MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

KITCHENER
WOODBRIDGE
LONDON
KINGSTON
BARRIE
BURLINGTON

EXISTING CONDITIONS **REPORT**

SOUTH FERGUS MASTER ENVIRONMENTAL & SERVICING PLAN AND SECONDARY PLAN

County of Wellington, Township of Centre Wellington

Date:

August, 2021

Prepared by:
MacNaughton Hermsen Britton Clarkson Planning Limited (MHBC)
540 Bingemans Centre Drive, Suite 200
Kitchener, Ontario
T: 519.576.3650
F: 519.576.0121

Our File 19144A

CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

MHBC Planning, in conjunction with Tatham Engineering and FRiCorp Ecological Services, was retained on behalf of the area landowners to coordinate the South Fergus Master Environmental Servicing Plan "(MESP") and Secondary Plan. The MESP and Secondary Plan are intended to guide the development of the remaining designated greenfield lands in South Fergus. The Secondary Plan will establish land use designations and policy framework to be included in the Township of Centre Wellington Official Plan through an Official Plan Amendment. The MESP integrates infrastructure requirements for existing and future land use with environmental assessment planning principles. For the purpose of this report, the MESP and Secondary Plan will be referred to as "the Study". The lands subject to the Study are shown on **Figure 1** and will be referred to as the "Study Area".

This Existing Conditions Report provides a contextual framework of the Study Area and summary of the existing conditions in the Study Area and surroundings, including:

- Applicable existing land use planning policy framework;
- Natural heritage features;
- Surface and stormwater conditions ;
- Groundwater conditions ;
- Municipal services;
- Traffic; and
- Cultural heritage and archaeological resources

This Report is intended to be read in conjunction with technical reports and memorandums prepared by Tatham Engineering and FRiCorp Ecological Services, as appended to this Report.

1.1 Purpose of Study

The Township of Centre Wellington Official Plan (the "Township Official Plan") identifies two Secondary Plan Areas within the Fergus Urban Centre, one being located in northwest Fergus and subject to an approved Secondary Plan completed in 2013, and the other being the Study Area. Both of these areas represent large land areas that were added to the Urban Centre boundary in 2003 to accommodate projected growth for at least 20 years. The Northwest Fergus Secondary Plan was completed in 2013. This process is intended to result in a Secondary Plan for the South Fergus Area.

The MESP is a long range plan that integrates infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine and infrastructure system in order to outline a framework for planning for subsequent projects and/or developments. At a minimum the MESP addresses Phase 1 and 2 of the Municipal Class Environmental Assessment ("EA") process. Master planning provides the municipality with a broad framework through which the need and justification for specific projects can be established and the environmental assessment process can be satisfied.

The intent of the Study is to integrate the MESP and Secondary Plan processes. When these planning documents are prepared simultaneously, alternatives can be assessed taking into account land use and servicing issues while addressing a preferred alternative which minimizes, to the extent possible, the impact on the community, natural environment and the economy. The integrated

approach satisfies the requirements of the Class EA and the Planning Act. Documentation and supporting technical reports prepared through the Study process will be provided to review agencies for review and comment as required and will be made available to the public for review and comment.

Council of the Township of Centre Wellington authorized an agreement between the Township and Participating Landowners to provide for the completion of the Study on March 22, 2021. MHBC has been retained as the project manager for the MESP and Secondary Plan and to provide planning, urban design and cultural heritage expertise. The consulting team also includes Tatham Engineering, FRiCorp Ecological Services, AMICK Consultants Limited and Altus Group.

1.2 Study Objectives

The following Problem/Opportunity Statement has been developed for the Study:

> *The Township Official Plan requires the completion of the South Fergus Secondary Plan and Master Environmental Servicing Plan (MESP) to provide an integrated planning approach for future urban development within the Study Area.*

The objectives for the Study are as follows:

- Assess existing conditions;
- Identify alternative solutions to the problem or opportunity;
- Assess impacts and determine mitigation measures and management alternatives;
- Determine the preferred solution;
- Document the study, including the problem or opportunity, alternative solutions, preferred solutions and consultation and decision making processes; and
- Engage in public consultation through Public Information Centres, to ensure that subwatershed, resident and stakeholder issues are incorporated into the Study.

As part of the Agreement with the Township of Centre Wellington, a Terms of Reference was developed to guide the completion of the Study. The Terms of Reference were reviewed by the County of Wellington, the Township of Centre Wellington and the Grand River Conservation Authority. The requirements for the Study outlined in the Terms of Reference include:

- Background Review and Existing Conditions, including: policy review, socio-economic conditions, natural environment, functional servicing, surface water resources, stormwater management, groundwater, hydrogeological, floodplain hydraulics, fluvial geomorphology and erosion assessment
- Supplementary Reports/Analysis, including: Transportation Plan, Urban Design Guidelines, Parks Concept, Fiscal Impact Study, Archaeological Assessment and Cultural Heritage Evaluation and Assessment
- Impact Assessment
- Management Plan, including: components related to the Natural Heritage System, storm water management measures and monitoring and implementation
- Preparation of a Secondary Plan to provide the land use vision and policy framework for the Study Area.

This Study will form the basis of an Official Plan Amendment, to be approved by Township and County Council, to implement the Secondary Plan. This amendment will direct the preparation and approval of future Planning Act applications to facilitate the development of the Study Area.

1.3 Purpose of Report

The purpose of this Existing Conditions Report is to document the background research and inventory of the existing conditions related to the natural, social and cultural environment. It also includes an assessment of constraints and preliminary impact assessment. The existing conditions will be used as the baseline information to identify alternative solutions, assess potential impacts of the alternative solutions on the environment and recommend any measures to mitigate those impacts through a preferred solution.

This Report, along with the technical appendices, represents the summary of background information and characterizes the existing condition. This Report fulfils the required Background Review and Existing Conditions portion of the MESP and Secondary Plan process as well as a portion of the impact assessment requirements.

2.0 DESCRIPTION OF STUDY AREA & SURROUNDINGS

The Study Area is located in the southern portion of Fergus (**Figure 1**). It has an area of 152 hectares (375 acres) and is generally located on the lands bounded by Scotland Street to the east, Second Line to the south, Guelph Street to the west and existing development to the north.

Fergus is one of three Urban Centres within the Township of Centre Wellington. It is located centrally within the County of Wellington, approximately four kilometers west of Elora and 20 kilometers north of Guelph. According to the County of Wellington's Draft Phase 1 Municipal Comprehensive Review Report, dated June 16, 2021, the population of Fergus in 2021 was 18,500 (excluding census undercount) with 7,310 total households.

The Study Area is comprised of eight separate properties, the majority of which are used for agricultural purposes. Several of the properties within the Study Area feature existing buildings and structures. The properties within the Study Area include:

- 936 Guelph Street - this property is used for agricultural purposes and features a single detached dwelling and accessory building
- 963 Tower Street South - this property is used for agricultural purposes and does not feature any buildings or structures
- 1100 Tower Street South – this property is used for agricultural purposes and does not feature any buildings or structures
- 7856 Second Line – this property features one single detached dwelling and a number of agricultural-related and accessory buildings
- 7872 Second Line - this property is used for agricultural purposes and does not feature any buildings or structures
- 935 Scotland Street – this property features a single detached dwelling and accessory building
- 925 Scotland Street – this property is used for agricultural purposes and does not feature any buildings or structures
- Part Lot 13, Plan 61R-3777 - this property is used for agricultural purposes and does not feature any buildings or structures

The parcel fabric for existing properties within the Study Area is shown on **Figure 1.**

The subject lands are located within the Nichol Drain No. 2 watershed, which covers an area of 559.4 hectares. The Nichol Drain No. 2 Subwatershed Study was prepared in 1996 by R.J. Burnside & Associates Ltd. to provide a general overview of the environmental features within the watershed and establish a stormwater management strategy for the lands in the Study Area, east of Tower Street South (Highway 6). The Nichol Drain No. 2 Subwatershed Study has been considered in the preparation of this Existing Conditions Report.

The Study Area includes connection of natural features, including a creek, municipal drain, wetlands and wooded areas through the central portion of the Study Area. These natural features are all regulated by the Grand River Conservation Authority ("GRCA"). An inventory of existing natural features has been prepared through this existing conditions review.

Existing development and land uses adjacent to the Study Area, includes:

NORTH: A range of residential and commercial uses. Residential uses to the northeast and north west are primarily comprised of low-rise residential development including single detached and townhouse dwellings. Along the Tower Street (Highway 6) corridor are existing highway commercial uses including automotive uses, large format retail, restaurants, and a grocery store.

EAST: Rural residential and agricultural uses. Centre Wellington District High School is located to the east of the Study Area, on the west side of Scotland Street, south of McQueen Boulevard. Rural residential uses are east of the high school. Scotland Street represents the easterly limits of the Fergus Urban Centre.

