



MMM Group Limited

Second Avenue Infrastructure Improvements

PROJECT FILE REPORT

Municipal Class Environmental Assessment
Schedule "B" Project

Prepared for:
City of Greater Sudbury

April 2016

Communities
Transportation
Buildings
Infrastructure



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STANDARD LIMITATIONS

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This Standard Limitations statement is considered part of this report.

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1.0 INTRODUCTION & BACKGROUND

1.1 General

MMM Group Limited (MMM), a WSP Company, was retained by the City of Greater Sudbury (hereinafter referred to as 'the City') to update the Project File Report for the Municipal Class Environmental Assessment, Schedule B, for infrastructure improvements on Second Avenue North (Municipal Road 72).

This study was undertaken to identify and address the existing and future traffic congestion on Second Avenue and evaluate alternative solutions to address the problem / opportunity statement.

1.2 Study Area

Second Avenue North is a two lane secondary arterial road that generally runs in a north-south direction from Bancroft Drive to the Kingsway (Municipal Road 55, a former alignment of the Trans-Canada Highway). The study limits for Second Avenue are located between Donna Drive and First Avenue. The overall study area includes a wider area than Second Avenue to ensure full assessment of other alternative solutions to address the problem / opportunity statement. **Exhibit 1-1** illustrates the study area.

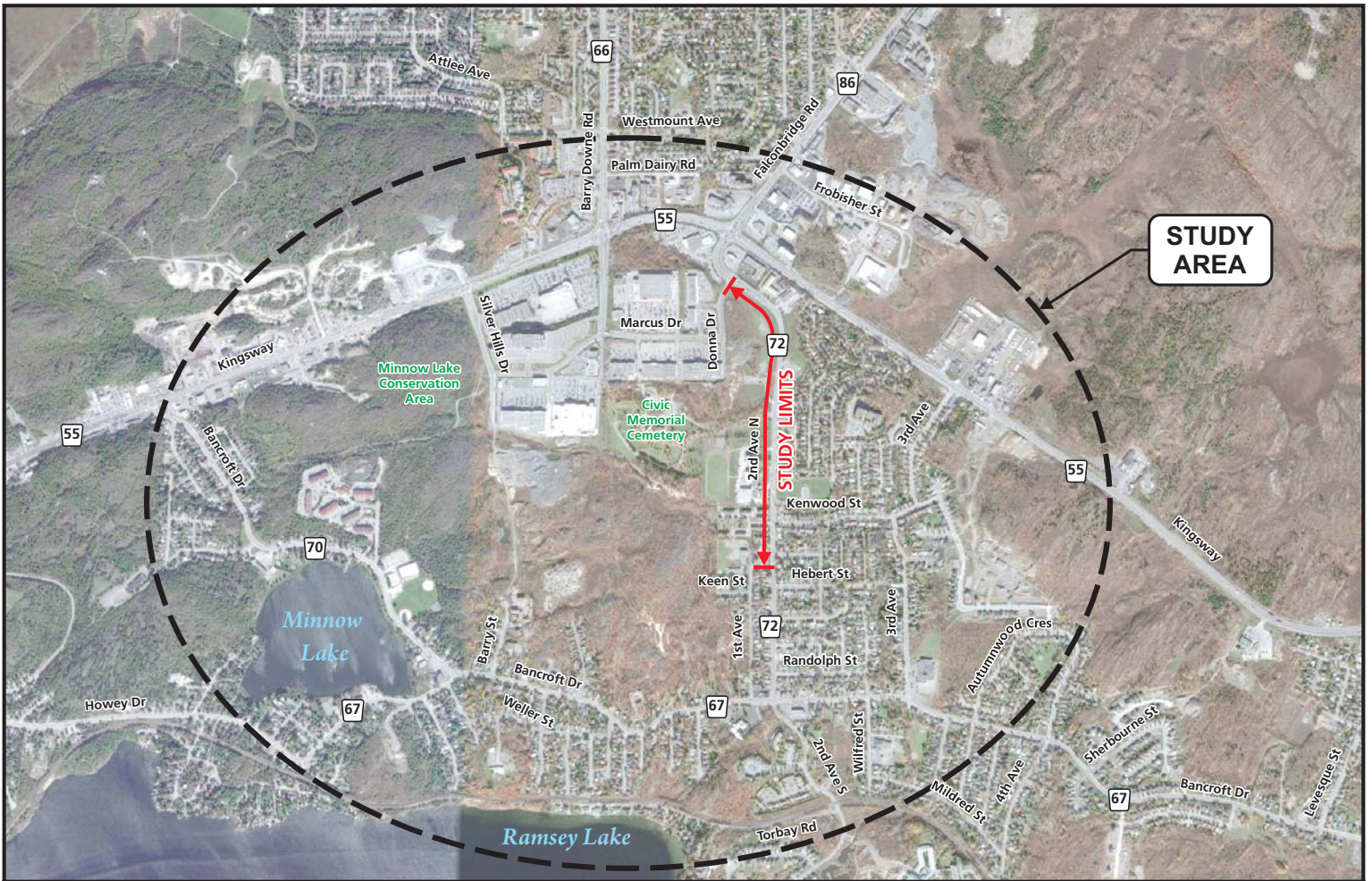
1.3 Background

In 2011, the City began an update to their existing Transportation Master Plan (TMP) to account for the significant development in the preceding years and to include an active transportation component to encourage a healthy community. One component of the TMP was to identify the required road network improvements within the next twenty years using population and employment projections to inform traffic modelling analysis. The early conclusions identified the need for widening Second Avenue (MR 72), due to existing and future congestion, and this work was included in the 2014 capital budget.

The City published the Notice of Commencement for the TMP, on The City of Greater Sudbury's website on January 4, 2012 and hosted two Public Information Centres (PIC) on January 11, 2012 and June 19, 2013. The schedule to complete the TMP was delayed, and it was anticipated that TMP would not be complete until after the proposed construction start date for Second Avenue. Therefore, the City proceeded to complete the remainder of the Schedule B, Municipal Class Environmental Assessment for only Second Avenue to meet the proposed construction schedule.

The City hosted a PIC for the Second Avenue project on March 19, 2014. Following the feedback from this PIC and subsequent stakeholder meetings, the City made changes to the proposed Second Avenue design.

The City then published a notice of completion for the Second Avenue Project on April 16, 2014 in the Sudbury Star and Le Voyageur, and hosted a follow-up PIC on April 22, 2014, to present the design changes.



Second Avenue Infrastructure Improvements
Municipal Class Environmental Assessment

Exhibit 1-1
Study Area

During the 30 day comment period, two Part II Order Requests were received by the Ministry of the Environment and Climate Change (MOECC) citing environmental concerns and requesting that the project be documented as an Individual Environmental Assessment.

The City reviewed comments from the Part II Order Requests and held the following meetings with key stakeholders that represented active transportation interests and the local community to discuss the proposed Second Avenue Infrastructure Improvements and attempt to resolve the issues raised in the Part II Order Requests.

The City prepared a Project File Report in March 2015 to address the comments received in the Part II Order Requests received in May 2014. The Notice of Study Completion was published in the Sudbury Star and Le Voyageur on March 25, 2015 and April 1, 2015. The March 2015 Project File was also available for review on the City's website.

During the public review period for the March 2015 Project File Report, six Part II Order Requests and one letter of concern were received by the Ministry of the Environment and Climate Change (MOECC) citing environmental concerns and requesting that the project be documented as an Individual Environmental Assessment.

In a letter dated May 13, 2015, MOECC determined that the project was not planned in accordance with the requirements of the MCEA Class EA process. Therefore, the MOECC was unable to consider the Part II Orders received and requested the City to provide an updated Project File Report to be available to public and agency review.

Given the foregoing, the City retained MMM, a WSP Company, to undertake additional environmental investigations and to update the Project File Report to address the MOECC comments in their May 13, 2015 letter.

Appendix A provides a summary of the MOECC comments that were received in their May 13, 2015 letter and an explanation of how these comments were addressed in this updated Project File Report.

1.4 Scope of Study

The purpose of this study is to undertake a Municipal Class Environmental Assessment (Class EA) for the proposed infrastructure improvements on Second Avenue (MR 72) in the City of Greater Sudbury.

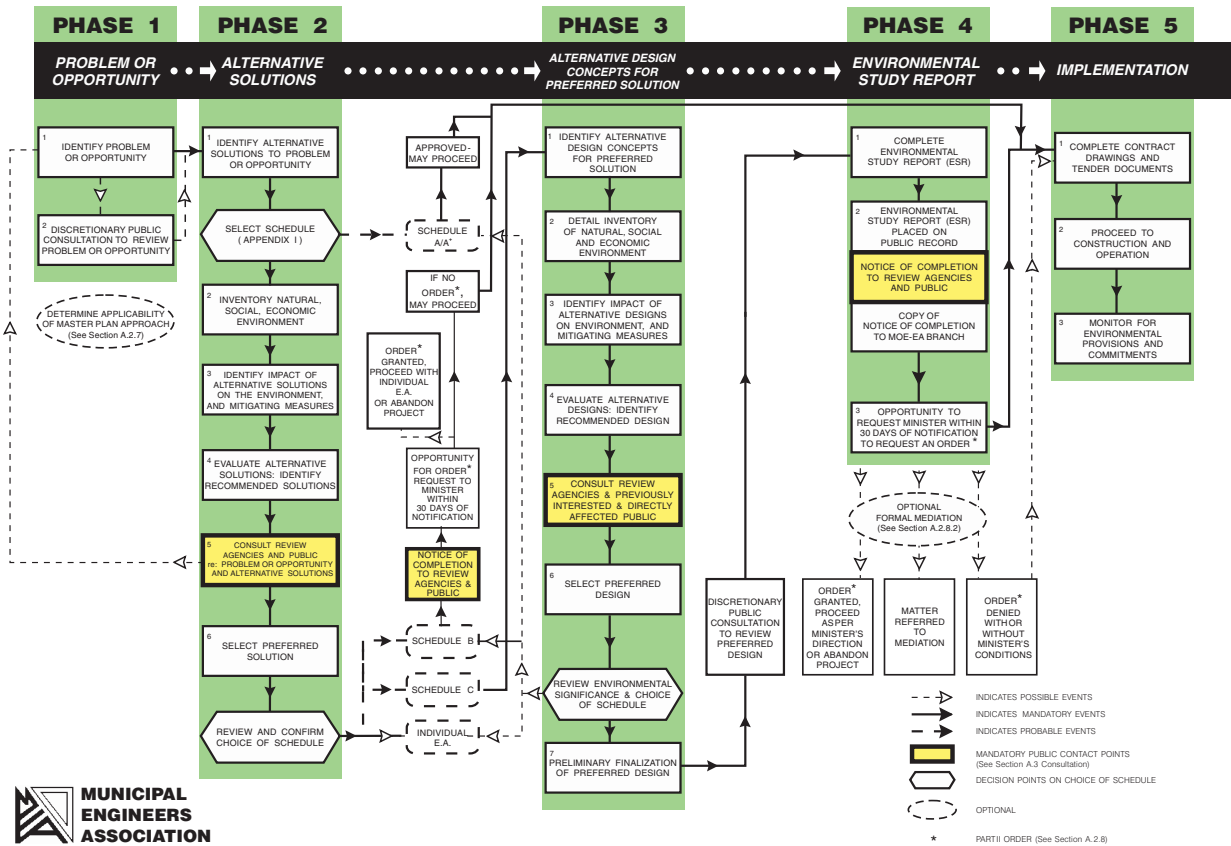
1.5 Environmental Assessment Process

The *Municipal Class Environmental Assessment* (MCEA) enables the planning of municipal infrastructure projects to be undertaken in accordance with an approved procedure designed to protect the environment. The Class EA process provides a decision making framework that allows proponents to meet the requirements of the *Environmental Assessment Act (EA Act)* in an effective and efficient manner. Provided the Class EA process is followed, a proponent does not have to apply for formal approval under the *EA Act*. The overall MCEA process is illustrated in **Exhibit 1-2**. Since projects undertaken by municipalities can vary in their environmental impact, projects are classified in the Class EA in term of schedules, as described below.

- **Schedule A** Projects which are limited in scale, have minimal adverse environmental effects and include the majority of municipal road maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the Class EA planning process.

MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA



Second Avenue Infrastructure Improvements
Municipal Class Environmental Assessment

Exhibit 1-2
Municipal Class EA Planning and Design Process
(October 2000, as amended 2007 & 2011)

- Schedule A+ Similar to Schedule A projects, Schedule A+ Projects are pre-approved, however, the public is to be advised prior to project implementation.
- Schedule B Projects which have the potential for some adverse environmental effects. These projects are subject to a screening process which includes contacting directly affected public and relevant review agencies.
- Schedule C Projects which have the potential for significant environmental effects and which must proceed under full planning and documentation procedures specified in the Class EA documentation.

This project followed the process for Schedule B projects as per MCEA Appendix 1 – Project Schedules – *General Operation and Maintenance of Linear Paved Facilities and Related Facilities*. This project is considered a reconstruction or widening of an existing road and the City estimated that the cost of the preferred solution for the road widening is less than \$2.3M.

Under the Class EA process for Schedule B projects, the proponent of the project is required to undertake a screening process involving consultation with directly affected public and agency stakeholders to ensure they are aware of the project and their concerns are adequately addressed. The EA process follows a phased approach, which typically includes the following activities:

Phase I – Problem or Opportunity

- Collect background data and reports;
- Notify stakeholders of the study and solicit input; and
- Document the problem.

Phase II – Alternative Solutions

- Inventory environmental conditions in the study area;
- Identify alternative solutions for solving the problem;
- Provide an opportunity for public and stakeholder input;
- Evaluate the alternative solutions and select a preferred solution;
- Assess potential environmental impacts and proposed mitigation measures;
- Notify public, stakeholders of completion of the study;
- Receive and review stakeholder input;
- Document the study findings in Project File; and
- Place the Project File onto the public record for a 30-day review period.

Phase III – Alternative Design Concepts for Preferred Solution

- Not required for a Schedule 'B' project.

Phase IV – Environmental Study Report

- Not required for a Schedule 'B' project.

Phase V - Implementation

- Complete contract drawings and tender documents;
- Proceed to construction and operation; and
- Monitor for environmental provisions and commitments.

This Project File Report documents the Phases I and II of the Municipal Class EA process for this project. Phase V will be carried out subsequently to the filing of this Project File Report subject to obtaining all environmental approvals and funding.

1.5.1 Part II Order

It is recommended that all stakeholders work together to determine the preferred means of addressing the problem. If concerns regarding a project cannot be resolved in discussions with the proponent (for this study, the proponent is the City of Greater Sudbury), the Municipal Class EA does include an appeal mechanism. Under the Municipal Class EA, members of the public, interest groups, agencies, and other stakeholders may submit a written request to the Minister of the Environment and Climate Change to require the proponent (the City of Greater Sudbury) to comply with Part II of the Environmental Assessment Act before proceeding with the proposed undertaking. This is known as a 'Part II Order'.

The request for a Part II Order must also be copied to the proponent at the same time it is submitted to the Minister. Written requests for a Part II Order must be submitted to the Minister within 30-calendar day review period after the proponent has issued the Notice of Completion. Requests after the 30-calendar day review period will not be considered. The Minister of the Environment and Climate Change can be contacted as follows:

Ministry of the Environment and Climate Change
Floor 11
77 Wellesley St. W
Toronto ON M7A 2T5
Fax: 416-314-8452

The Minister determines whether or not that a Part II Order is necessary with the Minister's decision being final.

1.6 Study Organization

1.6.1 Project Team

The City of Greater Sudbury is the proponent of the project and carried out the Municipal Class EA process. Key City staff included representatives from the City's Infrastructure Services Department and City Planning Department. The City also:

- Carried out public and stakeholder consultation, including holding Public Information Centres;
- Engaged First Nations and Aboriginal Groups;
- Undertook initial assessment of planning alternatives;
- Identified the preferred solution;
- Prepared the drainage assessment; and
- Developed the design plans for the preferred solution.

The City retained MMM, a WSP Company, to assist in updating the EA Project File to address comments received from MOECC regarding the March 2015 Project File. MMM also undertook the following additional investigations:

- Natural environment review, including Species at Risk;
- Noise Assessment;
- Heritage Review; and
- Additional Traffic Analysis.

The City also retained Woodland Heritage Services to complete the Stage 1 Archaeological Assessment for the proposed improvements. On behalf of the City, MMM also retained NOVUS Environmental Inc. to undertake the Air Quality Assessment.

1.6.2 Stakeholders

An extensive consultation program was undertaken to aid in the planning and impact assessment for this project. Throughout the duration of the study, the City consulted and engaged with:

- External agencies (including Provincial Ministries / Agencies, Utilities, Federal Departments and the Nickel District Conservation Authority);
- First Nations and Aboriginal groups;
- Emergency Services Providers and School Boards; and
- The Public (including adjacent property owners, community / interest groups and the general public).

Consultation and engagement was an integral component of the study, as it provided opportunities for two-way communication with interested stakeholders. Consultation activities provided a forum to identify potentially significant environmental issues early in the decision making process and ensure that they were given appropriate consideration.

Section 5.0 outlines the consultation activities undertaken, identify the key issues raised and how they were resolved.

2.0 PROBLEM / OPPORTUNITY STATEMENT

The problem statement for the potential improvements to Second Avenue is based on the problem statement presented in the City's Draft Transportation Study Report (April 2015), which states:

Greater Sudbury's current transportation system needs to be enhanced to address current deficiencies, and to accommodate growth in population, employment and commercial activity to the horizon of 2031. Developing a multi-modal system is a key component of that change; multi-modal mobility is also needed to address the directions set by the Province and by City Council, reflecting greater sustainability and intensification. Sustainability must encompass the goals of an active community, a healthy environment and economic vitality.

Key opportunities in Greater Sudbury related to these needs include:

- Creating transportation choices to better support biking, walking, and transit;
- Implementing short-term solutions for intersections and corridors of traffic congestion;
- In the longer term, creating a transportation network which offers more direct routings; and
- Providing the transportation network needed to support intensified land use in designated growth areas.

The analysis included in the Draft Transportation Study Report (TSR) indicates that Second Avenue exhibits traffic congestion and traffic volumes approaching capacity in the existing conditions (year 2009 in the Draft TSR). Model output from the 2009 existing conditions analysis shows 572 northbound trips on Second Avenue north of Scarlett Road in the p.m. peak hour for a volume to capacity ratio of 0.82, assuming that the capacity of Second Avenue is 700 vehicles per hour per lane. 700 vehicles per hour is a reasonable assumption for lane capacity and is the same assumption used for similar types of roads, such as Howey / Bancroft Drive. The data in **Appendix B** includes the number of lanes, capacity per lane, posted speed, peak hour traffic volumes and the volume to capacity ratios.

The Draft TSR identifies roads that have volume to capacity ratios of 0.80 or higher as approaching capacity and in need of consideration of measures to increase vehicle capacity or reduce vehicle demand. Subsequent traffic count data collected by the City in 2011 shows even higher northbound traffic flows in the p.m. peak hour (706 vehicles in the peak hour, which was factored given the day of the week and time of year to be about 630). 706 vehicles would be considered at capacity for Second Avenue, with 630 vehicles equating to a volume to capacity ratio of 0.90 (630/700). These 2011 traffic count data are provided in **Appendix B**.

The Draft TSR developed three alternative scenarios for the 2031 horizon year and identified road projects across the city to include in each scenario. For the Do Nothing scenario, no road projects were included anywhere in the City's transportation network and the travel demand model was run with additional population and employment growth. In this scenario, Second Avenue north of Scarlett was forecast to experience an increase in traffic volumes over 2009 conditions and exhibit a volume to capacity ratio of 0.98. The data related to the 2031 Do Nothing Scenario is provided in **Appendix B**. The data include the number of lanes, capacity per lane, posted speed, peak hour traffic volumes and the volume to capacity ratios.

Due to the high volume to capacity ratio reported in the Do Nothing Scenario, the widening of Second Avenue was included as a project in the subsequent two Draft TSR 2031 scenarios. The 2031 model results may be under-representing the number of vehicle trips on Second Avenue, given that 2011 existing traffic counts are higher than or on par with the 2031 forecasted traffic volumes, further justifying the inclusion of Second Avenue widening as a project to include in alternative scenario analysis.

The 2031 Auto-Focused Scenario includes the same population and employment growth as the Do Nothing Scenario but also includes road projects such as the widening of Second Avenue as well as multiple other road projects across the city. The travel demand model shows a resulting volume to capacity ratio of 0.47. Model output sheets for this scenario are on file with the City.

The Sustainability-Focused Scenario, identified as the preferred scenario in the Draft TSR, also uses the same population and employment growth forecasts as the other two 2031 scenarios. It includes the Second Avenue widening and other road projects across the City, but not as many road projects as included in the Auto-Focused Scenario. Second Avenue is forecasted to exhibit a volume to capacity ratio of 0.46 in this scenario. Forecast traffic volumes and model parameters, similar to those provided for the other model scenarios, are available in **Appendix B**.

An additional modelling scenario was developed for the purposes of this Environmental Assessment. The 2031 Do Nothing Scenario was augmented to include the improvements on Second Avenue. This analysis, termed the Widen Second Avenue Only Scenario, shows what would happen if Second Avenue were the only road widened in the city transportation network. The modelling results, provided in **Appendix B**, indicate that the increased capacity on Second Avenue draws increased vehicle volumes on Second Avenue, as vehicles re-route to utilize the additional capacity.

A summary of the volume to capacity ratios of the various scenarios analyzed is provided in **Exhibit 2-1**.

Exhibit 2-1: Second Avenue Volume to Capacity Ratios in Different Analysis Scenarios

Year	Scenario	Northbound P.M. Peak Volume	Number of Northbound Lanes	Capacity of Each Lane	Volume to Capacity Ratio (Vehicle Volume / Total Capacity)
2009	Model Existing Conditions	572	1	700	0.82
2011	Observed Traffic Counts	706	1	700	1.01
2031	Model Do Nothing Scenario	689	1	700	0.98
2031	Model Auto Focused Scenario	664	2	700	0.47
2031	Model Sustainability Focused Scenario (Preferred)	645	2	700	0.46
2031	Widen Second Avenue Only Scenario	814	2	700	0.58

Creating transportation choices by better supporting biking, walking and transit is part of the problem statement in the Draft TSR. The City should determine the appropriate ways to support alternative transportation as part of any improvements to Second Avenue.

In summary, traffic congestion is expected to increase in the horizon year of 2031 if no improvements to existing Second Avenue within the study limits. As such, the City of Greater Sudbury is carrying out this study to assess alternative solutions and identify the recommended alternative design that will address the ongoing vehicle capacity concerns and the desire to enhance and improve the alternative forms of transportation.

3.0 EXISTING ENVIRONMENTAL FEATURES

This section provides a general overview of existing conditions in the Second Avenue study limits. A map of existing conditions in the overall study area is shown in **Exhibit 3-1**. A number of field studies and summary reports were prepared to address the Second Avenue infrastructure improvements and its surrounding environment within the Second Avenue study limits. While this section summarizes the existing conditions, **Section 6.4** later in this report summarizes the assessment of potential impacts on the environment and identifies proposed mitigation measures.

3.1 Natural Environment

MMM undertook a site visit on November 26, 2015 and carried out a background review on environmentally significant species and designated natural areas in the vicinity of the study area. This included contacting the agencies (Ministry of Natural Resources and Forestry (MNR), Conservation Sudbury (also known as Nickel District Conservation)) and examining the online Natural Heritage Information Centre (NHIC) database and the MNR Species at Risk by Area mapping (MNR, 2015). The following sub-sections summarize the findings of the natural environment review and **Appendix C** includes the Natural Heritage Existing Conditions and Impact Assessment Technical Memo. A map of the Natural Environment Conditions in the vicinity of Second Avenue within the study limits (i.e. Donna Drive to First Avenue) is shown in **Exhibit 3-2**.

3.1.1 Terrestrial Ecosystems

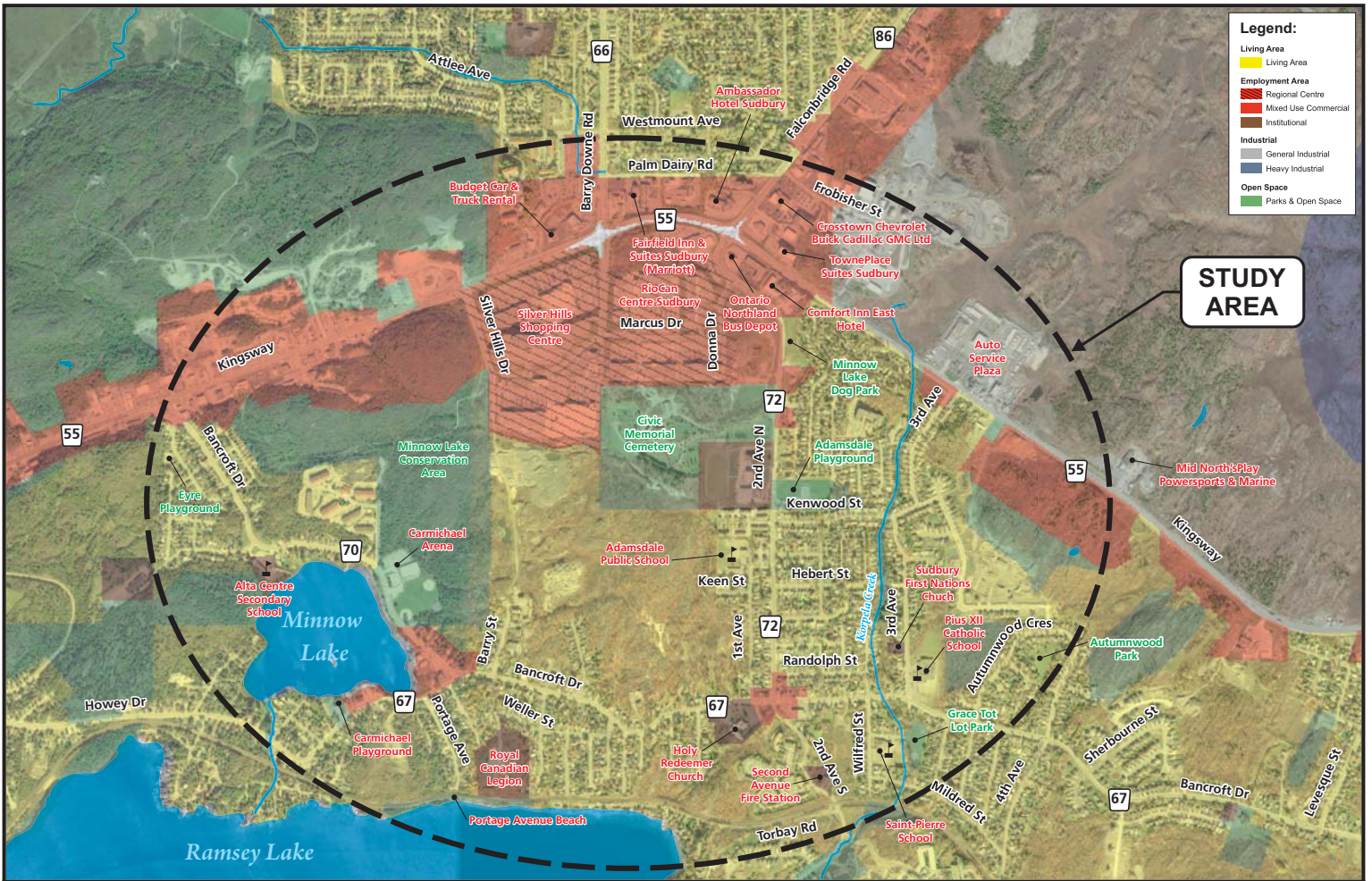
Most of the vegetation communities identified in the study area are culturally influenced. This included cultural meadows on both sides of Second Avenue between Donna Drive and Scarlett Road where lack of maintenance has allowed succession to occur to a cultural meadow and cultural thicket feature. Natural vegetation occurs in the study area in the valleyland north of the cemetery road, in the woodland east of Adamsdale Park and in the riparian areas of the unnamed watercourse north of Third Avenue. Further details on these communities are described below.

Dry to Moist Old Field Meadow Type (CUM1-1)

The majority of the vegetated areas in the study area are dry to moist old field meadows that have become established on abandoned lots and adjacent to the dog park area on Second Avenue. Each of the units was slightly different in composition but all were abundant with Grass (*Poa* spp.), Asters (*Syphyotrichum* spp.), Creeping Bentgrass (*Agrostis stolonifera*), Tall Goldenrod (*Solidago altissima*), Wild Carrot (*Daucus carota*), and Common Mullein (*Verbascum thapsus*), with occasional Reed-canary Grass (*Phalaris arundinacea*), Red Raspberry (*Rubus idaeus*), and Common Tansy (*Tanacetum vulgare*). The sparse trees and shrubs found in these areas include seedlings of Manitoba Maple (*Acer negundo*), Balsam Poplar (*Populus balsamifera*), White Spruce (*Picea glauca*), Balsam Fir (*Abies balsamea*), and Staghorn Sumac (*Rhus typhina*).

Dry to Moist Old Field Meadow Type / Mineral Cultural Thicket Ecosite (CUM1-1/CUT1)

This vegetation type was found in the vicinity of the dog park and parking lot west of Second Avenue. The units are a mosaic of Old Field Meadow and Cultural Thicket. The Old Field Meadow is as described above. The thicket consisted of successional Paper Birch (*Betula papyrifera*), Poplars (*Populus tremuloides*, and *P. balsamifera*), and Willows (*Salix* spp.).





Legend

- ELC Boundary
- Wetland Communities
- - - Surface Drainage
- Watercourse



ELC Communities

- CGL Green Lands
- CGL_2 Green Lands - Parkland
- CUM1-1 Dry- Moist Old Field Meadow Type
- CUT1 Mineral Cultural Thicket Ecosite
- CVC Commercial and Institutional
- CVR_2 Residential - High Density Residential
- CVR_3 Residential - Single Family Residential
- ES17 Poplar-White Birch
- ES17.1 Poplar-White Birch dry to moderately fresh
- ES17.2 Poplar-White Birch fresh to moist
- ES6 Rock Slope/Talus - Acidic/Circumneutral
- ES8 Rock Barren - Acidic/Circumneutral
- HR Hedgerow
- MAS2-1 Cattail Mineral Shallow Marsh Type
- OAG Open Agriculture
- RBT3-2 Jack pine Treed Rock Barren Type
- SWT Thicket Swamp
- SWT2-2 Willow Mineral Thicket Swamp Type

Poplar-White Birch (ES17)

Units of this ecosite exist in the valleyland north of the cemetery road, in the wooded area north of Scarlett Road, and in the wooded area east of Adamsdale Playground. The sparse to moderate canopy of these woodlands was dominated by Paper Birch. All of these units are anthropogenically disturbed to a degree, and some could not be adequately classified to an FEC vegetation type.

Poplar-White Birch dry to moderately fresh (ES17.1)

The unit is present in the valleyland north of the cemetery road, in the wooded area north of Scarlett Road, and in the wooded area east of Adamsdale Playground. The canopy of this woodland was dominated by Paper Birch, with occasional Manitoba Maple and Trembling Aspen (*Populus tremuloides*), and sparse Red Oak (*Quercus rubra*), Basswood (*Tilia americana*), and Crack Willow (*Salix fragilis*). The sparse shrub layer contained occasional Red Oak saplings and sparse Sugar Maple, Manitoba Maple and Scots Pine (*Pinus sylvestris*). The ground layer was dominated by abundant Bracken Fern (*Pteridium aquilinum*) and contained occasional sedges (*Carex* spp.), sparse Red Columbine (*Aquilegia canadensis*) and mosses.

Poplar-White Birch fresh to moist (ES17.2)

The unit present in the wooded area east of Adamsdale Playground contained species indicative of a moister soil than the other units of ES17. A small dug ditch, with a small metal culvert under a trail was noted immediately behind the backyard fences of the houses on the north side of Kenwood Street. It is our understanding that this small ditch receives temporary drainage in times of high rainfall. The ditch was dry at the time of field investigations. The canopy of this woodland is dominated by Paper Birch, with occasional Manitoba Maple and sparse Trembling Aspen (*Populus tremuloides*), Silver Maple (*Acer saccharinum*), Eastern White Cedar (*Thuja occidentalis*) and Scots Pine. The subcanopy and shrub layer was sparse and contained European Mountain-ash (*Sorbus aucuparia*), Honeysuckle (*Lonicera* sp.), Red Raspberry, and small Scots Pine and Balsam Fir (*Abies balsamea*). The ground layer contained occasional Early Lowbush Blueberry (*Vaccinium angustifolium*) and sparse Garlic Mustard (*Aliaria petiolata*), Spotted Jewelweed (*Impatiens capensis*), Bittersweet Nightshade (*Solanum dulcamera*), Woodfern (*Dryopteris* sp.), Sedges, Grasses, Creeping Bentgrass, and Reed Canary Grass. This unit was heavily anthropogenically influenced with frequent dumping, invasive species, garden waste, and vandalism.

Hedgerows (HR)

Linear hedgerows were observed in several locations in the study areas. The species composition of the hedgerows was variable. Tree species included: Poplar (*Populus x canadensis*, *P. nigra*, *P. tremuloides*), Scots Pine, Ash (*Fraxinus americana* and *F. pennsylvanica*), Spruce (*Picea abies* and *P. glauca*), Paper Birch, Manitoba Maple, and Norway Maple (*Acer platanoides*).

Cattail Mineral Shallow Marsh Type (MAS2-1) and Cattail Mineral Shallow Marsh Type/Thicket Swamp (MAS2-1/SWT)

These units were located along the drainage channels present west of Second Avenue in the dog park. The units were dominated by Narrow-leaved Cattail (*Typha angustifolia*). Sparse Northern Water Plantain (*Alisma plantago-aquatica*), Purple Loosestrife (*Lythrum salicaria*), Aster (*Symphotrichum* sp.) and Reed-canary grass were also observed. Some units were a mosaic with Thicket Swamp (SWT) abundant with Trembling Aspen, White Birch, and Willows.

Rock Slope/Talus – acidic/circumneutral (ES6)

Although not vegetated, this unit was classified under the FEC system. The unit consists of a talus slope of Precambrian shield rocks.

Rock Barren – acidic/circumneutral (ES8)

This unit is a treed rock barren ecosite. Approximately 50% of the surface was bare, Precambrian shield rock or sand derived from that rock. The canopy was short, and sparse, with occasional Jack Pine (*Pinus banksiana*), Paper Birch, and Red Oak. The shrub layer contained sparse saplings of the canopy layer species. The ground layer was dominated by mosses and lichens, however in areas of deeper soils, Velvet-leaved Blueberry (*Vaccinium myrtilloides*) and Bracken Fern were abundant.

Willow Mineral Thicket Swamp (SWT2-2)

This unit was found in the vicinity of the unnamed watercourse north of the intersection of Kenwood Street and Third Avenue. Few trees were found in this unit and those were all Manitoba Maple. The moderately dense shrub layer was abundant with Willows (*Salix bebbiana* and other *Salix* spp.) and contained sparse Speckled Alder (*Alnus incana* subsp. *rugosa*), and Red Osier Dogwood (*Cornus stolonifera*). The tall ground layer was abundant with Reed-canary Grass with occasional Narrow-leaved Cattail, and sparse Spotted Joe Pye Weed (*Eutrochium maculatum*), Willowherb (*Epilobium* sp.), and Bittersweet Nightshade.

Other Ecosites

Several other ecosites are located within the study limits, which represent the cemetery lands and Parks (CGL and CGL_2, respectively), commercial land use (CVC), residential land use (CVR_2 and CVR_3), and a community garden (OAG). As these are not naturally vegetated ecosites, vegetation was not documented in these areas.

3.1.2 Wildlife Habitat

Wildlife habitat is limited due to the developed nature of the study area. The meadows, thickets, forest and wetlands in the study area provide some habitat for wildlife. The old-field cultural meadows contain tall grasses that may provide habitat for grassland birds. The forested areas in the study area likely provide habitat for a variety of tolerant bird species and small mammals. The forest north of the cemetery road connects to a larger natural area southwest of the study area, and may be used by wildlife. Generalist turtles may travel along the unnamed watercourse corridor into the study area. If they are able to reach the study area, the forest and thicket swamp surrounding the watercourse may support tolerant reptile species. Amphibians are likely to be present in the unnamed watercourse and possibly using the forest west of Second Avenue, which was noted to contain ephemeral pools. Those wildlife species observed tend to be tolerant of humans and development. Wildlife species observed are indicated below by habitat in which they were observed:

Forests

- Raccoon (*Procyon lotor*)
- Grey Squirrel (*Sciurus carolinensis*)
- Black-capped Chickadee (*Poecile atricapillus*)

Cultural Meadows and Parks

- Ring-billed Gull (*Larus delawarensis*)
- American Crow (*Corvus brachyrhynchos*)

It should be noted that a drainage feature was observed in the valleyland north of the cemetery road. Localized ponding was observed. This ponding, depending on its permanence, may provide breeding habitat for spring breeding amphibians.

3.1.3 Aquatic Habitat and Fisheries

Korpela Creek originating from a wetland north of the Kingsway flowing south to Ramsey Lake exists in the study area. The watercourse flows between the residential properties on Plumtree Crescent and Third Avenue and is conveyed through two large culverts under Kenwood Street where it continues beyond the assessed reach. Immediately south of Kenwood Street, flow is conveyed south through a straightened vegetated channel towards Ramsey Lake. The Ramsey Lake subwatershed map is found in **Appendix D**.

The assessed reach consists of an area 50 m upstream and 100 m downstream of the storm sewer outlet. Upstream of the assessed reach, the watercourse flows through a willow thicket swamp. In the assessed reach, the watercourse flows south through a defined channel with dense cover by Reed-canary Grass and naturalized shrubby riparian vegetation for approximately 100 m before it flows into the twin culverts under Kenwood Street.

Based on discussions with City Staff, the MNRF has advised the City that the channel functions as direct fish habitat for a warmwater baitfish community. The constraints on in water construction activities for warmwater streams typically extend from April 1st to June 15th.

3.1.4 Species of Conservation Concern

Provincially Rare Species

As mentioned previously, one provincially rare species record was indicated by the NHIC database search for Purplish Copper (*Lycaena helloides*), last observed in 1992.

Species at Risk

No SAR were observed during the field investigations. SAR identified by the MNR SAR species by area website, and those thought to have potential habitat in the study area are assessed in Appendix B for likelihood of occurring within the study area. These species include the SAR: Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*), Peregrine falcon (*Falco peregrinus*), Short-eared Owl (*Asio flammeus*), Monarch Butterfly (*Danaus plexippus*), Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), Lake Sturgeon (*Acipenser fulvescens*), Milksnake (*Lampropeltis triangulum* subsp. *triangulum*), Blanding's Turtle (*Emydoidea blandingii*), Snapping Turtle (*Chelydra serpentina*). Of the SAR assessed there is moderate potential for, Monarch, Snapping Turtle and Milksnake to be using the natural habitats in the area of proposed works. These species are all designated as Special Concern and as such do not have species or habitat protection under the ESA (2007). Snapping Turtle and Milksnake have protection from being killed or harmed by the Canada Wildlife Act (1985). While Short-eared Owl and Myotis species have the potential to be found in the study area, the areas which would provide potential habitat are outside of the area of proposed works. No impacts to SAR species are anticipated if the mitigation measures in **Section 6.4.3** are followed.

3.1.5 Natural Areas

No provincially designated natural areas occur in or around the study area.

3.2 Socio-Economic Environment

3.2.1 Land Use

The land use of the project area consist of Park Open Space (former pit/clean fill dump site), Cemetery lands, Mixed use Commercial, Industrial and Residential Living. This is identified in Schedule A – Zone Maps By-law 2010-100Z in **Appendix E**. Land uses in the overall study area are generally shown in **Exhibit 3-1**.

3.2.2 Contaminated Properties

The City provided the following background information on The Minnow Lake Dog Park, as it was historically an aggregate source site. When the aggregate source was depleted the location was used as a surplus fill site for construction contracts for over a decade. The surplus fill would contain excavated material being granulars, native soil, concrete and asphalt. Surplus fill has not been placed on this site for approximately a decade, with the exception of the development of the Minnow Lake Dog Park.

3.2.3 Noise

A Noise Sensitive Area (NSA) is defined as a noise sensitive land use (urban or rural) with an Outdoor Living Area (OLA) associated with the land use. NSAs include:

- Private homes, such as single family residences;
- Townhouses;
- Multiple unit buildings, such as apartments with outdoor living area for use by all occupants; and

- Hospitals and nursing homes where there are outdoor living areas for the patients.

Adjacent NSAs along Second Avenue within the study area are as follows:

- Single family residences along Camelot Drive north and south of Scarlett Road;
- Townhouses on Carmichael Village Road on the east side of Second Avenue;
- Townhouses north First Avenue on west side of Second Avenue; and
- Single family residences on Kenwood Street and Margaret Street on the east side of Second Avenue.

There are no existing noise barriers within the study area.

Following the Ministry of Transportation (MTO) and MOECC Noise Protocol, a noise assessment was undertaken to assess the potential noise impacts from the preferred solution. The findings of the noise assessment are outlined in **Section 6.4.6**.

3.2.4 Air Quality

Air quality impacts associated with the improvements to Second Avenue within the study limits were assessed. Relevant agencies and organizations in Canada and their applicable contaminant guidelines are:

- MOECC Ambient Air Quality Criteria (AAQC);
- Health Canada/Environment Canada National Ambient Air Quality Objectives (NAAQOs); and
- Canadian Council of Ministers of the Environment (CCME) Canada Wide Standards (CWSs).

Within the guidelines, the threshold value for each contaminant and its applicable averaging period was used to assess the maximum predicted effect at sensitive receptors derived from computer simulations. The findings of the air quality assessment are outlined in **Section 6.4.7**.

3.2.5 Recreational Facilities

The study area includes a number of recreational facilities including Minnow Lake Dog Park, Minnow Lake Conservation Area and Carmichael Arena.

The study area also includes the following playgrounds, some which include outdoor ice rinks:

- Carmichael Playground;
- Grace Park;
- Adamsdale Playground;
- Autumnwood Park; and
- Eyre Playground.

3.3 Cultural Environment

3.3.1 Built Heritage

The City of Greater Sudbury, Department of Growth and Development, was contacted to confirm details of listed/designated properties or heritage districts that might be in or adjacent to the Study Area. The City confirmed there are no heritage properties listed in the study limits and there are no heritage districts under Part 5 of the *Ontario Heritage Act*.

The Sudbury Civic Memorial Cemetery is located within the study limits. The cemetery's driveway has direct access to Second Avenue between Scarlett Road and Carmichael Village Road. The closest grave site is approximately 250 m to Second Avenue.

Section 6.4.9 provides further details regarding the heritage review and correspondence with the Ministry of Tourism, Culture and Sport (MTCS).

3.3.2 Archaeology

A Stage 1 Archaeological Assessment was completed by Woodland Heritage Services in January 2015 to identify and assess the known and potential archaeological resources within the Second Avenue study limits. Assessment activities were performed in accordance with the provisions of the Ontario Heritage Act (R.S.O. 1990) and following the Ontario Ministry of Tourism, Culture, and Sport (MTCS) Standards and Guidelines for Consultant Archaeologists (MTCS 2011).

The Stage 1 Archaeological Assessment determined that:

- The study corridor is located within an area that has been previously disturbed by construction and maintenance of the road and creation of roadside drainage features;
- No areas of archaeological potential were identified; and
- A search of MTCS's archaeological site database revealed that there are no registered archaeological sites within one kilometer of the study corridor.

The Stage 1 Archaeological Assessment concluded that no further archaeological works are required for the Second Avenue study corridor. The Stage 1 Archaeological Assessment Report is provided in **Appendix F**.

3.4 Transportation and Utilities

3.4.1 The Road

Second Avenue is currently a two lane secondary arterial road that generally runs in a north-south direction from Bancroft Drive to the Kingsway.

3.4.2 Utilities

Existing utilities along Second Avenue within the study limits include:

- Hydro poles along the east side of Second Avenue, between Donna Drive and Scarlett Road; and
- Hydro poles along the east side of Second Avenue, between Scarlett Road and Kenwood Street, which have been relocated to accommodate the proposed road widening.

4.0 IDENTIFICATION AND EVALUATION OF ALTERNATIVE SOLUTIONS

4.1 Identification of Alternative Solutions

Under Phase 2 of the Municipal Class Environmental Assessment process, all feasible and reasonable planning solutions to address the problems are to be considered. In this case, the alternative solutions that were considered are:

- Do Nothing;
- Improve and Expand Transit Service (Transportation Demand Management);
- Improve and Expand Third Line;
- Construct Silver Hills Drive;
- Improve and Expand Second Avenue;
 - Expand to three lanes;
 - Expand to five lanes; and
- Construct a new roadway

Exhibit 4-1 illustrates the alternative solutions. An overview of each of the alternative solutions is provided below.

Do Nothing - While the Do Nothing alternative would not involve capital costs and would not impact the environment or private property, it also does not address the problem statement concerns of existing and forecast traffic congestion nor does it offer any improvements for alternative modes of transportation such as biking, walking or transit.

Improve and Expand Transit Service (Transportation Demand Management) – Enhancing transportation demand management measures may reduce vehicle demand on Second Avenue to a certain degree. Greater Sudbury Transit already operates three bus routes that service Second Avenue, including:

- Route 002 – Second Avenue / Shopping Centre / Centre Commercial Route operates from the downtown transit terminal to New Sudbury Centre by way of Second Avenue. According to Greater Sudbury Transit ridership data for the year 2013, this was the sixth busiest route for ridership in the transit network. The route generally runs on 30 minute headways from Monday through Saturday.
- Route 102 – Howey / Third Avenue operates from the downtown transit terminal to the Moonlight Lane neighbourhood by way of a portion of Second Avenue. This route is designed more for commuter traffic and is scheduled hourly only in the morning and evening peak hours, Monday through Friday.
- Route 241 – Howey / Moonlight / Shopping Centre operates northbound only on Second Avenue on nights and hourly on Sundays. This route makes a loop from the downtown transit terminal to the Moonlight Avenue neighbourhood, eventually north on Second Avenue to the New Sudbury Centre and then returns on the Kingsway to the downtown transit terminal.

Greater Sudbury Transit route maps for these three routes are provided in **Appendix G**.

Vehicle traffic volumes are approaching capacity even with these transit routes in place today. Expanding transit service would require additional buses and additional transit drivers and would not necessarily increase transit ridership to a point of decreasing vehicle traffic demand enough to remain within road capacity. This alternative also does not include improvements to encourage biking and walking.

Improve and Expand Third Avenue - Third Avenue is not an appropriate alternative to accommodate additional traffic for several reasons,

- Pius XII Catholic Elementary School is located on the northeast corner of Third Avenue and Bancroft Drive. Adding traffic to Third Avenue could increase conflicts between pedestrians, cyclists, buses and private vehicles accessing the school, which could lead to heightened safety concern.
- The intersection of Third Avenue and Bancroft Drive is unsignalized whereas the intersection of Second Avenue and Bancroft Drive is signalized.
- Third Avenue is not a continuous street, due to an almost 90 m jog on Kenwood Street that divides Third Avenue into two segments.
- Third Avenue is a collector road and was not planned, designed or constructed with the intention to handle increased traffic volumes suitable for an arterial road such as Second Avenue.

Construct Silver Hills Drive - Silver Hills Drive is proposed to connect the Kingsway (existing Chapters entrance) with Bancroft Drive. This proposed improvement to Silver Hills Drive is not considered an alternative for Second Avenue, as it is needed to address primarily trips associated with new development planned adjacent to this road along with future traffic volumes between Bancroft Drive and the Kingsway. As shown in the model results (included in **Appendix B**) for the 2031 Sustainability-focused alternative and the 2031 Auto-focused alternative, the construction of Silver Hills Drive does not result in traffic re-routing from Second Avenue to Silver Hills Drive. Traffic volumes are forecasted to remain high on Second Avenue with or without Silver Hills Drive. The Second Avenue widening is needed to accommodate traffic volumes forecast for Second Avenue and cannot be replaced by Silver Hills Drive. Additionally, Second Avenue as an arterial road is better designed to handle increased traffic volumes and connects Bancroft Drive, the Kingsway and the Falconbridge Highway, all of which are important arterial roads that accommodate city-wide traffic.

Improve and Expand Second Avenue - Two sub-alternatives were considered in the widening of Second Avenue. One sub-alternative considered the widening of Second Avenue to three lanes and the other considered widening Second Avenue to five lanes.

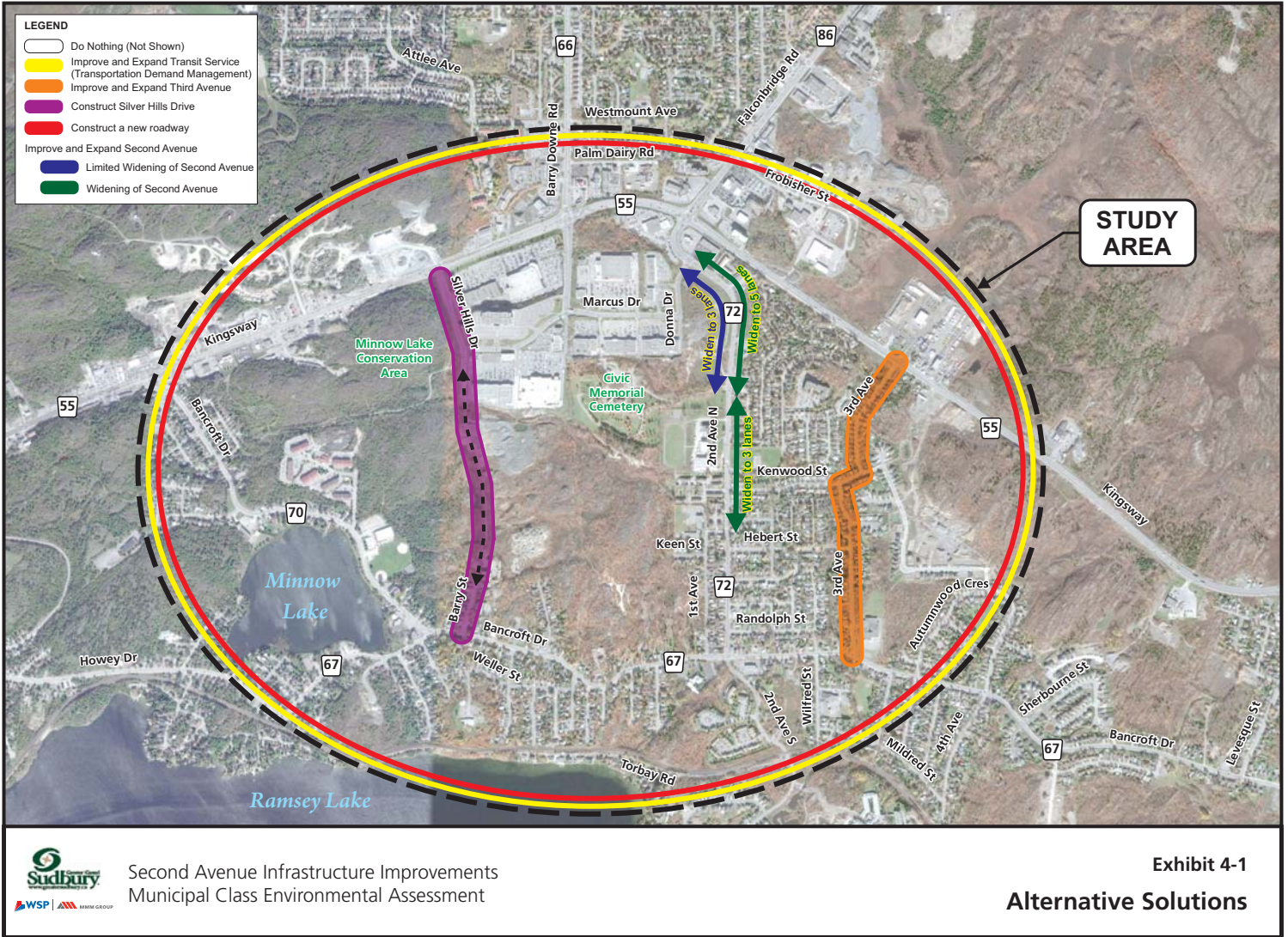
- **To 3 lanes** - The alternative to widen Second Avenue to three lanes from Donna Drive to Scarlett Road addresses only part of the problem statement. Construction to three lanes would provide an opportunity to construct new facilities for pedestrians and cyclists but adding a two-way centre turning lane does not provide the vehicle capacity necessary to accommodate the existing and forecast traffic volumes.
- **To 5 lanes** - Widening Second Avenue to five lanes addresses the existing and forecast vehicle capacity constraints and also allows for improvements to be made to promote biking, walking and transit. While there are capital costs associated with this project, the widening to five lanes provides the City with the opportunity to construct a showcase “complete street”. “Complete streets” are those that are planned, designed, constructed, operated and maintained for all types of transportation system users and all modes of transportation. The Draft TSR was developed under the umbrella policy of “complete streets” and the Second Avenue project would be constructed to put this policy into action.

The City has identified Second Avenue for multi-modal improvements including a cycle track, sidewalks on both sides of the road and bus bays to promote alternatives to vehicle travel.

Construct a new roadway - Constructing a brand new roadway that presently does not exist in the study area was considered but was determined to be the most costly alternative for a number of evaluation criteria. Besides the cost to construct the actual road, the location of a new road would be constrained due to existing development, topography constraints due to water bodies and rock outcroppings, ecological and other environmental constraints. Depending on where it was located, the new roadway may or may not result in traffic re-routing from Second Avenue. Second Avenue acts as a north south connection between the Kingsway and Howey / Bancroft and provides a connection north to the Falconbridge Highway, another important arterial road. A new roadway would not be expected to be located in an area that would offer as good connectivity and could require major remediation measures to address environmental concerns, in addition to probable private property acquisition.

4.2 Evaluation of Alternative Solutions

The alternative solutions were evaluated in detail using the criteria and weighting outlined in **Exhibit 4-2**. The assessment / evaluation summary of the alternative solutions is outlined in **Exhibit 4-3**.



Second Avenue Infrastructure Improvements
Municipal Class Environmental Assessment

Exhibit 4-1
Alternative Solutions

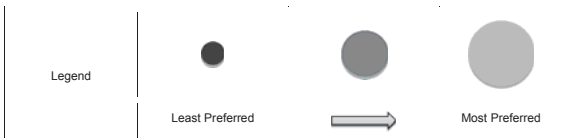
Exhibit 4-2: Screening Criteria Used to Evaluate Alternatives

Criterion	Indicators	Level of Importance	Rationale for Importance
Active Transportation	<ul style="list-style-type: none"> Provides dedicated facilities for pedestrians and cyclists 	HIGH	The most vulnerable road users, pedestrians and cyclists, should be considered first in the design of road improvements.
Transportation Planning	<ul style="list-style-type: none"> Accommodates existing and future traffic demand Accommodates long term planning objectives Enhances safety 	HIGH	Transportation Planning has high importance because of the overall purpose of the project is to determine a plan that accommodates future traffic volumes and traffic operations to Year 2031.
Natural Environment	<ul style="list-style-type: none"> Impact to wildlife and terrestrial resources. Impact to fish and aquatic resources Impact to water resources (surface and groundwater) Impacts to Species at Risk 	LOW	Natural Environment has low importance because the natural environment features in the study area are not significant and that majority of the study area is located in a built environment.
Socio-Economic Environment	<ul style="list-style-type: none"> Property requirements Impact on future land uses and operations Potential Noise Impacts Potential Air Quality Impacts Community and recreational facilities, including trails, parklands, etc. Construction Disruption 	HIGH	Socio-economic environment has a high importance because the study area is located in a built environment and it is desirable to minimize property requirements and potential impacts on adjacent residences, businesses and properties. There also may be potential noise level increases if traffic is shifted closer to communities, as well as air quality impacts.
Cultural Environment	<ul style="list-style-type: none"> Impact to built heritage features Impact to archaeological resources Impacts to cemeteries. 	LOW	Cultural environment has a low importance since there archaeological potential is low given that the study area is located in a built environment. Also, heritage features have not been identified within the study area.
Cost	<ul style="list-style-type: none"> Costs including construction, utility relocation, and property requirements. 	MEDIUM	Cost has a medium importance because a cost-effective plan that improves traffic operations and provides access to the local area while minimizing environmental impacts is required.

Exhibit 4-3: Evaluation of Alternative Solutions

Factor / Indicator	Weighting	Alternatives Solutions						
		Do Nothing	Improve and Expand Transit Service (TDM)	Improve and Expand Third Avenue	Construct Silver Hills Drive	Improve and Expand Second Avenue to 3 Lanes	Improve and Expand Second Avenue to 5 Lanes	Construct a New Roadway
Active Transportation <ul style="list-style-type: none"> Provides dedicated facilities to pedestrians and cyclists 	HIGH							
		<ul style="list-style-type: none"> Does not provide an opportunity to enhance safety for cyclists and pedestrians along Second Avenue 	<ul style="list-style-type: none"> Does not provide an opportunity to enhance safety for cyclists and pedestrians along Second Avenue 	<ul style="list-style-type: none"> Potentially could provide an opportunity to enhance safety for cyclists and pedestrians 	<ul style="list-style-type: none"> Potentially could provide an opportunity to enhance safety for cyclists and pedestrians 	<ul style="list-style-type: none"> Provides an opportunity to enhance safety for cyclists and pedestrians 	<ul style="list-style-type: none"> Provides an opportunity to enhance safety for cyclists and pedestrians 	<ul style="list-style-type: none"> Potentially could provide an opportunity to enhance safety for cyclists and pedestrians
Transportation Planning <ul style="list-style-type: none"> Accommodates existing and future traffic demand Accommodates long term planning objectives Enhances safety 	HIGH							
		<ul style="list-style-type: none"> Does not accommodate existing and future traffic demands 	<ul style="list-style-type: none"> Does not fully accommodate existing and traffic demands 	<ul style="list-style-type: none"> Addresses current and projected traffic volumes to 2031; however Third Avenue is a collector road, therefore not a viable option for anticipated traffic volumes Not a continuous route, jogs at Kenwood Street, therefore not as attractive to traffic as Second Avenue Intersection Improvements (i.e. traffic signals) would be required at Bancroft Drive and Third Avenue 	<ul style="list-style-type: none"> Not expected to result in re-routing of traffic from Second Avenue to Silver Hills Drive, therefore would not fully address traffic demands Intersection Improvements (i.e. traffic signals) would be required at Bancroft Drive and Silver Hills Drive; could include improvements for cyclists and pedestrians 	<ul style="list-style-type: none"> Does not accommodate existing and future traffic demands 	<ul style="list-style-type: none"> Addresses current and projected traffic volumes to 2031 	<ul style="list-style-type: none"> Potentially could address projected traffic volumes, if traffic re-routed to this new road
Natural Environment <ul style="list-style-type: none"> Impact to wildlife and terrestrial resources Impact to fish and aquatic resources Impact to water resources (surface and groundwater) Impacts to Species at Risk 	LOW							
		<ul style="list-style-type: none"> No natural environment concerns 	<ul style="list-style-type: none"> No natural environment concerns 	<ul style="list-style-type: none"> Moderate tree removal 	<ul style="list-style-type: none"> Significant tree removal 	<ul style="list-style-type: none"> Moderate tree removal, no other known natural environmental concerns 	<ul style="list-style-type: none"> Moderate tree removal, no other known natural environmental concerns 	<ul style="list-style-type: none"> Potential for significant tree removal and other natural environment concerns
Socio-Economic Environment <ul style="list-style-type: none"> Property requirements Impact on future land uses and operations Potential Noise Impacts Potential Air Quality Impacts Community and recreational facilities, including trails, parklands, etc. 	HIGH							
		<ul style="list-style-type: none"> No property impact No road closures or disruptions Avoids impacts to recreational facilities Does not provide opportunity to improve cycling and pedestrian provisions along Second Avenue 	<ul style="list-style-type: none"> No property impact No road closures or disruptions Avoids impacts to recreational facilities Does not provide opportunity to improve cycling and pedestrian provisions along Second Avenue Traffic congestion anticipated 	<ul style="list-style-type: none"> Significant impact to existing residential properties Greater potential for noise level increases and/or air quality impacts for residences along 3rd Avenue Temporary road closures and noise disruptions during construction Does not provide opportunity to improve cycling and pedestrian provisions along Second Avenue 	<ul style="list-style-type: none"> Property acquisition required Greater potential for noise level increases and/or air quality impacts for residences along Barry Street Temporary road closures and noise disruptions during construction Impacts to recreational facilities (e.g. Blueberry Trail, etc.) 	<ul style="list-style-type: none"> No property acquisition required Minor noise level increases and/or air quality impacts for residences along Second Avenue Temporary road closures and noise disruptions during construction Avoids impacts to existing 	<ul style="list-style-type: none"> No property acquisition required Minor noise level increases and/or air quality impacts for residences along Second Avenue Temporary road closures and noise disruptions during construction Avoids impacts to existing 	<ul style="list-style-type: none"> Potential significant impact to existing residential properties Greater potential noise level increases and/or air quality impacts for residences New road construction and noise disruptions during construction

Factor / Indicator	Weighting	Alternatives Solutions						
		Do Nothing	Improve and Expand Transit Service (TDM)	Improve and Expand Third Avenue	Construct Silver Hills Drive	Improve and Expand Second Avenue to 3 Lanes	Improve and Expand Second Avenue to 5 Lanes	Construct a New Roadway
<ul style="list-style-type: none"> Construction Disruption 		<ul style="list-style-type: none"> * Traffic congestion anticipated to worsen along Second Avenue, which may potential increase air quality impacts (i.e. more idling vehicles) 	<ul style="list-style-type: none"> to worsen along Second Avenue, which may potential increase air quality impacts (i.e. more idling vehicles) 		<ul style="list-style-type: none"> associated with Minnow Lake Conservation Area * Does not provide opportunity to improve cycling and pedestrian provisions along Second Avenue 	<ul style="list-style-type: none"> recreational facilities (i.e. dog park, outdoor rink, playground) along Second Avenue ✓ Provides opportunity to improve cycling and pedestrian provisions along Second Avenue 	<ul style="list-style-type: none"> recreational facilities (i.e. dog park, outdoor rink, playground) along Second Avenue. ✓ Provides opportunity to improve cycling and pedestrian provisions along Second Avenue 	<ul style="list-style-type: none"> * Does not provide opportunity to improve cycling and pedestrian provisions along Second Avenue
Cultural Environment <ul style="list-style-type: none"> Impact to built heritage features Impact to archaeological resources Impacts to cemeteries. 	LOW	<ul style="list-style-type: none"> ✓ No archeological potential ✓ No impacts to heritage resources ✓ Avoids direct impacts to Sudbury Civic Memorial Cemetery 	<ul style="list-style-type: none"> ✓ No archeological potential ✓ No impacts to heritage resources ✓ Avoids direct impacts to Sudbury Civic Memorial Cemetery 	<ul style="list-style-type: none"> ✓ Low archeological potential ✓ Low potential for impacting heritage resources ✓ Avoids direct impacts to Sudbury Civic Memorial Cemetery 	<ul style="list-style-type: none"> * High archeological potential * Low potential for impacting heritage resources ✓ Avoids direct impacts to Sudbury Civic Memorial Cemetery 	<ul style="list-style-type: none"> ✓ Low archeological potential ✓ Low potential for impacting heritage resources ✓ Avoids direct impacts to Sudbury Civic Memorial Cemetery. 	<ul style="list-style-type: none"> ✓ Low archeological potential ✓ Low potential for impacting heritage resources ✓ Avoids direct impacts to Sudbury Civic Memorial Cemetery. 	<ul style="list-style-type: none"> * High archeological potential * Greater potential for impacting heritage resources * Greater potential to impact cemetery
Cost <ul style="list-style-type: none"> Construction cost Property Cost 	MEDIUM	<ul style="list-style-type: none"> ✓ No capital or property cost 	<ul style="list-style-type: none"> ✓ Low capital and property costs 	<ul style="list-style-type: none"> * Higher capital and property cost 	<ul style="list-style-type: none"> * High capital and property cost 	<ul style="list-style-type: none"> ✓ Modest capital cost and no property costs 	<ul style="list-style-type: none"> ✓ Modest capital cost and no property cost 	<ul style="list-style-type: none"> * Higher capital and property cost
Overall Evaluation								



4.3 Recommended Alternative Solution

The alternative to widen Second Avenue to five lanes scored the highest among the alternatives analyzed because it best meets the problem statement to address vehicle capacity and multi-modal transportation improvements.

It is recommended that Second Avenue be widened to five lanes from Donna Drive to Scarlett Road and three lanes from Scarlett Road to Kenwood Street. By widening the road, in addition to improvements in other parts of the Greater Sudbury road network, the capacity concerns identified in the Draft TSR 2031 Do Nothing Alternative are expected to be addressed. In addition, this alternative will have minimal impact to the environment, it is the most cost effective and no public or private lands will be required for the proposed work. **Therefore, the proposed widening of Second Avenue is the recommended alternative solution.** Exhibit 4-4 shows the overall recommended solution. The plan view drawings of the proposed widening of Second Avenue are shown in **Appendix H**.

4.4 Analysis of Traffic Signals versus Roundabout at the Intersection of Second Avenue and Scarlett Road

Further consideration was given as to whether or not the intersection of Second Avenue and Scarlett Road should be controlled by a stop sign, traffic signal or a roundabout.

Turning movement counts at the existing intersection were collected by the City on September 24, 2013 for the peak hours of:

- 7:30 a.m. to 9:30 a.m.
- 11:30 a.m. to 1:30 p.m.
- 3:00 p.m. to 6:00 p.m.

The peak hour was identified as 4:30 p.m. to 5:30 p.m. based on the counts. The turning movement counts are provided in **Exhibits 4-5 and 4-6**. Year 2013 turning movement count volumes were increased by a factor of 1.5% per year for 20 years to the year 2033 for the purposes of future conditions analysis. An increase of 1.5% per year is the standard traffic volume growth rate used in Greater Sudbury for Traffic Impact Studies and represents the historical growth of traffic volumes measured on a regular basis by the City. Year 2033 traffic volumes for this intersection are on file with the City.

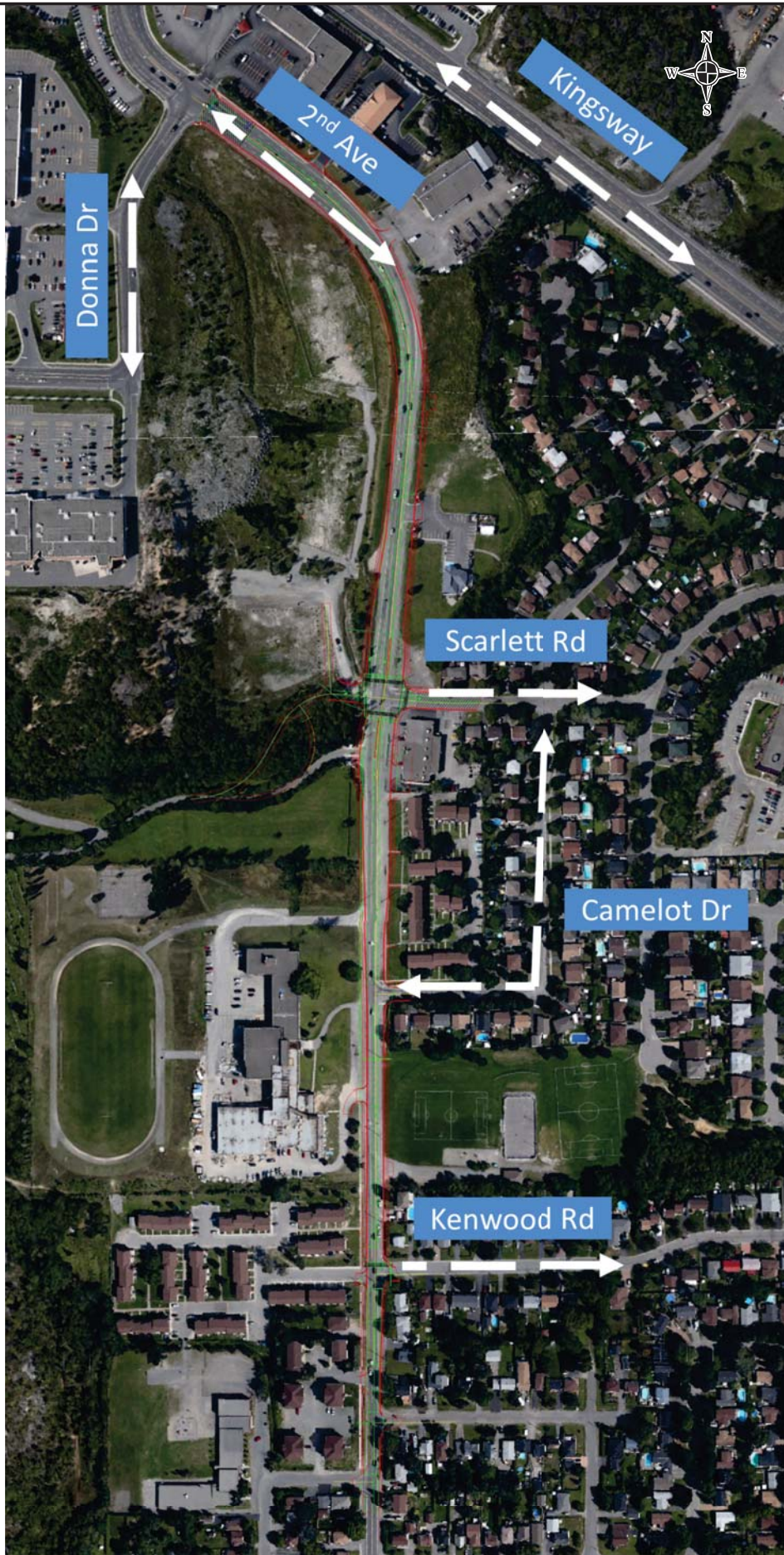


Exhibit 4-5: Year 2013 PM Peak Hour Turning Movement Counts – Second Avenue at Scarlett Road

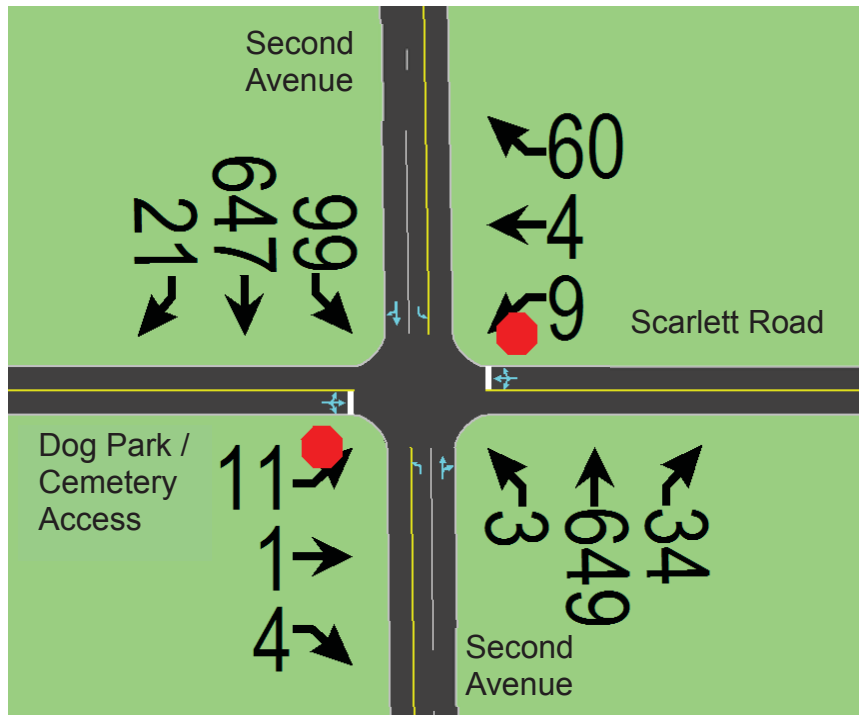
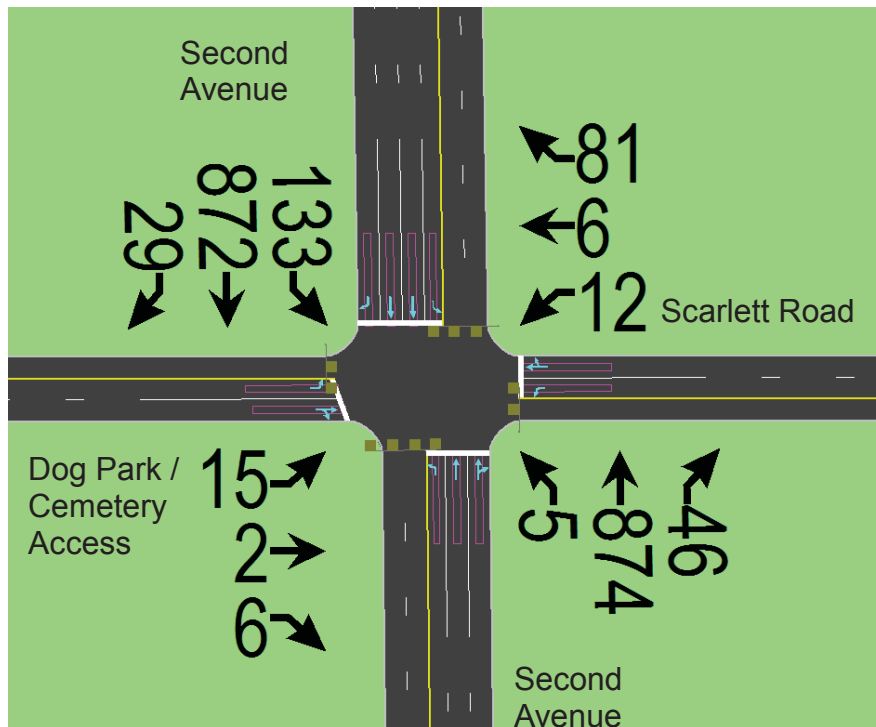


Exhibit 4-6: Year 2033 PM Peak Hour Turning Movement Counts – Second Avenue at Scarlett Road



4.4.1 Traffic Signal Warrant Analysis

Traffic volumes were reviewed further to determine if traffic signals are warranted. Warrants 1 and 2 from the Ontario Traffic Manual (OTM) Book 12 were used, as was Warrant 4. Based on OTM Book 12, if Warrant 1 or Warrant 2 is 100% fulfilled, then the need for a traffic signal must be considered. However, if neither Warrant 1 nor Warrant 2 surpass 100%, but both are satisfied to the extent of 80% or more, then traffic signals may also be warranted. Signal warrants at existing intersections should be based on eight-hour counts, as stipulated in OTM Book 12; however, the data collected for purposes of this study are based on seven-hour counts, with the eighth hour computed as the average of the seven hours counted.

According to OTM Book 12, Warrant 1 represents the minimum vehicular volume justification, which is intended for applications where the principal reason to consider the installation of a traffic signal is the cumulative delay produced by a large volume of intersecting traffic at an unsignalized intersection.

OTM Book 12 further states that Warrant 2 represents the delay to cross traffic justification, which is intended for application where the traffic volume on the main road is so heavy that traffic on the minor road suffers excessive delay or hazard in entering or crossing the main road.

Warrant 4 is applied to analyze roads often used for commuter travel, as is the case with Second Avenue. Warrant 4 examines four-hour counts for the peak a.m. and p.m. commuter periods, recognizing that other hours may not exhibit as high of traffic volumes as the peak commuter hours. Warrants are met if each of the four highest hours exceeds the thresholds shown in OTM Book 12 for this warrant.

The results of the warrant analyses are summarized in **Exhibit 4-7**. Detailed summaries of the signal warrant analysis are on file with the City.

Exhibit 4-7: Signal Warrant Compliance for Second Avenue at Scarlett Road Intersection

Scenario	Warrant 1	Warrant 2	Warrant 4
Year 2013 Existing Conditions	51%	37%	83%

The analysis shows that the intersection, while close for Warrant 4 pertaining to peak commuter traffic volumes, does not meet the traffic signal warrants. However, traffic volumes are not the only reason that an intersection may be signalized. Further analysis was conducted to determine the performance on the intersection as described in **Section 4.4.2**.

4.4.2 Intersection Performance Analysis

The year 2013 and 2033 p.m. peak hour turning movement volumes were tested in Synchro traffic analysis software as an unsignalized and then signalized intersection and Sidra Intersection traffic analysis software as a roundabout. In all three intersection control type scenarios, improvements were made to the existing intersection to combine the entrance to the Civic Memorial Cemetery and the Minnow Lake Dog Park, and aligning this new entrance across from Scarlett Road. This improvement addresses existing safety concerns with offset intersections on Second Avenue and created a four-legged intersection at Second Avenue and Scarlett Road.

As the analysis earlier recommended that Second Avenue be widened, this new lane configuration was used for the analysis of year 2033 conditions. As there are existing northbound left and northbound through-right lane and southbound left and southbound through lanes, the intersection was analyzed with two circulating lanes when analyzed as a roundabout for existing and future conditions.

The results of the analyses of the three intersection control types are summarized in **Exhibit 4-8**.

Exhibit 4-8: Traffic Analysis of Second Avenue at Scarlett Road Intersection

Intersection Control	2013 PM Peak Hour		2033 PM Peak Hour	
	Level of Service	Critical Movements	Level of Service ₁	Critical Movements ₂
Unsignalized	F (75)	None	F (603)	EB-LTR (1.31) WB-LTR (1.05)
Signalized	A (5)	None	A (5)	None
Roundabout	A (4)	None	A (4)	None

Notes:

1. The LOS at an unsignalized intersection is defined by the movement with the highest delay.
2. Critical movements are those with a volume-to-capacity ratio exceeding 0.85 for a signalized intersection or with an LOS of 'E' or 'F' for an unsignalized intersection.

The results of the analysis indicate that:

- As an unsignalized intersection in the existing year 2013 conditions, the intersection would exhibit LOS F due to the long delay for vehicles exiting the cemetery / dog park;
- This delay at the cemetery / dog park approach would be expected to increase and exhibit over capacity conditions in the future year 2033 analysis, with the Scarlett Road approach also forecasted to exhibit over capacity conditions;
- As a signalized intersection, there are no delay or capacity concerns in the existing or future conditions; and
- A two-lane circulating roundabout would be expected to accommodate traffic volumes with no critical movements and a level of service similar to that of a traffic signal for both existing and future conditions.

Output sheets of the unsignalized, signalized and roundabout analyses are on file with the City.

A roundabout is most appropriate in locations where traffic volumes are balanced across all approaches. At this intersection, the majority of traffic is north-south, with very low volumes from the dog park / cemetery approach. With a roundabout, all vehicles must slow down and yield to traffic in the roundabout. The north-south traffic may be unnecessarily slowing down to accommodate the curvature of the roundabout when in fact there is no opposing traffic in the roundabout. While the roundabout can accommodate traffic volumes, it is not the most efficient way to accommodate them.

A traffic signal can be actuated to detect vehicles at this intersection from the Scarlett Road or dog park / cemetery approach. If no vehicles are detected, the signal will remain green for north-south traffic. When vehicles are detected, the green cycle length will be based on the number of vehicles queued at these approaches and is expected to be relatively short due to modest vehicle volumes. The delay to north and southbound traffic will be minor.

Although there are some benefits to a roundabout compared to a signalized intersection in general, in this instance, the traffic operational benefits of a roundabout do not outweigh the benefits of a traffic signal. Additionally, a roundabout would require more physical space to construct compared to a traffic signal and would impact adjacent property owners (Cemetery and commercial mall). The Civic Memorial Cemetery is the only City-owned cemetery with space remaining for additional burials. Encroaching on these lands with the wider footprint of a roundabout could reduce the number of burial spaces available. The existing commercial mall on the southeast corner of the intersection also would be impacted with possible reduced access or reduced parking due to a wider footprint of a roundabout. A Comparative Analysis Report (Roundabout Versus Signalized Intersection) is included in **Appendix B**.

4.4.3 Intersection Control Recommendation

The intersection of Second Avenue and Scarlett Road is recommended to be controlled by traffic signals. Even though the intersection does not meet traffic signal warrants, there are existing and future concerns with vehicle delays and lane capacities if the intersection remains an unsignalized intersection. Traffic signals will regulate traffic flow and address existing and future vehicle delay. Traffic signals will allow for a signalized pedestrian crossing. Traffic signals require less physical space to install and will not require encroachment on cemetery lands on the west side of Second Avenue or commercial lands on the east side of Second Avenue.

5.0 CONSULTATION / ENGAGEMENT

Consultation early on and throughout the process is a key feature of environmental assessment planning. Consistent with the requirements for Schedule B projects under the Municipal Class EA, there were four main points of contact with stakeholders; Notice of Commencement, the two Public Information Centres, and the filing of this Project File Report for public review with a Notice of Study Completion. Consultation with public and agency stakeholders was carried out by the City of Greater Sudbury, and comments and questions were welcomed throughout the course of the study. Stakeholders were advised of the project and offered the opportunity to participate in the project the use of conventional, effective consultation methods. These included:

- Notice of Commencement was published on the City of Greater Sudbury website;
- Correspondence with external agencies and members of the public through direct mail;
- Two Public Information Centres, and
- Filing of this Project File Report for public review.

The purpose of this section is to outline the consultation / engagement activities undertaken, identify concerns raised and how they were resolved. The following sub-sections provide details of the consultation process with all the supporting documentation provided in **Appendix I**.

Since the study area is located in a French Language Services Area (FLSA), all public notices were available in French. In addition, a French speaking project team member attended all meetings.

5.1 Public Consultation

5.1.1 Notice of Study Commencement

In order to ensure public awareness of this study, a Notice of Commencement was published on the City of Greater Sudbury website on January 4, 2012 as a part of the Transportation Master Plan (TMP) project.

The purpose of the Notice of Study Commencement was to inform the general public of the project initiation and to solicit questions, concerns and pertinent information. A copy of the notice is provided in **Appendix I**.

5.1.2 Public Information Centres

Public Information Centres (PICs) are informal meetings where area residents and other interested parties are provided the opportunity to review planning and project information, identify concerns and provide input to the City's Project Team. The PICs were arranged as 'drop-in', open house style sessions where City representatives were available to answer questions and discuss the project. PICs serve an important function in providing an opportunity for direct, two-way communication with stakeholders on specific local conditions, issues, and concerns regarding this study.

The City hosted two Public Information Centres (PIC) for the TMP. PIC #1 was held on January 11, 2012 to obtain a better understanding of existing conditions, current concerns and views on the future transportation network of Greater Sudbury. PIC #2 was held on June 19, 2013 to obtain feedback on the recommended preferred transportation alternative for the road network, the recommended active transportation network and the transportation policies that support the various elements of the Transportation Study. PIC #3 was held on June 24, 2015 to receive feedback on the Draft TMP report. Approximately 100 people attended each PIC. The (Draft) Recommended 2031 Road Network Map presented at PIC #2 and again at PIC#3 is included in **Appendix I**. There were no specific comments received in regards to the Second Avenue Widening.

The schedule to complete the TMP was delayed, and it was anticipated that the TMP would not be complete until after the proposed construction start date for Second Avenue. Therefore, the City proceeded to complete the remainder of the Schedule B Class EA for only Second Avenue to meet the proposed construction schedule. The City held two Public Information Centres for the Municipal Class EA for Second Avenue, which are summarized in the following sub-sections.

5.1.3 Public Information Centre #1

Public Information Centre (PIC) #1 was held for this project on March 19, 2014 at the Adamsdale Playground (Field House) at 270 Second Avenue, Sudbury from 4:00 p.m. to 7:00 p.m. The City sent a Notice of Public Information Centre out by direct mail to members of the public. A copy of the notice is provided in **Appendix I**.

The purpose of the PIC was to inform residents of the project and to secure comments on the proposed works. Attendees were encouraged to review construction plans that were at the PIC. Copies of the display panels are provided in **Appendix I** and drawings of recommended solution in **Appendix H**.

The PIC was organized as an informal 'drop-in' style session and project staff from the City were available to answer questions and discuss the project. Attendees were asked to sign the register and were encouraged to complete a comment sheet.

Approximately 80 people attended the PIC. No agency representatives were present. Thirty (30) comment sheets were submitted at the PIC. The comments received at PIC #1 are summarized as follows:

- The need for bicycle lanes;
- Five lanes are not required;
- Wide curb lanes are not an appropriate cycling facility for Second Avenue;
- The cycling route is not continuous as there is a paved shoulder south of First Avenue to Bancroft Drive;
- The pedestrian traffic signals should not be removed as there is a primary school and a housing complex south of the project that use these signals to cross Second Avenue safely;
- Would like to see the lights at the Park and Second Avenue to stay where they are to make things safer for the children to cross to the Park; and
- There is a drainage problem on the corner of First Avenue and Second Avenue.

5.1.4 Public Information Centre #2

After PIC #1, the City evaluated the comments received and held a meeting with key stakeholders (Rainbow Routes, Minnow Lake Community Action Network, Sudbury Cyclist Union, Cycling Grannies, Sustainable Mobility Advisory Panel, John Lindsay and Dorothy Klein) that represented active transportation and the local community on April 16, 2014. The concerns at this meeting were related to speed with a road transition from 5 to 3 lanes, install radar speed warning signs, install median island to act as a gateway to neighborhood, and cyclist concerns. The meeting minutes are noted in **Appendix I**. Following this meeting and their feedback, the City made the following changes to the preferred alternative solution:

- The wide curb lanes were replaced with cycle tracks and the City's first cycling cross ride was proposed at the traffic signals at Scarlett Road.
- The paved shoulders were extended between Kenwood Street and First Avenue to make the cycling route continuous.
- The pedestrian signals were to remain, however they would be relocated to Kenwood Street to better reflect the pedestrian desire line now that the former high school was converted to apartments.
- As the limits of the project were extended to First Avenue, the storm sewer design was modified to address the localized drainage problem.

A meeting was held on April 21, 2015 with Dorothy Klein and City representatives. The following concerns were raised; the community wants more information and are concerned with air quality and emissions, as well as close proximity of new roads to properties on Second Avenue. The meeting minutes are noted in **Appendix I**.

The above changes were presented at PIC #2, which was held on April 22, 2014 at the Adamsdale Playground (Field House) at 270 Second Avenue, Sudbury from 4:00 p. m. to 7:00 p.m. The purpose of PIC #2 was to provide an update to the PIC #1 and inform residents of the project to secure comments on the proposed work. Attendees were encouraged to review the construction plans at the PIC. Copies of the display panels are provided in **Appendix I** and drawings of recommended solution in **Appendix H**.

The PIC was organized as an informal 'drop-in' style session and project staff from the City were available to answer questions and discuss the project. Attendees were asked to sign the register and were encouraged to complete a comment sheet.

Approximately 60 people attended the PIC. No agency representatives were present. 11 comment sheets were submitted at the PIC. The majority of the comments from PIC #2 were regarding the need for a five lane road. The responses were mixed, with residents in favour and opposed. The need for five lanes is due to the growth of the community and because there is not sufficient capacity within the road for traffic volumes today and into the future. This was supported by the traffic modelling analysis and is discussed in **Section 2.0** further.

The comments received at PIC #2 are summarized below.

- The project is needed;
- Satisfied with five lanes;
- Opposed to five lanes;
- Would like to see a bike path;
- Would like team to consider a speed limit of 40 km/h;
- Feel that having five lanes that go to three lanes will cause cars to pass each other and safety issues.
- Suggest two lanes with a turning lane for all of Second Avenue; and
- There will be safety concerns, noise issues, traffic issues and increase stress levels to residents in this area if Second Avenue if it is extended to five lanes.

5.1.5 Notice of Study Completion – April 2014

The City published a notice of completion for the Second Avenue Project on April 16, 2014 in the Sudbury Star and Le Voyageur. A copy of this notice is provided in **Appendix I**.

5.1.6 Part II Order Requests – May 2014

The City received two Part II Order Requests on May 15, 2014 and on May 16, 2014 in response to the Notice of Study Completion. The issues and concerns identified and proponent responses are summarized as in **Exhibit 5-1**. Below is a summary of comments provided in the Part II Order Requests:

- Concern that road expansion will impact air pollution levels in the surrounding area, in particular green spaces;
- Concern that the recommended plan does not take into account the *Source Protection Plan* for the *Greater Sudbury Watershed* and impacts to Ramsey Lake. The Plan was approved on September 19, 2014 and became effective April 1, 2015.
- Concern that the project will generate triple the amount of stormwater runoff entering the Ramsey Lake Watershed;
- Concern that converting the drainage system from open ditches to a formalized stormwater management system will reduce natural filtration opportunities and impact phosphorus and nutrient discharge into Ramsey Lake;
- Concern regarding the lack of stormwater treatment devices;
- Concern regarding winter de-icing operations (salting) of the expanded roadway and the impact of this practice on Lake Ramsey;
- Concern related to an anticipated increase in traffic volumes resulting from roadway expansion, including an increase in atmospheric emissions given that the surrounding residential is defined by a high incidence rate of respiratory illness; and
- Concern that environmental specialist reporting was not made available for public review.

The City evaluated comments from the PICs and Part II Order Requests and held the following meetings with key stakeholders that represented active transportation interests and the local community to discuss the proposed Second Avenue Infrastructure Improvements and attempt to resolve the issues raised in the Part II Order Requests:

- **May 15, 2014** - met with Minnow Lake CAN regarding Part II Order. The meeting minutes are noted in **Appendix I**;
- **May 26, 2014** - met with Greater Sudbury Watershed Alliance (GSWA) regarding Minnow Lake CAN Part II Order. Refer to the City letter, dated June 18, 2014 to GSWA in **Appendix I**; and
- **June 3, 2014** - met with Minnow Lake CAN regarding Part II Order.

5.1.7 Notice of Study Completion – March 2015

The City prepared a Project File Report in March 2015 to attempt to address the comments received in the Part II Order Requests received in May 2014. The Notice of Study Completion was published in the Sudbury Star and Le Voyageur on March 25, 2015 and April 1, 2015. A copy of this notice is provided in **Appendix I**. The March 2015 Project File was also available for review on the City's website.

During the public review period for the March 2015 Project File Report, six Part II Order Requests and one letter of concern were received by the Ministry of the Environment and Climate Change (MOECC) in April 2015 citing environmental concerns and requesting that the project be documented as an Individual Environmental Assessment. The concerns raised in the Part II Order Requests included:

- Concerned that the project was not planned in accordance with the requirements of the Class EA. Concerned the project should have been chosen a Class C instead of B;
- An up-to-date Transportation Master Plan should have been considered in this Class EA to address non-car related features;
- Would like all models of congestion to take into account 'induced demand', whereby building a bigger road encourages more people to use the road;
- A wider road will contribute to more current sodium and phosphorus drinking water issues;
- Concerns with the stormwater management area is showing signs it may not be able to perform to an 'enhanced level' especially when more stormwater is expected to flow through it;
- There has been little consideration given to the concerns of citizens in the area and those further afield who are concerned about possible impacts to Lake Ramsey with the significantly increased storm water untreated runoff;
- Concerned with increased speeding and feel the project has increased community anxiety. Combination of wider road, wider intersection and speeding will make this road less safe than at present;
- Vehicles idling at large intersections will also increase emissions;
- Increased runoff will contain contaminants from oil, gas, and any other substance that ends up on the road besides winter salt deposits;
- Concern of cost to the citizen-taxpayers of this city;
- Traffic volume presented does not justify it nor do future population projections to 2031;
- Project File does not indicate measures to mitigate air and water pollution;
- Not enough environmental study has been done with respect to limiting the amount of road expansion through the use of a modern one lane roundabout which would substantially reduce the harmful environmental impact of the project;
- No specific 'commencement' notice for Second Avenue was published;
- Project File contains material not revealed in the PICs or public meetings held previously. There were no meetings held with respect to the current Project File;
- There was no information in the Project File that was not brought to attention of those attending the PICs and other meetings and no new PICs were held;
- Concerns with the proximity of the widened road to existing residential homes. This will bring dust, noise, gas and fumes with closer to these homes with serious health and comfort issues raised;
- A comprehensive traffic study should be addressed prior to anything that might adversely affect traffic volumes and vehicle types; and
- Strongly suggested and recommend that Second Avenue be rebuilt to accommodate a single lane modern roundabout at the Scarlet Drive and new Cemetery/Dog Park entrance.

In a letter dated May 13, 2015, MOECC determined that the project was not planned in accordance with the requirements of the MCEA Class EA process. Therefore, the MOECC was unable to consider the Part II Orders received and requested the City to provide an updated Project File Report to be available to public and agency review. Subsequently, the City retained MMM to assist in updating the Project File Report to address MOECC comments.

