Stayner and Area Transportation Plan Township of Clearview

Prepared by

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Canada

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File No: MCG 16235

1.0 Executive Summary

This study has been prepared to provide a transportation plan for Stayner and area, as background to ongoing planning work to update the Official Plan and the Development Charges By-Law within the Township of Clearview. The focus of this study is the road system and pedestrian/trail system. Consideration of regional transportation initiatives (e.g. improved bus service, rail service or car pool lots) are beyond the scope of this present study.

Projects identified within this Plan may be implemented through the completion of a subsequent Class Environmental Assessment, as required.

1.1 Forecasted Growth and Traffic Considerations

This transportation plan responds to Provincial and County growth allocations, which forecasts a population increase of 11,400 persons and job increases of 1,400 jobs, within Clearview Township, between 2006 and 2031. The Township has prepared a draft growth plan for Stayner which responds to these growth allocations, and which forms the basis for this transportation plan. The Township has estimated that there are presently about 2,276 residential units in various stages of approvals and have forecasted that Stayner may grow by 2631 units by build-out (beyond year 2029). Significant growth is also forecasted for Collingwood, Wasaga Beach and the Town of the Blue Mountains.

Traffic congestion continues to increase in Stayner and along roadways in proximity to Stayner, due to ongoing growth as well as to significant recreational through traffic, especially during the summer and on weekends. This congestion also adversely impacts the reliability of goods movement through this area. Significant volumes of truck traffic also occur on the connecting link and as a result of the gravel pit and quarry operations to the west.

For the purposes of assessing the operations along the arterial roads in the study area, traffic growth rates of 5% per year to 2016 and 3% per year thereafter, have been assumed, consistent with previous studies in this area. For the purposes of assessing the operations along collector roads in the study area, traffic forecasts have been based on trip generation from the proposed growth areas, using standard trip generation rates.

1.2 Related Constraints and Opportunities

While traffic considerations form the primary focus of this transportation plan, various other factors have been identified that may impact this planning work, including the following:

- Proposed land developments within Stayner. Projects will be partially funded through development charges, where applicable.

- The opportunities and constraints associated with the natural heritage resources in the study area. Protection of wildlife corridors, wetlands and runoff quality have been identified.

- Coordination with roadworks proposed in the broader study area, by the Province or the County. The County plans to assume jurisdiction of 27/28 Sideroad, as part of a new east/west County road corridor through the Georgian Triangle. In the short term an alternate route to Highway 26 will be provided around Stayner, via County Road 7 and 27/28 Sideroad. Long term plans are anticipated, by the Ministry of Transportation (MTO), for a Highway 26 bypass around Stayner, however such plans are beyond the timeframe considered in this present study. In the interim, the MTO is proceeding with plans to widen Highway 26, between Collingwood and Wasaga Beach and is expected to widen the highway to the north of Stayner, once traffic conditions warrant such improvements.

- Coordination with other infrastructure servicing work. Locations of major sewer and water works have been identified.

1.3 Arterial Roads

The existing arterial roads in the Stayner area were reviewed and improvement needs were identified.

The arterial roads serving the Stayner area are presently functioning adequately, although congested conditions occur during summer peak periods through the core area. The County has resurfaced County Road 7 recently and the Township is in the process of upgrading the structural adequacy of 27/28 Sideroad. Together, these improvements provide an interim alternate route around Stayner, thereby relieving some of the congestion through the core area. Even with this relief, it is forecasted that the peak period traffic volumes in the core area will be over their theoretical capacity by year 2018, and that Highway 26 will be at capacity to the north and east of Stayner by year 2028. Further improvements to the core area are not physically possible, and therefore optimization of the alternate route is recommended in the short and medium term. In the long term, improvements to the County arterial road system and the Provincial highway system, as noted previously, will assist in addressing this congestion.

The improvement requirements identified along the major arterial road intersections are summarized in the following table.

Table (i) - Summary of Improvement Requirements at Primary Arterial Road Intersections (MTO and County Jurisdictions)

Intersection (Jurisdiction)	Improvement	Cost Estimate	Timeframe For Improvement
Highway 26 / CR 42 / CR 91 (Clearview, MTO connecting link)	No improvements required within study period.	N/A	N/A
Highway 26 / 27/28 Sideroad (MTO)	Signalization, plus add left turn lane on all approaches	$500,000	2011
	Add second southbound left turn lane.	$150,000	2018 to 2028
Highway 26 / CR 7 (MTO)	Signalization plus additional storage for turning lanes	$300,000	2010
	Add second southbound left turn lane.	$150,000	2018 to 2028
CR7 / Sideroad 27/28 (County of Simcoe)	Add northbound left turn lane, plus undergrounds for future signalization.	$150,000	2009
	Signalization plus add eastbound right turn lane.	$250,000	2016

1.4 Collector Road Considerations

The existing, and proposed, collector roads in the Stayner area were reviewed, and improvement needs were identified. Planning criteria, traffic thresholds and cross section requirements were recommended for collector roads. Traffic forecasts were made for existing, and proposed, collector roads to confirm improvement requirements and the functional designation.

The improvement requirements identified along the collector roads in the study area are summarized in the following tables.

Table (ii) - Short Term (0 – 10 years) Road Improvements

Road	Location	Type of Improvement	Cost	Property
Industrial Road	County Road 42 to County Road 91 (part of route)	Reconstruct 400 metres of existing road.	$ 540,000	$12,500
		500 metres of new road.	$ 750,000	dedication
Margaret Street	County Road 42 to Warrington Road	Reconstruct 520 metres of existing road.	$702,000	27,500
		860 metres of new road.	$1,290,000	dedication
Industrial Road/Regina Street	County Road 91 to Regina Street	650 metres of new road.	$975,000	dedication
		Bridge Crossing	$486,000	dedication
North Street	Highway 26 to Stayner Street	Reconstruct 380 metres of existing road.	$513,000	$33,750
Locke Avenue	Highway 26 to Scott Street	Reconstruct 620 metres of existing road.	$837,000	
Scott Street	Highway 26 to Locke Avenue	Reconstruct 750 metres of existing road.	$1,012,500	$16,250
Mowat Street	Highway 26 to north limit of development	Reconstruct 920 metres of existing road.	$1,242,000	$87,500
North/South Collector Road	Dancor Development	620 metres of new road.	$930,000	dedication
East/West Collector Road	Dancor Development	1325 metres of new road.	$1,987,500	dedication
Warrington Road	Margaret Street Extension to Superior Street	Reconstruct 500 metres of existing road.	$675,000	
Collector Road	Emerald Creek Subdivision	600 metres of new road	$900,000	dedication

Table (iii) - Medium Term (10 – 20 years) Road Improvements

Road	Location	Type of Improvement	Cost	Property
Sunnidale Street	Cherry Street to Centre Line Road	Reconstruct 1450 metres of existing road.	$1,957,500	
North/South Collector Road	Greenfield development to north of Dancor lands.	320 metres of new road.	$480,000	dedication
Cherry Street	Sunnidale Street to Highway 26	Reconstruct 400 metres of existing road.	$540,000	

Table (iv) - Long Term (20 + years) Road Improvements

Road	Location	Type of Improvement	Cost	Property
Industrial Road	Industrial lands	850 metres of new road (through industrial lands)	$1,275,000	dedication
Industrial Road	Regina Street to 27/28 Sideroad	1450 metres of new road (through long term planning area)	$2,175,000	dedication
N/S Collector Road	North Street to Industrial Road	1200 metres of new road (through long term planning area)	$1,800,000	dedication
N/S Collector Road	Limit of development to 27/28 Sideroad	900 metres of new road.	$1,350,000	dedication
Mowat Street	Limit of development to 27/28 Sideroad	Reconstruct 900 metres of existing road.	$1,215,000	$112,500

1.5 Traffic Signal Plan

Traffic signal requirements in the Stayner Area were reviewed, and improvement needs were identified. It is recommended that traffic monitoring continue at the identified intersections, and that traffic signals be installed when actual signal warrant requirements are met, as verified by eight-hour traffic counts.

The forecasted traffic signal requirements in the study area are summarized in the following table.

Table (v) - Traffic Signal Plan

Intersection	Horizon Period	Cost Estimate	Justification / Comments
Highway 26 / County Road 42 / County Road 91	Existing	N/A	Acceptable operations beyond year 2028.
Highway 26 / Perry Street	Existing	N/A	Allows for pedestrian crossing in commercial core. Allows diversion of traffic from Oak Street and Huron Street during congested periods.
Highway 26 / County Road 7	2009 – 2018	$300,000 plus possible future $150,000 for second left turn lane	Increased traffic due to growth and to improvements along the alternate route around Stayner. It is forecasted that signal warrants may be met by 2010. Intersection is under MTO jurisdiction.
Highway 26 / 27/28 Sideroad	2009 – 2018	$500,000 plus possible future $150,000 for second left turn lane	Increased traffic due to growth and to improvements along the alternate route around Stayner. It is forecasted that signals warrants may be met by 2011. Intersection is under MTO jurisdiction.
Highway 26 / Sobey's Access / Highschool Access	2009 – 2018	$250,000	To facilitate operations at a commercial / institutional access.
County Road 7 / 27/28 Sideroad	2009 – 2018	$400,000	Increased traffic due to growth and to improvements along the alternate route around Stayner. It is forecasted that signal warrants may be met by 2016. Intersection is under County jurisdiction.

Highway 26 / Proposed Dancor Collector Road	2009 – 2018	$350,000	To facilitate traffic operations from residential/commercial development (Dancor) and access to an emergency services hub. Signal warrants are likely to be met. Intersection is under MTO jurisdiction.
Highway 26 Proposed Emerald Creek Subdivision Collector Road.	2009-2018	$300,000	To facilitate traffic operations from residential/commercial development, (Emerald Creek Subdivision). Signal warrants are likely to be met. Intersection is under MTO jurisdiction.
Margaret Street / Warrington Road	2009 – 2018	$350,000	Extension of Margaret Street will require interconnection of railway signals/gates with signalized intersection operations, due to proximity of the railway to the intersection.
Highway 26 / Mowat Street / Superior Street	2019 – 2028	$300,000	To facilitate traffic from residential growth in the northeast quadrant. Signal warrants are likely to be met.
County Road 42 / Margaret Street / Industrial Access	2019 – 2028	$300,000	To facilitate traffic operations from residential development (Margaret Street Subdivision) and industrial access. Signal warrants may be met within horizon period. Intersection is under County jurisdiction.
Highway 26 / North Street	After 2028	$300,000	To facilitate traffic operations from development in the long term planning area in the northwest quadrant.
County Road 91/Industrial Road	After 2028	$300,000	To facilitate development is the northwest and southwest quadrants.

It is forecasted that the number of signals along the Highway 26 corridor, including the connecting link, will increase from the existing two signals to eight signals by 2028. It is recommended that these traffic signals be coordinated along this corridor. Traffic signals will also be required to facilitate the alternate route around Stayner (i.e. 27/28 Sideroad and County Road 7), for connections to County Roads and to facilitate the railway crossing at Margaret Street / Warrington Road.

1.6 Coordination of Infrastructure Projects

The ongoing rehabilitation needs for the existing Township roads have been previously identified in the Township's Road Needs Study (2006). It is recommended that these works be coordinated with the road requirements identified in this transportation plan.

Preliminary plans have been identified for expansion to the water and sanitary infrastructure in Stayner. It is recommended that any expansions to the transportation infrastructure be coordinated with other major servicing works in the study area, where possible.

1.7 Master Plan For Sidewalks and Trails

Sidewalk and trail requirements in the Stayner area were reviewed, and improvement needs were identified for the primary connections.

It is recommended that approximately 5,680 metres of sidewalk ($596,400 cost estimate) be added to the existing sidewalk system to address primary connection deficiencies in the existing built-up area. In addition, approximately 4,390 metres of sidewalk ($460,950 cost estimate) are proposed to be added to connect developing areas.

Preferred locations for a trail system have been identified, including a central trail along the railway and a perimeter trail adjacent to the area of development. These potential locations are conceptual only at this time however, it is recommended that these routes continue to be developed, as budgets allow and as coordination opportunities arise.

Consideration has been given to the opportunities and constraints associated with the integration of bicycle facilities into the Township's transportation infrastructure. Options are provided for modifying the street cross sections to accommodate such facilities.

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Appendices

2.0 Introduction

2.1 Purpose

The Township of Clearview is developing a new Official Plan, as well as completing an update to their Development Charges Bylaw. Preparation of these documents is guided by various background studies related to issues such as growth, land use, services and transportation. This study responds to council's request to formulate a Transportation Plan for the Stayner area, as a component to the broader studies referred to above.

For the purposes of assessing the transportation system in the Stayner area, the study area has been divided into four quadrants as follows:

- Southwest Quadrant – west of County Road 42 and south of County Road 91;
- Southeast Quadrant – east of County Road 42 and south of Highway 26;
- Northwest Quadrant – west of Highway 26 and north of County Road 91;
- Northeast Quadrant – east of Highway 26 and north of Highway 26.

The quadrants chosen are centered on the intersection of the main arterial roads servicing the Stayner area (i.e. Highway 26 / County Road 42 / County Road 91).

3.0 Background

3.1 Previous Studies

The following background studies have been reviewed in the completion of this Transportation Plan:

- Township of Clearview Land Budget 2009; Township of Clearview, February 2009
- The Provincial Growth Plan for the Greater Golden Horseshoe; Province of Ontario, 2006
- County of Simcoe Master Transportation Plan; Earth Tech, July 2008
- County of Simcoe Official Plan; as approved by County Council in November 2008
- Simcoe Area Growth Plan; Hemson Consulting, May 2008

- Georgian Triangle Area Transportation Paper; R. J. Burnside & Associates Limited, January 2008

- Township of Clearview Engineering Standards; October 2007

- Township of Clearview 2006 Road Needs Study; R. J. Burnside & Associates Limited, 2006

- Clearview Township Sidewalk Assessment; Envision Tatham, May 2007

- Township of Clearview Stayner Servicing Plan; R. J. Burnside & Associates Limited, May 2003

- Township of Clearview – Stayner, Highway 26 At Airport Road Traffic Study; Ainley Group, September 2000

- Township of Clearview Development Charges Background Study; Meridian Planning Consultants, November 2004

- Development of a Natural Heritage System For The County of Simcoe; Gartner Lee, June 1996

- Various traffic impact studies for developments within the Stayner area.

3.2 Official Plan and Growth Studies

The Township of Clearview is presently updating their Official Plan, partly to implement a number of new provincial policy directions regarding long-range planning and growth management in Ontario. The new provincial policy initiatives include the following:

- The Provincial Growth Plan for the Greater Golden Horseshoe (2006);
- Amendments to the Planning Act, collectively referred to as Bill 51.

For the Simcoe County Area (including Simcoe County, Barrie, Orillia and First Nations) the Provincial Growth Plan has allocated a total population of 667,000 people and 254,000 jobs by 2031. The updated Official Plan for the County (as approved by County council in November 2008), forecasts population in Clearview to grow from 14,600 persons (2006) to 26,000 persons (2031) and employment to grow from 4400 jobs (2006) to 5800 jobs (2031). On a County basis, this forecast maintains the level of activity that has been occurring in these areas over the past twenty years, even though this allocation is lower than many other expectations of future growth in the Simcoe County Area. However, under the Bill 51 Planning Act amendments, municipalities in the Simcoe County Area will no longer be required to

respond to development applications to expand urban boundaries or change land use designations as they have in the past.

The Provincial Growth Plan also directs development to settlement areas and sets specific intensification and density targets that are to be achieved. The County of Simcoe has implemented a new Official Plan that further refines the Provincial targets as they apply to various areas within the County. The growth allocation for Clearview is slightly more than twice the historic rate of growth for the Township, although it may be perceived to be higher due to the focusing of growth in the settlement areas. The update of the Township of Clearview's Official Plan is intended to be in conformity with the County's targets.

The Township has created a Draft Growth Plan for the Stayner area, as shown in Figure 1. In addition to the constraints imposed by the growth targets/densities, the Township's Draft Growth Plan provides a logical expansion of the existing settlement, while protecting agricultural lands and reducing the potential for sprawl. The transportation plan presented in this report is based on this Draft Growth Plan.

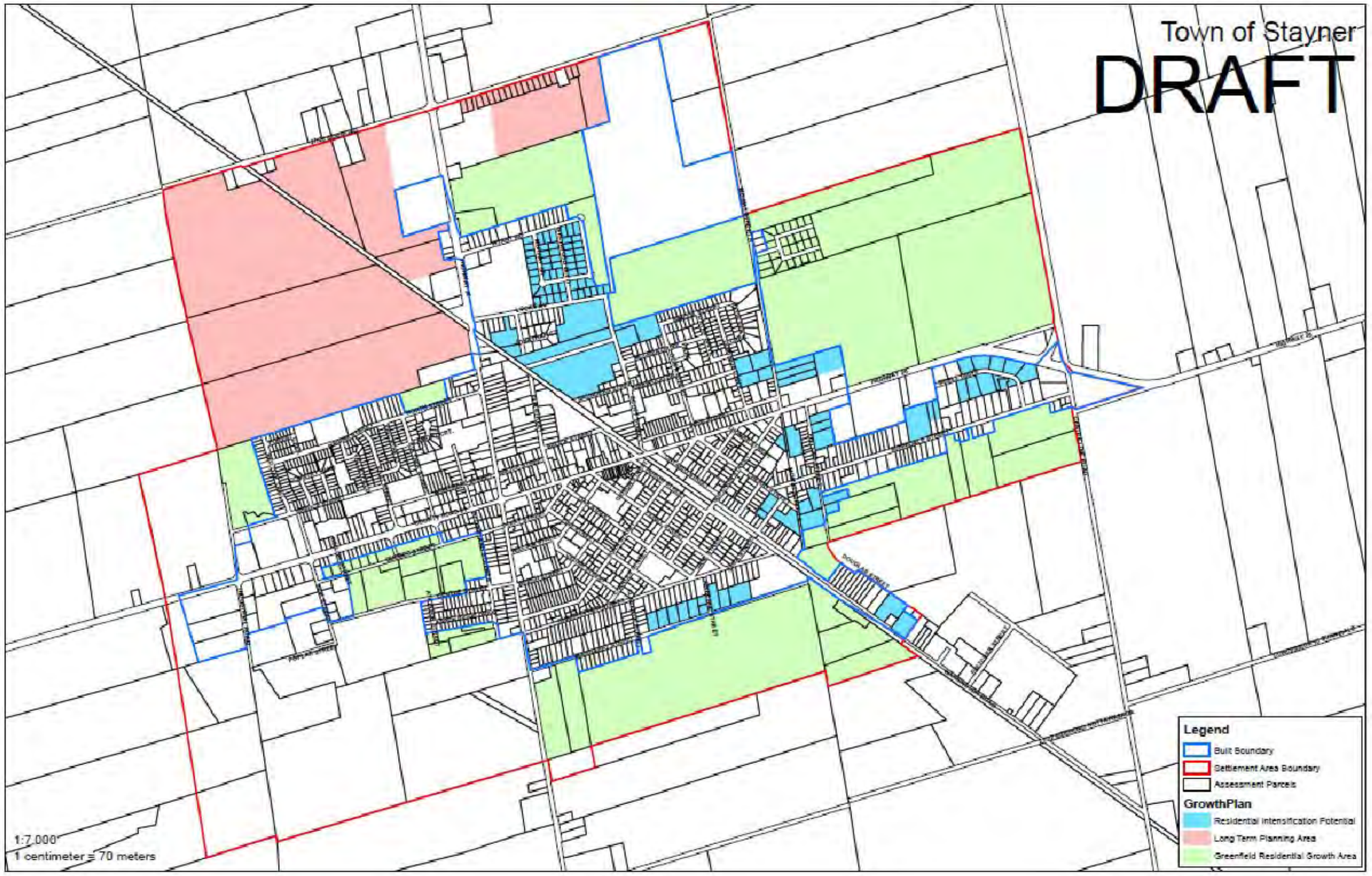
3.3 Development Charges

Development Charges for roadworks are typically based on the identification of road improvements required to accommodate growth, cost estimates and cost sharing associated with such improvements, as well as an estimate of the timeframe for the completion of such works.

The Township is presently completing a study to update their Development Charges. The present Development Charges were based on a background study completed in 2004 (Development Charges Background Study; Merridian Planning, November, 2004). Road improvement requirements were based on the Township's Road Management Plan (2002). Costs were assigned between new development and existing development, for various components (roads, buildings, vehicles), depending on benefits derived. Population forecasts were based on an assessment of historic population trends, building permits etc. It is expected that the updated development charge study will take into account the new growth targets and the transportation plan set out in this present study. Forecasts will be updated every five years to confirm development assumptions.

3.4 Class Environmental Assessment

Road projects are approved under the Class Environmental Assessment (Class EA) process (Municipal Engineers Association, June 2007, updated September 2007).



Source: Township of Clearview, February 2009

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

DRAFT GROWTH PLAN FOR STAYNER

BURNSIDE
R.J. Burnside & Associates Limited
3 Ronell Crescent, Collingwood, Ontario L9Y 4J6
telephone (705) 446-0515 **fax** (705) 446-2399

Drawn By	Checked By	Figure
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If a transportation planning study is conducted under the Class EA process, the result is a Master Plan. A Master Plan completes the initial stages of the Class EA (i.e. Phase 1 and Phase 2, often referred to as the need and justification) by considering the overall transportation problems and possible solutions. While this study has considered environmental factors, it has not been completed under the Class EA process. Therefore, additional investigation and evaluation, to the level of detail required by the Class EA process, will be required to implement any major projects identified. Where applicable (i.e. Schedule C projects), projects may also be required to complete Phases 3 and 4 of the Class EA process (i.e. consideration of alternative designs and posting of an Environmental Study Report) in order to obtain approval for implementation. Projects that are subsequently completed as part of a Plan of Subdivision, are required to meet the intent of the Class EA process, however they can follow the provisions of the Planning Act as they apply to public notification and appeal provisions.

3.5 Planning Context

Development within Clearview is to be directed to its four main settlement areas (i.e. Stayner, Creemore, New Lowell and Nottawa), with the primary focus for growth being in Stayner.

The number of residential units in Stayner is expected to grow by 2631 units by build-out (beyond year 2029). Significant growth is also forecasted for Collingwood, Wasaga Beach and the Town of the Blue Mountains. In addition, these recreation communities have dramatically increased the travel demands on weekends in this area, particularly during the summer months. It is estimated that key corridors experience traffic increases of between 20% to 30% in summer months, as compared to their annual average daily traffic (AADT). For example, Wasaga Beach attracts up to 100,000 visitors per day in the summer, and 2 million visitors annually.

It is estimated that person trips originating within the County of Simcoe will increase by 63% by horizon year 2031 (County of Simcoe Transportation Master Plan, 2008). However, through concerted efforts to increase public transit usage, the overall increases in car trips are forecasted to be somewhat lower than this value (i.e. 40%). The impacts on key transportation corridors will be significantly higher than these growth rates reflect, due to the concentration of growth in settlement areas and the high percentages of traffic travelling to, or through, the County.

In addition to the immediate Stayner area, significant commercial growth has occurred along County Road 7 in Wasaga Beach, and such growth is anticipated to continue in this area.

A major issue in the Stayner area is the volume of through traffic using County and municipal roads, in lieu of using Highway 26 during congested periods. These

congested conditions are exacerbated during the summer and winter months, especially on Friday and Sunday nights, by recreational traffic in this area. The County and municipal roads in this area have not been designed to accommodate these heavier traffic volumes.

The Stayner area also experiences a significant volume of truck traffic along its arterial roads, due to the Highway 26 connecting link and due to the number of large gravel pit and quarry operations that exist on the west edge of Clearview Township. In this respect all County roads and Provincial roads qualify as truck routes, although they may have load restrictions in March and April.

3.6 Natural Heritage Considerations

The planning of improvements to the transportation system have also taken into account the opportunities and constraints imposed by the natural heritage system that exists in the study area.

Lamont Creek and McIntyre Creek emerge on the Simcoe Lowlands, southeast and southwest of Stayner. Rich agricultural lands dominate their landscape. Lamont Creek flows through Stayner and joins McIntyre Creek within the Wasaga Sands golf course, before discharging to the Lower Nottawasaga River, east of Sunnidale Road. Information pertaining to the health of these subwatersheds is contained in **Appendix A**, along with mapping delineating areas that are subject to permit control under Ontario Regulation 172/06 (Regulation For Development, Interference With Wetlands, And Alterations To Shorelines and Watercourses). Permit approval will be required to implement improvements to the transportation system in the Stayner area, and mitigation measures will be necessary to safeguard the natural heritage resources in this area, including the following:

- Maintenance of natural heritage corridors, that have been identified along the forested areas within the study area (see **Appendix A**). The Township's Official Plan has also designated an area, along MacIntyre Creek, as Greenland – Natural Heritage Area, however this area is beyond the area directly impacted by this transportation plan.

- Maintenance of the quality of stormwater runoff into the tributary streams. Lamont Creek receives urban inputs through Stayner, that result in elevated nutrient loading and bacteria levels, contributing to poor stream health. The stream health of McIntyre Creek improves as it enters a deep valley, which intercepts groundwater springs and seeps.

- Minimization of impacts to wetlands. Wetlands have been identified in the northwest and southwest quadrants of the study area, although they are not considered to be locally or provincially significant. A small area of provincially significant wetland (Stayner Wetland Complex) does occur to the south of the

study area, adjacent to 21/22 Sideroad and southward. This provincially significant wetland is designated as Greenland – Wetland Area in the Township's Official Plan (see **Appendix B**), but is beyond the area directly impacted by this transportation plan.

A previous study (Development of a Natural Heritage System For The County of Simcoe; Gartner Lee, June 1996) identified the major terrain units in the County (see map in **Appendix A**). The Stayner area is part of the Wasaga Lowlands and the terrain units in the study area include sands (unconfined aquifer, high permeability) and till plains (low permeability).

3.7 Transportation Mode Considerations

The terms of reference for this study primarily focused on developing a transportation plan to facilitate vehicular travel by road or pedestrian travel via sidewalks, trails or bikeways. It is acknowledged that other modes of travel are available in the Stayner area. The County of Simcoe's Transportation Master Plan identifies the following considerations with respect to alternative transportation modes in this area:

- Bus Transit – Greyhound/PMCL Transportation Corporation provides inter-county and inter-regional bus transit services, which service Collingwood and Wasaga Beach, as well as Stayner. The County's Transportation Master Plan has suggested that key inter-municipal transit route enhancements be further investigated between Collingwood, Wasaga Beach, Stayner, Angus and Barrie.

- Rail Services – Barrie-Collingwood Railway is a short line operator which provides rail car transportation for industrial clients in Barrie and Collingwood. The rail line runs through the heart of Stayner. The County's Transportation Master Plan has suggested that investigations be made to provide rail based services to Collingwood, as a method of reducing the congestion along Highway 26.

- Car Pool Lots – The County's Transportation Master Plan has identified potential locations for car pool lots in the area of County Road 7 (just east of Stayner) and at Highway 26 (at Wasaga Beach).

- A primary goods movement corridor is available through Stayner, via Highway 26, County Road 7 and 27/28 Sideroad, as well as via the rail system. The reliability of this goods movement is aggravated by the increase in summer traffic congestion in this area.

4.0 Existing Development and Existing Transportation System

The existing land use, arterial roads and collector roads in the Stayner area are shown on the Official Plan schedules in **Appendix B**, as follows:

- Schedule A3 – Stayner Land Use and Transportation Plan, Urban Settlement Area;
- Schedule A – Map 4 – North Central Land Use and Transportation Plan.

The road surface type and approximate traffic ranges, for the roads within the study area are shown on Figures 2 and 3, taken from the Township's 2006 Road Needs Study. A schematic of the existing, and proposed road designations, along with existing intersection configurations, is shown on Figure 4.

4.1 Existing Arterial Roads

As shown on Schedule A3 in **Appendix A**, the existing arterial roads in the Stayner area include the following:

- *Highway 26* – This two-lane road runs east/west through the core area of Stayner, turning north/south at its junction with County Roads 42 and 91. The section of Highway 26 through Stayner is under the jurisdiction of the Township of Clearview, as a designated connecting link commencing at Mowat Street, to the east, and running to Wyant Road, to the north. Beyond the connecting link, Highway 26 is under the jurisdiction of the Ministry of Transportation. Posted speeds along Highway 26 are 80 km/h, decreasing to 50 km/h through the connecting link area. Highway 26 has a right-of-way (ROW) of 20 metres through the core area, increasing to 30 metres to the east of Mowat Street.

- *County Road 91 (CR 91)* – This two-lane road commences at Highway 26, in the core area, and runs westerly from this point. To the east of Industrial Road, CR 91 is under the jurisdiction of the Township of Clearview. To the west of Industrial Road, CR 91 is under the jurisdiction of the County of Simcoe. Posted speeds along CR 91 are 80 km/h, decreasing to 50 km/h along the section maintained by the Township. CR 91 has a ROW width of 20 metres for a short distance to the west of Highway 26, increasing to 30 metres beyond that point.

- *County Road 42 (CR 42)* – This two-lane road commences at Highway 26 in the core area, and runs southerly from this point. To the north of Margaret Street, CR 42 is under the jurisdiction of the Township of Clearview. To the south of Margaret Street, CR 42 is under the jurisdiction of the County of Simcoe. Posted speeds along CR 42 are 80 km/h, decreasing to 50 km/h along the section maintained by the Township.

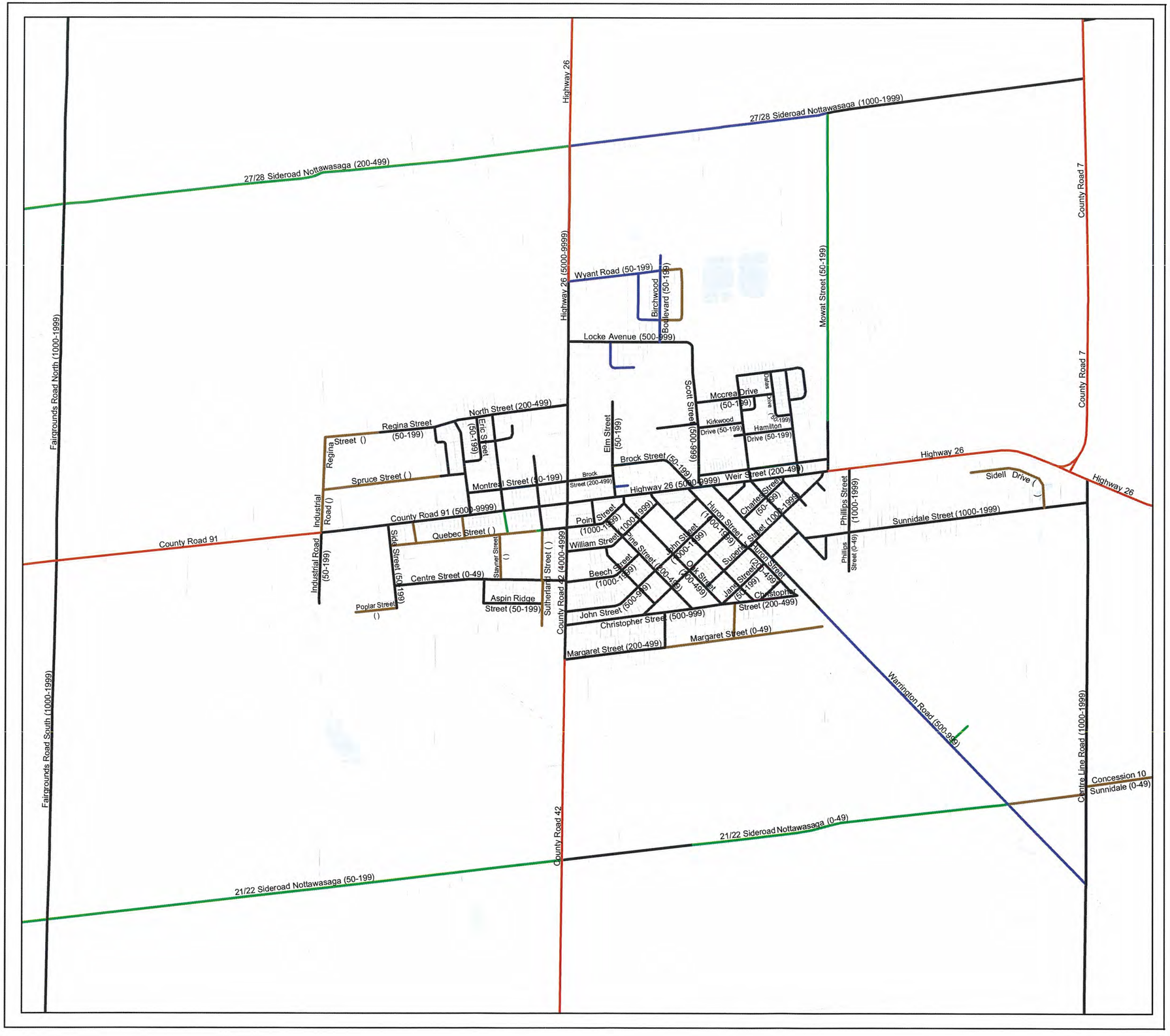

FIGURE 2

TOWNSHIP OF CLEARVIEW

STAYNER AND AREA TRANSPORTATION STUDY

ROAD SURFACE TYPE AND APPROXIMATE TRAFFIC RANGES STAYNER AREA

Legend

Township Roads

- ASPHALT
- EARTH
- GRAVEL
- SURFACE TREATMENT
- UNKNOWN

(1000-1999) - Annual Average Daily Traffic (AADT) Range

Source of Data: Township of Clearview Road Study, 2006 & Ontario Ministry of Natural Resources.

N

0 500 1,000
Meters

Scale: 1:20000
Date: April, 2009

Projection: UTM Zone 17
Datum: NAD 83

Project: MCG 16235
Prepared By: Anthony Jay

Verified By: Henry Centen

BURNSIDE

F:\GIS\projects\MCG\16235\Figure 2 Surface Type and Traffic Ranges.mxd

FIGURE 3

TOWNSHIP OF CLEARVIEW

STAYNER AND AREA TRANSPORTATION STUDY

ROAD SURFACE TYPE AND APPROXIMATE TRAFFIC RANGES STAYNER

Legend

Township Roads

- ASPHALT
- EARTH
- GRAVEL
- SURFACE TREATMENT
- UNKNOWN

(1000-1999) - Annual Average Daily Traffic (AADT) Range

Source of Data: Township of Clearview Road Study, 2006 & Ontario Ministry of Natural Resources.

N

0 250 500
Meters

Scale: 1:10000
Date: April, 2009

Projection: UTM Zone 17
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Project: MCG 16235
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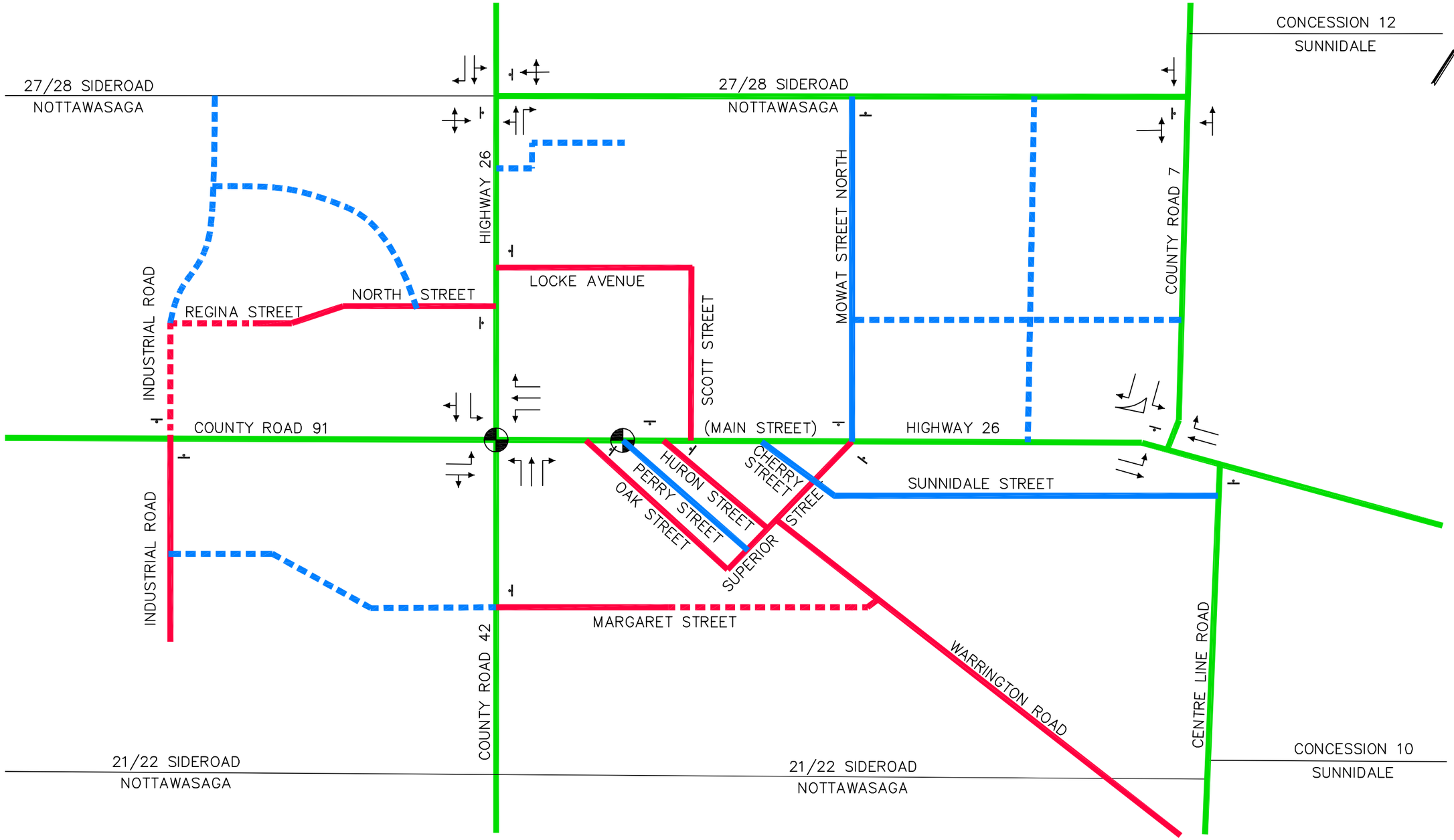
BURNSIDE

F:\GIS\projects\MCG\16235\Figure 3 Surface Type and Traffic Ranges.mxd



Legend

- EXISTING ARTERIAL ROADS
- EXISTING COLLECTOR ROAD DESIGNATION
- PROPOSED COLLECTOR ROAD DESIGNATION
- STOP SIGNS
- TRAFFIC SIGNAL
- THROUGH LANE
- TURN LANE
- CHANNELIZED LANE

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

ROAD CLASSIFICATIONS AND EXISTING INTERSECTION CONFIGURATIONS

BURNSIDE
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- *County Road 7 (CR 7)* – This two-lane road commences at Highway 26, just east of Stayner, and runs northerly to Wasaga Beach. This road also provides a connection to 27/28 Sideroad, forming an alternate route around Stayner (i.e. in lieu of using Highway 26). CR 7 is under the jurisdiction of the County of Simcoe and presently has a 30 metre ROW. The Posted speed along CR 7 is 80 km/h. The County rehabilitated the asphalt surface of CR 7 in 2008 (i.e. cold-in-place recycle).