SOUTH: Primarily agricultural and rural residential uses. Adjacent to the southerly limits of the Study Area, on the west side of Highway 6 is a landscape materials yard. Second Line represents the southerly limit of the Fergus Urban Centre.

WEST: Primarily natural heritage features, rural residential and agricultural uses. Guelph Street represents the westerly limits of the Fergus Urban Centre.

The subject lands are bisected by Tower Street South (Highway 6), a Provincial Highway. All other roads adjacent to the Study Area are currently local roads. The existing transportation network has been reviewed through this existing conditions report (refer to Section 4).

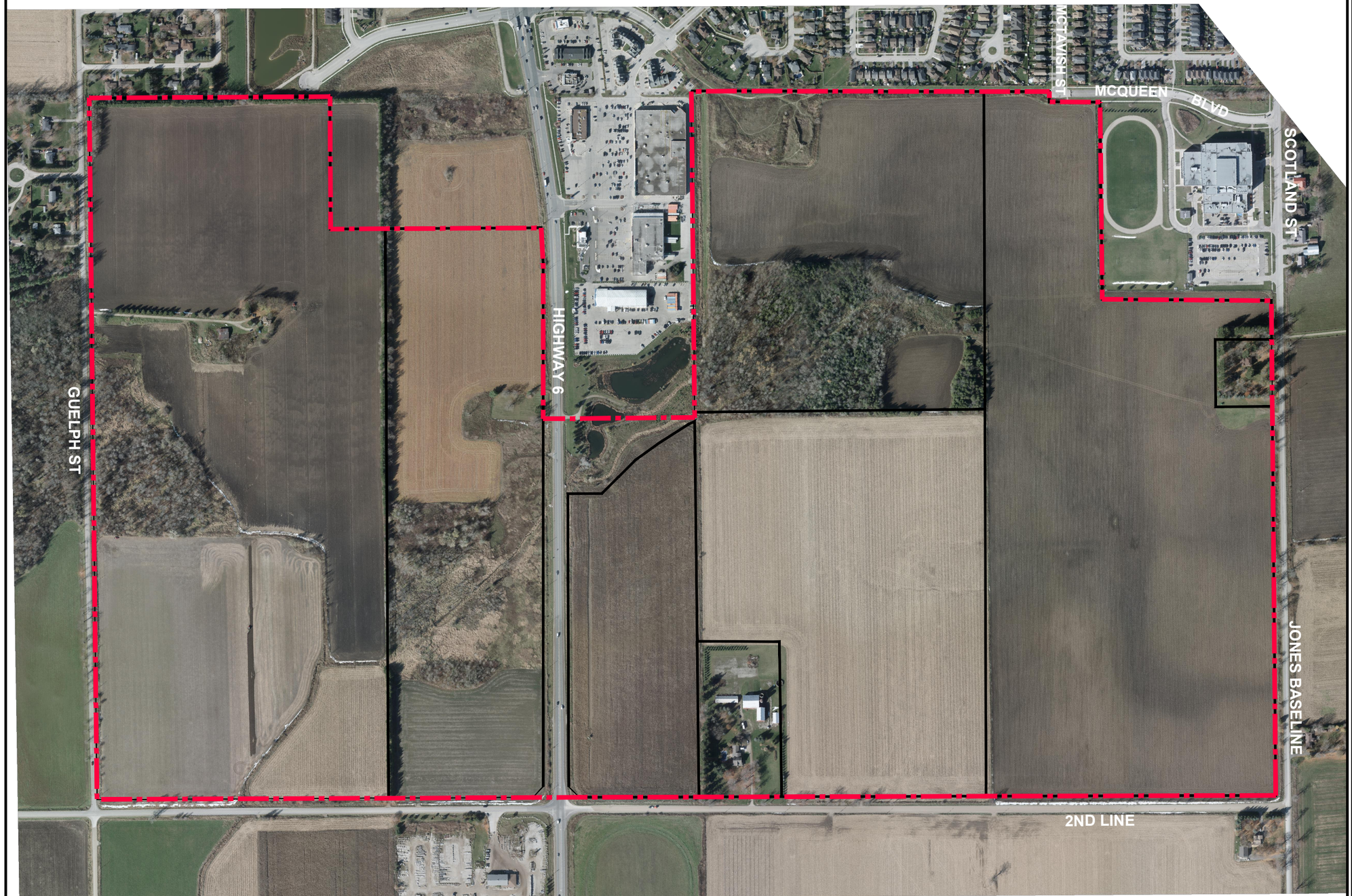


Figure # 1

Location Plan

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

Study Area (±151 ha)

Parcel Fabric*

Base Map Source:

Imagery: Northway\Photomap\Remote Sensing Ltd, 2020 and GRCA 2015

*Parcel fabric digitized from GRCA web mapping and is approximate in size and location

DATE: May 2021

SCALE: NTS

FILE: 19144A

DRAWN: DGS

north

K:\19144A - South Fergus MESP and Secondary Plan\RPT\Location Plan.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

3.0 POLICY OVERVIEW

This section of the report provides a summary of the applicable land use policy framework as it applies to the Study Area, and identifies how future development must be consistent with and/or conform to, this framework. In addition, this section of the report provides a basis for recommended Secondary Plan policies which will seek to improve and complement existing policy direction.

3.1 Provincial Policy Framework

The following is a review of the Provincial Policy Framework, including a review of the key relevant policies to be considered through the Study.

3.1.1 *A Place to Grow Growth Plan for the Greater Golden Horseshoe*

The 2020 A Place to Grow: Growth Plan for the Greater Golden Horseshoe ("A Place to Grow") came into effect on August 28, 2020. This Plan is the framework for implementing the Provincial Government's initiative to plan for growth and development in a way that supports economic prosperity, protects the environment, and helps the communities achieve a high quality of life within the Greater Golden Horseshow ("GGH").

Among the guiding principles of the plan include: support the achievement of complete communities that are designed to support healthy and active living and meet the needs of daily living; prioritize intensification and higher densities to make efficient use of land and infrastructure and support transit viability; provide flexibility to capitalize on new economic and employment opportunities as they emerge, while providing certainty for traditional industries; support a range and mix of housing options; improve the integration of land use planning with planning and investment in infrastructure and public service facilities; provide for different approaches to managing growth that recognize the diversity of communities in the GGH; protect and enhance natural heritage, hydrologic, and landform systems, features, and functions; conserve and promote cultural heritage resources; and integrate climate change considerations into planning and managing growth.

3.1.1.1 Managing Growth

Population and employment forecasts for the GGH are contained in Schedule 3 of A Place to Grow. The County of Wellington population and employment growth forecasted is:

- Population 160,000
- Employment – 70,000

Section 2.2.1.2 provides that forecasted growth will be allocated based on the majority of growth being directed to settlement areas that have a delineated built boundary; have existing or planned municipal water and wastewater systems; and, can support the achievement of complete communities. Within settlement areas, growth will be focused in delineated built-up areas, strategic growth areas, locations with existing or planned transit; and areas with existing or planned public service facilities. Development will be generally directed away from hazardous lands.

Further, section 2.2.1.3 provides that upper and single tier municipalities will undertake integrated planning to manage forecasted growth to the horizon of the plan. This will include establishing a

hierarchy of settlement areas, be supported by planning for infrastructure and public service facilities; provide for an urban form that will optimize infrastructure, to support the achievement of complete communities through a more compact built form; and, support the environmental and agricultural protection and conservation objectives of the plan.

Complete communities are defined as:

> *"Places such as mixed-use neighbourhoods or other areas within cities, towns, and settlement areas that offer and support opportunities for people of all ages and abilities to conveniently access most of the necessities for daily living, including an appropriate mix of jobs, local stores, and services, a full range of housing, transportation options and public service facilities. Complete communities are age-friendly and may take different shapes and forms appropriate to their contexts."*

Section 2.2.1.4 sets out the policies to support the achievement of complete communities, including: feature a diverse mix of land uses and convenient access to local stores, services and public service facilities; improve social equity and overall quality of life; provide a diverse range of housing options including additional residential units and affordable housing; expand convenient access to a range of transportation options, public service facilities, publicly accessible one space, parks, trails and other recreational facilities; and healthy, local and affordable food options; provide for a more compact urban from and more vibrant public realm; mitigate and adapt to the impacts of a changing climate; and integrate green infrastructure and appropriate low impact development.

3.1.1.2 Designated Greenfield Areas

Section 2.2.7 of A Place to Grow sets out the policies for Designated Greenfield Areas and provides that new development will be planned, designated and zoned in a manner that supports the achievement of complete communities; supports active transportation; and encourages the integration and sustained viability of transit services. The minimum density target applicable to the Designated Greenfield Area of Wellington County is 40 residents and jobs combined per hectare. The minimum density target will be measured over the entire Designated Greenfield Area, excluding: natural heritage features and areas, natural heritage systems, and floodplains, provided development is prohibited in these areas; specific utility rights-of-way; employment areas; and cemeteries.

