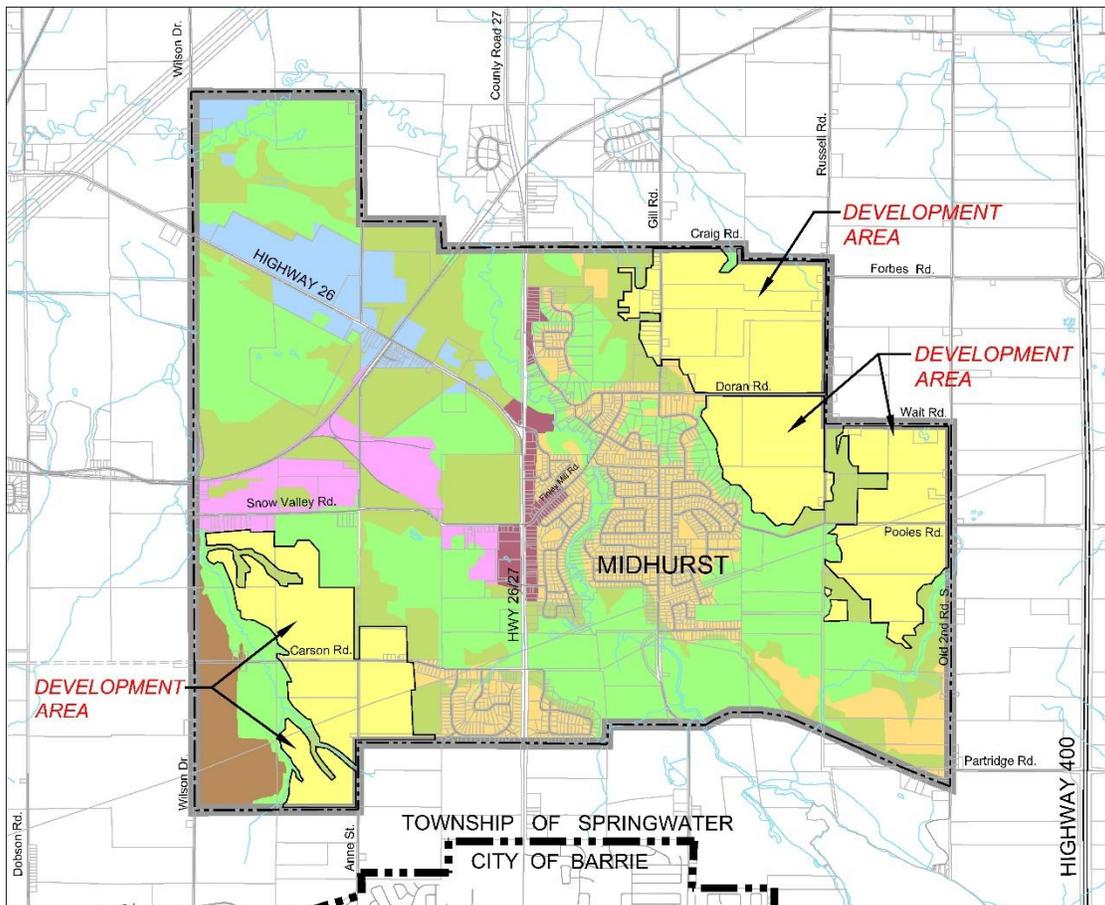


Township of Springwater Midhurst Water, Wastewater & Transportation (Phase 3 and 4) Environmental Study Report



File: 113027
March 2020

**Volume 1 of 6
Main Body**

Ainley Group
Consulting Engineers and Planners
280 Pretty River Parkway
Collingwood, ON, L9Y 4J5
Telephone: 705-445-3451
www.ainleygroup.com

Township of Springwater
Midhurst Water, Wastewater & Transportation
Class Environmental Assessment
Phase 3 & 4

Environmental Study Report

Project No. 113027

Prepared for:

Township of Springwater

Prepared By:



Reid Mitchell

Reviewed By:



J. A. Mullan, P.Eng.

Ainley Group

550 Welham Road
Barrie, ON L6M 8Z7
Phone: (705) 726-3371
www.ainleygroup.com

EXECUTIVE SUMMARY

Purpose

As a result of the withdrawal of an appeal of the Midhurst Secondary Plan by the Ontario Ministry of Municipal Affairs and Housing in November 2012, 300 hectares out of the total 756 hectares of land proposed to be re-designated as urban in OPA 38, were cleared for development. This decision enabled the Township of Springwater to continue with the Class Environmental Assessment (EA) Planning Process for the servicing of the future development. The purpose of this Environmental Study Report (Phase 3 and 4) is to document the planning process leading to the selection of preferred water, wastewater and transportation servicing solutions to meet the needs of the future development.

Revisions to Master Plan Document

Phases 1 and 2 of the Class EA planning process were documented in a Master Plan Report which was finalized in July 2009. Since that time several minor revisions were identified which are outlined in this ESR. As a result, the following revisions are noted:

1. It was determined that two water treatment facilities should be provided considering the proposed final well locations,
2. Water demands were confirmed (including allowance for filter backwash waste) as a result of the decision to construct two separate water treatment facilities,
3. It was decided to provide in-ground water storage facilities (one at each of the two treatment plants),
4. Wastewater flows were confirmed,
5. The location of the wastewater treatment plant was revised, and a minor revision was made to the alignment of the sewage forcemain from the Doran Road area,
6. An analysis of the potential Craig Road alignments was undertaken, and a recommended alignment was selected,
7. Based on a review by the MTO, it was decided to upgrade the existing Highway 400 interchange at Forbes Road rather than creating a new interchange at Pooles Road,
8. As a result of the upgraded interchange, improvements are required on Forbes Road and Russell Road,
9. It was determined that a widening (to 3 lanes) is required on Finlay Mills Road from Wattie Road to Hwy 26, and
10. An assessment was undertaken as to the feasibility/need for traffic roundabouts at intersections throughout the Secondary Plan Area.

Phasing and Staging

Based on the approval of the initial 300 hectares of development, a development phasing and staging projection was prepared. Phase 1 (300 hectares) will be developed in 5 stages with cumulative totals of:

- Carson Road – 2,650 units (including 350 equivalent employment units)
- Doran Road – 2,350 units
- Total – 5,000 units

Recommended Water Supply, Treatment and Storage Servicing

The recommended solution for the provision of water servicing to the Midhurst Secondary Plan Area is to develop two separate water supply systems – one for the Carson Road area and one for the Doran Road area. The design concepts are summarized hereinafter.

Wastewater Effluent Discharge Criteria

The evaluation of wastewater treatment options was based on the following:

- Wastewater flows are 6450 m³/day (Phase 1) and 12314 m³/day (Ultimate),
- One Wastewater Treatment Plant (WWTP) is to be provided at the sand and gravel pit site north of Snow Valley Road,
- Effluent Discharge will be to Willow Creek at Highway 26,
- 7Q20 flow rate in Willow Creek is 430 L/s, and,
- Effluent Compliance Limits are proposed as follows:
 - cBOD5 - 15 mg/L (both Phases)
 - TSS - 15 mg/L (both Phases)
 - Ammonia N - 1.5 mg- N/L (Phase 1) and 1.0 mg-N/l (Ultimate) Summer period
 - Ammonia N - 3.0 mg-N/L (Phase 1) and 2.0 mg-N/L (Ultimate) Winter period
 - TIN - 15.4 mg-N/L (Phase 1) Ultimate target to be determined in future
 - TP - 0.05 mg/L (Phase 1) and 0.03 mg/L (Ultimate)
 - E. Coli. - 100/mL (both Phases) (see MOECC review – April 30, 2018)
- Effluent Design Objectives for both Phases of Development are as follows:
 - cBOD5 - 10 mg/L
 - TSS - 10 mg/L
 - Ammonia N - 1.0 mg- N/L Summer period
 - Ammonia N - 2.0 mg-N/L Winter period
 - TIN - 15.0 mg-N/L (Phase 1) Ultimate target to be determined in future
 - TP - 0.03 mg/L
 - E. Coli. - 100/mL

Assuming a stormwater infiltration rate of 23 mm and at the Ultimate (Build out) flow rate, an estimated 66 kg/yr of phosphorus may need to be offset using phosphorus offsetting techniques in order to attain a “no net increase” in TP as required by the NVCA and the Township.

However, it has been noted by the MECP in a comment letter dated April 30, 2018, that the addition of 66 kg/year of phosphorus (or even up to the full load of 134kg/year from the WWTP) would be a very small fraction of the total load that is annually released into the downstream systems (Minesing Wetland) and is unlikely to be of any concern. As such the MECP advised that it will not be necessary to include a Phosphorous offsetting program as part of the ECA for the

WWTP. As the “no net increase” in TP is a requirement of the NVCA and the Township, the ESR still strives for this and the issue will be discussed with the NVCA and the Township in advance of the design of the wastewater treatment plant.

The final effluent compliance and design limits will be determined in consultation with the MECP as part of the Environmental Compliance Approvals (ECA). It is noted that the need for phosphorus offsetting (to address the additional load of 66 kg/year) will be determined in the future, based on consultations with the NVCA and the Township. Should an offsetting program be deemed to be necessary, the details of such a program will be finalized through discussions with the NVCA and the Township.

Recommended Wastewater Collection, Treatment and Effluent Discharge Solution

The recommended solution for the provision of wastewater servicing to Midhurst Secondary Plan Area is to develop one treatment plant with a collection system designed to service the two development areas, in addition to being capable of servicing the existing residents within Midhurst, if necessary, in the future. The design concept is summarized hereinafter.

Recommended Transportation Improvements

A complete list of recommended transportation improvements attributable to the development of the Midhurst Secondary Plan is included in Section 7.6. The Class EA Schedule “C” projects are identified as follows:

- Provide Craig Road as an east – west link between Russell Rd. and County Rd. 27 (required as part of Phase 1, Stage 1 of Development)
- Widen Wilson Rd. from Barrie City limits to Snow Valley Rd. to 4 lanes (by County of Simcoe, required as part of Phase 1, Stage 3 of Development)
- Widen Forbes Rd. from Hwy 400 to Russell Rd. to 4 lanes (required as part of Phase 2, Stage 1)
- Widen Russell Rd from south of Walt Rd. to Forbes Rd. to 4 lanes (required as part of Phase 2, Stage 1)
- Widen Finlay Mill Rd from Wattie Road to Hwy 26 to 3 lanes (required as part of Phase 1, Stage 1 in conjunction with forcemain installation)
- Upgrade the existing Hwy 400 interchange at Forbes Road (required as part of Phase 2, Stage 3)

It should be noted that in conjunction with the Upgrade for the Hwy. 400 & Forbes Road Interchange, as part of Phase 2 Stage 3, (By or before 2041) a re-evaluation of the proposed improvements will be undertaken in conjunction with the MTO.

Phase 3 Public and Review Agency Consultation

Extensive consultation with the Public and Interested Parties, has taken place throughout the Class EA process including:

- Phase 3 “Notice of Commencement” of Phases 3 and 4 of the Class EA planning process for the Midhurst Water, Wastewater and Transportation servicing was published in April of 2013. In conjunction with this Notice an Open House was held, following which comments were received and responses to these initial comments were provided.
- Throughout the Class EA planning process, multiple meetings were held with the designated Steering Committee.
- At the beginning of Phase 3 a Residents Liaison Committee was formed, with representatives from the Public and Interested parties. The purpose of this committee was to provide conduit for the flow of information between the Community and the Steering Committee throughout the Class EA planning process. Meetings with the Residents Liaison Committee were coordinated with the Steering Committee Meetings to ensure that the public were continually aware of what was being completed.
- Meetings were held with Agencies including MECP, MTO and NVCA.
- A Phase 3 Public Information Centre (PIC) was held on October 18, 2016 to present the preferred solutions for the water, wastewater and transportation servicing. Comments were received and a Communication Plan is included in this ESR complete with a summary of the comments and the related responses. (Appendix X)
- Fact Sheets (1 to 6) were prepared for the purpose of presenting some of the responses.
- A Special Township of Springwater Council Meeting, specifically relating to the Midhurst Class EA, was held on March 8, 2017, to allow members of the Public and Interested Parties an opportunity to provide additional comments to the Township of Springwater Council. The presentation/deputations that were made were subsequently reviewed and responses were provided to the Steering Committee. (Appendix AA)
- A draft Environmental Study Report (ESR) was provided to the Ministry of Environment and Climate Change (Subsequently Ministry of the Environment, Conservation and Parks – MECP) on April 25, 2017, for review and comment. The Township also sent a letter to the MOECC dated April 25, 2017, requesting that the Ministry give special attention to several issues that were presented to the Council at the Special Council meeting of March 8, 2017. The MOECC provided comments in a letter dated April 30, 2018. (Appendix BB). The draft ESR was revised to reflect those comments.
- Detailed Review Comments on the Background Reports were received from the NVCA on Jun 30, 2017 and a meeting was held on October 30, 2017 with the NVCA to discuss that Agency’s comments. A response letter was sent to the NVCA on April 5, 2018. (Appendix BB).
- An Open House was held on Monday June 18, 2018 to present the Draft ESR. (copy of Notice in Appendix CC)

Preliminary Design Considerations

Some preliminary design considerations were identified and are listed in Section 16.

Phase 4 Draft ESR – Public Review

A Notice of Completion of the Class EA planning process was advertised in the local newspaper and was sent to the various review agencies and interested members of the public. The Notice stated that the 30-day public review period would commence on June 18, 2018 and would end on July 19, 2018. The Notice also provided information on an Open House that would be held on June 18, 2018. The purpose of the Open House was to present the draft ESR to the public.

The public review period was subsequently extended to 90 days to end on September 18, 2018.

Requests for Part II Order

As a result of the public review, a total of 5 requests for a Part II Order (to elevate the environmental assessment process to an Individual EA) were received by the MECP. A copy of all correspondence related to these requests, is included in Appendix DD. The requests were received just prior to the end of the 90-day public review period (September 18, 2018). As requested by the MECP (letter dated September 19, 2018), project information was provided to the MECP in response to the various comments/concerns raised by the five Requesters. Responses were provided in a timely manner to all future MECP questions and requests for additional information/clarification. The Minister of the Environment, Conservation and Parks provided his decision on the Part II Order requests in a letter received under cover of an email dated November 21, 2019 which stated "...that I have decided that an individual environmental assessment is not required."

Recent MTO Comments

Ainley responded to the MTO in an email dated June 8, 2018 related to questions on the Transportation Operational Analysis Memo for the Midhurst Development area. Ainley advised that "...we have adjusted several aspects of our analysis..." In a subsequent email (June 11, 2018), Ainley provided a covering letter outlining how each of the MTO's questions were addressed. In a letter dated November 9, 2018, Ainley responded to questions provided by the MTO (email dated September 17, 2018) and in particular, with respect to the Traffic Operational Analysis Memorandum of May 30, 2018.

The MTO submitted a follow up email on Jan 29, 2019 with some additional questions in relation to Ainley's Nov 9, 2018 letter. Ainley responded to these questions in a letter dated April 7, 2020.

In addition to traffic related comments, the MTO commented on procedures for the approval of proposed pipelines to be installed within MTO road allowances. Those comments were provided in an email dated November 20, 2018. The MTO advised that "...early consultation on plans to work within or crossing of highway rights-of-way is recommended." The MTO also recommended

“...that alternatives other than parallel installations along our ROW be explored for both this forcemain (effluent pipeline) and other servicing proposals in the ESR.”

Copies of these items of correspondence are included in Appendix DD.

Recent NVCA Comments

As a result of the publication of the Notice of Completion, the NVCA provided comments in a letter dated September 17, 2018. Ainley provided responses in a letter dated March 19, 2019. A copy of that letter is included in Appendix DD.

Recent First Nations Comments

As a result of the public review period, four responses were received from First Nations Groups. In summary, the comments received were as follows:

- | | |
|--------------------------------|---|
| Chippewas of the Thames | - “...we have identified no concerns with your project or the information that you have presented to us at this time.” |
| Huron Wendat | - “Could you please let us know if any archaeological assessment have been done as part of the EA?” |
| Mississaugas of the New Credit | - “Your project is out of our treaty area.” |
| Rama | - “...we’ve forwarded the information to Karry Sandy McKenzie...” “Ms. McKenzie will review your letter and take the necessary action if required.” |

Copies of these items of correspondence are included in Appendix DD.

List of Project Undertakings

A list of Project Undertakings was provided to the MECP on October 29, 2018. That list summarizes the design concepts as follows:

TRANSPORTATION (See Section 7.6 and Table 7.6.6.1 of ESR)

As per the County’s Transportation Master Plan, anticipated improvements include:

- Snow Valley Road from CR 28 to Highway 26 widening to 4 lanes by 2021
- Wilson Drive from Barrie limit to Highway 26 widening to 4 lanes by 2031
- Widening of CR 93 from CR 11 (Forbes Road) to City of Barrie limit by 2031
- CR 27 from Highway 26 to CR 22 widening to 4 lanes by 2041

Based on the assessment, the following improvements are recommended:

Identified Needs at Start of Development

Construct Craig Road from Russell Road to County Road 27 (consider a roundabout at the intersection with County Rd. 27 See Section 7.6.2 of ESR) as an extension of Forbes Road. It is proposed that this project will be completed during the first stage of development.

By or Before 2031 Horizon

- Extend St. Vincent Street between Belmont Crescent and Park Trail (As part of Phase 1, Stage 3)
- Widen Wilson Road to four lanes. (As part of Phase 1, Stage 3)
- Provide a continuous two-way left turn lane on Finlay Mill Road from Wattie Road to Hwy 26 (Phase 1, Stage 1)
- The intersection of Wilson Drive at Snow Valley Road southerly intersection (as part of Phase 1, Stage 2)
 - Add a traffic signal (consider a roundabout at this intersection See Section 7.6.2 of ESR))
 - Add an exclusive left turn lane on each approach
- The intersection of Wilson Drive at Carson Road (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach
- The intersection of Highway 26 at Snow Valley Road/Finlay Mill Road (as part of Phase 1, Stage 1)
 - Add an eastbound right turn lane
- The intersection of Russell Road at Forbes Road (as part of Phase 2, Stage 1)
 - Add a traffic signal (consider a roundabout at this intersection See Section 7.6.2 of ESR)
 - Add an exclusive left turn lane on each approach
 - Add a northbound right turn
- The intersection of Russell Road at Doran Road (as part of Phase 2, Stage 1)
 - Add a traffic signal
 - Add an exclusive left turn lane on the northbound and eastbound approaches
 - Add a southbound right turn
- The intersection of Finlay Mill Road at Wattie Road (as part of Phase 1, Stage 1)
 - Add a southbound left turn lane
 - Add a northbound right turn lane (triggered by background traffic)

By or Before 2041 Horizon

- Add an additional through lane in each direction to a total of 4 lanes on the following sections of roads:
 - Forbes Road from Russell Road to Highway 400 (as part of Phase 2, Stage 1)
 - Russell Road from south of Walt Road to Forbes Road (as part of Phase 1, Stage 5)
- The intersection of Wilson Drive at Snow Valley Road northerly intersection (as part of Phase 1, Stage 2)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach
- The intersection of Highway 26 at Snow Valley Road/Finlay Mill Road (Combined with the initial road reconstruction/urbanization and as part of Phase 1, Stage 1)
 - Add a southbound right turn lane
- The intersection of Highway 26 at Carson Road (Combined with previous intersection work as part of Phase 1, Stage 4)
 - Add an eastbound right turn lane; and
- The intersection of Doran Road at St. Vincent Street (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach

We note that the traffic signal warrant is not fully met for this intersection but in consideration of the large left turn movement for westbound to southbound it may be beneficial.
- The intersection of St. Vincent Street at Pooles Road (as part of Phase 1, Stage 5)
 - Add a northbound right turn lane and signalize the intersection
 - Add southbound left turn lane
- The intersection of Russell Road at Pooles Road (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add a westbound right turn lane
 - Add an exclusive left turn lane on the east and south approaches
- The intersection of Forbes Road at Russell Road (as part of Phase 2, Stage 1)
 - Change the westbound inside lane to a left turn lane (double left turn lanes)
 - Change the northbound right turn lane to a channelized right turn lane
- The intersection of Forbes Road at Highway 400 (as part of Phase 1, Stage 2)
 - Add a westbound left turn lane for the SB off-ramp; and
 - Add an eastbound channelized right turn lane for the SB off-ramp
 - Add an eastbound left turn lane for the NB off-ramp

It should be noted that in conjunction with the Upgrade for the Hwy. 400 & Forbes Road Interchange, as part of Phase 2 Stage 3, (By or before 2041) a re-evaluation of the proposed improvements will be undertaken in conjunction with the MTO.

Table 7.6.6 and Figure 7.6-1 provide a summary of the above noted improvements. For the development of the transportation network improvement scheduling consideration was given to coordinate those improvements with general servicing requirements for the development areas. Projects such as intersection improvements along the Findley Mill Road / Snow Valley Road corridor are among the first transportation improvements completed because sanitary sewer infrastructure will be installed along this corridor at the initial stages of development so the transportation improvements will be completed at that time.

Active transportation considerations are outlined in Section 7.6.3 of the ESR.

Future transit considerations are outlined in Section 7.8 of the ESR.

WASTEWATER (See Sections 6.5.3 and 6.6 of ESR)

Design and construct a wastewater treatment plant based on the design information as previously noted.

The plant can be constructed in stages but must be expandable in the future to accommodate the servicing of existing Midhurst (future total ADF of approximately 12,314 m³/d)

Recommended Wastewater Treatment Processes:

- Screening and degritting (for disposal to a landfill site) with pumping of wastewater if necessary, followed by,
- Primary / Secondary treatment with step feed biological nitrogen removal (BNR) with chemical addition for phosphorus removal (two main bioreactors) followed by,
- Tertiary treatment using membrane technology followed by,
- UV disinfection and pumping to Willow Creek for effluent discharge.
- Biological stabilized liquid sludge for beneficial re-use using mechanical thickening and ATAD (no dewatering) with a capacity of 240 days storage.

Effluent discharge pipe from the plant to Willow Creek, sized to service the entire Secondary Plan area including existing Midhurst. (Section 6.7 of ESR)

Design and construct wastewater collection system complete with pump stations and manifolded forcemain system as required, to service proposed development layout and, in the future, existing Midhurst. A manifolded forcemain is suggested in order to reduce the number of forcemains that will eventually need to be constructed. It is anticipated that a number of pumps stations can use the same forcemain. The proposed sewage pumping station locations and staging is presented in Table 17 of the ESR. Stations 1, 9 and 10 will be required

initially and stations 2, 7 and 8 will be required ultimately. The remaining stations (# 3, 4, 5 and 6) will be required if it is decided, by the Township, to service the existing properties (2018) within the developed area of Midhurst

WATER (See Section 5.10 of ESR)

Carson Road Area

- Construction of 3 equally sized production wells at the sand and gravel pit site with any 2 being capable of providing a total of 73 L/s to meet the Phase 1 demand,
- Construction of production wells at the West Snow Valley site with a minimum of 2 wells each rated at a minimum of 8 L/s (could be as high as 20 L/s each), complete with raw water transmission main to meet the Ultimate demand,
- A WTP to be built at the sand and gravel pit site with two treatment trains. An Ion Exchange treatment train is recommended for nitrate removal from the waters produced at the sand and gravel pit site to meet the Phase 1 demand. Ultimately, a separate filtration treatment train will be required to remove iron and manganese from the West Snow Valley water supply. The disinfection system for both trains will include a liquid chlorine storage tank and feed system with enough chlorine contact time to provide 2-log inactivation of viruses. The process wastewater will be pumped to the adjacent Wastewater Treatment Plant. The facility will be equipped with an emergency power supply to sustain the entire operation including the on-site well pumps,
- An in-ground water storage tank will be provided with a minimum capacity of 3,868 m³ (say 3,900) in order to meet the Ultimate water storage requirement for emergency, fire storage and equalization volume for peak hour demand, and,
- A pumping station will be built as part of the WTP to provide the peak hour water demand to the Carson Road Development Area and to maintain the pressure range between 345 and 620 kPa throughout the area. The station will also house fire pumps to provide 133 L/s for 3 hours. Pressure reducing valves will be required to service some small areas of the distribution system.

In addition to the works proposed in the Evaluation Report, it is noted that well pump houses will be required at all well sites to provide primary power, stand-by power (if not provided by a larger facility), flow metering and pump controls. A full water distribution system will be provided complete with valves, fire hydrants, sampling stations, air release valves, drain valves and water service connections.

Doran Road Area

- Construction of 3 equally sized production wells at the Doran Road well site with any 2 being capable of providing a total of 100 L/s to meet the Phase 1 demand complete with raw water transmission main to the Water Treatment Plant proposed to be located east of Gill Road within the Development,

- Construction of production wells at the Old School Road site with a minimum of 2 wells each rated at a minimum of 40 L/s, complete with raw water transmission main to the Water Treatment Plant to meet the Ultimate demand,
- A Water Treatment Plant to be built east of Gill Road within the Development to treat water from the two well sites. A filtration treatment system with special filter media for removal of Iron and Manganese will be required. The disinfection system will include a liquid chlorine storage tank and feed system with enough chlorine contact time to provide 2-log inactivation of viruses. The process wastewater will be pumped to the adjacent sewage pumping station. The facility will be equipped with an emergency power supply to sustain the entire operation,
- An in-ground water storage tank will be provided with a minimum Phase 1 capacity of 3,470 m³ (say 3,500) expandable to meet the Ultimate required minimum capacity of 5,382 m³ (say 5,400) to provide storage requirements for emergency, fire storage and equalization volume for peak hour demand, and,
- A pumping station will be built as part of the WTP to provide the peak hour demand to the Doran Road Area and to maintain the pressure range between 345 and 620 kPa throughout the area. The station will also house fire pumps to provide 133 L/s for 3 hours.

In addition to the works proposed in the Evaluation Report, it is noted that well pump houses will be required at all well sites to provide primary power, stand-by power, flow metering and pump controls. A full water distribution system will be provided complete with valves, fire hydrants, sampling stations, air release valves, drain valves and water service connections.

TABLE OF CONTENTS

- VOLUME 1 of 6 – Main Body of ESR**
- VOLUME 2 of 6 – Appendix A to H**
- VOLUME 3 of 6 – Appendix J to M**
- VOLUME 4 of 6 – Appendix N to Y**
- VOLUME 5 of 5 – Appendix Z to DD**
- VOLUME 6 of 6 – Appendix T1 to T10**

| | |
|--|----------------|
| EXECUTIVE SUMMARY..... | E1- E11 |
| 1.0 Introduction | 1 |
| 1.1 MMAH Decision..... | 1 |
| 1.2 Authorization | 1 |
| 1.3 Steering Committee Meetings | 1 |
| 1.4 Residents Liaison Committee Meetings..... | 1 |
| 1.5 Purpose of Phase 3 and 4 Class EA Planning Process | 2 |
| 1.6 Background and Supporting Documents | 2 |
| 1.7 Master Plan Requirements | 14 |
| 2.0 Revisions to Phase 1 and 2 Master Plan Report (July 2009) | 14 |
| 2.1 Water Supply, Treatment and Distribution | 14 |
| 2.1.1 Confirmation of Water Demands (Average, Max Day, Peak Hour and Fire Flow) 14 | |
| 2.1.2 Dual or Single Water Treatment Plants | 15 |
| 2.1.3 Type of Water Storage Facility and Level of Fire Protection..... | 16 |
| 2.1.4 Distribution System – Hydraulic Analysis | 17 |
| 2.2 Wastewater Treatment and Collection | 18 |
| 2.2.1 Confirmation of Flows (Average and Peak) | 18 |
| 2.2.2 Wastewater Treatment Plant Location | 18 |
| 2.2.3 Forcemain Route Revisions | 19 |
| 2.3 Traffic | 19 |
| 2.3.1 Craig Road Alignment..... | 19 |
| 2.3.2 Hwy 400 Interchange Location..... | 19 |
| 2.3.3 Forbes Road and Russell Road Improvements | 19 |
| 3.0 Populations and Proposed Development Phasing | 20 |
| 4.0 Evaluation Approach..... | 21 |
| 4.1 Water Supply, Treatment and Storage..... | 21 |
| 4.2 Wastewater Treatment | 21 |
| 5.0 Water Supply, Treatment, Storage and Distribution | 24 |

| | | |
|------------|---|-----------|
| 5.1 | Phase 1 & 2 Requirements..... | 24 |
| 5.2 | Water Supply (Well) Locations, Layout and Suggested Phasing..... | 24 |
| 5.3 | Raw Water Transmission Mains – Sizing and Alignments | 26 |
| 5.4 | Water Treatment Plant Options | 27 |
| 5.4.1 | Doran Road Water Treatment Plant..... | 27 |
| 5.4.2 | Carson Road Water Treatment Plant..... | 27 |
| 5.5 | Treated Water Transmission Mains – Sizing and Alignments | 28 |
| 5.6 | Watermain Sizing | 28 |
| 5.7 | Impacts and Mitigation Measures | 29 |
| 5.7.1 | General..... | 29 |
| 5.7.2 | Air Quality | 29 |
| 5.7.3 | Climate Change | 29 |
| 5.7.4 | Spills Risk Management..... | 30 |
| 5.7.4.1 | System Overview..... | 30 |
| 5.7.4.2 | Spills Risk | 30 |
| 5.7.4.3 | Dealing with Potential Main Breaks | 31 |
| 5.7.4.4 | Dealing with Potential for Equipment or Pump Failure..... | 31 |
| 5.7.4.5 | Dealing with Potential for Power Failure | 31 |
| 5.7.4.6 | Dealing with Potential for Control/Communication Failure | 32 |
| 5.8 | Opinion on Probable Capital Cost..... | 32 |
| 5.9 | Evaluation of Options | 33 |
| 5.10 | Selection of Recommended Design Concepts – Water Supply..... | 33 |
| 5.11 | Staging Considerations | 35 |
| 5.11.1 | Wells..... | 35 |
| 5.11.2 | Treatment and Storage Facilities | 35 |
| 5.11.3 | Watermains..... | 37 |
| 6.0 | Wastewater Collection, Treatment and Effluent Discharge..... | 38 |
| 6.1 | Phase 1 & 2 Requirements..... | 38 |
| 6.2 | Summary of Design Basis | 38 |
| 6.3 | Effluent Discharge Criteria..... | 38 |
| 6.4 | Wastewater Treatment Background Studies..... | 39 |
| 6.4.1 | General..... | 39 |
| 6.4.2 | Willow Creek 7Q20 Flow Assessment..... | 39 |
| 6.4.3 | Willow Creek Assimilative Study | 40 |
| 6.4.4 | Overall Phosphorus Budget | 40 |
| 6.4.5 | Increased Phosphorus Loading..... | 42 |
| 6.4.6 | Impact on Hynes Dragon Fly..... | 43 |
| 6.4.7 | Potential Impacts to Minesing Wetlands..... | 43 |
| 6.4.8 | Willow Creek and Wilson Drive Terrestrial Habitat Assessment | 43 |

| | | |
|------------|--|-----------|
| 6.4.9 | Fluvial Geomorphological Assessment of Willow Creek | 45 |
| 6.5 | Evaluation of Wastewater Treatment Alternatives | 45 |
| 6.5.1 | General..... | 45 |
| 6.5.2 | Summary of Evaluation Process – Liquid Treatment..... | 46 |
| 6.5.3 | Recommended Wastewater Treatment Option | 49 |
| 6.5.4 | Opinion of Probable Capital Cost – Wastewater Treatment Plant | 49 |
| 6.5.5 | Staging | 50 |
| 6.6 | Collection Options | 51 |
| 6.6.1 | General..... | 51 |
| 6.6.2 | Development Sanitary Sewers..... | 51 |
| 6.6.3 | Sewage Pumping Stations | 51 |
| 6.6.4 | Forcemain Alignments | 52 |
| 6.7 | Effluent Discharge Options | 53 |
| 6.7.1 | General..... | 53 |
| 6.7.2 | Effluent Disposal Site Options..... | 53 |
| 6.7.3 | Effluent Discharge Pipe Route Options | 53 |
| 6.7.4 | Effluent Discharge Headwall | 53 |
| 6.8 | Impacts and Mitigation Measures | 53 |
| 6.8.1 | General..... | 53 |
| 6.8.2 | Air Quality | 54 |
| 6.8.3 | Effluent Discharge Headwall | 54 |
| 6.8.4 | Spills Risk Management..... | 55 |
| 6.8.4.1 | System Overview | 55 |
| 6.8.4.2 | Spills Risk | 56 |
| 6.8.4.3 | Dealing with Potential Main Breaks..... | 56 |
| 6.8.4.4 | Dealing with Potential for Main Blockages..... | 56 |
| 6.8.4.5 | Dealing with Potential for Capacity Exceedances..... | 57 |
| 6.8.4.6 | Dealing with Potential for Equipment or Pump Failure | 58 |
| 6.8.4.7 | Dealing with Potential for Power Failure..... | 59 |
| 6.8.4.8 | Dealing with Potential for Control/Communication Failure | 59 |
| 6.9 | Opinion on Probable Capital Costs – Sewage Pumping Stations and Forcemains | 60 |
| 6.10 | Staging Considerations | 60 |
| 6.10.1 | Sewers..... | 60 |
| 6.10.2 | Sewage Pumping Stations | 60 |
| 6.10.3 | Forcemains | 60 |
| 6.10.4 | Wastewater Treatment Plant..... | 60 |
| 6.10.5 | Effluent Discharge Pipe..... | 60 |
| 7.0 | Traffic | 61 |
| 7.1 | Introduction | 61 |

| | | |
|-------------|--|------------|
| 7.2 | Existing Conditions | 62 |
| 7.2.1 | Road Network | 62 |
| 7.2.2 | Existing Traffic Volumes..... | 63 |
| 7.2.3 | Existing Traffic Operations | 65 |
| 7.3 | Future Background Conditions | 69 |
| 7.3.1 | Future Road Network..... | 69 |
| 7.3.2 | Background Traffic Volumes | 69 |
| 7.3.3 | Background Traffic Operations..... | 71 |
| 7.4 | Proposed Midhurst Developments..... | 79 |
| 7.4.1 | Site Locations and Land Uses..... | 79 |
| 7.4.2 | Proposed Phasing..... | 79 |
| 7.4.3 | Site Generated Trips..... | 82 |
| 7.4.4 | Site Trips | 82 |
| 7.4.5 | Trip Distribution & Assignment..... | 83 |
| 7.5 | Proposed Midhurst Developments..... | 92 |
| 7.5.1 | Future Total Traffic Volumes | 93 |
| 7.5.2 | Operational Analysis | 93 |
| 7.5.3 | 2031 Total Traffic Volumes | 93 |
| 7.5.4 | 2041 Total Traffic Volumes | 99 |
| 7.5.5 | Turn Lane Requirements | 105 |
| 7.6 | Required Road Improvement Summary..... | 105 |
| 7.6.1 | Link Traffic Capacities..... | 108 |
| 7.6.2 | Roundabouts | 111 |
| 7.6.3 | Active Transportation | 112 |
| 7.6.4 | Selected Cross Sections for Road Improvements | 114 |
| 7.6.5 | Additional Right-of -Way Requirements..... | 114 |
| 7.6.6 | Cost of Road Improvements | 115 |
| 7.7 | Craig Road Extension..... | 118 |
| 7.8 | Future Transit Considerations | 118 |
| 7.9 | Mitigation Measures | 118 |
| 8.0 | Notice of Commencement | 120 |
| 9.0 | Phase 3 Public Information Centre | 121 |
| 10.0 | Special Council Meeting – March 8, 2017 | 122 |
| 11.0 | Financial Considerations | 123 |
| 12.0 | Draft ESR - Recent Agency Consultations and Public Comments – March 2017 to April 2018..... | 124 |
| 12.1 | MOECC Review of Draft Environmental Study Report..... | 124 |
| 12.2 | Nottawasaga Valley Conservation Authority (NVCA)..... | 125 |
| 12.3 | Public Comments and Responses..... | 125 |
| 12.4 | City of Barrie | 126 |

| | |
|---|------------|
| 12.5 Ministry of Tourism, Culture and Sport | 126 |
| 12.6 Ecojustice | 126 |
| 12.7 Ministry of Transportation | 127 |
| 13.0 Notice of Completion | 128 |
| 14.0 Requests for Part II Order and Final ESR | 129 |
| 14.1 General | 129 |
| 14.2 Responses | 129 |
| 14.3 MECP Decision | 131 |
| 14.4 MTO Comments | 132 |
| 14.5 NVCA Comments | 133 |
| 14.6 Public Comments | 133 |
| 14.7 First Nations Comments | 133 |
| 14.8 Summary of Responses and Future Actions to be Taken | 133 |
| 15.0 Summary of Recommended Projects and Staging | 141 |
| 16.0 Summary of Design Considerations | 146 |
| 16.1 General | 146 |
| 16.2 Transportation | 146 |
| 16.3 Wastewater | 146 |
| 16.4 Water..... | 148 |
| 17.0 Public Review of Draft ESR and Requests for Part II Order | 150 |

Appendices

- A – Ministry of Attorney General letter dated November 28, 2012
- B – Minutes of Steering Committee Meetings and Agency Meetings
- C – Minutes of Residents Liaison Meetings
- D – Stage 1 Archaeological Assessment for the Proposed Craig Road Extension – Archeoworks Inc., June 8, 2016
- E – Memorandum – Update to EA Traffic Forecasts Based on Updated Employment Estimates – BA Group, May 23, 2014
- F – Memorandum – Midhurst EA Transportation Work Update – BA Group, November 12, 2013
- G – Memorandum – Updated Midhurst Roundabout Analysis – BA Group, June 11, 2015
- H – Memorandum – Highway 400 / Forbes Road Interchange Operations – AECOM, April 26, 2016
- J – Hydrogeological Study, Midhurst Water Supply Exploration Program – Golder Associates Ltd., May 2018, and Report on Carson and Doran Neighbourhoods Water Supply – Midhurst Secondary Plan: Supplementary Hydrologic Modelling – Golder Associates Ltd., May 2018
- K – Evaluation of Midhurst Water Supply and Water Treatment Alternatives – Black & Veatch, May 2016
- L – Hutchinson Environmental Sciences Ltd. Reports and Memoranda: Willow Creek Assimilative Capacity Study, May 2018 (including 7Q20 Flow Assessment); Hine’s Emerald Dragonfly

- Habitat in the Minesing Wetlands and the Midhurst Development, February 2017; Technical Memorandum, Estimating Phosphorus Loads to the Minesing Wetland, August 2016; Technical Memorandum, Monthly Total Phosphorus Concentrations in Willow Creek Predicted at Phase 1 and Full Build Out of the Midhurst Secondary Plan Area, October 2016; and Memorandum, Response to XCG Review of Midhurst Phosphorus Budget, March 2017;
- M – XCG Consulting Limited letters January 29, 2016 and June 22, 2016; Midhurst Secondary Plan Area, Phosphorus Budget Update – Hutchinson Environmental Sciences Ltd., May 2018
- N – Willow Creek and Wilson Drive Terrestrial Habitat Assessment – Beacon Environmental, May 30, 2016
- O – Memorandum – Potential Impacts to Minesing Swamp Related to Proposed Discharge of Treated Effluent from Midhurst Wastewater Treatment Plant to Willow Creek – Beacon Environmental, September 19, 2013
- P – Fluvial Geomorphological Assessment of Willow Creek Downstream of Proposed WWTP Discharge at Highway 26, Midhurst On. – Palmer Environmental Consulting Group Inc., December 13, 2013
- Q – Design Basis for Midhurst Wastewater Treatment Plant – Black & Veatch, April 2014
- R – Evaluation of Treatment Alternatives for Midhurst Wastewater Treatment Plant – Black & Veatch, May 2018
- S – Midhurst WWTP and WTP Facilities – RWDI Air Inc., May 28, 2018 and Odour Mitigation Assessment For Midhurst Wastewater Treatment Plant and Sewage Pumping Stations – Black & Veatch May 25, 2018
- T – Environmental Screening Craig Road Corridor, Midhurst – Azimuth Environmental Consulting Inc., October 9, 2015
- U – Drawings – See List Below
- V – Impacts and Mitigation Measures Related to Water Servicing Infrastructure
- W – Notice of Commencement, May 2013 Open House - Comments and Responses
- X – Phase 3 PIC Information and Communication Plan - Comments and Responses
- Y – Impacts and Mitigation Measures Related to Wastewater Servicing Infrastructure
- Z – Midhurst Forcemain Route Options
- AA – Special Council Meeting – March 8, 2017 – Public Comments and Responses
- BB – Comments after Submission of Draft ESR
- CC – Notice of Completion
- DD – Post Notice of Completion Comments and Responses (Part II Order Requests)
- T 1 – Traffic Counts, BA Group, November 12, 2013
- T 2 – Synchro Report, Ainley Group, June 2015
- T 3 – Traffic Signal Warrant, Ainley Group, August 2016
- T 4 – Left Turn Lane Warrant Analysis, Ainley Group
- T 5 – Proposed Intersections
- T 6 – Typical Cross-Sections
- T 7 – Craig Road Alternatives
- T 8 – Mitigation Measures – Transportation Works

Tables

| | |
|--|-----|
| Table 1 – List of Background and Supporting Documents | 3 |
| Table 2 - Water Demands (Assuming Two Separate Water Systems) | 15 |
| Table 3 – Water Storage Facilities – Advantages and Disadvantages..... | 16 |
| Table 4 – Water Storage Volumes | 17 |
| Table 5 – Wastewater Flows | 18 |
| Table 6 - Development Phasing and Staging Projections..... | 20 |
| Table 7 – Wastewater Liquid Train Primary and Secondary Evaluation Criteria | 22 |
| Table 8 – Suggested Well Phasing – Carson Road Development..... | 25 |
| Table 9 – Suggested Well Phasing – Doran Road Development..... | 25 |
| Table 10 – Raw Water Transmission Main Routes and Sizes | 26 |
| Table 11 – Treated Water Flows | 28 |
| Table 12 - Impacts and Mitigation Measures Related to Water Servicing Infrastructure (Please see Appendix V)..... | 29 |
| Table 13 – Probable Opinion of Cost Estimates for Water Supply Infrastructure | 33 |
| Table 14 – Proposed Wastewater Effluent Compliance Limits | 38 |
| Table 15 – Proposed Wastewater Effluent Design Objectives..... | 39 |
| Table 16 – Probable Opinion of Cost Estimates for Wastewater Treatment Plant | 50 |
| Table 17 – Proposed Sewage Pumping Station Locations and Staging | 51 |
| Table 18 – Impacts and Mitigation Measures Related to Wastewater Servicing Infrastructure (Please see Appendix Y)..... | 54 |
| Table 7.2.3.1 – Intersection Operations – Existing 2015 Traffic Volumes..... | 67 |
| Table 7.3.1-2 – AADT Growth on Area Major Roads..... | 70 |
| Table 7.3.2-2 – Population and Employment Forecasts | 70 |
| Table 7.3.3-1 – Intersection Operations - 2031 Background Traffic Volumes | 74 |
| Table 7.3.3-2 – Intersection Operations - 2041 Background Traffic Volumes | 76 |
| Table 7.4-2 – Development Phasing | 81 |
| Table 7.4-4 – Midhurst Developments Trip Generation Estimates..... | 83 |
| Table 7.4-3 – Trip Distribution Carson Development Area | 90 |
| Table 7.4-4 – Trip Distribution Doran South Development Area | 90 |
| Table 7.4-5 – Trip Distribution Doran North Development Area..... | 91 |
| Table 7.4-6 – Trip Distribution Employment Lands 1 | 91 |
| Table 7.4-7 – Trip Distribution Employment Lands 2..... | 92 |
| Table 7.5.3-1 – Intersection Operations – 2031 Total Traffic Volumes | 96 |
| Table 7.5.3-2 – Intersection Operations – 2031 Total Traffic Volumes with Improvements..... | 99 |
| Table 7.5.4-1 – Intersection Operations – 2041 Total Traffic Volumes | 100 |
| Table 7.5.4-2 – Intersection Operations – 2041 Total Traffic Volumes with Improvements..... | 104 |
| Table 7.6.4-1 - Road Improvement Cross Sections..... | 115 |
| Table 7.6.5-1 - Transportation Improvement ROW Requirements..... | 116 |
| Table 7.6.6-1 – Opinion of Cost of Transportation Improvements | 117 |

Drawings (Appendix U)

| | |
|------------------|--|
| 113027 – OP1 | Overall Plan, Proposed Effluent Pipeline (Ainley Group) |
| 113027 – EP1-EP9 | Proposed Effluent Pipe Alignment Plans (Ainley Group) |
| 113027 – OP2 | Proposed Production Well Locations (Ainley Group) |
| 113027 – OP3 | Proposed Water Supply and Distribution System (Ainley Group) |
| 113027 – OP4 | Proposed Wastewater Collection and Treatment System (Ainley Group) |
| 113027 – OP5 | Overall Plan, Preferred Wastewater Collection, Treatment & Disposal Solution (Ainley Group) |
| 113027 – OP6 | Overall Plan Proposed Wastewater Collection and Treatment System (c/w Drainage Areas) |
| 113027 – A1 | Preliminary Elevation of Typical Sewage Pumping Station and Water Pumphouse and Reservoir (Ainley Group) |
| 113027 – A2 | Preliminary Elevation of Typical Well Pumphouse (Ainley Group) |

Figures

| | |
|--------------|--|
| Figure 7.2.1 | – Existing Intersection Configuration & Control |
| Figure 7.2.2 | – Existing 2015 Traffic Volumes |
| Figure 7.3.1 | – 2031 Background Traffic Volumes, Ainley Group |
| Figure 7.3.2 | – 2041 Background Traffic Volumes, Ainley Group |
| Figure 7.4.1 | – Midhurst Conceptual Phasing Plan |
| Figure 7.4.2 | – Carson Road Development Generated Traffic Volumes |
| Figure 7.4.3 | – Doran Road Development Generated Traffic Volumes |
| Figure 7.4.4 | – Doran Road South Development Generated Traffic Volumes |
| Figure 7.4.5 | – Employment Land #1 Development Generated Traffic Volumes |
| Figure 7.4.6 | – Employment Land #2 Development Generated Traffic Volumes |
| Figure 7.5.1 | – 2031 Total Traffic Volumes |
| Figure 7.5.2 | – 2041 Total Traffic Volumes |
| Figure 7.6.2 | – Transportation Road Improvement Phasing Plan |
| Figure 7.6.3 | – Active Transportation Interconnection Plan |

Phase 3

1.0 Introduction

1.1 MMAH Decision

On November 28, 2012, the Ontario Ministry of Municipal Affairs and Housing (MMAH) withdrew part of its appeal of the Midhurst Secondary Plan. As a result, 300 hectares out of the total 756 hectares proposed to be re-designated as urban in OPA 38 were cleared for development. At the present time, the remaining 456 hectares and all related policies to OPA 38 remain under appeal at the Ontario Municipal Board (OMB). A copy of a letter dated November 28, 2012 from the Ministry of the Attorney General is provided in Appendix 'A'.

1.2 Authorization

Following the completion of a Master Plan Document (July 2009) and subsequent to the above-mentioned MMAH decision, the Township of Springwater retained Ainley Group to administer and document the completion of Phases 3 and 4 of the Class Environmental Assessment planning process for the servicing of the Midhurst secondary plan area. Terms of Reference were prepared and agreed to and the authorization to proceed was given by the Township at the end of January 2013.

1.3 Steering Committee Meetings

Steering Committee meetings were held to administer the planning process. The Steering Committee was made up of members from the Township Council and Staff, Ainley Group staff and the Developers Group.

A Copy of the minutes of the Steering Committee meetings is included in Appendix B.

1.4 Residents Liaison Committee Meetings

In order to maintain contact with local interest groups, a Residents Liaison Committee was formed, and meetings were held at key points during the planning process. The Committee members included:

| | |
|---------------------------|-----------------------------|
| Mayor Bill French | - Township of Springwater |
| Deputy Mayor Don Allen | - Township of Springwater |
| Councillor Sandy McConkey | - Township of Springwater |
| Councillor Jack Hanna | - Township of Springwater |
| Councillor Sandy McConkey | - Township of Springwater |
| Robert Brindley | - Township of Springwater |
| Mark Archer | - Township of Springwater |
| Shauna Dudding | - Geranium Corporation |
| Alex Troop | - Alliance Homes |
| Tiziano Zaghi | - Residents Representatives |

| | |
|----------------|-----------------------------|
| David Strachan | - Residents Representatives |
| Robert Wright | - Residents Representatives |
| Gerald Scanlan | - Residents Representatives |
| Regan Frankcom | - Residents Representatives |
| Joe Mullan | - Ainley Group |

A copy of the minutes of the Residents Liaison meetings is included in Appendix C.

1.5 Purpose of Phase 3 and 4 Class EA Planning Process

The Ontario Environmental Assessment Act includes provision for municipal road projects and municipal water and wastewater projects to be planned as “Class Environmental Assessments”. The Municipal Engineers Association (MEA), on behalf of Ontario Municipalities, completed a Class EA Document in 1987, which was updated in 2007, 2011 and again in 2015 and is currently known as the MEA Class EA Document, (October 2000 as amended 2007, 2011 and 2015). That Document outlines the planning process to be followed for Schedule “C” projects.

The purpose of the Township’s Phase 3 and 4 planning process is to:

- Identify revisions to the Master Plan (July 2009) with respect to servicing;
- Confirm Projects which require Phase 3 and 4 planning (Schedule “C” Projects);
- Identify and evaluate design options for the Schedule “C” Projects;
- Select Recommended/Preferred Solutions for the identified Schedule “C” projects; and to
- Document the Planning Process in an Environmental Study Report for public and review agency review and comment.

1.6 Background and Supporting Documents

In order to complete the assessment of the various servicing works that were identified in the Master Plan (2009), the Developer Group prepared background information Reports /Memorandums. The background and supporting documents will be assessed by the Township, review agencies and the public. A list of the Background and Supporting Documents is provided below in Table 1 complete with a brief summary of each Report/Memorandum.