5.2 Agency Consultation

The following agencies and interest groups were contacted during the project:

- Greater Sudbury Hydro Plus Inc.
- Greater Sudbury Police Services
- Union Gas
- East Link
- Bell Canada, Engineering Department
- Hydro One
- Hydro One Networks Inc.
- Agilis Networks
- Vianet
- Ministry of the Environment and Climate Change (Thunder Bay)
- Ministry of the Environment and Climate Change (Sudbury District Office)
- Ministry of the Environment and Climate Change, Environmental Approvals Branch (Toronto)
- Ministry of Natural Resources (Sudbury District Office)
- Conservation Sudbury (Nickel District Conservation Authority)
- Fisheries & Oceans Canada
- Sudbury and District Health Unit
- Ontario Clean Water Agency
- Rainbow District School Board
- Conseil scolaire de district catholique du Nouvel-Ontario
- Conseil scolaire de district du Grand Nord de l'Ontario
- Sudbury Catholic District School Board
- Sudbury Student Services Consortium
- Environment Canada, Ontario Region
- Ministry of Culture
- Rainbow Routes Association

The City attempted to address all comments, concerns and requests for additional information from external agencies and stakeholders. Relevant correspondence and presentation materials are included in **Appendix I**.

Presentations were provided to Minnow Lake CAN on April 28, 2014 and August 14, 2014. These presentations are provided in **Appendix I**.

The City has also consulted with the Nickel District Conservation Authority (NDCA), who reviewed the site plan drawing for the storm sewer improvements on Second Avenue from Donna Drive to First Avenue on June 3, 2014. The NDCA did not have any comments under the Conservation Authorities Act, but provided comments under the Clean Water Act for information. NDCA comments have been considered in the design for the storm sewer improvements on Second Avenue.

All related correspondence is provided in **Appendix I**.

5.3 First Nations and Aboriginal Groups Engagement

The City engaged with the Wahnapiitae First Nations with mailed letters on September 4, 2014 and April 8, 2015 and with the Atikameksheng Anishnawbek First Nation on September 05, 2014. No comments were received. All related correspondence is provided in **Appendix I**.

5.4 Integration of External Consultation / Engagement into the Recommended Solution

The intent of the consultation and engagement program, including holding Public Information Centres, for this project was to ensure that the public, stakeholders and external agencies had an opportunity to identify their concerns and contribute to the recommended solution while addressing the consultation requirements in the Municipal Class EA document. **Exhibit 5-1** highlights the key concerns and comments provided by the public and agencies and how they were addressed throughout the study.

Exhibit 5-1: Integration of External Consultation

Summary of Key Comments Received	City Review / Response
<p>Concern that road expansion will impact air pollution levels in the surrounding area, in particular green spaces.</p>	<p>A detailed air quality analysis has been carried out to assess the potential air quality impacts of the recommended solution based on MOECC air quality criteria. The Province of Ontario and the Federal Government have established criteria for concentrations of airborne contaminants. The Provincial Ambient Air Quality Criteria (AAQC's) are effect-based levels in air. The effects considered may be based on odour, vegetation, soiling, visibility, corrosion or other effects. AAQC's are used in environmental assessments, special air monitoring studies and assessments of general air quality to determine the potential for causing an adverse effect.</p> <p>Future (2031) No-Build and Future 2031 Build scenarios were assessed as part of the Air Quality Assessment. In summary:</p> <ul style="list-style-type: none"> • The maximum combined concentrations for the future build scenario were all below their respective MOECC guidelines, with the exception of PM10, TSP, and annual benzene. • Frequency Analysis determined that the project did not have additional exceedances of the PM10 guideline over the 5 year period. The TSP guideline was exceeded 1 additional day over the 5 year period. For both contaminants, this equates to additional exceedances less than 1% of the time. • Ambient benzene exceeded the relevant guideline without the road contribution. The contribution from the roadway was less than 1% of the maximum combined concentration. • Mitigation measures are not warranted, due to the small number of additional days which are expected to exceed this guideline.
<p>Will there be any noise impacts to residents living adjacent to Second Avenue?</p>	<p>A detailed noise analysis has been carried out to assess the potential noise impacts of the widening of Second Avenue based on MTO and MOE criteria for acceptable noise levels. Future (2031) No-Build and Future (2031) Build scenarios were assessed as part of the noise analysis. The analysis determined that the potential for noise level increases are predicted to be less than 5 dBA, thus, the review of noise mitigation is not warranted based on provincial criteria.</p>

Summary of Key Comments Received	City Review / Response
<p>Concern that the recommended plan does not take into account the <i>Source Protection Plan for the Greater Sudbury Watershed</i> and impacts to Ramsey Lake.</p>	<p>A Proposed Drinking Water Source Protection Plan was prepared under the Clean Water Act and was submitted to the Minister of the Environment for review and approval on August 20, 2012. The source protection plan contains policies to protect sources of municipal residential drinking water.</p> <p>Second Avenue is within intake protection zone 3 for the Ramsey Lake drinking water source. Storm water infrastructure and the application of road salt are activities that could pose drinking water threats.</p> <p>The proposed source protection plan contains policies to manage these threat activities. Refer to the letter received from Conservation Sudbury in Appendix I regarding Drinking Water Source Protection.</p> <p>The City shares the general public's concern for the wellbeing of Ramsey Lake. One of the City's first priorities is to develop a policy to provide storm water management strategy for the Ramsey Lake area within five years of the source protection plan taking effect. As stated in the City's letter to the Greater Sudbury Watershed Alliance (Appendix I), the City is currently preparing the Terms of Reference for a Watershed Study for Ramsey Lake and expects to retain a consultant in 2016 (The City had scheduled to retain the consultant in 2014, however this was delayed). The watershed study will include state of the art and best management practices for storm water management and treatment, and a prioritization and implementation plan of treatment improvements for Ramsey Lake.</p> <p>The majority of Ramsey Lake's shoreline is developed, and the treatment of all sources of storm water is a significant undertaking. The City's preliminary estimate for this work is in excess of \$25 million. While the Second Avenue project is located in intake protection zone 3, there are two other zones within the watershed with a likely higher storm water treatment priority. The actual priority will not be known until the watershed study is complete. The City is proposing to complete the watershed study, determine a prioritization and implementation plan, so that the investment in storm water treatment can be maximized.</p> <p>For the Second Avenue project, it is not known if an end-of-pipe treatment facility or a communal facility to treat storm water from a greater area would be the preferred solution. However, the proposed construction of the storm sewer on Second Avenue does not hinder the installation of either storm water treatment alternative in the future.</p>
<p>Concern that the project will generate triple the amount of stormwater runoff entering the Ramsey Lake Watershed.</p>	<p>The City completed the Second Avenue project storm water design with a 5 year design storm. The proposed storm water design will have less than a 5% increase in storm water runoff compared to the existing storm water runoff. The stormwater design is shown in Appendix H – Drawings of the Recommended Solution.</p>

Summary of Key Comments Received	City Review / Response
<p>Concern that converting the drainage system from open ditches to a formalized stormwater management system will reduce natural filtration opportunities and impact phosphorus and nutrient discharge into Ramsey Lake.</p>	<p>Please refer to the response above regarding the Source Water Protection Plan.</p> <p>The existing cross section of Second Avenue is rural with very shallow ditches. The drainage in this area has caused historic road operational issues, which have been addressed as part of the detailed design.</p>
<p>The proponent has not incorporated any storm water treatment devices into the planning process to address increased pollutant loads discharged into Ramsey Lake.</p>	<p>Please refer to the response above regarding the Source Water Protection Plan.</p>
<p>Concern regarding winter de-icing operations (salting) of the expanded roadway and the impact of this practice on Lake Ramsey.</p>	<p>Please refer to the response above regarding the Source Water Protection Plan.</p> <p>The proposed widening of Second Avenue will result in an additional 7,500 square metres of road requiring winter maintenance. As Second Avenue is a secondary arterial road, it is a salt route during the winter. However, this additional road will not result in a significant increase in salt usage in comparison to the watershed.</p> <p>The City does have a Salt Management Plan and is working to minimize the amount of salt for winter maintenance.</p>
<p>Five lanes are not required on Second Avenue.</p>	<p>It is recommended that Second Avenue be widened to five lanes from Donna Drive to Scarlett Road and three lanes from Scarlett Road to Kenwood Street. By widening the road, in addition to improvements in other parts of the Greater Sudbury road network, the capacity concerns identified in the Draft TSR 2031 Do Nothing Alternative are expected to be addressed. In addition, this alternative will have minimal impact to the environment, it is the most cost effective and no public or private lands will be required for the proposed work.</p>
<p>Wide curb lanes are not an appropriate cycling facility for Second Avenue.</p>	<p>The wide curb lanes were replaced with cycle tracks and the City's first cycling cross ride was proposed at the traffic signals at Scarlett Road.</p>

Summary of Key Comments Received	City Review / Response
<p>The pedestrian traffic signals should not be removed as there is a primary school and a housing complex south of the project that use these signals to cross Second Avenue safely.</p>	<p>The pedestrian signals are to remain, however they would be relocated to Kenwood Street to better reflect the pedestrian desire line now that the former high school was converted to apartments.</p>
<p>There is a drainage problem on the corner of First Avenue and Second Avenue.</p>	<p>As the limits of the project were extended to First Avenue, the storm sewer design was modified to address the localized drainage problem.</p>
<p>Concern that environmental specialist reporting was not made available for public review.</p>	<p>Environmental reports are provided in the Appendices as part of this Project File Report.</p>

6.0 PROJECT DESCRIPTION AND MITIGATION MEASURES

6.1 Recommended Design

The Recommended Solution involves the widening of Second Avenue to five lanes from Donna Drive to Scarlett Road and three lanes from Scarlett Road to Kenwood Street. The Recommended Solution is previously shown in **Exhibit 4-4**.

Following the direction set forth in the Draft TSR, the City is creating a showcase “complete street” on Second Avenue to address alternative modes of transportation and to address any additional work that should be completed for the purposes of cost effectiveness and efficiency. The following items are included in the project:

- Sidewalks on both sides of Second Avenue to facilitate pedestrian movement;
- Urbanize (add curbs) to Second Avenue to facilitate the construction of sidewalks;
- Add storm sewer to allow for urbanization and correct existing drainage issues;
- Provide cycle tracks to facilitate cycling;
- Replace sections of water main and sanitary sewer;
- Install traffic signals at Scarlett Road to facilitate traffic movement and to provide a protected pedestrian crossing;
- Realign the cemetery and dog park entrance to the proposed traffic signals to improve safety and facilitate traffic movement;
- Relocate the pedestrian traffic signals between the former high school and the park to the intersection of Second Avenue at Kenwood Street; and
- Add bus bays to facilitate public transportation.

6.2 Construction Staging

Impacts to the road network will be limited to construction related activities. Construction staging plans will be developed to minimize disruptions to motorists during the roadway widening and drainage improvements.

6.3 Drainage Improvements

A new storm sewer system is being proposed on Second Avenue from Donna Drive to First Avenue, and through the north end of Adamsdale Playground. The existing storm sewer on the south leg of Plumtree Crescent will also be upsized. Subdrain piping will be added to both sides of the curb and gutter sections of Second Ave for the purpose of collecting sub-surface water and conveying it to a proper outlet. Furthermore, approximately 19.5 HA of drainage area that is currently conveyed to Korpela Creek via Scarlett Road, will now be conveyed to Korpela Creek via the new storm sewer on Plumtree Crescent.

6.4 Potential Environmental Effects and Proposed Mitigation Measures

In order to ensure effective environmental quality control and risk management, the following environmental mitigation plan is proposed to:

- Identify and summarize environmental sensitivities;
- Present environmental protection measures in a way that can be translated into Contractual requirements; and
- Present monitoring commitments in a manner that verifies that environmental protection measures are being implemented and are effective.

It is important to ensure that the Contractor is made aware of, and is prepared to address, all environmental issues that may arise during construction activities. The following sections summarize the potential environmental impacts and proposed mitigation measures associated with the project.

6.4.1 Erosion and Sediment Control

Erosion and sediment control (ESC) measures will be implemented during all phases of construction, clean-up, and restoration to prevent sediment-laden runoff from entering any of the watercourses, private property or other sensitive areas directly from the construction zone. Mitigation measures include:

- Prior to the initiation of construction, ESC measures will be developed and will be installed according to engineering drawings. Siltation fencing will be installed, where appropriate, around the creek banks to minimize the risk of deleterious substances being carried with runoff into the creek. The siltation fencing will be tied in to existing structures to ensure there are no gaps through which sediment or deleterious substances can enter the creek;
- Siltation fencing will be installed in such a way that deleterious substances cannot run off the fencing and therefore must pass through the fencing prior to entering the creek;
- Siltation fencing will be inspected daily and repaired as required to ensure it is functioning correctly during the construction period. The siltation fencing will be left in place until such time that the site restoration measures have become established;
- Pumping of sediment laden water from the trenches will be undertaken in such a way to prevent sediment or other deleterious materials from entering the creek;
- Before being discharged, the water will be filtered through a filtration device (e.g. a filter bag);
- Water will be discharged a minimum of 30 m from the creek and will be allowed to flow through vegetation to further ensure that the potential for sediment release into the creek is minimized; and
- All creek bed, banks and vegetation that are disturbed during construction works, will be restored to their original condition, or better and the Contractor is to ensure that the creek bed and banks are stable prior to removing the isolation measures from the creek.

6.4.2 Management of Excess Materials and Property Contamination

The City provided the following background information on the Minnow Lake Dog Park, as it was historically an aggregate source site. When the aggregate source was depleted, the location was used as a surplus fill site for construction contracts for over a decade. The surplus fill would contain excavated material being granulars, native soil, concrete and asphalt. The proposed construction limits will not impact this area. Surplus fill has not been placed on this site for approximately a decade, with the exception of the development of the Minnow Lake Dog Park.

Recommendations to manage excess materials to be generated during construction are as follows:

- Excess materials to be generated during the project are recommended to be managed through re-use, recycling or disposal at an approved landfill facility in accordance with Ontario Provincial Standard Specification (OPSS) 180 (November 2011).
- Following the Ontario Ministry of the Environment and Climate Change (MOECC) Management of Excess Soil – A Guide for Best Management Practices (January 2014), it is recommended that any excess earth / soil (i.e., excavated earth) to be generated during this project should be re-used elsewhere within this project or at other road improvement / infrastructure projects, whenever possible, provided that the environmental quality of the excess soil meets the receiving site's environmental soil criteria.
- Temporary erosion and sedimentation control measures shall be implemented by the Contractor prior to the start of construction.
- Since the excavation work for the project is expected to be relatively shallow (i.e., within 5 metres), groundwater will not likely be encountered during excavation activities. If there is an accumulation of surface water and/or groundwater, then the ponded water shall be managed according to existing environmental regulations including O. Reg. 153/04, O. Reg. 347, and applicable municipal sewer use by-laws.
- If existing asphalt on Second Avenue North is to be removed during construction, it is recommended to check the asphalt for presence of designated substances prior to the asphalt re-use / disposal.

6.4.3 Natural Environment

6.4.3.1 Terrestrial Ecosystems

Potential Impacts

Potential impacts to natural vegetation features are limited and as follows:

- Widening of Second Avenue:
 - Removal of some Old Field Cultural Meadow (CUM1-1) and Cattail Marsh/Thicket Swamp (MAS2-1/SWT) adjacent to Second Avenue between Donna Drive and Scarlett Avenue;
 - Minor disturbance to drainage patterns, and therefore possibly wetland communities (MAS2-1 and MAS2-1/SWT) in the parklands west of Second Avenue between Donna Drive and Scarlett Road; and
 - Potential sedimentation and erosion in Cattail Marsh (MAS2-1 and MAS2-1/SWT) vegetation due to construction activities.
- Replacement and expansion of the storm sewer network under Second Avenue and from Second Avenue to the outlet in the Korpela Creek through Adamsdale Park, under Plumtree Crescent and via the City easement.

- Selected removal of vegetation in the Poplar-White Birch fresh to moist forest (ES17.2). These removals are expected to be minimal as the alignment is proposed in the area of current trails and meadow vegetation;
 - Removal of some Willow Mineral Thicket Swamp (SWT2-2) vegetation at the outlet of the storm sewer due to grading, headwall replacement and erosion control works; and
 - Potential sedimentation and erosion in Willow Mineral Thicket Swamp (SWT2-2) vegetation due to construction activities.
- Realignment of the entranceway drive of Civic Memorial Cemetery to meet Scarlett Road
 - Removal of approximately 0.5 hectares of the Poplar-White Birch dry to moderately fresh forest (ES17.1); and
 - There will be temporary disruption to surface drainage patterns due to construction. Existing drainage patterns should be returned to existing conditions, as much as possible.

Potential sedimentation and erosion in the Poplar-White Birch dry to moderately fresh forest (ES17.1) due to construction activities.

Mitigation Measures

- Areas of natural vegetation to be retained should be delineated as such on all contract drawings, these areas should be clearly delineated in the work area using silt fencing and/or tree protection fencing, as appropriate. This fencing should clearly identify the areas to be protected.
- Silt fencing should be placed at the edge of work areas adjacent to wetland communities to prevent siltation of wetlands.
- All vegetation cover not specified for removal shall be preserved in order to minimize erosion and sedimentation.
- Trees to be removed should be inventoried and clearly marked for removal.
- Trees to be retained, adjacent to works, should be delineated using tree protection fencing placed at the dripline. This fencing should clearly identify the areas to be protected
- Dust control shall be undertaken using water, not chemical suppressants to prevent deleterious substances from entering natural habitats including wetlands.
- Areas of vegetation to be retained should not be used for stockpiling of materials or waste.
- Re-stabilize and re-vegetate exposed soil surfaces as soon as possible using native seed mixes appropriate to the site conditions.
- The area in the vicinity of the realigned cemetery road should be restored following works. Restoration should include re-planting disturbed areas with site appropriate trees, shrubs and ground cover and restoring existing water drainage patterns in order to maintain existing forest conditions west of the new road.

6.4.3.2 Wildlife Habitat

Potential Impacts

Potential impacts to natural vegetation features are limited and as follows:

- Widening of Second Avenue:
 - Removal of some meadow habitat adjacent to Second Avenue between Donna Drive and Scarlett Avenue that may support wildlife;
 - There will be temporary disruption to surface drainage patterns due to construction. Existing drainage patterns should be returned to existing conditions, as much as possible; and
 - Potential sedimentation and erosion in wetland habitat for amphibians due to construction activities.
- Replacement and expansion of the storm sewer network under Second Avenue and from Second Avenue to the outlet in the Korpela Creek through Adamsdale Park, under Plumtree Crescent and via the City easement:
 - Selected removal of forest habitat that could support forest edge breeding birds. These removals are expected to be minimal as the alignment is proposed in the area of current trails and meadow vegetation; and
 - Potential sedimentation and erosion in the Thicket Swamp wetland habitat which may support amphibians and reptiles.
- Realignment of the entranceway drive of Civic Memorial Cemetery to meet Scarlett Road:
 - Removal of a portion of the forest habitat that may support a variety of urban/suburban tolerant birds and other wildlife species, including potential breeding amphibians (i.e. frogs). These works are expected to require the removal of approximately 0.5 hectares of this ecosite; and
 - Potential disruption of surface drainage from the drainage feature in the valleyland to the storm sewer under Second Avenue. This may change the current pattern of drainage and ponding which can provide wildlife habitat.

Mitigation Measures

- It is recommended to avoid vegetation clearing (including grubbing) during the breeding bird season (approximately April 1 to August 31). However, if work is required during this period a search for active nests can be carried out by an avian biologist to identify if work can proceed without creating a disturbance to nest sites. It should be noted that occasionally bird species will precede (e.g., late March nesting) or exceed (e.g., September) the approximate breeding bird season window.
- The Contractor shall not destroy active nests (nests with eggs or young birds) of protected migratory birds, including SAR protected under the ESA (2007).
- If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the MBCA (1994) or ESA (2007), all activities will stop and the Contract Administrator / Environment Canada will be contacted to discuss mitigation options, and/or to obtain direction from MNR for species listed under the ESA (2007).
- It is noted that a part of the project area is in Old-field Meadow and may support ground nesting birds. As such removal of meadows should also avoid the aforementioned breeding bird season.
- Install temporary erosion and sediment control measures prior to construction, and maintain throughout construction especially near the drainage swale and wetland units to be retained in order to prevent reptiles (including SAR) and amphibians from entering the construction area.
- In the event that an animal encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm

to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified.

- In the event that a SAR or possible SAR is found in the construction area, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. The Contract Administrator will then contact the MNRF SAR Biologist for direction, as these animals are protected under the ESA (2007).

6.4.3.3 Fisheries

Potential Impacts

Potential impacts to fish and fish habitat are limited to works associated with the storm sewer outlet works, and include:

- In water works to convey flow from storm sewer to receiving watercourse as well as erosion protection measures;
- Sedimentation and erosion into the creek due to construction activities;
- The addition of deleterious substances (sediment, fuel, oil, lubricant, etc.) into the creek associated with construction activities and machinery;
- The pumping of sediment laden water associated with precipitation events or leaks in isolation measures to maintain a dry working environment;
- The removal of vegetation and the creek bed and banks within the isolated work area;
- Fish passage; and
- Harm to fish during construction.

Mitigation Measures

- Any in water works or increase in storm water flows to the watercourse are subject to review under the Fisheries Act. The proposed design, including the physical footprint, must be reviewed under the Fisheries Act and, if required, approved by Fisheries and Oceans Canada (DFO) prior to any works commencing.
- Work is to occur only during the MNRF approved in-water timing window for a warmwater creek. MNRF has confirmed the watercourses in the area are subject to an in-water timing constraint from April 1st to June 15th.
- All in-water work activities (e.g. headwall repair / reconstruction and erosion protection) are to be completed in isolation of flowing water (i.e. coffer dam) so as to avoid causing harm or death to fish and being in contravention of the Fisheries Act.
- Immediately following the isolation of the in-water work area where fish may be present, a fish removal will be undertaken with fish being relocated to suitable habitat downstream. An MNRF License to Collect Fish for Scientific Purposes Application will be required.
- Any water intake pipes associated with the initial dewatering of the isolated work area will be screened to prevent entrainment or impingement of fish that are trapped between the coffer dams.
- Downstream flow will be maintained by pumping or fluming water around the isolated work area.

- The downstream end of the flume will discharge over a suitable ESC measure to prevent channel scour (e.g. river stone splash pad).
- The Contractor is to ensure that the regular maintenance and repair of the dam and flume system and seals is carried out to prevent debris-fouling and impingement of fish. Should the isolated work area be breached and fish inadvertently re-enter the isolated work area, all work will cease until the fish are removed and the work area is dewatered.
- Due to maintenance of existing pipe size, flow increase is anticipated to fall within approved discharge volumes and thus is not anticipated to adversely affect fish or their habitat. This is to be confirmed the aforementioned *Fisheries Act* screening which must occur prior to works commencing.

6.4.4 Groundwater

During construction, there is a potential for contamination to enter groundwater recharge areas and/or waterstreams. To minimize these impacts, the following mitigation measures are recommended to be implemented:

- All activities shall be controlled to prevent entry of any petroleum products, lubricant spills, waste, rubble or concrete material, construction debris and sediment or other potential contaminants / deleterious substances to the watercourses, road-side ditches, culverts and surface water catchment grates.
- No storage, maintenance or re-fuelling of equipment shall be conducted within 30 m of the watercourses or wetlands. A monitoring plan to prevent spills and fall of debris in surface water features and contingency plan to efficiently mitigate any potential spills should be prepared prior to the construction stage of the project.
- A Spills Prevention and Response Plan shall be developed by the Contractor and kept on site at all times. All disturbed surfaces shall be properly designed and stabilized before the removal of the erosion and sediment control measures to avoid erosion and conveyance of sediment-laden water in waterstreams.
- Comprehensive sediment and erosion control measures shall be developed and implemented by the Contractor. Specific aspects include:
 - Sedimentation control measures shall be in place between the work areas and all reaches of those watercourses where works are required, including ditch and drainage works that drain to watercourses that support fish habitat;
 - The silt fencing shall be properly installed and regularly inspected and maintained. It shall be left in place and maintained until all surfaces contributing drainage to these watercourses are fully stabilized;
 - All exposed and newly constructed surfaces shall be stabilized using appropriate means in accordance with the characteristics of the soil material;
 - The disturbed access areas shall be stabilized and re-vegetated following construction; and
 - Any temporarily stockpiled material, construction or related materials shall be properly contained (e.g., within silt fencing) in areas separated at least 30 m from the watercourses wherever possible.
- All construction materials and debris shall be removed and appropriately disposed of following construction.

6.4.5 Property

The proposed infrastructure improvements to Second Avenue can be accommodated with the existing roadway right-of-way.

6.4.6 Noise

As part of this EA Project File update, a noise assessment was undertaken to assess the potential increase in noise level to adjacent Noise Sensitive Areas (NSAs) as a result of the proposed improvements to Second Avenue from Donna Drive to First Avenue. Existing land uses along Second Avenue are a mixture of recreational, residential and commercial. The land uses north of Scarlett Road are recreational (Minnow Lake Dog Park) on the west side of Second Avenue and commercial on the east side of Second Avenue. The land use along Second Avenue south of Scarlett Road to First Avenue is primarily residential. The noise assessment was undertaken based on a selection of several representative private residential homes within the Study Area and based on a worse-case scenario where only Second Avenue is improved and no other improvements are implemented as recommended in the Draft Transportation Master Plan. These residential houses located adjacent to Second Avenue were selected to represent the potential noise impacts to the NSAs in proximity to Second Avenue.

The potential increase in noise levels between the with and without proposed improvements scenarios were determined to be less than 5 dBA; therefore, the consideration of noise mitigation is not warranted based on MTO/MOECC Noise Protocol. The Protocol only requires the provision of noise mitigation is to be investigated should the future noise level with the proposed improvements result in a greater than 5 dBA increase over the future noise level without the proposed improvements. The Noise Report documentation is included in **Appendix J**.

Construction noise effects are temporary in nature and often are unavoidable. Construction activities will vary temporally and spatially as the project progresses. Sound levels from construction at a given receptor location will vary over time as different activities take place, and as those activities change location within the right-of-way.

During construction the contractor will be required to abide by the City of Greater Sudbury's Noise Bylaw. If any construction activities planned outside of the normal working hours (i.e. 6 pm to 7 am) will require a noise by-law exemption. A copy of the City of Greater Sudbury's noise by-law is included in **Appendix K**.

6.4.7 Air Quality

An air quality assessment for the Project File Update for the Second Avenue widening was completed and the full report is included in **Appendix L**. The air quality assessment was based on a worse-case scenario where only Second Avenue is improved and no other improvements are implemented as recommended in the Draft Transportation Master Plan.

The predicted results show that every contaminant with the exception of PM10, TSP, and benzene are predicted to be well below the relevant guideline including the contribution from the roadway. It should be noted that ambient benzene concentrations alone were over 190% of the annual guideline and that the roadway contribution to the maximum was 2%. Ambient PM10 exceeded the standard and the roadway contribution to the maximum was 4%. There were no additional PM10 exceedances due to the roadway. Ambient TSP did not exceed the background; the roadway project accounted for one exceedance of the guideline. One exceedance over a five-year period represents a very low frequency and the roadway contribution to the maximum TSP concentration was 10%.

The predicted results from our preliminary modelling show that the impact of the roadway project on local air quality is low, with decreasing concentrations in the future year scenario due to predicted improvements in vehicle exhaust technology.

6.4.8 Archaeology

Woodland Heritage Services Limited undertook a Stage 1 Archeological Assessment on September 8, 2014. The assessment did not locate any areas of archeological potential. The adjacent area is disturbed and developed. As a result, it is recommended that no further archeological work be required in advance of the proposed work. The Stage 1 Archeological Assessment Report is included in **Appendix F**.

6.4.9 Heritage

The City of Greater Sudbury, Department of Growth and Development, was contacted to confirm details of listed/designated properties or heritage districts that might be in or adjacent to the Study Area. The City confirmed there are no heritage properties listed in the Study area and there are no heritage districts under Part 5 of the *Ontario Heritage Act*.

The Sudbury Civic Memorial Cemetery is located within the study limits. The cemetery's driveway has direct access to Second Avenue between Scarlett Road and Carmichael Village Road. The closest grave site is approximately 250 m to Second Avenue.

MMM consulted with the Ministry of Tourism, Culture and Sport (MTCS) to review the proposed plan to Second Avenue and discuss the heritage review that was undertaken as part of the update the Project File Report. MTCS acknowledged there are no heritage districts in the study area under Part 5 of the Ontario Heritage Act. MTCS also confirmed that the relocation of the cemetery gate adjacent to Second Avenue is not a heritage concern since the property is located far enough from the road. Correspondence from MTCS is included in **Appendix M**.

6.4.10 Road Network / Construction Staging

The widening of Second Avenue is anticipated to improve the overall traffic operations in the City's road network.

Potential impacts to the road network are not anticipated during construction since the proposed works will be staged to minimize disruption to traffic on Second Avenue.

Advance signage will notify motorists of the construction zones and timing for works.

6.4.11 Utilities

Two hydro poles on the west side of Second Avenue, between Scarlett Road and Kenwood Street and five aluminum street light poles require relocation to accommodate the proposed improvements to Second Avenue. Bell also has 5 pedestal boxes that will be permanently removed.

Relocation of affected utilities will occur through consultation with the affected utility providers.

6.5 Summary of Identified Concerns and Proposed Mitigation

Exhibit 6-1 summarizes the identified concerns and the proposed mitigation measures, based on the environmental sensitivities and the proposed plan for the infrastructure improvements to Second Avenue. By implementing the recommended mitigation measures, potential impacts of the proposed infrastructure improvements on the environment can be avoided or minimized. All of the recommended construction mitigation will be incorporated into the Contract documents.

Exhibit 6-1: Summary of Environmental Impacts and Proposed Mitigation Measures

Environmental Issue / Concern	Potential Environmental Impact	Proposed Mitigation
Erosion and sediment control	Activities associated with construction of the proposed improvements may result in erosion.	<ul style="list-style-type: none"> • ESC measures will be developed and will be installed according to engineering drawings. • Siltation fencing will be installed, where appropriate and inspected daily and repaired as required. • Pumping of sediment laden water from the trenches will be undertaken in such a way to prevent sediment or other deleterious materials from entering the creek. • Before being discharged, the water will be filtered through a filtration device (e.g. a filter bag); • Water will be discharged a minimum of 30 m from the creek and will be allowed to flow through vegetation to further ensure that the potential for sediment release into the creek is minimized. • All creek bed, banks and vegetation that are disturbed during construction works, will be restored to their original condition, or better and the Contractor is to ensure that the creek bed and banks are stable prior to removing the isolation measures from the creek.
Management of Excess Materials and Property Contamination	There is a potential for contaminated properties to be encountered during widening of Second Avenue North.	<ul style="list-style-type: none"> • Excess materials to be generated during the project are recommended to be managed through re-use, recycling or disposal at an approved landfill facility. • It is recommended that any excess earth / soil (i.e., excavated earth) to be generated during this project should be re-used elsewhere within

Environmental Issue / Concern	Potential Environmental Impact	Proposed Mitigation
		<p>this project or at other road improvement / infrastructure projects, whenever possible, provided that the environmental quality of the excess soil meets the receiving site's environmental soil criteria.</p> <ul style="list-style-type: none"> • If there is an accumulation of surface water and/or groundwater, then the ponded water shall be managed according to existing environmental regulations including O. Reg. 153/04, O. Reg. 347, and applicable municipal sewer use by-laws. • If existing asphalt on Second Avenue North is to be removed during construction, it is recommended to check the asphalt for presence of designated substances prior to the asphalt re-use / disposal.
<p>Fisheries & Aquatic Habitat</p>	<p>Potential impacts include impacts to in water works, sedimentation and erosion, the pumping of sediment laden water associated with precipitation events or leaks in isolation measures to maintain a dry working environment, the removal of vegetation and the creek bed and banks within the isolated work area and impact to fish passage and potential to harm fish during construction.</p>	<ul style="list-style-type: none"> • Any in water works or increase in storm water flows to the watercourse are subject to review under the Fisheries Act. The proposed design, including the physical footprint, is to be reviewed under the Fisheries Act and, if required, approved by Fisheries and Oceans Canada (DF) prior to any works commencing. • MNRF has confirmed the watercourses in the area are subject to an in-water timing constraint from April 1st to June 15th • All in-water work activities are to be completed in isolation of flowing water, so as to avoid causing harm or death to fish and being in contravention of the Fisheries Act. • Immediately following the isolation of the in-water work area where fish may be present, a fish removal will be undertaken with fish being relocated to suitable habitat downstream. An MNRF License to Collect Fish for Scientific Purposes Application will be required. • Any water intake pipes associated with the initial dewatering of the isolated work area will be screened to prevent entrainment or impingement of fish that are trapped between the coffer dams. • Downstream flow will be maintained by pumping or fluming water around the isolated work area.

Environmental Issue / Concern	Potential Environmental Impact	Proposed Mitigation
		<ul style="list-style-type: none"> • The Contractor is to ensure that the regular maintenance and repair of the dam and flume system and seals is carried out to prevent debris-fouling and impingement of fish. Should the isolated work area be breached and fish inadvertently re-enter the isolated work area, all work will cease until the fish are removed and the work area is dewatered. • Due to maintenance of existing pipe size, flow increase is anticipated to fall within approved discharge volumes and thus is not anticipated to adversely affect fish or their habitat. This is to be confirmed through the aforementioned Fisheries Act screening which must occur prior to works commencing.
Terrestrial Ecosystems	Impacts related to removal of vegetation, minor disturbance to drainage patterns and potential sedimentation and erosion due to construction activities.	<ul style="list-style-type: none"> • Areas of natural vegetation to be retained should be delineated as such on all contract drawings, these areas should be clearly delineated in the work area using silt fencing and/or tree protection fencing, as appropriate. This fencing should clearly identify the areas to be protected. • Silt fencing should be placed at the edge of work areas adjacent to wetland communities to prevent siltation of wetlands. • Trees to be removed should be inventoried and clearly marked for removal. • Trees to be retained, adjacent to works, should be delineated using tree protection fencing placed at the dripline. This fencing should clearly identify the areas to be protected • Areas of vegetation to be retained should not be used for stockpiling of materials or waste. • All vegetation cover not specified for removal shall be preserved in order to minimize erosion and sedimentation. • Re-stabilize and re-vegetate exposed soil surfaces as soon as possible using native seed mixes appropriate to the site conditions. • The area in the vicinity of the realigned cemetery road should be restored following

Environmental Issue / Concern	Potential Environmental Impact	Proposed Mitigation
Wildlife & Habitat (Including SAR)	<p>Potential impacts may include removal of some meadow habitat that may support wildlife.</p> <p>There will be temporary disruption to surface drainage patterns due to construction.</p> <p>Potential sedimentation and erosion.</p> <p>Selected removal of forest habitat that could support forest edge breeding birds.</p>	<p>works.</p> <ul style="list-style-type: none"> • It is recommended to avoid vegetation clearing (including grubbing) during the breeding bird season (approximately April 1 to August 31). However, if work is required during this period a search for active nests can be carried out by an avian biologist to identify if work can proceed without creating a disturbance to nest sites. It should be noted that occasionally bird species will precede (e.g., late March nesting) or exceed (e.g., September) the approximate breeding bird season window. • The Contractor shall not destroy active nests (nests with eggs or young birds) of protected migratory birds, including SAR protected under the ESA (2007). When these nests are encountered, the Contract Administrator must be contacted. • If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the MBCA (1994) or ESA (2007), all activities will stop and the Contract Administrator/ Environment Canada will be contacted to discuss mitigation options, and/or to obtain direction from MNRF for species listed under the ESA (2007). • In the event that an animal encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. • In the event that a SAR or possible SAR is found in the construction area, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. The Contract Administrator will then contact the MNRF SAR Biologist for direction, as these animals are protected under the ESA (2007).

Environmental Issue / Concern	Potential Environmental Impact	Proposed Mitigation
Groundwater	<p>During construction, there is potential for increased pollutants to enter groundwater recharge area during construction.</p>	<ul style="list-style-type: none"> • All activities shall be controlled to prevent entry of any petroleum products, lubricant spills, waste, rubble or concrete material, construction debris and sediment or other potential contaminants / deleterious substances to the watercourses, road-side ditches, culverts and surface water catchment grates. • No storage, maintenance or re-fuelling of equipment shall be conducted within 30 m of the watercourses or wetlands. A monitoring plan to prevent spills and fall of debris in surface water features and contingency plan to efficiently mitigate any potential spills should be prepared prior to the construction stage of the project. • A Spills Prevention and Response Plan shall be developed by the Contractor and kept on site at all times. All disturbed surfaces shall be properly designed and stabilized before the removal of the erosion and sediment control measures to avoid erosion and conveyance of sediment-laden water in waterstreams. • Comprehensive sediment and erosion control measures shall be developed and implemented by the Contractor. • All construction materials and debris shall be removed and appropriately disposed of following construction.
Property	<p>No permanent property takings will be required.</p> <p>There will be temporary disruption of park space during construction.</p> <p>Temporary disruption during construction and/or inconvenience to properties</p>	<ul style="list-style-type: none"> • All disturbed property and landscaping should be reinstated after construction is complete. • Install temporary construction fencing around the construction zone within the park lands as required. • Construction to be scheduled so as to minimize disruption. • Ensure access for emergency response vehicles /personnel

Environmental Issue / Concern	Potential Environmental Impact	Proposed Mitigation
	and buildings.	<ul style="list-style-type: none"> • Notify public/property owners of construction scheduling by mail, news media, or communication with City Representatives on site.
Noise	Potential noise impacts associated with construction operations.	<ul style="list-style-type: none"> • Staging of construction to minimize disruption to the public and adjacent properties. • Equipment idling shall be restricted to the minimum necessary to perform specified work. • During construction the contractor will be required to abide by the City of Greater Sudbury's Noise Bylaw; any construction activities planned outside of the normal working hours (i.e. 6 pm to 7 am) will require a noise by-law exemption.
Air quality	The potential impact to local air quality is low.	<ul style="list-style-type: none"> • During dry periods bare soil will be covered with water and dust suppressant to minimize dust. • The contractor is responsible for following a construction code of practice for air quality.
Archaeology	A Stage 1 Archaeological Assessment was completed in January 2015 and confirmed that the study corridor is located within an area that has been previously disturbed by construction and maintenance of the road and creation of roadside drainage features. No areas of archaeological potential were identified.	<ul style="list-style-type: none"> • If archaeological resources are encountered during project work, the Ministry of Tourism, Culture & Sport (MTCS) should be notified and activities impacting archaeological resources should cease immediately until a determination of their nature and significance is carried out. • If human remains are encountered, the Cemeteries Regulation Unit of the Ministry of Consumer Services should be contacted. If human remains are associated with archaeological resources, MTCS should be notified.
Heritage	The City and MTCS confirmed there are no heritage properties listed in the Study area and there are no heritage districts under Part 5 of the Ontario Heritage Act.	<ul style="list-style-type: none"> • No mitigation required

Environmental Issue / Concern	Potential Environmental Impact	Proposed Mitigation
Road Network / Construction Staging	Potential impacts to the road network are not anticipated during construction since the proposed works will be staged to minimize disruption to traffic on Second Avenue.	<ul style="list-style-type: none"> • Advance signage will notify motorists of the construction zones and timing for works.
Utilities	There are 2 hydro poles on the west side of Second Avenue, between Scarlett Road and Kenwood Street and 5 aluminum street light poles, within the project limits that will need to be relocated. Bell also has 5 pedestal boxes that will be permanently removed.	<ul style="list-style-type: none"> • Relocation of affected utilities will occur through consultation with the affected utility providers.

6.6 Estimated Cost

The cost estimate for the road widening is approximately \$850,000. Therefore, this project has been undertaken following the Schedule 'B' process for municipal roads, as the cost estimate to widen the road is less than \$2.3 million. MOECC has confirmed following the Schedule B process is applicable for the widening of Second Avenue.

In addition to the widening, the overall improvements include additional items to showcase a 'complete street' on Second Avenue within the study limits. These items are listed previously in **Section 6.1**. The total cost estimate for the overall improvements is \$6,600,000 excluding taxes.

APPENDIX A

Summary of MOECC Comments

**City of Greater Sudbury
Second Avenue Class EA
MOECC Comments and Proposed Approach to Update Project File**

MOECC Comments – May 13 th Letter		City / MMM Response / Approach to Update Project File
Class EA Requirements	Documentation Summary and Additional Requirements	
<p>Problem Statement and Rationale</p> <p>The Class EA requires that the proponent identify and describe the problem or opportunity which the project proposes to address.</p>	<p>The Project File identifies the problem as traffic congestion from significant development and an opportunity to provide active transportation infrastructure. The Project File states that the problem/opportunity was determined through the City's Transportation Master Plan (TMP) update. The ministry was made aware that the draft TMP was posted to the City's website on May 11, 2015. However, the TMP document is not yet complete.</p> <p>The Project File states on Page 3 that traffic modelling was analyzed in the TMP to identify road improvements required during the next twenty years. The traffic modeling data and analysis was not available in the Project File. Therefore the need for the Project is not clear to the ministry.</p> <p>Page 5 states that the problem statement for the Project was identified in the TMP which was unavailable to the public for review during the 30-day review period.</p> <p>Any relevant studies related to this Project, such as problem identification, traffic modelling, and active transportation plans/studies should be summarized or provided as part of the Project File. Alternatively, once the TMP is completed it could be referenced as a supporting document in the Project File.</p>	<p>The Project File was updated to identify the 'Problem being Addressed', which included:</p> <ul style="list-style-type: none"> • Existing and future traffic data. • Traffic analysis, level of service, capacity constraints. • Existing and projected lane requirements. <p>The above is presented in Section 2.0 in the updated Project File. Traffic analysis details are also provided in Appendix B.</p> <p>Section 2.0 in the Project File documented the Problem Statement and concluded the need for additional lanes on Second Avenue.</p>
<p>Alternative Solutions Step 1</p> <p>All reasonable and feasible solutions shall be identified and described.</p>	<p>Section 6 proposes alternative solutions for addressing the problem/opportunity.</p> <p>The Project File identifies 3 solutions:</p> <ul style="list-style-type: none"> ▶ Do nothing ▶ Widen third avenue ▶ Widen second avenue to 5 lanes <p>The alternative solutions are described briefly and then identified in Table 7-2. The Project study area map should include the alternatives referred to in this section and Table 7-2.</p>	<p>Section 4.0 of the Project File identifies and evaluates the Alternative Solutions section. The Alternative Solutions were expanded to include the following:</p> <ul style="list-style-type: none"> • Do Nothing • Improve and Expand Transit Service (i.e. Transportation Demand Management) • Impact and Expand other City roadways (i.e. widen Third Avenue) • Improve and Expand Second Avenue <ul style="list-style-type: none"> ○ To 3 lanes ○ To 5 lanes

MOECC Comments – May 13 th Letter		City / MMM Response / Approach to Update Project File
Class EA Requirements	Documentation Summary and Additional Requirements	
	<p>Two possible solutions were stated but not included in analysis: 1) widening to 3 lanes; 2) widening Silver Hills Drive. The Project File states these alternatives were not included as they would not meet the problem statement. The assessment of these alternatives should be included in the Project File, specifically the widening Second Avenue to three lanes, to better illustrate to concerned persons as to why this alternative was not selected as preferred.</p> <p>The alternatives only considered improvements through widening roads versus the do nothing alternative. The inclusion of other reasonable and feasible alternatives such as Transportation Demand Management and modal shift would be valuable to the analysis. If these analyses were part of the TMP referenced in Section 2, a summary of the analysis or a completed TMP should have been included in the Project File.</p> <p>Additionally, no rationale for choosing the preferred alternative of wide curb lanes for accommodating active transportation was provided in the Project File.</p>	<ul style="list-style-type: none"> Construct a new roadway <p>Section 4.1 provides the rationale for wide curb lanes for the input into the Project File.</p>
	<p>In Table 10-1 the City's response to requesters' concern with air quality impacts states that by 2031, the 'Do Nothing' alternative will result in a critical capacity point for traffic congestion. The next sentence states that traffic volumes are not expected to increase dramatically. These statements should be quantified for clarity of understanding.</p>	<p>The updated Project File provides clarity of the anticipated traffic volumes in the future.</p>
<p>Alternative Solutions Step 2</p> <p>Preparation of a physical description of the area where the project is to occur and a general inventory of the natural, social, and economic environments.</p> <p>P. A-27 of the Class EA provides some guidance on</p>	<p>Section 5 of the Project File provides an inventory of the existing environment.</p> <p>Section 5.1 indicates that the City visited the site that the Official Plan did not identify any significant habitat. It is not evident whether any wildlife or Species at Risk were identified in the study area. The Project File should document the presence of any wildlife or Species at Risk in the study area.</p> <p>There is no indication whether any built heritage resources or landscapes (in the cemetery, for example) are present in the study area.</p>	<p>The following additional environmental investigation/review were undertaken:</p> <ul style="list-style-type: none"> Natural environment investigations / Species at Risk identification to meet the requirements of the Species at Risk Act, Fisheries Act, Nickel District Conservation Authority regulations, etc.. This included the collection of background information from MNRF, field investigations for terrestrial ecosystems and fish habitat, and an assessment of potential impacts. Socio-economic review – extracted from City's

MOECC Comments – May 13 th Letter		City / MMM Response / Approach to Update Project File
Class EA Requirements	Documentation Summary and Additional Requirements	
<p>this topic: “Step 2 – Preparation of a physical description of the area where the project is to occur and a general inventory of the natural, social and economic environments which are to be considered when reviewing the effects of a project in that area.”</p>	<p>The inventory of the environment should include the wider study area that the other alternatives would affect as well as the preferred alternative. From the Project study area map, it is not clear where the Third Avenue alternative is located or whether this has been included in the description of the environment.</p> <p>The description of the natural environment should also include environmental components such as any watercourses/aquatic habitats. For example, fish habitat is mentioned later in the document (p. 11, Table 9-1, Potential Impacts and Proposed Mitigation Measures) but there is no description of which watercourses are part of the Project study area and which areas have fisheries habitat. The map provided in Appendix A does not clearly identify the Project study area. A more detailed map should be provided of the study area with watercourses labelled as well as the linkage to Ramsey Lake (where stormwater would eventually outlet).</p>	<p>Official Plan and draft TMP.</p> <ul style="list-style-type: none"> • Noise impact assessment to meet the requirements of the MTO / MOE Noise Protocol, which requires an assessment of proposed works that result in increased traffic and/or shifts traffic closer to Noise Sensitive Areas. • Air quality assessment, including air quality modelling. • A heritage review including consultation with the Ministry of Tourism, Culture and Sport. <p>Mitigation for stormwater management impacts is included in the Project File. The City has undertaken the assessment of stormwater management.</p> <p>The Project File also includes a summary of utilities along the roadway corridor and any potential relocations.</p> <p>The review of groundwater, erosion and sediment control, and management of excess material / property contamination is also included in the updated Project File.</p> <p>Section 3.0 in the Project File provides a summary of the existing environmental features. Exhibits 3-1 and 3-2 illustrate the socio-economic and natural features in the study area.</p>
<p>Alternative Solutions Step 3 and 4</p> <p>Identify the magnitude of the net positive and negative effects of each alternative solutions, identify mitigating measures.</p> <p>Evaluate all reasonable</p>	<p>An evaluation of alternatives was presented in Section 7. The screening criteria included a fulsome list of potential effects. Section 9, Potential Impacts and Mitigation Measures, did not however identify whether any impacts were expected to occur during Project operations, such as potential impacts to stormwater, source water, noise, dust and vibration. The inclusion of some of the information from Table 10-1 would benefit this discussion.</p> <p>The Project File would benefit from a statement on how the evaluation/screening criteria were developed.</p>	<p>Exhibit 4-2 in the Project File explains the screening criteria used to evaluate the alternative solutions and the weighting of criteria. Exhibit 4-3 provides a detailed qualitative assessment of the alternatives solutions, which identifies the widening of Second Avenue to five lanes as the preferred solution.</p> <p>Section 6.4 in the Project File documents the potential environmental effects and proposed mitigation measures.</p>

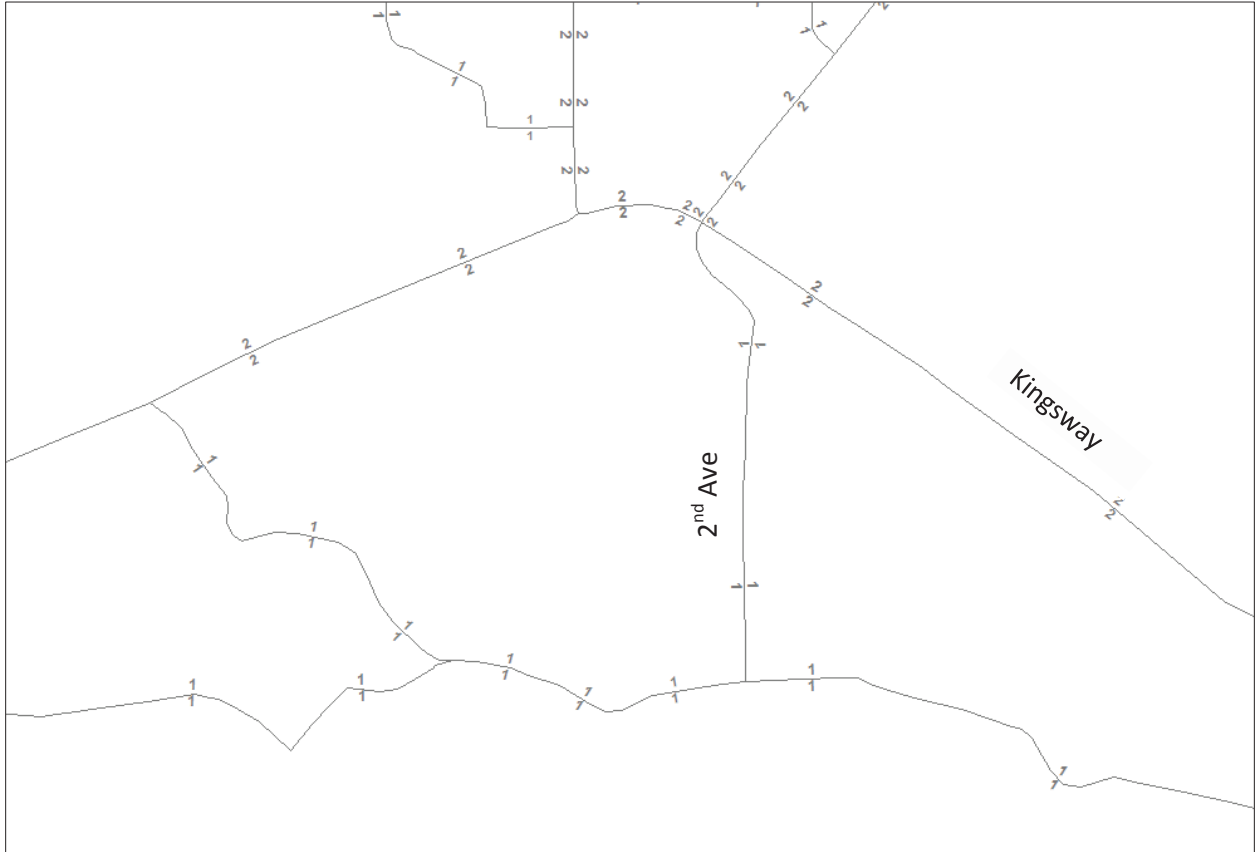
MOECC Comments – May 13 th Letter		City / MMM Response / Approach to Update Project File
Class EA Requirements	Documentation Summary and Additional Requirements	
<p>alternative solutions.</p> <p>Alternative Solutions Step 5</p> <p>Consult with the public on the preliminary preferred solution.</p> <p>Confirmation of the preferred solution.</p> <p>Section A.4.1 of the Class EA provides guidance on the contents of the Project File:</p> <p>“The Project File shall contain a complete record of all activities associated with the planning of the project and shall include:</p> <ul style="list-style-type: none"> ▶ Correspondence ▶ Copies of notices, letters, bulletins relating to public consultation ▶ Memoranda to file explaining the proponent's rationale in developing stages of the project ▶ Copies of reports prepared by consultants and others.” 	<p>Section 10 of the Project File contains information on public consultation. The notice of study commencement for the TMP and Project notices are included in the Appendices. The Public Information Centres (PICs) held for the TMP and the Project were summarized as were the public comments made at the PICs. The City documented the design changes made after the second PIC and again refer to traffic modelling analysis as supporting the preferred alternative.</p> <p>The posting of the Notice of Completion for the Project is documented as is the receipt of Part II Order requests during the initial public comment period. A summary of concerns and the City's response is contained in Table 10-1 and Section 10.5 documents meetings held with interested parties.</p> <p>Appendix E provides some consultation records such as correspondence from the Conservation Authority and Project notices.</p> <p>In order to follow the requirements outlined in Section A.4.1 of the Class EA, the City should include the following items in the Project File or Appendix E:</p> <ul style="list-style-type: none"> ▶ Minutes of meetings related to public or agency concerns ▶ Any responses to project notices received from the stakeholders listed in Section 10.6 ▶ Record of consultation with Aboriginal communities ▶ Copies of any information presented at the PICs ▶ The traffic modelling analysis references in Section 10.2 ▶ Record of any additional agency consultation (the ministry's Source Protection branch, for example, as referenced in the Conservation Authority's letter) 	<p>Section 5.0 in the Project File provides further details of the consultation process that the City undertook for TMP and the Second Avenue Municipal EA process.</p> <p>Appendix G provides relevant consultation and engagement that occurred during the Municipal Class EA, including, but not limited to:</p> <ul style="list-style-type: none"> • Newspaper notices • Study Mailing List (public and external agencies) • Letters from the public and external agencies / City's responses • PIC materials • Aboriginal / First Nations engagement / copies of letters, etc.

APPENDIX B

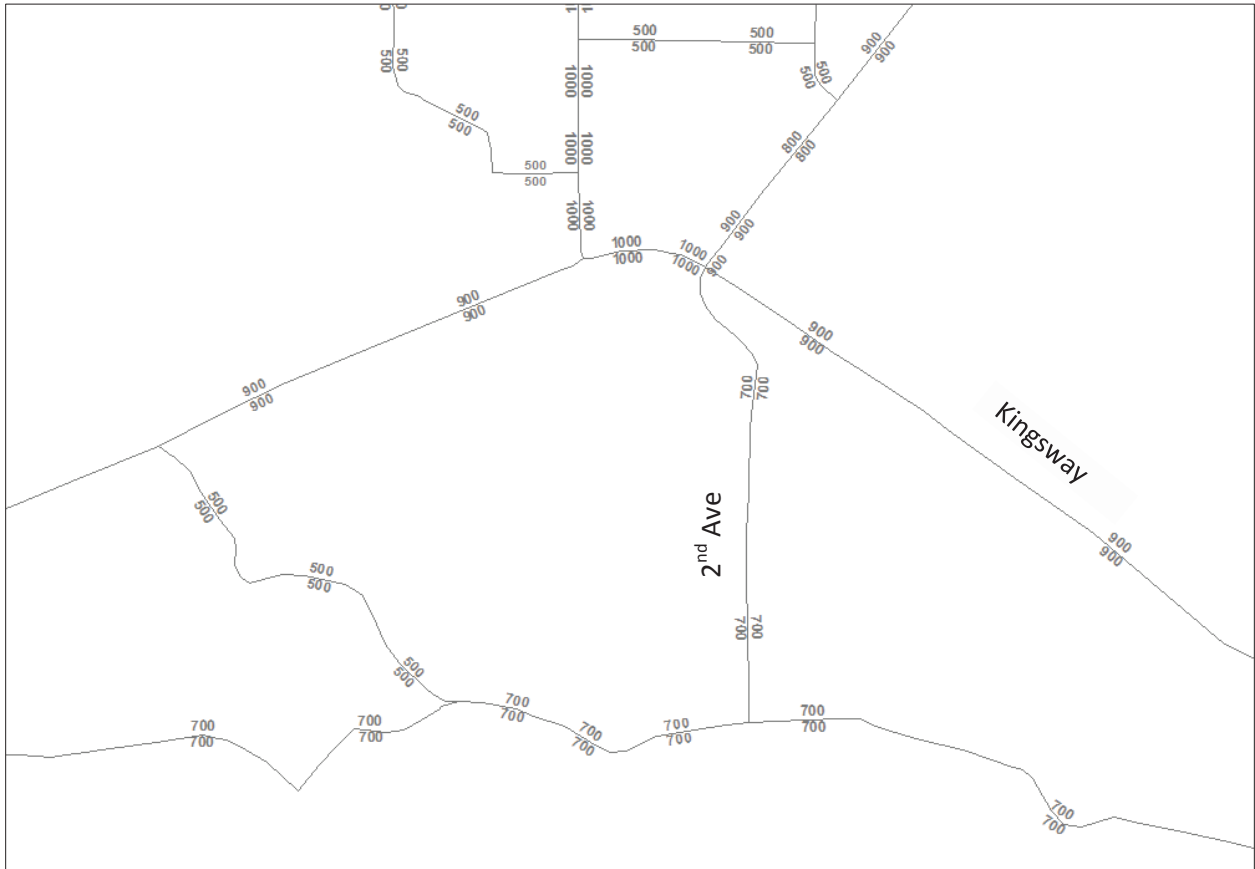
Traffic Analysis

EXISTING SCENARIO (2009)

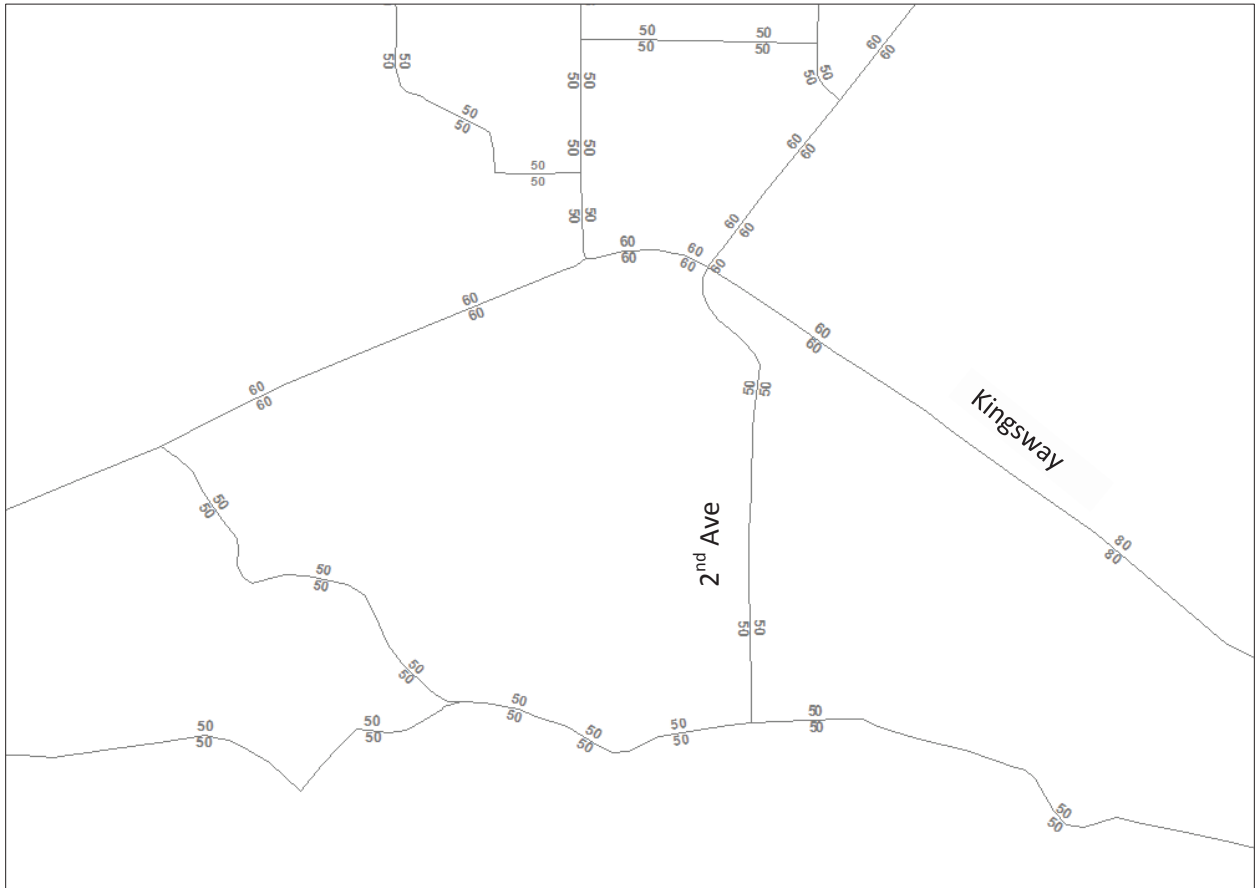
1. Number of Lanes



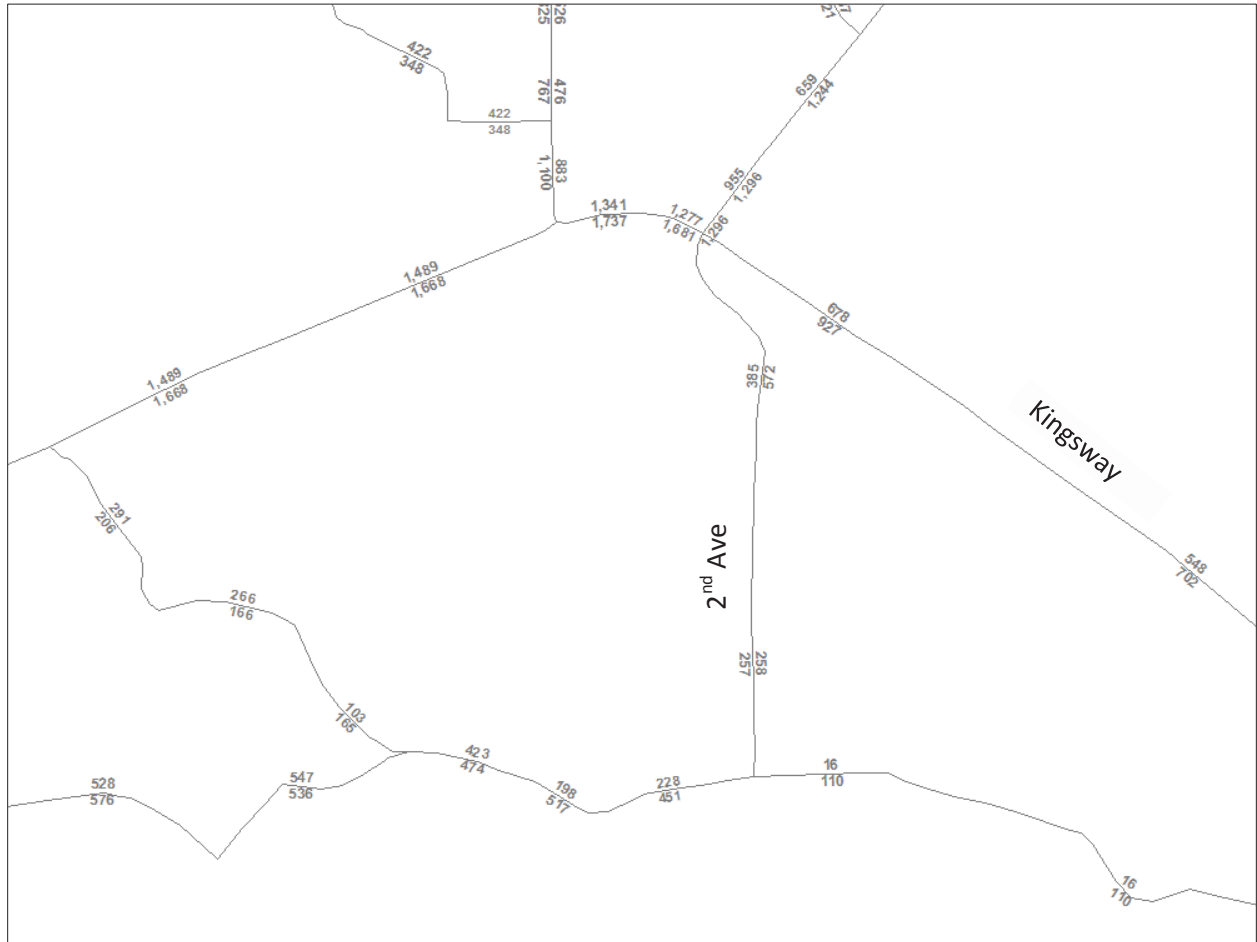
2. Capacity per Lane (Vehicles per Hour per Lane)



3. Posted Speed (Kilometres per Hour)



4. Peak Hour Volumes (Vehicles per Hour)



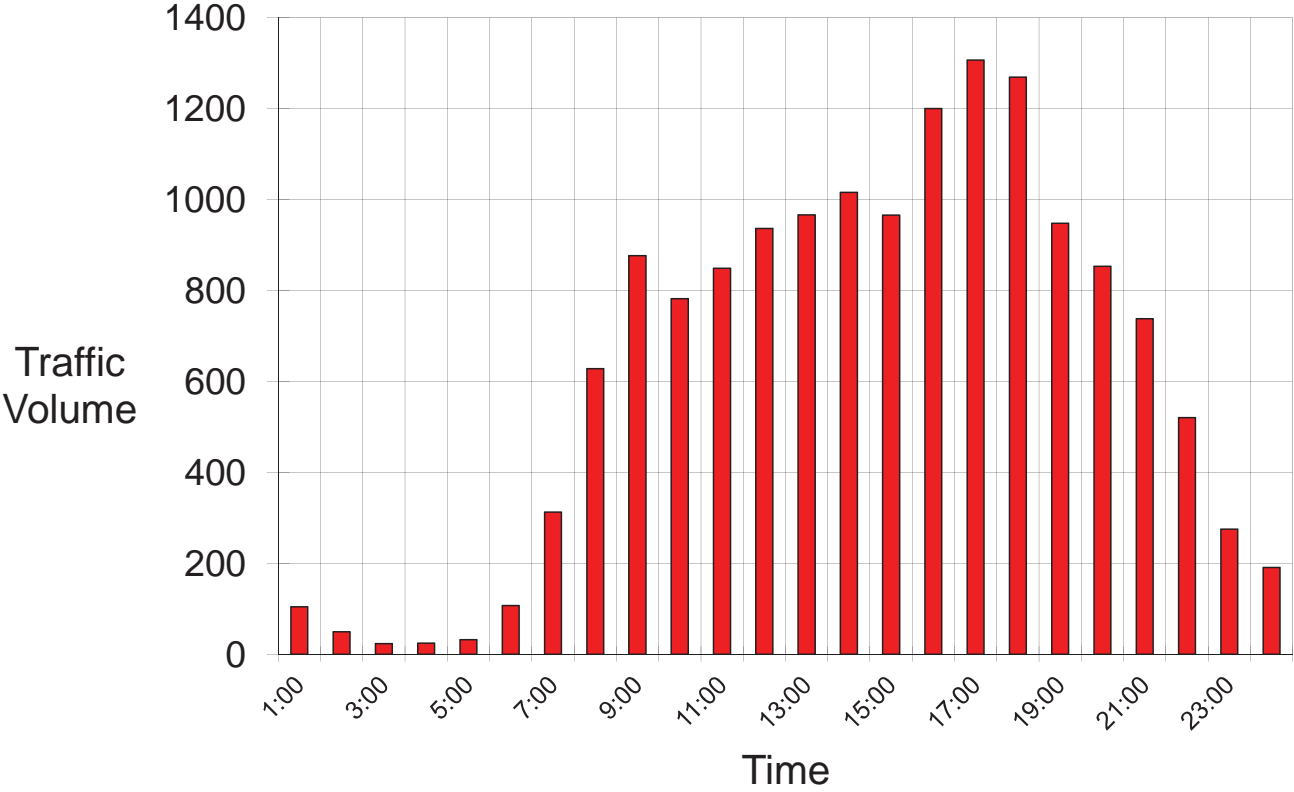
AUTOMATIC COUNTER TABULATIONS

STREET: Second Ave (Total)
LOCATION: South of Donna
COUNTER NUMBER: adr 07
YEAR: 2011
MONTH: 5
DAY: 19
TOTAL: 16777
AADT: 14972
Analyst: JT

HOUR	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOUR QUARTER		TOTAL	TOTALS FACTORED
0 to 1	50	24	24	19		117	104
1 to 2	17	21	10	7		55	49
2 to 3	6	6	8	6		26	23
3 to 4	6	11	7	3		27	24
4 to 5	4	7	17	8		36	32
5 to 6	11	19	37	53		120	107
6 to 7	55	71	99	125		350	312
7 to 8	103	143	201	257		704	628
8 to 9	243	242	250	247		982	876
9 to 10	221	184	216	255		876	782
10 to 11	217	242	237	255		951	849
11 to 12	259	229	290	271		1049	936
12 to 13	293	243	267	280		1083	967
13 to 14	288	279	275	296		1138	1016
14 to 15	229	275	302	276		1082	966
15 to 16	322	333	351	339		1345	1200
16 to 17	351	384	380	349		1464	1307
17 to 18	419	376	339	288		1422	1269
18 to 19	271	223	313	255		1062	948
19 to 20	233	245	254	224		956	853
20 to 21	207	196	200	224		827	738
21 to 22	157	174	142	110		583	520
22 to 23	94	73	72	69		308	275
23 to 24	69	52	50	43		214	191
Total	4125	4052	4341	4259		16777	14972

MONTHLY FACTOR		1.00	TOTAL COUNT	16777
DAILY FACTOR	Thur	0.91	AADT:	14972
	Fri	0.88		

Second Ave (Total) - South of Donna



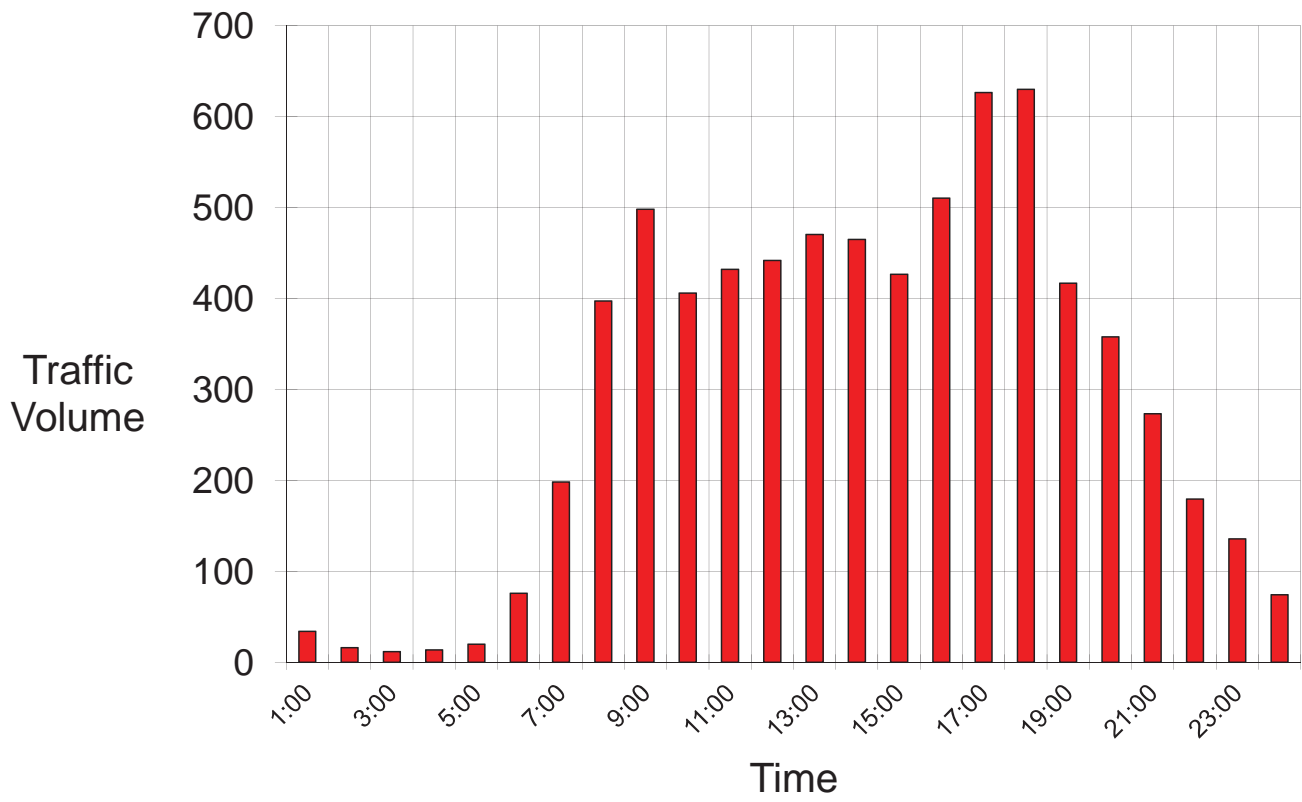
AUTOMATIC COUNTER TABULATIONS

STREET: 2 Ave - Northbound
LOCATION: Comfort Inn
COUNTER NUMBER: adr 07
YEAR: 2011
MONTH: 5
DAY: 19
TOTAL: 7966
AADT: 7109
Analyst: JT

HOUR	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOUR QUARTER		TOTAL	TOTALS FACTORED
0 to 1	20	7	7	4		38	34
1 to 2	5	6	4	3		18	16
2 to 3	3	3	3	4		13	12
3 to 4	2	5	5	3		15	13
4 to 5	3	4	11	4		22	20
5 to 6	6	12	31	36		85	76
6 to 7	37	43	55	87		222	198
7 to 8	66	93	134	152		445	397
8 to 9	146	121	148	143		558	498
9 to 10	117	94	125	119		455	406
10 to 11	131	112	122	119		484	432
11 to 12	134	105	135	121		495	442
12 to 13	136	109	132	150		527	470
13 to 14	150	122	121	128		521	465
14 to 15	109	125	126	118		478	427
15 to 16	148	129	152	143		572	510
16 to 17	139	208	178	177		702	626
17 to 18	203	185	182	136		706	630
18 to 19	113	102	133	119		467	417
19 to 20	102	103	112	84		401	358
20 to 21	88	77	62	79		306	273
21 to 22	63	55	43	40		201	179
22 to 23	55	28	40	29		152	136
23 to 24	26	27	17	13		83	74
Total	2002	1875	2078	2011		7966	7109

MONTHLY FACTOR 1.00 **TOTAL COUNT** 7966
DAILY FACTOR Thur 0.91 **AADT:** 7109
 Fri 0.88

2 Ave - Northbound



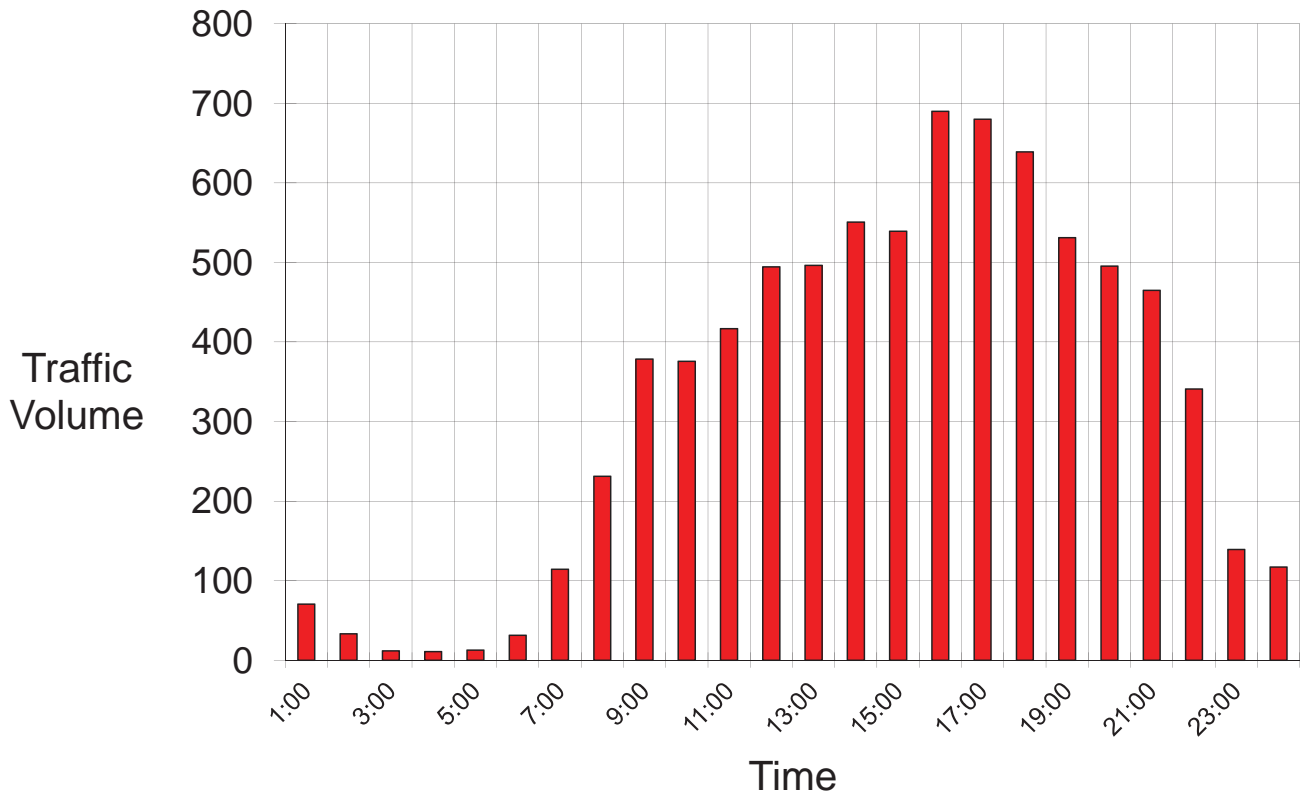
AUTOMATIC COUNTER TABULATIONS

STREET: 2 Ave - Southbound
LOCATION: South of Donna
COUNTER NUMBER: adr 11
YEAR: 2011
MONTH: 5
DAY: 19
TOTAL: 8811
AADT: 7863
Analyst: JT

HOUR	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOUR QUARTER	TOTAL	TOTALS FACTORED
0 to 1	30	17	17	15	79	71
1 to 2	12	15	6	4	37	33
2 to 3	3	3	5	2	13	12
3 to 4	4	6	2	0	12	11
4 to 5	1	3	6	4	14	12
5 to 6	5	7	6	17	35	31
6 to 7	18	28	44	38	128	114
7 to 8	37	50	67	105	259	231
8 to 9	97	121	102	104	424	378
9 to 10	104	90	91	136	421	376
10 to 11	86	130	115	136	467	417
11 to 12	125	124	155	150	554	494
12 to 13	157	134	135	130	556	496
13 to 14	138	157	154	168	617	551
14 to 15	120	150	176	158	604	539
15 to 16	174	204	199	196	773	690
16 to 17	212	176	202	172	762	680
17 to 18	216	191	157	152	716	639
18 to 19	158	121	180	136	595	531
19 to 20	131	142	142	140	555	495
20 to 21	119	119	138	145	521	465
21 to 22	94	119	99	70	382	341
22 to 23	39	45	32	40	156	139
23 to 24	43	25	33	30	131	117
Total	2123	2177	2263	2248	8811	7863

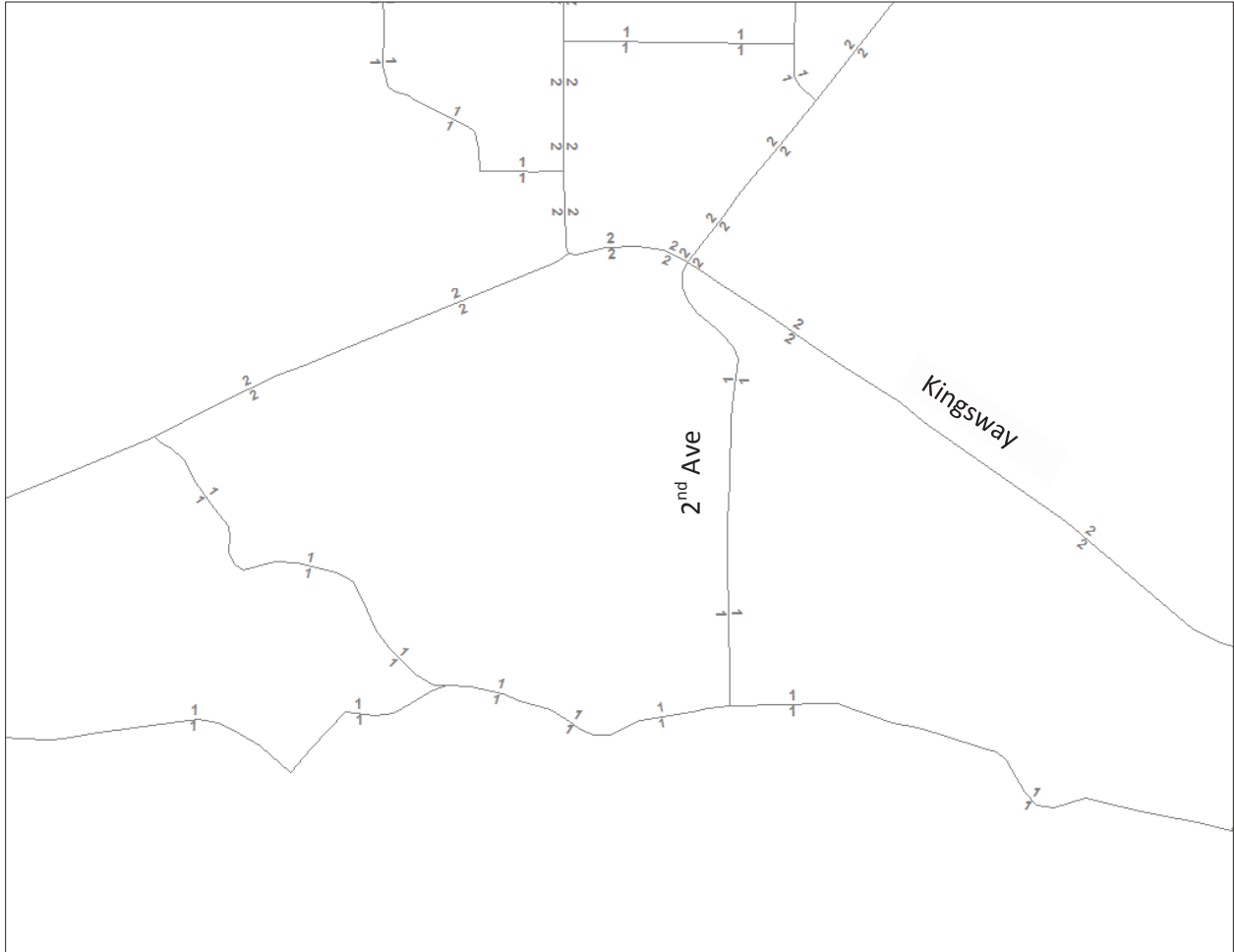
MONTHLY FACTOR 1.00 **TOTAL COUNT** 8811
DAILY FACTOR Thur 0.91 **AADT:** 7863
 Fri 0.88

2 Ave - Southbound - South of Donna

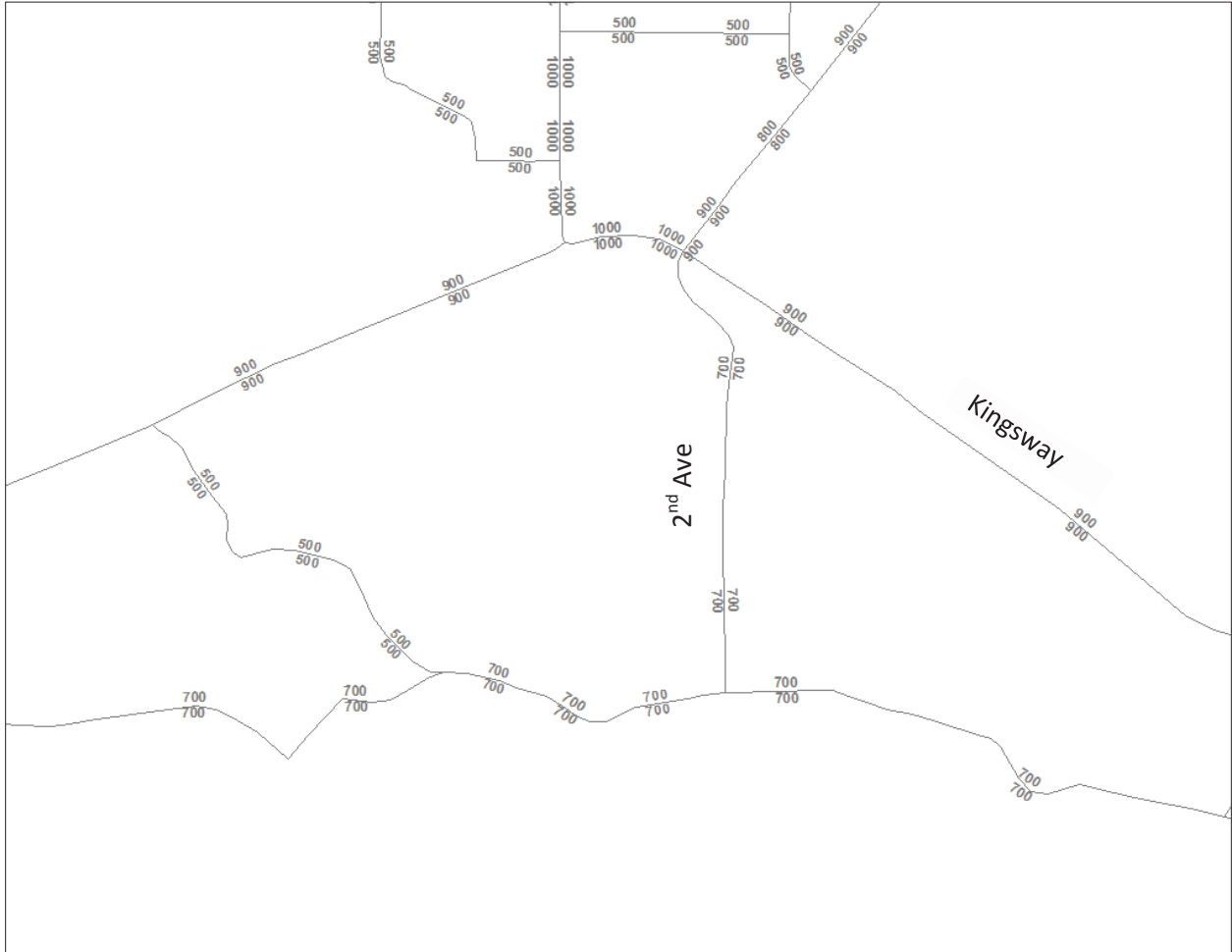


DO NOTHING SCENARIO (2031)

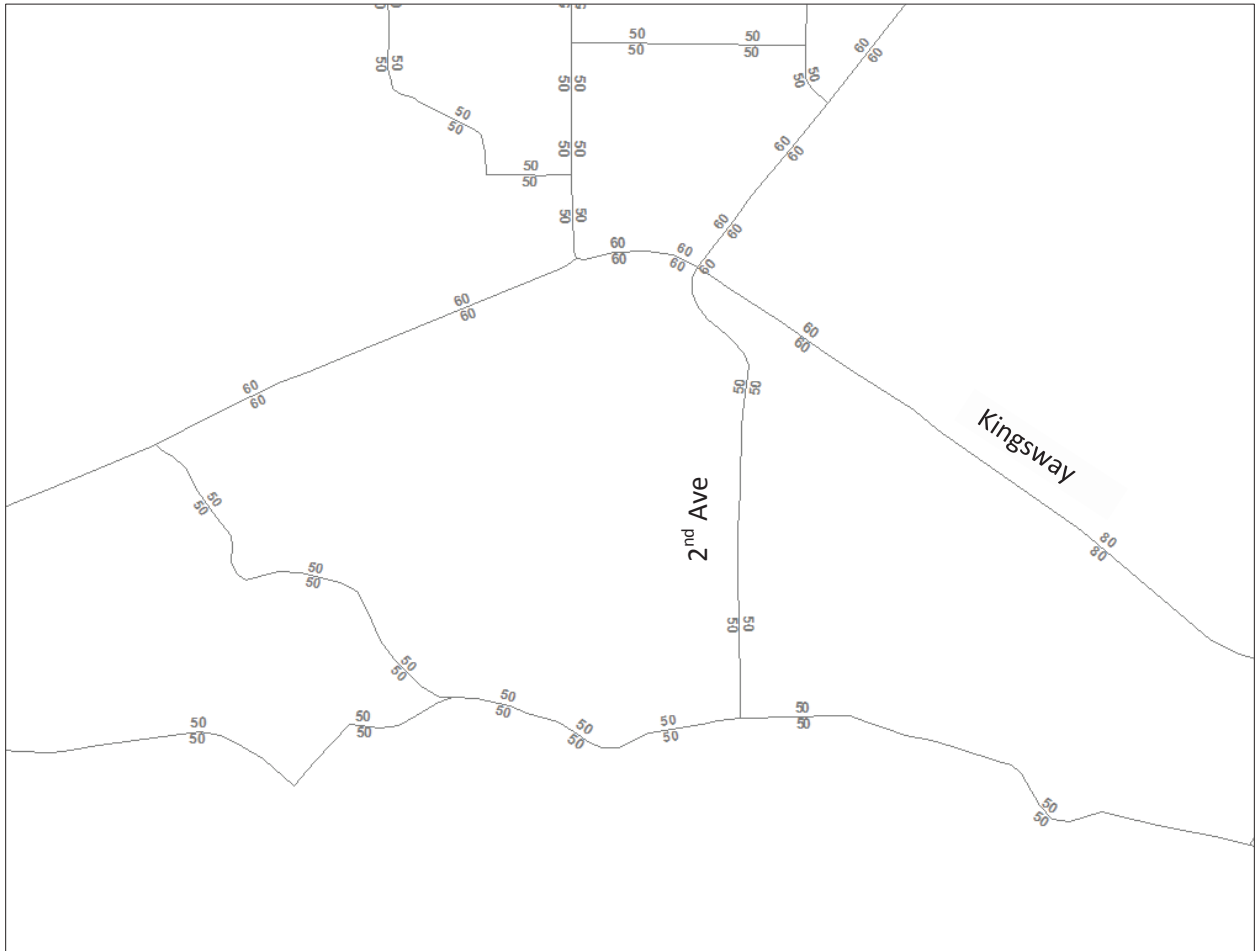
1. Number of Lanes



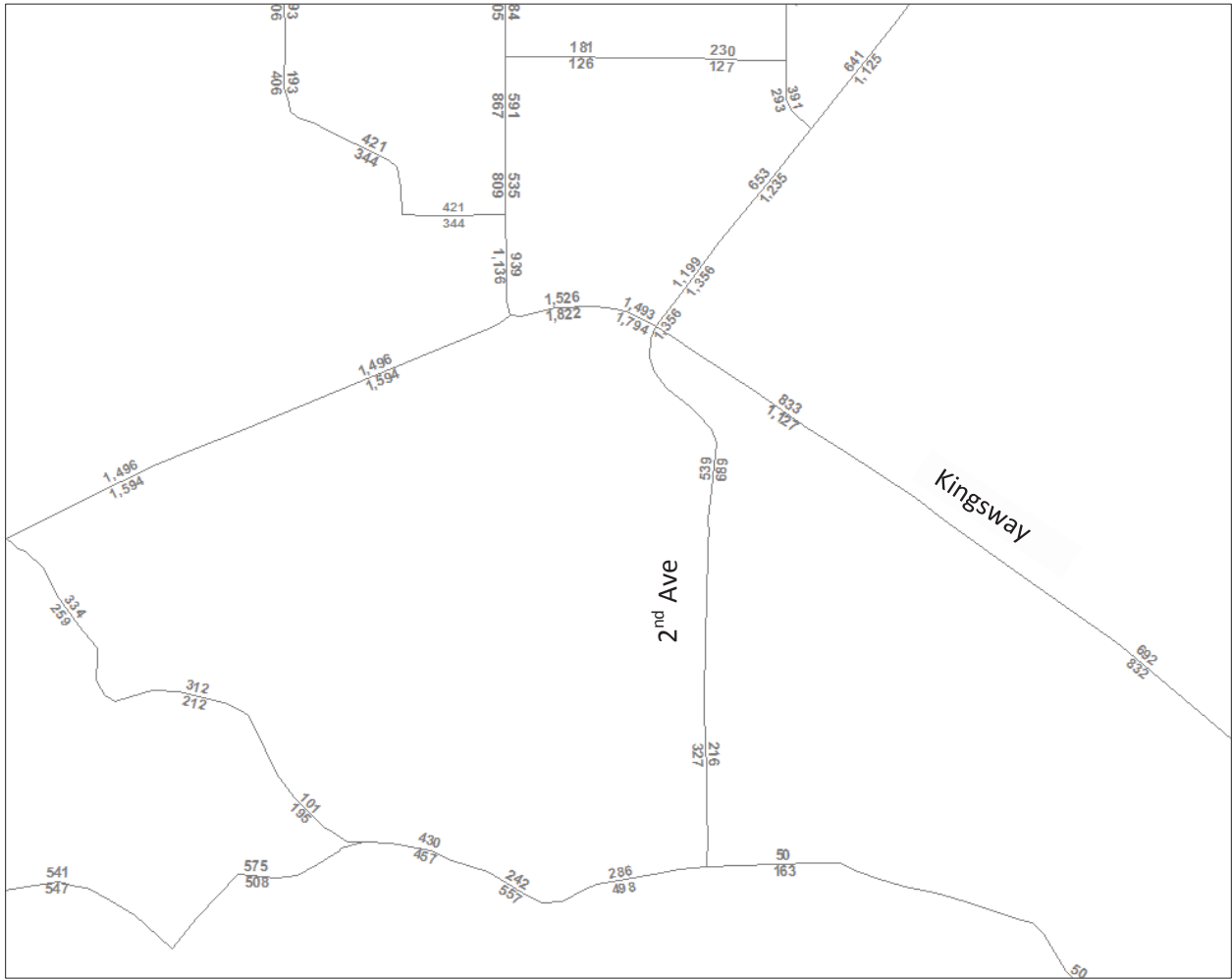
2. Capacity per lane (Vehicles per Hour per Lane)