3.1.1.3 Transportation

Section 3.2.2 of the Growth Plan requires transportation, land use planning and transportation investment to be coordinated and that the transportation system within the Greater Golden Horseshoe be planned and managed to: provide connectivity among transportation modes; offer a balance of transportation choice; be sustainable and reduce greenhouse gas emissions; offer multi-modal access to jobs, housing, schools, cultural and recreational opportunities and goods and services; accommodate agricultural vehicles and equipment; provide for the safety of system users. A complete streets approach will be adopted to ensure the needs and safety of all road users

3.1.1.4 Water and Wastewater Systems and Stormwater Management

In accordance with Section 3.2.6, the water and wastewater services will be planned, designed and constructed to serve growth in a manner that: prioritizes opportunities for optimization and improved efficiency within existing systems; serves growth that supports the minimum density targets of the plan; is designed in accordance with a comprehensive water or wastewater master plan or equivalent, informed by watershed planning.

Section 3.2.7 of A Place to Grow states that proposals for large-scale development proceeding by way of a secondary plan will be supported by a stormwater management plan that is informed by

a subwatershed plan, or equivalent; incorporates and integrated treatment approach; establishes planning, design and construction practices to minimize vegetation removal, grading and soil compaction, sediment erosion and impervious services; and aligns with the stormwater master plan or equivalent for the settlement area.

3.1.1.5 A Place to Grow Summary

This summary above includes a review of the key relevant policies of the A Place to Grow. The policies of Place to Grow to be taken into consideration through the preparation of the Study. The Study will be prepared to conform to A Place to Grow.

3.1.2 *Provincial Policy Statement*

The Provincial Policy Statement, 2020 (the "PPS") was issued by the Province of Ontario in accordance with Section 3 of the Planning Act. The 2020 PPS applies to all decisions regarding the exercise of any authority that affects a land use planning matter made on or after May 1, 2020.

The PPS provides policy direction on matters of provincial interest related to land use planning and development. It provides a vision for land use planning in Ontario that encourages an efficient use of land, resources and public investment in infrastructure. The PPS encourages a diverse mix of land uses in order to provide choice and diversity to create complete communities. A variety of modes of transportation are required to facilitate pedestrian movement, active transportation opportunities and less reliance on the automobile. The PPS strongly encourages development that will provide long term prosperity, environmental health and social well-being. One of the key considerations of the PPS is that planning decisions 'shall be consistent' with the Policy Statement. The following is an analysis of the proposed development in the context of the policies in the PPS.

Policy 1.1.1 provides that healthy, liveable and safe communities are sustained by: promoting efficient development and land use patterns which sustain the financial well-being of the Province and municipalities over the long term; accommodating an appropriate affordable and market-based range and mix of residential types, employment, institutional, recreation, park and open space, and other uses to meet long-term needs; avoiding development and land use patterns which may cause environmental or public health and safety concerns; avoiding development and land use patterns that would prevent the efficient expansion of settlement areas in those areas which are adjacent or close to settlement areas; promoting the integration of land use planning, growth management, transit-supportive development, intensification and infrastructure planning to achieve cost-effective development patterns, optimization of transit investments, and standards to minimize land consumption and servicing costs; improving accessibility for persons with disabilities and older persons; ensuring that necessary infrastructure and public service facilities are or will be available to meet current and projected needs; promoting development and land use patterns that conserve biodiversity; and preparing for the regional and local impacts of a changing climate.

Policy 1.1.2 requires that sufficient land shall be made available to accommodate an appropriate range and mix of land uses to meet projected needs for a time horizon of up to 25 years. Within settlement areas, sufficient land shall be made available for intensification, redevelopment and designated growth areas.

3.1.2.1 Settlement Areas

Policy 1.1.3.1 of the PPS states that Settlement Areas shall be the focus for growth and development. Settlement areas are urban areas, rural settlement areas or designated greenfield areas within a municipality where development is concentrated and which have a mix of land uses

or lands which have been designated in an official plan for development of the long term planning horizon (25 years).

Land use patterns within Settlement Areas shall be based on a density and mix of uses which: efficiently use land and resources; are appropriate for, and efficiently use, the infrastructure and public service facilities which are planned or available, and avoid the need for their unjustified and/or uneconomical expansion; minimize negative impacts to air quality and climate change, and promote energy efficiency; prepare for the impacts of a changing climate; support active transportation; and, are freight supportive (Policy 1.1.3.2).

Policy1.1.3.6 provides that new development taking place in designated growth areas should occur adjacent to the existing built-up area and should have a compact form, mix of uses and densities that allow for the efficient use of land, infrastructure and public service facilities.

The Study Area is located within the Urban System identified by the County of Wellington Official Plan. It is outside of the Built Boundary of the Fergus Centre Urban Centre and forms part of the Designated Greenfield Area. As such, the Study Area is considered to be within a designated growth area, as per the policies of the PPS.

Policy 1.1.3.7b) provides that planning authorities should establish and implement phasing policies to ensure the orderly progression within designated growth areas and the timely provision of the infrastructure and public service facilities to meet current and projected needs.

The subject lands are located within an area identified as a Secondary Planning Area on the Township of Centre Wellington Official Plan. Through this Study, will provide an integrated planning approach for future urban development within the Study Area.

3.1.2.2 Housing

Policy 1.4.1 provides that planning authorities shall maintain, at all times, the ability to accommodate residential growth for a minimum of 15 years through residential intensification, redevelopment and lands which are designated and available for residential development. Further, Policy 1.4.3 of the PPS states that planning authorities shall provide for an appropriate range and mix of housing options and densities to meet projected market-based and affordable housing needs of current and future residents of the regional market area.

The Study will result in the preparation of a Secondary Plan that will provide a land use vision and policy framework for the Study Area. The designation of land for development and the consideration of a servicing strategy will contribute to the lands designated and available for residential within the Township. The policies of the Secondary Plan will consider the appropriate range and mix of housing options and densities for the Study Area.

3.1.2.3 Public Spaces, Recreation, Parks, Trails and Open Space

Policy 1.5.1 of the PPS states that healthy, active communities should be promoted by: planning public streets, spaces and facilities to be safe, meet the needs of pedestrians, foster social interaction and facilitate active transportation and community connectivity; and, planning for a full range and equitable distribution of publicly accessible built and natural settings for recreation.

The Study will include consideration of public spaces, recreation, parks, trails and open space. Based on the findings of the Study, lands will be designated accordingly.

3.1.2.4 Municipal Servicing and Stormwater Management

Policy 1.6.1 provides that planning for infrastructure and public service facilities shall be coordinated and integrated with land use planning and growth management. Policy 1.6.6.2 of the PPS, provides that municipal sewage services and municipal water services are the preferred form of servicing for settlement areas.

With respect to stormwater management policy 1.6.6.7 requires that planning for stormwater management shall: be integrated with planning for sewage and water services and ensure that systems are optimized, feasible and financially viable over the long term; minimize or prevent increases in contaminant loads; minimize erosion and changes in water balance, and prepare for the impacts of a changing climate; mitigate risks to human health, safety, property and the environment; maximize the extent and function of vegetative and pervious surfaces; and promote stormwater management best practices.

The MESP component of the study is a long range plan that integrates infrastructure requirements for existing and future land use. The MESP will be integrated with the Secondary Plan process which takes into account land use and servicing issues will addressing a preferred solution. The policies of the PPS regarding servicing and stormwater management will be considered in the Study.

3.1.2.5 Transportation

Policy 1.6.7 of the PPS identifies transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs. As part of a multi-modal transportation system, connectivity within and among transportation systems and modes should be maintained and improved. Land use pattern, density and mix of uses should be promoted that minimize the length and number of vehicle trips and support current and future use of transit and active transportation.

A detailed assessment of the current road network is included in the Transportation Plan – Existing Conditions.

3.1.2.6 Natural Heritage

Policy 2.1.1 of the PPS provides that natural features and areas shall be protected for the long term. Specifically:

- Development and site alteration shall not be permitted in significant wetlands (Policy 2.1.4)
- Development ad site alteration shall not be permitted in significant woodlands, significant valley lands, significant wildlife habitat, and significant areas of natural and scientific interest, unless it has been demonstrated that there will be no negative impacts to the natural features of the ecological functions(Policy 2.1.5)
- Development and site alteration shall not be permitted on adjacent lands to natural heritage features or areas unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions (Policy 2.1.8)

A Natural Heritage Existing Conditions Report has been undertaken to document the limits of the existing natural heritage features and describe primary recommended buffers. Through the Secondary Plan process, the boundaries of the natural heritage features will be defined based on the limits of the existing features and recommended buffers and appropriate land use designations will be applied.

3.1.2.7 Water

Policy 2.2 of the PPS sets out policies requiring that planning authorities protect, improve or restore the quality and quantity of water. Specifically, Policy 2.2.2 provides that development and site alteration shall be restricted in or near sensitive surface water features and sensitive ground water features such that these features and their related hydrologic functions will be protected, improved or restored.