- *27/28 Sideroad* – This two-lane road runs east/west, connecting CR 7 to Highway 26, to the north of Stayner. 27/28 Sideroad is under the jurisdiction of the Township of Clearview and has a 20 m right-of-way. The posted speed along 27/28 Sideroad is 80 km/h. The Township is presently improving the base along this road (i.e. improved granular depths and upgrading of the asphalt surface, 600 mm granular B, 150 mm granular A and 90 mm asphalt). While these improvements will facilitate the function of this road as an alternate route around Stayner, it is noted that any significant widening of the road is constrained by the available right-of-way width. Widening is further constrained by the major hydro line and gas line that exist in this area. 27/28 Sideroad also provides a connection to Concession 12 of Sunnidale (via CR 7). The Transportation Plan for the County of Simcoe has identified both 27/28 Sideroad and Concession 12 of Sunnidale for long term inclusion into the County's Road System (i.e. primary arterial road by 2031, 36 m ROW), however these roads are not priorities for such uploading in the short term. The proposed future County road system is shown on Schedule 5.5.2 in **Appendix C**, taken from the County Official Plan.

- *Centre Line Road* – This two-lane road commences at Highway 26, just east of Stayner, and runs southerly. Centre Line Road is under the jurisdiction of the Township of Clearview, has a 20 metre ROW and has a posted speed of 80 km/h.

4.2 Existing Collector Roads

As shown on Schedule A3 in **Appendix B**, the existing collector roads in the Stayner area include the following:

- *Southwest Quadrant – Industrial Road*

Industrial Road presently services industrial/commercial development and terminates at a closed County landfill site. Industrial Road has a ROW width of 20 metres.

- *Southeast Quadrant – Warrington Road, Superior Street, Oak Street, Huron Street and Margaret Street.*

The ROW widths along these roads are typically a minimum of 20 metres, with the exception of parts of Margaret Street (i.e. 15 metre ROW) and Warrington Road, south of Margaret Street (10 metre or 15 metre ROW).

Margaret Street presently terminates just east of Clarence Street. Where development exists on both sides of Margaret Street, the right-of-way (ROW) is presently 20 metres. To the east and west of this section the existing ROW is approximately 15 metres. Considering the collector road designation, it is recommended that the Margaret Street ROW be widened to 26 metres, where practical. Along areas of existing development, a reduced 20 metre ROW may be considered.

- *Northwest Quadrant – Industrial Road (designated but not yet built), Regina Street (partially built) and North Street.*

Industrial Road, and part of Regina Street, are designated collector roads but not yet built. The Township is presently constructing a bridge crossing to facilitate the construction of the street connection in this area. The ROW varies along these streets, from 15 metres (part of North Street) to 26 metres (new part of Regina Street).

- *Northeast Quadrant – Locke Avenue and Scott Street.*

These roads are two-lane roads with posted speeds of 50 km/h. The ROW along these roads is 20 metres, with the exception of the south part of Scott Street, where the ROW is 15 metres.

4.3 Existing Signalized Intersections

Signalization presently exists at the following intersections:

- *Intersection of Highway 26 / County Road 42 / County Road 91*. Signalization at this intersection accommodates the junction of the three arterial roads at this location. A traffic study of this intersection, completed in 2000, resulted in the addition of turning lanes, maximizing the capacity within the physical constraints that exist at this location.

- *Intersection of Perry Street with Highway 26*. Signalization at this intersection facilitates traffic movements from Perry Street, while also providing a centralized location for pedestrian crossing within the commercial core.

5.0 Future Development and Future Road Deficiencies

5.1 Related Transportation Plans

Previous study work has identified a number of improvements, in the broader study area, that will impact the transportation system within Stayner.

The Simcoe County Transportation Plan (Earth Tech, July 2008) and the County's updated Official Plan (approved by council November 2008) proposes enhancements to the County Road network in the Stayner area as shown on the mapping in **Appendix C** and as discussed further below. The County proposes to add 660 lane km to their network, not including committed projects, by 2031. Enhancements to the County Road System, that will impact traffic movements in the Stayner area, include the following:

- Uploading and improvement to 27/28 Sideroad, between County Road 10 and Highway 26, as a primary arterial road (36 m ROW) within the County system. These upgrades are anticipated over the short term (i.e. 0-10 year timeframe). Over the medium term (i.e. 10-20 year timeframe), this road is recommended to be widened to 4 lanes, from 2 lanes, to accommodate future traffic volumes.

- Uploading and improvement to 27/28 Sideroad, between Highway 26 and County Road 124, as a secondary arterial road (30.5 m ROW) within the County system. These upgrades are anticipated over the long term (i.e. 20+ year timeframe).

- Uploading and improvements to 12th Concession Sunnidale and Flos Road 4, from County Road 93 to County Road 7, as secondary arterial roads within the County system. It is anticipated that the upgrades to the west of County Road 29 will be completed in the medium term (i.e. 10-20 year timeframe), while those to the east of County Road 29 will be completed in the long term (i.e. 20+ year timeframe).

- Over the long term (i.e. 20+ years), widening of County Road 10 from 2 lanes to 4 lanes, from Highway 26 to 27/28 Sideroad/Concession 12 and from County Road 90 to County Road 9.

- Widening of County Road 90 from 2 lanes to 5 lanes, from Barrie to Angus, as a controlled access road (commencing 2010).

The proposed County road improvements are expected to provide the following benefits:

- Provide an alternate route around the Highway 26 congestion through Stayner.

- Provide improved continuity to the overall County Road system.

- Provide additional east/west connectivity in the County Road system, by providing an alternate east/west corridor through the Georgian Triangle, connecting to the Stayner alternate route.

- Provide capacity relief to County Road 92 at the east end of Wasaga Beach.

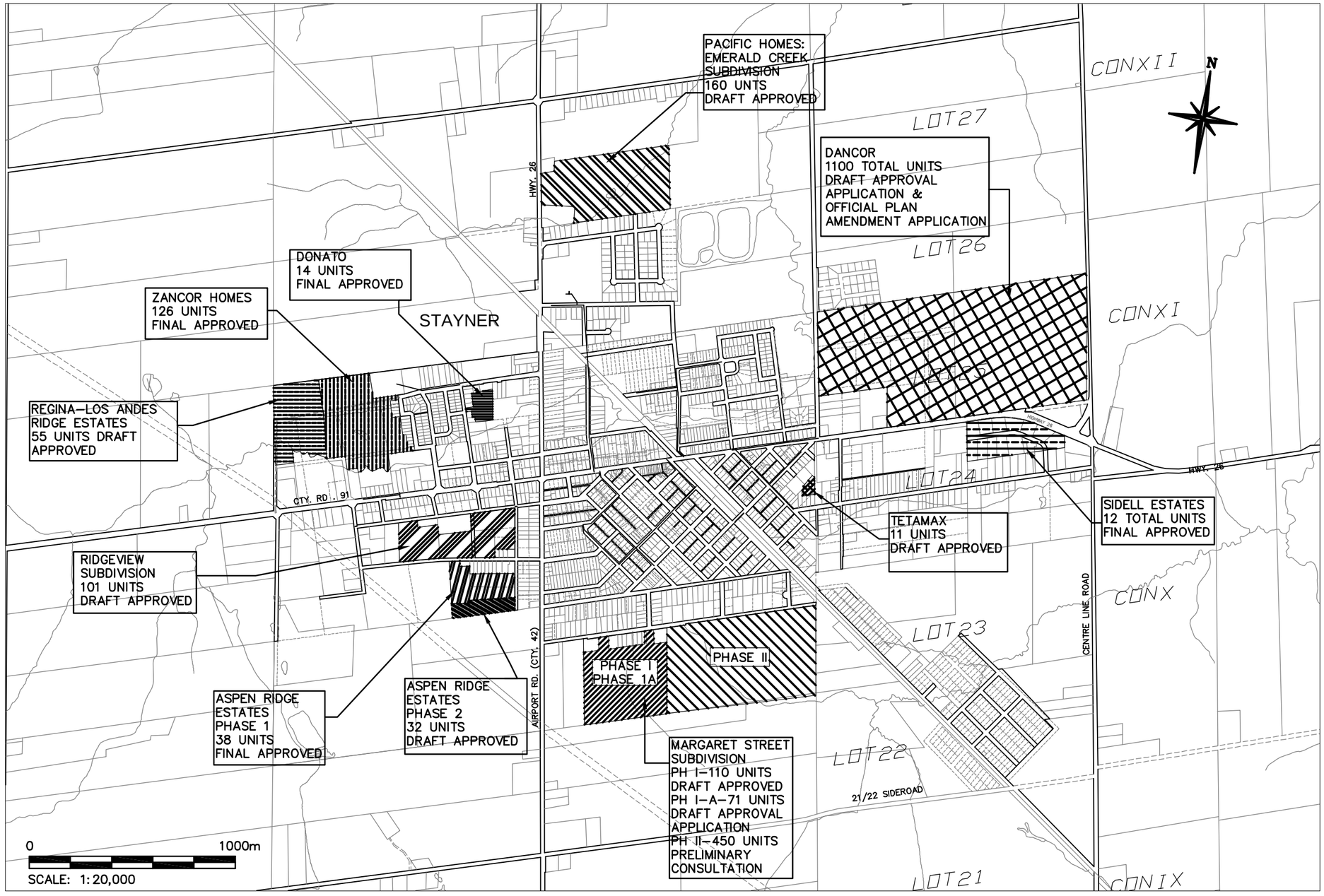
The Ministry of Transportation (MTO) proposes to upgrade Highway 26 from 2 lanes to 4 lanes, between Collingwood and Wasaga Beach, by 2010. It is anticipated that Highway 26, between 27/28 Sideroad and Wasaga Beach will also be widened in the medium term (i.e. 10-20 year timeframe). Long term (i.e. 20+ year timeframe) planning may include a bypass of Highway 26 around Stayner, however this work is considered to be beyond the time frame considered in this present study.

The Township of Clearview has commenced upgrades to 27/28 Sideroad, to provide an alternate route for traffic around Stayner, in response to congestion in the core area. The alternate route connects Highway 26, east of Stayner to Highway 26, north of Stayner, via County Road 7 and 27/28 Sideroad.

5.2 Forecasted Development Traffic

5.2.1 Land Development Projects

As noted previously, the Township has developed a draft development plan for the Stayner area (see Figure 1), including greenfield residential growth areas, residential intensification areas and long term planning areas. The basis of this draft development plan was set out in a document prepared by the Township entitled "Township of Clearview Land Budget 2009", which was issued in February 2009. Excerpts from this document are included in **Appendix D**, including plans showing the location of developments within the municipality, both residential and non-residential, as well as details pertaining to these applications. Many of the greenfield residential growth areas, identified by the municipality, already have draft plans or final plans that have been previously approved, as shown on Figure 5 (Development Location Plan). As noted previously, the Township has estimated that there are presently about 2,276 residential units in various stages of approvals and has estimated that Stayner may grow by 2631 units by build-out (beyond year 2029).



Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

DEVELOPMENT LOCATION PLAN

BURNSIDE

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3 Ronell Crescent, Collingwood, Ontario L9Y 4J6
telephone (705) 446-0515 **fax** (705) 446-2399

Scale	Project No.	Figure
AS NOTED	MCG16235	5

16235–STAYNER–PLAN.dwg

A number of applications on employment lands in the Stayner area are also active, including the following:

- Moldenhauer – Highway 26
- Georgian Aggregates and Construction – Asphalt Plant – 27/28 Sideroad
- Stayner Firehall – Sidell Drive
- Sobeys Grocery Store – Highway 26
- Emerald Creek commercial lands – Wyant Road
- Stayner Massage Therapy – Highway 26
- Timber Mart Building Centre – Centre Line Road.

There are also about 111 hectares of industrial land that are currently vacant in Stayner. Much of this land is not presently serviced, but is designated Industrial in the Official Plan, such as the land located to the west of County Road 42 and the north of County Road 91 (see mapping in **Appendix B**). The Township has estimated a need for about 35 hectares of industrial lands to be brought into production between 2009 and 2028, on a Township-wide basis, in order to meet their allocated job targets.

Traffic estimates have been based on approved plans, where available. Where development plans are not available, traffic estimates have been based on planning level densities, which have been used by the Township in the preparation of their draft development plan, including the following:

- Greenfield areas – 32 persons per hectare, 2.8 persons per unit, which equates to11.43 units per hectare.
- Intensification areas – 24 persons per hectare, 596 units of intensification, which equates to 8.74 units per hectare, based on the intensification areas available.
- Industrial and Commercial lands – 32 jobs per hectare, current employment rate of 8.94% of population.

The greenfield densities are in accordance with those specified for rural communities in the Simcoe Area Growth Plan (County of Simcoe, Hemson Consulting, 2008). It is expected that the densities established by the Province, the County and the Township will be reviewed on a regular basis and planning targets adjusted, where required, to respond to planning constraints/opportunities and decisions.

5.2.2 Trip Generation

Trip generation estimates have been made for the various developments proposed in the study area, using standard trip generation rates recommended by the Institute of Transportation Engineers, as follows:

Single Family Residential – ITE Code 210

- AM Peak Hour weekday – 0.1875 trips/unit incoming, 0.5625 trips/unit outgoing

- PM Peak Hour weekday – 0.6363 trips/unit incoming, 0.3737 trips/unit outgoing
- Daily weekday – 4.785 trips/unit incoming, 4.785 trips/unit outgoing

Townhouses – ITE Code 230
- AM Peak Hour weekday – 0.0748 trips/unit incoming, 0.3652 trips/unit outgoing
- PM Peak Hour weekday – 0.3484 trips/unit incoming, 0.1716 trips/unit outgoing
- Daily weekday – 2.905 trips/unit incoming, 2.905 trips/unit outgoing

Apartments – ITE Code 220
- AM Peak Hour weekday – 0.102 trip/unit incoming, 0.408 trips/unit outgoing
- PM Peak Hour weekday – 0.403 trips/unit incoming, 0.217 trips/unit outgoing
- Daily weekday – 3.325 trips/unit incoming, 3.325 trips/unit outgoing

Light Industrial – ITE Code 110
- AM Peak Hour weekday – 0.8096 trips/1000 sq.ft. GFA incoming, 0.1104 trips/1000 sq. ft. GFA
- PM Peak Hour weekday – 0.1164 trips/1000 sq.ft. GFA incoming, 0.8536 trips/1000 sq.ft. GFA
- Daily weekday – 3.485 trips/1000 sq.ft. GFA incoming, 3.485 trips/1000 sq. ft. GFA outgoing

Estimates have been made for the timing of the various developments, to assess the transportation needs in the short term (2009 to 2018), medium term (2019 to 2028) and long term (beyond 2028).

5.2.3 Trip Distribution

The Simcoe County Transportation Plan estimated the types of trips within the County as follows:

- 28% home-work related trips. These are concentrated in the peak, most congested periods.
- 10% to/from school
- 20% not home-based
- 48% home-based discretionary (i.e. shopping, social, non-work).

The major trip areas include Stayner, Collingwood and Wasaga Beach to the north, Barrie to the east and external trips to the south (e.g. Alliston Honda, Greater Toronto Area).

The directional distribution of traffic has been estimated, taking into account the above noted factors.

5.3 Future Arterial Road Requirements

5.3.1 Arterial Road Traffic Considerations

Existing Arterial Road Traffic

The estimated peak hour turning movements (year 2009) at the major arterial road intersections in the study area are shown on Figure E1 in **Appendix E**. The turning movements have been based on traffic counts completed for previous traffic impact studies in the study area (i.e. by private developers and MTO). The design condition is based on Summer Average Daily Traffic (SADT), which is about 20% higher than the Average Annual Daily Traffic (AADT) in this area, due to the influence of recreational traffic. The estimated SADT and AADT link volumes on the arterial roads, for year 2009, are shown on Figure E4 in **Appendix E**.

Forecasted Arterial Road Traffic

Traffic forecasts have been made for horizon years 2018 and 2028 (see Figure E2 and E3 in **Appendix E**), based on assumed traffic growth of 5% per year to 2016 and 3% per year thereafter. These growth rates generally agree with the growth rates forecasted in earlier provincial and local transportation studies in this area. The forecasted SADT and AADT link volumes on the arterial roads, for horizon years 2018 and 2028, are shown on Figures E5 and E 6 in **Appendix E**.

The forecasted traffic volumes account for the anticipated diversion of traffic that will occur as a result of the capacity constraints along Main Street (Highway 26). The alternate route for this traffic is along County Road 7 and 27/28 Sideroad.

Assessment of Link Volume Capacities on Arterial Roads

The forecasted traffic link volumes, along the arterial roads, are summarized in the following table:

Table 5.1 - Forecasted Traffic On Arterial Roads (Summer Average Daily Traffic)

Road	Theoretical Capacity (vpd)	Forecasted Link Volume 2009 (vpd)	Forecasted Link Volume 2018 (vpd)	Forecasted Link Volume 2028 (vpd)
Highway 26 – rural east	22,000	13,000	19,500	26,100
Highway 26 – urban fringe east	21,400	12,400	12,900	17,700
Highway 26 – core east	14,800	14,400	17,700	20,200

Highway 26 – rural north	22,000	12,500	18,000	25,100
Highway 26 – urban fringe north	20,500	11,600	13,500	14,600
County Road 91	21,700	7,500	11,100	14,900
County Road 42	22,300	8,700	13,000	17,500
County Road 7	23,200	5,900	23,200	19,000
27/28 Sideroad	20,000	3,500	10,500	14,100

In the core area, the roadway link capacity is constrained by the side friction caused by parking and the elevated level of activity. Under such conditions it is forecasted that Highway 26, in the core, is presently operating at capacity during summer conditions. Improvements are presently being made to 27/28 Sideroad to provide an alternate route of travel in this area. It is expected that this alternate route will attract through traffic, thereby moderating the growth of traffic in the core, during these high traffic periods. However, due to continuing growth of traffic from other areas, it is expected that congestion within the core area will continue to increase over time. Transportation improvements in the broader study area may assist in addressing this capacity deficiency. Examples of such improvements include the implementation of a Highway 26 bypass around Stayner or the creation of a primary County Road between County Road 10 and Highway 26, incorporating 27/28 Sideroad (Nottawasaga) and Concession 12 (Sunnidale). However, for the purposes of this study, it has been assumed that implementation of an ultimate Highway 26 bypass, or of an ultimate alternative east/west County Road corridor, will occur beyond the timeframe under consideration.

It is forecasted that Highway 26, to the north and east of Stayner, will be operating beyond capacity by year 2028. Providing additional lanes on Highway 26, to address this deficiency, is not possible due to the resulting increase of traffic through the core area of Stayner. The long term improvements noted above would also assist in addressing the Highway 26 deficiencies in these areas.

Assessment of Intersection Capacities

Synchro computer modeling was completed to confirm the operations at the major arterial intersections for summer PM weekday peak hour conditions. To assess the traffic impacts, and the need for turning lanes and/or signalization at the arterial road intersections, the following criteria have been assessed:

- *Operational Criteria* – The Level of Service (LOS) and volume-to-capacity (v/c) ratio were noted for the intersection overall and for any critical movements

identified at the intersection. The LOS is a measure qualifying the amount of delay experienced by motorists (see **Appendix F** for description of LOS). The critical movements are defined as a) any through lane, or shared through/turning lane, with a v/c of 0.85 or greater, or b) any exclusive turning lane with a v/c of 1.00 or greater. For stop-controlled intersections the operations are applied to the minor street approach only.

- *Left Turn Lane Warrants* – For unsignalized intersections (two-way stop control), left turn lane warrants are based on MTO warrant charts, which account for the turning traffic volumes, advancing traffic volumes and opposing traffic volumes. For signalized intersections, typical trigger volumes were assessed for the implementation of additional lanes including the following:
  - Dedicated left turn lanes where left turn movements exceed 100 vph.
  - Double left turn lanes where left turn movements exceed 300 vph.
  - Additional through lanes where traffic volumes exceed 450 vph/lane.

  For County Roads, the County of Simcoe Master Transportation Plan suggests that left turn lanes be considered where left turn movements exceed 60 vph, for both signalized or unsignalized conditions.

- *Right Turn Lane Warrants* **–** For unsignalized intersections, right turn lanes may be considered where right turning vehicles exceed 60 vph and where the volume of right turns creates a hazard or reduces the capacity of the intersection. For signalized intersections, an exclusive right turn lane should be considered if right turn movements exceed 300 vph and the adjacent through volume exceeds 300 vph.

- *Signal Warrants* – MTO Signal warrants are based on methodologies set out in Book 12 of the Ontario Traffic Manual. For planning purposes, the signal warrant volumes have been based on an average hourly volume equivalent to 1/16 of the AADT. However it is recommended that traffic at intersections continue to be monitored, with the implementation of signalization made only after actual warrant volumes (i.e. based on eight hour traffic volumes) are met.

The detailed computer modeling is included in **Appendix F** and the results are summarized in the following tables.

Table 5.2 - Intersection Operations – Horizon Year 2009 (Existing lane configuration and traffic controls)

Intersection	Traffic Controls	Intersection (Signalized) or Minor Approach (Unsignalized)		Critical Movements		
		LOS	v/c	Movement	LOS	v/c
Hwy 26 / CR 42 / CR 91	Signals	B	0.51	-	-	-
Hwy 26 / 27/28 Sideroad	Unsignalized	D (EB) E (WB)	0.13 (EB) 0.69 (WB)	-	-	-
Hwy 26 / CR 7	Unsignalized	F	0.98	SB left	F	0.98
27/28 Sideroad / CR 7	Unsignalized	B	0.25	-	-	-

Table 5.3 - Intersection Operations – Horizon Year 2018 (Existing lane configuration and traffic controls)

Intersection	Traffic Controls	Intersection (Signalized) or Minor Approach (Unsignalized)		Critical Movements		
		LOS	v/c	Movement	LOS	v/c
Hwy 26 / CR 42 / CR 91	Signals	B	0.62	-	-	-
Hwy 26 / 27/28 Sideroad	Unsignalized	F (EB) F (WB)	6.74 (EB) 3.80 (WB)	EB left/thru/right WB left/thru/right	F F	6.74 3.80
Hwy 26 / CR 7	Unsignalized	F	5.10	SB left	F	5.10
27/28 Sideroad / CR 7	Unsignalized	F	1.88	EB left/right	F	1.88

As shown in the tables, the unsignalized intersection at Highway 26 / County Road 7 is presently operating at capacity for the SB left turn movement during peak hour periods in the summer. With the expected diversion of traffic to the County Road 7 / 27/28 Sideroad alternate route, it is forecasted that the critical movements at the

unsignalized intersections along that route will be significantly over-capacity by horizon year 2018.

It is forecasted that signalization warrants will be met at these intersections within this time frame, as summarized in the following table.

Table 5.4 - Estimated Traffic Signal Warrants For Arterial Road Intersections

Intersection	Horizon Year	Minimum Volume Warrant (percentage met)	Delay To Cross Traffic Warrant (percentage met)	Estimated Year Signal Warrants May Be Met
Highway 26 / 27/28 Sideroad	Existing	80	56	2011
	2018	220	62	
Highway 26 / County Road 7	Existing	85	94	2010
	2018	211	476	
27/28 Sideroad / County Road 7	Existing	33	72	2016
	2018	133	108	

At the intersection of 27/28 Sideroad / County Road 7, the MTO warrants for a northbound left turn lane are forecasted to be met by 2009. Initial widening work may be completed at this intersection, with provision of undergrounds for future signalization.

The forecasted future intersection operations, after signalization and lane improvements, are summarized in the following tables.

Table 5.5 - Intersection Operations – Horizon Year 2018 (Revised lane configuration* and signalization of all intersections)

Intersection	Traffic Controls	Intersection		Critical Movements		
		LOS	v/c	Movement	LOS	v/c
Hwy 26 / CR 42 / CR 91	Signals	B	0.62	-	-	-
Hwy 26 / 27/28 Sideroad	Signals	B	0.67	-	-	-
Hwy 26 / CR 7	Signals	B	0.68	-	-	-
27/28 Sideroad / CR 7	Signals	B	0.57	-	-	-

*Revised lane configurations:

- Highway 26 / Sideroad 27/28 – Add left turn lane on all legs
- County Road 7 / Sideroad 27/28 – Add left turn lane on EB and NB legs.

Table 5.6 - Intersection Operations – Horizon Year 2028 (Revised lane configuration* and signalization of all intersections)

Intersection	Traffic Controls	Intersection		Critical Movements		
		LOS	v/c	Movement	LOS	v/c
Hwy 26 / CR 42 / CR 91	Signals	C	0.81	EB thru	D	0.90
Hwy 26 / 27/28 Sideroad	Signals	C	0.89	-	-	-
Hwy 26 / CR 7	Signals	D	0.98	WB thru SB left	E E	1.02 1.01
27/28 Sideroad / CR 7	Signals	C	0.77	-	-	-

*Revised lane configurations:

- Highway 26 / Sideroad 27/28 – Add left turn lane on all legs
- County Road 7 / Sideroad 27/28 – Add left turn lane on EB and NB legs.

As shown in the above tables, it is forecasted that the subject intersections will continue to operate acceptably through horizon year 2018 as signalized intersections. The SB left turn movement at the intersection of Highway 26 / Sideroad 27/28 is forecasted to be high (i.e. 458 vph), as is the forecasted SB left turn movement at the intersection of Highway 26 / County Road 7 (i.e. 476 vph). However, sufficient capacity exists at both of these intersections to address these needs without a second left turn lane being required through year 2018.

As shown in the above tables, the following deficiencies are forecasted to occur by horizon year 2028:

- The eastbound through movement at the Highway 26 / County Road 42 / County Road 91 intersection are forecasted to be congested during peak periods. However, further improvements to this intersection are not possible due to physical constraints. The overall intersection operations are acceptable.

- The intersection of Highway 26 / Sideroad 27/28 is forecasted to be congested. While the individual movements are not shown to be critical, a review of operations using SimTraffic (continuous simulation) shows significant queuing occurring for the SB left turn movement. The left turn movement is forecasted to be 615 vph and therefore a double left turn lane is likely to be warranted by 2028 at this intersection.

- The intersection of Highway 26 / County Road 7 is forecasted to be at capacity, with the westbound through movement and the southbound left turn movement forecasted to be over-capacity. The SB left turn movement is forecasted to be 639 vph and therefore a double left turn lane is likely to be warranted by 2028 at this intersection.

Based on the above analysis it is recommended that a second left turn lane be provided at the intersections of Highway 26 and 27/28 Sideroad and at the intersection of Highway 26 and County Road 7 by horizon year 2028. The revised intersection operations, with the addition of a second left turn lane at these intersections, are summarized in the following table.

Table 5.7 - Intersection Operations – Horizon Year 2028 (Revised lane configuration* and signalization of all intersections)

Intersection	Traffic Controls	Intersection		Critical Movements		
		LOS	v/c	Movement	LOS	v/c
Hwy 26 / CR 42 / CR 91	Signals	C	0.81	EB thru	D	0.90
Hwy 26 / 27/28 Sideroad	Signals	B	0.77	-	-	-
Hwy 26 / CR 7	Signals	C	0.82	WB thru	C	0.86
27/28 Sideroad / CR 7	Signals	C	0.77	-	-	-

*Revised lane configurations:

- Highway 26 / Sideroad 27/28 – Add left turn lane on all legs. Add second SB left turn lane.
- County Road 7 / Sideroad 27/28 – Add left turn lane on EB and NB legs.
- Highway 26 / County Road 7 – Add second SB left turn lane.

The staging of modifications to the intersection of Highway 26 / Sideroad 27/28 was reviewed further through a Synchro analysis of the impacts of deleting the northbound right turn lane at this intersection. The analysis shows that the northbound movements would continue to operate acceptably through year 2018, but that by year 2028 these movements would be congested but acceptable (i.e. LOS C, v/c = 0.87 for combined northbound thru/right movement). It is recommended that the improvements to the existing SB and NB right turn lanes at this intersection be converted to thru/right lanes in conjunction with the addition of the required left turn lanes. The intersection operations should continue to be monitored to confirm if a dedicated NB right turn lane is warranted in the future.

The increasing use of 27/28 Sideroad and County Road 7 as an alternate route around Stayner will result in significant increases in right turn movements as shown in the following table.

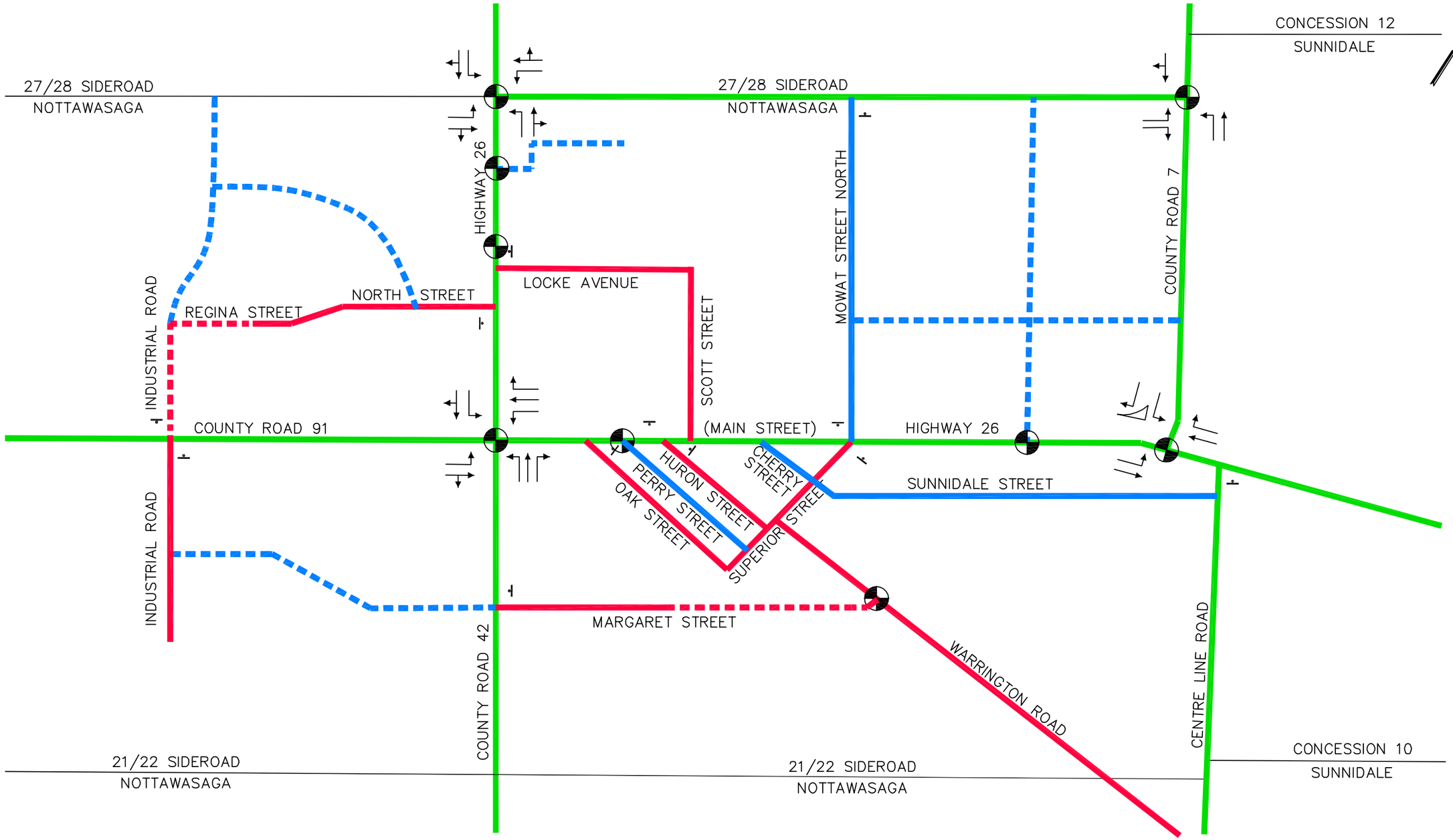
Table 5.8 - Right Turn Movements Along Alternate Route Around Stayner

Intersection	Horizon Year	Direction	Estimated Right Turn Movements (PM Summer Average Peak Hour)	Recommended Right Turn Treatment
Highway 26 / 27/28 Sideroad	2009	Westbound	140	Combined thru/right lane
	2018		459	
	2028		618	
Highway 26 / CR 7	2009	Westbound	142	Dedicated right turn lane
	2018		462	
	2028		622	
County Road 7 / 27/28 Sideroad	2009	Eastbound	45	Dedicated right turn lane
	2018		351	
	2028		471	

The recommended right turn treatment at the intersections has been based on a review of the property constraints, as well as the traffic volumes for other related movements. Over the long term, if significant truck volumes develop along this route, further consideration may be made to channelizing these right turn movements to facilitate truck turns.

Summary of Improvement Requirements To Arterial Road Intersections

All arterial road intersections presently involve either Provincial or County roads and therefore improvements to those intersections will be under the jurisdiction of those road authorities. However, the improvements to these intersections will have direct, and indirect, impacts on the Township's roads and therefore these needs have been identified in this study. It is recommended that the Township continue to coordinate the required improvements at these intersections with the applicable road authorities. Based on the analysis completed in this study, the intersection configurations and controls proposed for the arterial roads are shown on Figures 6 and 7 for horizon year 2018 and 2028. The identified improvement needs at the arterial road intersections are summarized in the following table.



Legend

- EXISTING ARTERIAL ROADS
- EXISTING COLLECTOR ROAD DESIGNATION
- PROPOSED COLLECTOR ROAD DESIGNATION
- STOP SIGNS
- TRAFFIC SIGNAL
- THROUGH LANE
- TURN LANE
- CHANNELIZED LANE

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

PROPOSED INTERSECTION CONFIGURATIONS AND CONTROLS

HORIZON YEAR 2018

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Scale	Project No.	16235-TS-1.DWG
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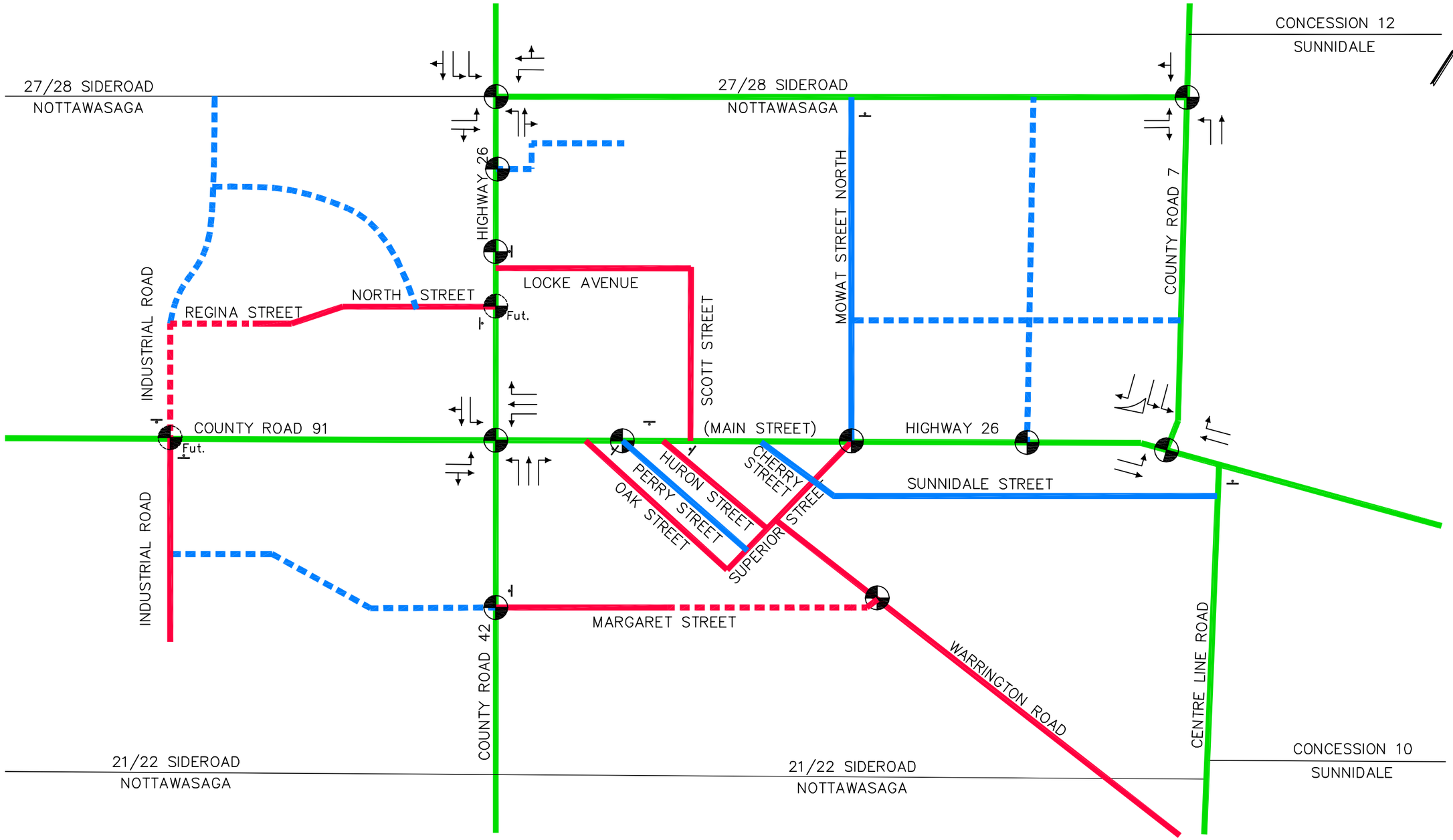

Legend

- EXISTING ARTERIAL ROADS
- EXISTING COLLECTOR ROAD DESIGNATION
- PROPOSED COLLECTOR ROAD DESIGNATION
- STOP SIGNS
- TRAFFIC SIGNAL
- TRAFFIC SIGNAL –BEYOND 2028
- THROUGH LANE
- TURN LANE
- CHANNELIZED LANE

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

PROPOSED INTERSECTION CONFIGURATIONS AND CONTROLS

HORIZON YEAR 2028

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Scale	Project No.	16235-TS-1.DWG
NOT TO SCALE	MCG16235	

Table 5.9 - Summary of Improvement Requirements at Primary Arterial Road Intersections (MTO and County Jurisdictions)

Intersection (Jurisdiction)	Improvement	Cost Estimate	Timeframe For Improvement
Highway 26 / CR 42 / CR 91 (Clearview, MTO connecting link)	No improvements required within study period.	N/A	N/A
Highway 26 / 27/28 Sideroad (MTO)	Signalization, plus add left turn lane on all approaches	$500,000	2011
	Add second southbound left turn lane.	$150,000	2018 to 2028
Highway 26 / CR 7 (MTO)	Signalization plus additional storage for turning lanes	$300,000	2010
	Add second southbound left turn lane.	$150,000	2018 to 2028
CR7 / Sideroad 27/28 (County of Simcoe)	Add northbound left turn lane, plus undergrounds for future signalization.	$150,000	2009
	Signalization plus add eastbound right turn lane.	$250,000	2016

5.4 Future Collector Road Additions and Improvements

5.4.1 Collector Road Criteria

Future collector roads are designated to accommodate higher traffic volumes and for general compatibility with adjacent land uses, while addressing issues of connectivity, operational safety, parking etc.