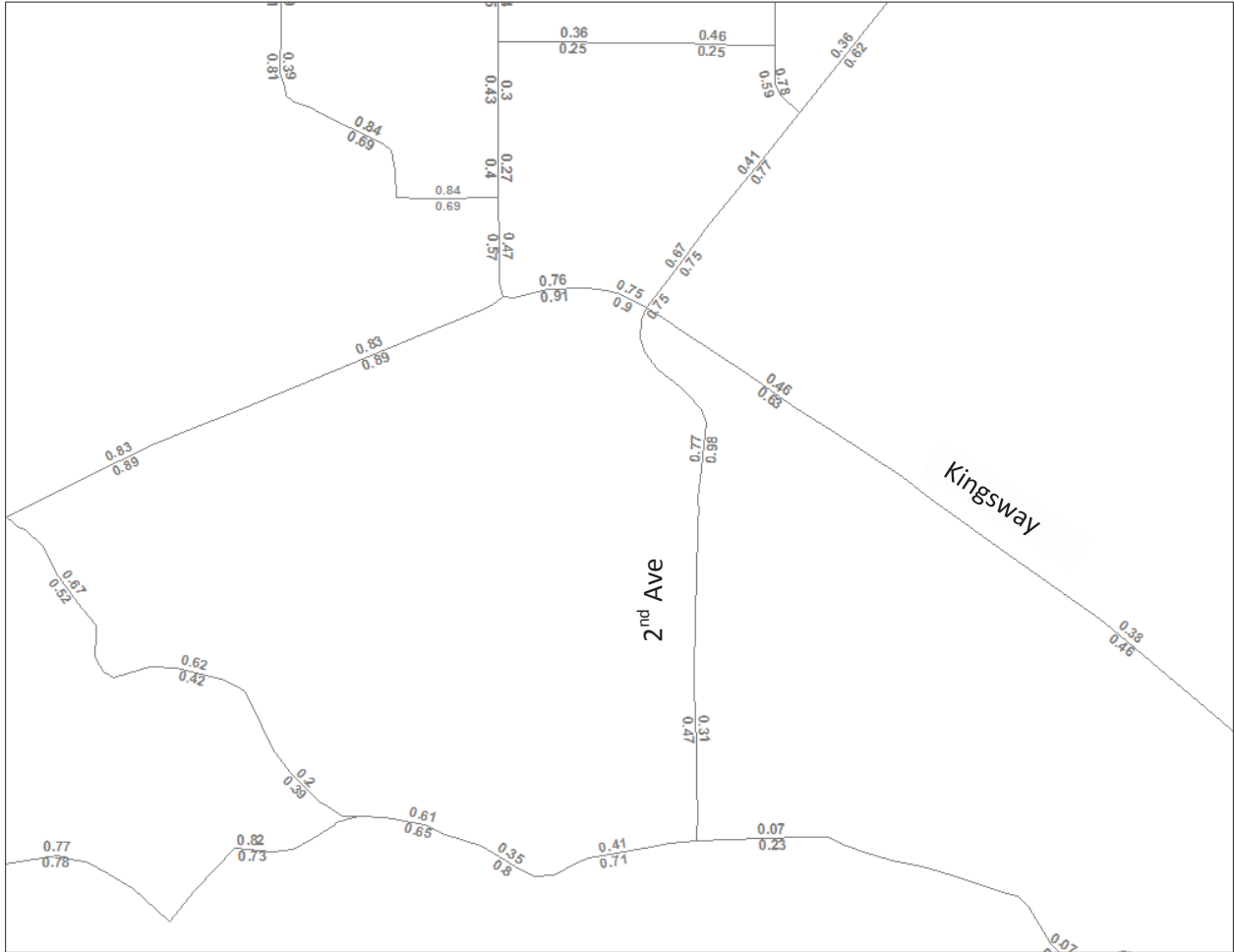
3. Posted speed (Kilometres per Hour)



4. Peak Hour Volumes (Vehicles per Hour)

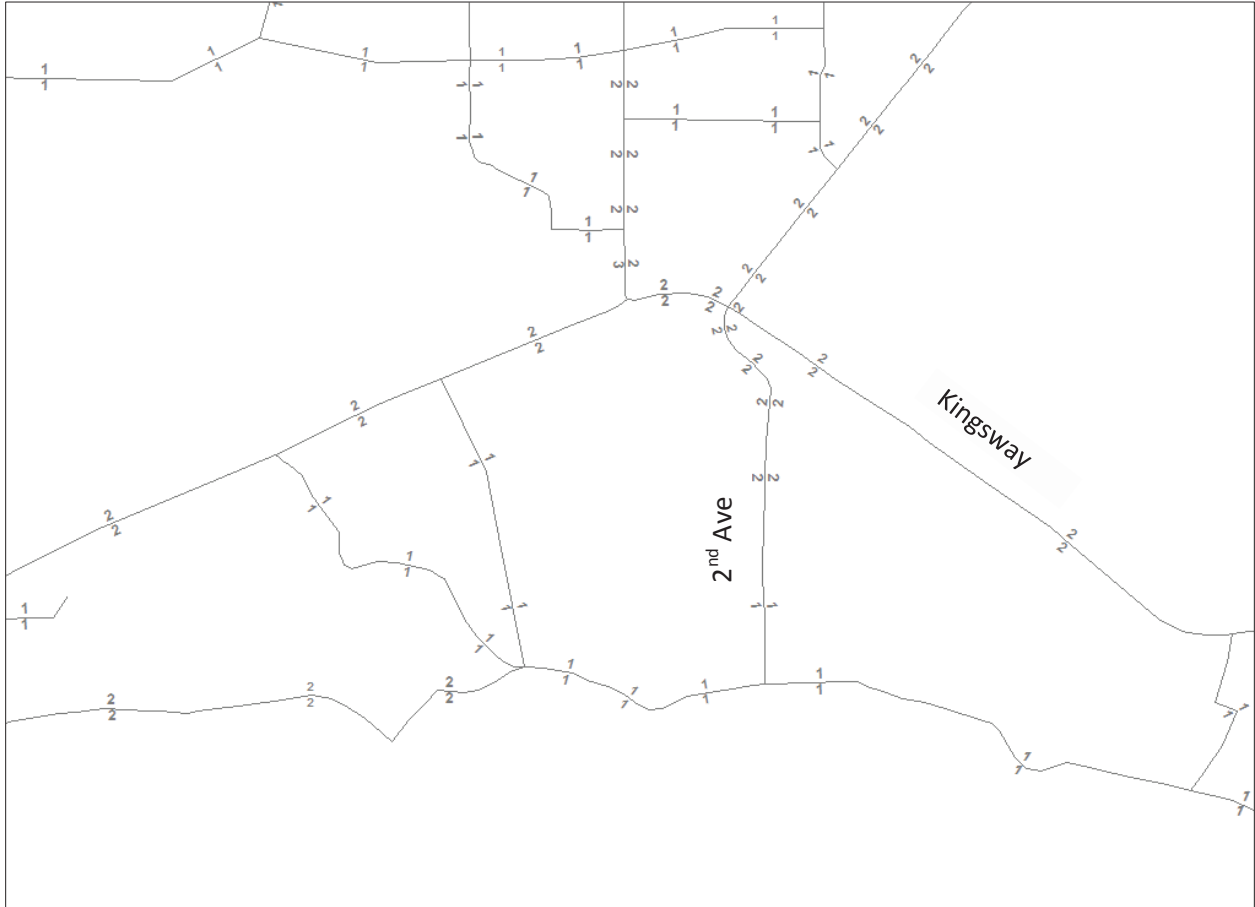


5. Volume to Capacity Ratios

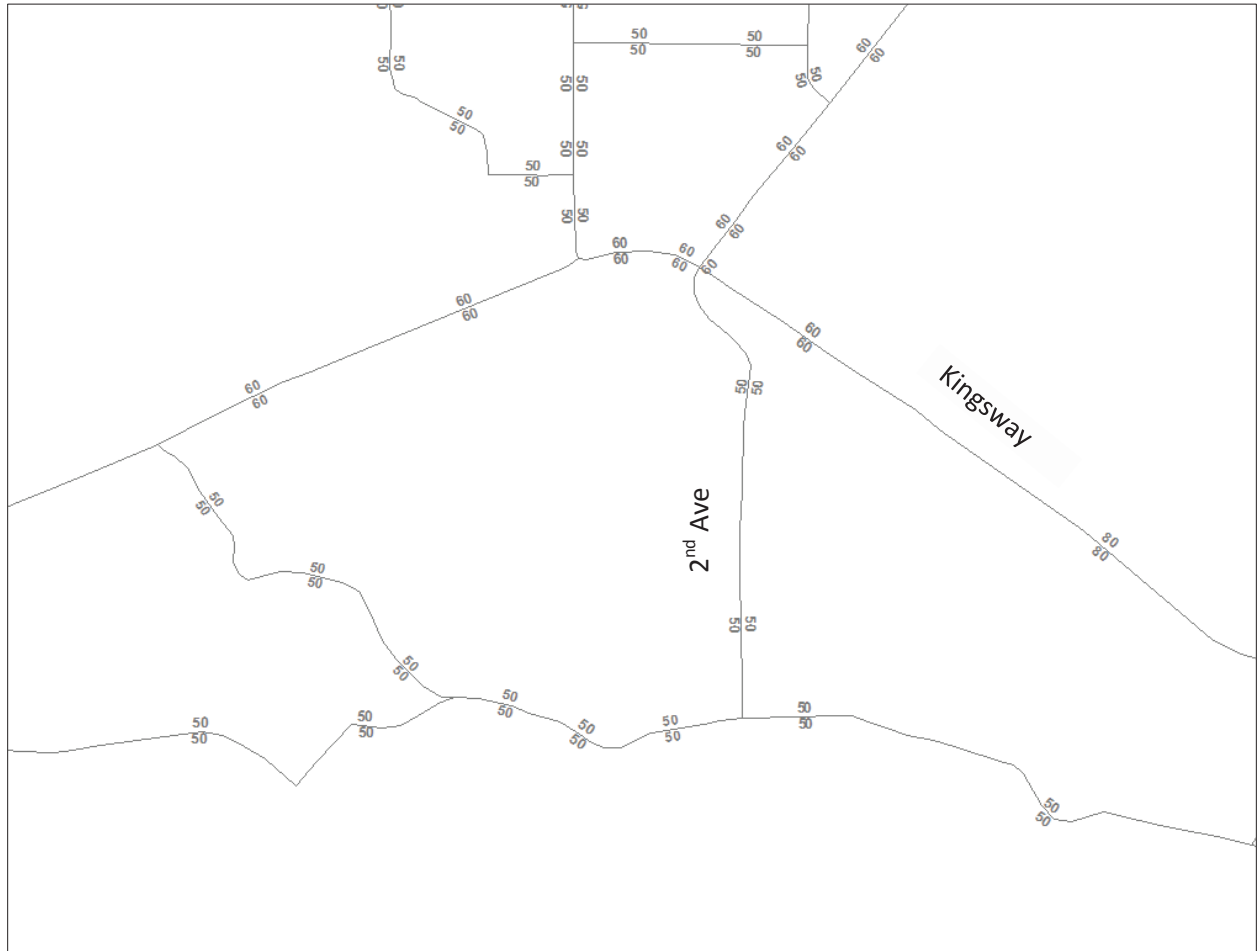


AUTO FOCUSED SCENARIO (2031)

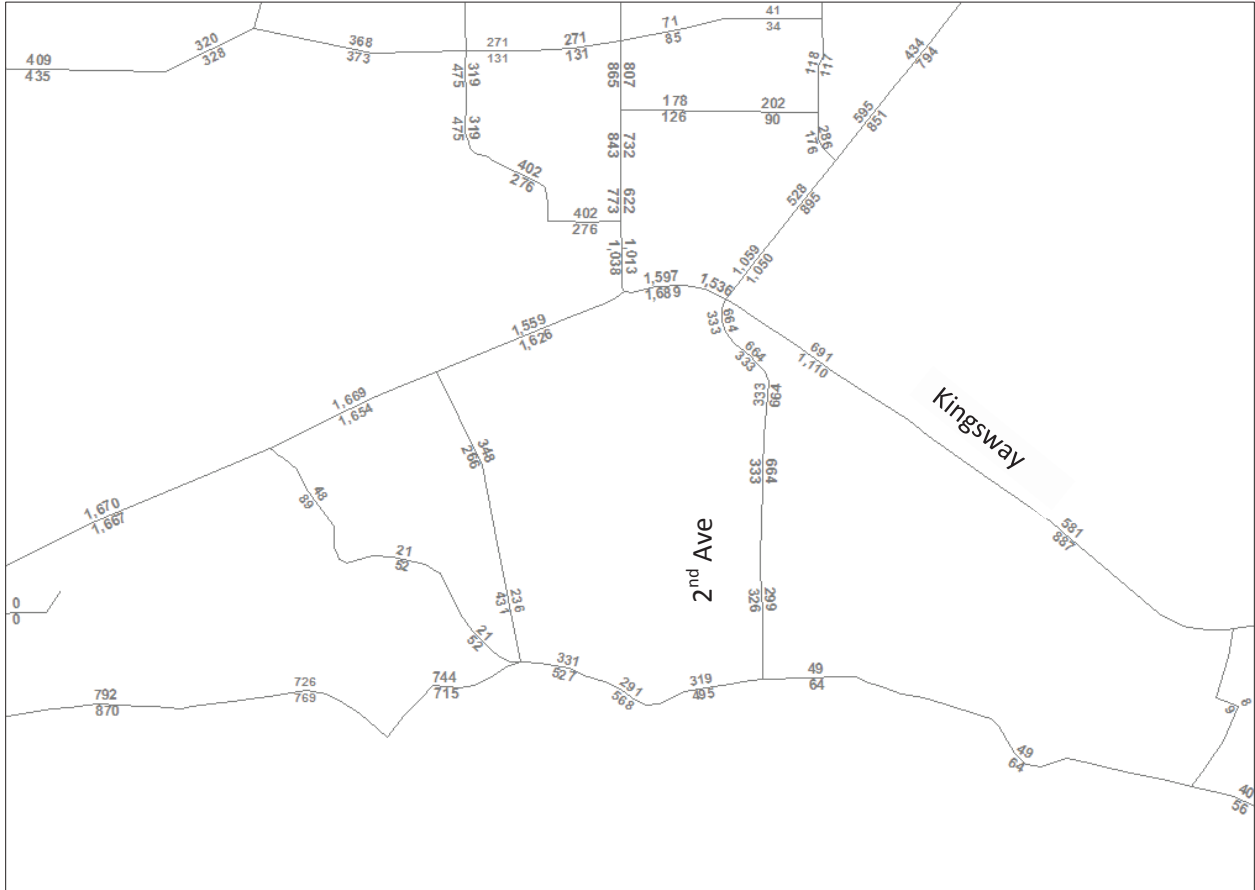
1. Number of Lanes



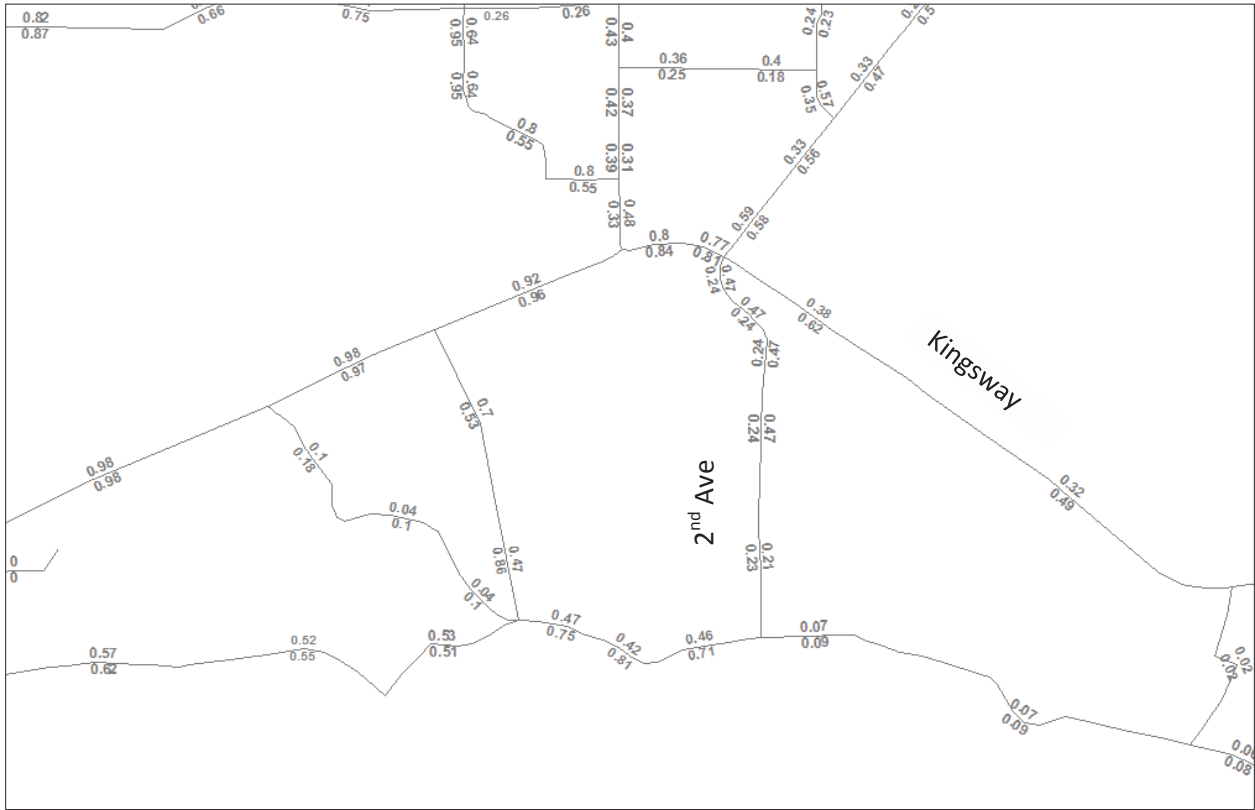
3. Posted speed (Kilometres per Hour)



4. Peak Hour Volumes (Vehicles per Hour)

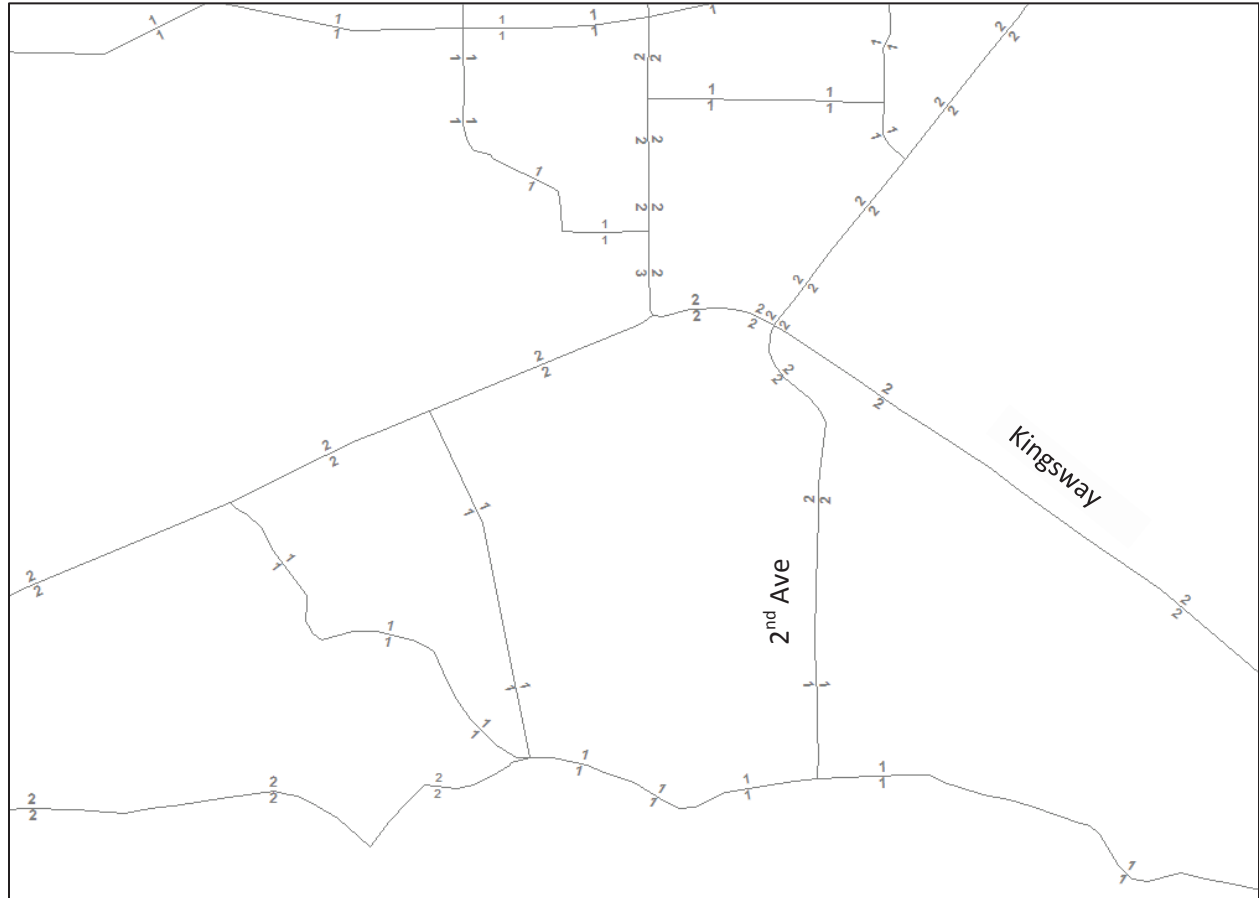


5. Volume to Capacity Ratios

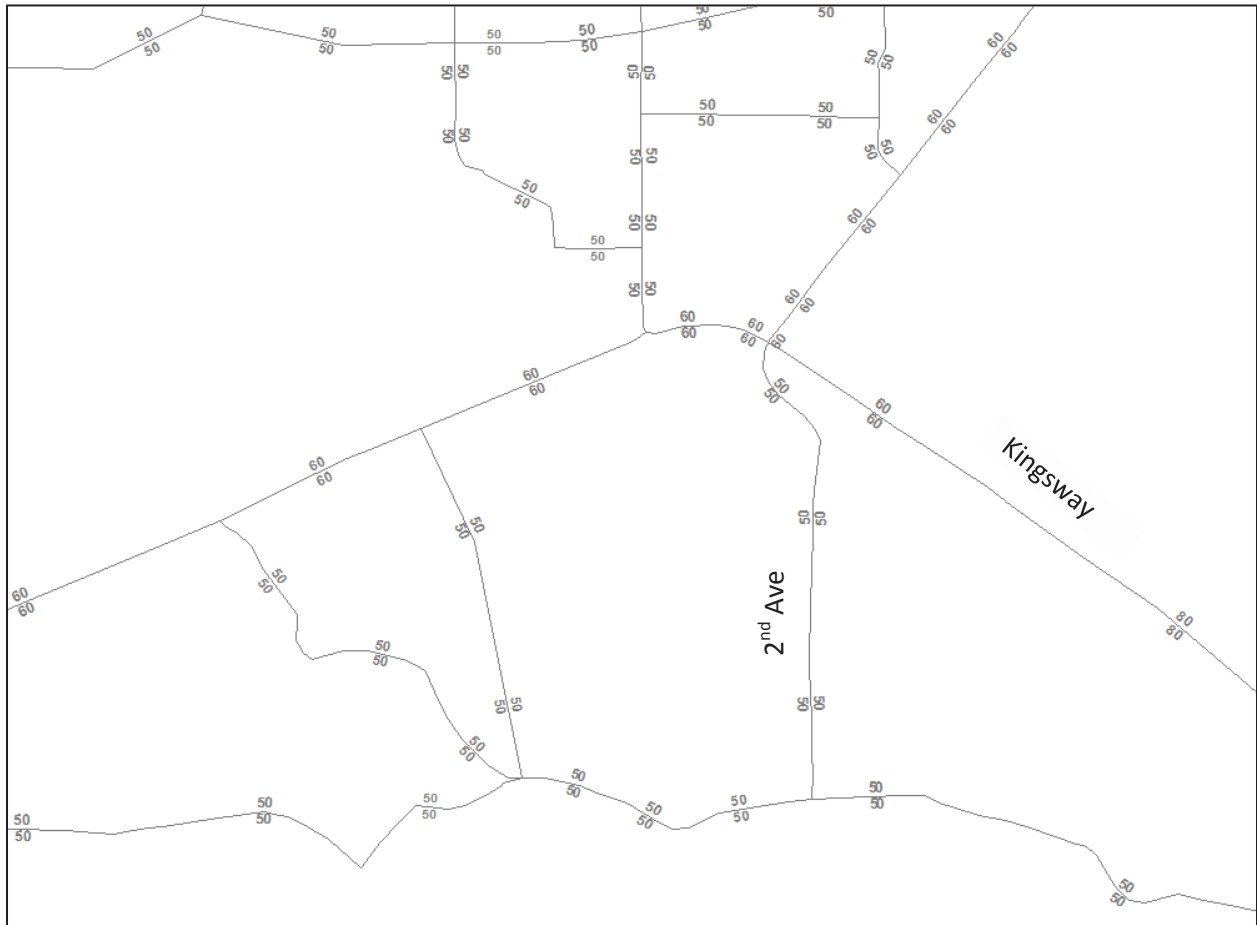


SUSTAINABILITY FOCUSED SCENARIO (2031)

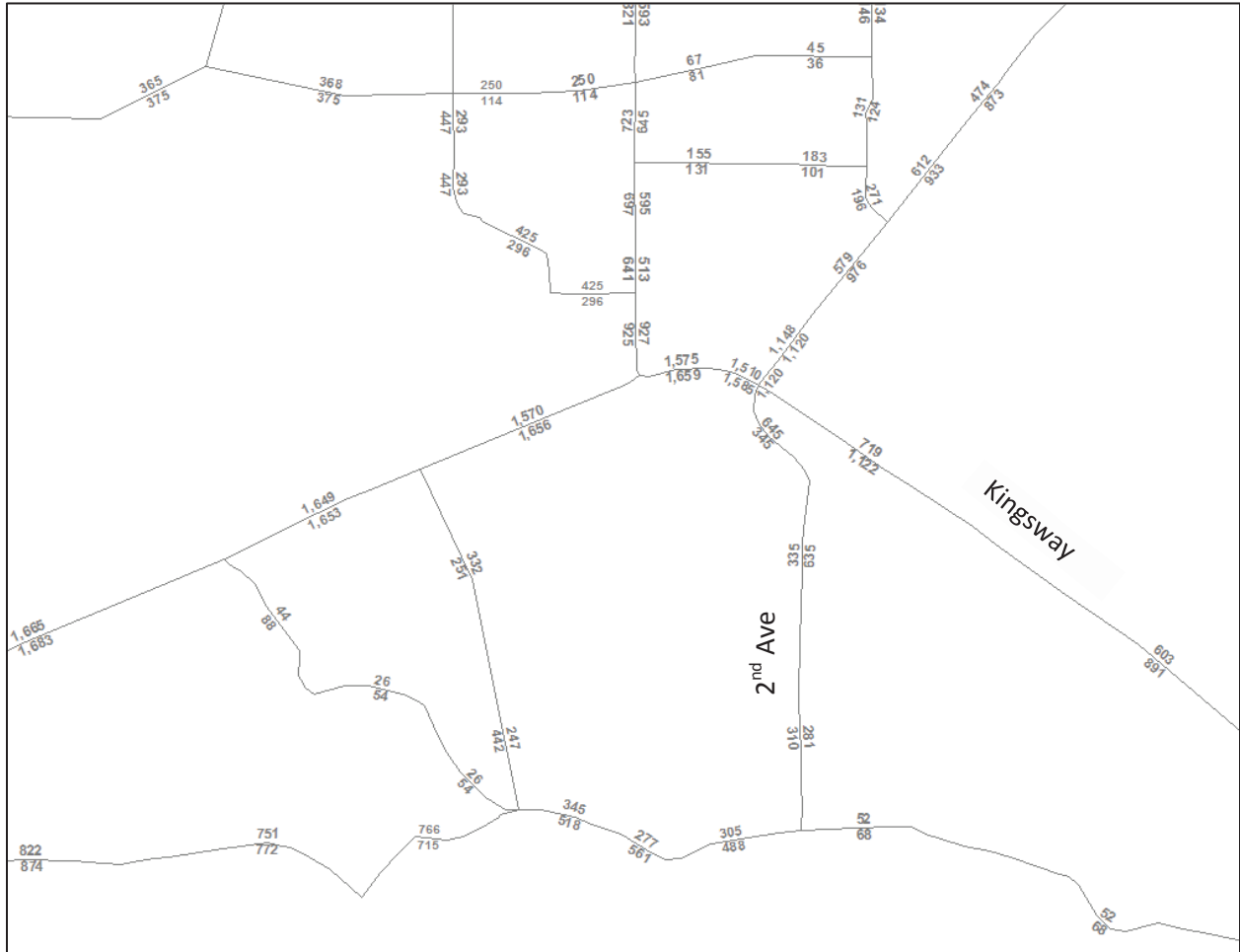
1. Number of Lanes



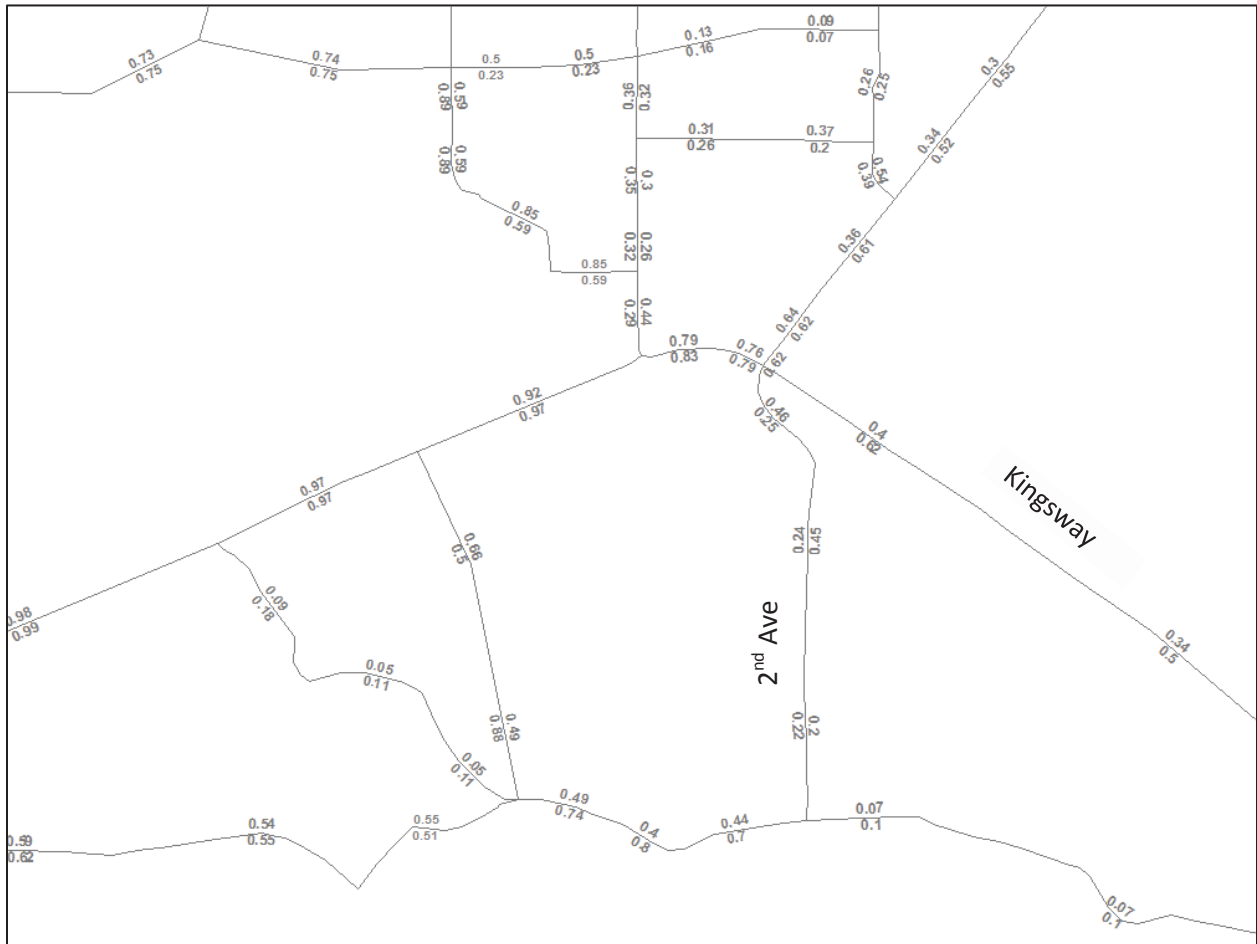
3. Posted Speed (Kilometres per Hour)



4. Peak Hour Volumes (Vehicles per Hour)

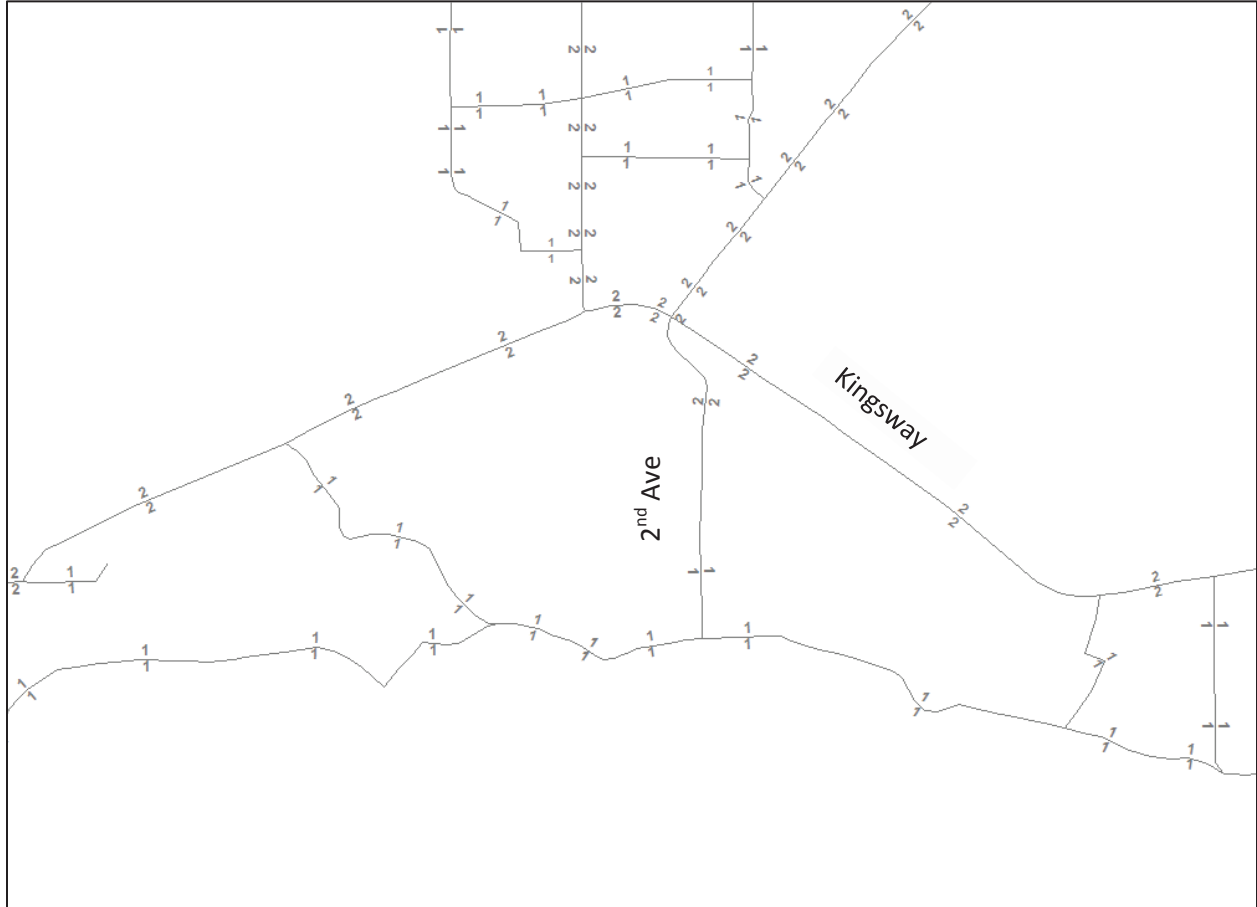


5. Volume to Capacity Ratios

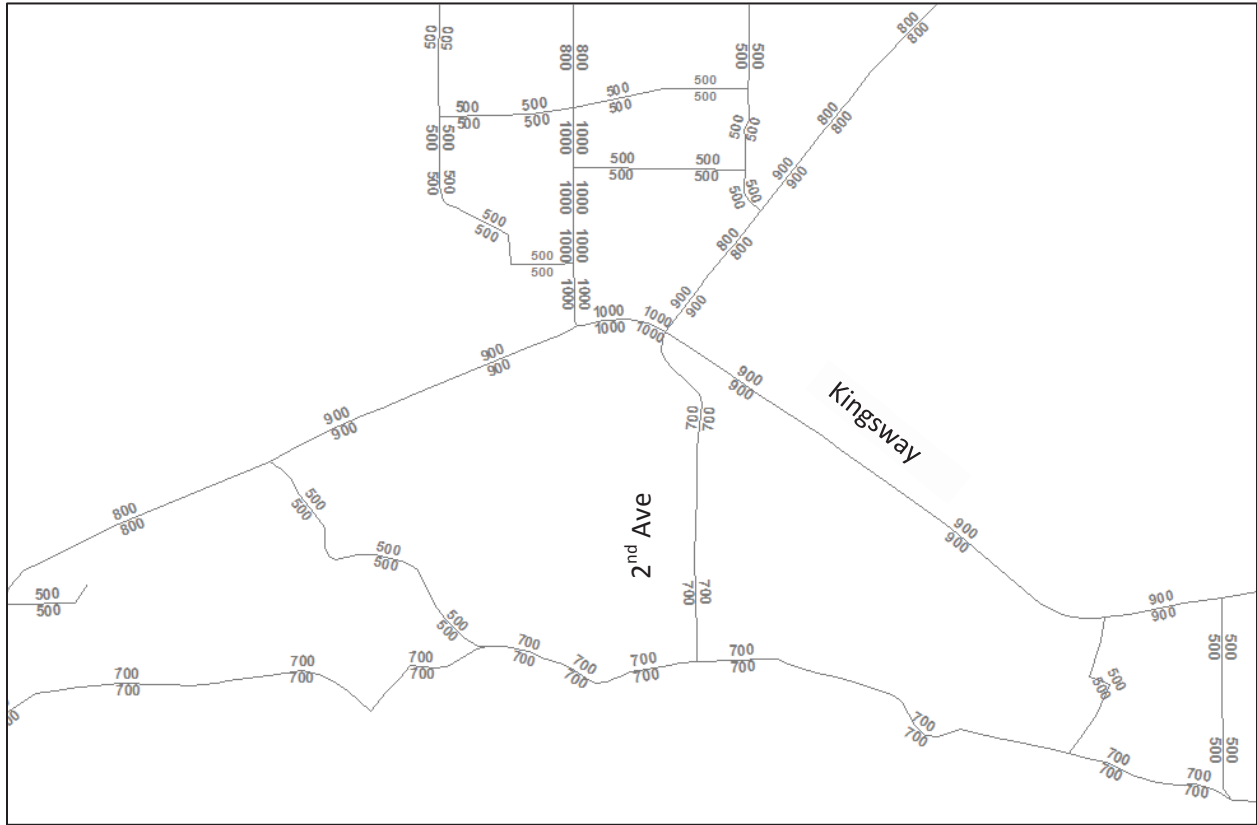


WIDENING SECOND AVENUE ONLY (2031)

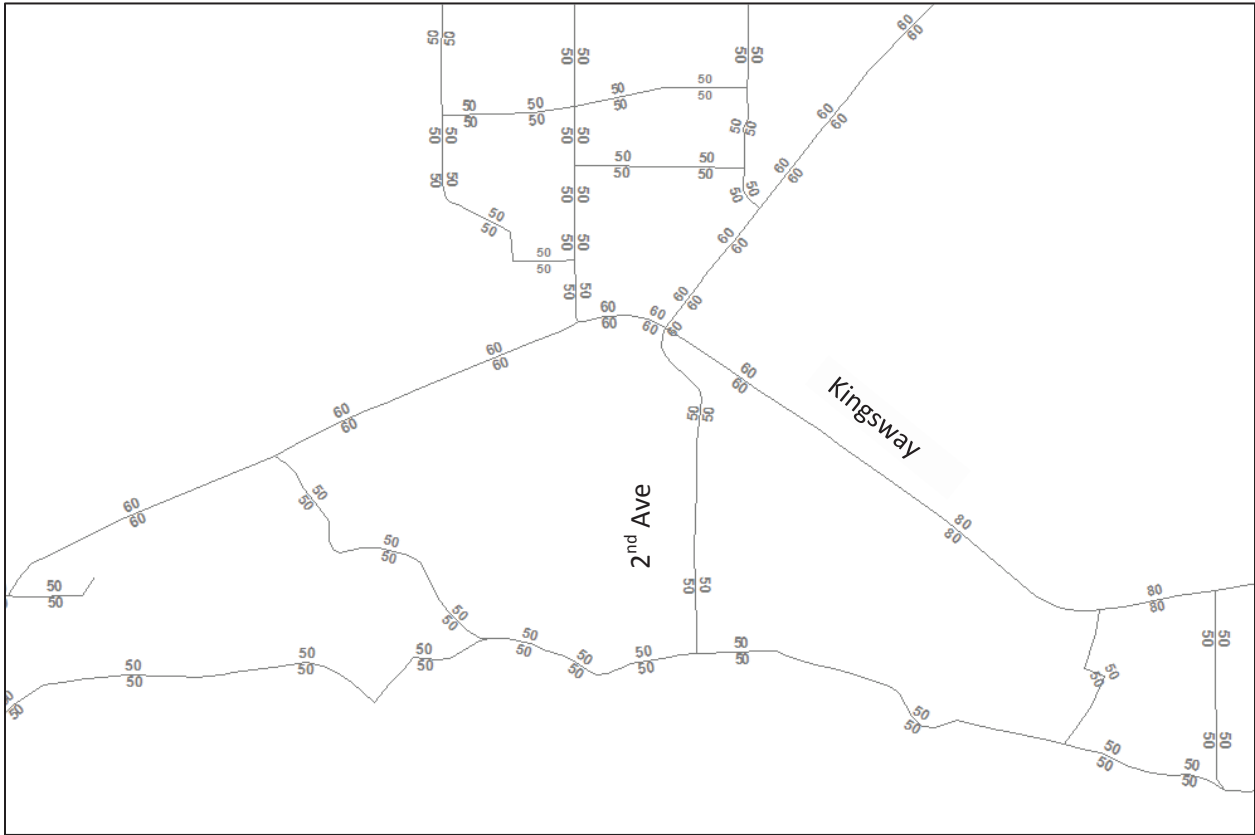
1. Number of Lanes



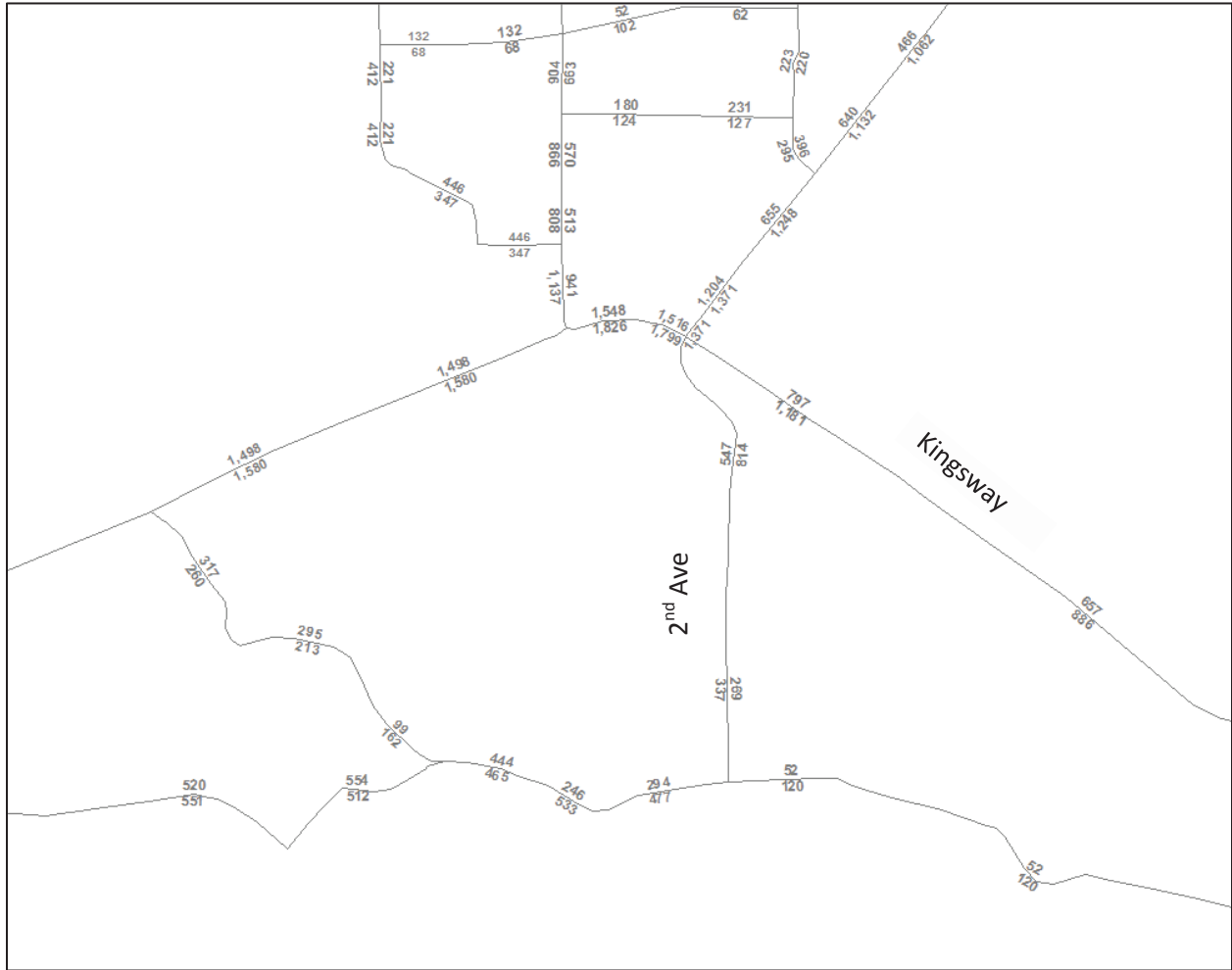
2. Capacity per Lane (Vehicles per Hour per Lane)



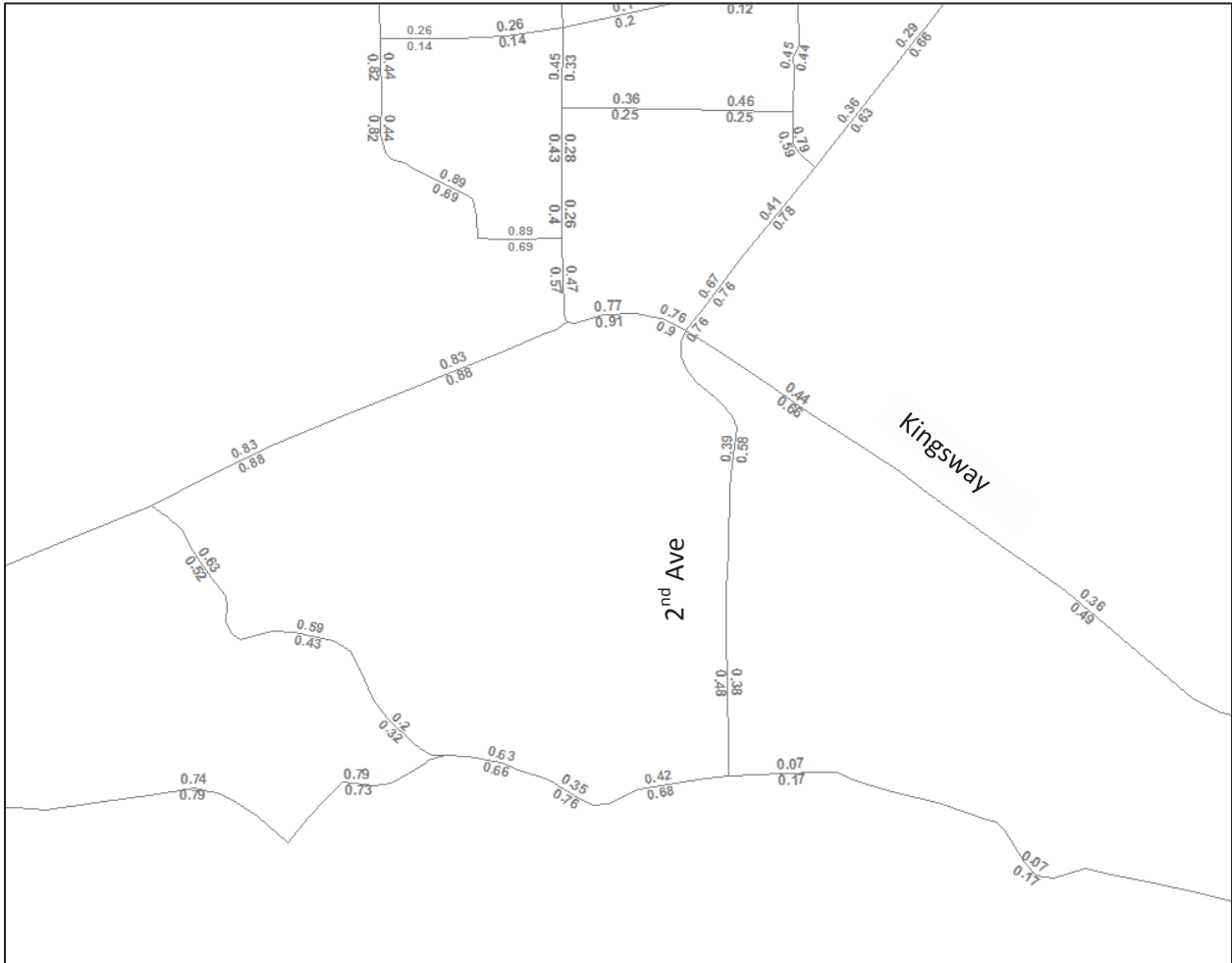
3. Posted Speed (Kilometres per Hour)



4. Peak Hour Volumes (Vehicles per Hour)



5. Volume to Capacity Ratios





Comparative Analysis: Roundabout vs. Signalized Intersection

Second Avenue at Scarlett Road

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Background Information

The City of Greater Sudbury (City) is currently undertaking a Transportation Master Plan that identified the need to widen Second Avenue between Scarlett Road and Donna Drive. The City then scheduled a reconstruction and widening of Second Avenue from Donna Drive to Kenwood Street for the 2014 construction season (see Figure 1). The limits of the project have since been extended south to First Avenue to address drainage and cycling infrastructure connectivity issues that were identified during detailed design. As part of the reconstruction, a traffic signal warrant analysis indicated that a signalized intersection be built at Second Avenue and Scarlett Road. Part of the signalization of this intersection would include combining the entrance to the Civic Memorial Cemetery and the Minnow Lake Dog Park and aligning this new entrance across from Scarlett Road. The City considered the construction of a roundabout at this location, and formalized the process with this report. The City does not have a formal process for reviewing traffic control options for intersections prior to detailed design.



Figure 1- Project Location

Description of Alternatives

The City of Greater Sudbury's Transportation Master Plan has identified the need to widen Second Avenue based on projected traffic volumes. The scheduled capital project proposes to widen Second Avenue to a five lane cross section (two thru lanes for northbound (NB) traffic, two thru lanes for southbound (SB) traffic and a centre two way turning lane). In addition, it is proposed that the entrance to the Civic Memorial Cemetery and the Minnow Lake Dog Park be combined into one entrance that is aligned with Scarlett Road. The intersection control alternatives were developed based on these proposals.

Signalized Intersection

The proposed signalized intersection configuration is as follows:

- Second Avenue SB Approach – one right-turn (RT) lane, two thru lanes, one left-turn (LT) lane
- Second Avenue NB Approach – one thru lane, one shared thru/RT lane, one LT lane
- Scarlett Road Westbound (WB) Approach - one shared thru/RT lane, one LT lane
- Cemetery/Dog Park Entrance Eastbound (EB) Approach - one shared thru/RT lane, one LT lane

Roundabout

The proposed roundabout configuration allows for two lane approaches for the NB and SB legs and one lane approaches for the EB and WB legs. Due to the two lane approaches for Second Avenue, the roundabout requires a two lane configuration. The *National Cooperative Highway Research Program (NCHRP) Report 672 – Roundabouts: An Information Guide – Second Edition* indicates that the typical inscribed circle diameter for a multilane roundabout ranges from 46 m to 91 m. A conceptual design indicates a roundabout with a 55m ICD (Waterloo guidelines) will function at this intersection with 9.1 m road width.

Intersection Capacity

Capacity analysis for 2031 traffic volumes was completed in Synchro for the signalized intersection and Sidra Intersection for the roundabout. The results of these analyses are presented in the main body of the Project File. The results indicate that each type of intersection traffic control will operate at a high level of service at the projected 2031 traffic volumes.

Right-of-Way Requirements

Signalized Intersection

The proposed signalized intersection configuration can be accommodated within existing 30 m wide right-of-way limits. No additional property would be required, nor would access to the commercial strip mall located in the southeast corner of the site be affected.

Roundabout

A roundabout with a 55 m ICD cannot be accommodated within the existing right-of-way limits. The location of the roundabout is further restricted due to the strip mall in the southeast corner of the intersection. It will be extremely difficult to acquire additional property from this site without severely impacting the parking lot and access. To avoid this property restriction and potential expense in expropriation, the centre of the intersection will have to be shifted approximately 15 to 20 metres west. This will require horizontal curves be added both north and south of the intersection to properly align the NB and SB approaches, requiring approximately 30 m of additional road length. Additional property will be required to realign Second Avenue. In addition, the internal roads to the cemetery and dog park will need to be realigned to provide a safe approach to the roundabout, further impacting the property.

While the property being impacted to the west is owned by the City, it is the City's only cemetery with available room for burials. The City recently went through a property expropriation process to acquire additional lands to the south to expand the cemetery. Any use of these lands will impact the available capacity and shorten the expected life of the cemetery. The appraised cost of these lands is estimated at approximately \$200,000.

Costs

Typically, the construction costs for pavement, grading, drainage, and associated works are similar for both types of intersection traffic control. In terms of the roundabout, there will be additional costs associated with the realignment of the Second Avenue and the internal roads for the cemetery and dog park. The additional construction cost for a roundabout in comparison to a signalized intersection for the road portion only is estimated at \$400,000. This does not include an allowance for the internal cemetery and dog park road realignment, work within the center of the roundabout, or the restoration and grading of the impacted area. Additional costs are also anticipated for temporary traffic staging during construction, as Second Avenue will have to remain open to traffic. Without a detailed design, the estimated additional cost of the roundabout will likely be in excess of \$500,000.

The estimated cost for the traffic signal plant is \$200,000. Annual maintenance costs for a signalized intersection are between \$4,000 and \$5,000. It is expected that annual maintenance costs for a roundabout will be limited to maintaining landscaping features and the additional asphalt surface.

Including the cost for the property impact above, it is estimated that the roundabout will cost approximately \$500,000 more than the signalized intersection.

Safety

Pedestrian Safety

The design characteristics at a roundabout encourage pedestrian safety and visibility. The crosswalk is located one car-length behind the yield line at the entrance to the circulatory roadway. This allows the driver to address one conflict at a time: first, the pedestrian crosswalk, and second, identifying a gap in the circulatory roadway to enter the roundabout itself. The same is true at the roundabout exit: the driver first identifies his exit and leaves the circulatory roadway, and then identifies and addresses the pedestrian crosswalk. The crosswalk is properly signed and marked for the approaching vehicle. Proper lighting of the crosswalk also ensures that pedestrians are visible in nighttime conditions and are not backlit.

British statistics have shown that pedestrian collision rates at roundabouts are just over 50% less than those at signalized intersections. This is primarily due to two key geometric features: first, pedestrians must only cross one direction of traffic at a time and have a refuge at the median splitter island; and second, all vehicular turning movements at a roundabout are merged into the circulatory roadway and require pedestrians to be aware of only one movement at a time. For example, when crossing the direction of traffic approaching the roundabout, pedestrians only need to be aware of vehicles approaching. When crossing on the opposite side of the roadway where vehicles are exiting the roundabout, pedestrians only need to be aware of the lane(s) of traffic from the circulatory roadway exiting towards the crosswalk. Whereas, at a signalized intersection, pedestrians crossing the exiting lane of the intersection must be aware of through vehicle traffic, left turning traffic, and right turning traffic since all vehicles begin the turning movement from a different location.

People who are visually impaired may experience difficulty using roundabout crosswalks, particularly where traffic volumes are high. Roundabouts, like channelized turn lanes, present challenges different from other intersections since the traffic is most often under yield control as opposed to stop control. It is difficult to be sure that traffic will yield to pedestrians, and the continuous circulation of vehicles makes it difficult for the visually impaired to determine significant gaps in traffic movements. In addition to determining when to cross the road, pedestrians with vision impairment must identify where to cross, which way to walk during the crossing, and when they have arrived at their destination curb or island (reference MTO website: <http://www.mto.gov.on.ca/english/engineering/roundabout/faq.shtml#7>)

During the public input process there were many concerns raised about the ability of pedestrians crossing, especially for children and seniors.

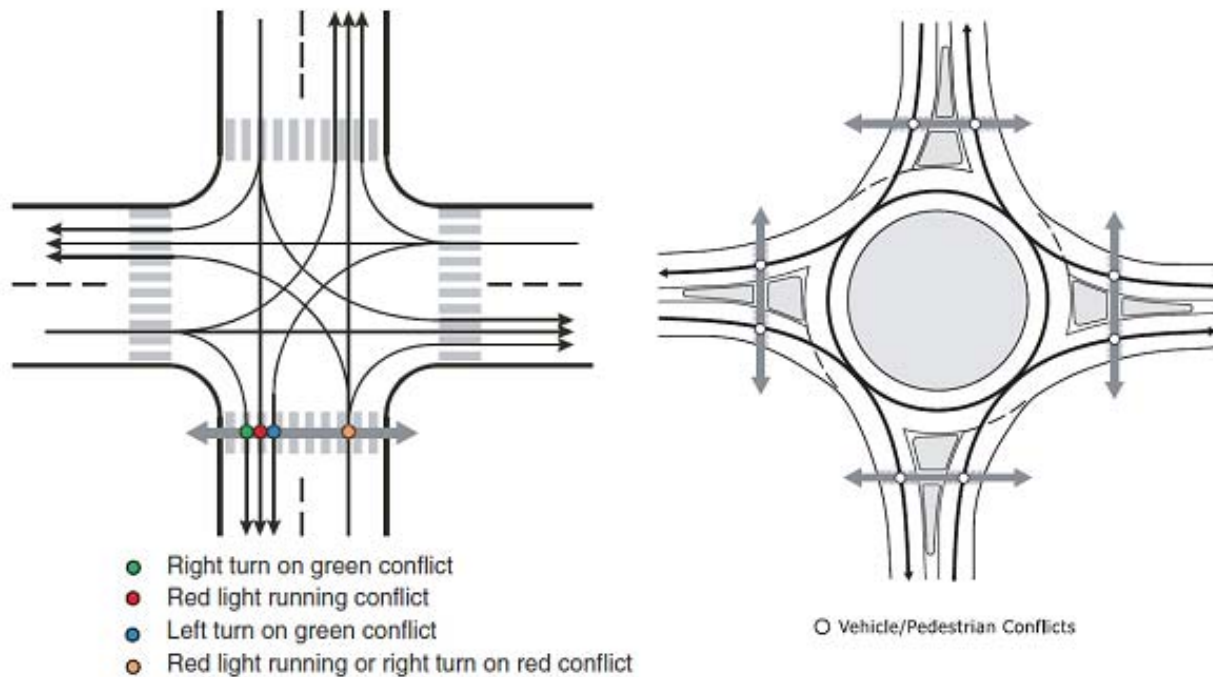


Figure 2 - Pedestrian Vehicle Conflict Points

Vehicle Safety

Studies completed in the United States have shown a significant decrease in collisions and personal injury collisions for intersections that have been converted from signal-controlled to roundabouts. The statistics show a 48% reduction in overall collisions and a 78% reduction in personal injury or fatal collisions as per *NCHRP Report 572*. This can be explained by the reduction of the number of vehicle conflict points and the elimination of crossing conflicts. Crossing conflicts occur where the paths of two traffic streams intersect. These are the most severe of all conflicts and the most likely to involve injuries or fatalities. These collision types are typically right-angle collisions and head-on collisions. As shown below, the number of vehicle-vehicle conflict points in a roundabout are reduced as much as 75% from a signalized intersection.

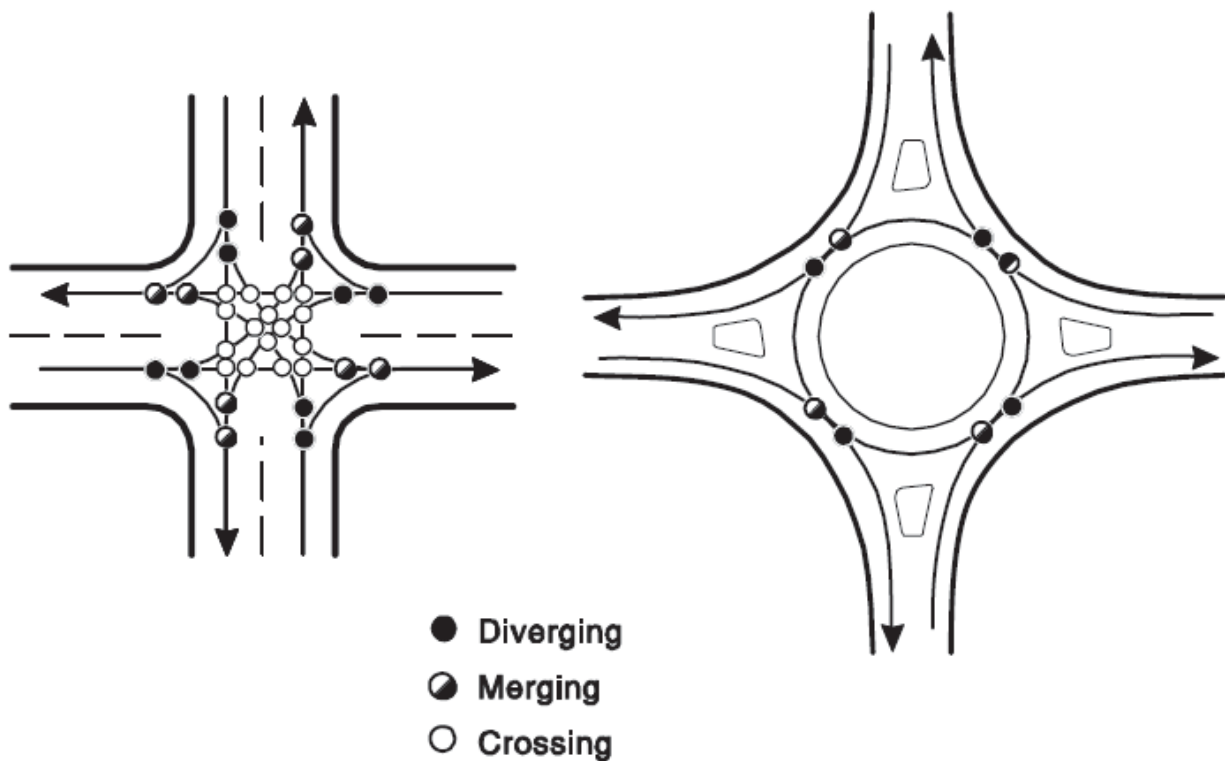


Figure 3 - Vehicle Conflict Points

Bicycle Safety

A raised cycle track is proposed for Second Avenue. The cycle track begins south of Donna Drive and continues to Kenwood Drive. As a result, cyclists will need to be accommodated through the Second Avenue at Scarlett Road intersection.

Roundabout

Cyclists face similar conflicts as motor vehicles at both signalized intersections and roundabouts. However, because cyclists typically ride on the right side of the road between intersections, they face additional conflicts when they need to merge into the flow of motor vehicle traffic or where motor vehicles cross their path.

Many of the additional conflicts experienced by cyclists vary depending on how they choose to negotiate the intersection. Multi-lane roundabouts can be navigated in the center of the lane (in the middle of the roadway), on the outer edge of the lane or on the sidewalk (dismounted).

Figure 4 below shows the conflicts a cyclist in the center of the lane (solid line) and when riding on the outer edge of the lane (dotted). There is only one conflict point when the car is exiting and the bicyclist is continuing.



Figure 4 - Navigating a Multi-Lane Roundabout on the Outside Edge of the Lane

Figure 5 below depicts the movements of bicyclists in the center of their lane (in-lane) for a left turn movement and the resulting conflicts. As can be seen, the movement in the inner lane does not result in any conflicts. A bicyclist using the outside lane results in conflicts when being passed by motorists, path overlaps and at the exits. The figure also depicts how a bicyclist can use the sidewalk to pass through a roundabout.



Figure 5 - Navigating a Multi-Lane Roundabout In-Lane (Correct and Incorrect Lanes)

Signalized Intersection

For a signalized intersection, a Cross Ride is being proposed. It allows cyclist to ride their bicycle within the crossing without dismounting. As shown in Figure 6, a Cross Ride is typically provided between the crosswalk and the through lane of traffic. Cyclists approaching the intersection are required to obey the traffic signal display and only proceed on a green indication. This layout separates cyclists from vehicles through the intersection and eliminates sideswipe type of collisions. However, merging conflicts will remain with left turning and right turning vehicles.

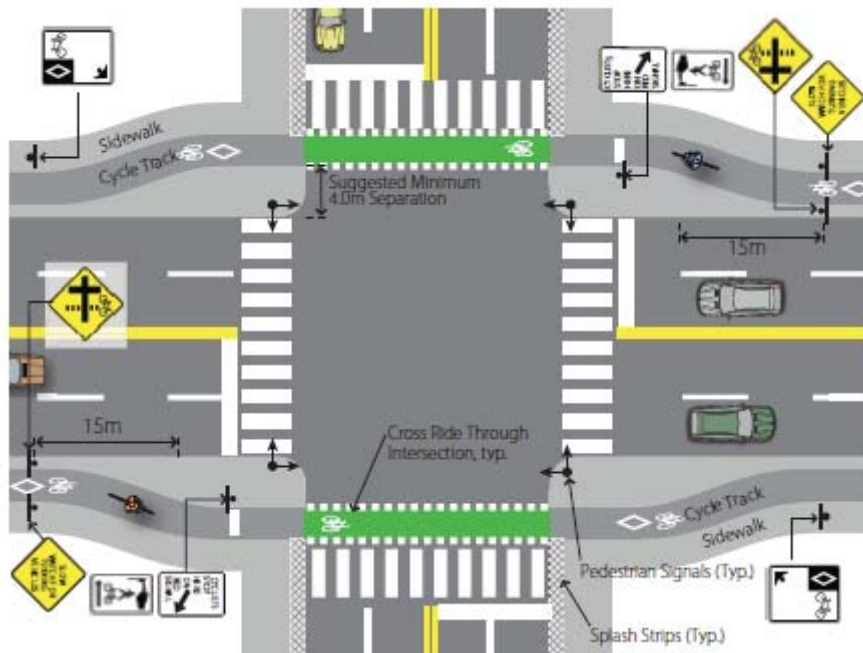


Figure 6 - Typical Cross Ride at a Signalized Intersection

The cycling facilities provided for both the roundabout and signalized intersection will be new to cyclists in the City of Greater Sudbury. However, for a multi lane roundabout, research has shown that only the most confident and experienced cyclists will attempt to ride through the intersection. Most others will be intimidated and utilize the sidewalk instead. Utilizing the sidewalk creates additional conflicts with pedestrians. The proposed Cross Ride will integrate with the raised cycle track and should be less intimidating for less experienced cyclists.

Driver Familiarity

Only one single lane roundabout has currently been installed in the City of Greater Sudbury and it is at the intersection of three local roadways, all with low traffic volumes and within a new subdivision. The majority of City of Greater Sudbury drivers will not be familiar with how traffic navigates through a roundabout.

With over 120 traffic signals installed within the City of Greater Sudbury, local drivers are very familiar with signalized intersections.

The City is currently designing the Maley Drive Extension with roundabouts. Maley Drive is a primary arterial road and is meant to divert truck traffic around the City. Prior to this, the City understands that an educational campaign will be required to educate local residents on the use of roundabouts. There are also other projects where roundabouts are being considered throughout the City.

Environmental

When operating within their capacity, roundabouts typically operate with lower vehicle delays than signalized intersections. With a roundabout, it is not necessary for traffic to come to a complete stop when no conflicts are present. When there are queues on one or more approaches, traffic within the queues usually continues to move. The performance of roundabouts during off-peak hours is particularly good when compared to signalized intersections, usually with very low average delays.

These lower vehicle delays translate to increased fuel savings, reduced greenhouse gases and reduced vehicle noise.

Summary of Findings

A summary of the analysis is presented in the following table.

Table 1 - Comparative Ratings

	Roundabout	Signalized Intersection
Capacity	=	=
Right of Way Requirements	-	+
Construction Costs	-	+
Maintenance Costs	+	-
Pedestrian Safety	=	=
Vehicle Safety	+	-
Cyclist Safety	-	+
Driver Familiarity	-	+
Environmental	+	-

Comparative Ratings: + (Advantage) ; - (Disadvantage); = (equal or no significant difference)

Based on the conceptual design, installing a roundabout at the intersection of Second Avenue and Scarlett Road will be very challenging. The restricted right-of-way in the southeast corner of the intersection would require the entire intersection be shifted to the west. This in turn would require a realignment of the northbound and southbound approaches of Second Avenue to properly align with the roundabout. Additionally, the internal roads for the Civic Memorial Cemetery and Minnow Lake Dog Park would need to be realigned to provide a safe and functional approach to the roundabout.

Although in general there is an increased benefit to vehicle safety by utilizing a roundabout instead of a signalized intersection, there has only been one reported angle type collision in the last three years at this intersection. In terms of cyclists, a raised cycle track is being provided as part of the reconstruction of Second Avenue to provide a separated cycling facility. With the roundabout design, those who do not want to dismount their bicycle will be required to merge into traffic to negotiate the roundabout. Under the signalized intersection design, cyclists will remain separated from the thru traffic although they will

still be exposed to left and right turning vehicles. Under these circumstances, it is believed cyclist safety will be enhanced with a signalized intersection.

Although there are some benefits to a roundabout compared to a signalized intersection, they do not outweigh the increased construction costs, the impact to adjacent property owners (Cemetery and commercial mall) and the decreased safety for cyclists. It is recommended a signalized intersection be provided at the intersection of Second Avenue at Scarlett Road.

APPENDIX C

Natural Heritage Existing Conditions and Impact Assessment Technical Memo

March 18, 2016

Natural Heritage Existing Conditions and Impact Assessment Technical Memo

Second Avenue EA Update, City of Greater Sudbury

1.0 INTRODUCTION

The City of Greater Sudbury (City) retained MMM Group Limited (MMM) to undertake an update to the Second Avenue Environmental Assessment (EA) Study. As a part of the EA process, MMM investigated the few natural features found in the study area, to identify any significant features / habitat including habitat for Species at Risk. Refer to Figure 1 for site location.

The study area is dominated by suburban development with limited natural heritage features. A review of background information revealed that an un-named watercourse exists within the study area.

Second Avenue connects Bancroft Drive to Kingsway Road. A segment of Second Avenue, from Donna Drive south to just past First Avenue is being examined by the EA. The EA study aims to examine the feasibility of the following (Figure 2):

1. Widening of Second Avenue.
2. Expansion of the storm sewer network under Second Avenue and from Second Avenue to the outlet in Korpela Creek (the watercourse).
3. Realignment of the entranceway drive of the Civic Memorial Cemetery.

This report documents the ecosystem existing conditions assessment. The results of the vegetation, wildlife, and fisheries data collection and analysis are presented herein.

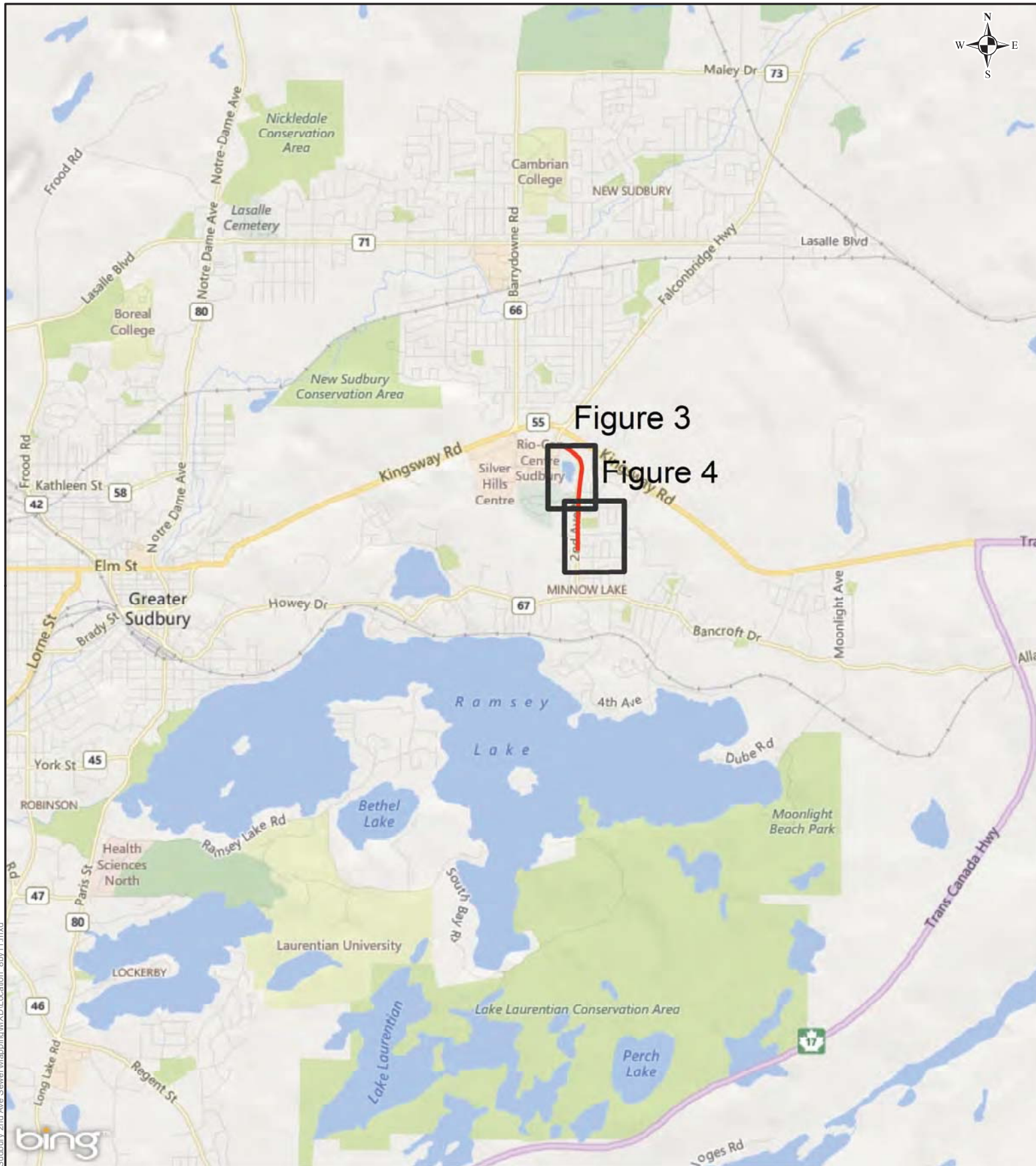





Figure 3

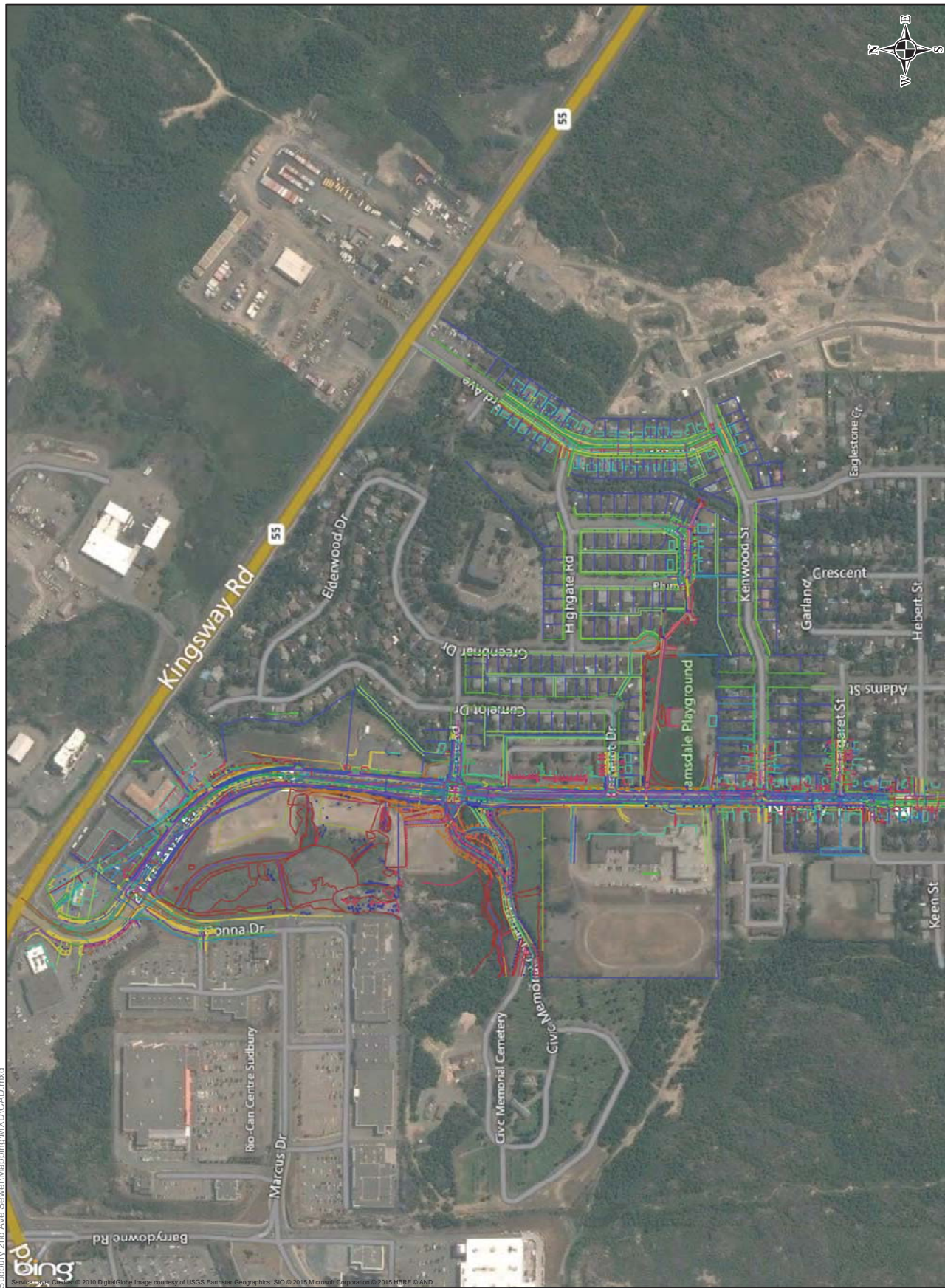
Figure 4

- Legend**
-  Natural Features Figures
 -  Study Corridor



Client:	City of Greater Sudbury	
Title:	Sudbury Second Ave Sewer Location Map	
Prepared by:		
16-15104-101-NE1	Scale as Shown	Review: LA
Date: December 2015	Figure 1	

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Client:	City of Greater Sudbury		
Title:	Sudbury Second Ave Sewer Proposed Works		
Prepared by:			
16-15104-101-NE1	Scale as Shown	Review: LA	
Date: December 2015	Figure 2		
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2.0 BACKGROUND INFORMATION

Several sources were used to provide background information on environmentally significant species and designated natural areas in the vicinity of the study area. This included contacting the agencies (Ministry of Natural Resources and Forestry (MNR), Conservation Sudbury) and examining the online Natural Heritage Information Centre (NHIC) database and the MNR Species at Risk by Area mapping (MNR, 2015).

The MNR in Sudbury District was contacted on December 7, 2015 for information on Species At Risk (SAR) and provincially designated natural areas. Species At Risk are species designated under the provincial *Endangered Species Act, 2007* (ESA) or under the federal Species at Risk Act (SARA) as either Extirpated, Endangered, Threatened or Special Concern depending on level of risk. Examples of provincially designated natural areas are: Area of Natural and Scientific Interest, Provincially Significant Wetland, Environmentally Significant Area, Provincial Park and Conservation Area.

The MNR responded to our request on January 7, 2016, stating that they have no known occurrences of SAR, Natural Heritage Features, Wetlands, Areas of Natural and Scientific Interest (ANSIs), or other significant features in the study area. However, they cautioned that the study area is largely unassessed for species or natural heritage features and that the lack of features may be reflective of lack of assessment. They also explained that watercourses in the study area have not been assessed, but are considered warmwater fisheries and are subject to an in-water timing constraint from April 1st to June 15th.

MNR's Natural Heritage Information Centre (NHIC) online database was searched for records of designated natural areas and species of conservation concern within one kilometre of the study area. Species of conservation concern (SCC) include SAR and provincially rare species. Species ranked by the NHIC as S1, S2 or S3 are considered provincially rare. The database returned a single record of a provincially rare insect, Purplish Copper (S3) in the squares within the study area.

MNR's Species at Risk by Area map was consulted to see what species were identified as being in the Greater Sudbury area. Seven species were identified. These species were screened for potential to be in the study area and are addressed in further detail in Section 3.5.2 and Appendix B.

Conservation Sudbury was contacted on December 10, 2015 for information on Regulation Limits, significant natural features, fisheries information, natural heritage features, wetlands, ANSI's and any other significant features of note. At the time this report was submitted, no response had yet

been received from Conservation Sudbury. A response to our information request was received from Conservation Sudbury on January 4, 2016. They confirmed that Korpela Creek is regulated with a 30 m setback on each side of the centre line of the watercourse (Appendix A). All wetlands are regulated with a 30 m setback for those under 2 hectares and a 120 m setback for those over 2 hectares. They did not have information on any other features.

3.0 METHODS

Prior to the site visit, areas of natural vegetation communities were delineated using aerial photo interpretation. Field investigations were conducted on November 26, 2015. These investigations included a general characterization of the study area and detailed investigations within the areas of natural vegetation. In the natural areas, investigations included classification of vegetation communities defined using the Field Guide to Forest Ecosystems of Central Ontario (Chambers et al. 1997) with non-forested communities defined using the Ecological Land Classification for Southern Ontario: First Approximation (Lee et al., 1998) with 2013 code updates (Lee, 2013) for communities which could not be well described by the first approximation codes (as per new ELC guidelines).

Investigations also included a search for wildlife, wildlife habitat and evidence of wildlife (e.g. tracks, scat, dens). Efforts were made to identify plant and wildlife SAR while in the field.

A single watercourse, Korpela Creek, was identified by NHIC base maps and by the City of Greater Sudbury. Preliminary investigations into fisheries habitat were conducted on November 26, 2015. The aquatic habitat assessments consisted of documentation of the watercourse location, and observable characteristics, along with a description of the habitat features present. The watercourse was assessed from 50 m upstream of the stormwater outfall proposed to be modified by the expansion of the storm sewer network to 100 m downstream at the Kenwood Street crossing. A photographic record of this assessment can be found in Appendix C.

A small, low-lying area of pooled water was observed in the forest north of the Cemetery roads. This pooled water is not connected to any natural features or visible flow paths, and there is no background information to indicate that this feature functions as an intermittent watercourse. As such, it was determined that this feature functions solely as an isolated drainage feature for runoff from surrounding lands and does not function as fish habitat.

3.1 Local Context

The landscape in the area of the site can generally be defined as a developed suburban neighbourhood. Residential development dominates the vicinity of Second Avenue with some

scattered commercial uses in the vicinity of the Scarlett Road intersection. A park and a public cemetery also exist within the study area. Additionally, many street trees are planted in the urban landscape. These landscaped features are not considered natural vegetation, and were therefore not examined. Korpela Creek, north of Third Avenue, which forms part of the local drainage network discharges downstream to Ramsey Lake. Areas of natural vegetation were identified prior to field investigations. The vegetation communities are described below and shown on Figures 3 and 4.

3.2 Vegetation

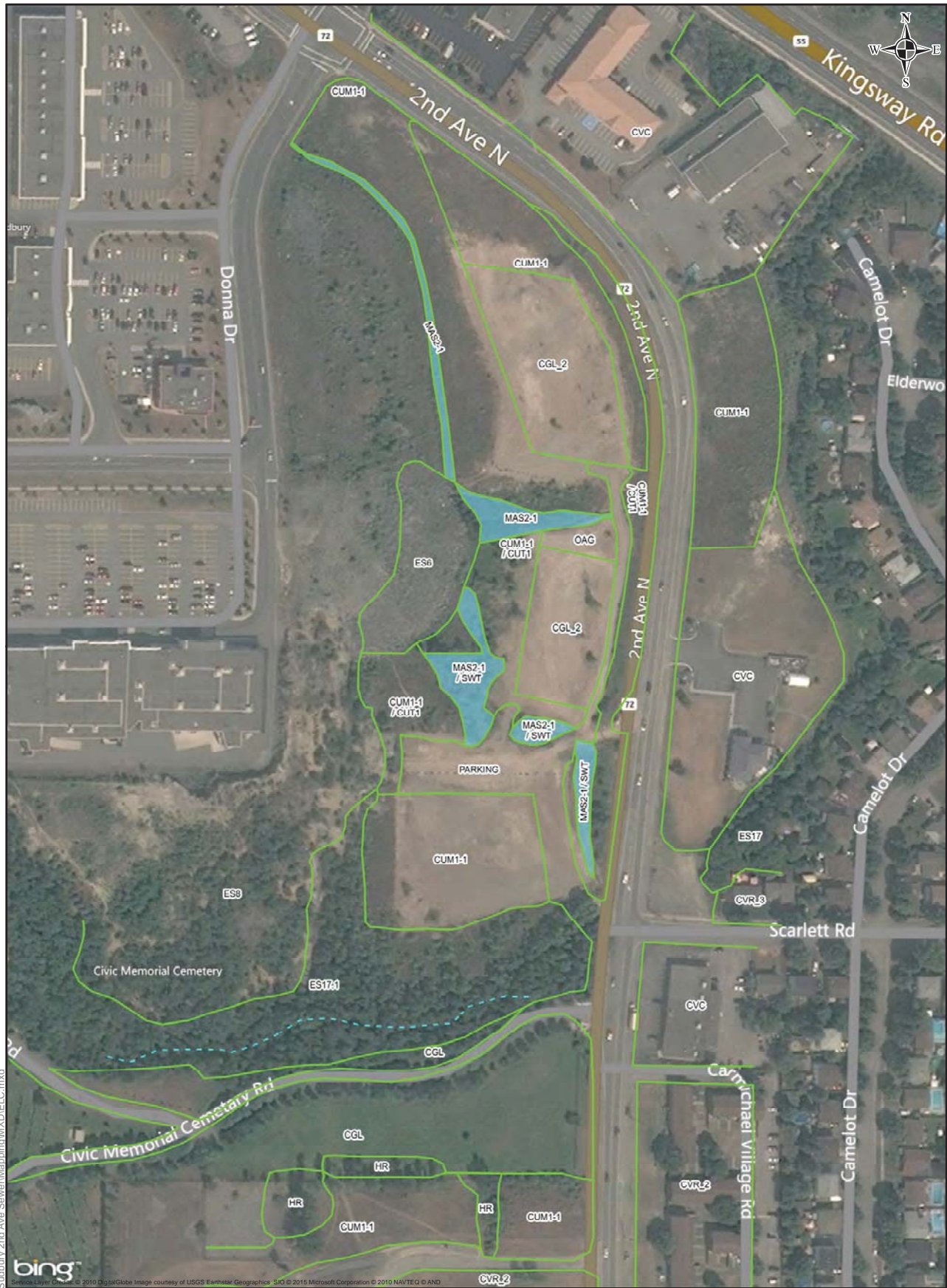
Most of the vegetation communities identified in the study area are culturally influenced. This included cultural meadows on both sides of Second Avenue between Donna Drive and Scarlett Road where lack of maintenance has allowed succession to occur to a cultural meadow and cultural thicket feature. Natural vegetation occurs in the study area in the valleyland north of the cemetery road, in the woodland east of Adamsdale Park and in the riparian areas of Korpela Creek north of Third Avenue. Further details on these communities are described below.

Dry to Moist Old Field Meadow Type (CUM1-1)

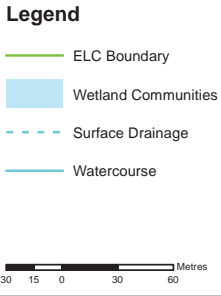
The majority of the vegetated areas in the study area are dry to moist old field meadows that have become established on abandoned lots and adjacent to the dog park area on Second Avenue. Each of the units was slightly different in composition but all were abundant with Grass (*Poa spp.*), Asters (*Symphyotrichum spp.*), Creeping Bentgrass (*Agrostis stolonifera*), Tall Goldenrod (*Solidago altissima*), Wild Carrot (*Daucus carota*), and Common Mullein (*Verbascum thapsus*), with occasional Reed-canary Grass (*Phalaris arundinacea*), Red Raspberry (*Rubus ideaeus*), and Common Tansy (*Tanacetum vulgare*). The sparse trees and shrubs found in these areas include seedlings of Manitoba Maple (*Acer negundo*), Balsam Poplar (*Populus balsamifera*), White Spruce (*Picea glauca*), Balsam Fir (*Abies balsamea*), and Staghorn Sumac (*Rhus typhina*).

Dry to Moist Old Field Meadow Type / Mineral Cultural Thicket Ecosite (CUM1-1/CUT1)


This vegetation type was found in the vicinity of the dog park and parking lot west of Second Avenue. The units are a mosaic of Old Field Meadow and Cultural Thicket. The Old Field Meadow is as described above. The thicket consisted of successional Paper Birch (*Betula papyrifera*), Poplars (*Populus tremuloides*, and *P. balsamifera*), and Willows (*Salix spp.*).