Table 1 – List of Background and Supporting Documents

| Report Title (Abbreviated) and Author | Brief Summary |
|---|--|
| <p>Stage 1 Archeological Assessment for the Proposed Craig Road Extension as part of the Midhurst Class Environmental Assessment Phase 3 & 4 In the Geographic Township of Vespra, Historical County of Simcoe, Township of Springwater, County of Simcoe, Ontario.</p> <p>Archeoworks Inc. – June 8, 2016</p> <p>(Copy included in Appendix D)</p> | <ul style="list-style-type: none"> • Study Area defined by 10 potential alignments, • Elevated potential for recovery of archaeological materials, • Stage 2 Assessment required to confirm Recommended Alignment |
| <p>Update To EA Traffic Forecasts Based on Updated Employment Estimates.</p> <p>BA Group – May 23, 2014</p> <p>(Copy included in Appendix E)</p> | <ul style="list-style-type: none"> • Assessed addition of employment and retail lands on traffic forecast, • May cause increased traffic pressure at intersections along Finlay Mill and Highway 26 corridor, • Additional traffic can be accommodated with intersection improvements, • Finlay Mill may become congested during peak periods (weekday afternoons), • Users may choose alternate route to avoid congestion |
| <p>Midhurst EA Transportation Work Update</p> <p>BA Group – November 12, 2013</p> <p>(Copy included in Appendix F)</p> | <ul style="list-style-type: none"> • New traffic counts related to 3 Schedule C transportation projects, • Confirms need for widening of Wilson Road to 4 lanes from Snow Valley Road to Barrie City limits, • Confirms need for Hwy 400 interchange improvements as a requirement of a future phase of development (full build out), • Notes that extension of Craig Road is not required as a result of the Midhurst development but rather an improvement to provide a network benefit for all area traffic |

| Report Title (Abbreviated) and Author | Brief Summary |
|---|--|
| <p>Updated Midhurst Roundabout Analysis</p> <p>BA Group – Updated July 11, 2015</p> <p>(Copy included in Appendix G)</p> | <ul style="list-style-type: none"> • Three locations are suitable for the consideration of a roundabout – Wilson Rd at Carson Rd., Russell Rd. at future Craig Rd. and Russell Rd. at Doran Rd. • Two additional locations may warrant consideration of a roundabout – County Rd. 27 and Hwy 26 split and County Rd. 27 at future Craig Rd. |
| <p>Hwy 400 / Forbes Road Interchange Operations, Traffic Analysis</p> <p>AECOM – April 26, 2016</p> <p>(Copy included in Appendix H)</p> | <p>For year 2031 there is no need to widen Forbes Rd and Russell Rd. However, there is a need for signalization and storage lanes at the west ramp terminal intersection.</p> <p>In 2041, widening of Forbes Rd and Russell Rd is beneficial.</p> |
| <p>Township of Springwater, Midhurst Secondary Plan, Class Environmental Assessment, Traffic Operational Analysis.</p> <p>Ainley Group, March 2017</p> <p>(See Section 7 of ESR and Memorandums dated May 30, 2018 to MTO and County – Appendix DD)</p> | <ul style="list-style-type: none"> • Purpose is to assess transportation needs within the Midhurst area • Considers the area road network improvements required to accommodate the proposed development in two Phases (year 2031 and year 2041 planning horizons) |
| <p>Hydrogeological Study, Midhurst Water Supply Exploration Program, Township of Springwater, Ontario</p> <p>Golder Associates – May 2018</p> <p>(Copy included in Appendix J)</p> | <ul style="list-style-type: none"> • Well sites in the Doran Rd. area can each support twin wells and a total production rate of 140 L/s, • Well sites in the Carson Rd. area can each support twin wells and a total production rate of 81 L/s, • Assessment indicates that the proposed water supply has a low vulnerability to surficial contaminates and causes minimal interference with surrounding wells, • Provides foundation for meeting the Technical Rules: Assessment Report requirements as governed by the Clean Water Act, 2006 related to source water protection |
| <p>Report on Carson and Doran Neighbourhoods Water Supply – Midhurst Secondary Plan:</p> | <ul style="list-style-type: none"> • Purpose of Report is to estimate the potential surface water impacts that may occur as a result of the future taking of groundwater, |

| Report Title (Abbreviated) and Author | Brief Summary |
|---|--|
| <p>Supplementary Hydrologic Modelling</p> <p>Golder Associates – May 2018</p> <p>(Copy included in Appendix J)</p> | <ul style="list-style-type: none"> • Additional water takings result in drawdowns of up to 10 m in A3 in the area of Doran Neighbourhoods with lateral zone of influence reaching 6 km from the proposed development. Well interference at surrounding municipal systems is 1.5 m or less and is not anticipated to impact well performance • Baseflow reductions at Willow Creek are highest during late summer. Max reduction is about 9% in the Midhurst area. Willow Creek catchment experiences between about 3% to 7% baseflow loss depending on the time of year. • Capture zones for municipal wells were developed for various years. Most zones are directed east to northeast. 25-year time of travel zones reach upgradient distances ranging from about 1 km to 4.5 km in length. • Water supply aquifers A3 and A4 have a low vulnerability AVI in the areas of the capture zones. |
| <p>Evaluation of Midhurst Water Supply and Water Treatment Alternatives</p> <p>Black & Veatch – May 2016</p> <p>(Copy included in Appendix K)</p> | <p>Carson Rd. Area</p> <ul style="list-style-type: none"> • Construction of 3 equally sized wells at the sand and gravel site with any 2 capable of providing 73 L/s (Development Phase 1), • Construction of well(s) west of Snow Valley Resort to provide a minimum of 8 L/s (Development Build out), • Construction of Water Treatment Plant (WTP) at the sand and gravel site for nitrate removal, methane stripping, filtering of iron and manganese and disinfection, • Construction of underground water storage facility at the sand and gravel site with a minimum capacity of 3,868 m³ • Construction of a high lift pumping station to provide peak hour demands and fire flow (133 L/s) at suitable pressures throughout the distribution system, • Phase 1 Capital Cost estimate = \$10,868,000, and |

| Report Title (Abbreviated) and Author | Brief Summary |
|--|---|
| | <ul style="list-style-type: none"> • Additional Capital Cost estimate for full buildout = \$5,937,000 These costs are superseded with the costs in Section 5 of the ESR <p>Doran Rd. Area</p> <ul style="list-style-type: none"> • Construction of 3 equally sized wells in the Alliance area with any 2 capable of providing 100 L/s, • Construction of a minimum of 2 wells in the area south of Pooles Rd. to provide a minimum of 40 L/s to meet Development Build out requirements, • Construction of WTP within the Alliance site for filtering of iron and manganese and disinfection, • Construction of underground water storage facility within the Alliance site with a Development Phase 1 capacity of 3,500 m³ and a Development Build out capacity of 5,400 m³, • Construction of a high lift pumping station to provide peak hour demands and fire flow (133 L/s) at suitable pressures throughout the distribution system, • Phase 1 Capital Cost estimate = \$11,641,000, and • Additional Capital Cost estimate for full buildout = \$8,039,000 These costs are superseded with the costs in Section 5 of the ESR |
| <p>Water Supply System Alternatives Review (Appendix A to above-mentioned Evaluation Report)</p> <p>Black & Veatch – May 2016</p> | <ul style="list-style-type: none"> • Three Alternatives evaluated, • Alternative 3 (Two WTPs) is the preferred water supply option |
| <p>Willow Creek Assimilative Capacity Study, Hutchinson Environmental Sciences Ltd. May 2018 including 7Q20 Flow Assessment Update for Willow Creek at Highway 26 (Near Minesing), May 18, 2018 (Appendix L)</p> | <p><u>7Q20 Flow Assessment</u></p> <ul style="list-style-type: none"> • Computer assessment using statistical data found low flows ranging from 499 L/s to 542 L/s over past 10 years, • Actual 7-day low flow was 499 L/s recorded in 2013, • Current 7-day low flow rate was modified to account for future increases in groundwater pumping |

| Report Title (Abbreviated) and Author | Brief Summary |
|---------------------------------------|--|
| | <p>(baseflow losses) resulting in 7-day low flow range of 430 L/s to 464 L/s,</p> <ul style="list-style-type: none"> • A 7Q20 low flow rate of 430 L/s is proposed as a conservative estimate for assimilation modelling of Willow Creek <p><u>Assimilative Capacity Study</u></p> <ul style="list-style-type: none"> • Assessment based on Phase 1 flow of 6450 m³/day and Development Build out flow rate of 12314 m³/day, • Predicts complete mixing of ammonia at distance of 302 m to 361 m downstream of effluent discharge, • Existing concentration of Total Phosphorus in Willow Creek is 0.031 mg/L and therefore, Willow Creek is considered to be a “Policy 2 receiver” for the Midhurst Class EA, as the concentration exceeds (slightly) the Provincial Water Quality Objective (PWQO) of 0.03 mg/L, • “Policy 2’ states that “Water quality which presently does not meet the PWQO shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the objectives.” • Deviations from “Policy 2” may be considered, • Adoption of a total phosphorus effluent concentration of 0.05 mg/L (Phase 1) would result in phosphorus concentration of between 0.032 and 0.034 mg/L in Willow Creek and an additional 118 kg of phosphorus loading per year, • Adoption of a total phosphorus effluent concentration of 0.03 mg/L (Buildout) would result in phosphorus concentration of just below the existing level of 0.031 mg/L in Willow Creek and an additional 135 kg of phosphorus loading per year, • Through implementation of best management practices and low impact development, it is estimated that the annual loading of phosphorus to Willow Creek can be reduced to between 33 and 66 kg/yr at full buildout, • Notes that a Phosphorus offsetting is not needed due to the very low additional loading to Willow Creek and downstream Wetlands. However, as this |

| Report Title (Abbreviated) and Author | Brief Summary |
|---|--|
| | <p>is an NVCA requirement further discussions will be had with NVCA & Township about the need for Phosphorus offsetting program.</p> <ul style="list-style-type: none"> • Dissolved oxygen concentrations are predicted to be greater than PWQO at all locations in the Creek under all flow conditions, • Proposed warm weather effluent ammonia concentrations (1 and 1.5 mg/l) would result in un-ionized ammonia concentrations well below the 0.26 mg/l threshold for acute lethality, • PWQO for un-ionized ammonia were met prior to the point of complete mixing, • Proposed winter effluent ammonia concentrations of 3 and 2 mg/L are sufficient to meet PWQO at the point of complete mixing for Development Phase 1 and Buildout (respectively), • Recommends loading limits for total phosphorus as well as effluent concentration limits – to ensure that an annual loading limit is achieved |
| <p>Midhurst Secondary Plan Area Phosphorus Budget Update</p> <p>Hutchinson Environmental Sciences Ltd., May 2018, along with XCG Consulting Limited letters dated January 29, 2016 and June 22, 2016</p> <p>(Copy included in Appendix M)</p> | <ul style="list-style-type: none"> • XCG retained to provide peer review of phosphorus budget report • Master Drainage Plan required by NVCA to address cumulative impacts of stormwater management and municipal effluent discharge on water quality in Willow Creek and Minesing wetland • Include how development will proceed with no net increase in phosphorus loading to the Minesing wetland • Phosphorus budgets were completed for Development Phase 1 and for Full Buildout, • Assumed that stormwater runoff will be collected and treated to provide 80% removal of Total Suspended Solids • Assumed that on site controls will be implemented to reduce stormwater runoff volumes and associated phosphorus loads through infiltration (first 20 or 25 mm of rainfall), • See Summary of Phosphorus Loadings Table (below) for results |

| Report Title (Abbreviated) and Author | Brief Summary |
|---|---|
| | <ul style="list-style-type: none"> • Assuming a capture of the first 20 mm of rainfall and an effluent phosphorus concentration of 0.03 at full buildout, the calculated increase in phosphorus loading to Willow Creek is estimated to be 66 Kg/yr (Full Buildout) • "...minor increase in phosphorus loadings from both the 20 mm and 25 mm scenario would have no effect on the Minesing wetland..." and "...the TP limit of 0.03 mg/L for discharge of treated municipal effluent at Full Buildout would reduce the 75th percentile phosphorus concentrations in Willow Creek..." • Hutchinson Environmental Sciences Ltd. (HESL) notes that Phosphorus offsetting is not needed due to the very low additional loading to Willow Creek and downstream Wetlands. However, as this is an NVCA requirement further discussions will be had with NVCA & Township about the need for Phosphorus offsetting program. • <i>It was also determined that site controls will be designed to infiltrate the first 23 mm of rainfall)</i> |
| <p>Technical Memorandum Re: Hine's Emerald Dragonfly Habitat in the Minesing Wetlands and the Midhurst Development</p> <p>Hutchinson Environmental Sciences Ltd.</p> <p>- February 7, 2017</p> <p>(Copy included in Appendix L)</p> | <ul style="list-style-type: none"> • Reviews the characteristics of the Hine's Emerald Dragonfly (HED) habitat and the proposed Midhurst Development to determine the potential for interaction of the development with regulated HED habitat, • Development is more than 5 km from the regulated HED habitat and therefore there is no potential for direct effects on the habitat, • Memo examines how groundwater pumping for water supply may interact with HED habitat and reviews the management activities that will assure there is no impact to HED or its habitat, • Provides recommendations to protect HED habitat, • Concludes that development of the Midhurst Secondary Plan area does not threaten the HED or its habitat. |

| Report Title (Abbreviated) and Author | Brief Summary |
|--|--|
| <p>Technical Memorandum, Estimating Phosphorus Loads to the Minesing Wetland, Hutchinson Environmental Sciences Ltd, - August 9, 2016</p> <p>(Copy included in Appendix L)</p> | <ul style="list-style-type: none"> • Phosphorus loads entering the wetland are dominated by the Nottawasaga River – 56% • Willow Creek accounts for less than 7% of the load to the wetland • Estimated increase in TP load (66 kg/yr) represents an increase of 2.6% of the existing Willow Creek load and 0.2% of the total load to the Wetland • There will be no detectable change in nutrient status of the wetland as a result of development of the MSP |
| <p>Technical Memorandum, Monthly Total Phosphorus Concentrations in Willow Creek Predicted at Phase 1 and Full Build Out of the Midhurst Secondary Plan Area, Hutchinson Environmental Sciences Ltd. – October 13, 2016</p> <p>(Copy included in Appendix L)</p> | <ul style="list-style-type: none"> • Supports the case that phosphorus offsets in the watershed are not needed to balance the impact of the WWTP discharge |
| <p>Memorandum, Response to XCG Review of Midhurst Phosphorus Budget, Hutchinson Environmental Sciences Ltd. – March 7, 2017</p> <p>(Copy included in Appendix L)</p> | <ul style="list-style-type: none"> • Infiltration galleries must be designed for a 23 mm storm instead of a 20 mm storm in order to reduce phosphorus in the runoff to 21 kg and 66 kg for Phase 1 and Full Build out respectively. • A phosphorus offsetting program will need to be developed |
| <p>Willow Creek and Wilson Drive Terrestrial Habitat Assessment</p> <p>Beacon Environmental – May 30, 2016</p> <p>(Copy included in Appendix N)</p> | <ul style="list-style-type: none"> • Highway 26 crossing of Willow Creek is the more appropriate location for the effluent outfall from a terrestrial natural habitat perspective |
| <p>Potential Impacts to Minesing Swamp Related to Proposed Discharge of Treated Effluent From Midhurst Wastewater Treatment Plant to Willow Creek</p> | <ul style="list-style-type: none"> • Purpose – to provide an opinion as to whether the discharge of treated wastewater effluent into Willow Creek at Highway 26 will impact the features and function of the Provincially Significant Minesing Wetland • Assimilative capacity of the Creek was assessed by HESL |

| Report Title (Abbreviated) and Author | Brief Summary |
|--|--|
| <p>Beacon Environmental – September 19, 2013</p> <p>(Copy included in Appendix O)</p> | <ul style="list-style-type: none"> • Reasons for Conclusion: <ul style="list-style-type: none"> - Effluent enters Creek 4.0 km upstream of discharge to Minesing wetland - Existing water quality in section of Creek downstream of effluent discharge is already considered to be “below potential” due to agriculture - Modelling indicates that the mixing zone for un-ionized ammonia under any flow condition does not extend very far downstream of the effluent discharge point - Assimilative capacity of Willow Creek is high and the distance between the discharge point and Minesing wetland is so great that Provincial Water Quality Objectives will be met and, in some cases, will be well below the PWQOs, by the time the water enters the wetland • Therefore, it is concluded that there will be no impact to the Minesing wetland as a result of effluent discharge into Willow Creek at Highway 26. |
| <p>Fluvial Geomorphological Assessment of Willow Creek Downstream of Proposed WWTP Discharge at Highway 26, Midhurst, On.</p> <p>Palmer Environmental Consulting Group Inc. – December 13, 2016</p> <p>(Copy included in Appendix P)</p> | <ul style="list-style-type: none"> • Concludes that the addition of the treated effluent discharge to Willow Creek in the vicinity of Highway 26 is not anticipated to increase downstream erosion rates above existing, natural levels |
| <p>Design Basis for Midhurst Wastewater Treatment Plant</p> <p>Black & Veatch – April 2014</p> <p>(Copy included in Appendix Q)</p> | <ul style="list-style-type: none"> • Provides rational for design information used in the preparation of the “Evaluation” report (see next Report) |

| Report Title (Abbreviated) and Author | Brief Summary |
|---|---|
| <p>Evaluation of Treatment Alternatives for Midhurst Wastewater Treatment Plant</p> <p>Black & Veatch – May 2018</p> <p>(Copy included in Appendix R)</p> | <ul style="list-style-type: none"> • Average daily flow = 6450 m³/day (Phase 1) and 12314 m³/day (Full buildout – includes existing un-serviced), • Wastewater treatment plant (WWTP) to be located within abandoned sand and gravel pit, north of Snow Valley Road, east of Wilson Drive, • Plant to be modular to allow for development phasing, • Collection system includes sewage pump stations with manifolded forcemains to allow for future servicing expansions, • Effluent discharge to Willow Creek at Highway 26 crossing, • Reiterates proposed effluent compliance and design objective limits, • Provides evaluation methodology and criteria for assessment of treatment options, • Evaluates long and short lists of treatment options for liquid train and biosolids management, • Preliminary preferred liquid treatment solution includes: <ul style="list-style-type: none"> - Screening and degritting - Step feed biological nitrogen removal (BNR) with chemical addition for phosphorus removal - Tertiary membrane filtration - Ultraviolet disinfection - Effluent discharge to Willow creek • Preliminary preferred biosolids management solution is: <ul style="list-style-type: none"> - Biological stabilized liquid sludge to beneficial re-use with mechanical thickening and Autothermal Thermophilic Aerobic Digestion (ATAD) with 240-day storage, and • Capital cost estimates are: <ul style="list-style-type: none"> - Phase 1 = \$51,569,000 - Full buildout = \$38,953,000 (additional) <p>These costs are superseded with the costs in Section 6 of the ESR</p> |

| Report Title (Abbreviated) and Author | Brief Summary |
|---|--|
| Midhurst WWTP and WTP Facilities RWDI Air Inc. – May 28, 2018 (Copy included in Appendix S) | <ul style="list-style-type: none"> Acoustic assessment of Wastewater and water treatment facilities at two sites Facilities will be in compliance with the strictest suburban limits in accordance with NPC-300 requirements |
| Odour Mitigation Assessment – Black & Veatch May 25, 2018 (copy included in Appendix S) | <ul style="list-style-type: none"> No odour concerns with the design of the current WWTP Implementation of headworks biofilter will ensure success Headworks biofilter discharge should allow for the addition of a second stage scrubber |
| Environmental Screening Craig Road, Midhurst Azimuth Environmental Consulting Inc. October 9, 2015 (Copy included in Appendix T) | <p>Environmental conditions will require further review during design stages</p> <p>Stage II assessment is necessary over three seasons to develop suitable mitigation plans. NVCA approvals required.</p> |

Summary of Phosphorus Loadings (kg/yr) from the redevelopment of MSPA

| Infiltration | Phase 1 | | | Full Build Out | | |
|---------------------------------------|------------|------------|------------|----------------|------------|------------|
| | None | 20 mm | 25 mm | None | 20 mm | 25 mm |
| Pre-development* | 46 | 46 | 46 | 134 | 134 | 134 |
| Runoff | 213 | 21 | 11 | 663 | 66 | 33 |
| Change in Phosphorus Load from Runoff | 167 | -25 | -35 | 529 | -68 | -101 |
| WWTP Load | 118 | 118 | 118 | 134 | 134 | 134 |
| Total Post Development | 331 | 139 | 129 | 797 | 200 | 167 |
| Change in P export | 285 | 93 | 83 | 663 | 66 | 33 |

Notes: Post-development loads also incorporate 63% reduction from SWMP.
*different infiltration scenarios were not modelled for pre-development conditions

1.7 Master Plan Requirements

The Midhurst Master Plan Phase 1 and 2 document (July 2009) outlined requirements that the Developer Group must undertake in order to proceed with the construction of the proposed works. A suggested list of Permits and Approvals was provided in Section 20.0 of the Master Plan Phase 1 and 2 Report. That list should be reviewed prior to final design.

Applicable Class EA Schedules were provided in Section 21.0 of the Master Plan document for all works proposed in the Master Plan. The Schedule C items which will be addressed in this Phase 3 Report are as follows.

- New water system including wells, treatment works, storage works and distribution system,
- New sewage system including collection system with pumping stations, treatment works and effluent discharge outfall,
- Upgrade Highway 400 interchange at Forbes Road,
- Upgrade Forbes Road from Highway 400 to Russell Road,
- Upgrade Russell Road from Forbes Road to Pooles Road
- New, 2-lane road (Craig Road) from Russell Road to County Road 27, and
- New, 4-lane road (Wilson Road) from Snow Valley Road to Barrie City limits.

The Master Plan Phase 1 and 2 Report also provided a “Summary of Commitments” (Section 23.0) which must be addressed prior to construction.

2.0 Revisions to Phase 1 and 2 Master Plan Report (July 2009)

2.1 Water Supply, Treatment and Distribution

Following the completion of the Master Plan (July 2009), several revisions were made to the proposed water supply, treatment and distribution system. These revisions are described in sections 2.1.1 to 2.1.4.

2.1.1 Confirmation of Water Demands (Average, Max Day, Peak Hour and Fire Flow)

The water demands have been revised slightly from the Master Plan to reflect the fact that new development will now likely be serviced from two separate supply systems. In addition, an allowance (5%) for loss due to filter backwashing requirements has been considered. Water demands for both the Ultimate development and the currently approved development are provided and a preliminary staging is suggested in Table 2.

Table 2 - Water Demands (Assuming Two Separate Water Systems)

| Phase & Stage | | Carson Road | Doran Road |
|-------------------------------|-----------------------------|-----------------|--------------|
| | | Max. Day Demand | |
| | | L/s | |
| Phase 1 | Stage i (1A + 1B) | 22.4 | 5.8 |
| | Stage ii (1C + 1D) | 46.6 | 13.3 |
| | Stage iii (1E + 1F) | 62.1 | 20.6 |
| | Stage iv (1G to 1I) | 69.2 | 30.8 |
| | Stage v (1J, 1K, 2B, C & D) | 69.9 | 58.9 |
| | Backwash (5%) | 3.5 | 2.9 |
| Phase 1 Totals | | 73.4 | 61.8 |
| Phase 2 | Stage i | 80.3 | 77.7 |
| | Stage ii | 80.3 | 99.5 |
| | Stage iii | 80.3 | 117.6 |
| | Stage iv | 80.3 | 135.8 |
| | Backwash (5%) | 0.3 | 3.7 |
| Phase 1 & 2 Totals | | 81.0 | 140.0 |

Notes Person Per Unit = 3
Per Capita Water Demand = 380 L/Day

Water Maximum Day Demand Factor for Carson Road 2.0
Water Maximum Day Demand Factor for Doran Road 1.9
Existing Water System has residual capacity for existing unserved units

2.1.2 Dual or Single Water Treatment Plants

During the preparation of the Master Plan, preliminary hydrogeological investigations were undertaken which indicated that the future municipal water supply for the proposed Midhurst developments could be obtained by developing wells within the Doran Road area and along Russell Road to the north and south of Doran Road. Since that time (2009) requirements for source water protection were identified by the Province and it was determined that, where possible, all the future wells should be located either within the development areas or within Town owned lands which meet the requirements as governed by the Clean Water Act, 2006. As a result, additional hydrogeological investigations were completed resulting in revised recommendations for the locations of the required municipal wells. Four well sites were identified in the Hydrogeological Study completed by Golder Associates, May 2018 (Appendix J). In the eastern development lands, one site is located within the Doran Road development area and the other site is located in the area known as the Old School site south of Pooles Road. In the western development lands, one site is located within a sand and gravel pit (Developer owned) north of Snow Valley Road and the fourth site is on Township owned land west of Snow Valley Resort.

Considering the fact that the identified well sites were now divided in location (two in the east and two in the west), it was decided that a reassessment of the water treatment plant needs should be undertaken. In the Report entitled Water Supply System Alternatives Review (Black & Veatch, May 2016), three water treatment plant (WTP) alternatives were assessed. The three Alternatives are described as follows:

Alternative 1 – WTP in Carson Road area to service all future development

Alternative 2 – WTP in Doran Road area to service all future development

Alternative 3 – One WTP in each Development area

Advantages and disadvantages of each of the three alternatives were considered and based on that evaluation, it was determined that Alternative 3 (two separate water treatment plants) is the preferred option. One WTP would be located within the Doran Road area and the other would be located at the sand and gravel pit site north of Snow Valley Road.

In summary it was noted that:

- Each alternative is operationally viable – no significant disadvantage,
- Little practical difference in daily operation and maintenance, and
- Whole life cost for a 25-year project period shows minimal difference

The Report may be found as Appendix A to the Evaluation of Midhurst Water Supply and Water Treatment Alternatives, Black & Veatch, May 2016 (Appendix K).

2.1.3 Type of Water Storage Facility and Level of Fire Protection

An analysis of water storage facility options was not undertaken as part of the preparation of the Master Plan. At that time (2009), it was suggested that the water storage be elevated (Current Midhurst storage is a combination of elevated and inground). The Township recently expressed a preference for inground storage for the new developments. Both options have advantages and disadvantages as outlined in Table 3.

Table 3 – Water Storage Facilities – Advantages and Disadvantages

| | Elevated Storage* | Inground Storage** |
|------------|--|--|
| Advantages | <ul style="list-style-type: none"> • No double pumping – system pressure is maintained by having water at an elevated position • Lower operating cost • Could be used for telecommunications • Advertising potential – Municipal | <ul style="list-style-type: none"> • Lower maintenance cost • Aesthetically better view in a residential setting – can be landscaped |

| | | |
|---------------|---|--|
| Disadvantages | <ul style="list-style-type: none"> • High maintenance costs associated with painting (unless glass lined) • Could be viewed as aesthetically displeasing in a residential setting | <ul style="list-style-type: none"> • Double pumping required • Higher operating costs associated with pumping • No potential for telecommunications • No municipal advertising potential |
|---------------|---|--|

* Elevated storage includes standpipes and glass-lined structures in addition to the conventional steel storage tank

**Inground storage includes buried and partially buried reservoirs

Based on the Township's preference, the design will allow for inground water storage facilities in both Development areas.

Recent discussions (2015) with the Township led to the acceptance of a reasonable design fire flow rate of 133 L/s for 3 hours. This rate will be used in the future to design fire flow pumps and was used to size the water storage facilities. The suggested water storage volumes are presented in Table 4.

Table 4 – Water Storage Volumes

| Phase and Stage | | Carson Road Development m ³ | Doran Road Development m ³ |
|-----------------|--|---|--|
| Phase 1 | Fire flow – 133 L/s for 3 hours | 1436 | 1436 |
| | Equalization – 25% of MDD | 1511 | 1273 |
| | Emergency – 25% x (Fire Flow + Equalization) | 737 | 677 |
| | Total Required Storage | 3684 | 3386 |
| Ultimate | Fire flow – 133 L/s for 3 hours | 1436 | 1436 |
| | Equalization – 25% of MDD | 1658 | 2869 |
| | Emergency – 25% x (Fire Flow + Equalization) | 774 | 1076 |
| | Total Required Storage | 3868 | 5382 |

2.1.4 Distribution System – Hydraulic Analysis

The revision to the Master Plan to proceed with two water treatment/storage/high lift pumping facilities negates the need for an immediate interconnection of the two future water distribution systems. Each development area will be supplied from its own WTP. Considering the fact that

the two areas are not at the same elevation, the two-plant alternative simplifies the hydraulics of the distribution systems. Each system will be designed to maintain a pressure range of between 345 kPa to 620 kPa (50 to 90 psi). Extremities of each system may require pressure reducing valves. The exact sizing and layout of both distribution systems will be finalized during the design phase using computer simulations to confirm flows and pressures under all conditions (Average day, Maximum day, peak hour and MDD plus Fire). Connections to the existing Midhurst water distribution system may be made in the future if necessary, to provide security of water supply to all Midhurst residents. These connections will likely be through pressure regulating valves.

2.2 Wastewater Treatment and Collection

Following the completion of the Master Plan, several revisions were made to the proposed wastewater treatment and collection system. These revisions are described in sections 2.2.1 to 2.2.3.

2.2.1 Confirmation of Flows (Average and Peak)

The wastewater flows have been taken from the Master Plan. Wastewater flows for both the ultimate development and the currently approved development (300 Ha.) are provided and a preliminary staging is suggested in Table 5. It is considered that the proposed design wastewater flow allows for the 5% backwash allowance from the water treatment plants and therefore no additional allowance is necessary.

Table 5 – Wastewater Flows

| Phase & Stage | | Wastewater Average Daily Flow (Cumulative) m ³ /day |
|-----------------------|-----------------------------|--|
| Phase 1 | Stage i (1A + 1B) | 1,393 |
| | Stage ii (1C + 1D) | 2,962 |
| | Stage iii (1E + 1F) | 4,094 |
| | Stage iv (1G to 1I) | 4,967 |
| | Stage v (1J, 1K, 2B, C & D) | 6,460 |
| Phase 1 Total | | 6,450 |
| Phase 2 | Stage i | 7,752 |
| | Stage ii | 8,719 |
| | Stage iii | 9,654 |
| | Stage iv | 10,588 |
| | Existing Un-serviced | 12,314 |
| Ultimate Total | | 12,314 |

Notes: Person Per Unit = 3
Per Capita Wastewater Demand = 340 L/Day
Per Capita Wastewater Infiltration = 90 L/Day

2.2.2 Wastewater Treatment Plant Location

The Master Plan proposed a location for the wastewater treatment plant (WWTP) within the Carson Road Development lands. Specifically, the site can be described as being just south of

Snow Valley Road, immediately east of Wilson Drive. That site was adjacent to existing development.

Subsequent to the completion of the Master Plan, additional consideration was given to the location of the WWTP site. It was considered that a site more remote from existing and future development would be desirable. As part of the Developer owned lands within the Midhurst Secondary Plan area, there is an abandoned sand and gravel pit site on the north side of Snow Valley Road, stretching east from Wilson Drive. It is proposed to locate the WWTP on that site. A revised copy of the Option G, Preferred Solution Drawing (taken from the Master Plan) is included in Appendix 'U' as Drawing 113027-OP5.

2.2.3 Forcemain Route Revisions

As a result of the relocation of the proposed WWTP, slight revisions were made to the proposed routing of the raw sewage forcemain and the effluent forcemain as previously identified in the Master Plan. The revisions are shown on the Drawing 113027-OP5 (Copy included in Appendix 'U').

2.3 Traffic

2.3.1 Craig Road Alignment

The Master Plan identified the need for a direct connection between Forbes Road to County Rd 27 via Craig Road. Several alignments have been assessed as part of this ESR.

2.3.2 Hwy 400 Interchange Location

The Master Plan recommended a new Hwy. 400 interchange at Pooles Road. Subsequent to that Study, the MTO advised that an upgraded interchange at Hwy. 400 and Forbes Road is the preferred solution. This is a revision to the Master Plan.

2.3.3 Forbes Road and Russell Road Improvements

As a result of the proposed upgrade to the existing Hwy 400 interchange at Forbes Road, it was determined that Forbes Road, between Hwy 400 and Russell Road will need to be widened to 4 lanes in conjunction with the development of Phase 2 to accommodate the predicted traffic increase from new development. This is a revision to the Master Plan which recommended an upgrade only to Forbes Road.

In addition, and as a direct result of the Hwy. 400 interchange revision, it was determined that Russell Road from south of Walt Road to Forbes Road will need to be widened to 4 lanes in conjunction with the development of Phase 2. This is a revision to the Master Plan which recommended an upgrade only to that section of Russell Road.

3.0 Populations and Proposed Development Phasing

The proposed overall (ultimate) number of residential units is unchanged from that listed in the Master Plan as follows:

| | |
|------------------------------|---------------|
| Development Area 1 | - 2,379 units |
| Development Area 2 | - 2,920 units |
| Development Area 3 | - 2,559 units |
| Future employment equivalent | - 350 units |
| Total Projected Growth | - 8,208 units |
| Existing Midhurst | - 1338 units |

The proposed development phasing is provided in Table 6.

Table 6 - Development Phasing and Staging Projections

| Phase & Stage | | Carson Road Developments | | | Doran Road Developments | | Cumulative Total Units |
|---------------------------|-----------------------------|--------------------------|------------|------------------------|-------------------------|------------------------|------------------------|
| | | Residential Units | Employment | Cumulative Total Units | Residential Units | Cumulative Total Units | |
| Phase 1 | Stage i (1A + 1B) | 748 | 100 | 848 | 232 | 232 | 1,080 |
| | Stage ii (1C + 1D) | 819 | 100 | 1767 | 297 | 529 | 2,296 |
| | Stage iii (1E + 1F) | 487 | 100 | 2354 | 291 | 820 | 3,174 |
| | Stage iv (1G to 1I) | 219 | 50 | 2623 | 407 | 1227 | 3,850 |
| | Stage v (1J, 1K, 2B, C & D) | 27 | 0 | 2650 | 1123 | 2350 | 5,000 |
| Phase 1 Totals | | 2300 | 350 | 2650 | 2350 | 2350 | 5,000 |
| Ultimate | Stage i | 259 | 0 | 2909 | 750 | 3100 | 6,009 |
| | Stage ii | 0 | 0 | 2909 | 750 | 3850 | 6,759 |
| | Stage iii | 0 | 0 | 2909 | 725 | 4575 | 7,484 |
| | Stage iv | 0 | 0 | 2909 | 724 | 5299 | 8,208 |
| Development Totals | | 2559 | 350 | 2909 | 5299 | 5299 | 8,208 |

In summary, it is proposed that an equivalent of 5,000 units be developed on the initially approved 300 Ha., over 5 stages as Development Phase 1 (2,650 in the Carson Road area and 2,350 in the Doran Road area). Depending upon future MMAH decisions to release additional lands for development in the Secondary Plan area, it is proposed to develop a further 3,208 units (259 in the Carson Road area as well as 2,949 in the Doran Road area) for an overall total of 8,208 equivalent units.

4.0 Evaluation Approach

4.1 Water Supply, Treatment and Storage

As noted previously (Section 2.1.2) three Alternatives for water treatment were identified. The advantages and disadvantages of the three alternatives were assessed and it was determined that the water supply strategy should consist of two separate treatment/storage facilities – one in the Carson Rd. area and the other in the Doran Rd. area. The evaluation approach was based simply on an assessment of the advantages and disadvantages (See “Water Supply System Alternatives Review, May 2016, Black & Veatch, found as an Appendix 1 to Appendix K of this Environmental Study Report).

The evaluation of the actual water treatment options was outlined in the Report titled “Evaluation of Midhurst Water Supply and Water Treatment Alternatives, May 2016, Black and Veatch, found in Appendix K of this ESR). Due to the normal chemical characteristics of the water supplies, it was not considered necessary to identify and assess a list of complicated water treatment options. The treatment options selected for recommendation are standard for this type of water chemistry.

The selection of the treated water storage options (in-ground) was made by the Township based on aesthetic considerations.

4.2 Wastewater Treatment

In general, the evaluation approach for the determination of recommended wastewater treatment options to meet the proposed Design Objectives included:

1. The development of screening criteria for both a long list and a short list of Alternatives,
2. The development of a long list of technologies,
3. Screening the long list to arrive at a short list of Alternatives,
4. The development of alternative design concepts for the short list of alternatives, and
5. The identification of a preliminary recommended solution.

The long list of alternatives for the liquid train was assessed based on:

- Track record
- Scalability
- Staging/Phasing ability
- Operational and maintenance costs
- Capital cost

The short list of alternatives for the liquid train portion of the plant was assessed based on a list of primary and secondary weighted criteria (See “Evaluation of Treatment Alternatives for Midhurst Wastewater Treatment Plant” – Appendix R of this ESR) and summarized in Table 7.

Table 7 – Wastewater Liquid Train Primary and Secondary Evaluation Criteria

| Primary Criteria | | Secondary Criteria | |
|------------------|----------|-----------------------------------|----------|
| Criteria | Weight % | Criteria | Weight % |
| Social/Cultural | 10 | Aesthetic | 10 |
| | | Truck traffic | 10 |
| | | Noise | 40 |
| | | Odour | 40 |
| Technical | 40 | Ability to comply with objectives | 30 |
| | | Process robustness | 30 |
| | | Energy requirements | 10 |
| | | Suitability of phasing | 10 |
| | | Time to construct | 5 |
| | | Ease of operation and maintenance | 10 |
| | | Site requirements | 5 |
| Environmental | 20 | Sustainability | 15 |
| | | Health and safety | 40 |
| | | Impact on biosolids treatment | 30 |
| | | Greenhouse gas | 15 |
| Economic | 30 | Capital cost | 30 |
| | | Operation and maintenance cost | 40 |
| | | Life cycle analysis | 30 |

This evaluation approach was used to assess the following:

- Primary/secondary treatment,
- Tertiary treatment
- Disinfection treatment

The assessment of the Biosolids Management long list options was similar but with a different list of criteria as follows:

- Compliance with policies
- Social impact
- Technical and operation
- Cost
- Security
- Revenue
- Resource recovery

The evaluation of the short list of Biosolids options was undertaken based on an assessment of advantages and disadvantages to arrive at a final short list of options. That final list of options was then evaluated based on the previously established criteria and weighting used for the liquid train evaluation.

5.0 Water Supply, Treatment, Storage and Distribution

5.1 Phase 1 & 2 Requirements

All the proposed water works as identified in the Master Plan Document require additional Class EA planning (Phases 3 & 4). These works include:

- Determination of well sites, well site layouts and suggested phasing;
- Sizing and alignment of raw water transmission mains from well sites to treatment plant sites;
- Water treatment plants including treatment, pumping and in-ground storage options;
- Sizing and alignment of treated water transmission mains from treatment plant sites to development areas; and
- Sizing of trunk watermains within the developments

5.2 Water Supply (Well) Locations, Layout and Suggested Phasing

Based on the results of the hydrogeological study, it is proposed to develop and equip wells in a phased manner depending on development requirements. The well requirements are based on the Maximum Day Demands as outlined previously in Table 2. The proposed well locations are shown on Drawing No. 113027-OP2 (Copy included in Appendix U).

The wells are identified as noted in the Hydrogeological Study as follows with required capacities:

Carson Road Area

TW34 and OW29 – 20 L/sec each well = 40 L/sec

TW22 and OW19 – 36.5 L/sec each well = 73 L/sec

Total production = 113 L/sec

Doran Road Area

PW1 – 55 L/sec

TW35 – 45 L/sec

TW21 and TW24 – 20 L/sec each well = 40 L/sec

Total production = 140 L/sec

The suggested well phasing is provided in Tables 8 and 9. (A 5% allowance has been added to each demand rate to account for the loss of water due to filter backwashing)

Table 8 – Suggested Well Phasing – Carson Road Development

| Phase/Stage | MDD Required L/sec | Add Well # - Capacity L/sec |
|----------------------|--------------------|---|
| Phase 1 / Stage i | 22.4 + 5% = 23.5 | TW22 = 36.5 L/sec plus one standby well at 36.5 L/sec |
| Phase 1 / Stage ii | 46.6 + 5% = 48.9 | OW19 = 36.5 – Total = 73 L/sec |
| Phase 1 / Stage iii | 62.1 + 5% = 65.2 | No action required |
| Phase 1 / Stage iv | 69.2 + 5% = 72.7 | No action required but predicted demand equals capacity |
| Phase 1 / Stage v | 69.9 + 5% = 73.4 | May require TW34 = 20 L/sec – Total = 93 L/sec |
| Ultimate / Stage i | 76.8 + 5% = 80.6 | OW 29 may be required to provide redundancy to TW34 |
| Ultimate / Stage ii | 76.8 + 5% = 80.6 | No action required |
| Ultimate / Stage iii | 76.8 + 5% = 80.6 | No action required |
| Ultimate / Stage iv | 76.8 + 5% = 80.6 | No action required |

Table 9 – Suggested Well Phasing – Doran Road Development

| Phase/Stage | MDD Required L/sec | Add Well # - Capacity L/sec |
|----------------------|--------------------|--|
| Phase 1 / Stage i | 5.8 + 5% = 6.1 | PW1 = 55 L/sec plus one standby well at 55 L/sec |
| Phase 1 / Stage ii | 13.3 + 5% = 14.0 | No action required |
| Phase 1 / Stage iii | 20.6 + 5% = 21.6 | No action required |
| Phase 1 / Stage iv | 30.8 + 5% = 32.3 | No action required |
| Phase 1 / Stage v | 58.9 + 5% = 61.8 | TW35 = 45 L/sec – Total = 100 L/sec |
| Ultimate / Stage i | 77.7 + 5% = 81.6 | No action required |
| Ultimate / Stage ii | 96.5 + 5% = 101.3 | TW21 = 20 L/sec – Total = 120 L/sec, plus one standby well at 20 L/sec |
| Ultimate / Stage iii | 114.7 + 5% = 120.4 | TW24 = 20 L/sec – Total = 140 L/sec |
| Ultimate / Stage iv | 132.8 + 5% = 139.4 | No action required but predicted demand equals capacity |

The wells, once drilled, tested and rated will be equipped with a pump and a water level monitoring device. The pumping equipment can be either submersible or vertical turbine (to be determined during final design). Electrical controls, flow meters and SCADA equipment will be housed in a well pumphouse which will consist of a brick building with pitched roof. For remote well sites, a stand-by power unit (Diesel generator set) will be provided and will be housed in the building. The sites will be landscaped to Township requirements and will have a paved driveway for maintenance access. A typical elevation view of a proposed well pumphouse is shown on Drawing 113027-A2 (Copy included in Appendix U).

5.3 Raw Water Transmission Mains – Sizing and Alignments

Raw water transmission pipelines will be required from each of the well sites to either of the two water treatment plants. Preliminary pipeline sizing is based on the maximum required flow rate from each well site and considers flow velocity as well as pipeline head loss. In general terms, the routes of the raw water transmission mains and the suggested pipe sizes are as described in Table 10.

Table 10 – Raw Water Transmission Main Routes and Sizes

| Well Site | Flow Rate(L/s) | Route | Length (m) | Pipe Size (mm) | Velocity (m/s) | Pipeline Headloss (m) |
|-------------|----------------|--|------------|----------------|----------------|-----------------------|
| TW34 & OW29 | 40 | Snow Valley Rd to Carson Rd. area Treatment Plant | 5000 | 250 | 0.81 | 16.7 |
| TW22 & OW19 | 73 | Within site of Carson Rd. area Treatment Plant | 25 | 200 | 2.32 | 0.75 |
| PW1 & TW35 | 100 | Within Doran Rd. area streets to Treatment Plant on Gill Rd. | 1600 | 300 | 1.41 | 12.0 |
| TW21 & TW24 | 40 | Pooles Rd., Russell Rd., Doran Rd. area streets to Treatment Plant on Gill Rd. | 4200 | 250 | 0.81 | 14.0 |

In order to reduce pipeline head loss, the pipe sizing should be reviewed as part of the final design. It is suggested that the ultimate pipe sizes be installed initially, rather than staging the raw water pipelines.

5.4 Water Treatment Plant Options

5.4.1 Doran Road Water Treatment Plant

The basis for the design requirements of the Doran Road area Water Treatment Plant (WTP) are based on the water quality results as described in the Hydrogeological Assessment by Golder Associates (Appendix J). The water from the PW1 and TW35 wells will require treatment for the removal of iron and manganese. The water from the southern wells (TW21 and TW24) will require disinfection only. Water from both well sites can be blended prior to treatment. The water treatment, as recommended in the ‘Evaluation of Midhurst Water Supply and Water Treatment Alternatives’, Black & Veatch – May 2016 (Appendix K) includes filtering for removal of iron and manganese in addition to disinfection. Raw water would be pumped from the wells to the WTP site where it would be dosed with sodium hypochlorite for disinfection and oxidation of iron and manganese prior to being filtered. The type of filter will be selected as part of the final design process. The filter will be backwashed periodically, and the wastewater will be sent to a settling basin for wash water recovery. The recovered water will be returned to the inlet of the filter and the sludge will be sent to the sewage collection system. The treated water will be stored in an in-ground water storage reservoir. Top-up chlorination will be provided to ensure a residual concentration of chlorine in the distribution system. High lift pumps will provide water to the distribution system in order to meet average day, maximum day, peak hour and firefighting requirements.

It is recommended to provide chemical disinfection using liquid sodium hypochlorite to achieve 2-log inactivation of viruses. Chlorine contact time could be provided in the water storage reservoir.

5.4.2 Carson Road Water Treatment Plant

Similar to the Doran Road WTP, the design requirements of the Carson Road area (WTP) are based on the water quality results as described in the Hydrogeological Assessment by Golder Associates (Appendix J). However, the water quality from the sand and gravel pit area (TW22 and OW19) is different from the water quality of the West Snow Valley area (TW34 and OW29). Water from the sand and gravel pit wells is moderately high in nitrate (although below the Ontario Drinking Water Standard – 7.7 vs. 10.0 mg/L) while water from the West Snow Valley area is high in iron and manganese and may contain hydrogen sulfide and methane gases. Therefore, two separate treatment trains will be required at the WTP.

The water treatment, as recommended in the ‘Evaluation of Midhurst Water Supply and Water Treatment Alternatives (Black & Veatch – May 2016 see Appendix K) for the sand and gravel pit wells includes ion exchange to reduce nitrate concentrations by 50% to allow for any future increases in raw water nitrate concentrations in addition to disinfection.

Treatment for the West Snow Valley area water will include filtering for removal of iron and manganese in addition to disinfection. Raw water would be pumped from the wells to the WTP site where it would be dosed with sodium hypochlorite for disinfection and oxidation of iron and manganese prior to being filtered. The type of filter will be selected as part of the final design process. The filter will be backwashed periodically and the wastewater will be sent to a settling

basin for wash water recovery. The recovered water will be returned to the inlet of the filter and the sludge will be sent to the sewage collection system.

The treated water from both treatment trains will be blended and stored in an in-ground water storage reservoir. High lift pumps will provide water to the distribution system in order to meet average day, maximum day, peak hour and firefighting requirements.

It is recommended to provide chemical disinfection using liquid sodium hypochlorite to achieve 2-log inactivation of viruses and to provide residual chlorine in the distribution system. Chlorine contact time could be provided in the water storage reservoir.

5.5 Treated Water Transmission Mains – Sizing and Alignments

The discharge pipe from both WTPs will be sized to meet the combined requirements of maximum day demand plus fire flow. The flow requirements are provided in Table 11

Table 11 – Treated Water Flows

| WTP Phase/Flow | MDD (L/s) (see Table 2) | Fire Flow (L/s) | Total (L/s) |
|-----------------|-------------------------|-----------------|-------------|
| Doran Phase 1 | 58.9 | 133 | 191.9 |
| Doran Ultimate | 132.8 | 133 | 265.8 |
| Carson Phase 1 | 69.9 | 133 | 202.9 |
| Carson Ultimate | 76.8 | 133 | 209.8 |

Assuming a maximum velocity of 2.5 m/s under this extreme flow condition, the suggested treated water transmission main pipe sizes are as follows:

Doran Phase 1 – 300 mm

Doran Ultimate – 400 mm

Carson Phase 1 and Ultimate – 400 mm

It is suggested that the sizing of the treated water transmission mains be reviewed during final design, taking into consideration initial water demands. The lengths and alignments of the transmission mains will be determined through computer modelling as part of the final design.

5.6 Watermain Sizing

Sizing of distribution watermains will be assessed during final design for development servicing. Although the two new systems (Doran Road area and Carson Road area) will have separate

hydraulic grade lines in order to ensure adequate pressure in both areas, consideration will be given to interconnection with the existing Midhurst water distribution system for emergency purposes. Regardless, under normal operating conditions, the system pressure will be maintained between 50 and 90 psi (345 to 620 kPa) in both areas.

Based on a review of the elevations in the Carson Road area, the distribution system will be comprised of two pressure zones, separated by pressure reducing valves.

The Doran Road area has an elevation difference of about 30 m which means that the entire area can be serviced from one pressure zone.

5.7 Impacts and Mitigation Measures

5.7.1 General

Environmental impacts (Effects) of the proposed water servicing works were considered. The list of “Effects” as provided in Appendix 2 of the MEA Municipal Class EA was used for the purposes of identifying mitigation measures. A copy of the MEA List is included in Table 12 (Appendix V) with suggested mitigation measures for the construction and operation of the proposed wells, water treatment plants/reservoirs and the trunk watermains.

**Table 12 - Impacts and Mitigation Measures Related to Water Servicing Infrastructure
(Please see Appendix V)**

5.7.2 Air Quality

The issue of air quality and mitigation with respect to the proposed water treatment and supply works, will be assessed as part of the final design.