A Surface Water, Floodplain Hydraulics and Erosion Assessment as well as a Hydrogeological Investigation have has been completed as part of this Existing Conditions Report.

3.1.2.8 Natural Hazards

Policy 3.0 of the PPS provides policies related to reducing the potential for public cost or risk to Ontario's residents from natural or human-made hazards. Policy 3.1 states that development shall generally be directed to areas outside of hazardous lands adjacent to river, street or lake systems which are impacted by flooding hazards or erosion hazards.

A Surface Water, Floodplain Hydraulics and Erosion Assessment has been completed as part of this Existing Conditions Report. This assessment included a preliminary natural hazards study related to establishing the flood and erosion control limits associated with Nichol Drain No. 2 across the Study Area. This information will be used to identify key development constraints.

3.1.2.9 PPS Summary

This summary above includes a review of the relevant key policies of the Provincial Policy Statement to be taken into consideration through the preparation of the Study. The Secondary Plan will be prepared to be consistent with the policies of the PPS.

3.2 County of Wellington Official Plan

The County of Wellington Official Plan was adopted by Wellington County Council on September 24, 1998 and approved by the Ministry of Municipal Affairs on April 13, 1999. It came into effect on May 6, 1999. It has since been amended, including by a five year review, OPA 81, adopted by the County of Wellington on September 26, 2013 and approved by the Ministry of Municipal Affairs and Housing on April 28, 2014.

The County Official Plan provides a consistent set of policies across the County intended to provide sufficient detail for the entire County. Local municipalities have the option, per Section 2.7, to rely on the County's official plan or develop their own more detailed policies. In the Township of Centre Wellington, a local municipal official plan also applies to the delineated Urban Centres.

The County Official Plan designates three major land use systems – the Greenlands System, the Rural System and the Urban System. The Greenlands System consists of natural heritage features. The Rural System consists of prime agricultural areas, and the Urban System consists of Hamlets and Urban Centres. The Study Area is designated Urban Centre and Greenlands, as shown on Schedule A1 of the County Official Plan (**Figure 2**).

Section 2.8 of the County Official Plan sets out policies with respect to future Secondary Plans and states that Secondary Plans may be established for all or part of a local municipality either as part of the County official Plan or as locally adopted Official Plans. Secondary Plans will complement the County's Plan by providing greater detail or clarity with respect to local issues. The County Official Plan is to be amended when secondary or local plans are proposed.

This Study will result in the preparation of a Secondary Plan that will form the basis of an Official Plan Amendment, to be approved by Township and County Council. The Secondary Plan will provide a land use vision and policy framework for the Study Area that conforms to the County Official Plan and provides greater detail and clarity with respect to the Study Area.

3.2.1 *Growth Strategy*

Section 3.1 of the County Official Plan sets out the growth strategy for the County. This strategy encourages development patterns which are cost efficient; environmentally sound; compatible with existing uses; maintain small town character; maintain resource land; and provide access to community services and facilities. In order to achieve the general growth strategy, the majority of growth will be directed to urban centres that offer municipal water and sewage services.

Per Table 1 of the County Official Plan, The projected growth in the County to 2041 is a population of 140,000. A total of 62% of this population is projected to be in Urban Centres. The projected growth for Centre Wellington is set out on Table 5 of the County Official Plan. The Fergus Urban Centre is projected to have a total population of 13,060 people and 4,675 households by 2041.

Section 4.4.1 of the County Official Plan requires that the County will ensure that residential growth can be accommodated for a minimum of 10 years through residential intensification, redevelopment and lands which are designated and available for new development.

It is noted that the Provincial Policy Statement, 2020, requires that sufficient land shall be made available to accommodate an appropriate range and mix of land uses to meet projected needs for

a time horizon of up to 25 years. Planning authorities are also required to maintain the ability to accommodate residential growth for a minimum of 15 years through residential intensification and redevelopment and lands which are designated and available for residential development.

The Secondary Plan will ultimately result in lands within the Fergus Urban Area being designated and available for development. This will assist the County in ensuring that residential development can be accommodated in accordance with the requirements of the County Official Plan and Provincial Policy Statement.

3.2.2 *Urban System - Designated Greenfield Area*

The Study Area is located with thin the southern portion of the Fergus Urban Centre, outside of the identified Built Boundary. Accordingly, the subject lands form part of the Designated Greenfield Area.

The Urban System identified by the County Official Plan includes the Hamlets and Urban Centers. Section 7.2 provides that new development and increases in population will be directed to the urban system, particularly to those areas with full municipal services. In accordance with Section 7.3, land use patterns in the urban system shall be based on densities and a mix of land uses which efficiently use land and resources; are appropriate for and efficiently use the infrastructure and public service facilities which are planned or available and avoid the need for their unjustified and/or uneconomic expansion; minimize negative impacts to air quality and climate change and promote energy efficiency.

Section 7.5.1 provides that Urban Centres are expected to provide a full range of land use opportunities. Residential uses at various densities, commercial, industrial and institutional uses, as well as parks and open space will be permitted where compatible and where services are available. Section 7.5.3 provides that detailed official plan designations and zoning regulations will identify the location and nature of permitted uses in Urban Centres.

Policies regarding Greenfield Housing are set out at Section 4.4.4 of the County Official Plan which state that new developments will be required to achieve densities which promote the overall greenfield density target of 40 persons and jobs per hectare and, specifically, strive to achieve at least 16 units per gross hectare in newly developing subdivisions. Somewhat lower densities may be considered in newly developing subdivisions where there are physical and environmental constraints. Medium density housing types are encouraged in new subdivisions and other greenfield areas. The Greenfield Housing density target contained in the County Official Plan conforms to the density target for Wellington County set out in A Place to Grow Growth Plan for the Greater Golden Horseshoe.

In accordance with the County Official Plan and the Growth Plan, density calculations exclude environmentally protected features, rights-of-way for electricity transmission lines, freeways, railways, employment areas and cemeteries.

The policies regarding the Designated Greenfield Area set out in the County Official Plan and the density targets required by the County Official Plan and A Place to Grow will form the basis for the preparation of the Secondary Plan. The MESP will ensure that the Study Area can be appropriately serviced to support the planned development of the Study Area.

3.2.3 *Core Greenlands*

The Secondary Plan Area is bisected by a creek which is surrounded by environmental features. In addition, a wetland is located along the western portion of the subject lands. These environmental features form part of the County's Greenlands Network and are designated Core Greenlands or Greenlands by the County Official Plan.

Core Greenlands are areas within the Greenlands System that have greater sensitivity or significance. These areas include provincially significant wetlands, all other wetlands, habitat of engendered or threatened species and fish habitat; and hazardous lands. Section 5.4 of the Official Plan provides that these areas will be identified in policy and protected.

Greenlands include other significant natural heritage features, including habitat, areas of natural and scientific interest, streams and valleylands, woodlands, environmentally sensitive areas, ponds, lakes and reservoirs and natural links. Section 5.5 provided that these areas are intended to be afforded protection from development or site alteration which would have negative impacts.

The Terms of Reference requires background review related to existing conditions within the Study Area, field investigations and studies related to the natural environment. Delineating extent of natural heritage features and recommended buffers allows for the formulation of a servicing strategy and policy framework to ensure these areas are identified in policy and protected from development.

3.2.4 *Servicing*

Section 11 of the County Official Plan provides policies with respect to water and waste water services, storm water management facilities and waste management service. Section 11.2.4 provides that municipal services are the preferred method of servicing in all urban centres.

Local municipalities are responsible for the operation of publicly owned water and waste water systems. Stormwater management is primarily a local responsibility. The County is responsible for reviewing and approving stormwater facilities in plans of subdivision and for stormwater management on County Roads.

The MESP will outline a framework related to infrastructure projects required to provide adequate servicing infrastructure for the subject lands and will identify a stormwater management strategy including the preferred number, size and location of stormwater management ponds.

3.2.5 *Transportation*

The Study Area is bisected by Provincial Highway No. 6. / Tower Street, under the jurisdiction of the Ministry of Transportation Ontario ("MTO"). Per Section 12.5.2, Provincial highways generally function as major roadways or arterials but are regulated under the Public Transportation and Highway Improvement Act. Access will only be considered to those properties abutting a provincial highway that meet the minimum safety and geometric requirements of the Ministry of Transportation.

The Study Area is bounded by Scotland Street to the east, 2nd Line to the South, Guelph Street in the west and existing development on local streets to the north. None of the roadways within the Study Area or adjacent roadways are County Roads.

3.2.6 *Summary*

This report provides a summary of the relevant policies of the County of Wellington Official Plan to be taken into consideration through the preparation of the Study. The Secondary Plan will be prepared such that it provides greater clarity and policy direction for lands within the Study Area, including with respect to la preferred land use strategy, growth projections, recommended mix of dwelling unit types and densities, preservation of natural heritage features, servicing and stormwater management and the transportation network. The Secondary Plan will be prepared to conform to the County of Wellington Official Plan.

