (unsignalized)	EB	Left/Through/Right	A	8.9	A	9.0
	WB	Left/Through/Right	A	9.0	A	9.0
	NB	Left/Through/Right	A	0.2	A	0.8
	SB	Left/Through/Right	A	2.1	A	2.0
	Intersection Summary		A	4.0	A	3.0
Hinshaw Drive / Residential Driveway #2 (unsignalized)	EB	Left/Through/Right	A	8.8	A	9.0
	WB	Left/Through/Right	A	8.9	A	9.0
	NB	Left/Through/Right	A	0.3	A	0.6
	SB	Left/Through/Right	A	0.8	A	1.6
	Intersection Summary		A	3.0	A	2.4
Hinshaw Drive / Residential Driveway #3 (unsignalized)	EB	Left/Through/Right	A	8.9	A	9.0
	WB	Left/Through/Right	A	9.2	A	9.3
	NB	Left/Through/Right	A	0.7	A	0.8
	SB	Left/Through/Right	A	1.0	A	2.4
	Intersection Summary		A	4.9	A	3.5

## 5.0 IMPROVEMENT OPTIONS

Based on the Synchro operational assessment, the side street movements at the Highway 20 / Herder Drive and Highway 20 / 47 Avenue intersections are expected to experience delay problems. In theory, the level of performance at the minor street approach could be improved by one of the following methods:

- Implement a 4-way stop control at the intersection.
- Install additional travel lanes at the intersection.
- Install traffic signals at the intersection.

The first option of implementing a 4-way stop control at the intersection is not feasible at the above locations. The two Highway 20 intersections contain multi-lane at each of the four approaches, and experience shows that a 4-way stop configuration does not function well for multi-lane approaches. Drivers will likely get confused about which vehicle should be the next to go through the intersection and this creates a safety hazard to the road users.

DAW evaluated the second option by adding extra travel lanes on Highway 20 and the side streets (without modifying the existing traffic controls) in Synchro. It was found that the additional lane improvement only brings marginal benefit to the problematic traffic movements and does not entirely resolve the delay issues.

The third option of installing traffic signals at the intersections was tested in Synchro. **Table 6** summarizes the results of this improvement. The intersections were analyzed with the current lane arrangements. The Synchro signalization assessment indicates the following:

- The intersection of Highway 20 / Herder Drive would operate at an overall intersection LOS A in both a.m. and p.m. peak hours. The individual traffic movements would operate between LOS A and B.
- The intersection of Highway 20 / 47 Avenue would operate at an overall intersection LOS A in both a.m. and p.m. peak hours. The individual traffic movements would operate between LOS A and B.

**TABLE 6. POST-DEVELOPMENT OPERATING CONDITIONS WITH TRAFFIC SIGNALS**

INTERSECTION / MOVEMENT			AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (secs/veh)	LOS	Delay (secs/veh)
Highway 20 / Herder Drive (Signalized)	EB	Left/Through/Right	A	9.4	A	9.9
	WB	Left/Through/Right	A	9.1	B	10.3
	NB	Left	A	5.0	A	6.8
		Through	A	6.4	A	6.2
		Right	A	1.8	A	2.0
	SB	Left	A	5.9	A	5.4
		Through/Right	A	5.6	A	7.0
	Intersection Summary		A	6.5	A	7.5
Highway 20 / 47 Avenue (Signalized)	EB	Left/Through/Right	A	8.7	B	11.4
	WB	Left/Through	A	9.7	B	15.3
		Right	A	8.0	B	11.5
	NB	Left/Through	A	6.9	A	5.7
		Right	A	4.2	A	3.0
	SB	Left/Through	A	8.2	A	5.1
		Right	A	2.6	A	1.5
	Intersection Summary		A	7.6	A	6.4

The Synchro results support the need for traffic signals at the Highway 20 intersections. However, it remains to be determined if the highway intersections meet the Transportation Association of Canada (TAC)<sup>4</sup> warrant for a traffic signal. The TAC traffic signal warrant system considers factors such as vehicular volumes, pedestrian volumes, speed limit on the main street, number of lanes that the pedestrians have to cross, distance to an adjacent signalized intersection and proximity to school sites or seniors complexes. The warrant system states that a signal is warranted when the calculated warrant point value is **100** or greater.