5.7.3 Climate Change

While mitigation of climate change is outside of the scope of this study, it is recognized that design codes and guidelines are being revised to account for changing climate. The Canadian Standards Institute (CSI) is working to assess the potential impact of climate change on water supply/treatment facilities and there has been an increase in studies by Canadian cities aimed at mitigating the potential effects of climate change on important infrastructure. The design of the water supply, treatment and distribution systems for Midhurst should take into account potential adaptive measures for the anticipated changes and should establish the potential impact on the Midhurst Secondary Plan area during detailed design. The goal is to decrease the vulnerability of the water system to the anticipated climate change effects. Many of the challenging conditions presented by a changing climate are already considered within the design of water supply/treatment facilities. At the design stage, consideration should be made for the possibility of an increase in frequency and/or severity of the following conditions:

- Blowing snow/blizzard
- Cold or heat wave

- Drought/dry periods
- Extreme diurnal temperature variation
- Freeze/thaw
- High wind/hurricane or tornado
- Freezing rain/ice storm
- Hail
- Heavy fog
- Heavy rain/lightning/thunderstorm
- Heavy snowfall
- High and low temperatures

In general, water supply/treatment facilities are classed as “post-disaster buildings” in Ontario under the Ontario Building code. A post-disaster building designation means that a building and its ancillary infrastructure are expected to remain functional and accessible after a rare climatic or seismic event. As such, the design of water supply/treatment facilities already takes into account additional factors of safety for extreme events.

In addition to the requirements already outlined in the OBC, reasonable risk reduction measures should be investigated at the design stage to manage the additional challenges presented by climate change. These would include the provision of site space for snow storage, more robust insulation, additional storage for treatment chemicals and spare parts, and increased fuel storage for power generation. In addition, site design measures can be considered such as the establishment of berms and tree stands to minimize the impacts of blowing snow.

The distribution system should be designed to prevent freezing of pipelines, including service connections and to provide easy access to valves and fire hydrants.

5.7.4 Spills Risk Management

5.7.4.1 System Overview

The recommended alternative water systems for Midhurst will consist of wells and well pumphouses, local and trunk watermains, treatment plants and reservoirs. Liquid Chlorine will be used for disinfection of the water supply. The possibility of chlorine spill will be addressed as part of the design.

Drains will be provided at the treatment plants and at the reservoirs. The overflow of water from these drains will be handled appropriately to avoid erosion and siltation of adjacent lands.

5.7.4.2 Spills Risk

While the system will be designed to minimize the risk of overflows or spills to the natural environment, there does still exist some degree of risk. Overflows could potentially arise from:

- Water Main Breaks
- Equipment Failure
- Power Failure
- Control/Communications System failure

5.7.4.3 Dealing with Potential Main Breaks

The highest risk of spills from water pipe systems is from breaks as the pressure from pumps can result in spills to the surface. Measures to be considered in the design to minimize the risk of spills from main breaks include:

- Quality control during all aspects of construction including on development lands
- Use of line valves for isolation of watermain sections
- Implementing a preventative maintenance program including regular inspections

5.7.4.4 Dealing with Potential for Equipment or Pump Failure

Equipment or pump failure also have the potential to result in overflows or spills from water systems. Pumps are a critical component in water systems. Pump failure will lead to low system pressure and loss of water supply. Likewise, the failure of chemical feed pumps and other equipment in the treatment plant can result in process failures. The Ministry of Environment and Climate Change (MOECC) provides design guidelines for pumping stations and treatment plant design in Ontario that requires the use of dual or standby equipment for all pumping stations and treatment systems. The use of dual pumps and multiple treatment trains minimize the risk of pump or equipment failure. Measures that should be considered in the design and operation of the system include:

- Installation of a minimum of dual systems for all pumps and equipment
- Design for plant operational flexibility such that pump systems can have multiple duties
- Conduct a risk assessment and develop a contingency and response plan to deal with equipment failures
- Implement a Maintenance Management System (MMS) that prevents equipment failure
- Adopt a proactive approach to fixing any piece of equipment that is out of operation.
- Develop a contingency plan
- Maintain an inventory of critical spare parts on site

5.7.4.5 Dealing with Potential for Power Failure

Water treatment and supply systems must have a continuous and reliable supply of power for the safe operation of the system. The preferred treatment plant alternative has a wide range of equipment, instruments and control devices that require continuous and stable power. Treatment plants are built in strict compliance with electrical codes that ensure all electrical systems are safe and reliable. Measures that should be considered in the design and operation of the system to minimize the risk power failure include:

- Negotiate multiple power feeds
- Consider using twin power transformers to ensure a more robust supply
- Install standby power with automatic transfer from the prime power source sufficient to maintain the entire facility in operation during prime power failure
- Select a fuel supply for standby power based on the security of the supply (gas or diesel)
- Protect all electrical systems against the threat of lightning strikes

5.7.4.6 Dealing with Potential for Control/Communication Failure

Continuous operation of the water systems will rely on the System Control and Data Acquisition (SCADA) System. This is the system that will automatically control the operation of all equipment throughout the system 24 hours a day. It automatically starts and stops equipment as necessary and provides alarms to the operators in the event of any failure. Typically, operators can remotely investigate any issues with the operation and either remotely start a standby system or go to the facility and take manual control of the particular system. The control system consists of sensing instruments, controllers and computers using control software customized for the particular system operation.

A system wide communications system that allows all facilities to be interconnected to the control system must also be robust and secure to support system reliability.

SCADA systems improve the reliability of the operation and greatly reduce the response time needed to deal with operational issues. Measures that should be considered in the design and operation of the system to minimize the risks include:

- Design the SCADA system with dual controllers and computers
- Ensure protection and back up of all sensitive controls and computer networks using Un-interruptible Power Supply (UPS)
- Develop a contingency plan for manual operation in the event of control system failure
- Regularly maintain all sensing instruments

5.8 Opinion on Probable Capital Cost

Probable opinion of capital cost estimates are provided in the Evaluation Report (See Appendix K). The Estimates are summarized in Table 13 and include wells, raw water transmission mains, Water Treatment Plants, Reservoirs and general costs (Approvals, Permits, Engineering and Contingency Allowances).

Table 13 – Probable Opinion of Cost Estimates for Water Supply Infrastructure

| ITEM DESCRIPTION | DORAN ROAD WTP | CARSON ROAD WTP |
|---|---------------------|---------------------|
| Municipal Wells (six new Municipal wells) | \$6,200,000 | \$3,832,000 |
| Trunk Watermains | \$900,000 | \$680,000 |
| Water Treatment Plants and Inground Reservoirs | \$8,056,000 | \$7,872,000 |
| SUB TOTAL PHASE 1 | \$15,200,000 | \$12,400,000 |
| Contingency (10%) | \$1,500,000 | \$1,200,000 |
| Engineering Fees, Permits etc. (17%) | \$2,600,000 | \$2,100,000 |
| TOTAL PHASE 1 | \$19,300,000 | \$15,700,000 |
| | | |
| Municipal Wells (five new Municipal wells) | \$1,800,000 | \$500,000 |
| Trunk Watermains | \$1,600,000 | \$4,800,000 |
| Expansion of Water Treatment Plants and Inground Reservoirs | \$3,900,000 | \$2,200,000 |
| SUB TOTAL PHASE 2 | \$7,300,000 | \$7,500,000 |
| Contingency (10%) | \$700,000 | \$800,000 |
| Engineering Fees, Permits etc. (17%) | \$1,200,000 | \$1,300,000 |
| TOTAL PHASE 2 | \$9,200,000 | \$9,600,000 |
| | | |
| TOTAL PHASE 1 & 2 | \$28,500,000 | \$25,300,000 |
| | \$53,800,000 | |

5.9 Evaluation of Options

Water treatment options were presented and considered in the Evaluation Report. Engineering considerations were used to determine the recommended treatment methods for the various water supplies. Filtration for removal of iron and manganese was selected instead of sequestration due to reliability. Ion exchange was selected for nitrate reduction based on cost implications (less costly than reverse osmosis and electrodialysis) and because Ion Exchange produces far less waste by-product. Chemical disinfection and ultraviolet radiation were assessed for disinfection of the water supply. It was recognized that a disinfectant residual must be maintained in the water distribution system and therefore, chemical disinfection using liquid sodium hypochlorite was selected as the recommended solution.

5.10 Selection of Recommended Design Concepts – Water Supply

The Evaluation Report summarized the recommended works required to provide water supply to the two developments. The design concepts are reiterated as follows:

Carson Road Area

- Construction of 3 equally sized production wells at the sand and gravel pit site with any 2 being capable of providing a total of 73 L/s to meet the Phase 1 demand,
- Construction of production wells at the West Snow Valley site with a minimum of 2 wells each rated at a minimum of 8 L/s (could be as high as 20 L/s each), complete with raw water transmission main to meet the Ultimate demand,
- A WTP to be built at the sand and gravel pit site with two treatment trains. An Ion Exchange treatment train is recommended for nitrate removal from the waters produced at the sand and gravel pit site to meet the Phase 1 demand. Ultimately, a separate filtration treatment train will be required to remove iron and manganese from the West Snow Valley water supply. The disinfection system for both treatment trains will include a liquid chlorine storage tank and feed system with enough chlorine contact time to provide 2-log inactivation of viruses. The process waste water will be pumped to the adjacent Wastewater Treatment Plant. The facility will be equipped with an emergency power supply to sustain the entire operation including the on-site well pumps,
- An in-ground water storage tank will be provided with a minimum capacity of 3,868 m³ (say 3,900) in order to meet the Ultimate water storage requirement for emergency, fire storage and equalization volume for peak hour demand, and,
- A pumping station will be built as part of the WTP to provide the peak hour water demand to the Carson Road Development Area and to maintain the pressure range between 345 and 620 kPa throughout the area. The station will also house fire pumps to provide 133 L/s for 3 hours. Pressure reducing valves will be required to service some small areas of the distribution system.

In addition to the works proposed in the Evaluation Report, it is noted that well pump houses will be required at all well sites to provide primary power, stand-by power (if not provided by a larger facility), flow metering and pump controls. A full water distribution system will be provided complete with valves, fire hydrants, sampling stations, air release valves, drain valves and water service connections.

Doran Road Area

- Construction of 3 equally sized production wells at the Doran Road well site with any 2 being capable of providing a total of 100 L/s to meet the Phase 1 demand complete with raw water transmission main to the Water Treatment Plant proposed to be located east of Gill Road within the Development,
- Construction of production wells at the Old School Road site with a minimum of 2 wells each rated at a minimum of 40 L/s, complete with raw water transmission main to the Water Treatment Plant to meet the Ultimate demand,
- A Water Treatment Plant to be built east of Gill Road within the Development to treat water from the two well sites. A filtration treatment system with special filter media for removal of Iron and Manganese will be required. The disinfection system will include a liquid

chlorine storage tank and feed system with sufficient chlorine contact time to provide 2-log inactivation of viruses. The process waste water will be pumped to the adjacent sewage pumping station. The facility will be equipped with an emergency power supply to sustain the entire operation,

- An in-ground water storage tank will be provided with a minimum Phase 1 capacity of 3,470 m³ (say 3,500) expandable to meet the Ultimate required minimum capacity of 5,382 m³ (say 5,400) to provide storage requirements for emergency, fire storage and equalization volume for peak hour demand, and,
- A pumping station will be built as part of the WTP to provide the peak hour demand to the Doran Road Area and to maintain the pressure range between 345 and 620 kPa throughout the area. The station will also house fire pumps to provide 133 L/s for 3 hours.

In addition to the works proposed in the Evaluation Report, it is noted that well pump houses will be required at all well sites to provide primary power, stand-by power, flow metering and pump controls. A full water distribution system will be provided complete with valves, fire hydrants, sampling stations, air release valves, drain valves and water service connections.

5.11 Staging Considerations

5.11.1 Wells

Suggested Staging of wells is presented in Tables 8 and 9 (Section 5.1).

5.11.2 Treatment and Storage Facilities

The initial water demands in both service areas will be minimal and it may take several years of development to reach the Phase 1 water requirements. It is suggested, however, that both of the WTP buildings be constructed initially to meet the needs of the ultimate developments (full buildout). Although the ultimate process equipment may not be required initially, the ultimate building structure should be provided at the commencement of development. Suggested staging for the two WTPs, including the water storage facilities, are provided as follows;

Doran Road WTP

The anticipated maximum day water demand for the Doran Road area starts at 5.8 L/s (Phase 1 – Stage i) and increases gradually to 58.9 L/s at the end of Phase 1 (not including allowance for backwash waste). In the Ultimate stage, the maximum day water demand is predicted to range from 77.7 L/s to 132.8 L/s (excluding backwash waste). These are significant ranges and consideration should be given to the provision of more than one treatment train. Initially, filtration could be provided for a flow of up to 30 L/s (meets MDD for Phase 1 – stage iv). A second filtration train could be added to double the treatment capacity to meet the full Phase 1 MDD of 58.9 L/s. Consideration should also be given to the provision of a third filtration train to provide 50% redundancy. A requirement will be made during the pre-design stage to conduct pilot testing on the raw water from the various Doran Road area wells to confirm that filtration is the preferred treatment method and to determine the appropriate filter media.

In order to meet the Ultimate MDD water requirement, the three filters could be replaced such that each train has a capacity of 70 L/s for a total system capacity of 140 L/s with one train providing 50% redundancy. The initial process piping could be provided to meet the Ultimate flow condition, but this will need to be assessed as part of the final design.

The water storage reservoir requirement (useable volume) ranges from approximately 3,500 m³ (Phase 1) to 5,400 m³ (Ultimate). The Ultimate overall cell volume should be increased to say 6,000 m³ to allow for freeboard and non-useable water in the bottom of the cells. Therefore, it is proposed that the reservoir be constructed in 5 cells, each with a volume of about 1,200 m³. Three cells could be provided initially to meet the needs of Phase 1. Two additional cells could be added when required for the Ultimate condition.

The disinfection system should be staged to meet the flow capacities of the filters (i.e. 30 L/s then 60 L/s then 100 L/s and ultimately 140 l/s). However, a much smaller system may be required at the commencement of development in order to meet the initial low water demands. This will be taken into account during final design.

The high lift pumping requirements will also need to be staged in order to provide the full range of minimum day demand up to maximum day demand and peak hour demand for all Stages of development. Pumping and high lift piping requirements will be fully assessed as part of the final design. Variable frequency drives will be provided to ensure a full range of flows. Maximum duty pumps will be installed to meet the fire flow requirement of 133 L/s. Pump redundancy will be necessary.

The stand-by power requirements will also depend on the staging of pumps. This will be determined during final design.

Carson Road WTP

The maximum day water demands for the Carson Road area start at 22.4 L/s (Phase 1 – Stage i) and increase gradually to 69.9 L/s at the end of Phase 1 (not including allowance for backwash waste). In the Ultimate stage, the maximum day water demand is predicted to be 76.8 L/s for all Stages (excluding backwash waste). The Phase 1 water demand range may be able to be provided by the production wells at the Gravel pit site (full capacity of 73 L/s) depending on the amount of backwash waste. As noted previously, the water from these wells is moderately high in Nitrate and it has been determined that ion exchange treatment is to be provided to reduce the nitrate concentration. Assuming that all of the raw water will require treatment, it is suggested that ultimately, three ion exchange treatment trains be provided to handle the Ultimate MDD rate of 76.8 L/s plus allowance for backwash waste. Each train should be rated at a flow of say 40 L/s. Two trains should be provided initially (one providing 100% redundancy) at a rated capacity of 40 L/s. A third train could be added at some point in Phase 1 to provide the Ultimate capacity with 50% redundancy. Pilot testing of the raw water supply will be a requirement of pre-design. It is noted that the nitrate level in the raw water does not exceed the Ontario Drinking Water limit of 10 mg/L. Therefore, removal of nitrate may not be a requirement of the MOECC Approval. However, provision will be made for the reduction of nitrate by installing treatment equipment. It

is also noted that some of the water flow could by-pass the treatment process allowing for a reduction in the capacity of the ion exchange units and the amount of salt that is used in the process. This will be considered as part of the pre-design process. Process piping should be provided to meet the Ultimate condition but that will be determined as part of the final design.

In order to meet the Ultimate MDD requirement, it may be necessary to develop wells in the West Snow Valley area. That water will require filtration for iron and manganese removal. Assuming that a flow rate of 8 L/s is required to reach the total Ultimate demand of 81 L/s, it is suggested that two separate filtration trains be installed in the WTP, each rated at 8 L/s to provide redundancy. Pilot testing of the raw water supply from this area will be required during pre-design.

The water storage reservoir requirement (useable volume) ranges from approximately 3,700 m³ (Phase 1) to 3,900 m³ (Ultimate). The Ultimate overall cell volume should be increased to say 4,400 m³ to allow for freeboard and non-useable water in the bottom of the cells. Therefore, it is proposed that the reservoir be constructed in 4 cells, each with a volume of about 1,100 m³. All four cells should be provided initially to meet the needs of Phase 1. Cells can be brought online as needed.

The disinfection system should be staged to meet the staged flow capacities (i.e. 20 L/s then 40 L/s then 60 L/s and ultimately 80 l/s). However, a much smaller system may be required at the commencement of development in order to meet the initial low water demands. This will be taken into account during final design.

The high lift pumping requirements will also need to be staged in order to provide the full range of minimum day demand up to maximum day demand and peak hour demand for all Stages of development. Pumping and high lift piping requirements will be fully assessed as part of the final design. Variable frequency drives will be provided to ensure a full range of flows. Maximum duty pumps will be installed to meet the fire flow requirement of 133 L/s. Pump redundancy will be necessary.

The stand-by power requirements will also depend on the staging of pumps. This will be determined during final design.

5.11.3 Watermains

Watermain sizing will be undertaken as part of the final design. The watermains (raw and treated) will be sized and installed for the ultimate flow conditions – MDD plus fire flow.

6.0 Wastewater Collection, Treatment and Effluent Discharge

6.1 Phase 1 & 2 Requirements

All the proposed wastewater works as identified in the Master Plan Document require additional Class EA planning (Phases 3 & 4). These works include:

- Wastewater Treatment Plant – liquid and biosolids treatment options;
- Sizing and alignment of effluent discharge pipe;
- Location and design options for effluent discharge to Willow Creek
- Wastewater Pumping Stations; and
- Sizing and alignment of sewage forcemains.

6.2 Summary of Design Basis

The basis for the preliminary design of the proposed WWTP is provided in the Technical Memorandum, Design Basis for Midhurst Wastewater Treatment Plant dated April 2014 as prepared by Black & Veatch. That document provides information on population, flow generation, raw sewage loading, and effluent quality. A copy of the Memorandum is included in Appendix 'Q'.

6.3 Effluent Discharge Criteria

The proposed effluent discharge criteria (Compliance and Design Objectives) are listed in the Evaluation of Treatment Alternatives for Midhurst Wastewater Treatment Plant dated May 2018 as prepared by Black & Veatch (see Appendix R). The effluent criteria is provided in Appendix 9 of that report.

The proposed effluent compliance limits are reiterated in Table 14

Table 14 – Proposed Wastewater Effluent Compliance Limits

| Description | Concentration | | |
|--|---------------|------------|---------|
| | Phase 1 | Ultimate | Units |
| Carbonaceous Biochemical Oxygen Demand (cBOD5) | 15 | 15 | mg/L |
| Total Suspended Solids (TSS) | 15 | 15 | mg/L |
| Ammonia – N, June 1 to October 31 | 1.5 | 1.0 | mg-N/L |
| Ammonia – N, November 1 to May 31 | 3.0 | 2.0 | mg-N/L |
| Total Inorganic Nitrogen (TIN) (Ammonia – N + Oxidized – N) | 15.4 | See note 1 | mg-N/L |
| Total Phosphorus (TP) | 0.05 | 0.03 | mg/L |
| Disinfection (E. Coli.) | 100 | 200 | /100 ml |

Note 1 – Based on MOECC preliminary review, it was determined that the Phase 1 target for TIN should be 15.4 mg-N/L and that the Ultimate target would be determined at the Phase 2 ECA stage in the future. The MOECC also determined that the ultimate maximum concentration for E. Coli. should be 100/100ml.

The proposed effluent design limits (more stringent than compliance) are reiterated in Table 15.

Table 15 – Proposed Wastewater Effluent Design Objectives

| Description | Sample Type | Concentration | |
|--|-----------------|----------------------|--------|
| | | Value | Units |
| Carbonaceous Biochemical Oxygen Demand (cBOD5) | Composite | 10 | mg/L |
| Total Suspended Solids (TSS) | Composite | 10 | mg/L |
| Ammonia – N, June 1 to October 31 | Composite | 1.0 | Mg-N/L |
| Ammonia – N, November 1 to May 31 | Composite | 2.0 | Mg-N/L |
| Oxidized Nitrogen | Composite | 15 | Mg-N/L |
| Total Phosphorus (TP) | Daily Composite | 0.03 (See note 2) | mg/L |
| Disinfection (E. Coli.) | Grab | 100 | /100mL |

Note 2 – The MOECC suggested that the feasibility of adding a monthly loading limit should be discussed at the ECA for Phase 1.

6.4 Wastewater Treatment Background Studies

6.4.1 General

The analysis and assessment of wastewater treatment alternatives was supported by numerous studies which provided information and confirmation of the proposed overall wastewater treatment scheme. The results and conclusions of these studies are summarized hereinafter.

6.4.2 Willow Creek 7Q20 Flow Assessment

In order to establish a reasonable assimilative capacity of the proposed effluent receiving stream (Willow Creek) it was necessary to determine the average annual low flow rate in Willow Creek. This is referred to as the 7Q20 – the 7-day average annual low flow rate with an expected probability equal to a 20-year return period. The 7Q20 was calculated using 10 years of recorded flow data. Hutchinson Environmental Sciences Ltd. undertook this assessment which was documented in their Report entitled “7Q20 Flow Assessment Update for Willow Creek” – May 18, 2016. Based on the assessment, a 7Q20 low flow rate of 430 L/s is proposed as a conservative estimate for assimilation modelling of Willow Creek.

6.4.3 Willow Creek Assimilative Study

Using the calculated 7Q20 low flow rate, assimilation computer models for the proposed effluent concentrations were run for the Phase 1 and Ultimate effluent flows to determine concentrations of ammonia and phosphorus in Willow Creek. This work was documented in a Report entitled “Willow Creek Assimilative Study” by Hutchinson Environmental Sciences Ltd. – May 2018, (Appendix L).

Existing concentrations of phosphorus and ammonia in Willow Creek were used to determine the base levels in the Creek. The existing concentration of phosphorus in Willow Creek is 0.035 mg/L which exceeds the MOECC’s Provincial Water Quality Objective (PWQO) of 0.03 mg/L. This means that Willow Creek is classified as a “Policy 2” receiver for Phosphorus. Policy 2 is defined as “Water Quality which presently does not meet the Provincial Water Quality Objectives shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the objectives”.

The existing concentration of ammonia in Willow Creek is 0.024 mg/L which is well below the threshold of acute lethality of 0.26 mg/L making the classification as a “Policy 1” receiver for ammonia.

At the end of Phase 1 Development, it is proposed that the effluent be treated to a phosphorus concentration of 0.05 mg/L which results in a total loading 118 kg/yr of Total Phosphorus (TP).

Ultimately, it is proposed to treat the effluent to a phosphorus concentration of 0.03 mg/L which will produce an annual TP loading of 134 kg/yr.

It is proposed that these TP loadings be reduced through the use of Best Management Practices, Low Impact Development and, if deemed to be necessary, through phosphorus offsetting (trading). Phosphorus offsetting may be required in order to satisfy the NVCA and Township requirement of “no net increase”. This is described in Section 6.4.4 below.

The maximum un-ionized ammonia concentrations were determined to be 0.038 mg/L (Phase 1) and 0.057 mg/L (Ultimate). These concentrations are well below the 0.26 mg/L threshold for acute lethality.

6.4.4 Overall Phosphorus Budget

In order to reduce the overall phosphorus concentration in Willow Creek as a result of the proposed Developments, Hutchinson Environmental Sciences Ltd. (HESL) was retained to undertake an overall phosphorus budget. The findings and recommendations were outlined in a Report entitled “Phosphorus Budget” – May 2018, (Appendix M).

The purpose of the Report was to assess:

- Cumulative impact of phosphorus from stormwater management ponds,
- Cumulative impacts of the WWTP, and stormwater on flooding, erosion and phosphorus loading, and

- How the development will proceed with no net increase in phosphorus loading to the Minesing Wetland.

Phosphorus budgets were completed for Phase 1 and for the Ultimate (Full Build out) populations.

The Report made the following assumptions and conditions related to stormwater runoff:

- Stormwater runoff will be collected and treated to MOECC “Enhanced Level” quality control requirements,
- On-site controls such as Low Impact Development (LID) techniques and Best Management Practices (BMP) will be implemented to reduce stormwater runoff and associated phosphorus loads through infiltration,
- A target infiltration rate of the first 23 mm of all rain events will be assessed,
- Sensitivity analysis was completed using an assumption of 20 mm infiltration rate of all rain events for comparison against the NVCA target of 25 mm,
- LIDs proposed for the developments include soak away pits, infiltration trenches, bio-swales and increased topsoil depth, and
- Any site runoff that is not infiltrated will be directed to one of the stormwater management ponds (SWMP).

The requirement for the infiltration of the first 25 mm of rain from all storm events is considered to be unreasonable and therefore a more realistic infiltration value of 20 mm was examined for comparison purposes. It was subsequently determined that an infiltration rate of 23 mm is the maximum feasibly achievable rate.

HESL estimated that a loading of 46 kg of phosphorus per year is currently being added to Willow Creek originating from existing land uses (agriculture and forest). Based on the Phase 1 wastewater effluent concentration for total phosphorus (TP = 0.05 mg/L), an estimated 118 kg/yr. of TP would be added to Willow Creek from the WWTP. Assuming 20 mm of infiltration along with LID techniques, Best Management Practices and stormwater management techniques, it is estimated that the phosphorus loading will be reduced to 21 kg/yr from the estimated pre-development loading of 46 kg/yr. It is considered that the development will actually reduce phosphorus loading from stormwater runoff by 25 kg/yr (46 – 21). This could result in a total additional loading of phosphorus of 139 kg/yr, (118 + 21 = 139) which is an increase of 93 kg/yr over the pre-development load of 46 kg/yr. Assuming 25 mm of infiltration (NVCA requirement) the phosphorus load from stormwater runoff is estimated to be 11 kg/yr. resulting in a total additional loading of phosphorus of 129 kg/yr (118 + 11 = 129) which is an increase of 83 kg/yr. over the pre-development load of 46kg/yr.

HESL estimated that a loading of 134 kg/yr of phosphorus would be directed to Willow Creek in the future from current mixed land uses. Based on the Ultimate (Full Buildout) wastewater effluent concentration for total phosphorus (TP = 0.03 mg/L), an estimated 134 kg/yr of TP would be added to Willow Creek from the WWTP. Assuming 20 mm of infiltration along with LID techniques, Best Management Practices and stormwater management techniques, it is estimated that the

phosphorus loading will be reduced to 66 kg/yr. from the estimated pre-development loading of 134 kg/yr. It is considered that the development will actually reduce phosphorus loading from stormwater runoff by 68 kg/yr (134 – 66). This results in a total additional loading of phosphorus of 200 kg/yr., (134 + 66 = 200) which is an increase of 66 kg/yr. over the pre-development load of 134 kg/yr. Assuming 25 mm of infiltration (NVCA requirement) the phosphorus load from stormwater runoff is estimated to be 33kg/yr. resulting in a total additional loading of phosphorus of 167 kg/yr. (134 + 33 = 167) which is an increase of 33 kg/yr. over the pre-development load of 134kg/yr.

Although there will be a reduction in phosphorus loading from the stormwater runoff component, the addition of the WWTP effluent into Willow Creek means that there will be an anticipated increase in phosphorus loading in the subwatershed of 93 kg/yr. for Phase 1 and 66 kg/yr. Ultimately (based on an infiltration rate of 20 mm) and 83 kg/yr. for Phase 1 and 33 kg/yr. for the Ultimate condition (based on an infiltration rate of 25 mm). However, all of these increases are considered to be minor in the overall discharge to the watershed and therefore it is considered that there would be no effect on the Minesing wetlands. As a result, the Hutchinson Report recommends against the implementation of a phosphorus offsetting program for the Willow Creek watershed.

A Master Drainage Plan is currently being prepared based on an infiltration rate of 23 mm. The Phosphorus Budget Report will be confirmed once the details of the approved draft plans have been completed.

6.4.5 Increased Phosphorus Loading

In order to review the Phosphorus Budget Report, it was determined that an expert in that field should be retained to undertake a peer review. XCG Consulting Limited was retained by Ainley Group to complete the peer review. In a letter report dated June 22, 2016, XCG advised that the HESL Phosphorus Budget analysis "...does not properly account for infiltration facility recovery time; and that therefore, the estimates that 90% and 95% runoff reduction will be provided by 20 mm and 25 mm infiltration, respectively, may be over-estimates, and possibly significantly so." And "...as much as 72 hours may be needed for full capacity recovery at below-grade infiltration facilities." XCG recommended that this matter be reviewed.

Simultaneous with the review the XCG analysis, HESL provided a Technical Memorandum (August 9, 2016), estimating the phosphorus load to the Minesing Wetland. That analysis concluded that the estimated TP load at full buildout of 66 kg/yr, represents an increase of 2.6% to the existing Willow creek load and 0.2% to the total estimated load to the Minesing wetland. The majority of the load to the wetland (56%) is from the Nottawasaga River. HESL concluded that there will be no detectable change in nutrient status of the wetland as a result of development of the Midhurst Secondary Plan Area (see Appendix M for copies of the related documentation).

An additional Technical Memorandum (HESL – October 13, 2016) further assesses the impact of TP on Willow Creek. That analysis "...further supports the case that phosphorus offsets in the watershed are not needed to balance the impact of the WWTP discharge (see Appendix M).

Following notification of the XCG analysis, HESL recalculated the TP budget and the results were provided in a Memorandum dated March 7, 2017 (see Appendix M). HESL concluded that “The XCG review raised a valid consideration...” and “Infiltration galleries must be designed for a 23 mm storm...instead of a 20 mm storm in order to reduce phosphorus in runoff to 21 and 66 kg for Phase 1 and Full Build out respectively.” HESL further advised in a covering email, that a phosphorus offsetting program will need to be developed.

Following the completion of the Phosphorus Budget and subsequent Peer Review by XCG Consultants Limited, it is confirmed that the net cumulative change in Phosphorus after the development of the Midhurst Secondary Plan will be 66 kg/yr. It is also acknowledged that in accordance with prior commitments including the Draft Plan Conditions, the Midhurst Developer Group are committed to working with the Nottawasaga Valley Conservation Authority (NVCA) and the Township of Springwater to achieve a cumulative net zero increase in Phosphorus in the Willow Creek following the development of the Midhurst Secondary Plan.

6.4.6 Impact on Hynes Dragon Fly

Golder Associates completed additional hydrologic modelling on the proposed water taking to determine the impacts on surface waters in the area. The results concluded that surface water level changes in the Minesing Wetland and Snow Valley area of approximately 1mm or less are considered inconsequential. A copy of the Report is included in Appendix J.

HESL concluded in a Technical Memorandum dated February 2017, that, based on the inconsequential impact to surface water levels, there would be no impact to the Hine’s Emerald Dragonfly as a result of the proposed water taking. A copy of the HESL Technical Memorandum is included in Appendix L.

6.4.7 Potential Impacts to Minesing Wetlands

Beacon Environmental prepared a memorandum dated September 19, 2013 to describe the potential impacts to the Minesing Wetlands related to the proposed discharge of effluent into Willow Creek (Appendix O). The Assessment concluded that there will be no impact to the Minesing Wetland as a result of effluent discharge into Willow Creek at Highway 26 based on the following observations:

- Effluent enters Creek 4.0 km upstream of discharge to Minesing wetland,
- Existing water quality in section of Creek downstream of effluent discharge is already considered to be “below potential” due to agriculture,
- Modelling indicates that the mixing zone for un-ionized ammonia under any flow condition does not extend very far downstream of the effluent discharge point, and
- Assimilative capacity of Willow Creek is high and the distance between the discharge point and Minesing wetland is so great that Provincial Water Quality Objectives will be met and, in some cases, will be well below the PWQOs, by the time the water enters the wetland.

6.4.8 Willow Creek and Wilson Drive Terrestrial Habitat Assessment

Beacon Environmental was also retained to complete a terrestrial habitat assessment of two effluent discharge locations on Willow Creek and to assess the route of the proposed effluent

discharge pipe along Wilson Drive. Vegetative communities and the existence of any natural habitat were identified at the aforementioned locations and photographs were included in the Report (Appendix N). The observations are summarized as follows:

Willow Creek Outfall Option 1 - Golf Course Road

- No vegetative communities were noted in the area that may be considered rare either nationally, provincially or locally,
- No plant or wildlife species of national, provincial or local significance were observed, and
- Construction of the outfall would require removal of mature trees and vegetation and the destabilizing and restoration of stream banks.

Willow Creek Outfall Option 2 – Highway 26

- No vegetative communities were noted in the area that may be considered rare either nationally, provincially or locally,
- No plant or wildlife species of national, provincial or local significance were observed,
- Vegetative community has been recently disturbed as a result of construction and maintenance of Highway 26 and the bridge,
- Streambank is vegetated with herbaceous species but is almost completely devoid of woody species of shrubs or trees,
- Construction of the outfall at this location would likely not result in the removal of any trees,
- Restoration and streambank rehabilitation that would be required post-construction would result in an improvement of the vegetation community, stabilize the streambank and improve wildlife habitat, and
- Construction is to be timed to occur outside of the breeding and nesting season for the Barn Swallows that use the bridge for nesting purposes.

Wilson Drive Forcemain Route

- No vegetative communities were noted in the area that may be considered rare either nationally, provincially or locally,
- No plant or wildlife species of national, provincial or local significance were observed,
- Proposed pipe alignment is within the existing road allowance and therefore, a minimal number of trees would require removal,
- Field investigations should be conducted at the detailed design stage, during the growing season, to provide a more complete inventory of vegetative species and communities, and
- A further study should be conducted during detailed design to assess water flow, temperature regime and fish habitat of the one small watercourse crossing on Wilson Drive.

The Report concluded:

- Option 2 – Highway 26, is the more appropriate location for the WWTP outfall, and
- Impacts to natural features along Wilson Drive are considered to be minor and temporary and can be mitigated using proper construction methods.

6.4.9 Fluvial Geomorphological Assessment of Willow Creek

A two-phase geomorphological assessment of Willow Creek at Highway 26 was completed by Palmer Environmental Consulting Inc. and a report dated December 13, 2013 was prepared (Appendix P). The conclusions of the assessment are summarized as follows:

- Erosion is a natural process that occurs along Willow Creek,
- The channel is sufficiently wide that the addition of proposed effluent discharge would have such a small effect on depths and velocities that bed and bank erosion rates would be unaffected, and
- The addition of the treated effluent discharge to Willow Creek in the vicinity of Highway 26 and Golf Course Road is not anticipated to increase downstream erosion rates above existing, natural levels.

6.5 Evaluation of Wastewater Treatment Alternatives

6.5.1 General

The basis for the design of the WWTP was outlined in Technical Memorandum entitled “Design Basis for Midhurst Wastewater Treatment Plant” prepared by Black & Veatch (Appendix Q). A summary of the design information is presented as follows:

- Phase 1 units = 5,000 with an equivalent population of 15,000 persons
- Buildout units = 9,546 (includes existing Midhurst) with an equivalent population of 28,638 persons
- Average day flow = 340 L/c/d (dry weather) + 90 L/c/d (extraneous) = 430 L/c/d
- Harmon peak factor = 2.78 (Phase 1) and 2.50 (full buildout)
- Average dry weather flows = 6,450 m³/d (Phase 1) and 12,314 m³/d (full buildout)
- Peak hourly dry weather flows = 15,519 m³/d (Phase 1) and 26,891 m³/d (full buildout)
- CBOD₅ influent loads = 1,125 kg/d (Phase 1) and 2,148 kg/d (full buildout)
- TSS influent loads = 1,350 kg/d (Phase 1) and 2,577 kg/d (full buildout)
- TKN influent loads = 195 kg/d (Phase 1) and 372 kg/d (full buildout)
- TP influent loads = 45 kg/d (Phase 1) and 86 kg/d (full buildout)
- Proposed effluent limits are outlined in Section 6.3

Alternative wastewater treatment options were identified and evaluated by Black & Veatch in their Report entitled “Evaluation of Treatment Alternatives for Midhurst Wastewater Treatment Plant – June 2016 (Appendix R). The Evaluation Report assesses options for the treatment of liquid and biosolid wastes as well as disinfection of the final effluent. The Report is based on the following:

- Wastewater flows are as outlined in Table 5 (see Section 2.2.1)
- One Wastewater Treatment Plant (WWTP) is to be provided at the sand gravel pit site north of Snow Valley Road
- Effluent Discharge will be to Willow Creek at Highway 26
- 7Q20 flow rate in Willow Creek is 430 L/s
- Effluent criteria is as outlined in Tables 14 and 15

- Assuming a conservative infiltration rate of 23 mm and at the Ultimate (Build out) flow rate, an estimated 66 kg/yr of phosphorus may need to be offset using phosphorus offsetting techniques. However, it is considered that the addition of 66 kg/yr of phosphorus to the overall watershed is not significant and will have no impact on the Minesing wetlands. This issue will be discussed with the MECP and the NVCA as part of the pre-design process.

6.5.2 Summary of Evaluation Process – Liquid Treatment

6.5.2.1 General

The liquid treatment train is defined as the wastewater treatment process commencing at the head of the WWTP and ending with the discharge of treated effluent into the receiving body of water. The processes are:

- Preliminary Treatment,
- Primary Treatment,
- Secondary Treatment,
- Tertiary Treatment,
- Disinfection,
- Effluent Pumping, and
- Biosolids Treatment and Management

6.5.2.2 Preliminary Treatment

Preliminary treatment of the wastewater will include screening and grit removal. Currently, at other Township of Springwater plants, screenings and grit are removed by a contractor (Progressive Waste Solutions Canada Inc.) for disposal at a landfill site in Blenheim, Ontario. It is very likely that the screenings and grit from the proposed Midhurst WWTP will be handled in a similar fashion.

Following screening and grit removal, there may be a need for pumping the wastewater into the primary treatment section. Flow splitting and flow measurement may also be required. These items will be addressed during preliminary and final design. In addition, the need for peak flow storage will be assessed to prevent spills of untreated sewage.

6.5.2.3 Primary Treatment

Three primary treatment options were considered in the Long List of technologies and this list was reduced to two technologies for final assessment. The primary treatment technologies considered are:

- Activated primary clarifiers – to be paired with Secondary biological nitrogen and phosphorus removal, and
- Mechanical primary – to be paired with Secondary membrane biological nitrogen removal with mechanical primary treatment and chemical addition for phosphorus removal.

The selection of the preferred Primary treatment technology was determined based on the evaluation of the Secondary treatment options.

6.5.2.4 Secondary Treatment

A total of ten Primary/Secondary treatment options made up the long list of alternatives. That list was reduced to a short list of four technologies as follows:

- Activated primary clarifiers paired with step feed biological nitrogen removal (BNR) with chemical addition for phosphorus removal,
- Activated primary clarifiers paired with sequencing batch reactors (SBR) biological nitrogen removal with chemical addition for phosphorus removal,
- Activated primary clarifiers paired with biological nitrogen and phosphorus removal, and
- Mechanical primary paired with membrane biological nitrogen removal with chemical addition for phosphorus removal.

Advantages and disadvantages including cost estimates for each of the four primary/secondary treatment options are provided in the Black & Veatch Evaluation Report (Appendix R). A detailed evaluation of the four options is also provided. The Preferred solution for the treatment of the liquid train is the provision of screening and grit removal with pumping if necessary, followed by activated primary clarifiers paired with step feed biological nitrogen removal (BNR) with chemical addition for phosphorus removal.

6.5.2.5 Tertiary Treatment

Three Tertiary treatment technologies were short listed for evaluation. They are:

- Membrane filtration,
- Two stage filtration; and
- Blue Pro®

Black & Veatch considered cost, effluent limits, pilot study results and other factors in recommending the use of Membrane filtration for the proposed Midhurst WWTP. It was noted that Membrane filtration is often the preferred technology when the total phosphorus effluent limit is less than 0.1 mg/L.

6.5.2.6 Disinfection

Considering the fact that the proposed effluent discharge is to a sensitive water body, it is proposed to provide ultraviolet (UV) disinfection of the final effluent.

6.5.2.7 Effluent Pumping

Following UV disinfection, the final effluent will be piped to an on-site pump station for discharge to Willow Creek. The pumps will be equipped with variable frequency drives and will be staged to handle a large range of flows. Spare pumps will be provided for redundancy. The effluent will be pumped into a forcemain which will be constructed from the WWTP, west along Snow Valley Road, north on Wilson Drive and then west on Highway 26 to the proposed Willow Creek effluent discharge outfall structure. The outfall structure will be designed to limit erosion of the Creek bank and will be accessible for maintenance purposes.

6.5.2.8 *Biosolids Treatment and Management*

The treatment of wastewater will result in the production of biosolids (sludge) which are nutrient rich, primarily organic and which are of a quality that can be beneficially used for land application as a soil amendment to fertilizer supplement as well as a variety of procedures that derive energy from biosolids or which convert them to useful products.

Three biosolids management strategies were identified as follows:

- Beneficial Re-use (several product types were identified),
- Transport to another facility (several products were identified), and
- Transport to landfill in unstabilized cake form.

The recommended strategy is the Beneficial Re-use of biosolids, and three product types were selected for further analysis as follows:

- Stabilized liquid sludge,
- Stabilized cake, and
- Solar dried pellets.

The processes that were considered in order to produce these product types are:

- Thickening,
- Stabilization,
- Dewatering, and
- Storage.

The biosolids treatment strategies were screened based on methods of achieving the specific treatment processes for thickening and stabilization as well as the need for dewatering and the requirement for storage. From that screening process, a total of six processes were selected for further assessment. They are:

1. Stabilized liquid sludge for beneficial re-use
 - a. Mechanical thickening with aerobic digestion (no dewatering) and storage capacity of 240 days
 - b. Mechanical thickening with autothermal thermophilic aerobic digestion (ATAD), no dewatering and storage capacity of 240 days
2. Stabilized cake for beneficial re-use
 - a. Mechanical thickening, aerobic digestion, dewatering and storage capacity of 240 days
 - b. Mechanical thickening, ATAD, dewatering and storage capacity of 240 days
3. Solar dried pellets for beneficial re-use
 - a. Mechanical thickening, aerobic digestion, dewatering and solar dryer
 - b. Mechanical thickening, ATAD, dewatering and solar dryer

Advantages and disadvantages of these six alternatives were identified and cost estimates were presented. A weighted scoring analysis of the six alternatives was prepared using a comprehensive list of criteria. It was determined that the recommended solution should be Biological Stabilized liquid sludge for beneficial re-use using mechanical thickening, ATAD, (no dewatering) and storage capacity of 240 days (Option 1 b).

6.5.3 Recommended Wastewater Treatment Option

In summary, the recommended wastewater treatment design concept for the Ultimate (full buildout) development is as follows:

Liquid Treatment Train

- Screening and degritting (for disposal to a landfill site) with pumping of wastewater if necessary, followed by,
- Primary / Secondary treatment with step feed biological nitrogen removal (BNR) with chemical addition for phosphorus removal (two main bioreactors) followed by,
- Tertiary treatment using membrane technology followed by,
- UV disinfection and pumping to Willow Creek for effluent discharge.

Biosolids Management

- Biological stabilized liquid sludge for beneficial re-use using mechanical thickening and ATAD (no dewatering) with a capacity of 240 days storage.

6.5.4 Opinion of Probable Capital Cost – Wastewater Treatment Plant

Opinion of capital cost estimates are provided in the Evaluation Report. The Estimates are summarized in Table 16 and included the main Pumping Station and associated forcemains.

Table 16 – Probable Opinion of Cost Estimates for Wastewater Treatment Plant

| ITEM DESCRIPTION | ESTIMATED COST |
|--|----------------------|
| Sewage Pump Stations (5 ranging in size from 30 L/s to 140 L/s) | \$8,250,000 |
| Forcemains (approximate 14.5 km ranging in size from 150mm to 350mm dia) | \$16,430,000 |
| Wastewater Treatment Plant - ADF 6,450m ³ /day | \$40,605,000 |
| Effluent forcemain from WWTP to Willow Creek at Hwy 26 | \$4,700,000 |
| SUB TOTAL PHASE 1 | \$70,000,000 |
| Contingency (10%) | \$7,000,000 |
| Engineering Fees, Permits etc. (17%) | \$11,900,000 |
| TOTAL PHASE 1 | \$89,000,000 |
| Sewage Pump Stations (approx. 100 L/s) | \$2,000,000 |
| Forcemains | \$350,000 |
| Expansion of Wastewater Treatment Plant - ADF 12,314 m ³ /day | \$30,672,000 |
| SUB TOTAL PHASE 2 | \$33,000,000 |
| Contingency (10%) | \$3,300,000 |
| Engineering Fees, Permits etc. (17%) | \$5,600,000 |
| TOTAL PHASE 2 | \$42,000,000 |
| TOTAL PHASE 1 & 2 | \$131,000,000 |

6.5.5 Staging

The WWTP will be staged to handle the full range of wastewater flows. It is proposed to construct approximately 50% of the Ultimate plant initially which will service the first 5000 equivalent residential units. Black & Veatch is proposing that this half of the plant be constructed on the west side of the site (see Figure 2 in Appendix 8 of the Black & Veatch Evaluation Report – Appendix R). The second half of the ultimate WWTP will be constructed on the east half of the site. The proposed ring road will be constructed initially.

As part of the final design, consideration will be given to the following issues related to initial low flows:

- Need for smaller diameter effluent forcemain coupled with flushing stations,
- Need to truck wastewater to another treatment facility initially – low influent flow rate will be too small for the new plant to treat effectively,
- Need for a small package plant to handle initial low flow rate if trucking is not feasible,
- Operation of sewage pumping stations to handle low flows (odour concerns), and
- Need for smaller diameter forcemains to handle initial low flows (odour concerns).

6.6 Collection Options

6.6.1 General

Wastewater collection options were considered in the Master Plan. The Preferred Solution involves the design and construction of sewage pumping stations at locations within the development areas such that gravity sanitary sewers can be designed to make use of existing and proposed topography. The forcemains from these sewage pumping stations will be sized to accommodate both the interim (Phase 1) and Ultimate peak wastewater flows from each station. All of the forcemains will discharge to the proposed wastewater treatment plant (WWTP). Manifolding of forcemains will be considered during final design in order to reduce the number of forcemains discharging to the WWTP.

6.6.2 Development Sanitary Sewers

The design of development gravity sanitary sewer systems will be the subject of subdivision reviews which will be undertaken by the Township prior to actual construction. However, the determination of the location of sewage pumping stations will be dependent on the feasibility of designing sewers at a reasonable maximum depth below final development grades. Therefore, the wastewater collection system layout that is proposed in this Class EA will need to be reviewed and adjusted to meet proposed grades during final design. The proposed collection system layout is shown on Drawing 113027 OP6 (Appendix U).

6.6.3 Sewage Pumping Stations

The preliminary location of sewage pumping stations was determined as part of the Master Plan process. The approximate locations are shown on the Drawing 113027 OP6 (Appendix 'U'). Based on the preliminary wastewater collection system layout, it is anticipated that 10 sewage pumping stations will be required to service existing and proposed development in the Secondary Plan area. The stations have been numbered (see Drawing 113027 –OP6) and are described in Table 17 as follows:

Table 17 – Proposed Sewage Pumping Station Locations and Staging

| Station No. | Location | Timing |
|-------------|---|------------------------------|
| 1 | North Doran Rd. development area | Phase 1 |
| 2 | South Doran Rd. development area | Phase 1 |
| 3 | Existing north Midhurst | In the future, when required |
| 4 | Existing south Midhurst | In the future, when required |
| 5 | Existing central Midhurst | In the future, when required |
| 6 | Existing Del Trend/Carson Rd. area | In the future, when required |
| 7 | Existing north employment lands (Hwy 26 west) | Phase 1 |

| Station No. | Location | Timing |
|-------------|---|---------|
| 8 | Employment lands north of Snow Valley Rd. | Phase 1 |
| 9 | South Carson Rd. development area | Phase 1 |
| 10 | North Carson Rd. development area | Phase 1 |

The most common sewage pumping station layouts are:

- Submersible, and
- Wet well / Dry well.

Submersible type sewage pumping stations are equipped with submersible pumps which are located within the wet well. The wet well is typically divided for ease of maintenance. The station controls and stand-by power unit are typically located either on top of the wet well (in a building) or in a separate structure adjacent to the wet well. This type of sewage pump station is considered as being suitable for flows up to 100 L/s.

For flows greater than 100 L/s, it is common practice to use a wet well / dry well configuration. The pumps are housed outside of the wet well (in a dry well) for ease of maintenance. All controls and the stand-by power unit are housed in a building located on top of the wet well / dry well structure.

The type of sewage pumping station required for each of the locations will be determined during the preliminary design phase.

6.6.4 Forcemain Alignments

Forcemain route options were shown on the Option G Drawing as included in the Master Plan. As a result of the slight relocation of the WWTP, the discharge point for the main forcemains is now proposed to be north of Snow Valley Road, at the WWTP site.

The exact alignment of the forcemains (side of street) will be determined during the initial design phase and will be based on the location of existing utilities and other constraints along the roadways.

Sizing of forcemains will also be determined during final design. Consideration will be given to phasing of wastewater flows. It may be necessary to provide an interim, small diameter pipe to handle initial flows at a reasonable velocity. This will mitigate issues relating to the long length of some of the pipelines resulting in odours and the requirement for flushing. Regardless of the pipe sizing, regular flushing will be required during the initial phases of development and flushing connections will be included in the forcemain designs.