It is noted that the County of Wellington is presently reviewing and updating their Official Plan policies to prepare for added growth. The Official Plan update constitutes a Municipal Comprehensive Review and is part of a five-year Official Plan review. At the time of writing the County is undertaking Phase 1 of their MCR which includes reporting on Urban Structure and Growth Allocations.

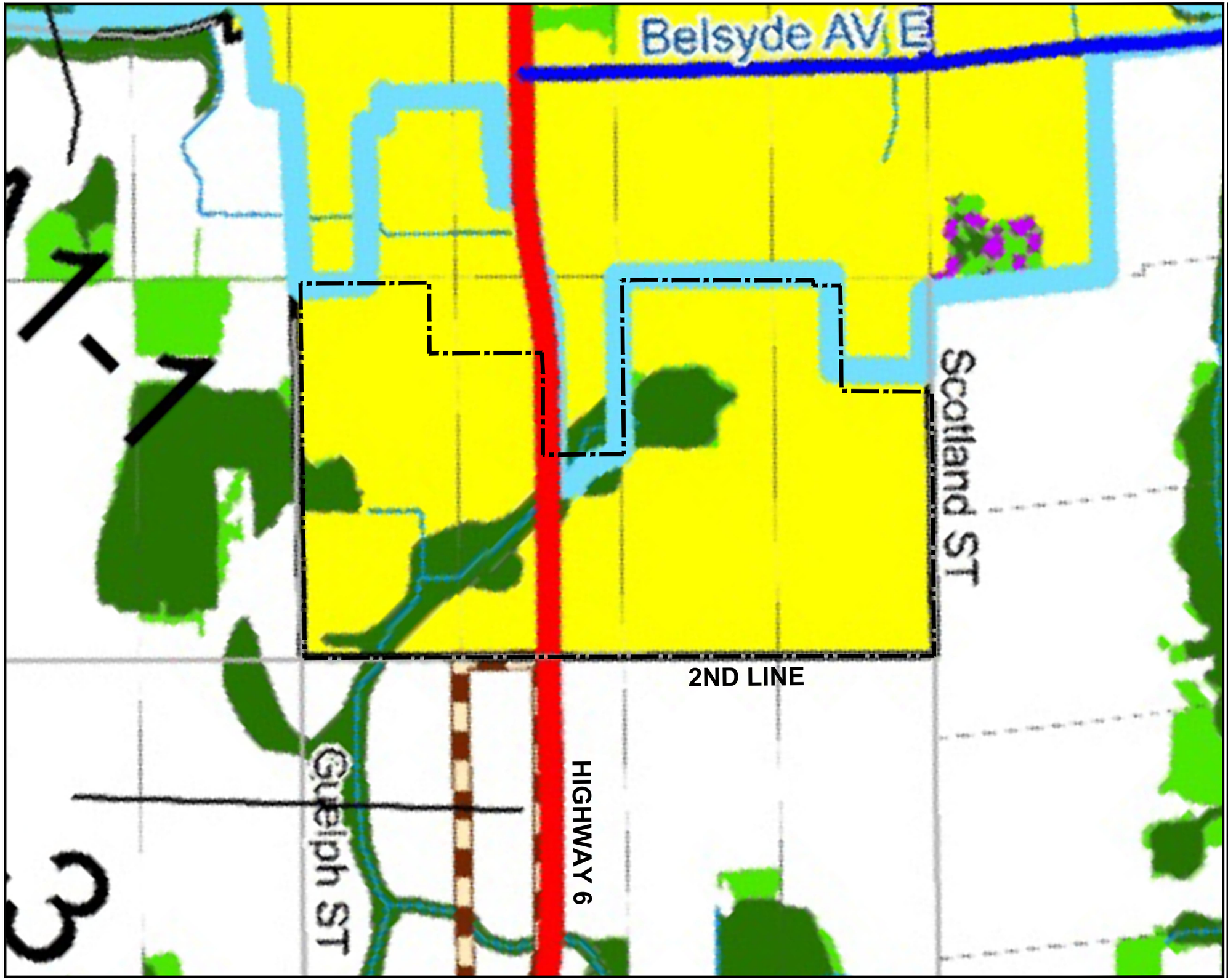


Figure # 2

County of Wellington Official Plan Schedule A1 Centre Wellington

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

Study Area (±151 ha)

The Greenlands System
- Core Greenlands
- Greenlands
- Earth Science ANSI

The Rural System
- Prime Agricultural
- Recreational
- Rural Employment Area
- PA Policy Area
- Community Planning Study Area

The Urban System
- H. Hamlet Area
- U.C. Urban Centre

Other
- Trail
- Landfill Site
- Montrose Water Management Protection Area
- Grand River Crossing
- D Deferral
- County Roads
- Provincial Highways
- Built Boundary

Base Map Source:
County of Wellington Official Plan, Schedule A1 Centre Wellington (Updated January 8, 2021)

DATE: May 2021
SCALE: 1:10,000
FILE: 19144A
DRAWN: DGS

north

K:\19144A - South Fergus MESP and Secondary Plan\RPT\Wellington OP Schedule A1.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
FRICORP ECOLOGICAL SERVICES
TATHAM ENGINEERING

3.3 County Official Plan Review

The County of Wellington is currently undertaking a Municipal Comprehensive Review ("MCR") and the Official Plan five-year review process. The County is required to update the Official Plan to the current version of A Place to Grow, Growth Plan for the Greater Golden Horseshoe (the "Growth Plan"), to a 2051 horizon, including a review and evaluation of the minimum greenfield density forecasts contained in the Growth Plan.

At the time of writing, the County had prepared "Draft Phase 1 MCR Report: Urban Structure and Growth Allocations" for public input. The following section summarizes the key findings of this report relevant to the South Fergus Secondary Plan and MESP.

3.3.1 *Population Growth Forecast*

Per the Growth Plan, the County's total population base is forecast to grow to 160,000 which is an increase of approximately 66,400 persons between 2016 and 2015 or an average population growth rate of 1.5% during this period. To accommodate this population forecast, the County will require an additional 22,000 new households between 2021 and 2051, or approximately 700 new households annually. A large component of housing growth will include low-density housing, however increasing demand is also anticipated for medium-density and high density housing forms.

It is anticipated that the County will become increasingly more urban with approximately 66% of the County's population base being accommodated within the Urban System. The Urban System is anticipated to accommodate an additional 58,300 persons by 2051.

Specifically, the Township of Centre Wellington is anticipated to accommodate 45% of the County's population growth. Centre Wellington is anticipated to grow at an annual population rate of 2.0% between 2016 and 2051, which is higher than the annual growth rate experienced over the previous 10-year period (2006-2016). To accommodate this, Centre Wellington is anticipated to add 11,540 additional housing units between 2016 and 2051, which is a population increase of 29,900 and approximately 330 units annually. The majority of this future development will be accommodated within the Fergus and Elora/Salem Urban Centres. A wide-range of housing types are expected, compared to historical trends.

The Phase I MCR also provides population forecasts for each of the Urban Centres. Fergus is anticipated to accommodate a population growth increment of 22,200 persons, or 630 persons annually. This is approximately one third of the County's population growth and an annual growth rate of 2.7%.

3.3.2 *Employment Growth Forecasts*

With respect to the County's employment growth outlook and allocations to 2051, the County is expected to accommodate balanced growth between residential and non-residential development and provide increased local job opportunities for the residents of the County. By 2051, the County's employment base forecast is to reach approximately 70,000, per Schedule 3 of the Growth Plan. This is an increase of approximately 30,100 jobs from 2016 or an annual employment growth rate of 1.7%.

Within the Urban System, employment is grouped into Urban Employment Areas and Urban Community Areas. Urban Employment Areas include employment lands and are clusters of industrial and export-based activities which are designated in the County Official Plan as Industrial,

as well as employment supportive uses such as hotels, restaurants, gas stations, etc. Urban Community Areas include other lands not part of the Urban Employment Area. Non-residential uses in this area include those that serve the residents and visitors to the Urban Centers, such as the central business district and highway commercial lands.

Between 2020 and 2051, Urban Employment Areas is anticipated to account for 32% of total employment. Urban Community Areas are anticipated to account for 53% of the County's employment growth within mainly work at home, commercial services, tourism services and institutional uses.

Centre Wellington's is anticipated to accommodate nearly half the County-wide employment growth to 2051. Approximately 74% of this growth is anticipated to be accommodated in Population Related Employment (PRE) serving the local population base. Centre Wellington is anticipated to grow at an annual employment rate of 2.5% over the next 35-years, which is higher than the previous 10-year annual growth rate of 0.7% annually. As a result, Centre Wellington is anticipated to add 14,700 employees between 2016 and 2051, representing 420 employees annually. This is significantly higher than the annual employment added over the previous 10-year period.