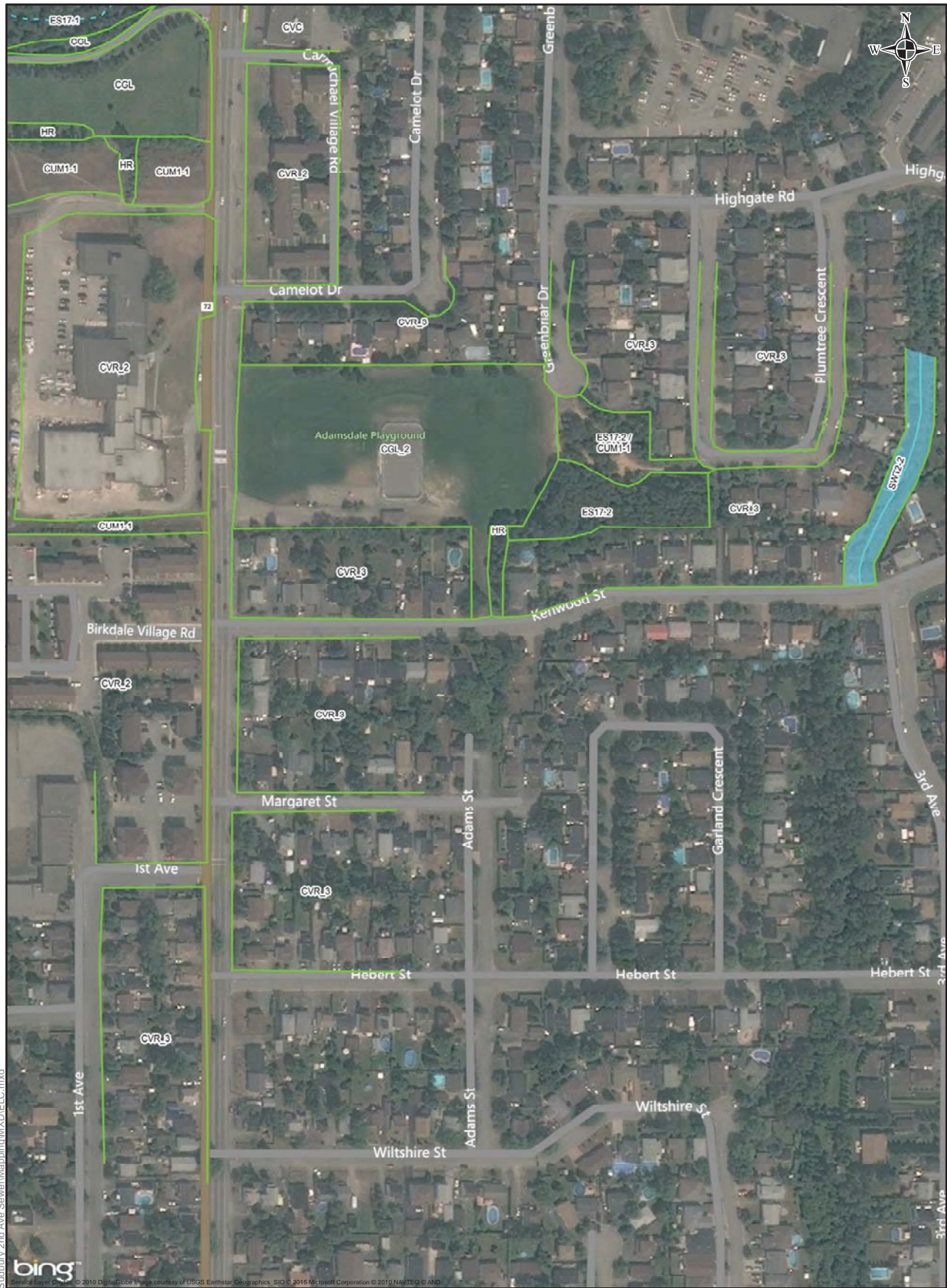


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ELC Communities	
CGL	Green Lands
CGL_2	Green Lands - Parkland
CUM1-1	Dry- Moist Old Field Meadow Type
CUT1	Mineral Cultural Thicket Ecosite
CVC	Commercial and Institutional
CVR_2	Residential - High Density Residential
CVR_3	Residential - Single Family Residential
ES17	Poplar-White Birch
ES17.1	Poplar-White Birch dry to moderately fresh
ES17.2	Poplar-White Birch fresh to moist
ES6	Rock Slope/Talus - Acidic/Circumneutral
ES8	Rock Barren - Acidic/Circumneutral
HR	Hedgerow
MAS2-1	Cattail Mineral Shallow Marsh Type
OAG	Open Agriculture
RBT3-2	Jack pine Treed Rock Barren Type
SWT	Thicket Swamp
SWT2-2	Willow Mineral Thicket Swamp Type

Client:	City of Greater Sudbury		
Title:	Sudbury Second Ave Sewer Existing Natural Features		
Prepared by:			
16-15104-101-NE1	Scale as Shown	Review: LA	
Date: December 2015	Figure 3		
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Legend

- ELC Boundary
- Wetland Communities
- Surface Drainage
- Watercourse

ELC Communities	CGL	Green Lands
	CGL_2	Green Lands - Parkland
	CUM1-1	Dry- Moist Old Field Meadow Type
	CUT1	Mineral Cultural Thicket Ecosite
	CVC	Commercial and Institutional
	CVR_2	Residential - High Density Residential
	CVR_3	Residential - Single Family Residential
	ES17	Poplar-White Birch
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	MAS2-1	Cattail Mineral Shallow Marsh Type
	OAG	Open Agriculture
	RBT3-2	Jack pine Tread Rock Barren Type
	SWT	Thicket Swamp
	SWT2-2	Willow Mineral Thicket Swamp Type

Client:	City of Greater Sudbury	
Title:	Sudbury Second Ave Sewer Existing Natural Features	
Prepared by:		
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Poplar-White Birch (ES17)

Units of this ecosite exist in the valleyland north of the cemetery road, in the wooded area north of Scarlett Road, and in the wooded area east of Adamsdale Playground. The sparse to moderate canopy of these woodlands was dominated by Paper Birch. All of these units are anthropogenically disturbed to a degree, and some could not be adequately classified to an FEC vegetation type.

Poplar-White Birch dry to moderately fresh (ES17.1)

The unit present in the valleyland north of the cemetery road, in the wooded area north of Scarlett Road, and in the wooded area east of Adamsdale Playground. The canopy of this woodland was dominated by Paper Birch, with occasional Manitoba Maple and Trembling Aspen (*Populus tremuloides*), and sparse Red Oak (*Quercus rubra*), Basswood (*Tilia americana*), and Crack Willow (*Salix fragilis*). The sparse shrub layer contained occasional Red Oak saplings and sparse Sugar Maple, Manitoba Maple and Scots Pine (*Pinus sylvestris*). The ground layer was dominated by abundant Bracken Fern (*Pteridium aquilinum*) and contained occasional sedges (*Carex* spp.), sparse Red Columbine (*Aquilegia canadensis*) and mosses.

Poplar-White Birch fresh to moist (ES17.2)

The unit present in the wooded area east of Adamsdale Playground contained species indicative of a moister soil than the other units of ES17. A small dug ditch, with a small metal culvert under a trail was noted immediately behind the backyard fences of the houses on the north side of Kenwood Street. It is our understanding that this small ditch receives temporary drainage in times of high rainfall. The ditch was dry at the time of field investigations. The canopy of this woodland is dominated by Paper Birch, with occasional Manitoba Maple and sparse Trembling Aspen (*Populus tremuloides*), Silver Maple (*Acer saccharinum*), Eastern White Cedar (*Thuja occidentalis*) and Scots Pine. The subcanopy and shrub layer was sparse and contained European Mountain-ash (*Sorbus aucuparia*), Honeysuckle (*Lonicera* sp.), Red Raspberry, and small Scots Pine and Balsam Fir (*Abies balsamea*). The ground layer contained occasional Early Lowbush Blueberry (*Vaccinium angustifolium*) and sparse Garlic Mustard (*Alliaria petiolata*), Spotted Jewelweed (*Impatiens capensis*), Bittersweet Nightshade (*Solanum dulcamera*), Woodfern (*Dryopteris* sp.), Sedges, Grasses, Creeping Bentgrass, and Reed Canary Grass. This unit was heavily anthropogenically influenced with frequent dumping, invasive species, garden waste, and vandalism.

Hedgerows (HR)

Linear hedgerows were observed in several locations in the study areas. The species composition of the hedgerows was variable. Tree species included: Poplar (*Populus x canadensis*, *P. nigra*, *P. tremuloides*), Scots Pine, Ash (*Fraxinus americana* and *F. pennsylvanica*), Spruce (*Picea abies* and *P. glauca*), Paper Birch, Manitoba Maple, and Norway Maple (*Acer platanoides*).

Cattail Mineral Shallow Marsh Type (MAS2-1) and Cattail Mineral Shallow Marsh Type/Thicket Swamp (MAS2-1/SWT)

These units were located along the drainage channels present west of Second Avenue in the dog park. The units were dominated by Narrow-leaved Cattail (*Typha angustifolia*). Sparse Northern Water Plantain (*Alisma plantago-aquatica*), Purple Loosestrife (*Lythrum salicaria*), Aster (*Symphotrichum sp.*) and Reed-canary grass was also observed. Some units were a mosaic with Thicket Swamp (SWT) abundant with Trembling Aspen, White Birch, and Willows.

Rock Slope/Talus – acidic/circumneutral (ES6)

Although not vegetated, this unit was classified under the FEC system. The unit consists of a talus slope of Precambrian shield rocks.

Rock Barren – acidic/circumneutral (ES8)

This unit is a treed rock barren ecosite. Approximately 50% of the surface was bare, Precambrian shield rock or sand derived from that rock. The canopy was short, and sparse, with occasional Jack Pine (*Pinus banksiana*), Paper Birch, and Red Oak. The shrub layer contained sparse saplings of the canopy layer species. The ground layer was dominated by mosses and lichens, however in areas of deeper soils Velvet-leaved Blueberry (*Vaccinium myrtilloides*) and Bracken Fern were abundant.

Willow Mineral Thicket Swamp (SWT2-2)

This unit was found in the vicinity of Korpela Creek north of the intersection of Kenwood Street and Third Avenue. Few trees were found in this unit and those were all Manitoba Maple. The moderately dense shrub layer was abundant with Willows (*Salix bebbiana* and other *Salix spp.*) and contained sparse Speckled Alder (*Alnus incana* subsp. *rugosa*) and Red Osier Dogwood (*Cornus stolonifera*). The tall ground layer was abundant with Reed-canary Grass with occasional Narrow-leaved Cattail, and sparse Spotted Joe Pye Weed (*Eutrochium maculatum*), Willowherb (*Epilobium sp.*), and Bittersweet Nightshade.

Other Ecosites

Several other Ecosites are shown on ELC mapping (Figures 3 and 4). These ecosites represent the cemetery lands and Parks (CGL and CGL_2, respectively), commercial land use (CVC), residential

land use (CVR_2 and CVR_3), and a community garden (OAG). As these are not naturally vegetated ecosites, vegetation was not documented in these areas.

3.3 Wildlife

Wildlife habitat is limited due to the developed nature of the study area. The meadows, thickets, forest and wetlands in the study area provide some habitat for wildlife. The old-field cultural meadows contain tall grasses which could provide habitat for grassland birds. The forested areas in the study area likely provide habitat for a variety of urban/suburban tolerant bird species and small mammals. The forest north of the cemetery road connects to a larger natural area southwest of the study area, and may be used by wildlife. Generalist turtles may travel along the Korpela Creek corridor into the study area. If they are able to reach the study area, the forest and thicket swamp surrounding the watercourse may support urban/suburban tolerant reptile species. Amphibians are likely to be present in Korpela Creek and possibly using the forest west of Second Avenue which was noted to contain ephemeral pools. Those wildlife species observed tend to be tolerant of humans and development. Wildlife species observed are indicated below by habitat in which they were observed:

Forests

- Raccoon (*Procyon lotor*)
- Grey Squirrel (*Sciurus carolinensis*)
- Black-capped Chickadee (*Poecile atricapillus*)

Cultural Meadows and Parks

- Ring-billed Gull (*Larus delawarensis*)
- American Crow (*Corvus brachyrhynchos*)

It should be noted that a drainage feature was observed in the valleyland north of the cemetery road. Localized ponding was observed. This ponding, depending on its permanence, may provide breeding habitat for spring breeding amphibians.

3.4 Aquatic Habitat and Community

An unnamed watercourse originating from a wetland north of Kingsway Road flowing south to Ramsey Lake exists in the study area. The watercourse flows between the residential properties on Plumtree Crescent and Third Avenue and is conveyed through two large culverts under Kenwood

Street where it continues beyond the assessed reach. Immediately south of Kenwood Street flow is conveyed south through a straightened vegetated channel towards Ramsey Lake.

The assessed reach consists of an area 50 m upstream and 100 m downstream of the storm sewer outlet. Upstream of the assessed reach, the watercourse flows through a willow thicket swamp. In the assessed reach, the watercourse flows south through a defined channel with dense cover by Reed-canary Grass and naturalized shrubby riparian vegetation for approximately 100 m before it flows into the twin culverts under Kenwood Street

Based on discussions with City Staff (Rob Rocca, Pers. Corr. Nov. 26, 2015), the MNRF has advised the City that the channel functions as direct fish habitat for a warmwater baitfish community. In our consultation with MNRF, they explained that watercourses in the study area have not been assessed, but are considered warmwater fisheries and are subject to an in-water timing constraint from April 1st to June 15th.

3.5 Species of Conservation Concern

3.5.1 Provincially Rare Species

As mentioned previously, one provincially rare species record was indicated by the NHIC database search for Purplish Copper (*Lycaena helloides*), last observed in 1992.

3.5.2 Species at Risk

No SAR were observed during the field investigations. SAR identified by the MNRF SAR species by area website, and those thought to have potential habitat in the study area are assessed in Appendix B for likelihood of occurring within the study area. These species include the SAR: Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*), Peregrine falcon (*Falco peregrinus*), Short-eared Owl (*Asio flammeus*), Monarch Butterfly (*Danaus plexippus*), Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), Lake Sturgeon (*Acipenser fulvescens*), Milksnake (*Lampropeltis triangulum* subsp. *triangulum*), Blanding's Turtle (*Emydoidea blandingii*), Snapping Turtle (*Chelydra serpentina*). Of the SAR assessed there is moderate potential for, Monarch, Snapping Turtle and Milksnake to be using the natural habitats in the area of proposed works. These species are all designated as Special Concern and as such do not have species or habitat protection under the ESA (2007). Snapping Turtle and Milksnake have protection from being killed or harmed by the Canada Wildlife Act (1985). While Short-eared Owl and Myotis species have the potential to be found in the study area, the areas which would provide potential habitat are outside of the area of proposed works. No impacts to SAR species are anticipated if the mitigation measures in section 5.0 are followed.

3.6 Natural Areas

No provincially designated natural areas occur in or around the study area.

4.0 POTENTIAL IMPACTS

Potential impacts were assessed based on the design for the following works:

1. Widening of Second Avenue.
2. Replacement and expansion of the storm sewer network under Second Avenue and from Second Avenue to the outlet in Korpela Creek through Adamsdale Park, under Plumtree Crescent and via the City easement.
3. Realignment of the entranceway drive of Civic Memorial Cemetery to meet Scarlett Road

4.1 Vegetation

Potential impacts to natural vegetation features are limited and as follows:

1. Widening of Second Avenue
 - Removal of some Old Field Cultural Meadow (CUM1-1) and Cattail Marsh/Thicket Swamp (MAS2-1/SWT) adjacent to Second Avenue between Donna Dr. and Scarlett Avenue
 - Minor disturbance to drainage patterns, and therefore possibly wetland communities (MAS2-1 and MAS2-1/SWT) in the parklands west of Second Avenue between Donna Dr. and Scarlett Avenue
 - Potential sedimentation and erosion in Cattail Marsh (MAS2-1 and MAS2-1/SWT) vegetation due to construction activities.
2. Replacement and expansion of the storm sewer network under Second Avenue and from Second Avenue to the outlet in Korpela Creek through Adamsdale Park, under Plumtree Crescent and via the City easement.
 - Selected removal of vegetation in the Poplar-White Birch fresh to moist forest (ES17.2). These removals are expected to be minimal as the alignment is proposed in the area of current trails and meadow vegetation.
 - Removal of some Willow Mineral Thicket Swamp (SWT2-2) vegetation at the outlet of the storm sewer due to grading, headwall replacement and erosion control works.

- Potential sedimentation and erosion in Willow Mineral Thicket Swamp (SWT2-2) vegetation due to construction activities.
3. Realignment of the entranceway drive of Civic Memorial Cemetery to meet Scarlett Road
- Removal of approximately 0.5 hectares of the Poplar-White Birch dry to moderately fresh forest (ES17.1).
 - There will be temporary disruption to surface drainage patterns due to construction. Existing drainage patterns should be returned to existing conditions, as much as possible.
 - Potential sedimentation and erosion in the Poplar-White Birch dry to moderately fresh forest (ES17.1) due to construction activities.

4.2 Wildlife

1. Widening of Second Avenue
- Removal of some meadow habitat adjacent to Second Avenue between Donna Drive and Scarlett Avenue which may support wildlife.
 - There will be temporary disruption to surface drainage patterns due to construction. Existing drainage patterns should be returned to existing conditions, as much as possible.
 - Potential sedimentation and erosion in wetland habitat for amphibians due to construction activities.
2. Replacement and expansion of the storm sewer network under Second Avenue and from Second Avenue to the outlet in Korpela Creek through Adamsdale Park, under Plumtree Crescent and via the City easement.
- Selected removal of forest habitat which could support forest edge breeding birds. These removals are expected to be minimal as the alignment is proposed in the area of current trails and meadow vegetation.
 - Potential sedimentation and erosion in the Thicket Swamp wetland habitat which may support amphibians and reptiles.
3. Realignment of the entranceway drive of Civic Memorial Cemetery to meet Scarlett Road

- Removal of a portion of the forest habitat which may support a variety of urban/suburban tolerant birds and other wildlife species, including potential breeding amphibians (i.e. frogs). These works are expected to require the removal of approximately 0.5 hectares of this ecosite.
- Potential disruption of surface drainage from the drainage feature in the valleyland to the storm sewer under Second Avenue. This may change the current pattern of drainage and ponding which can provide wildlife habitat.

4.3 Fisheries

Potential impacts to fish and fish habitat are limited to works associated with the storm sewer outlet works, and include:

- In water works to convey flow from storm sewer to receiving watercourse as well as erosion protection measures;
- Sedimentation and erosion into the watercourse due to construction activities;
- The addition of deleterious substances (sediment, fuel, oil, lubricant, etc.) into the watercourse associated with construction activities and machinery;
- The pumping of sediment laden water associated with precipitation events or leaks in isolation measures to maintain a dry working environment;
- The removal of vegetation and the watercourse bed and banks within the isolated work area;
- Fish passage; and,
- Harm to fish during construction.

5.0 MITIGATION MEASURES

Prior to works, an Erosion and Sediment Control (ESC) plan should be prepared. This plan should be included in contract drawings. Erosion and sediment control measures should be regularly inspected by the Contract Administrator and repaired as soon as possible.

Vegetation

- Areas of natural vegetation to be retained should be delineated as such on all contract drawings, these areas should be clearly delineated in the work area using silt fencing and/or tree protection fencing, as appropriate. This fencing should clearly identify the areas to be protected.
- Silt fencing should be placed at the edge of work areas adjacent to wetland communities to prevent siltation of wetlands.
- All vegetation cover not specified for removal shall be preserved in order to minimize erosion and sedimentation.
- Trees to be removed should be inventoried and clearly marked for removal.
- Trees to be retained, adjacent to works, should be delineated using tree protection fencing placed at the dripline. This fencing should clearly identify the areas to be protected
- Dust control shall be undertaken using water, not chemical suppressants to prevent deleterious substances from entering natural habitats including wetlands.
- Areas of vegetation to be retained should not be used for stockpiling of materials or waste.
- Re-stabilize and re-vegetate exposed soil surfaces as soon as possible using native seed mixes appropriate to the site conditions.
- The area in the vicinity of the realigned cemetery road should be restored following works. Restoration should include re-planting disturbed areas with site appropriate trees, shrubs and ground cover and restoring existing water drainage patterns in order to maintain existing forest conditions west of the new road.

Wildlife

- It is recommended to avoid vegetation clearing (including grubbing) during the breeding bird season (approximately April 1 to August 31). However, if work is required during this period a search for active nests can be carried out by an avian biologist to identify if work can proceed without creating a disturbance to nest sites. It should be noted that occasionally bird species will precede (e.g., late March nesting) or exceed (e.g., September) the approximate breeding bird season window.
- The Contractor shall not destroy active nests (nests with eggs or young birds) of protected migratory birds, including SAR protected under the ESA (2007). When these nests are encountered, the Contract Administrator must be contacted.
- If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the MBCA (1994) or ESA (2007), **all activities will stop and the Contract Administrator/ Environment Canada will be contacted to discuss mitigation options, and/or to obtain direction from MNRF for species listed under the ESA (2007).**

- It is noted that a part of the project area is in Old-field Meadow and may support ground nesting birds. As such removal of meadows should also avoid the aforementioned breeding bird season.
- Install temporary erosion and sediment control measures prior to construction, and maintain throughout construction especially near the drainage swale and wetland units to be retained in order to prevent reptiles (including SAR) and amphibians from entering the construction area.
- In the event that an animal encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified.
- In the event that a SAR or possible SAR is found in the construction area, **all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified.** The Contract Administrator will then contact the MNRF SAR Biologist for direction, as these animals are protected under the ESA (2007).

Fish Protection

- Any in water works or increase in storm water flows to the watercourse are subject to review under the *Fisheries Act*. The proposed design, including the physical footprint, must be reviewed under the *Fisheries Act* and, if required, approved by Fisheries and Oceans Canada (DFO) prior to any works commencing.
- Work is to occur only during the MNRF approved in-water timing window for a warmwater creek. MNRF has confirmed the watercourses in the area are subject to an in-water timing constraint from April 1st to June 15th.
- All in-water work activities (e.g. headwall repair / reconstruction and erosion protection) are to be completed in isolation of flowing water (i.e. coffer dam) so as to avoid causing harm or death to fish and being in contravention of the *Fisheries Act*.
- Immediately following the isolation of the in-water work area where fish may be present, a fish removal will be undertaken with fish being relocated to suitable habitat downstream. An MNRF License to Collect Fish for Scientific Purposes Application will be required.
- Any water intake pipes associated with the initial dewatering of the isolated work area will be screened to prevent entrainment or impingement of fish that are trapped between the coffer dams.
- Downstream flow will be maintained by pumping or fluming water around the isolated work area.

- The downstream end of the flume will discharge over a suitable ESC measure to prevent channel scour (e.g. river stone splash pad).
- The Contractor is to ensure that the regular maintenance and repair of the dam and flume system and seals is carried out to prevent debris-fouling and impingement of fish. Should the isolated work area be breached and fish inadvertently re-enter the isolated work area, all work will cease until the fish are removed and the work area is dewatered.
- Due to maintenance of existing pipe size, flow increase is anticipated to fall within approved discharge volumes and thus is not anticipated to adversely affect fish or their habitat. This is to be confirmed through the aforementioned *Fisheries Act* screening which must occur prior to works commencing.

Erosion and Sediment Control

- Prior to the initiation of construction, ESC measures will developed and will be installed according to engineering drawings. Siltation fencing will be installed, where appropriate, around the watercourse banks to minimize the risk of deleterious substances being carried with runoff into the watercourse. The siltation fencing will be tied in to existing structures to ensure there are no gaps through which sediment or deleterious substances can enter the watercourse.
- Siltation fencing will be installed in such a way that deleterious substances cannot run off the fencing and therefore must pass through the fencing prior to entering the watercourse.
- Siltation fencing will be inspected daily and repaired as required to ensure it is functioning correctly during the construction period. The siltation fencing will be left in place until such time that the site restoration measures have become established.
- Pumping of sediment laden water from the trenches will be undertaken in such a way to prevent sediment or other deleterious materials from entering the watercourse.
- Before being discharged, the water will be filtered through a filtration device (e.g. a filter bag);
- Water will be discharged a minimum of 30 m from the watercourse and will be allowed to flow through vegetation to further ensure that the potential for sediment release into the watercourse is minimized.
- All watercourse bed, banks and vegetation that are disturbed during construction works, will be restored to their original condition, or better and the Contractor is to ensure that the watercourse bed and banks are stable prior to removing the isolation measures from the watercourse.

Operation of Machinery

- The prevention of deleterious substances from entering the watercourse will be mitigated by ensuring that all machinery entering the construction site will be clean and in good working order. All machinery will be refueled a minimum of 30 m from the watercourse and the Contractor will have an emergency spill plan and kit on site to prevent any contaminants from entering the watercourse.
- Any spoil material associated with the open-cut and any material being stored for use during construction will be stored a minimum of 30 m from all watercourses to minimize the potential for sediment transport to the watercourse.
- All construction equipment and materials are to be stored a minimum of 30 m from the watercourse to minimize the potential for deleterious material to inadvertently enter the watercourse.
- The Contractor must take all necessary precautions to minimize the accumulation of litter and construction debris within any natural areas outside of the construction limits.

6.0 PERMITTING REQUIREMENTS

6.1 Terrestrial

As a matter of due diligence, it is recommended that consultation be completed regarding potential SAR in the Study Area prior to commencing work. Based on available information at the time of writing this report, it is not anticipated that any SAR will be impacted by the works; however, this should be verified with the MNR.

6.2 Aquatic Habitat

As Korpela Creek north of the Kenwood Street and Third Avenue intersection functions as direct fish habitat, any modifications to the channel are subject to a review under the *Fisheries Act (1985)*. The *Fisheries Act* prohibits actions that cause serious harm to fish that are part of or support a commercial, recreational or Aboriginal fishery (Section 35). An assessment under the *Fisheries Act* needs to be undertaken by the proponent to determine if the project will cause serious harm to fish. The proposed works should be reviewed and assessed prior to the commencement of works following the Self-Assessment Protocol to determine if the proposed work will need to be sent to Fisheries and Oceans Canada (DFO) for a review under the *Fisheries Act*. Based on the preliminary proposed in-water works in direct fish habitat, it is not anticipated that a *Fisheries Act* Authorization will be required and standard mitigation measures will be sufficient to avoid causing

serious harm to fish. It is anticipated that a Request for Review of the proposed work will need to be submitted to DFO and that the work will be allowed to proceed under a Letter of Advice.

We also anticipate that, prior to the commencement of work, a License to Collect Fish for Scientific Purposes will be required from the MNRF to undertake fish removal activities.

As Korpela Creek is regulated by Conservation Sudbury/Nickel District Conservation Authority (NDCA) a permit under O. Reg. 156/06: Nickel District Conservation Authority Regulation of Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses will be required for the stormwater outfall and channel modifications. The level of permitting will need to be discussed with the NDCA prior to commencing work.

7.0 REFERENCES

Chambers, B.A., Naylor, B.J., Nieppola, J., Merchant, B. and Uhlig, P. 1997. Field Guide to Forest Ecosystems of Central Ontario. Ministry of Natural Resources. SCSS Field Guide FG-01.

Lee, H. T 2013. Ecological Land Classification Evolution update. ELC Portal Website: http://www.conservation-ontario.on.ca/events_workshops/ELC_portal/index.html

Lee, H., Bakowsky, W., Riley, J., Bowles, J., Puddister, M., Uhlig, P., and McMurray, S. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources. SCSS, Science Development and Transfer Branch, Field Guide FG-02.

Ministry of Natural Resources and Forestry (MNRF). 2015. Make a Map: Natural Heritage Areas. [accessed November 25, 2015].

APPENDIX A – AGENCY CONSULTATION

Lorraine Adderley

From: Dallas Taylor
Sent: December-07-15 4:44 PM
To: brian.riche@ontario.ca
Cc: Lorraine Adderley
Subject: Information Request - Second Avenue Reconstruction and Widening
Attachments: MNRF_Info Request_Letter_Dec 7 2015.pdf

Dear Mr. Riche,

On behalf of MMM Group, a WSP company, please find the attached information request letter for the proposed Second Avenue Reconstruction and Widening project. Please feel free to contact me with any questions you may have.

Best regards,



Dallas Taylor, M. Sc.
Ecologist – Fisheries
Écologiste – Pêches

MMM Group

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December 7, 2015

Brian Riche
Ministry of Natural Resources and Forestry
Sudbury District
3767 Hwy 69 S Suite 5
Sudbury ON P3G 1E7
705-564-7823

Subject: Information Request
Ecological investigations for the Proposed Second Avenue Reconstruction and Widening from First Avenue to Donna Drive

Dear Mr. Riche,

The City of Greater Sudbury has retained MMM Group, a WSP company, to undertake an ecological screening of the proposed reconstruction and widening of Second Avenue between First Avenue (17T 504890 5149018) and Donna Drive (17T 504753 5150048) (study area shown on Figure 1). At this time I would like to initiate consultation with the MRNF to formally request background information for the study area, including:

- Significant natural features;
- Species at Risk (SAR);
- Fisheries information such as fish community data, the thermal regime, timing windows and habitat sensitivity for the watercourse crossings along the proposed alignments;
- Natural heritage features;
- Wetlands (Provincially significant or unevaluated);
- Area of Natural or Scientific Interests (ANSI); and
- Other significant natural features

Please indicate the associated setback / buffers associated with any of the identified significant natural feature located within the proposed alignments (i.e. wetlands).

A preliminary screening of sensitive species through the Fisheries and Oceans Canada (DFO) SAR Mapping and MNR's Natural Heritage Information Centre (NHIC) database was undertaken to identify the sensitive species within the study area. DFO Mapping from the Nickel District Conservation Authority (NDCA) (2015) indicated no aquatic SAR (fish or mussels) present in the study area. NHIC records indicated no Endangered, Threatened or Special Concern species present within the vicinity of the subject property; however, the records did indicate that the Purplish Copper (S3) may be

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present. I wish to confirm the presence of this species, as well as request information related to the presence of any additional SAR listed under the Endangered Species Act 2007 located within the surrounding area.

I look forward to the MNRF's response and if further information is required please feel free to contact the undersigned at (905) 882-1100 ext. 6860.

Yours very truly,

MMM GROUP



Dallas Taylor, M.Sc.
Ecologist - Fisheries
Ecology Department

Enclosure: Figure 1: Study Area



Figure 1: Study area and alignment shown in red.

Lorraine Adderley

From: Dallas Taylor
Sent: January-07-16 2:37 PM
To: Lorraine Adderley
Subject: FW: Information Request - Second Avenue Reconstruction and Widening

FYI see below.



Dallas Taylor, M. Sc.
Ecologist – Fisheries
Écologiste – Pêches

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From: Hall, Mike (MNRF) [<mailto:mike.hall@ontario.ca>]
Sent: January-07-16 2:34 PM
To: Dallas Taylor
Cc: Riche, Brian (MNRF)
Subject: RE: Information Request - Second Avenue Reconstruction and Widening

Dear Mr. Taylor,

Please refer below with regards to your values information request; MNRF_Info Request_Letter_Dec 7 2015.pdf, regarding Second Avenue:

Significant natural features;

Species at Risk (SAR); **no known occurrences – these are Patented lands and MNRF has not received any incidental SAR occurrences and is unaware of any assessment efforts regarding SAR,**

Fisheries information such as fish community data, the thermal regime, timing windows and habitat sensitivity for the watercourse crossings along the proposed alignments; **watercourses in the identified area have not been assessed, they are however, considered warm water fisheries and subject to an in-water timing constraint from April 1st to June 15th,**

Natural heritage features; **no known values,**

Wetlands (Provincially significant or unevaluated); **none identified or apparent,**

Area of Natural or Scientific Interests (ANSI); and **none identified,**

Other significant natural features **none identified,**

As mentioned the area identified is primarily patented lands and the lack of values information, particularly for species at risk, may reflect a lack of assessment effort rather than an absence of a given species. If a species at risk is encountered at any time during this project, please contact the undersigned immediately for direction with regards to Endangered Species Act implications.

Regards,

Mike

Mike Hall

Management Biologist
Sudbury District
(705) 564-7862
mike.hall@ontario.ca

From: Dallas Taylor [TaylorD@mmm.ca]
Sent: Monday, December 07, 2015 4:43 PM
To: Riche, Brian (MNRF)
Cc: Lorraine Adderley
Subject: Information Request - Second Avenue Reconstruction and Widening

Dear Mr. Riche,

On behalf of MMM Group, a WSP company, please find the attached information request letter for the proposed Second Avenue Reconstruction and Widening project. Please feel free to contact me with any questions you may have.

Best regards,



Dallas Taylor, M. Sc.
Ecologist – Fisheries
Écologiste – Pêches

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Lorraine Adderley

From: Dallas Taylor
Sent: December-10-15 4:53 PM
To: linda.lachance@sudbury.ca
Cc: Lorraine Adderley
Subject: Information Request - Second Avenue Reconstruction and Widening
Attachments: NDCA_Info Request_Letter_Dec 10 2015.pdf

Dear Ms. Lachance,

On behalf of MMM Group, a WSP company, please find the attached information request letter for the proposed Second Avenue Reconstruction and Widening project. As I was unsure to whom I should address this letter, I have addressed it to you. If you could please forward this letter to any individuals who would be able to provide the requested information, it would be greatly appreciated.

Please feel free to contact me with any questions you may have.

Best regards,



Dallas Taylor, M. Sc.
Ecologist – Fisheries
Écologiste – Pêches

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December 10, 2015

Linda Lachance
Administrative Assistant

Nickel District Conservation Authority (NDCA)
199 Larch Street, 4th Floor
Suite 401
Sudbury, Ontario
P3E 5P9

**Subject: Information Request
Ecological investigations for the Proposed Second Avenue Reconstruction and Widening
from First Avenue to Donna Drive**

Dear Ms. Lachance,

The City of Greater Sudbury has retained MMM Group, a WSP company, to undertake an ecological screening of the proposed reconstruction and widening of Second Avenue between First Avenue (17T 504890 5149018) and Donna Drive (17T 504753 5150048) (study area shown on Figure 1). The works involved include the widening of Second Avenue, a rehabilitation of a storm sewer outfall and a realignment of the cemetery roads with Scarlett Road. At this time I would like to initiate consultation with the NDCA to formally request background information for the study area, including:

- Regulation limits (GIS shapefile, if possible);
- Significant natural features;
- Fisheries information such as fish community data, the thermal regime, timing windows and habitat sensitivity for the watercourse crossings along the proposed alignments;
- Natural heritage features;
- Wetlands;
- Area of Natural or Scientific Interests (ANSI); and
- Other significant natural features

Please indicate the associated setback / buffers associated with any of the identified significant natural feature located within the proposed alignments (i.e. wetlands). Any other information that you may see relevant would be greatly appreciated.

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I look forward to the NDCA's response and if further information is required please feel free to contact the undersigned at (905) 882-1100 ext. 6860.

Yours very truly,

MMM GROUP



Dallas Taylor, M.Sc.
Ecologist - Fisheries
Ecology Department

Enclosure: Figure 1: Study Area

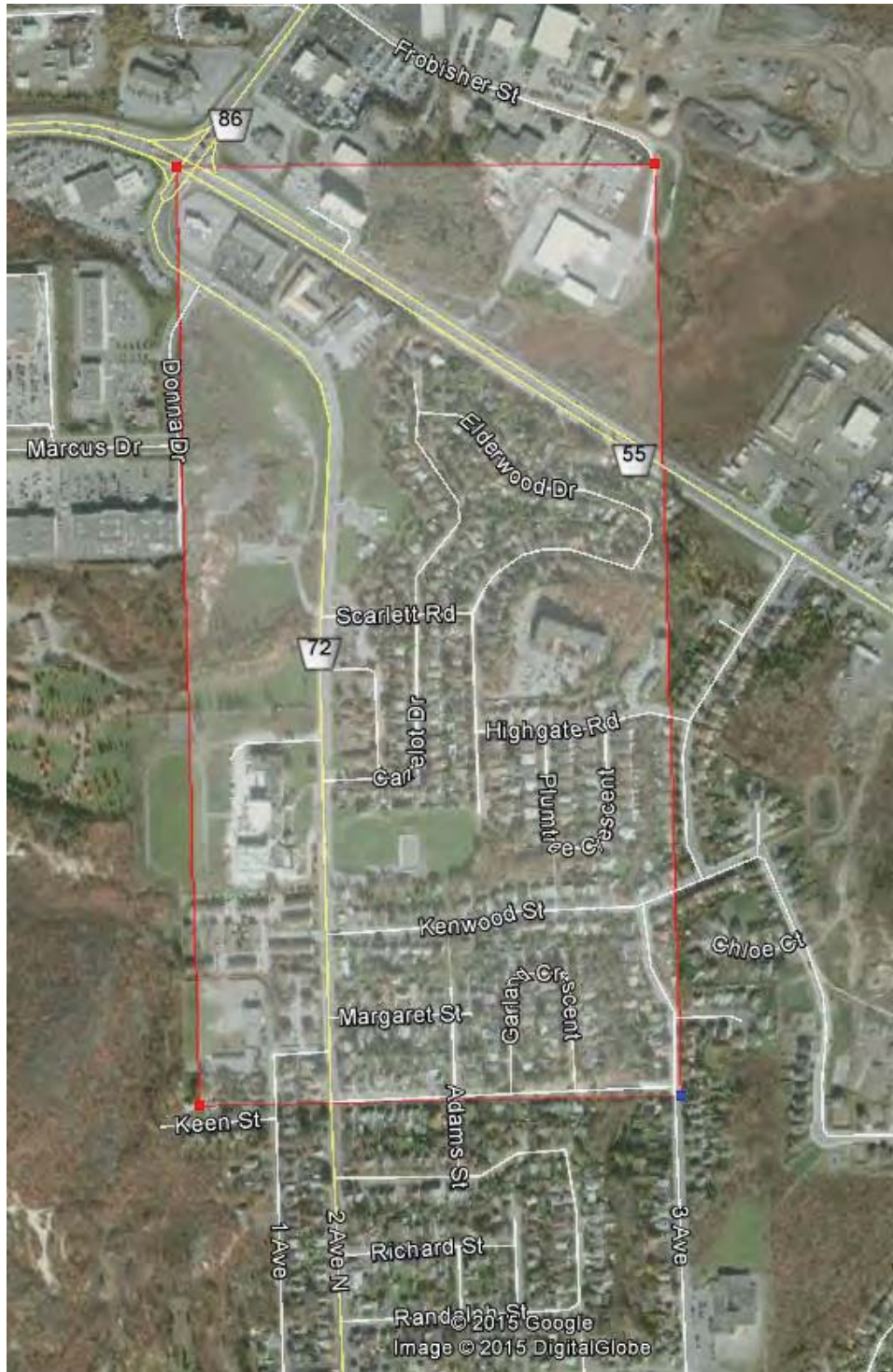


Figure 1: Study area.



Also Operating as Nickel District Conservation Authority
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Sudbury, ON P3E 5P9
☎ (705) 674-5249 ✉ (705) 674-7939
www.nickeldistrict.ca

December 16, 2015

MMM Group Limited
100 Commerce Valley Drive W.
Thornhill, ON L3T 0A1

Attention: Dallas Taylor, Ecologist
Ecology Department

Dear Sir or Madam:

Re: Information Request - Ecological Investigations for Proposed Second Avenue
Reconstruction & Widening Project, Sudbury

Further to your request for information, we provide the following information.

Attached are maps showing the regulation limits for the watercourse located adjacent to Second Avenue. The limits are for a 30 metre setback on each side of the centre line of the creek. With regard to the wetlands, the setback from area less than 2 hectares is 30 metres, and larger than 2 hectares, 120 metres.

All of the other information you requested falls under the purview of the Ministry of Natural Resources and Forestry, Sudbury office. We do not have documentation on the data you requested.

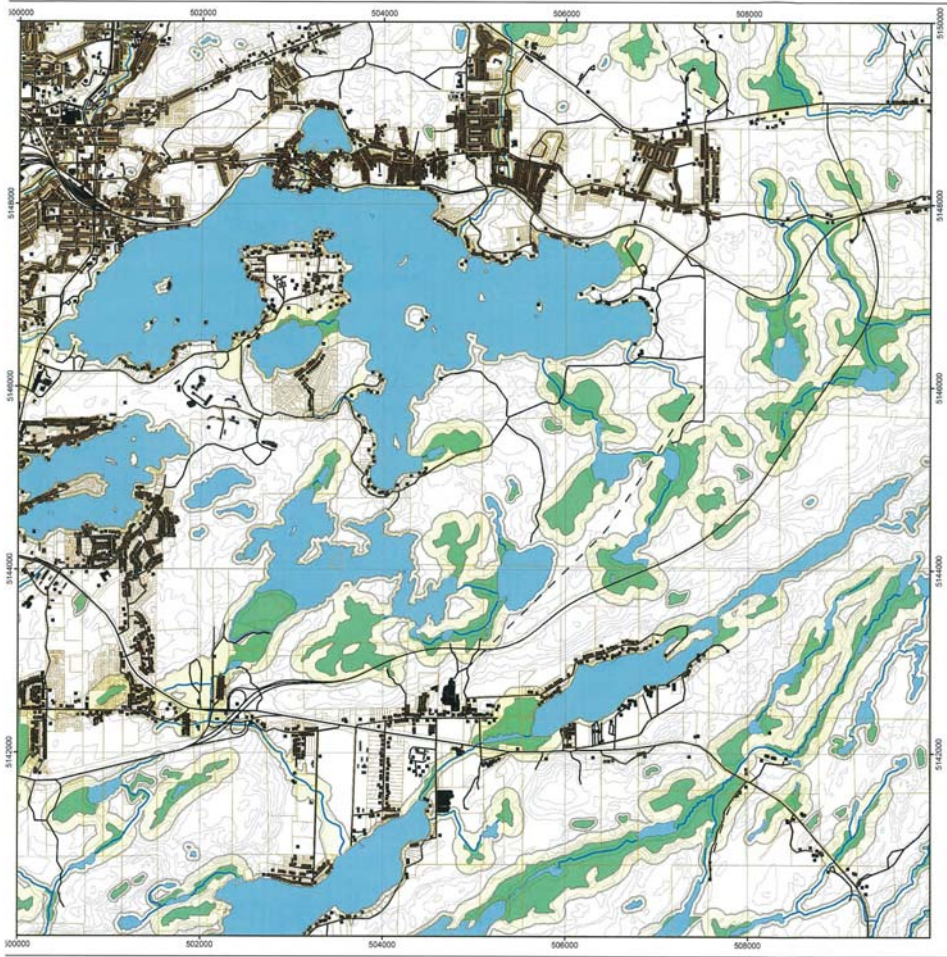
I trust this is satisfactory.

Yours truly,

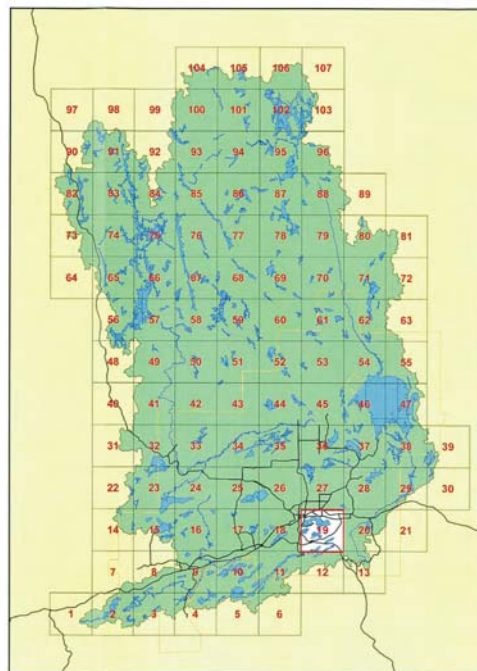
A handwritten signature in black ink, appearing to read "Dennis Lenz".

Dennis Lenz
Regulations Officer

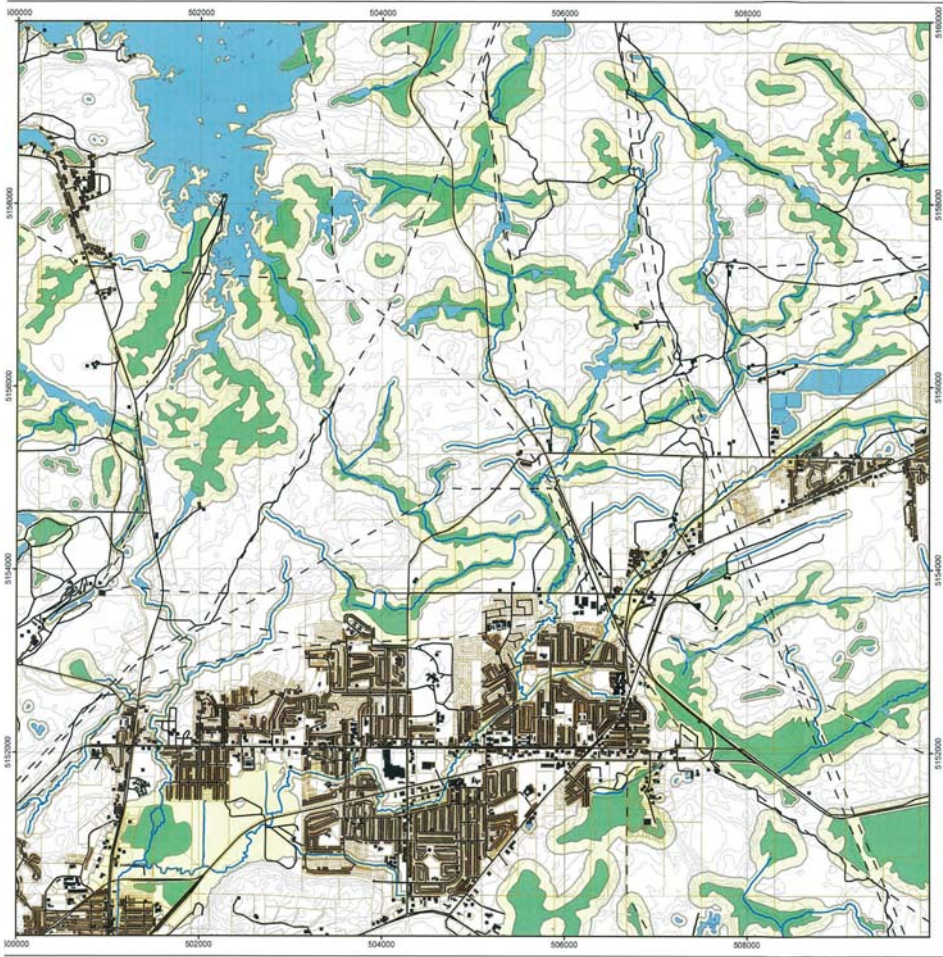
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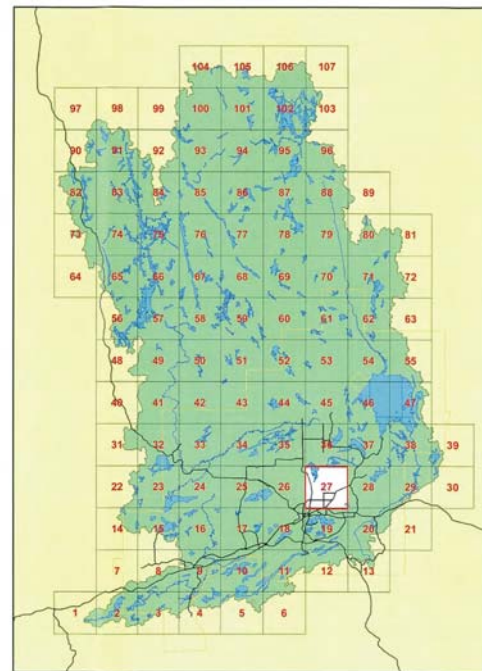
- Legend**
- NDC Watershed
 - Municipal_BND
 - Potential Wetlands
 - Regulation Limits
 - Lakes
 - Parcels
 - Contours
 - Railway
 - Road
 - Utility Line



<p>(ONTARIO REGULATION 97/04) REGULATION OF DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES ONTARIO REGULATION 156/06</p>	<p>Map No 19 of 107</p>
<p>PLOT DATE: FILE</p>	



- Legend**
- NDCA Watershed
 - Municipal_BND
 - Potential Wetlands
 - Regulation Limits
 - Lakes
 - Parcels
 - Contours
 - Railway
 - Road
 - Utility Line



<p>(ONTARIO REGULATION 97/04) REGULATION OF DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES ONTARIO REGULATION 156/06</p>	<p>Map No 27 of 107</p>
<p>PLOT DATE: F.R.E.</p>	



APPENDIX B – SAR SCREENING

Species At Risk Designations	
ENDANGERED	
THREATENED	
SPECIAL CONCERN	
EXTIRPATED	

Species	ESA Status ¹ and Regional Occurrence	ESA Protection ²	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Birds								
Bobolink (<i>Dolichonyx oryzivorus</i>)	THR	Species and General Habitat Protection	MNRF website: SAR by area – Greater Sudbury Region	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands (MNRF Guelph - Waterloo List, 2014)	Minimal – A small area of marginal habitat exists in cultural meadows surrounding the dog park west of Second Avenue. This area is small, and disturbed and as such is unlikely to provide habitat for this species.	Field Reconnaissance	None observed (out of season)	Minimal likelihood and magnitude – The habitat present in the study area is small and disturbed and unlikely to support Bobolink. As such this is not anticipated to have an impact on this species.
Eastern Meadowlark (<i>Sturnella magna</i>)	THR	Species and General Habitat Protection	MNRF website: SAR by area – Greater Sudbury Region	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps (MNRF Guelph - Waterloo List, 2014)	Moderate – A small area of potential habitat exists in cultural meadows surrounding the dog park west of Second Avenue. This area is small, and disturbed and as such is unlikely to provide habitat for this species.	Field Reconnaissance	None observed (out of season)	Minimal likelihood and magnitude – The habitat present in the study area is small and disturbed and unlikely to support Bobolink. As such this is not anticipated to have an impact on this species.
Peregrine Falcon <i>anatum/tundrius</i> (<i>Falco peregrinus anatum/tundrius</i>)	THR	N/A	MNRF website: SAR by area – Greater Sudbury Region	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas (MNRF Guelph - Waterloo List, 2014)	Minimal – Appropriate nesting habitat not present in study area. Foraging vagrants are possible.	Field Reconnaissance	None observed	None – Appropriate nesting habitat is not present and therefore would not be impacted.
Short-eared Owl (<i>Asio flammeus</i>)	SC	N/A	MNRF website: SAR by area – Greater Sudbury Region	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields (MNRF Guelph - Waterloo List, 2014)	Moderate – As this species is a habitat generalist, potential foraging habitat exists in the cultural meadows and parklands in the study area.	Field Reconnaissance	None observed	Minimal likelihood and magnitude – Small areas of cultural meadow will be lost due to the Second Avenue road expansion; this is not anticipated to have a significant impact on this species.
Fish								
Lake Sturgeon (Great Lakes-Upper Street Lawrence) (<i>Acipenser fulvescens</i>)	THR	Species and General Habitat Protection	MNRF website: SAR by area – Greater Sudbury Region	Freshwater lakes and rivers with soft bottoms of mud, sand or gravel at depths of five to 20 m. Spawning usually occurs in shallow, fast flowing water below dams, waterfalls or rapids with gravel and boulders (MNRF Species Profile Online 2014).	Minimal – Ramsey Lake is unlikely to serve as Sturgeon habitat. Therefore this species would not be present in Korpela Creek.	Field Reconnaissance	None observed (out of spawning season)	None – The proposed works to the storm sewer outlet at Korpela Creek are not anticipated to impact this species.
Insects								
Monarch (<i>Danaus plexippus</i>)	SC	N/A	MMM	Exist primarily wherever milkweed and wildflowers exist: abandoned farmland, along roadsides, and other open spaces (MNRF Guelph - Waterloo List, 2014)	High/Minimal – Monarch butterflies are common foragers in cultural meadow habitats, like those present in the study area. No milkweed (<i>Asclepias</i> spp.) plants were observed in the study area. As this species depends on milkweed for reproduction, there is a minimal likelihood of breeding habitat being present.	Field Reconnaissance	None observed (out of season)	Minimal likelihood and magnitude – No milkweed (<i>Asclepias</i> spp.) plants were observed in the study area. As this species depends on milkweed for reproduction, breeding habitat is not expected to be impacted. However small areas of cultural meadow will be lost due to the Second Avenue road expansion, this meadow likely provides foraging habitat for the species.
Reptiles								

Species	ESA Status ¹ and Regional Occurrence	ESA Protection ²	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Blanding's Turtle (<i>Emydoidea blandingii</i>)	THR	Species and General Habitat Protection	MNRF website: SAR by area – Greater Sudbury Region	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams (MNRF Guelph - Waterloo List, 2014)	Minimal – Appropriate habitat is not present in the study area or in the vicinity of the study area.	Field Reconnaissance	None observed (out of season)	None – No habitat is expected to be impacted in the study area.
Snapping Turtle (<i>Chelydra serpentina</i>)	SC	N/A	MNRF website: SAR by area – Greater Sudbury Region	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits (MNRF Guelph - Waterloo List, 2014)	Moderate – Potential habitat exists in Korpela Creek into which the storm sewer outlets.	Field Reconnaissance	None observed (out of season)	Minimal likelihood and magnitude – If mitigation measures are applied, and instream habitat is restored minimal impacts will occur to this species.
Milksnake (<i>Lampropeltis triangulum</i>)	SC	N/A	MNRF website: SAR by area – Greater Sudbury Region	Generally occur in rural areas, where it is most frequently reported in and around buildings, especially old structures. It is also found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. They must also be in proximity of water, and suitable locations for basking and egg-laying (MNRF Guelph - Waterloo List, 2014)	Moderate – Potential habitat exists in the natural and cultural habitats of the site. Water and basking locations were available both east and west of second avenue.	Field Reconnaissance	None observed (out of season)	Moderate likelihood and Minimal magnitude – If recommended mitigation measures are applied, and habitat is restored following works minimal impacts will occur to this species.
Reptiles								
Northern Long-eared Bat (Northern Myotis) (<i>Myotis septentrionalis</i>)	END	Species and General Habitat Protection	MMM	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.) (MNRF Guelph - Waterloo List, 2014)	Moderate – Potential overwintering habitat exists in the old quarry west of Second Avenue. Potential roosting habitat is unlikely in the study area as all forest were young and lacking large diameter trees.	Field Reconnaissance	None observed (out of season)	Minimal likelihood and magnitude – Habitats which could serve as hibernation or roosting habitat are well outside of the proposed work areas.
Small-footed Bat (<i>Myotis leibii</i>)	END	Species and General Habitat Protection	MMM	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark (MNRF Guelph - Waterloo List, 2014)	Moderate – Potential overwintering and maternal roosting habitat exists in the old quarry west of Second Avenue and on the rock barns.	Field Reconnaissance	None observed (out of season)	Minimal likelihood and magnitude – Habitats which could serve as hibernation or roosting habitat are well outside of the proposed work areas.
Little Brown Bat (Little Brown Myotis) (<i>Myotis lucifugus</i>)	END	Species and General Habitat Protection	MMM	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh) (MNRF Guelph - Waterloo List, 2014)	Moderate – Potential overwintering habitat exists in the old quarry west of Second Avenue. Potential roosting may occur in attics of adjacent residential houses in the study area.	Field Reconnaissance	None observed (out of season)	Minimal likelihood and magnitude – Habitats which could serve as hibernation or roosting habitat are well outside of the proposed work areas.

APPENDIX C – AQUATIC HABITAT PLATES



Plate 1: Looking upstream from storm sewer outlet at unnamed watercourse (November 26, 2015).



Plate 2: Intersection of storm sewer outlet and unnamed watercourse (November 26, 2015).



Plate 3: Storm sewer outlet at unnamed watercourse. Headwall and culvert to be replaced (November 26, 2015).



Plate 4: Riparian vegetation on banks of unnamed watercourse, downstream of storm sewer outlet (November 26, 2015).



Plate 5: Culverts under Kenwood St for unnamed watercourse (November 26, 2015).



Plate 6: Valleyland drainage in forest west of Second Ave. (November 26, 2015).



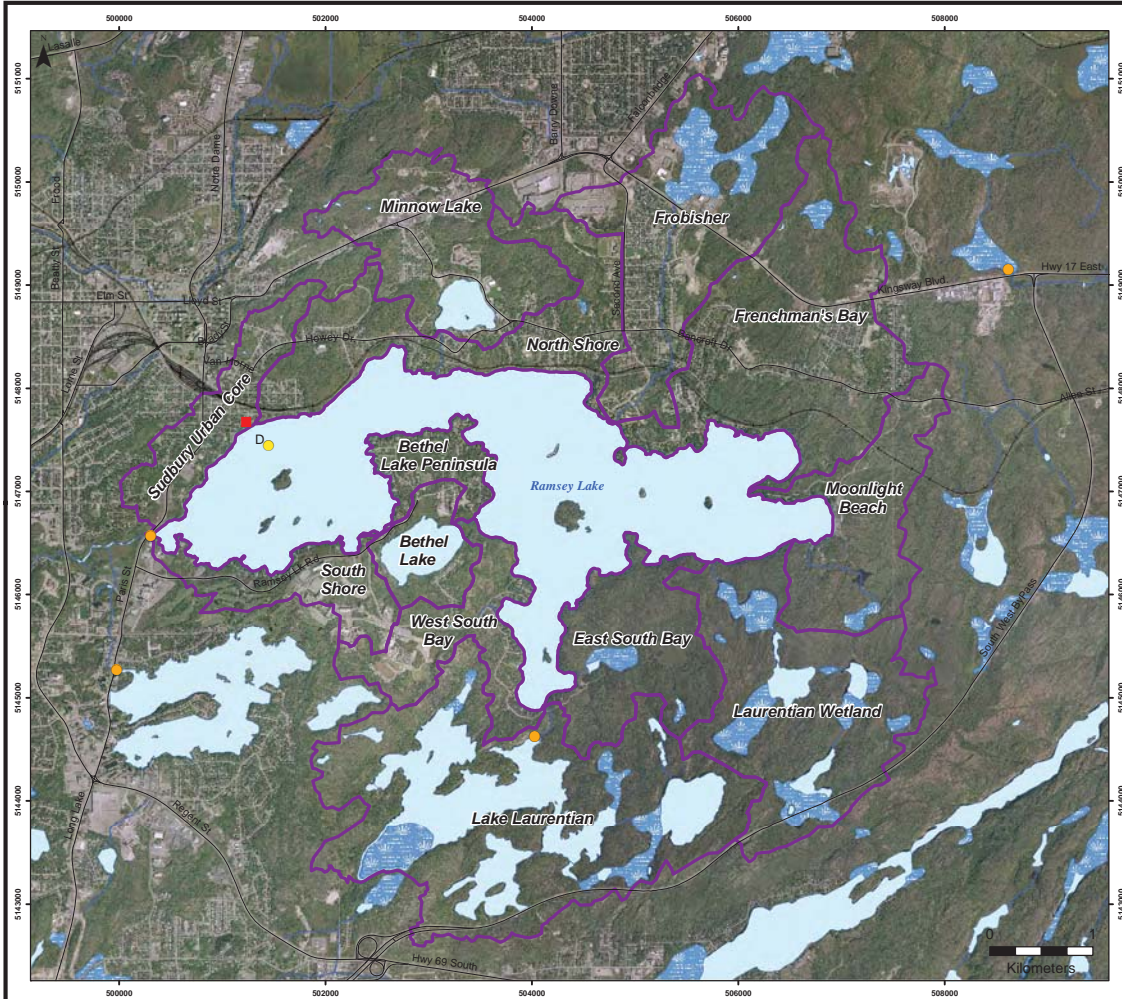
Plate 7: Localized ponding of valleyland drainage feature in forest west of Second Ave. (November 26, 2015).



Plate 8: End of drainage flow in forested valley west of Second Ave. (November 26, 2015).

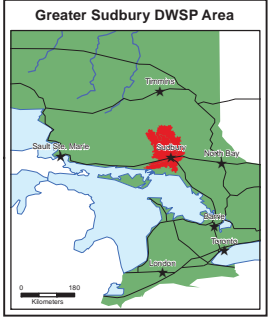
APPENDIX D

Ramsey Lake Subwatershed Map



Legend

- D Surface Water Intake
- Dams
- Water Treatment Plant
- Ramsley Lake Subwatersheds
- Roads
- Railway
- ~ Rivers
- Lakes
- Wetlands



This map has been prepared to meet provincial requirements under the Clean Water Act, 2006 and should not be used for other purposes without consultation with the responsible conservation authority and should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation.

This publication was produced by:
 Nickel District Conservation Authority
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Data Acknowledgement:
 Members of the Ontario Geospatial Data Exchange
 City of Greater Sudbury
 WESA Inc.
 Golder Associates Ltd.

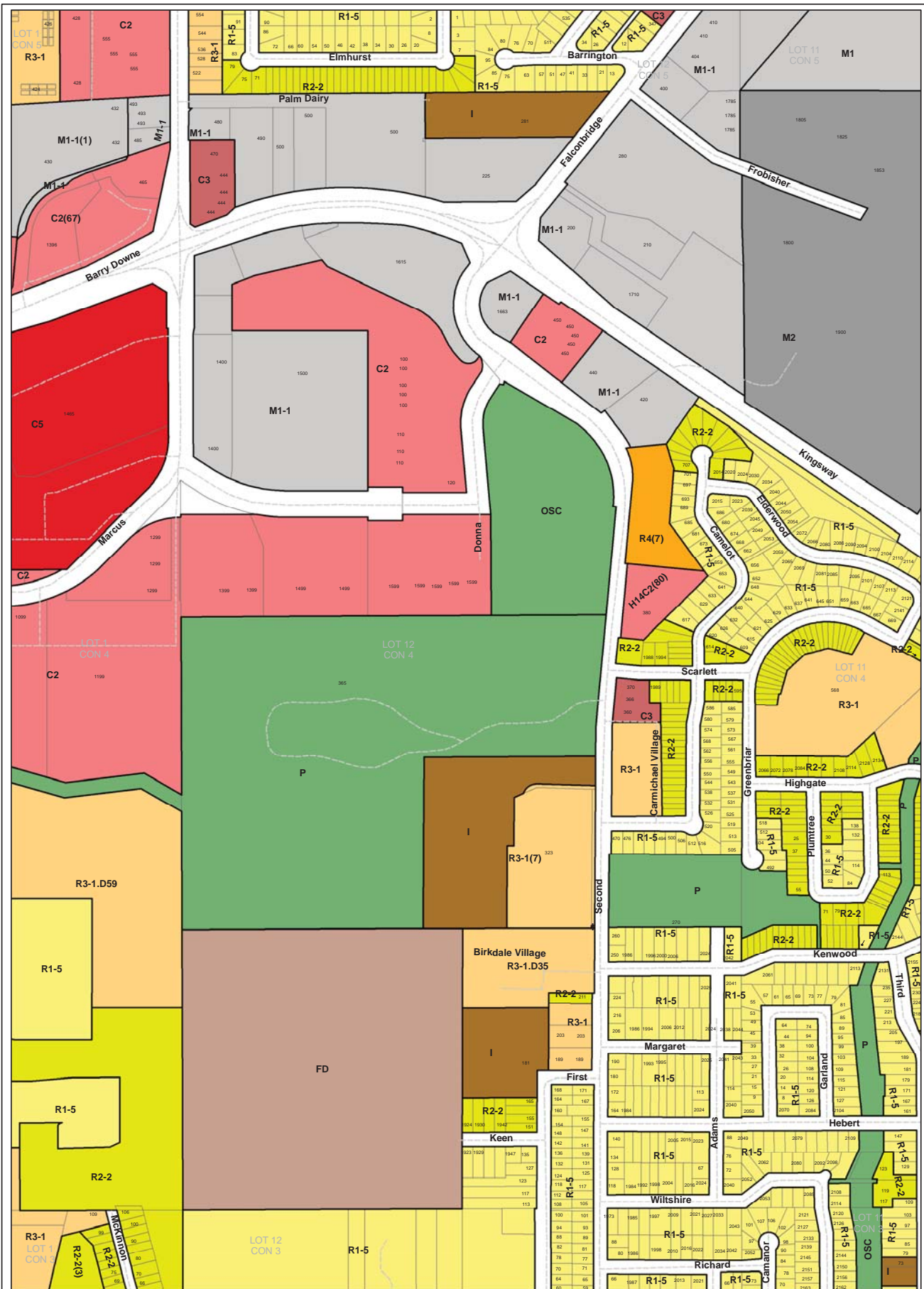
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 Map Projection & Datum: UTM NAD83 Zone 17N



Made possible by the Government of Ontario.

APPENDIX E

Schedule A – Zone Maps By Law 2010-100Z

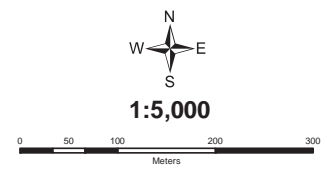


- Zone Overlays**
- Flood Fringe (FF)
 - Flood Plain (FP)
 - CGS Boundary
 - Zone Boundaries
 - Well Head Protection Overlay (WPA)

NEELON TWP LOT 12 CON 4

Schedule A - Zone Maps
By-law 2010-100Z

City of Greater Sudbury



August 13, 2015

APPENDIX F

Stage 1 Archaeological Assessment

ORIGINAL REPORT
WOODLAND HERITAGE SERVICES LIMITED
STAGE ONE ARCHAEOLOGICAL ASSESSMENT

STAGE 1 ARCHAEOLOGICAL RESOURCE ASSESSMENT OF THE SECOND AVENUE ROAD WIDENING PROJECT, FROM DONNA DRIVE TO FIRST AVENUE, IN LOT 12 CONCESSION 4 AND LOT 11 CONCESSION 4, NEELON TOWNSHIP, CITY OF GREATER SUDBURY, SUDBURY DISTRICT.

Prepared for

**THE CITY OF GREATER SUDBURY
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Submitted by

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Our Project # J2014-50**

January 23, 2015

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THE CITY OF GREATER SUDBURY
PO BOX 5000, STN 'A',
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Re: Stage 1 Archaeological Resource Assessment Of The Second Avenue Road Widening Project, From Donna Drive to First Avenue, in Lot 12 Concession 4 and Lot 11 Concession 4, Neelon Township, City of Greater Sudbury, Sudbury District.

Please find attached a copy of an initial Archaeological Resource Assessment Report for the above captioned project.

As required by archaeological licence regulations, we will file a digital copy in the specified format via the Ministry of Tourism, Culture and Sport's (MTCS) PastPort Portal for review on your behalf.

We were pleased to have assisted you with this project and hope to be of continuing service with your future undertakings.

Yours truly,
WOODLAND HERITAGE SERVICES LIMITED.



John Pollock
JP/rp, Enclosures

Executive Summary

On September 8th, 2014 Woodland Heritage Services undertook a ground based Stage 1 archaeological resource property assessment in advance of the proposed widening of Second Avenue from Donna Drive to First Avenue and the associated storm sewer work extending to the east through a park towards Plumtree Crescent, in Neelon Township, City of Greater Sudbury, Sudbury District. Refer to Maps 1 and 2.

The field inspection did not locate any areas of archaeological potential. The areas along Second Avenue where disturbances are anticipated have already been disturbed during previous road construction and maintenance work, as well as through the creation of roadside drainage features. Additionally, the stream area was examined and it was revealed that it is, in effect, a seasonally dry gully with non-navigable water. The stream area has also been disturbed through channelization in order to improve drainage. Refer to Images 1-26 and Maps 6 and 7.

Recommendation from Section 2.2

As no areas of archaeological potential were located on the subject property, it is recommended that no further archaeological work be required in advance of the widening of Second Avenue from Donna Drive to First Avenue, and the associated storm sewer work in Lot 12 Concession 4 and Lot 11 Concession 4, Neelon Township, City of Greater Sudbury, Sudbury District.

Project Personnel

John Pollock, P016	- Project Director
Ryan Primrose, P208	- Field Director
David Gadzala, R1040	- Report Author
Mark Bradford	- Archaeological Assistant, Compliance Officer
Daxon Primrose	- Wildlife Control Officer

Acknowledgements

Woodland Heritage Services Limited would like to acknowledge the help of The City of Greater Sudbury for providing maps, coordinates and background information.

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Limitations to this report

Some information in this report may be confidential, including any photos, maps, texts of narrative information concerning First Nation communities and / or private informants. The Freedom of Information and Protection of Privacy Act requires that this information be kept secure and not be distributed to unauthorized parties. Further, the Standards and Guidelines for Consultant Archaeologists (2011), Section 7.3.3 requires that such information is not contained in reports which may be entered into the Ontario Public Register of Archaeology Reports. As such, this information, although available to the report author, may not be transmitted as part of the report package except as required for Ministry of Tourism, Culture and Sport review.

Some information in this report may be sensitive, including the location of registered archaeological sites. Policy developed under the Ontario Heritage Act requires that this information be kept secure and not be distributed to unauthorized parties. Further, the Standards and Guidelines for Consultant Archaeologists (2011), Section 7.6.1, standard 1 requires that any information that identifies the location of an archaeological site be presented only in the supplementary documentation to the report. The supplementary documentation is excluded from the Ontario Public Register of Archaeology Reports. As such, this information, although available to the report author, may not be transmitted as part of the report package except as required for Ministry of Tourism, Culture and Sport review.

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As set out in the Ontario Heritage Act and associated Regulations, archaeological assessment has as its focus only material remains of past human use and occupation of landscapes. Archaeological assessments completed under the terms and conditions of a licence issued under the authority of the Ontario Heritage Act do not directly involve documenting Native values, traditional land use, traditional ecological knowledge or traditional territories. While this information is at times valuable in evaluating archaeological potential or interpreting archaeological sites, the use of such information does not render it part of the archaeological record. Control over the recording and use of this information rests solely with the individuals and communities wherein the knowledge resides.

1.0 PROJECT BACKGROUND

This section of the project report provides the context for the archaeological fieldwork. The project background section covers three areas: development context (including regulatory context), historical context, and archaeological context.

1.1 Development context

Woodland Heritage Services Limited was retained by the City of Greater Sudbury to complete a Stage 1 Archaeological Resource Assessment in advance of the widening of Second Avenue from Donna Drive to First Avenue and the associated storm sewer work extending to the east through a park towards Plumtree Crescent, in Neelon Township, City of Greater Sudbury, Sudbury District (Maps 1 and 2).

The archaeological fieldwork was completed in advance of any new ground disturbing activities. The locations can be located by referring to Maps 1, 2, 6, and 7.

Woodland Heritage Services received permissions to pass on the properties and perform all activities related to Stage 1 archaeological and cultural heritage assessments.

1.1.1 Regulatory Context

This Archaeological and Cultural Heritage Resource Assessment Study was undertaken within the context of the *Planning Act* and the 2005 Provincial Policy Statement issued under the authority of the *Planning Act*.

According to the 2005 Provincial Policy Statement, "Ontario's long-term prosperity, environmental health, and social well-being depend on protecting natural heritage, water, agricultural, mineral and cultural heritage and archaeological resources for their economic, environmental and social benefits," (p.15). Section 2.6 of the Provincial Policy Statement outlines the *Planning Act's* approach towards cultural heritage and

archaeology:

2.6 CULTURAL HERITAGE AND ARCHAEOLOGY

2.6.1 *Significant built heritage resources and significant cultural heritage landscapes shall be conserved.*

2.6.2 *Development and site alteration shall only be permitted on lands containing archaeological resources or areas of archaeological potential if the significant archaeological resources have been conserved by removal and documentation, or by preservation on site. Where significant archaeological resources must be preserved on site, only development and site alteration which maintain the heritage integrity of the site may be permitted.*

2.6.3 *Development and site alteration may be permitted on adjacent lands to protected heritage property where the proposed development and site alteration has been evaluated and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved.*

Mitigative measures and/or alternative development approaches may be required in order to conserve the *heritage attributes* of the *protected heritage property* affected by the adjacent *development or site alteration*.

As such, before the City of Greater Sudbury can widen Second Avenue, an archaeological resource assessment must be undertaken.

Generally, archaeological resource assessment studies are classified as Stage 1 through Stage 4, as follows:

- **Stage 1:** Preliminary assessment to determine if there are any known significant archaeological resources in the immediate vicinity of or on the subject property and the potential of the site to have heritage resources.

- **Stage 2:** Completion of a property inspection by a licensed archaeologist if the Stage 1 assessment identified known resources or the presence of archaeological potential areas, if recommended.
- **Stages 3 and 4:** Advanced site-specific archaeological mitigation through excavation, documentation or avoidance, if recommended.

As mentioned above, a Stage One Assessment is an overview of potential archaeological sites which under regulations involves field visits and potential mapping but no detailed site mapping or test pits which would be part of a Stage Two project.

Under the Ontario Heritage Act, (R.S.O. 1990) anyone wishing to carry out archaeological fieldwork in Ontario must meet the following criteria:

- Have a licence from the Ministry of Tourism, Culture and Sport.
- File a report with the Ministry of Tourism, Culture and Sport containing details of the fieldwork that has been done for each project.
- File information about the archaeological site with the Ministry of Tourism, Culture and Sport for each project.

Under Ontario Regulation 8/06 of the Ontario Heritage Act, “consultant archaeologist” means “an archaeologist who enters into an agreement with a client to carry out or supervise archaeological fieldwork on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client”.

Refer to Section 3.0 of this report titled, “Advice on compliance with legislation” for more information.

1.2 Historical context

In pre-contact and early historic times prior to the arrival of Europeans, First Nations Peoples were active in the study area. Evidence of human activity can be traced back to the retreat of the last series of glaciers.

1.2.1 First Nation Archaeological Overview

In pre-contact and early historic times prior to the arrival of Europeans, First Nations Peoples were active in the study area. Evidence of human activity can be traced back to the retreat of the last series of glaciers.

Archaeologists generally divide the historic sequence in Ontario into pre-European contact and post-European contact. The pre-contact historical sequence is further subdivided into temporal/cultural periods based on material culture traits and settlement patterns derived from archaeological data. The pre-contact sequence is divided as follows:

- Late Paleo-Indian (circa 7,000 - 5000 BC)
- Shield Archaic (circa 5,000 - 500 BC)
- Middle Woodland (circa 500 BC - AD 1200)
- Late Woodland (circa AD 1200 - 1600)

Archaeologists' understanding of the post-European contact period is based in both archaeological and documentary research. The post-contact historical sequence can be described in terms of significant themes relating to the consecutive waves of influence from, primarily, eastern Canada. The post-contact historic sequence is generally subdivided according to the main Euro-Canadian economic or political trends. The major post-contact periods in northeastern Ontario are divided as follows:

- Early post-contact (circa AD 1600 – 1865)

Survey and Development (circa AD 1865 – 1940)

Additional subdivision of each period is possible, depending on the historical themes being examined. In this report, we have identified a series of sub-themes based on the development of resource industries in the region and vicinity of the subject property.

Following is a brief summary of the relevant archaeological periods for northeastern Ontario, which appears to begin with the Shield Archaic.

Shield Archaic. The earliest known inhabitants of the northeastern Ontario some 6,000 – 8,000 years ago were the Shield Archaic Peoples. In northern Ontario, this period represents about 4,000 years of occupation of an area stretching from Manitoba to Quebec. The Shield Archaic appears to evolve directly out of the preceding Late Palaeo period (not known archaeologically in northeastern Ontario), although there are several key differences in material culture. While Shield Archaic quarry/workshop and habitation sites continue the use of the same raw materials and a similar lithic technology centred on the production of large bifaces and somewhat less refined lanceolate points, over time, this technology yields to a wider variety of projectile point styles, including various forms of stemmed and notched points. Of interest in northern Ontario is the rise in the use of native copper in the production of tools and decorative items (Wright, 1972a; Pollock, 1984).

The initial Shield Archaic peoples appear to have been wide ranging big game hunters. As the environment stabilised following the glacial retreat, these people shifted to an economy of smaller game and fishing which required smaller tools and a more local, territorial seasonal round to exploit resources at different times of the year. This trend from big game to more diverse, local resources appears to have continued through the Shield Archaic period to about 2,000 years ago.

Early Shield Archaic sites may be more closely associated with post glacial landscape features such as relict shorelines. As the environment stabilised, sites became more widely distributed, and associated with suitable occupation locations on modern lakes and rivers.

Middle Woodland (Laurel). In terms of material culture, the Middle Woodland was similar to the preceding Shield Archaic, but with the addition of fired clay pottery. As clay is a more plastic and malleable material than stone, distinct surface variations in decoration and structural variations in vessel construction allow archaeologists to develop refined distinctions between different ceramic types. Middle Woodland pottery vessels are characteristically thin-walled, with straight sided rims and pointed bases and decorations made using plain tool impressions (Wright, 1967).

The Middle Woodland economy appears to have been similar to the Shield Archaic, with seasonal exploitation of a variety of subsistence resources the norm. Based on the distribution of sites, it is understood that extended family groups traversed hunting, fishing or gathering territories in pursuit of large and small game, and fish for subsistence during most of the year. In the summer these groups may have come together into larger bands on larger lakes or rivers. The presence of a series of large ceremonial mounds containing burials, centred on the Rainy River in northwestern Ontario, also suggests that during some years, larger ceremony based gatherings also occurred (Arthurs, 1986; Reid and Rajnovich, 1991).

Other than the summer group campsites, Laurel sites are generally small, possibly reflecting the establishment of a seasonal round which saw the Laurel people break up into individual families during the fall, winter and spring periods of the year to more effectively exploit available resources. Laurel site distribution and settlement patterns differ from the inland site pattern noted for the Archaic period and set the pattern for

settlement in the following Terminal Woodland period. Laurel peoples showed a preference for large lakes and rivers with preferred campsites on sandy bays, portage ends, points, peninsulas and locations near waterfalls, below rapids and at river mouths. These locations served for the establishment of small, seasonal hunting and fishing camps.

Late Woodland (Blackduck and Selkirk). The Middle Woodland (Laurel) material culture appears to have gradually evolved into the late Woodland. This transition is not as evident in the lithic and copper artifacts, but the pottery makes a notable change to thin-walled, globular pots with constricted necks and widened lips decorated using a combination of plain and 'cord-wrapped' object impressions. Two main pottery types are noted by archaeologists who have speculated that a more southerly type (Blackduck) represents early Ojibway culture, while the more northerly type (Selkirk) represents a Cree culture (Wright, 1972b; MacNeish, 1958).

Recent data from northern Ontario suggests a trend toward an increase in population during the Terminal Woodland period reflected in an increased frequency of sites recovered during archaeological surveys. Archaeological evidence suggests that a seasonal cycle of travelling to resource exploitation areas may have been well established during this era. Site locations follow an established pattern with preference given to level places on islands, peninsulas, narrow parts of lakes, sandy beaches and portage ends, as well as rapids and waterfalls on rivers. These people were the ancestors of present day regional cultural/social groups (Settlement Surveys Ltd. 1995:37).

Early Post-Contact (Fur Trade). European contact in northern Ontario was disruptive to the natural evolution of material culture, traditional land use and subsistence practice among indigenous populations. It is understood that traditional material cultural items were supplanted quite rapidly by corresponding trade items imported from Europe. As

the pursuit of furs became increasingly important to the purchase and replacement of trade items, subsistence practices became displaced by exploitation of fur resources. Settlement patterns also changed, although more gradually, trading trips to fur trade posts were introduced, and in some cases settlement occurred at or near fur trade posts or, later, near the railways.

Historical documents also begin to name the indigenous occupants of the region. The northern interior shield area, were inhabited by Anishnabeg Peoples (Ojibwa and Algonquin). Farther north in Ontario was the traditional territory of the Cree. Their first contact with Europeans was with the Recollects and Jesuit missionaries and other French explorers and traders during the period 1616 to 1649 (Lytwyn, 2002).

It is important to note that during the middle decades of the seventeenth century there was a series of intertribal wars for control of the fur trade. These wars involved Iroquoian groups from south of the Great Lakes (Mohawk, Onondaga, Oneida, Seneca and Cayuga) in a conflict against the Huron-Petun and Neutral in southern Ontario. Attempts to form peace or commercial treaties failed, denying the Iroquoian groups access to lucrative northern trade relationships with groups such as the Nipissing, the 'middlemen' of the trade all the way north to James Bay (Hunt 1940:35, 45). In March of 1649, an attack by a party of 1000 Mohawk and Senecas on the Huron town of St. Ignace (Hunt 1940:92) led to the Huron fleeing southern Ontario, and the displacement of numerous other groups in the upper Great Lakes. While many of these groups regained their territories later in the 17th century, the Huron did not.

It should be noted that one or more First Nation or Métis populations live and use the land in, and around the study area. It is not within the scope of a technical archaeological report to comment on the various First Nations and their respective

involvement, land-use and traditional territories. Recent and modern First Nation or Métis histories are best addressed by the First Nations themselves.

1.3 Archaeological context

1.3.1 Registered Archaeological Sites

Before initiation of fieldwork, the site files and catalogued reports at Woodland Heritage Services Ltd. and/or the offices of the Archaeological Data Coordinator, Ministry of Tourism, Culture and Sport were checked to determine if any pre-contact or post-contact archaeological sites had been previously recorded either in or near the study area.

There are no registered archaeological sites within 1 kilometre of the proposed project area.

1.3.2. Current Land Use(s), Field Conditions, Soils and Topography

The project area is located along the side of Second Avenue and as such, it is used primarily for transportation and drainage purposes. Part of the project area is located adjacent to a public park used for recreational purposes. The portion of the study area leading to the mapped stream is used as a residential area.

According to Northern Ontario Engineering Geology Terrain Study (NOEGTS) maps #5001 and 5003, the north portion of the project area is located on a well-drained, low-relief terraced glacial outwash plain typically composed of gravel and sand. The south portion is located on a well-drained, low-relief glacial outwash plain typically composed of sand and silt. This portion of the property is suspected of having a high water table. Refer to Map 3.

The vegetation of this area is typical of the Great Lakes – St. Lawrence transition forest with mixed forest and varying stages of growth. Great Lakes – St. Lawrence transition forests typically feature species such as white pine, spruce, cherry, and birch.

The study area is located within the Canadian Shield and as such, the 2011 Standards and Guidelines relating to Shield regions were followed. For a map showing the project area within the Canadian Shield, refer to Maps 4 and 5.

1.3.3. Fieldwork Schedule

The fieldwork component of the study was carried out September 8th, 2014.

1.3.4. Past Fieldwork

Past fieldwork was carried out by Settlement Surveys / Woodland Heritage Services in the regional study area.

In 2011, a Stage 1 and 2 archaeological assessment was undertaken approximately 5 km to the north on 10 areas along the proposed Maley Drive extension within the City of Greater Sudbury, Ontario (MTCS PIF P208-029-2011; Woodland Heritage Services, 2011). All areas displaying archaeological potential were tested using a sub-surface testing regimen conforming to MTCS requirements. Through the Stage 1 and 2 assessment, it was found that many areas had been previously disturbed or were permanently saturated. No areas of archaeological potential, or archaeological or cultural heritage resources were located. It was recommended that the City of Greater Sudbury be allowed to proceed with their plans to develop the Maley Drive extension without further archaeological work.

In 2010, a Stage 1 archaeological and cultural heritage assessment was carried out as part of G.W.P. No. 5122-06-00 for four Variable Message Sign (VMS) locations in

northeastern Ontario (MTCS PIF P016-287-2010; Woodland Heritage Services, 2011). One location was approximately 10 km east of the proposed project area, roughly 1.2 km. east of Hwy. 90 by Coniston on Highway 17. All four areas were inspected visually and no areas of archaeological potential were identified through the Stage 1 archaeological and cultural heritage assessment. As the areas around VMS #15, VMS #16, VMS#17 and VMS #18 did not have archaeological potential, it was recommended that the proponent be allowed to proceed with their plans of developing the variable message signs.

In 2009, a Stage 1 and 2 Archaeological and Cultural Heritage Resource Assessment was undertaken approximately 5 km to the southeast on a 12.1 km portion of Highway 17 from 1 Km West of Highway 69, easterly to East Junction of Sudbury Municipal Road 55 (MTCS PIF P016-230-2009; Woodland Heritage Services, 2009). Archaeological subsurface testing in a 5m grid pattern in areas of high archaeological potential was conducted, producing negative results for the location of archaeological or cultural heritage resource. It was recommended that the proponent be allowed to proceed with the rehabilitation work and that all former high potential archaeological areas required for the highway construction be reclassified as low potential.

To the best of our knowledge, no archaeological fieldwork has previously been undertaken within the current project area.

1.3.5. Physical features affecting fieldwork strategy, decisions or the identification of artifacts or cultural features.

During the property inspection, it was revealed that the storm sewer work area leading to the mapped stream was privately owned and used for residential purposes. As such, access to these areas was not possible. However, a property inspection at nearby accessible areas of the creek demonstrated that the creek is a seasonally dry gully and

has been disturbed and channelized for drainage purposes. Therefore, it does not display archaeological potential.

According to Standard 1.2.1 of the Ministry of Tourism, Culture and Sport's *2011 Standards and Guidelines for Consultant Archaeologists*, the property inspection coverage was sufficient to identify the presence or absence of any features of archaeological potential within the project area.

2.0 STAGE 1 ASSESSMENT BACKGROUND

This section of the report details the property inspection, areas of identified archaeological potential, and recommendations concerning future archaeological resource work that may be required.

2.1 Stage 1 Analysis and Conclusions

2.1.1 Property Inspection

Prior to the field inspection, satellite imagery, surficial geology mapping, and past Woodland Heritage Services Ltd. reports were used to inform the on-ground survey portion of this Stage 1 assessment. On-ground spot-checks, in addition to transects, were carried out in order to determine the property's cultural heritage value or interest.

Background research into glacial shoreline features did not identify relict areas of immediate post-glacial archaeological potential within the project area. Refer to Map 3.

A variety of land conditions were encountered and documented through detailed photographic, textual and geographic means including the use of multiple handheld GPS devices.

It is important to note that not all water features depicted on the topographic / digital mapping are considered to be associated with archaeological potential. For example, some mapped waterbodies are in actuality small seasonal streams, flooded beaver ponds, or simply dry gullies. These areas do not represent features of archaeological potential. During this assessment, it was revealed that the stream appearing on the City of Greater Sudbury's development plans as well as the National Topographic System (NTS) map was a seasonally dry gully with non-navigable water. Additionally, a pond mapped near the intersection of Second Avenue and Donna Drive was not present; the field inspection demonstrated that it was in actuality a disturbed grassy gravel field (Image 1).

The property inspection was commenced at the northern limit of the property, at the intersection of Second Avenue and Donna Drive. The west side of Second Avenue was examined first, beginning at Donna Drive and extending southwards to First Avenue. Upon reaching the southern boundary of the study area, the property inspection was continued on the east side of Second Avenue, extending northwards towards Donna Drive. Finally, the location of the storm sewer work extending through the park towards Plumtree Crescent was assessed. The mapped "stream" into which the storm sewer flows was also observed in order to provide local environmental and topographical context.

At the northernmost section of the property, a disturbed grassy field with areas of exposed gravel is located on the west side of Second Avenue (Image 1). Immediately to the south, a small knob of exposed bedrock is located adjacent the roadside (Image 2). The shoulder on the west side of the road has been disturbed during previous road construction and maintenance efforts: some areas feature gravel shoulders, including a snow plough turn-around (Images 5, 6, 13, and 14), while other areas are paved (Images 9 and 14) and feature sidewalks (Images 8, 9, and 14). Along Second Avenue, the

roadside has been contoured for drainage purposes (Images 3, 4, 6-9) or for landscaping purposes. A small, gravel side road is located approximately 600 metres north of First Avenue, leading to a disturbed grassy field on mechanically-levelled gravel (Images 10-12).

Much like the west side of Second Avenue, the east side features disturbed paved and unpaved shoulders (Images 15-17, 20, and 21). Private properties and businesses are located adjacent the road, many of which have been paved for parking or landscaped (Images 20 and 21). Roughly 250 metres north of First Avenue, a park is located on the west side of the road (Image 18). The north end of this park, the location of the storm sewer work, has previously been disturbed in order to contour the property for drainage purposes (Image 19).

Finally, the location of the mapped “stream” was assessed. Upon visiting the stream, it was revealed that the stream was in fact a seasonally dry gully with a non-navigable waterbody. The stream bed, though featuring water-tolerant vegetation such as cattails, sedges, and alder, did not contain open water and is largely artificial in nature (Images 22-25). The drainage stream has been modified and channelized, likely during the construction of the subdivision in which it is located. Boulder-embedded concrete was witnessed in some areas functioning as a creek bank and bed (Image 23). The location where the stream crosses Highgate Road to the north was also observed in order to assess the nature of the stream (Image 26).

2.1.2 Identify and describe areas of archaeological potential within the project area.

Areas of archaeological potential were not identified during the field inspection of the proposed project area.

2.1.3 Identify and describe areas that have been subject to extensive and deep land alterations.

Located in urban Sudbury, the entire project area has previously been disturbed. The areas of Second Avenue which are to be impacted by the road widening project have already been disturbed by the construction and maintenance of the road and the creation of roadside drainage features. The “stream” into which the storm sewer drains is not considered to be a feature of archaeological potential; not only does it not have enough water to allow for water-based travel but it has also been disturbed and channelized to improve local drainage.

2.2 Stage 1 Recommendations

As no areas of archaeological potential were located on the subject property, it is recommended that no further archaeological work be required in advance of the widening of Second Avenue from Donna Drive to First Avenue, and the associated storm sewer work in Lot 12 Concession 4 and Lot 11 Concession 4, Neelon Township, City of Greater Sudbury, Sudbury District.

3.0 ADVICE ON COMPLIANCE WITH LEGISLATION

Advice on compliance with legislation is not part of the archaeological record. However, for the benefit of the proponent and approval authority in the land use planning and development process, the report must include the following standard statements:

1.
 - a) This report will be submitted to the Ministry of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that the licensed consultant archaeologist has met the terms and conditions of their archaeological licence, and that the archaeological fieldwork and report

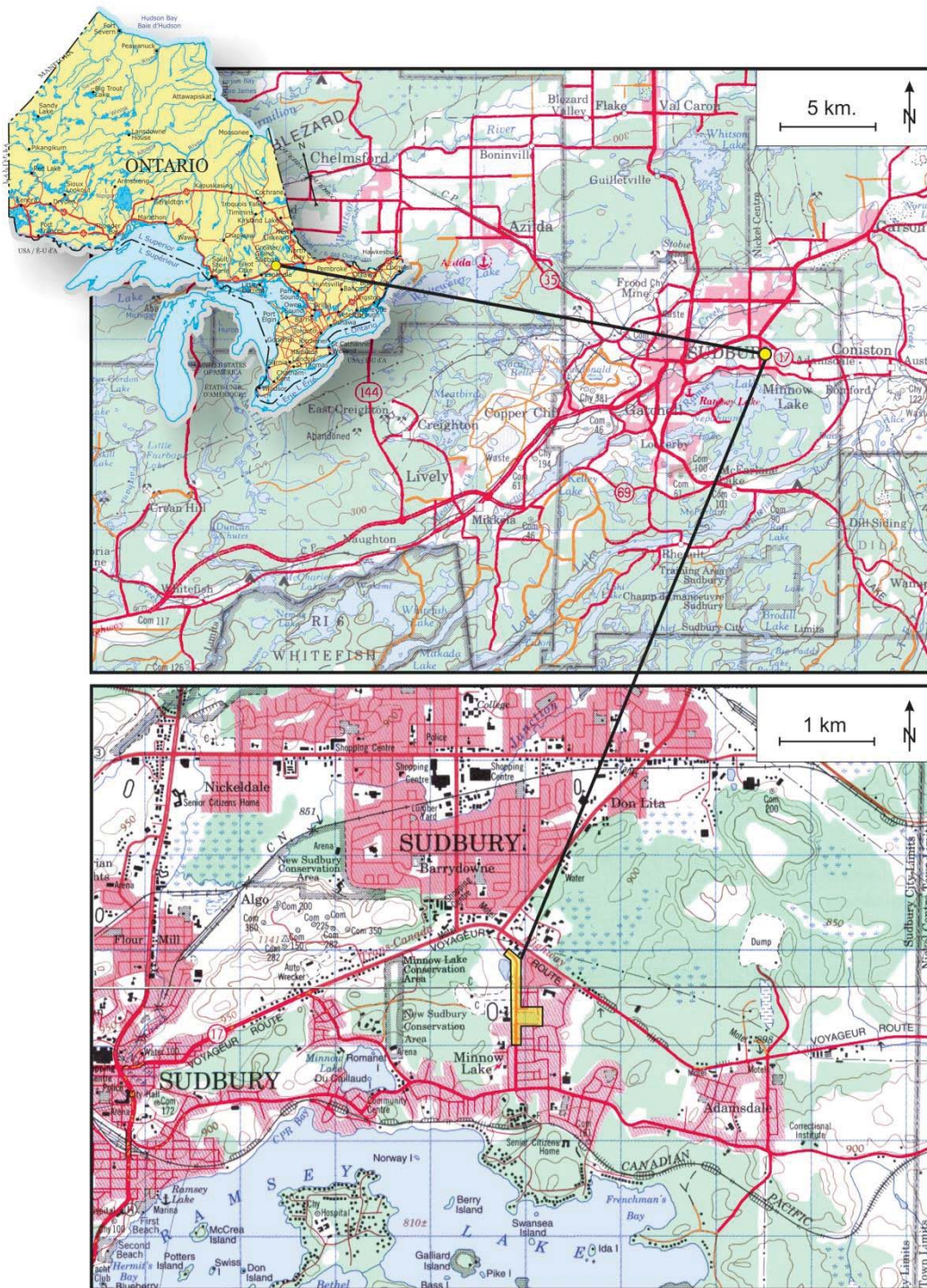
recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario.

- b) It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artefact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeological has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public register of Archaeological Reports referred to in section 65.1 of the *Ontario Heritage Act*.
- c) Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the *Ontario Heritage Act*.
- d) The *Cemeteries Act, R.S.O. 1990 c. C.4* and the *Funeral, Burial and Cremations Services Act, 2002, S.O. 2002, c.33* (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries, Ministry of Small Business and Consumer Services.