6.7 Effluent Discharge Options

6.7.1 General

The Master Plan (Wastewater Option G Drawing) showed the proposed route of the effluent discharge pipe from the WWTP site. As a result of the relocation of the WWTP site to the north side of Snow Valley Road, a slight revision is required to the route of the effluent discharge pipe. This revision is shown on the relevant drawings (included in Appendix U). It is also noted that although the proposed effluent discharge is to Willow Creek, an exact location on the Creek was not selected in the Master Plan. The Master Plan did determine that the effluent should be discharged into Willow Creek in the approximate vicinity of the crossing at Golf Course Road, but no assessment was undertaken to evaluate precise sites on the Creek.

6.7.2 Effluent Disposal Site Options

Beacon Environmental was retained to assess two sites on Willow Creek for the evaluation of the feasibility of an effluent outfall pipe discharge. The two sites were: the creek crossing on Golf Course Road, north of Highway 26 and the creek crossing of Highway 26. Based on the information provided by Beacon Environmental (Appendix N), the Highway 26 crossing of Willow Creek is the preferred location for the effluent outfall from a terrestrial natural habitat perspective.

6.7.3 Effluent Discharge Pipe Route Options

The Master Plan determined that the route of the proposed effluent pipeline should follow Wilson Drive north to Highway 26 and then east to the crossing of Willow Creek. Additional assessment was undertaken as part of the Phase 3 EA planning process to determine that the effluent pipeline should be routed out of the WWTP to the north side of Snow Valley Road, extend along the north side of Snow Valley Road to Wilson Drive (County Road # 53), run north on the west side of Wilson Drive and west on the south side of Highway 26 to the proposed effluent outfall site. The proposed route is shown on Drawings 113027 EP1 to EP9 (Appendix U).

6.7.4 Effluent Discharge Headwall

The effluent pipe will terminate at a properly designed headwall which will mitigate erosion issues, and which will be protected from effects of maximum flows in Willow Creek. The design of the headwall will be included in the final design stage of the development.

6.8 Impacts and Mitigation Measures

6.8.1 General

Environmental impacts (Effects) of the proposed wastewater servicing works were considered. The list of "Effects" as provided in Appendix 2 of the MEA Municipal Class EA was used for the purposes of identifying mitigation measures. A copy of the MEA List is included in Table 18 (Appendix Y) with suggested mitigation measures for the construction and operation of the proposed wastewater treatment plant, sewage pumping stations, forcemains and the effluent discharge pipe.

6.8.2 Air Quality

Based on the preliminary assessment of odour and air quality, and in regard to mitigation, it was determined that:

- “Predicted concentrations for all individual contaminants of significance were found to be less than their respective Standards or guidelines under O. Reg. 419/05 at all receptors....”
- “For odour, modelling of a conservative scenario predicted concentrations somewhat above the recommended limit of 1 OU at a nearby receptor, however the frequency of occurrence of this exceedance was less than 0.5%, which is considered acceptable by the MOECC.”
- A setback distance of 20 m from the edges of the roadway to nearby receptors would be adequate to mitigate any impacts on the section of Wilson Road that will be widened from 2 to 4 lanes.
- Biofilters are required at the headworks of the WWTP.

6.8.3 Effluent Discharge Headwall

While mitigation of climate change is outside of the scope of this study, it is recognized that design codes and guidelines are being revised to account for changing climate. The Canadian Standards Institute (CSI) is working to assess the potential impact of climate change on wastewater treatment facilities and there has been an increase in studies by Canadian cities aimed at mitigating the potential effects of climate change on important infrastructure. The design of the wastewater treatment and collection system for Midhurst should take into account potential adaptive measures for the anticipated changes and should establish the potential impact on the Midhurst Secondary Plan area during detailed design. The goal is to decrease the vulnerability of the wastewater system to the anticipated climate change effects. Many of the challenging conditions presented by a changing climate are already considered within the design of wastewater treatment facilities. At the design stage, consideration should be made for the possibility of an increase in frequency and/or severity of the following conditions:

Table 18 – Impacts and Mitigation Measures Related to Wastewater Servicing Infrastructure (Please see Appendix Y)

- Blowing snow/blizzard
- Cold or heat wave
- Drought/dry periods
- Extreme diurnal temperature variation
- Freeze/thaw
- High wind/hurricane or tornado
- Freezing rain/ice storm
- Hail
- Heavy fog
- Heavy rain/lightning/thunderstorm
- Heavy snowfall

- High and low temperatures

In general, wastewater treatment facilities are classed as “post-disaster buildings” in Ontario under the Ontario Building code. A post-disaster building designation means that a building and its ancillary infrastructure are expected to remain functional and accessible after a rare climatic or seismic event. As such, the design of wastewater treatment facilities already takes into account additional factors of safety for extreme events.

In addition to the requirements already outlined in the OBC, reasonable risk reduction measures should be investigated at the design stage to manage the additional challenges presented by climate change. These would include the provision of site space for snow storage, more robust insulation, additional storage for treatment chemicals and spare parts, and increased fuel storage for power generation. In addition, site design measures can be considered such as the establishment of berms and tree stands to minimize the impacts of blowing snow.

The collection system should be designed and maintained to eliminate extraneous flows entering the system from roofs and sump pumps and should also include sealed manholes where there is a threat of local flooding. Sewage pumping stations should be designed to the same building standards as the wastewater treatment plant.

In establishing the 7Q20 low flow in Willow Creek, a future reduction in flow was allowed to account for climate change.

6.8.4 Spills Risk Management

6.8.4.1 System Overview

The recommended alternative wastewater system for Midhurst will consist of local and trunk sewers, sewage pumping stations and forcemains, a wastewater treatment plant and an outfall extending to Willow Creek. It is noted that a considerable portion of the lands within and around Midhurst are environmentally sensitive. It is possible for the proposed wastewater infrastructure to malfunction resulting in the potential for a wastewater spill.

The wastewater collection system will be completely separate from the stormwater system and will not be connected to roof down pipes or sump pumps. None the less, the flow capacity of the wastewater system will include an allowance for inflow and infiltration which is often the cause of spills. As the system ages, there will be opportunities for groundwater and storm water to enter the sanitary sewers. The sanitary sewage system, including pipes and sewage pumping stations, will also be designed for peak flows of more than 2 times the design capacity in accordance with Ministry of Environment and Climate Change (MOECC) design guidelines. It is noted that all system pipes and pumping station wet wells will be sized and built for their ultimate capacity which will not be reached until full build out and this provides additional storage capacity in the sewer system over the short term. Critical unit processes in the wastewater treatment plant will also be designed for peak flows as per MOECC guidelines. While the plant will undergo a phased construction, each phase will be designed for peak flow. As such, it is unlikely that flows in the system will exceed the system capacity.

Due to the sensitivity of the local environment, overflow pipes from sewage pumping stations or overflow chambers that would permit by-passes or spills of untreated or partially treated wastewater to the natural environment throughout the system are not recommended. Ideally, all flows will be contained in the system until discharge of the treated effluent to the river. However, the trade-off with no overflow outlets to the environment and retaining sewage in the collection system is that the potential for flooding basements in areas serviced by pumping stations increases. This makes design and management of the system more important in order to ensure that sufficient system storage is provided for all flow scenarios.

The effluent disinfection system, in the recommended sewage treatment alternative evaluation, is UV which eliminates the risk of a spill to the river for chlorination and dechlorination chemicals.

6.8.4.2 Spills Risk

While the system will be designed to minimize the risk of overflows or spills to the natural environment, or back-ups into private properties, there does still exist some degree of risk. Overflows could potentially arise from:

- Main Breaks
- Main Blockages
- Capacity Exceedances from Infiltration and Inflow during storm events
- Equipment Failure
- Power Failure
- Control/Communications System failure

6.8.4.3 Dealing with Potential Main Breaks

The highest risk of spills from wastewater pipe systems is from forcemain breaks as the pressure from pumps can result in spills to the surface similar to what is visible during watermain breaks. The recommended collection system alternative is based on using twin forcemains (to accommodate phasing) from sewage pumping stations except the from the smaller local stations. Leaks in manholes and sewers are more likely to allow groundwater into the system rather than causing a spill. Other measures to be considered in the design to minimize the risk of spills from main breaks include:

- Quality control during all aspects of construction including on development lands
- Use of heat welded polyethylene pipe for all forcemains
- Use of line valves for isolation of forcemain sections
- Use of pump pressure control to indicate leaks, send alarms and stop pump operation
- Implementing a preventative maintenance program including regular inspections using CCTV

6.8.4.4 Dealing with Potential for Main Blockages

Spills from wastewater pipe systems can also result from blockages of the sewer or pump intakes. This can be caused by illegal discharges of grease or large items. The recommended collection system alternative is based on using minimum sized sewers of 200 mm and non-clog sewage pumps. In addition, the entire system will be monitored using a computer control system that will alarm on pump failure or rising liquid levels in the pumping stations. Under normal conditions

sewage collection systems operate continuously without blockages. Permitted discharges are defined within a sewer use by-law. Measures to be considered to minimize the risk of spills from blockages include:

- Implementation of a sewer use by-law that prevents discharge of materials likely to block the sewers or damage pumps
- Education leaflets on sewer use aimed at eliminating illegal discharges
- Regular inspections of industrial, commercial and school properties to prevent illegal discharges
- Careful hydraulic design of all elements to prevent sedimentation and deposits/build ups in the system
- Implementing a preventative maintenance program including regular inspections using closed circuit television (CCTV)

6.8.4.5 Dealing with Potential for Capacity Exceedances

Overflow events can occur when the volume of water entering the collection system exceeds the capacity of the sewers, pumping stations, or the treatment facility. In such events, the excess sewage can be by-passed through overflow discharges (typically to surface waters) or collected within holding tanks. Without overflows or peak flow storage, excess sewage can also back-up within the collection system ultimately leading to basement flooding.

As noted above, the preferred alternative will be isolated from extraneous flows entering the system and consideration will be given to not allowing overflows out of the system. The system will be designed to contain flow events within collection system capacity, pumping station capacity and treatment capacity.

The potential for capacity exceedances will be greater as the collection system ages. The connection of roof downspouts, sump pump discharges, and stormwater catch basins to the sanitary system are common examples of past practices that have been discontinued and must be prevented. Deteriorated systems can experience flow peaks over 5 times the average flow. This must be prevented through maintenance and inspections. Newer systems and systems without the improper connections would exhibit peak flows as low as 2 times the average flow.

Fully eliminating all sources of system inflow and infiltration is not feasible; however, best practices can significantly reduce the scale of the issue. In a system without improper connections, extraneous flow will still enter the collection system through manhole covers, loose joints, or breaks caused by roots. The sewer use by-law, that is enforced, should address the issue of illegal connections.

Another source of extraneous flows in new collection systems is improper installation of sewer mains and laterals. In order to ensure new installations are completed correctly, testing of installed sewers should include flow monitoring before connections and CCTV inspections. Contractors should be required to repair all deficiencies identified through the monitoring program. Other inflow and infiltration minimizing measures, such as leak-free manhole lids in low-lying areas, should also be adopted.

Often, the installation of sewer laterals on private property can be a significant source of infiltration to the municipal collection system. It is recommended that the Town Building Department only

allow the use of pipe materials that are typically specified for use on the municipal side of the collection system. Most municipalities require the use of DR 28 PVC pipe with gasketed joints.

As the system ages, the potential or risk of high flows exceeding the peak capacity of the wastewater treatment plant or pumping stations will increase. This can be managed by increasing storage throughout the system either by constructing additional wet wells at pumping station sites or storage tanks at critical locations such as the last pumping station before the wastewater treatment plant. The volume of storage necessary to manage peak flow events would need to be determined through focused risk assessments to determine the best location for the storage. In establishing sites for sewage pump stations and the treatment plant, provision should be made for the future construction of additional wet well capacity or storage tanks. Risk assessment would include risks associated with system back up and the potential for basement flooding. In the future, if the risk of basement flooding cannot be mitigated using increased storage or system capacity increases, it may be necessary to construct overflows from pumping stations to the river.

The suggested approach to establish the need for peak flow storage is as follows:

- Monitor daily wastewater flow averages and peaks at the treatment facility and track the scale and frequency of peak flow events
- Compare peak flow events to peak flow capacity in the collection system and treatment facility
- Quantify the risk (probability and consequence) of overflow events occurring
- Where the quantified risk is determined to be unacceptable:
 - First:
 - Identify I/I sources through wastewater flow monitoring of the collection system
 - Enact inflow and infiltration reduction measures (pipe relining/replacement, manhole rehabilitation, etc.)
 - Quantify the impact of inflow and infiltration reduction measures
 - Second:
 - Conduct risk analysis of overflow in each collection area
 - Establish peak flow retention within collection areas where risk exceeds acceptable levels

6.8.4.6 Dealing with Potential for Equipment or Pump Failure

Equipment or pump failure also have the potential to result in overflows or spills from wastewater systems. Pumps are a critical component in wastewater systems and are used to convey wastewater from pump stations to the treatment plant. A large number of pump systems also exist in treatment plants to operate many of the processes and finally to convey effluent to the river. Their failure can lead to a rapid build-up of wastewater with the potential for a spill. Likewise, the failure of chemical feed pumps, screens, air blowers, UV systems and other equipment in the treatment plant can result in process failures. The Ministry of Environment and Climate Change (MOECC) provides design guidelines for pumping stations and treatment plant design in Ontario that requires the use of dual or standby equipment for all pumping stations and treatment systems. The use of dual pumps and multiple treatment trains minimize the risk of pump or equipment failure resulting in a spill or discharge of partially treated wastewater. Measures that should be

considered in the design and operation of the system to minimize the risk of spills from pump or equipment failure include:

- Installation of a minimum of dual systems for all pumps and equipment at sewage pumping stations and the treatment plant sufficient to ensure continuous operation of all systems
- Design for plant operational flexibility such that pump systems can have multiple duties
- Conduct a risk assessment and develop a contingency and response plan to deal with equipment failures
- Implement a Maintenance Management System (MMS) that prevents equipment failure
- Adopt a proactive approach to fixing any piece of equipment that is out of operation.
- Develop a contingency plan to by-pass pumping stations
- Maintain an inventory of critical spare parts on site

6.8.4.7 Dealing with Potential for Power Failure

Wastewater systems must have a continuous and reliable supply of power for the safe operation of the system. The preferred treatment plant alternative has a wide range of equipment, instruments and control devices that require continuous and stable power. Treatment plants and pumping stations are built in strict compliance with electrical codes that ensure all electrical systems are safe and reliable. Measures that should be considered in the design and operation of the system to minimize the risk of spills from power failure include:

- Negotiate multiple power feeds to sewage pumping stations and treatment plant with the power authority
- Consider using twin power transformers to ensure a more robust supply
- Install standby power with automatic transfer from the prime power source sufficient to maintain the entire facility in operation during prime power failure
- Select a fuel supply for standby power based on the security of the supply (gas or diesel)
- Protect all electrical systems against the threat of lightning strikes

6.8.4.8 Dealing with Potential for Control/Communication Failure

Continuous operation of the wastewater system will rely on the System Control and Data Acquisition (SCADA) System. This is the system that will automatically control the operation of all equipment throughout the system 24 hours a day. It automatically starts and stops equipment as necessary and provides alarms to the operators in the event of any failure. Typically, operators can remotely investigate any issues with the operation and either remotely start a standby system or go to the facility and take manual control of the particular system. The control system consists of sensing instruments, controllers and computers using control software customized for the particular system operation.

A system wide communications system that allows all facilities to be interconnected to the control system must also be robust and secure to support system reliability.

SCADA systems improve the reliability of the operation and greatly reduce the response time needed to deal with operational issues. Measures that should be considered in the design and

operation of the system to minimize the risk of spills resulting from a control/communications system failure include:

- Design the SCADA system with dual controllers and computers
- Ensure protection and back up of all sensitive controls and computer networks using Un-interruptible Power Supply (UPS)
- Develop a contingency plan for manual operation in the event of control system failure
- Regularly maintain all sensing instruments

6.9 Opinion on Probable Capital Costs – Sewage Pumping Stations and Forcemains

Depending on the required ultimate capacity of the sewage pumping station, capital costs could range from between \$1.5 million to \$3 million (in 2017 dollars). Forcemain costs could range from between \$500 to \$1,000 /m (in 2017 dollars).

6.10 Staging Considerations

6.10.1 Sewers

Sanitary sewer sizing will be undertaken as part of the final design. The sewers will be sized and installed for the ultimate peak flow condition.

6.10.2 Sewage Pumping Stations

Initially, in order to service Development Phase 1 Stages 1 and 2, sewage pumping station numbers 1, 9 and 10 will be required. As development occurs in subsequent stages of Phase 1, sewage pumping station number 2, 7 and 8 will be constructed. The design of these stations must allow for a gradual increase in wastewater flows since development will occur gradually over several years. Therefore, consideration must be given during final design to staging the capacity of the pump stations.

6.10.3 Forcemains

Similar to the capacity requirements of the sewage pumping stations, the related forcemain sizing will need to allow for a gradual increase in flow over several years. This could be accommodated by installing a smaller diameter pipe initially to handle low flows. However, consideration should be given to installing the ultimate forcemain at the same time in order to avoid future disruption along the route of the pipeline(s).

6.10.4 Wastewater Treatment Plant

The staging of the WWTP is discussed in Section 6.5.5.

6.10.5 Effluent Discharge Pipe

The sizing of the effluent discharge pipe may also need to be staged due to the gradual increase in effluent flows over the duration of the development. A smaller diameter pipe could be installed to handle initial flows. This will be determined as part of the final design.

7.0 Traffic

7.1 Introduction

The proposed development will be implemented in two phases within the 2031 and 2041 planning horizons. The proposed communities, referred to as the Carson Development Area 1, and the Doran Development Areas 2 and 3 are situated along the east and west limits of the Midhurst Secondary Plan. The proposed developments are described further in Section 7.4 and Figure 7.4.1.

A Transportation Master Plan was prepared in October of 2008 (by URS) to evaluate the transportation needs for Midhurst. The findings and recommendations were then considered during the completion of the Midhurst Phase 1 and 2 Class EA study resulting in a consolidated summary of recommended transportation improvements required to accommodate the 2031 Phase 1 and 2041 Phase 2 development. To fulfill the requirements of Phases 3 and 4 of the Class EA, updated road and intersection improvement needs and timing of the improvements to the area road network have been considered. The proposed road improvements are to accommodate the proposed development of approximately 8208 residential units and employment lands including 495,000 sq. ft of retail space and light industrial area for approximately 3130 employees.

The earlier noted phases associated with 2031 & 2041 are the general focus of the traffic analysis to assess the transportation needs of the area boundary road network under existing conditions and future traffic projections for the horizon years of 2031 (full build-out of Phase 1), and 2041 (ultimate horizon). This analysis has been completed to assist the evaluation of the impact of resulting traffic growth on the area road system and identify necessary improvements and required timing of those improvements. Road projects which were identified as being required for the servicing of the Secondary Plan area are listed in the Section 7.6. Most of these Projects were determined to be Schedule 'B' activities as described in the MEA Class EA Document. However, six of the Projects were determined to fall under the definition of a Schedule 'C' activity. They are as follows:

- Forbes Road widening to 4 – lanes and interchange improvements at Forbes Road with Hwy 400;
- 2-lane new construction of Craig Road from Russell Road to County Road 27; and
- 4-lane widening reconstruction of Wilson Drive from Snow Valley Road to Barrie City Limits.
- 4-lane widening of Russell Road from Walt Road to Forbes Road
- 4-lane reconstruction of Forbes Road from Highway 400 to Russell Road
- 3-Lane (TWLTL) reconstruction of Finlay Mill Road from Wattie Road to Highway 26

In addition to some projects requiring a Schedule "C" EA any projects involving roads or intersections within the jurisdiction of the MTO will require the Municipality and/or the County of Simcoe (depending upon who has local jurisdiction) to enter into a legal agreements with the MTO

regarding encroachment on the MTO and obtain permission to undertake the proposed highway improvements within the specified timelines. Any proposed works within and/or crossing highway rights-of-way will also require MTO Encroachment permits.

7.2 Existing Conditions

This section describes the road network, traffic volumes and operations for the existing conditions at key intersections and transportation links within the study area.

7.2.1 Road Network

The key road network consists of Highway 26, County Road 27, Snow Valley Road, Wilson Drive, Carson Road, St. Vincent Street, Finlay Mill Road, Gill Road, Doran Road, Russell Road, Pooles Road and Forbes Road. County Road 27, Snow Valley Road, and Wilson Drive are under the jurisdiction of the County of Simcoe and are arterial roads, as identified in the County's Official Plan. St. Vincent Street, Finlay Mill Road, Gill Road, Doran Road, Russell Road, Pooles Road and Forbes Road are arterial or primary roads under the jurisdiction of the Township. Highway 26 is a provincial Highway and is under the jurisdiction of MTO.

An 80 km/hr speed limit is posted on the following roads in the study area:

- Highway 26/27
- County Road 27
- Carson Road from Wilson Drive to west of Anne Street
- Wilson Drive
- Doran Road from approximately 350 m east of Gill Road to Russell Road
- Pooles Road from west of Russell Road to the east end of the road
- Russell Road
- Forbes Road
- Snow Valley Road west of Highway 26 to the west
- Seadon Road

A 60 km/hr speed limit is posted on the following roads in the study area:

- Snow Valley Road near Highway 26
- Snow Valley Road west of Wilson Drive to the west

A 50 km/hr speed limit is posted on the following roads in the study area:

- Carson Road from Anne Street to Highway 26/27
- St Vincent Street
- Doran Road from approximately 350 m east of Gill Road to County Road 27
- Pooles Road from St Vincent Street to west of Russell Road
- Finlay Mill Road

A 40 km/hr speed limit is posted on the following roads in the study area:

- Wilson Drive NB near Snow Valley Road northerly intersection

- Snow Valley Road near Wilson Drive northerly intersection

The existing configuration of the key 14 intersections is illustrated in Figure 7.2.1 (overleaf).

7.2.2 Existing Traffic Volumes

Weekday traffic counts on Tuesday June 11, 2013 identified the AM and PM peak hours to be from 7:45 to 8:45 and from 16:30 to 17:30. That data was derived from BA Group's Midhurst Transportation Work Update Memo dated November 12, 2013 for the following boundary road intersections:

- Carson Road & Wilson Drive
- Wilson Drive & Snow Valley Road northerly intersection
- Wilson Drive & Snow Valley Road southerly intersection
- Highway 26/Bayfield Street & Carson Road
- Highway 26/Bayfield Street & Snow Valley Road/Finlay Mill Road
- Highway 26 & County Road 27
- Doran Road & St Vincent Street/Gill Road
- Pooles Road/Green Pine Ave & St Vincent Street
- Russell Road & Forbes Road
- Russell Road & Doran Road
- Russell Road & Pooles Road
- Hwy 400 SB off-ramp & Forbes Road
- Hwy 400 NB off-ramp & Forbes Road

A summary of this traffic data for the AM and PM peak periods is provided in Appendix T - 1. Traffic volumes at the intersection of Wattie Road with Finlay Mill Road were estimated based on the traffic volumes at the adjacent intersections and the development level and street pattern in the area.

Historic AADT data on the section of Highway 26 from Barrie northerly limits to County Road 27 obtained from MTO indicates a 1.1% annual growth rate from 2006 to 2010. To reflect the current 2015 traffic volumes, the 2013 traffic counts were increased by 2.2%. The corresponding 2015 weekday peak hour traffic volumes are shown in Figure 7.2.2 (overleaf) for the study area's 14 intersections.

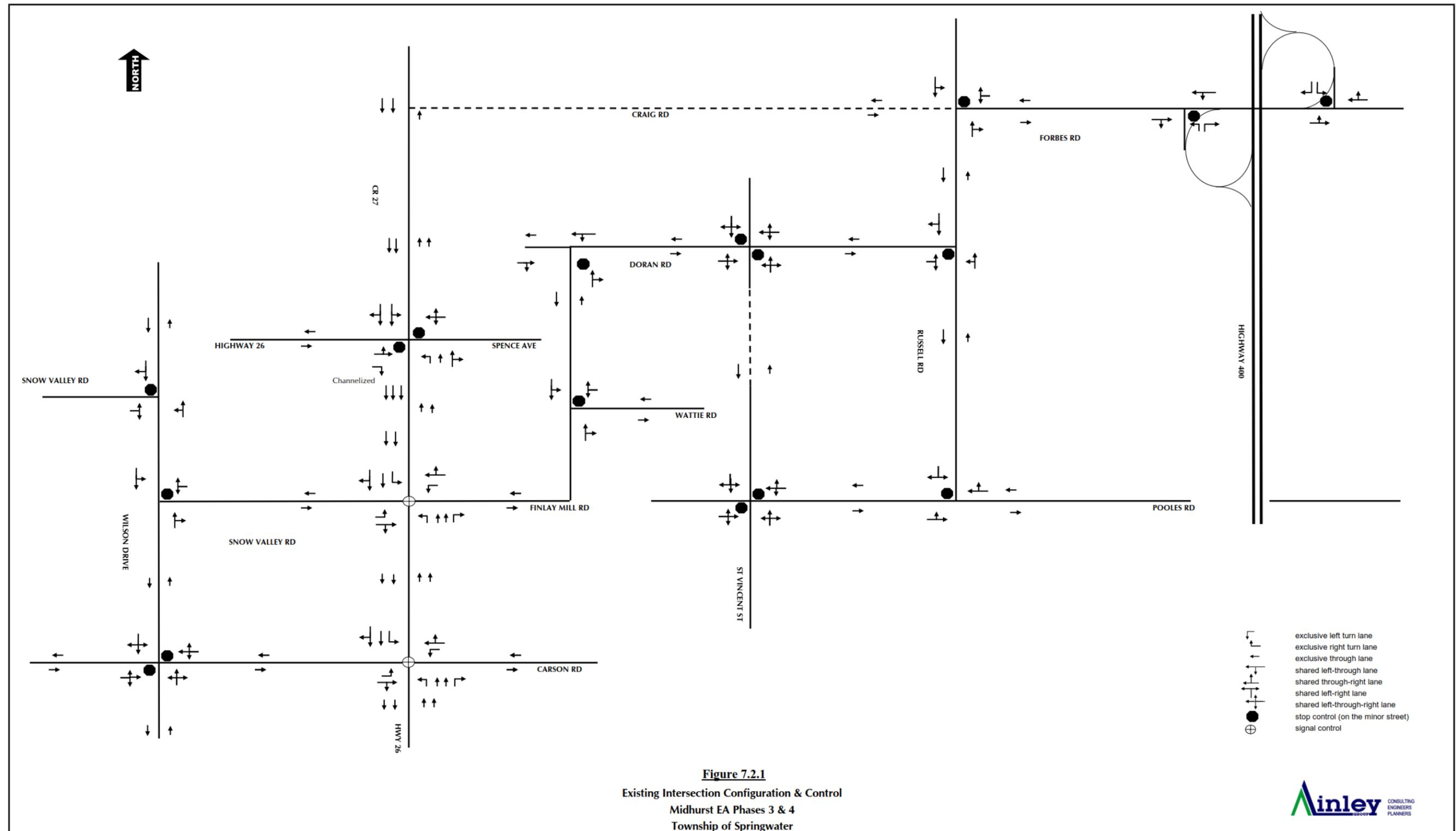


Figure 7.2.1
 Existing Intersection Configuration & Control
 Midhurst EA Phases 3 & 4
 Township of Springwater

7.2.3 Existing Traffic Operations

The capacity, and hence operations, of a road system is effectively dictated by its intersections. As such, the analysis focused on the operation of the area key intersections.

The methodology applied was consistent with the Highway Capacity Manual 2000/2010 method for signalized and unsignalized intersections as employed in the software program Synchro 8. The analysis is based on the 2015 traffic volumes, and the existing intersection configuration and control.

Table 7.2.3.1 summarizes the results of the analysis showing the level of service (LOS), estimated delays (measured in seconds) and the volume to capacity (v/c) ratio for the critical movement of the intersections. Level of service A, corresponding to minimal delays, is the best whereas level of service F, corresponding to high delays, is generally considered a poor condition. When volume is less than capacity, v/c ratio is less than 1. Otherwise, v/c ratio equals to 1 or more than 1, which means volume reaches capacity or is more than capacity.

For unsignalized intersections, the level of service corresponds to the minor street lane groups given that the major street movements proceed relatively unimpeded. For signalized intersections, the results pertain to the average intersection delay and assume optimal signal timing and phasing to achieve the most efficient overall network operations through signal coordination. If the actual situations are under expectations, adjustments to the signal timing and/or phasing can be readily implemented. Level of service definitions and the corresponding detailed worksheets are included in Appendix T – 2, Operational Analysis (SYNCRO).

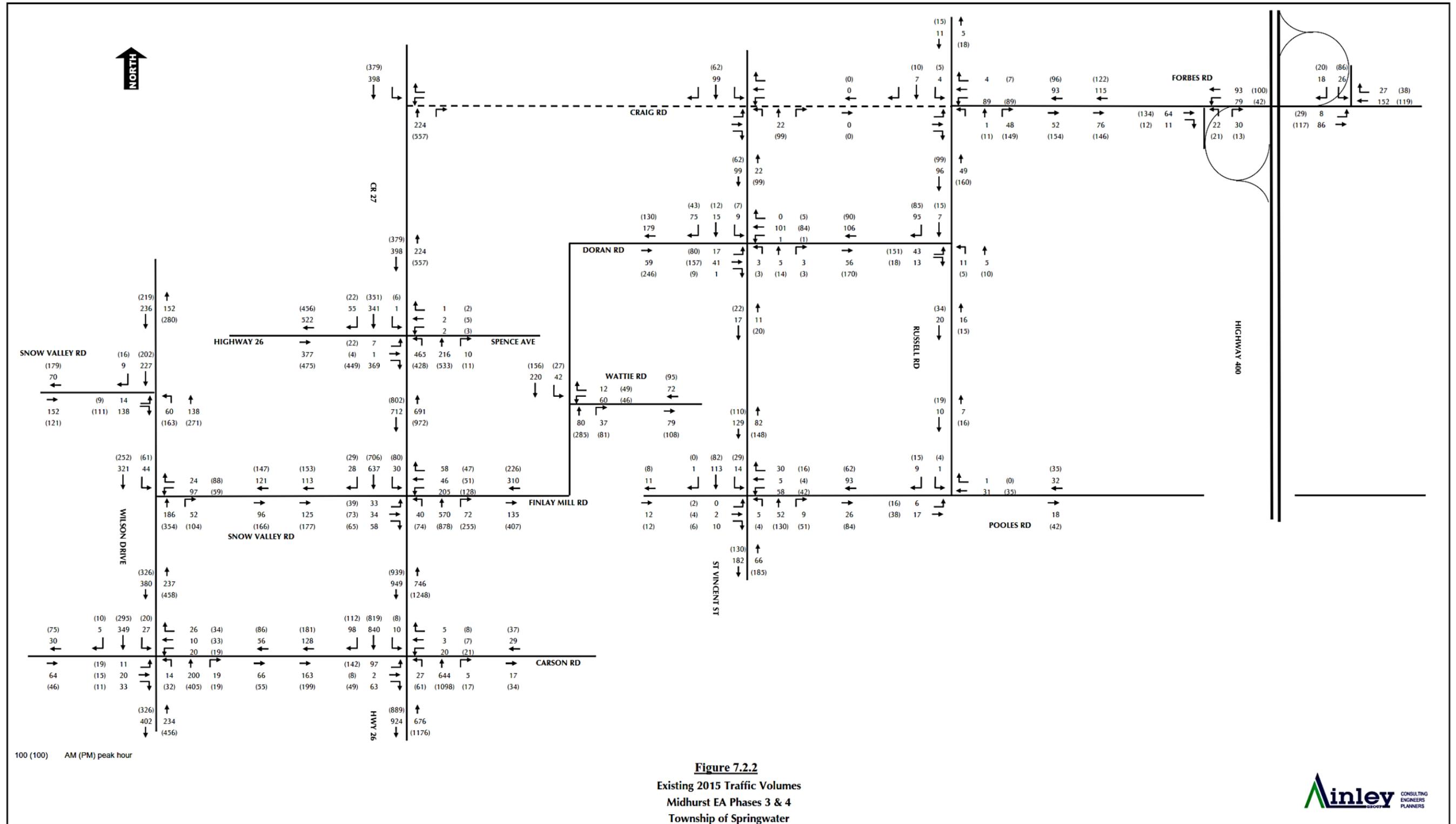


Table 7.2.3.1 – Intersection Operations – Existing 2015 Traffic Volumes

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|--|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Russell Rd & Forbes Rd | WB | stop | 9.1 | A | 0.10 | 9.6 | A | 0.11 |
| Pooles Rd & Russell Rd | SB | stop | 8.5 | A | 0.01 | 8.7 | A | 0.02 |
| Russell Rd & Doran Rd | EB | stop | 9.1 | A | 0.06 | 9.8 | A | 0.19 |
| Hwy 400 SB off-ramp & Forbes Rd | NBL | stop | 11.0 | B | 0.04 | 10.9 | B | 0.04 |
| Snow Valley Rd & Wilson Dr. northerly intersection | SB | stop | 13.3 | B | 0.37 | 15.5 | C | 0.40 |
| Forbes Rd & Hwy400 NB off-ramp | SBL | stop | 10.3 | B | 0.04 | 11.4 | B | 0.14 |
| St. Vincent & Pooles Rd | EB | stop | 9.2 | A | 0.01 | 10.1 | B | 0.02 |
| | WB | | 10.3 | B | 0.13 | 11.1 | B | 0.10 |
| Finlay Mill Road & Wattie Rd | WB | stop | 11.8 | B | 0.13 | 12.7 | B | 0.18 |
| Highway 26 & Carson Rd | all | signal | 8.6 | A | | 9.9 | A | |
| | EBL | | 15.9 | B | 0.26 | 16.5 | B | 0.37 |
| | EBT-R | | 15.6 | B | 0.28 | 15.0 | B | 0.21 |
| | WBL | | 16.0 | B | 0.06 | 15.5 | B | 0.06 |
| | WBT-R | | 14.4 | B | 0.03 | 14.2 | B | 0.05 |
| | NBL | | 9.8 | A | 0.08 | 11.8 | B | 0.18 |
| | NBT | | 6.3 | A | 0.37 | 9.2 | A | 0.64 |
| | NBR | | 4.7 | A | 0.01 | 5.1 | A | 0.02 |
| | SBL | | 7.3 | A | 0.02 | 11.4 | B | 0.03 |
| | SBT | | 8.7 | A | 0.53 | 9.2 | A | 0.54 |
| Highway 26 & Snow Valley Road | all | signal | 15.2 | B | | 16.3 | B | |
| | EBL | | 19.1 | B | 0.09 | 18.3 | B | 0.10 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|-----------------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| | EBT-R | | 21.9 | C | 0.14 | 22.1 | C | 0.30 |
| | WBL | | 15.0 | B | 0.38 | 15.4 | B | 0.28 |
| | WBT-R | | 17.8 | B | 0.27 | 19.4 | B | 0.30 |
| | NBL | | 9.8 | A | 0.10 | 9.4 | A | 0.18 |
| | NBT | | 13.9 | B | 0.44 | 17.0 | B | 0.68 |
| | NBR | | 11.7 | B | 0.12 | 14.9 | B | 0.44 |
| | SBL | | 9.8 | A | 0.06 | 10.1 | B | 0.24 |
| | SBT | | 16.4 | B | 0.51 | 16.5 | B | 0.55 |
| | SBT-R | | 16.4 | B | 0.51 | 16.4 | B | 0.55 |
| St. Vincent St/Gill Rd & Doran Rd | NB | stop | 9.9 | A | 0.02 | 12.3 | B | 0.04 |
| | SB | | 9.6 | A | 0.12 | 10.3 | B | 0.09 |
| Hwy 26/CR 27 & Spence Ave | EB | stop | 42.3 | E | 0.08 | 59.9 | F | 0.30 |
| | WB | | 41.1 | E | 0.05 | 50.2 | F | 0.12 |
| Wilson Dr & Snow Valley Rd | WB | stop | 15.9 | C | 0.28 | 17 | C | 0.34 |
| Wilson Dr & Seadon Rd/Carson Rd | EB | stop | 14.1 | B | 0.15 | 20.4 | C | 0.17 |
| | WB | | 14.2 | B | 0.13 | 19.4 | C | 0.27 |

As per the analysis provided above, good levels of service (C or better) occur at most of the intersections under the existing weekday conditions except for the intersection of Highway 26 at CR 27 and Spence Avenue where a poor level of service “F” is provided during the PM peak hour.

The need for a traffic signal at the intersection of Highway 26 with CR27/Spence Avenue was reviewed. A signal warrant analysis was carried out based on existing traffic volumes and the warrants are not met although LOS on the minor Street is poor in the PM Peak traffic hour. A traffic signal is warranted for the projected 2031 traffic volumes with the Phase 1 development in place (a completed signal warrant analysis is provided in Appendix T – 3). Installation of a traffic signal is recommended at the intersection by or before 2031 to accommodate development traffic. A check on the traffic signal warrants for the intersection of Doran Road and Finlay Mill Road

shows signals are not required for the existing traffic nor for the total traffic at the 2041 study horizon year.

The need for a left turn lane or right turn lane at the intersections was reviewed based on the 2015 weekday traffic volumes, applicable MTO standards and existing configuration, control, and speed limits, the following left turn lane or right turn lane is warranted:

- A 25 m southbound left turn storage length on Wilson Drive at Snow Valley Road southerly intersection
- A 85 m northbound right turn parallel lane on Wilson Drive at Snow Valley Road southerly intersection
- A 15 m southbound left turn storage length on Wilson Drive at Carson Road/Seadon Road
- A 15 m northbound left turn storage length on Wilson Drive at Carson Road/Seadon Road

7.3 Future Background Conditions

This section describes the road network and background traffic volumes expected for 2031 and 2041 planning horizons. The 2031 and 2041 horizons were selected given that full build-out and occupancy of the proposed Phase 1 of the development is expected to occur in 2031, whereas full build-out and occupancy of the proposed Midhurst development is assumed to occur by 2041. (Further discussed in Section 7.4).

7.3.1 Future Road Network

The County of Simcoe has recently completed an updated Transportation Master Plan. The final report dated October 2014 has identified the following improvements in the study area:

- Snow Valley Road from CR 28 to Highway 26 widening to 4 lanes by 2021
- Wilson Drive from Barrie limit to Highway 26 widening to 4 lanes by 2031
- Widening of CR 93 from CR 11 (Forbes Road) to City of Barrie limit by 2031
- CR 27 from Highway 26 to CR 22 (Horseshoe Valley Road) widening to 4 lanes by 2041

When analysing future traffic operation for background traffic it is assumed that these improvements have taken place by the 2031 or 2041 horizon.

7.3.2 Background Traffic Volumes

Background traffic volumes expected for the 2031 and 2041 horizon years have been determined from the 2015 volumes, future general growth and development specific growth. Historic traffic data for the area provincial highways and County Roads is available from MTO and the County of Simcoe. Growth rates were calculated based on the historic data as specified in Table 7.3.2-1.

Table 7.3.2-1 – AADT Growth on Area Major Roads

| ROAD SECTION | YEAR | AADT | YEAR | AADT | ANNUAL GROWTH RATE |
|---|------|--------|------|--------|--------------------|
| Hwy 26 from Barrie N Limits to CR 27 | 2006 | 20,300 | 2010 | 21,200 | 1.09% |
| CR 27 from Hwy 26 to CR 22 | 2003 | 10,700 | 2012 | 11,200 | 0.51% |
| Snow Valley Rd from Hwy 26 to Wilson Dr | 2009 | 2,600 | 2012 | 2,700 | 1.27% |
| Forbes Road from CR 93 to Hwy 400 | 2008 | 3,000 | 2014 | 3,700 | 3.56% |

Traffic growth will depend largely on the population and employment growth of an area. The population and employment forecasts for the Township of Springwater are documented in the following reports:

- *Simcoe County Land Budget Data Collection and Analysis Phase 1: Population Growth* prepared by Simcoe County Planning Department dated February 2015
- *Proposed Amendment 1 to the Growth Plan for the Greater Golden Horseshoe, 2006* by the Ministry of Infrastructure dated October 2010
- *Simcoe Area Growth Plan* prepared by Hemson Consulting Ltd. Dated May 2008.

Future population and employment projections are provided in Table 7.3.2-2.

Table 7.3.2-2 – Population and Employment Forecasts

| COMMUNITY | POPULATION | | | EMPLOYMENT | | |
|-------------------------|------------|--------|---------------|------------|-------|---------------|
| | 2011 | 2031 | ANNUAL GROWTH | 2006 | 2031 | ANNUAL GROWTH |
| Township of Springwater | 18,749 | 24,000 | 1.2% | 5,000 | 5,600 | 0.5% |

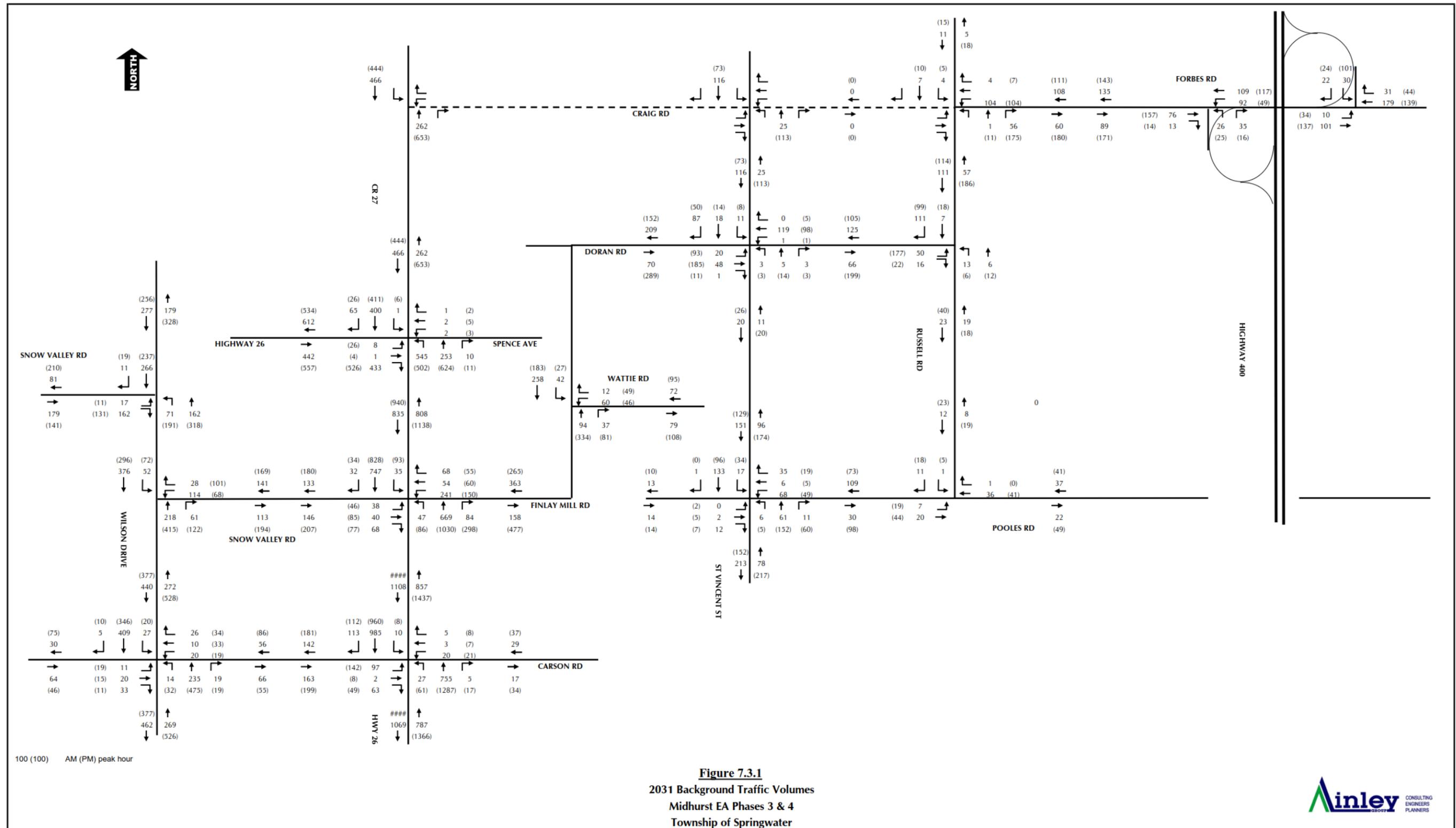
It is assumed that projected growth includes some of the Midhurst developments, but not all Phase 1 of the Midhurst developments.

Given that Midhurst development growth will be considered specifically and that the average growth rate for the section of Highway 26 is 1.09% for the past five years, an annual general background growth rate of 1.0% was applied for traffic volumes on Highway 26, CR 27, Wilson Drive, Snow Valley Road and Finlay Mill Road – Doran Road – Forbes Road corridor. While there may be other specific developments that may increase traffic volumes in the area, these have been accounted for in the assumed growth rate. The resulting 2031 and 2041 background peak hour traffic volumes are illustrated in Figures 7.3.1 and 7.3.2 (overleaf) respectively.

7.3.3 Background Traffic Operations

The operational analyses at the area key intersections were repeated given the future background traffic volumes and existing intersection/road configurations. The improvements listed in Section 7.3.1 were also assumed to be in place.

A summary of the assessment is provided in Tables 7.3.3-3 and 7.3.3-2 for the 2031 and 2041 horizons respectively. As previously noted, level of service (LOS) “A” corresponds to the best operating condition with minimal delays whereas LOS “F” corresponds to poor operations resulting from high intersection delays. The corresponding worksheets are provided in Appendix T-2 Operational Analysis.