Local streets function primarily to access abutting properties, while collector streets have the dual function of providing access and increased mobility for traffic. Collector roads provide a logical connection between local roads and arterial roads. Arterial roads function primarily to serve traffic mobility and typically have access restrictions.

The determination of functional road classifications vary widely among road authorities, with traffic volumes being only one of the factors considered. The traffic volumes associated with functional classifications also varies, with the resulting

classifications often being more qualitative than quantitative (i.e. according to function rather than traffic volume). However for planning purposes within this present study, the following traffic ranges are suggested:

- Local roads – 0 to 2000 vpd AADT
- Collector roads – 2000 to 8000 vpd AADT
- Arterial roads – greater than 8000 vpd AADT

These traffic volumes generally agree with typical functional classification threshold values adopted by other municipalities, or as suggested by transportation organizations, such as the Transportation Association of Canada and the Institute of Transportation Engineers. Traffic volume of around 2000 vpd AADT is considered to be a threshold for environmental sensitivity to traffic in local neighbourhoods.

Considering the wide range of traffic volumes associated with collector roads, it is expected that design features to enhance traffic mobility will increase as the traffic increases, including the following:

- Additional restrictions on accesses and parking.
- Potential for increased setbacks to development.
- Provision of sidewalks on both sides of the roadway or increased setbacks to sidewalks.
- Increased road widths.
- Decreases in curvilinear alignment and increased use of tangent sections/lengths.
- Increased operating speeds.

The existing and proposed collector roads in Stayner have been assessed for the various quadrants as noted previously, and the results are described in the following sections. The general locations of the proposed collector road system are shown on Figure 4.

5.4.2 Collector Roads In The Southwest Quadrant

An industrial/commercial collector road is proposed to extend from Industrial Road easterly to intersect with County Road 42, opposite Margaret Street. This road will traverse the lands designated for industrial uses, as well as allow for connections to the residential lands located to the north of this area.

Considering the allocation towards employment lands in the overall growth plan, it is anticipated that less than 15% of this area may develop within the study period. Therefore it is likely that this collector road will continue to develop from each end (i.e. easterly from Industrial Road and westerly from County Road 42), as development proceeds.

(i.e. easterly from Industrial Road and westerly from County Road 42), as development proceeds.

It is recommended that Industrial Road be upgraded to collector road standards as development proceeds.

The need to upgrade the intersection controls at Industrial Road / County Road 91 or at the new intersection with County Road 42 will depend on the type of development on the employment lands. It is recommended that these intersections continue to be monitored as development continues in this area.

Based on a light industrial type of use, it is estimated that the potential development on these employment lands will add less than 1000 vpd AADT to this roadway. Considering the existing industrial/commercial development along Industrial Road, the connection of the residential areas to the north and the long term development of the remaining designated lands, a collector road designation for this roadway is considered appropriate. This road may also provide an alternate route for truck traffic connecting between County Road 91 and County Road 42 in this area.

The existing, and proposed, residential areas in this quadrant access County Road 91 and County Road 42 through connections at Side Street, Sutherland Street, Quebec Street and Centre Street. Based on the existing and active/proposed residential development in this quadrant, traffic will be dispersed through these connection points, with forecasted traffic volumes on these roads remaining within acceptable thresholds for local roads. Connections of these local roads to County Road 91 and County Road 42 can continue to be through stop control on these local roads.

5.4.3 Collector Roads in The Southeast Quadrant

Additional collector roads are required in this quadrant to accommodate the forecasted development, which is summarized in the following table:

Table 5.10 - Forecasted Developments In The Southeast Quadrant

Development	Number of Units	Assumed Time Period
Margaret Street Subdivision – Phases 1 and 1A	181	2009 - 2018
Margaret Street Subdivision – Phase 2	337	2009 - 2018
Intensification Along Margaret Street	36	2009 - 2018
Intensification Along Warrington Road	17	2009 – 2018

Greenfield development to east and west of Margaret Street Subdivision development	209	2019 - 2028
Intensification east of Warrington Road	122	2019 - 2028
Greenfield development to east of Warrington Road	378	2019 - 2028

A number of alternate locations were considered for a collector road to service this quadrant including the following:

- An easterly extension of Margaret Street;
- A new collector road through the Margaret Street development;
- Upgrading of 21/22 Sideroad.

The location and costs of improving 21/22 Sideroad (i.e. about 2.7 km of mostly gravel or earth road would require upgrading and paving), represent significant constraints in the viability of upgrading this road to function as a collector road to meet the traffic circulation needs within the study time period. Similarly locating a new collector road within the Margaret Street Subdivision development may not provide the most effective traffic distribution towards the arterial roads serving this area. Therefore, it is proposed that Margaret Street be extended easterly from its present terminus, to connect to Warrington Road. An extension of Margaret Street provides the following benefits:

- Uses a previously designated collector road.
- The trip distribution from the proposed development to the south of this road (i.e. Margaret Street Subdivision), is predominately to the north. Margaret Street is appropriately located to accommodate this traffic.
- Minimizes the number of railway crossings required, assuming that Margaret Street would require extension in any case.

It is recommended that the ROW along Margaret Street be widened to a minimum of 20 metres, where constrained by existing development, or 26 metres where possible. A 26 metre ROW is also required through the intersection of Margaret Street with Warrington Road, to accommodate turning lanes at this location.

The Margaret Street extension will require a crossing of the railway line in this area, as well as a realignment of the intersection of Margaret Street and Warrington Road, as shown in Figure 8. The separation of the existing railway line, relative to the new intersection of Margaret Street / Warrington Road, is less than 60 metres and therefore Transport Canada requires a warning system, including gates, at the railway crossing, plus signalization of the intersection.

Note: Property lines shown serve as guidelines only.

LEGEND

- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- SIGNALIZED INTERSECTION

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

EXTENSION OF MARGARET STREET
INTERSECTION DETAILS

BURNSIDE
R.J. Burnside & Associates Limited
3 Ronell Crescent, Collingwood, Ontario L9Y 4J6
telephone (705) 446-0515 fax (705) 446-2399

Drawn By	Checked By	Figure
A.K.B.	H.B.C.	8
Scale	Project No.	16235 MasterPlan.DWG
NOT TO SCALE	MCG16235	

The signals must be interconnected with the warning circuits of the railway tracks to allow pre-emption of the traffic signals, to avoid conflict between the operations at the railway and the intersection.

It is expected that collector road traffic from Margaret Street will follow Warrington Road to Superior Street, ultimately connecting to Highway 26.

To accommodate the identified greenfield development to the east of Warrington Road, it is recommended that Sunnidale Street and Cherry Street be designated as collector roads, to provide a connection to Highway 26.

The forecasted traffic volumes on the collector roads within the southeast quadrant are summarized in the following table:

Table 5.11 - Forecasted Traffic Volume on Collector Roads In Southeast Quadrant

Collector Road	Location	Forecasted AADT 2018	Forecasted AADT 2028
Margaret Street	CR 42 to Warrington Road	<3000 vpd	<4500 vpd
Sunnidale Street and Cherry Street	Highway 26 to Centre Line Road	<2000 vpd	<3500 vpd
Warrington Road	South of Superior Street	<4000 vpd	< 5000 vpd
Oak Street	South of Highway 26	<3000 vpd	<3500 vpd
Superior Street	East of Warrington Street	<4000 vpd	<5000 vpd
Huron Street	South of Highway 26	<3000 vpd	<3500 vpd
Perry Street	South of Highway 26	<3000 vpd	<3500 vpd

The intersection of Margaret Street / County Road 42 may require signalization, if traffic volumes meet signalization warrants. Truck restrictions are recommended on Margaret Street to effectively direct truck traffic from the employment lands (to the west) to continue to use County Road 42 and not use this residential collector road.

Ultimately a second road connection to County Road 42 may also be made to service the Margaret Street Subdivision development, in conjunction with development of the lands located between the Margaret Street Subdivision development and County Road 42. The location of such a second access would be expected to meet the County's spacing criteria for intersections. In addition it is recommended that this road

connection be a local road connection and be configured, internal to the development plans, to minimize the potential for through traffic using this route in lieu of Margaret Street.

Traffic from the Margaret Street Subdivision development may also travel north, via local roads, to connect to the commercial core or to connect to the collector roads in this area (i.e. Oak Street, Perry Street and Superior Street). The local road connections include Clarence Street and the future Lawrence Street (presently only an unopened ROW). Considering the anticipated trip distribution from the proposed development to the south of Margaret Street, it is recommended that Lawrence Street be constructed in conjunction with the Margaret Street Subdivision development. Traffic volumes on both Clarence Street and Lawrence Street are expected to remain at levels appropriate to local roads.

A signalized intersection presently exists at the intersection of Perry Street and Highway 26. It is proposed that Perry Street be designated as a collector road, due to higher traffic volumes that exist on this road and to provide additional relief to the other collector roads in the area (ie. Oak Street and Huron Street). Both Oak Street and Huron Street are unsignalized at their intersections with Highway 26, and it is preferred that Perry Street continue to be the primary signalized intersection servicing this area.

5.4.4 Collector Roads in The Northwest Quadrant

The completion of the previously designated collector road (Regina Street / Industrial Road) is required to accommodate the identified developments in this quadrant. This collector road also services existing development, as well as the arena and recreation centre.

Existing and proposed development also access County Road 91 and Highway 26 via an existing grid of local road connections, including Sutherland Street, Stayner Street, East Street and Montreal Street. With the inclusion of the proposed collector road noted above, the volume of traffic using these alternate access points will allow for their continued operation as local roads.

New collector roads will be required to service the long term planning areas identified to the north of the existing developed area.

The forecasted developments in the northwest quadrant are summarized in the following table:

Table 5.12 - Forecasted Developments In The Northwest Quadrant

Development	Number of Units	Assumed Time Period
Donato Development	14	2009 – 2018
Zancor Development	126	2009 - 2018
Regina Los Andes Development	55	2009 - 2018
Greenfield development to north of North Street	23	2018 - 2028
Light Industrial along West Street and CR 91	17.85 hectares	Long term
Long term planning area to north of existing development (west of railway)	1096	Long term
Long term planning area to east of railway	297	Long term

It is expected that the long term planning areas, to the north of the existing development, will be developed beyond the horizon period considered in this study (i.e. 2028). However consideration has been given to the long term collector road connections in this area, and their potential to impact on the collector roads included in the study period.

It is proposed that the future extension of Industrial Road to 27/28 Sideroad be along the east side of the area designated as Environmental Protection, in order to protect the natural environmental features in this area. In the long term the County of Simcoe proposes to assume control of 27/28 Sideroad as a secondary arterial road. While the extension of Industrial Road will provide a connection between 27/28 Sideroad and County Road 91, its function as a connection to an alternate east/west route around Stayner is expected to be limited. Fairgrounds Road, located to the west of Stayner, is an existing paved road that can be developed further as an alternate route around Stayner, in the long term, for connection to an expanded network of County Roads in this area.

A second collector road is proposed to connect between Regina Street and the extension of Industrial Road. The provision of a second access reduces the need to provide an additional crossing of the railway in this area, by directing the traffic to the North Street connection to Highway 26.

Access to the part of the long term planning area that is located to the east of the railway, is expected to be via local road connections to Highway 26 and 27/28 Sideroad.

The forecasted traffic volumes on the collector roads within the northwest quadrant are summarized in the following table:

Table 5.13 - Forecasted Traffic Volume on Collector Roads In The Northwest Quadrant

Collector Road	Location	Forecasted AADT 2018	Forecasted AADT 2028	Long Term (after 2028)
North Street	West of Highway 26	<1500 vpd	<2000 vpd	<7000 vpd
Regina Street	West of North Street	<500 vpd	<1000 vpd	<1500 vpd
Industrial Road	North of CR 91	<500 vpd	<1000 vpd	<3000 vpd

As noted in the above table, the traffic on North Street is forecasted to increase significantly once the long term planning area is developed. The Township's Road Needs Study has identified the need to reconstruct a part of North Street in the short term. Where practical, it is recommended that this road be upgraded to collector road standards as part of any reconstruction work.

5.4.5 Collector Roads in The Northeast Quadrant

The existing collector roads (Scott Street and Locke Avenue) presently carry less than 1000 vpd. However, additional development (intensification and greenfield) is proposed in this quadrant that will increase the traffic volumes on these roads. The Township's Road Needs Study has identified a need to reconstruct these roads, in the short term. Where practical, it is recommended that these roads be upgraded to collector road standards as part of any reconstruction work. It is recommended that the intersection of Scott Street and Locke Street with Highway 26 remain as stop-control to reduce the potential for through traffic using the route to avoid the downtown.

Additional collector roads are required in this quadrant to accommodate the forecasted development, which is summarized in the following table:

Table 5.14 - Forecasted Developments In The Northeast Quadrant

Development	Number of Units	Assumed Time Period
Dancor Subdivision - residential	770 (475 singles, 80 townhouses, 215 apartments)	2009 - 2018
Dancor Subdivision - residential	330 (204 singles, 35	2019 – 2028

	townhouse, 91 apartments)	
Dancor Subdivision – commercial	6.72 hectares	2009 - 2018
Pacific Homes Emerald Creek Subdivision - residential	160 (99 singles, 61 apartments)	2009 - 2018
Pacific Homes Emerald Creek Subdivision – commercial	2.63 hectares	2009 - 2018
Intensification – Mowat Street	36	2009 – 2018
Greenfield – north of Dancor	436	2019 - 2028
Greenfield – west of Mowat St.	215	2019 - 2028
Greenfield – east of Wyant Road	38	2009 - 2018
Intensification – Locke/Scott area	215	2009 - 2018
Long term planning area	162	Beyond 2028

A new north/south collector road is proposed through the Dancor lands, continuing through the proposed greenfield development lands to the north and ultimately connecting to 27/28 Sideroad. It is anticipated that the proposed north/south collector road through the Dancor lands will intersect with Highway 26 at a signalized intersection, as per preliminary requirements identified by the Ministry of Transportation. This intersection will facilitate access/egress from the Dancor lands (residential and commercial) and from a proposed hub for emergency services (fire, ambulance, police), which is planned opposite to the Dancor access in this area.

A new east/west collector road is proposed through the Dancor lands, connecting between Mowat Street and County Road 7. A second connection is also proposed to Mowat Street from the Dancor lands, as a local road.

A new collector road is proposed to service the Emerald creek Subdivision and future development to the north. It is recommended that this collector road not connect to 27/28 Sideroad, in order to maximize traffic mobility in this area.

Mowat Street is proposed to be upgraded to a collector road, providing a connection between Highway 26 and 27/28 Sideroad. Mowat Street is presently a gravel road from 27/28 Sideroad to just north of Weir Street and significant upgrading is required to meet collector road standards. It is anticipated that the improvements to Mowat Street will be implemented as development of the adjacent lands occurs. Mowat Street presently has a ROW of about 15 metres along the majority of its length, and therefore ROW widening is required in conjunction with any upgrading of this road to collector road standards. Existing strip development, along the south part of Mowat Street, may limit ROW widening in that area, and therefore a minimum acceptable ROW width of 20 metres may be required in that area. For the remainder of Mowat Street, a minimum ROW of 20 metres is recommended, or 26 metres where adjacent development dedications are available.

The forecasted traffic volumes on the existing and proposed collector roads within the northeast quadrant are summarized in the following table:

Table 5.14 - Forecasted Traffic Volume on Collector Roads In The Northeast Quadrant

Collector Road	Location	Forecasted AADT 2018	Forecasted AADT 2028
North/south road through Dancor lands	North of Highway 26	<3500	<4500
East/west road through Dancor lands	East of Mowat Street	<2500	<3000
East/west road through Dancor lands	West of County Road 7	<2000	<2500
Mowat Street	North of Highway 26	<2500	<5000
Locke Avenue	East of Highway 26	<2000	<2500
Scott Street	North of Highway 26	<2000	<3000
Collector Road through Emerald Creek Subdivision	East of Highway 26	<2000	<3000

5.4.6 Cost Estimates For Collector Road Improvements

Based on the analysis completed in this transportation plan, planning level cost estimates have been made for the identified road projects for the time horizons considered, as summarized in the following tables. The cost estimates have been based on the following assumptions:

- Unit costs of $1,350 per metre for an 8.5 metre road section and $1,500 per metre for a 9.5 metre road section.
- Assumed 8.5 m road section (20 m ROW) in areas of existing development and reconstruction of exiting roads, and 9.5 metre road section (26 m ROW) in areas of new development.
- Costs include full new construction including: excavation, granular, curb and gutter, subdrain, asphalt, concrete sidewalk, storm sewer works, trees, street lights.
- Sidewalks are included on one side for 20 metre ROW and both sides for 26 m ROW.
- Costs include an allowance of 20% for engineering and contingencies.
- Costs exclude: property acquisition, utility relocation, major crossings, traffic signals and turning lanes.

- Property acquisition costs are based on $250,000 per hectare, but these are subject to change as a result of property appraisals on a case-by-case basis.

The Township may choose to implement these projects in a different order or phasing from that suggested, in order to accommodate other council priorities such as the need to coordinate with other infrastructure works, planned developments in the area, or other considerations beyond the scope of this project.

Table 5.15 - Short Term (0 – 10 years) Road Improvements

Road	Location	Type of Improvement	Cost	Property
Industrial Road	County Road 42 to County Road 91 (part of route)	Reconstruct 400 metres of existing road.	$540,000	$12,500
		500 metres of new road.	$750,000	dedication
Margaret Street	County Road 42 to Warrington Road	Reconstruct 520 metres of existing road.	$702,000	$27,500
		860 metres of new road.	1,290,000	dedication
Industrial Road/Regina Street	County Road 91 to Regina Street	650 metres of new road.	$975,000	dedication
		Bridge crossing	$486,000	dedication
North Street	Highway 26 to Stayner Street	Reconstruct 380 metres of existing road.	$513,000	$33,750
Locke Avenue	Highway 26 to Scott Street	Reconstruct 620 metres of existing road.	$837,000	
Scott Street	Highway 26 to Locke Avenue	Reconstruct 750 metres of existing road	$1,012,500	$16,250
Mowat Street	Highway 26 to north limit of development	Reconstruct 920 metres of existing road.	$1,242,000	$87,500
North/South Collector Road	Dancor Development	620 metres of new road.	$930,000	dedication
East/West Collector Road	Dancor Development	1325 metres of new road.	$1,987,500	dedication
Warrington Road	Margaret Street Extension to Superior Street	Reconstruct 500m of existing road	$675,000	

Collector Road	Emerald Creek Subdivision	600 metres of new road	$900,000	dedication

Table 5.16 - Medium Term (10 – 20 years) Road Improvements

Road	Location	Type of Improvement	Cost	Property
Sunnidale Street	Cherry Street to Centre Line Road	Reconstruct 1450 metres of existing road	$1,957,500	
North/South Collector Road	Greenfield development to north of Dancor lands.	320 metres of new road.	$480,000	dedication
Cherry Street	Sunnidale Street to Highway 26	Reconstruct 400 metres of existing road.	$540,000	

Table 5.17 - Long Term (20 + years) Road Improvements

Road	Location	Type of Improvement	Cost	Property
Industrial Road	Industrial lands	850 metres of new road (through industrial lands)	$1,275,000	dedication
Industrial Road	Regina Street to 27/28 Sideroad	1450 metres of new road (through long term planning area)	$2,175,000	dedication
N/S Collector Road	North Street to Industrial Road	1200 metres of new road (through long term planning area)	$1,800,000	dedication
N/S Collector Road	Limit of Development to 27/28 Sideroad	900 metres of new road	$1,35,000	dedication
Mowat Street	Limit of Development to 27/28 Sideroad	Reconstruct 900 metres of existing road	$1,215,000	$112,500

Funding for works identified within this Transportation Plan may be from the Township's capital budget, Development Charges, private agreements, sharing with other road authorities having jurisdiction, or from provincial or federal funding programs. The details of such funding is beyond the scope of this study.

5.5 Traffic Signal Plan

Where warranted, traffic signals are used to allocate time among the conflicting traffic movements of intersections. MTO traffic signal warrants are based on intersection traffic during the heaviest eight hours of the average day and/or a high incidence of accidents at the intersection. Traffic signal warrants are typically verified through eight-hour traffic counts, taken after development has occurred, since it is difficult to forecast the distribution of traffic over an eight hour period that may result from development. However, for planning purposes, the Ontario Traffic Manual allows for warrants be assessed based on an average hourly volume, taken to be equivalent to 1/16 of the AADT.

While peak traffic from residential areas is often focused on a.m. and p.m. commuter periods, commercial or recreational traffic typically contributes to more prolonged periods of peak traffic activity, and therefore have a higher potential for meeting eight-hour traffic signal warrants.

It is recommended that traffic continue to be monitored at the major intersections (i.e. arterial/arterial and collector/arterial), and that signals be implemented once signal warrants have been confirmed. Intersections that may require signalization within the study horizon periods are shown on Figure 6 (2018) and Figure 7 (2028) and are summarized in the following table:

Table 5.18 - Traffic Signal Plan

Intersection	Horizon Period	Cost Estimate ($)	Justification / Comments
Highway 26 / County Road 42 / County Road 91	Existing	N/A	Acceptable operations beyond year 2028.
Highway 26 / Perry Street	Existing	N/A	Allows for pedestrian crossing in commercial core. Allows diversion of traffic from Oak Street and Huron Street during congested periods.
Highway 26 / County Road 7	2009 – 2018	$300,000 plus possible future $150,000 for second left	Increased traffic due to growth and to improvements along the alternate route around Stayner. It is forecasted that signal warrants may be met by 2010.

		turn lane	Intersection is under MTO jurisdiction.
Highway 26 / 27/28 Sideroad	2009 – 2018	$500,000 plus possible future $150,000 for second left turn lane	Increased traffic due to growth and to improvements along the alternate route around Stayner. It is forecasted that signal warrants may be met by 2011. Intersection is under MTO jurisdiction.
Highway 26 / Sobey's Access / Highschool Access	2009 – 2018	$250,000	To facilitate operations at a commercial / institutional access.
County Road 7 / 27/28 Sideroad	2009 – 2018	$400,000	Increased traffic due to growth and to improvements along the alternate route around Stayner. It is forecasted that signal warrants may be met by 2016. Intersection is under County jurisdiction.
Highway 26 / Proposed Dancor Collector Road	2009 – 2018	$350,000	To facilitate traffic operations from residential/commercial development (Dancor) and access to an emergency services hub. Signal warrants are likely to be met. Intersection is under MTO jurisdiction.
Highway 26 Proposed Emerald Creek Subdivision Collector Road	2009-2018	$300,000	To facilitate traffic operations from residential/commercial development (Emerald Creek Subdivision). Signal warrants are likely to be met. Intersection is under MTO jurisdiction.
Margaret Street / Warrington Road	2009 – 2018	$350,000	Extension of Margaret Street will require interconnection of railway signals/gates with signalized intersection operations, due to proximity of the railway to the intersection.
Highway 26 / Mowat Street / Superior Street	2019 – 2028	$300,000	To facilitate traffic from residential growth in the northeast quadrant. Signal warrants are likely to be met.
County Road 42 / Margaret Street / Industrial Access	2019 – 2028	$300,000	To facilitate traffic operations from residential development (Margaret Street Subdivision) and industrial access.

			Signal warrants may be met within horizon period. Intersection is under County jurisdiction.
Highway 26 / North Street	After 2028	$300,000	To facilitate traffic operations from development in the long term planning area in the northwest quadrant.
County Road 91/Industrial Road	After 2028	$300,000	To facilitate development in the northwest and southwest quadrants.

It is forecasted that the number of signals along the Highway 26 corridor, including the connecting link, will increase from the existing two signals to eight signals by 2028. The spacing between signals will vary from a minimum of 440 metres to a maximum of 900 metres along this corridor. The uniformity of signals and their relative spacings will allow for coordination of these signals to optimize the traffic progression (i.e. speeds and Level of Service). It is recommended that traffic continue to be monitored, as additional traffic signals are added to the system, as a basis for the most appropriate signal coordination design.

5.6 Preliminary Development Charge Cost Sharing

It is expected that the ongoing Development Charges Study will provide the basis for cost sharing of projects identified in the Transportation Plan. However, based on traffic considerations a preliminary cost sharing for various transportation improvements is set out in the following table. The cost sharing noted is preliminary and subject to confirmation through the ongoing Development Charges Study work.

Table 5.19 – Preliminary Development Charge Cost Sharing

Item	Improvements	Percentage Cost Sharing		
		Local Service Development Charge	Municipal-Wide Development Charge	Non-Growth
Collector Road	Reconstruct existing Road to 8.5m width.		10%	90%
	Property Acquisition - Widen ROW to minimum 20m.		50%	50%

Widen Collector Road	Reconstruct and widen existing road to 9.5m width.		40%	60%
	Property Acquisition - Widen ROW to minimum 26m.		90%	10%
New Collector Road	Construct new collector road to 9.5m width	70%	20%	10%
	Property Acquisition - New 26m ROW.	100% (dedication)		
New Traffic Signals	New traffic signals and turning lanes.	70%	20%	10%

6.0 Coordination of Infrastructure Projects

This study has identified functional road needs within the Stayner area, based on road classification and traffic requirements. Upgrading, or expansion, to the road system to address these needs should be coordinated with the Township's construction plans for associated roads, and to the construction of other infrastructure projects.

For coordination purposes, the Township's Road Needs Study (2006) was reviewed to identify projects that were recommended to be part of the Township's ten year construction program (i.e. 2007-2016). The arterial or collector roads, for which construction improvements have been identified, are summarized in the following table:

Table 6.1 - Arterial or Collector Roads Recommended For Improvements In Road Needs Study

Road	Location	Improvement Recommended	Improvement Year
Warrington Road	Fletcher Street to Margaret Street extension	Upgrade from surface treatment to asphalt	2009
Warrington Road	Margaret Street Extension to Superior Street	Resurface (asphalt)	2011
Warrington Road	Centre Line Road	Upgrade from surface	2011

	to 21/22 Sideroad Nottawasaga	treatment to asphalt	
Locke Avenue	Highway 26 to Jonathan Court	Reconstruction	2009
Locke Avenue	Jonathan Court to Scott Street	Reconstruction	2013 - 2014
27/28 Sideroad Nottawasaga*	Mowat Street to 0.55 km west	Upgrade from surface treatment to asphalt	2010
27/28 Sideroad Nottawasaga*	Highway 26 to 0.78 km east	Resurface (surface treatment)	2013
North Street	Highway 26 to Stayner Street	Reconstruction	2012
Scott Street	Weir Street to Locke Avenue	Reconstruction	2013

*Note: 27/28 Sideroad is currently being upgraded in 2008-2009 to improved standards to provide an alternate route around Stayner.

For coordination purposes, the Township's Stayner Servicing Plan (2003) was reviewed to identify general servicing constraints or opportunities, related to other municipal servicing that is required to accommodate growth in the study area. The preliminary servicing plans for expanding the sewer and water system to service growth in Stayner are included in **Appendix G**. These servicing plans are presently being updated in conjunction with the revised growth forecasts and revisions to the Official Plan.

Preliminary plans for expansion to the water supply system include the provision of a new well and storage reservoir in the southwest quadrant, as well as two new wells in the southeast quadrant. Various preliminary locations for trunk watermains are also noted on the plans. It is also noted that the Collingwood-New Tecumseth Water Supply Pipeline runs along the existing railroad ROW through Stayner, and this source may be considered in the future for connection.

Preliminary plans for expansion to the sewage collection system include the provision of pumping stations, forcemains and gravity sewers. Preliminary locations for two new pumping stations are shown in the northeast quadrant, with one new pumping station in the northwest quadrant. Upgrades to the Township's existing wastewater treatment plant (in the northeast quadrant) are also required to accommodate growth.

It is recommended that any expansions to the transportation infrastructure be coordinated with major servicing works, where possible.

7.0 Engineering Standards

The standard road cross sections, presently specified in the Township's Engineering Standards, are included in **Appendix H**. For urban conditions (i.e. < 23 metre lot frontages), an urban cross section is required, including curb and gutter and storm sewers. A modified urban cross section may also be used in areas where grades exceed 6.0%. The modified urban cross section includes a reduced asphalt width, with paved shoulders behind the curbs. Where lot frontages exceed 23 metres, rural cross sections (i.e. open ditches) can be used. All typical cross sections are developed in a 20 metre right-of-way.

It is expected that urban cross sections will apply to all local and collector roads considered in this study. Rural cross sections will apply to arterial roads in rural areas. Cross sections for arterial roads, in areas that are not rural, will have site-specific designs to address their constraints and opportunities (e.g. commercial areas, connecting links, parking requirements etc.).

The existing cross section standards for Township roads are not currently specifically related to either the road's function or to traffic volumes. Conversely, the Township's planning standards require a 26 metre right-of-way (ROW) for collector roads, and roads are to be classified as arterial, collector or residential, in accordance with the Township's Official Plan. The Engineering Standards require that sidewalks be provided on both sides of roads that are developed within a 26 m ROW.

Developer's have used standard 8.5 metre roads for both local roads (20 m ROW) and collector roads (26 m ROW) within the Township. An example of such an approach is shown on the cross section developed for the Regina Street collector road (see Appendix H). Since the road function and traffic volumes typically vary between local and collector roads, it is recommended that cross sections be developed to reflect these requirements.

Considerations in the development of typical ROW cross sections for various functional requirements include:

- Road widths required to adequately accommodate traffic mobility, access, parking (if allowed) and other uses (e.g. cycling).
- Provision for service locations, clearances and separations.
- Form of adjacent development – e.g. side, rear or front lotting, urban or rural.
- Pedestrian facilities.
- Volume of heavy vehicles (eg. servicing industrial area).

Road width criteria, based on AADT and design speed, from the Ministry of Transportation, Transportation Association of Canada and the Ontario Good Road Association are contained in **Appendix I**.

For new industrial collector roads (eg. Industrial Road) it is recommended that a minimum ROW width of 30 metres be provided.

For collector roadways that allow on-street parking, it is recommended that road widths be increased to facilitate the mobility of traffic. Assuming parking is allowed along one side of the road only, a minimum 9.5 metre road width (i.e. edge of pavement to edge of pavement) is recommended for new collector roads, developed within a 26 m ROW. Where existing development constraints (e.g. existing road widths, existing ROW widths, setbacks etc.) do not allow for development of this preferred collector road cross section, a reduced standard may be considered, with associated restrictions. For example, where parking is not allowed on a collector road, the standard 8.5 metre road is sufficient to accommodate traffic mobility. ROW requirements incorporating standard 8.5 metre roads will vary from 20 metres to 26 metres, depending on constraints (e.g. servicing corridors, pedestrian requirements, setbacks etc.).

The above noted road widths also allow for the sharing of the lanes with bicycle traffic, where cycling traffic is low. In areas with moderate to high cycling traffic a shoulder bikeway, bike lane or bike path may be considered, as discussed further in a subsequent section to this report. The minimum widths recommended for such dedicated cycling facilities are as follows:

- Shoulder bikeways or bike lanes - 1.5 m;
- Bike path – 1.5 m if exclusive or 2.0 m if shared with pedestrians.

The cross section standards will be finalized as part of the Township's ongoing Official Plan studies and Design Guidelines Study.

8.0 Master Plan for Sidewalks, Trails and Bicycle Facilities

Section 3.8.2.5 of the Clearview Township Official Plan has identified the need for "adequate and safe pedestrian and cycling linkages between communities, development areas, open space, and community facilities and services". The Township has also adopted "Smart Growth" goals that include "encouragement of better choices in travel between and within communities".

The intention of the sidewalk, trail and bicycle facility system for the Stayner area may be summarized as follows:

- To provide pedestrian and cycling connections to primary generators of such activities (e.g. schools, commercial areas, municipal office, library, arena, community centre, parks, churches etc.).

- To facilitate movement around, and through, Stayner (e.g. via a potential central north/south trail adjacent to the railway line and along a potential perimeter trail around the built-up area).
- To facilitate connections to the trail system in the broader area (i.e. to trail connections between communities or to regional trails).

The formulation of a master plan for sidewalks, trails and bicycle facilities should consider the following:

- Form and function of the pedestrian connection, including compatibility with adjacent land use, natural amenities (e.g. woodlands, watercourses etc.) or corridors (e.g. railways, arterial roads, drainage easements).
- Location of major public destinations.
- Number and type of road crossings (highways, arterial roads, collector roads) or railway crossings.
- System continuity or location of identified gaps, with a goal to improving access, circulation and safety.

A recommended Master Plan For Sidewalks and Trails in the Stayner area is shown on Figure 9, and discussed in subsequent sections to this report. The locations of sidewalks and trails are conceptual only, and will be refined through the ongoing studies associated with the new Official Plan and development applications.

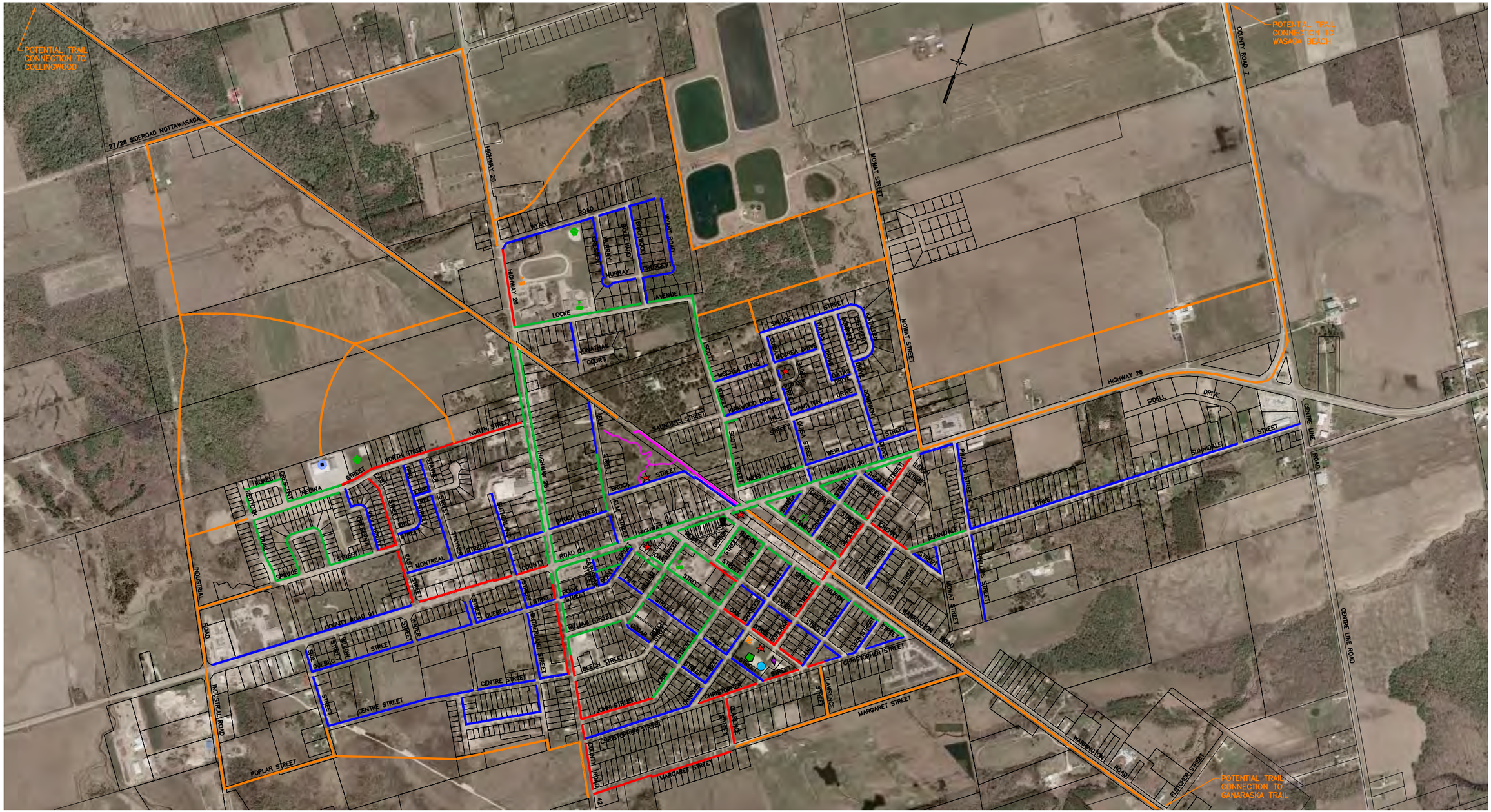
8.1 Sidewalks

A sidewalk assessment plan for Stayner was prepared by Envision Tatham in 2007, a copy of which is included in **Appendix J**, for reference purposes. As shown in that study, Stayner presently has sidewalks on some of its streets, however many streets presently do not have sidewalks and gaps exist in a number of areas that restrict effective connection to major public destinations. Where these gaps represent a primary discontinuity, they should have the highest priority for improvement in the overall pedestrian/cyclist system.