2. Reports recommending further archaeological fieldwork or protection for one or more archaeological sites must include the following standard statement:

‘Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed, except by a person holding an archaeological licence’.

4.0 MAPS



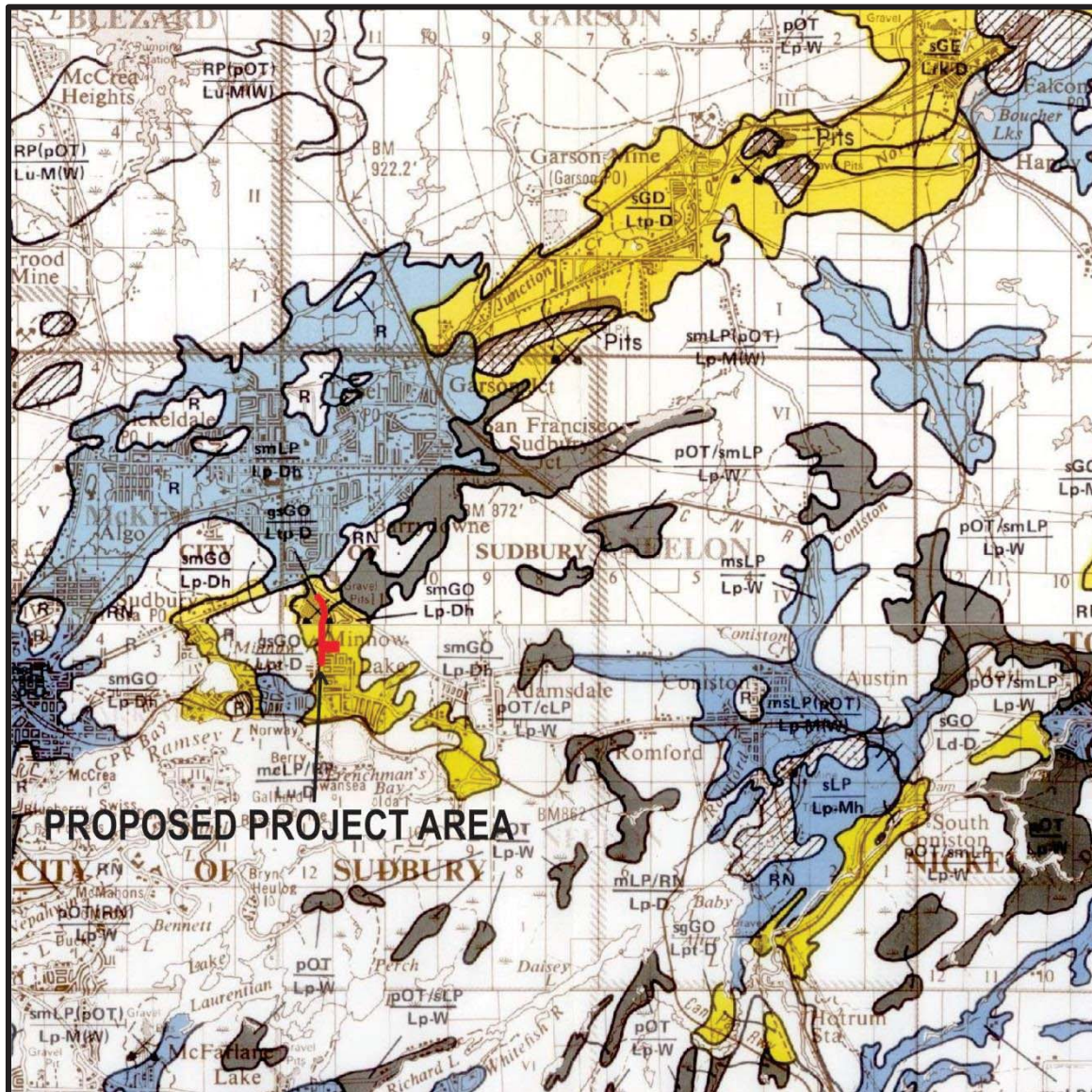
Map 1. Project location map showing the location of the project area.

An unmodified development plan was submitted to MTCS through PastPort as part of the report package.

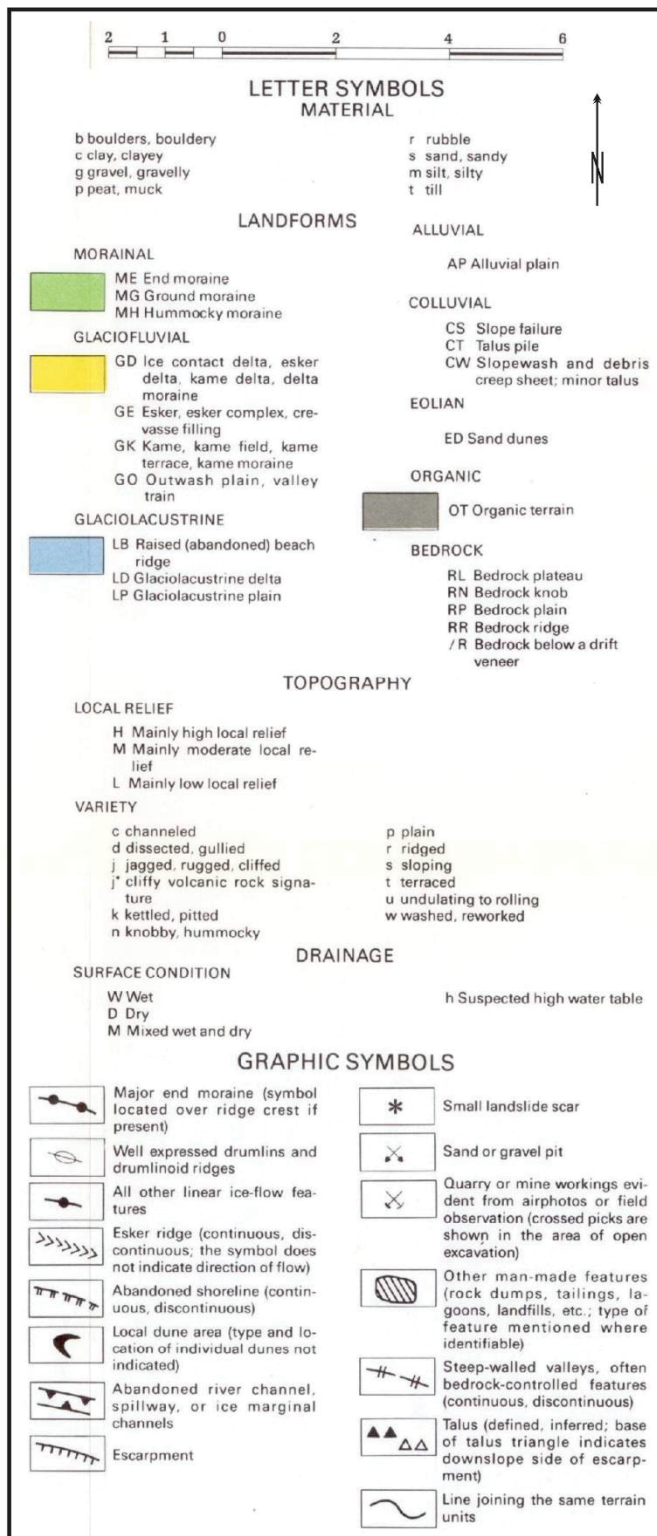
Map 2. Development plans for the proposed project area.



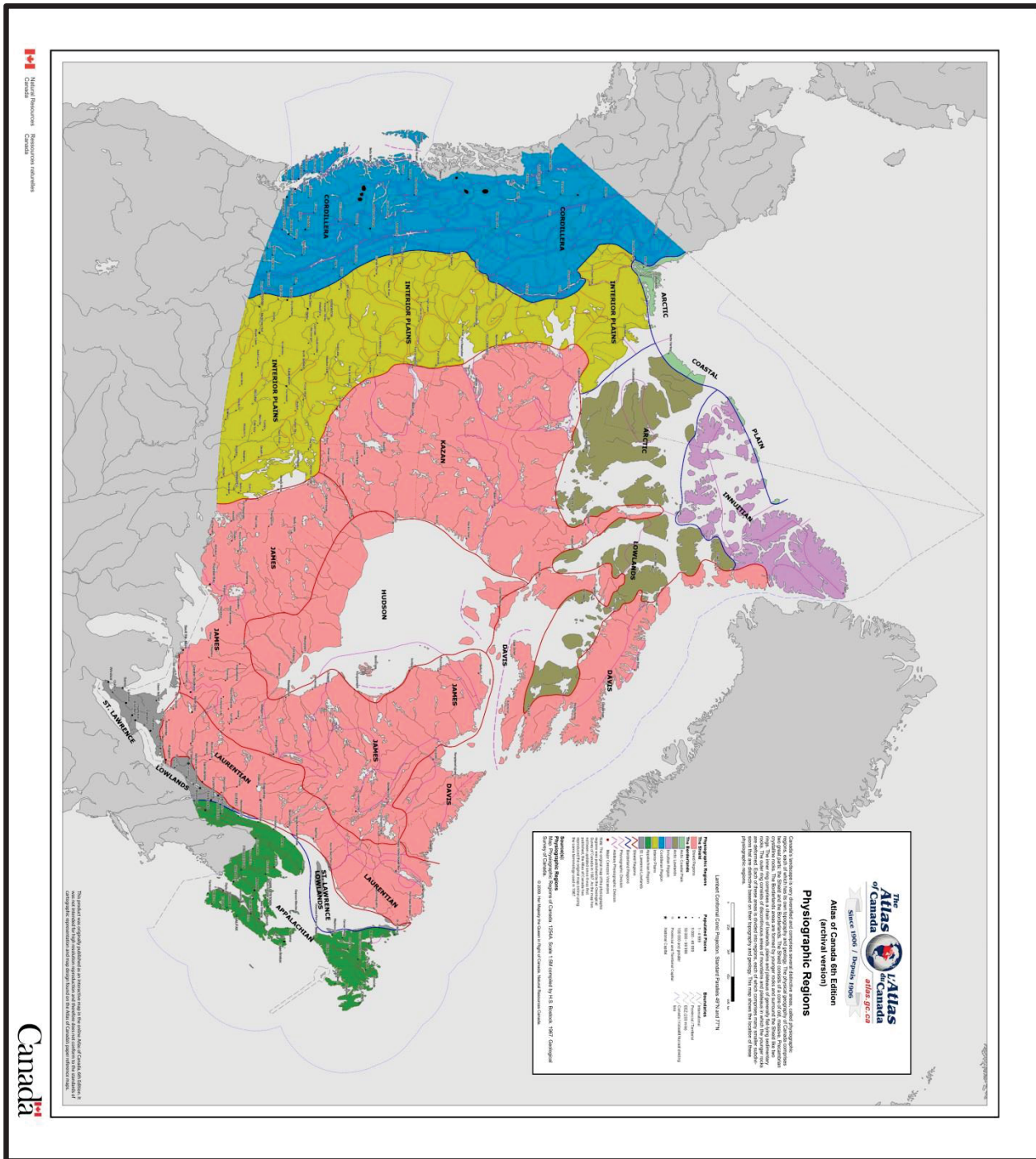
Stage 1 Archaeological Resource Assessment of the Second Avenue Road Widening Project, Neelon Township, City of Greater Sudbury, Sudbury District. MTCS PIF # P016-0408-2014.



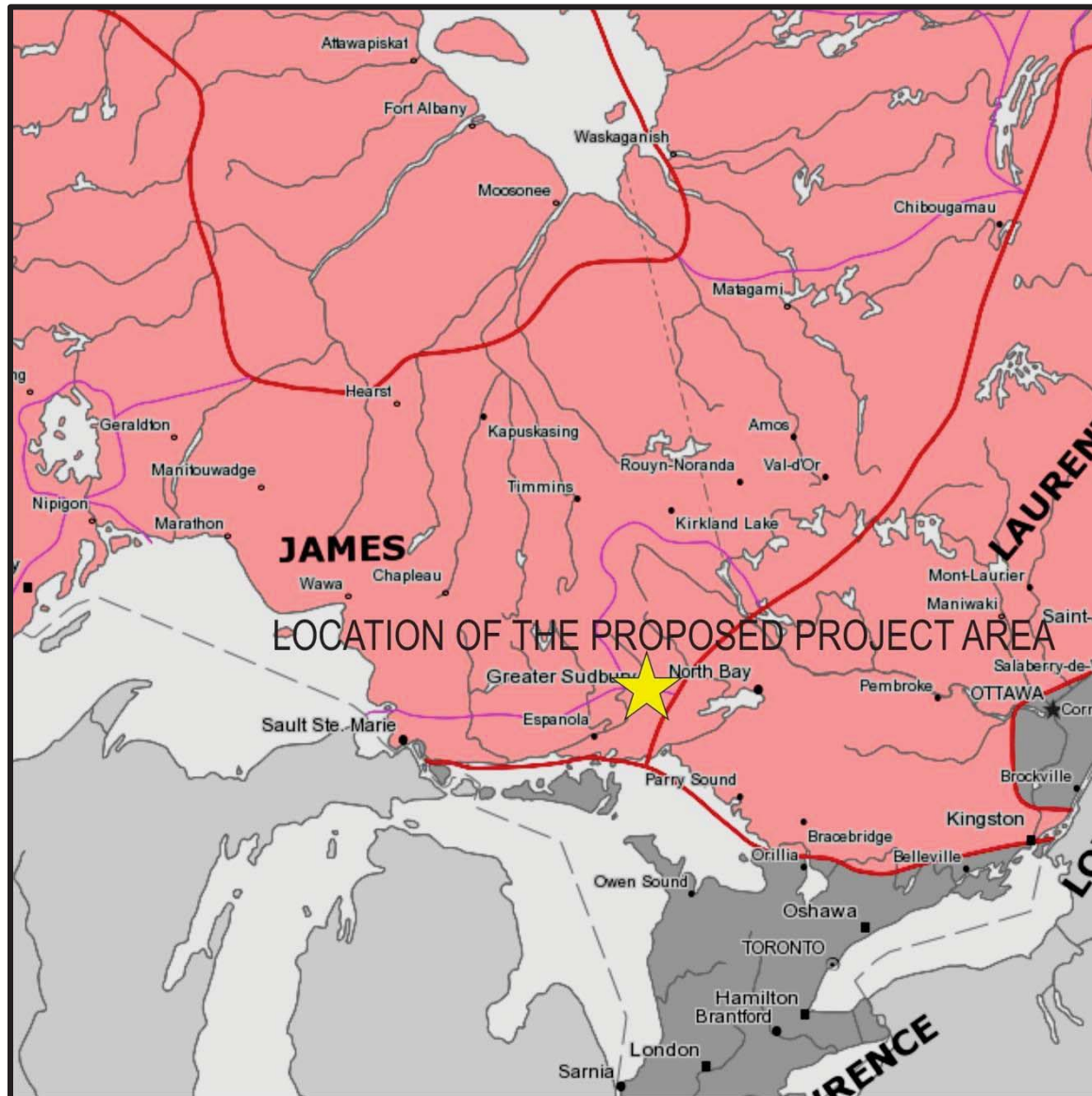
Map 3a. Northern Ontario Engineering Geology Terrain Study (NOEGTS) maps # 5001 and 5003 showing the surficial geology of the project area and the adjacent lands.



Map 3b. Legend for the previous map.



Map 4. Map of the physiographic regions of Canada (Bostock, 1967).



Map 5a. Physiographic map showing the proposed project area clearly located in the Canadian Shield (pink).



**Atlas of Canada 6th Edition
(archival version)**

Physiographic Regions

Canada's landscape is very diversified and comprises several distinctive areas, called physiographic regions, each of which has its own topography and geology. The physical geography of Canada comprises two great parts: the Shield and the Borderlands. The Shield consists of a core of old, massive, Precambrian crystalline rocks. The Borderlands areas are formed by younger rocks and surround the Shield like two rings. The inner ring comprises a chain of lowlands, plains and plateaus of generally flat-lying sedimentary rocks. The outer ring consists of discontinuous areas of mountains and plateaus in which the younger rocks are deformed. Each of these areas is divided into regions, each of which comprises many smaller subdivisions that are distinctive based on their topography and geology. This map shows the location of these physiographic regions.



Lambert Conformal Conic Projection. Standard Parallels 49°N and 77°N

Physiographic Regions

The Shield

Shield Regions

The Borderlands

Arctic Coastal Plain

Arctic Lowlands

Innuitian Region

Cordilleran Region

Interior Plains

Appalachian Region

St. Lawrence Lowlands

Shield Regions

Borderland Regions

Physiographic Division

Arbitrary Physiographic Division

Major Cenozoic Volcanoes

Populated Places

- 1 - 4 999
- 5 000 - 49 999
- 50 000 - 99 999
- 100 000 and greater
- Provincial and Territorial Capital
- ★ National Capital

Boundaries

- International
- Provincial / Territorial
- EEZ (200 mile)
- Canada / Kalaallit Nunaat dividing line

Note: The original map of the physiographic regions was published by the Geological Survey of Canada in 1967. As the map has not been updated since it was first published, the Atlas of Canada has reproduced the original map online using the same terminology used in 1967.

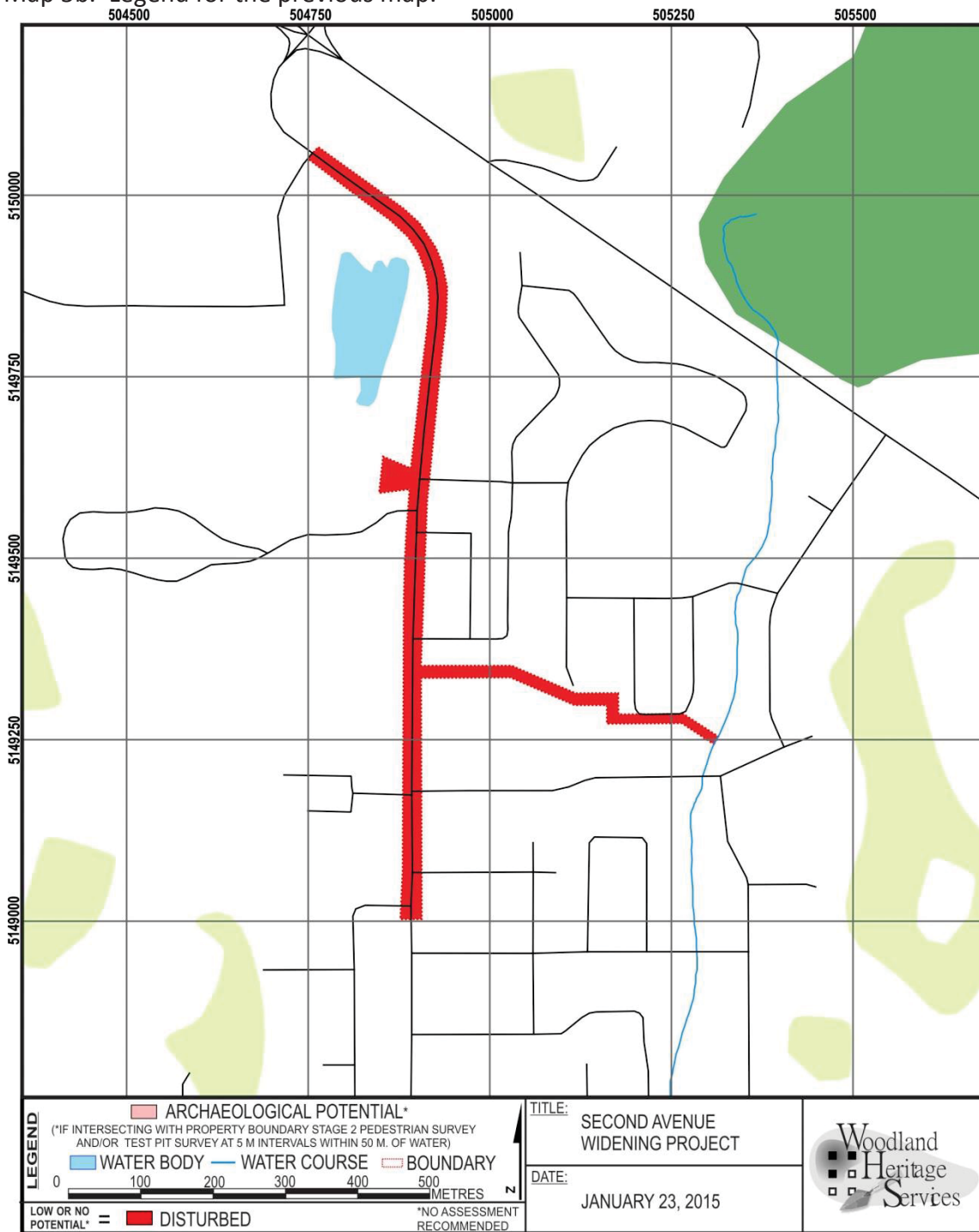
Source(s):

Physiographic Regions

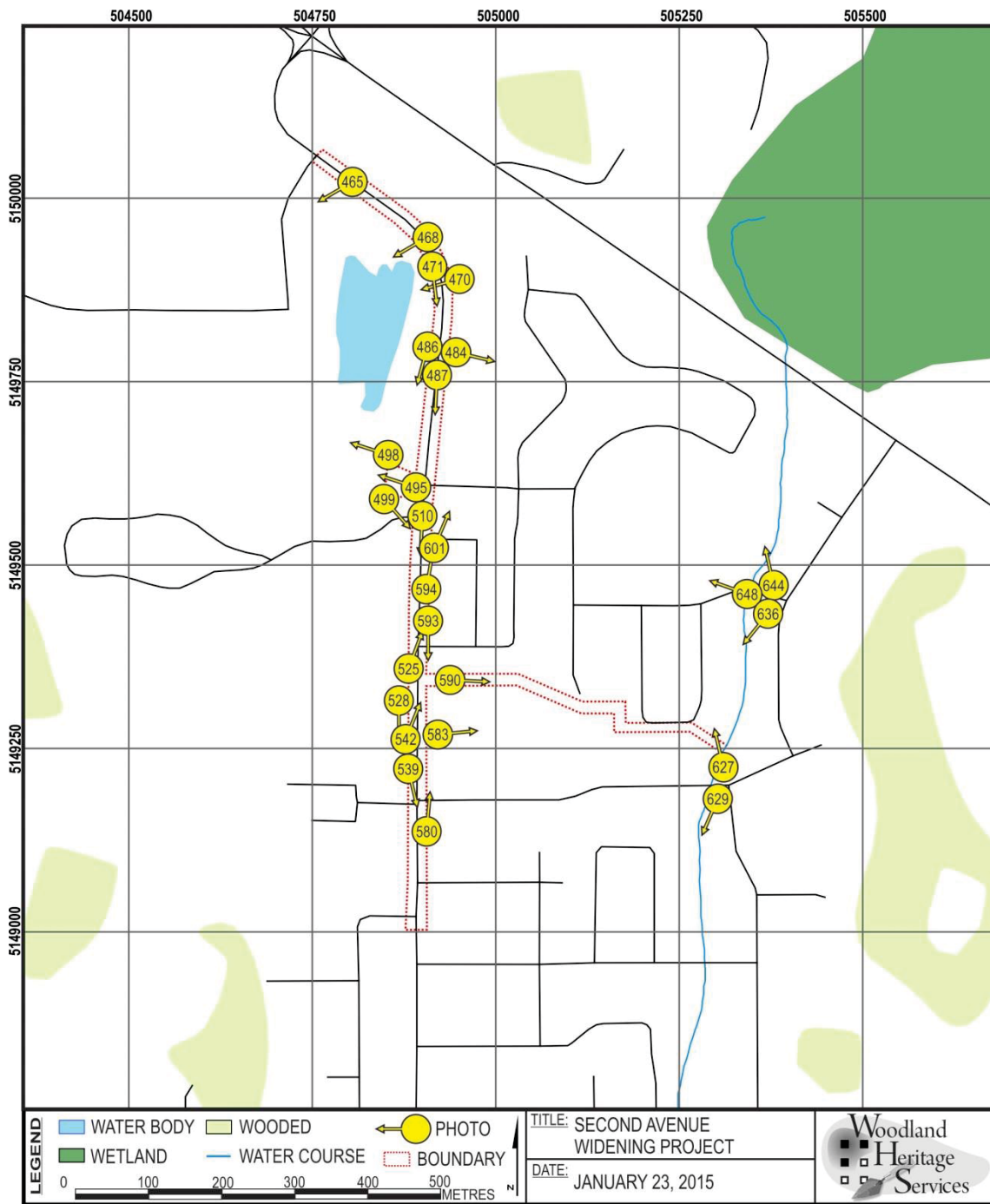
Map. Physiographic Regions of Canada. 1254A. Scale 1:5M compiled by H.S. Bostock. 1967. Geological Survey of Canada.

© 2009. Her Majesty the Queen in Right of Canada. Natural Resources Canada.

Map 5b. Legend for the previous map.



Map 6. Archaeological potential map showing the ground conditions affecting archaeological potential within the study area.



Map 7. Photograph location map showing the locations and directions of photographs used in this report.

5.0 IMAGES



Image 1. Photograph 465 showing a patch of exposed gravel in a disturbed field on the north end of the property. Note the mapped pond is not present.



Image 2. Photograph 468 showing some exposed bedrock on the north end of the property.



Image 3. Photograph 470 showing a raised mound on the west side of the road, a disturbance caused during the construction of the road.



Image 4. Photograph 471 showing the drainage contouring on the west side of the road.



Image 5. Photograph 486 showing a gravel snowplough turn around on the west side of Second Avenue.



Image 6. Photograph 487 showing the gravel shoulder and a disturbed drainage feature.



Image 7. Photograph 510 showing the contouring and a drainage ditch on the west side of Second Avenue.



Image 8. Photograph 539 showing the concrete sidewalk and a drainage ditch on the west side of Second Avenue.



Image 9. Photograph 542 showing the sidewalk, paved shoulder, and drainage ditch on the west side of Second Avenue.



Image 10. Photograph 495 showing a gravel road leading to a disturbed grassy field.



Image 11. Photograph 498 showing the disturbed gravel field with grassy vegetation on the west side of the road.



Image 12. Photograph 499 showing the side of a gravel road on the west side of Second Avenue.



Image 13. Photograph 525 showing the disturbed gravel shoulder of Second Avenue.



Image 14. Photograph 528 showing the shoulder, sidewalk, and manhole cover on the west side of the road.



Image 15. Photograph 580 showing the gravel shoulder on the east side of the road.



Image 16. Photograph 593 showing the gravel shoulder and asphalt sidewalk on the east side of the road.



Image 17. Photograph 594 showing the gravel shoulder on the east side of the road.



Image 18. Photograph 583 of the park on the east side of Second Avenue.



Image 19. Photograph 590 of the north end of the park, showing the contouring for drainage purposes.



Image 20. Photograph 601 showing the paved shoulder and the parking lot of a local business.



Image 21. Photograph 484 looking eastwards towards a local business on the east side of the road.



Image 22. Photograph 627 of the dry creek bed.



Image 23. Photograph 629 showing boulder-embedded concrete in the disturbed creek bed.



Image 24. Photograph 636 looking towards the creek.





Image 25. Photograph 644 showing cattails and other grasses growing in the seasonal creek bed.



Image 26. Photograph 648 of the location where the stream crosses Highgate Road to the north.

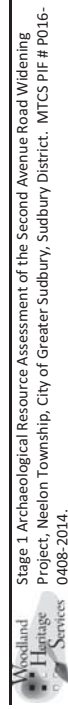
6.0 REFERENCES

- Arthurs, David
1986 Archaeological investigations at the Long Sault site (Manitou Mounds). Ontario Ministry of Citizenship and Culture, Heritage Branch, Northwestern Region, Conservation Archaeology Report No.7.
- Bostock, H.S.
1967 Physiogeographic Regions of Canada. 1:254A. Scale 1:5M. Geological Survey of Canada.
- Gartner, J.F.
1978a Northern Ontario Engineering Geology Terrain Study, Data Base Map, Capreol. Ontario Geological Survey, Map 5001, Scale 1:100 000
1978b Northern Ontario Engineering Geology Terrain Study, Data Base Map, Sudbury. Ontario Geological Survey, Map 5003, Scale 1 :100 000
- Hunt, George T.
1940 The Wars of the Iroquois. The University of Wisconsin Press.
- Lytwyn, Peter
2002 *Muskegowuck athinuwick : original people of the great swampy land*. University of Manitoba Press, Winnipeg.
- MacNeish, Richard S.
1958 An Introduction to the Archaeology of Southeast Manitoba. Bulletin No. 157, National Museum of Canada.
- Ministry of Municipal Affairs and Housing
2005 Provincial Policy Statement, 2005. Electronic Document. <http://www.mah.gov.on.ca/Asset1421.aspx>, accessed October 21, 2013.
- Ministry of Tourism, Culture and Sport
2011 Standards and Guidelines for Consultant Archaeologists. Queen's Printer for Ontario.
- Ontario Heritage Act
1990 (2009) Revised Statutes of Ontario 1990, c. O.18. Electronic Document. Retrieved November 11, 2014 from http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o18_e.htm#BKO.

Pollock, J.W.



Stage 1 Archaeological Resource Assessment of the Second Avenue Road Widening Project, Neelon Township, City of Greater Sudbury, Sudbury District. MTCS PIF # P016-0408-2014.

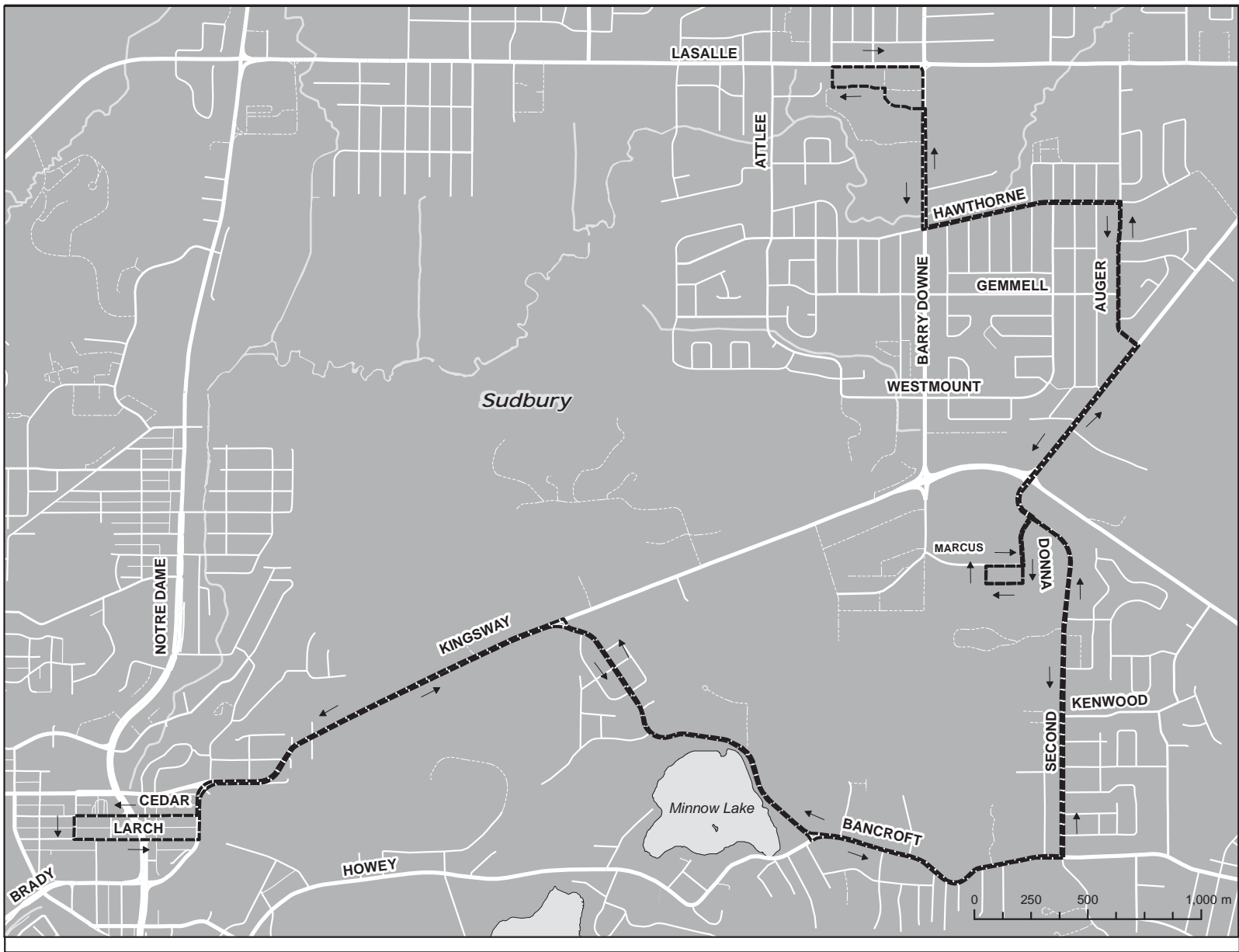


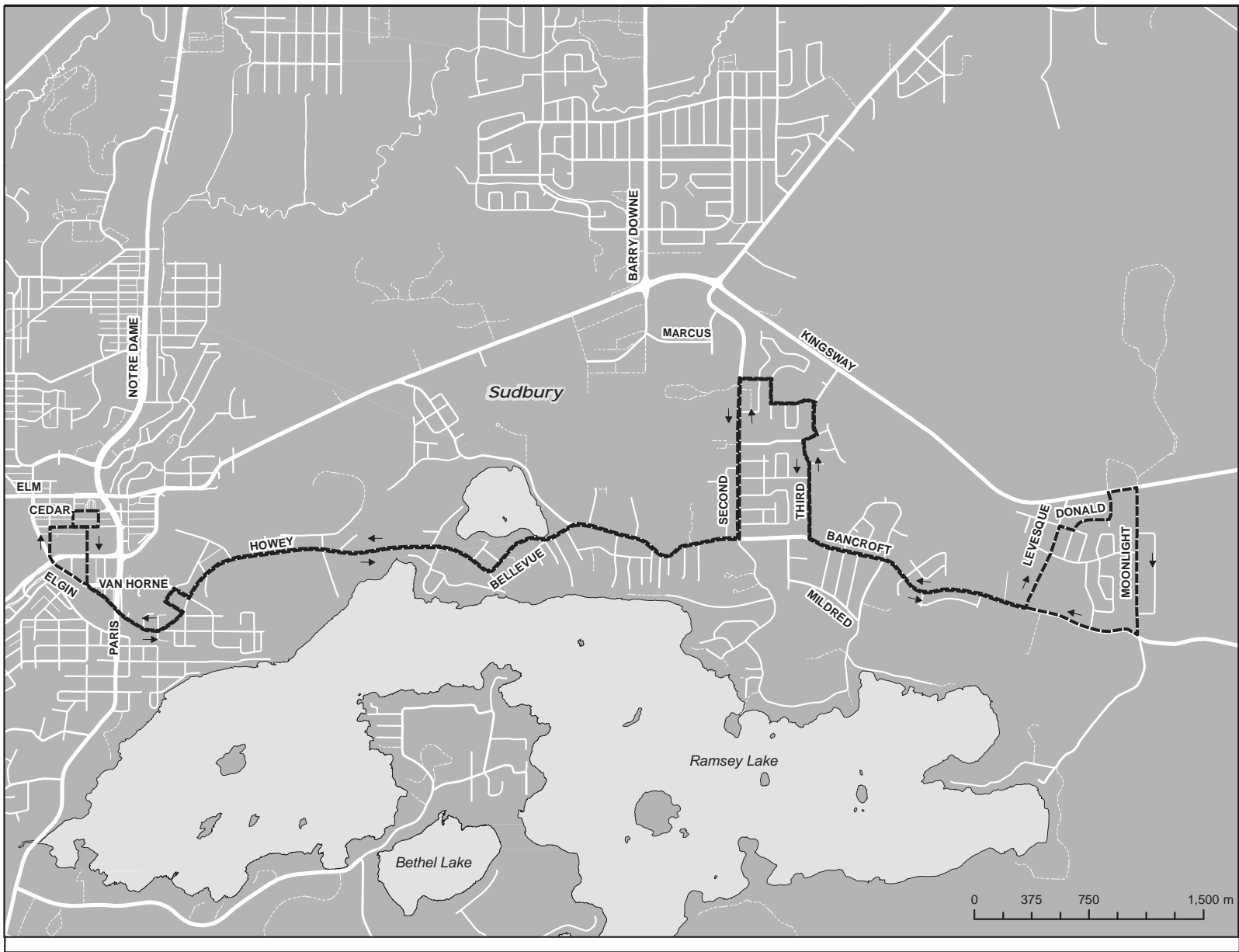
Stage 1 Archaeological Resource Assessment of the Second Avenue Road Widening Project, Neelon Township, City of Greater Sudbury, Sudbury District. MTCS PIF # P016-0408-2014.

- 1984 A Technological Analysis of Lake Abitibi Bifaces. Unpublished Ph.D. Thesis, Department of Anthropology, University of Alberta, Edmonton.
- Reid, C.S. Paddy' and Grace Rajnovich
 1991 Laurel: a re-evaluation of the spatial, social and temporal paradigms. Canadian Journal of Archaeology 15:193-234
- Settlement Surveys Ltd. (Dr. J. W. Pollock).
 1995 *Archaeological and Historical Sites*, Cultural Heritage Project, Elk Lake Community Forest. Ontario (licence 94-065).
- Woodland Heritage Services
 2009 Stage 1 and 2 Archaeological and Cultural Heritage Resource Assessment of 12.1 Km. of Highway 17 from 1 Km West of Highway 69, Easterly to East Junction of Sudbury Municipal Road 55 Located in Broder, Dill and Neelon Townships, District of Sudbury. G.W.P. 5086-06-00. MCL C1F P016-230-2009.
 2011 Stage 1 Archaeological and Cultural Heritage Resource Assessment of Four Variable Message Signs (VMS): VMS #18 in South Ferris Township, Nipissing District, VMS #15 in Neelon Township, Sudbury District and VMS #16 in Bristol Township and VMS #17 in Hislop Township, Cochrane District, Ontario. G.W.P. No. 5122-06-00. MTC P1F P016-287-2010
 2011 Stage 1 and 2 Archaeological and Cultural Heritage Assessment of the Proposed Maley Drive Extension in the City of Greater Sudbury, Sudbury District. MTCS P1F P208-029-2011
- Wright, J.V.
 1967 *The Laurel Tradition and the Middle Woodland Period*. National Museum of Canada, Bulletin No. 217 / Anthropological Series 79. Queen's Printer and Controller of Stationery, Ottawa.
- 1972a *The Shield Archaic*. National Museum of Man Publications in Archaeology, No. 3. National Museums of Canada, Ottawa.
- 1972b *Ontario Prehistory: An eleven-thousand-year archaeological outline*. National Museums of Canada, Ottawa.

APPENDIX G

The City of Greater Sudbury Transit Route Maps








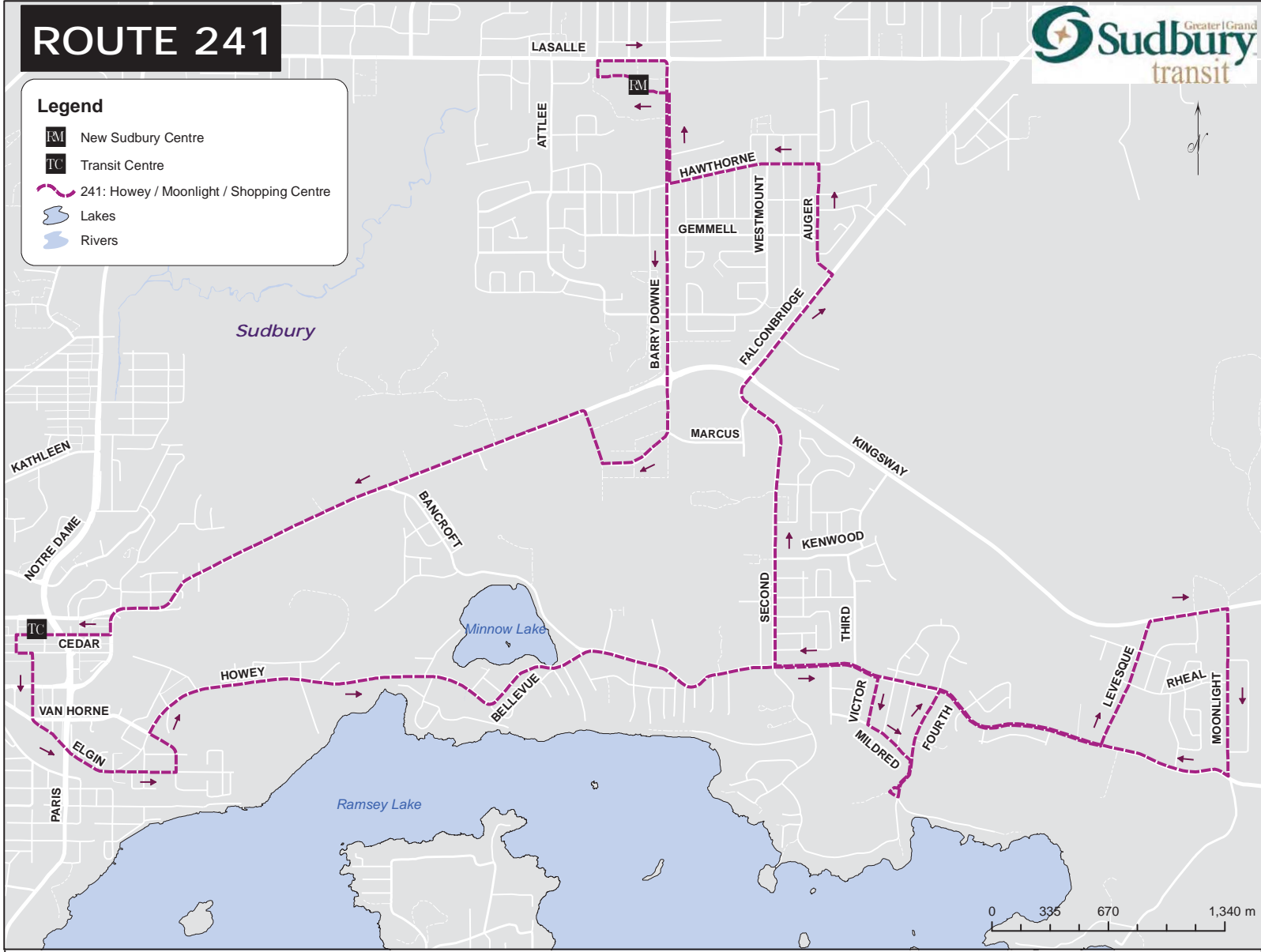


ROUTE 241



Legend

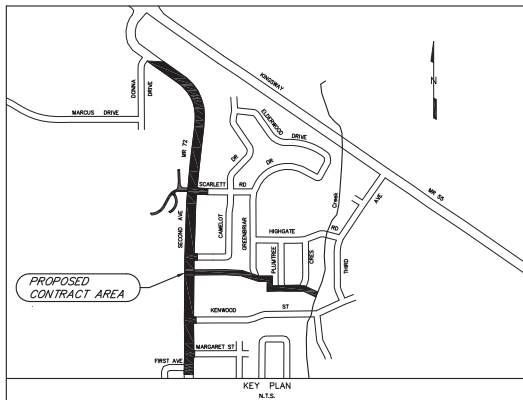
-  New Sudbury Centre
-  Transit Centre
-  241: Howey / Moonlight / Shopping Centre
-  Lakes
-  Rivers



Please note: Not all streets are contained within this map. To be used as a guideline only. Routes are subject to change without notice. Copyright 2015 - GIS & Mapping, City of Greater Sudbury

APPENDIX H

Drawings of Recommended Solution



TONY CECUTTI, P.Eng., FEC
 GENERAL MANAGER OF INFRASTRUCTURE SERVICES

INDEX TO PLANS		
PAGE	DESCRIPTION	FILE No.
1	COVER PAGE – KEY PLAN & INDEX	C6321-1
2 to 9	SECOND AVENUE – PLAN & PROFILE	C6321-2 TO 9
10 & 11	STORM SEWER – PLAN & PROFILE	C6321-10 & 11
12	PLUMTREE CRESCENT – PLAN & PROFILE	C6321-12
13	SCARLETT ROAD – PLAN & PROFILE	C6321-13
14 & 15	CEMETERY ROADS – PLAN & PROFILE	C6321-14 & 15
16	DOG PARK ACCESS ROAD – PLAN	C6321-16
17 to 19	TYPICAL SECTIONS, DETAILS, CONSTRUCTION NOTES & LEGEND	C6321-17 TO 19
20	SIDE ROAD PROFILES	C6321-20
21 to 26	TRAFFIC SIGNALIZATION & ROADWAY PAINT MARKINGS	C6321-21 TO 26

RECONSTRUCTION & WIDENING SECOND AVENUE (MR72)

FIRST AVENUE TO DONNA DRIVE

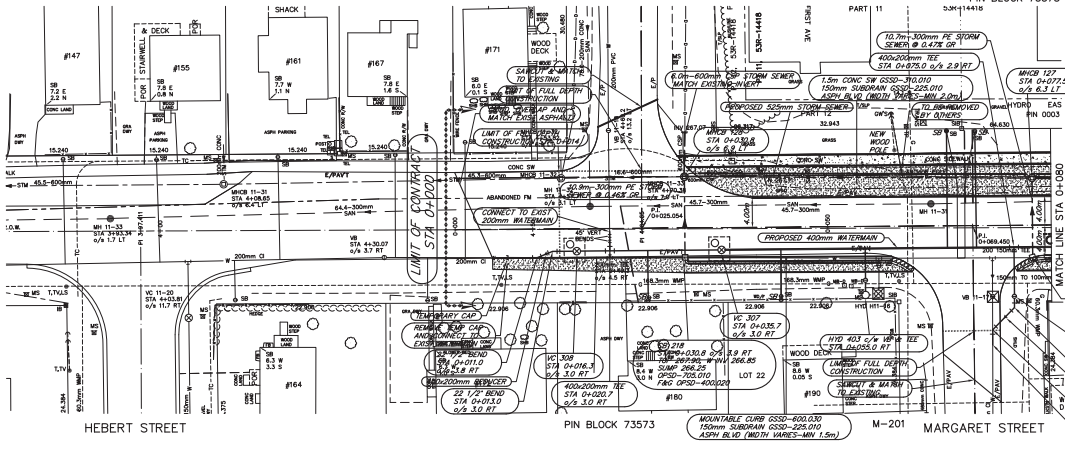
DRAFT

CONTRACT No. ENG14-17

SECOND AVENUE (MR72)

FIRST AVENUE

PIN BLOCK 73573

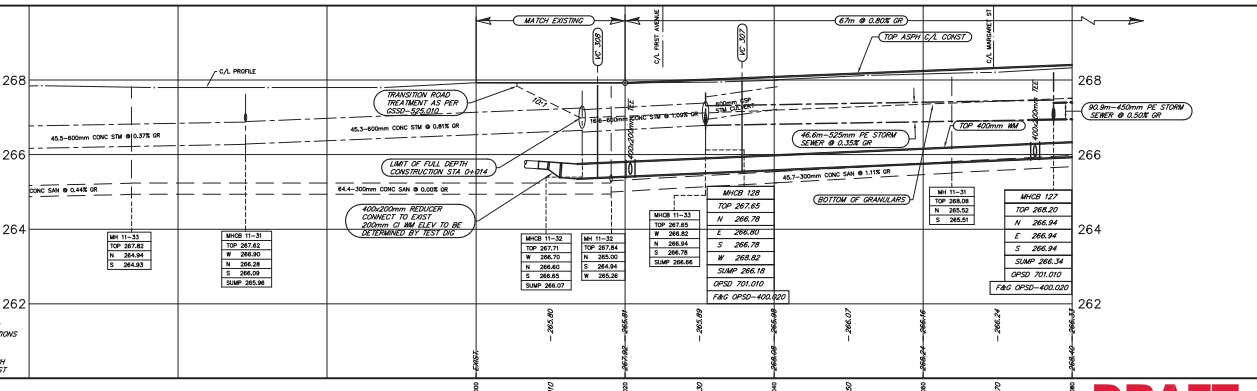


NOTE:
REFER TO PAGES 17 TO 19 FOR TYPICAL SECTIONS, NOTES, DETAILS & LEGEND.

NOTE:
LOCATION OF ALL EXISTING UTILITIES ARE APPROXIMATE ONLY AND MUST BE CONFIRMED IN THE FIELD.

NOTES:
ALL PROPOSED WATER SERVICES ARE 20mm UNLESS OTHERWISE NOTED.
REMOVE AND REPLACE ALL SP. ALL PROPOSED SANITARY SEWER SERVICES ARE 100mm UNLESS OTHERWISE NOTED.

WATERMAIN NOTES:
AT WATERMAIN CROSSINGS, THERE IS TO BE A MIN OF 0.5m VERTICAL SEPARATION BETWEEN THE SEWER & THE WATERMAIN.
WHERE PROPOSED WATERMAIN CROSS SEWER MAINS, ONE LENGTH OF WM PIPE IS TO BE CENTERED AT THE POINT OF CROSSING SO THE PIPE AXIS IS EQUIDISTANT FROM THE SEWER.
MAXIMUM JOINT REFLECTION OF 100mm PER 6m LENGTH OF PIPE FOR DIAMETERS EQUAL TO OR LESS THAN 300mm.



DRAFT

DATE	REVISIONS	BY	CAUTION
			- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
			- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
			- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

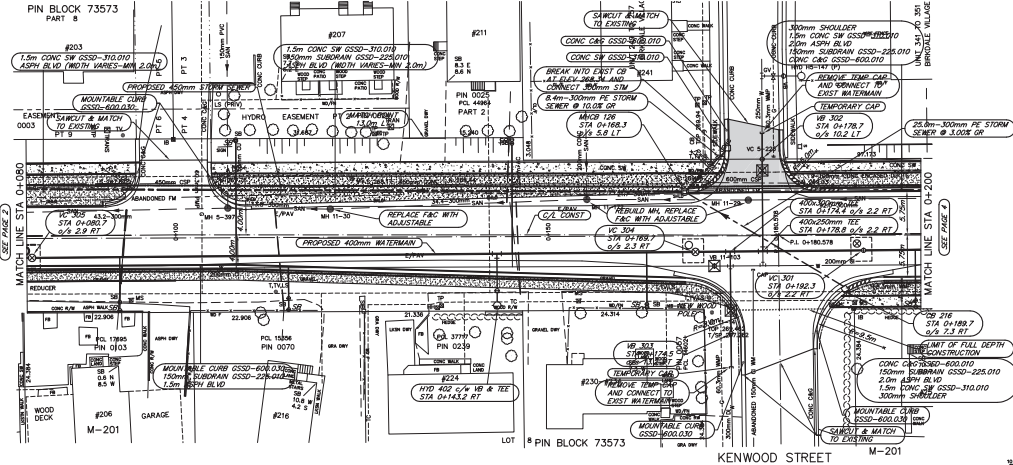
DATE	2014-09-20
DESIGNED	AC
CHECKED	
ENGINEER	
APPROVED	



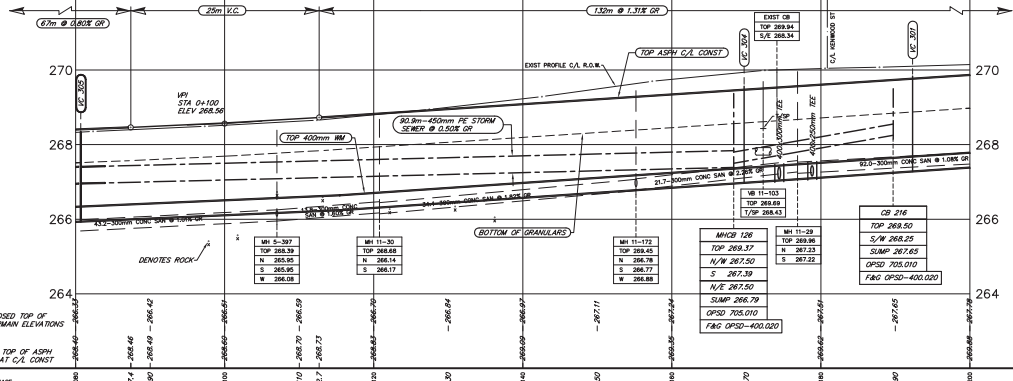
PLAN & PROFILE
SECOND AVENUE (MR72)
STA 0+000 TO STA 0+080
AT FIRST AVENUE & MARGARET STREET
SUDBURY AREA

SCALE	1:250 HOR 1:500 VERT
CONTRACT NO.	ENG14-17
CAD/DWG NUMBER	C6321-2
PAGE NO.	2 of 28

SECOND AVENUE (MR72)



NOTES:
 REFER TO PAGES 17 TO 19 FOR TYPICAL SECTIONS, NOTES, DETAILS & LEGEND.
 LOCATION OF ALL EXISTING UTILITIES ARE APPROXIMATE ONLY AND MUST BE CONFIRMED IN THE FIELD.
 ALL PROPOSED WATER SERVICES ARE 20mm UNLESS OTHERWISE NOTED. REMOVE AND REPLACE ALL SP. ALL PROPOSED SANITARY SEWER SERVICES ARE 100mm UNLESS OTHERWISE NOTED.
 WATERMAN NOTES:
 AT WATERMAN CROSSINGS, THERE IS TO BE A MIN OF 0.5m VERTICAL SEPARATION BETWEEN THE SEWER & THE WATERMAN.
 WHERE PROPOSED WATERMANS CROSS SEWER MAINS, ONE LENGTH OF 100mm PVC IS TO BE CENTERED AT THE POINT OF CROSSING SO THE PIPE JOINTS ARE EQUIDISTANT FROM THE SEWER.
 MAXIMUM JOINT DEFLECTION OF 100mm PER 6m LENGTH OF PVC PIPE FOR DIAMETERS EQUAL TO OR LESS THAN 300mm.



DRAFT

DATE	REVISIONS	BY	CAUTION
			- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
			- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
			- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

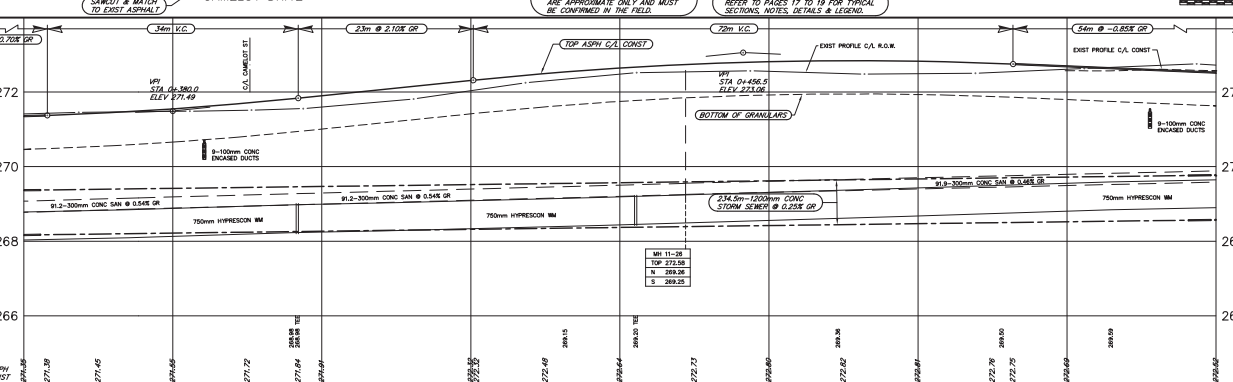
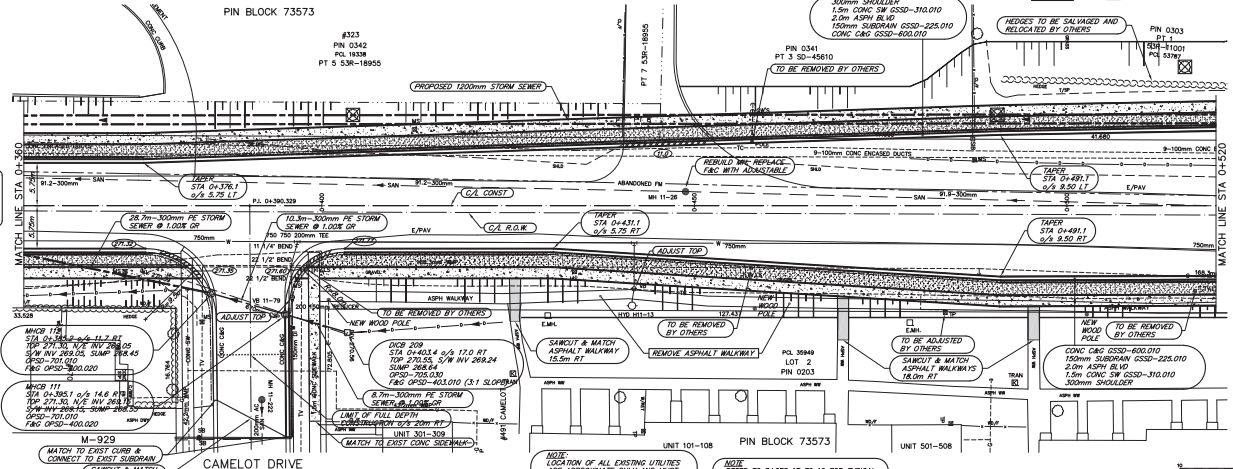
DATE: 2014-09-20	DESIGNED: AC
CHECKED:	ENGINEER:
APPROVED:	



PLAN & PROFILE
 SECOND AVENUE (MR72)
 STA 0+080 TO STA 0+200
 AT KENWOOD STREET
 SUDBURY AREA

SCALE: 1:250 HOR.
 1:500 VERT.
 CONTRACT NO. ENG14-17
 C/D/FILE NUMBER: C6321-3
 PAGE NO: 3 of 28

SECOND AVENUE (MR72)



DRAFT

DATE	REVISIONS	BY

CAUTION
 - ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
 - WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
 - LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

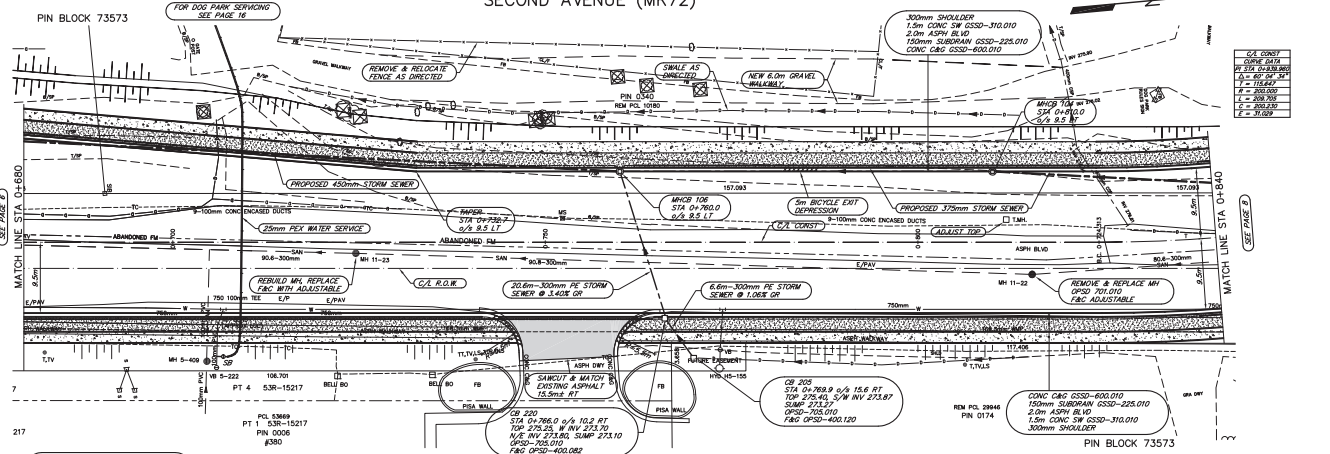
DATE	2014-09-20
DRAWN	AC
DESIGNED	
CHECKED	
ENGINEER	
APPROVED	



PLAN & PROFILE
 SECOND AVENUE (MR72)
 STA 0+360 TO STA 0+520
 AT CAMELOT DRIVE
 SUDBURY AREA

SCALE	1:250 HOR. 1:500 VER.
CONTRACT NO.	ENG14-17
DWG/FILE NUMBER	C6321-5
PAGE NO.	5 of 28

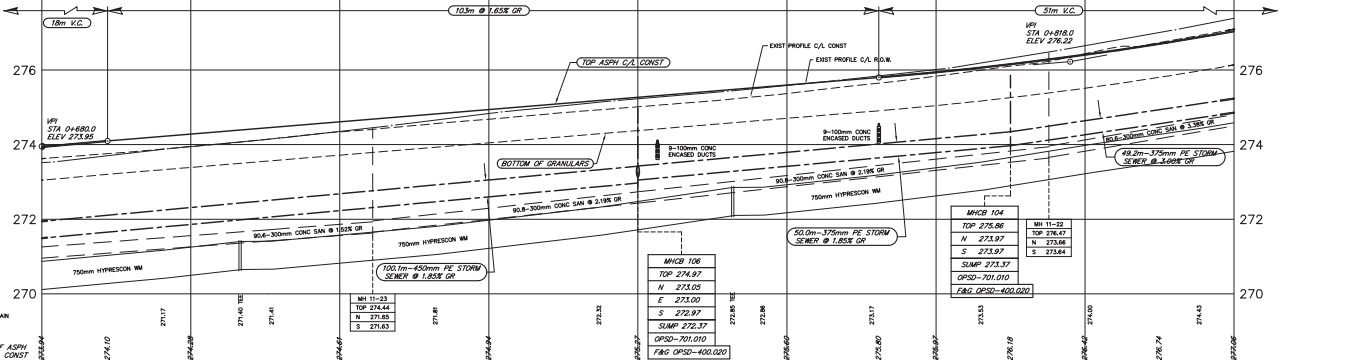
SECOND AVENUE (MR72)



C/A CONST	1:50
CONC	1:50
ASPH	1:50
HYDRON	1:50
PE	1:50
GR	1:50
GR	1:50
GR	1:50
GR	1:50
GR	1:50
GR	1:50

NOTE: LOCATION OF ALL EXISTING UTILITIES ARE APPROXIMATE ONLY AND MUST BE CONFIRMED IN THE FIELD.

NOTE: REFER TO PAGES 17 TO 19 FOR TYPICAL SECTIONS, NOTES, DETAILS & LEGEND.



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REVISIONS

DATE	DETAILS	BY

CAUTION

- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

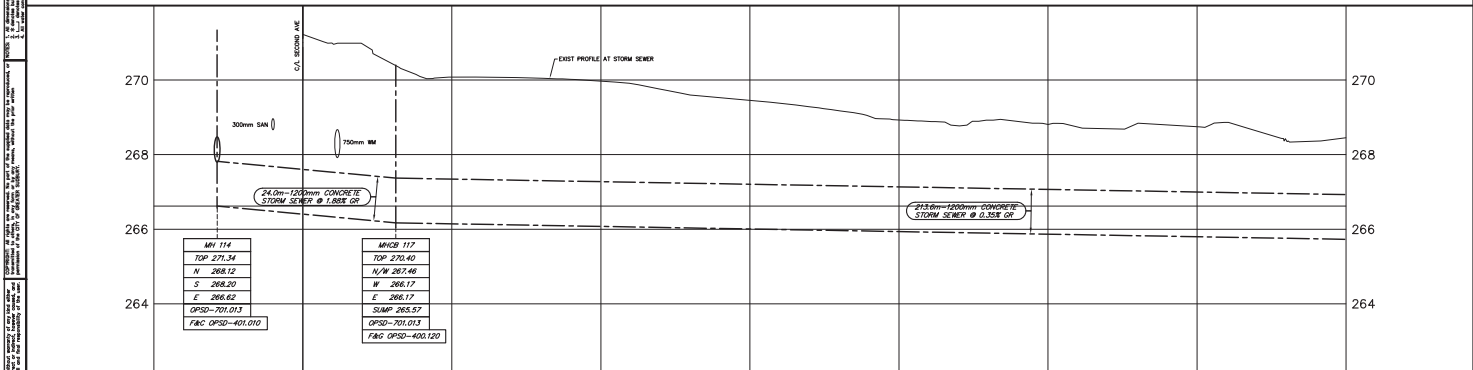
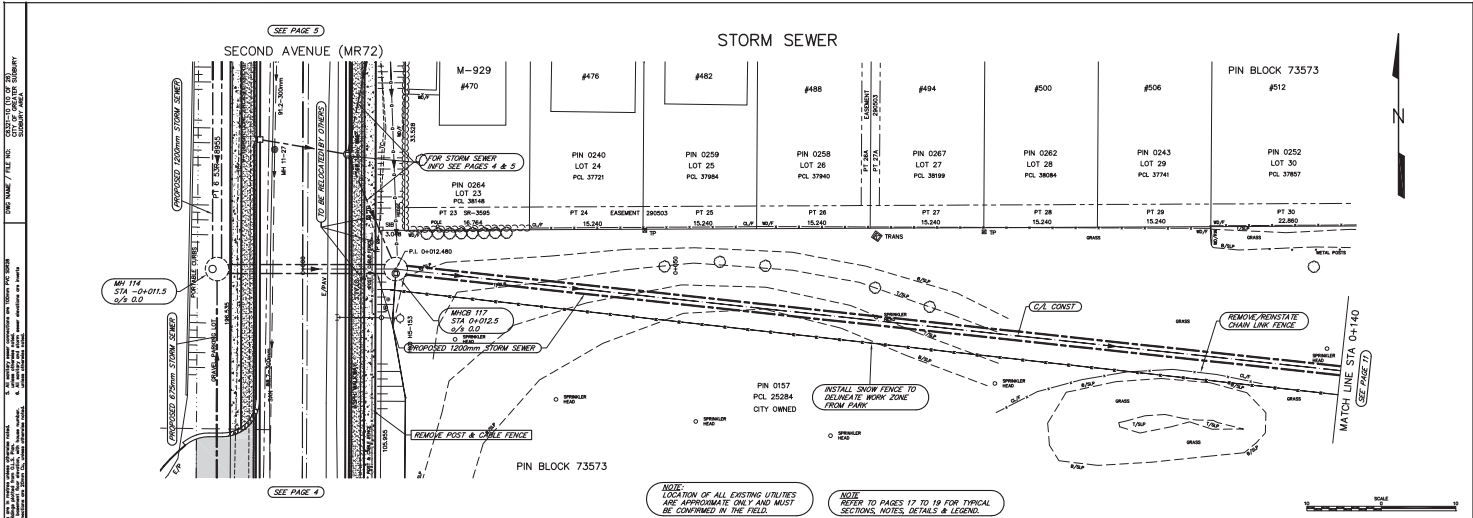
DATE: 2014-09-20

DESIGNED:	
CHECKED:	
ENGINEER:	
APPROVED:	



PLAN & PROFILE
 SECOND AVENUE (MR72)
 STA 0+680 TO STA 0+840
 NORTH OF SCARLETT ROAD
 SUDBURY AREA

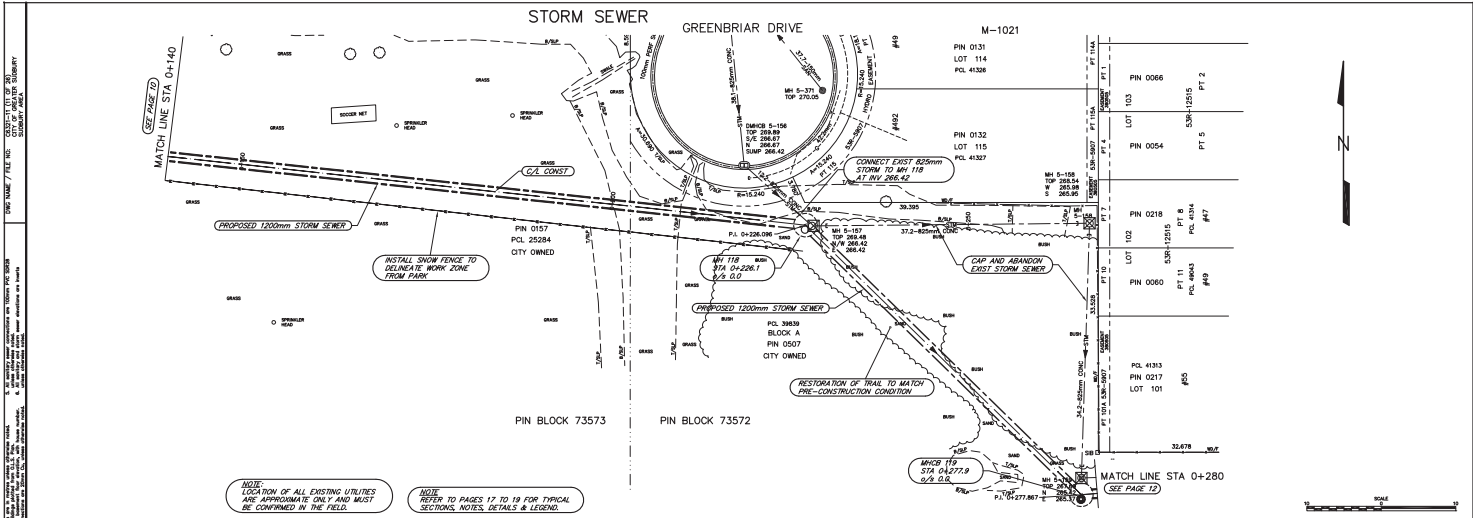
SCALE:	1:250 HOR. 1:500 VER.
CONTRACT NO.:	ENG14-17
C/D/FILE NUMBER:	C6321-7
PAGE NO.:	7 of 28



DRAFT

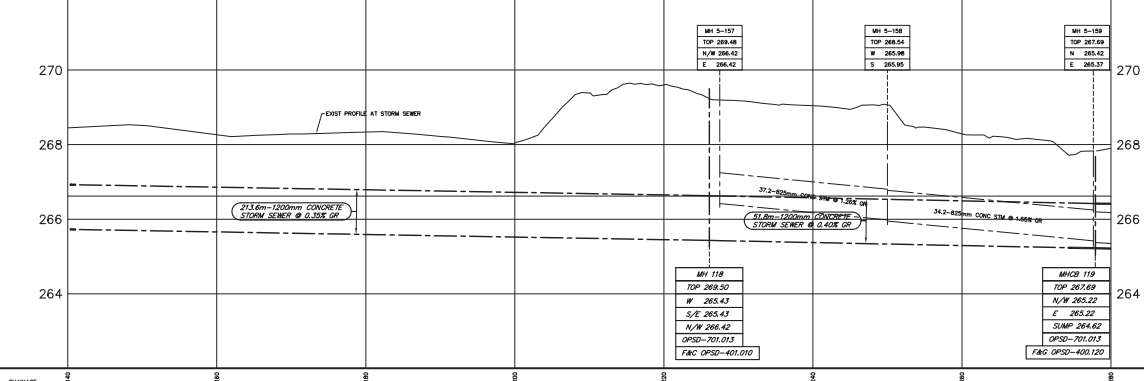
REVISIONS			CAUTION			DATE: 2014-09-20			PLAN & PROFILE		
DATE	DETAILS	BY	- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.	DESIGNED:	ENGINEER:	APPROVED:	STORM SEWER STA -0+010 TO STA 0+140 AT SECOND AVENUE SUDBURY AREA			SCALE: 1:250 HOR. 1:500 VERT.	CONTRACT NO. ENG4-17
			- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.							CAD/DRAW NUMBER: C6321-10	PAGE NO. 10 of 28
			- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.								





NOTE: LOCATION OF ALL EXISTING UTILITIES ARE APPROXIMATE ONLY AND MUST BE CONFIRMED IN THE FIELD.

NOTE: REFER TO PAGES 17 TO 19 FOR TYPICAL SECTIONS, NOTES, DETAILS & LEGEND.



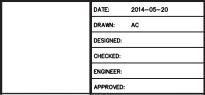
DRAFT

DATE	REVISIONS	BY

CAUTION

- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE	2014-09-20
DRAWN	AC
DESIGNED	
CHECKED	
ENGINEER	
APPROVED	



PLAN & PROFILE

STORM SEWER
 STA 0+140 TO STA 0+280
 AT GREENBRIAR DRIVE
 SUDBURY AREA

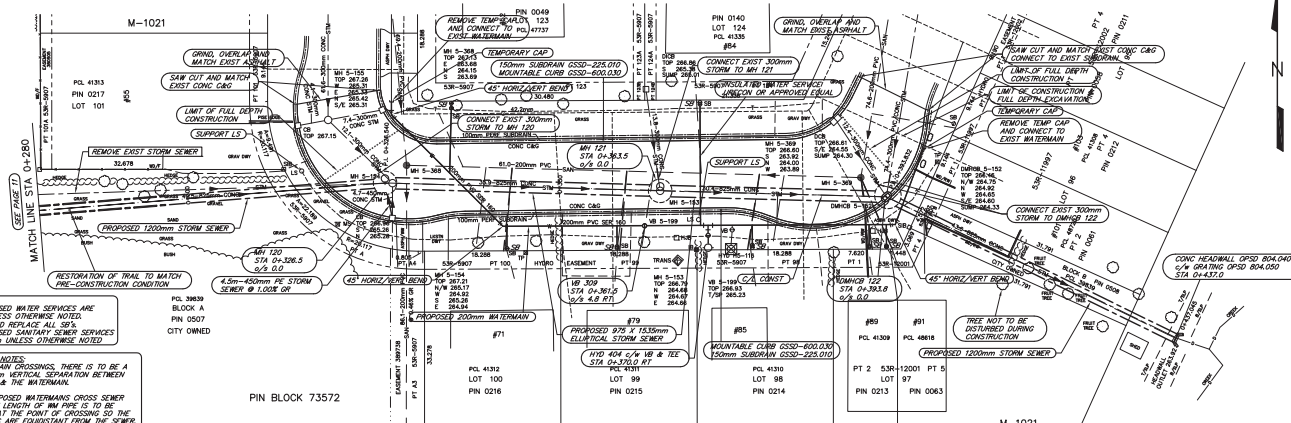
SCALE: 1:250 HOR.
 1:500 VER.

CONTRACT NO. ENG14-17

CAD/DWG NUMBER: C6321-11

PAGE NO: **11** of 28

PLUMTREE CRESCENT

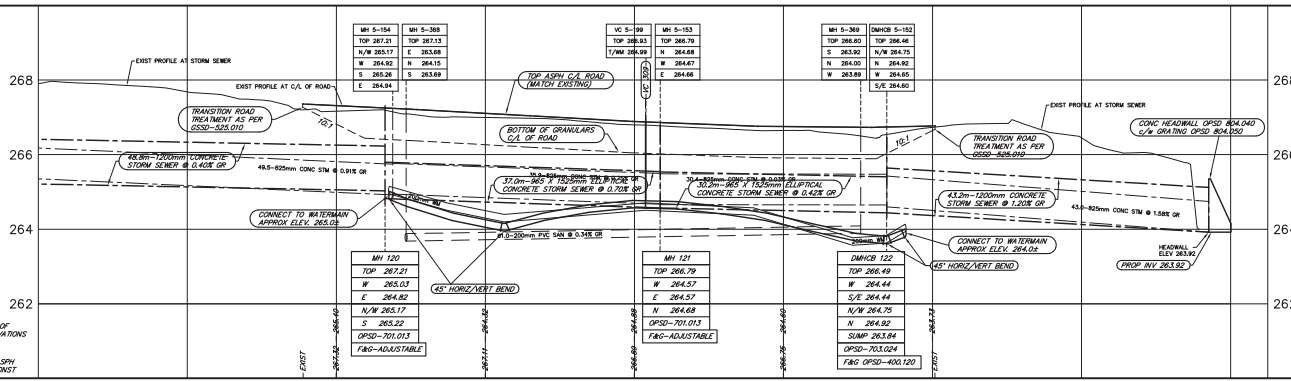


NOTES:
 ALL PROPOSED WATER SERVICES ARE 200mm UNLESS OTHERWISE NOTED.
 REMOVE AND REPLACE ALL SR.
 ALL PROPOSED SANITARY SERVICES ARE 100mm UNLESS OTHERWISE NOTED.

WATERMAIN NOTES:
 AT WATERMAIN CROSSINGS, THERE IS TO BE A MIN OF 0.5m VERTICAL SEPARATION BETWEEN THE SERVICE & THE WATERMAIN.
 WHERE PROPOSED WATERMANS CROSS SEWER MAINS, ONE LENGTH OF 90° PIPE IS TO BE CENTERED AT THE POINT OF CROSSING SO THE PIPE JOINTS ARE EQUIDISTANT FROM THE SEWER.
 MAXIMUM JOINT DEFLECTION OF 100mm PER 6m LENGTH OF PIPE FOR DIAMETERS EQUAL TO OR LESS THAN 300mm.

NOTE:
 LOCATION OF ALL EXISTING UTILITIES ARE APPROXIMATE ONLY AND MUST BE CONFIRMED IN THE FIELD.

NOTE:
 REFER TO PAGES 17 TO 19 FOR TYPICAL SECTIONS, NOTES, DETAILS & LEGEND.



DRAFT

DATE	REVISIONS	BY

CAUTION

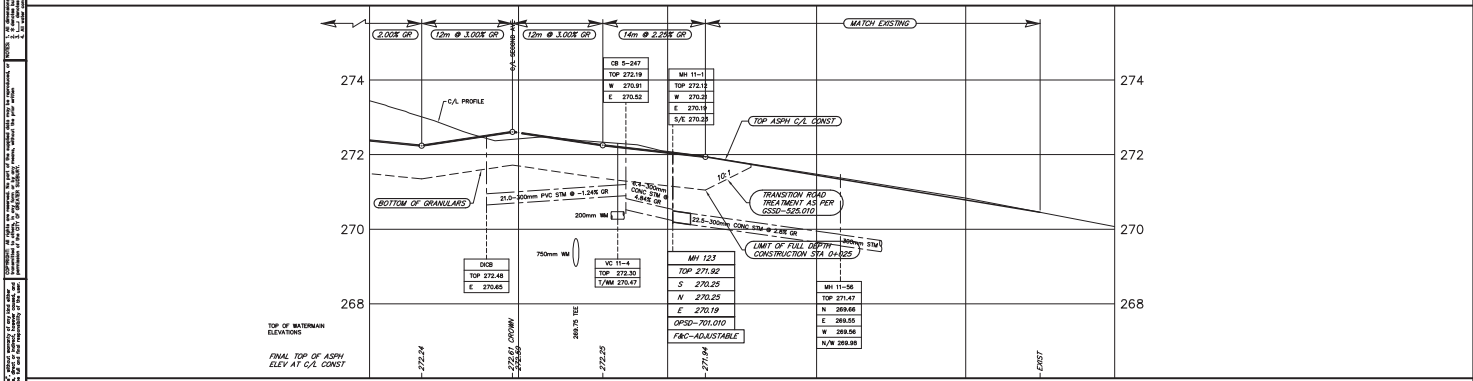
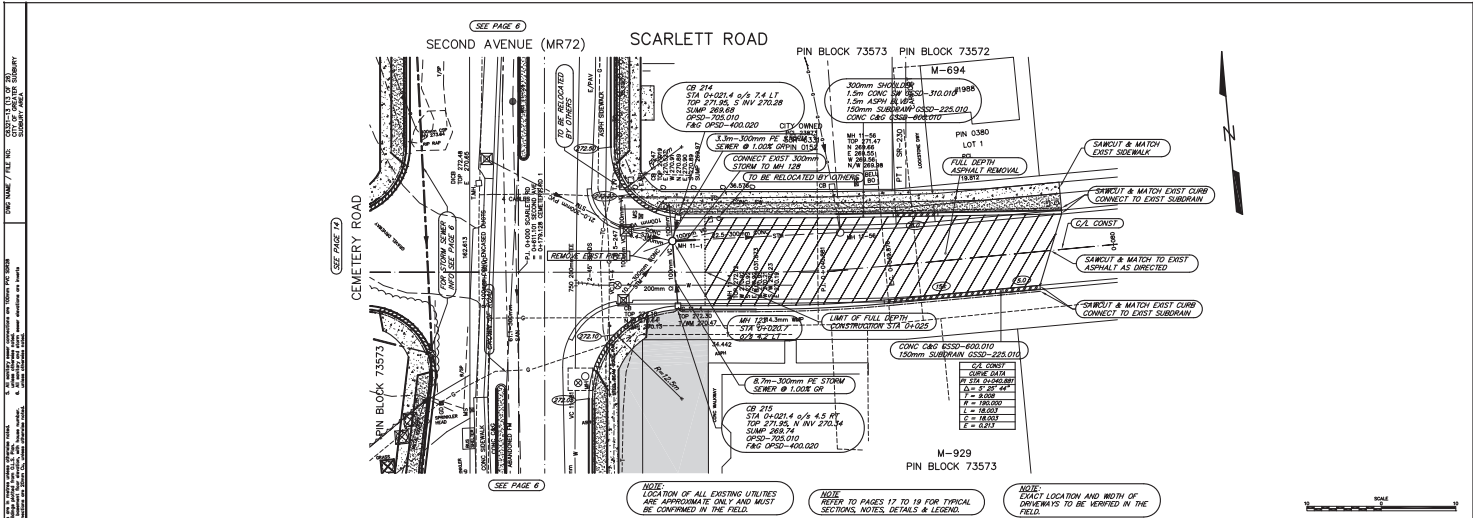
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- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE: 2014-09-20	DESIGNER: AC
CHECKED: []	ENGINEER: []
APPROVED: []	



PLAN & PROFILE
 PLUMTREE CRESCENT
 STA 0+280 TO STA 0+440
 AT PLUMTREE CRESCENT
 SUDBURY AREA

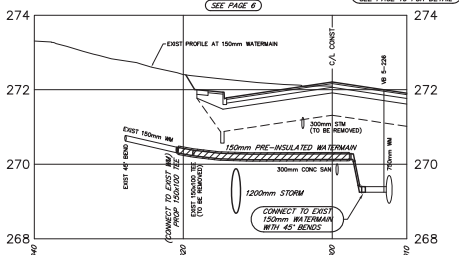
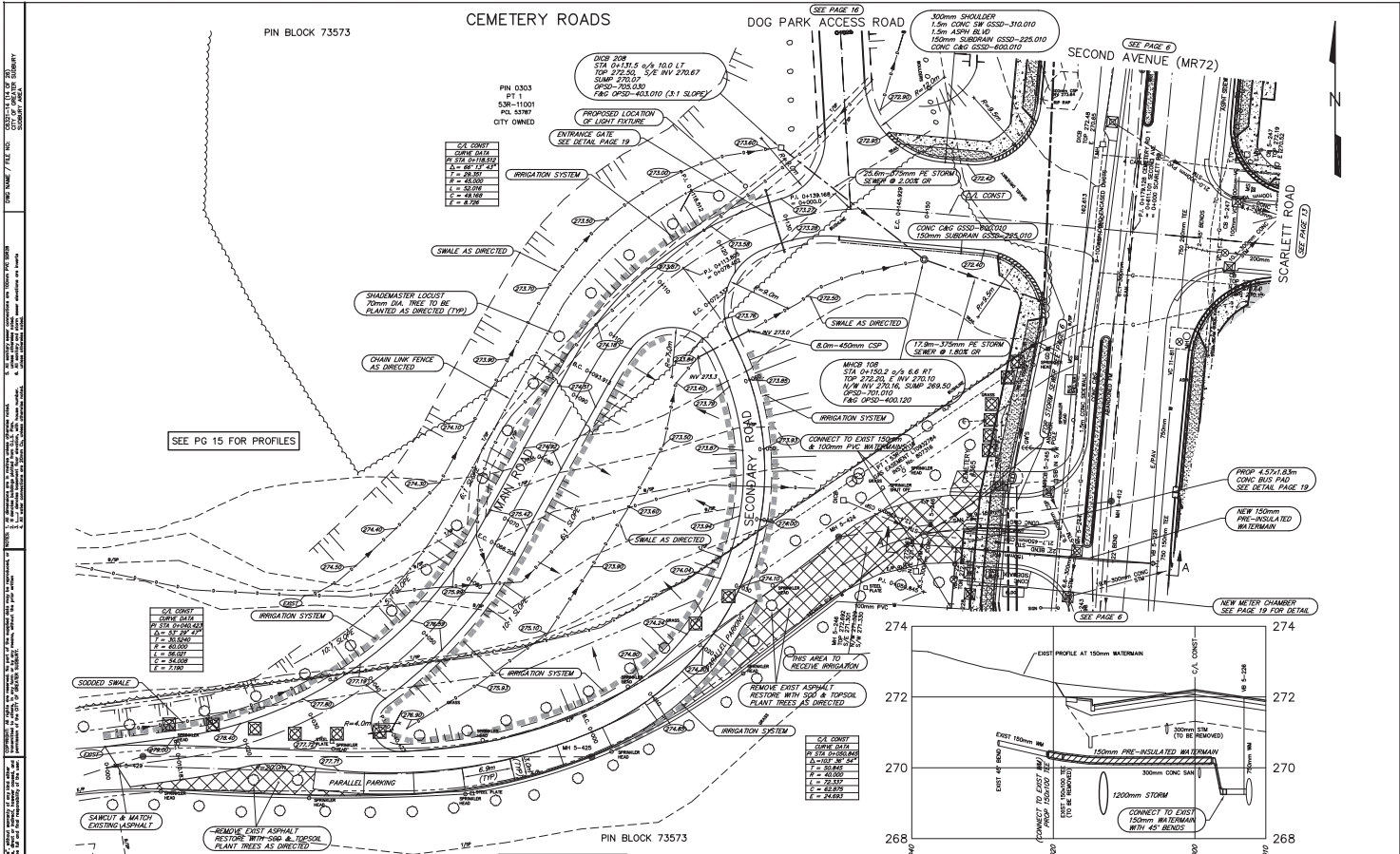
SCALE: 1:250 HOR.
 1:500 VERT.
 CONTRACT NO. ENG14-17
 C/D/FILE NUMBER: C6321-12
 PAGE NO: 12 of 28



DRAFT

REVISIONS			CAUTION			DATE: 2014-09-20			PLAN & PROFILE		
DATE	DETAILS	BY	- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING			DESIGNED:	SCARLETT ROAD			SCALE: 1:250 HOR, 1:500 VERT	
			- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED			CHECKED:	STA 0+000 TO STA 0+080			CONTRACT NO. ENG-1-17	
			- LOCATION & BISE OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.			ENGINEER:	AT SECOND AVENUE			CAD/DWG NUMBER: C6321-13	
						APPROVED:	SUBURBY AREA			PAGE NO. 13 of 28	





DRAFT

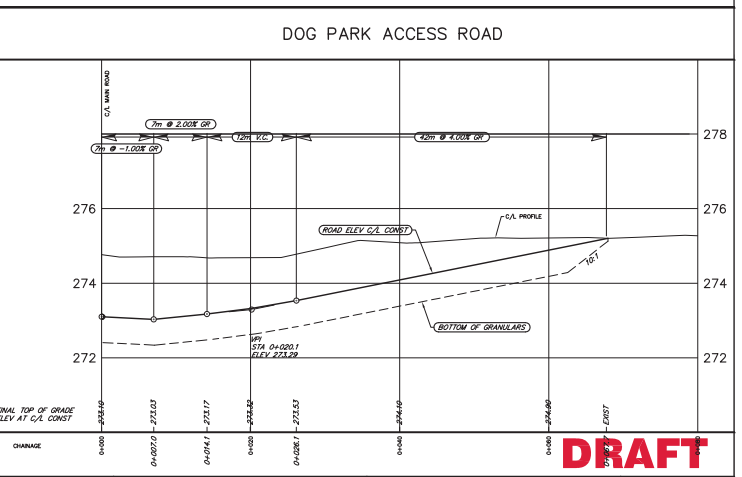
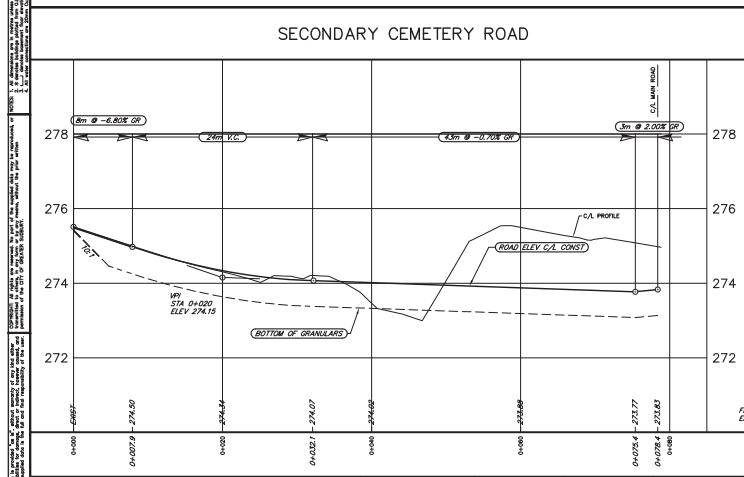
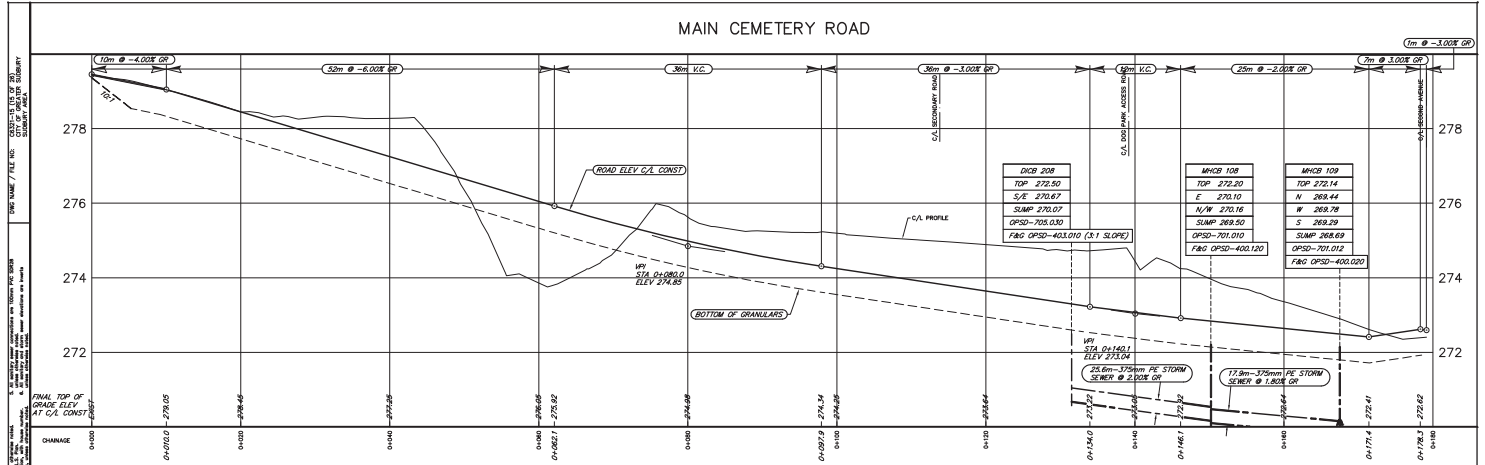
SECTION A-A

REVISIONS			CAUTION			DATE: 2014-09-20		
DATE	DETAILS	BY	- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING			DESIGNED:	DRAWN: AC	
			- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED			CHECKED:	ENGINEER:	
			- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.			APPROVED:	APPROVED:	



PLAN
CEMETERY ROADS
STA 0+000 TO STA 0+179.128
AT SECOND AVENUE
SUDBURY AREA

SCALE: 1:250 HOR.
CONTRACT NO. ENG14-17
JOB/FILE NUMBER: C6321-14
PAGE NO.: **14** of 28



DRAFT

REVISIONS		CAUTION
DATE	DETAILS	BY

CAUTION

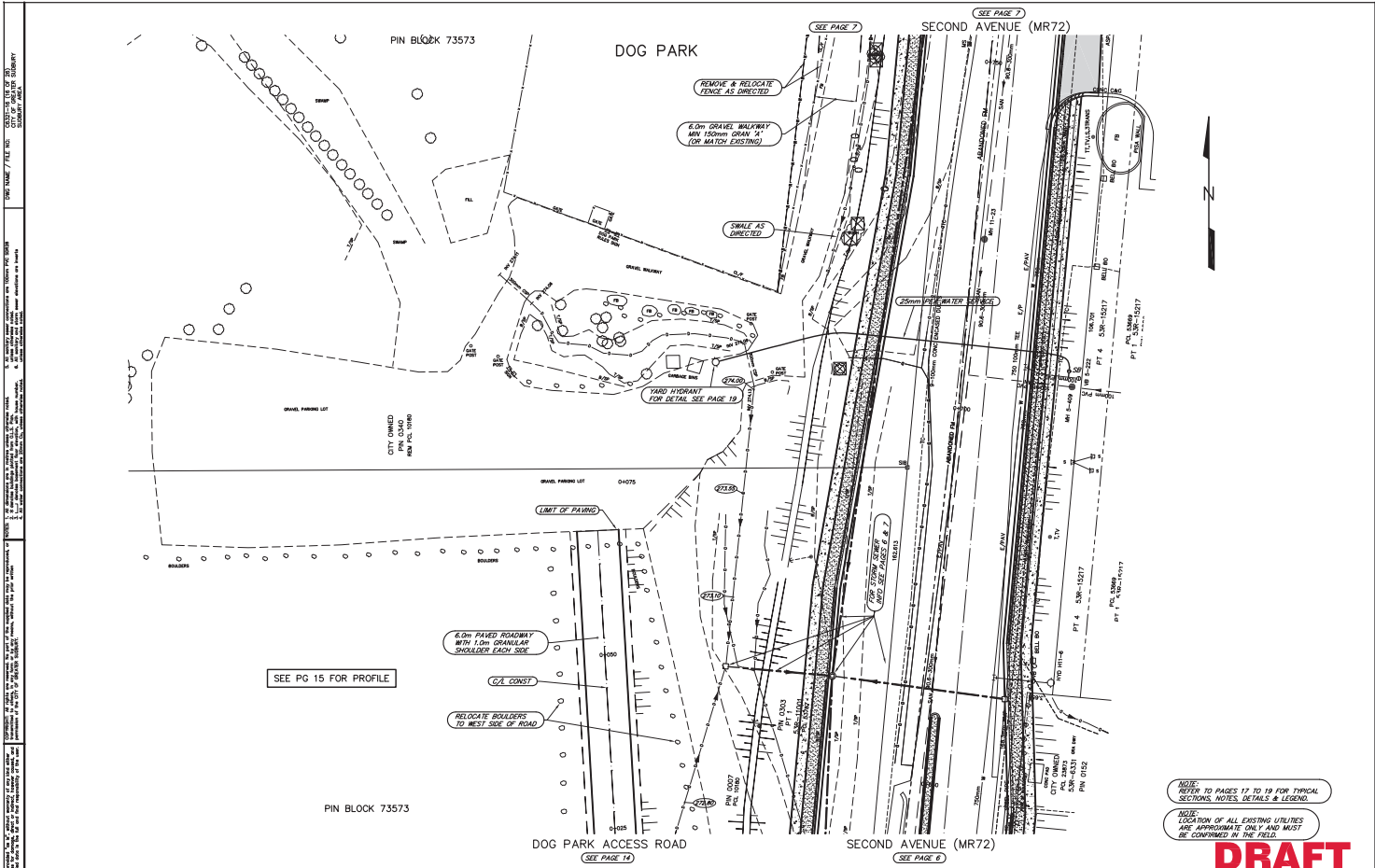
- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING
- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED
- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE: 2014-09-20
 DRAWN: AC
 DESIGNED:
 CHECKED:
 ENGINEER:
 APPROVED:



PROFILES
CEMETERY ROADS & DOG PARK ACCESS ROAD
 AT SECOND AVENUE
 SUDBURY AREA

SCALE: 1:250 HOR.
 1:50 VERT.
 CONTRACT NO. ENG4-17
 C/D FILE NUMBER: C6321-15
 PAGE NO: **15** of 28



DRAFT

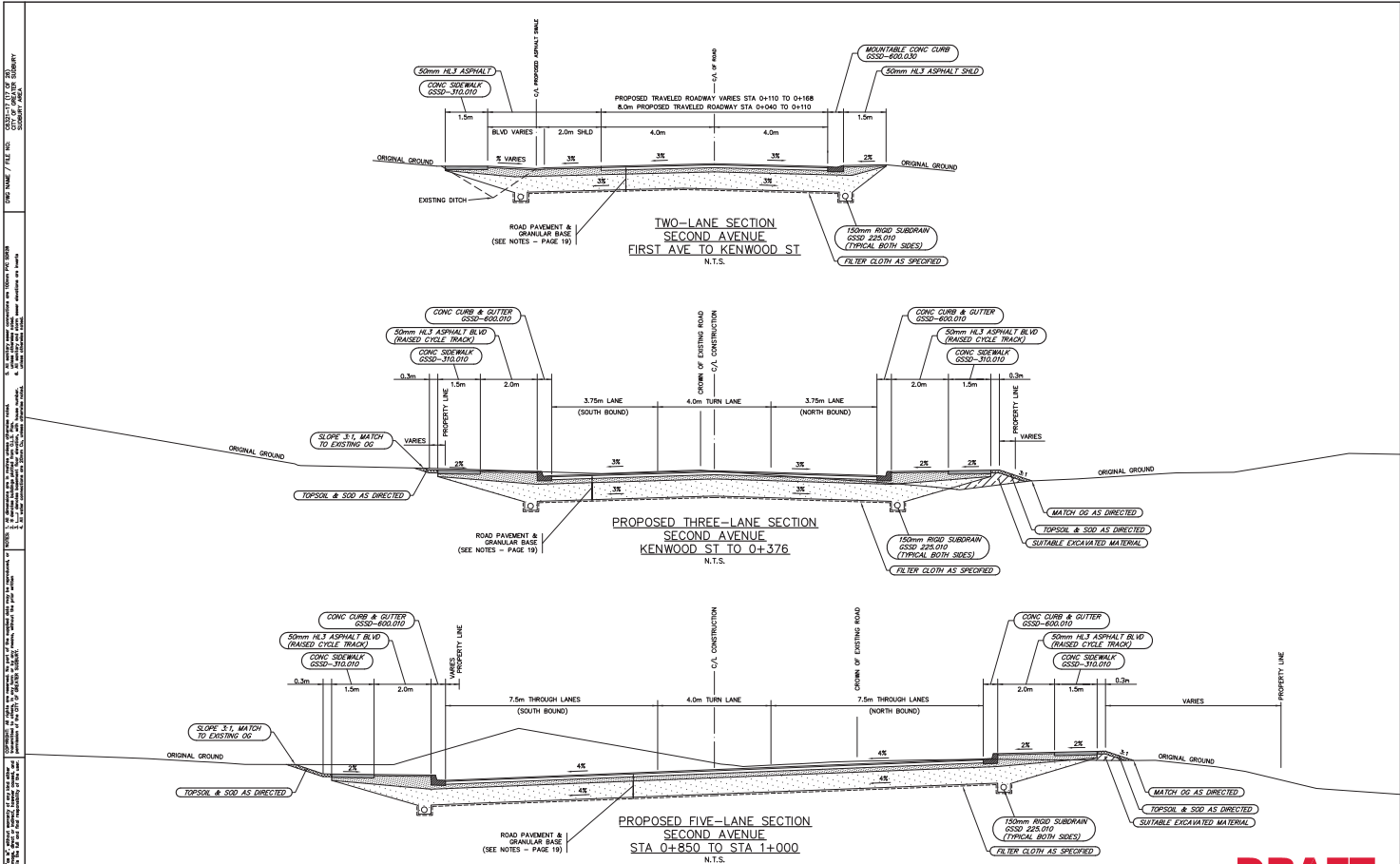
REVISIONS		
DATE	DETAILS	BY

CAUTION
 - ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
 - WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
 - LOCATION & SIZE OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE: 2014-09-20
DRAWN: AC
DESIGNED:
CHECKED:
ENGINEER:
APPROVED:

PLAN
DOG PARK ACCESS ROAD & WATER SERVICE AT SECOND AVENUE SUDBURY AREA

SCALE: 1:250 HOR.
CONTRACT NO. ENG-1-17
CAD/DWG NUMBER: C6321-16
PAGE NO: 16 of 28



DRAFT

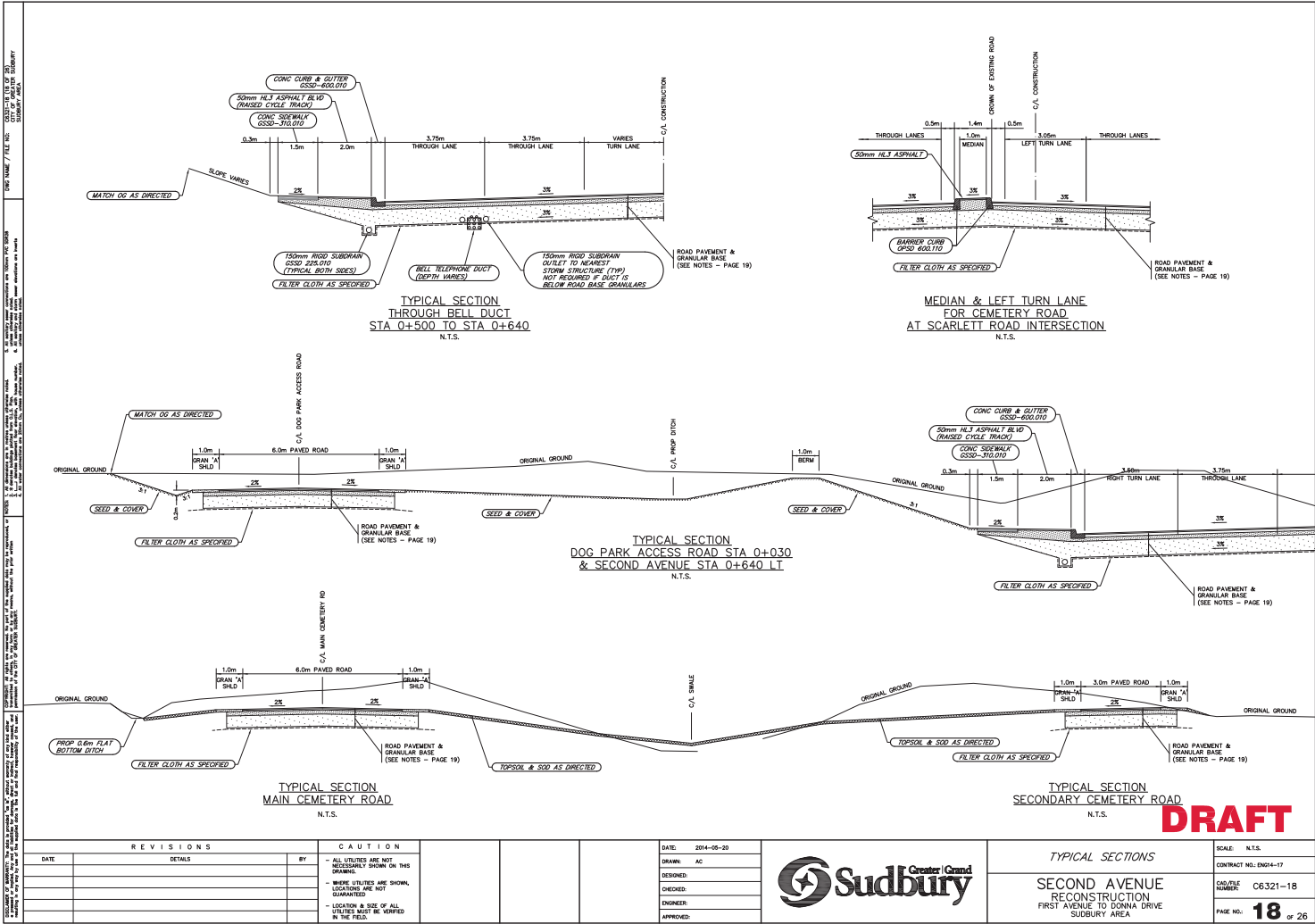
REVISIONS		BY	CAUTION
DATE	DETAILS		- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING
			- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED
			- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD

DATE	2014-09-20
DRAWN	AC
DESIGNED	
CHECKED	
ENGINEER	
APPROVED	



TYPICAL SECTIONS
SECOND AVENUE
 RECONSTRUCTION
 FIRST AVENUE TO DOWNA DRIVE
 SUDBURY AREA

SCALE	N.T.S.
CONTRACT NO.	EN04-17
CH/D/FILE NUMBER	C6321-17
PAGE NO.	17 of 26



DRAFT

REVISIONS		
DATE	DETAILS	BY

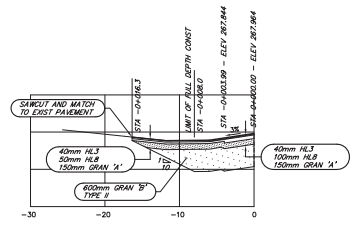
CAUTION	
-	ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
-	WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
-	LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE:	2014-09-20
DRAWN:	AC
DESIGNED:	
CHECKED:	
ENGINEER:	
APPROVED:	

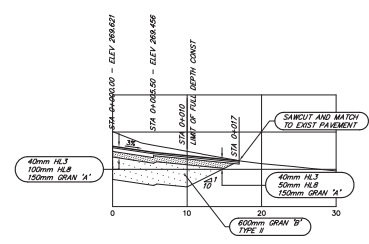


TYPICAL SECTIONS	SCALE: N.T.S.
SECOND AVENUE RECONSTRUCTION	CONTRACT NO. EN04-17
FIRST AVENUE TO DORNA DRIVE	C/D/FILE NUMBER: C6321-18
SUDBURY AREA	PAGE NO: 18 of 26

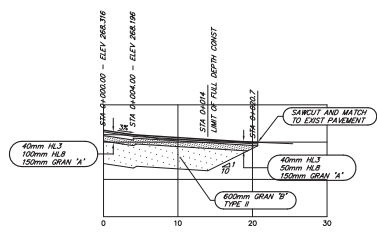
1. THE CITY OF SUDBURY IS PROVIDING THESE PLANS FOR INFORMATIONAL PURPOSES ONLY. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF ALL INFORMATION SHOWN ON THESE PLANS. THE CITY OF SUDBURY DOES NOT WARRANT THE ACCURACY OF ANY INFORMATION SHOWN ON THESE PLANS. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF ALL INFORMATION SHOWN ON THESE PLANS. THE CITY OF SUDBURY DOES NOT WARRANT THE ACCURACY OF ANY INFORMATION SHOWN ON THESE PLANS.