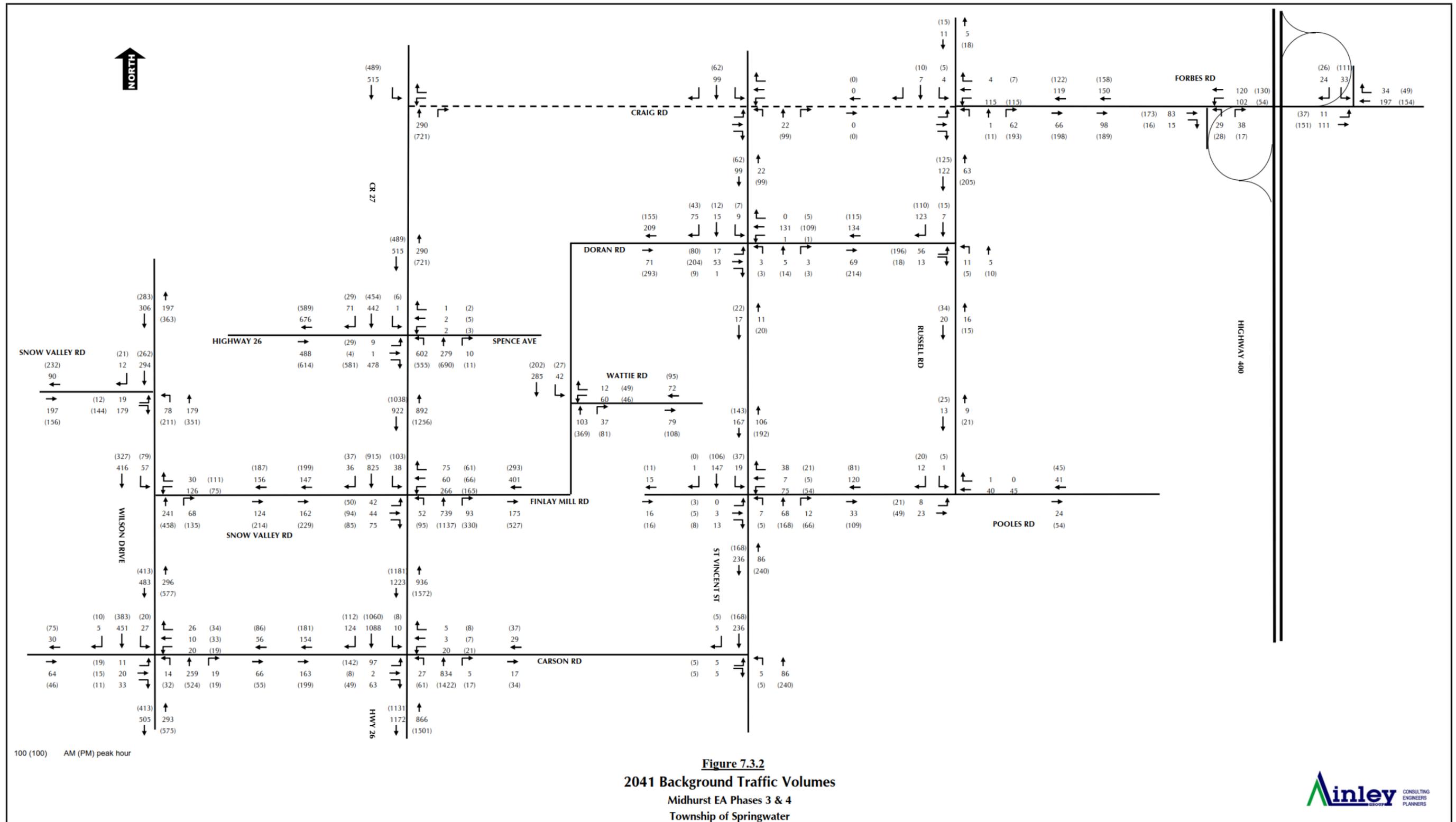


Table 7.3.3-1 – Intersection Operations - 2031 Background Traffic Volumes

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|--|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Russell Rd & Forbes Rd | WB | stop | 9.2 | A | 0.12 | 9.8 | A | 0.13 |
| Pooles Rd & Russell Rd | SB | stop | 8.5 | A | 0.01 | 8.7 | A | 0.02 |
| Russell Rd & Doran Rd | EB | stop | 9.2 | A | 0.07 | 10.1 | A | 0.22 |
| Hwy 400 SB off-ramp & Forbes Rd | NBL | stop | 11.7 | B | 0.05 | 11.5 | B | 0.05 |
| Snow Valley Rd & Wilson Dr. northerly intersection | SBL | stop | 14.0 | B | 0.41 | 18.0 | C | 0.48 |
| Forbes Rd & Hwy400 NB off-ramp | SBL | stop | 10.8 | B | 0.05 | 12.3 | B | 0.18 |
| St. Vincent & Pooles Rd | EB | stop | 9.3 | A | 0.02 | 10.5 | B | 0.02 |
| | WB | | 10.7 | B | 0.16 | 11.8 | B | 0.13 |
| Finlay Mill Road & Wattie Rd | WB | stop | 12.3 | B | 0.13 | 13.6 | B | 0.19 |
| Highway 26 & Carson Rd | all | signal | 9.4 | A | | 9.8 | A | |
| | EBL | | 15.9 | B | 0.26 | 21.8 | C | 0.42 |
| | EBT-R | | 15.6 | B | 0.28 | 19.6 | B | 0.23 |
| | WBL | | 16.0 | B | 0.06 | 20.3 | C | 0.07 |
| | WBT-R | | 14.4 | B | 0.03 | 18.7 | B | 0.05 |
| | NBL | | 11.4 | B | 0.09 | 12.3 | B | 0.19 |
| | NBT | | 6.8 | A | 0.43 | 8.8 | A | 0.65 |
| | NBR | | 4.7 | A | 0.01 | 4.6 | A | 0.02 |
| | SBL | | 8.0 | A | 0.03 | 12.2 | B | 0.03 |
| | SBT | | 10.1 | B | 0.62 | 8.5 | A | 0.54 |
| | SBT-R | | 10.1 | B | 0.63 | 8.5 | A | 0.54 |
| | all | Signal | 17.2 | B | | 19.4 | B | |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|-----------------------------------|-------|---|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Highway 26 & Snow Valley Road | EBL | | 19.7 | B | 0.10 | 18.6 | B | 0.12 |
| | EBT-R | | 22.8 | C | 0.17 | 22.9 | C | 0.34 |
| | WBL | | 15.2 | B | 0.43 | 15.6 | B | 0.33 |
| | WBT-R | | 18.0 | B | 0.30 | 19.8 | B | 0.34 |
| | NBL | | 10.9 | B | 0.14 | 10.4 | B | 0.24 |
| | NBT | | 15.8 | B | 0.53 | 21.4 | C | 0.81 |
| | NBR | | 12.6 | B | 0.15 | 17.0 | B | 0.53 |
| | SBL | | 10.8 | B | 0.10 | 12.0 | B | 0.31 |
| | SBT | | 19.7 | B | 0.62 | 19.8 | C | 0.66 |
| | SBT-R | | 19.5 | B | 0.62 | 19.6 | C | 0.66 |
| St. Vincent St/Gill Rd & Doran Rd | NB | stop | 10.1 | B | 0.02 | 12.8 | B | 0.04 |
| | SB | | 9.8 | A | 0.12 | 10.6 | B | 0.09 |
| Hwy 26/CR 27 & Spence Ave | all | Signal (previously stop control) | 4.7 | A | | 4.7 | A | |
| | EBL | | 30.8 | C | 0.19 | 28.8 | C | 0.27 |
| | EBT | | 28.9 | C | 0.02 | 27.1 | C | 0.04 |
| | EBR | | 0.5 | A | 0.29 | 0.6 | A | 0.35 |
| | WBL | | 29.1 | C | 0.05 | 27.1 | C | 0.03 |
| | WBT-R | | 29.2 | C | 0.05 | 27.2 | C | 0.05 |
| | NBL | | 5.8 | A | 0.72 | 5.6 | A | 0.68 |
| | NBT-R | | 1.9 | A | 0.10 | 2.9 | A | 0.26 |
| | SBL | | 6.9 | A | 0.00 | 7.7 | A | 0.02 |
| | SBT-R | | 8.3 | A | 0.26 | 9.0 | A | 0.26 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|---------------------------------|-----|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Wilson Dr & Snow Valley Rd | WBL | stop | 16.7 | C | 0.28 | 21.4 | C | 0.25 |
| Wilson Dr & Seadon Rd/Carson Rd | EB | stop | 14.3 | B | 0.15 | 20.2 | C | 0.17 |
| | WB | | 13.7 | B | 0.12 | 20.7 | C | 0.28 |

As indicated in Table 7.3.1-3, an acceptable level of service C or better will be provided at all intersections and their lane groups, thus no improvements are required under the 2031 background traffic conditions from a traffic operation perspective other than the previously noted signalization of the intersection of Hwy 26 / County Road 27– Spence Avenue.

The need for a left turn lane at the intersections was reviewed based on the 2031 background traffic volumes, applicable MTO standards and existing configuration, control, and speed limits. Given that 4 lanes are on Wilson Drive and Snow Valley Road, no left turn lanes are warranted.

Table 7.3.3-2 – Intersection Operations - 2041 Background Traffic Volumes

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|--|-----|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Russell Rd & Forbes Rd | WB | stop | 9.3 | A | 0.13 | 9.9 | A | 0.15 |
| Pooles Rd & Russell Rd | SB | stop | 8.5 | A | 0.01 | 8.7 | A | 0.02 |
| Russell Rd & Doran Rd | EB | stop | 9.3 | A | 0.08 | 10.3 | A | 0.25 |
| Hwy 400 SB off-ramp & Forbes Rd | NBL | stop | 12.2 | B | 0.06 | 12.0 | B | 0.05 |
| Snow Valley Rd & Wilson Dr. northerly intersection | SBL | stop | 15.6 | C | 0.48 | 21.6 | C | 0.57 |
| Forbes Rd & Hwy400 NB off-ramp | SBL | stop | 11.1 | B | 0.06 | 13.0 | B | 0.21 |
| St. Vincent & Pooles Rd | EB | stop | 9.4 | A | 0.02 | 10.7 | B | 0.03 |
| | WB | | 11.0 | B | 0.18 | 12.3 | B | 0.15 |
| Finlay Mill Road & Wattie Rd | WB | stop | 12.7 | B | 0.14 | 14.3 | B | 0.21 |
| Highway 26 & Carson Rd | All | signal | 10.2 | B | | 10.6 | B | |
| | EBL | | 15.9 | B | 0.26 | 21.8 | C | 0.42 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|-----------------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| | EBT-R | | 15.6 | B | 0.28 | 19.6 | B | 0.23 |
| | WBL | | 16.0 | B | 0.06 | 20.3 | C | 0.07 |
| | WBT-R | | 14.4 | B | 0.03 | 18.7 | B | 0.05 |
| | NBL | | 12.8 | B | 0.10 | 13.8 | B | 0.21 |
| | NBT | | 7.1 | A | 0.48 | 9.9 | A | 0.72 |
| | NBR | | 4.7 | A | 0.01 | 4.6 | A | 0.02 |
| | SBL | | 8.5 | A | 0.03 | 14.0 | B | 0.03 |
| | SBT | | 11.5 | B | 0.69 | 9.2 | A | 0.59 |
| | SBT-R | | 11.5 | B | 0.69 | 9.2 | A | 0.59 |
| Highway 26 & Snow Valley Road | All | signal | 19.0 | B | | 18.7 | B | |
| | EBL | | 20.1 | C | 0.11 | 24.0 | C | 0.14 |
| | EBT-R | | 23.5 | C | 0.19 | 29.4 | C | 0.42 |
| | WBL | | 15.4 | B | 0.46 | 20.6 | C | 0.40 |
| | WBT-R | | 18.2 | B | 0.32 | 25.2 | C | 0.40 |
| | NBL | | 11.8 | B | 0.17 | 10.5 | B | 0.27 |
| | NBT | | 17.3 | B | 0.60 | 19.2 | B | 0.75 |
| | NBR | | 13.3 | B | 0.17 | 15.9 | B | 0.49 |
| | SBL | | 11.5 | B | 0.12 | 13.1 | B | 0.36 |
| | SBT | | 22.8 | C | 0.70 | 18.0 | B | 0.61 |
| | SBT-R | | 22.6 | C | 0.70 | 17.9 | B | 0.61 |
| St. Vincent St/Gill Rd & Doran Rd | NB | stop | 10.2 | B | 0.02 | 13.1 | B | 0.05 |
| | SB | | 9.9 | A | 0.12 | 10.8 | B | 0.10 |
| | All | signal | 5.5 | A | | 5.5 | A | |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|---------------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Hwy 26/CR 27 & Spence Ave | EBL | | 34.1 | C | 0.22 | 28.9 | C | 0.30 |
| | EBT | | 31.4 | C | 0.02 | 27.0 | C | 0.04 |
| | EBR | | 0.5 | A | 0.32 | 0.7 | A | 0.39 |
| | WBL | | 31.7 | C | 0.05 | 27.0 | C | 0.03 |
| | WBT-R | | 31.7 | C | 0.05 | 27.1 | C | 0.05 |
| | NBL | | 7.1 | A | 0.77 | 6.8 | A | 0.73 |
| | NBT-R | | 1.8 | A | 0.11 | 3.0 | A | 0.29 |
| | SBL | | 7.7 | A | 0.00 | 9.4 | A | 0.02 |
| | SBT-R | | 9.5 | A | 0.30 | 11.3 | B | 0.32 |
| Wilson Dr & Snow Valley Rd | WBL | stop | 19.0 | C | 0.34 | 25.7 | D | 0.31 |
| Wilson Dr & Seadon Rd/Carson Rd | EB | stop | 15.2 | C | 0.16 | 22.6 | C | 0.19 |
| | WB | | 14.4 | B | 0.13 | 23.5 | C | 0.32 |

Given the increase in background traffic volumes, levels of service and delays deteriorate. However, an acceptable level of service D or better will be provided at all intersections and their lane groups, thus no improvements are required under the 2041 background traffic conditions from a traffic operation perspective.

The need for a left turn lane at the intersections was reviewed based on the 2041 background traffic volumes, applicable MTO standards and existing configuration, control, and speed limits. No additional left turn lanes are warranted.

With respect to the need for a right turn lane, MTO criteria indicate that they should be considered when the turning volume exceeds 60 vehicles per hour at an unsignalized intersection. Based on the 2031 and 2041 background traffic volumes, a northbound right turn lane is recommended on Finlay Mill Road at Wattie Road.

7.4 Proposed Midhurst Developments

This section will provide additional details with respect to the proposed developments, including their locations, projected development sites generated traffic volumes and the assignment to the road network.

7.4.1 Site Locations and Land Uses

The Midhurst developments located within the Midhurst Settlement Area are illustrated in Figure 7.4.1 (overleaf) and are listed below:

- 1) Neighbourhood #1 Carson Road Development – 2559 residential units plus employment land equivalent to 350 residential units;
- 2) Neighbourhood #2 Doran Road North Development – 1815 residential units;
- 3) Neighbourhood #3 Doran Road South Development – 3484 residential units;
- 4) Employment land #1 located on the north side of Snow Valley Road and east side of Wilson Drive – 2655 jobs; and
- 5) Employment land #2 located on the south side of Snow Valley Road and west side of Highway 26 – 475 jobs and 495,000 sq. ft. GFA commercial.

The total number of equivalent residential units is approximately 8208.

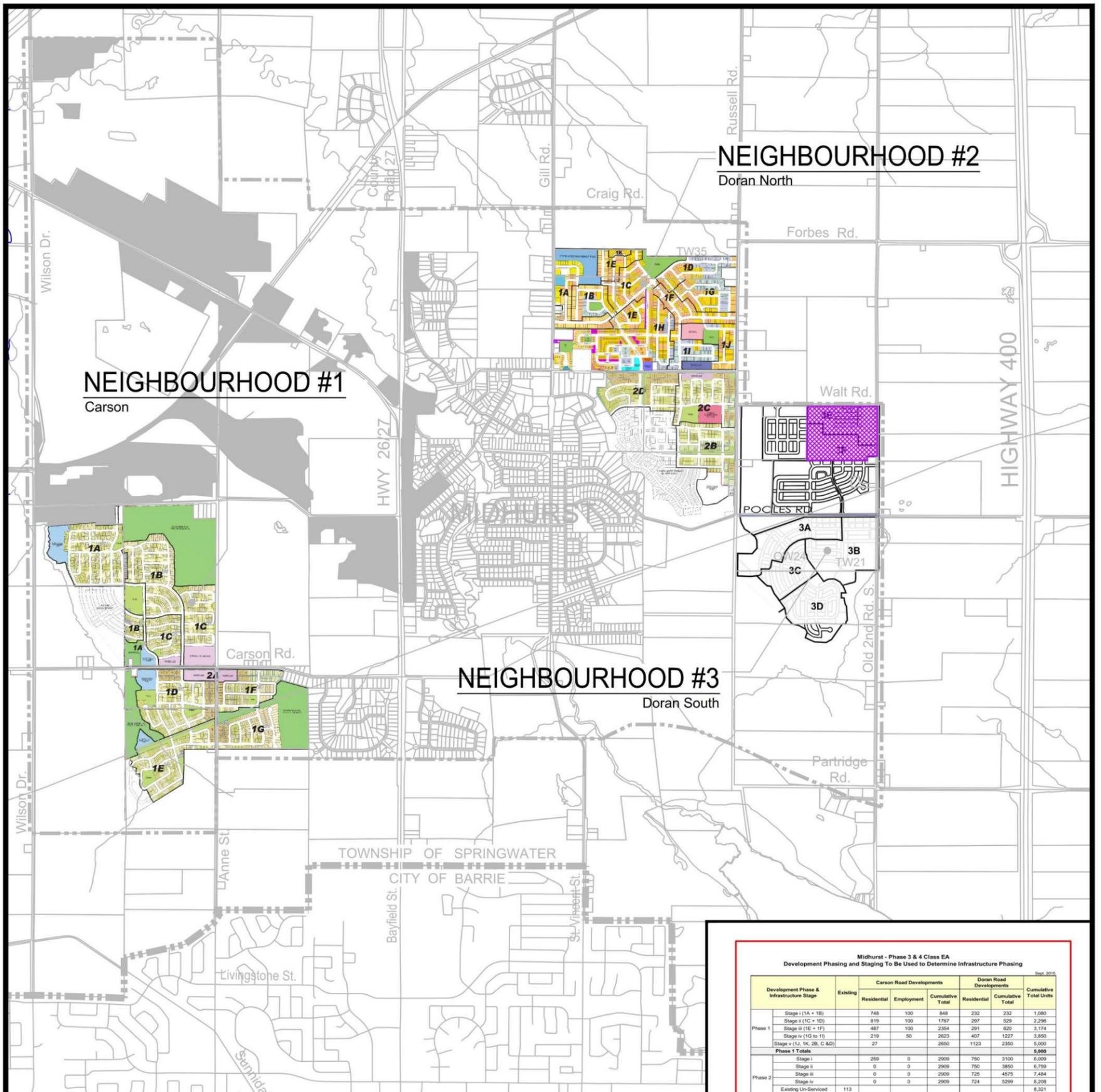
7.4.2 Proposed Phasing

For the three residential developments, development phasing is shown in Figure 7.4.1 and Table 7.4-1. For the employment lands, it is anticipated that they will be completed during Phase 1 by 2031. By 2027, all approved units (3850 units) would be built. The balances of the 5000 units planned for Phase 1 are subject to Township approval and would be completed between 2027 and 2031.

MIDHURST SECONDARY PLAN

TRANSPORTATION ROAD IMPROVEMENT PHASING PLAN

FIGURE 7.4.1. MIDHURST - CONCEPTUAL PHASING PLAN



Midhurst - Phase 3 & 4 Class EA
Development Phasing and Staging To Be Used to Determine Infrastructure Phasing

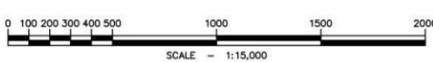
| Development Phase & Infrastructure Stage | Existing | Carson Road Developments | | | Doran Road Developments | | | Cumulative Total Units |
|--|----------|--------------------------|------------|------------------|-------------------------|------------------|------------------|------------------------|
| | | Residential | Employment | Cumulative Total | Residential | Cumulative Total | Cumulative Total | |
| Phase 1 | | | | | | | | |
| Stage i (1A + 1B) | | 748 | 100 | 848 | 232 | 232 | 1,080 | |
| Stage ii (1C + 1D) | | 819 | 100 | 1,917 | 297 | 529 | 2,296 | |
| Stage iii (1E + 1F) | | 487 | 100 | 2,354 | 291 | 820 | 3,174 | |
| Stage iv (1G to 1J) | | 219 | 50 | 2,623 | 407 | 1,227 | 3,850 | |
| Stage v (1K, 1L, 2B, C & D) | | 27 | | 2,650 | 1,123 | 2,350 | 5,000 | |
| Phase 1 Totals | | | | | | | 5,000 | |
| Phase 2 | | | | | | | | |
| Stage i | | 259 | 0 | 2,909 | 750 | 3,100 | 6,009 | |
| Stage ii | | 0 | 0 | 2,909 | 750 | 3,850 | 6,759 | |
| Stage iii | | 0 | 0 | 2,909 | 725 | 4,575 | 7,484 | |
| Stage iv | | 0 | 0 | 2,909 | 724 | 5,299 | 8,208 | |
| Existing Un-Serviced | | 113 | | | | | 8,321 | |
| Existing Serviced | | 1,225 | | | | | 9,546 | |
| Phase 1 & 2 Totals | | | | | | | 9,546 | |

PROPOSED DEVELOPMENT PHASING (WITHIN THE 300 Ha) AS SUBMITTED TO OMB IN 2014

| UNIT TYPE | DEVELOPMENT PHASE & INFRASTRUCTURE STAGE | | | | | | | | | | | | | | | | TOTAL | | | | |
|--|--|-----------|-----------|-----------|--------------------|-----------|-----------|-----------|---------------------|-----------|-----------|-----------|---------------------|-----------|-----------|----------|-------|-------------------------|----------|--|--|
| | Stage i (1A + 1B) | | | | Stage ii (1C + 1D) | | | | Stage iii (1E + 1F) | | | | Stage iv (1G to 1J) | | | | | Stage v (1K, 2B, C & D) | | | |
| | Doran Rd | Carson Rd | Carson Rd | Carson Rd | Doran Rd | Carson Rd | Carson Rd | Carson Rd | Doran Rd | Carson Rd | Carson Rd | Carson Rd | Doran Rd | Carson Rd | Carson Rd | Doran Rd | | Carson Rd | Doran Rd | | |
| EXISTING RESIDENTIAL | 1 | | | | | | | | | | | | | | | | | | 1 | | |
| 21.3 m SINGLES | 3 | | | | | | | | | | | | | | | | | | 3 | | |
| 18.2 m SINGLES | 28 | 1 | 1 | 1 | | | | 2 | 23 | | | | | | | | | | 53 | | |
| 15.2 m SINGLES | 66 | 12 | 27 | 33 | 3 | 12 | 2 | 28 | 4 | 24 | 68 | | | | | | | | 279 | | |
| 12.2 m SINGLES | 21 | 127 | 24 | 85 | 67 | 85 | 32 | 83 | 59 | 76 | 80 | 29 | 27 | 55 | 35 | 6 | 15 | 4 | 85 | | |
| 11.0-11.6 m SINGLES | 79 | 69 | 59 | 59 | 63 | 49 | 49 | | | | | | | | | | | | 43 | | |
| 11.0 m SINGLES (RATH) | | | | | | | | | | | | | | | | | | | 73 | | |
| 10.5-10.7 m SINGLES | 2 | 28 | 65 | 46 | 73 | 41 | 61 | 61 | 22 | 54 | 9 | | | | | | | | 462 | | |
| 9.75 m SINGLES | 121 | 202 | 244 | 110 | 125 | 55 | 23 | | | | | | | | | | | | 45 | | |
| 12.2 m BUNGALOW TOWNS | 12 | | | | 54 | | | | 16 | 31 | 28 | 8 | | | | | | | 149 | | |
| 7.6 m TOWNHOMES | 22 | | | | 18 | | | | 63 | 13 | 90 | 5 | | | | | | | 211 | | |
| 4.5-5.0 m TOWNHOMES (RATH) | | | | | 162 | 24 | 84 | | 30 | | | | | | | | | | 38 | | |
| APR/EX | | | | | 10 | | | | 24 | | | | | | | | | | 82 | | |
| Unit Sub-Total | 119 | 339 | 113 | 390 | 135 | 401 | 162 | 416 | 160 | 274 | 125 | 210 | 205 | 219 | 140 | 42 | 200 | 13 | 264 | | |
| Future Residential Full Lots | 13 | 6 | | | 6 | 3 | | | | | | | | | | | | | 28 | | |
| Unit Total With Future Residential Full Lots | 119 | 352 | 113 | 396 | 135 | 401 | 162 | 416 | 166 | 277 | 125 | 210 | 205 | 219 | 140 | 42 | 200 | 13 | 264 | | |

NOTE: * Denotes identical Phase numbered areas west of Bayfield Street
NOTE: 84 Units have been moved from Phase 1L to 1J to accommodate Planning trigger of 3,850 Units

This map, either in whole or in part, may not be reproduced without the written authority from the County of Simcoe. Copyright County of Simcoe. Land Information Network Copyright © LINC 1998. Produced under license from the Ontario Ministry of Natural Resources, Copyright © Queen Printer 1998. This map is not a legal survey. For more information call (905) 736-9388.



.Table 7.4-2 – Development Phasing

| BUILD OUT TIMING /PHASING | CARSON RD DEV. | | | DORAN RD N DEV. | | DORAN RD S DEV. | | ACCUMULATIVE TOTAL UNITS |
|---------------------------------|----------------|---------------|----------------|-----------------|----------------|-----------------|----------------|-----------------------------|
| | Res. Units | Emp. Units | % Build Out | Units | % Build Out | Units | % Build Out | |
| 2016 | 249 | 33 | 10 | 77 | 5 | | | 359 |
| 2017 | 250 | 34 | 19 | 78 | 11 | | | 721 |
| 2018 | 249 | 33 | 29 | 77 | 16 | | | 1,080 |
| Stage 1 Subtotal | 748 | 100 | 29 | 232 | 16 | | | 1,080 |
| 2019 | 205 | 25 | 37 | 74 | 21 | | | 1,384 |
| 2020 | 205 | 25 | 45 | 74 | 27 | | | 1,688 |
| 2021 | 204 | 25 | 53 | 75 | 32 | | | 1,992 |
| 2022 | 205 | 25 | 61 | 74 | 37 | | | 2,296 |
| Stage 2 Subtotal | 819 | 100 | 61 | 297 | 37 | | | 2,296 |
| 2023 | 162 | 33 | 67 | 97 | 43 | | | 2,588 |
| 2024 | 162 | 34 | 74 | 97 | 50 | | | 2,881 |
| 2025 | 163 | 33 | 81 | 97 | 57 | | | 3,174 |
| Stage 3 Subtotal | 487 | 100 | 81 | 291 | 57 | | | 3,174 |
| 2026 | 110 | 25 | 86 | 203 | 71 | | | 3,512 |
| 2027 | 109 | 25 | 90 | 204 | 85 | | | 3,850 |
| Stage 4 Subtotal | 219 | 50 | 90 | 407 | 85 | | | 3,850 |
| Stage 5- 2031 | 27 | | 91 | 213 | 100 | 910 | 24 | 5,000 |
| Ph1 Subtotal | 2,300 | 350 | 91 | 1,440 | 100 | 910 | 24 | 5,000 |
| Stage 6 - 2034 | 259 | | 100 | 375 | | 375 | 43 | 6,009 |
| Stage 7 - 2036 | | | | | | 750 | 62 | 6,759 |
| Stage 8 - 2039 | | | | | | 725 | 81 | 7,484 |
| Stage 9 - 2041 | | | | | | 724 | 100 | 8,208 |
| Total | 2,909 | | 100 | 1,815 | 100 | 3,484 | 100 | 8,208 |

7.4.3 Site Generated Trips

This section will discuss site generated trips and trip distribution and assignment. As the project has progressed various traffic models have been developed. Appendix E contains trip generation and traffic projections prepared by BA Group in May 2014. The traffic projections in the following sections agree fairly well with that previous model by BA Group in the Phase 1 in the area of the Carson Road development but less so in the Doran Road area development. This is in large part due to changes in the road network model as the road network evolved. At the time of the BA Group study in 2014 a new interchange was contemplated at Highway 400 and Pooles Road. This was later dropped and improvements to the Forbes Road corridor and Highway 400/ Forbes Road interchange were included in the model. This significantly changes the trip distribution for the northeast area of the proposed development (Doran North and South areas). The following Section 7.4.4 and 7.4.5 provide traffic projections for the most current road network and proposed improvements.

Trip generation and traffic projections are also provided in Appendix H in a report prepared by AECOM in April 2016, Highway 400 / Forbes Road Interchange Operations. That study was carried out to determine if improvements to the Highway 400- Forbes Road interchange in lieu of a new interchange at Pooles Road and Highway 400 would be effective. That report concluded that improvements to the Forbes Road interchange would be useful in accommodating traffic generated by the new development. The AECOM analysis uses a different methodology in estimating traffic volumes and the numbers cannot be compared directly to the projections presented in the following summary.

7.4.4 Site Trips

Trips generated by the Midhurst developments have been specifically estimated, as per the ITE Trip Generation Manual. For the residential developments, trip rates were calculated by using the equations and a combination of 77% single family detached units (land use code 210) and 23% residential condo/townhouse units (land use code 230) given that the percentage of townhouse units in Phase 1 is 23%. For the employment lands, trip rates were estimated by using the equations for general light industrial (land use code 110) and shopping centre land use (land use code 820).

Trips can be made between Carson Road development and the Employment Lands via development internal roads without using the boundary roads. These trips are considered internal trips and should be deducted from the total trips. An internal capture rate of 5% was assumed. There are also trips to the commercial land use when people are on the way home or on the way to work etc. These are by-pass trips. These trips are already on the road network and should be deducted from the total trips. 25% by-pass trips for the commercial land use were assumed.

Trip estimates for the peak hours of the road network are provided in Table 7.4-2. In total, the Midhurst developments are expected to generate 6204 primary trips in the AM peak hour and 7,842 trips in the PM peak hour (both inbound and outbound trips). By 2027, all approved units (3,850 units) would be built. By 2031 Phase 1 of the Midhurst developments are expected to generate 4,209 trips in the AM peak hour and 5,615 trips in the PM peak hour (both inbound and outbound trips).

Table 7.4-4 – Midhurst Developments Trip Generation Estimates

| Development | Rate/ Estimate | Unit/ Size | AM PEAK HOUR | | | PM PEAK HOUR | | |
|--------------------|---------------------|--------------------|--------------|-------|-------|--------------|-------|-------|
| | | | In | Out | Total | In | Out | Total |
| Carson Road | Rate | unit | 0.15 | 0.47 | 0.62 | 0.443 | 0.254 | 0.697 |
| | estimate | 2,909 | 435 | 1381 | 1816 | 1289 | 739 | 2028 |
| | 5% Internal Capture | | -22 | -69 | -91 | -64 | -37 | -101 |
| | Sub-total | | 413 | 1312 | 1725 | 1225 | 702 | 1927 |
| Doran Road North | Rate | unit | 0.15 | 0.47 | 0.62 | 0.443 | 0.254 | 0.697 |
| | estimate | 1,440 | 216 | 684 | 900 | 638 | 366 | 1004 |
| Doran Road South | Rate | unit | 0.15 | 0.47 | 0.62 | 0.443 | 0.254 | 0.697 |
| | estimate | 3,859 | 578 | 1832 | 2410 | 1710 | 980 | 2,690 |
| Sub-total | | 8,208 | 1,207 | 3,828 | 5,035 | 3,573 | 2,048 | 5,621 |
| Employment Land #1 | Rate | employee | 0.25 | 0.05 | 0.3 | 0.07 | 0.24 | 0.31 |
| | estimate | 2655 | 661 | 136 | 797 | 173 | 650 | 823 |
| | 5% Internal Capture | | -33 | -7 | -40 | -9 | -32 | -41 |
| | Sub-total | | 628 | 129 | 757 | 164 | 618 | 782 |
| Employment Land #2 | Rate | employee | 0.25 | 0.05 | 0.3 | 0.07 | 0.24 | 0.31 |
| | estimate | 475 | 118 | 25 | 143 | 31 | 116 | 147 |
| | Rate | 1000 sq. ft GFA | 0.49 | 0.31 | 0.8 | 1.84 | 1.91 | 3.75 |
| | estimate | 495 | 242 | 154 | 396 | 909 | 947 | 1,856 |
| | 5% Internal Capture | | -18 | -9 | -27 | -47 | -53 | -100 |
| | 25% By-pass Trips | | -60 | -39 | -99 | -227 | -237 | -464 |
| | Sub-total | | 282 | 131 | 413 | 666 | 773 | 1,439 |
| Total | | | 2,117 | 4,087 | 6,204 | 4,403 | 3,439 | 7,842 |

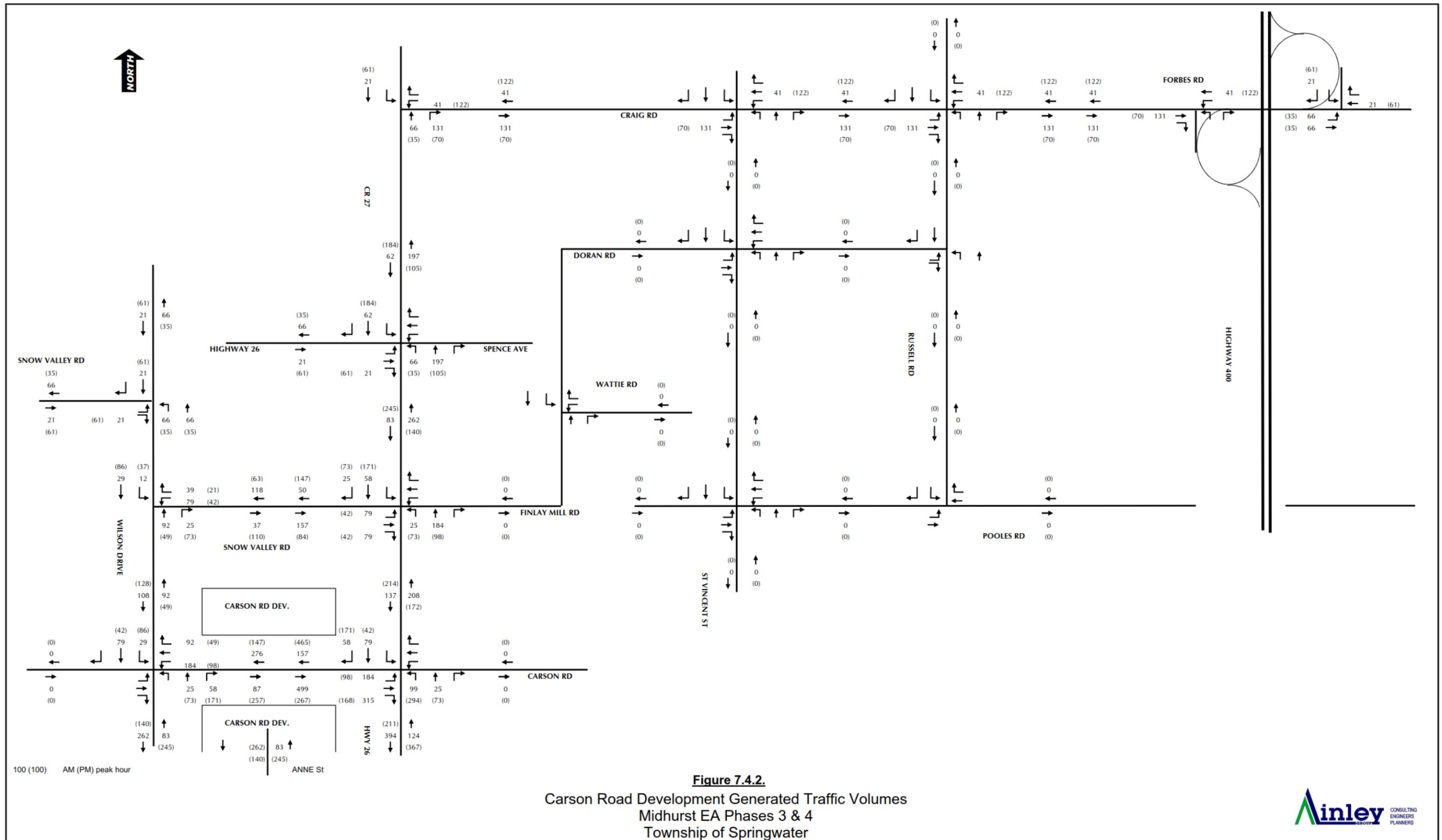
7.4.5 Trip Distribution & Assignment

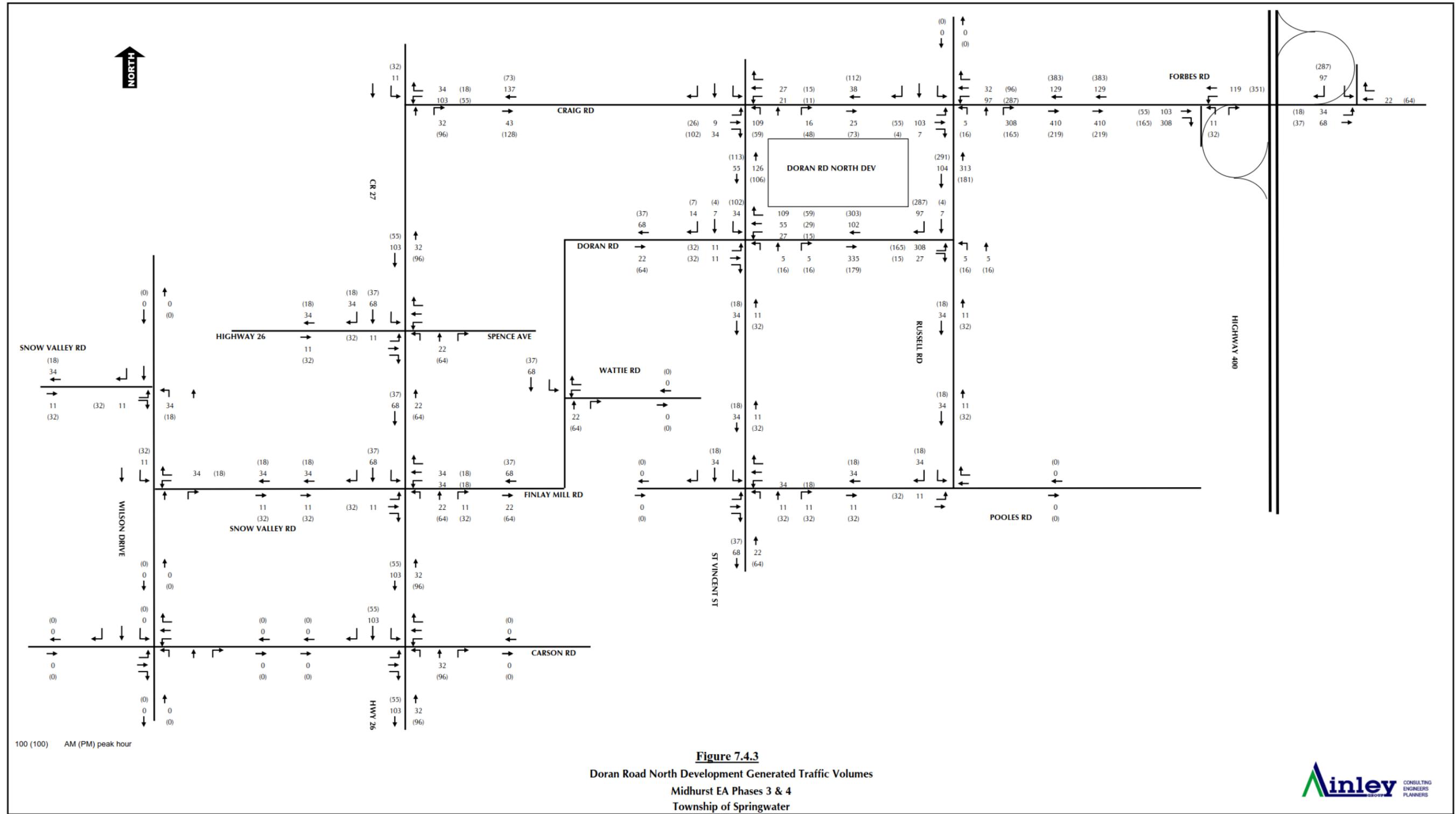
The Transportation Master Plan prepared by the County of Simcoe and the analysis of the area traffic during the assessment of a potential partial interchange on Highway 400 at Pooles Road (AECOM June 2015) describe the prime origin / destination for the Midhurst area as 70% to and

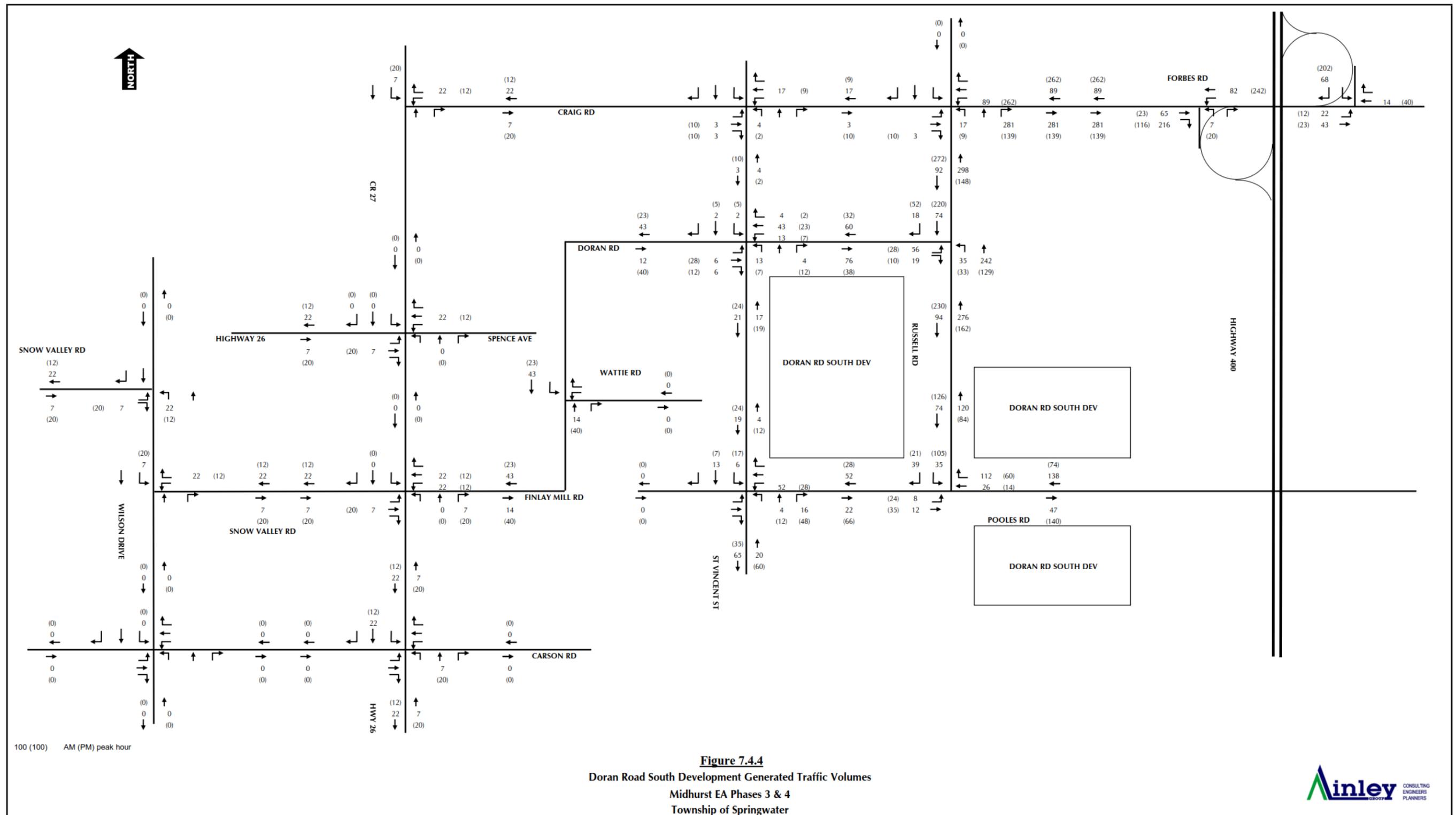
from the south. No other guidance is provided on the other directions and we have assigned 10% to each of the other cardinal directions. There are several north south options available to existing and future residents of Midhurst and the route selection will be dependent on where they are situated within Midhurst. We have assumed that if you are in the Carson Road area development the traffic to and from the south would typically use Highway 26/Bayfield or Anne Street or Wilson Road and unlikely to use St. Vincent Street or Highway 400. For those in the Russell Road/Doran Road area developments the route selection to and from the south would be on Highway 400 or St. Vincent Street or Highway 26/Bayfield Street. Rudimentary time trials were carried out on the north south routes from Doran Road between Russell Road and St. Vincent Street to the intersection of Highway 400 and Bayfield Street by taking Russell to Forbes to Highway 400 and by taking Findley Mill Road/Highway 26/Bayfield and by taking Pooles to St. Vincent Street to Cundles Road to Bayfield to Highway 400. The data collected shows that the Forbes to Highway 400 route is the quickest during the PM Peak at approximately 10 minutes followed by the Highway 26 route at 11.5 minutes and then the St. Vincent Route at 13.5 minutes.

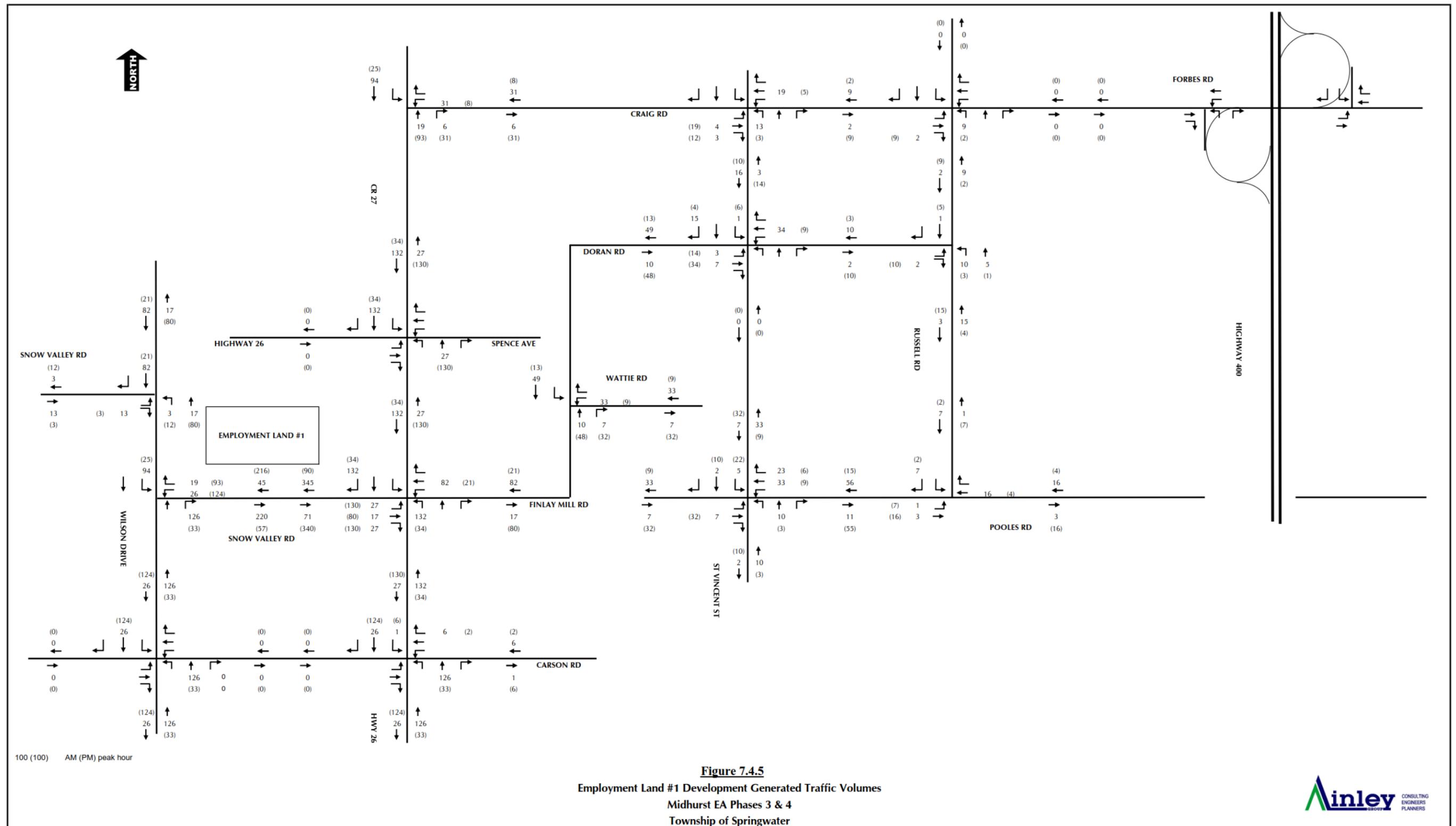
For the western development area of Carson Road between Highway 26 and Wilson Road we have assigned the 70% of traffic to and from the south as 30% along Highway 26, 20% along Anne Street and 20% along Wilson Road. For the eastern development area in the vicinity north of Doran Road between Russell and St Vincent we have assigned the 70% of traffic to and from the south as 45% to Forbes and Hwy 400, 20% to Findley Mill Road / Highway 26 and 10% to Craig Road to CR 27 / Hwy 26 and 15% to Pooles Road and St. Vincent. For the eastern development area in the vicinity south of Doran Road between Russell and St Vincent we have assigned the 70% of traffic to and from the south as 45% to Forbes and Hwy 400, 20% to Findley Mill Road and Highway 26 and 30% to Pooles Road and St. Vincent.

Figures 7.4.2 to 7.4.6 provide a summary of the trip distribution assigned to the three development areas.