The Envision study identified areas which could benefit from additional sidewalks, as well as priorities among those sidewalk projects. In some cases, the criteria used for assessment resulted in sidewalks being recommended on both sides of local residential streets, where no sidewalks presently exist. While this level of service may be desirable, budget constraints may limit its full implementation.

Within new subdivisions, the Township's engineering standards presently require sidewalks on one side of local roads and on both sides of roadways that have 26 metre right-of-ways. In accordance with the Township's standards, it is recommended that new local roads have sidewalks provided on one side and new collector roads or arterial roads have sidewalks provided on both sides of the roadway. It is recommended that sidewalks on existing roads be upgraded to meet these minimum

standards, where possible. Recognizing the budget limitations and physical constraints for addressing the sidewalk deficiencies along many of the roads within



LEGEND

- FUTURE SIDEWALK OR TRAIL CONNECTION
- HIGH PRIORITY SIDEWALK ADDITIONS ON EXISTING ROADS
- SECONDARY PRIORITY SIDEWALK ADDITIONS ON EXISTING ROADS
- EXISTING SIDEWALK
- EXISTING TRAIL

- ARENA
- BALL DIAMOND
- BOWLING PARK
- CURLING RINK
- PARK

- POOL
- TENNIS COURT
- LIBRARY
- PUBLIC ELEMENTARY SCHOOLS
- PUBLIC HIGHSCHOOLS

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

MASTER PLAN FOR SIDEWALKS AND TRAILS

BURNSIDE
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telephone (705) 446-0515 **fax** (705) 446-2399

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Stayner, it is recommended that sidewalk upgrading work be prioritized according to the following:

- Provision of sidewalks on at least one side of roads that serve areas of high pedestrian activity and/or have high vehicular volumes/speeds. Priority should be given to addressing gaps in the continuity of the sidewalks in such areas.
- Providing sidewalks on both sides of roads, where the result would be a significant safety improvement due to a reduction in major road crossings.
- To provide access to, and continuity with, the existing and proposed trail systems.
- To provide connection for proposed development areas.

The priority locations for new sidewalks are summarized in the following table. The priority sidewalks within the existing built up area are intended to service existing development, as well as to provide external connections to future development. The priority sidewalks for developing areas are primarily intended to service future development, although they may also provide improved access from the existing development to the broader trail systems.

Table 8.1 - Priority Areas For Sidewalk Additions

Location	Type	Length (m)	Rationale
Priority Sidewalks Within Existing Built Up Area			
County Road 42 From County Road 91 to Margaret Street	Arterial Sidewalk	820	Connection of existing and proposed residential areas to commercial core. The location of this sidewalk is constrained by a large open ditch that runs along the roadway in part of this area.
County Road 91 From County Road 42 to East Street	Arterial Sidewalk	450	Connection of existing and proposed residential areas to commercial core.
Oak Street From Superior Street to John Street	Collector Sidewalk	210	Connection of existing and proposed residential areas to commercial core and school.
Superior Street From Highway 26 to Oak Street	Collector Sidewalk	790	Connection of existing and proposed residential areas to commercial core and school.
North Street and Regina Street from Highway 26 to Valleyfield Crescent	Collector Sidewalk	685	Connection of arena and community centre to schools along Highway 26 and to existing and proposed residential areas.
East Street from County Road 91 to	Local Sidewalk	490	Connection of existing and proposed residential areas to

Regina Street			commercial core and to arena and community centre.
Highway 26 from Locke Avenue to Wyant Road	Arterial Sidewalk	280	Connection of existing and proposed residential areas to commercial core and to schools.
Oak Street, Lawrence Street (future), Christopher Street, Clarence Street	Local Sidewalks	800	Connection of proposed residential area to commercial core, park and school.
Margaret Street from County Road 42 to Clarence Street	Collector Sidewalk	520	Connection of proposed residential development to commercial core. Increased traffic along collector road due to proposed development.
John Street from County Road 42 to 335 m east	Local Sidewalk	335	Gap in existing local sidewalk.
Perry Street from Gideon Street to John Street	Local Sidewalk	135	Gap in local sidewalk and connection to school.
Cherry Street from Sunnidale Road to Superior Street	Local Sidewalk	165	Gap in local sidewalk.
Total Sidewalk In Existing Built Up Area		5,680	
Sidewalk Cost Estimate: 5,680 m x 1.5 m x $70/sq.m		$596,400	
Priority Sidewalks Associated With Developing Areas			
Margaret Street from Clarence Street to Warrington Road	Collector Sidewalk	830	Connection of proposed residential development to commercial core and future trail system. Increased traffic along collector road due to proposed development. Controlled railway crossing.
Mowat Street from Highway 26 to north boundary of residential development	Collector Sidewalk	900	Connection of proposed residential development to commercial core. Increased traffic along collector road due to proposed development.
Highway 26 from Mowat Street to County Road 7	Arterial Sidewalk	1260	Connection of proposed residential development to commercial core. Connection of commercial core to external trail system.

Highway 26 from Wyant Road to north boundary of residential development	Arterial Sidewalk	400	Connection of proposed residential development to commercial core and schools.
Regina Street and Industrial Road	Collector Sidewalk	735	Proposed collector roads.
Spruce Street from Red Oak Trail to Industrial Road	Local Sidewalk	265	Proposed local road. Connection to perimeter trail system.
Total Sidewalk Associated With Developing Areas		4,390	
Sidewalk Cost Estimate: 4,390 m x 1.5 m x $70/sq.m		$460,950	

Costs for upgrading and extending the sidewalk system are expected to be met through the Township's capital improvement program and from development charges or development agreements, as applicable.

It is recommended that new sidewalks be constructed with a minimum width of 1.5 metres to facilitate passing of pedestrians, strollers, wheelchairs etc. Increased sidewalk widths may be required at locations of high pedestrian activity.

Where possible, sidewalks should be set back from the edge of the curb or roadway in order to minimize maintenance (e.g. allow for snow storage) and to enhance safety.

8.2 Trails

The Clearview Culture and Recreation Advisory Committee has prepared a draft concept plan showing potential trail locations, both within Stayner and connecting to the broader area. The potential locations for trails, identified by the committee, are shown on the mapping in **Appendix J**, along with the existing regional trails (i.e. Bruce Trail and Ganaraska Trail).

A high potential exists for creating a north/south trail linkage along the rail corridor as shown on the mapping in **Appendix J**. This trail would facilitate a connection to the Ganaraska Trail to the south and to Collingwood to the north. In addition a potential route has been identified, along the County Road 7 corridor, to facilitate a connection to Wasaga Beach. It is anticipated that the form of these trails would accommodate both pedestrian and cyclist traffic, with a granular trail surface. It is recommended that these routes continue to be developed, as budgets allow and as coordination opportunities arise.

The Clearview Culture and Recreation Advisory Committee is currently working to complete a section of trail within the Centennial/Kinsmen Participark (north of Brock Street and west of Elm Street) that would link to the main north/south trail in this area. This walking trail takes advantage of the natural amenities in this area (i.e. woodland areas and watercourse).

A perimeter trail has been proposed around Stayner to connect the residential areas to the central trail and to facilitate circulation around the community. With the exception of a short section of "high potential" trail, located west of County Road 42 at the interface between the industrial lands and residential lands, the remainder of these trails are only potential, conceptual locations. While the concept of a perimeter trail has merit, from a pedestrian/cyclist circulation perspective, the form and function of such trails, and their integration into development concepts, has yet to be determined.

The location of a perimeter collector trail has been reviewed, for the purposes of establishing a Master Plan for the sidewalks, trails and bikeways, which integrates with the Township's sidewalks (existing and proposed) as well as with the proposed road system. In new developments, if opportunities exist to integrate natural features (e.g. woodlands, watercourse valleylands etc.) or design features (e.g. major drainage easements, stormwater management areas etc.), the trails can be rural in form. Such trails may also be widened to accommodate both pedestrian and bicycle connections, where required. However, where opportunities for integration of rural trails into new developments are limited, the trail connections may take the form of urban sidewalks/bikeways along the collector roadways, or with bicycle traffic utilizing the edge of the roadway in bike lanes.

For the purposes of reviewing the potential locations for connecting trails, the study area has been divided into the same quadrants considered for the collector road analysis, and is discussed in the following sections.

8.2.1 Trail Connections In The Southwest Quadrant

A high potential trail route has been identified through Phase 2 of the Aspen Ridge Estates development and along the west side of County Road 42. It is assumed that the section of trail through the residential development would utilize the sidewalks/roadways, although the section through the future industrial lands could be developed as a rural trail.

The potential trail route runs to the west across the future industrial lands, with potential for connection to/from the residential streets located directly to the north. At Industrial Road the trail would run to the north, alongside this road.

Existing woodland areas are located a short distance to the north and to the south of the potential trail route in this area. A small adjustment to the trail routing may take

advantage of the amenity feature offered by such woodland areas. It is recommended that such adjustments be considered during the detailed design of trails in this area.

8.2.2 Trail Connections In The Southeast Quadrant

The potential trail route in this area connects between County Road 42 and Warrington Road, through lands proposed for residential development (Margaret Street Subdivision development). However, since it is proposed that Margaret Street be extended easterly to Warrington Road as a collector road, an alternative to the trail identified can be made alongside this collector road. This also provides opportunity for installing warning devices at the railway crossing on Margaret Street, for improved safety for both vehicular and pedestrian crossings.

A trail connection is also proposed to the residential lands to the north, via the future development of Lawrence Street. It is expected that this connection would utilize proposed residential sidewalks in this area.

8.2.3 Trail Connections In The Northeast Quadrant

The potential trail routes identified in this area include the following:

- East/west connection, through proposed development lands, from Locke Avenue to Mowat Street and from Mowat Street to County Road 7. The trail through the lands to the east of Mowat Street may be alongside the collector road, unless opportunities can be integrated for green space corridors associated with drainage easements etc. However, the trail through the lands to the west of Mowat Street is through an existing woodland area, and therefore opportunities for integrating this amenity feature should be explored in the detailed designs for this subdivision.

- Connection to the existing residential lands to the south at Simcoe Street (opposite Datas Drive). The location identified for this connection may be constrained by the proximity to existing houses in this area. Therefore, an alternate connection, located at the west end of Simcoe Street, may be preferred.

- Connection from Mowat Street to 27/28 Sideroad, generally south and west of the sewage lagoons. This connection provides opportunity for integration into the woodland area located immediately adjacent to the lagoons. Since this area is not planned for development, this section can be developed as a rural trail connection. Appropriate fencing of the lagoon area is recommended, if a trail system is developed in this area.

- Connection from Highway 26 towards Wasaga Beach, along County Road 7. Since this trail is regional in nature, its location along an arterial roadway may allow for implementation of a rural form of trail. The location of the rural trail

should be set back beyond the road ditches, to maximize separation from the roadway in this area.

- Connection from Mowat Street to County Road 7, along Highway 26. Since Highway 26 is an arterial roadway, with access controls, it is suggested that this trail be implemented in a rural form, well set back from the roadway.

- Connection from west of the sewage lagoons to Highway 26, along 27/28 Sideroad. Since the right-of-way is limited along this arterial road, consideration may be made for relocating this trail connection to the lands to the south, to utilize the amenities provided by a woodland area and watercourse through the Emerald Creek Estates development.

8.2.4 Trail Connections In The Northwest Quadrant

The potential trail routes identified in this area include the following:

- Connection along the proposed Industrial Road. A significant part of this trail can be developed through woodland areas and most of the trail can be rural in form.

- Connection from the Arena to the future Industrial Road and for connection to the main north/south trail (railway trail). Considering that the development of this area is considered long term, it is suggested that interim rural trails be implemented in these areas. Ultimately parts of this trail may be integrated into the collector road cross section in this area. For the easterly branch of this trail, measures should be taken to provide a safe crossing of the railway line, for potential connection to the school facilities to the east.

- Connection along 27/28 Sideroad from Highway 26 to the future extension of Industrial Road. Over the short term this road is likely to remain a rural Township road, while the County's long term planning proposes that this road become a secondary arterial road under the jurisdiction of the County. The location of trails along 27/28 Sideroad should have increased set back from the roadway to recognize the road's future arterial function. Over the long term, the use of 27/28 Sideroad as a pedestrian/cyclist connection also allows for a single vehicular/pedestrian crossing of the railway line, with appropriate warning controls.

8.3 Bicycle Facilities

Cycling is recognized as a viable form of transportation, as a means of recreation and exercise, and as a way of protecting the environment. To respond to the increased use of bicycles, consideration has been given to implementing bicycle facilities as part of this Transportation Plan.

Public surveys, completed as part of the Simcoe County Transportation Master Plan, suggested that walking and cycling tend to be recreational in nature today. However, over time, it is expected that greater emphasis will be placed on walking and cycling as a preferred mode of travel for short trips (i.e. under 5 km in length). Communities that are less than 10 km apart should be linked by biking/walking trails, if feasible. It is recommended that the Township's policies and infrastructure development respond to these trends. New growth areas should be planned to encourage walking and cycling by providing infrastructure to connect to the existing trails network, provide access to local commercial areas, and to provide safe walking and cycling routes to neighbourhood schools and community centres. These links will complement the enhanced network of regional trails being planned at the County level.

Typical bikeway facilities are classified by the Transportation Association of Canada as shown in **Appendix K**, including shared roadway /wide curb lane bikeway, shoulder bikeway, bike lane and bike path.

On local roads and low-volume collector roads, cycling can be accommodated as a shared lane with vehicular traffic. However, since cyclist corridors should be a minimum of 1.5 m in width, passing vehicles are required to move beyond the centerline, similar to the passing of parked cars on these streets. Under low traffic volumes (i.e. say less than 3000 AADT), low cyclist volumes and low speed conditions, operational safety should remain acceptable with shared lane facilities. Alternatively, if these roads are developed in a 20 m ROW, a bike path, or a combination bike path/sidewalk, could be provided in the boulevard, as shown on Figure 10. However, unless additional ROW can be acquired, the constrained ROW may result in unacceptable space constraints, such as reduced areas available for street trees or snow storage, for example. Therefore, shared lane bike facilities are recommended for low volume roads, where the ROW is restricted to 20 metres.

On higher-volume collector roads, or arterial roads, it is recommended that standards be developed to accommodate cycling facilities within the ROW or within designated blocks within developments The practicality of implementing a bicycle lane will depend on the availability of right-of- way and the need to accommodate higher volumes of cyclists. Along trails, or along boulevards, it may also be possible to implement a separate bicycle path to accommodate cyclists, to avoid the potential for cyclist/pedestrian conflicts.

The Township's present standards require sidewalks to be placed on both sides of collector roads (i.e. 26 m ROW). Typically cyclists are precluded from using these sidewalks due to the potential for pedestrian conflict. Therefore the introduction of enhanced cycling facilities is restricted to the following:

TYPICAL ROAD CROSS–SECTION

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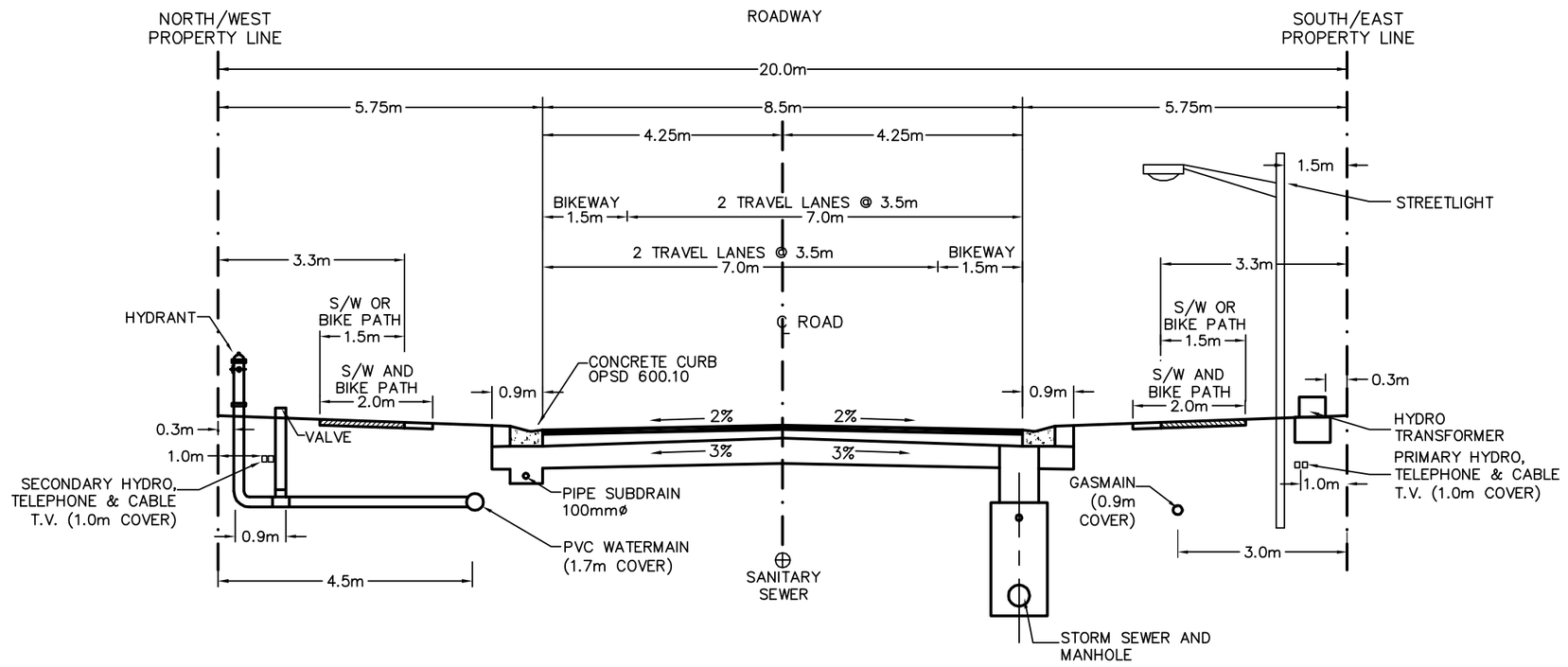

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

MODIFIED STANDARD RIGHT–OF–WAY CROSS SECTION TO INCLUDE BICYCLE FACILITY

BURNSIDE

R.J. Burnside & Associates Limited
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telephone (705) 446-0515 **fax** (705) 446-2399

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- Providing sufficient lane widths to accommodate shared roadway operations or to implement a shoulder bikeway or dedicated bike lane. These facilities can be established by reducing the width of the motor vehicle traffic lanes, prohibiting on-street parking, or widening of the roadway.
- Providing a bike path within the ROW or within a suitable block.

For urban cross sections, assuming that a minimum ROW of 26 m is available to accommodate higher volume traffic facilities, an on-street or on-boulevard bicycle facility can be integrated into the ROW as shown in Figure 11.

However in an urban environment, it should be recognized that the creation of bike routes may be further constrained by the following:

- Problems created by drivers reversing out of their properties, having reduced visibility of the bikeway.
- Potential hazards created to cyclists due to the opening of vehicle doors.
- Environmental hazards created by traffic noise, fumes and speed and the splashing of water from gutters.

For rural cross sections, which typically have higher traffic speeds, it is preferred that a bicycle path be established along the backslope of the ditch, as shown on Figure 12.

Detailed design for bicycle facilities should meet the requirements set out in the Geometric Design Guide For Canadian Roads, Transportation Association of Canada.

Where bicycle facilities are provided, it is recommended that the Township further encourage both public and private entities to provide the following:

- Secure bicycle racks/shelters.
- Showers and change rooms.
- Direct sidewalk connections between activity areas.
- Development of promotional information, including highlighting the benefits of walking and cycling, identification of safe routes, and general operational guidelines.
- Coordination between the municipality, the County and private organizations/individuals in establishing trails, including inter-regional linkage and linkages in new developments and redevelopment areas, where feasible.
- Provide signage along the trail routes to identify key destination points.

TYPICAL ROAD CROSS–SECTION

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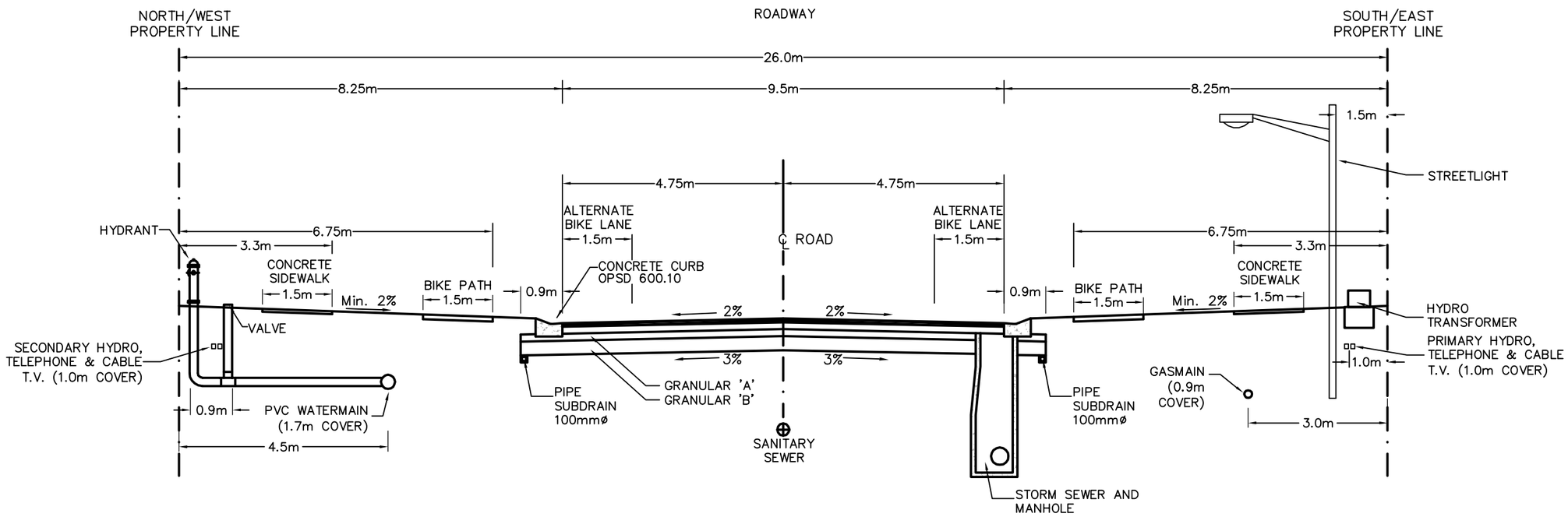

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

MODIFIED 26m RIGHT–OF–WAY CROSS SECTION TO INCLUDE BICYCLE FACILITY AND WIDER ASPHALT

BURNSIDE

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TYPICAL ROAD CROSS–SECTION

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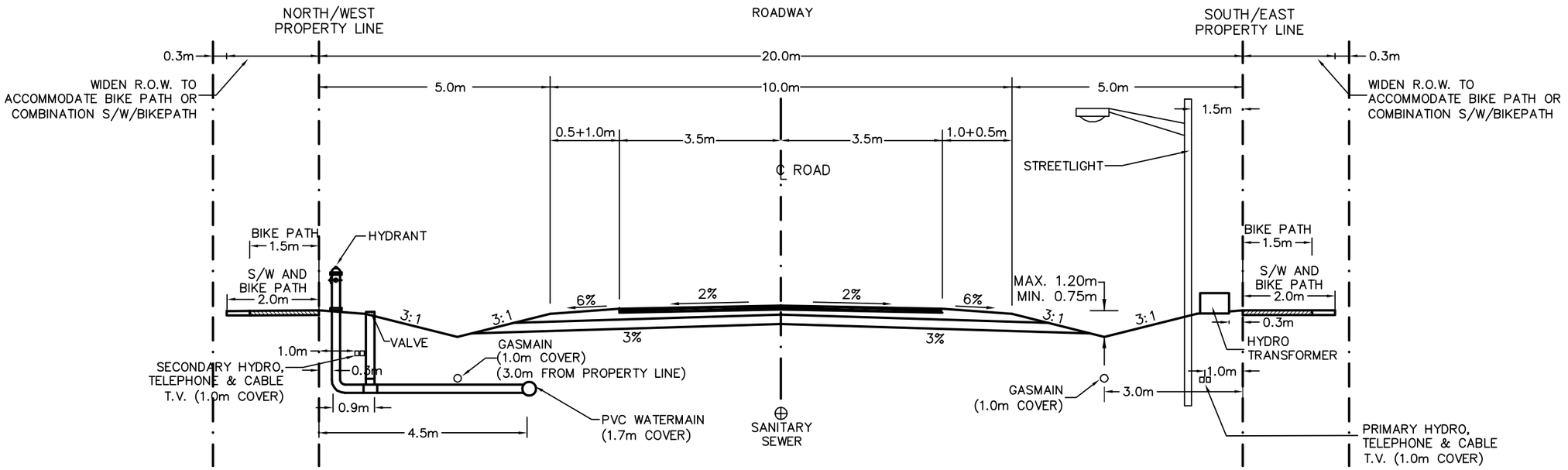

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

MODIFIED STANDARD RURAL RIGHT–OF–WAY CROSS SECTION TO INCLUDE BICYCLE FACILITY

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- Provide benches and rest stops at regular intervals throughout the system.
- Provide appropriate traffic control devices on off-road cycling facilities to direct cyclists and pedestrians safety across intersecting roadways and railways.
- Develop policies outlining the requirements related to the dedication of lands in new developments to complete future trail/sidewalk connections identified in the Official Plan.

Trail and sidewalk facilities should be planned to encourage crossing locations at intersections rather than mid block. If mid-block bikeway crossings are required, adequate design measures should be included to ensure safety including:

- Geometric alignments to promote a reduction in speed of the cyclists.
- Warning or control devices such as bollards, changes to the surface texture, signage etc.
- Ensuring adequate site distance is available for crossing purposes.

Ultimately the development of a barrier-free and comprehensive network of sidewalks, trails and bicycle facilities will make travel by foot and bicycle more attractive to the users of the system.

9.0 Updating of This Transportation Plan

The forecasts made in this transportation plan have been based on the information presently available. It is recommended that this plan be reviewed every five years, as a minimum, to confirm its continuing validity and to make any revisions necessary to address the following:

- Revisions to provincial requirements/forecasts, including population/job targets that may impact the Stayner area.
- Revisions to County requirements/forecasts, including revisions to the County Official Plan, roads downloaded or uploaded, and new roads.
- Monitoring of actual development/job growth that occurs, impacting the Stayner area, and comparisons to forecasts.
- Impact of road improvements or traffic diversion.
- Ongoing traffic monitoring to confirm traffic forecasts.

Report Prepared By:

Henry B. Centen, P. Eng.
Senior Project Manager – Transportation

BURNSIDE

Appendix A
Documentation Related to Natural Heritage Constraints and Opportunities

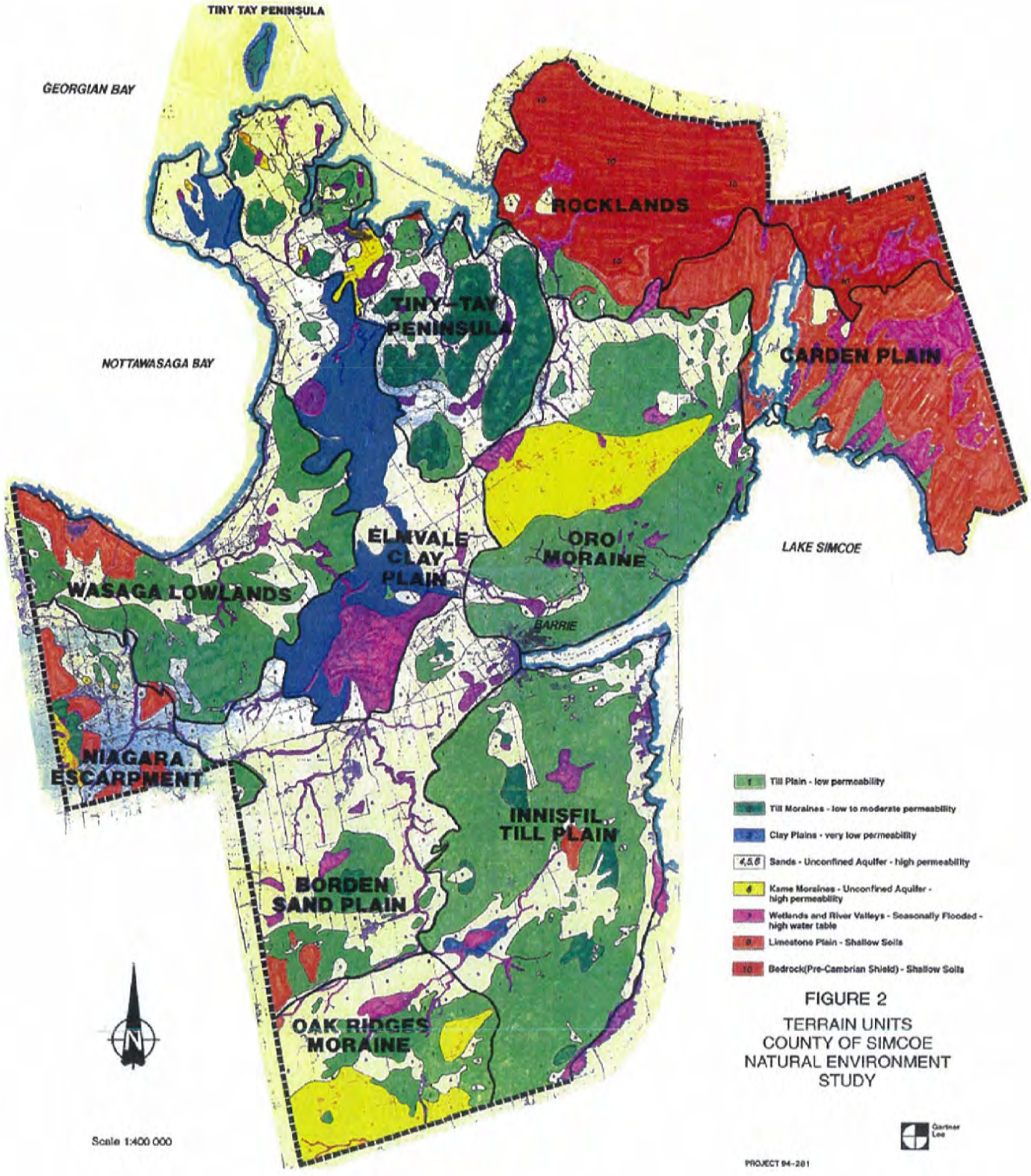


FIGURE 2

TERRAIN UNITS
COUNTY OF SIMCOE
NATURAL ENVIRONMENT
STUDY

Gartner Lee

PROJECT 94-281

Lower Nottawasaga River 2007 Subwatershed Report Card

The Lower Nottawasaga River extends from Angus downstream through the Minesing Wetlands, emerging from this vast wetland at Edenvale. Downstream of Edenvale, the river cuts through the Edenvale Moraine and pauses briefly at Jack's Lake (a widening in the river that was part of an ancient lagoon) before cutting through the parabolic (cresent-shaped) sand dunes of Wasaga Beach Provincial Park. The river then flows through the Wasaga Beach urban area before discharging to Georgian Bay. Several watercourses including Willow Creek and the Mad River (discussed in other watershed reports) enter the river between Angus and Wasaga Beach.

Grades

C	**Forest Conditions**
D	**Surface Water Quality**
B	**Wetland Conditions**

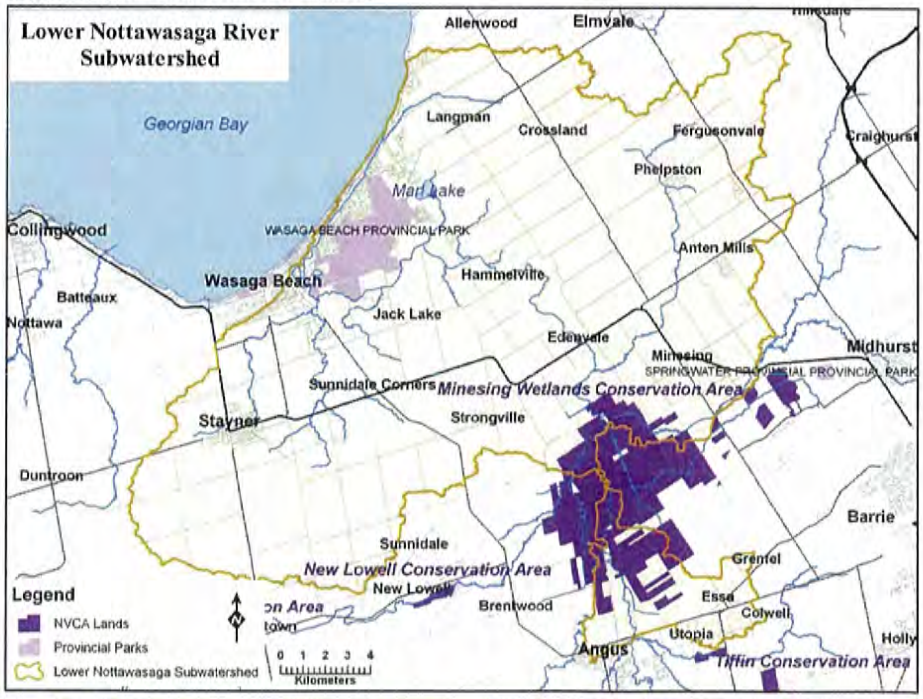
Marl Creek arises on the Simcoe Lowlands north of Fergusonvale and flows through a mosaic of farm fields, forests and wetlands before entering an extensive agricultural plain that extends downstream to the Minesing Wetlands. Marl Creek enters the Nottawasaga River at the north end of the wetland complex.

Similarly, Lamont Creek and McIntyre Creek emerge on the Simcoe Lowlands southeast and southwest of Stayner. Rich agricultural lands dominate their landscape. Lamont Creek flows through Stayner and joins McIntyre Creek within the Wasaga Sands golf course before discharging to the river east of Sunnidale Road.

Little Marl Creek emerges on clay plains near Langman and flows through agricultural lands and a golf course before entering Marl Lake—one of only three natural lakes within the Nottawasaga River watershed. This lake is the remnant of a large lagoon that covered this lowland area 5,000 years ago when lake levels were substantially higher than today.

Sturgeon Creek originates on the Simcoe Lowlands northeast of Langman, flowing through agricultural lands before entering a mixture of swamp and forest cover at Deerbrook Drive. Downstream, Sturgeon Creek flows through a cottage/residential area before discharging to the Nottawasaga River at Sturgeon Point Marina.

This report card describes the health of forests, wetlands and streams within the Lower Nottawasaga River subwatershed and is part of a larger report titled ***The Nottawasaga Valley Conservation Authority Watershed Report Cards*** that is posted on the NVCA website (www.nvca.on.ca).



Partner Municipalities: Town of Wasaga Beach, Springwater Township, Clearview Township
Watercourses: Marl Creek, Sturgeon Creek, Lamont Creek, McIntyre Creek, Little Marl Creek, Willow Creek, Nottawasaga River

"Working Together to Protect and Restore"

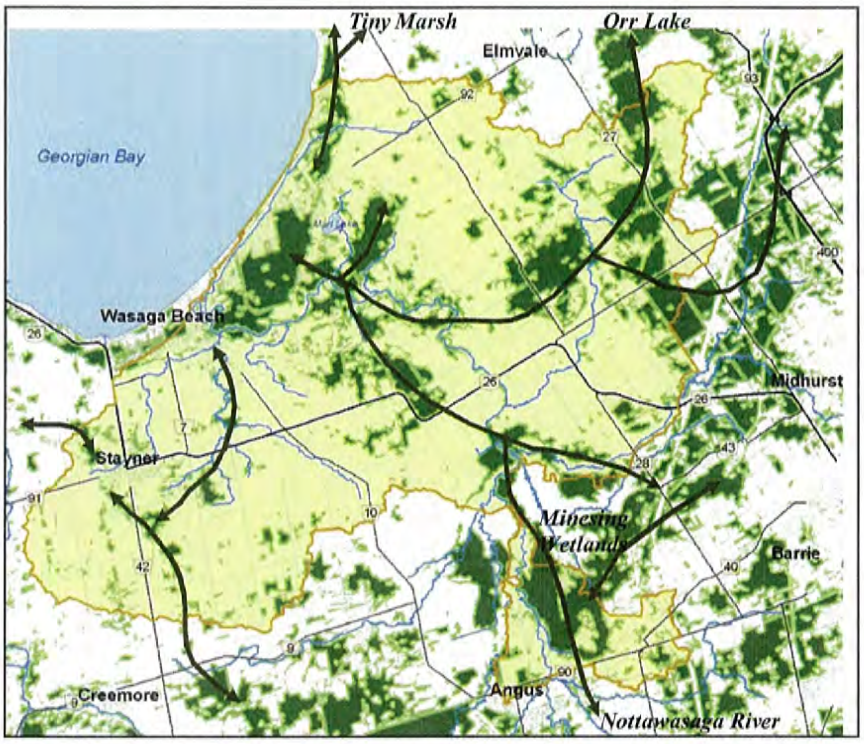
Forest Conditions

Grade C

Forest cover within the Lower Nottawasaga River subwatershed are generally healthy but quite variable. There are extensive areas of prime agricultural lands where forest cover is sparse. However, large tracts of forest are associated with the Minesing Wetlands, Wasaga Beach Provincial Park, Jack's Lake, Marl Lake and the headwaters of Marl Creek. Watershed forest cover is under pressure from urban development.