3.3.3 *Summary*

As a result of these findings, the Phase I MCR Report recommended the following preliminary recommendations, among others:

- The County adopted the growth allocations by area municipalities to 2051.
- The Urban System should be defined based on full municipal servicing. Urban Centres with full municipal servicing are recommended to be referred to a Primary Urban Centres.
- Modifications to the Employment Area definition should include only areas identified in an Official Plan is Industrial and Rural Employment Areas lands should be considered. This would exclude Highway Commercial uses from Employment Areas.
- County and area municipalities with an identified Urban System (such as the Fergus Urban Area), should plan for a steady shift in their population and employment base towards urban development.

The Phase 2 MCR Report is scheduled to be completed in the Fall of 2021 and will include the technical growth management requirements of the MCR, including conclusions on urban land requirements and recommendations for accommodating growth in the Urban and Rural Systems.

The findings of the Phase 1 MCR report, including forecasted population and employment growth will be considered in the preparation of the South Fergus MESP and Secondary Plan.

3.4 Township of Centre Wellington Municipal Official Plan

The Township of Centre Wellington Municipal Official Plan (the "Official Plan") was adopted by Council on November 24, 2003 and approved by the Ontario Municipal Board on Map 31, 2005. The Municipal Plan has since been amended, including by Official Plan Amendment 5, which brought the Municipal Plan into conformity with the Growth Plan. The Municipal Plan applies only to the Urban Centres in the County of Wellington which include Fergus, Elora-Salem and Belwood.

The subject lands are located within the Urban Boundary of the Fergus Urban Centre. They are within an area identified as a Secondary Planning Area and identified as "Future Residential" and "Future Employment Lands" on Schedule A-1 of the Official Plan (**Figure 3**). These classifications are not land use designations and are illustrated for public notice to show the general desired mix of land uses in each area as contemplated by the Township at the time the Official Plan was prepared in 2003.

3.4.1 *Secondary Plan Area*

Section D.11 of the Official Plan provides policies with respect to Secondary Plan Areas and states that Secondary plans represent a method to undertake more details planning of undeveloped areas of the municipality to facilitate the orderly and ultimate development of these areas. These plans address the mix, arrangement and density of land uses; the local street pattern; the size and location of neighbourhood parks and schools; and the location of major services.

Section E. 11.4.3 sets out the following requirements for Secondary Plans, including, but not limited to:

a) a general statement of the character of the area along with detailed development objectives;
b) a conceptual plan for the area which establishes the boundaries of the area, and a land use and transportation framework for the lands, together with a description of the concept and desired future for the area;
c) policies establishing a strategy for the provision of housing, employment, community facilities, open space, commercial services and other land use matters including location, form and intensity of development for such uses, desired forms of housing, range of housing densities and unit types and opportunities for modestly priced housing;
d) Detailed urban design policies and directions;
e) A detailed transportation plan, including pedestrian and bicycle paths;
f) Detailed strategy for the protection of the natural environment including the preservation of natural areas, woodlots and vistas and the maintenance or enhancement of water quality, and establishment of an open space system and recreation facilities;
g) Servicing strategy;
h) Population capacity and employment targets, the location, types and density of proposed land uses, and the proposed phasing, servicing and financing of development; and,
i) Other implementation measures including leisure design policies, environmental/servicing design policies and heritage and archaeological requirements.

A number of background studies are required to be undertaken to complete a Secondary Plan, including: a stormwater management plan, transportation plan, environmental impact assessment, servicing strategy, urban design guidelines, market analysis, development charges studies, development phasing studies, fiscal impact studies, parks concept plan, archaeological assessment, heritage resources assessment, hydrogeological and groundwater impact assessment.

This Report, and the appended Technical Memorandums and Reports satisfy the requirement to prepare background studies related to hydrogeological conditions, natural heritage features, water and sanitary servicing, surface water resources, floodplain hydraulics and erosion assessment. These background studies will inform the completion of the reports required to prepare the Secondary Plan and MESP. The Secondary Plan will be prepared in accordance with the requirements of the Township Official Plan.

3.4.2 *Housing*

Section C.5.2 requires that the Township shall maintain a minimum ten year supply of residentially designated land within each Urban Area at all times. It is noted that the Provincial Policy Statement, 2020 requires that planning authorities shall maintain, at all times, the ability to accommodate residential growth for a minimum of 15 years through residential intensification, redevelopment and, if necessary, lands which are designated and available for residential development.

In Greenfield Areas, the Township will encourage increased densities and a broader mix of housing. Section C.5.6 of the Township Official Plan sets out the policies applicable to Greenfield Housing which require new developments to achieve densities which promote the overall greenfield density target of 40 persons and jobs per hectare, including 16 units per gross hectare in newly developing subdivisions. The introduction of medium density housing types in other greenfield areas is also encouraged.

The Secondary Plan will be prepared in accordance with the density target and will consider the appropriate range and distribution of housing types.

3.4.3 *Natural Heritage*

Schedule A1 of the Township Official Plan designates portions of the Study Area as Core Greenlands, consistent with the designation in the County of Wellington Official Plan. Lands designated Core Greenlands form part of the Township's Natural Heritage System. Per Section C.3.1, lands designated Core Greenlands have a greater sensitivity or significance and include: provincially significant wetlands, habitat of endangered or threatened species and floodways and hazard lands.

Per Section D.8.4, the Core Greenlands designation is based on mapping provided by the County, in consultation with the Grand River Conservation Authority. The limits of the Core Greenlands designation may need to be revised by more detailed mapping on individual sites.

A Natural Heritage Existing Conditions Report has been undertaken to document the limits of existing natural heritage features and describe preliminary recommend buffers. Ultimately, through the Secondary Plan process, the boundaries of the Core Greenlands designation that apply to the Study Area will be defined based on the limits of existing features and recommended buffers.

3.4.4 *Municipal Servicing and Stormwater Management*

The Township Official Plan requires that all new development in an Urban Center shall be provided with full municipal services including: sanitary and sewage disposal facilities, water supply facilities, storm drainage facilities, public roads and telecommunications.

With respect to the provision of sewer and water services, Section C.6.2 requires that the Fergus Urban Centre has municipal sewer and water services and that it is the long-term intention to

eventually provide municipal sewage and water services to all of the areas designated within the Fergus Urban Centre.

Schedule B (**Figure 4**) of the Official Plan identifies the Study Area as being within a Future Municipal Service Areas – Southwest with a future Sewage Pumping Station to the north of the Study Area. In design of servicing for new growth, the Sanitary Sewer Servicing Areas shall be considered and infrastructure sized accordingly.

The Township encourages effective management of stormwater drainage and run-off through the implementation of best management practices and stormwater management techniques, in accordance with applicable provincial policies and guidelines.

It is noted that Council has directed Township staff to proceed with a Municipal Class Environmental Assessment for the expansion of the Union Street West Waste Water Pumping Station to service future growth in the Fergus Urban Centre. The MESP process for the Study Area will set out a servicing strategy for the Study Area.

3.4.5 *Transportation*

The Township has an established hierarchy of roads which include: arterial roads, collector roads and local road. Schedule B to the Official Plan (**Figure 4)** identifies existing roads within and surrounding the Study Area as:

- Highway 6 is identified as an Arterial Road
- Second Line is identified as a Future Arterial Road
- Guelph Road is identified as a Future Collector Road
- MacQueen Boulevard is identified as a Collector Road and identified to be extended to the east and west.

A detailed assessment of the current road network is included in the Transportation Plan – Existing Conditions.

3.4.6 *Parkland*

Per Section C.12 of the Official Plan and the Township's Parks and Recreation Strategic Master Plan, the Township shall endeavor to provide approximately 3 hectares of parkland or open space for every 1,000 people in the Township. Lands suitable for municipal parkland include:

- Lands adjacent to established parks, school yards or storm water management areas,
- Lands within easy walking distance of the residential area served
- Lands located near the highest density residential developments
- Lands with adequate street frontage to provide for visibility and safety,
- Lands that are level, regularly shaped and not susceptible to major flooding, poor drainage, or other environmental or physical conditions that would interfere with their development or use for public recreation.

The Township encourages the conveyance of lands with environmental constraints or significant natural features to the Township or the GRCA for passive recreation or conservation use. These lands will generally be excluded for the purpose of calculating the required parkland dedication. A parkland strategy, including the approximate location for future parks within the Study Area, will be prepared as part of the Secondary Plan.

3.4.7 *Official Plan Summary*

This report provides a summary of the relevant policies of the Township of Centre Wellington Official Plan to be taken into consideration through the preparation of the Study, including the requirements for Secondary Plans. The Secondary Plan will be prepared in accordance with and to conform to the Township Official Plan.