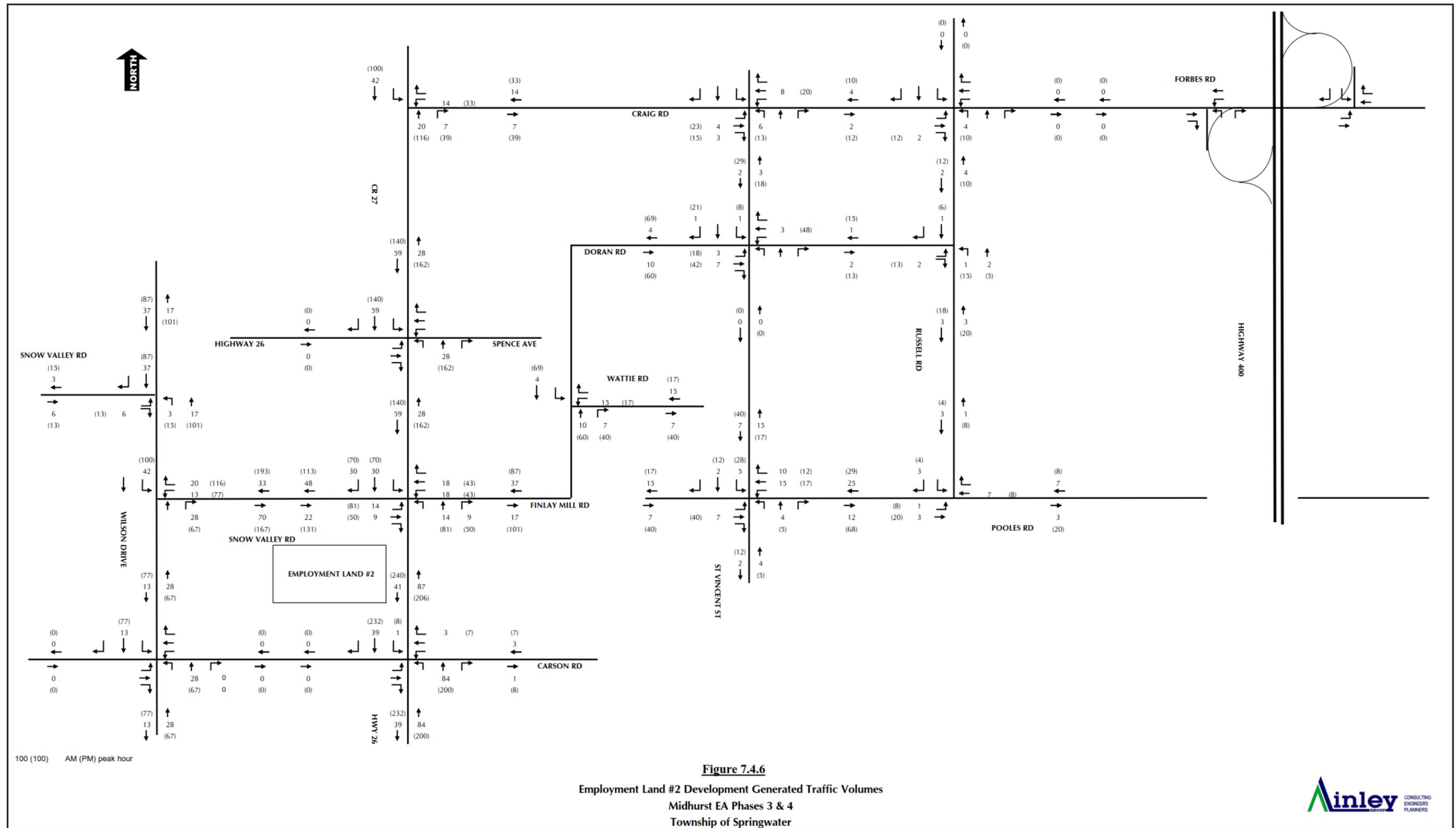


Table 7.4-3 – Trip Distribution Carson Development Area

| CARSON DEVELOPMENT AREA | |
|---------------------------------------|----------------------------|
| <i>Route</i> | <i>Percentage Assigned</i> |
| to the south via Wilson | 20% |
| to the south via Anne | 20% |
| to the south via Hwy 26 | 30% |
| to the north via CR 27 | 10% |
| to the west via Hwy 26 | 5% |
| to the west by Wilson / Snow Valley | 5% |
| to the west via Snow Valley / Hwy 26 | 5% |
| to the east via Craig Rd /Forbes Rd | 5% |
| from the south via Wilson | 20% |
| from the south via Anne | 20% |
| from the south via Hwy 26 | 30% |
| from the north via CR 27 | 10% |
| from the west via Hwy 26 | 5% |
| from the west Wilson / Snow Valley | 5% |
| from the west via Snow Valley / Hwy26 | 5% |
| from the east via Forbes | 5% |

Table 7.4-4 – Trip Distribution Doran South Development Area

| DORAN SOUTH DEVELOPMENT AREA | |
|--|----------------------------|
| <i>Route</i> | <i>Percentage Assigned</i> |
| to the south via Hwy 400/F | 45% |
| to the south via St. Vincent | 15% |
| to the south via Hwy 26 – Finlay | 10% |
| to the south via Hwy 26 – Craig | 0% |
| to the north via Russel – Craig – CR 27 | 3% |
| to the west via Doran – Spence – Hwy 26 | 7% |
| to the north via Forbes – Hwy 400 | 7% |
| to the west via Finlay – Snow Valley | 3% |
| to the east via Forbes – Hwy 400 | 10% |
| from the south via Hwy 400/Forbes | 45% |
| from the south via St. Vincent | 15% |
| from the south via Hwy 26 – Finlay | 10% |
| from the south via Hwy 26 – Craig | 0% |
| from the north via Russell – Craig – CR 27 | 3% |
| from the west via Doran – Spence – Hwy 26 | 7% |
| from the north via Forbes – Hwy 400 | 7% |
| from the west via Finlay – Snow Valley | 3% |
| from the east via Forbes – Hwy 400 | 10% |

Table 7.4-5 – Trip Distribution Doran North Development Area

| DORAN NORTH DEVELOPMENT AREA | |
|-------------------------------------|----------------------------|
| <i>Route</i> | <i>Percentage Assigned</i> |
| to the south via Hwy 400 | 45% |
| to the south via St. Vincent | 5% |
| to the south via Hwy 26 Finlay | 5% |
| to the south via Hwy 26 Craig | 10% |
| to the north via CR 27 | 5% |
| to the west via Hwy 26 | 5% |
| to the north via Hwy 400 | 5% |
| to the west via SVR | 5% |
| to the east via Forbes | 10% |
| to the south via Russell-Pooles | 5% |
| from the south via Hwy 400 | 45% |
| from the south via St. Vincent | 5% |
| from the south via Hwy 26 Finlay | 5% |
| from the south via Hwy 26 Craig | 10% |
| from the north via CR 27 | 5% |
| from the west via Hwy 26 | 5% |
| from the north via Hwy 400 | 5% |
| from the west via SVR | 5% |
| from the east via Forbes | 10% |
| from the south via Russell-Pooles | 5% |

Table 7.4-6 – Trip Distribution Employment Lands 1

| EMPLOYMENT LANDS 1 | |
|---------------------------|----------------------------|
| <i>Route</i> | <i>Percentage Assigned</i> |
| to the south via Wilson | 20% |
| to the south via Anne | 10% |
| to the south via Hwy 26 | 20% |
| to the north via CR 27 | 15% |
| to the east via Finlay | 13% |
| to the northwest Wilson | 13% |
| to the west via SVR | 2% |
| to the east via Craig | 5% |
| to the east via Doran | 1% |
| to the east via Carson | 1% |
| from the south via Wilson | 20% |
| from the south via Anne | 10% |
| from the south via Hwy 26 | 20% |
| from the north via CR 27 | 15% |

| EMPLOYMENT LANDS 1 | |
|---------------------------|----------------------------|
| <i>Route</i> | <i>Percentage Assigned</i> |
| from the east via Finlay | 13% |
| from the northwest Wilson | 13% |
| from the west via SVR | 2% |
| from the east via Craig | 5% |
| from the east via Doran | 1% |
| from the east via Carson | 1% |

Table 7.4-7 – Trip Distribution Employment Lands 2

| EMPLOYMENT LANDS 2 | |
|---------------------------|----------------------------|
| <i>Route</i> | <i>Percentage Assigned</i> |
| to the south via Wilson | 10% |
| to the south via Anne | 10% |
| to the south via Hwy 26 | 30% |
| to the north via CR 27 | 15% |
| to the east via Finlay | 13% |
| to the northwest Wilson | 13% |
| to the west via SVR | 2% |
| to the east via Craig | 5% |
| to the east via Doran | 1% |
| to the east via Carson | 1% |
| from the south via Wilson | 10% |
| from the south via Anne | 10% |
| from the south via Hwy 26 | 30% |
| from the north via CR 27 | 15% |
| from the east via Finlay | 13% |
| from the northwest Wilson | 13% |
| from the west via SVR | 2% |
| from the east via Craig | 5% |
| from the east via Doran | 1% |
| from the east via Carson | 1% |

The development specific trip estimates were assigned to the area road network. The resulting future site generated traffic volumes are illustrated in Figures 7.4.2 to 7.4.6 for the Carson Road, Doran Road North, Doran Road South, Employment Land #1 and Employment Land #2 development respectively.

7.5 Proposed Midhurst Developments

This section will address the resulting impacts of the proposed developments on the area road network. The following will be addressed:

- operations of the area key intersections; and
- potential improvements to the study area road system, if necessary.

7.5.1 Future Total Traffic Volumes

To assess the impacts of the increased traffic volumes resulting from the proposed developments, the site generated traffic was combined with the future background traffic volumes for the 2031, and 2041 horizon years. It is assumed that the future road network discussed in Section 7.3.1 will be in place by the specific timelines. The resulting future total volumes are illustrated in Figures 7.5-1 and 7.5-2 (overleaf) for the 2031 and 2041 horizons respectively.

7.5.2 Operational Analysis

The operations of the study area intersections have been investigated based on the 2031 and 2041 future total volumes. It is assumed that the following road connections will be in place by 2025:

- Craig Road is opened from Russell Road to Gill Road (2018)
- Craig Road is extended from Gill Road to County Road 27 (2018)
- St Vincent Street is connected between Belmont Crescent and Park Trail (2025)

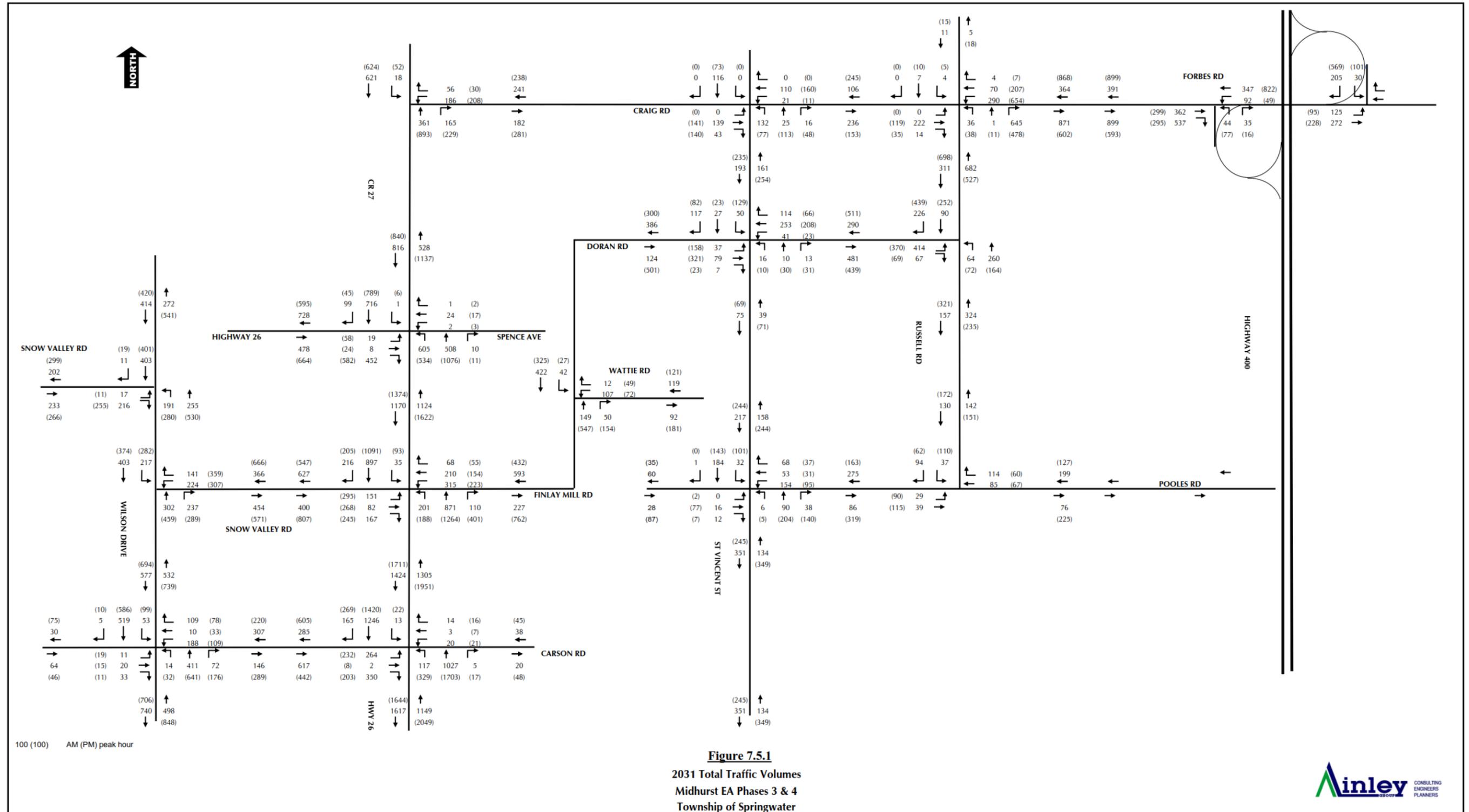
The timing for the above improvements should be sooner than later. The 10-year horizon is considered the worst-case scenario and is to allow time for design and construction.

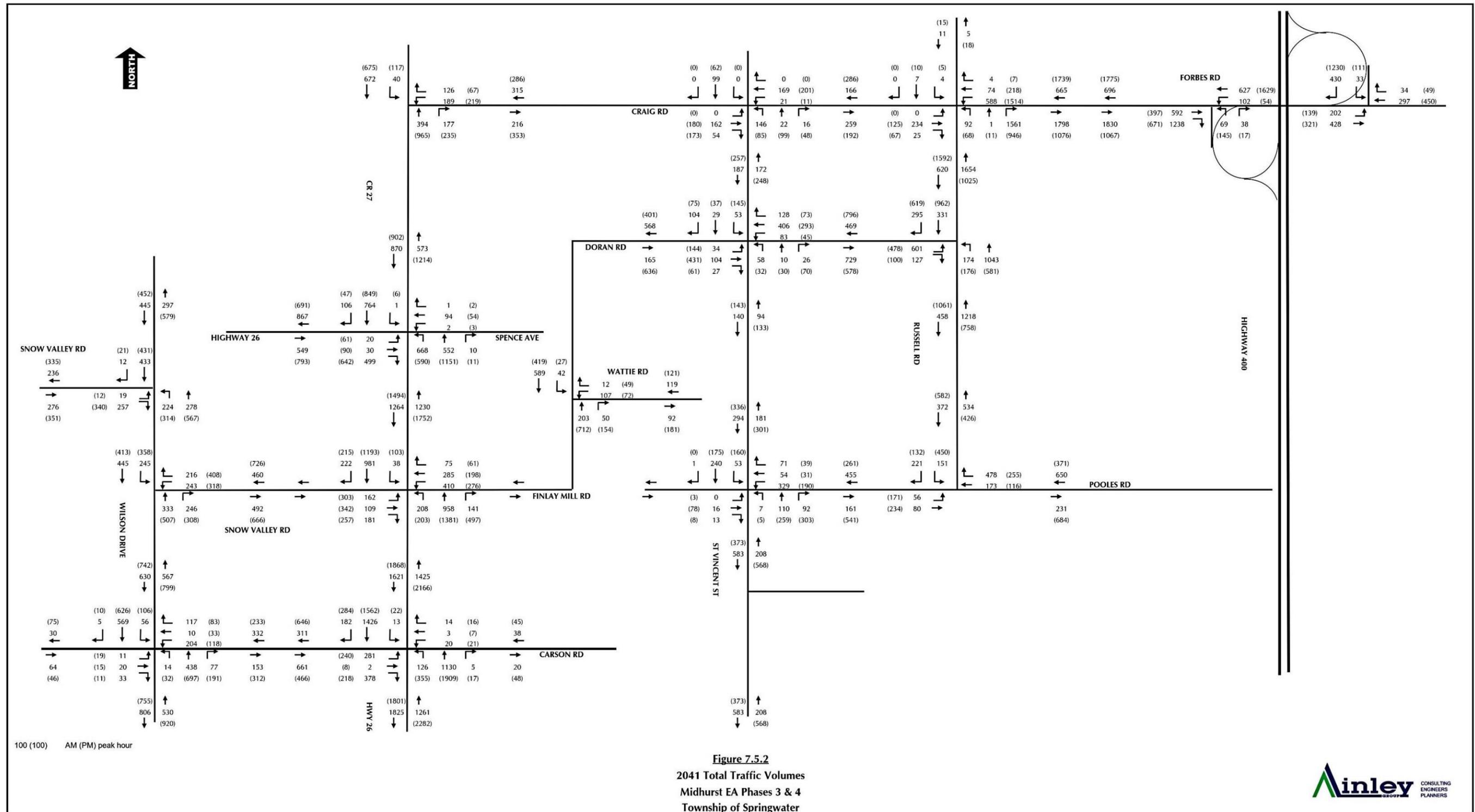
Route selection for the Craig Road link between Russell Road and County Road 27 along the north limits of the study area is still in the preliminary stages which will be refined as the overall design of the transportation improvements proceeds. Completion of this link during the early stages of Phase 1 development is necessary as it provides alternate routing for some development traffic to access the County Road 27/Hwy 26/ Bayfield corridor and to some extent Hwy 400 without using existing Midhurst community roads. This Craig Road link is proposed as a two-lane rural road with a multi-use trail on one side of the road.

7.5.3 2031 Total Traffic Volumes

Given the future 2031 total traffic volumes, a traffic signal warrant analysis was carried out at various intersections. A traffic signal is warranted at the following intersections for the 2031 horizon:

- County Road 27 at Craig Road (possible roundabout)
- Wilson Drive at Carson Road (possible roundabout)
- Wilson Drive at Snow Valley Road southerly intersection
- Russell Road at Doran Road
- Forbes Road/Craig Road at Russell Road (possible roundabout)
- Highway 26 at County Road 27 / Spence Ave.





A traffic signal with an exclusive left turn lane on each approach was assumed at the above noted intersections. A southbound right turn lane on Russell Road at Doran Road and a northbound right turn lane on Russell Road at Forbes Road were also assumed given the right turn volumes. The results of the operational assessment are provided in Table 7.5.3-1 for the 2031 horizon, whereas detailed worksheets are provided in Appendix T-2 Operational Analysis.

Table 7.5.3-1 – Intersection Operations – 2031 Total Traffic Volumes

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|--|-------|----------------------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Russell Rd & Forbes Rd | all | Signal or roundabout | 22.7 | C | | 28.3 | C | |
| | EBL | | 0 | - | 0 | 0 | - | 0 |
| | EBT-R | | 23.8 | C | 0.50 | 17.1 | B | 0.29 |
| | WBL | | 17.6 | B | 0.60 | 43.1 | D | 0.97 |
| | WBT-R | | 12.1 | B | 0.10 | 8.3 | A | 0.23 |
| | NBL | | 15.6 | B | 0.07 | 18.7 | B | 0.09 |
| | NBT | | 14.6 | B | 0 | 17.8 | B | 0.02 |
| | NBR | | 26.3 | C | 0.84 | 22.2 | C | 0.74 |
| | SBL | | 18.6 | B | 0.01 | 18.0 | B | 0.01 |
| | SBT-R | | 18.5 | B | 0.01 | 17.8 | B | 0.02 |
| Pooles Rd & Russell Rd | SB | Stop | 10.1 | B | 0.16 | 12.4 | B | 0.27 |
| Russell Rd & Doran Rd | all | signal | 18.7 | B | | 18.3 | B | |
| | EBL | | 31.1 | C | 0.84 | 27.9 | C | 0.81 |
| | EBR | | 16.6 | B | 0.15 | 17.2 | B | 0.16 |
| | NBL | | 7.6 | A | 0.10 | 7.5 | A | 0.15 |
| | NBT | | 9.1 | A | 0.28 | 7.5 | A | 0.17 |
| | SBT | | 11.4 | B | 0.12 | 12.6 | B | 0.33 |
| | SBR | | 13.8 | B | 0.36 | 19.2 | B | 0.67 |
| Hwy 400 SB off-ramp & Forbes Rd | NBL | Stop | 35.1 | E | 0.28 | 26.3 | D | 0.33 |
| Snow Valley Rd & Wilson Dr. northerly intersection | SBL | Stop | 22.8 | C | 0.69 | 28.9 | D | 0.76 |
| Forbes Rd & Hwy400 NB off-ramp | SBL | stop | 18.1 | C | 0.10 | 21.0 | C | 0.32 |
| St. Vincent & Pooles Rd | EB | stop | 11.1 | B | 0.05 | 20.2 | C | 0.28 |
| | WB | | 16.9 | C | 0.49 | 28.8 | D | 0.54 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|-----------------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Finlay Mill Road & Wattie Rd | WB | stop | 17.9 | C | 0.31 | 25.8 | D | 0.43 |
| Highway 26 & Carson Rd | all | signal | 26.3 | C | | 39.3 | D | |
| | EBL | | 32.6 | C | 0.64 | 76.9 | E | 0.87 |
| | EBT-R | | 42.5 | D | 0.84 | 57.8 | E | 0.77 |
| | WBL | | 40.6 | D | 0.15 | 58.9 | E | 0.20 |
| | WBT-R | | 31.3 | C | 0.07 | 52.9 | D | 0.16 |
| | NBL | | 21.2 | C | 0.57 | 79.7 | E | 0.96 |
| | NBT | | 13.4 | B | 0.52 | 13.3 | B | 0.70 |
| | NBT-R | | 13.3 | B | 0.52 | 13.2 | B | 0.70 |
| | SBL | | 17.1 | B | 0.05 | 24.0 | C | 0.14 |
| | SBT | | 30.5 | C | 0.85 | 46.5 | D | 0.94 |
| | SBT-R | | 31.2 | C | 0.86 | 53.7 | D | 0.98 |
| Highway 26 & Snow Valley Road | all | signal | 35.5 | D | | 60.9 | E | |
| | EBL | | 24.5 | C | 0.39 | 31.4 | C | 0.62 |
| | EBT-R | | 44.4 | D | 0.79 | 115.9 | F | 1.09 |
| | WBL | | 24.3 | C | 0.72 | 57.6 | E | 0.86 |
| | WBT-R | | 28.3 | C | 0.58 | 43.4 | D | 0.46 |
| | NBL | | 39.1 | D | 0.82 | 105.9 | F | 1.00 |
| | NBT | | 23.6 | C | 0.65 | 45.0 | D | 0.88 |
| | NBR | | 17.7 | B | 0.18 | 36.0 | D | 0.63 |
| | SBL | | 17.7 | B | 0.14 | 37.2 | D | 0.59 |
| | SBT | | 50.6 | D | 0.94 | 66.6 | E | 0.96 |
| | SBT-R | | 51.5 | D | 0.94 | 68.6 | E | 0.97 |
| St. Vincent St/Gill Rd & Doran Rd | NB | stop | 13.3 | B | 0.09 | 16.9 | C | 0.20 |
| | SB | | 13.9 | B | 0.31 | 39.3 | E | 0.72 |
| Hwy 26/CR 27 & Spence Ave | all | signal | 12.8 | B | | 10.7 | B | |
| | EBL | | 34.1 | C | 0.29 | 33.6 | C | 0.54 |
| | EBT | | 32.3 | C | 0.12 | 28.5 | C | 0.17 |
| | EBR | | 0.5 | A | 0.30 | 0.7 | A | 0.39 |
| | WBL | | 31.6 | C | 0.03 | 27.8 | C | 0.03 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|---------------------------------|-------|----------------------------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| | WBT-R | | 35.2 | D | 0.37 | 28.3 | C | 0.12 |
| | NBL | | 14.8 | B | 0.76 | 14.8 | B | 0.74 |
| | NBT-R | | 2.1 | A | 0.20 | 3.8 | A | 0.45 |
| | SBL | | 15.6 | B | 0.00 | 14.7 | B | 0.04 |
| | SBT-R | | 23.6 | C | 0.76 | 21.7 | C | 0.74 |
| CR 27 & Craig Road | all | Signal or Roundabout | 9.1 | A | | 12.0 | B | |
| | WBL | | 15.7 | B | 0.50 | 30.1 | C | 0.78 |
| | WBR | | 13.8 | B | 0.17 | 23.0 | C | 0.13 |
| | NBT | | 8.1 | A | 0.44 | 13.2 | B | 0.81 |
| | NBR | | 7.1 | A | 0.24 | 5.3 | A | 0.24 |
| | SBL | | 10.1 | B | 0.04 | 20.9 | C | 0.24 |
| | SBT | | 7.8 | A | 0.40 | 5.5 | A | 0.30 |
| Wilson Dr & Snow Valley Rd | all | signal | 12.1 | B | | 23.0 | C | |
| | WBL | | 19.6 | B | 0.69 | 22.5 | C | 0.68 |
| | WBR | | 17.6 | B | 0.48 | 39.4 | D | 0.89 |
| | NBT | | 12.9 | B | 0.51 | 27.9 | C | 0.83 |
| | NBR | | 12.7 | B | 0.47 | 19.1 | B | 0.61 |
| | SBL | | 8.2 | A | 0.43 | 16.6 | B | 0.70 |
| | SBT | | 7.1 | A | 0.44 | 9.3 | A | 0.42 |
| Wilson Dr & Seadon Rd/Carson Rd | all | Signal or roundabout | 9.8 | A | | 8.3 | A | |
| | EBL | | 13.2 | B | 0.03 | 18.7 | B | 0.07 |
| | EBT-R | | 11.6 | B | 0.13 | 16.2 | B | 0.10 |
| | WBL | | 14.5 | B | 0.41 | 18.3 | B | 0.32 |
| | WBT-R | | 12.5 | B | 0.31 | 18.2 | B | 0.45 |
| | NBL | | 9.9 | A | 0.03 | 7.3 | A | 0.07 |
| | NBT | | 8.4 | A | 0.35 | 6.7 | A | 0.46 |
| | NBT-R | | 8.5 | A | 0.36 | 6.7 | A | 0.46 |
| | SBL | | 10.3 | B | 0.12 | 10.3 | B | 0.25 |
| | SBT | | 8.5 | A | 0.38 | 6.0 | A | 0.32 |
| | SBT-R | | 8.5 | A | 0.38 | 6.0 | A | 0.32 |

Given the assumed improvements, all intersections and their lane groups will operate acceptably at a level of service “E” or better in the 2031 horizon except for the intersection of Highway 26 at Snow Valley Road where a poor level of service “F” occurs on the eastbound through-right shared lane and the northbound left turn lane, volumes are at or over capacity during the PM peak hour. Thus, improvements at the intersection are required.

Operational analysis and traffic growth should be reassessed on a five-year basis to confirm assumptions on traffic growth development progress and trip distribution are accurate and revise improvement scheduling as necessary.

Should an eastbound right turn lane be added at the intersection of Highway 26 at Snow Valley Road/Finlay Mill Road, the intersection would operate acceptably. The results of the analysis are summarized in Table 7.5.3-2.

Table 7.5.3-2 – Intersection Operations – 2031 Total Traffic Volumes with Improvements

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|-------------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Highway 26 & Snow Valley Road | all | signal | 31.7 | C | | 36.8 | D | |
| | EBL | | 25.2 | C | 0.40 | 30.2 | C | 0.71 |
| | EBT | | 30.9 | C | 0.26 | 45.2 | D | 0.75 |
| | EBR | | 35.2 | D | 0.63 | 51.9 | D | 0.81 |
| | WBL | | 21.0 | C | 0.58 | 28.9 | C | 0.62 |
| | WBT-R | | 29.4 | C | 0.63 | 41.1 | D | 0.70 |
| | NBL | | 32.7 | C | 0.78 | 42.5 | D | 0.83 |
| | NBT | | 22.0 | C | 0.63 | 30.1 | C | 0.85 |
| | NBR | | 16.5 | B | 0.18 | 24.4 | C | 0.60 |
| | SBL | | 16.5 | B | 0.13 | 22.8 | C | 0.47 |
| | SBT | | 44.9 | D | 0.91 | 44.3 | D | 0.91 |
| | SBT-R | | 45.7 | D | 0.91 | 45.6 | D | 0.92 |

7.5.4 2041 Total Traffic Volumes

Given the future 2041 total traffic volumes, an additional through lane in each direction to a total of 4 lanes are required on the following sections of roads:

- Forbes Road from Russell Road to Highway 400
- Russell Road from south of Doran Road to Forbes Road

Given the northbound right turn and westbound left turn volumes at the intersection of Russell Road at Forbes Road, the northbound right turn lane should be changed to a channelized right

turn lane and the westbound inside through lane becomes a left turn lane to a double left turn lane.

A traffic signal warrant analysis was carried out at various intersections. A traffic signal is warranted at the following intersections for the 2041 horizon:

- Wilson Drive at Snow Valley Road northerly intersection
- Pooles Road at Russell Road
- Forbes Road at Highway 400 SB off-ramp

A traffic signal with an exclusive left turn lane on each approach was assumed at the above noted intersections. A westbound right turn lane on Pooles Road at Russell Road and an eastbound channelized right turn lane on Forbes Road at Highway 400 SB off-ramp were also assumed. Based on the above improvements, the results of the operational assessment are provided in Table 7.5.4-1 for the 2041 horizon, whereas detailed worksheets are provided in Appendix T2.

Table 7.5.4-1 – Intersection Operations – 2041 Total Traffic Volumes

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Russell Rd & Forbes Rd | all | signal | 41.7 | D | | 40.7 | D | |
| | EBL | | 0 | - | 0 | 0 | - | 0 |
| | EBT-R | | 27.9 | C | 0.59 | 38.6 | D | 0.58 |
| | WBL | | 55.9 | E | 0.95 | 46.3 | D | 0.99 |
| | WBT-R | | 11.3 | B | 0.09 | 5.3 | A | 0.18 |
| | NBL | | 18.6 | B | 0.18 | 39.0 | D | 0.24 |
| | NBT | | 16.8 | B | 0.00 | 35.3 | D | 0.04 |
| | NBR | | 0 | - | 0 | 0 | - | 0 |
| | SBL | | 22.1 | C | 0.01 | 35.5 | D | 0.02 |
| | SBT-R | | 22.1 | C | 0.01 | 35.2 | D | 0.04 |
| Pooles Rd & Russell Rd | all | signal | 12.3 | B | | 15.0 | B | |
| | EBL | | 11.8 | B | 0.13 | 16.0 | B | 0.41 |
| | EBT | | 11.6 | B | 0.12 | 15.6 | B | 0.38 |
| | WBT | | 12.4 | B | 0.25 | 14.3 | B | 0.18 |
| | WBR | | 12.8 | B | 0.32 | 14.2 | B | 0.17 |
| | SBL | | 12.1 | B | 0.23 | 16.5 | B | 0.61 |
| | SBR | | 11.4 | B | 0.14 | 10.1 | B | 0.08 |
| Russell Rd & Doran Rd | all | signal | 20.7 | C | | 18.5 | B | |
| | EBL | | 36.2 | D | 0.91 | 36.3 | D | 0.88 |
| | EBR | | 15.0 | B | 0.22 | 17.2 | B | 0.21 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|--|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| | NBL | | 13.5 | B | 0.39 | 15.7 | B | 0.57 |
| | NBT | | 18.6 | B | 0.69 | 10.5 | B | 0.34 |
| | SBT | | 19.6 | B | 0.31 | 22.4 | C | 0.75 |
| | SBR | | 4.4 | A | 0.28 | 7.5 | A | 0.59 |
| Hwy 400 SB off-ramp & Forbes Rd | all | signal | 11.3 | B | | 19.5 | B | |
| | EBT | | 10.8 | B | 0.43 | 7.9 | A | 0.23 |
| | WBL | | 15.3 | B | 0.29 | 9.5 | A | 0.10 |
| | WBT | | 11.0 | B | 0.46 | 22.6 | C | 0.93 |
| | NBL | | 11.8 | B | 0.12 | 19.5 | B | 0.32 |
| Snow Valley Rd & Wilson Dr. northerly intersection | all | signal | 14.0 | B | | 13.6 | B | |
| | EBL | | 9.2 | A | 0.04 | 9.2 | A | 0.03 |
| | EBT | | 10.8 | B | 0.36 | 11.6 | B | 0.48 |
| | WBT | | 10.6 | B | 0.32 | 11.4 | B | 0.44 |
| | WBR | | 9.9 | A | 0.19 | 11.0 | B | 0.38 |
| | SBL | | 20.6 | C | 0.72 | 20.4 | C | 0.71 |
| | SBR | | 10.3 | B | 0.01 | 10.3 | B | 0.01 |
| Forbes Rd & Hwy400 NB off-ramp | SBL | stop | 34.8 | D | 0.22 | 52.4 | F | 0.63 |
| St. Vincent & Pooles Rd | EB | stop | 12.5 | B | 0.06 | 46.2 | E | 0.53 |
| | WB | | 97.8 | F | 1.08 | 527.8 | F | 2.00 |
| Finlay Mill Road & Wattie Rd | WB | stop | 26.2 | D | 0.43 | 45.5 | E | 0.61 |
| Highway 26 & Carson Rd | all | signal | 38.1 | D | | 52.6 | D | |
| | EBL | | 33.4 | C | 0.66 | 83.8 | F | 0.89 |
| | EBT-R | | 48.0 | D | 0.88 | 66.3 | E | 0.81 |
| | WBL | | 42.3 | D | 0.17 | 65.3 | E | 0.22 |
| | WBT-R | | 30.9 | C | 0.06 | 57.2 | E | 0.15 |
| | NBL | | 30.4 | C | 0.73 | 117.3 | F | 1.07 |
| | NBT | | 15.0 | B | 0.58 | 16.9 | B | 0.78 |
| | NBT-R | | 14.9 | B | 0.58 | 16.7 | B | 0.78 |
| | SBL | | 19.7 | B | 0.06 | 34.3 | C | 0.18 |
| | SBT | | 51.2 | D | 0.99 | 63.8 | F | 1.01 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|-----------------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| | SBT-R | | 56.2 | F | 1.01 | 79.4 | F | 1.06 |
| Highway 26 & Snow Valley Road | all | signal | 46.7 | D | | 51.3 | D | |
| | EBL | | 27.4 | C | 0.46 | 46.3 | D | 0.82 |
| | EBT | | 33.3 | C | 0.34 | 88.4 | F | 0.97 |
| | EBR | | 39.3 | D | 0.67 | 68.4 | E | 0.86 |
| | WBL | | 23.8 | C | 0.71 | 48.9 | D | 0.86 |
| | WBT-R | | 30.7 | C | 0.69 | 51.8 | D | 0.74 |
| | NBL | | 63.7 | E | 0.94 | 81.6 | F | 0.95 |
| | NBT | | 27.9 | C | 0.74 | 36.5 | D | 0.88 |
| | NBR | | 20.0 | C | 0.24 | 31.6 | C | 0.71 |
| | SBL | | 19.9 | B | 0.18 | 31.6 | C | 0.60 |
| | SBT | | 79.3 | F | 1.05 | 57.5 | E | 0.96 |
| | SBT-R | | 81.5 | F | 1.05 | 60.6 | F | 0.97 |
| St. Vincent St/Gill Rd & Doran Rd | NB | stop | 24.4 | C | 0.35 | 27.2 | D | 0.47 |
| | SB | | 19.9 | C | 0.45 | 211.2 | F | 1.30 |
| Hwy 26/CR 27 & Spence Ave | all | signal | 20.1 | C | | 15.0 | B | |
| | EBL | | 33.5 | C | 0.16 | 35.9 | D | 0.49 |
| | EBT | | 33.4 | C | 0.17 | 35.9 | D | 0.52 |
| | EBR | | 0.6 | A | 0.33 | 0.8 | A | 0.43 |
| | WBL | | 32.4 | C | 0.01 | 31.6 | C | 0.02 |
| | T-R | | 37.2 | D | 0.54 | 33.5 | C | 0.32 |
| | NBL | | 27.2 | C | 0.88 | 22.4 | C | 0.82 |
| | NBT-R | | 3.3 | A | 0.23 | 4.2 | A | 0.47 |
| | SBL | | 19.5 | B | 0.0 | 18.2 | B | 0.04 |
| | SBT-R | | 33.9 | C | 0.86 | 29.7 | C | 0.83 |
| CR 27 & Craig Road | all | signal | 9.5 | A | | 10.4 | B | |
| | WBL | | 16.1 | B | 0.51 | 29.8 | C | 0.78 |
| | WBR | | 15.3 | B | 0.38 | 23.7 | C | 0.27 |
| | NBT | | 7.8 | A | 0.37 | 8.0 | A | 0.58 |
| | NBR | | 7.8 | A | 0.37 | 8.0 | A | 0.58 |
| | SBL | | 9.7 | A | 0.09 | 16.8 | B | 0.42 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|---------------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| | SBT | | 7.9 | A | 0.42 | 5.9 | A | 0.32 |
| Wilson Dr & Snow Valley Rd | all | signal | 12.4 | B | | 21.4 | C | |
| | WBL | | 20.4 | C | 0.70 | 31.8 | C | 0.77 |
| | WBR | | 13.1 | B | 0.43 | 19.3 | B | 0.67 |
| | NBT | | 14.1 | B | 0.57 | 25.6 | C | 0.80 |
| | NBR | | 13.6 | B | 0.49 | 18.8 | B | 0.57 |
| | SBL | | 9.1 | A | 0.49 | 24.9 | C | 0.84 |
| | SBT | | 7.7 | A | 0.48 | 8.8 | A | 0.42 |
| Wilson Dr & Seadon Rd/Carson Rd | all | signal | 10.2 | B | | 8.6 | A | |
| | EBL | | 13.4 | B | 0.03 | 21.3 | C | 0.08 |
| | EBT-R | | 11.6 | B | 0.13 | 18.3 | B | 0.10 |
| | WBL | | 14.8 | B | 0.44 | 20.9 | C | 0.36 |
| | WBT-R | | 12.6 | B | 0.32 | 20.6 | C | 0.47 |
| | NBL | | 10.6 | B | 0.04 | 7.3 | A | 0.07 |
| | NBT | | 8.8 | A | 0.38 | 6.6 | A | 0.47 |
| | NBT-R | | 8.8 | A | 0.38 | 6.6 | A | 0.47 |
| | SBL | | 10.9 | B | 0.14 | 11.0 | B | 0.29 |
| | SBT | | 9.0 | A | 0.41 | 5.8 | A | 0.32 |
| | SBT-R | | 9.0 | A | 0.41 | 5.8 | A | 0.32 |

Given the increase in traffic volumes, despite the assumed improvements, a poor level of service "F" occurs at the following intersections:

- Forbes Road at Highway 400 NB off-ramp
- St. Vincent Street at Pooles Road
- Highway 26 at Carson Road
- Highway 26 at Snow Valley Road
- St. Vincent Street at Doran Road

Thus, improvements at these intersections should be considered. The following improvements are recommended:

Intersection of Forbes Road at Highway 400 NB off-ramp:

- Add an eastbound left turn lane

Intersection of St. Vincent Street at Pooles Road

- Add a northbound right turn lane; and
- Add a southbound left turn lane
- Consider intersection signalization

Intersection of Highway 26 at Carson Road

- Add an eastbound left turn lane; and

Intersection of Highway 26 at Snow Valley Road

- Add a southbound right turn lane

Intersection of St. Vincent Street at Doran Road

- Add a traffic signal; and
- Add an exclusive left turn lane on each approach

Based on the above improvements, the above intersections would operate acceptably. The results of the analysis are summarized in Table 7.5.4-2.

Table 7.5.4-2 – Intersection Operations – 2041 Total Traffic Volumes with Improvements

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|--------------------------------|-------|---------|--------------|------|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| Forbes Rd & Hwy400 NB off-ramp | SBL | stop | 20.3 | C | 0.13 | 22.3 | C | 0.36 |
| St. Vincent & Pooles Rd | EB | stop | 10.6 | B | 0.03 | 18.3 | C | 0.26 |
| | WB | | 41.2 | E | 0.87 | 51.1 | F | 0.82 |
| Highway 26 & Carson Rd | all | signal | 30.9 | C | | 30.2 | C | |
| | EBL | | 36.3 | D | 0.71 | 69.5 | E | 0.89 |
| | EBT | | 23.6 | C | 0.00 | 34.8 | C | 0.02 |
| | EBR | | 33.8 | C | 0.79 | 34.4 | C | 0.57 |
| | WBL | | 32.4 | C | 0.09 | 45.6 | D | 0.15 |
| | WBT-R | | 32.0 | C | 0.08 | 45.8 | D | 0.21 |
| | NBL | | 20.3 | C | 0.36 | 46.2 | D | 0.86 |
| | NBT | | 13.3 | B | 0.56 | 16.3 | B | 0.80 |
| | NBT-R | | 13.2 | B | 0.56 | 16.2 | B | 0.81 |
| | SBL | | 17.4 | B | 0.05 | 30.2 | C | 0.17 |
| | SBT | | 40.8 | D | 0.95 | 31.9 | C | 0.91 |
| SBR | 44.4 | D | 0.97 | 39.4 | D | 0.96 | | |
| Highway 26 & Snow Valley Road | all | signal | 32.4 | C | | 38.0 | D | |
| | EBL | | 23.1 | C | 0.42 | 45.3 | D | 0.81 |

| INTERSECTION | | CONTROL | AM PEAK HOUR | | | PM PEAK HOUR | | |
|-----------------------------------|-------|---------|--------------|-----|------|--------------|-----|------|
| | | | Delay(s) | LOS | v/c | Delay(s) | LOS | v/c |
| | EBT | | 29.1 | C | 0.33 | 79.3 | E | 0.96 |
| | EBR | | 24.2 | C | 0.42 | 35.3 | D | 0.59 |
| | WBL | | 19.4 | B | 0.68 | 39.5 | D | 0.83 |
| | WBT-R | | 26.7 | C | 0.68 | 41.1 | D | 0.66 |
| | NBL | | 38.1 | D | 0.82 | 43.3 | D | 0.83 |
| | NBT | | 30.3 | C | 0.82 | 39.1 | D | 0.92 |
| | NBR | | 8.4 | A | 0.16 | 15.3 | B | 0.55 |
| | SBL | | 20.1 | C | 0.18 | 28.8 | C | 0.59 |
| | SBT | | 50.8 | D | 0.98 | 35.9 | D | 0.85 |
| | SBR | | 20.0 | C | 0.38 | 15.4 | B | 0.27 |
| St. Vincent St/Gill Rd & Doran Rd | All | signal | 12.5 | B | | 12.8 | B | |
| | EBL | | 17.0 | B | 0.12 | 15.8 | B | 0.36 |
| | EBT-R | | 8.3 | A | 0.17 | 13.1 | B | 0.66 |
| | WBL | | 9.6 | A | 0.14 | 16.6 | B | 0.14 |
| | WBT-R | | 13.7 | B | 0.71 | 10.7 | B | 0.50 |
| | NBL | | 14.1 | B | 0.13 | 12.8 | B | 0.07 |
| | NBT-R | | 10.9 | B | 0.07 | 11.5 | B | 0.17 |
| | SBL | | 12.2 | B | 0.10 | 15.0 | B | 0.29 |
| | SBT-R | | 12.4 | B | 0.24 | 11.6 | B | 0.19 |

7.5.5 Turn Lane Requirements

The need for a left turn lane on Finlay Mill Road at Wattie Road was reviewed. Based on MTO left turn lane warrant criteria, the 2031 and 2041 traffic volumes and a design speed of 60 km/h, a 15 m southbound left turn lane is warranted in both the 2031 and 2041 horizons.

7.6 Required Road Improvement Summary

This study has addressed the transportation impacts attributable to the development of the Midhurst Secondary Plan in the Township of Springwater. Overall, and in considering the peak traffic periods, the developments are expected to generate 6,204 primary trips in the AM peak hour and 7,842 trips in the PM peak hour (both inbound and outbound trips). By 2027, all approved units (3,850 units) would be built. By 2031, Phase 1 of the Midhurst developments are expected to generate 4,209 trips in the AM peak hour and 5,615 trips in the PM peak hour (both inbound and outbound trips).

To address the potential impacts of the proposed developments, peak hour operations at the area 15 intersections were reviewed for the 2015, 2031 and 2041 horizons. Traffic projections for 10-

and 20-year horizons are only approximations and should be checked with 5-year updates or more frequently based on development stages to confirm assumptions on traffic growth and development progress are accurate and the proposed improvement type and schedule are appropriate.

As per the County's Transportation Master Plan, anticipated improvements include:

- Snow Valley Road from CR 28 to Highway 26 widening to 4 lanes by 2021
- Wilson Drive from Barrie limit to Highway 26 widening to 4 lanes by 2031
- Widening of CR 93 from CR 11 (Forbes Road) to City of Barrie limit by 2031
- CR 27 from Highway 26 to CR 22 widening to 4 lanes by 2041

Figure 7.6.1 provides a schematic special distribution and staging for many of the proposed improvements. Many of the improvements have been advanced in the schedule to coincide with general road reconstruction for infrastructure installation.

Based on the assessment, the following improvements are recommended:

Identified Needs at Start of Development

Construct Craig Road from Russell Road to County Road 27 as an extension of Forbes Road.) It is proposed that this project will be completed during the first stage of development.

By or Before 2031 Horizon

- Extend St. Vincent Street between Belmont Crescent and Park Trail (As part of Phase 1, Stage 3)
- Widen Wilson Road to four lanes. (As part of Phase 1, Stage 3)
- Provide a continuous two-way left turn lane on Finlay Mill Road from Wattie Road to Hwy 26 (Phase 1, Stage 1)
- The intersection of Wilson Drive at Snow Valley Road southerly intersection (as part of Phase 1, Stage 2)
 - Add a traffic signal (consider a roundabout at this intersection See Section 7.6.2 of ESR))
 - Add an exclusive left turn lane on each approach
- The intersection of Wilson Drive at Carson Road (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach
- The intersection of Highway 26 at Snow Valley Road/Finlay Mill Road (as part of Phase 1, Stage 1)
 - Add an eastbound right turn lane
- The intersection of Russell Road at Forbes Road (as part of Phase 2, Stage 1)
 - Add a traffic signal (consider a roundabout at this intersection See Section 7.6.2 of ESR)
 - Add an exclusive left turn lane on each approach
 - Add a northbound right turn

- The intersection of Russell Road at Doran Road (as part of Phase 2, Stage 1)
 - Add a traffic signal
 - Add an exclusive left turn lane on the northbound and eastbound approaches
 - Add a southbound right turn
- The intersection of Finlay Mill Road at Wattie Road (as part of Phase 1, Stage 1)
 - Add a southbound left turn lane
 - Add a northbound right turn lane (triggered by background traffic)

By or Before 2041 Horizon

- Add an additional through lane in each direction to a total of 4 lanes on the following sections of roads:
 - Forbes Road from Russell Road to Highway 400 (as part of Phase 2, Stage 1)
 - Russell Road from south of Walt Road to Forbes Road (as part of Phase 1, Stage 5)
- The intersection of Wilson Drive at Snow Valley Road northerly intersection (as part of Phase 1, Stage 2)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach
- The intersection of Highway 26 at Snow Valley Road/Finlay Mill Road (Combined with the initial road reconstruction/urbanization and as part of Phase 1, Stage 1)
 - Add a southbound right turn lane
- The intersection of Highway 26 at Carson Road (Combined with previous intersection work as part of Phase 1, Stage 4)
 - Add an eastbound right turn lane
- The intersection of Doran Road at St. Vincent Street (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach

We note that the traffic signal warrant is not fully met for this intersection but in consideration of the large left turn movement for westbound to southbound it may be beneficial.

- The intersection of St. Vincent Street at Pooles Road (as part of Phase 1, Stage 5)
 - Add a northbound right turn lane and signalize the intersection
 - Add southbound left turn lane
- The intersection of Russell Road at Pooles Road (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add a westbound right turn lane
 - Add an exclusive left turn lane on the east and south approaches

- The intersection of Forbes Road at Russell Road (as part of Phase 2, Stage 1)
 - Change the westbound inside lane to a left turn lane (double left turn lanes)
 - Change the northbound right turn lane to a channelized right turn lane
- The intersection of Forbes Road at Highway 400 (as part of Phase 1, Stage 2)
 - Add a westbound left turn lane for the SB off-ramp; and
 - Add an eastbound channelized right turn lane for the SB off-ramp
 - Add an eastbound left turn lane for the NB off-ramp

It should be noted that in conjunction with the upgrade for the Hwy. 400 & Forbes Road Interchange, as part of Phase 2 Stage 3, (By or before 2041) a re-evaluation of the proposed improvements will be undertaken in conjunction with the MTO.

Table 7.6.6 and Figure 7.6-1 provide a summary of the above noted improvements. For the development of the transportation network improvement scheduling, consideration was given to coordinate those improvements with general servicing requirements for the development areas. Projects such as intersection improvements along the Findley Mill Road / Snow Valley Road corridor are among the first transportation improvements completed because sanitary sewer infrastructure will be installed along this corridor at the initial stages of development, so the transportation improvements will be completed at that time.

7.6.1 Link Traffic Capacities

With the development of the Total Traffic Volumes for 2041 for the built-out condition as identified on Figure 7.6.2, a review of the traffic volumes on the various key road links was completed. In general, lane capacity for the various road segments will vary from 600 vehicles per lane per hour to 1000 vehicles per lane per hour depending on the general road conditions, horizontal and vertical alignment and degree of access. The peak hour traffic projections for Russell Road and Forbes Road in one direction are approximately 1670 and 1830 respectively. Reconstruction as a four-lane road is proposed for these two roads. The current development plan does not provide driveway access to these roads so lane capacity will be maximized and the resulting volume to capacity ratio will be high but acceptable.

The eastern portion of Pooles Road east of Russell Road has a projected lane volume of approximately 670 vehicles per hour and with no direct driveway access, it will have an acceptable v/c ratio. On the western portion of Pooles Road, as it approaches St. Vincent Street, the lane volume reduces to approximately 550 vehicles per hour. This segment has existing homes with direct driveway access, but the estimated lane volume is well below a modest 600 vehicle per hour lane capacity.

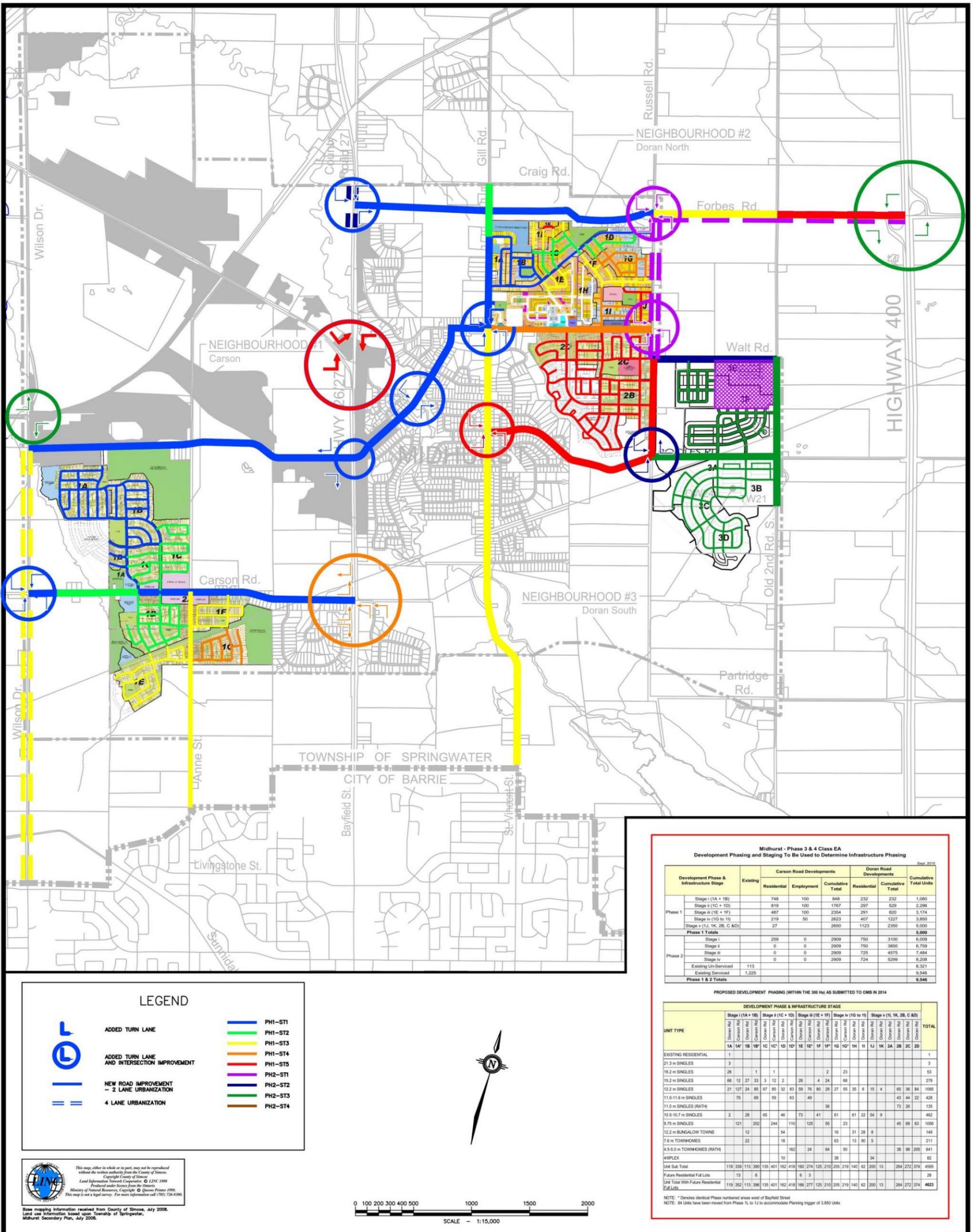
The Doran Road corridor between Russell Road and St. Vincent Street is estimated to be approximately 800 vehicles per lane per hour. Although there are a small number of existing driveways along this segment the resulting v/c ratio will be acceptable if care is taken to restrict direct driveway access for new development and provide adequate turn lane storage for the intersecting streets providing access to the Doran North and Doran South developments.