The provincially significant forests of Wasaga Beach Provincial Park and adjoining areas provide a wide range of habitats—from swamp forests along the ancient beach shoreline to dry pine-oak woodlands which mantle the provincially significant parabolic sand dunes. These dunes also support provincially rare sand barren and prairie/savannah habitats. The full range of these habitats is required to support the Threatened eastern hog-nosed snake.

Though shoreline forest cover is sparse, portions of the Wasaga Beach shoreline support provincially rare shoreline dune communities that thrive in the dynamic beach environment. Good stewardship by local residents and the park as well as local planning agencies is required to maintain and enhance these habitats in balance with the important tourism opportunities along the world's largest freshwater beach.



Legend

- Forest Interior
- Forested Area
- Lower Nottawasaga River Subwatershed
- Natural Heritage Corridors

Subwatershed forest cover provides important vegetated corridor connections upstream through the Minesing Wetlands to the southeast, Tiny Marsh to the northeast, Matheson Creek to the east and the Severn Sound headwaters to the north.

Indicators	Lower Nottawasaga River Results		NVCA Watershed Results		Indicator Description	5-Year Trend
Forest Cover	27.6%	C	32.8%	B	Forest Cover is the percentage of the watershed that is forested. Environment Canada suggests that 30% forest cover is the minimum needed to support healthy wildlife habitat — more coverage is beneficial.	⇩
Forest Interior	11.1%	B	10.8%	B	Forest interior is the area of forest that lies more than 100 m from a forest edge – away from the windy, dry conditions and predators that are associated with the edge. Sensitive forest birds, mammals, reptiles and amphibians require deep forest habitat for survival. Environment Canada suggests that 10% forest interior cover is the minimum needed to support a range of species.	⇩
Riparian Cover	28.8%	D	42.6%	C	Streamside forest cover (riparian vegetation) filters pollutants and provides important fish and wildlife habitat. Environment Canada suggests that at least 30 m on each side of the stream (over 75% of its length) should be in forest cover to support healthy streams.	Insufficient Data

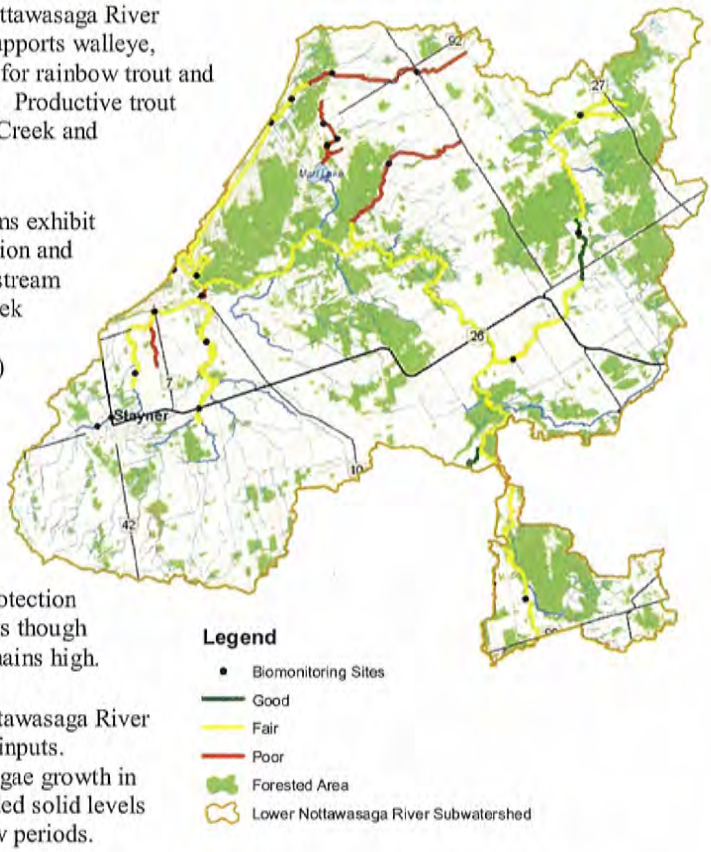
Surface Water Quality

Grade D

Surface water quality and stream habitat in the Lower Nottawasaga River subwatershed ranges from fair to poor. The main river supports walleye, northern pike and bass and provides a migratory corridor for rainbow trout and chinook salmon. Northern pike are present in Marl Lake. Productive trout habitat is limited to the downstream portion of McIntyre Creek and portions of Marl Creek.

The agricultural headwaters of the tributary stream systems exhibit "fair" to "poor" stream health as a result of stream alteration and sparse riparian (streamside) vegetation cover. The downstream portions of Sturgeon Creek and mid-sections of Marl Creek show an improvement in stream health associated with extensive adjacent forest cover and groundwater (springs) input. Similarly, stream health in McIntyre Creek improves as it enters a deep valley which intercepts groundwater springs and seeps.

Lamont Creek receives urban inputs through Stayner that result in elevated nutrient loadings, contributing to "poor" stream health. Urban inputs also occur on the Nottawasaga River through Wasaga Beach. Shoreline protection (retaining walls) in this area has impacted riparian habitats though upstream riparian cover (through the provincial park) remains high.



Nutrient levels (Total Phosphorus) are high along the Nottawasaga River as a result of subwatershed and upstream (Innisfil Creek) inputs. These high levels contribute to dense aquatic plant and algae growth in the lower river during the summer months. Total suspended solid levels indicate that the river is moderately turbid during low flow periods.

Historical bacteria (*E. coli*) monitoring in the river and tributaries suggests that summer bacteria levels exceed provincial recreational guidelines for swimming, particularly in the tributary streams. However, regular shoreline monitoring by Ontario Parks and the Simcoe County Health Department indicates that the beach itself remains a healthy place to swim.

Indicators	Lower Nottawasaga River Results		NVCA Subwatershed Average		Indicator Description	5-Year Trend
Benthic Grade	1.85	C	2.20	B	Insects and other "bugs" that inhabit the streambed are excellent indicators of stream health. Healthy streams receive a score of "3" while unhealthy streams receive a score of "1".	Insufficient Data
Total Phosphorus (baseflow; mg/L)	0.036	F	0.021	C	Total Phosphorus indicates nutrient levels within a stream. Our healthiest streams have levels less than 0.01 mg/L during low flow conditions. Streams typically have levels greater than 0.03 mg/L during storms (Lower Nottawasaga River Range: 0.015 — 0.093 mg/L). Provincial Water Quality Guidelines suggest that levels greater than 0.03 mg/L result in unhealthy stream conditions.	⟺
Total Suspended Solids (baseflow; mg/L)	13.89	C	9.89	B	High levels of suspended solids make streams look dirty or cloudy. Though streams may naturally look this way after storms, cloudy water during dry conditions may indicate urban or agricultural impacts. Healthy streams have levels less than 5 mg/L during low flow conditions. Environment Canada suggests that levels greater than 25 mg/L indicate unhealthy conditions.	Insufficient Data
E. coli (coliform-forming units/100ml)	300	C	312	C	E. coli are found in human and animal waste. Its presence indicates fecal contamination. Ontario Recreational Water Quality Guidelines suggest that waters with less than 100 CFUs/100 ml are safe for swimming.	Insufficient Data

Wetland Conditions

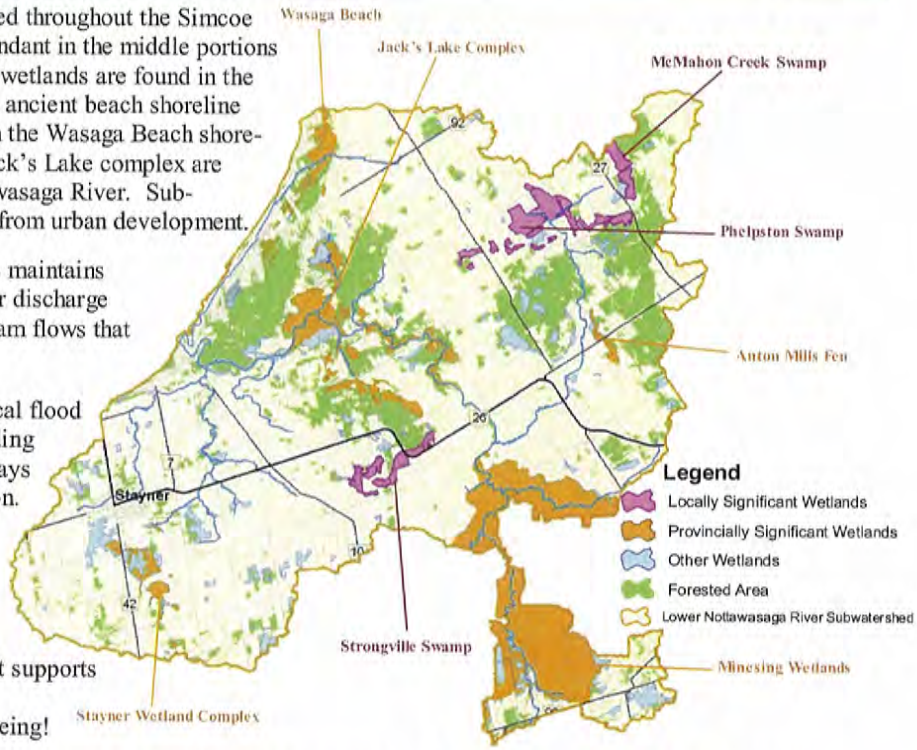
Grade B

Wetlands and lowland forest are scattered throughout the Simcoe Lowlands. They are typically most abundant in the middle portions of the smaller subwatersheds; however, wetlands are found in the headwaters of Marl Creek and along the ancient beach shoreline extending about a kilometre inland from the Wasaga Beach shoreline. The Minesing Wetlands and the Jack's Lake complex are larger wetlands located along the Nottawasaga River. Sub-Watershed wetlands are under pressure from urban development.

Groundwater recharge in some wetlands maintains groundwater supplies while groundwater discharge from other wetlands maintains cold stream flows that support trout.

The Minesing Wetlands provides a critical flood control function for Wasaga Beach, holding back upstream floodwaters for several days and releasing them in a controlled fashion.

Five wetland groupings have been identified as provincially significant by the Ontario Ministry of Natural Resources. The Minesing Wetlands is considered internationally significant—it supports rare vegetation communities, plants and animals—and is a great place to go canoeing!



Provincial and municipal planning policies protect provincially significant wetlands from development and site alteration.

Indicators	Lower Nottawasaga River Results		NVCA Watershed Results		Indicator Description	5-Year Trend
Wetland Cover	14.6%	A	12.0%	A	10% wetland cover has been identified as a minimum guideline for healthy watersheds (Environment Canada).	⇩
Wetland Buffer (100m buffer area)	36.1%	C	37.0%	C	A buffer is a vegetated area next to a wetland or stream. Many wildlife species require adjacent upland areas for foraging, nesting and other activities.	⇩

Local Actions Needed for Improvement

- Protect and restore forest and wetland cover, streambanks and shorelines to maintain and enhance natural habitats and corridors
- Restore forest and meadow cover next to wetlands and streams to improve wildlife habitat and stream/wetland health
- Manage plantations with a goal of restoring native forest cover over time
- Work with landowners to reduce impacts of onstream ponds, and shoreline/streambank erosion
- Work with landowners and municipalities to manage municipal drains in headwaters to maximize natural functions
- Work with farmers, municipalities, developers, golf courses and others to manage nutrients by: keeping cattle out of streams, implementing nutrient management plans, managing urban stormwater runoff and controlling sediment on construction sites
- Work with landowners to implement fish-friendly riverbank stabilization projects in Wasaga Beach

Thanks to our Watershed Champions—our landowners, community/environmental groups, schools, businesses and government agencies—that support stewardship activities in our watershed!

Contact NVCA staff at (705) 424-1479 or at www.nvca.on.ca to get involved!

NOTTAWASAGA VALLEY CONSERVATION AUTHORITY
8195 CONCESSION LINE 8
UTOPIA, ONTARIO. L0M 1T0
TELEPHONE: (705) 424-1479
FAX: (705) 424-2115
www.nvca.on.ca

ONTARIO REGULATION 172/06

REGULATION FOR DEVELOPMENT, INTERFERENCE WITH WETLANDS, AND ALTERATIONS TO SHORELINES AND WATERCOURSES.

(IN CONFORMANCE WITH ONTARIO REGULATION 97/04

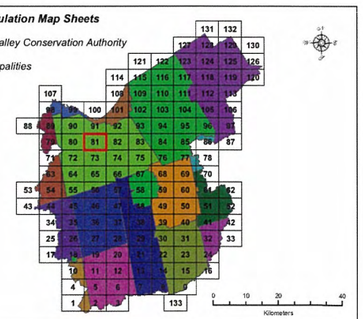
LEGEND

- MUNICIPAL BOUNDARY
- NVCA JURISDICTION
- REGULATION LIMIT
- LOT & CONCESSION FABRIC

Index to Regulation Map Sheets

Nottawasaga Valley Conservation Authority

Member Municipalities



n case of a conflict, the description of the areas provided in Section 2(1) of Ontario Regulation 172/06 prevails over the information shown on this map. Under Ontario Regulation 172/06 of the Conservation Authorities Act, the Nottawasaga Valley Conservation Authority regulates development in areas defined in Section 2, Subsection 1. The Regulation limit for riverine systems includes the greater (>) of the flood plain limit and the erosion hazard limit, plus an allowance of 15 metres. The Regulation limit for Lake Huron (Georgian Bay includes the high lake level (178.0 meters GSCD) plus an allowance of 45 metres (wave uprush, other water related hazards, dynamic beach). Provincially Significant Wetlands have been provided by the Ministry of Natural Resources. All other wetlands were delineated by the NVCA using the Ontario Wetland Evaluation System. The Regulation limit shown on this map includes wetlands greater than 2 hectares plus an allowance of 120 metres in order to identify lands where development could interfere with the function of a wetland. Ontario Regulation 172/06 applies to all wetlands and areas within the flooding hazard limit and erosion hazard limit shown and not shown on this map. Karst topography is a landscape created by groundwater dissolving sedimentary rock, such as limestone. This creates landforms

1:10,000

400 0 400 800 1,200

Meters

NO	REVISIONS	DATE	DRAWN BY
2	REVISED FOLLOWING MUNICIPAL CONSULTATION	Feb 16, 2007	CHECKED PLANNING
1	APPROVED, REGULATION NUMBER ADDED	May 4, 2006	CHECKED REGULATIONS
			CHECKED ENGINEERING
			APPROVED
			DATE May 15, 2006

ONTARIO REGULATION 172/06

REGULATION FOR DEVELOPMENT, INTERFERENCE WITH WETLANDS, AND ALTERATIONS TO SHORELINES AND WATERCOURSES. (IN CONFORMANCE WITH ONTARIO REGULATION 97/06)

PLOT DATE: FILE:

SHEET NO. 81 of

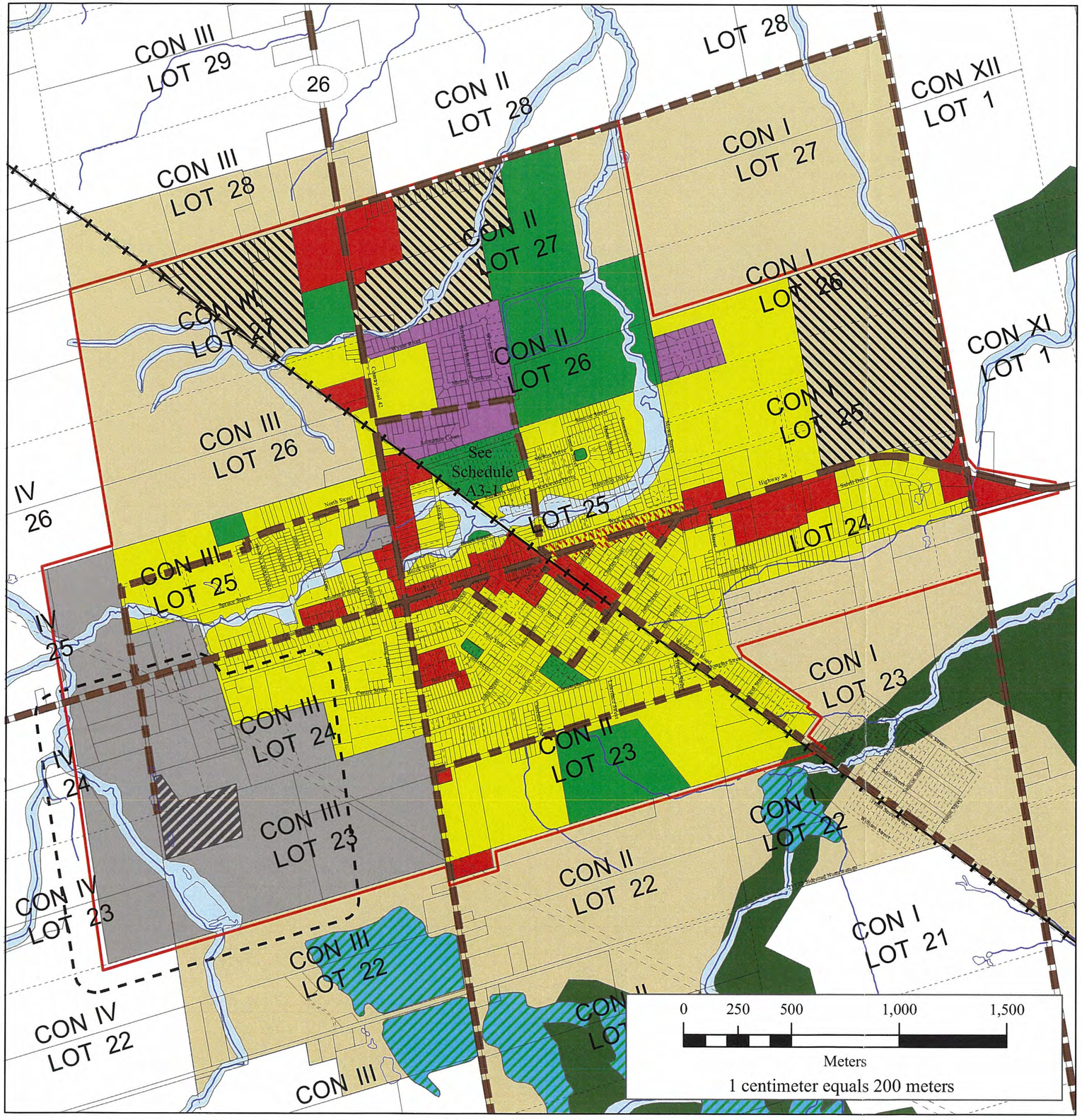
BURNSIDE

Appendix B
Land Use and Transportation Schedules
Clearview Official Plan

OFFICIAL PLAN
of the
TOWNSHIP OF CLEARVIEW

CLEARVIEW TOWNSHIP

Schedule A3 Stayner
Land Use and Transportation Plan
Urban Settlement Area



Land Use - General

- Greenland - Hazard Land Areas
- Greenland - Natural Heritage Areas
- Greenland - Wetland Areas
- Open Space
- Agriculture
- Rural
- Residential
- Estate Residential
- Special Policy Residential
- Future Development
- Commercial
- Commercial Transition Area
- Future Commercial
- Extractive Industrial
- Industrial
- Mineral Aggregate Resource Area
- Waste Disposal Industrial

Land Use - Niagara Escarpment Plan Area

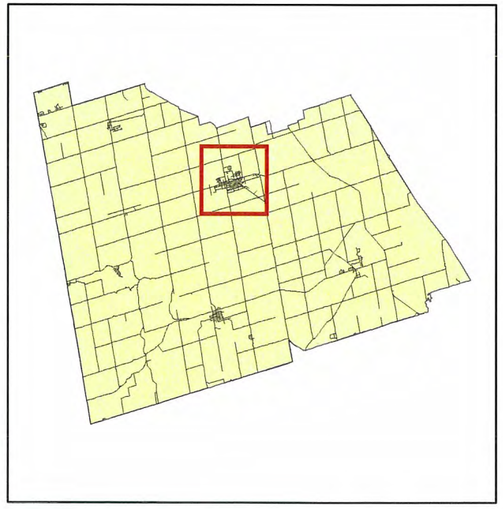
- Escarpment Natural Area
- Escarpment Protection Area
- Escarpment Recreation Area
- Escarpment Rural Area
- Mineral Resource Extraction Area
- Public Land in the Parks System

Boundary Classifications

- Waste Disposal Assesment Area
- Boundary of the Niagara Escarpment Plan
- Special Development Area - Collingwood Airport
- Urban Settlement Area Boundary
- Special Servicing Area
- Recreational District

Transportation

- Provincial Highways
- Arterial Roads
- Collector Roads
- Local Roads
- Railway Lands / Water Transmission Line
- Lamont Creek Regulatory Floodline



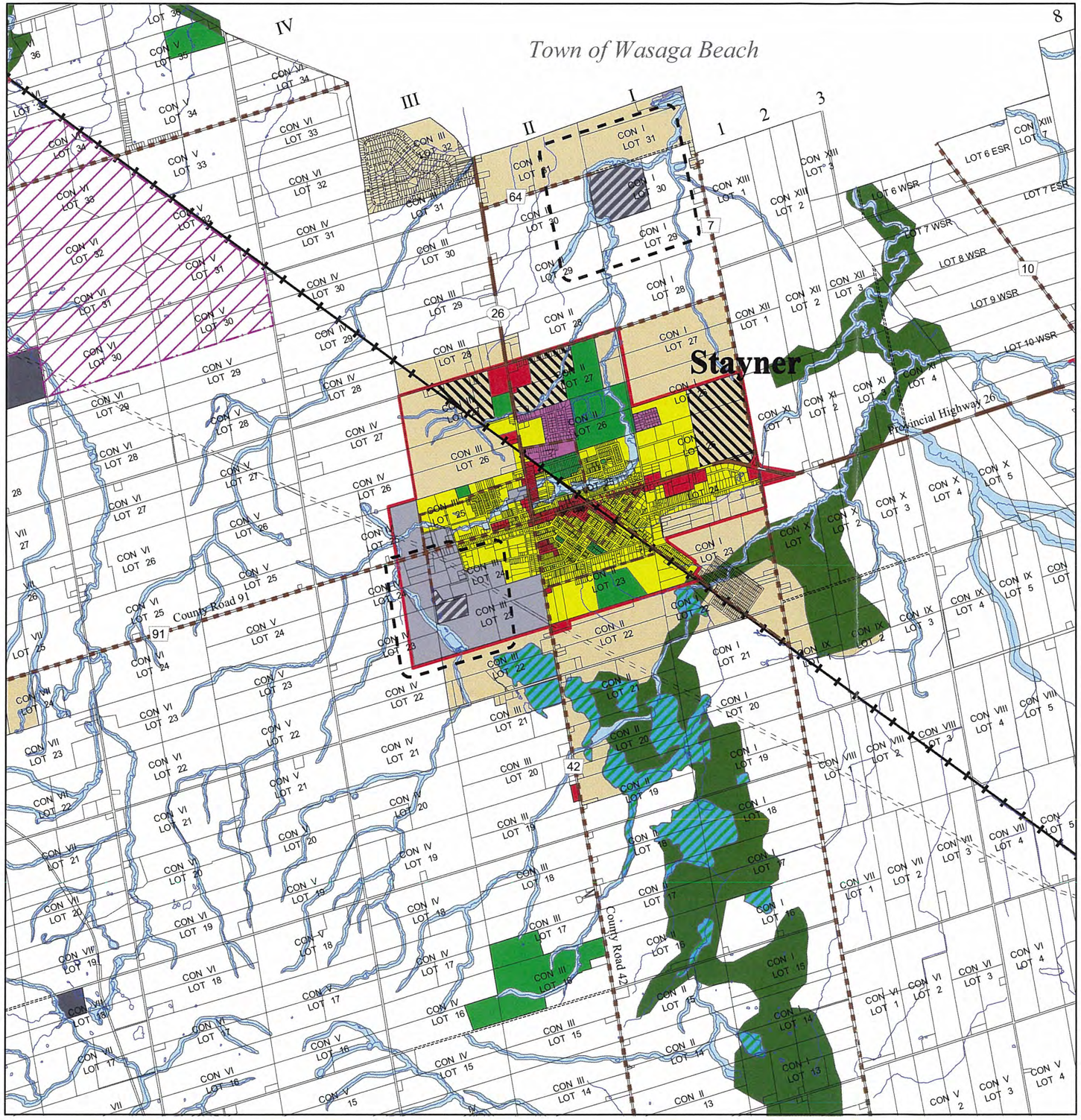
Projection: Universal Transverse Mercator
Mapping Date: 21 March, 2002

Parcel and hydrological data provided by
Simcoe County
Land Information Network Co-Operative.

NOTE: This map is not a legal survey.

OFFICIAL PLAN of the TOWNSHIP OF CLEARVIEW

Schedule A - Map 4 - North Central Land Use and Transportation Plan



Land Use - General

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- Escarpment Recreation Area
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- Recreational District

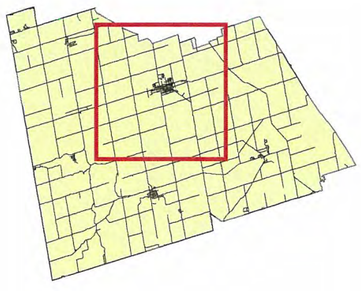
Transportation

- Provincial Highways
- Arterial Roads
- Collector Roads
- Local Roads
- Railway Lands / Water Transmission Line

0 0.5 1 2 3 4

Kilometers

1 centimeter equals 500 meters



Projection: Universal Transverse Mercator
Mapping Date: 21 March, 2002

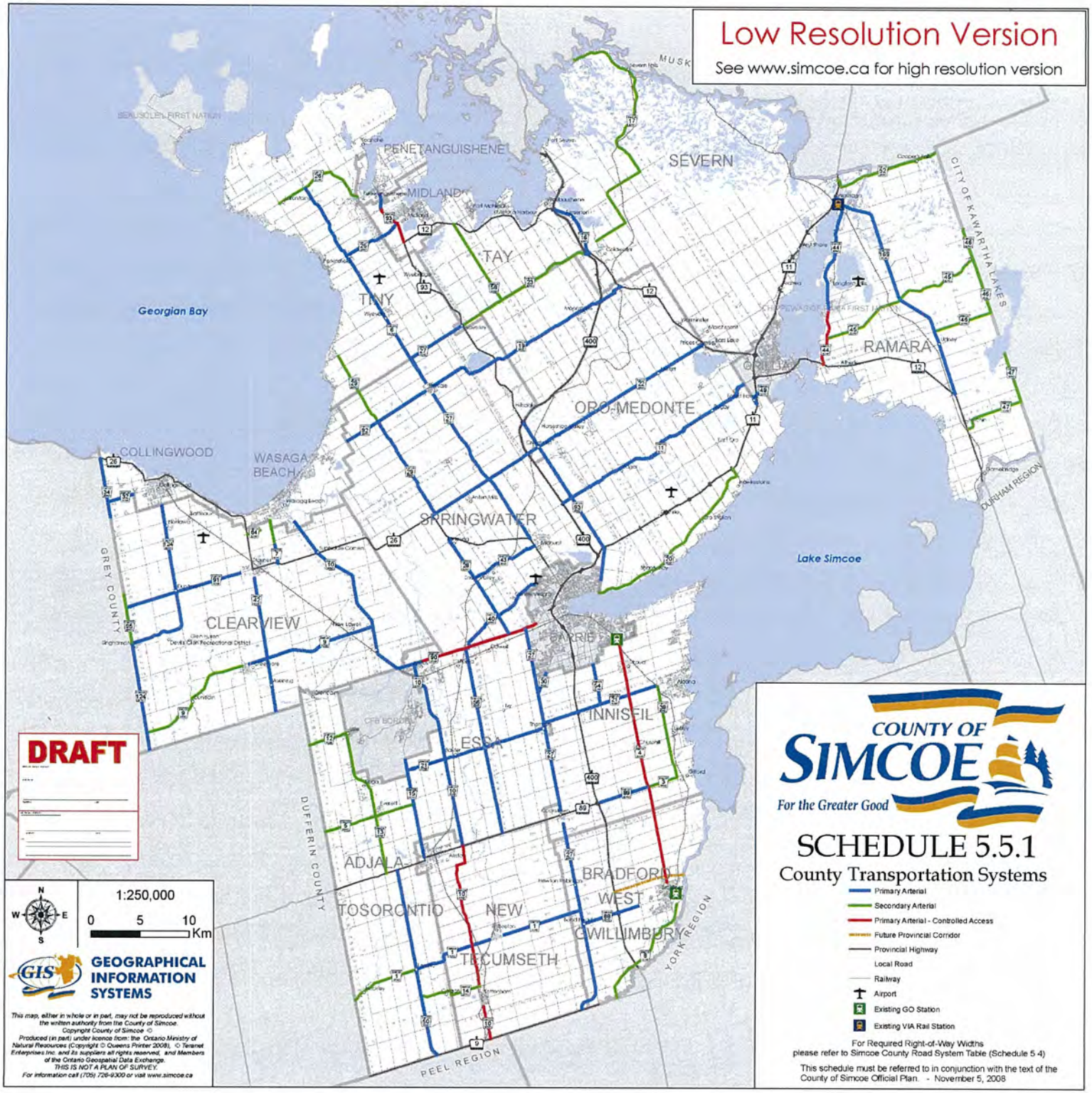
Parcel and hydrological data provided by Simcoe County Land Information Network Co-Operative.

NOTE: This map is not a legal survey.

BURNSIDE

Appendix C

Excerpts from County of Simcoe Official Plan (Approved by County Council November , 2008


Low Resolution Version
See www.simcoe.ca for high resolution version
MUSKOKA
BEAUSOLEIL FIRST NATION
PENETANGUISHENE
SEVERN
MIDLAND
TAY
TINY
Georgian Bay
CITY OF KAWARTHA LAKES
RAMARA
ORILLIA
ORO-MEDONTE
COLLINGWOOD
WASAGA BEACH
SPRINGWATER
DURHAM REGION
Lake Simcoe
GREY COUNTY
CLEARVIEW
BARRIE
INNISFIL
ESSA
DUFFERIN COUNTY
ADJALA-TOSORONTIO
NEW WILLIAMBURY
BRADFORD WEST GWILLIMBURY
TECUMSETH
YORK REGION
PEEL REGION
DRAFT
N
W
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S
1:250,000
0 5 10 Km
GIS
GEOGRAPHICAL INFORMATION SYSTEMS
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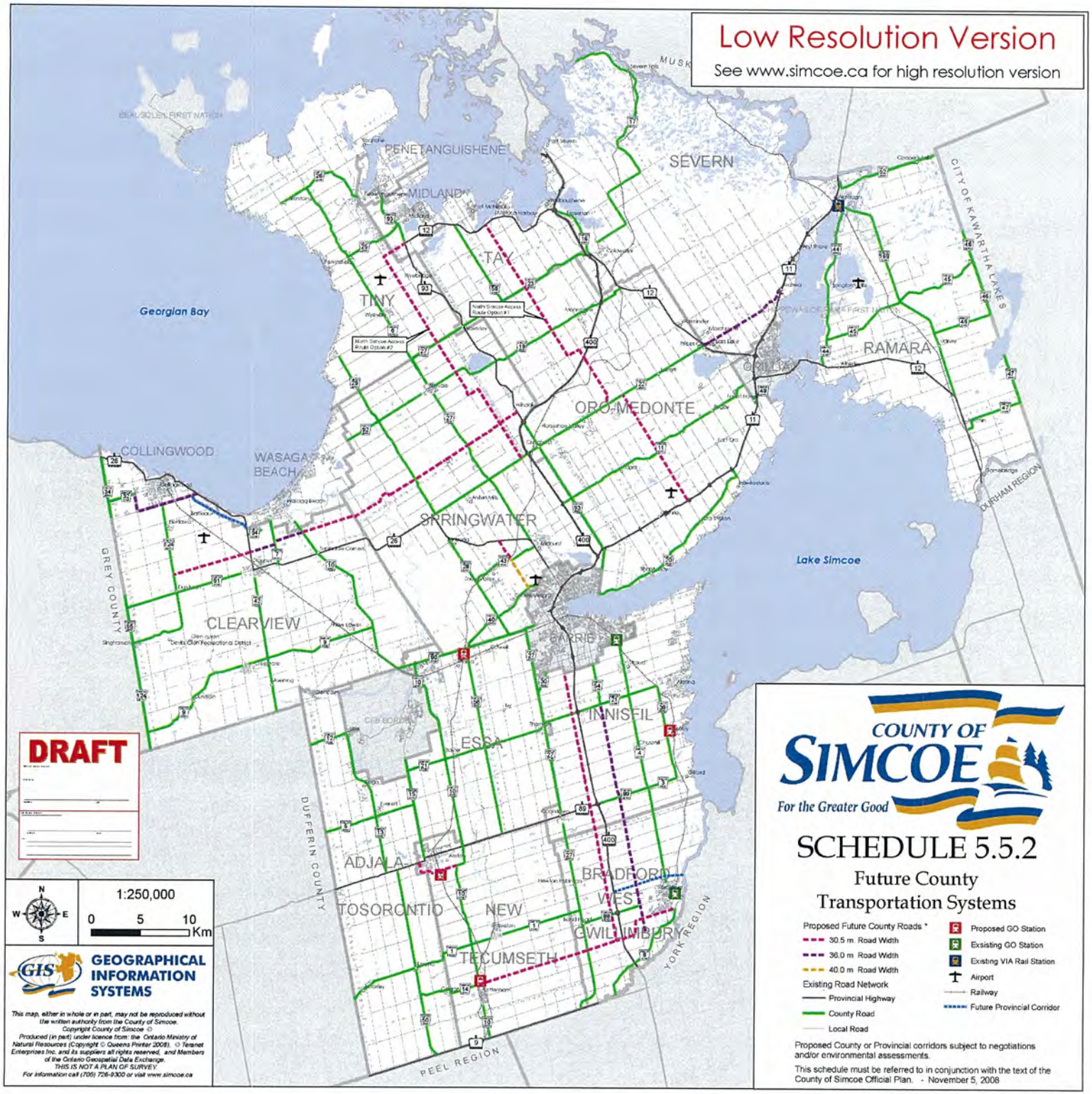
For information call (705) 726-9300 or visit www.simcoe.ca
COUNTY OF SIMCOE
For the Greater Good
SCHEDULE 5.5.1
County Transportation Systems
Primary Arterial
Secondary Arterial
Primary Arterial - Controlled Access
Future Provincial Corridor
Provincial Highway
Local Road
Railway
Airport
Existing GO Station
Existing VIA Rail Station
For Required Right-of-Way Widths
please refer to Simcoe County Road System Table (Schedule 5.4)
This schedule must be referred to in conjunction with the text of the County of Simcoe Official Plan. - November 5, 2008