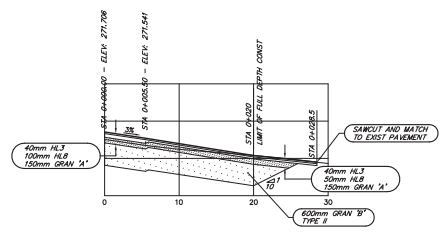
C/L PROFILE AT FIRST AVE.
N.T.S.



C/L PROFILE AT KENWOOD ST.
N.T.S.



C/L PROFILE AT MARGARET ST.
N.T.S.



C/L PROFILE AT CAMELOT DR.
N.T.S.

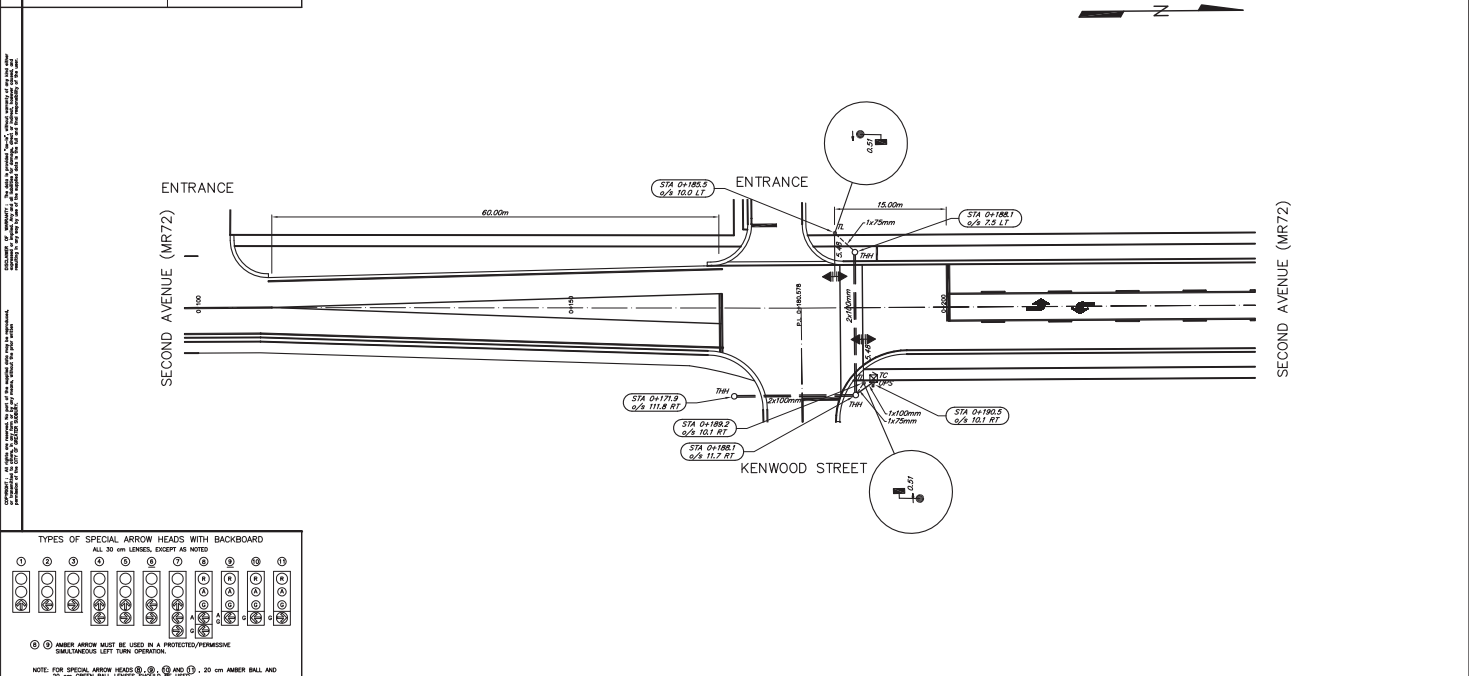
DRAFT

REVISIONS			CAUTION		DATE: 2014-06-09			SIDE ROAD PROFILES	
DATE	DETAILS	BY	- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING. - WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED. - LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.		DRAWN: AC	DESIGNED:		SECOND AVENUE RECONSTRUCTION FIRST AVENUE TO DONNA DRIVE SUDBURY AREA	SCALE: AS SHOWN
					CHECKED:	ENGINEER:		CAD/DWG NUMBER: C6321-20	PAGE NO: 20 of 26
					APPROVED:				

CAD / FILE NUMBER: 08321-21 (1 OF 26)

LEGEND	
	VEHICLE PRESENCE LOOP DETECTOR
	VEHICLE LOOP DETECTOR
	DUPLEX LOOP DETECTOR
	EMERGENCY LOOP DETECTOR
	TRAFFIC CONTROLLER
	TRAFFIC SIGN
	TRAFFIC SIGN WITH FLASHING BEACON
	ILLUMINATED TRAFFIC SIGN
	TRAFFIC SIGNAL POLE (TSP)
	TRAFFIC SIGNAL POLE WITH BACKWARD FACING ARROW (TSP-BA)
	TRAFFIC SIGNAL POLE WITH BACKWARD FACING ARROW AND FLASHING BEACON (TSP-BA-FB)
	TRAFFIC SIGNAL POLE WITH BACKWARD FACING ARROW AND FLASHING BEACON AND ONE OR MORE PERMITTED LENSES (TSP-BA-FB-PL)
	TRAFFIC SIGNAL POLE WITH BACKWARD FACING ARROW AND FLASHING BEACON AND ONE OR MORE PERMITTED LENSES AND A TRAFFIC SIGNAL HEAD (TSP-BA-FB-PL-TSH)
	TRAFFIC SIGNAL POLE WITH BACKWARD FACING ARROW AND FLASHING BEACON AND ONE OR MORE PERMITTED LENSES AND A TRAFFIC SIGNAL HEAD AND A TRAFFIC SIGNAL HEAD (TSP-BA-FB-PL-TSH-TSH)
	TRAFFIC SIGNAL POLE WITH BACKWARD FACING ARROW AND FLASHING BEACON AND ONE OR MORE PERMITTED LENSES AND A TRAFFIC SIGNAL HEAD AND A TRAFFIC SIGNAL HEAD AND A TRAFFIC SIGNAL HEAD (TSP-BA-FB-PL-TSH-TSH-TSH)
	TRAFFIC SIGNAL POLE WITH BACKWARD FACING ARROW AND FLASHING BEACON AND ONE OR MORE PERMITTED LENSES AND A TRAFFIC SIGNAL HEAD AND A TRAFFIC SIGNAL HEAD AND A TRAFFIC SIGNAL HEAD AND A TRAFFIC SIGNAL HEAD (TSP-BA-FB-PL-TSH-TSH-TSH-TSH)

CONDUIT LINETYPE LEGEND	
	100mm PVC RIBB TRAFFIC SIGNAL DUCT
	100mm PVC FIBRE OPTIC TRAFFIC SIGNAL DUCT
	75mm PVC RIBB TRAFFIC SIGNAL DUCT
	75mm PVC FIBRE OPTIC TRAFFIC SIGNAL DUCT
	50mm PVC FIBRE OPTIC TRAFFIC SIGNAL DUCT
	LOOP DETECTOR DUCT (SEE NOTE AS APPLICABLE)



TYPES OF SPECIAL ARROW HEADS WITH BACKBOARD
 All 30 cm lenses, except as noted

CLASSIFICATION OF ROADWAY	TRAFFIC SIGNAL HEADS	LOCATION
TYPE	SIZE	BACKBOARD
ROADWAY SECOND AVENUE (MR72)	PRIMARY	HWY
SECONDARY	HWY	YES
PRIMARY ARTERIAL	PRIMARY	HWY
MULTILANE	AUXILIARY	HWY
TWO-LANE	PRIMARY	HWY
ROADWAY KENWOOD STREET	PRIMARY	HWY
LOCAL ROAD	SECONDARY	HWY
MULTILANE	AUXILIARY	HWY
TWO-LANE	PRIMARY	HWY
	SECONDARY	HWY

DATE	DESCRIPTION OF REVISIONS	ANALYST

DRAFT

METRIC - ALL DIMENSIONS ARE SHOWN IN METRES UNLESS OTHERWISE SPECIFIED

LOCAL MUNICIPALITY: CITY OF GREATER SUDBURY
 LOCAL MUNICIPALITY: CITY OF GREATER SUDBURY

INTERSECTION: SECOND AVENUE (MR72) AT KENWOOD STREET
 INTERSECTION: SECOND AVENUE (MR72) AT KENWOOD STREET

DATE: _____ SCALE: 1:250
 DATE: _____ SCALE: 1:250

RECOMMENDED BY: _____
 MUNICIPAL OFFICIAL (MUNICIPAL INSTALLATION)

APPROVAL DATE: _____
 APPROVAL DATE: _____

DRAWN BY: JEC
 CHECKED: _____

DESIGNED BY: SE
 DATE: 2014-06-20

CONTRACT NO: 0914-17
 CAD/FILE NO: 08321-21

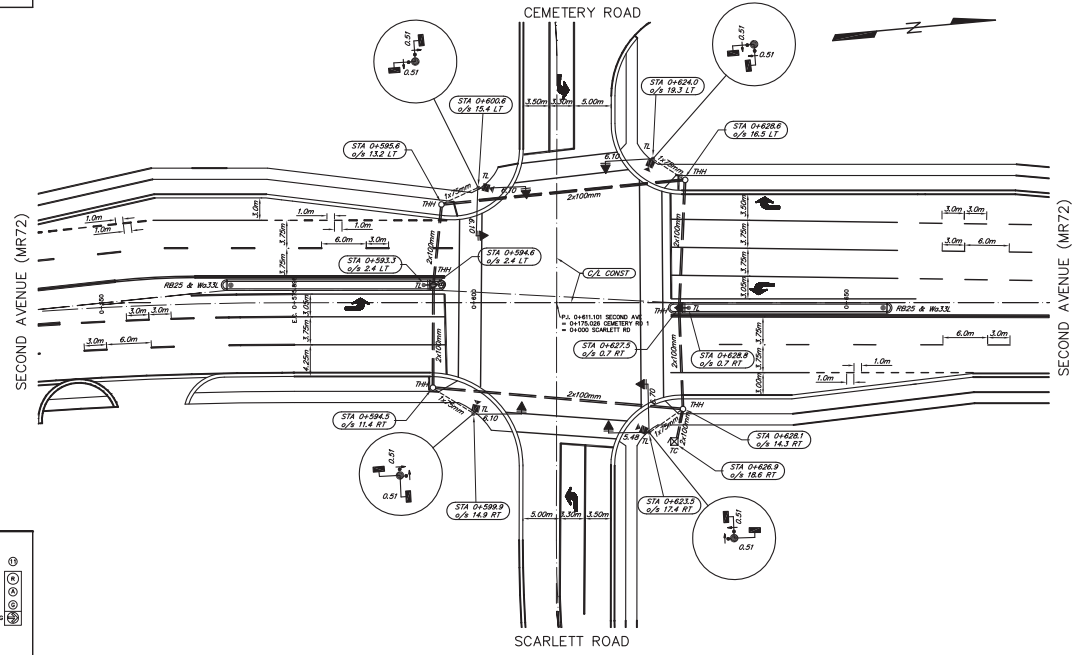
GENERAL MANAGER OF INFRASTRUCTURE SERVICES

PAGE No: **21** of 26

CAD / FILE NUMBER : 06321-22 (22 OF 20)

LEGEND	
	VERTICAL ADVANCE LOOP DETECTOR
	NORMAL LOOP DETECTOR
	DOUBLE LOOP DETECTOR
	FORWARD LOOP DETECTOR
	TRAFFIC CONTROLLER
	TRAFFIC SIGN
	TRAFFIC SIGN WITH FLASHING BEACON
	ILLUMINATED TRAFFIC SIGN
	TRAFFIC SIGNAL POLE (TSP)
	TRAFFIC SIGNAL POLE WITH PEDESTRIAN SIGNAL CONTROL
	TRAFFIC SIGNAL POLE WITH PEDESTRIAN SIGNAL CONTROL AND AMBER ARROW
	PEDESTRIAN SIGNAL HEAD
	PEDESTRIAN PUSH BUTTON

CONDUIT LINETYPE LEGEND	
	100mm PVC RIBB TRAFFIC SIGNAL DUCT
	100mm PVC FIBRE OPTIC TRAFFIC SIGNAL DUCT
	75mm PVC RIBB TRAFFIC SIGNAL DUCT
	75mm PVC FIBRE OPTIC TRAFFIC SIGNAL DUCT
	50mm PVC FIBRE OPTIC NETWORK DUCT
	LOOP DETECTOR DUCT (OVER SIZE AS NOTE)



TYPES OF SPECIAL ARROW HEADS WITH BACKBOARD

All 30 cm lenses, except as noted

--	--	--	--	--	--	--	--	--	--

NOTE: AMBER ARROW MUST BE USED IN A PROTECTIVE/PEDESTRIAN SIMULTANEOUS LEFT TURN OPERATION.

NOTE: FOR SPECIAL ARROW HEADS (1), (2), (3) AND (4), 20 cm AMBER BALL AND 20 cm GREEN BALL LENSES SHOULD BE USED.

CLASSIFICATION OF ROADWAY	TRAFFIC SIGNAL HEADS		LOCATION	
	TYPE	SIZE	MOUNTING HT	OFFSET FROM POLE
ROADWAY SECOND AVENUE (MR72)	PRIMARY	HWY	YES	5.0
PRIMARY ARTERIAL	SECONDARY	HWY	YES	5.0
MULTILANE	AUXILIARY			
TWO-LANE	PRIMARY			
	SECONDARY			
ROADWAY SCARLETT ROAD	PRIMARY	HWY	YES	5.0
LOCAL ROAD	SECONDARY	HWY	YES	5.0
MULTILANE	AUXILIARY			6.10 - 6.70
TWO-LANE	PRIMARY			5.48 - 6.10
	SECONDARY			

DATE	DESCRIPTION OF REVISIONS	ANALYST



METRIC - ALL DIMENSIONS ARE SHOWN IN METRES UNLESS OTHERWISE SPECIFIED

LOCAL MUNICIPALITY: CITY OF GREATER SUDBURY

INTERSECTION: SECOND AVENUE (MR72) AT SCARLETT ROAD

DATE: _____ SCALE: 1:250

RECOMMENDED BY: _____ MUNICIPAL OFFICIAL (MANUAL INSTALLATION)

DESIGNED BY: SE

CHECKED: _____ DATE: 2014-06-20

CITY OF GREATER SUDBURY

SIGNAL INSTALLATION APPROVED AS PER SECTION 144 (51) N.T.A.

GENERAL MANAGER OF INFRASTRUCTURE SERVICES

APPROVAL DATE: _____

CONTRACT NO: 04014-17

CAD FILE: 06321-22

PAGE No: **22** of 26

DRAFT

SECOND AVENUE (MR72)

FIRST AVENUE

MARGARET STREET

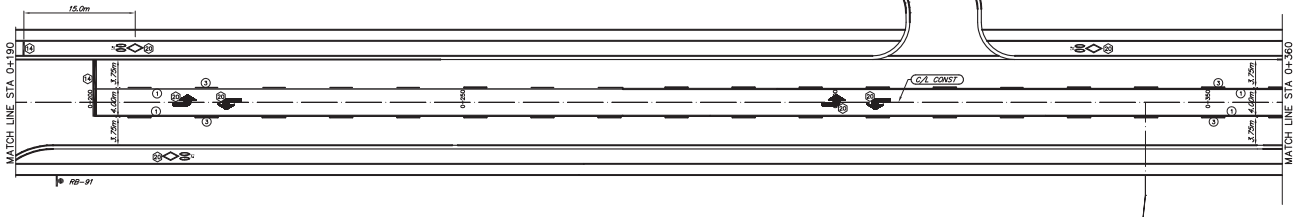
KENWOOD STREET

SECOND AVENUE (MR72)

PAINT MARKING LEGEND

- 1 SOLID YELLOW, 10cm
- 2 SOLID DOUBLE YELLOW, 10cm
- 3 363 BROKEN YELLOW, 10cm
- 4 SOLID YELLOW, 20cm
- 5 SOLID WHITE, 10cm
- 6 333 BROKEN WHITE, 10cm
- 7 363 BROKEN WHITE, 10cm
- 8 363 BROKEN WHITE, 10cm
- 9 SOLID WHITE, 20cm
- 10 111 BROKEN WHITE, 20cm
- 11 333 BROKEN WHITE, 20cm
- 12 333 BROKEN WHITE, 30cm
- 13 CROSSWALK SOLID WHITE, 30cm
- 14 STOP BAR SOLID WHITE, 40cm
- 15 ZEBRA SOLID WHITE, 60cm
- 16 CROSSWALK SOLID WHITE, 80cm
- 20 SYMBOLS

- NOTES:**
1. 333 DENOTES PAVEMENT MARKING SPACING (SEE 300 LINE, 3m, 5m, 5m LINE)
 2. USE TO DENOTE PAVEMENT MARKING.
 3. USE TO DENOTE PAVEMENT MARKING DURABLE.



DRAFT

REVISIONS		
DATE	DETAILS	BY

CAUTION

- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE:	2014-09-20
DRAWN:	AC
DESIGNED:	
CHECKED:	
ENGINEER:	
APPROVED:	

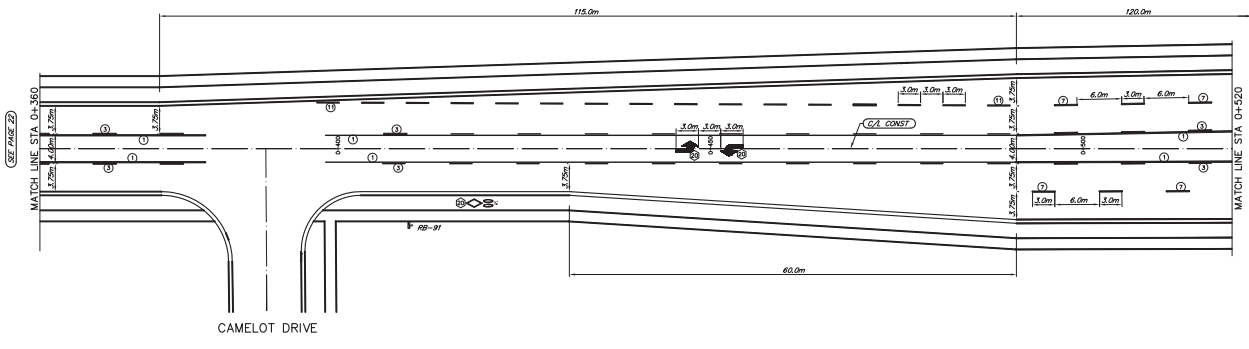
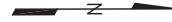


ROADWAY PAINT MARKINGS

SECOND AVENUE (MR72)
 STA 0+000 TO STA 0+360
 AT MARGARET STREET & KENWOOD DRIVE
 SUDBURY AREA

SCALE:	1:250 HOR.
CONTRACT NO.:	ENG4-17
CAD/DWG NUMBER:	C6321-23
PAGE NO.:	23 of 28

SECOND AVENUE (MR72)



PAINT MARKING LEGEND

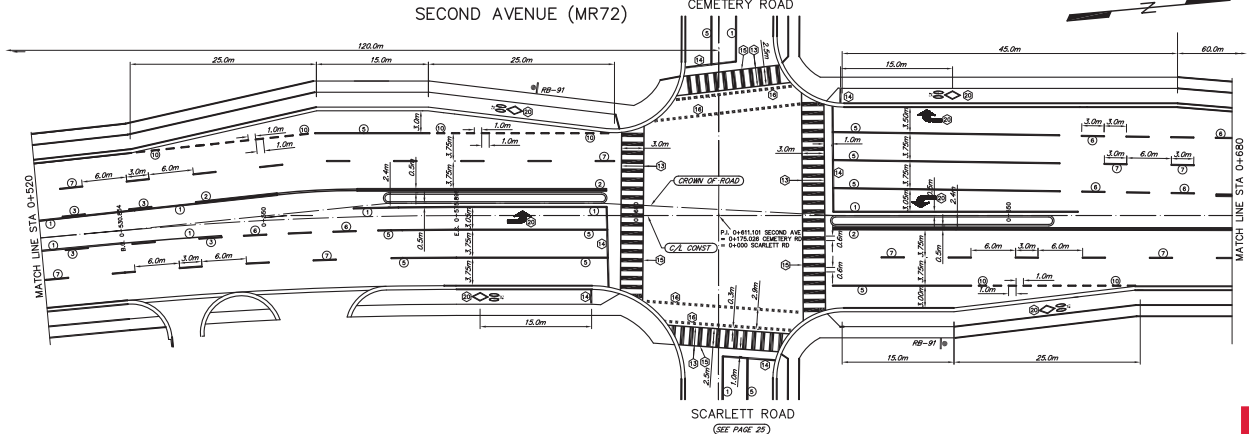
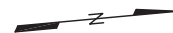
- 1 SOLID YELLOW, 10cm
- 2 SOLID DOUBLE YELLOW, 10cm
- 3 3x3 BROKEN YELLOW, 10cm
- 4 SOLID YELLOW, 20cm
- 5 SOLID WHITE, 10cm
- 6 3x3 BROKEN WHITE, 10cm
- 7 3x3 BROKEN WHITE, 15cm
- 8 3x3 BROKEN WHITE, 15cm
- 9 SOLID WHITE, 20cm
- 10 11x11 BROKEN WHITE, 20cm
- 11 3x3 BROKEN WHITE, 20cm
- 12 3x3 BROKEN WHITE, 30cm
- 13 CROSSHAIR SOLID WHITE, 30cm
- 14 STOP BAR SOLID WHITE, 40cm
- 15 ZEBRA SOLID WHITE, 60cm
- 16 CROSSHAIR SOLID WHITE, 40cm
- 20 SYMBOLS

- NOTES**
1. 3x3 SPACED PAYMENT MARKING SPACING: (400 3m LINE, 3m GAP, 3m LINE)
 2. USE (1) TO DENOTE PAYMENT MARKING.
 3. USE (2) TO DENOTE PAYMENT MARKING, DUMPABLE.

SECOND AVENUE (MR72)

CEMETERY ROAD

SCARLETT ROAD



DRAFT

DATE	REVISIONS	DETAILS	BY

CAUTION

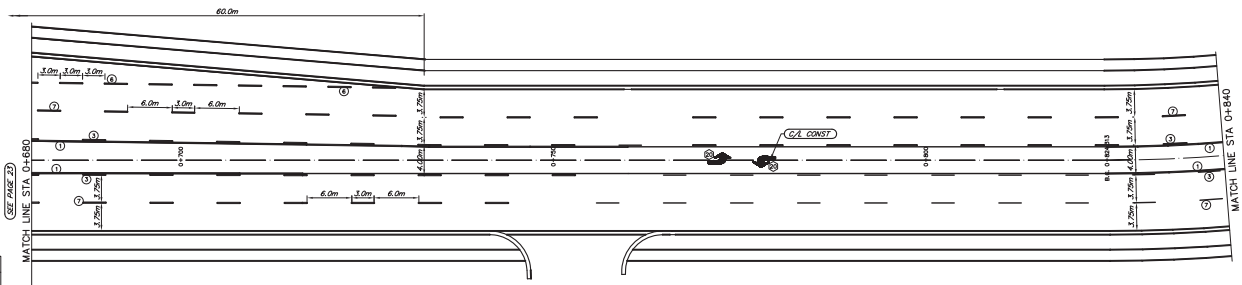
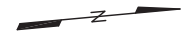
- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
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- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE:	2014-09-20
DRAWN:	AC
DESIGNED:	
CHECKED:	
ENGINEER:	
APPROVED:	

ROADWAY PAINT MARKINGS
 SECOND AVENUE (MR72)
 STA 0+360 TO STA 0+680
 AT CAMELOT DRIVE & SCARLETT ROAD
 SUDBURY AREA

SCALE:	1:250 HORIZ.
CONTRACT NO.:	ENG14-17
CD/D/FILE NUMBER:	C6321-24
PAGE NO.:	24 of 28

SECOND AVENUE (MR72)

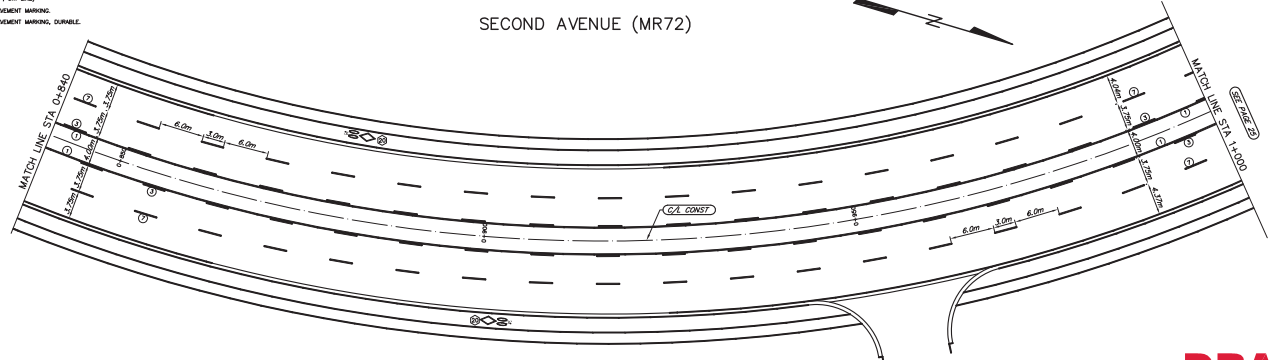


PAINT MARKING LEGEND

- 1 SOLID YELLOW, 10cm
- 2 SOLID DOUBLE YELLOW, 10cm
- 3 363 BROKEN YELLOW, 10cm
- 4 SOLID YELLOW, 20cm
- 5 SOLID WHITE, 10cm
- 6 333 BROKEN WHITE, 10cm
- 7 363 BROKEN WHITE, 10cm
- 8 363 BROKEN WHITE, 15cm
- 9 SOLID WHITE, 20cm
- 10 111 BROKEN WHITE, 20cm
- 11 333 BROKEN WHITE, 20cm
- 12 333 BROKEN WHITE, 30cm
- 13 CROSSBARK SOLID WHITE, 20cm
- 14 STOP BAR SOLID WHITE, 45cm
- 15 Zebra SOLID WHITE, 45cm
- 16 CROSSBARKS SOLID WHITE, 40cm
- 20 TRIANGLES

- NOTES:**
1. 333 DENOTES PAINT MARKING SPACING. (50' ON LANE, 20' OFF 20' LANE)
 2. USE (O) TO DENOTE PAINT MARKING.
 3. USE (D) TO DENOTE PAINT MARKING, DURNABLE.

SECOND AVENUE (MR72)



DRAFT

REVISIONS		
DATE	DETAILS	BY

CAUTION

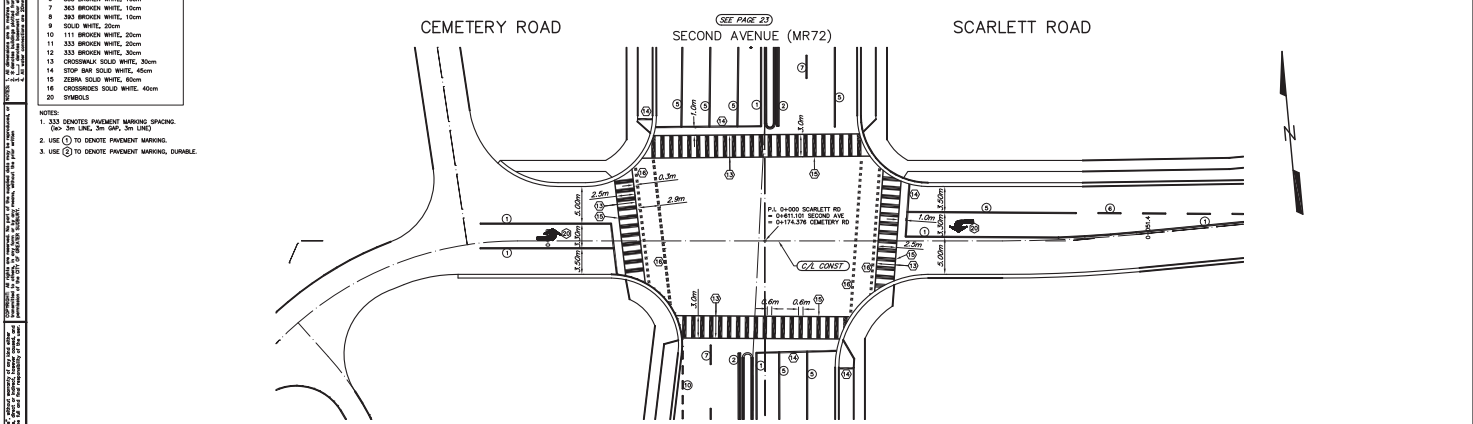
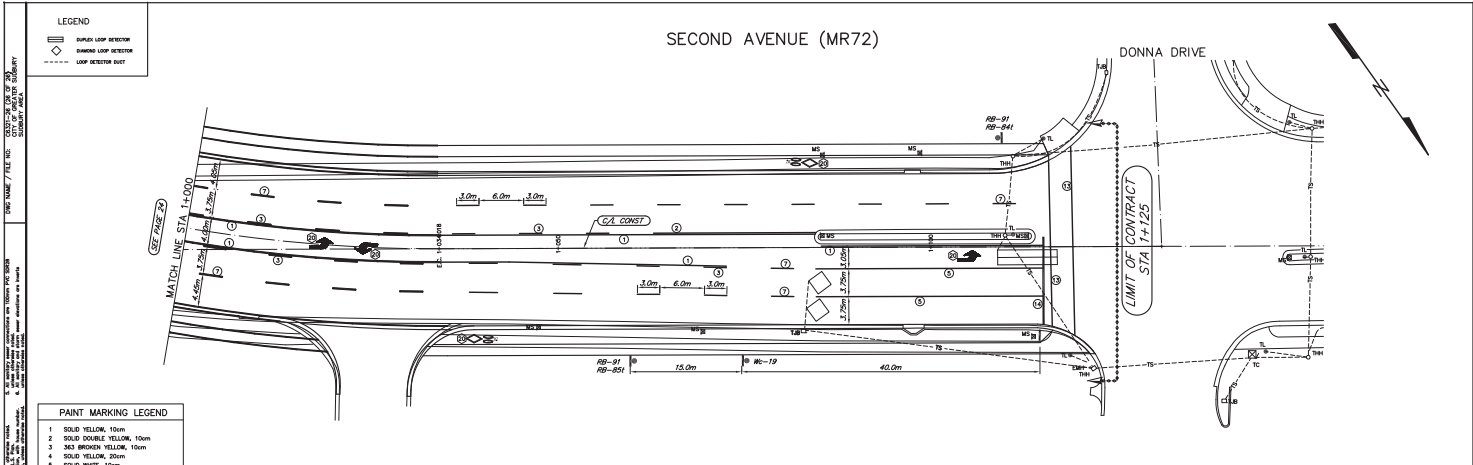
- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
- LOCATION & DEPTH OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE: 2014-09-20
DRAWN: AC
DESIGNED:
CHECKED:
ENGINEER:
APPROVED:



ROADWAY PAINT MARKINGS
 SECOND AVENUE (MR72)
 STA 0+680 TO STA 1+000
 BETWEEN SCARLETT ROAD & DONNA DRIVE
 SUDBURY AREA

SCALE: 1:250 HOR.
 CONTRACT NO. ENG4-17
 C/D/A/B/L NUMBER: C6321-25
 PAGE NO. **25** of 28



LEGEND

- DASHED LOOP DETECTOR
- DIAMOND LOOP DETECTOR
- LOOP DETECTOR DUCT

PAINT MARKING LEGEND

- 1 SOLID YELLOW, 10cm
- 2 SOLID DOUBLE YELLOW, 10cm
- 3 303 BROKEN YELLOW, 10cm
- 4 SOLID YELLOW, 30cm
- 5 SOLID WHITE, 10cm
- 6 303 BROKEN WHITE, 10cm
- 7 303 BROKEN WHITE, 15cm
- 8 303 BROKEN WHITE, 15cm
- 9 SOLID WHITE, 30cm
- 10 111 BROKEN WHITE, 20cm
- 11 333 BROKEN WHITE, 20cm
- 12 333 BROKEN WHITE, 30cm
- 13 CROSSWALK SOLID WHITE, 30cm
- 14 STOP BAR SOLID WHITE, 45cm
- 15 ZEBRA SOLID WHITE, 60cm
- 16 CROSSWALK SOLID WHITE, 45cm
- 20 SYMBOLS

NOTES

1. 333 DENOTES PAVEMENT MARKING SPACING (300 3m LINE, 3m GAP, 3m LINE)
2. LINE (O) TO DENOTE PAVEMENT MARKING.
3. LINE (O) TO DENOTE PAVEMENT MARKING, DURABLE.

DRAFT

REVISIONS		
DATE	DETAILS	BY

CAUTION

- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED.
- LOCATION & SIDE OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

DATE: 2014-09-20
DRAWN: AC
DESIGNED: _____
CHECKED: _____
ENGINEER: _____
APPROVED: _____



ROADWAY PAINT MARKINGS
SECOND AVENUE (MR72)
 STA 1+000 TO DONNA DRIVE
 AND SCARLETT RD & CEMETERY RD INTERSECTION
 SUDBURY AREA

SCALE: 1:250 HORIZ.
 CONTRACT NO. ENG14-17
 C/D/A/E NUMBER: C6321-26
 PAGE NO.: **26** of 28

APPENDIX I

Public Consultation

NOTICE OF STUDY COMMENCEMENT

Class Environmental Assessment City of Greater Sudbury Transportation Study

We Value Your Input

The City of Greater Sudbury welcomes public input to create a Transportation Plan for vehicles, public transit, cyclists and pedestrians in our community. Learn more and submit comments at a public information centre on Wednesday, January 11, in Room C-12 at Tom Davies Square, 200 Brady Street, Sudbury. You are welcome to attend anytime between 4 p.m. and 7 p.m.

Background

The City's most recent Transportation Study was updated in 2005. The current study will address policies to guide the development of a comprehensive and sustainable network that will accommodate all modes of transportation, including cycling and walking, in a healthy community. The final Transportation Plan will be incorporated into the City of Greater Sudbury's Official Plan to establish goals, objectives and policies that will manage and direct physical change throughout the community for the next 20 years.

Complete an Online Survey

Everyone is welcome to share views about the future of transportation in Greater Sudbury. A confidential online survey is available at www.greatersudbury.ca/officialplan

Municipal Class Environmental Assessment

This study is being conducted in accordance with the requirements of Schedule 'B' of the Municipal Class Environmental Assessment (Class EA) process, an approved planning document that describes the process that a municipality must follow to meet the requirements of the Environmental Assessment Act.

For more information or to be included on a mailing list for future Transportation Study events, please contact:

Jim Gough, P.Eng.
Senior Project Manager
Partner
MMM Group Ltd.
100 Commerce Valley Drive West
Thornhill, ON L3T 0A1
905-882-7283
Fax: 905-882-0055
goughj@mmm.ca

David Shelsted, MBA, P.Eng.
Acting Director of Roads and Transportation
City of Greater Sudbury
1800 Frobisher Street
P.O. Box 5000, Stn. A
Sudbury, ON P3A 5P3
705-674-4455, ext. 3688
Fax: 705-560-6109
david.shelsted@greatersudbury.ca



Second Avenue (MR 72) Infrastructure Improvements

Notice of Public Information Centre

Wednesday, March 19, 2014
Adamsdale Playground (Field House)
270 Second Avenue, Sudbury

Everyone is invited to attend
at any time between
4 p.m. to 7 p.m.

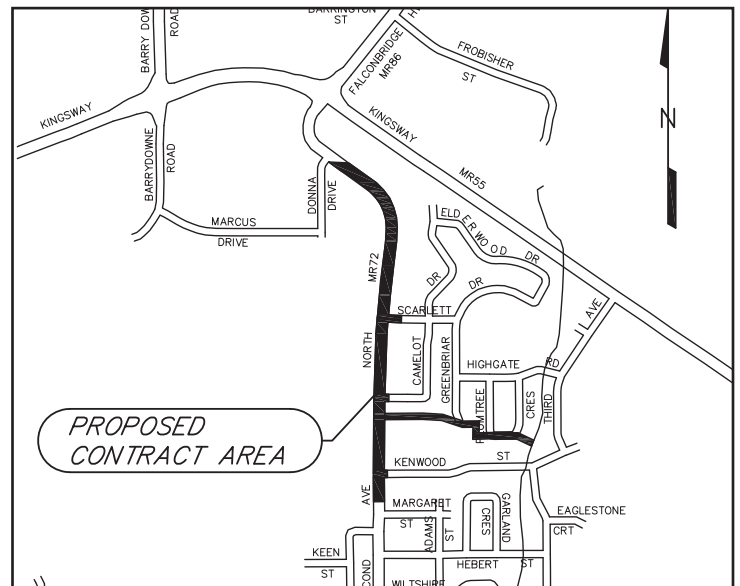


The City of Greater Sudbury is proposing infrastructure improvements on Second Avenue from Donna Drive to Kenwood Street.

Proposed improvements on Second Avenue include:

- Reconstruction of the roadway, including new pavement and granulars;
- Road widening with additional turn lanes and through lanes;
- New traffic signals at intersection of Second Avenue and Scarlett Road;
- Removal of pedestrian crossing traffic signals at Adamsdale Playground;
- Improvements and realignment of Cemetery and Dog Park entrances;
- New curb and sidewalk on both sides of Second Avenue;
- New Storm Sewer;
- Replacement of watermain and services from Adamsdale Playground to Kenwood Street;
- Utility Relocations, including poles and new streetlights.

The purpose of the Public Information Centre (PIC) is to inform the residents of the project and to secure comments on the proposed work. Attendees are encouraged to review the



construction plans that will be posted at the PIC. Project staff from the City will be available to answer questions and respond to any concerns.

This work is anticipated to start in the Spring of 2014.

For further information, please contact:

Councillor Terry Kett
Ward #11 Councillor
City of Greater Sudbury
1998 Hebert Street
705 566 3755

David Kalviainen, P. Eng.
Roads Engineer
City of Greater Sudbury
200 Brady Street
P.O. Box 5000, Station 'A'
Sudbury, ON, P3A 5P3
(705) 674-4455, ext 4161

Rob Rocca
Engineering Technician
City of Greater Sudbury
200 Brady Street
P.O. Box 5000, Station 'A'
Sudbury, ON, P3A 5P3
(705) 674-4455, ext 2360

Amélioration de l'infrastructure de l'avenue Second (R. M. 72)

AVIS DE CENTRE D'INFORMATION

Mercredi 19 mars 2014
Terrain de jeux Adamsdale
(pavillon sportif)
270, avenue Second, à Sudbury

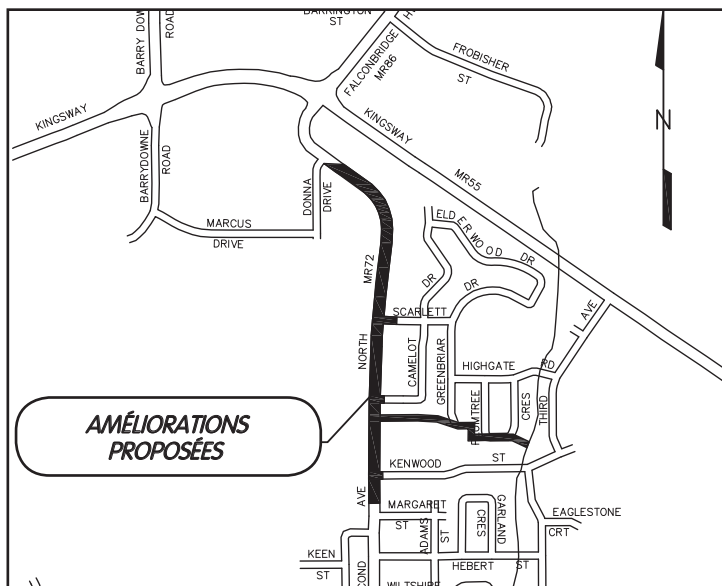
Tout le monde est invité
à y assister n'importe
quand de 16 h à 19 h.



La Ville du Grand Sudbury propose des améliorations de l'infrastructure de l'avenue Second, de la promenade Donna à la rue Kenwood.

Les améliorations proposées comprennent :

- la réfection de la route, y compris le remplacement de la chaussée et de granulés;
- l'élargissement de la route avec l'ajout de voies de virage et voies de transit;
- l'installation de feux de circulation à l'angle de l'avenue Second et du chemin Scarlett;
- l'enlèvement du passage pour piétons au terrain de jeux Adamsdale;
- l'amélioration et le remaniement de l'entrée au cimetière et de l'entrée au parc à chiens;
- le remplacement des bordures et des trottoirs sur les deux côtés de l'avenue Second;
- le remplacement de l'égout pluvial;
- le remplacement de la conduite principale d'eau et des services d'eau du terrain de jeux Adamsdale jusqu'à la rue Kenwood;
- le déplacement de services d'utilité publique, y compris les pôles et l'installation de nouveaux lampadaires.



Ce centre d'information a pour but d'informer les membres de la communauté de ce projet et de recueillir des commentaires sur les travaux proposés. On encourage les personnes qui y seront présentes à consulter les plans d'exécution qui seront affichés au centre d'information. Le personnel du projet de la Ville sera à votre disposition pour répondre aux questions et à toute préoccupation.

Ces travaux sont censés débuter au début du printemps 2014.

Pour plus de renseignements, veuillez communiquer avec :

Terry Kett
Conseiller du quartier 11
Ville du Grand Sudbury
1998, rue Hebert
705 566-3755

David Kalviainen
Ingénieur des routes
Ville du Grand Sudbury
200, rue Brady
C. P. 5000, succursale A
Sudbury (Ontario) P3A 5P3
705 674-4455, poste 4161

Rob Rocca
Technicien des sciences de
l'ingénierie
Ville du Grand Sudbury
200, rue Brady
C. P. 5000, succursale A
Sudbury (Ontario) P3A 5P3
705 674-4455, poste 2360

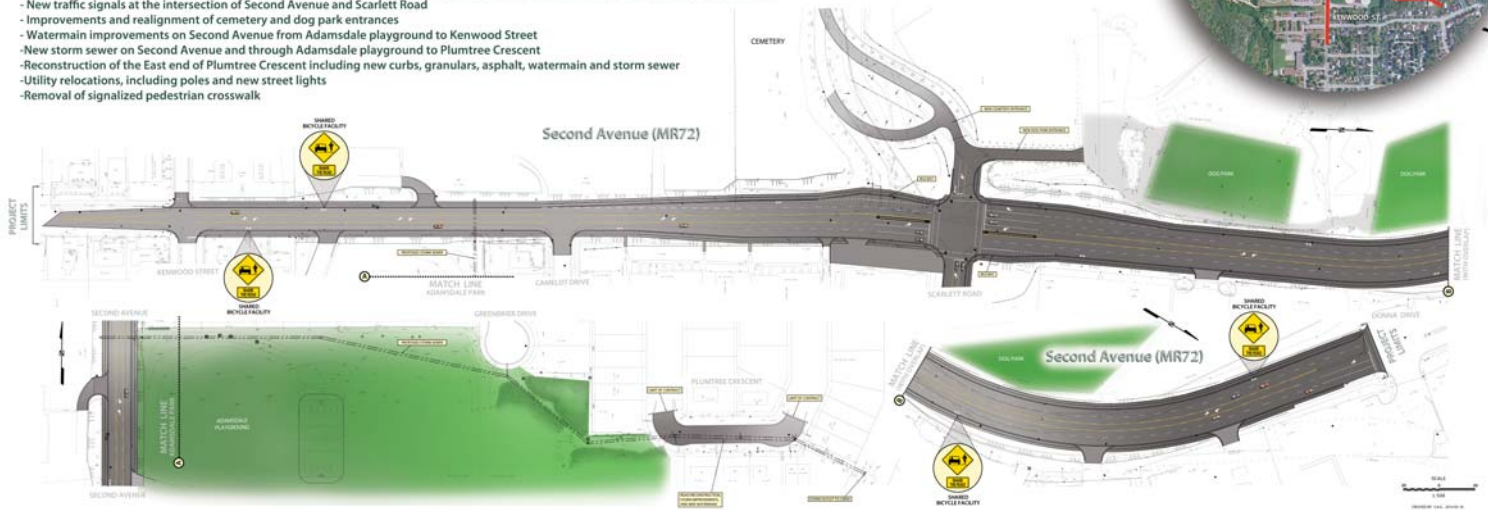


SECOND AVENUE (MR72) KENWOOD STREET TO DONNA DRIVE ROAD RECONSTRUCTION AND STORM SEWER IMPROVEMENTS



Second Avenue (MR72)

- Reconstruction and widening of Second Avenue from Kenwood Street to Donna Drive to provide for a continuous centre turning lane and widened curb lanes to accommodate shared bicycle facilities, complete with new curb, sidewalk on both sides, granulars and asphalt
- New traffic signals at the intersection of Second Avenue and Scarlett Road
- Improvements and realignment of cemetery and dog park entrances
- Watermain improvements on Second Avenue from Adamsdale playground to Kenwood Street
- New storm sewer on Second Avenue and through Adamsdale playground to Plumtree Crescent
- Reconstruction of the East end of Plumtree Crescent including new curbs, granulars, asphalt, watermain and storm sewer
- Utility relocations, including poles and new street lights
- Removal of signalized pedestrian crosswalk



**Second Avenue (MR 72)
Infrastructure Improvements**

Notice of Public Information Centre #2



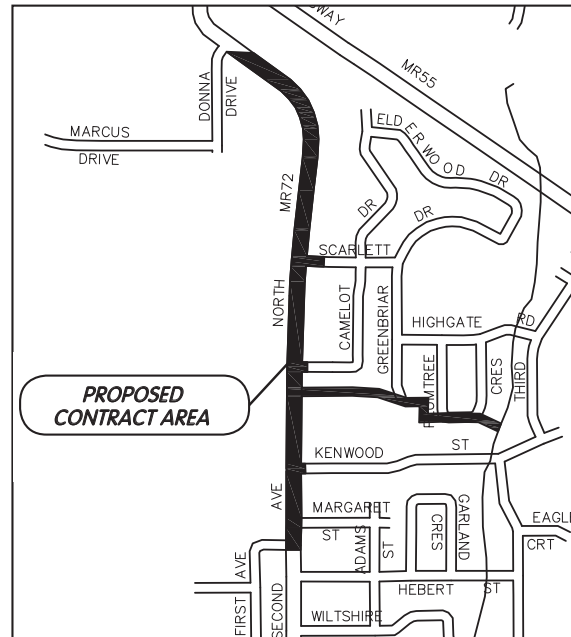
**Tuesday, April 22, 2014
Adamsdale Playground (Field House)
270 Second Avenue, Sudbury**

**Everyone is invited to attend
at any time between
4 p.m. to 7 p.m.**

The City of Greater Sudbury is proposing infrastructure improvements on Second Avenue from Donna Drive to First Avenue.

Proposed improvements on Second Avenue include:

- Reconstruction of the roadway, including new pavement and granulars;
- Road widening with additional turn lanes and through lanes;
- New traffic signals at intersection of Second Avenue and Scarlett Road;
- Relocation of pedestrian crossing traffic signals at Adamsdale Playground;
- Improvements and realignment of Cemetery and Dog Park entrances;
- New curb and sidewalk on both sides of Second Avenue from Donna Drive to Kenwood Street;
- Raised cycle tracks in widened boulevard from Donna Drive to Kenwood Street;
- Paved shoulder from Kenwood Street to First Avenue;
- New Storm Sewer;
- Replacement of watermain and services from Adamsdale Playground to First Avenue ;
- Utility Relocations, including poles and new streetlights.
- Plumtree Crescent will also be reconstructed at the southern section to accommodate new storm sewer.



The purpose of the Public Information Centre (PIC) is to provide an update to the initial PIC held March 19, 2014, and inform the residents of the project to secure comments on the proposed work. Attendees are encouraged to review the construction plans that will be posted at the PIC. Project staff from the City will be available to answer questions and respond to any concerns.

This work is anticipated to start in the Summer of 2014.

For further information, please contact:

**Councillor Terry Kett
Ward #11 Councillor
City of Greater Sudbury
1998 Hebert Street
(705) 566-3755**

**David Kalviainen, P. Eng.
Roads Engineer
City of Greater Sudbury
200 Brady Street
P.O. Box 5000, Station 'A'
Sudbury, ON, P3A 5P3
(705) 674-4455, ext 4161**

**Rob Rocca
Engineering Technician
City of Greater Sudbury
200 Brady Street
P.O. Box 5000, Station 'A'
Sudbury, ON, P3A 5P3
(705) 674-4455, ext 2360**

Amélioration de l'infrastructure de l'avenue Second (R. M. 72)

AVIS D'UN DEUXIÈME CENTRE D'INFORMATION



Mardi 22 avril 2014

Terrain de jeux Adamsdale
(pavillon sportif)

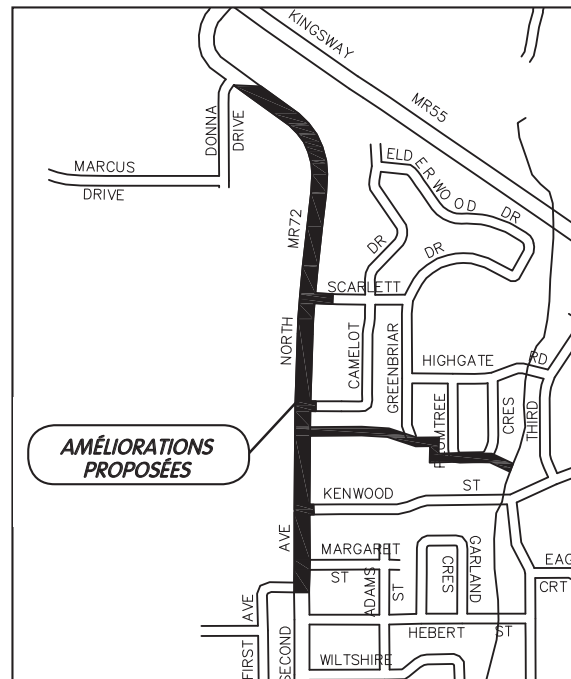
270, avenue Second, à Sudbury

Tout le monde est invité à
y assister n'importe quand
de 16 h à 19 h.

La Ville du Grand Sudbury propose des améliorations de l'infrastructure de l'avenue Second, de la promenade Donna à l'avenue First.

Les améliorations proposées sur l'avenue Second comprennent :

- la réfection de la route, y compris le remplacement de la chaussée et de la couche de base granulaire;
- l'élargissement de la route avec l'ajout de voies de virage et voies de transit;
- l'installation de feux de circulation à l'angle de l'avenue Second et du chemin Scarlett;
- le déplacement du signal lumineux pour piétons au terrain de jeux Adamsdale;
- l'amélioration et le remaniement de l'entrée au cimetière et de l'entrée au parc à chiens;
- l'installation d'une bordure et d'un trottoir sur les deux côtés de l'avenue Second, de la promenade Donna à la rue Kenwood;
- l'ajout d'une piste cyclable surélevée, de la promenade Donna à la rue Kenwood;
- l'ajout d'un accotement revêtu de la rue Kenwood à l'avenue First;
- le remplacement de l'égout pluvial;
- le remplacement de la conduite principale d'eau et des tuyaux de raccordement du terrain de jeux Adamsdale jusqu'à l'avenue First;
- le déplacement de services d'utilité publique, y compris les pôles et l'installation de nouveaux lampadaires;
- la réfection de l'extrémité sud du croissant Plumtree en raison du nouvel égout pluvial.



Ce centre d'information a pour but de faire la mise à jour des renseignements partagés lors du premier centre d'information qui a eu lieu le 19 mars 2014, d'informer les membres de la communauté de ce projet et de recueillir des commentaires sur les travaux proposés. On encourage les personnes qui y seront présentes à consulter les plans d'exécution qui seront affichés au centre d'information. Le personnel du projet de la Ville sera à votre disposition pour répondre aux questions et à toute préoccupation.

Ces travaux sont censés débuter au début de l'été 2014.

Pour plus de renseignements, veuillez communiquer avec :

Terry Kett
Conseiller du quartier 11
1998, rue Hebert
705 566-3755

David Kalviainen, ing.
Ingénieur des routes
Ville du Grand Sudbury
200, rue Brady
C. P. 5000, succursale A
Sudbury (Ontario) P3A 5P3
705 674-4455, poste 4161

Rob Rocca
Technicien des sciences de l'ingénierie
Ville du Grand Sudbury
200, rue Brady
C. P. 5000, succursale A
Sudbury (Ontario) P3A 5P3
705 674-4455, poste 2360

3-1-1 Service À votre service

 Greater Grand
Sudbury
www.grandsudbury.ca

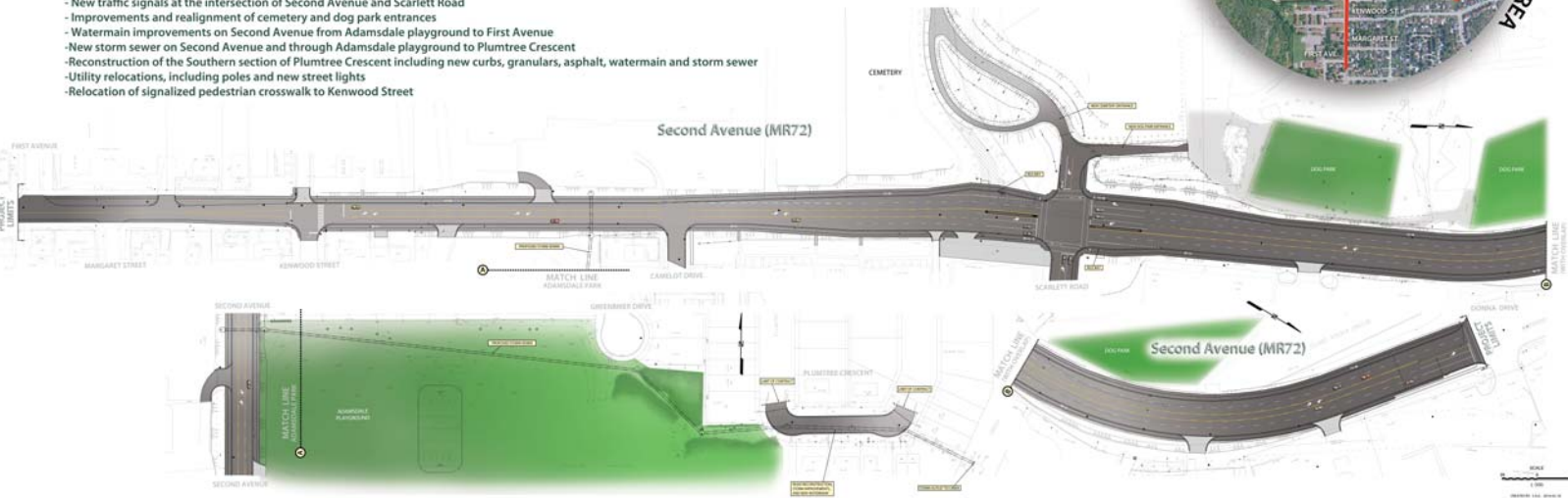


SECOND AVENUE (MR72) FIRST AVENUE TO DONNA DRIVE ROAD RECONSTRUCTION AND STORM SEWER IMPROVEMENTS

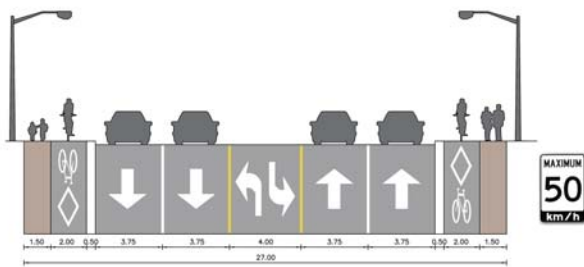


Second Avenue (MR72)

- Reconstruction and widening of Second Avenue from First Avenue to Donna Drive to provide for a continuous centre turning lane and to accommodate bicycle facilities, complete with new curb, sidewalk on both sides, granulars and asphalt
- New traffic signals at the intersection of Second Avenue and Scarlett Road
- Improvements and realignment of cemetery and dog park entrances
- Watermain improvements on Second Avenue from Adamsdale playground to First Avenue
- New storm sewer on Second Avenue and through Adamsdale playground to Plumtree Crescent
- Reconstruction of the Southern section of Plumtree Crescent including new curbs, granulars, asphalt, watermain and storm sewer
- Utility relocations, including poles and new street lights
- Relocation of signalized pedestrian crosswalk to Kenwood Street



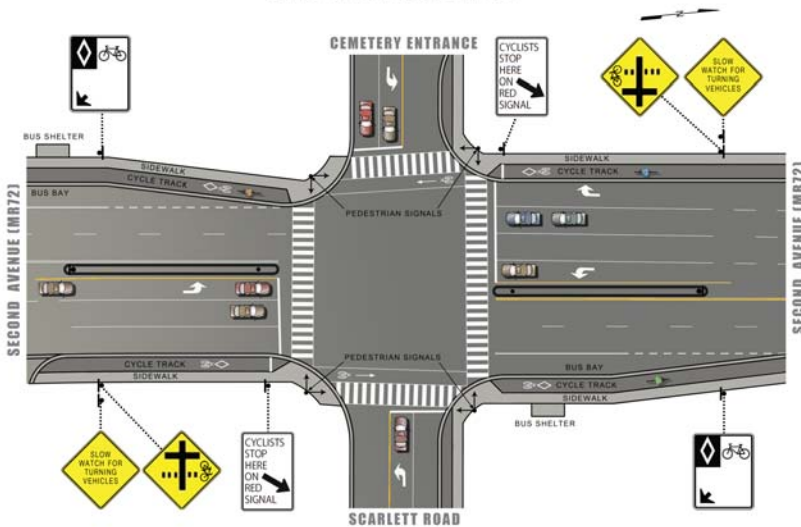
SECOND AVENUE (MR 72) ROADWAY LAYOUT & BICYCLE FACILITIES



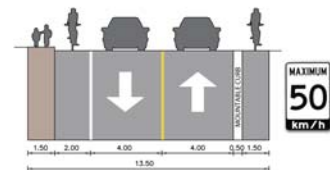
**PREFERRED ALTERNATIVE
RAISED CYCLE TRACK BIKE FACILITY
NORTH OF KENWOOD STREET**



**SHARED ROADWAY
WITH WIDE CURB LANE**



**RAISED CYCLE TRACK
CARRIED THROUGH AN INTERSECTION**

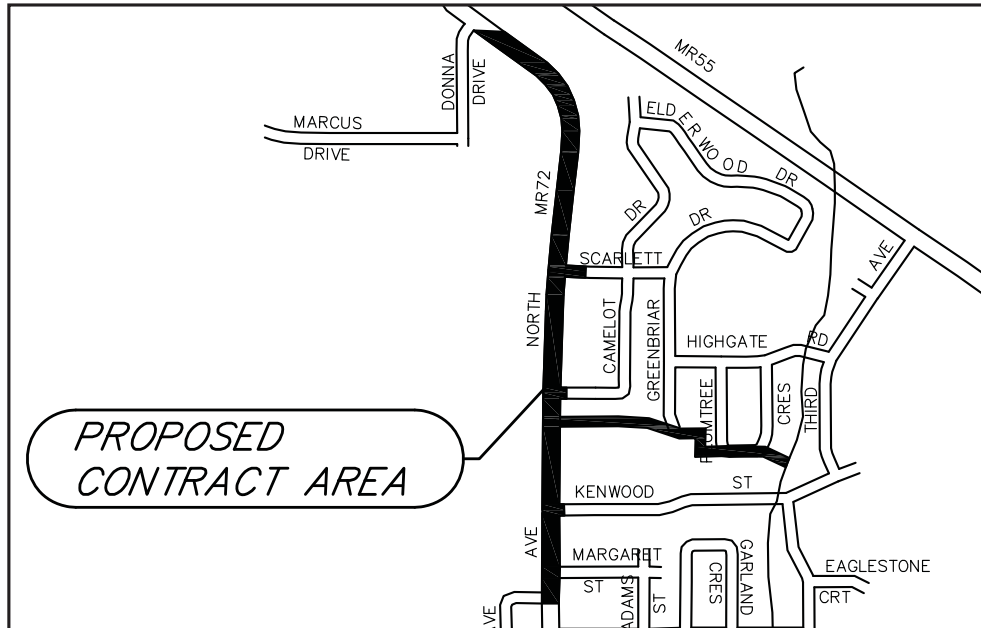


**PAVED SHOULDER BIKE FACILITY
SOUTH OF KENWOOD**

NOTE: ALL DISTANCES ARE IN METRES
DRAWN BY: S&S 2014-04-10

NOTICE OF COMPLETION

Municipal Class Environmental Assessment Second Avenue (MR72) Infrastructure Improvements



The City of Greater Sudbury (City) is proposing to widen the road to accommodate additional lanes on Second Avenue (MR72) between Donna Drive to Kenwood Street.

The City has planned this project as a component of a Master Plan Study (City of Greater Sudbury Transportation Study) in accordance with the requirements of the Schedule 'B' of the Municipal Class Environmental Assessment process. The Notice of Study Commencement was posted January 11, 2012.

Subject to comments received as a result of this Notice, and the receipt of necessary approvals, the City plans to proceed with the construction of this project in 2014.

For further information, please contact:

Rob Rocca
Engineering Technician
City of Greater Sudbury
200 Brady Street, P.O. Box 5000, Stn 'A'
Sudbury, ON P3A 5P3
(705) 674-4455, ext 2360

David Kalviainen, P. Eng.
Roads Engineer
City of Greater Sudbury
200 Brady Street, P.O. Box 5000, tn 'A'
Sudbury, ON P3A 5P3
(705) 674-4455, ext 4161

If concerns raised during the prescribed Review Period cannot be resolved through discussion with the City of Greater Sudbury, a person or party may request that the Minister of the Environment make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order). Written requests must be received by the Minister at the address below within 30 calendar days of this Notice. A copy of the request must also be sent to the City Clerk, to the address below.

The Honourable James J. Bradley
Minister of the Environment
Attn: Ms. Agatha Garcia-Wright
Environmental Assessment
and Approvals Branch
2 St. Clair Avenue West, Floor 12A
Toronto, ON M4V 1L5

City Clerk
City of Greater Sudbury
200 Brady Street,
P.O. Box 5000, Stn 'A'
Sudbury, ON P3A 5P3

This Notice Issued: Wednesday, April 16, 2014

NOTICE OF COMPLETION

Municipal Class Environmental Assessment Second Avenue (MR72) Infrastructure Improvements



The City of Greater Sudbury (City) is proposing to widen the road to accommodate additional lanes on Second Avenue (MR72) between Donna Drive to Kenwood Street.

The City has planned this project as a component of a Master Plan Study (City of Greater Sudbury Transportation Study) in accordance with the requirements of the Schedule 'B' of the Municipal Class Environmental Assessment process. The Notice of Study Commencement was posted January 11, 2012.

Subject to comments received as a result of this Notice, and the receipt of necessary approvals, the City plans to proceed with the construction of this project in 2015.

The Project File Report has been prepared to document the planning and decision making process. The report will be available for review for 30 calendar days of this notice at the following locations:

City of Greater Sudbury Engineering Services
3rd Floor, Tom Davies Square, 200 Brady Street
Sudbury, ON P3A 5P3
Mon-Fri : 8:30 am – 4:30 pm
Phone: 311
Website: www.greatersudbury.ca/roads

For further information, please contact:

Rob Rocca
Project Manager
City of Greater Sudbury
200 Brady Street, P.O. Box 5000, Stn 'A'
Sudbury, ON P3A 5P3
(705) 674-4455, ext 2360

David Kalviainen, P. Eng.
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The Honourable James J. Bradley
Minister of the Environment
Attn: Ms. Agatha Garcia-Wright
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2 St. Clair Avenue West, Floor 12A
Toronto, ON M4V 1L5

City Clerk
City of Greater Sudbury
200 Brady Street, P.O. Box 5000, Stn 'A'
Sudbury, ON P3A 5P3

Publish date: April 1, 2015





Greater Sudbury Transportation Study Draft Recommended 2031 Road Network New Sudbury Enlargement

- List of Proposed Road Network Improvements**
5. Falconbridge Highway widening (Maley Dr. to Garson Coniston Rd.)
 6. Maley Dr. extension (Falconbridge Highway to Garson Coniston Rd.)
 7. Second Ave. extension (Donna Dr. to Scarlett Rd.)
 8. Barry Downe Rd. widening (Westmount Ave. to Kingsway)
 9. Montrose Ave. South extension from Notre Dame Ave. to Lasalle Blvd.
 10. Proposed road for construction in Silver Hills Development

Legend

Existing Road Network

- Existing Provincial Road / Highway
- Existing Roads

Proposed Road Network

- Proposed Roads for Construction
- Proposed Roadway Widening
- Proposed Road Improvements to Provincial Highways
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Regional Trails and Routes

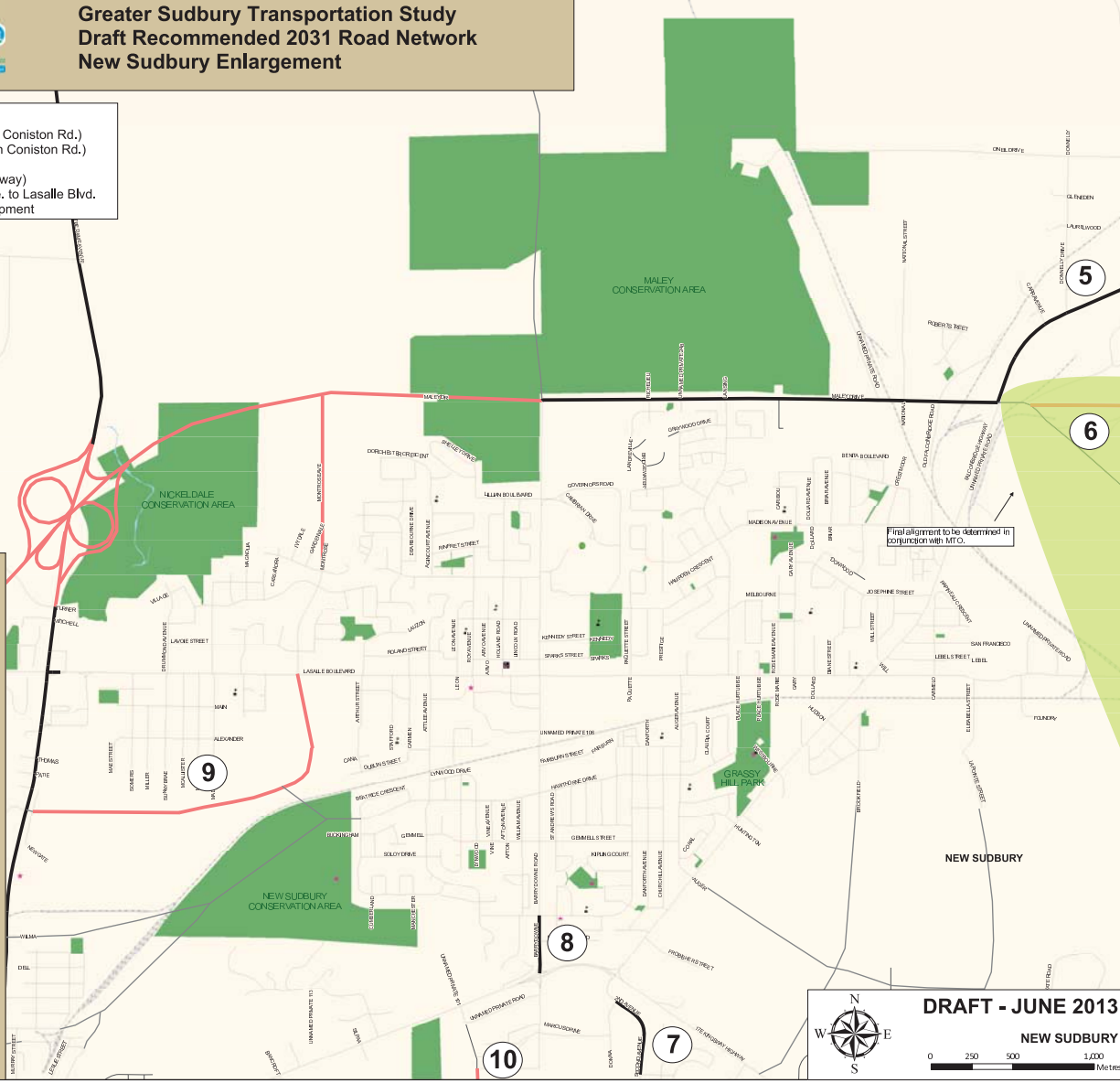
- Trans Canada Trail

Destinations

- Arena / Community Centre
- College/University
- Schools
- Libraries
- Tourist Attractions

Other

- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway



DRAFT - JUNE 2013

NEW SUDBURY

0 250 500 1,000 Metres



200, rue Brady Street, Tom Davies Square
Sudbury, ON P3E 5K3
☎ (705) 674-5249 ✉ (705) 674-7939
www.nickeldistrict.ca

RECEIVED

JUN 19 2014

**ENGINEERING
City of Greater Sudbury**

June 13, 2014

Mr. Rob Rocca
Infrastructure Services
City of Greater Sudbury
200 Brady Street
Sudbury, ON

Dear Sir:

Re: Reconstruction of Second Avenue - First Ave. to Donna Drive

The staff of Nickel District Conservation Authority (N.D.C.A.) have reviewed the plans for the above noted subdivision, and are clearing the storm sewer infrastructure.

This project will still require comments from Source Water Protection under the Clean Water Act.

If you have any further questions, please contact the undersigned.

Yours truly,

Dennis Lenzi
Regulations Officer

ljl

June 18, 2014

Greater Sudbury Watershed Alliance Inc.
403 Flowers Road
Whitefish ON P0M 3E0

Attention: Lesley Flowers, Chair.

Dear Ms. Flowers:

RE: Letter of Concern for Second Avenue (MR 72) Infrastructure Improvements

Thank you for your letter of May 14, 2014, and our meeting with Lilly Noble on May 26, 2014. As discussed, the City of Greater Sudbury shares the Greater Sudbury Watershed Alliance's concern of the impact of storm water on Ramsey Lake, a major source of municipal drinking water. The storm water from Second Avenue discharges to the Frobisher subwatershed (Korpela Creek) of Ramsey Lake.

It is because of this concern and the future requirements of the Source Water Protection Plan that the City is currently preparing the Terms of Reference for a Watershed Study for Ramsey Lake. We expect to retain a consultant before the end of 2014.

The Terms of Reference will include:

- State of the art and best management practices for storm water management and treatment.
- A prioritization and implementation plan of treatment improvements for Ramsey Lake.

It is an important undertaking to prioritize the treatment improvements so that the capital investment provides the greatest benefit.

The City recognizes the value of the Greater Sudbury Watershed Alliance and that they will be a key stakeholder in the watershed study.

I trust that this letter accurately reflects our conversation. Please contact me should you have any questions or require further information.

Regards,

A handwritten signature in blue ink that reads 'David Shelsted'.

David Shelsted, MBA P.Eng.,
Director of Roads and Transportation Services

DRINKING WATER SOURCE
PROTECTION
DE L'EAU POTABLE À LA SOURCE



Nickel District
Conservation
Authority

RECEIVED

JUN 19 2014

ENGINEERING
City of Greater Sudbury

June 18, 2014

Rob Rocca
Engineering Technician
Infrastructure Services
City of Greater Sudbury
200 Brady Street
Sudbury ON P3A 5P3

RE: Prop Storm Sewer improvements on Second Ave

The Nickel District Conservation Authority (NDCA) has reviewed the site plan drawings circulated for the storm sewer improvements on Second Avenue from Donna Drive to First Avenue on June 3, 2014. The NDCA does not have any comments under the *Conservation Authorities Act*. The following comments under the *Clean Water Act* are provided for your information.

A Proposed Drinking Water Source Protection Plan was prepared under the *Clean Water Act* and was submitted to the Minister of the Environment for review and approval on August 20, 2012. The source protection plan contains policies to protect sources of municipal residential drinking water. The information below is based on proposed policies that would be implemented if they are accepted by the Ministry of the Environment when the plan comes into effect.

The subject property is within intake protection zone 3 for the Ramsey Lake drinking water source. The *Clean Water Act* specifies which activities are regulated under the Act. The development of subdivisions is not a prescribed threat under the Act, however the following associated activities would be significant drinking water threats in this area:

- Sanitary sewers
- Stormwater infrastructure
- Application of road salt
- Application of commercial fertilizer containing phosphorous

The proposed source protection plan contains policies to manage these threat activities. All policies in the plan can be viewed at www.sourcewatersudbury.ca. They include but are not limited to:

- A policy for the Ministry of the Environment to ensure that it's Environmental Compliance

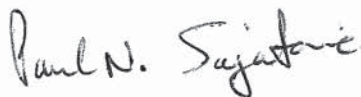
Nickel District Conservation Authority
200 Brady Street, Sudbury, Ontario P3E 5K3
Tel: (705) 674.5249 Fax: (705) 674.7939
www.nickeldistrict.ca

Approval (which governs stormwater and other sewage systems), to include appropriate terms and conditions to ensure that a sewage system ceases to be a significant drinking water threat or does not become a significant drinking water threat; this could result in additional conditions for developers in their Environmental Compliance Approvals (formerly Certificates of Approval)

- A policy for the City of Greater Sudbury to provide a stormwater management strategy for the Ramsey Lake area within five years of the source protection plan taking effect
- An education and outreach policy for homeowners, businesses and other property owners on the importance of reducing detrimental stormwater runoff from private properties
- For the City of Greater Sudbury to incorporate into the Official Plan policies related to reducing storm water runoff volume and pollutant loadings from development
- A policy for a risk management plan to manage the storage of road salt for larger quantities and for education and outreach for smaller quantities
- For the City of Greater Sudbury to review and update its salt management plan (identify vulnerable areas for source protection; optimize the use and management of road salt; implement practices to minimize loss of salt to the environment and the impact of salt on drinking water sources; prioritize roads in vulnerable areas for snow removal and street sweeping and cleaning during or soon after the spring snow melt; annual training on these matters for employees who are responsible for the application of road salt)
- An education and outreach policy for residents, businesses, institutions and contractors providing relevant information and best management practices for the application of road salt; and for the application of commercial fertilizer containing phosphorous
- A policy for the City of Greater Sudbury to monitor changes in sodium and phosphorous in the Ramsey Lake watershed; and to design and implement the program within one year of the plan taking effect.

We are available to meet with you if you would like to discuss these comments in more detail. Thank you for the opportunity to comment on this proposal.

Sincerely,



Paul Sajatovic
General Manager NDCA

From: David Shelsted <David.Shelsted@greatersudbury.ca>
Sent: September-18-14 9:43 AM
To: peter.recollet wahnapitaefn.com
Subject: Re: Second Avenue Infrastructure Improvements - Consultation Process

Good morning Peter,

Thank you for the email, the first two weeks of October work for me except for October 7, which date do you suggest?

Regards,

Dave

>>> "peter.recollet wahnapitaefn.com" <peter.recollet@wahnapitaefn.com> 9/15/2014 8:01 AM >>>

Good morning Dave

I was unable to get this on council agenda until next month

Council has no immediate issues

Let us re schedule for first week in October

Sorry for the delay

Peter

On Thursday, September 4, 2014, David Shelsted <David.Shelsted@greatersudbury.ca> wrote:

Good afternoon Peter,

Thanks for meeting with me this afternoon.

As requested, the following is a summary of our meeting action items:

- I am to send a drainage drawing for the project (this may take a few days).
- An Open House is to be held from 4PM to 6PM, September 15 at the Center of Excellence (the City will display the overall project drawings, the drainage drawings, and the intake protection zone drawings. It was also indicated that one staff member from the City would be sufficient)
- Peter will provide the advertisement, the location, sign in sheets, and any refreshments.
- Peter will assist with preparing the final consultation report.
- Peter will send a copy of the consultation process template for this and future projects. Dave will coordinate with others at the City to see if it can be adopted as a standard process for consultation between the First Nation and the City.

I look forward to seeing you again on the 15th.

Regards,

Dave

David Shelsted, MBA, P.Eng.

Director of Roads and Transportation

Infrastructure Services

Roads and Transportation

705-674-4455 Ext. 3688

--

Sent from Gmail Mobile

From: David Shelsted <David.Shelsted@greatersudbury.ca>
Sent: September-05-14 1:36 PM
To: smiller@wfn.com; tmigwans@wfn.com
Subject: Second Avenue Infrastructure Improvements - Request for Consultation
Attachments: Second Ave PIC Reduced 11X17_200dpi_2014-09-05_1.pdf; 201409051321.pdf

Good afternoon Chief Miller,

I have been in discussions with Teresa Migwans, Director of Operations, regarding the City of Greater Sudbury's proposed infrastructure improvements to Second Avenue in Minnow Lake. She asked that I provide a description of the proposed work with a drawing, for your review and comments.

I appreciate your time in reviewing this project, and I will make myself available should you require any additional information or have any questions.

We have more detailed information available if required.

Regards,

Dave

David Shelsted, MBA, P.Eng.
Director of Roads and Transportation
Infrastructure Services
Roads and Transportation
705-674-4455 Ext. 3688

Ministry of the Environment
and Climate Change

Environmental Approvals
Branch

2 St. Clair Avenue West
Floor 12A
Toronto ON M4V 1L5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement et de
l'Action en matière de changement
climatique

Direction des autorisations
environnementales

2, avenue St. Clair Ouest
Étage 12A
Toronto ON M4V 1L5
Tél : 416 314-8001
Télé. : 416 314-8452



ENV1283MC-2014-1245

February 4, 2015

Mr. David Kalviainen, P. Eng.
Roads Engineer
City of Greater Sudbury
200 Brady Street
P.O. Box 5000, Station 'A'
Sudbury, ON, P3A 5P3

Dear Mr. Kalviainen:

RE: Part II Order Requests – Second Avenue Infrastructure Improvements

Between May 13, 2014 and May 15, 2014 the Minister of the Environment and Climate Change (Minister) received two Part II Order requests asking that the City of Greater Sudbury (City) be required to prepare an individual environmental assessment (Environmental Assessment) for the proposed Second Avenue Infrastructure Improvements (Project).

It is my understanding that the Project is being planned in accordance with the Schedule B provisions of the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA). The Class EA requires proponents of projects in this category to assess and mitigate any negative project impacts, and thoroughly document the project planning process in order to fulfil the requirements of the Environmental Assessment Act (EAA). The Class EA also requires that a Project File be completed and available for public review for a minimum 30-day period.

Under Section 13 of the EAA, a proponent of an undertaking subject to a class environmental assessment shall not proceed with the undertaking unless the proponent does so in accordance with the class environmental assessment. Alternatively, the proponent may carry out an individual environmental assessment. It has come to my

attention that the Transportation Background Study which identified this Project has not been completed, nor has a Project File been completed.

As the ministry's Project Evaluator confirmed in a phone call to you on January 23, 2015, ministry staff have determined that the Project was not planned in accordance with the requirements of the Class EA. As the Class EA is a streamlined, self-assessment process, the ministry expects proponents to complete all required consultation, impact assessment and documentation prior to issuing a Notice of Completion. Therefore, the Minister is unable to consider the Part II Order requests at this time.