St. Vincent Street has an estimated peak traffic volume of 580 vehicles per hour per lane. This link has existing residential properties with direct driveway access. Assuming a low lane capacity to reflect the degree of access the v/c ration is acceptable. The LOS at the stop-controlled T intersection of St. Vincent Street and Jodie's Lane is an acceptable Level B for the 2041 traffic projections.

MIDHURST SECONDARY PLAN

TRANSPORTATION ROAD IMPROVEMENT PHASING PLAN

FIGURE 7.6.2. PHASING SCHEMATIC



The Finlay Mill Road corridor has an estimated peak hour lane volume of approximately 950 for the segment south of Wattie Road. This road link has existing residential driveway access and the volume capacity ratio will be high. As noted in the initial study: BA Group study of May 2014 (see Appendix E), the proposed development will increase congestion on Finlay Mill Road. To increase the average “lane capacity”, the improvements proposed for this segment include a Two-Way Left Turn Lane (TWTL) south of Wattie Road intersection which will reduce the delay to through traffic from vehicles turning left.

The eastern portion of Snow Valley Road at the approach to Hwy 26 has an estimated peak hour lane volume of approximately 900. Much of the adjacent land use for that segment is County Forest so direct access is low. The resulting v/c ratio will be high but acceptable. On the western portion of Snow Valley Road, the estimated peak hour lane volume is approximately 730. This road segment has direct access for several homes and businesses, including Public Works Yard. It will be important to provide sufficient storage lengths for turn lanes at any intersecting streets providing access to the Carson Road development area and perhaps at some of the commercial entrances. The resulting v/c ratio will be high but acceptable.

The eastern portion of Carson Road at the approach to Hwy 26 has an estimated peak hour lane volume of approximately 650. Existing residential properties along this segment have direct driveway access. The resulting v/c ratio will be high but acceptable. On the western portion of Carson Road, the estimated peak hour lane volume is approximately 330. Even with direct access for several existing homes the resulting v/c ratio will be low.

7.6.2 Roundabouts

Although much of the above analysis is specific to signalized intersections, roundabouts have been considered for many of the intersections. An initial list of 11 intersections was considered as candidates for this type of intersection treatment. These intersections included:

1. Wilson Road at Carson Road
2. Bayfield Road at Carson Road
3. Russell Road and Doran Road
4. County Road 27 at (future) Craig Road
5. Highway 26 at County Road 27
6. Russell Road at (future) Craig Road/Forbes Road
7. St. Vincent Street at Doran Road
8. St. Vincent Street at Pooles Road
9. Finlay Mill Road at Wattie Road
10. Russell Road at Pooles Road
11. Bayfield Road at Findley Mill / Snow Valley Road

A preliminary review of property impacts, compatibility with adjacent terrain resulted in the elimination of intersections 3, 8 and 9. The remaining eight were subjected to additional analysis including a review of terrain and traffic operations. This led to the elimination of all but 1, 4, and 6. These three will be carried forward for further consideration as the design stage evolves.

Schematic layouts of these three intersections, Wilson Road at Carson Road, county Road 27 at Craig Road and Russell Road at Forbes Road/Craig Road are provided in Appendix T-5. In the initial evaluation of roundabouts by BA Group in June 2015, see Appendix G, the intersection of Russell Road and Doran Road was included in the intersections suitable for further consideration as a roundabout, but that intersection was subsequently dropped from the list due to right of way constraints.

7.6.3 Active Transportation

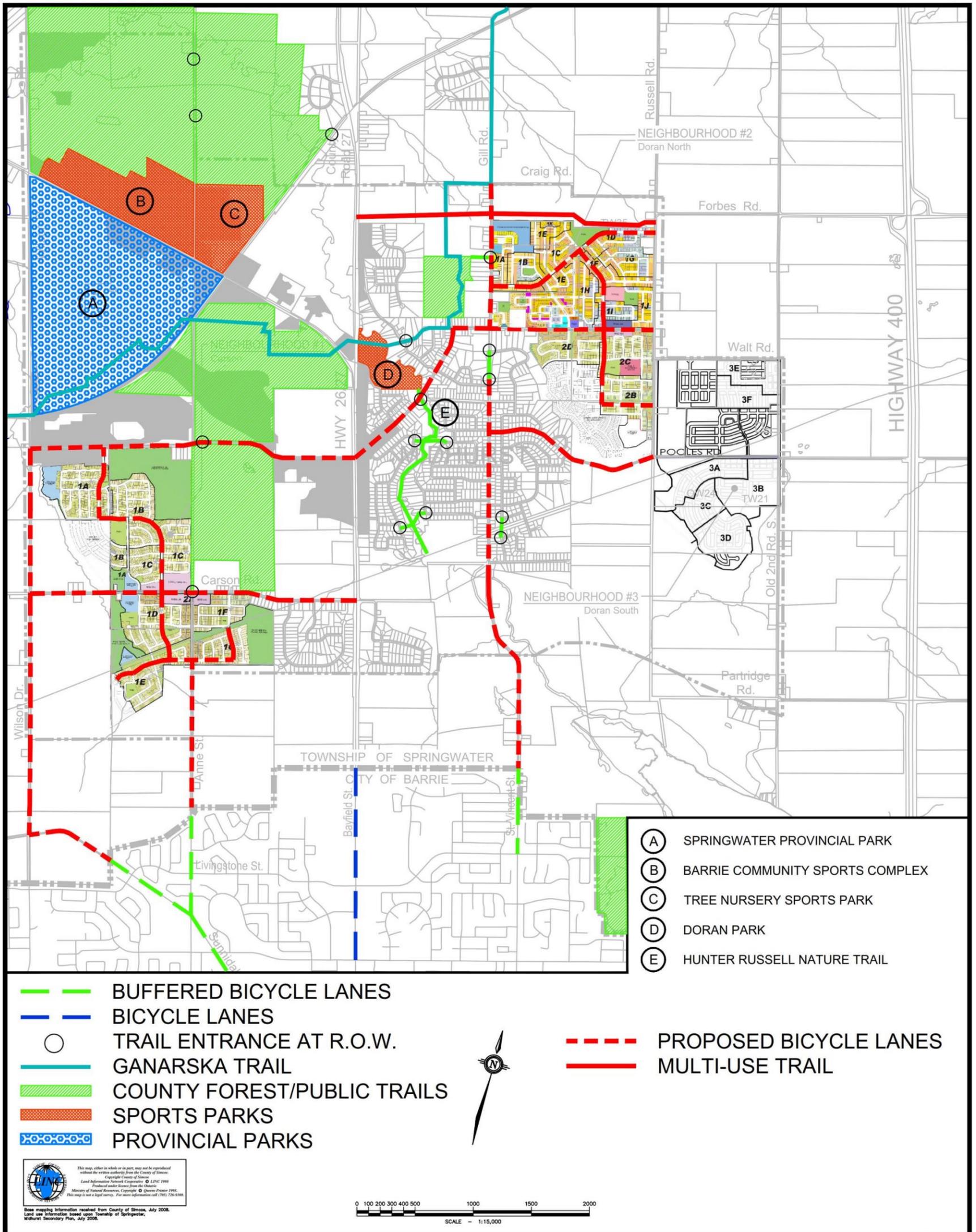
Figure 7.6.3-1 presents a preliminary layout of bicycle lanes and multi-use trails to integrate the development areas with existing recreational features and trail systems in the surrounding area, as well as general connectivity with the existing Midhurst area. The routing is based on a review of information gathered for City of Barrie, County Simcoe and Township of Springwater on proposed extension of bicycle lanes northwards along Wilson Road, Anne St. and St. Vincent Street, connection with Ganarska Trail, Provincial Park and existing trails within the County forest to the west of County Road 27 and, sports parks within the general area. The proposal provides bicycle lanes along existing key corridors and a multi-use trail along the northerly and northeast limits to provide connectivity. In addition to these general area links, each of the development areas will be required to provide bicycle lanes along collector roads within those developments.

Figure 7.6.3-1 is schematic and the “bike lane” may take the form of a paved shoulder on some rural road segments. Along Russell Road north of Doran Road, a multi-use trail along the west side boulevard is proposed due to the anticipated heavy traffic volumes. The multi-use trail provides better separation between bicycles and vehicles and is a relatively efficient use of right of way rather than providing 2 bicycle lanes and sidewalks. The same principal was applied along Craig Road and the link to Ganarska Trail. Along Finlay Mill Road, the available right of way and terrain combine to make the provision of any additional sidewalks and bicycle lanes problematic and alternate routes for bicycle lanes will be sought for that link in detailed design.

MIDHURST SECONDARY PLAN

ACTIVE TRANSPORTATION INTERCONNECTION PLAN

FIGURE 7.6.3-1



7.6.4 Selected Cross Sections for Road Improvements

Table 7.6.4-1 provides a summary of the proposed cross sections to be applied to the various road improvements. In general, urban cross-sections have been applied to road improvement projects within the developed areas of Midhurst and rural cross-sections applied to outlying areas such as Craig Road, Forbes Road, Wilson Road, and St. Vincent Street between Willow Creek and the City of Barrie limits. Portions of Carson Road west of the developed area and portions of Pooles Road have been retained as rural cross-section. Generally, the traffic lanes are 3.5 metres wide but for County Roads such as Wilson Road and Snow Valley Road the lanes are 3.75 metres wide. In most instances where rural cross-section has been applied, a paved shoulder with a width of at least 2 metres is provided as the Active Transportation feature.

7.6.5 Additional Right-of -Way Requirements

Table 7.6.5-1 provides a summary of the proposed right of way widths required to accomplish the proposed road improvements. For existing roadways not directly adjacent to the proposed development, the intention is to work within the existing road right of way limits. Localized right of way widening will be required to accommodate some intersection improvements. On roadways adjacent to new development, the necessary right of way widening will be taken from the development lands. This is applicable to much of Carson Road, Doran Road, Walt Road, Old Second Road and portions of Russell Road.

Several areas of proposed road improvement require additional right of way. These areas are not adjacent to development and right of way will need to be purchased. The following is a list of those segments. Right of way is required along Forbes road where the proposed improvement is to reconstruct the road from 2 to 4 lanes. Craig Road between Russell Road and County Road 27 requires a new right of way. It has been assumed that a 23-metre right of way will be purchased. Additional right of way width will be required to accommodate the large cut at the approach to County Road 27. Along Carson Road, the portion immediately west of the intersection with Highway 27 requires significant widening to accommodate additional lanes required for the 2041 traffic projections. To the east of Glenhuron Drive, it is proposed that the widening will be taken from the north side of the road. Along Russell Road to the north of Doran Road, development is along the west side of Russell Road. Where development is adjacent to the Russell Road a widening will be obtained from the development. However, there is a portion of Russell Road between the northern limit of development and Forbes Road that is not adjacent to new development and a 3-metre widening will need to be purchased.

At this time, Snow Valley Road is proposed as a 2-lane road in the existing 20 metre right-of-way. The County may consider a 4-lane cross-section in the future. At that time, additional right-of way could be acquired along the less developed north side of the road.

Table 7.6.5 provides a summary of the proposed roadway improvements and the existing and proposed right-of-way requirements.

7.6.6 Cost of Road Improvements

Table 7.6.6-1 provides a summary of the estimated construction costs of roadway improvements external to the Plans of Subdivision. The cost of the road improvements will be borne by Developers and funded through Development Charges. Further, in advance of the identified highway improvements associated with MTO controlled roads proceeding, the Township and/or the County of Simcoe (depending upon who has local jurisdiction) will enter into a legal Agreement(s) with the MTO regarding the funding for the proposed highway improvements within specified timelines. In addition, the Township will update the Traffic Operational Analysis every five (5) years to confirm that the timelines/horizon years noted remain applicable.

Table 7.6.4-1 - Road Improvement Cross Sections

| Phase | Stage | Street Name | From | To | Intersections | Approx. Length (km) | No. of Proposed Lanes | Urban or Rural | Active Transportation Lanes | Existing R.O.W. Width | Proposed R.O.W. Width | |
|---------|-----------------------|--------------------|---------------------------|----------------------------|----------------------------|----------------------------|-----------------------|----------------|-----------------------------|-----------------------|-----------------------|----|
| Phase 1 | 1 | Finlay Mill Road | Hwy 26 | Wattie Road | | 0.85 | 3 | Urban | NO | 20 | 20 | |
| | | Finlay Mill Road | Wattie Road | Doran Road | | 0.60 | 2 | Urban | NO | 20 | 20 | |
| | | Craig Road | County Rd 27 | Russel Road | | 2.70 | 2 | Rural | Multi Use Trail | 26 | 26 | |
| | | Snow Valley Road | Wilson Drive | Hwy 26 | | 2.80 | 2 | Rural | 2 -2.0m each | 20 | 26 | |
| | | Doran Road | Finlay Mill Road | West limit of Draft Plans | | 0.75 | 2 | Urban | 2 - 1.5m each | varies | varies | |
| | | Gill Road | Doran Road | North limit of Draft Plan | | 0.85 | 2 | Urban | 2 - 1.5m each | 20 - 21.5 | 23 | |
| | | Gill Road | North Limit of Draft Plan | Craig Road | | 0.40 | 2 | Rural | 2 - 2.0m each | 20 | 23 | |
| | | Carson Road | Anne Street | West of Glenbrook Drive | 2 Subdivision Entrances | 0.70 | 2 | Urban | 2 - 1.5m each | 20 - 28 | 28 | |
| | | Carson Road | West of Glenbrook Drive | Hwy 26 | | 0.70 | 2 - 5 | Urban | 2 - 1.5m each | 20 - 27 | 28 | |
| | | | | | | Carson Road - Wilson Drive | | | | | | |
| | | | | | | Carson Road - Hwy 26 | | | | | | |
| | | | | | | Craig Rd - County Rd 27 | | | | | | |
| | | | | | | Finlay Mill - Wattie Road | | | | | | |
| | | | | | | Finlay Mill - HWY 26/27 | | | | | | |
| | | | | | | Gill Road - Doran Road | | | | | | |
| | | | | | HWY 26 - HWY 27 | | | | | | | |
| | | | | | | 10.35 | | | | | | |
| | | 2 | St. Vincent Street | Doran Road | Belmont Crescent link | | 0.50 | 2 | Urban | 2 - 1.5m each | 20 - 30 | 20 |
| | | | St. Vincent Street | Belmont Crescent | Willow Creek Bridge | | 1.70 | 2 | Urban | 2 - 1.5m each | 20 | 20 |
| | | | Carson Road | Wilson Drive | Black Creek | | 0.60 | 2 | Rural | 2 - 1.5m each | 20 | 20 |
| | | | Carson Road | Black Creek | Anne Street | 4 Subdivision Entrances | 0.80 | 2 - 3 | Urban | 2 - 1.5m each | 36 | 36 |
| | | | | | | HWY 400 - Forbes Rd. | | | | | | |
| | | | | | | 3.60 | | | | | | |
| | | 3 | Forbes Road | Russell Road | Old Second Road South | | 1.10 | 2 | Rural | 2 - 2.0m each | 20 - 30 | 30 |
| | | | St. Vincent Street | Willow Creek bridge | City of Barrie Limits | | 1.70 | 2 | Rural | 2 - 2.0m each | 20 | 20 |
| | | | Anne Street | Carson Road | South limit of Draft Plans | | 0.65 | 2 | Urban | 2 - 1.5m each | 26 | 26 |
| | | | Anne Street | South limit of Draft Plans | City of Barrie Limits | | 1.25 | 2 | Rural | 2 - 2.0m each | 20 | 20 |
| | | | Wilson Drive | City of Barrie limits | Snow Valley Road | | 3.80 | 4 | Rural | 2 -2.0m each | 26 | 40 |
| | | | Russell Road (Interim) | Pooles Road | Forbes Road | | 1.00 | 2 | Rural | 2 -2.0m each | 20 | 20 |
| | | | | | Craig Rd. - County Rd 27 | | | | | | | |
| | | | | | | 9.50 | | | | | | |
| | | 4 | Doran Road | West limit of Draft Plans | Russell Road | | 1.40 | 2 - 3 | Urban | 2 - 1.5m each | 29.5 | 30 |
| | | | | | | 4 Subdivision Entrances | | | | | | |
| | | | | | | 1.40 | | | | | | |
| | | 5 | Forbes Road (interim) | Old Second Road South | Hwy 400 | | 1.20 | 2 | Rural | NO | 20 | 40 |
| | Pooles Road | | St. Vincent Street | Silverwood Crescent | | 0.75 | 2 | Urban | 2 - 1.5m each | 17 - 20 | 20 | |
| | Pooles Road | | Silverwood Crescent | Russell Road | | 0.75 | 2 | Rural | 2 - 1.5m each | 10 | 23 | |
| | Russell Road | | Pooles Road | Walt Road | 3 Subdivision Entrances | 0.60 | 2 | Urban | 2 - 1.5m each | 20 - 28 | 28 | |
| | Russell Road | | Walt Road | Forbes Road | | 0.50 | 4 | Urban | 2 - 1.5m each | 26 | 26 | |
| | | | | | Russell Rd. - Walt Rd. | | | | | | | |
| | | | | Pooles Rd. - St. Vincent | | | | | | | | |
| | | | | | 3.8 | | | | | | | |
| | PHASE 1 LENGTH | | | | | 28.65 | | | | | | |
| Phase 2 | 1 | Forbes Road | Russell Road | Hwy 400 | | 2.3 | 4 | Rural | 2-2.0m each | 20 | 36 | |
| | | | | | Russell Road - Forbes Road | | | | | | | |
| | | | | | Russell Road - Doran Road | | | | | | | |
| | 2 | Walt Road | Old Second Rd. | Russell Rd | | 1.1 | 2 | Urban | 2-2.0m each | 20 | 23 | |
| | | | | | Pooles Road - Russell Road | | | | | | | |
| | 3 | Old 2nd Road South | Walt Rd. | Pooles Rd. | | 1.2 | 2 | Rural | 2-2.0m each | 20 | 23 | |
| | | Pooles Road | Old Second Rd | Russell Rd. | | 1.1 | 2 | Rural | 2-2.0m each | 20 | 23 | |
| | | | | | Hwy 400 - Forbes Road | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | PHASE 2 LENGTH | | | | | 5.7 | | | | | | |



Table 7.6.5-1 - Transportation Improvement ROW Requirements

| Stage | Street Name | From | To | Intersections | Approx. Length (km) | No. of Proposed Lanes | Urban or Rural | Active Transportation Lanes | Existing R.O.W. Width | Proposed R.O.W. Width |
|-----------------------|------------------------|----------------------------|----------------------------|--|---------------------|-----------------------|----------------|-----------------------------|-----------------------|-----------------------|
| 1 | Finlay Mill Road | Hwy 26 | Wattie Road | | 0.85 | 3 | Urban | NO | 20 | 20 |
| | Finlay Mill Road | Wattie Road | Doran Road | | 0.60 | 2 | Urban | NO | 20 | 20 |
| | Craig Road | County Rd 27 | Russel Road | | 2.70 | 2 | Rural | Multi Use Trail | 26 | 26 |
| | Snow Valley Road | Wilson Drive | Hwy 26 | | 2.80 | 2 | Rural | 2 -2.0m each | 20 | 26 |
| | Doran Road | Finlay Mill Road | West limit of Draft Plans | | 0.75 | 2 | Urban | 2 - 1.5m each | varies | varies |
| | Gill Road | Doran Road | North limit of Draft Plan | | 0.85 | 2 | Urban | 2 - 1.5m each | 20 - 21.5 | 23 |
| | Gill Road | North Limit of Draft Plan | Craig Road | | 0.40 | 2 | Rural | 2 - 2.0m each | 20 | 23 |
| | Carson Road | Anne Street | West of Glenbrook Drive | 2 Subdivision Entrances | 0.70 | 2 | Urban | 2 - 1.5m each | 20 - 28 | 28 |
| | Carson Road | West of Glenbrook Drive | Hwy 26 | | 0.70 | 2 - 5 | Urban | 2 - 1.5m each | 20 - 27 | 28 |
| | | | | Carson Road - Wilson Drive | | | | | | |
| | | | | Carson Road - Hwy 26 | | | | | | |
| | | | | Craig Rd - County Rd 27 | | | | | | |
| | | | | Finlay Mill - Wattie Road | | | | | | |
| | | | Finlay Mill - HWY 26/27 | | | | | | | |
| | | | Gill Road - Doran Road | | | | | | | |
| | | | HWY 26 - HWY 27 | | | | | | | |
| | | | | | 10.35 | | | | | |
| 2 | St Vincent Street | Doran Road | Belmont Crescent link | | 0.50 | 2 | Urban | 2 - 1.5m each | 20 - 30 | 20 |
| | St Vincent Street | Belmont Crescent | Willow Creek Bridge | | 1.70 | 2 | Urban | 2 - 1.5m each | 20 | 20 |
| | Carson Road | Wilson Drive | Black Creek | | 0.60 | 2 | Rural | 2 - 1.5m each | 20 | 20 |
| | Carson Road | Black Creek | Anne Street | 4 Subdivision Entrances | 0.80 | 2 - 3 | Urban | 2 - 1.5m each | 36 | 36 |
| | | | | HWY 400 - Forbes Rd. | | | | | | |
| | | | | | 3.60 | | | | | |
| 3 | Forbes Road | Russell Road | Old Second Road South | | 1.10 | 2 | Rural | 2 - 2.0m each | 20 - 30 | 30 |
| | St Vincent Street | Willow Creek bridge | City of Barrie Limits | | 1.70 | 2 | Rural | 2 - 2.0m each | 20 | 20 |
| | Anne Street | Carson Road | South limit of Draft Plans | | 0.65 | 2 | Urban | 2 - 1.5m each | 26 | 26 |
| | Anne Street | South limit of Draft Plans | City of Barrie Limits | | 1.25 | 2 | Rural | 2 - 2.0m each | 20 | 20 |
| | Wilson Drive | City of Barrie limits | Snow Valley Road | | 3.80 | 4 | Rural | 2 -2.0m each | 26 | 40 |
| | Russell Road (Interim) | Pooles Road | Forbes Road | | 1.00 | 2 | Rural | 2 -2.0m each | 20 | 20 |
| | | | | Craig Rd. - County Rd 27 | | | | | | |
| | | | | | 9.50 | | | | | |
| 4 | Doran Road | West limit of Draft Plans | Russell Road | | 1.40 | 2 - 3 | Urban | 2 - 1.5m each | 29.5 | 30 |
| | | | | 4 Subdivision Entrances | | | | | | |
| | | | | | 1.40 | | | | | |
| 5 | Forbes Road (interim) | Old Second Road South | Hwy 400 | | 1.20 | 2 | Rural | NO | 20 | 40 |
| | Pooles Road | St. Vincent Street | Silverwood Crescent | | 0.75 | 2 | Urban | 2 - 1.5m each | 17 - 20 | 20 |
| | Pooles Road | Silverwood Crescent | Russell Road | | 0.75 | 2 | Rural | 2 - 1.5m each | 10 | 23 |
| | Russell Road | Pooles Road | Walt Road | 3 Subdivision Entrances | 0.60 | 2 | Urban | 2 - 1.5m each | 20 - 28 | 28 |
| | Russell Road | Walt Road | Forbes Road | | 0.50 | 4 | Urban | 2 - 1.5m each | 26 | 26 |
| | | | | Russell Rd. - Walt Rd. Pooles Rd. - St. Vincent | | | | | | |
| | | | | | 3.9 | | | | | |
| PHASE 1 LENGTH | | | | | 28.65 | | | | | |
| 1 | Forbes Road | Russell Road | Hwy 400 | | 2.3 | 4 | Rural | 2-2.0m each | 20 | 36 |
| | | | | Russell Road - Forbes Road | | | | | | |
| | | | | Russell Road - Doran Road | | | | | | |
| 2 | Walt Road | Old Second Rd. | Russell Rd | | 1.1 | 2 | Urban | 2-2.0m each | 20 | 23 |
| | | | | Pooles Road - Russell Road | | | | | | |
| 3 | Old 2nd Road South | Walt Rd. | Pooles Rd. | | 1.2 | 2 | Rural | 2-2.0m each | 20 | 23 |
| | Pooles Road | Old Second Rd | Russell Rd. | | 1.1 | 2 | Rural | 2-2.0m each | 20 | 23 |
| | | | | Hwy 400 - Forbes Road | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| PHASE 2 LENGTH | | | | | 5.7 | | | | | |

Table 7.6.6-1 – Opinion of Cost of Transportation Improvements

| Phase | Stage | Street Name | From | To | Intersections | Approx. Length (km) | No. of Proposed Lanes | Urban or Rural | Active Transportation Lanes | Existing R.O.W. Width | Proposed R.O.W. Width | Required Property Acquisition (Sqm.) | Asphalt Platform Width | Total Boulevard Width | Sidewalk or Multi Use Trail | Comments | Cost Per Metre for Construction | Feature Comments | Cost for Feature | Total Estimated Construction Cost | |
|---|------------------------|------------------|----------------------------|----------------------------|----------------------------|---------------------|-----------------------|----------------|-----------------------------|-----------------------|-----------------------|--------------------------------------|------------------------|-----------------------|--------------------------------------|---|--------------------------------------|---|------------------|-----------------------------------|-------------|
| Phase 1 | 1 | Finlay Mill Road | Hwy 26 | Wattie Road | | 0.85 | 3 | Urban | NO | 20 | 20 | 0 | 10.5 | 4.25 | 2 - 1.5m each side | No room for Active Transportation lanes | \$3,900 | Bridge at Finlay Mills and Wattie and Retaining Walls | \$2,109,300 | \$5,424,300 | |
| | | Finlay Mill Road | Wattie Road | Doran Road | | 0.60 | 2 | Urban | NO | 20 | 20 | 0 | 11 | 4 | 2 - 1.5m each side | No room for Active Transportation lanes | \$3,800 | | \$0 | \$2,280,000 | |
| | | Snow Valley Road | Wilson Drive | Hwy 26 | | 2.80 | 2 | Rural | 2 - 2.0m each | 20 | 26 | 16800 | 12.5 | 3.75 | Paved Shoulder | County Road | \$2,800 | Hydro Relocation for Overhead Transformers on Snowvalley Road | \$1,560,000 | \$9,400,000 | |
| | | Doran Road | Finlay Mill Road | West limit of Draft Plans | | 0.75 | 2 | Urban | 2 - 1.5m each | varies | varies | Given by Dev | 11 | | | 2 - 1.5m each side | Need various widenings | \$3,900 | Retaining Walls | \$136,500 | \$3,061,500 |
| | | Gill Road | Doran Road | North limit of Draft Plan | | 0.85 | 2 | Urban | 2 - 1.5m each | 20 - 21.5 | 23 | 2550 | 11 | min. 4.0 | | 2 - 1.5m each side | 1.5m widening from Alliance | \$3,900 | | \$0 | \$3,315,000 |
| | | Gill Road | North Limit of Draft Plan | Craig Road | | 0.40 | 2 | Rural | 2 - 2.0m each | 20 | 23 | 1200 | 11 | 4.5 | | NO | Ganaraska Trail | \$2,700 | | \$0 | \$1,080,000 |
| | | Carson Road | Anne Street | West of Glenbrook Drive | 2 Subdivision Entrances | 0.70 | 2 | Urban | 2 - 1.5m each | 20 - 28 | 28 | Given by Dev | 11 | | | 1.5m on South side | Carson Trail Sub. on North side | \$3,900 | | \$0 | \$2,730,000 |
| | | Carson Road | West of Glenbrook Drive | Hwy 26 | | 0.70 | 2 - 5 | Urban | 2 - 1.5m each | 20 - 27 | 40 | 14000 | 11.0 - 20.5 | | | 1.5m on South side | Open ditch on North side | \$3,800 | | \$0 | \$2,660,000 |
| | | | | | Carson Road - Wilson Drive | | | | | | | | | | | | | \$500,000 | | | \$500,000 |
| | | | | | Carson Road - Hwy 26 | | | | | | | | | | | | | \$2,000,000 | | | \$2,000,000 |
| | | | | Finlay Mill - Wattie Road | | | | | | | | | | | | | \$250,000 | | | \$250,000 | |
| | | | | Finlay Mill - HWY 26/27 | | | | | | | | | | | | | \$400,000 | | | \$400,000 | |
| | | | | Gill Road - Doran Road | | | | | | | | | | | | | \$250,000 | | | \$250,000 | |
| | | | | HWY 26 - HWY 27 | | | | | | | | | | | | | \$750,000 | | | \$750,000 | |
| | | | | | | | 7.65 | | | | | | | | | | | | | \$34,100,800 | |
| | | 2 | St. Vincent Street | Doran Road | Belmont Crescent link | | 0.50 | 2 | Urban | 2 - 1.5m each | 20 - 30 | 20 | 0 | 11 | min. 4.0 | 2 - 1.5m each side | Opening of unopened road allowance | \$4,000 | Retaining Walls | \$201,500 | \$2,201,500 |
| | St. Vincent Street | | Belmont Crescent | Willow Creek Bridge | | 1.70 | 2 | Urban | 2 - 1.5m each | 20 | 20 | 0 | 11 | 4.0 | 2 - 1.5m each side | | | \$4,000 | | \$0 | \$6,800,000 |
| | Carson Road | | Wilson Drive | Black Creek | | 0.60 | 2 | Rural | 2 - 1.5m each | 20 | 20 | 0 | 11 | 4.5 | Paved Shoulder | | Culvert For Carson Road at Black Cre | \$4,200 | \$1,560,000 | \$4,080,000 | |
| | Carson Road | | Black Creek | Anne Street | 4 Subdivision Entrances | 0.80 | 2 - 3 | Urban | 2 - 1.5m each | 36 | 36 | Given by Dev | 11 - 13.5 | min. 4.0 | 2 - 1.5m each side | | | \$2,400 | | \$0 | \$1,920,000 |
| | | | | HWY 400 - Forbes Rd. | | | | | | | | | | | | | \$1,000,000 | | | \$1,000,000 | |
| | | | | | | | 3.60 | | | | | | | | | | | | | \$16,001,500 | |
| | | 3 | Forbes Road | Russell Road | Old Second Road South | | 1.10 | 2 | Rural | 2 - 2.0m each | 20 - 30 | 30 | 0 | 12.5 | 3.75 | Paved Shoulder | Interim scenario | \$3,400 | | \$0 | \$3,740,000 |
| | St. Vincent Street | | Willow Creek bridge | City of Barrie Limits | | 1.70 | 2 | Rural | 2 - 2.0m each | 20 | 20 | 0 | 11 | 4.5 | ? | Possible MUT on East side | \$2,700 | | \$0 | \$4,590,000 | |
| | Anne Street | | Carson Road | South limit of Draft Plans | | 0.65 | 2 | Urban | 2 - 1.5m each | 26 | 26 | Given by Dev | 11 | 7.0 | 2 - 1.5m each side | | Retaining Walls | \$390,000 | \$2,145,000 | | |
| | Anne Street | | South limit of Draft Plans | City of Barrie Limits | | 1.25 | 2 | Rural | 2 - 2.0m each | 20 | 20 | 0 | 11 | 4.5 | Paved Shoulder | | | \$2,700 | | \$0 | \$3,375,000 |
| | Wilson Drive | | City of Barrie limits | Snow Valley Road | | 3.80 | 4 | Rural | 2 - 2.0m each | 26 | 40 | 53200 | 17 | | | County Road | \$3,000 | | \$0 | \$11,400,000 | |
| | Russell Road (Interim) | | Pooles Road | Forbes Road | | 1.00 | 2 | Rural | 2 - 2.0m each | 20 | 20 | 0 | 11 | | | | | \$300 | | \$0 | \$300,000 |
| | | | | Craig Rd. - County Rd 27 | | | | | | | | | | | | | \$1,500,000 | | | \$1,500,000 | |
| | | | | | | | 9.50 | | | | | | | | | | | | | \$27,050,000 | |
| | | 4 | Doran Road | West limit of Draft Plans | Russell Road | | 1.40 | 2 - 3 | Urban | 2 - 1.5m each | 29.5 | 30 | Given by Dev | 11 - 13.5 | min. 4.0 | 2 - 1.5m each side | | | \$3,800 | \$0 | \$5,320,000 |
| | | | | | 4 Subdivision Entrances | | | | | | | | | | | | | | | \$0 | \$5,320,000 |
| | | | | | | | 1.40 | | | | | | | | | | | | | \$0 | \$5,320,000 |
| | | 5 | Forbes Road (interim) | Old Second Road South | Hwy 400 | | 1.20 | 2 | Rural | NO | 20 | 40 | 24000 | 12.5 | 3.75 | | | \$200 | | \$0 | \$240,000 |
| Pooles Road | St. Vincent Street | | Silverwood Crescent | | 0.75 | 2 | Urban | 2 - 1.5m each | 17 - 20 | 20 | 2250 | 11 | max. 4.0 | 2 - 1.5m each side | Need various widenings (also Midves) | \$3,800 | | \$0 | \$2,850,000 | | |
| Pooles Road | Silverwood Crescent | | Russell Road | | 0.75 | 2 | Rural | 2 - 1.5m each | 10 | 23 | 9750 | 11 | | | | Retaining Walls | \$2,500 | \$91,000 | \$1,966,000 | | |
| Russell Road | Pooles Road | | Walt Road | 3 Subdivision Entrances | 0.60 | 2 | Urban | 2 - 1.5m each | 20 - 28 | 28 | 4800 | 11 | min. 4.0 | 1.5m on West side | 8m widening on Geranium Draft Plan | \$3,700 | | \$0 | \$2,220,000 | | |
| Russell Road | Walt Road | | Forbes Road | | 0.50 | 4 | Urban | 2 - 1.5m each | 26 | 26 | 0 | 18 | | | | | \$3,900 | | \$0 | \$1,950,000 | |
| | | | | Russell Rd. - Walt Rd. | | | | | | | | | | | | | | | \$0 | \$0 | |
| | | | Pooles Rd. - St. Vincent | | | | | | | | | | | | | | | \$0 | \$0 | | |
| | | | | | | 3.8 | | | | | | | | | | | | | \$9,226,000 | | |
| | | | | | | 25.95 | | | | | | | | | | | | | \$91,698,300 | | |
| Phase 2 | 1 | Forbes Road | Russell Road | Hwy 400 | | 2.3 | 4 | Rural | 2-2.0m each | 40 | | | 19 | | | Ultimate scenario | \$2,500 | | \$0 | \$5,750,000 | |
| | | | | | Russell Road - Forbes Road | | | | | | | | | | | | | | \$800,000 | \$800,000 | |
| | | | | | Russell Road - Doran Road | | | | | | | | | | | | | | | \$350,000 | |
| | | 2 | Walt Road | Old Second Rd. | Russell Rd | | 1.1 | 2 | Urban | 2-2.0m each | 20 | | | 11 | | | | \$3,700 | \$0 | \$4,070,000 | |
| | | | | | Pooles Road - Russell Road | | | | | | | | | | | | | | \$300,000 | | |
| | | 3 | Old 2nd Road South | Walt Rd. | Pooles Rd. | | 1.2 | 2 | Rural | 2-2.0m each | 20 | | | 11.5 | | | | \$2,500 | \$0 | \$3,000,000 | |
| | Pooles Road | | Old Second Rd | Russell Rd. | | 1.1 | 2 | Rural | 2-2.0m each | 20 | | | | 11.5 | | | | \$2,500 | \$0 | \$2,750,000 | |
| | | | | | HWY 400 - Forbes Road | | | | | | | | | | | | | \$6,000,000 | \$6,000,000 | | |
| | | | | | | 5.7 | | | | | | | | | | | | | \$22,720,000 | | |
| SUB-Total Phase 1 & 2 | | | | | | | | | | | | | | | | | | | | \$114,418,300 | |
| Contingency Allowance (5%) | | | | | | | | | | | | | | | | | | | | \$5,700,000 | |
| Engineering (15%) | | | | | | | | | | | | | | | | | | | | \$17,200,000 | |
| TOTAL PHASE 1 & 2 (Excl HST) | | | | | | | | | | | | | | | | | | | | \$137,318,300 | |

Note: This excludes the costs associated Craig Road Extension (Russell Rd to Cty Rd 27), as these costs are within the Township Wide Development Charges

7.7 Craig Road Extension

Of all the road segments considered for improvement Craig Road represents a separate case, regarding the fact that it will be a new east west link across the north limit of the development area connecting Forbes Road to County Road 27. Many alignments were considered in the alignment selection process. A summary of the routes is provided in Appendix T-7. The selection of the preferred alignment, Alternative Option 3, results from its best match for the following criteria:

- Convenient link to Hwy 400 traffic that is currently using the Hwy 400 / Forbes Rd interchange.
- Convenient access to Russell Road and the Doran North development area.
- Minimizes impacts on existing homes along Gill Road.
- Location of intersection with CR 27 minimizes impacts on homes and businesses with direct access to CR 27.

Alignment Option 3 scores well on the above criteria but does have a relatively high construction cost due to the large cut required at the approach to CR 27. Initial attempts at developing an alignment that utilizes the existing Craig Road right of way as much as possible was eventually abandoned due to impacts on some of the Gill Road residences. It was also found that the generally straight alignment extending westwards from the Forbes Road – Russell Road intersection facilitated drainage because it more closely followed the drainage divide and the route disturbed less of the wooded area.

The proposed cross-section for Craig Road is a two-lane rural road cross-section. A multi-use trail is proposed along the south side of the road as an active transportation link between the Doran Development area and the Ganarska Trail system.

7.8 Future Transit Considerations

There are no transit facilities within the Township of Springwater at this time nor are there plans to provide that service in the near future. However, the collector roads within the proposed developments as well as the proposed improvements to the collector and arterial roads and intersections in the Midhurst area are designed to a standard that can accommodate buses and transit infrastructure in the future.

7.9 Mitigation Measures

A list of potential environmental impacts and suggested mitigation measures for the proposed transportation works is included in Appendix T – 8. Low Impact Development features (LID's) will be incorporated in the design of the internal roads of the developments and in the reconstructed area collector roads to assist in providing enhanced water quality control, as well as quantity control of runoff and preservation of groundwater balance. Feature to be applied will vary with type of cross-section, right of way width, soil type and groundwater conditions. The following is a

general summary of LID's to be considered. Schematics of several of these features are included in Appendix T-8.

| LID Feature | Rural Cross-Section | Urban Cross-section |
|---|---------------------|---------------------|
| Flat bottom ditch with check dams | X | |
| Catch basin Filters / Goss Traps | | X |
| Catch Basin Sumps | | X |
| Oil Grit Separators | | X |
| Infiltration Galleries | X | X |
| Perforated Storm Sewers, Entobicoke System | X | |
| Oversized Storm Sewers with restricted outlet | X | |
| Bio-swailes / Rain Gardens | X | X |

8.0 Notice of Commencement

A Notice of Study Commencement was published in the Barrie Advance on April 25 and May 2, 2013 announcing that the Township intended to continue the Class EA Planning Process (Phases 3 and 4) for the servicing of the Midhurst Secondary Plan Area. Copies of the Notice were sent to review agencies and interested members of the public. An Open House was held on Wednesday May 29, 2018 to present applicable display boards from the Phase 2 and 2 Master Plan. The Open House Display Boards along with copies of the comments received and the responses provided are included in Appendix W.

9.0 Phase 3 Public Information Centre

The Phase 3 Public Information Centre was held on October 18, 2016. A Notice of Public Information Centre (PIC) was published in two editions of the Barrie Advance, prior to October 16. The Notice was also posted on the Township website and copies were sent to various review agencies and interested members of the public. A copy of the Notice and a list of recipients (Communication Plan) are included in Appendix X.

The format of the PIC was an informal drop in session followed by a formal presentation including a question and answer period after the presentation. Information boards were on display for public viewing. A copy of the Display Boards is included in Appendix X. A 57-page summary of the information provided in the display was presented on-screen during the formal presentation. A copy of the formal presentation material is also included in Appendix X.

A Summary of Response Comments was prepared (copy included in Appendix X) and response letters were mailed out in early March 2017.

10.0 Special Council Meeting – March 8, 2017

In response to several requests, the Township of Springwater held a Special Council Meeting on March 8, 2017 for the purpose of allowing interested parties to provide comment on the Midhurst Class EA planning process.

A summary of the comments/concerns was prepared as a Memorandum to the Steering Committee and a copy is included in Appendix AA. The Memorandum includes responses to the comments/concerns for the Steering Committee's information.

In addition, subsequent to the Special Council meeting, comments were received by the Township from Mr. John Harris (local property owner), regarding the proposed water supply. Golder Associates Ltd. provided responses to these comments. A copy of all the documentation related to the Special Council Meeting is included in Appendix AA along with responses which were provided to the Steering Committee.

11.0 Financial Considerations

All of the proposed recommended works identified in this ESR are a direct result of the need for servicing future development areas except for the proposed extension of Craig Road. Therefore, the cost of all development related works will be paid for by the Midhurst Developer Group. The cost of the Craig Road extension will be undertaken and financed by the Township, through Development Charges.

The cost of operating and maintaining the proposed works will be financed through a blended service rate (current Township servicing method), paid for by all property owners who receive benefit from the infrastructure. Initially, it will be the responsibility of the Developer Group to operate the water and wastewater systems until a sufficient number of residents are connected to the system at which point, the Township will assume responsibility for operation and maintenance.

PHASE 4

12.0 Draft ESR - Recent Agency Consultations and Public Comments – March 2017 to April 2018

12.1 MOECC Review of Draft Environmental Study Report

A draft version of the Phase 3 and 4 Environmental Study Report (draft ESR) was provided to the Ministry of Environment and Climate Change (MOECC) on April 25, 2017 (in digital format), for that Agency's review prior to proceeding to Phase 4 of the planning process. On April 28, 2017, a follow-up email was sent to the MOECC providing a letter dated April 25, 2017 from the Township of Springwater, a letter dated April 27, 2017 from Ainley Group and hard copies of key components of the draft ESR. Copies of these items of correspondence are included in Appendix BB.

The Township letter to the MOECC identified several "...issues and concerns that have been raised by interested stakeholders..." and requested that the MOECC "... pay particular attention to those issues in the course of undertaking its technical review of the draft ESR...". The issues identified by the Township are summarized as follows:

1. Water Supply – Should a survey of surrounding wells be undertaken to measure and test actual well depths rather than relying on historical records in order to determine if the development of new wells will significantly impact existing wells?
2. Well Quality and Maintenance – Should the Township be concerned that frequent well maintenance rehabilitation efforts will be required to recover lost well performance due to the fact that almost all of the proposed wells will be constructed in fine grained aquifer material and that the water quality consists of elevated mineral content?
3. Water Flow Testing – Should additional well testing be undertaken considering only four tests of up to a combined capacity of 129 L/s have been completed while the future water demand is about 221 L/s? Are the computer models reliable using the results from only 72 hours of actual pump testing?
4. Protecting Our Watercourses and Wetlands – Requests that the impact of an effluent phosphorus limit of 0.03 mg/L be reviewed by the MOECC in that the NVCA suggest that anything more than 0.02 mg/L could have a negative impact.
5. Transportation – Requested that the MOECC review the adequacy of the traffic models used to predict traffic growth and road design.

The Ainley Group letter provided clarification with regard to the phosphorus loading from the Midhurst Secondary Plan development. Ainley noted that a "net zero increase" in total phosphorus to the watercourse and the Minesing Wetlands, was agreed to by all parties (NVCA, Developers Group and the Township). The letter states that an independent consultant (XCG Consulting Ltd.), was retained to complete a Peer Review of the Phosphorus Budget Report. The Phosphorus Budget Report concludes that an additional 66 kg/yr of phosphorus load would be

discharged into Willow Creek at full build-out assuming an effluent requirement of 0.03 mg/L. The Phosphorus Budget also notes that such a loading would be approximately 0.2% of the total annual phosphorus load that is currently going through the Minesing Wetlands. The letter further states that the ESR will be revised in the future to note that a net zero increase in phosphorus loading must be achieved.

The MOECC provided comments and recommendations on the requirements for completing an air quality assessment for the proposed projects that were outlined in the draft ESR in a letter dated July 5, 2017. A copy of this letter is included in Appendix BB. As a result, a more detailed assessment was undertaken by RWDI to augment its initial Report dated May 2, 2016. RWDI's revised Report dated December 15, 2017 was provided to the MOECC to be included in the review of the draft ESR. In addition, and based on the RWDI Assessment dated December 15, 2017, Black & Veatch prepared a Report entitled "Odour Mitigation Assessment For Midhurst Wastewater Treatment Plant and Sewage Pumping Stations". Updated copies of those two Reports are included in Appendix S.

On August 11, 2017, Ainley received an email from the MOECC clarifying the requirements of an Air Quality assessment related to transportation. A copy of that email is included in Appendix BB.

The MOECC provided its comments on the draft ESR in a letter dated April 30, 2018. A copy of that letter is included in Appendix CC along with a response letter from Ainley Group dated June 5, 2018

It is noted that numerous post Class EA planning process requirements (pre-design) are suggested by the MOECC. These pre-design tasks are included in Section 16 of this ESR.

12.2 Nottawasaga Valley Conservation Authority (NVCA)

In an email dated June 30, 2017, the NVCA provided additional comments to a March 3, 2017 letter from Ainley Group. A meeting was held at the NVCA office on October 30, 2017 and the notes from that meeting were used to prepare a response to the NVCA (Ainley Group letter dated April 5, 2018). A copy of the email and the letter are included in Appendix BB.

12.3 Public Comments and Responses

Just prior to the submission of the ESR to the MOECC, the Township received an email dated March 13, 2017 from Mr. Gerald Scanlan of Scanlan Real Estate Limited, Markham. Mr. Scanlan questioned the existing traffic counts on various streets in Midhurst and attempted to calculate the total traffic for the year 2041. Ainley responded to the request for clarification of the traffic numbers in a letter dated May 25, 2017, complete with a copy of a new Table outlining a summation of the existing and anticipated future traffic numbers (2031 – 2041 Background and Development Traffic on Existing Streets). A copy of the related correspondence is included in Appendix BB.

As a result of the Phase 3 PIC (September 2016), Ainley received an email dated November 30, 2016 from Mr. Stan Kirsch, representing the Frankcom Estate. Mr. Kirsch advised Ainley that in his opinion "...the Estate's lands are not being properly addressed in your EA work for Midhurst."

A proposed lot fabric for the Frankcom Estate lands had been previously provided to Ainley in March 2015. Mr. Kirsch followed up with a more detailed list of queries and comments in his emails of January 9 and 11 of 2017. Ainley responded to Mr. Kirsch in a letter dated March 3, 2017 and Mr. Kirsch subsequently replied in a letter dated March 27, 2017. Mr. Kirsch also wrote to the MOECC of his concerns (copy not provided to Ainley) and the MOECC responded in an email dated August 3, 2017. Since the Class EA planning process was on hold (awaiting MOECC comments on the draft ESR), Ainley delayed responding to Mr. Kirsch. Ainley did respond to Mr. Kirsch in a letter dated May 30, 2018 (sent by email). Copies of all related correspondence on this matter are included in Appendix BB.

Shortly after the submission of the draft ESR to the MOECC (April 25, 2017), Ainley received four emails (via the Township) from concerned residents of Midhurst. Copies of these four emails are included in Appendix BB. At that time (early May 2017), the planning process had been put on hold pending receipt of review comments from the MOECC. Therefore, it was decided that responses to the concerns of these four Midhurst residents would be delayed. As noted above, the MOECC provided written comments on the draft ESR on April 30, 2018. Responses to the concerned residents were sent out in May of 2018 (see copies in Appendix BB).

12.4 City of Barrie

In a letter dated May 31, 2017, Ainley Group responded to a previous comment received from the City of Barrie related to the Draft Traffic Operational Analysis. In addition, Ainley responded to the City's additional inquiries in a letter dated June 9, 2017. Copies of both letters are included in Appendix BB.

12.5 Ministry of Tourism, Culture and Sport

In a letter dated July 14, 2017, the Ministry of Tourism, Culture and Sport confirmed future requirements for the Stage 2 Archaeological Assessment of the proposed alignment for the extension of Craig Road. A copy of this letter is included in Appendix BB. The Stage 2 Archaeological Assessment will be undertaken prior to final design of the roadway.