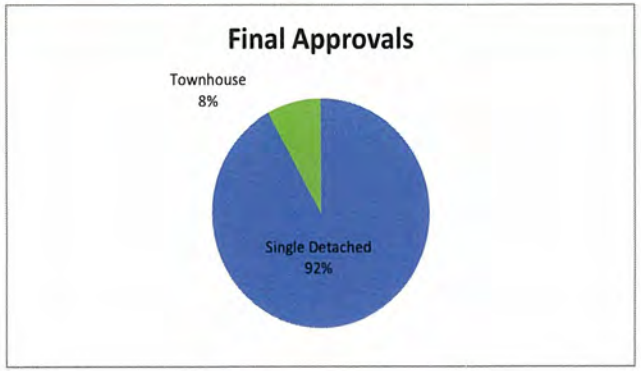


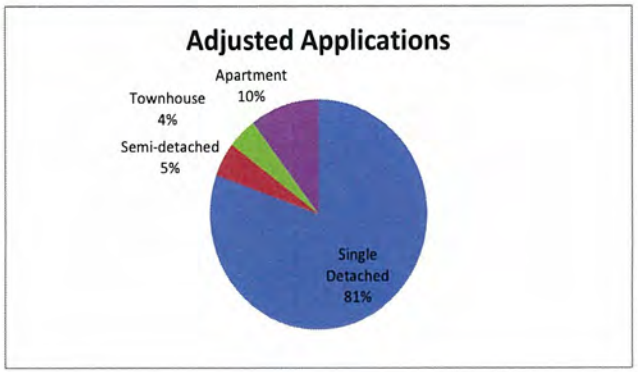
BURNSIDE

Appendix D
Excerpt from Township of Clearview Land Budget 2009

Residential Development Applications

Development Title	Legal Address	Status	#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Osler Bluff Estates	Plan 51M873, Formerly Nottawasaga	FA	43	1	42	43	-	-	-
North Ten	W Pt Lot 16 to 18, N Pt Lot 16 to 18, Con 9, Formerly Nottawasaga	FA	10	10	-	-	-	10	-
Collingwoodlands	Plan 51M779, Formerly Nottawasga	FA	13	3	10	13	-	-	-
Aspen Ridge	Pt Lot 42, W Side of Sutherland Street, Pt Lot 49, S Side of Centre Street, 51M839, Formerly Town of Stayner	FA	38	32	6	38	-	-	-
Zancor	Plan 51M826, Formerly Town of Stayner	FA	126	106	20	126	-	-	-
Donato	Plan 51M858, Formerly Town of Stayner	FA	14	14	-	14	-	-	-
Sidell (Phase 3)	Plan 51M541, Formerly Town of Stayner	FA	8	-	8	8	-	-	-
Tetamex	Plan 68, Pt Blk M, RP51R18167, Formerly Town of Stayner	FA	11	11	-	-	-	11	-
			#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Subtotal			263	177	86	242	-	21	-
Development Title	Legal Address	Status	#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Alliance	Pt Lot 8, N & S 1/2 Lot 9, Concession 4, Formerly Village of Creemore	DA	498	-	498	231	166	74	27
MacIntosh	Plan 315, Pt Lot 35, RP 51R5173 Part 1, Formerly Village of Creemore	DA	72	-	72	-	-	-	72
Cappuccitti	Pt Lot 25 WSR, Con 2, RP51R17482 Parts 1 and 2, Formerly Sunnidale	DA	30	-	30	30	-	-	-
Ridgeview	Plan 196, Pt Lot 44, 45, 47, 50, RP51R16180, RP51R26858, Formerly Town of Stayner	DA	101	-	101	101	-	-	-
Regina	Plan 194, Pt Pk Lot 25 N/S North St, Pt Pk Lot 25 and 26 N/S Centre St, Formerly Town of Stayner	DA	55	-	55	55	-	-	-
Zancor Village Green I	E Pt Lot 23, Con 2, RP51R35868 Parts 1, 3 to 10, Formerly Town of Stayner	DA	110	-	110	110	-	-	-
Emerald Estates	Pt Lot 27, Con 2, RP51R32906 Part 1, Formerly Town of Stayner	DA	160	-	160	99	-	-	61
			#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Subtotal			1,026	-	1,026	626	166	74	160
Development Title	Legal Address	Status	#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Del Zotto - New Lowell	Pt Lot 21, Con 4, RP51R33358 Parts 1,2,3,4,5,6, Formerly Sunnidale	DAA	1,925	-	1,925	1,925	-	-	-
Atkinson	Plan 141, Pt Pk Lot 3, RP51R21658, Part 1, Formerly Sunnidale	DAA	9	-	9	9	-	-	-
Melville Estates	Plan 296, Pt Lots 10 to 14, Plan 410 Pt Lots 10 to 16, Formerly Nottawasaga	DAA	22	-	22	-	-	-	22
Del Zotto - Nottawa	N Pt Lot 34, Con 8, Formerly Nottawasaga	OPA/DAA	2,625	-	2,625	2,625	-	-	-
Osler Recreational Area	Pt Lot 38 and 39, Con 12, Formerly Nottawasaga	OPA	800	-	800	800	-	-	-
Dancor	W Pt Lot 25, Con 1, Formerly Town of Stayner	OPA/DAA	1,100	-	1,100	615	64	115	306
Aspen Ridge (Storey)	Pt Lot 42, W Side of Sutherland Street, Pt Lot 49, S Side of Centre Street, 51M839, Formerly Town of Stayner	DAA	32	-	32	32	-	-	-
Zancor Village Green Ia	E Pt Lot 23, Con 2, RP51R35868 Parts 1, 3 to 10, Formerly Town of Stayner	DAA	71	-	71	71	-	-	-
Zancor Village Green II	E Pt Lot 23, Con 2, RP51R35868 Parts 1, 3 to 10, Formerly Town of Stayner	PC	450	-	450	450	-	-	-
			#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Subtotal			7,034	-	7,034	6,527	64	115	328
Adjustment to Delzotto Applications			(3,550)		(3,550)	(3,550)			
			#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Subtotal			3,484	-	3,484	2,977	64	115	328
			#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Total			8,323	177	8,146	7,395	230	210	488
			#Units	#Units Built	#Units Remaining	Single Detached	Semi-detached	Townhouse	Apartment
Adjusted Total			4,773	177	4,596	3,845	230	210	488





Township of Clearview Residential Development

Update: February 2009

Creemore

#1. Alliance - 498/0 Total Units - DA
#2 MacIntosh - 72/0 Total Units - DA

Devils Glen

#1 North Ten - 10/10 Total Units - FA

NewLowell

#1. Del Zotto - 1925/0 Units - DAA
#2. Cappuccitti - 30/0 Total Units - DA
#3. Atkinson - 9/0 Total Units - DAA

Nottawa

#1. Mellville Estates - 22/0 Total Units - DAA
#2. Del Zotto - 2625/0 Units - OPA/DAA

OslerBluff

#1. Osler Bluff Estates - 43/1 Total Units - FA
#2 Collingwoodlands - 13/3 Total Units - FA
#3 Osler Recreational Area - 800/0 Total Units - OPA

Stayner

#1. Ridgeview - 101/0 - DA
#2. Dancor - 1100/0 Total Units - DAA,OPA
#3. Apsen Ridge - 38/32 Total Units - FA
#4. Aspen Ridge (Storey) - 32/0 Total Units -DAA
#5. Zancor - 126/106 Total Units - FA
#6. Regina - 55/0 Total Units - DA
#7. Zancor Village Green I - 110/0 Total Units - DA
#8. Donato - 14/14 Total Units - FA
#9. Emerald Estates - 160/0 Total Units - DA
#10. Sidell (Phase 3) - 12/0 Total Units - FA
#11, Tetamex - 11/11 Total Units - FA
#12. Zancor Village Green Ia - 71/0 - DAA
#13. Zancor Village Green II - 450/0 - PC

DA - Draft Approved
DAA - Draft Approval Application
FA - Final Approved
OPA - Official Plan Amendment Application
Units Applied For vs Approx. Units Constructed

TOWNSHIP OF CLEARVIEW - ACTIVE COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL DEVELOPMENT APPLICATIONS

List	Applicant(s)	Development Title	Roll Number(s)	Municipal Address	Legal Address	Development Type	Planning Status
1	John and Rhonda Broderick	J and R Cycle	4329-010-003-26000	8166 Highway 26	Lot 31, Concession 2, Formerly Nottawasaga	Commercial	SP
2	Savvas Koundouros	Moldenhauer	4329-020-003-02500/02400	7355 and 7368 Highway 26	Plan 153 W, Part Lot 24, East Part Lot 24, Formerly Town of Stayner	Commercial	ZBA - SP
3	Robert Litz and Fred Cini	Recycling and Wholesale Topsoil Deposit	4329-010-003-25700	5820 County Road 64	E 1/2 of Lot 31, Concession 2, Formerly Nottawasaga	Industrial	OPA - ZBA - SP - CN
4	Diane and Lloyd Montgomery	Cashtown/Montgomery Pit	4329-010-001-05200	6901 County Road 9	Lots 8 and Lots 9, Concession 2, Formerly Nottawasaga	Industrial	OPA (AP) - ZB (AP) - SP
5	Georgian Aggregates and Construction Inc	Asphalt Plant	4329-010-002-13400	5825 27/28 Sideroad	Part Lot 27, Concession 2, Formerly Town of Stayner	Industrial	OPA - ZBA - SP
6	PKD Investments Limited	Stayner Rental	4329-010-002-22905	7482 County Road 91	Part Lot 24, Concession 4, Formerly Nottawasaga	Industrial	SP (AP)
7	807878 Ontario Inc	Murray Contractors Yard	4329-010-005-71204	2700 Concession 6	Part Lot 38, Concession 7, Formerly Nottawasaga	Industrial	SP (AP)
8	Township of Clearview	Creemore Surplus Fire Hall	4329-030-001-13100	3 Caroline Street East	Part Lot 15, Plan 315, Formerly Village of Creemore	Commercial	ZBA - SP
9	Georgian Aggregates and Construction Inc	Duntroon Quarry	4329-010-008-27100/27200/27300	794519/794533/9828 County Road 91	Lot 25 and 26, Concession 12, Formerly Nottawasaga	Industrial	OPA - OMB APPEAL
10	The Estates of Clearview Inc	Dancor Development	4329-010-002-04400/04500	7044 and 6934 Highway 26	West and East Part Lot 25, Concession 1, Formerly Nottawasaga	Commercial	OPA - ZBA - SP
11	Borden Paintball Inc	Borden Paintball	4329-040-001-19500	3251 12/13 Sideroad South	Part Lot 25 WSR, Concession 2, Formerly Sunnidale	Commercial	ZBA - SP
12	Township of Clearview	Stayner Firehall	4329-020-001-28032/28034/28060/28062	307, 309, 312, 314 Sidell Drive	Lots 2 to 5, Plan 51M541, Formerly Town of Stayner	Institutional	ZBA - SP
13	Sobeys Captial Inc	Sobeys Grocery Store	4329-010-002-17850	7595 Highway 26	Part Lot 26, Concession 3, RP51R34602, Formerly Town of Stayner	Commercial	OPA (AP) - ZBA (AP) - SP
14	FPLMET Group Inc	Emerald Creek	4329-010-002-12901	32 Wyant Road	Part Lot 27, Concession 2, RP51R32906, Formerly Town of Stayner	Commercial	OPA (AP) - ZBA - SP
15	1392073 Ontario Limited	Truck Transport Terminal	4329-040-001-06400	9523 County Road 10	Lot 27, Concession 1, Formerly Sunnidale	Industrial	SP - OMB APPEAL
16	WayJen Investment Inc (D Gordon)	Midwest Metals	4329-030-001-37303	7685 County Road 9	Part Lot 9, Concession 5, Formerly Village of Creemore	Industrial	SP
17	2146794 Ontario Inc	Haisai Restaurant	4329-010-009-07700	794079 County Road 124	Lot 13, Concession 12, Plan 92, Formerly Nottawasaga	Commercial	SP (AP)
18	Creemore Springs Brewery Limited	Creemore Springs Brewery	4329-030-001-05800/07900	6 Edward St E/3 Elizabeth St E/121 Mill St	Part Lot 14, Lot 15 and 16, Plan 315, Formerly Village of Creemore	Industrial	PC (OPA, ZBA, SP)
19	Clearview Montessori	Clearview Montessori Elementary School	4329-010-006-08800	4082 County Road 124	Part Lot 35, Concession 9, RP51R21337/34956, Formerly Nottawasaga	Institutional	PC (ZBA, SP)
20	Dorothy Gray	Grayhawk Preschool	4329-030-001-10200	6 Elizabeth Street East	Lots 16 and 17, Plan 315, Formerly Village of Creemore	Commercial	SP (AP)
21	Lisa and John Squire	Stayner Massage Therapy	4329-020-001-04700	7142 Highway 26	Lot 28, Plan 102, Formerly Town of Stayner	Commercial	ZBA (AP) - SP (AP)
22	Liquor Control Board of Ontario (LCBO)	Creemore LCBO	4329-030-001-20700	10 Francis Street	Lots 15, 16, 17, Plan 315, Formerly Village of Creemore	Commercial	SP
23	Osler Bluff Ski Club	Oslerbrook Golf Course	4329-010-012-09200	795449 Collingwood-Clearview Townline	Part Lot 38, Concession 11, Part Lot 38 and 39, Concession 12, Formerly Nottawasaga	Commercial	ZBA (AP) - SP (AP)
24	Devil's Glen Country Club	Devil's Glen Clubhouse	4329-010-010-18400	1793County Road 124	Part Lot 16, 17, 18, Concessions 9 and 10, Formerly Nottawasaga	Commercial	SP
25	Jozwiak	Meat Processing Operation	4329-040-003-21002	SP-2006-033	Part Lot 14, Concession 12, Formerly Sunnidale	Commercial	ZBA (AP) - SP (AP)
26	Hussey	Sunnidale Dog Kennel	4329-040-001-04705	3670 McCarthy Drive	Lot 28, Concession 1 WSR, Formerly Sunnidale	Commercial	ZBA (AP) - SP (AP)
27	John Forbes	Forbes Garden Centre	4329-020-002-19400	7271 Highway 26	Plan 381 Lot H, Part 12, RP51R8529, Formerly Nottawasaga	Commercial	SP
28	1204419 Ontarion Inc (Doug Cripps)	TimberMart Buidling Centre	4329-020-001-28020	1010 Centre Line Road	Plan M541 Part Blk 24 RP51R26682 Parts 3 and 4, Formerly Town of Stayner	Commercial	SP (AP)

Commercial/Industrial/Institutional Development Activity Township of Clearview

1. J and R Cycle: SP
2. Moldenhauer: ZBA - SP
3. Recycling and Wholesale Topsoil Deposit: OPA - ZBA - SP - CN
4. Cashtown/Montgomery Pit: OPA (AP) - ZB (AP) - SP
5. Asphalt Plant: OPA - ZBA - SP
6. Stayner Rental: SP (AP)
7. Murray Contractors Yard: SP (AP)
8. Creemore Surplus Fire Hall: ZBA - SP
9. Duntroon Quarry: OPA - OMB APPEAL
10. Dancor Development: OPA - ZBA - SP
11. Borden Paintball: ZBA - SP
12. Stayner Firehall: ZBA - SP
13. Sobeys Grocery Store: OPA (AP) - ZBA (AP) - SP
14. Emerald Creek: OPA (AP) - ZBA - SP
15. Truck Transport Terminal: SP - OMB APPEAL
16. Midwest Metals: SP
17. Haisai Resturant: SP (AP)
18. Creemore Springs Brewery: PC (OPA,ZBA, SP)
19. Clearview Montessori Elementary School: PC (ZBA,SP)

Town of Collingwood

Town of The Blue Mountains

Town of Wasaga Beach

Municipality of Grey Highlands

BATTEAUX

NOTTAWA

STAYNER

SUNNIDALE

DUNTROON

NEW LOWELL

GLENDEVILSIGLEN

SINGHAMPTON

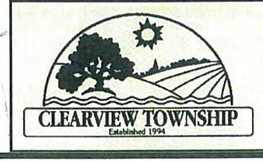
CASHTOWN CORNERS

Creemore

BRENTWOOD

Updated: January 2009

SP - Site Plan Application
ZBA - Zoning By-law Amendment Application
OPA - Official Plan Amendment Application
AP - Approved
CN - Consent Application
PC - Pre-Consultation



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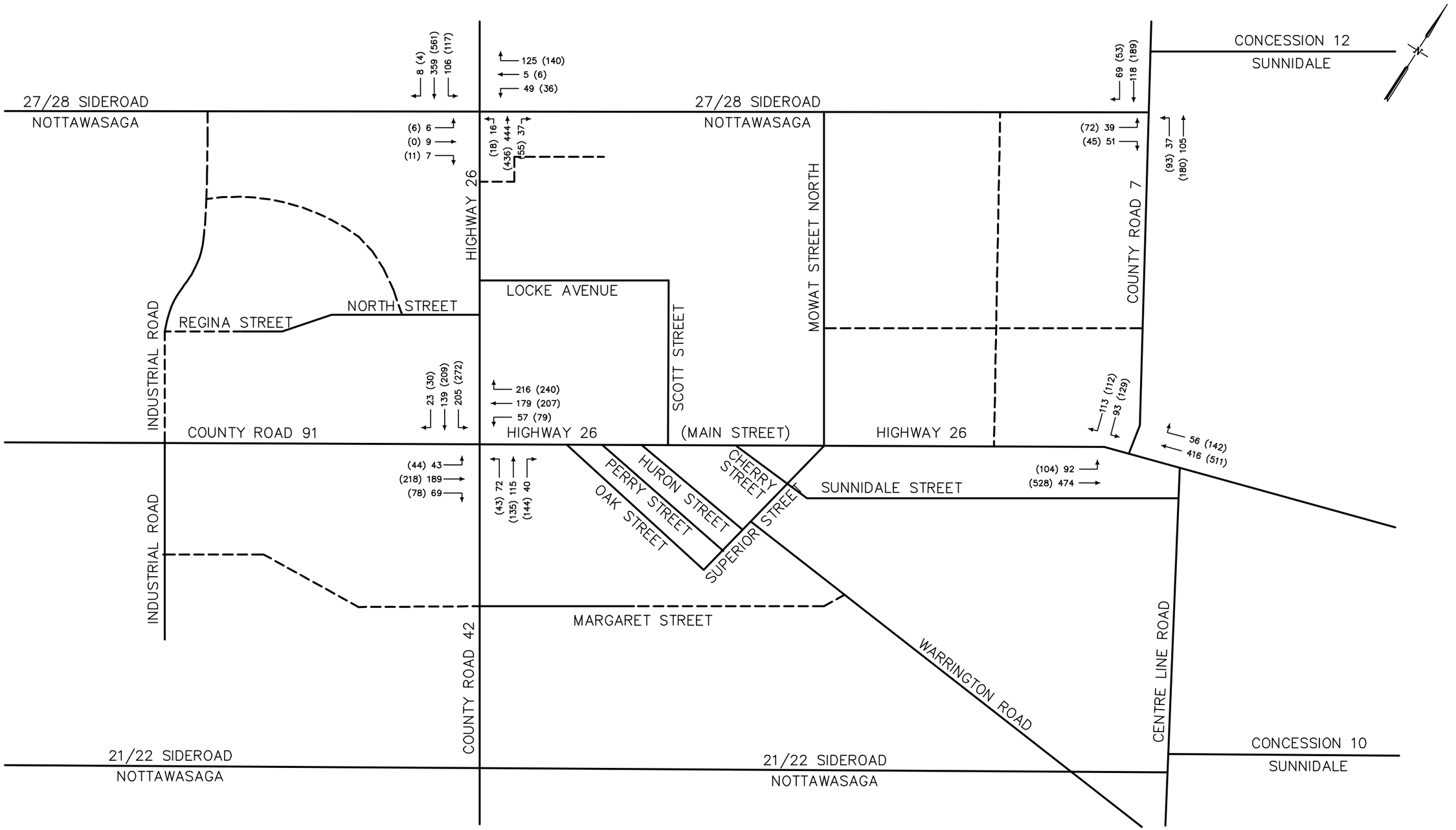
Appendix E
Turning Movements at Arterial Intersections and Lane Capacities Along Arterial Roads



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285 – AM PEAK HOUR

(285) – PM PEAK HOUR

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

PEAK HOUR TURNING MOVEMENTS ON ARTERIAL ROADS – 2009
(SUMMER AVERAGE DAILY TRAFFIC CONDITION)

BURNSIDE
R. J. Burnside & Associates Limited
3 Ronell Crescent, Collingwood, Ontario
telephone (705) 446-0515 fax (705) 446-2399
web www.rjburnside.com

Drawn By	Checked By	Figure
D.C.M.	H.B.C.	E1
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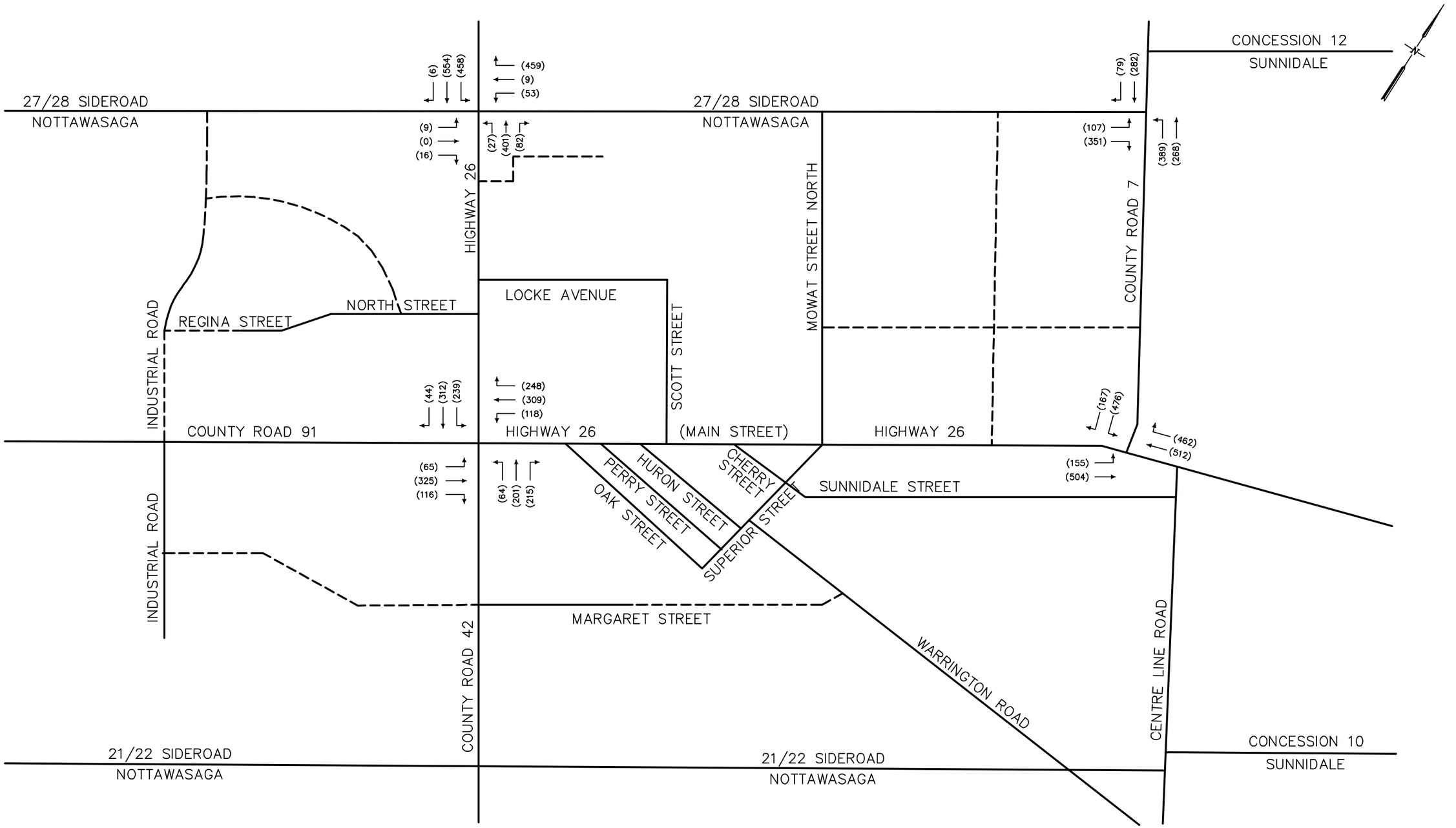

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(285) – PM PEAK HOUR

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

PM PEAK HOUR TURNING MOVEMENTS ON ARTERIAL ROADS – 2018
(SUMMER AVERAGE DAILY TRAFFIC CONDITION)

BURNSIDE
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3 Ronell Crescent, Collingwood, Ontario
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web www.rjburnside.com

Drawn By	Checked By	Figure
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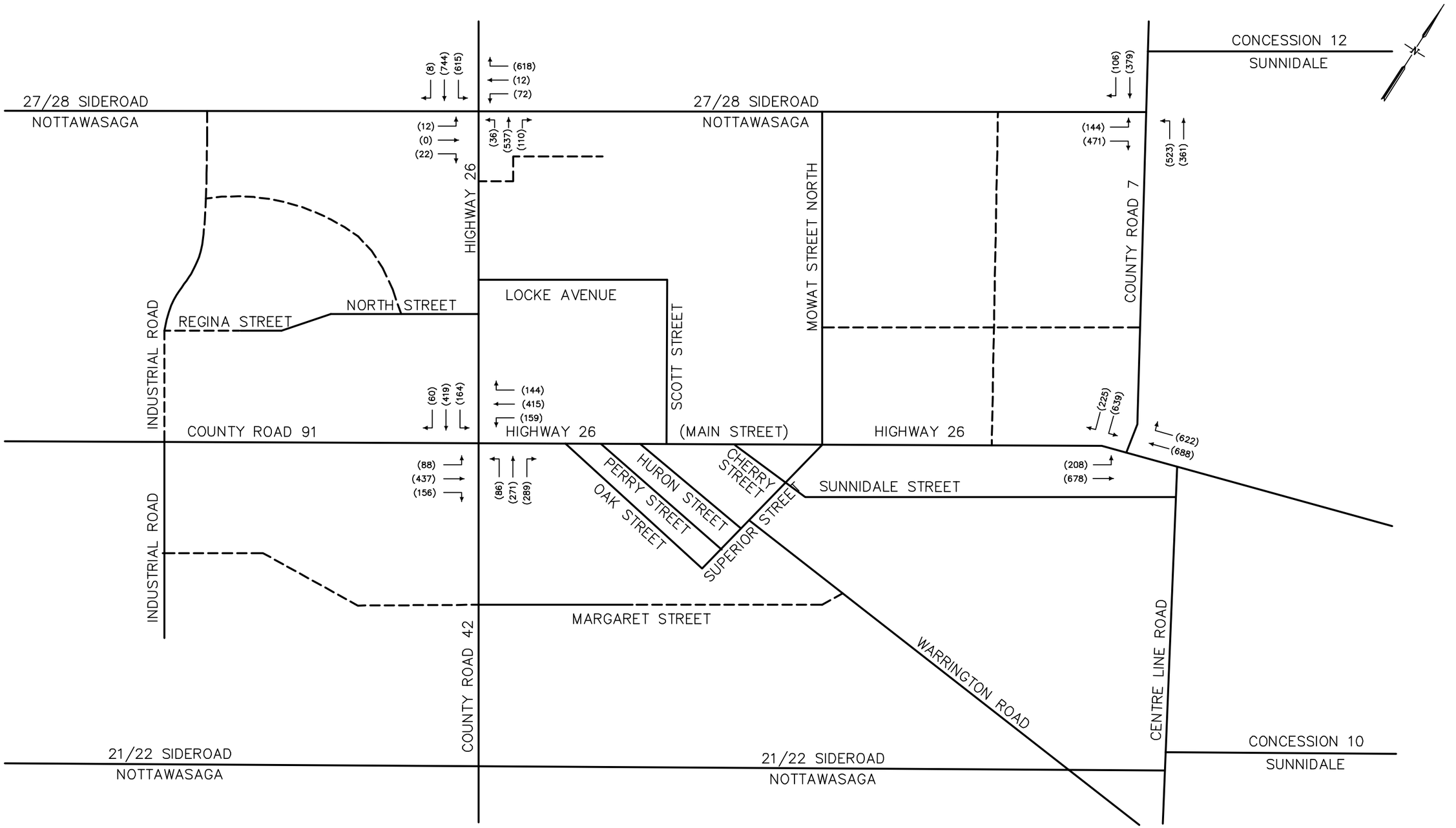

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(285) – PM PEAK HOUR

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

PM PEAK HOUR TURNING MOVEMENTS ON ARTERIAL ROADS – 2028
(SUMMER AVERAGE DAILY TRAFFIC CONDITION)

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3 Ronell Crescent, Collingwood, Ontario
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web www.rjburnside.com

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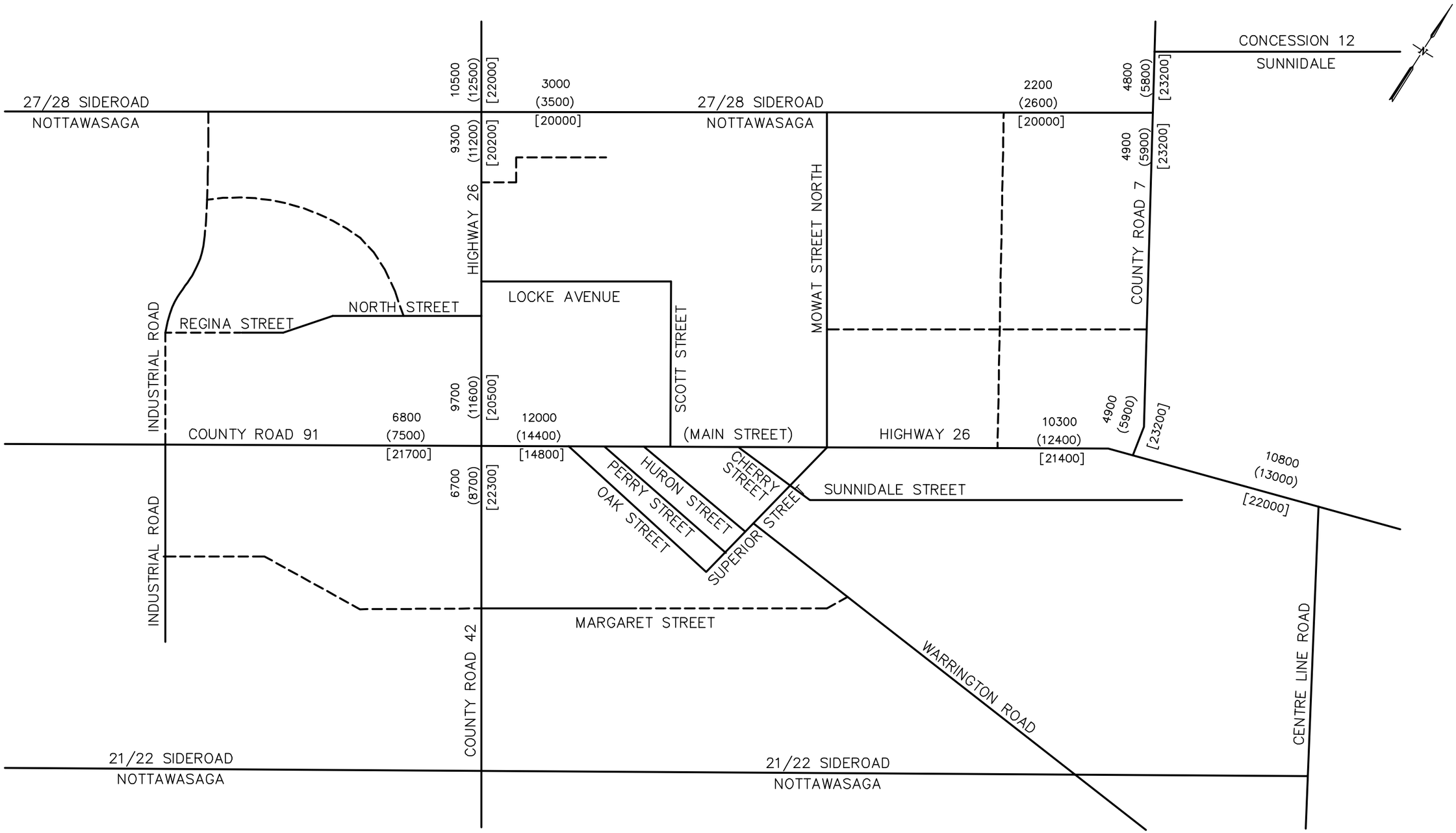

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(1000) – SUMMER AVERAGE DAILY TRAFFIC (SADT)

[1000] – ROADWAY CAPACITY (DAILY)

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

DAILY TRAFFIC ON ARTERIAL ROADS –2009

BURNSIDE
R. J. Burnside & Associates Limited
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telephone (705) 446-0515 fax (705) 446-2399
web www.rjburnside.com

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D.C.M.	H.B.C.	E4
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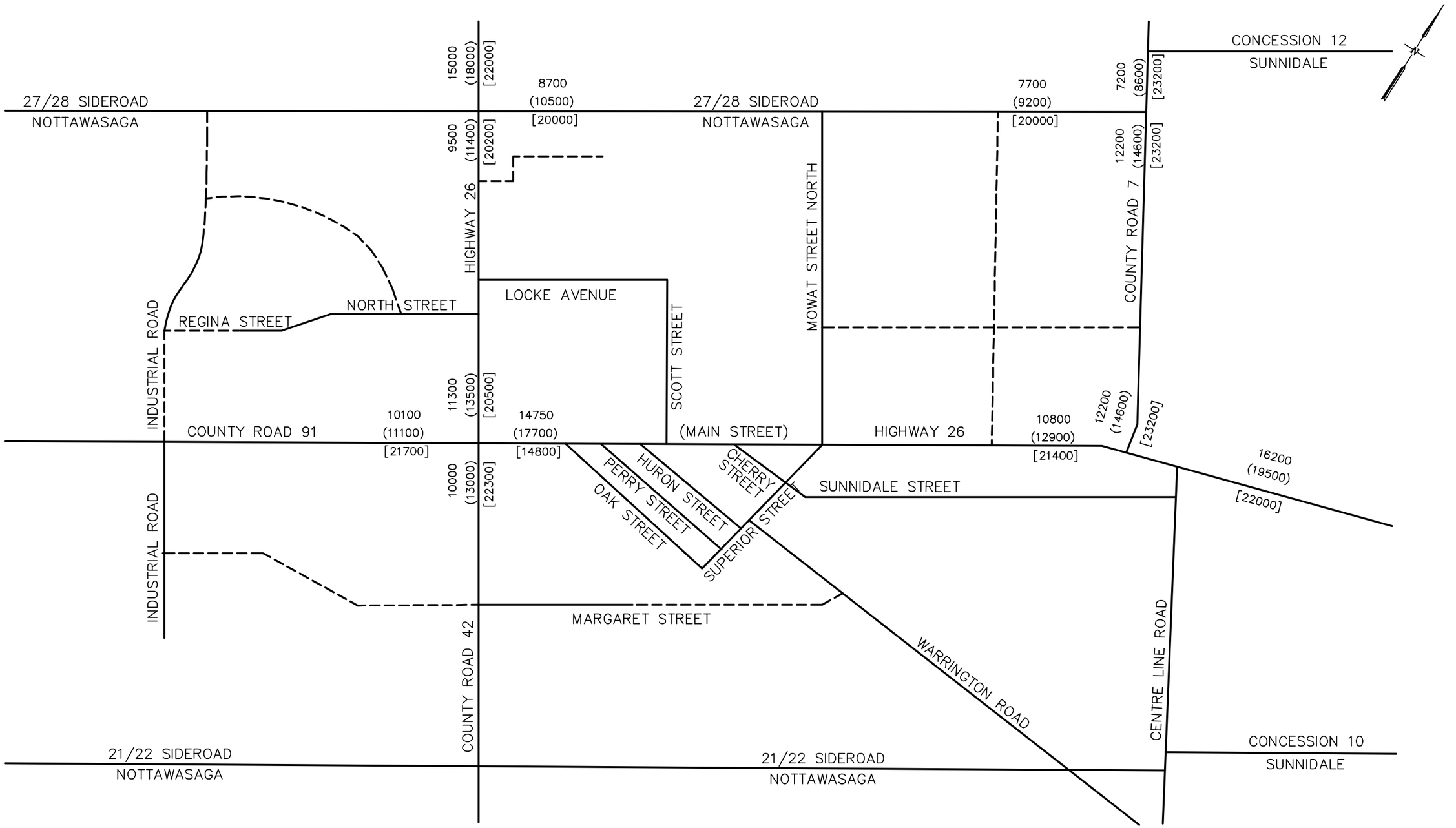
NOT TO SCALE	MCG16235	



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1000 – AADT (ANNUAL AVERAGE DAILY TRAFFIC)

(1000) – SADT (SUMMER AVERAGE DAILY TRAFFIC)

[1000] – ROADWAY CAPACITY (DAILY)

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

DAILY TRAFFIC ON ARTERIAL ROADS –2018
WITH BY–PASS DIVERSION

BURNSIDE
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telephone (705) 446-0515 **fax** (705) 446-2399
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Drawn By	Checked By	Figure
D.C.M.	H.B.C.	E5
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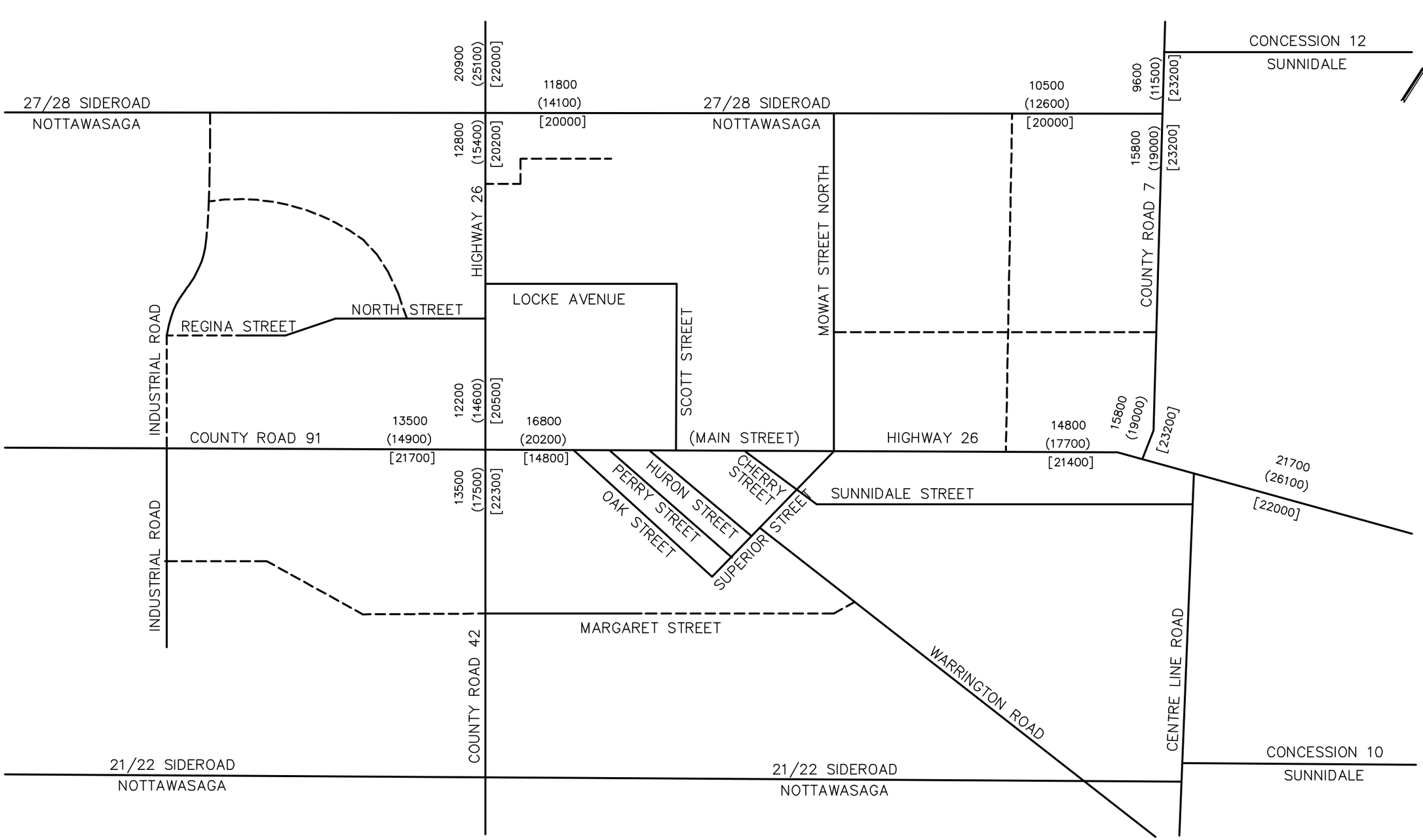

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1000 – AADT (ANNUAL AVERAGE DAILY TRAFFIC)

(1000) – SADT (SUMMER AVERAGE DAILY TRAFFIC)

[1000] – ROADWAY CAPACITY (DAILY)

Project Title

STAYNER AND AREA TRANSPORTATION STUDY

Drawing Title

DAILY TRAFFIC ON ARTERIAL ROADS –2028
WITH BY–PASS DIVERSION

BURNSIDE
R. J. Burnside & Associates Limited
3 Ronell Crescent, Collingwood, Ontario
telephone (705) 446-0515 fax (705) 446-2399
web www.rjburnside.com

Drawn By	Checked By	Figure
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Appendix F

Operational Analysis (Synchro)

For Arterial Roads

APPENDIX F - LEVEL OF SERVICE DEFINITIONS

Level of Service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists. The 2000 *Highway Capacity Manual* provides a measure of the Level of Service based on the control delay at intersections. Control delay is defined as the component of delay that results when a control signal causes a lane group to reduce speed or to stop; it is measured by comparison with the uncontrolled condition.