DAW conducted the TAC traffic signal warrant analysis for the Highway 20 intersections and the results of this assessment are shown in **Table 7**. The input parameters for the warrant calculations are included in **Appendix C**.

<sup>4</sup> Transportation Association of Canada, Canadian Traffic Signal Warrant Procedure, February 2003.

**TABLE 7. TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY**

Intersection	Scenario	Warrant Point	Signal Warranted?
Highway 20 / Herder Drive	Existing	57/100	NO
	Post-Development	62/100	NO
Highway 20 / 47 Avenue	Existing	152/100	YES
	Post-Development	170/100	YES

The warrant analysis shows that traffic signals are not warranted at the intersection of Highway 20 / Herder Drive under both existing and post-development scenarios. DAW recommends that the Town of Sylvan Lake monitor this intersection periodically in the future, especially when other new developments to the southeast of this intersection are being built, and consider signalization of the intersection when the traffic signal warrant calculation results in 100 points or greater.

On the contrary, the TAC warrant analysis shows that traffic signals are warranted at the intersection of Highway 20 / 47 Avenue under both existing and post-development scenarios. As a result, DAW recommends that traffic signals should be installed immediately at this intersection to alleviate the existing delay problems on the side street movements. It should be noted that traffic signals are required based on existing conditions, regardless of whether the proposed development will occur in the future or not.

Through discussions with the Director of Operations of Sylvan Lake, the intersection of Highway 20 / 47 Avenue is planned to have traffic signals installed this year, if the Town gets through the design and approval process in time for this construction season. The intersection of Highway 20 / Herder Drive will also have traffic signals at a later time; it is expected that a set of pedestrian signals would be installed first, follow by the full set of traffic lights later. It has also been stated that the intersection of 47 Avenue / Herder Drive will be signalized in the longer-term. The Town of Sylvan Lake requires the developers to contribute towards the cost of signalization at these intersections, and the charges are likely going to be assessed based on the development area.

## **APPENDIX A: SCOPE OF WORK CONFIRMATION**

## **APPENDIX B: SYNCHRO SOFTWARE OUTPUTS**

### **Existing Operating Conditions – AM Peak Hour**

1. Highway 20 / Herder Drive
2. Herder Drive / Hinshaw Drive (north)
3. Herder Drive / Hinshaw Drive (south)
4. 47 Avenue / Herder Drive
5. Highway 20 / 47 Avenue

### **Existing Operating Conditions – PM Peak Hour**

6. Highway 20 / Herder Drive
7. Herder Drive / Hinshaw Drive (north)
8. Herder Drive / Hinshaw Drive (south)
9. 47 Avenue / Herder Drive
10. Highway 20 / 47 Avenue

### **Post-Development Operating Conditions – AM Peak Hour**

11. Highway 20 / Herder Drive
12. Herder Drive / Hinshaw Drive (north)
13. Herder Drive / Hinshaw Drive (south)
14. 47 Avenue / Herder Drive
15. Highway 20 / 47 Avenue
16. Herder Drive / Commercial Driveway
17. Hinshaw Drive / Residential Driveway #1
18. Hinshaw Drive / Residential Driveway #2
19. Hinshaw Drive / Residential Driveway #3

### **Post-Development Operating Conditions – PM Peak Hour**

20. Highway 20 / Herder Drive
21. Herder Drive / Hinshaw Drive (north)
22. Herder Drive / Hinshaw Drive (south)
23. 47 Avenue / Herder Drive
24. Highway 20 / 47 Avenue
25. Herder Drive / Commercial Driveway
26. Hinshaw Drive / Residential Driveway #1
27. Hinshaw Drive / Residential Driveway #2
28. Hinshaw Drive / Residential Driveway #3

### **Post-Development Operating Conditions WITH TRAFFIC SIGNALS**

29. Highway 20 / Herder Drive (AM Peak Hour)
30. Highway 20 / 47 Avenue (AM Peak Hour)
31. Highway 20 / Herder Drive (PM Peak Hour)
32. Highway 20 / 47 Avenue (PM Peak Hour)

## **APPENDIX C: TRAFFIC SIGNAL WARRANT CALCULATIONS**

1. Highway 20 / Herder Drive – Existing Scenario
2. Highway 20 / Herder Drive – Post-Development Scenario
3. Highway 20 / 47 Avenue – Existing Scenario
4. Highway 20 / 47 Avenue – Post-Development Scenario