12.6 Ecojustice

Ecojustice (Ms. Laura Bowman Barrister and Solicitor) advised The Township and Ainley Group (in a letter dated December 15, 2014), that they were representing the Midhurst Ratepayers Association. They expressed concern about several issues and notified the Township of the following:

- No knowledge of forthcoming Phase 3 and 4 study
- Lack of consultation
- Intent to conduct a peer review of the Phase 3 and 4 study
- Wants disclosure of technical reports used to support the Phase 3 and 4 study
- Wants cumulative impact assessment
- Wants environmental assessment data for Willow Creek and Minesing Wetlands

Ecojustice reiterated its concerns in a letter dated January 13, 2015.

A response was provided from the Township's legal advisor (Mr. Barnet Kussner, Weir/Foulds LLP) in a letter dated January 27, 2015.

Copies of all three letters are included in Appendix BB.

12.7 Ministry of Transportation

A number of email exchanges with the Ministry of Transportation (MTO) between 2017 and Jun 2018 were received containing questions relating to the Transportation reports associated with the Class EA. Detailed responses were prepared and sent to the MTO on July 12, 2017 and June 5, 2018.

A copy of MTO comments and the responses letters are included in Appendix BB.

13.0 Notice of Completion

A Notice of Completion was published in the local newspaper on May 30 and June 7, 2018. A copy of the Notice was provided to Review Agencies and interested members of the public in a mail out that occurred on May 31, 2018. The Notice advised the public of the draft Environmental Study Report and established the 30-day review period as being from Wednesday June 13, 2018 to Thursday, July 19, 2018. The Notice also advised the public that a Public Information Centre would be held on Monday June 18, 2018 for the purpose of presenting the draft ESR. Copies of the Notice, Communication Plan and other related correspondence, are included in Appendix CC.

Considering the nature of the proposed works, the Township determined that the public review period should be 90 days. As such, a Revised Notice of Completion was published on June 15, 2018 extending the review period to Tuesday, September 18, 2018. A copy of the revised Notice is included in Appendix CC.

14.0 Requests for Part II Order and Final ESR

14.1 General

On September 19, 2018, the Township received a letter from the Ministry of Environment, Conservation and Parks (MECP) advising that they received five Part II Order requests "...asking that the Township of Springwater be required to prepare an individual environmental assessment under the Environmental Assessment Act for the proposed Midhurst Water, Wastewater & Transportation Class Environmental Assessment (Phase 4)." The MECP letter outlined how the Township was to proceed to provide information to the Ministry in order to evaluate the requests. A copy of the MECP letter is included in Appendix DD. Information related to the five requests is as follows:

| | |
|---|--|
| Allison Graham | - email dated September 10, 2018 |
| Midhurst Ratepayers' Association (MRA) | - Letter dated September 17, 2018 |
| Rick and Michele Bowman | - Correspondence dated September 9, 2018 |
| James Feehely (Francom Estate) | - Letter dated September 18, 2018 |
| Daniel B. Artenosi (Carson Trails Estate) | - Letter dated September 18, 2018 |

Copies of these submissions to the MECP are included in Appendix DD.

14.2 Responses

The MECP responded to each of the five requesters in separate letters dated September 19, 2018. The MECP advised each of the requesters that the Ministry "...will review the issues and concerns you have cited as reasons for which an individual EA should be prepared." and "...the Minister will make a final decision whether or not to require that an individual EA be prepared by the Township." Copies of these five letters are included in Appendix DD.

In response to the MECP request, project information was provided by Ainley to the Ministry beginning on October 29, 2018 with the submission of completed MECP Tables A and B.

The MECP conducted a thorough review of the Draft ESR in order to determine the validity of the requests for a Part II Order and the following is a summary of the review process in chronological order.

| | |
|--------------|--|
| May 30, 2018 | Ainley Memorandum to MTO to assess the transportation needs of the section of Highway 26 from Carson Road to Spence Ave./County Road 27, and the intersections of Hwy 400 ramps at Forbes Road under existing conditions and future traffic projections for the horizon years of 2031 (full build-out of Phase 1) and 2041 (ultimate). |
| May 30, 2018 | Ainley Memorandum to County of Simcoe to assess the transportation needs of the various County Roads and intersections within the study area. |

| | |
|--------------------|---|
| May 31, 2018 | publication and distribution of Notice of Completion of ESR |
| June 5, 2018 | Letter from Ainley to MOECC (Paul Martin) in response to MOECC comments dated April 30, 2018 |
| June 15, 2018 | publication and distribution of REVISED Notice of Completion of ESR (extending public review period to 4:00 pm on September 18, 2018) See Appendix CC. |
| September 10, 2018 | Receipt of A. Graham request |
| September 18, 2018 | Receipt of four other requests – M. Bowman, Midhurst Rate Payers Association (S. Buxton), Carson Trails Estates Inc. (represented by Daniel B. Artenosi of Overland LLP) and Frankcom Estates (represented by James Feehely of Feehely, Gastaldi Barristers and Solicitors) |
| September 19, 2018 | MECP letter to Township advising of the receipt of the five requests for a Part II Order including a request for information (MECP Tables A and B with instructions) |
| September 19, 2018 | MECP letter to the five Requesters outlining the review process |
| October 3, 2018 | MECP letters to D. Artenosi (representing Carson Trails Estates), R. and M. Bowman and J. Feehely (representing Frankcom Estates) asking for clarification of their concerns (specifically which of the identified undertakings were of a concern). |
| October 15, 2018 | Letter from D. Artenosi in reply to MECP letter dated October 3, 2018 |
| October 15, 2018 | Email from M. Bowman in reply to MECP letter dated October 3, 2018 |
| October 15, 2018 | Email request from MECP to Ainley for a list of all water, wastewater and transportation undertakings. (List was provided to MECP on October 29, 2018). |
| October 29, 2018 | Email from MECP to M. Bowman stating that the Class EA process is separate and distinct from the Midhurst Secondary Plan. |
| October 29, 2018 | Ainley email to MECP (C. Robinson) including completed Tables A and B. |
| October 29, 2018 | Ainley email to MECP (C. Robinson) including a list of undertakings as proposed by the EA |
| October 31, 2018 | Ainley email to MECP regarding developments within Midhurst Secondary Plan that were or are at the LPAT and the current status of the appeals related to Frankcom Estates and Carson Trails Estates. |
| November 5, 2018 | Email from M. Bowman to MECP re: Midhurst Secondary Plan issues. |
| December 31, 2018 | Part II Order Request Addendum from Midhurst Ratepayers Association. |

| | |
|------------------|--|
| January 15, 2019 | Email from MECP to Ainley requesting Report that details environmental features within study area and potential impacts as a result of proposed development. |
| January 22, 2019 | Email from Ainley to MECP responding to January 15, 2019 email outlining telephone discussion re: documentation of environmental features. |
| March 12, 2019 | Email from MECP to Ainley requesting information re: response to NVCA, need for additional studies on fish habitat, need for consultation with DFO and need for consultation with Environment and Climate Change Canada re: Hine's Emerald Dragonfly. |
| July 25, 2019 | Email from V. Patel (Geranium) to MECP providing information referencing location of reports in the ESR pertaining to Hines Emerald Dragon Fly, advising sections of ESR related to DFO Guidelines (7Q20 Assessment) and providing a supplementary memorandum (Beacon Environmental) speaking to Eastern Prairie Finged-orchid and Spotted Turtle. |
| August 1, 2019 | Memorandum from MECP (Jennifer Moulton) to Geranium re: additional information on Source Water Protection. |
| August 6, 2019 | Email from MNRF (Shirley Brent) acknowledging receipt of DFO Guideline information and how the hydrogeological impact assessment meets the DFO Guideline. |
| August 8, 2019 | Technical Memorandum from Golder re: Response to MECP questions on source water protection. Provided (by email) to MECP reviewers (Jennifer Moulton et al). |

A copy of all the abovementioned correspondence is included in Appendix DD.

14.3 MECP Decision

The MECP's decisions on the requests for a Part II Order were provided under cover of an email dated November 21, 2019. In a letter to the Township, the Minister advised that it has been determined "...that an individual environmental assessment is not required." Letters were provided to each of the five Requesters, notifying them of the decision. Several conditions were imposed with respect to the proposed projects and these conditions were outlined in the Minister's letter to the Township. The conditions are summarized as follows:

1. A plan is to be submitted to the Director of the Species at Risk Branch (MECP) that sets out the field inventory, assessment, of other activities to be carried out by the Township to identify any species listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species and their habitat that may be adversely affected by work related to one or more of the undertakings.
2. Township shall make revisions to the plan to ensure compliance with the Endangered Species Act, 2007 and implement the plan approved by the Director. The plan shall be

approved by the Director and implemented by the Township prior to any work covered by the plan or any construction activities for any of the undertakings being carried out.

3. Township shall update and provide to the Director for review, Figure 1 from the Technical Memorandum dated February 7, 2017, titled "Hine's Emerald Dragonfly Habitat in the Minesing Wetlands and the Midhurst Development" including several points listed in the Minister's letter.
4. Prior to completing any detailed designs for the proposed undertakings, the Township shall inform and consult with any landowners that have potential to be impacted by source protection policies in the future as set out by two bullet points provided in the Minister's letter.
5. The Township shall prepare an Odour Mitigation Plan for the design and operation of the proposed wastewater facilities.
6. Township shall make the approved plan required by Condition 1 (above) publicly available on its website prior to any work covered by the plan or any construction activities for any of the undertakings being carried out and the Township shall make the plan required by Condition 5 (above) publicly available on its website within 5 days of submitting the plan with the Environmental Compliance Approval application.
7. Township shall submit a written report to the Director, Environmental Assessment and Permissions Branch, on how it has fulfilled conditions 1 to 6, prior to the commencement of construction.

The Minister further encourages the Township to make the November 21, 2019 letter available to the public on the Township's website and he notes that "If a significant change is required to any of the projects in the Master Plan, the Township shall consult with the Ministry to determine if an addendum to the Master Plan is required.

A copy of the Minister's letters is included in Appendix DD.

Based on the decision by the Minister, the ESR was finalized and a memo was sent to the MECP notifying the Ministry of the completion of the Class EA planning process.

In addition to the five requests for a Part II Order, written communications were also received from the NVCA and the MTO during the public review period.

14.4 MTO Comments

The MTO provided a list of questions related to transportation (email October 18, 2017) and Ainley provided answers to those questions in a letter to P. Dorton dated June 5, 2018. An Email dated September 17, 2018, was received from Mr. P. Dorton of the MTO. A response letter was provided to the MTO dated November 9, 2018. In addition, the MTO (Email dated October 23, 2018), asked if the municipal EA study included a future encroachment permit on Hwy 26. Ainley responded to the MTO (Email dated November 6, 2018), advising that the proposed forccemain route along Hwy 26 is outlined in the Draft ESR. The MTO responded (Email dated November

20, 2018) recommending alternatives other than parallel installations along MTO ROWs be explored for both the outfall forcemain and other servicing proposals in the ESR.

The MTO also submitted a follow up email on Jan 29, 2019 with additional questions in relation to Ainley's Nov 9, 2018 letter. Ainley responded to these questions in a letter dated April 7, 2020. (See Appendix DD)

14.5 NVCA Comments

A letter dated September 17, 2018 was received from L. J. Bull of the NVCA. A response letter was provided to the NVCA dated March 20, 2019. (See Appendix DD)

14.6 Public Comments

In addition, comments/questions were received during the 90-day public review period from D. Strachan (Midhurst Ratepayers Association). Those questions and the subsequent responses are outlined in emails dated June 15, June 18, July 1, July 10, August 7, August 23, 2018 (copies included in Appendix DD).

14.7 First Nations Comments

Following the issuance and publication of the Notice of Completion, numerous First Nations representatives were contacted and were encouraged to provide comment on the Draft ESR. As a result, four First Nations groups provided written responses as follows (See Appendix DD):

- Chippewas of the Thames First Nation, letter dated June 14, 2018 advising that "...we have identified no concerns with your project of the information that you have presented to us at this time."
- Huron Wendat, email dated June 5, 2018 requesting "Could you please let us know any archaeological assessment have been done as part of the EA?" Archaeological assessments were done as part of the Secondary Plan. In addition, a Stage 1 assessment was undertaken along the proposed alignments for the extension of Craig Road. Additional (Stage II) assessments may be necessary as part of final design.
- Mississaugas of the New Credit First Nation, letter dated August 13, 2018, advising that "Your project is out of our Treaty Territory."
- Rama First Nation, email dated June 12, 2018 advising that information was forwarded to Ms. Karry Sandy McKenzie, Williams Treaties First Nation Process Co-ordinator/Negotiator.

14.8 Summary of Responses and Future Actions to be Taken

A review of all responses provided to review agencies after the September 18, 2018 public review period was undertaken. The following is a summary of the future actions to be taken:

MTO (Ainley Memorandum dated May 30, 2018 – Transportation Operational Analysis)

- Identifies projects related to MTO.
- Intersection of Hwy 26 at County Rd 27 to be monitored and signals implemented when development traffic warrants the improvement.

County of Simcoe (Ainley Memorandum dated May 30, 2018 – Operational Analysis)

- Identifies projects related to County.
- Intersection of Hwy 26 at County Rd 27 to be monitored and signals implemented when development traffic warrants the improvement.
- Route selection of proposed Craig Road extension to be finalized prior to detailed design including location and details of intersection with Cty Rd 26.
- Further consideration (prior to final design) of constructing roundabouts at Wilson Rd/Carson Rd, County Rd 27/Craig Rd (future) and at Russell Rd/Craig Rd/Forbes Rd.

MOECC (Ainley Letter dated June 5, 2018)

- All storm water management infrastructure will require ECAs from the Ministry prior to construction
- Many of the issues raised at this stage may also be revisited and evaluated in greater detail during subsequent ministry approvals
- LID measures will be included in the detailed design of transportation improvements.
- Water takings (for transportation construction works) that require a PTTW will be evaluated in much greater detail as part of future PTTW applications. Geotechnical investigations will be completed.
- An Adaptive Monitoring and Management Plan will be developed in conjunction with a Master Drainage Plan which will address surface water concerns.
- Significantly more detailed information will be required in order to obtain PTTW.
- As part of the PTTW application, verification will be provided that there are no reaches of surface water where there is significant interconnection between shallow and deep systems within the zone of influence.
- Ministry does not agree that a 10% loss in baseflow would be insignificant. Additional consultation with NVCA and MECP may be required. Site specific studies will be undertaken to confirm that the MNRF and MECP thresholds are met and that they are protective as the project proceeds. Future monitoring will continue to characterize aquatic features but will also be focused on collecting data to inform the site-specific assessment of the groundwater environment and associated ecological low flow requirements which will be used when completing the Permit To Take Water process.
- Modeling results (groundwater) may need to be revisited.
- As part of the future PTTW applications, it is recommended to “take a closer look” at the geology/hydrogeology to determine if areas of more enhanced hydraulic connectivity exist.

- PTTW may be required for the construction of water and wastewater works.
- NVCA “no net increase” requirement for phosphorus is noted.
- Reviewer recommends a more detailed evaluation of effluent nitrate/TIN loadings from the WWTP before the MECP commits to establishing effluent targets.
- MECP may consider adding a monthly loading limit for total phosphorus for Phase 1 during the ECA approval stage.
- Recommends early pre-consultations.
- SWM plans are to be prepared for each development phase for MECP review.
- Recommend consideration of whether wet ponds will indeed be constructed in addition to LIDs and if not, the need to review the P Budget assessment.
- Each proposed sewage pumping station (and related sewer system) will be reviewed in detail with respect to potential odour impacts during the detailed design stage.
- During the ECA stage, the most current version of the air dispersion model (AERMOD) will be used to assess all potential sources of odour.
- During construction, best management practices will be applied to mitigate any air quality impacts caused by construction dust.
- A best management practice plan (BMPP) for dust should be included in the ECA submission.
- Biofilters are proposed to control odours from the proposed WWTP. The manufacturer’s recommendations for proper operation and maintenance of the biofilters will be followed to achieve the assumed control efficiency used in the AERMOD calculation.
- A submission on Air Quality will be made as part of the ECA application for all proposed works.

MECP (Ainley - Table B Response to Part II Order Requests submitted to MECP October 26, 2018)

- Issue of Source Water Protection will be reviewed by the MECP as part of the future submissions for Permits to Take Water
- During detailed design for transportation improvements, hydrological/hydraulic calculations will be completed to the requirements of the NVCA and the MECP regarding climate change directives relating to increased severe weather events.
- Active transportation routes will be provided as part of the final design of the proposed new residential developments.
- Climate change impacts will be considered during the design of water supply/distribution works and wastewater collection/treatment works.
- Applicable permits related to the Endangered Species Act will be obtained with respect to the proposed raw water pipeline from wells TW34 and OW29.
- Applicable permits related to the Endangered Species Act will be obtained with respect to the proposed extension of Craig Road and for any proposed road widenings that require

property acquisition. A Natural Heritage review of the proposed roadway widenings and the extension of Craig Road will be undertaken prior to final design.

- Various Stage 2 archaeological assessments are required.

MECP (Ainley - October 26, 2018 Table A Response to Midhurst Ratepayers Association Request)

- Additional hydrogeological studies and/or investigations would be completed in support of future Permit To Take Water (PTTW) applications.
- It is anticipated that a requirement of the future ECA for the Midhurst WWTP will be that the undiluted wastewater effluent be tested and shown to be non-acutely lethal prior to discharge into Willow Creek.
- The potential effects of temporary construction dewatering should be addressed during the PTTW application stage.
- A monitoring program will be instituted to ensure that private water supplies and surface water features are not adversely impacted by the water taking.
- Adequate well head protection will be ensured for the two wells that are proposed to be developed on Township lands to the west of Snow Valley, should the wells be required in the future.
- During the PTTW application process, unacceptable drawdown at private water supply wells will be evaluated further to ensure no negative impacts to the wells within the zone of influence.
- A comprehensive monitoring program of fish, water quality, water temperatures and wetted width has been implemented and that program will be continued through development and post-development as part of the Monitoring and Adaptive Management Plan. That Plan will include a variety of natural heritage-related triggers which will inform the need for mitigation as required.
- Removal of nitrate from the water supply will be provided in the Water Treatment Plants and this removal will continue until it is no longer required.
- A storm water management system(s) will be provided to hold back the first 25 mm of storm runoff for a period of 48 hours. (Note that it has been determined that 25 mm is not feasible and therefore a figure of 23 mm will be used for design purposes).
- The storm water management system(s) will infiltrate back into the ground, close to the source, the first 20 mm of rainfall while also ensuring a healthy hydrologic cycle.
- The post-development phosphorus loading will be reduced to below pre-development loading levels such that there will be no net increase as a result of full buildout development.
- Storm water flows from development lands will be greatly controlled and reduced such that the existing problems of silting and bank erosion within Willow Creek and ultimately into Minesing Wetland will not be exacerbated.

- Best Management Practices in consideration of HED habitat have been identified and will be implemented in the design of the proposed developments.
- The “no net increase” requirement for phosphorus will be further discussed and finalized with the NVCA and the Township in advance of the development proceeding.
- Committed to including Low Impact Development (LID) measures, where possible, into proposed road reconstructions.
- Determination of strategy(s) to ensure no net increase in phosphorus will be undertaken through consultation with the NVCA and the Township prior to detailed design.

MECP (Ainley - October 26, 2018 Table A Response to M. Bowman Request)

- Multi-use trail along Russel Road will be included in transportation improvements
- Township will ensure that connecting trails/sidewalks are constructed between Russel Road and the internal subdivision.
- Storm water management and LIDs will be designed to Provincial Standards and Regulations.
- A storm water management system(s) will be provided to hold back the first 25 mm of storm runoff for a period of 48 hours. (Note that it has been determined that 25 mm is not feasible and therefore a figure of 23 mm will be used for design purposes).
- The storm water management system(s) will infiltrate back into the ground, close to the source, the first 20 mm of rainfall while also ensuring a healthy hydrologic cycle.
- An Adaptive Management and Monitoring Plan will be developed to monitor any changes to surface water from the proposed methods of storm water management, wastewater management or groundwater drawdown.
- A large majority of the proposed LIDs will be within Municipal property such that they can be maintained by the Township.

MECP (Ainley - October 26, 2018 Table A Response to A. Graham Request)

- A list of Best Management Practices for consideration of HED habitat will be implemented in the design of the proposed developments.

MECP (Ainley - October 26, 2018 Table A Response to Carson Trail Request)

- No future actions were identified.

MECP (Ainley - October 26, 2018 Table A Response to Francom Estates Request)

- No future actions were identified.

MTO

- Early consultation on plans to work within or crossing of highway rights-of-way (email Nov 20, 2018).
- Consideration of alternatives for pipeline installations other than parallel along MTO ROW. Pre-design meeting with MTO is suggested. (email Nov 20, 2018).
- Traffic growth on MTO roads will be monitored in the future to assess the need and timing of any intersection improvements. Signals (or roundabouts) will only be installed at intersections when warrants are met. (Ainley letter dated Nov 9, 2018).
- The need for a double north-bound turn lane on Hwy 26 at the Carson Road intersection will be analyzed further during the pre-design stage. (Ainley letter dated Nov. 9, 2018).
- To accommodate additional lanes at the Hwy 400/Forbes Rd. intersection, widening of the underpass structure may be required, or alternately, there may be a need to accelerate consideration of a Parclo A-4 interchange configuration. With signalization of the ramp terminal intersections, removal of the right turn channels may be required. (Ainley letter dated Nov. 9, 2018).
- Conduct a feasibility review to accommodate active transportation at the Hwy 400/Forbes Rd IC and other highway intersections. (Ainley letter dated Nov. 9, 2018).
- In advance of the identified highway improvements associated with MTO controlled roads proceeding, the Township will enter into a legal Agreement with the MTO (and possibly Simcoe County) regarding the funding for the proposed highway improvements within specified timelines. In addition, the Township will update the Traffic Operational Analysis every five (5) years to confirm that the timelines/horizon years noted remain applicable. (Ainley letter dated Nov. 9, 2018).
- Any proposed works within and/or crossing highway rights-of-way will require MTP Encroachment permit approvals. Preliminary designs should be presented to the MTO early in the planning process. (Ainley letter dated Nov. 9, 2018).
- It is acknowledged that the proposed extension of Craig Road should be a County Road and that further discussions should take place regarding when and how this should happen. It is intended that the Craig Rd. extension be constructed as part of Phase 1, Stage 1 of the development. (Ainley letter dated June 5, 2018).
- If Phase 2 proceeds in the future, the existing Highway 400/Forbes Road intersection will need to be monitored to identify the required timing of the off-ramp intersection improvements. Prior to commencing development of Phase 2, the Township is committed to undertaking a Municipal Class Environmental Assessment for the proposed intersection improvements with inclusion of MTO requirements. (Ainley letter dated June 5, 2018).
- Storage lengths at the intersection of Highway 26 and Carson Road will be adjusted during detailed design using more up to date traffic data – available at that time. (Ainley letter dated June 5, 2018).

- Carson Road has been provided with two westbound lanes to receive the two proposed northbound left turn lanes. Median position and lane widths can be reviewed at the detailed design. (Ainley letter dated June 5, 2018).
- During detailed design, consider modifying southerly entrance to existing plaza at the intersection of Highway 26/Snow Valley Road. (Ainley letter dated June 5, 2018).
- Refinement of the alignment of the LTL on the west approach of Cty Road 27/Hwy 26 can be undertaken during detailed design. (Ainley letter dated June 5, 2018).

NVCA

- Additional phosphorus removal measures will be identified, assessed and implemented as necessary to achieve a cumulative net zero increase in phosphorus in the Willow Creek following the development of the Midhurst Secondary Plan. (Ainley letter dated March 19, 2019).
- It was determined that an infiltration rate of 23 mm is the maximum feasibly achievable rate. (Ainley letter dated March 19, 2019).
- NVCA will review the proposed WWTP outlet to Willow Creek during the detailed design stage to ensure protection against erosion. Stormwater management and natural hazards will be reviewed for the Study Area. (Ainley letter dated March 19, 2019).
- Information on additional vegetation surveys of the proposed WWTP outlet site (conducted in 2018) will be provided during detailed design. (Ainley letter dated March 19, 2019).
- A detailed restoration plan of the proposed WWTP outlet site will be submitted for approval as part of the detailed design process. This will include the small meadow community associated with the site. Supplemental nesting structures for Barn Swallows will be considered. (Ainley letter dated March 19, 2019)
- A detailed impact assessment will be provided for the proposed WWTP outlet pipeline along Wilson Road as part of detailed design. This will describe and map vegetation and will comment on the need for encroachment into any vegetation communities. Impacts to roadside wetlands will be considered. Assessment of the removal of any mature trees will be undertaken if necessary. A restoration plan will be prepared for NVCA review as part of the detailed design. (Ainley letter dated March 19, 2019).
- Re: impact to habitat for Brook Trout. Monitoring to characterize baseline fish communities will continue into the future construction and post-construction periods to assess any potential impacts and determine if adaptive management associated with stormwater, wastewater management or groundwater extraction is required to mitigate any potential impacts. (Ainley letter dated March 19, 2019).
- The ECA that will be issued for the WWTP by MECP will address the requirements to meet effluent limits. (Ainley letter dated March 19, 2019).
- All monitoring locations (re: baseflow losses), protocols and adaptive responses will be documented in the "Monitoring and Adaptive Management Plan" that is being prepared as part of the Master Drainage Plan. Long term upkeep of the monitoring stations is encouraged. (Ainley letter date March 19, 2019).

- Wetted perimeter analysis sites will continue to be monitored and they will be included in the Monitoring and Adaptive Management Plan – Master Drainage Plan. (Ainley letter dated March 19, 2019).
- Effluent and stream temperatures, groundwater levels and aquatic biota responses will be monitored as part of the Monitoring and Adaptive Management Plan. (Ainley letter dated March 19, 2019).
- Pre-consultation with NVCA will continue with respect to source water protection and any future applications for Permits To Take Water. (Ainley letter dated March 19, 2019)
- NVCA Permits will be obtained as necessary prior to any construction or grading on regulated portions lands.

MECP Letter received under cover of email dated November 21, 2019

- See Section 14.3

15.0 Summary of Recommended Projects and Staging

A list of Project Undertakings was provided to the MECP on October 29, 2018. That list summarizes the design concepts (Projects and Staging) as follows:

TRANSPORTATION (See Section 7.6 and Table 7.6.6.1 of ESR)

As per the County's Transportation Master Plan, anticipated improvements include:

- Snow Valley Road from CR 28 to Highway 26 widening to 4 lanes by 2021
- Wilson Drive from Barrie limit to Highway 26 widening to 4 lanes by 2031
- Widening of CR 93 from CR 11 (Forbes Road) to City of Barrie limit by 2031
- CR 27 from Highway 26 to CR 22 widening to 4 lanes by 2041

Based on the assessment, the following improvements are recommended:

Identified Needs at Start of Development

Construct Craig Road from Russell Road to County Road 27. Consider a roundabout at the intersection with County Rd. 27, (See Section 7.6.2 of ESR) as an extension of Forbes Road. It is proposed that this project will be completed during the first stage of development.

By or Before 2031 Horizon

- Extend St. Vincent Street between Belmont Crescent and Park Trail (As part of Phase 1, Stage 3)
- Widen Wilson Road to four lanes. (As part of Phase 1, Stage 3)
- Provide a continuous two-way left turn lane on Finlay Mill Road from Wattie Road to Hwy 26 (Phase 1, Stage 1)
- The intersection of Wilson Drive at Snow Valley Road southerly intersection (as part of Phase 1, Stage 2)
 - Add a traffic signal (consider a roundabout at this intersection See Section 7.6.2 of ESR))
 - Add an exclusive left turn lane on each approach
- The intersection of Wilson Drive at Carson Road (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach
- The intersection of Highway 26 at Snow Valley Road/Finlay Mill Road (as part of Phase 1, Stage 1)
 - Add an eastbound right turn lane
- The intersection of Russell Road at Forbes Road (as part of Phase 2, Stage 1)
 - Add a traffic signal (consider a roundabout at this intersection See Section 7.6.2 of ESR)
 - Add an exclusive left turn lane on each approach
 - Add a northbound right turn
- The intersection of Russell Road at Doran Road (as part of Phase 2, Stage 1)

- Add a traffic signal
- Add an exclusive left turn lane on the northbound and eastbound approaches
- Add a southbound right turn
- The intersection of Finlay Mill Road at Wattie Road (as part of Phase 1, Stage 1)
 - Add a southbound left turn lane
 - Add a northbound right turn lane (triggered by background traffic)

By or Before 2041 Horizon

- Add an additional through lane in each direction to a total of 4 lanes on the following sections of roads:
 - Forbes Road from Russell Road to Highway 400 (as part of Phase 2, Stage 1)
 - Russell Road from south of Walt Road to Forbes Road (as part of Phase 1, Stage 5)
- The intersection of Wilson Drive at Snow Valley Road northerly intersection (as part of Phase 1, Stage 2)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach
- The intersection of Highway 26 at Snow Valley Road/Finlay Mill Road (Combined with the initial road reconstruction/urbanization and as part of Phase 1, Stage 1)
 - Add a southbound right turn lane
- The intersection of Highway 26 at Carson Road (Combined with previous intersection work as part of Phase 1, Stage 4)
 - Add an eastbound right turn lane;
- The intersection of Doran Road at St. Vincent Street (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add an exclusive left turn lane on each approach

We note that the traffic signal warrant is not fully met for this intersection but in consideration of the large left turn movement for westbound to southbound it may be beneficial.

- The intersection of St. Vincent Street at Pooles Road (as part of Phase 1, Stage 5)
 - Add a northbound right turn lane and signalize the intersection
 - Add southbound left turn lane
- The intersection of Russell Road at Pooles Road (as part of Phase 1, Stage 1)
 - Add a traffic signal
 - Add a westbound right turn lane
 - Add an exclusive left turn lane on the east and south approaches
- The intersection of Forbes Road at Russell Road (as part of Phase 2, Stage 1)

- Change the westbound inside lane to a left turn lane (double left turn lanes)
- Change the northbound right turn lane to a channelized right turn lane
- The intersection of Forbes Road at Highway 400 (as part of Phase 1, Stage 2)
 - Add a westbound left turn lane for the SB off-ramp; and
 - Add an eastbound channelized right turn lane for the SB off-ramp
 - Add an eastbound left turn lane for the NB off-ramp

Table 7.6.6 and Figure 7.6-1 provide a summary of the above noted improvements. For the development of the transportation network improvement scheduling, consideration was given to coordinate those improvements with general servicing requirements for the development areas. Projects such as intersection improvements along the Findley Mill Road / Snow Valley Road corridor are among the first transportation improvements completed because sanitary sewer infrastructure will be installed along this corridor at the initial stages of development so the transportation improvements will be completed at that time.

Active transportation considerations are outlined in Section 7.6.3 of the ESR.

Future transit considerations are outlined in Section 7.8 of the ESR.

WASTEWATER (See Sections 6.5.3 and 6.6 of ESR)

Design and construct a wastewater treatment plant based on the design information as previously noted.

The plant can be constructed in stages but must be expandable in the future to accommodate the servicing of existing Midhurst (future total ADF of approximately 12,314 m³/d)

Recommended Wastewater Treatment Processes:

- Screening and degritting (for disposal to a landfill site) with pumping of wastewater if necessary, followed by,
- Primary / Secondary treatment with step feed biological nitrogen removal (BNR) with chemical addition for phosphorus removal (two main bioreactors) followed by,
- Tertiary treatment using membrane technology followed by;
- UV disinfection and pumping to Willow Creek for effluent discharge.
- Biological stabilized liquid sludge for beneficial re-use using mechanical thickening and ATAD (no dewatering) with a capacity of 240 days storage.

Effluent discharge pipe from the plant to Willow Creek, north of Highway 26, sized to service the entire Secondary Plan area including existing Midhurst. (Section 6.7 of ESR)

Design and construct wastewater collection system complete with pump stations and manifolded forcemain system as required, to service proposed development layout and, in the future, existing Midhurst. A manifolded forcemain is suggested in order to reduce the number of forcemains that will eventually need to be constructed. It is anticipated that a number of

pumps stations can use the same forcemain. The proposed sewage pumping station locations and staging is presented in Table 17 of the ESR. Stations 1, 9 and 10 will be required initially and stations 2, 7 and 8 will be required ultimately. The remaining stations (# 3, 4, 5 and 6) will be required if it is decided, by the Township, to service the existing properties (2018) within the developed area of Midhurst.

WATER (See Section 5.10 of ESR)

Carson Road Area

- Construction of 3 equally sized production wells at the sand and gravel pit site with any 2 being capable of providing a total of 73 L/s to meet the Phase 1 demand,
- Construction of production wells at the West Snow Valley site with a minimum of 2 wells each rated at a minimum of 8 L/s (could be as high as 20 L/s each), complete with raw water transmission main to meet the Ultimate demand,
- A WTP to be built at the sand and gravel pit site with two treatment trains. An Ion Exchange treatment train is recommended for nitrate removal from the waters produced at the sand and gravel pit site to meet the Phase 1 demand. Ultimately, a separate filtration treatment train will be required to remove iron and manganese from the West Snow Valley water supply. The disinfection system for both trains will include a liquid chlorine storage tank and feed system with enough chlorine contact time to provide 2-log inactivation of viruses. The process waste water will be pumped to the adjacent Wastewater Treatment Plant. The facility will be equipped with an emergency power supply to sustain the entire operation including the on-site well pumps,
- An in-ground water storage tank will be provided with a minimum capacity of 3,868 m³ (say 3,900) in order to meet the ultimate water storage requirement for emergency, fire storage and equalization volume for peak hour demand, and,
- A pumping station will be built as part of the WTP to provide the peak hour water demand to the Carson Road Development Area and to maintain the pressure range between 345 and 620 kPa throughout the area. The station will also house fire pumps to provide 133 L/s for 3 hours. Pressure reducing valves will be required to service some small areas of the distribution system.

In addition to the works proposed in the Evaluation Report, it is noted that well pump houses will be required at all well sites to provide primary power, stand-by power (if not provided by a larger facility), flow metering and pump controls. A full water distribution system will be provided complete with valves, fire hydrants, sampling stations, air release valves, drain valves and water service connections.

Doran Road Area

- Construction of 3 equally sized production wells at the Doran Road well site with any 2 being capable of providing a total of 100 L/s to meet the Phase 1 demand, complete with raw water transmission main to the Water Treatment Plant proposed to be located east of Gill Road within the Development,
- Construction of production wells at the Old School Road site with a minimum of 2 wells each rated at a minimum of 40 L/s, complete with raw water transmission main to the Water Treatment Plant to meet the Ultimate demand,
- A Water Treatment Plant to be built east of Gill Road within the Development to treat water from the two well sites. A filtration treatment system with special filter media for removal of Iron and Manganese will be required. The disinfection system will include a liquid chlorine storage tank and feed system with enough chlorine contact time to provide 2-log inactivation of viruses. The process wastewater will be pumped to the adjacent sewage pumping station. The facility will be equipped with an emergency power supply to sustain the entire operation,
- An in-ground water storage tank will be provided with a minimum Phase 1 capacity of 3,470 m³ (say 3,500) expandable to meet the Ultimate required minimum capacity of 5,382 m³ (say 5,400) to provide storage requirements for emergency, fire storage and equalization volume for peak hour demand, and,
- A pumping station will be built as part of the WTP to provide the peak hour demand to the Doran Road Area and to maintain the pressure range between 345 and 620 kPa throughout the area. The station will also house fire pumps to provide 133 L/s for 3 hours.

In addition to the works proposed in the Evaluation Report, it is noted that well pump houses will be required at all well sites to provide primary power, stand-by power, flow metering and pump controls. A full water distribution system will be provided, complete with valves, fire hydrants, sampling stations, air release valves, drain valves and water service connections.

16.0 Summary of Design Considerations

As a result of the Phase 3 and Phase 4 Class EA Planning process, a number of design considerations were identified. These will be addressed as part of the final design of the proposed servicing projects. These considerations are summarized as follows and are in addition to commitments identified in Section 14.7 of this ESR:

16.1 General

- Review list of Permits and Approvals that was provided in Section 20.0 of the Master Plan Phase 1 and 2 Report (Section 1.7 of ESR)
- The Master Plan Phase 1 and 2 Report provided a “Summary of Commitments” (Section 23.0) which must be addressed prior to construction (Section 1.7 of ESR)

16.2 Transportation

- Stage 2 Archeological Assessment required to confirm Recommended Alignment of the Craig Road Extension (Table 1)
- Consider roundabouts at County Road 27 and Hwy. 26 and at County Road 27 and the future Craig Road intersection.

16.3 Wastewater

- Consider Deviation from Policy 2 re: effluent impact on Willow Creek (Table 2)
- Master Drainage Plan to be reviewed by NVCA to assess cumulative impacts of stormwater management and municipal effluent discharge on water quality in Willow Creek and Minesing wetland (Table 1). Discuss with NVCA and the Township, the need for a phosphorus offsetting program and if required, outline the details of such a program. The Phosphorus Budget Report will be confirmed once the details of the approved draft plans have been completed (Section 6.4.4).
- Review recommendations for the protection of the Hines Emerald Dragonfly habitat (Table 1)
- Re-evaluation of the Phosphorus Budget Report based on the conclusions of the Master Drainage Plan. (Section 6.4.4)
- Construction of the effluent outfall discharge to Willow Creek is to be timed to occur outside of the breeding and nesting season for the Barn Swallows that use the Hwy 26 bridge for nesting purposes (Section 6.4.7).
- Field investigations should be conducted at the detailed design stage, during the growing season, to provide a more complete inventory of vegetative species and communities along the proposed route of the effluent discharge pipe (Section 6.4.7). This requirement applies to all proposed pipelines with alignments along existing roadways.

- A further study should be conducted during detailed design to assess water flow, temperature regime and fish habitat of the one small watercourse crossing on Wilson Drive (Section 6.4.7). This requirement applies to all proposed creek crossings.
- Although it is considered that the addition of 66 kg/yr of phosphorus to the overall watershed is not significant and will have no impact on the Minesing wetlands, this issue will be discussed with the MOECC and the NVCA as part of the pre-design process (Section 6.5.1).
- Following screening and grit removal at the proposed WWTP, there may be a need for pumping the wastewater into the primary treatment section. Flow splitting and flow measurement may also be required. These items will be addressed during preliminary and final design. In addition, the need for peak flow storage will be assessed to prevent spills (Section 6.5.2.2).
- As part of the final design of the wastewater collection and treatment system, consideration will be given to the following issues related to initial low flows (Section 6.5.4):
 - Need for smaller diameter effluent forcemain coupled with flushing stations,
 - Need to truck wastewater to another treatment facility initially – low influent flow rate will be too small for the new plant to treat effectively,
 - Need for a small package plant to handle initial low flow rate,
 - Operation of sewage pumping stations to handle low flows (odour concerns)
 - Need for smaller diameter forcemains to handle initial low flows (odour concerns)
- Manifolding of sewage forcemains will be considered during final design in order to reduce the number of forcemains discharging to the WWTP (Section 6.6.1).
- The wastewater collection system layout that is proposed in the Class EA will be reviewed and adjusted during final design to meet the proposed grades of the developments (Section 6.6.2).
- The type of sewage pumping station required for each of the proposed station locations will be determined during the final design (Section 6.6.3).
- The exact alignment of the sewage forcemains (side of the street) and the size of the pipe will be determined during the initial design phase. The provision of forcemain flushing connections will be considered during final design. (Section 6.6.4).
- The design of the effluent outfall headwall (at Willow Creek) will be included in the final design (Section 6.7.4).
- Sanitary sewer sizing will be undertaken as part of the final design. The sewers will be sized and installed for the ultimate peak flow condition (Section 6.10.1).
- As part of final design, consideration will be given to staging the capacity of sewage pumps (Section 6.10.2).

- Sanitary forcemain sizing will need to allow for a gradual increase in flow over several years. Consideration will be given to installing smaller diameter pipes to accommodate initial low flows. The timing of the installation of the ultimate forcemain size will be considered as part of final design (Section 6.10.3).
- The size of the effluent discharge pipe may also need to be staged to accommodate initial low flow rates. This will be determined during final design (Section 6.10.5).
- Provide Stormwater Management Plans to the MOECC for review as part of the final design (Section 12).
- As part of the adaptive management and monitoring plan, being developed in conjunction with the Midhurst Overall Drainage Plan, undertake ongoing site-specific studies as development proceeds to confirm that the DFO thresholds (less than 10 % baseflow loss) are met and that they are protective as the project proceeds (Ainley response letter to MOECC).

16.4 Water

- During final design, undertake all hydrogeological assessments necessary in support of applications for Permits To Take Water (PTTW) for all future municipal water supply wells and for any construction dewatering. Submit the applications for the PTTWs and obtain approvals as part of the ECA stage.
- The exact sizing and layout of both water distribution systems will be finalized during the design phase using computer simulations to confirm flows and pressures under all conditions (Average day, Maximum day, peak hour and MDD plus Fire). (Section 2.1.4)
- Type of well pumping equipment (either submersible or vertical turbine) to be determined during final design. (Section 5.2)
- Sizing of raw water transmission mains to be assessed during final design including consideration of development staging (Section 5.3)
- The type of filter that will be used to remove iron and manganese from well water will be selected as part of the final design process. (Sections 5.4.1 and 5.4.2)
- The sizing of the treated water transmission mains is to be reviewed during final design, taking into consideration initial water demands. The lengths and alignments of the transmission mains will be determined through computer modelling as part of the final design. (Section 5.5)
- Sizing of distribution water mains will be assessed during final design for development servicing. (Section 5.6)
- A requirement will be made during the pre-design stage to conduct pilot testing on the raw water from the various Doran Road area wells to confirm that filtration is the preferred treatment method and to determine the appropriate filter media. Consider provision of more than one treatment train – 50% redundancy. (Section 5.11.2)

- The initial process piping for the two water treatment plants could be provided to meet the Ultimate flow condition, but this will need to be assessed as part of the final design. (Section 5.11.2)
- The disinfection systems should be staged to meet the flow capacities of the filters. However, a much smaller system may be required at the commencement of development in order to meet the initial low water demands. This will be taken into account during final design. (Section 5.11.2)
- The high lift pumping requirements will also need to be staged in order to provide the full range of minimum day demand up to maximum day demand and peak hour demand for all Stages of development. Pumping and high lift piping requirements will be fully assessed as part of the final design. (Section 5.11.2)
- The stand-by power requirements will also depend on the staging of pumps. This will be determined during final design. (Section 5.11.2)
- The removal of nitrate from the proposed wells at the sand and gravel pit site may not be a requirement of the MOECC Approval. However, provision will be made for the reduction of nitrate by installing treatment equipment. It is also noted that some of the water flow could by-pass the treatment process allowing for a reduction in the capacity of the ion exchange units and the amount of salt that is used in the process. This will be considered as part of the pre-design process. Also, consider pilot testing of the Carson Road area well water and redundancy in the ion exchange treatment trains. (Section 5.11.2)

17.0 Public Review of Draft ESR and Requests for Part II Order

As a result of the publication of the REVISED Notice of Completion of the Draft Environmental Study Report (issued June 15, 2018), five requests for a Part II Order were received as follows:

- 1 Midhurst Rate Payers Association – September 18, 2018
- 2 Michele Bowman – September 18, 2018
- 3 Allison Graham – September 10, 2018
- 4 Carson Trails Estates Inc. – September 18, 2018
- 5 Estate of Marie Louise Frankcom – September 18, 2018

The Ministry of the Environment, Conservation and Parks (MECP) conducted a thorough review of the Draft ESR in order to determine the validity of the requests for a Part II Order and the following is a summary of the review process in chronological order:

- | | |
|--------------------|---|
| May 31, 2018 | publication and distribution of Notice of Completion of ESR |
| June 15, 2018 | publication and distribution of REVISED Notice of Completion of ESR (extending public review period to 4:00 pm on September 18, 2018) |
| September 10, 2018 | Receipt of Request from A. Graham request |
| September 18, 2018 | Receipt of Request from four other requests – M. Bowman, Midhurst Rate Payers Association (S. Buxton), Carson Trails Estates Inc. and Frankcom Estates |
| September 19, 2018 | MECP letter to Township advising of the receipt of the five requests for a Part II Order including a request for information (MECP Tables A and B with instructions) |
| September 19, 2018 | MECP letter to the five Requesters outlining the review process |
| October 3, 2018 | MECP letters to D. Artenosi (representing Carson Trails Estates), R. and M. Bowman and J. Feehely (representing Frankcom Estates) asking for clarification of their concerns (specifically which of the identified undertakings were of a concern). |
| October 15, 2018 | Letter from D. Artenosi in reply to MECP letter dated October 3, 2018 |
| October 15, 2018 | Email from M. Bowman in reply to MECP letter dated October 3, 2018 |
| October 15, 2018 | Email request from MECP to Ainley for a list of all water, wastewater and transportation undertakings. (List was provided to MECP on October 29, 2018). |
| October 29, 2018 | Email from MECP to M. Bowman stating that the Class EA process is separate and distinct from the Midhurst Secondary Plan. |

| | |
|-------------------|---|
| October 29, 2018 | Ainley email to MECP (C. Robinson) including completed Tables A and B. |
| October 31, 2018 | Ainley email to MECP regarding developments within Midhurst Secondary Plan that were or are at the LPAT and the current status of the appeals related to Frankcom Estates and Carson Trails Estates. |
| November 5, 2018 | Email from M. Bowman to MECP re: Midhurst Secondary Plan issues. |
| December 31, 2018 | Addendum request from Midhurst Ratepayers Association. |
| January 15, 2019 | Email from MECP to Ainley requesting Report that details environmental features within study area and potential impacts as a result of proposed development. |
| January 22, 2019 | Email from Ainley to MECP responding to January 15, 2019 email outlining telephone discussion. |
| March 12, 2019 | Email from MECP to Ainley requesting information re: response to NVCA, need for additional studies on fish habitat, need for consultation with DFO and need for consultation with Environment and Climate Change Canada re: Hine's Emerald Dragonfly. |

A copy of all the abovementioned correspondence is included in Appendix EE.

The MECP subsequently determined that "...an individual environmental assessment is not required." This decision was confirmed in a letter dated November 21, 2019. The Minister imposed conditions with respect to the proposed projects and they are summarized as follows:

- Township shall prepare and submit to the Director of Species at Risk Branch for approval, a plan to identify any species listed on the Species at Risk Ontario List as an extirpated, endangered or threatened species and their habitat that may be adversely affected by the work;
- Township shall revise the plan as required by the Director and shall implement the approved plan prior to any construction activities for any of the undertakings,
- Township shall update and provide to the Director for review and advice, Figure 1 from the Technical Memorandum dated February 7, 2017, titled "Hine's Emerald Dragonfly Habitat in the Minesing Wetlands and the Midhurst Development.";
- Prior to completing any detailed designs for the proposed undertakings, the Township shall inform and consult with any landowners that have potential to be impacted by source water protection policies in the future;
- Township shall prepare an Odour Mitigation Plan for the proposed wastewater facilities;
- Township shall make the plans required above publicly available on its website prior to any work covered by the plans or any construction activities for any of the undertakings being carried out, and;
- Township shall submit a written report to the Director, Environmental Assessment and Permissions Branch, on how it has fulfilled the above conditions prior to commencement of construction.

The Minister encouraged the Township to make the November 21, 2019 letter available to the public on the Township's website. The Minister also noted that "If a significant change is required to any of the projects in the Master Plan, the Township shall consult with the Ministry to determine if an addendum to the Master Plan is required." A copy of the Minister's letter is included in Appendix EE.

Based on the decision by the Minister, the ESR was finalized in March 2020.

In addition to the five requests for a Part II Order, written communications were also received from the NVCA and the MTO during the public review period.

An Email dated September 17, 2018 was received from Mr. P. Dorton of the MTO. A response letter was provided to the MTO dated November 9, 2018. In addition, the MTO (Email dated October 23, 2018) asked if the municipal EA study included a future encroachment permit on Hwy 26. Ainley responded to the MTO (Email dated November 6, 2018) advising that the proposed forcemain route along Hwy 26 is outlined in the Draft ESR. The MTO responded (Email dated November 20, 2018) recommending alternatives other than parallel installations along MTO ROWs be explored for both the outfall forcemain and other servicing proposals in the ESR.

The MTO also submitted a follow up email on Jan 29, 2019 with additional questions in relation to Ainley's Nov 9, 2018 letter. Ainley responded to these questions in a letter dated April 7, 2020.

A letter dated September 17, 2018 was received from L. J. Bull of the NVCA. A response letter was provided to the NVCA dated March 20, 2019.

In addition, comments/questions were received during the 90-day public review period from D. Strachan (Midhurst Ratepayers Association). Those questions and the subsequent responses are outlined in emails dated June 15, June 18, July 1, July 10, August 7, August 23, 2018 (copies included in Appendix EE).

Following the issuance and publication of the Notice of Completion, numerous First Nations representatives were contacted and were encouraged to provide comment on the Draft ESR. As a result, four First Nations groups provided written responses as follows:

- Chippewas of the Thames First Nation, letter dated June 14, 2018 advising that "...we have identified no concerns with your project of the information that you have presented to us at this time."
- Huron Wendat, email dated June 5, 2018 requesting "Could you please let us know any archaeological assessment have been done as part of the EA?" Archaeological assessments were done as part of the Secondary Plan. In addition, a Stage 1 assessment was undertaken along the proposed alignments for the extension of Craig Road. Additional (Stage II) assessments may be necessary as part of final design.
- Mississaugas of the New Credit First Nation, letter dated August 13, 2018, advising that "Your project is out of our Treaty Territory."
- Rama First Nation, email dated June 12, 2018 advising that information was forwarded to Ms. Karry Sandy McKenzie, Williams Treaties First Nation Process Co-ordinator/Negotiator.