Six Levels of Service are defined, with LOS A representing the best operating conditions and LOS F the worst, as described below:

LOS A: This Level of Service describes the highest quality of traffic flow and is referred to as free flow. The approach appears open, turning movements are easily made and drivers have freedom of operation. Control delay is less than 10 seconds/vehicle.

LOS B: This Level of Service is referred to as stable flow. Drivers feel somewhat restricted and occasionally may have to wait to complete the minor movement. Control delay is 10-15 seconds/vehicle for unsignalized intersections and 10-20 seconds/vehicle for signalized intersections.

LOS C: At this level, the operation is stable. Drivers feel more restricted and may have to wait, with queues developing for short periods. Control delay is 15-25 seconds/vehicle at unsignalized intersections and 20035 seconds/vehicle at signalized intersections.

LOS D: At this level, traffic is approaching unstable flow. The motorists experiences increasing restriction and instability of flow. There are substantial delays to approaching vehicles during short peaks within the peak period, but there are enough gaps to lower demand to permit occasional clearance of developing queues and prevent excessive back-ups. Control delay is 25-35 seconds/vehicle at unsignalized intersections and 35-55 seconds/vehicle at signalized intersections.

LOS E: At this level capacity occurs. Long queues of vehicles exist and delays to vehicles may extend. Control delay is 35-50 seconds/vehicle at unsignalized intersections and 55-80 seconds/vehicle at signalized intersections.

LOS F: At this Level of Service, the intersection has failed. Capacity of the intersection has been exceeded. Control delay exceeds 50 seconds/vehicle at unsignalized intersections and exceeds 80 seconds/vehicle at signalized intersections.

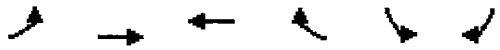
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1809		1789	1883	1601	1789	1883	1601	1789	1848	
Flt Permitted	0.62	1.00		0.26	1.00	1.00	0.60	1.00	1.00	0.55	1.00	
Satd. Flow (perm)	1164	1809		484	1883	1601	1127	1883	1601	1040	1848	
Volume (vph)	44	218	78	79	207	240	43	135	144	272	209	30
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	237	85	86	225	261	47	147	157	296	227	33
RTOR Reduction (vph)	0	17	0	0	0	166	0	0	108	0	6	0
Lane Group Flow (vph)	48	305	0	86	225	95	47	147	49	296	254	0
Turn Type	Perm			pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	16.5	16.5		25.1	25.1	25.1	21.2	21.2	21.2	37.0	37.0	
Effective Green, g (s)	18.0	18.0		26.6	26.6	26.6	22.7	22.7	22.7	38.5	38.5	
Actuated g/C Ratio	0.25	0.25		0.36	0.36	0.36	0.31	0.31	0.31	0.53	0.53	
Clearance Time (s)	5.5	5.5		4.0	5.5	5.5	5.5	5.5	5.5	4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	287	445		258	685	583	350	585	497	669	973	
v/s Ratio Prot		c0.17		0.02	c0.12			0.08		c0.07	0.14	
v/s Ratio Perm	0.04			0.10		0.06	0.04		0.03	c0.16		
v/c Ratio	0.17	0.68		0.33	0.33	0.16	0.13	0.25	0.10	0.44	0.26	
Uniform Delay, d1	21.7	25.0		16.6	16.8	15.7	18.1	18.8	17.9	10.0	9.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	4.3		0.8	0.3	0.1	0.8	1.0	0.4	0.5	0.7	
Delay (s)	21.9	29.3		17.4	17.1	15.9	18.9	19.9	18.3	10.5	10.1	
Level of Service	C	C		B	B	B	B	B	B	B	B	
Approach Delay (s)		28.3			16.6			19.0			10.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	73.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑	↱		↑	↱
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	0	11	36	6	140	18	436	55	117	561	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	12	39	7	152	20	474	60	127	610	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1533	1437	610	1389	1382	474	614			534		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1533	1437	610	1389	1382	474	614			534		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	98	63	95	74	98			88		
cM capacity (veh/h)	61	115	495	104	124	590	965			1034		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	198	493	60	737	4
Volume Left	7	39	20	0	127	0
Volume Right	12	152	0	60	0	4
cSH	140	289	965	1700	1034	1700
Volume to Capacity	0.13	0.69	0.02	0.04	0.12	0.00
Queue Length 95th (m)	3.4	35.3	0.5	0.0	3.2	0.0
Control Delay (s)	34.5	40.8	0.6	0.0	3.0	0.0
Lane LOS	D	E	A		A	
Approach Delay (s)	34.5	40.8	0.5		3.0	
Approach LOS	D	E				

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	104	528	511	142	129	112
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	113	574	555	154	140	122
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						7
Median type					None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	710				1355	555
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	710				1355	555
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				2	77
cM capacity (veh/h)	889				144	531

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	113	574	555	154	262
Volume Left	113	0	0	0	140
Volume Right	0	0	0	154	122
cSH	889	1700	1700	1700	269
Volume to Capacity	0.13	0.34	0.33	0.09	0.98
Queue Length 95th (m)	3.3	0.0	0.0	0.0	72.3
Control Delay (s)	9.6	0.0	0.0	0.0	75.8
Lane LOS	A				F
Approach Delay (s)	1.6		0.0		75.8
Approach LOS					F

Intersection Summary			
Average Delay	12.6		
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	72	45	93	180	189	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	49	101	196	205	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	632	234	263			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	632	234	263			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	94	92			
cM capacity (veh/h)	410	805	1301			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	127	297	263
Volume Left	78	101	0
Volume Right	49	0	58
cSH	505	1301	1700
Volume to Capacity	0.25	0.08	0.15
Queue Length 95th (m)	7.5	1.9	0.0
Control Delay (s)	14.5	3.2	0.0
Lane LOS	B	A	
Approach Delay (s)	14.5	3.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

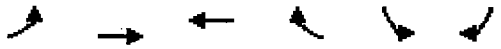
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1809		1789	1883	1601	1789	1883	1601	1789	1848	
Flt Permitted	0.56	1.00		0.16	1.00	1.00	0.53	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	1052	1809		307	1883	1601	1004	1883	1601	824	1848	
Volume (vph)	65	325	116	118	309	248	64	201	215	239	312	44
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	353	126	128	336	270	70	218	234	260	339	48
RTOR Reduction (vph)	0	17	0	0	0	156	0	0	168	0	6	0
Lane Group Flow (vph)	71	462	0	128	336	114	70	218	66	260	381	0
Turn Type	Perm			pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	21.9	21.9		29.7	29.7	29.7	19.2	19.2	19.2	33.1	33.1	
Effective Green, g (s)	23.4	23.4		31.2	31.2	31.2	20.7	20.7	20.7	34.6	34.6	
Actuated g/C Ratio	0.32	0.32		0.42	0.42	0.42	0.28	0.28	0.28	0.47	0.47	
Clearance Time (s)	5.5	5.5		4.0	5.5	5.5	5.5	5.5	5.5	4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	334	574		206	796	677	282	528	449	516	866	
v/s Ratio Prot		c0.26		c0.03	0.18			0.12		c0.07	0.21	
v/s Ratio Perm	0.07			0.23		0.07	0.07		0.04	c0.17		
v/c Ratio	0.21	0.80		0.62	0.42	0.17	0.25	0.41	0.15	0.50	0.44	
Uniform Delay, d1	18.5	23.1		15.9	15.0	13.2	20.5	21.6	19.9	12.6	13.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	8.1		5.7	0.4	0.1	2.1	2.4	0.7	0.8	1.6	
Delay (s)	18.8	31.2		21.6	15.3	13.4	22.6	24.0	20.6	13.4	14.7	
Level of Service	B	C		C	B	B	C	C	C	B	B	
Approach Delay (s)		29.6			15.7			22.3			14.2	
Approach LOS		C			B			C			B	

Intersection Summary				
HCM Average Control Delay	19.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	67.9%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	9	0	16	53	9	459	27	401	82	458	554	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	0	17	58	10	499	29	436	89	498	602	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2596	2182	602	2110	2099	436	609			525		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2596	2182	602	2110	2099	436	609			525		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	97	0	63	20	97			52		
cM capacity (veh/h)	1	23	499	22	26	620	970			1042		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	27	566	465	89	1100	7
Volume Left	10	58	29	0	498	0
Volume Right	17	499	0	89	0	7
cSH	4	149	970	1700	1042	1700
Volume to Capacity	6.74	3.80	0.03	0.05	0.48	0.00
Queue Length 95th (m)	Err	Err	0.7	0.0	20.1	0.0
Control Delay (s)	Err	Err	0.9	0.0	9.9	0.0
Lane LOS	F	F	A		A	
Approach Delay (s)	9999.0	Err	0.7		9.9	
Approach LOS	F	F				

Intersection Summary			
Average Delay	2637.4		
Intersection Capacity Utilization	120.3%	ICU Level of Service	H
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	155	504	512	462	476	167
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	548	557	502	517	182
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						7
Median type					None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1059				1441	557
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1059				1441	557
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	74				0	66
cM capacity (veh/h)	658				109	530

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	168	548	557	502	699
Volume Left	168	0	0	0	517
Volume Right	0	0	0	502	182
cSH	658	1700	1700	1700	137
Volume to Capacity	0.26	0.32	0.33	0.30	5.10
Queue Length 95th (m)	7.7	0.0	0.0	0.0	Err
Control Delay (s)	12.3	0.0	0.0	0.0	Err
Lane LOS	B				F
Approach Delay (s)	2.9		0.0		Err
Approach LOS					F

Intersection Summary			
Average Delay	2825.7		
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	107	351	389	268	282	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	116	382	423	291	307	86
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1486	349	392			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1486	349	392			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	45	64			
cM capacity (veh/h)	87	694	1166			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	498	714	392
Volume Left	116	423	0
Volume Right	382	0	86
cSH	265	1166	1700
Volume to Capacity	1.88	0.36	0.23
Queue Length 95th (m)	262.7	12.7	0.0
Control Delay (s)	442.6	7.6	0.0
Lane LOS	F	A	
Approach Delay (s)	442.6	7.6	0.0
Approach LOS	F		

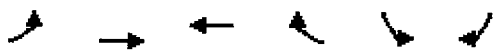
Intersection Summary			
Average Delay	140.7		
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1809		1789	1883	1601	1789	1883	1601	1789	1848	
Flt Permitted	0.56	1.00		0.16	1.00	1.00	0.53	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	1052	1809		307	1883	1601	1004	1883	1601	824	1848	
Volume (vph)	65	325	116	118	309	248	64	201	215	239	312	44
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	353	126	128	336	270	70	218	234	260	339	48
RTOR Reduction (vph)	0	17	0	0	0	156	0	0	168	0	6	0
Lane Group Flow (vph)	71	462	0	128	336	114	70	218	66	260	381	0
Turn Type	Perm			pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	21.9	21.9		29.7	29.7	29.7	19.2	19.2	19.2	33.1	33.1	
Effective Green, g (s)	23.4	23.4		31.2	31.2	31.2	20.7	20.7	20.7	34.6	34.6	
Actuated g/C Ratio	0.32	0.32		0.42	0.42	0.42	0.28	0.28	0.28	0.47	0.47	
Clearance Time (s)	5.5	5.5		4.0	5.5	5.5	5.5	5.5	5.5	4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	334	574		206	796	677	282	528	449	516	866	
v/s Ratio Prot		c0.26		c0.03	0.18			0.12		c0.07	0.21	
v/s Ratio Perm	0.07			0.23		0.07	0.07		0.04	c0.17		
v/c Ratio	0.21	0.80		0.62	0.42	0.17	0.25	0.41	0.15	0.50	0.44	
Uniform Delay, d1	18.5	23.1		15.9	15.0	13.2	20.5	21.6	19.9	12.6	13.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	8.1		5.7	0.4	0.1	2.1	2.4	0.7	0.8	1.6	
Delay (s)	18.8	31.2		21.6	15.3	13.4	22.6	24.0	20.6	13.4	14.7	
Level of Service	B	C		C	B	B	C	C	C	B	B	
Approach Delay (s)		29.6			15.7			22.3			14.2	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1601		1789	1883	1601	1789	1883	1601	1789	1880	
Flt Permitted	0.75	1.00		0.75	1.00	1.00	0.43	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	1415	1601		1406	1883	1601	818	1883	1601	597	1880	
Volume (vph)	9	0	16	53	9	459	27	401	82	458	554	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	0	17	58	10	499	29	436	89	498	602	7
RTOR Reduction (vph)	0	15	0	0	0	103	0	0	52	0	1	0
Lane Group Flow (vph)	10	2	0	58	10	396	29	436	37	498	608	0
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	4.9	4.9		4.9	4.9	18.3	21.4	21.4	21.4	38.8	38.8	
Effective Green, g (s)	6.4	6.4		6.4	6.4	19.8	22.9	22.9	22.9	40.3	40.3	
Actuated g/C Ratio	0.12	0.12		0.12	0.12	0.36	0.42	0.42	0.42	0.74	0.74	
Clearance Time (s)	5.5	5.5		5.5	5.5	4.0	5.5	5.5	5.5	4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	166	187		165	220	697	342	788	670	732	1385	
v/s Ratio Prot		0.00			0.01	c0.14		0.23		c0.17	0.32	
v/s Ratio Perm	0.01			0.04		0.11	0.04		0.02	c0.33		
v/c Ratio	0.06	0.01		0.35	0.05	0.57	0.08	0.55	0.06	0.68	0.44	
Uniform Delay, d1	21.5	21.4		22.2	21.4	14.0	9.6	12.0	9.5	4.6	2.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.0		1.3	0.1	1.1	0.5	2.8	0.2	2.6	1.0	
Delay (s)	21.6	21.4		23.5	21.5	15.1	10.1	14.8	9.6	7.2	3.8	
Level of Service	C	C		C	C	B	B	B	A	A	A	
Approach Delay (s)		21.5			16.1			13.7			5.3	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	1883	1883	1601	1789	1601
Flt Permitted	0.31	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	583	1883	1883	1601	1789	1601
Volume (vph)	155	504	512	462	476	167
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	548	557	502	517	182
RTOR Reduction (vph)	0	0	0	255	0	115
Lane Group Flow (vph)	168	548	557	247	517	67
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	26.6	26.6	26.6	26.6	19.5	19.5
Effective Green, g (s)	28.1	28.1	28.1	28.1	21.0	21.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.37	0.37
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	287	927	927	788	658	589
v/s Ratio Prot		0.29	c0.30		c0.29	
v/s Ratio Perm	0.29			0.15		0.04
v/c Ratio	0.59	0.59	0.60	0.31	0.79	0.11
Uniform Delay, d1	10.3	10.4	10.5	8.7	16.0	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	2.8	2.9	1.0	6.1	0.1
Delay (s)	18.8	13.2	13.3	9.7	22.2	12.0
Level of Service	B	B	B	A	C	B
Approach Delay (s)		14.5	11.6		19.5	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	57.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1789	1601	1789	1883	1828	
Flt Permitted	0.95	1.00	0.32	1.00	1.00	
Satd. Flow (perm)	1789	1601	594	1883	1828	
Volume (vph)	107	351	389	268	282	79
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	382	423	291	307	86
RTOR Reduction (vph)	0	305	0	0	15	0
Lane Group Flow (vph)	116	77	423	291	378	0
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	9.2	9.2	33.1	33.1	17.9	
Effective Green, g (s)	10.7	10.7	34.6	34.6	19.4	
Actuated g/C Ratio	0.20	0.20	0.65	0.65	0.36	
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	359	321	637	1222	665	
v/s Ratio Prot	c0.06		c0.14	0.15	0.21	
v/s Ratio Perm		0.05	c0.29			
v/c Ratio	0.32	0.24	0.66	0.24	0.57	
Uniform Delay, d1	18.2	17.9	5.8	3.9	13.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.4	2.6	0.5	3.5	
Delay (s)	18.7	18.3	8.4	4.3	17.1	
Level of Service	B	B	A	A	B	
Approach Delay (s)	18.4			6.7	17.1	
Approach LOS	B			A	B	

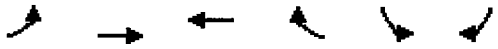
Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1809		1789	1883	1601	1789	1883	1601	1789	1848	
Flt Permitted	0.50	1.00		0.12	1.00	1.00	0.31	1.00	1.00	0.33	1.00	
Satd. Flow (perm)	946	1809		220	1883	1601	582	1883	1601	630	1848	
Volume (vph)	88	437	156	159	415	144	86	271	289	164	419	60
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	475	170	173	451	157	93	295	314	178	455	65
RTOR Reduction (vph)	0	17	0	0	0	76	0	0	225	0	6	0
Lane Group Flow (vph)	96	628	0	173	451	81	93	295	89	178	514	0
Turn Type	Perm			pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	28.8	28.8		38.8	38.8	38.8	20.6	20.6	20.6	28.6	28.6	
Effective Green, g (s)	30.3	30.3		40.3	40.3	40.3	22.1	22.1	22.1	30.1	30.1	
Actuated g/C Ratio	0.39	0.39		0.51	0.51	0.51	0.28	0.28	0.28	0.38	0.38	
Clearance Time (s)	5.5	5.5		4.0	5.5	5.5	5.5	5.5	5.5	4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	366	699		233	968	823	164	531	451	301	710	
v/s Ratio Prot		c0.35		c0.06	0.24			0.16		0.03	c0.28	
v/s Ratio Perm	0.10			0.33		0.05	0.16		0.06	0.20		
v/c Ratio	0.26	0.90		0.74	0.47	0.10	0.57	0.56	0.20	0.59	0.72	
Uniform Delay, d1	16.4	22.6		15.8	12.2	9.7	24.1	24.0	21.4	19.6	20.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	14.4		12.0	0.4	0.1	13.4	4.2	1.0	3.1	6.3	
Delay (s)	16.8	37.0		27.8	12.5	9.8	37.5	28.1	22.4	22.7	26.9	
Level of Service	B	D		C	B	A	D	C	C	C	C	
Approach Delay (s)		34.4			15.4			26.8			25.8	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	78.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

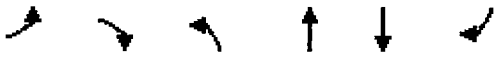
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1601		1789	1883	1601	1789	1883	1601	1789	1880	
Flt Permitted	0.75	1.00		0.74	1.00	1.00	0.36	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	1411	1601		1397	1883	1601	673	1883	1601	283	1880	
Volume (vph)	12	0	22	72	12	618	36	537	110	615	744	8
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	0	24	78	13	672	39	584	120	668	809	9
RTOR Reduction (vph)	0	21	0	0	0	57	0	0	56	0	0	0
Lane Group Flow (vph)	13	3	0	78	13	615	39	584	64	668	818	0
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	8.5	8.5		8.5	8.5	36.9	31.1	31.1	31.1	63.5	63.5	
Effective Green, g (s)	10.0	10.0		10.0	10.0	38.4	32.6	32.6	32.6	65.0	65.0	
Actuated g/C Ratio	0.12	0.12		0.12	0.12	0.46	0.39	0.39	0.39	0.78	0.78	
Clearance Time (s)	5.5	5.5		5.5	5.5	4.0	5.5	5.5	5.5	4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	170	193		168	227	818	264	740	629	737	1472	
v/s Ratio Prot		0.00			0.01	c0.26		0.31		c0.31	0.43	
v/s Ratio Perm	0.01			0.06		0.13	0.06		0.04	c0.40		
v/c Ratio	0.08	0.01		0.46	0.06	0.75	0.15	0.79	0.10	0.91	0.56	
Uniform Delay, d1	32.4	32.2		34.0	32.3	18.4	16.2	22.2	15.9	18.9	3.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.0		2.0	0.1	3.9	1.2	8.4	0.3	14.7	1.5	
Delay (s)	32.6	32.2		36.0	32.4	22.3	17.4	30.5	16.3	33.6	5.0	
Level of Service	C	C		D	C	C	B	C	B	C	A	
Approach Delay (s)		32.3			23.9			27.5			17.9	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	1883	1883	1601	1789	1601
Flt Permitted	0.11	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	214	1883	1883	1601	1789	1601
Volume (vph)	208	678	688	622	639	225
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	226	737	748	676	695	245
RTOR Reduction (vph)	0	0	0	412	0	120
Lane Group Flow (vph)	226	737	748	264	695	125
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	39.7	39.7	29.7	29.7	29.3	29.3
Effective Green, g (s)	41.2	41.2	31.2	31.2	30.8	30.8
Actuated g/C Ratio	0.52	0.52	0.39	0.39	0.38	0.38
Clearance Time (s)	4.0	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	228	970	734	624	689	616
v/s Ratio Prot	c0.07	0.39	0.40		c0.39	
v/s Ratio Perm	c0.44			0.16		0.08
v/c Ratio	0.99	0.76	1.02	0.42	1.01	0.20
Uniform Delay, d1	19.4	15.5	24.4	17.8	24.6	16.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	56.9	5.6	38.1	2.1	36.5	0.2
Delay (s)	76.4	21.0	62.5	19.9	61.1	16.6
Level of Service	E	C	E	B	E	B
Approach Delay (s)		34.0	42.3		49.5	
Approach LOS		C	D		D	

Intersection Summary				
HCM Average Control Delay	41.9	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	93.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

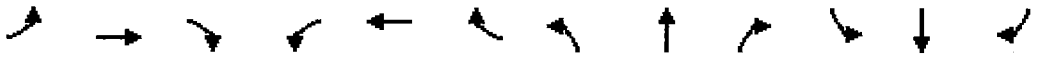


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1789	1601	1789	1883	1828	
Flt Permitted	0.95	1.00	0.19	1.00	1.00	
Satd. Flow (perm)	1789	1601	358	1883	1828	
Volume (vph)	144	471	523	361	379	106
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	512	568	392	412	115
RTOR Reduction (vph)	0	422	0	0	12	0
Lane Group Flow (vph)	157	90	568	392	515	0
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.8	11.8	53.1	53.1	27.3	
Effective Green, g (s)	13.3	13.3	54.6	54.6	28.8	
Actuated g/C Ratio	0.18	0.18	0.72	0.72	0.38	
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	313	281	669	1355	694	
v/s Ratio Prot	c0.09		c0.24	0.21	0.28	
v/s Ratio Perm		0.06	c0.37			
v/c Ratio	0.50	0.32	0.85	0.29	0.74	
Uniform Delay, d1	28.3	27.3	15.1	3.8	20.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	0.7	9.8	0.5	7.0	
Delay (s)	29.6	28.0	24.9	4.3	27.4	
Level of Service	C	C	C	A	C	
Approach Delay (s)	28.4			16.5	27.4	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

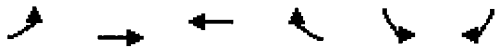
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1809		1789	1883	1601	1789	1883	1601	1789	1848	
Flt Permitted	0.50	1.00		0.12	1.00	1.00	0.31	1.00	1.00	0.33	1.00	
Satd. Flow (perm)	946	1809		220	1883	1601	582	1883	1601	630	1848	
Volume (vph)	88	437	156	159	415	144	86	271	289	164	419	60
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	475	170	173	451	157	93	295	314	178	455	65
RTOR Reduction (vph)	0	17	0	0	0	76	0	0	225	0	6	0
Lane Group Flow (vph)	96	628	0	173	451	81	93	295	89	178	514	0
Turn Type	Perm			pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	28.8	28.8		38.8	38.8	38.8	20.6	20.6	20.6	28.6	28.6	
Effective Green, g (s)	30.3	30.3		40.3	40.3	40.3	22.1	22.1	22.1	30.1	30.1	
Actuated g/C Ratio	0.39	0.39		0.51	0.51	0.51	0.28	0.28	0.28	0.38	0.38	
Clearance Time (s)	5.5	5.5		4.0	5.5	5.5	5.5	5.5	5.5	4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	366	699		233	968	823	164	531	451	301	710	
v/s Ratio Prot		c0.35		c0.06	0.24			0.16		0.03	c0.28	
v/s Ratio Perm	0.10			0.33		0.05	0.16		0.06	0.20		
v/c Ratio	0.26	0.90		0.74	0.47	0.10	0.57	0.56	0.20	0.59	0.72	
Uniform Delay, d1	16.4	22.6		15.8	12.2	9.7	24.1	24.0	21.4	19.6	20.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	14.4		12.0	0.4	0.1	13.4	4.2	1.0	3.1	6.3	
Delay (s)	16.8	37.0		27.8	12.5	9.8	37.5	28.1	22.4	22.7	26.9	
Level of Service	B	D		C	B	A	D	C	C	C	C	
Approach Delay (s)		34.4			15.4			26.8			25.8	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	78.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



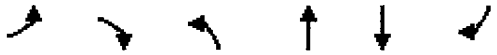
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1601		1789	1883	1601	1789	1883	1601	3471	1880	
Flt Permitted	0.75	1.00		0.74	1.00	1.00	0.36	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1411	1601		1397	1883	1601	673	1883	1601	3471	1880	
Volume (vph)	12	0	22	72	12	618	36	537	110	615	744	8
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	0	24	78	13	672	39	584	120	668	809	9
RTOR Reduction (vph)	0	21	0	0	0	79	0	0	62	0	0	0
Lane Group Flow (vph)	13	3	0	78	13	593	39	584	58	668	818	0
Turn Type	Perm			Perm		pm+ov	Perm		Perm	Prot		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)	7.8	7.8		7.8	7.8	25.4	28.4	28.4	28.4	17.6	50.0	
Effective Green, g (s)	9.3	9.3		9.3	9.3	26.9	29.9	29.9	29.9	17.6	51.5	
Actuated g/C Ratio	0.14	0.14		0.14	0.14	0.39	0.43	0.43	0.43	0.26	0.75	
Clearance Time (s)	5.5	5.5		5.5	5.5	4.0	5.5	5.5	5.5	4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	191	216		189	255	719	292	818	696	888	1407	
v/s Ratio Prot		0.00			0.01	c0.21		c0.31		0.19	0.43	
v/s Ratio Perm	0.01			0.06		0.16	0.06		0.04			
v/c Ratio	0.07	0.02		0.41	0.05	0.82	0.13	0.71	0.08	0.75	0.58	
Uniform Delay, d1	26.0	25.8		27.2	25.9	18.8	11.7	15.9	11.4	23.6	3.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.0		1.5	0.1	7.6	0.9	5.3	0.2	3.6	1.8	
Delay (s)	26.1	25.8		28.7	26.0	26.5	12.6	21.2	11.6	27.2	5.6	
Level of Service	C	C		C	C	C	B	C	B	C	A	
Approach Delay (s)		25.9			26.7			19.2			15.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



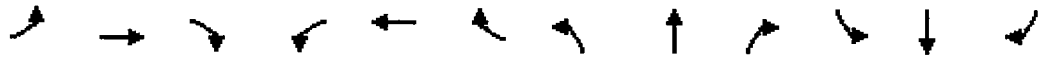
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	1883	1883	1601	3471	1601
Flt Permitted	0.11	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	209	1883	1883	1601	3471	1601
Volume (vph)	208	678	688	622	639	225
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	226	737	748	676	695	245
RTOR Reduction (vph)	0	0	0	363	0	181
Lane Group Flow (vph)	226	737	748	313	695	64
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	41.5	41.5	30.5	30.5	16.7	16.7
Effective Green, g (s)	43.0	43.0	32.0	32.0	18.2	18.2
Actuated g/C Ratio	0.62	0.62	0.46	0.46	0.26	0.26
Clearance Time (s)	4.0	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	290	1170	871	740	913	421
v/s Ratio Prot	c0.08	0.39	c0.40		c0.20	
v/s Ratio Perm	0.41			0.20		0.04
v/c Ratio	0.78	0.63	0.86	0.42	0.76	0.15
Uniform Delay, d1	13.9	8.1	16.6	12.4	23.5	19.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	2.6	10.7	1.8	3.8	0.2
Delay (s)	26.3	10.7	27.3	14.2	27.3	19.8
Level of Service	C	B	C	B	C	B
Approach Delay (s)		14.4	21.1		25.3	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



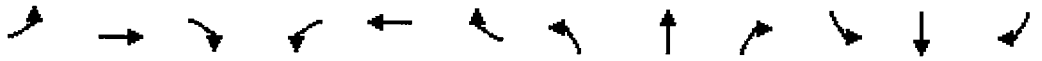
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1789	1601	1789	1883	1828	
Flt Permitted	0.95	1.00	0.19	1.00	1.00	
Satd. Flow (perm)	1789	1601	358	1883	1828	
Volume (vph)	144	471	523	361	379	106
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	512	568	392	412	115
RTOR Reduction (vph)	0	422	0	0	12	0
Lane Group Flow (vph)	157	90	568	392	515	0
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.8	11.8	53.1	53.1	27.3	
Effective Green, g (s)	13.3	13.3	54.6	54.6	28.8	
Actuated g/C Ratio	0.18	0.18	0.72	0.72	0.38	
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	313	281	669	1355	694	
v/s Ratio Prot	c0.09		c0.24	0.21	0.28	
v/s Ratio Perm		0.06	c0.37			
v/c Ratio	0.50	0.32	0.85	0.29	0.74	
Uniform Delay, d1	28.3	27.3	15.1	3.8	20.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	0.7	9.8	0.5	7.0	
Delay (s)	29.6	28.0	24.9	4.3	27.4	
Level of Service	C	C	C	A	C	
Approach Delay (s)	28.4			16.5	27.4	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1601		1789	1883	1601	1789	1836		1789	1880	
Flt Permitted	0.75	1.00		0.75	1.00	1.00	0.43	1.00		0.24	1.00	
Satd. Flow (perm)	1415	1601		1406	1883	1601	818	1836		451	1880	
Volume (vph)	9	0	16	53	9	459	27	401	82	458	554	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	0	17	58	10	499	29	436	89	498	602	7
RTOR Reduction (vph)	0	15	0	0	0	103	0	9	0	0	1	0
Lane Group Flow (vph)	10	2	0	58	10	396	29	516	0	498	608	0
Turn Type	Perm			Perm		pm+ov	Perm			pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	4.9	4.9		4.9	4.9	18.4	21.3	21.3		38.8	38.8	
Effective Green, g (s)	6.4	6.4		6.4	6.4	19.9	22.8	22.8		40.3	40.3	
Actuated g/C Ratio	0.12	0.12		0.12	0.12	0.36	0.42	0.42		0.74	0.74	
Clearance Time (s)	5.5	5.5		5.5	5.5	4.0	5.5	5.5		4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	166	187		165	220	700	341	765		662	1385	
v/s Ratio Prot		0.00			0.01	c0.14		0.28		c0.19	0.32	
v/s Ratio Perm	0.01			0.04		0.11	0.04			c0.37		
v/c Ratio	0.06	0.01		0.35	0.05	0.57	0.09	0.67		0.75	0.44	
Uniform Delay, d1	21.5	21.4		22.2	21.4	13.9	9.6	12.9		7.1	2.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0		1.3	0.1	1.1	0.5	4.7		4.8	1.0	
Delay (s)	21.6	21.4		23.5	21.5	15.0	10.1	17.7		11.9	3.8	
Level of Service	C	C		C	C	B	B	B		B	A	
Approach Delay (s)		21.5			16.0			17.3			7.5	
Approach LOS		C			B			B			A	

Intersection Summary				
HCM Average Control Delay	12.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	71.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1601		1789	1883	1601	1789	1835		1789	1880	
Flt Permitted	0.75	1.00		0.74	1.00	1.00	0.36	1.00		0.11	1.00	
Satd. Flow (perm)	1411	1601		1397	1883	1601	673	1835		206	1880	
Volume (vph)	12	0	22	72	12	618	36	537	110	615	744	8
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	0	24	78	13	672	39	584	120	668	809	9
RTOR Reduction (vph)	0	21	0	0	0	57	0	7	0	0	0	0
Lane Group Flow (vph)	13	3	0	78	13	615	39	697	0	668	818	0
Turn Type	Perm			Perm		pm+ov	Perm			pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	8.5	8.5		8.5	8.5	36.9	31.1	31.1		63.5	63.5	
Effective Green, g (s)	10.0	10.0		10.0	10.0	38.4	32.6	32.6		65.0	65.0	
Actuated g/C Ratio	0.12	0.12		0.12	0.12	0.46	0.39	0.39		0.78	0.78	
Clearance Time (s)	5.5	5.5		5.5	5.5	4.0	5.5	5.5		4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	170	193		168	227	818	264	721		703	1472	
v/s Ratio Prot		0.00			0.01	c0.26		0.38		c0.33	0.43	
v/s Ratio Perm	0.01			0.06		0.13	0.06			c0.42		
v/c Ratio	0.08	0.01		0.46	0.06	0.75	0.15	0.97		0.95	0.56	
Uniform Delay, d1	32.4	32.2		34.0	32.3	18.4	16.2	24.7		22.0	3.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0		2.0	0.1	3.9	1.2	26.2		22.5	1.5	
Delay (s)	32.6	32.2		36.0	32.4	22.3	17.4	50.9		44.4	5.0	
Level of Service	C	C		D	C	C	B	D		D	A	
Approach Delay (s)		32.3			23.9			49.1			22.7	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM Average Control Delay	29.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	89.7%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1601		1789	1883	1601	1789	1835		3471	1880	
Flt Permitted	0.75	1.00		0.74	1.00	1.00	0.36	1.00		0.95	1.00	
Satd. Flow (perm)	1411	1601		1397	1883	1601	673	1835		3471	1880	
Volume (vph)	12	0	22	72	12	618	36	537	110	615	744	8
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	0	24	78	13	672	39	584	120	668	809	9
RTOR Reduction (vph)	0	21	0	0	0	79	0	8	0	0	0	0
Lane Group Flow (vph)	13	3	0	78	13	593	39	696	0	668	818	0
Turn Type	Perm			Perm		pm+ov	Perm			Prot		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)	7.8	7.8		7.8	7.8	25.4	28.4	28.4		17.6	50.0	
Effective Green, g (s)	9.3	9.3		9.3	9.3	26.9	29.9	29.9		17.6	51.5	
Actuated g/C Ratio	0.14	0.14		0.14	0.14	0.39	0.43	0.43		0.26	0.75	
Clearance Time (s)	5.5	5.5		5.5	5.5	4.0	5.5	5.5		4.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	216		189	255	719	292	797		888	1407	
v/s Ratio Prot		0.00			0.01	c0.21		c0.38		0.19	0.43	
v/s Ratio Perm	0.01			0.06		0.16	0.06					
v/c Ratio	0.07	0.02		0.41	0.05	0.82	0.13	0.87		0.75	0.58	
Uniform Delay, d1	26.0	25.8		27.2	25.9	18.8	11.7	17.7		23.6	3.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0		1.5	0.1	7.6	0.9	12.7		3.6	1.8	
Delay (s)	26.1	25.8		28.7	26.0	26.5	12.6	30.4		27.2	5.6	
Level of Service	C	C		C	C	C	B	C		C	A	
Approach Delay (s)		25.9			26.7			29.5			15.3	
Approach LOS		C			C			C			B	

Intersection Summary				
HCM Average Control Delay	21.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	86.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

BURNSIDE

Appendix G
Preliminary Sewer and Water Servicing Plans (2003 Report)

LEGEND	DEVELOPED	UNDEVELOPED
RESIDENTIAL		
COMMERCIAL		
INDUSTRIAL		
INDUSTRIAL (WASTE DISPOSAL)		

R-2 68.7 29.5 — IDENTIFICATION; PEAK FLOW (L/S); AREA IN HECTARES

ANTICIPATED DIRECTION OF FLOW – FUTURE SERVICING

FUTURE SANITARY FORCEMAIN

FUTURE SANITARY GRAVITY SEWER

N

PUMP STATION AND 150mm ϕ FORCEMAIN TO W.P.C.P.

PUMP STATION AND 350mm ϕ FORCEMAIN TO W.P.C.P.

PUMP STATION AND 200mm ϕ FORCEMAIN TO W.P.C.P.