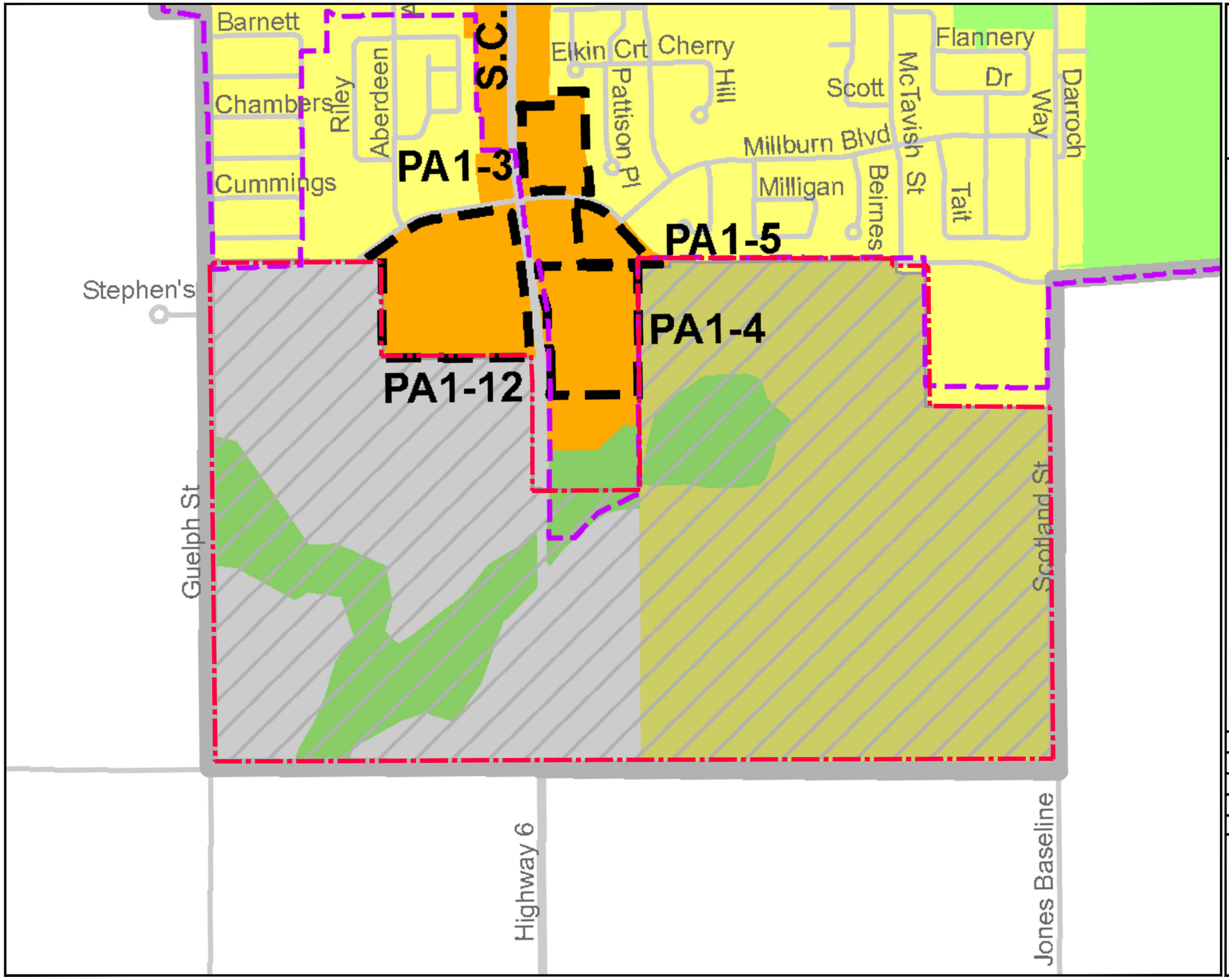


Figure # 3

Township of Centre Wellington Official Plan
Schedule A-1 Land Use Plan
Fergus, Elora-Salem

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

- Study Area (±151 ha)
- Residential
- Highway Commercial
- Core Greenlands
- Recreational
- Secondary Planning Area
- Future Residential
- Future Employment Lands

Note: The identification of Future Residential and Future Employment Lands is for public notice only and is subject to future considerations through Secondary Plan requirements.

- Urban Boundary
- Built Boundary
- Policy Area
- **S.C.** Shopping Centre

Base Map Source:
Township of Centre Wellington Official Plan, Schedule A-1 Land Use Plan (Updated: November 2016)

DATE: May 2021
SCALE: 1:7,500
FILE: 19144A
DRAWN: DGS

North

K:\19144A - South Fergus MESP and Secondary Plan\RPT\Centre Wellington OP Schedule A1.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
FRICORP ECOLOGICAL SERVICES
TATHAM ENGINEERING

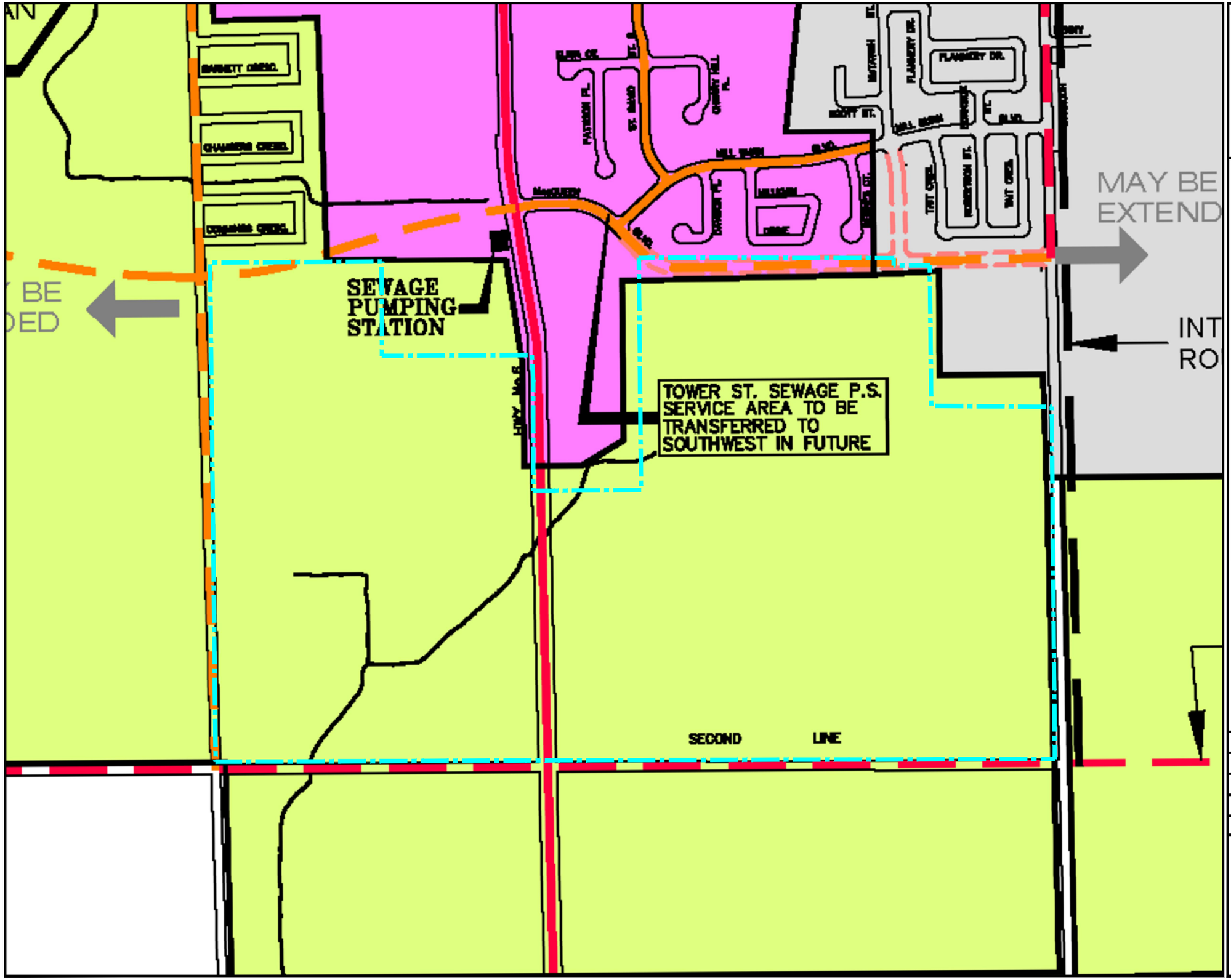


Figure # 4

Township of Centre Wellington Official Plan Schedule B Municipal Servicing Plan

South Fergus MESP and Secondary Plan

Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

Study Area (±151 ha)

ELORA/SALEM MUNICIPAL SERVICE AREAS

- SOUTHEAST
- SOUTHWEST
- TOWER STREET
- FUTURE ROADS
- ARTERIAL ROAD
- FUTURE ARTERIAL ROAD
- COLLECTOR ROAD

Base Map Source:

Township of Centre Wellington Official Plan, Schedule B Municipal Servicing Plan (June 2004)

DATE: May 2021

SCALE: 1:7,500

FILE: 19144A

DRAWN: DGS

north

K:\19144A - South Fergus MESP and Secondary Plan\RPT\Centre Wellington OP Schedule B.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

3.5 Township of Centre Wellington Zoning By-law

The Township of Centre Wellington Zoning By-law 2009-045 (the "Zoning By-law") was adopted by Council in 2009. A number of different zones apply to the Study Area, as illustrated on **Figure 5** to this Report. Current zoning of the Study Area are described as follows:

3.5.1 *Future Development*

The majority of the Study Area is zoned Future Development. The primary purpose of this zone is intended to identify lands where future development may occur subject to appropriate planning studies and zoning regulations. Only uses, buildings and structures lawfully existing on the date of passing of the Zoning By-law are permitted.