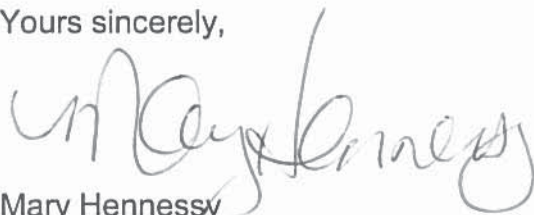
As a Project File has not being completed nor circulated for public and agency review, the City has failed to meet the Class EA requirements. Without proper project documentation, the ministry is unable to determine whether the City has met the public, agency, and Aboriginal community consultation requirements of a Schedule B Class EA project. In order to meet Class EA requirements, the City must complete a Project File, re-publish a Notice of Study Completion, and provide a minimum 30-day period for public review of the Project File.

I understand that since the Part II Order requests were submitted for the Project, the City has met with the Part II Order requesters, has undertaken further studies regarding cultural heritage and archaeological assessment, and is continuing to consult with potentially affected Aboriginal communities. This ongoing consultation and study should be documented in the Project File.

Please provide a copy of the Project File and the revised Notice of Completion to this Branch and the ministry's Northern Region Office when the Notice of Completion is issued, and contact Ms. Dorothy Moszynski, Project Evaluator, at 416-212-3693 or dorothy.moszynski@ontario.ca. Please also provide a Notice of Completion and a copy of the Project File to the Part II Order requesters.

Thank you for your ongoing co-operation.

Yours sincerely,



Mary Hennessy
Director (A)
Environmental Approvals Branch

- c. Mr. Dave Shelsted, Director of Roads and Transportation, City of Sudbury
Ms. Annamaria Cross, Manager, Environmental Assessment Services Section, MOECC
Ms. Dorothy Moszynski, Project Evaluator, Environmental Approvals Branch, MOECC

Ms. Dorothy C. Klein, Chair of Health and Social Concerns, Minnow Lake
Community Action Network
Mr. John Lindsay, President, Minnow Lake Restoration Group

March 25, 2015

[Agency Name]
[Agency Address]

[salutation]

**Re: Second Avenue (MR 72) Infrastructure Improvements
Donna Drive to Kenwood Street**

P.O. Box 5000 STN 'A'
200 BRADY STREET
SUDBURY ON P3A 5P3

C.P. 5000, SUCCA
200, RUE BRADY
SUDBURY ON P3A 5P3

705.674.4455 ☎
705.673.5171 📠

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www.grandsudbury.ca

The City of Greater Sudbury (City) is proposing to widen Second Avenue (MR 72) between Donna Drive to Kenwood Street, as a Schedule 'B' project under the Municipal Class Environmental Assessment.

The City has planned this project as a component of a Master Plan Study (City of Greater Sudbury Transportation Study) in accordance with the requirements of the Schedule 'B' of the Municipal Class Environmental Assessment process. The Notice of Study Commencement was posted January 11, 2012.

The construction works involve the widening and reconstruction of Second Avenue between Donna Drive and Kenwood Street, intersection improvements at Scarlett Road, realignment of the cemetery entrance and the dog park entrance, storm sewer and watermain improvements, curbs and sidewalk.

An overall plan showing the limits of the proposed improvements is enclosed.

The Project File Report has been prepared to document the planning and decision making process. The report will be available for review for 30 calendar days following the publication of the Notice of Completion. Copies of the Project File Report are available at the following locations:

City of Greater Sudbury Engineering Services
3rd Floor, Tom Davies Square, 200 Brady Street
Sudbury, ON P3A 5P3
Mon-Fri: 8:30 am – 4:30 pm
Phone: 311
Website: www.greatersudbury.ca/roads

We are interested in hearing any comments or concerns which you or your group may have about this project. For further information, please contact:

Rob Rocca
Project Manager
City of Greater Sudbury
200 Brady Street, P.O. Box 5000, Stn 'A'
Sudbury, ON P3A 5P3
(705) 674-4455, ext 2360

David Kalviainen, P. Eng.
Roads Engineer
City of Greater Sudbury
200 Brady Street, P.O. Box 5000, Stn 'A'
Sudbury, ON P3A 5P3
(705) 674-4455, ext 4161

Second Avenue (MR 72)
Infrastructure Improvements
Donna Drive to Kenwood Street

- 2 -

We would appreciate receiving your comments or concerns by Friday, May 1, 2015. If no response has been received by that date, we shall proceed on the assumption that you have no concerns.

Yours very truly,

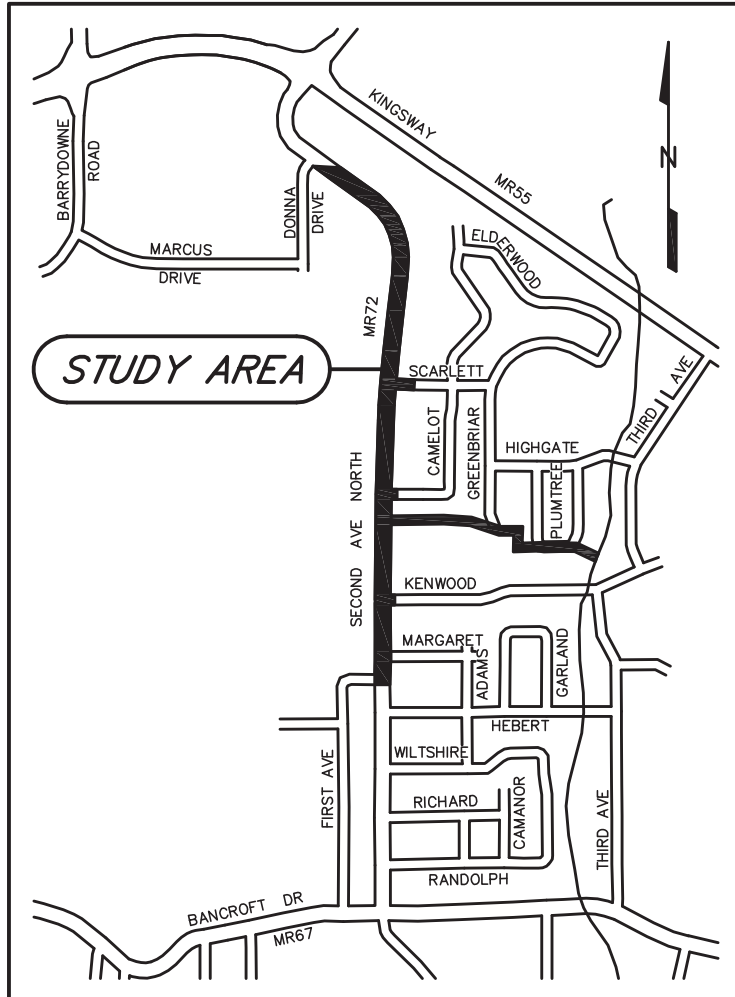
A handwritten signature in black ink, appearing to read 'RR' followed by a stylized flourish.

Rob Rocca
Project Manager

RR/sc

Encl(s)

cc: Tony Cecutti, General Manager of Infrastructure Services
Councillor Lynne Reynolds, Ward 11



Title	First Name	Last Name	Position	Company Name	Address Line 1	Address Line 2	City	State	ZIP Code
Mr.	Kerry	Taylor	Supervisor	Greater Sudbury Hydro Plus Inc.	P.O. Box 250, Stn. B	500 Regent Street	Sudbury	ON	P3E 4P1
Mr.	Paul	Pederson	Chief of Police - Greater Sudbury Police Services	Greater Sudbury Police Services	190 Brady Street		Sudbury	ON	P3E 1C7
Mr.	Christopher	Ridler	Construction Project Manager	Union Gas	P.O. Box 3040	36 Charles Street	North Bay	ON	P1B 8K7
Mr.	Korey	Taylor	Manager of OSP Design	East Link	P.O. Box 4500	500 BarryDowne Road, Unit 15	Sudbury	ON	P3A 3T3
Ms.	Nicole	Maville	Implementation Manager	Bell Canada	Engineering Department	100 Brady Street, F1	Sudbury	ON	P3A 3L9
Mr.	Donald	Hughes	Supervisor Distribution Technician	Hydro One	957 Falconbridge Road	P.O. Box 2040	Sudbury	ON	P3A 4R8
Mr.	Brian	McCormick	Manager, Environmental Eng and Project Support	Hydro One Networks Inc.	483 Bay Street	6th Floor, South Tower	Toronto	ON	M5G 2P5
Mr.	Joey	Frescura	General Manager	Agilis Networks	500 Regent Street	P.O. Box 250	Sudbury	ON	P3E 4P1
Mr.	Jesse	Gasteiger		Vianet	128 Larch Street	Suite 301	Sudbury	ON	P3E 5J8
Ms.	Rosanna	White	Environmental Resource Planner & EA Coordinator	Ministry of the Environment	Sudbury District Office	199 Larch Street, Suite 1201	Sudbury	ON	P3E 5P9
Ms.	Mary	Hennessy	cc: Dorothy Moszynski, Annamaria Cross	Ministry of the Environment	Environmental Approvals Branch	2 St. Clair Avenue West, Floor 12A	Toronto	ON	M4V 1L5
Ms.	Beth	Litchfield	Area Supervisor	Ministry of Natural Resources	Sudbury District Office	3767 Highway 69 South, Suite 5	Sudbury	ON	P3G 1E7
Mr.	Carl	Jorgensen	General Manager	Nickel District Conservation Authority	199 Larch Street, Suite 401		Sudbury	ON	P3E 5P9
Ms.	Stacey	Laforest	Director, Environmental Health Division	Sudbury and District Health Unit	1300 Paris Street		Sudbury	ON	P3E 3E3
Chief	Ted	Roque	cc: Peter Recollet	Wanapitei First Nation	259 Taighwenini Trail Road		Capreol	ON	P0M 1H0
Chief	Edward (Steven)	Miller	cc: Joanna Recollet, P. Eng. Director of Community Assistance	Atikameksheng Anishnawbek	P.O. Box 39		Naughton	ON	P0M 2M0
Mr.	David	Walters		Ontario Clean Water Agency	650 Memorial Drive		North Bay	ON	P1A 1T6
Mr.	Gord	Santalo		Rainbow District School Board	69 Young Street		Sudbury	ON	P3E 3G5
Ms.	Lyse-Anne	Papineau		Conseil scolaire de district catholique du Nouvel-Ontario	201 Jagues Street		Sudbury	ON	P3C 5L7
Ms.	Louise	D'Amour	Director of Education	Conseil scolaire de district du Grand Nord de l'Ontario	296 Van Horne Street		Sudbury	ON	P3B 1H9
Mr.	Jody	Cameron	Chairperson	Sudbury Catholic District School Board	165A D'Youville Street		Sudbury	ON	P3C 5E7
Ms.	Renee	Boucher	Manager, CEO	Sudbury Student Services Consortium	199 Travers Street		Sudbury	ON	P3C 3K2
Mr.	Robert	Dobos		Environment Canada	Ontario Region	867 Lakeshore Boulevard	Burlington	ON	L7R 4A6
Mr.	Andrew	Hinshelwood	Heritage/Archaeology Planner	Ministry of Culture	435 James Street South, Suite 334		Thunder Ba	ON	P7E 6S7
Ms.	Samantha	Baulch	Rainbow Routes Executive Director	Rainbow Routes Association	200 Brady Street	P.O. Box 5000, Stn.'A'	Sudbury	ON	P3A 3P5

April 7, 2015

HAND DELIVERED

P.O. Box 5000 STN 'A'
200 BRADY STREET
SUDBURY ON P3A 5P3

C.P. 5000, SUCC A
200, RUE BRADY
SUDBURY ON P3A 5P3

705.674.4455 ☎
705.673.5171 📠

www.greatersudbury.ca
www.grandsudbury.ca

Ms. Rosanna White
Ministry of the Environment
Sudbury District Office
199 Larch Street, Suite 1201
Sudbury, ON, P3E 5P9

Dear Ms. White:

Re: Second Avenue (MR 72) Infrastructure Improvements

Please find enclosed a copy of both the Project File Report and Notice of Completion, for the above noted project.

If you should have any questions, please do not hesitate to contact the undersigned at 705-674-4455, ext. 2360 or email at rob.rocca@greatersudbury.ca.

Yours truly,

A handwritten signature in black ink, appearing to read 'RR' followed by a stylized flourish.

Rob Rocca
Project Manager

RR/sc

Encl.

cc: Ms. Dorothy Moszynski – MOE (Toronto Environmental Approvals Branch)
Ms. Mary Hennessy – MOE (Toronto Environmental Approvals Branch)

April 8, 2015

P.O. Box 5000 STN 'A'
200 BRADY STREET
SUDBURY ON P3A 5P3

C.P. 5000, SUCCA
200, RUE BRADY
SUDBURY ON P3A 5P3

705.674.4455 J
705.673.5171 聿

www.greatersudbury.ca
www.grandsudbury.ca

Chief Ted Roque
Wahnapiatae First Nation
259 Taighwenini Trail Road
Capreol, Ontario, P0M 1H0

Dear Chief Roque,

**Re: Second Avenue (MR 72) Infrastructure Improvements
Donna Drive to Kenwood Street**

Please find enclosed a letter regarding the above noted project.

Our records showed a mailing address of P.O. Box 1119, Capreol, ON, P0M 1H0 where the letter was mailed to on March 25, 2015.

Should you have any questions or require any additional information, please contact the undersigned.

Yours very truly,

A handwritten signature in black ink, appearing to read 'RR' followed by a stylized flourish.

Rob Rocca
Project Manager
City of Greater Sudbury
705-674-4455 ext. 2360
rob.rocca@greatersudbury.ca

RR/sc

Encl.

c.c. Peter Recollet, Wahnapiatae First Nation

March 27, 2015

PO BOX 5000 STN A
200 BRADY STREET
SUDBURY ON P3A 5P3

CP 5000 SUCCA
200, RUE BRADY
SUDBURY ON P3A 5P3

705.671.2489

www.greatersudbury.ca
www.grandsudbury.ca

Mr. John Lindsay
1439 Bancroft Drive
Sudbury, ON, P3B 1R6

Dear Mr. Lindsay:

**Re: Second Avenue (MR 72) Infrastructure Improvements
Donna Drive to Kenwood Street**

Please be advised that a copy of the Project File Report for the above noted project will be delivered for you, today, March 27, 2015, to Financial Decisions at 1546 Bellevue Avenue.

If you should have any questions, please do not hesitate to contact the undersigned at 705-674-4455, ext. 2360 or email at rob.rocca@greatersudbury.ca.

Yours truly,

A handwritten signature in blue ink, appearing to read 'Rob Rocca'.

Rob Rocca
Project Manager

RR/sc

cc: Councillor Lynne Reynolds, Ward 11

March 27, 2015

Ms. Dorothy Carolyn Klein
1714 Bancroft Drive
Sudbury, ON, P3B 1S1

PO BOX 5000 STN A
200 BRADY STREET
SUDBURY ON P3A 5P3

CP 5000 SUCCA
200, RUE BRADY
SUDBURY ON P3A 5P3

Dear Ms. Klein:

**Re: Second Avenue (MR 72) Infrastructure Improvements
Donna Drive to Kenwood Street**

705.671.2489

www.greatersudbury.ca
www.grandsudbury.ca

Please be advised that a copy of the Project File Report for the above noted project will be delivered for you, today, March 27, 2015, to Financial Decisions at 1546 Bellevue Avenue.

If you should have any questions, please do not hesitate to contact the undersigned at 705-674-4455, ext 2360 or email at rob.rocca@greatersudbury.ca.

Yours truly,

A handwritten signature in blue ink, appearing to read 'RR', with a long horizontal stroke extending to the right.

Rob Rocca
Project Manager

RR/sc

cc: Councillor Lynne Reynolds, Ward 11

Meeting Notes
Second Ave Infrastructure Improvements

Date: April 16, 2014
Place: Tom Davies Square

Present: Rainbow Routes
Minnow Lake Community Action Network
Sudbury Cyclist Union
Cycling Grannies
Sustainable Mobility Advisory Panel
John Lindsay
Dorothy Klein
David Kalviainen
David Shelsted

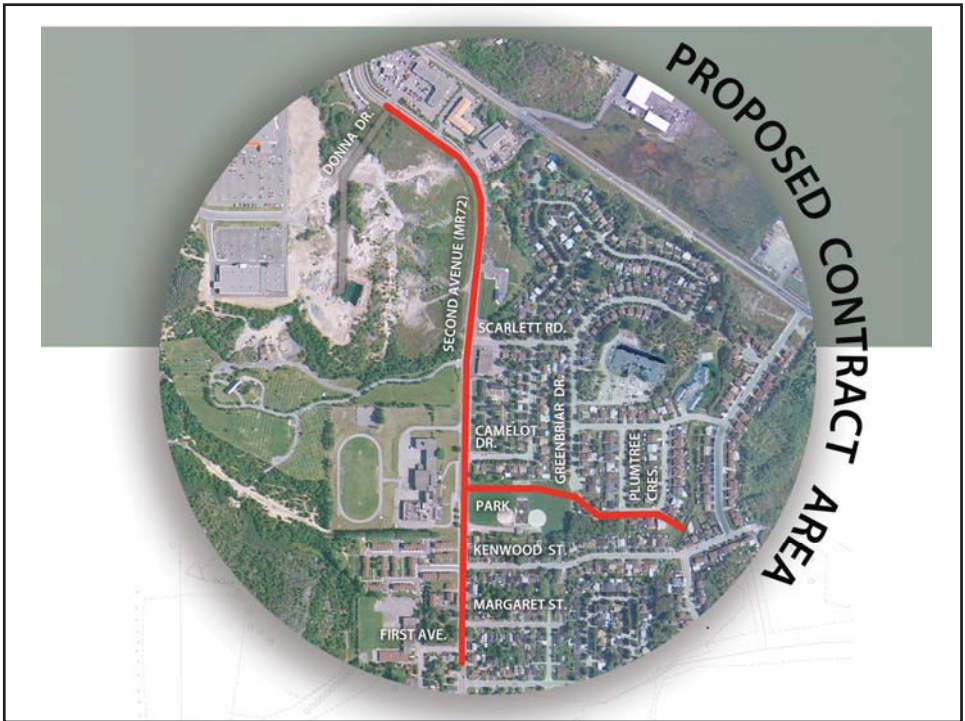
Discussion/Concern	Response
<ul style="list-style-type: none"> • Concerned about speed where road transitions from 5 to 3 lanes. • Can radar speed warning signs be installed? • Can a median Island be installed to act as a gateway to neighborhood? • Concerned with how cyclists will be detected through signalized intersection. Can cameras be used? • Can the curb be depressed further up from the intersection to allow cyclists to exit cycle track and navigate to left turn at Scarlett? • Can signs be installed south of Kenwood to indicate a shared road facility? 	<ul style="list-style-type: none"> • City will consider traffic calming measures and beautification. • City to review installation costs and design. • City will consider traffic calming measures and beautification • City will determine if traffic loops or if traffic cameras are more suitable. • Curb depression further up from intersection has been incorporated into the design. • City will consider designating this as a shared cycle route and signing the route accordingly.

Meeting Notes
Second Ave Infrastructure Improvements

Date: April 21, 2015
Place: Tom Davies Square

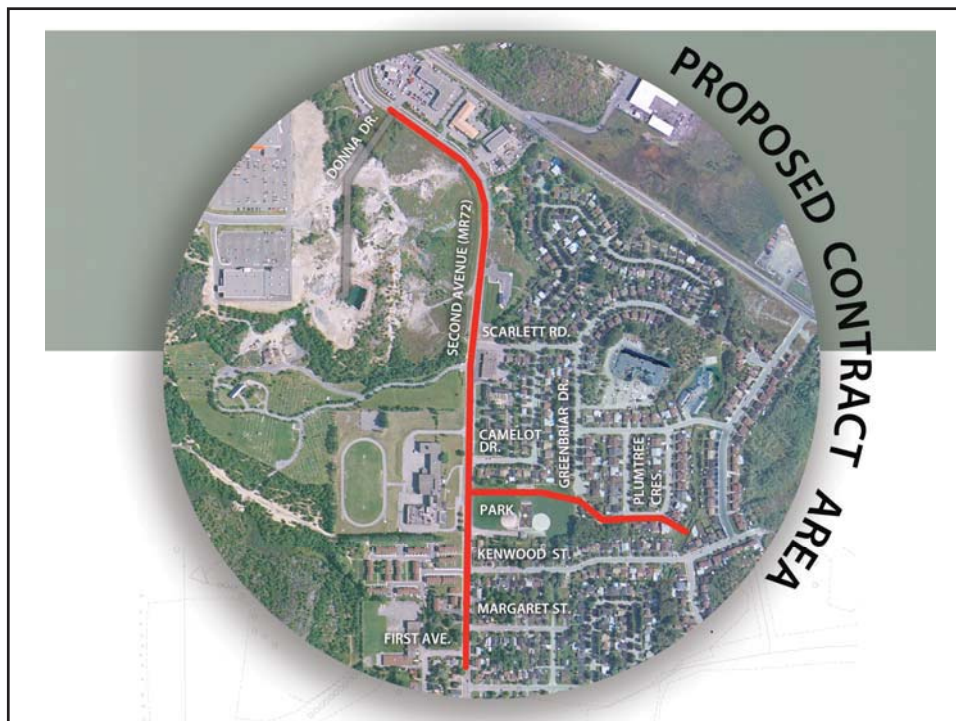
Present: Dorothy Klein
David Shelsted
Tony Cecutti
Rob Rocca

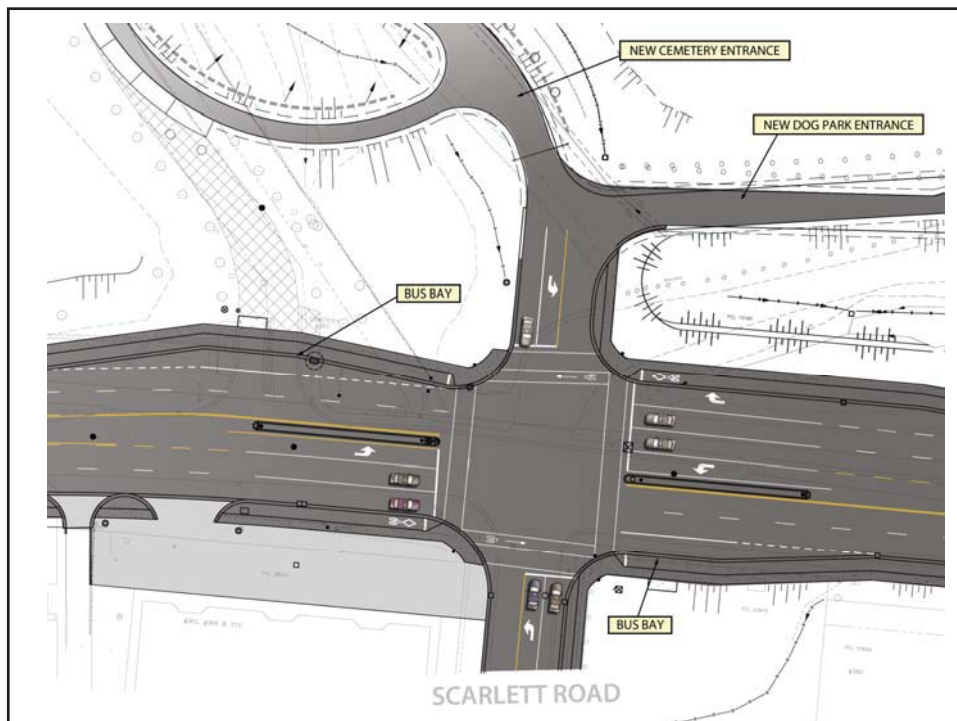
Discussion/Concern	Response
<ul style="list-style-type: none"> • Community is wanting more info, at first this wasn't being done now it is, and it is appreciated. • Want to make sure Notices sent to Native Properties south of Birkdale Village. • Concerned with Air Quality, emission etc due to widening. • Concerned with close proximity of new road to properties on Second Ave 	<ul style="list-style-type: none"> • Questions are coming up during the 30 day comment period. City is attempting to address questions as they come up. • PIC Notices were mailed and hand delivered by CGS to Native Property south of Birkdale. • Mainly domestic traffic on Second Ave, with very low percentage of commercial vehicles. • Discussed City's commitment to Active Transportation improving health and reducing emissions. • Most of widening proposed on west side of Second Ave to minimize impact to properties. Proposed edge of road will move closer to Birkdale by 3 feet, Sudbury Housing 4-6 feet, no change to properties north of Scarlett.

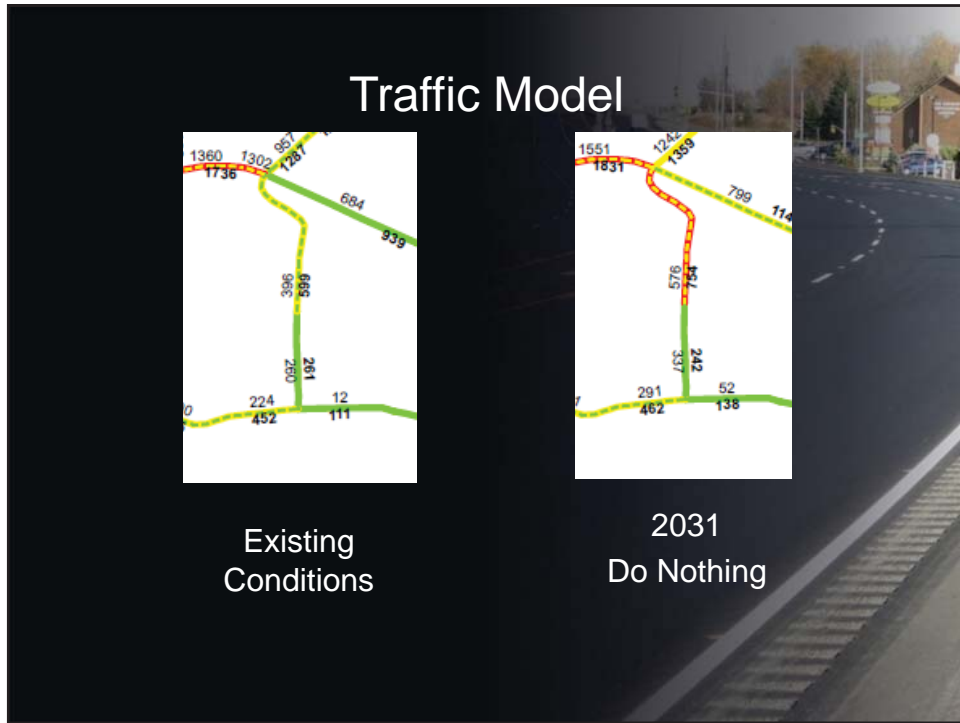


Background

- Adjacent property is mixed land use.
- Second is a secondary arterial road.
- Average annual daily traffic volume of:
 - 15,000 south of Donna Drive
 - 10,500 north of Bancroft Drive
- Existing road has the following characteristics:
 - Rural cross section
 - Two lanes
 - Asphalt path for pedestrians
 - Offset entrance to the cemetery.
 - Existing asphalt is in need of renewal.







Recommendation

- That the limits be extended to First Avenue
- That the water main replacement be funded from surplus funds from completed projects, \$700,000.
- That the road component be funded from the 2015 Roads Capital Program, \$800,000.

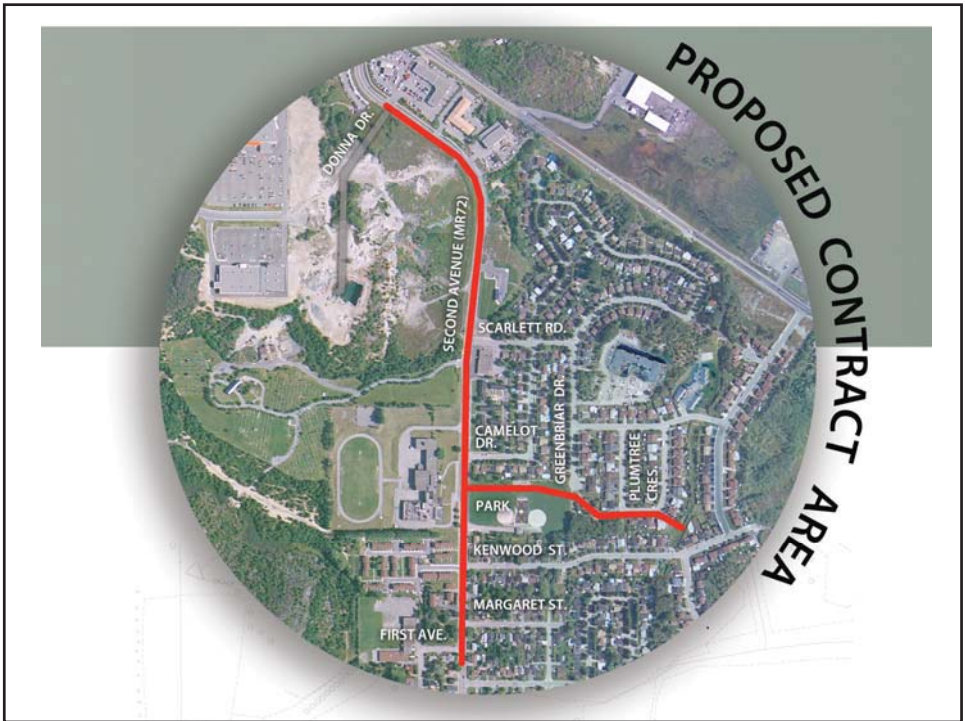
Questions?

Meeting Notes
Second Ave Infrastructure Improvements

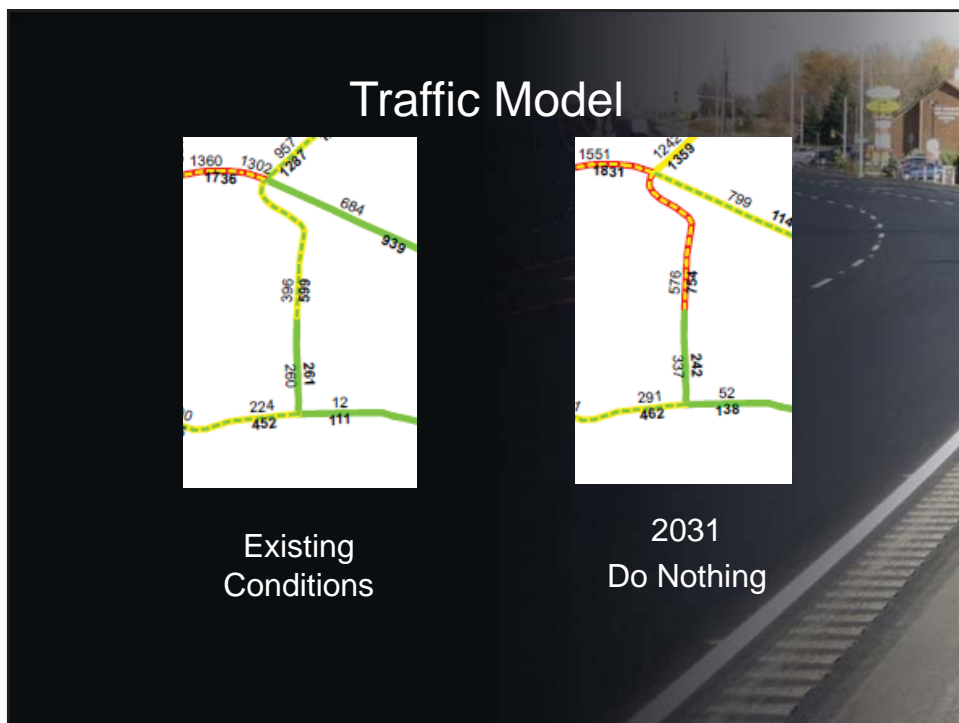
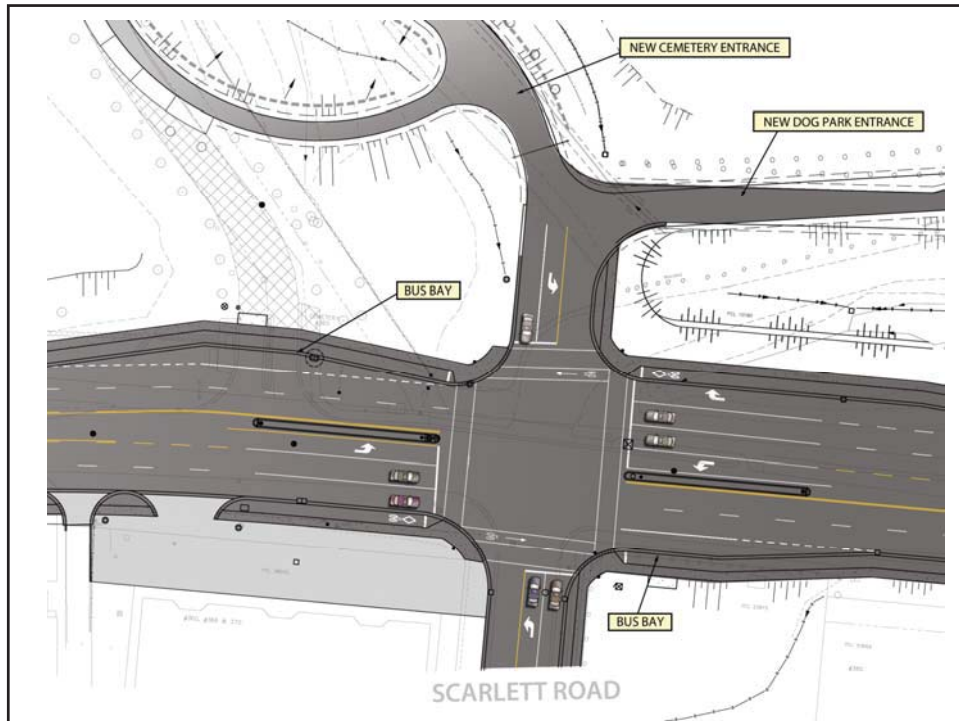
Date: May 15, 2014
Place: Tom Davies Square

Present: Dorothy Klein
David Kalviainen
David Shelsted

Discussion/Concern	Response
<ul style="list-style-type: none"> • Will storm trench through Adamsdale Playground be backfilled as pipe goes in and will a fence be erected? • Concerned with buses idling due to proposed bus bays. • Respiratory concerns, air pollution etc. • Why isn't a one lane roundabout being installed at Scarlett/Second Ave intersection? 	<ul style="list-style-type: none"> • Trench will be backfilled as pipe is being installed. Contract will specify construction fencing around the storm trench to delineate work zone. • Suggested to Parks Dept. to consider reorienting soccer fields to minimize impact. • Will discuss Second Ave bus route with City Transit Department and bring issue up of buses potentially idling at new bus bay locations. • Discussed City's commitment to Active Transportation improving health and reducing emissions. • There is not enough property to construct a roundabout. Single lane roundabout will not address the congestion on Second Ave.







Consultation

- January 11, 2012 – Open House TMP
- June 19, 2013 – Open House TMP
- March 19, 2014 – Open House 2nd Ave
- April 16, 2014 – Stakeholder Meeting 2nd Ave
- April 22, 2014 – Open House 2nd Ave
- Follow up meetings with requesters
- Communication by email and telephone
- Schedule B Class EA requires 2 points of contact

Revisions Made After Consultation

- Wide curb lanes changed to cycle tracks
- Paved shoulders extended to First Ave
- Pedestrian signals to remain, and relocated to Kenwood
- Addressed drainage issues at First Ave

Background – Data

- Average annual daily traffic volume of:
 - 15,000 south of Donna Drive
 - 10,500 north of Bancroft Drive
- How much closer is the edge of road to:
 - Birkdale Village - 1 m
 - Adamsdale Park - 3 m
 - Housing Corp. - 2 to 4 m

Background – Storm Water

- Increase in road paved area is 7,500 m² to 19,500 m²
- Increase in storm water runoff is less than 5%
- City is committed to completing a watershed study for Ramsey Lake
- Watershed study will prioritize storm water treatment locations

Background – Costs

- Total estimated project cost is \$6,600,000
- Cost of road widening is \$850,000
- Cost of roundabout is \$500,000 more than the cost of traffic signals

Project Status

- City has submitted supporting documentation to the MOE
- Awaiting Minister's decision

APPENDIX J

Noise Assessment Memo

MEMO (DRAFT)

RE: City of Sudbury
Second Avenue Infrastructure Improvements
Class Environmental Assessment Study

FROM: Rhonda George-Hiebert, M.Eng., P.Eng.

DATE: December 7, 2015

COPIES: Katherine Jim, P.Eng., WSP|MMM Group
Greg Moore, B.E.S., WSP|MMM Group

OUR FILE: W.O.1615104

SUBJECT: Second Avenue Improvements – Donna Drive to First Avenue
Noise Assessment

1. Introduction

The City of Greater Sudbury is undertaking a Municipal Class Environmental Assessment (EA), Schedule 'B', to update the March 2015 Project File Report based on comments provided by the Ministry of Environment and Climate Change's (MOECC). The study involves road improvements along Second Avenue from Donna Drive to First Avenue within the City of Greater Sudbury. The road improvements include widening Second Avenue to from 2 to 5 lanes (4 through lanes, and one centre turn lane) from Donna Drive to Kenwood Street and infrastructure improvements south of Kenwood Street. Second Avenue, between Donna Drive and First Avenue currently operates with a posted speed limit of 50 km/h and will remain at 50 km/h once the improvements are in place by 2031.

As part of the Class EA Study Project File update, a noise assessment was undertaken to assess the potential increase in noise level to adjacent Noise Sensitive Areas (NSAs) as a result of the proposed improvements to Second Avenue from Donna Drive to First Avenue. Existing land uses along Second Avenue are a mixture of recreational, residential and commercial. The land uses north of Scarlett Road are recreational (Minnow Lake Dog Park) on the west side of Second Avenue and commercial on the east side of Second Avenue. The land use along Second Avenue south of Scarlett Road to First Avenue is primarily residential. The noise assessment was undertaken based on a selection of several representative private residential homes within the Study Area. These residential houses located adjacent to Second Avenue were selected to represent the potential noise impacts to the NSAs in proximity to Second Avenue.

This memorandum summarizes the findings of the noise assessment.

2. Methodology

Noise levels are predicted in decibels in the A-weighted dBA scale, which best approximates the human perception of sound over a specified time period. An increase of 2 – 3 decibels in noise levels is considered to be just perceivable to the average person. It should be noted that a 3 dBA increase in noise equates to a doubling of traffic volumes.

Ministry of Transportation and the Ministry of the Environment and Climate change Guidelines

Since roadway sound levels vary over time, the noise descriptor used in Ontario to assess noise is the “equivalent sound level” - L_{eq} . L_{eq} is identified as the continuous sound level, which has the same energy as a time varying sound level over a specified time period. For the purposes of assessing municipal roadway noise, L_{eq} is calculated on the basis of the 16 hour daytime period, 7:00 a.m. to 11:00 p.m. For new residential developments adjacent to existing roads, the provincial objective is 55 dBA in the outdoor living area (OLA) for the daytime period.

Based on the Ontario Ministry of Transportation (MTO)/Ministry of the Environment and Climate Change (MOECC) Noise Protocol, where an existing roadway is proposed to be modified / widened adjacent to a Noise Sensitive Area (NSA), MOECC requires that the future noise levels without the proposed improvements be compared to the future noise level with the proposed improvements. The assessment is done at the outdoor living area (typically backyards) of each NSA. The provision of noise mitigation is to be investigated should the future noise level with the proposed improvements result in a greater than 5 dBA increase over the future noise level without the proposed improvements. If noise mitigation is provided, the objective is a minimum 5 dBA reduction. Mitigation will attempt to achieve levels as close to, or lower than, the objective level as is technically, economically and administratively feasible.

The STAMSON 5.0 computer modelling program, which is approved for use in Ontario by the MOECC, was used to assess existing and future noise levels on Second Avenue. This program is used to predict noise levels generated from the road at the outdoor living areas (typically backyards) of NSA's.

3. Analysis

Three scenarios were calculated:

- i) future noise levels without improvements to Second Avenue or surrounding roadways (Year 2031)
- ii) future noise levels with improvements to Second Avenue (Year 2031) and other roadway improvements that have been identified in the City's Draft Master Transportation Plan

- iii) future noise levels with improvements to Second Avenue (Year 2031) and no other roadway improvements that have been identified in the City’s Draft Master Transportation Plan.

For scenario ii) identified above the following roadway improvements have been identified in the City’s Draft Master Transportation Plan along with the improvements to Second Avenue. The traffic volumes used for Second Avenue in this scenario assume that these improvements have been made in addition to the improvements to Second Avenue:

Road Widenings

1. Notre Dame Avenue (MR 80) from Main Street to Kathleen Street [four-lane to six-lane]
2. Maley Drive from Barry Downe Road to Falconbridge Highway [two-lane to four-lane]
3. Falconbridge Highway from Maley Drive to Garson Coniston Road [four-lane to five-lane]
4. Second Avenue from Donna Drive to Scarlett Road [two-lane to five-lane]
5. Barry Downe Road from Westmount Avenue to the Kingsway [five-lane to six-lane]
6. The Kingsway east of Lloyd Street [four-lane to five-lane]
7. Howey Drive from Elgin Street to Bancroft Drive [two-lane to four-lane]
8. Ramsey Lake Road from Health Sciences North Road to South Bay Road [two-lane to four-lane]
9. Maley Drive from Lasalle Boulevard to MR 35 [two-lane to four-lane]
10. MR 35 from MR 15 to Notre Dame Street East [two-lane to five-lane]

Road extensions / new roads

1. Maley Drive Extension (Barry Downe Road to Lasalle Boulevard)
2. Montrose Avenue north extension (current terminus to Maley Drive extension)
3. Maley Drive extension / Maley East Bypass
4. Montrose Avenue extension south to Hawthorne Drive and Notre Dame Avenue
5. Silver Hills Drive
6. Ste. Anne Road extension
7. Larch Street extension
8. Remington Road extension from current terminus to Gateway Drive
9. Martilla Drive connection to Paris Street
10. John Street (Valley) extension

The following table summarizes the main assumptions and factors used in the analysis.

Table 3-1 - Factors Used In Noise Analysis

Factor	Assumptions
Noise Descriptor	L_{eq} (16 hr)
Posted Speed	Second Avenue between Donna Drive and First Avenue - 50 km/h (existing) - 50 km/h (future)
Traffic Volumes AADT	Second Avenue between Donna Drive and Kenwood Street: - Future, without improvements (2031) <ul style="list-style-type: none"> o Northbound – 6890 o Southbound - 5390

Factor	Assumptions
	<ul style="list-style-type: none"> - Future with improvements (to 2nd Ave. & surrounding roadways) (2031) <ul style="list-style-type: none"> o Northbound – 6350 o Southbound – 3350 - Future with improvements (2nd Ave. only) (2031) <ul style="list-style-type: none"> o Northbound – 8140 o Southbound – 5470 <p>Second Avenue between Kenwood Street and Bancroft Drive:</p> <ul style="list-style-type: none"> - Future, without improvements (2031) <ul style="list-style-type: none"> o Northbound – 2160 o Southbound - 3270 - Future with improvements (to 2nd Ave. & surrounding roadways) (2031) <ul style="list-style-type: none"> o Northbound – 2810 o Southbound – 3100 - Future with improvements (2nd Ave. only) (2031) <ul style="list-style-type: none"> o Northbound – 2690 o Southbound – 3370
Truck Percentages (Medium / Heavy)	<p>Medium truck – 0 %</p> <p>Heavy truck – 2 %</p>
Receptor Height	1.5 m above the ground
Noise Barrier	No existing noise barriers within the study limits

Future traffic projections for Year 2031 were derived from the historical trend analysis and growth projections that were conducted by MMM for the City’s update to the Transportation Master Plan. In addition, MMM also undertook traffic analysis to determine if the widening to Second Avenue occurred without improvements (scenario 3) to other City roads to represent a worse-case scenario.

4. Noise Sensitive Areas

There are existing residential houses abutting Second Avenue within the study limits, primarily south of Scarlett Street. The types of residential houses include townhouses and detached homes. Several were selected to be included in the noise calculations as representatives to these residential houses along Second Avenue. The selected receiver locations are summarized in Table 4-1.

Table 4-1 – Receiver Locations

Receiver #	Location	Characteristic of Property in Relation to Dundas Street
Receiver 1	491 Camelot Drive, Unit 207	Reversed Frontage
Receiver 2	491 Camelot Drive, Unit 102	Reversed Frontage
Receiver 3	470 Camelot Drive	Sidelot
Receiver 4	250 Second Avenue N.	Sidelot
Receiver 5	241 Second Avenue N, Unit 253	Sidelot
Receiver 6	216 Second Avenue N.	Sidelot
Receiver 7	171 Second Avenue N.	Sidelot
Receiver 8	1988 Scarlett Road	Sidelot
Receiver 9	689 Camelot Drive	Reversed Frontage

5. Results

Noise levels were calculated at the selected receiver locations for the future with and without improvements scenarios for the Year 2031. Table 5-1 and Figure 1 summarize the predicted daytime noise levels at Receivers 1 to 9, as well as the potential changes in future noise levels.

STAMSON output sheets for existing and future noise levels for Receivers 1 to 9 for the alternatives were developed.

Table 5-1: Second Avenue Class EA – Summary of Calculated Noise Levels

Receiver Location (see key plan)	Distance from Receiver Location to Noise Source (m)		Project Noise Level dBA Leq (16)			
	Future without Improvements (2 Lanes)	Future with Improvements (5 Lanes)	Future (2031) Without Improvements	Future (2031) With Improvements to All Roadways	Future (2031) With Improvements to Second Avenue Only	Difference in Noise Level with Improvements (All Roadways /Second Ave. Only)
<u>Receiver 1</u> 491 Camelot Drive, Unit 207	NB-25.5 SB-29.3	NB-21.3 SB-33.4	58.4	58.2	59.5	-0.2 / +1.1
<u>Receiver 2</u> 491 Camelot Drive, Unit 102	NB-25.5 SB-29.3	NB-23.8 SB-31.4	58.4	57.7	59.1	-0.7 / +0.7
<u>Receiver 3</u> 470 Camelot Drive	NB-16.8 SB-20.5	NB-15.0 SB-22.1	61.1	60.7	62.0	-0.4 / +0.9

Receiver Location (see key plan)	Distance from Receiver Location to Noise Source (m)		Project Noise Level dBA Leq (16)			
	Future without Improvements (2 Lanes)	Future with Improvements (5 Lanes)	Future (2031) Without Improvements	Future (2031) With Improvements to All Roadways	Future (2031) With Improvements to Second Avenue Only	Difference in Noise Level with Improvements (All Roadways /Second Ave. Only)
<u>Receiver 4</u> 250 Second Avenue N.	NB-17.9 SB-21.9	NB-15.3 SB-22.9	60.3	60.2	61.5	-0.1 / +1.2
<u>Receiver 5</u> 241 Second Avenue N, Unit 253	NB-22.6 SB-18.6	NB-23.5 SB-17.7	55.1	54.9	55.5	-0.2 / +0.4
<u>Receiver 6</u> 216 Second Avenue N.	NB-16.6 SB-20.9	NB-16.7 SB-21.0	57.3	57.7	57.8	+0.4 / +0.5
<u>Receiver 7</u> 171 Second Avenue N.	NB – 20 SB – 16.2	NB – 20 SB – 16.2	57.9	58.2	58.3	+0.3 / +0.4
<u>Receiver 8</u> 1988 Scarlett Road 0+642	NB – 46.1 SB – 54.2	NB – 48.0 SB – 60.9	54.7	53.4	54.7	-1.3 / 0
<u>Receiver 9</u> 689 Camelot Drive 0+840	NB – 84.8 SB – 88.3	NB – 87.2 SB – 98.7	50.7	49.3	50.7	-0.1 / 0

6. Findings

The findings of the noise assessment are as follows:

- The projected noise levels in Year 2031 at Receivers 1 to 9 without improvements to Second Avenue are calculated to range from 50.7 to 61.1 dBA.
- The projected noise levels in Year 2031 at Receivers 1 to 9 with the improvements to Second Avenue and surrounding road network are calculated to range from 49.3 dBA to 60.7 dBA.
- The projected noise levels in Year 2031 at Receivers 1 to 9 with the improvements to Second Avenue only are calculated to range from 50.7 dBA to 62.0 dBA.
- The maximum potential increase in noise level between the future (2031) without improvements and the future (2031) with improvements to Second Avenue only was calculated to be +1.2 dBA (Receiver 4).

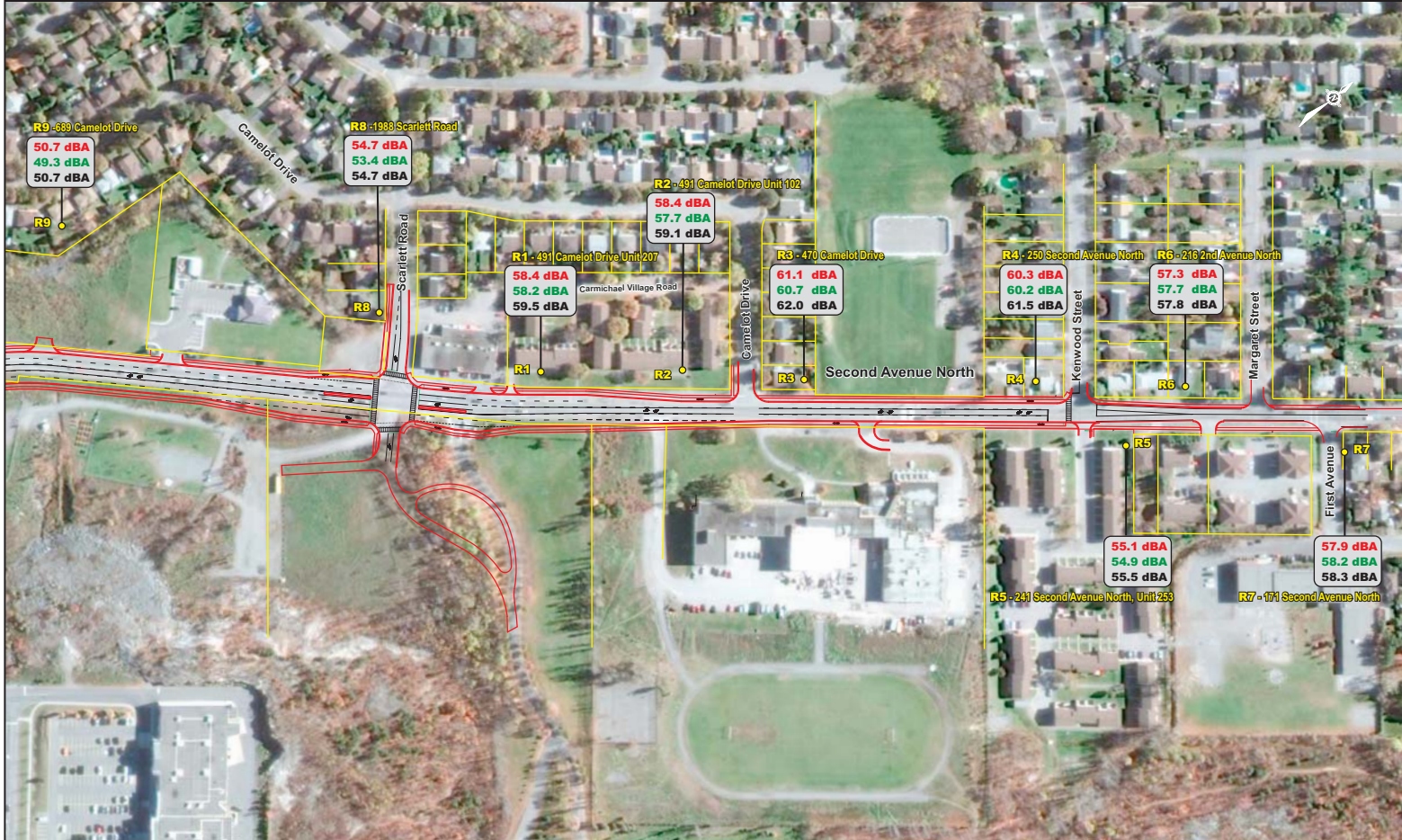
7. Construction Noise

Construction noise effects are temporary in nature and often are unavoidable. Construction activities will vary temporally and spatially as the project progresses. Sound levels from construction at a given receptor location will vary over time as different activities take place, and as those activities change location within the right-of-way.

During construction the contractor will be required to abide by the City of Sudbury's Noise By-law; any construction activities planned outside of the normal working hours (i.e. 6 pm to 7 am) will require a noise by-law exemption.

8. Conclusions

For the Second Avenue Class EA Study, the potential increase in noise level between the with and without proposed improvements were determined to be less than 5 dBA; therefore, the consideration of noise mitigation is not warranted based on MTO/MOECC Noise Protocol.



Second Avenue Class Environmental Assessment Study
 Donna Drive to First Avenue
 City of Greater Sudbury

LEGEND

- - Receiver Location
- xx.x dBA - Projected Future (2031) Noise Level without Improvements to Second Avenue
- xx.x dBA - Projected Future (2031) Noise Level with Improvements to Second Avenue & Surrounding Roadways
- xx.x dBA - Projected Future (2031) Noise Level with Improvements to Second Avenue Only

RESULTS OF NOISE ANALYSIS

APPENDIX K

Noise By Law

PROTECTION

Chapter 776 NOISE

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776.1.2 Council - defined
776.1.3 Person - defined
776.1.4 Times - reference to - defined

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SUDBURY

776.1

JANUARY 1991

NOISE

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776.2

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776.1.1

NOISE

776.2.4

**Article 1
INTERPRETATION**

776.1.1 City - defined

"City" means The Corporation of the City of Sudbury.

776.1.2 Council - defined

"Council" means the Council for The Corporation of the City of Sudbury.

776.1.3 Person - defined

"person" includes a sole proprietorship, a firm, a partnership, a co-partnership, an association, a corporation, and the heirs, executors, administrators, or other legal representatives of a person to whom the context can apply according to law.

776.1.4 Times - reference to - defined

All times referred to in this Chapter shall be the time in effect in the City of Sudbury in accordance with a resolution of Council passed in that behalf.

Article 2

GENERAL PROHIBITIONS

776.2.1 Bells - horns - sounding - prohibited

No person shall ring any bell, blow or sound any horn or cause the same to be rung, blown or sounded.

776.2.2 Shouting - noises unusual - prohibited

No person shall shout or create, cause or permit any unusual noise or noises.

776.2.3 Disturbance - of inhabitants - by noise - prohibited

No person shall create, cause, or permit any noise or noises likely to disturb the inhabitants.

776.2.4 Advertising - use of noise - unauthorized - prohibited

No person shall cause or permit to be caused any noise or sound of whatsoever nature and kind for the purpose of advertising or for attracting attention to any performance, show, or sale or display of goods, wares or merchandise, which noise or sound projects into any street or other public place unless written permission of the Council has first been obtained.

SUDBURY

776.3

JANUARY 1991

776.2.5

NOISE

776.3.6

776.2.5 Sound amplification - from vehicle - without licence
No person shall cause or permit to be caused any noise or sound created by the use or operation of any radio or mechanical loud speaker or amplifier or other such instrument or device or of any sound-producing, sound re-producing or sound-transmitting instrument or apparatus in or upon any vehicle without first having obtained a licence so to do pursuant to the provisions the General Licensing By-law, Chapter 476 [City of Sudbury Municipal Code] of the City.

Article 3

UNUSUAL NOISES

776.3.1 Unusual noises - set out

For the purpose of Section 776.2.2, the noises or sounds set out in Sections 776.3.2 through 776.3.17 inclusive, without limiting the generality of Section 776.2.2, shall be deemed to be unusual noises.

776.3.2 Tires - any vehicle - squealing

The noise created by the squealing of tires of any vehicle shall be deemed to be unusual noise.

776.3.3 Radio - television - other - volume - at disturbing levels

The sound or noise from or created by any radio, phonograph, stereo equipment, television set, or any musical or sound producing instrument of whatsoever kind, when such radio, phonograph, stereo equipment, television set or musical or sound-producing instrument is played or operated in such a manner or with such volume as to annoy or disturb the peace, quiet, comfort or repose of any individual in any dwelling house, apartment house, hotel, motel, lodging house or other type of residence shall be deemed to be unusual noise.

776.3.4 Animal - bird - sounds by - disturbing

Any sound made by any animal or bird which has the effect of disturbing the peace, quiet, comfort or repose of any individual shall be deemed to be unusual noise.

776.3.5 Machinery - equipment - in disrepair

Any noise or sound of whatsoever nature and kind caused by a condition of disrepair or maladjustment of any machinery or equipment of whatsoever nature and kind or part or accessory thereof shall be deemed to be unusual noise.

776.3.6 Vehicles - in disrepair - maladjusted

Any noise or sound of whatsoever nature and kind caused by a condition of disrepair or maladjustment of any motor vehicle, motorcycle or other vehicle whatsoever or part or accessory thereof shall be deemed to be unusual noise.

JANUARY 1991

776.4

SUDBURY

776.3.14 NOISE 776.4.4

776.3.14 Whistle - train - other vehicle - sounding - unnecessary
The sounding of the whistle of any railway vehicle or other vehicle unnecessarily shall be deemed to be unusual noise.

776.3.15 Lawn mower - motorized - operation - restrictions
The operation of a lawn mower which is run by electricity or gasoline, between the hours of 9 o'clock p.m. on any given day and 8 o'clock a.m. on the next following day during the months of July and August in any year and between the hours of 8 o'clock p.m. on any given day and 8 o'clock a.m. of the next following day for the remainder of the year shall be deemed to be unusual noise.

776.3.16 Siren - artificial noise device - on bicycle
The operation of any siren or other artificial noise device other than a bell or horn, attached to a bicycle shall be deemed to be unusual noise. By-law 73-101, 22 May, 1973.

776.3.17 Snow plowing - activities - time - restrictions
Noises created by any vehicle engaged in the plowing or removal of snow from private property shall be deemed to be unusual noise between the hours of 11:00 o'clock p.m. of any day and 6:00 o'clock a.m. of the next following day, if such noises are likely to disturb the inhabitants. By-law 84-23, 6 March, 1984.

**Article 4
EXEMPTIONS**

776.4.1 Bell - horn - siren - signal - sounding - required by law
This Chapter shall not apply to the sounding of any bell, horn, siren or other signal device of whatsoever kind when such is required by law.

776.4.2 Amplification - in public park - authorized by Council
This Chapter shall not apply to the use in a reasonable manner of any apparatus or mechanism for the amplification of the human voice or of music in a public park or in any other large public space in connection with any public election meeting, public celebration or other reasonable gatherings, provided that written permission of the Council has first been obtained.

776.4.3 Band - parade - authorized - by Council
This Chapter shall not apply to any band or any parade operating under written permission first obtained from the Council.

776.4.4 Newsboy - hawker - peddler - petty tradesman
This Chapter shall not apply to any newsboy, peddler, hawker or petty tradesman plying his/her calling legitimately.

JANUARY 1991 776.6 SUDBURY

776.3.7 NOISE 776.3.13

776.3.7 Vehicle - maintenance - repairing - unenclosed
The sounds emanating from the repairing, refinishing, painting, repainting, plating or rust-proofing of vehicles, machinery or any parts thereof where such repairing, refinishing, painting, repainting, plating, or rust-proofing is not carried on within an enclosed structure the doors and windows of which are closed shall be deemed to be unusual noise.

776.3.8 Whistles - steam - air - blowing
The blowing of any steam or air whistle attached to or used in connection with any stationary boiler or other machine or mechanism, except for the purpose of giving notice to workmen of the time to commence or cease work or as a warning of danger shall be deemed to be unusual noise.

776.3.9 Exhaust - discharge - into open air - unmuffled
The discharge into the open air of the exhaust of any steam engine, stationary internal combustion engine, motor vehicle or motorcycle except through a muffler or other device which effectively prevents loud or explosive noises shall be deemed to be unusual noise.

776.3.10 Excavation - construction - unnecessary noise
Any unnecessary noise arising between the hour of 6 o'clock p.m. of any day and 7 o'clock a.m. of the next following day from any excavation or construction work whatsoever including the erection, demolition, alteration or repair of any building, authorized by the City except in the case of urgent necessity shall be deemed to be unusual noise.

776.3.11 Manufacturing industry - noises from - limitations
Noises arising out of any manufacturing industry between the hour of 8 o'clock p.m. of any day and 8 o'clock a.m. of the next following day and which has the effect of disturbing the repose of any City inhabitant shall be deemed to be unusual noise.

776.3.12 Any noise - near hospital - school - in session
Any unnecessary noise in the vicinity of any school, seminary of learning or court, while any of the same are in session or in the vicinity of any hospital or convalescent or rest home shall be deemed to be unusual noise.

776.3.13 Trucks - vehicle - loaded - restrictions
Noises created by any vehicle including cement trucks which bear material or by articles or things loaded on any vehicle if such noises are likely to disturb the repose of any City inhabitant between the hours of 8 o'clock p.m. of any day and 8 o'clock a.m. of the next following day shall be deemed to be unusual noise.

SUDBURY 776.5 JANUARY 1991

776.4.5 NOISE 776.6.1

776.4.5 Public service - emergency vehicles - answering call
This Chapter shall not apply to any police vehicle or any fire department vehicle or any ambulance or any public service or emergency vehicle while answering a call.

776.4.6 Necessity - public
This Chapter shall not apply to any case of public necessity.

776.4.7 Salvation Army - operations
This Chapter shall not apply to the operation of the Salvation Army as heretofore carried on. By-law 73-101, 22 May, 1973.

Article 5 ENFORCEMENT

776.5.1 Fine - for contravention
Every person who contravenes any of the provisions of this Chapter is guilty of an offence and shall, upon conviction thereof, forfeit and pay a penalty of not more than five thousand dollars (\$5,000), exclusive of costs and every such fine is recoverable under the *Provincial Offences Act*. By-law 91-13, 15 January 1991.

Article 6 REPEAL

776.6.1 By-laws - previous
By-law 66-63 of The Corporation of the City of Sudbury and all amendments thereto are hereby repealed. By-law 73-101, 22 May, 1973.

SUDBURY 776.7 JANUARY 1991

APPENDIX L

Local Air Quality Assessment



Local Air Quality Assessment Second Avenue from Kingsway to Kenwood St Sudbury, Ontario

Novus Reference No. 15-0292

Version No. 1 (DRAFT)

December 14th, 2015

NOVUS PROJECT TEAM:

Engineer: Hamish Hains, M.A.Sc., P.Eng.
Project Manager: Scott Shayko, Hon.B.Comm., B.Sc.

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1.0 Introduction

Novus Environmental Inc. (Novus) was retained by MMM Group Limited (MMM) to conduct an air quality assessment for the proposed widening of Second Avenue in Sudbury, Ontario. This report assess the impacts of increased traffic volumes and adjusted roadway alignment due to the widening of the roadway from 2 to 5 lanes. The study area is approximately 1.5 km in length and is shown in **Figure 1**, with the proposed Second Ave alignment in yellow.

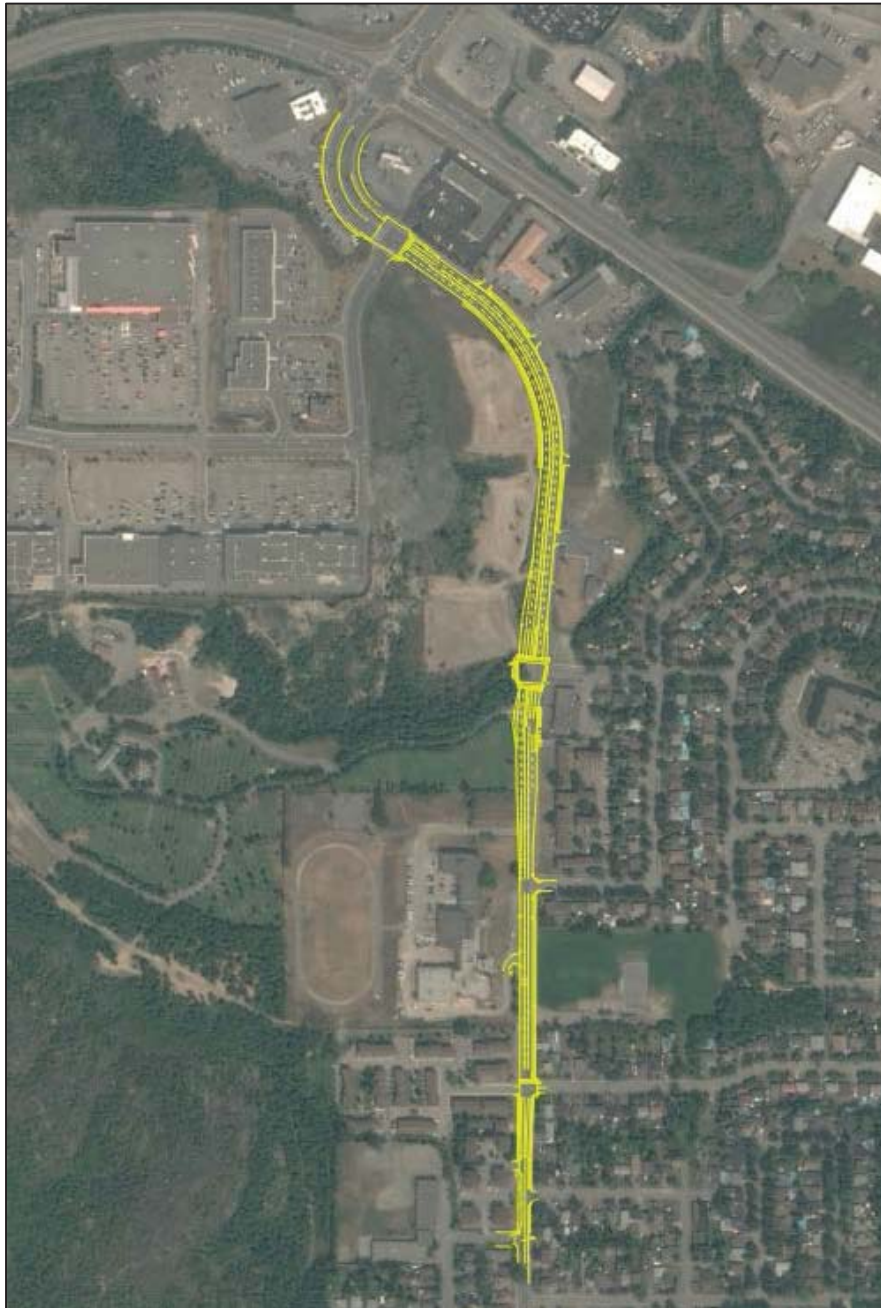


Figure 1: Study Area Showing the Proposed Roadway

1.1 Background

SUPPLIED BY MMM

1.2 Study Objectives

The objective of the study is to assess the local air quality impacts of widening the roadway from two lanes to five lanes. These objectives were assessed as follows:

- **2009 Existing** – Assess the existing roadway traffic volumes at representative receptors. Predicted contaminant concentrations from the roadway were combined with measured ambient concentrations to determine the overall impact.
- **2031 Future Build** – The widened roadway was modelled with future traffic volumes. Predicted roadway concentrations and measured ambient concentrations were combined to determine the overall impact at representative receptors.

1.3 Contaminants of Interest

The contaminants of interest for this study have been chosen based on the regularly assessed contaminants of interest for transportation assessments in Ontario, as determined by the Ministry of Transportation Ontario and Ministry of the Environment. Motor vehicle emissions have largely been determined by scientists and engineers with United States and Canadian government agencies such as the U.S. Environmental Protection Agency (EPA), the Ontario Ministry of the Environment and Climate Change (MOECC), Environment Canada (EC), Health Canada (HC), and the Ministry of Transportation Ontario (MTO). These contaminants are emitted due to fuel combustion, brake wear, tire wear, the breakdown of dust on the roadway, fuel leaks, evaporation and permeation, and refuelling leaks and spills as illustrated in **Figure 2**. Note that emissions related to refuelling leaks and spills are not applicable to motor vehicle emissions from roadway travel. Instead, these emissions contribute to the overall background levels of the applicable contaminants. All of the selected contaminants are emitted during fuel combustion, and the contaminants emitted from brake wear, tire wear, and breakdown of road dust are emitted as particulates. A summary of these contaminants are provided in **Table 1**.

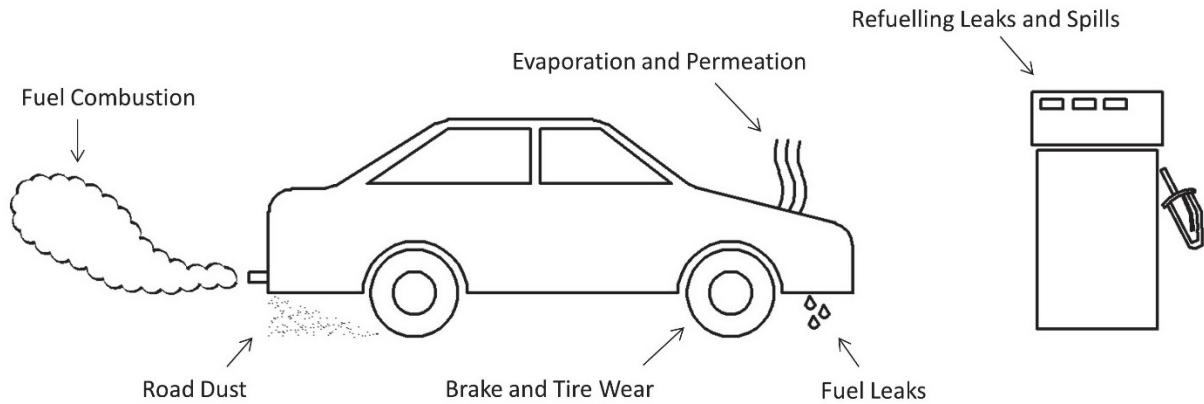


Figure 2: Motor Vehicle Emission Sources

Table 1: Contaminants of Interest

Contaminants		Volatile Organic Compounds (VOCs)	
Name	Symbol	Name	Symbol
Nitrogen Dioxide	NO ₂	Acetaldehyde	HCHO
Carbon Monoxide	CO	Acrolein	C ₃ H ₄ O
Fine Particulate Matter (<2.5 microns in diameter)	PM _{2.5}	Benzene	C ₆ H ₆
Coarse Particulate Matter (<10 microns in diameter)	PM ₁₀	1,3-Butadiene	C ₄ H ₆
Total Suspended Particulate Matter (<44 microns in diameter)	TSP	Formaldehyde	CCHO

1.4 Applicable Guidelines

In order to assess the impact of the project, the predicted effects at sensitive receptors were compared to guidelines established by government agencies and organizations. Relevant agencies and organizations in Canada and their applicable contaminant guidelines are:

- MOECC Ambient Air Quality Criteria (AAQC);
- Health Canada/Environment Canada National Ambient Air Quality Objectives (NAAQOs); and
- Canadian Council of Ministers of the Environment (CCME) Canada Wide Standards (CWSs).

Within the guidelines, the threshold value for each contaminant and its applicable averaging period was used to assess the maximum predicted effect at sensitive receptors derived from computer simulations. The contaminants of interest are compared against 1-, 8-, 24-hour, and annual averaging periods. The threshold values and averaging periods used in this assessment are presented in **Table 2** below. It should be noted that the CWS for PM_{2.5} is not based on the

maximum threshold value; PM_{2.5} is assessed based on the annual 98th percentile value, averaged over 3 consecutive years.

Table 2: Applicable Contaminant Guidelines

Contaminant	Averaging Period (hrs)	Threshold Value (µg/m ³)	Source
NO ₂	1	400	AAQC
	24	200	AAQC
CO	1	36,200	AAQC
	8	15,700	AAQC
PM _{2.5}	24	27 ^[1]	CWS (27 µg/m ³ standard is to be phased in in 2020)
	Annual	10 ^[2]	CWS
PM ₁₀	24	50	Interim AAQC
TSP	24	120	AAQC
Acetaldehyde	24	500	AAQC
Acrolein	24	0.4	AAQC
	1	4.5	AAQC
Benzene	Annual	0.45	AAQC
	24	2.3	AAQC
1,3-Butadiene	24	10	AAQC
	Annual	2	AAQC
Formaldehyde	24	65	AAQC

[1] The CWS is based on the annual 98th percentile concentration, averaged over three consecutive years

[2] The annual CWS is based on the average of the three highest annual average values over the study period

1.5 General Assessment Methodology

The worst-case contaminant concentrations due to motor vehicle emissions from the roadway were predicted at nearby receptors using dispersion modelling software on an hourly basis for a five-year period. 2010-2014 historical meteorological data from Sudbury Airport was used. Five years were modelled in order to capture the worst-case meteorological conditions. Two emissions scenarios were assessed, 2009 ‘existing’ and 2031 future build.

Combined concentrations were determined by adding modelled and background (i.e., ambient data) together on an hourly basis. Background concentrations for all available contaminants were determined from MOECC and NAPS (National Air Pollution Surveillance) datasets for the most representative locations; typically the ‘representative locations’ are stations within a close proximity to the study area.

Maximum 1-hour, 8-hour, 24-hour, and annual predicted combined concentrations were determined for comparison with the applicable guidelines using emission and dispersion models published by the U.S. Environmental Protection Agency (EPA). The worst-case

predicted impacts are presented in this report, however, it is important to note that the worst-case impacts may only occur at one receptor for a short duration.

Local background concentrations are presented in **Section 2.0**. Impacts due to the roadway for existing and future-build scenarios are presented in **Section 3.8**.

2.0 Background Ambient Data

2.1 Overview

Background (ambient) conditions are measured contaminant concentrations that are exclusive of emissions from the existing or proposed project infrastructure. These emissions are typically the result of trans-boundary (macro-scale), regional (meso-scale), and local (micro-scale) emission sources and result due to both primary and secondary formation. Primary contaminants are emitted directly by the source and secondary contaminants are formed by complex chemical reactions in the atmosphere. Secondary pollution is generally formed over great distances in the presence of sunlight and heat and most noticeably results in the formation of fine particulate matter (PM_{2.5}) and ground-level ozone (O₃), also considered smog.

In Ontario, a significant amount of smog originates from emission sources in the United States which is the major contributor during smog events which usually occur in the summer season (MOECC, 2005). During smog episodes, the U.S. contribution to PM_{2.5} can be as much as 90 percent near the southwest U.S. border. The effect of U.S. air pollution in Ontario on a high PM_{2.5} day and on an average PM_{2.5} spring/summer day is illustrated in **Figure 3**.

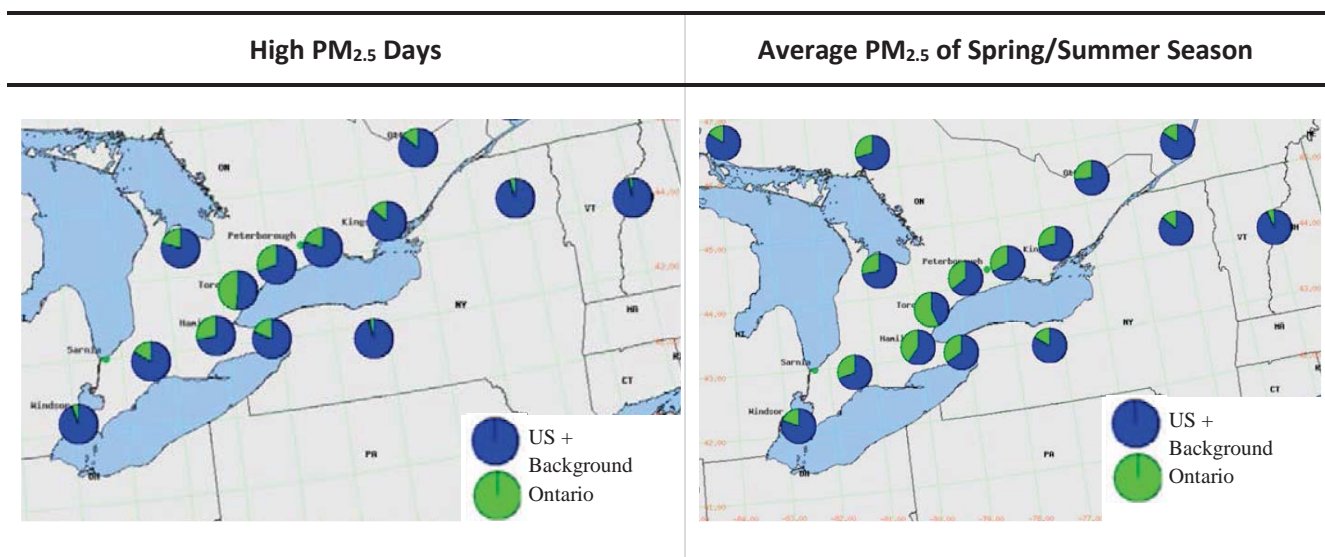


Figure 3: Effect of Trans-Boundary Air Pollution (MOECC, 2005)

Air pollution is strongly influenced by weather systems (i.e., meteorology) that typically move out of central Canada into the mid-west of the U.S. then eastward to the Atlantic coast. This

weather system generally produces winds with a southerly component that travel over major emission sources in the U.S. and result in the transport of pollution into Ontario. This phenomenon is demonstrated in the following figure and is based on a computer simulation from the Weather Research and Forecasting (WRF) Model.

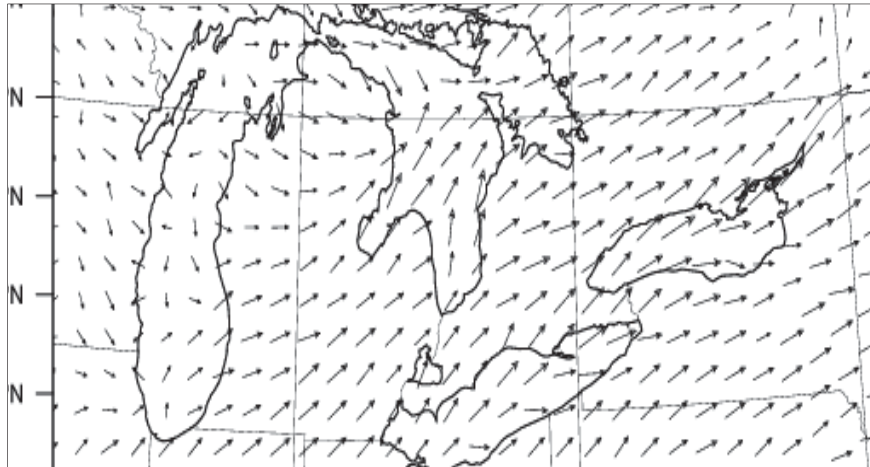


Figure 4: Typical Wind Direction during a Smog Episode

As discussed, understanding the composition of background air pollution and its influences is important in determining the potential impacts of a project, considering that the majority of the combined concentrations are typically due to existing elevated ambient background levels. In this assessment, background conditions were characterized utilizing existing ambient monitoring data from MOECC and NAPS Network stations and added to the modelled predictions in order to conservatively estimate the combined concentration.

2.2 Selection of Relevant Ambient Monitoring Stations

A review of publically available data from MOECC and NAPS ambient monitoring stations in Ontario was undertaken to identify the monitoring stations that are in relative proximity to the study area and that would be representative of background contaminant concentrations in the study area. Three MOECC (Sudbury, North Bay, and Toronto West) and two NAPS (Windsor, and Ottawa) stations were determined to be representative. Note that Toronto West is one of the only stations in Ontario which measures CO. Windsor is the only station in Ontario at which background acrolein, acetaldehyde, and formaldehyde concentrations are publically available for recent years. The locations of the relevant ambient monitoring stations are shown in **Figure 5**. Station information is presented in **Table 3**.

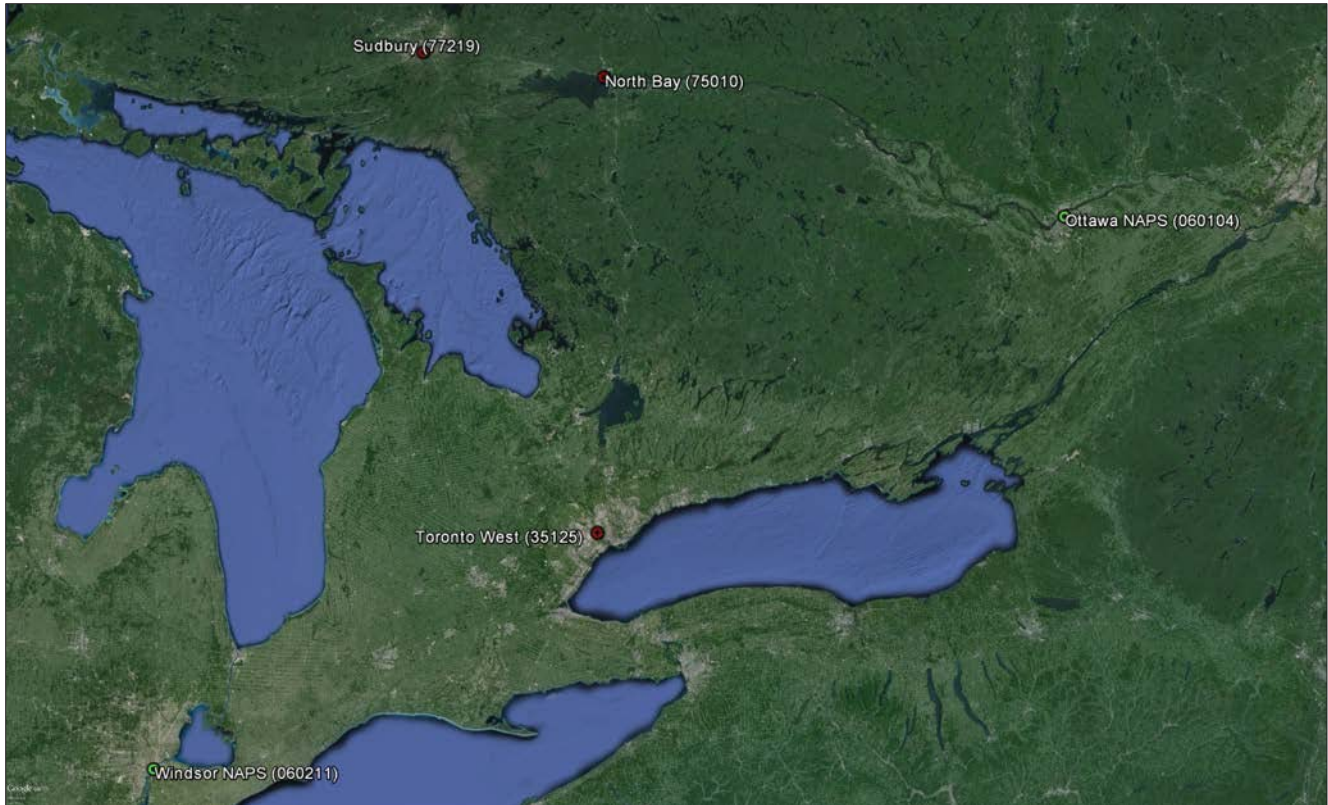


Figure 5: Relevant MOECC (shown in red) and NAPS (shown in green) Monitoring Stations; Windsor and Egbert NAPS Stations Not Shown

Table 3: Relevant MOECC and NAPS Station Information

City/Town	Station ID	Location	Operator	Contaminants
Sudbury	77219	1222 Ramsey Lake Rd	MOECC	PM _{2.5}
North Bay	75010	Chippewa St W	MOECC	NO ₂
Toronto West	35125	125 Resources Rd	MOECC	CO
Ottawa	60104	Rideau St & Wurtemberg St	NAPS	Benzene 1,3-Butadiene
Windsor	60211	College St/Prince St	NAPS	Formaldehyde Acetaldehyde Acrolein Benzene 1,3-Butadiene

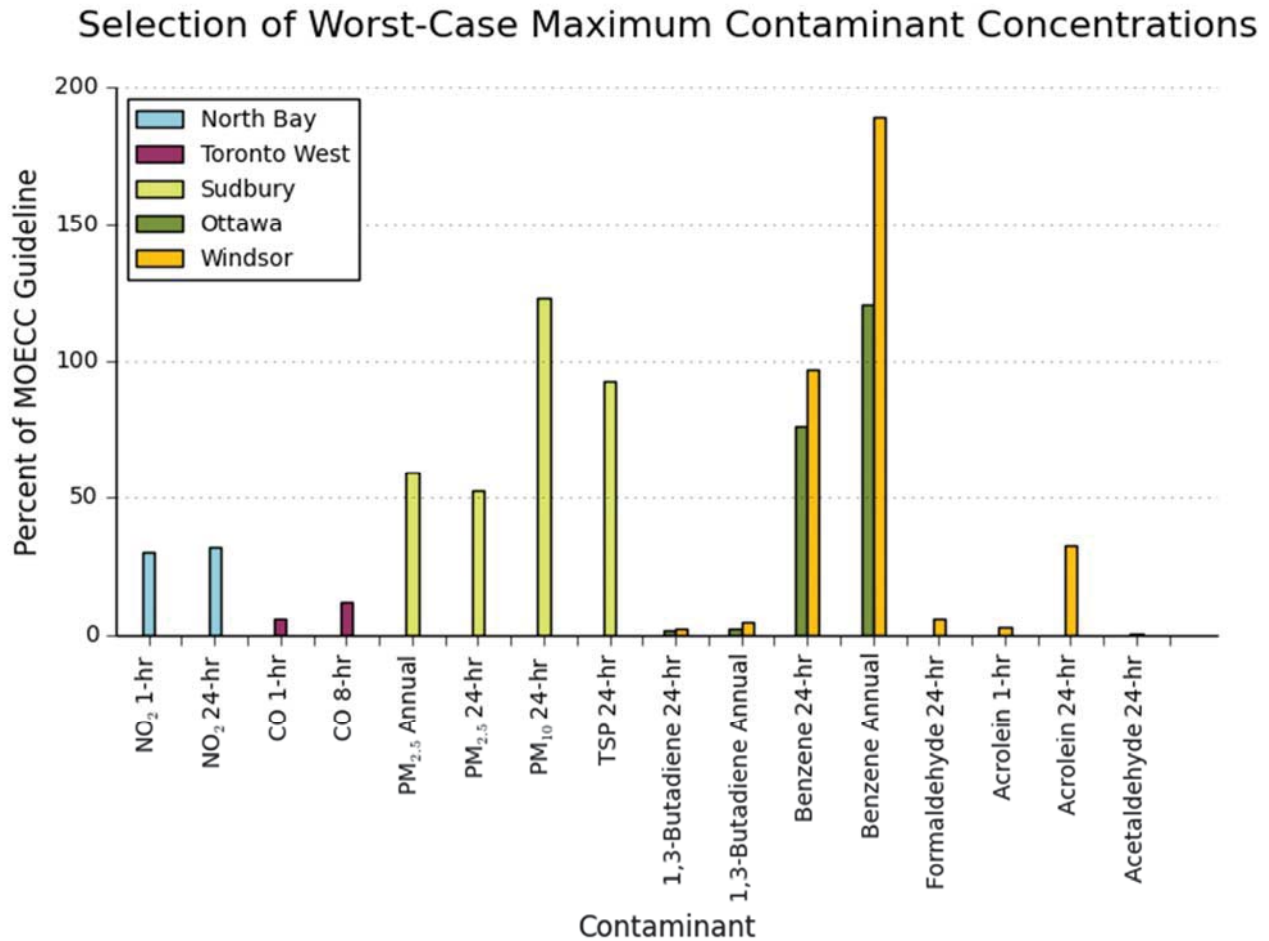
Since there are several monitoring stations which could be used to represent the study area, a comparison was performed for the available data on a contaminant basis, to determine the worst-case representative background concentration (see **Section 2.3**). Selecting the worst-case ambient data will result in a conservative combined assessment.

2.3 Selection of Worst-Case Monitoring Stations

Year 2010 to 2014 hourly ambient monitoring data from the selected stations were statistically summarized for the desired averaging periods, 1-hour, 8-hour, 24-hour, and annual. Note that VOC monitoring data for 2014 is not yet publically available. 2009-2013 data was used for VOC's. The station with the highest maximum value over the five-year period for each

contaminant and averaging period was selected to represent background concentrations in the study area. The maximum concentration represents an absolute worst-case background scenario. Ambient VOC data is not monitored hourly, but is typically measured every six days. To combine this dataset with the hourly modelled concentrations, each measured six-day value was applied to all hours between measurement dates, when there were 6 days between measurements. When there was greater than 6 days between measurements, the 90th percentile measured value for the year in question was applied for those days in order to determine combined concentrations. This method is conservative in determining combined impacts as it assumed the 10th percentile highest concentrations whenever data was not available. **Table 4** shows a comparison of the relevant stations for each contaminant of interest, and the selection of the worst-case station.

Table 4: Comparison of Background Concentrations



Note: PM₁₀ and TSP data are not publically available in Ontario; therefore, background concentrations were estimated by applying a PM_{2.5}/PM₁₀ ratio of 0.54 and a PM_{2.5}/TSP ratio of 0.3 (Lall et al., 2004).

Contaminant	Worst-Case Station	Contaminant	Worst-Case Station
NO ₂ (1-Hr)	North Bay	TSP	Sudbury
NO ₂ (24-Hr)	North Bay	1,3-Butadiene	Windsor
CO (1-Hr)	Toronto West	Benzene	Windsor
CO (8-hr)	Toronto West	Formaldehyde	Windsor
PM _{2.5}	Sudbury	Acrolein	Windsor
PM ₁₀	Sudbury	Acetaldehyde	Windsor

2.4 Detailed Analysis of Selected Worst-case Monitoring Stations

A detailed statistical analysis of the selected worst-case background monitoring station for each of the contaminants is presented below, summarized for average, 90th percentile and maximum concentrations. Maximum ambient concentrations represented a worst-case day. The 90th percentile concentration represents a day with reasonably worst-case background

concentrations, and the average concentration represents a typical day. Each site is presented on a yearly basis and for the five-year period. Where measurements exceeded the guideline, frequency analysis was performed.