STAYNER W.P.C.P. (EXPANSION REQUIRED)

9.9 SEWER CAPACITY TO BE INCREASED IN THIS AREA

250mm FORCEMAIN

GRAVITY SEWER

(FUTURE)

R-1 56.4 27.2

R-2 68.7 29.5

R-3 23.9 3.84

R-4 26.0 4.2

R-5 22.8 6.1

R-6 23.8 6.4

R-7 55 14.4

R-8 26.1 7.04

R-9 22.1 5.8

0 250 500

NOTES

1. EXISTING SANITARY AND WATER SYSTEM INFORMATION TAKEN FROM DRAWINGS PRODUCED BY AINLEY & ASSOCIATES, DRAWING NO. 192297-OP1 DATED JANUARY 1993. ADDITIONAL INFORMATION OBTAINED FROM TOWNSHIP FILES.

BENCHMARK

NO.	REVISIONS	DATE	APP'D

PRELIMINARY FOR REVIEW

CLIENT: TOWNSHIP of CLEARVIEW

TITLE: STAYNER SANITARY SEWAGE SYSTEM FUTURE EXPANSION

R. J. Burnside & Associates Limited
ENGINEERS – HYDROGEOLOGISTS – ENVIRONMENTAL CONSULTANTS
GEORGIAN BAY OFFICE, 3 RONELL CRESCENT, COLLINGWOOD, ONTARIO L9Y 4J6
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E-MAIL: collingwood@rjburnside.com

DRAWN	DRAWING NO.
RFN/TL	G-01122-SS-2
DESIGNED: J.L./P.S.	SCALE: 1: 7500
REVIEWED: J.L.	DATE: DECEMBER 2002

LEGEND

	DEVELOPED	UNDEVELOPED
RESIDENTIAL		
COMMERCIAL		
INDUSTRIAL		
INDUSTRIAL (WASTE DISPOSAL)		

R-2 / 68.7 | 29.5 — IDENTIFICATION; MAX. DAY DEMAND (L/s); AREA IN HECTARES

FUTURE TRUNK MAIN

PROPOSED 200mmø TRUNK MAIN

PROPOSED 250mmø TRUNK MAIN

STAYNER W.P.C.P.

R-1 56.4 | 22

R-2 68.7 | 29.5

R-3 23.9 | 3.1

R-4 28.0 | 3.4

R-5 22.8 | 4.9

R-6 23.8 | 5.1

R-7 55 | 11.8

R-8 26.1 | 5.6

R-9 22.1 | 4.7

P-1 19.8 | 10.2

P-2 19.8 | 10.2

P-3 19.8 | 10.2

P-4 19.8 | 10.2

P-5 20.8 | 10.7

(FUTURE)

250ø FORCEMAIN

PROPOSED 300mmø TRUNK MAIN

FUTURE GRADE LEVEL OF ELEVATED STORAGE

WELLS No.1 AND 3 SEE PLAN 'A'

WELL No.2 & RESERVOIR SEE PLAN 'B'

CONCESSION III

CONCESSION II

AIRPORT ROAD

SIMCOE CTY. RD. No. 42

WELL No. 2

EXISTING WATER RESERVOIR

CHLORINATION BUILDING

PLAN B
(N.T.S.)

(SUNNIDALE STREET)

WELL AND PUMPHOUSE No. 1

WELL AND PUMPHOUSE No.3

PLAN A
(N.T.S.)

0 250 500

NOTES

1. EXISTING SANITARY AND WATER SYSTEM INFORMATION TAKEN FROM DRAWINGS PRODUCED BY AINLEY & ASSOCIATES, DRAWING NO. 192297-OP1 DATED JANUARY 1993. ADDITIONAL INFORMATION OBTAINED FROM TOWNSHIP FILES.
2. LOCATION OF FUTURE STORAGE TO BE DETERMINED FOLLOWING SYSTEM MODELLING.

BENCHMARK

NO.	REVISIONS	DATE	APP'D

PRELIMINARY
FOR REVIEW

CLIENT
TOWNSHIP of CLEARVIEW

TITLE
STAYNER WATER SUPPLY SYSTEM
FUTURE EXPANSION

R. J. Burnside & Associates Limited
ENGINEERS - HYDROGEOLOGISTS - ENVIRONMENTAL CONSULTANTS
GEORGIAN BAY OFFICE, 3 RONELL CRESCENT, COLLINGWOOD, ONTARIO L9Y 4J6
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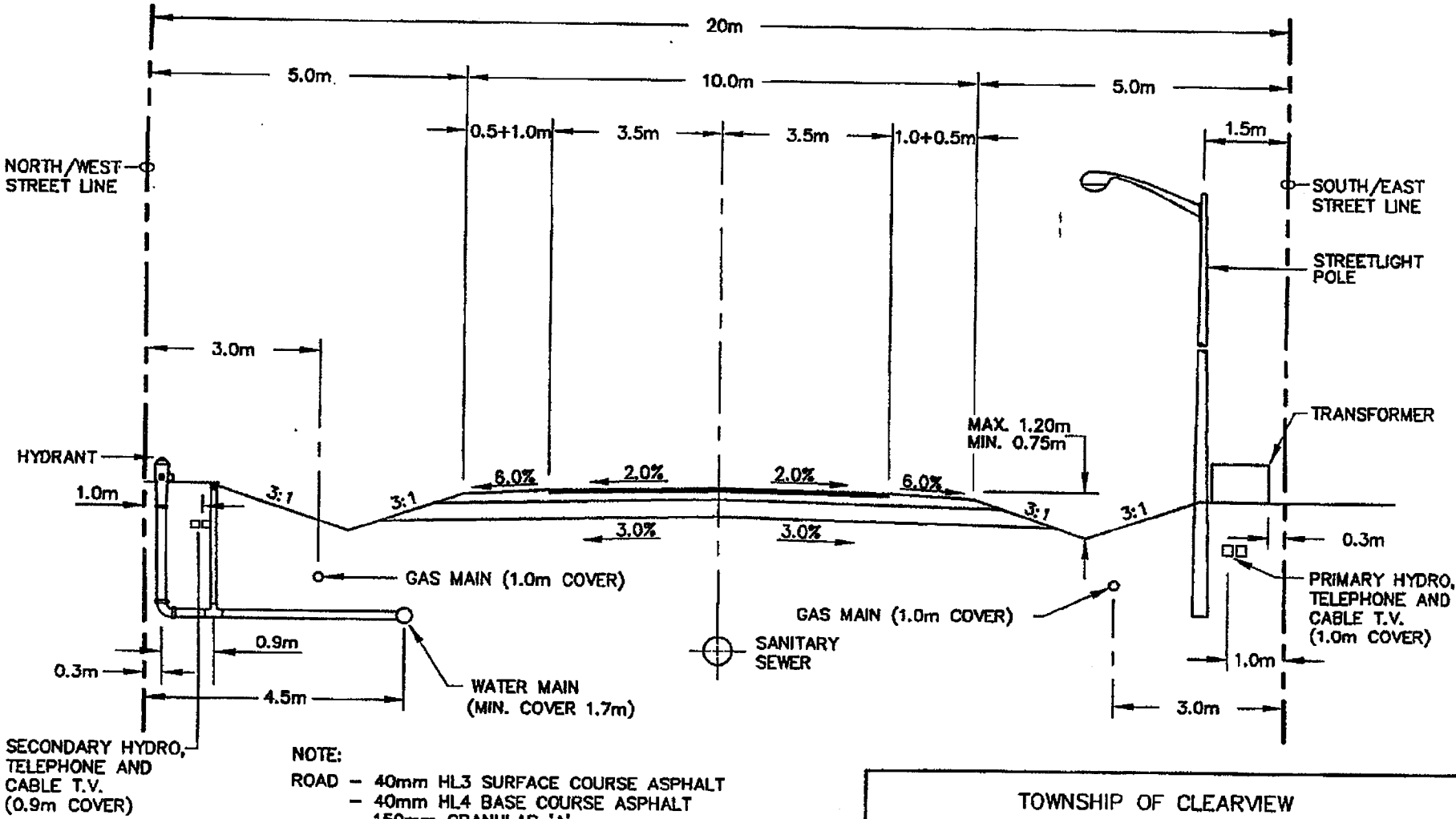
E-MAIL: collingwood@burnside.com

DRAWN G.T./T.L.	DRAWING NO. G-01122-WS-2
DESIGNED J.L./P.S.	SCALE 1: 7500
REVIEWED J.L.	DATE DECEMBER 2002

BURNSIDE

Appendix H
Typical Cross Sections for Township Roads



NOTE:

ROAD – 40mm HL3 SURFACE COURSE ASPHALT
– 40mm HL4 BASE COURSE ASPHALT
– 150mm GRANULAR 'A'
– 300mm GRANULAR 'B'

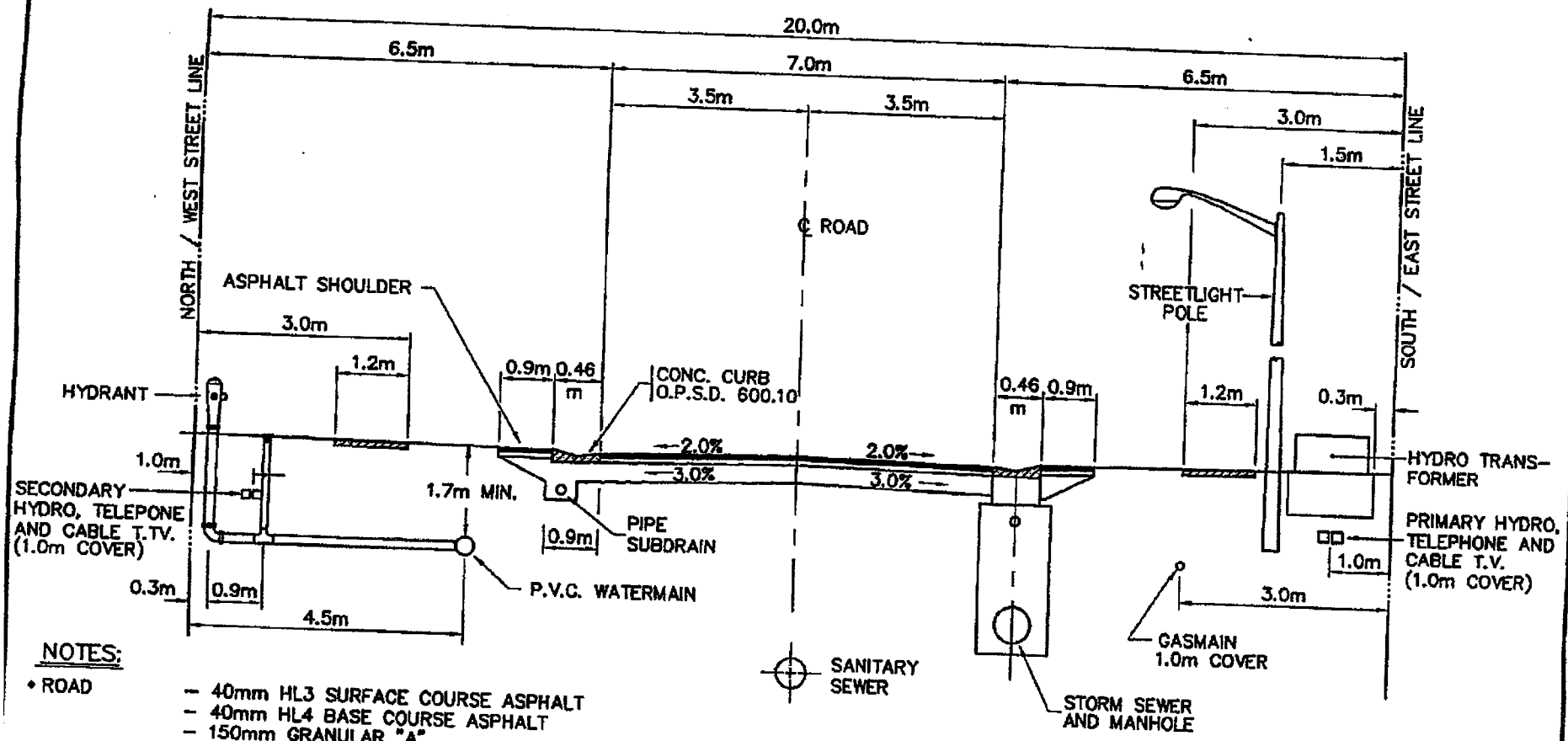
BOULEVARD – 75mm TOPSOIL AND NURSERY SOD

TOWNSHIP OF CLEARVIEW

STANDARD 9.0m ROAD – 20m R.O.W. (OPEN DITCH) WITH SERVICE LOCATIONS

No.	REVISIONS	APR'D	DATE

DESIGN:	A & A	DATE: FEB. 1998	DWG. No. STD–R1
DRAWN:	A & A	SCALE: N.T.S.	
CHECKED:	P.M.K.		



NOTES:

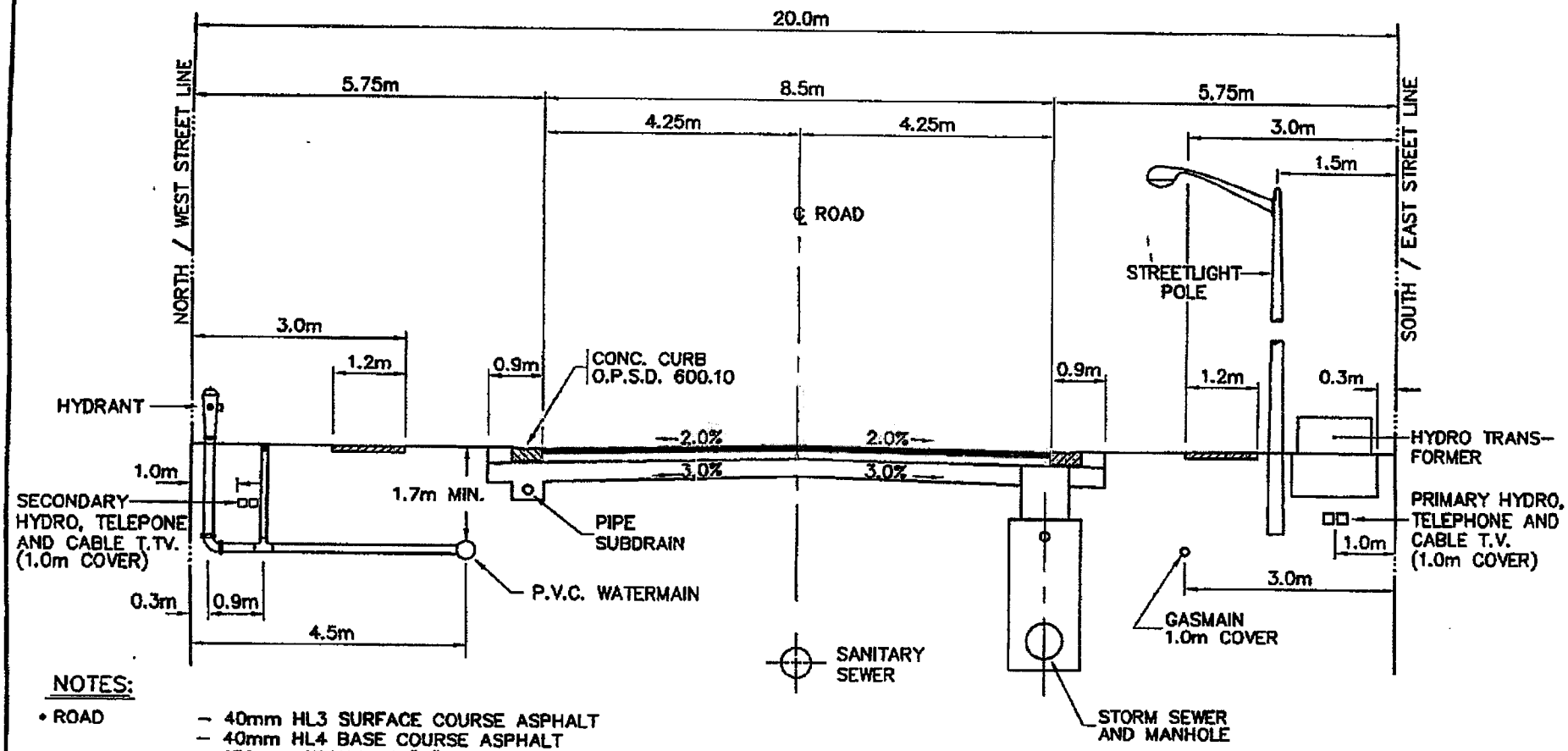
- ROAD
  - 40mm HL3 SURFACE COURSE ASPHALT
  - 40mm HL4 BASE COURSE ASPHALT
  - 150mm GRANULAR "A"
  - 300mm GRANULAR "B"
- SHOULDER
  - 50mm HL4 ASPHALT
  - 150mm GRANULAR "A"
- BOULEVARD — 75mm TOPSOIL & NURSERY SOD
- SIDEWALKS
  - 150mm GRANULAR "A" BASE
  - 130mm DEPT. CONCRETE
- MINIMUM RADII
  - CUL DE SAC 13.0m
  - RETURN 11.0m

No.	REVISIONS	APR'D	DATE
1	BASE COURSE HL & CONC. CURB		FEB. 1998

TOWNSHIP OF CLEARVIEW

STANDARD 7.0m ROAD – 20m R.O.W. (CURB & GUTTER – GRADES > 6.0%) WITH SERVICE LOCATIONS

DESIGN:	A & A	DATE: FEB. 1998	DWG. No. STD–R2
DRAWN:	A & A	SCALE: N.T.S.	
CHECKED:	P.M.K.		



NOTES:

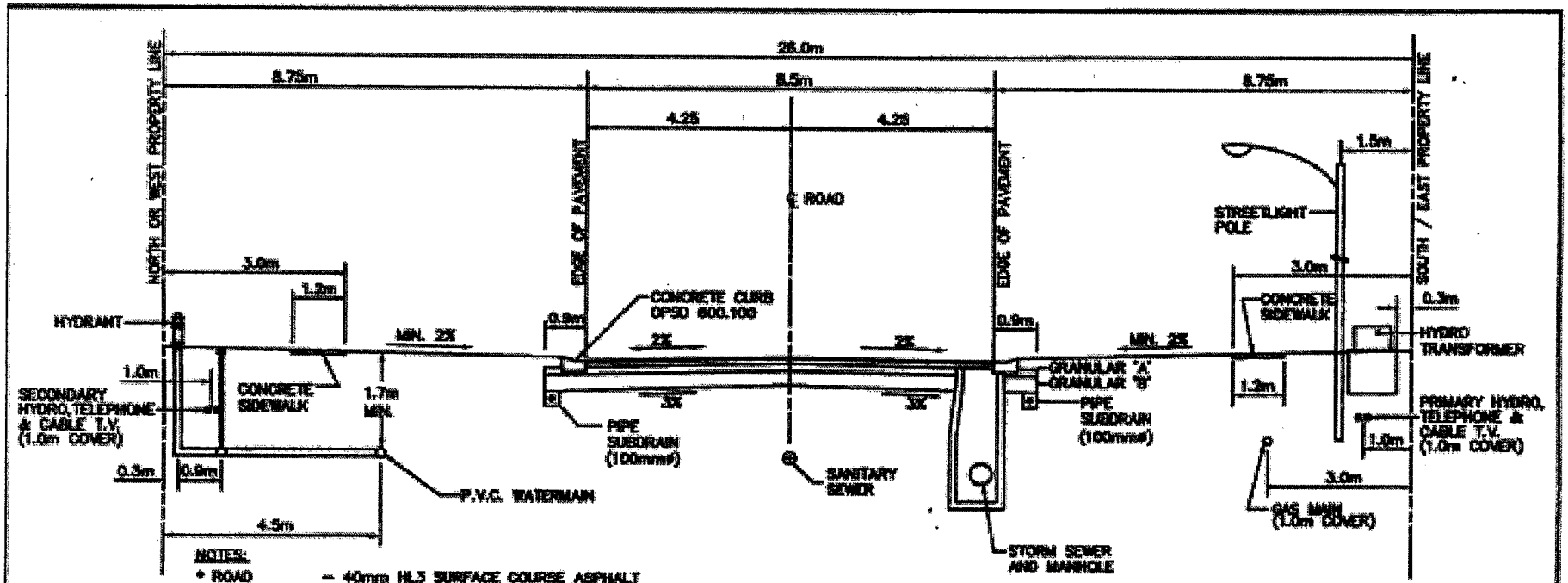
- ROAD – 40mm HL3 SURFACE COURSE ASPHALT
  – 40mm HL4 BASE COURSE ASPHALT
  – 150mm GRANULAR "A"
  – 300mm GRANULAR "B"
- BOULEVARD – 75mm TOPSOIL & NURSERY SOD
- SIDEWALKS – 150mm GRANULAR "A" BASE
  – 130mm DEPT. CONCRETE
- MINIMUM RADII – CUL DE SAC 13.0m
  – RETURN 11.0m

TOWNSHIP OF CLEARVIEW

STANDARD 8.5m ROAD – 20m R.O.W. (CURB & GUTTER) WITH SERVICE LOCATIONS

No.	REVISIONS	APR'D	DATE
1	BASE COURSE HL & CONC. CURB		FEB. 1998

DESIGN:	A & A	DATE: FEB. 1998	DWG. No.
DRAWN:	A & A	SCALE: N.T.S.	STD–R3
CHECKED:	P.M.K.		



NOTES:

* ROAD – 40mm HL3 SURFACE COURSE ASPHALT
  – 40mm HL4 BASE COURSE ASPHALT
  – 150mm GRANULAR 'A'
  – 300mm GRANULAR 'B'
* SIDEWALKS – 150mm GRANULAR 'A' BASE
  – 125mm THICK CONCRETE (THICKNESS AT DRIVEWAYS TO BE 150mm)
  – REFER TO GENERAL SERVICING DWG. GS-1 FOR LOCATION
* BOULEVARD – 70mm TOPSOIL & NURSERY SOD
* MINIMUM RADII – CUL DE SAC 13.0m
  – RETURN 11.0m

ROAD SECTION APPLIES TO: – REGINA STREET

* BASED ON TOWNSHIP OF CLEARVIEW STANDARD (STD-R3)

NO.	REVISION	APP'D	DATE

THE VILLAGES IN STAYNER
TOWNSHIP OF CLEARVIEW

STANDARD 8.5m ROAD – 26m R.O.W.
(CURB & GUTTER)
WITH SERVICE LOCATIONS

APP'D: BPS | DATE: MAR/04
DRAWN: WJV | SCALE: NTS

DWG. NO.
26m R.O.W.

BURNSIDE

Appendix I
Typical Road Width Criteria for Various Agencies

Appendix I – Road Width Criteria

Ministry of Transportation – Geometric Design Standards For Ontario Highways

Geometric Design Standards For Undivided Urban Roads

Design Year Traffic Volume		Design Speed	No. of Lanes	Lane Width	Parking Lane Width
AADT per lane	DHV per lane	Km/h		m	m
Greater than 6000	Greater than 600	80 60-70	4 4	3.5-3.75 3.5	
6000 To 3000	600 To 300	60-70 80 60-70	4* 2 2	3.5 3.5-3.75 3.5	 2.5-3.0 2.5-3.0
3000 To 2000	300 To 200	80 60-70 50	2 2 2	3.5 3.25 3.0	2.5-3.0 2.5-3.0 2.5-3.0
2000 To 1000	200 To 100	60-70 50	2 2	3.25 3.0	2.5-3.0 2.5-3.0
Less than 1000	Less than 100	40-50	2	2.75-3.0	2.5-3.0

*Four lanes may be appropriate toward the upper limits of this traffic range when there is a measurable capacity deficiency with only two lanes.

Transportation Association of Canada

Through Lane Widths For Urban Roadways

Through Lane	Description	Lane Width (m)
Freeway and expressway		3.7
Major arterial		3.7
Minor arterial	60 km/h design speed	3.5-3.7
Collector	Residential Industrial/Commercial	3.5-3.7 3.7
Local	Residential Industrial/Commercial	3.0 – 3.7 3.5-3.7

Appendix I (continued)

Ontario Good Roads Association

Recommended Minimum Road Widths*

Minimum Hard Top Road Widths (width of asphalt or surface treatment, excludes gravel shoulders)			Minimum Gravel Road Widths (width of gravel, excluding rounding)		
Application	Traffic Range	Minimum Width	Application	Traffic Range	Minimum Width
Rural (90 km/hr design speed)	> 3000 vpd	7.0 m**	Rural (80 km/hr design speed)	500 - 2000 vpd	7.5 m
	250 - 3000 vpd	6.5 m		250 - 500 vpd	6.5 m***
	50 - 250 vpd	6.0 m		50 - 250 vpd	6.0 m***
	< 50 vpd	5.0 m		< 50 vpd	5.5 m***
Semi-Urban or Urban (60 km/hr design speed)	> 2000 vpd	7.0 m	Semi-Urban or Urban residential access only (60 km/hr design speed)	250 - 400 vpd	6.0 m
	400 - 2000 vpd	6.5 m		50 - 250 vpd	5.5 m
	< 400 vpd	6.0 m		< 50 vpd	5.0 m

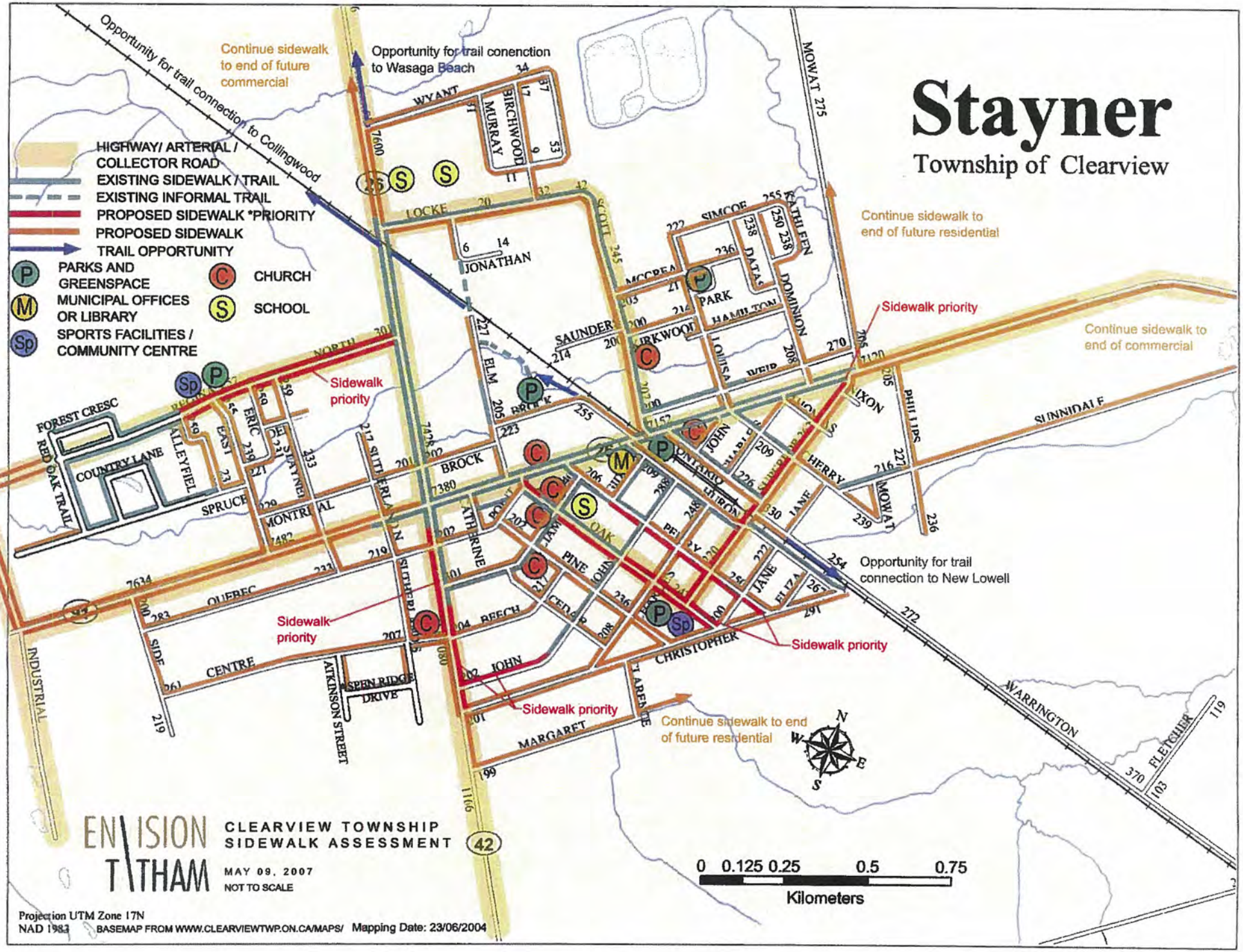
* Minimum road widths do not include provision for on street parking, where required or allowed.

** If truck percentage exceeds 10%, increase surface width by 0.5 metres.

*** Note: widths may be decreased by 0.5 metres if road is for residential access purposes only.

BURNSIDE

Appendix J
Stayner Sidewalk Assessment Plan (2007) and Conceptual Trails Plan


Stayner
Township of Clearview
Opportunity for trail connection to Collingwood
Continue sidewalk to end of future commercial
Opportunity for trail conenction to Wasaga Beach
HIGHWAY/ ARTERIAL / COLLECTOR ROAD
EXISTING SIDEWALK / TRAIL
EXISTING INFORMAL TRAIL
PROPOSED SIDEWALK *PRIORITY
PROPOSED SIDEWALK
TRAIL OPPORTUNITY
PARKS AND GREENSPACE
MUNICIPAL OFFICES OR LIBRARY
SPORTS FACILITIES / COMMUNITY CENTRE
CHURCH
SCHOOL
Continue sidewalk to end of future residential
Sidewalk priority
Continue sidewalk to end of commercial
Opportunity for trail connection to New Lowell
Continue sidewalk to end of future residential
WYANT
MURRAY
BIRCHWOOD
LOCKE
JONATHAN
SCOTT
SIMCOE
KATHLEEN
DOMINION
PARK
HAMILTON
SAUNDERS
KIRKWOOD
ELM
NORTH
FOREST CRESC
RED OAK TRAIL
COUNTRY LANE
ALLEYFIELD
EAST
ERIC
DELAWARE
SPRUCE
MONTREAL
BROCK
JOHN
HENRY
IXON
PHILLIPS
SUNNIDALE
MOWAT
LANE
ONTARIO
CATHERINE
OAK
PINE
JANE
ELIZA
BEECH
CHRISTOPHER
QUEBEC
SIDE
CENTRE
ATKINSON STREET
ASPEN RIDGE DRIVE
INDUSTRIAL
MARGARET
CLARENCE
MOWAT 275
WARRINGTON
FLETCHER
ENVISION TATHAM
CLEARVIEW TOWNSHIP
SIDEWALK ASSESSMENT
MAY 09, 2007
NOT TO SCALE
0 0.125 0.25 0.5 0.75
Kilometers
Projection UTM Zone 17N
NAD 1983
BASEMAP FROM WWW.CLEARVIEWTWP.ON.CA/MAPS/
Mapping Date: 23/06/2004

Stayner

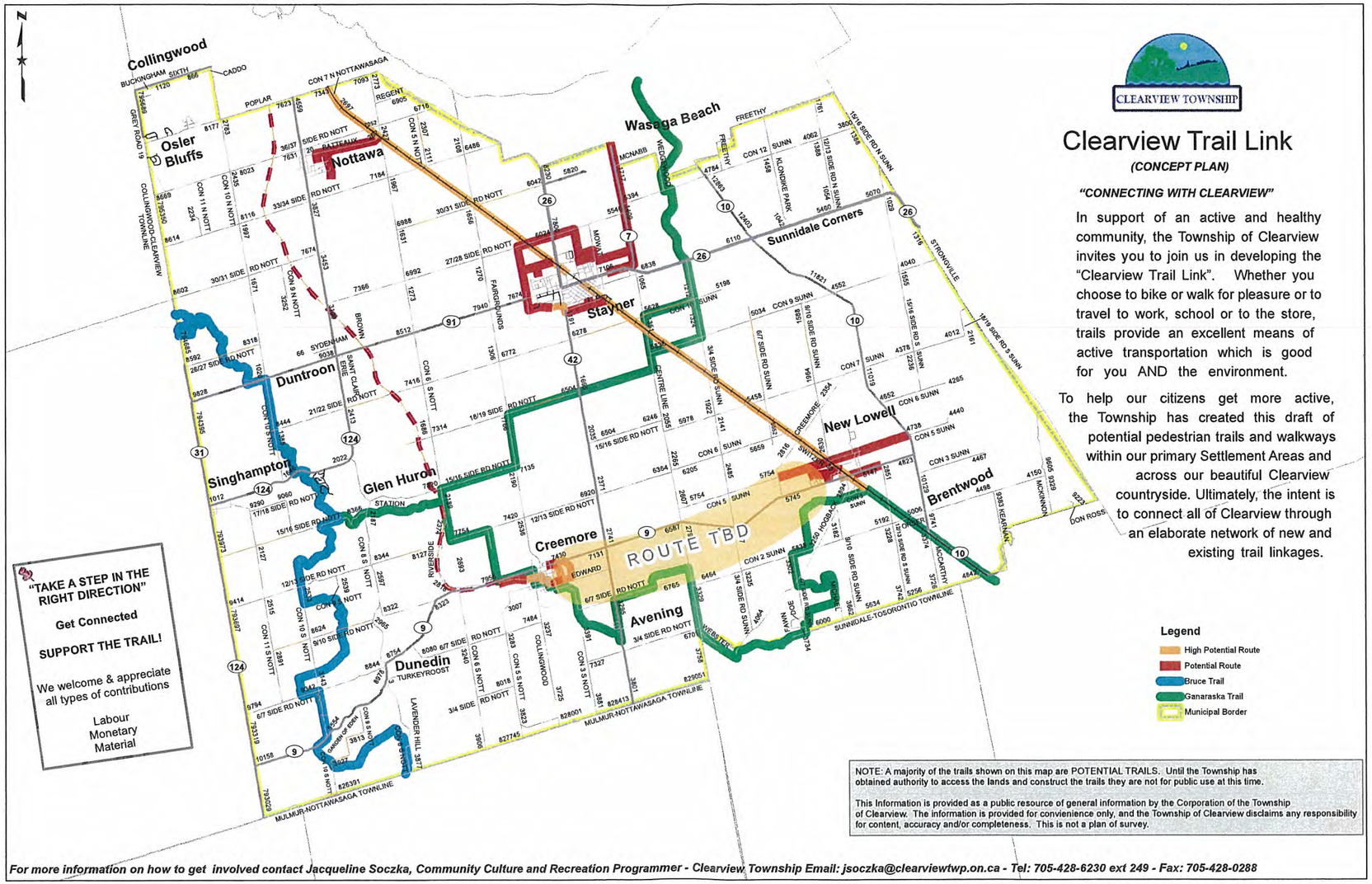
Legend

- Existing Trail
- Bruce Trail
- High Potential Route
- Potential Route
- Ganaraska Trail

Community Facilities

- Arena
- Ball Diamond
- Bowling Park
- Community Hall
- Conservation Area
- Curling Rink
- Park
- Pool
- Proposed Park
- Skate Park
- Soccer Field
- Tennis Court
- Library
- Public Elementary Schools
- Public High Schools
- Separate Elementary Schools

27/28 SIDEROAD
WYANT RD
MURRAY CR
BIRCHWOOD BLVD
HIGHWAY 26
LOCKE AV
JONATHAN CT
MOWAT STREET N
SIMCOE STREET
DATAS DRIVE
KATHLEEN ST.
MCCREA DRIVE
PARK
LOUISA STREET
KIRKWOOD DR
DOMINION DRIVE
HIGHWAY 26
SIDELL DRIVE
SAUNDERS STREET
ELM STREET
SCOTT STREET
WEIR STREET
THOMAS STREET
PHILLIPS STREET
SUNNIDALE STREET
BROCK STREET
ONTARIO STREET
GIDEON STREET
HURON STREET
SUPERIOR STREET
CHERRY STREET
MOWAT STREET S
FOREST CRES.
RED OAK TRAIL
COUNTRY LANE
SPRUCE STREET
REGINA STREET
VALLEYFIELD
ERIC STREET
EAST STREET
NORTH STREET
LAMONT CRT.
STAYNER STREET
MONTREAL STREET
BROCK STREET
OAK STREET
PERRY STREET
COUNTY ROAD 91
SUTHERLAND STREET S
POINT STREET
PINE STREET
JOHN STREET
WILLIAM STREET
QUEBEC STREET
WILLOW STREET
SIDE STREET
CEDAR STREET
JANE STREET
ELIZA STREET
DOUGLAS STREET
BEECH STREET
CHARLES STREET
CENTRE STREET
ATKINSON STREET
ASPEN RIDGE DRIVE
CHRISTOPHER STREET
CLARENCE STREET
LAWRENCE STREET
MARGARET STREET
INDUSTRIAL ROAD
POPLAR STREET
FLETCHER STREET
WARRINGTON RO



CLEARVIEW TOWNSHIP

Clearview Trail Link

(CONCEPT PLAN)

"CONNECTING WITH CLEARVIEW"

In support of an active and healthy community, the Township of Clearview invites you to join us in developing the "Clearview Trail Link". Whether you choose to bike or walk for pleasure or to travel to work, school or to the store, trails provide an excellent means of active transportation which is good for you AND the environment.

To help our citizens get more active, the Township has created this draft of potential pedestrian trails and walkways within our primary Settlement Areas and across our beautiful Clearview countryside. Ultimately, the intent is to connect all of Clearview through an elaborate network of new and existing trail linkages.

NOTE: A majority of the trails shown on this map are POTENTIAL TRAILS. Until the Township has obtained authority to access the lands and construct the trails they are not for public use at this time.

This Information is provided as a public resource of general information by the Corporation of the Township of Clearview. The information is provided for convienience only, and the Township of Clearview disclaims any responsibility for content, accuracy and/or completeness. This is not a plan of survey.

For more information on how to get involved contact Jacqueline Soczka, Community Culture and Recreation Programmer - Clearview Township Email: jsoczka@clearviewtwp.on.ca - Tel: 705-428-6230 ext 249 - Fax: 705-428-0288

BURNSIDE

Appendix K
Typical Bikeway Facilities (Transportation Association of Canada)

Figure 3.4.3.1 Bikeway Classification