Table 5: Summary of Background NO₂

Statistical Analysis		Five-Year Summary									
<p>North Bay 1-hr NO₂ Concentrations</p> <p>Concentration $\mu\text{g}/\text{m}^3$</p> <p>Guideline: $400 \mu\text{g}/\text{m}^3$</p> <p>Legend: Maximum (dark blue), 90th Percentile (medium blue), Average (light blue), Maximum (green), 90th Percentile (light green), Average (yellow-green)</p> <p>North Bay</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>30%</td> </tr> <tr> <td>90th Percentile</td> <td>7%</td> </tr> <tr> <td>Average</td> <td>3%</td> </tr> </tbody> </table> <p>Conclusion: A review of five years of ambient monitoring data from the North Bay Station indicated that background concentrations are well below the Guideline on a 1-hour basis.</p>		Statistic	% of Guideline	Maximum	30%	90 th Percentile	7%	Average	3%
Statistic	% of Guideline										
Maximum	30%										
90 th Percentile	7%										
Average	3%										
<p>North Bay 24-hr NO₂ Concentrations</p> <p>Concentration $\mu\text{g}/\text{m}^3$</p> <p>Guideline: $200 \mu\text{g}/\text{m}^3$</p> <p>Legend: Maximum (dark blue), 90th Percentile (medium blue), Average (light blue), Maximum (green), 90th Percentile (light green), Average (yellow-green)</p> <p>North Bay</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>32%</td> </tr> <tr> <td>90th Percentile</td> <td>12%</td> </tr> <tr> <td>Average</td> <td>6%</td> </tr> </tbody> </table> <p>Conclusion: A review of five years of ambient monitoring data from the North Bay Station indicated that background concentrations are well below the Guideline on a 24-hour basis.</p>		Statistic	% of Guideline	Maximum	32%	90 th Percentile	12%	Average	6%
Statistic	% of Guideline										
Maximum	32%										
90 th Percentile	12%										
Average	6%										

Table 6: Summary of Background CO

Statistical Analysis		Five-Year Summary									
<p>Toronto West 1-hr CO Concentrations</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>6%</td> </tr> <tr> <td>90th Percentile</td> <td>1%</td> </tr> <tr> <td>Average</td> <td>1%</td> </tr> </tbody> </table>	Statistic	% of Guideline	Maximum	6%	90th Percentile	1%	Average	1%	<p>Conclusion: A review of five years of ambient monitoring data from the Toronto West Station indicated that background concentrations are well below the Guideline on a 1-hour basis.</p>
Statistic	% of Guideline										
Maximum	6%										
90th Percentile	1%										
Average	1%										
<p>Toronto West 8-hr CO Concentrations</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>12%</td> </tr> <tr> <td>90th Percentile</td> <td>3%</td> </tr> <tr> <td>Average</td> <td>2%</td> </tr> </tbody> </table>	Statistic	% of Guideline	Maximum	12%	90th Percentile	3%	Average	2%	<p>Conclusion: A review of five years of ambient monitoring data from the Toronto West Station indicated that background concentrations are well below the Guideline on an 8-hour basis.</p>
Statistic	% of Guideline										
Maximum	12%										
90th Percentile	3%										
Average	2%										

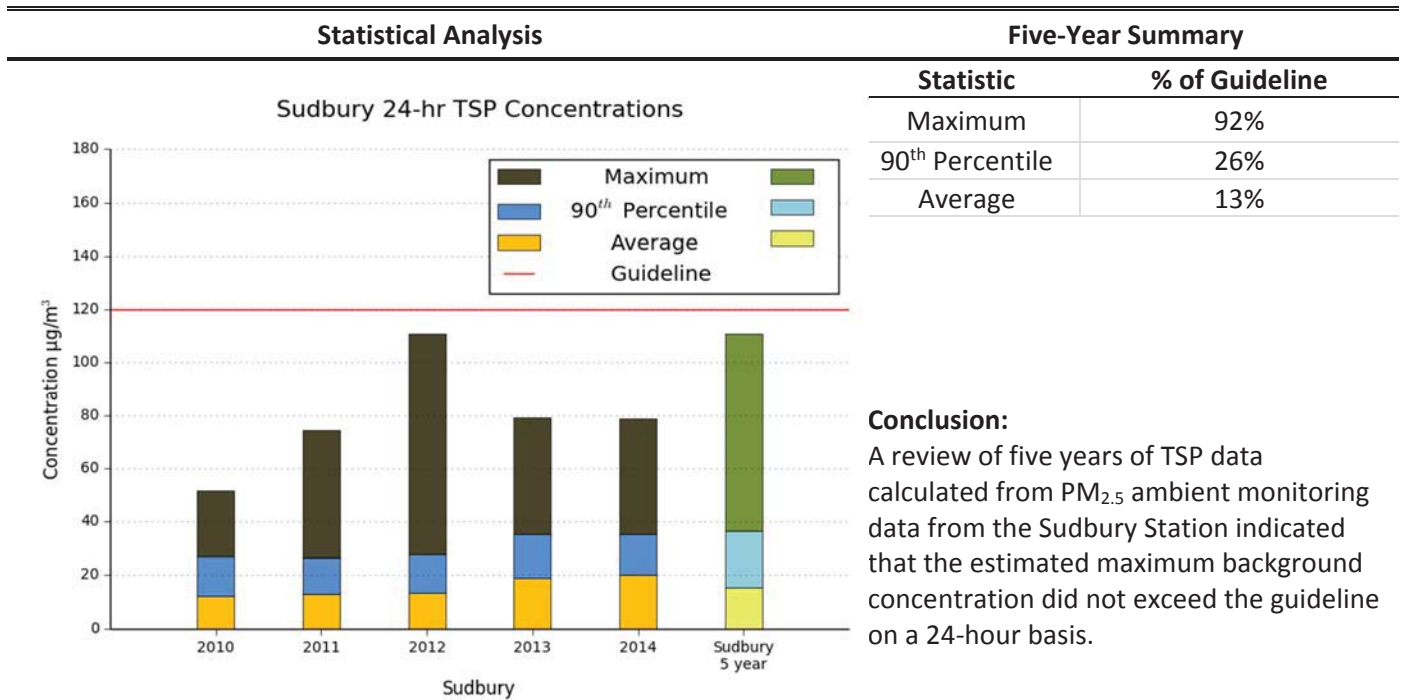
Table 7: Summary of Background PM_{2.5}

Statistical Analysis		Five-Year Summary																																
<p>Sudbury 24-hr PM_{2.5} Concentrations</p> <table border="1"> <caption>Sudbury 24-hr PM_{2.5} Concentrations (Estimated)</caption> <thead> <tr> <th>Year</th> <th>Average (µg/m³)</th> <th>90th Percentile (µg/m³)</th> <th>98th Percentile (µg/m³)</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>4.0</td> <td>4.0</td> <td>5.0</td> </tr> <tr> <td>2011</td> <td>4.0</td> <td>4.0</td> <td>5.0</td> </tr> <tr> <td>2012</td> <td>4.0</td> <td>4.0</td> <td>5.0</td> </tr> <tr> <td>2013</td> <td>5.5</td> <td>5.0</td> <td>4.5</td> </tr> <tr> <td>2014</td> <td>6.0</td> <td>4.5</td> <td>4.0</td> </tr> <tr> <td>Sudbury 5 year</td> <td>4.5</td> <td>6.0</td> <td>4.0</td> </tr> </tbody> </table>		Year	Average (µg/m³)	90 th Percentile (µg/m³)	98 th Percentile (µg/m³)	2010	4.0	4.0	5.0	2011	4.0	4.0	5.0	2012	4.0	4.0	5.0	2013	5.5	5.0	4.5	2014	6.0	4.5	4.0	Sudbury 5 year	4.5	6.0	4.0	<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>98th Percentile</td> <td>52%</td> </tr> </tbody> </table>	Statistic	% of Guideline	98 th Percentile	52%
Year	Average (µg/m³)	90 th Percentile (µg/m³)	98 th Percentile (µg/m³)																															
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2013	5.5	5.0	4.5																															
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Sudbury 5 year	4.5	6.0	4.0																															
Statistic	% of Guideline																																	
98 th Percentile	52%																																	
<p>Sudbury Annual PM_{2.5} Concentrations</p> <table border="1"> <caption>Sudbury Annual PM_{2.5} Concentrations (Estimated)</caption> <thead> <tr> <th>Year</th> <th>Annual Average (µg/m³)</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>3.5</td> </tr> <tr> <td>2011</td> <td>4.0</td> </tr> <tr> <td>2012</td> <td>4.0</td> </tr> <tr> <td>2013</td> <td>5.5</td> </tr> <tr> <td>2014</td> <td>6.0</td> </tr> <tr> <td>Sudbury 3-year average</td> <td>5.2</td> </tr> </tbody> </table>		Year	Annual Average (µg/m³)	2010	3.5	2011	4.0	2012	4.0	2013	5.5	2014	6.0	Sudbury 3-year average	5.2	<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>3-year Maximum Annual Average</td> <td>59%</td> </tr> </tbody> </table>	Statistic	% of Guideline	3-year Maximum Annual Average	59%														
Year	Annual Average (µg/m³)																																	
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2014	6.0																																	
Sudbury 3-year average	5.2																																	
Statistic	% of Guideline																																	
3-year Maximum Annual Average	59%																																	
<p>Conclusion: The guideline for PM_{2.5} is based on the 98th percentile value averaged over three consecutive years. A review of five years of ambient monitoring data from the Sudbury Station indicated that the highest 3-year average of 14.1 µg/m³ from 2012 to 2014 is 52% of the guideline.</p>		<p>Conclusion: The annual guideline for PM_{2.5} is based on the three-year maximum annual average. A review of five years of ambient monitoring data from the Sudbury Station indicated that the highest 3-year average of 5.2 µg/m³ from 2012 to 2014 is 59% of the guideline.</p>																																

Table 8: Summary of Background PM₁₀

Statistical Analysis		Five-Year Summary									
<p style="text-align: center;">Sudbury 24-hr PM₁₀ Concentrations</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td style="color: red;">123%</td> </tr> <tr> <td>90th Percentile</td> <td>35%</td> </tr> <tr> <td>Average</td> <td>17%</td> </tr> </tbody> </table>		Statistic	% of Guideline	Maximum	123%	90 th Percentile	35%	Average	17%
Statistic	% of Guideline										
Maximum	123%										
90 th Percentile	35%										
Average	17%										
<p>Note: PM₁₀ data is not publically available in Ontario; therefore, background concentrations were estimated by applying a PM_{2.5}/PM₁₀ ratio of 0.54. Lall et al. (2004)</p>		<p>Conclusion: A review of five years of PM₁₀ data calculated from PM_{2.5} ambient monitoring data from the Sudbury Station indicated that the estimated maximum background concentration exceeded the guideline on a 24-hour basis. Therefore, frequency analysis was conducted to determine the number of days the estimated background exceeded the guideline (see below).</p>									
<p style="text-align: center;">Frequency of Days above Guideline PM₁₀ 24-hr</p>		<table border="1"> <thead> <tr> <th>Number of Days Measured</th> <th>Number of Days > Guideline</th> </tr> </thead> <tbody> <tr> <td>1,816</td> <td>1</td> </tr> </tbody> </table>		Number of Days Measured	Number of Days > Guideline	1,816	1				
Number of Days Measured	Number of Days > Guideline										
1,816	1										
<p>Conclusion: Frequency analysis determined that 24-hr concentrations exceeded the guideline on an infrequent basis. Measured concentrations exceeded the guideline 1 day over the 5-year period. This means that the background concentration exceeded the guideline less than 1% of the time over the 5-year period.</p>											

Table 9: Summary of Background TSP

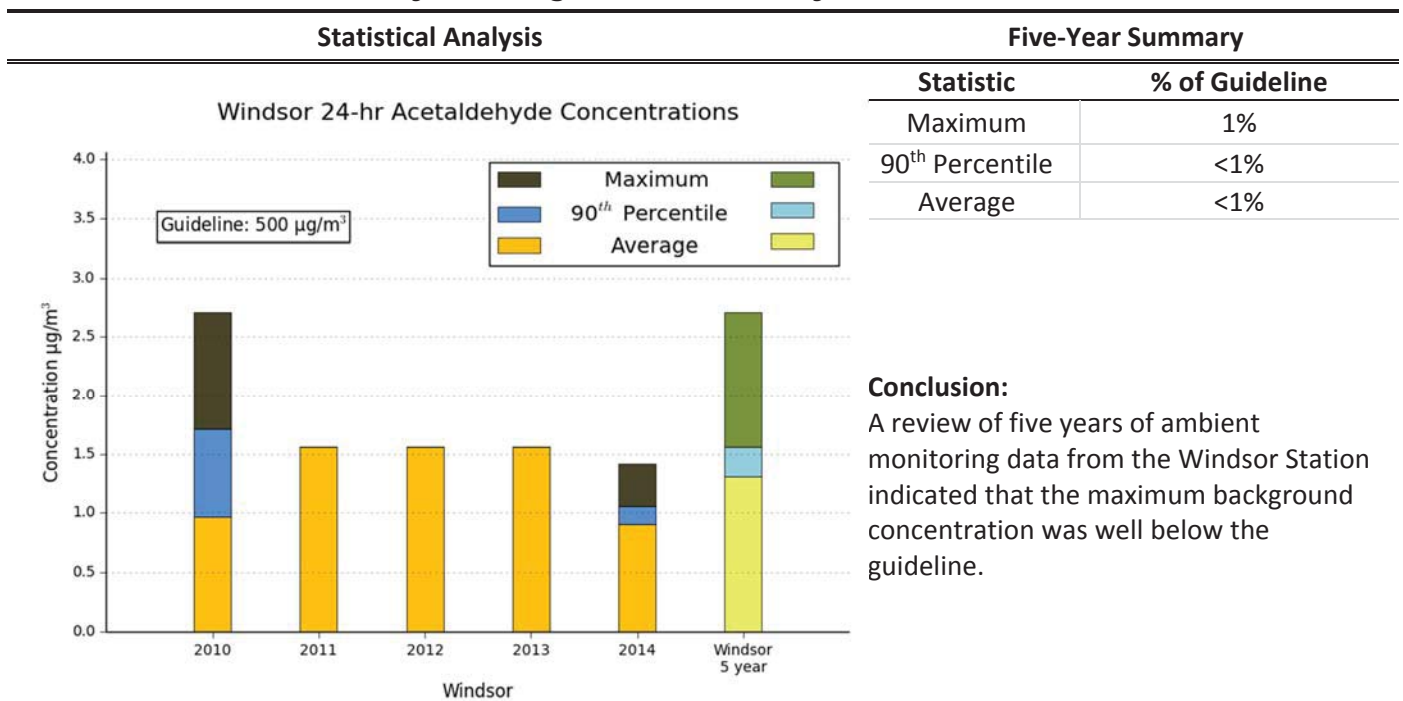


Conclusion:

A review of five years of TSP data calculated from PM_{2.5} ambient monitoring data from the Sudbury Station indicated that the estimated maximum background concentration did not exceed the guideline on a 24-hour basis.

Note: TSP data is not publically available in Ontario; therefore, background concentrations were estimated by applying a PM_{2.5}/TSP ratio of 0.3. Lall et al. (2004)

Table 10: Summary of Background Acetaldehyde



Conclusion:

A review of five years of ambient monitoring data from the Windsor Station indicated that the maximum background concentration was well below the guideline.

Table 11: Summary of Background Acrolein

Statistical Analysis		Five-Year Summary									
<p style="text-align: center;">Windsor 1-hr Acrolein Concentrations</p> <p style="text-align: center;">Windsor</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>3%</td> </tr> <tr> <td>90th Percentile</td> <td>2%</td> </tr> <tr> <td>Average</td> <td>1%</td> </tr> </tbody> </table> <p>Conclusion: A review of five years of ambient monitoring data from the Windsor Station indicated that background concentrations are well below the Guideline on a 1-hour basis.</p>		Statistic	% of Guideline	Maximum	3%	90th Percentile	2%	Average	1%
Statistic	% of Guideline										
Maximum	3%										
90th Percentile	2%										
Average	1%										
<p style="text-align: center;">Windsor 24-hr Acrolein Concentrations</p> <p style="text-align: center;">Windsor</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>32%</td> </tr> <tr> <td>90th Percentile</td> <td>19%</td> </tr> <tr> <td>Average</td> <td>16%</td> </tr> </tbody> </table> <p>Conclusion: A review of five years of ambient monitoring data from the Windsor Station indicated that background concentrations are well below the Guideline on a 24-hour basis.</p>		Statistic	% of Guideline	Maximum	32%	90th Percentile	19%	Average	16%
Statistic	% of Guideline										
Maximum	32%										
90th Percentile	19%										
Average	16%										

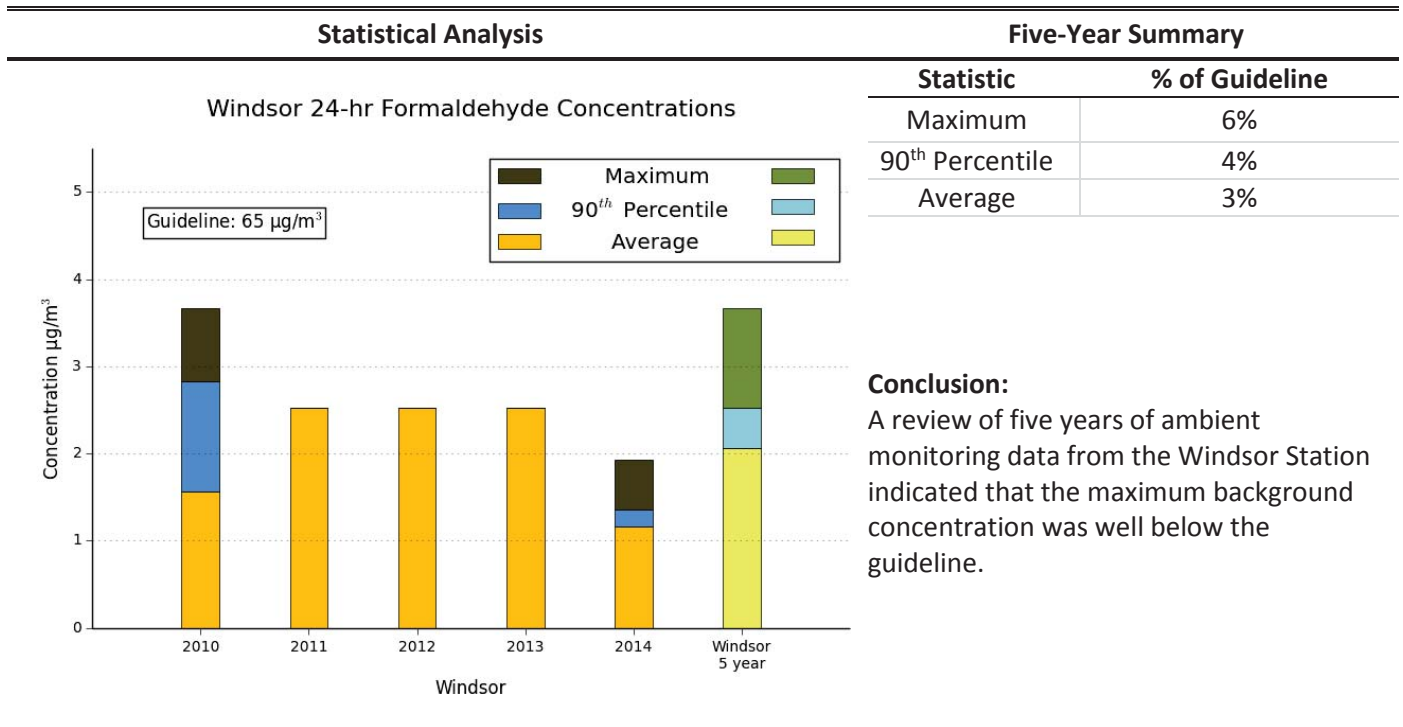
Table 12: Summary of Background Benzene

Statistical Analysis		Five-Year Summary									
<p>Windsor 24-hr Benzene Concentrations</p> <p>Concentration $\mu\text{g}/\text{m}^3$</p> <p>Windsor</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>97%</td> </tr> <tr> <td>90th Percentile</td> <td>44%</td> </tr> <tr> <td>Average</td> <td>31%</td> </tr> </tbody> </table> <p>Conclusion: A review of five years of ambient monitoring data from the Windsor Station indicated that background concentrations were 97% of the 24-hour standard.</p>		Statistic	% of Guideline	Maximum	97%	90th Percentile	44%	Average	31%
Statistic	% of Guideline										
Maximum	97%										
90th Percentile	44%										
Average	31%										
<p>Windsor Annual Benzene Concentrations</p> <p>Concentration $\mu\text{g}/\text{m}^3$</p> <p>Windsor</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum Annual Average</td> <td>190%</td> </tr> <tr> <td>Average Annual Average</td> <td>159%</td> </tr> </tbody> </table> <p>Conclusion: A review of five years of ambient monitoring data from the Windsor Station indicated that background concentrations were 190% of the annual standard. Average background concentrations over the five-year period were 159% of the standard.</p>		Statistic	% of Guideline	Maximum Annual Average	190%	Average Annual Average	159%		
Statistic	% of Guideline										
Maximum Annual Average	190%										
Average Annual Average	159%										

Table 13: Summary of Background 1,3-Butadiene

Statistical Analysis		Five-Year Summary									
<p>Windsor 24-hr 1,3-Butadiene Concentrations</p> <p>Concentration $\mu\text{g}/\text{m}^3$</p> <p>Guideline: $10 \mu\text{g}/\text{m}^3$</p> <p>Legend: Maximum, 90th Percentile, Average, Maximum</p> <p>Windsor</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>2%</td> </tr> <tr> <td>90th Percentile</td> <td>1%</td> </tr> <tr> <td>Average</td> <td>1%</td> </tr> </tbody> </table> <p>Conclusion: A review of five years of ambient monitoring data from the Windsor Station indicated that background concentrations were well below the 24-hour standard.</p>		Statistic	% of Guideline	Maximum	2%	90th Percentile	1%	Average	1%
Statistic	% of Guideline										
Maximum	2%										
90th Percentile	1%										
Average	1%										
<p>Windsor Annual 1,3-Butadiene Concentrations</p> <p>Concentration $\mu\text{g}/\text{m}^3$</p> <p>Guideline: $2.00 \mu\text{g}/\text{m}^3$</p> <p>Legend: Annual Average, Maximum Annual Average, Average Annual Average</p> <p>Windsor</p>		<table border="1"> <thead> <tr> <th>Statistic</th> <th>% of Guideline</th> </tr> </thead> <tbody> <tr> <td>Maximum Annual Average</td> <td>3%</td> </tr> <tr> <td>Average Annual Average</td> <td>3%</td> </tr> </tbody> </table> <p>Conclusion: A review of five years of ambient monitoring data from the Windsor Station indicated that background concentrations were 3% of the annual standard.</p>		Statistic	% of Guideline	Maximum Annual Average	3%	Average Annual Average	3%		
Statistic	% of Guideline										
Maximum Annual Average	3%										
Average Annual Average	3%										

Table 14: Summary of Background Formaldehyde



2.5 Summary of Background Conditions

Based on a review ambient monitoring data from 2010-2014, all contaminants were below their respective guidelines with the exception of PM_{10} and benzene. It should be noted that PM_{10} and TSP were calculated based on their relationship to $\text{PM}_{2.5}$.

A summary of the background concentrations as a percentage of their respective guidelines or CWS is presented in **Figure 6**.

Summary of Worst-Case Stations Ambient Concentrations

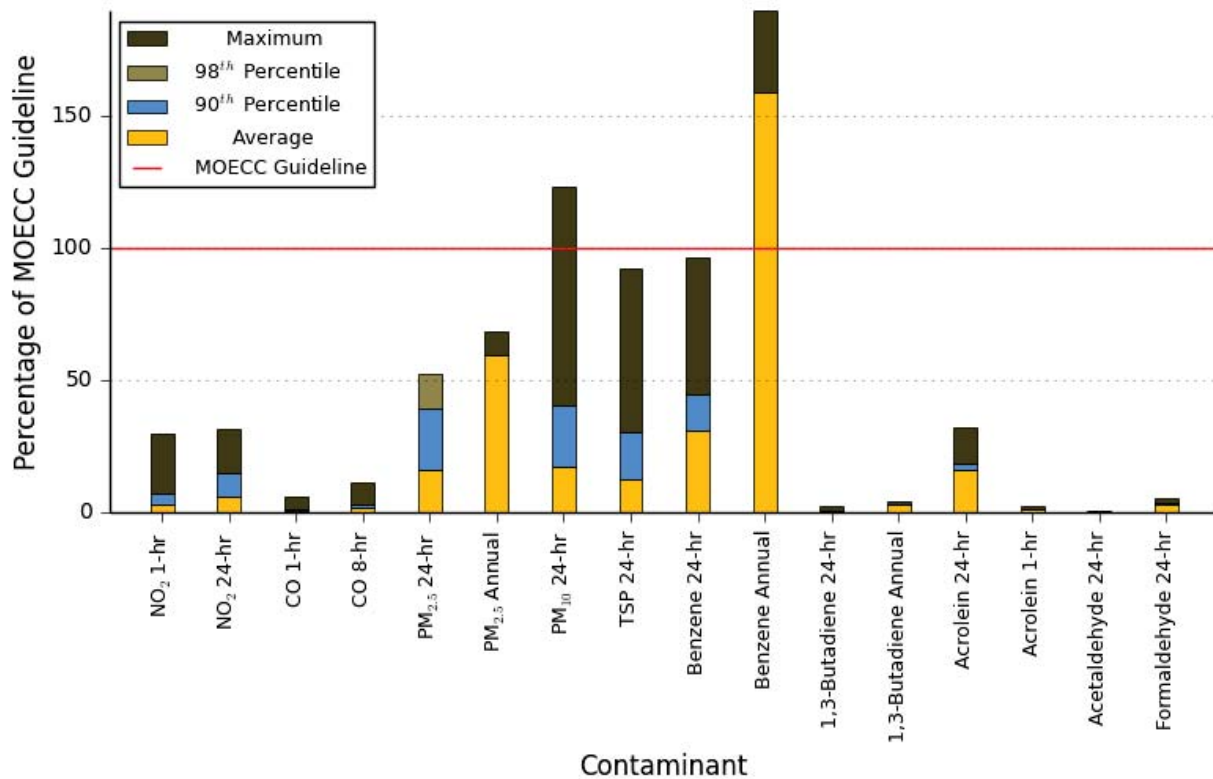


Figure 6: Summary of Background Conditions

3.0 Local Air Quality Assessment

3.1 Overview

The worst-case impacts due to roadway vehicle emissions were assessed for two scenarios: 2009 existing and 2031 future-build. The two scenarios include the following activities:

2009 Existing:

- Existing vehicle counts and roadway alignment

2031 Future Build:

- Projected vehicle volumes on Second Avenue considering population growth and the new roadway alignment
- Roadway widening to five lanes

The assessment was performed using U.S. EPA approved models to determine vehicle emission rates and air dispersion. Worst-case impacts at representative sensitive receptor locations were predicted. The details of the assessment are discussed below.

3.2 Location of Sensitive Receptors within the Study Area

Land uses which are defined as sensitive receptors for evaluating potential air quality effects are:

- Health care facilities;
- Senior citizens' residences or long-term care facilities;
- Child care facilities;
- Educational facilities;
- Places of worship; and
- Residential dwellings.

21 sensitive receptors were modelled to represent worst-case impacts surrounding the project area. Two schools and two hotels were included in the model. The remaining receptors chosen were residences. The receptor locations on mapping are identified in **Figure 7**, with Second Avenue shown in yellow.

Representative worst-case impacts were predicted by the dispersion model at the sensitive receptors closest to the roadway. This is due to the fact that contaminant concentrations disperse significantly with downwind distance from the motor vehicles resulting in reduced contaminant concentrations. At approximately 500 m from the roadway, contaminant concentrations from motor vehicles generally become indistinguishable from background levels. The maximum predicted contaminant concentrations at the closest sensitive receptors will usually occur during weather events which produce calm to light winds (< 3 m/s). During weather events with higher wind speeds, the contaminant concentrations disperse much more quickly.

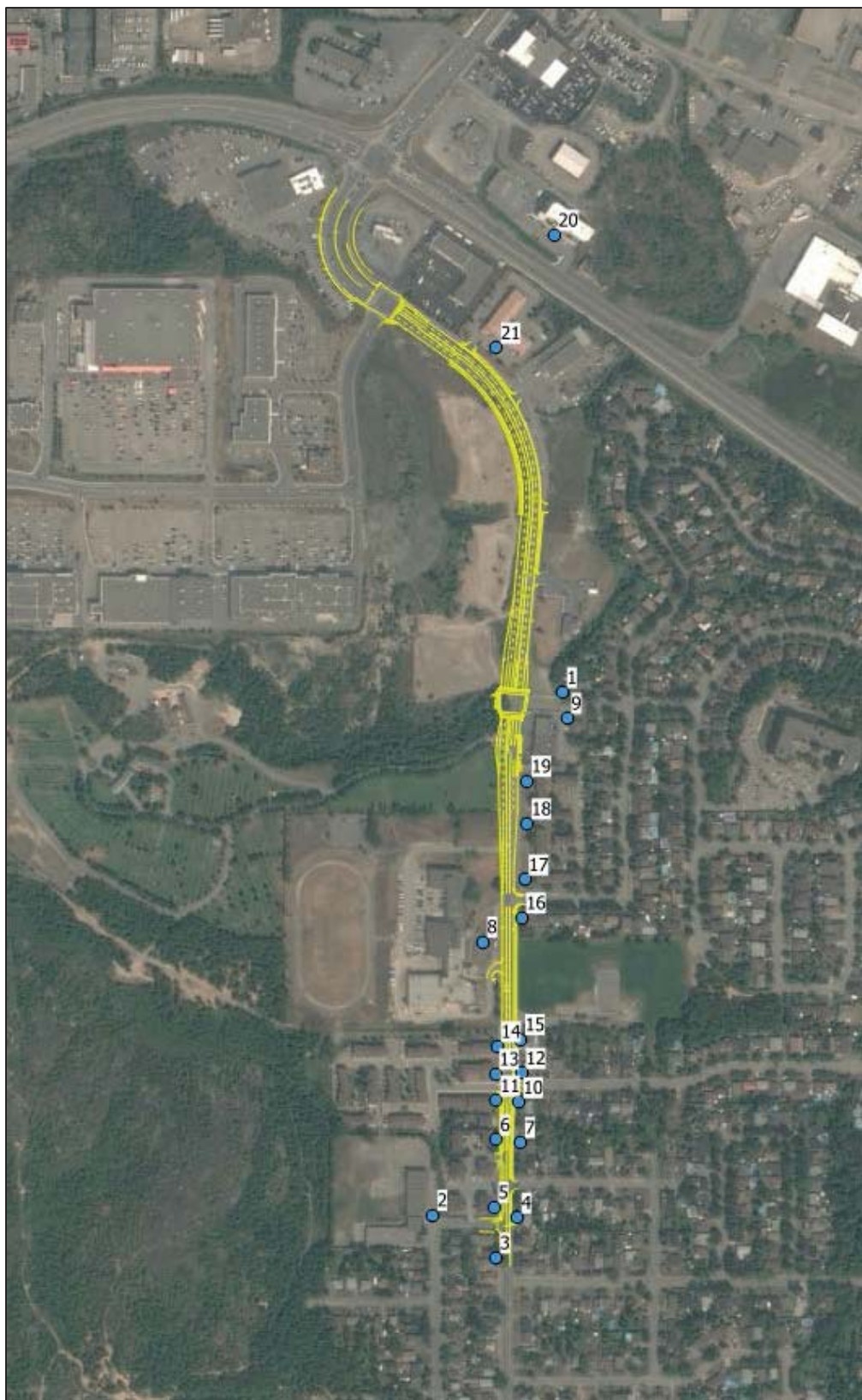


Figure 7: Receptor Locations Within The Study Area

3.3 Road Traffic Data

Traffic volumes for Second Ave were provided by MMM in the form of peak hourly traffic volumes for the 2009 existing and 2031 future-build scenarios. Peak hourly volumes were multiplied by a factor of 10 to determine annual average daily traffic (AADT). The traffic volumes used in the assessment are provided in **Table 15**. MMM also provided a 2% heavy-duty vehicle percentage. The U.S. EPA urban hourly vehicle distribution was assumed for the project and is presented in **Table 16**.

The study area contains three traffic signals at the intersections of Second Ave and Donna Dr, Second Ave and Scarlett Rd, and a pedestrian crosswalk on Second Ave north of Kenwood St. Signal timing information was provided by MMM.

Table 15: Traffic Volumes (AADT) and Heavy Duty Vehicle Percentages Used in the Assessment

Roadway	2009 Existing AADT	2031 Future-Build AADT	Heavy Duty Vehicle (%)	Speed (km/hr)
Second Ave, Kingsway to Donna Dr	9,570	13,610	2	50
Second Ave, Donna Dr to Scarlett Rd	9,570	13,610	2	50
Second Ave, Scarlett Rd to pedestrian crossing	9,570	13,610	2	50
Second ave, south of pedestrian crossing	5,150	6,060	2	50
Kingsway	29,580	33,150	2	60

Table 16: U.S. EPA Rural Hourly Vehicle Distribution

Hour	Weekday	Weekend
1	0.9%	2.2%
2	0.6%	1.4%
3	0.5%	1.0%
4	0.4%	0.8%
5	0.6%	0.7%
6	1.9%	1.0%
7	4.6%	1.9%
8	6.9%	2.6%
9	6.1%	3.8%
10	5.0%	4.8%
11	5.1%	5.9%
12	5.4%	6.5%
13	5.8%	7.1%
14	5.9%	7.1%
15	6.2%	7.1%
16	7.1%	7.2%
17	7.7%	7.1%
18	7.9%	6.8%
19	6.0%	6.0%
20	4.4%	5.2%
21	3.5%	4.3%
22	3.1%	3.9%
23	2.5%	3.2%
24	1.9%	2.4%

3.4 Meteorological Data

2010-2014 hourly meteorological data was obtained from the Sudbury Airport and upper air data was obtained from White Lake, Michigan as recommended by the MOECC. The combined data was processed to reflect conditions at the study area using the U.S. EPA’s PCRAMMET software program which prepares meteorological data for use with the CAL3QHCR model. A wind frequency diagram (wind rose) is shown in **Figure 8**. As can be seen in this figure, predominant winds are from the south-westerly and north-easterly directions.

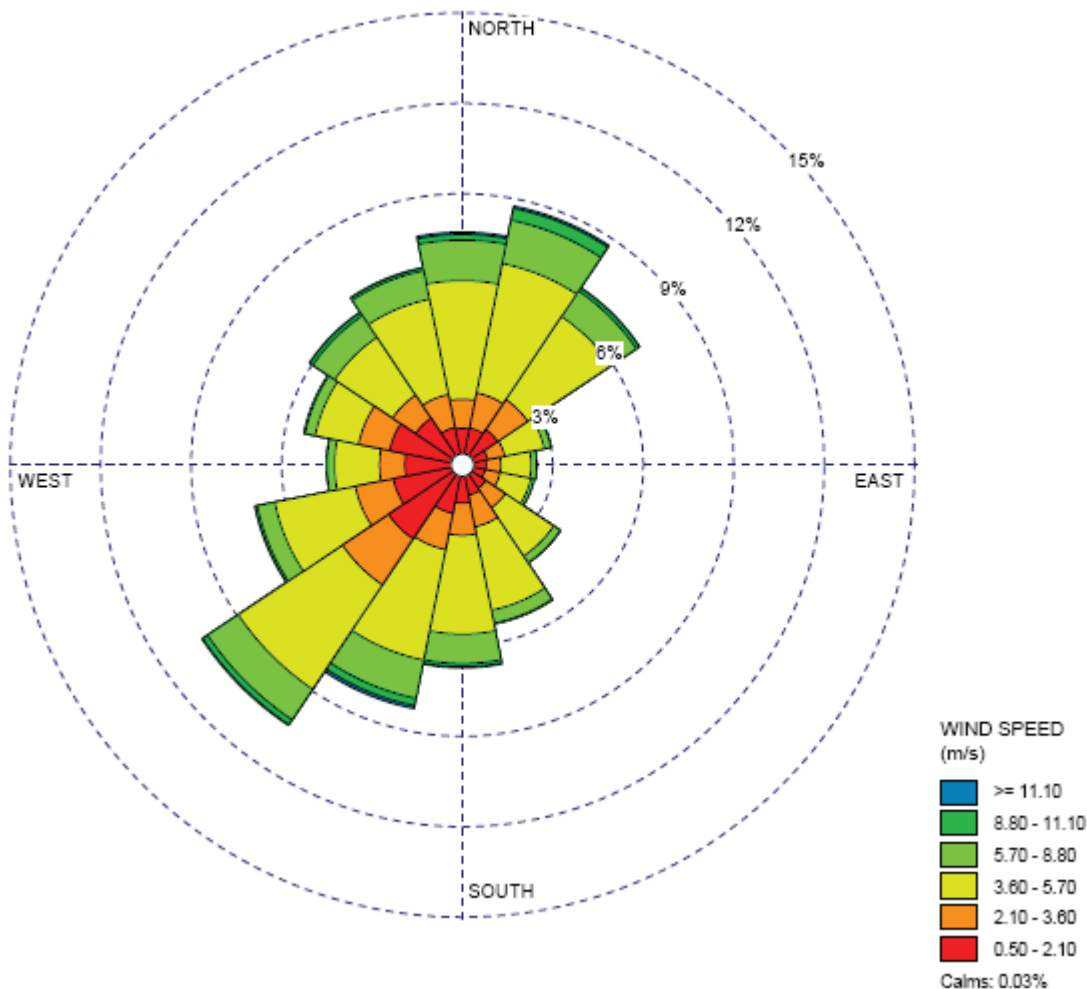


Figure 8: Wind Frequency Diagram for Sudbury Airport

3.5 Motor Vehicle Emission Rates

The U.S. EPA’s Motor Vehicle Emission Simulator (MOVES) model provides estimates of current and future emission rates from motor vehicles based on a variety of factors such as local meteorology and vehicle fleet composition. MOVES 2014, released in October 2014, is the U.S. EPA’s tool for estimating vehicle emissions due to the combustion of fuel, brake and tire wear, fuel evaporation, permeation and refuelling leaks. The model is based on “an analysis of millions of emission test results and considerable advances in the Agency’s understanding of vehicle emissions and accounts for changes in emissions due to proposed standards and regulations”. For this project, MOVES was used to estimate vehicle emissions based on vehicle type, road type, model year, and vehicle speed. Emission rates were estimated based on the heavy duty vehicle percentages provided by MMM. Vehicle age was determined based on the U.S. EPA’s default distribution. **Table 17** specifies the major inputs into MOVES.

Table 17: MOVES Input Parameters

Parameter	Input
Scale	Custom County Domain
Meteorology	Temperature and Relative Humidity were obtained from meteorological data from the Environment Canada Sudbury station for the years 2010 to 2014.
Years	2009, 2031
Geographical Bounds	Custom County Domain
Fuels	Compressed Natural Gas / Diesel Fuels / Gasoline Fuels
Source Use Types	Combination Long-haul Truck / Combination Short-haul Truck / Intercity Bus / Light Commercial Truck / Motor Home / Motorcycle / Passenger Car / Passenger Truck / Refuse Truck / School Bus / Single Unit Long-haul Truck / Single Unit Short-haul Truck / Transit Bus
Road Type	Urban Unrestricted Access
Contaminants and Processes	NO ₂ / CO / PM _{2.5} / PM ₁₀ / Acetaldehyde / Acrolein / Benzene / 1,3-Butadiene / Formaldehyde. TSP can't be directly modelled by MOVES. However, the U.S. EPA has determined, based on emissions test results, that >97% of tailpipe particulate matter is PM ₁₀ or less. Therefore, the PM ₁₀ exhaust emission rate was used for TSP.
Vehicle Age Distribution	MOVES defaults based on years selected for the roadway.

From the MOVES outputs, the highest monthly value was selected to represent a worst-case emission rate. The emission rates for each speed modelled for a 2% heavy duty vehicle percentage are shown in **Table 18**.

Table 18: MOVES Output Emission Factors for Roadway Vehicles (g/VMT); Idle Emission Rates are grams per vehicle hour

Year	Speed	NOx	CO	PM _{2.5}	PM ₁₀	TSP ¹	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Formaldehyde
2009	60 km/hr	0.89	5.04	0.04	0.09	0.09	0.0028	0.0002	0.0070	0.0009	0.0036
	50 km/hr	0.93	5.47	0.04	0.10	0.10	0.0032	0.0002	0.0079	0.0010	0.0040
	Idle	3.29	55.86	0.33	0.15	0.15	0.0529	0.0039	0.1420	0.0190	0.0703
2031	60 km/hr	0.07	1.07	0.01	0.05	0.05	0.0002	0.0000	0.0008	0.000001	0.0005
	50 km/hr	0.07	1.13	0.01	0.07	0.07	0.0002	0.0000	0.0009	0.000001	0.0005
	Idle	0.22	2.47	0.03	0.00	0.00	0.0025	0.0003	0.0074	0.0000	0.0062

¹ – Note that TSP can't be directly modelled by MOVES. However, the U.S. EPA has determined, based on emissions test results, that >97% of tailpipe particulate matter is PM₁₀ or less. Therefore, the PM₁₀ exhaust emission rate was used for TSP.

3.6 Re-suspended Particulate Matter Emission Rates

A large portion of roadway particulate matter emissions comes from dust on the pavement which is re-suspended by vehicles travelling on the roadway. These emissions are estimated

using empirically derived values presented by the U.S. EPA in their AP-42 report. The emissions factors for re-suspended PM were estimated by using the following equation from U.S. EPA’s Document AP-42 report, Chapter 13.2.1.3 and are summarized in **Table 19**.

$$E = k(sL)^{0.91} * (W)^{1.02}$$

Where: E = the particulate emission factor
 k = the particulate size multiplier
 sL = silt loading
 W = average vehicle weight (Assumed 3 Tons based on Toyota fleet data and U.S. EPA vehicle weight and distribution)

Table 19: Re-suspended Particulate Matter Emission Factors

Roadway AADT	K (PM _{2.5} /PM ₁₀ /TSP)	sL (g/m ²)	W (Tons)	E (g/VMT)		
				PM _{2.5}	PM ₁₀	TSP
<500	0.25/1.0/5.24	0.6	3	0.503	2.015	10.561
500-5,000	0.25/1.0/5.24	0.2	3	0.185	0.741	3.886
5,000- 10,000	0.25/1.0/5.24	0.06	3	0.061	0.247	1.299
>10,000	0.25/1.0/5.24	0.03	3	0.0176	0.070	0.368

3.7 Air Dispersion Modelling Using CAL3QHCR

The U.S. EPA’s CAL3QHCR dispersion model, based on the Gaussian plume equation, was specifically designed to predict air quality impacts from roadways using site specific meteorological data, vehicle emissions, traffic data, and signal data. The model input requirements include roadway geometry, sensitive receptor locations, meteorology, traffic volumes and motor vehicle emission rates as well as some contaminant physical properties such as settling and deposition velocities. CAL3QHCR uses this information to calculate hourly concentrations which are then used to determine 1-hour, 8-hour, 24-hour, and annual statistics for the contaminants of interest at the identified sensitive receptor locations. **Table 20** provides the major inputs used in CAL3QHCR. The emission rates used in the model were the outputs from the MOVES and AP-42 models, weighted for the vehicle fleet distributions provided. The outputs of CAL3QHCR are presented in the results section.

Table 20: CAL3QHCR Model Input Parameters

Parameter	Input
Free-Flow and Queue Link Traffic Data	Hourly traffic distributions were applied to the AADT traffic volumes in order to input traffic volumes in vehicles/hour. Emission rates from the MOVES output were input in grams/VMT or grams per vehicle hour. Signal timings for the traffic signal were input in seconds.
Meteorological Data	2010-2014 data from Sudbury Airport
Deposition Velocity	PM _{2.5} : 0.01 cm/s PM ₁₀ : 0.5 cm/s TSP: 0.15 cm/s NO ₂ , CO and VOCs: 0 cm/s
Settling Velocity	PM _{2.5} : 0.02 cm/s PM ₁₀ : 0.3 cm/s TSP: 1.8 cm/s CO, NO ₂ , and VOCs: 0 cm/s
Surface Roughness	The land type surrounding the project site is a mix of residential, commercial and undeveloped. The suburban surface roughness height for low intensity residential for all seasons of 52 cm was applied in the model.
Vehicle Emission Rate	Emission rates calculated in MOVES and AP-42 were input in g/VMT

3.8 Modelling Results

Presented below are the modelling results for the 2009 existing and 2031 future build scenarios based on 5-years of meteorological data. For each contaminant, combined concentrations are presented along with the relevant contribution due to the background and roadway. Results in this section are presented for the worst-case sensitive receptor (see **Table 21**), which was identified as the receptor with the maximum combined concentration for the 2031 future build scenario. Results for all modelled receptors are provided in **Appendix A**. It should be noted that the maximum combined concentration at any sensitive receptor often occurs infrequently and actually may only occur for one hour or day over the 5-year period.

Table 21: Worst-Case Sensitive Receptor for 2031 Future Build Scenario

Contaminant	Averaging Period	Sensitive Receptor
NO ₂	1-hour	n/a*
	24-hour	R20
CO	1-hour	R16
	8-hour	R16
PM _{2.5}	24-hour	R4
	Annual	R4
PM ₁₀	24-hour	R4
TSP	24-hour	R4
Acetaldehyde	24-hour	R16
Acrolein	1-hour	R20
	24-hour	R16
Benzene	24-hour	R20
	Annual	R16
1,3-Butadiene	24-hour	n/a*
	Annual	n/a*
Formaldehyde	24-hour	R20

**Maximum concentrations occurred entirely due to background concentrations, therefore all receptors measured the same during the maximum event.*

Coincidental hourly modelled roadway and background CAC concentrations were added to derive the combined concentration for each hour over the 5-year period. Hourly combined concentrations were then used to determine contaminant concentrations based on the applicable averaging period. Statistical analysis in the form of maximum, 90th percentile, and average combined concentrations were calculated for the worst-case sensitive receptor for each contaminant and are presented below. The maximum combined concentration (or 3-year average annual 98th percentile concentration in the case of PM_{2.5}) was used to assess compliance with MOECC guidelines or CWS. If excesses of the guideline were predicted, frequency analysis was undertaken in order to estimate the number of occurrences above the guideline. Provided below are the modelling results for the contaminants of interest.

Nitrogen Dioxide

Table 22 presents the predicted combined concentrations for the worst-case sensitive receptor for 1-hour and 24-hour NO₂ based on 5 years of meteorological data. Total NO_x was modelled and assumed to be all NO₂ to account for atmospheric conversion. The results conclude that:

- Both the maximum 1-hour and 24-hour NO₂ combined concentrations were below their respective MOECC guidelines.

Table 22: Summary of Predicted NO₂ Concentrations

Statistical Analysis																	
<p style="text-align: center;">Comparison of 1-hr NO₂ Concentrations</p>	<table border="1"> <thead> <tr> <th colspan="2">% of MOECC Guideline:</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>30%</td> </tr> <tr> <td>90th Percentile</td> <td>7%</td> </tr> <tr> <td>Average</td> <td>3%</td> </tr> <tr> <th colspan="2">Roadway Contribution:</th> </tr> <tr> <td>Maximum</td> <td><1%</td> </tr> <tr> <td>90th Percentile</td> <td><1%</td> </tr> <tr> <td>Average</td> <td>5%</td> </tr> </tbody> </table>	% of MOECC Guideline:		Maximum	30%	90 th Percentile	7%	Average	3%	Roadway Contribution:		Maximum	<1%	90 th Percentile	<1%	Average	5%
% of MOECC Guideline:																	
Maximum	30%																
90 th Percentile	7%																
Average	3%																
Roadway Contribution:																	
Maximum	<1%																
90 th Percentile	<1%																
Average	5%																
<p style="text-align: center;">Comparison of 24-hr NO₂ Concentrations</p>	<table border="1"> <thead> <tr> <th colspan="2">% of MOECC Guideline:</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>32%</td> </tr> <tr> <td>90th Percentile</td> <td>12%</td> </tr> <tr> <td>Average</td> <td>7%</td> </tr> <tr> <th colspan="2">Roadway Contribution:</th> </tr> <tr> <td>Maximum</td> <td>1%</td> </tr> <tr> <td>90th Percentile</td> <td>1%</td> </tr> <tr> <td>Average</td> <td>8%</td> </tr> </tbody> </table>	% of MOECC Guideline:		Maximum	32%	90 th Percentile	12%	Average	7%	Roadway Contribution:		Maximum	1%	90 th Percentile	1%	Average	8%
% of MOECC Guideline:																	
Maximum	32%																
90 th Percentile	12%																
Average	7%																
Roadway Contribution:																	
Maximum	1%																
90 th Percentile	1%																
Average	8%																

Conclusions:

- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was 8% or less.

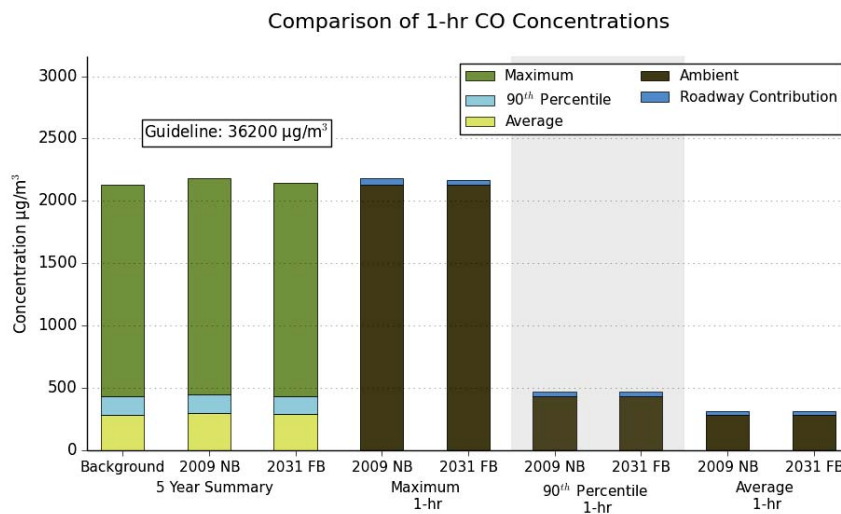
Carbon Monoxide

Table 23 presents the predicted combined concentrations for the worst-case sensitive receptor for 1-hour and 8-hour CO based on 5 years of meteorological data. The results conclude that:

- *Both the maximum 1-hour and 8-hour CO combined concentrations were well below their respective MOECC guidelines.*

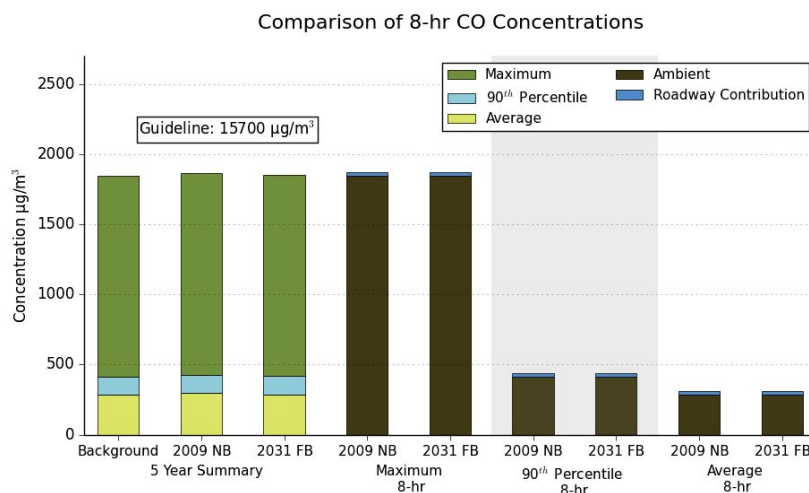
Table 23: Summary of Predicted CO Concentrations

Statistical Analysis



% of MOECC Guideline:

Maximum	6%
90 th Percentile	1%
Average	<1%
Roadway Contribution:	
Maximum	1%
90 th Percentile	1%
Average	2%



% of MOECC Guideline:

Maximum	12%
90 th Percentile	3%
Average	2%
Roadway Contribution:	
Maximum	1%
90 th Percentile	1%
Average	2%

Conclusions:

- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was 2% or less.

Fine Particulate Matter (PM_{2.5})

Table 24 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour and annual PM_{2.5} based on 5 years of meteorological data. The results conclude that:

- The average annual 98th percentile 24-hour PM_{2.5} combined concentration, averaged over three consecutive years was below the CWS.
- The maximum three-year annual average PM_{2.5} combined concentration was below the CWS

Table 24: Summary of Predicted PM_{2.5} Concentrations

Statistical Analysis													
<p>Comparison of 24-hr PM_{2.5} Concentrations</p>	<p>% of MOECC Guideline:</p> <table border="1"> <tr><td>98th Percentile</td><td>52%</td></tr> <tr><td>90th Percentile</td><td>36%</td></tr> <tr><td>Average</td><td>19%</td></tr> </table> <p>Roadway Contribution:</p> <table border="1"> <tr><td>98th Percentile</td><td>7%</td></tr> <tr><td>90th Percentile</td><td>6%</td></tr> <tr><td>Average</td><td>7%</td></tr> </table> <p>The PM_{2.5} results were below the 3-year CWS. The highest 3 year rolling average of the yearly 98th percentile combined concentrations was calculated to be 13.91 µg/m³ or 52% of the CWS.</p>	98 th Percentile	52%	90 th Percentile	36%	Average	19%	98 th Percentile	7%	90 th Percentile	6%	Average	7%
98 th Percentile	52%												
90 th Percentile	36%												
Average	19%												
98 th Percentile	7%												
90 th Percentile	6%												
Average	7%												
<p>Comparison of Annual PM_{2.5} Concentrations</p>	<p>% of MOECC Guideline:</p> <table border="1"> <tr><td>3-Year Annual Average</td><td>64%</td></tr> </table> <p>Roadway Contribution:</p> <table border="1"> <tr><td>3-Year Annual Average</td><td>8%</td></tr> </table> <p>The PM_{2.5} results were below the 3-year CWS. The maximum 3-year annual average concentration was 64% of the guidelines.</p>	3-Year Annual Average	64%	3-Year Annual Average	8%								
3-Year Annual Average	64%												
3-Year Annual Average	8%												

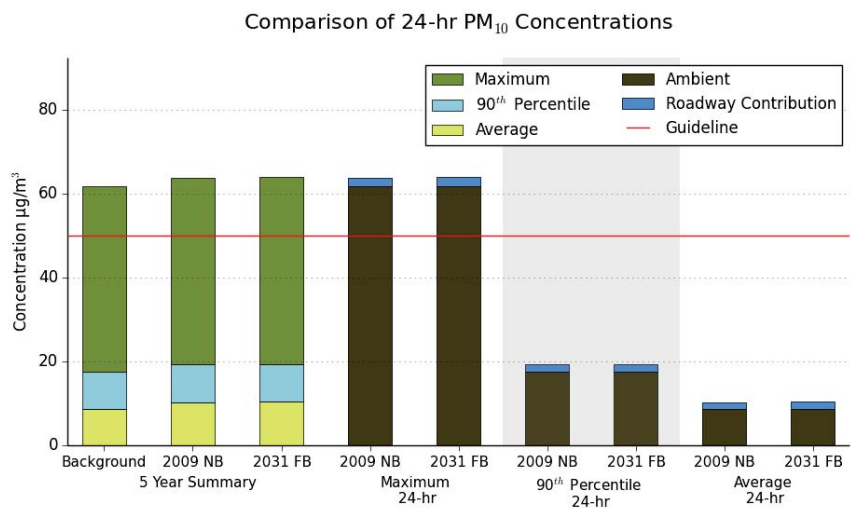
Coarse Particulate Matter (PM₁₀)

Table 25 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour PM₁₀ based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hr PM₁₀ combined concentrations exceeded the MOECC guideline.*

Table 25: Summary of Predicted PM₁₀ Concentrations

Statistical Analysis



% of MOECC Guideline:

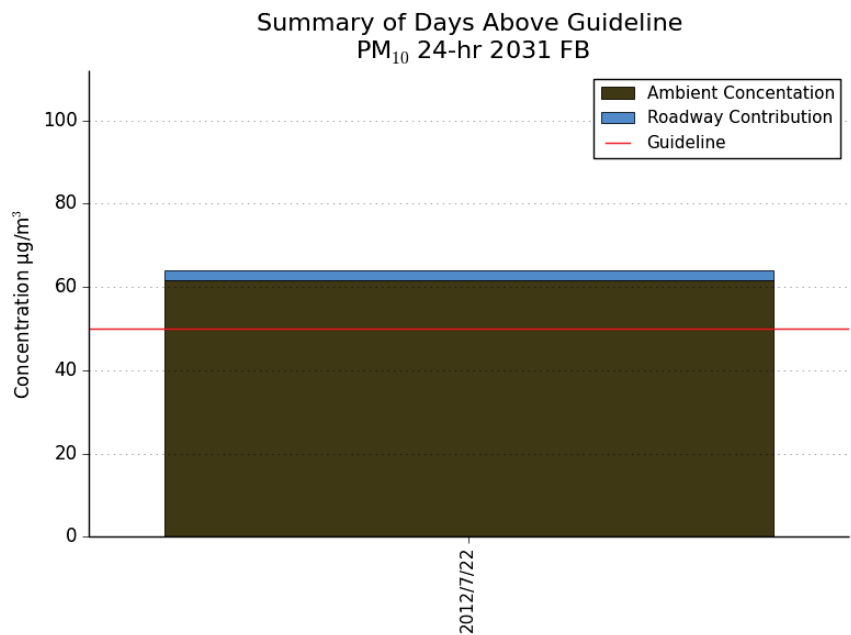
Maximum	128%
90 th Percentile	39%
Average	21%
Roadway Contribution:	
Maximum	4%
90 th Percentile	14%
Average	28%

Conclusions:

The combined concentrations of PM₁₀ surrounding the study area exceed the standard of 50 µg/m³. It should be noted, however, that background concentrations alone exceeded the standard and that the roadway contribution is 4% of the maximum value.

Frequency analysis was conducted to show that elevated concentrations were not frequent over a 5-year period.

Frequency analysis showed that one additional exceedance is expected due to the roadway over the five-year period, which is less than 1% of the time.



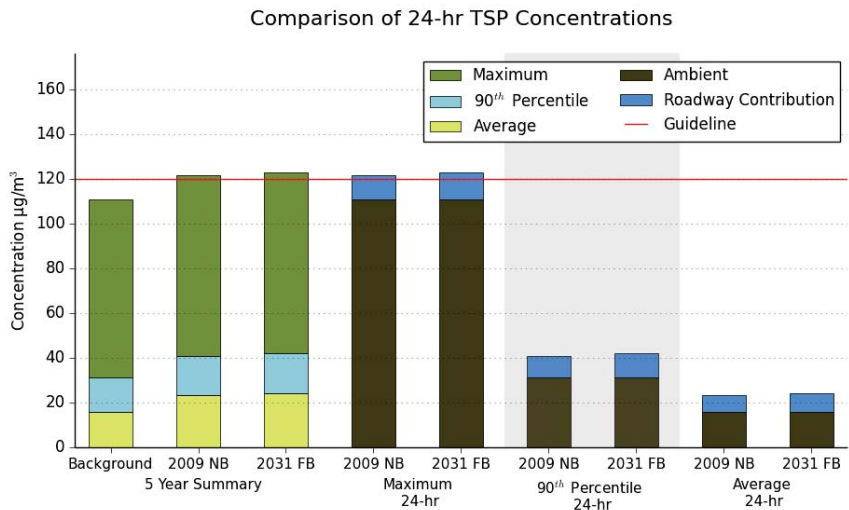
Total Suspended Particulate Matter (TSP)

Table 26 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour TSP based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hr TSP combined concentrations exceeded the MOECC guideline.*

Table 26: Summary of Predicted TSP Concentrations

Statistical Analysis



% of MOECC Guideline:

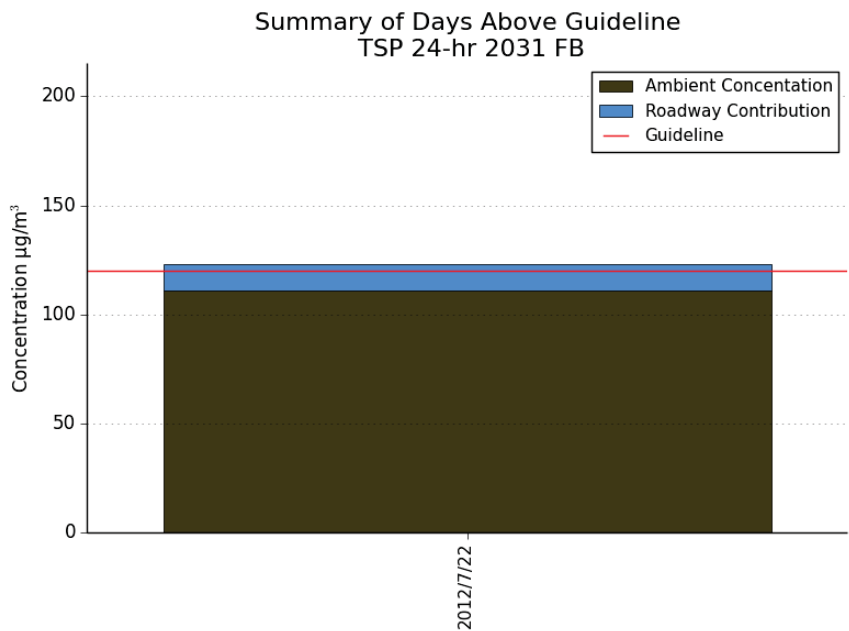
Maximum	102%
90 th Percentile	35%
Average	20%
Roadway Contribution:	
Maximum	10%
90 th Percentile	35%
Average	34%

Conclusions:

The TSP results show that the combined concentrations exceed the guideline. It should be noted that ambient concentrations alone were 92% of the guideline and the contribution from the roadway to the maximum concentration was 10%.

Frequency analysis was conducted to show that elevated concentrations were not frequent over a 5 year period.

Frequency analysis showed that one additional exceedance is expected due to the roadway over the five-year period, which is less than 1% of the time.



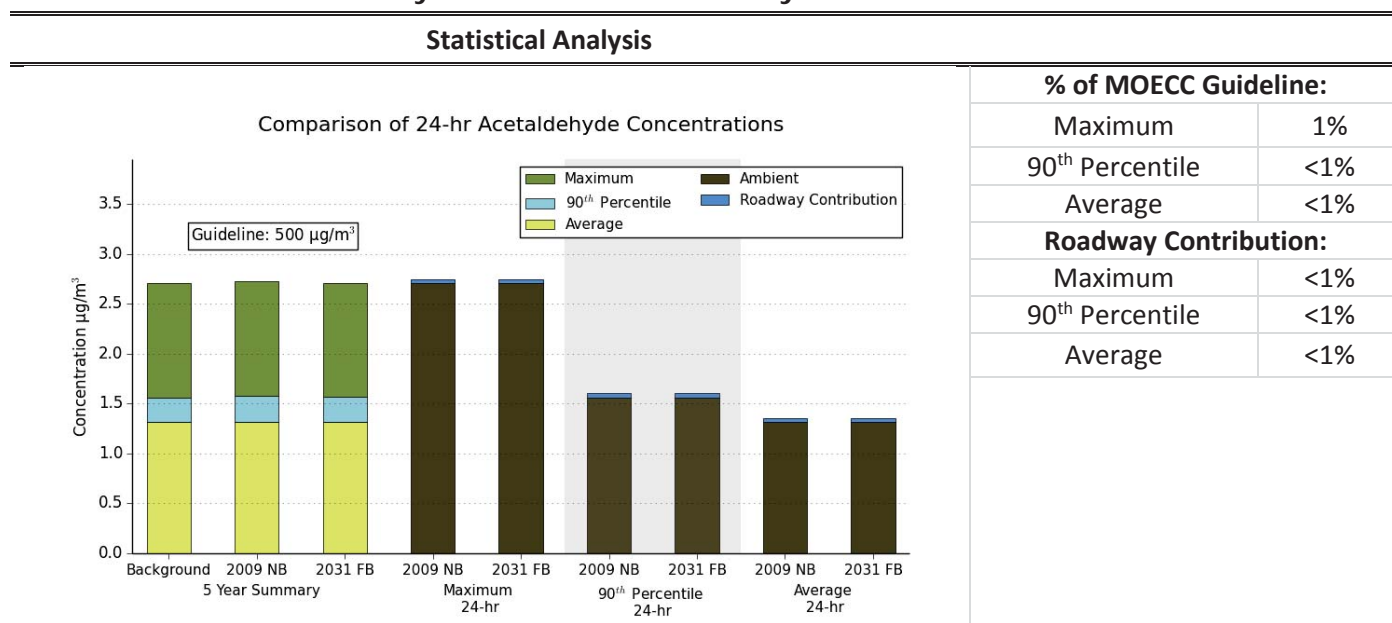
Ambient VOC concentrations are typically measured every 6 days in Ontario. In order to be able to combine the ambient data to the modelled results, the measured concentrations were applied to the following 6 days when measurements were 6 days apart. When measurements were further than 6 days apart, the 90th percentile annual value was used to represent the missing data. The combined hourly results were added to these concentrations to obtain the following results.

Acetaldehyde

Table 27 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour acetaldehyde based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hour acetaldehyde combined concentration was well below the respective MOECC guideline.*

Table 27: Summary of Predicted Acetaldehyde Concentrations



Conclusions:

- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was less than 1%.

Acrolein

Table 28 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour acrolein based on 5 years of meteorological data. The results conclude that:

- *The maximum 1-hour acrolein combined concentration was below the respective MOECC guideline.*
- *The maximum 24-hour acrolein combined concentration was below the respective MOECC guideline.*

Table 28: Summary of Predicted Acrolein Concentrations

Statistical Analysis														
<p style="text-align: center;">Comparison of 1-hr Acrolein Concentrations</p>	<p>% of MOECC Guideline:</p> <table border="1"> <tr><td>Maximum</td><td>3%</td></tr> <tr><td>90th Percentile</td><td>2%</td></tr> <tr><td>Average</td><td>1%</td></tr> </table> <p>Roadway Contribution:</p> <table border="1"> <tr><td>Maximum</td><td>1%</td></tr> <tr><td>90th Percentile</td><td><1%</td></tr> <tr><td>Average</td><td><1%</td></tr> </table> <p>Conclusions: The combined concentrations were below the respective MOECC guidelines. The contribution from the roadway was 1% or less.</p>	Maximum	3%	90 th Percentile	2%	Average	1%	Maximum	1%	90 th Percentile	<1%	Average	<1%	
	Maximum	3%												
	90 th Percentile	2%												
	Average	1%												
	Maximum	1%												
	90 th Percentile	<1%												
	Average	<1%												
	<p style="text-align: center;">Comparison of 24-hr Acrolein Concentrations</p>	<p>% of MOECC Guideline:</p> <table border="1"> <tr><td>Maximum</td><td>32%</td></tr> <tr><td>90th Percentile</td><td>19%</td></tr> <tr><td>Average</td><td>16%</td></tr> </table> <p>Roadway Contribution</p> <table border="1"> <tr><td>Maximum</td><td><1%</td></tr> <tr><td>90th Percentile</td><td><1%</td></tr> <tr><td>Average</td><td><1%</td></tr> </table> <p>Conclusions: The combined concentrations were below the respective MOECC guidelines. The contribution from the roadway was less than 1%.</p>	Maximum	32%	90 th Percentile	19%	Average	16%	Maximum	<1%	90 th Percentile	<1%	Average	<1%
		Maximum	32%											
		90 th Percentile	19%											
Average		16%												
Maximum		<1%												
90 th Percentile		<1%												
Average		<1%												

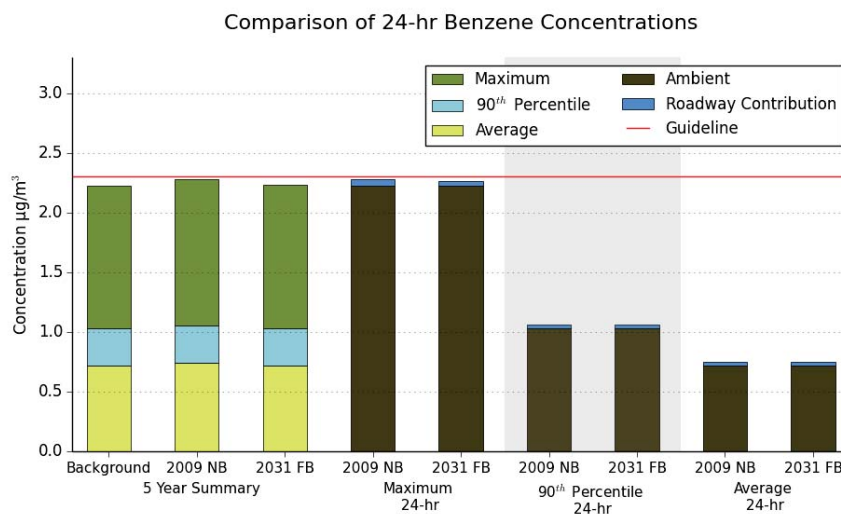
Benzene

Table 29 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour benzene based on 5 years of meteorological data. The results conclude that:

- The maximum 24-hour benzene combined concentration was below the respective MOECC guideline.
- The maximum annual benzene combined concentrations exceeded the respective MOECC guideline

Table 29: Summary of Predicted Benzene Concentrations

Statistical Analysis



% of MOECC Guideline:

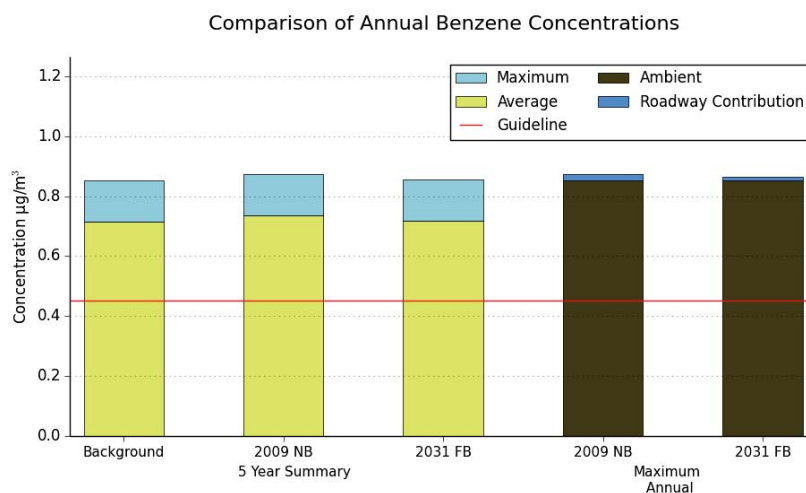
Maximum	97%
90 th Percentile	45%
Average	31%

Roadway Contribution:

Maximum	<1%
90 th Percentile	<1%
Average	<1%

Conclusions:

The combined concentrations were below the respective MOECC guidelines. The contribution from the roadway was less than 1%.



% of MOECC Guideline:

Annual Maximum	190%
----------------	------

Roadway Contribution:

Annual Maximum	<1%
----------------	-----

Conclusions:

The combined concentration exceeded the MOECC guideline. It should be noted that ambient concentrations were 190% of the guideline and the roadway contribution to the maximum was less than 1%.

1,3-Butadiene

Table 30 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour and annual 1,3-butadiene based on 5 years of meteorological data. The results conclude that:

- The maximum 24-hour 1,3-butadiene combined concentration was well below the respective MOECC guideline.
- The maximum annual 1,3-butadiene combined concentration was well below the respective MOECC guideline.

Table 30: Summary of Predicted 1,3-Butadiene Concentrations

Statistical Analysis																	
<p style="text-align: center;">Comparison of 24-hr 1,3-Butadiene Concentrations</p>	<table border="1"> <thead> <tr> <th colspan="2">% of MOECC Guideline:</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>2%</td> </tr> <tr> <td>90th Percentile</td> <td>1%</td> </tr> <tr> <td>Average</td> <td>1%</td> </tr> <tr> <th colspan="2">Roadway Contribution:</th> </tr> <tr> <td>Maximum</td> <td><1%</td> </tr> <tr> <td>90th Percentile</td> <td><1%</td> </tr> <tr> <td>Average</td> <td><1%</td> </tr> </tbody> </table> <p>Conclusions: The combined concentrations were below the respective MOECC guidelines. The contribution from the roadway was less than 1%.</p>	% of MOECC Guideline:		Maximum	2%	90 th Percentile	1%	Average	1%	Roadway Contribution:		Maximum	<1%	90 th Percentile	<1%	Average	<1%
% of MOECC Guideline:																	
Maximum	2%																
90 th Percentile	1%																
Average	1%																
Roadway Contribution:																	
Maximum	<1%																
90 th Percentile	<1%																
Average	<1%																
<p style="text-align: center;">Comparison of Annual 1,3-Butadiene Concentrations</p>	<table border="1"> <thead> <tr> <th colspan="2">% of MOECC Guideline:</th> </tr> </thead> <tbody> <tr> <td>Maximum</td> <td>5%</td> </tr> <tr> <td>Average</td> <td>3%</td> </tr> <tr> <th colspan="2">Roadway Contribution:</th> </tr> <tr> <td>Maximum</td> <td><1%</td> </tr> <tr> <td>Average</td> <td><1%</td> </tr> </tbody> </table> <p>Conclusions: The combined concentrations were below the respective MOECC guidelines. The contribution from the roadway was less than 1%.</p>	% of MOECC Guideline:		Maximum	5%	Average	3%	Roadway Contribution:		Maximum	<1%	Average	<1%				
% of MOECC Guideline:																	
Maximum	5%																
Average	3%																
Roadway Contribution:																	
Maximum	<1%																
Average	<1%																

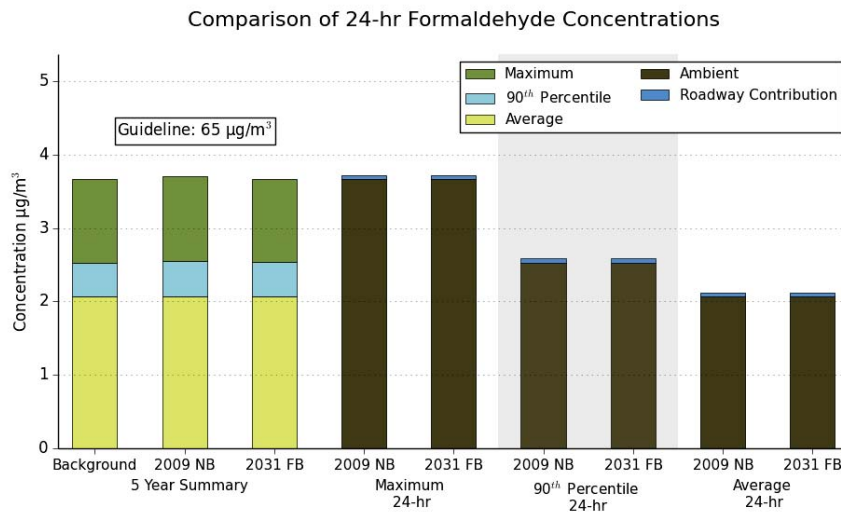
Formaldehyde

Table 31 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour formaldehyde based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hour formaldehyde combined concentration was below the respective MOECC guideline.*

Table 31: Summary of Predicted Formaldehyde Concentrations

Statistical Analysis



% of MOECC Guideline:

Maximum	6%
90 th Percentile	4%
Average	3%

Roadway Contribution:

Maximum	<1%
90 th Percentile	<1%
Average	<1%

Conclusions:

- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was less than 1%.

4.0 Conclusions and Recommendations

The potential effects of the proposed project infrastructure on local air quality have been assessed and are summarized in **Table 32**. The following conclusions and recommendations are a result of this assessment.

- *The maximum combined concentrations for the future build scenario were all below their respective MOECC guidelines or CWS, with the exception of PM₁₀, TSP, and annual benzene.*
- *Frequency Analysis determined that the project did not have additional exceedances of the PM₁₀ guideline over the 5 year period. The TSP guideline was exceeded 1 additional day over the 5 year period. For both contaminants this equates to additional exceedances less than 1% of the time.*
- *Ambient benzene exceeded the relevant guideline without the roadway contribution. The contribution from the roadway was less than 1% of the maximum combined concentration.*
- *Mitigation measures are not warranted, due to the small number of additional days which are expected to exceed the guideline.*

Table 32: Summary of 2031 Future Build Results

5 Year Statistical Summary		% of Guideline	
<p>Summary of Worst-Case Contaminant Concentration Roadway Contributions Included</p>		<p>2031 Future Build</p>	
		NO ₂ (1-hr)	30%
	NO ₂ (24-hr)	32%	
	CO (1-hr)	6%	
	CO (8-hr)	12%	
	PM _{2.5} (24-hr See Note)	52%	
	PM _{2.5} (annual)	64%	
	PM ₁₀	128%	
	TSP	102%	
	Acetaldehyde	1%	
	Acrolein (1-hr)	3%	
	Acrolein (24-hr)	32%	
	Benzene (24-hr)	97%	
	Benzene (annual)	190%	
	1,3-Butadiene (24-hr)	2%	
	1,3-Butadiene (annual)	5%	
	Formaldehyde	6%	

Note: The PM_{2.5} results are in compliance with the CWS. The highest 3 year rolling average of the yearly 98th percentile combined concentrations was calculated to be 13.91 µg/m³ or 52% of the CWS.

5.0 References

- Air & Waste Management Association, 2011. The Role of Vegetation in Mitigating Air Quality Impacts from Traffic Emissions. [online]
<http://www.epa.gov/nrmrl/appcd/nearroadway/pdfs/baldauf.pdf>
- CCME, 2000. Canadian Council of Ministers of the Environment. Canada-Wide Standards of Particulate Matter and Ozone. *Endorsed by CCME Council of Ministers*, Quebec City. [Online]http://www.ccme.ca/assets/pdf/pmozone_standard_e.pdf
- Environment Canada. 2000. Priority Substances List Assessment Report: Respirable Particulate Matter Less Than or Equal to 10 Microns. Canadian Environmental Protection Act, 1999. Environment Canada, Health Canada. [Online]
<http://www.ec.gc.ca/Substances/ese/eng/psap/final/PM-10.cfm>.
- Health Canada. 1999. National Ambient Air Quality Objectives for Particulate Matter Part 1: Science Assessment Document. Health Canada. A report by the CEPA/FPAC Working Group on Air Quality Objectives and Guidelines.
- Lall, R., Kendall, M., Ito, K., Thurston, G., 2004. Estimation of historical annual PM_{2.5} exposures for health effects assessment. *Atmospheric Environment* 38(2004) 5217-5226.
- Ontario Publication 6570e, 2008. *Ontario's Ambient Air Quality Criteria*. Standards Development Branch, Ontario Ministry of the Environment.
- Ontario Ministry of the Environment, 2005. *Transboundary Air Pollution in Ontario*. Queens Printer for Ontario.
- Randerson, D., 1984. *Atmospheric Science and Power Production*. United States Department of Energy.
- Seinfeld, J.H. and Pandis, S.P., 2006. *Atmospheric Chemistry and Physics From Air Pollution to Climate Change*. New Jersey: John Wiley & Sons.
- United States Environmental Protection Agency, 2008. *AERSURFACE User's Guide*. USEPA.
- United States Environmental Protection Agency, 1997. *Document AP 42*, Volume I, Fifth Edition, Chapter 13.2.1. USEPA.
- United States Environmental Protection Agency, 2010. *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression-Ignition*. USEPA.
- United States Environmental Protection Agency, 2009. *MOVES 2010 Highway Vehicles: Population and Activity Data*. USEPA.
- WHO. 2005. WHO air quality guidelines global update 2005. Report on a Working Group meeting, Boon, Germany, October 18-20, 2005.

Appendix A

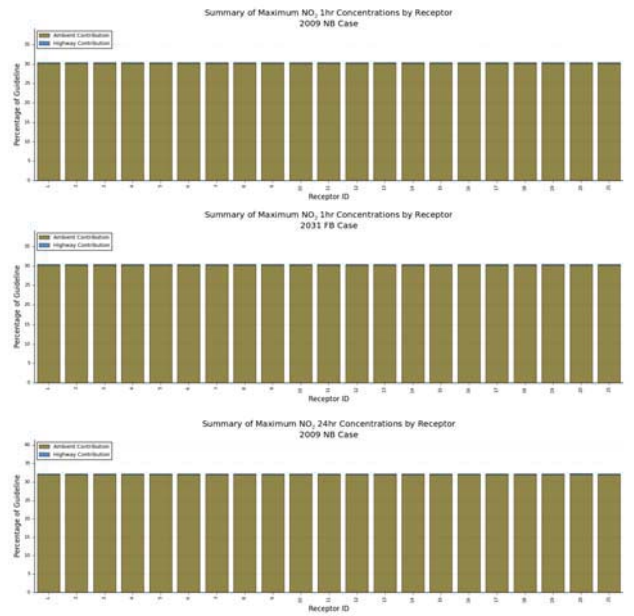
Receptor Specific Modelling Results

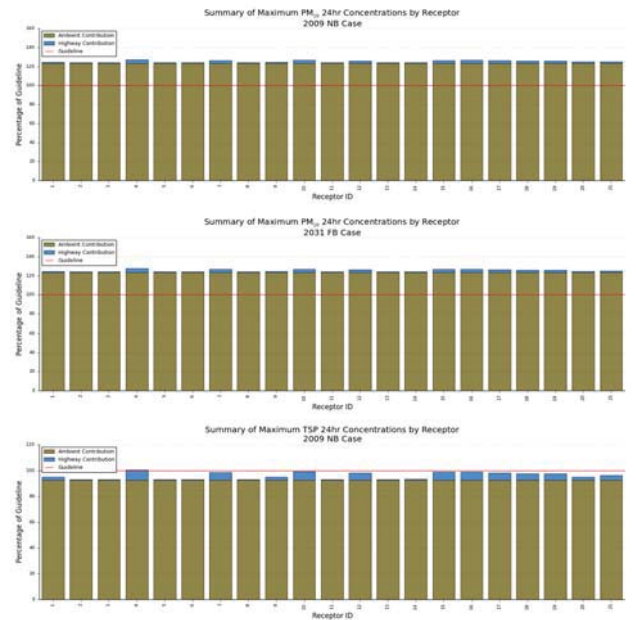
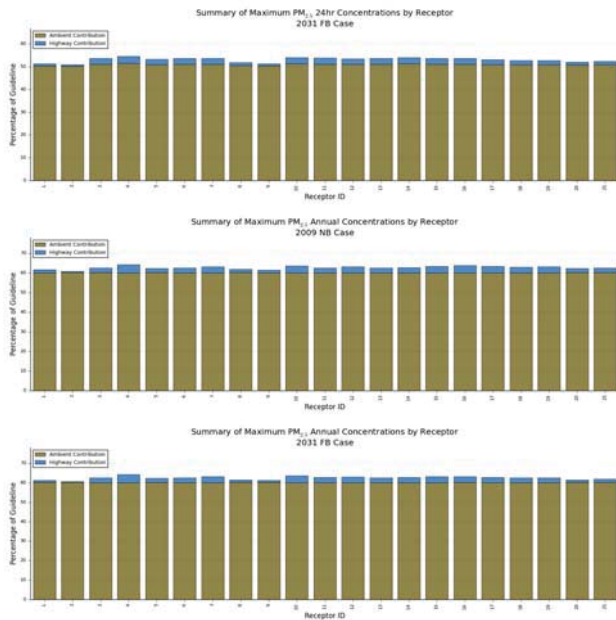
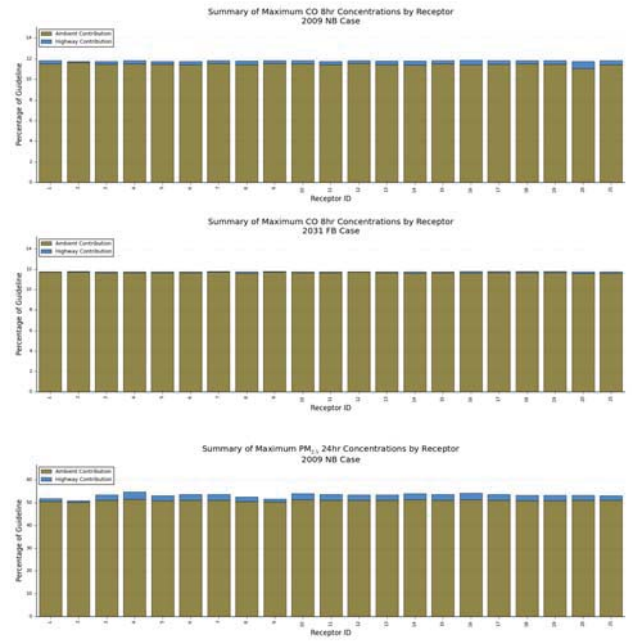
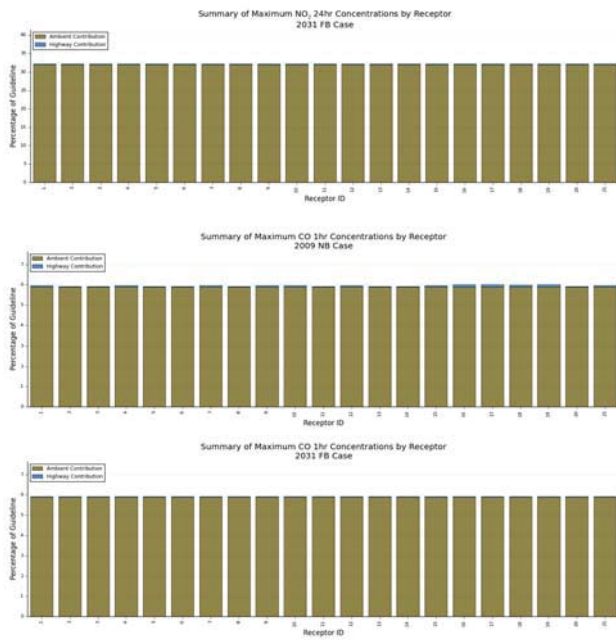
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for 2-sided printing purposes

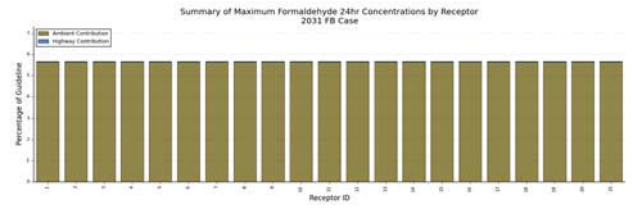
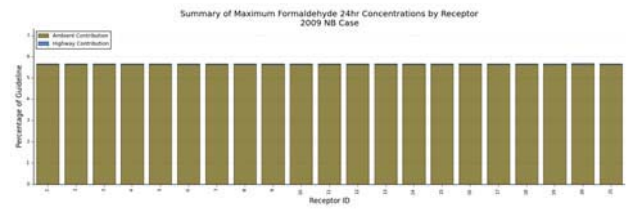
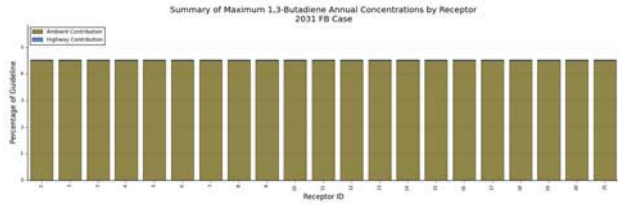
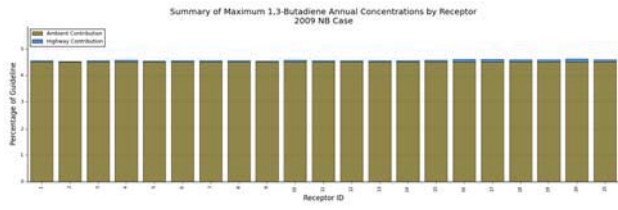
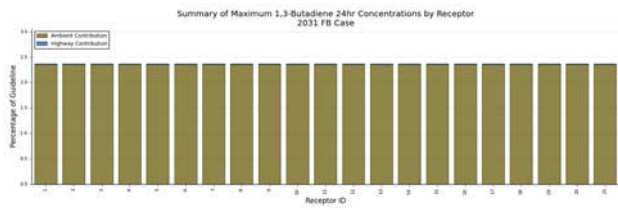
This section shows the maximum results predicted by the air dispersion modelling at each receptor within the study area for the 2009 existing and 2031 future-build scenarios. **Figure A1** shows the location of the receptors within the study area.



Figure A1: Receptor Locations within the Study Area







APPENDIX M

MTCS Correspondence

I acknowledge and found accurate the findings of the City of Greater Sudbury, as stated in the emails below, regarding the Second Avenue widening and reconstruction project from Donna Drive to First Avenue. There are no heritage districts in this area under Part 5 of the Ontario Heritage Act.

Through this ministry, the government has been promoting heritage conservation for many years, adjusting its role to meet changing needs and circumstances. We support provincial ministries, agencies, heritage organizations, museums and archaeologists in order to conserve and present Ontario's rich cultural heritage.

We appreciate the open discussion between the City of Greater Sudbury and the Ministry as well as agencies and consultants dealing with these issues.

Kindest regards,

Joël Gauthier
Regional Advisor | Conseiller régional
Tel: 705.564.3176 | Fax: 705.564.3043 | Toll Free/Sans frais 1.800.461.4004 | joel.c.gauthier@ontario.ca

Ministry of Citizenship, Immigration and International Trade | Ministère des Affaires civiques, de l'immigration et du Commerce international
Ministry of Tourism, Culture and Sport | Ministère du Tourisme, de la Culture et du Sport

-----Original Message-----

From: Yahn, Douglas [mailto:Douglas.Yahn@wspgroup.com]
Sent: December-04-15 12:47 PM
To: Gauthier, Joel C. (MCIIT)
Cc: Greg Moore (MooreG@mmm.ca)
Subject: FW: City of Greater Sudbury - EA Project File Update - Heritage Review

Joel,

As a follow up to our telephone conversation, you and I discussed next steps and agreed that having the City Clerk provide details of the listed/designated properties or heritage districts that might be in or adjacent to the Study Area would show our due diligence from a cultural resources perspective. Once that data is in hand (if though you had anticipated that there were no properties/districts of heritage significance on that route), you had requested that we submit this to you for your review and comment.

The City of Sudbury has now confirmed that there are no heritage properties in the project area (see below). Would it be possible to get a formal letter from you that we can include an appendix in the EA Project File to state that due diligence has been performed for the EA?

You and I concur that the relocation of the cemetery gate is not a heritage concern, as we discussed the fact that the cemetery proper is located far enough from the road to allow for land acquisition and the gate relocation without impacting the heritage resource.

I appreciate the assistance with this. I am pleased that the City, through us, is acknowledging the need to check for heritage concerns (even though none are present) for this project.

To: Greg Moore
Subject: RE: City of Greater Sudbury - EA Project File Update - Heritage Review_MTCS acknowledgement

-----Original Message-----

From: Yahn, Douglas [mailto:Douglas.Yahn@wspgroup.com]
Sent: Tuesday, December 15, 2015 8:43 AM
To: Greg Moore
Subject: FW: City of Greater Sudbury - EA Project File Update - Heritage Review_MTCS acknowledgement

Greg,

Please find below the response from Joel Gauthier at the Ministry of Tourism, Culture and Sport (MTCS) in Sudbury. He concurs with the information provided by the City. He has raised no further heritage concerns. I do not expect any formal response other than this email reply to be forthcoming.

Douglas

Douglas A. Yahn, M.E.S.
Senior Project Manager
Senior Archaeological Consultant
Cultural Heritage Specialist

Professional Associate, Lakehead University Executive Director, Thunder Bay Historical Museum Society Member, City of Thunder Bay Heritage Advisory Committee

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Please consider the environment before printing...

-----Original Message-----

From: Gauthier, Joel C. (MCIIT) [mailto:Joel.C.Gauthier@ontario.ca]
Sent: Tuesday, December 15, 2015 8:30 AM
To: Yahn, Douglas
Subject: RE: City of Greater Sudbury - EA Project File Update - Heritage Review_MTCS acknowledgement

Good day Doug,

1

I look forward to discussing further.

Douglas

Douglas A. Yahn, M.E.S.
Social Sciences Lead
Senior Project Manager
Senior Archaeological Consultant
Cultural Heritage Specialist

Professional Associate, Lakehead University Executive Director, Thunder Bay Historical Museum Society Member, City of Thunder Bay Heritage Advisory Committee (HAC)

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www.wspgroup.com

Please consider the environment before printing...

-----Original Message-----

From: Greg Moore
Sent: Wednesday, December 02, 2015 9:34 AM
To: 'Rob Rocca'; Brett Sears
Cc: Meredith Lynes; David Shelsted
Subject: RE: Fwd: FW: City of Greater Sudbury - EA Project File Update - Heritage Review

Hi Rob,

Fantastic.

We will follow-up with Joel at MTCS and ask for a response. We can include this in Project File and in the appendices.

Thanks for the follow-up. Greg

Greg Moore, B.E.S.
Senior Environmental Planner
Associate
Environmental Planning
MMM Group Limited
2655 North Sheridan Way, Suite 300
Mississauga, ON Canada L5K 2P8
t: 905.823.8500 ext. 1323 | f: 905.823.8503 | c: 647.968.1571 mooreg@mmm.ca | www.mmm.ca

3

From: Rob Rocca [mailto:Rob.Rocca@greatersudbury.ca]
Sent: Wednesday, December 02, 2015 8:21 AM
To: Brett Sears; Greg Moore
Cc: Meredith Lynes; David Shelsted
Subject: Re: Fwd: FW: City of Greater Sudbury - EA Project File Update - Heritage Review

Brett/Greg,

I have confirmed, that The City does not have any Heritage Properties listed in the Study Area. Refer to email below for more information.

Regards,

Rob Rocca
Project Manager
Infrastructure Services
City of Greater Sudbury
200 Brady Street, Sudbury ON P3A 5P3
Tel: (705) 674-4455, ext. 2360
email: rob.rocca@greatersudbury.ca

>>> Kris Longston 12/1/2015 8:18 PM >>>
Hi Brigitte and Rob,

Here is a link to a map showing the location of all properties in the City designed under Part 4 of the Ontario Heritage Act:
<http://www.greatersudbury.ca/linkservid/CFE70E6B-A768-5651-FE7FAE303327893B/showMeta/0/>

There are also 3 properties in the City that have been included on the City's Heritage Register as being of cultural heritage value. They are:

7 Serpentine Street
355 David Street
322 Pine Street

There are no heritage districts under Part 5 of the Ontario Heritage Act.

Please contact me or Ed Landry if you have any further questions.

Thanks,
Kris

Kris Longston, MES, MCIP, RPP
Acting Manager, Community and Strategic Planning, Department of Growth and Development City of Greater Sudbury,
PO Box 5000, Stn. A,
200 Brady Street,
Sudbury, ON
P3A 5P3

4

Tel : (705) 671-2489, Ext. 4353
Fax: (705) 673-2200
Email : kris.longston@greatersudbury.ca

>>> Brigitte Sobush 12/1/2015 4:26 PM >>>
Rob,

Clerk's Services cannot assist you with this request. The best person to talk to regarding heritage buildings and properties is Kris Longston.

Thanks,
Brigitte

>>> Rob Rocca 12/1/2015 4:05 PM >>>
Hi Brigitte,

We're in the process of completing an EA study for the Second Ave widening and reconstruction project from Donna Drive to First Avenue in Sudbury. Part of the study requires that we review the need for a Heritage assessment for the Study Area.

Can you look into and provide details of listed/designated properties or heritage districts that might be adjacent to the Study Area. See email chain below for more info.

The Study area would encompass the Minnow Lake area basically from Silver Hills easterly, including Second Ave from Donna to Bancroft as well as Third Avenue from Bancroft to the Kingsway. (see attached map)

If you need anything else, let me know.

Regards,

Rob Rocca
Project Manager
Infrastructure Services
City of Greater Sudbury
200 Brady Street, Sudbury ON P3A 5P3
Tel: (705) 674-4455, ext. 2360
email: rob.rocca@greatersudbury.ca

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