3.5.2 *Environmental Protection*

Lands designated Core Greenlands by the County of Wellington Official Plan have been zoned EP – Environmental Protection. The Core Greenlands features include provincially significant wetlands, wetlands, habitat of endangered or threatened species, floodways, and hazardous lands.

The primary purpose of this zone is intended to prohibit development on designated Core Greenlands. Core Greenlands include provincially significant wetlands, wetlands, habitat of endangered or threatened species, floodways, and hazardous lands.

Environmental Protection Overlay

The Environmental Protection Overlay corresponds to the Greenlands designation in the County Official Plan, as well as the GRCA regulated area limits (where mapping is available). This is not a separate zone but an overlay that will indicate to property owners and the zoning administrators that a physical feature is present that may require further review or permissions prior to development approvals or the issuance of a building permit.

Where the overlay is indicated on a zoning map, the provisions and regulations of the underlying zone continue to apply, but there may be additional provisions and regulations applied, or conditions that must be fulfilled prior to the granting of any planning approvals or the issuance of any building permit.

3.5.3 *Agricultural*

The lands municipally known as 7856 Second Line are zoned Agricultural (A) subject to exception 79.2. The A zone permits a range of agricultural uses. However, exception A79.2 limits permitted uses to only include a nursery business, including the sale of nursery stock and landscape materials, greenhouses, a single detached dwelling and accessory uses. Livestock housing facilities are not permitted.

3.5.4 *Zoning Summary*

Implementation of the Secondary Plan will proceed through future Planning Act applications including Zoning By-law Amendment and Plan of Subdivision Applications. A comprehensive zoning by-law amendment for the South Fergus Area to implement the Secondary Plan is not planned to occur through this process. Rather, site specific zoning by-law amendment applications are anticipated to permit future development within the Study Area.

Figure # 5

Township of Centre Wellington Comprehensive Zoning By-law 2009-045

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

Study Area (±151 ha)

- Zone Boundary
- Heritage Area Overlay
- Road
- Parcel Fabric
- Waterbody
- Watercourse
- EP
- EP Overlay

Base Map Source:

Township of Centre Wellington Comprehensive Zoning By-law 2009-045, Schedules 74, 79 and 84 (Office Consolidation February, 2021)

DATE: May 2021

SCALE: ±1:5,000

FILE: 19144A

DRAWN: DGS

north

K:\19144A - South Fergus MESP and Secondary Plan\RPT\Centre Wellington Zoning.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

3.6 GRCA Policies

The Grand River Conservation Authority Policies for Administering the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 150/06), (the "GRCA Policy"), was approved and came into effect on October 23, 2015.

Section 5 of the GRCA Policy provides that the Regulation gives the Grand River Conservation Authority ("GRCA") the mandate to prohibit development or regulate development in river or stream valleys, wetlands, Lake Erie shorelines, inland lakes and hazardous lands within the Grand River Watershed. It also gives the GRCA the authority to prohibit or regulate alterations which would result in the straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, watercourse, or changing or interfering in any way with a wetland. Development in areas defined by the regulation, interference with wetlands or alterations to river, creek, stream or watercourse channels requires permission from the GRCA.

In addition to a regulatory role, Section 6 provides that the GRCA has an advisory role to watershed municipalities. The GRCA staff provide technical input regarding potential environmental impacts and advice on how damaging impacts can be avoided or reduced. GRCA comments apply to natural hazards, and water quality and quantity, among others. The GRCA also reviews and comments on municipal policy and planning documents to reflect the GRCA's broad goals and objectives for managing the natural resources of the Grand River Watershed.

Figure 6 to this Report illustrates extent of the GRCA Regulated Area on the Subject Lands. Updates to the GRCA mapping to reflect the confirmed feature limits may be required. The Secondary Plan will establish the natural feature limits.

Future plan of subdivision applications and technical studies and/or assessments, site plans and/or other plans as we required by the GRCA will address design details associated with grading and stormwater management in areas regulated by the GRCA.

The Study will have regard to the GRCA Policies including analysis of any activities proposed within the Regulated Area.

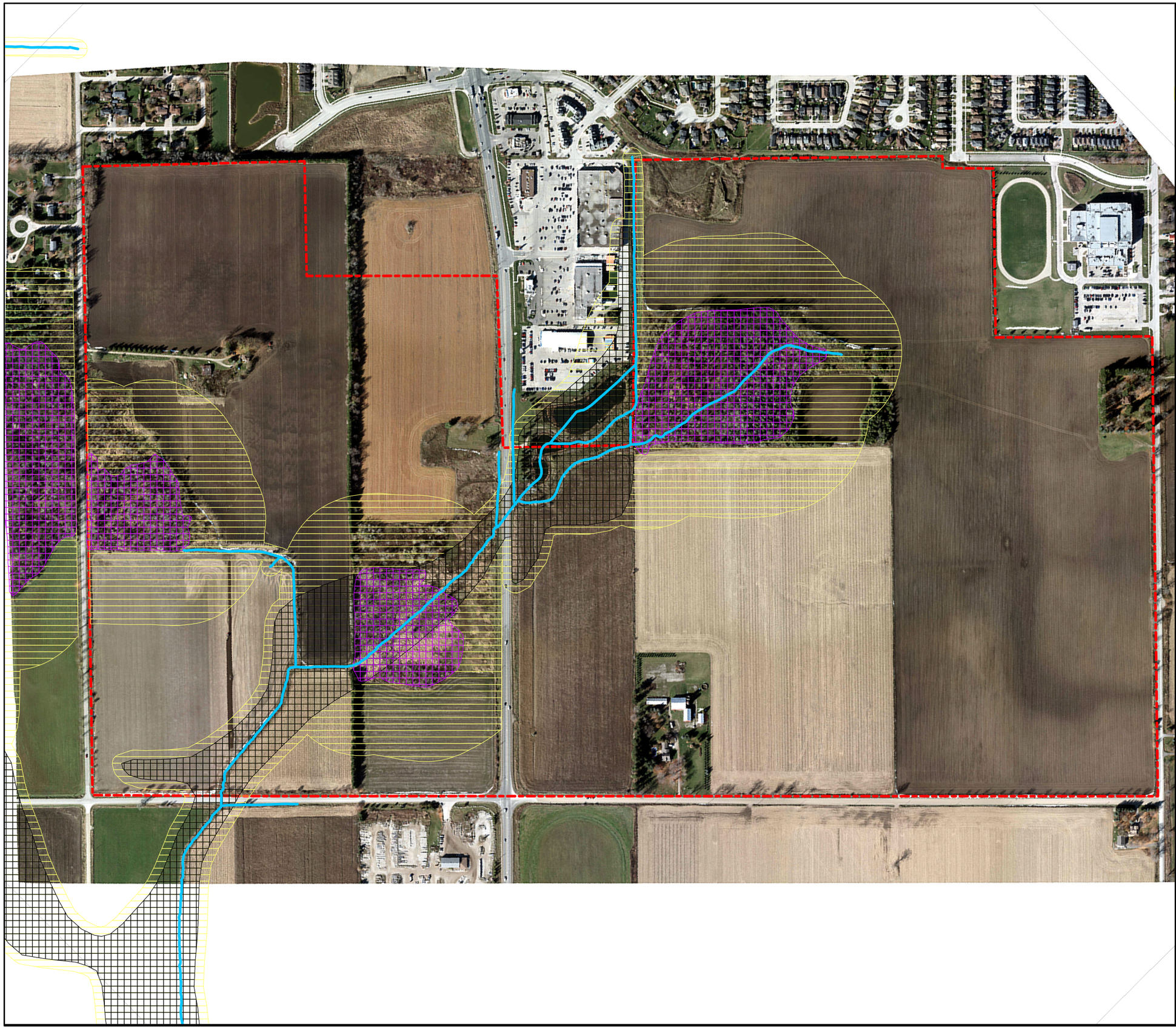


Figure # 6

Grand River Conservation Authority Data

South Fergus MESP Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

- Property Boundary
- Watercourse
- Regulatory Floodplain
- Regulation Limit
- Wetland

Base Map Source: Northway Photomap Remote Sensing Ltd.

DATE: June 12, 2021	north
SCALE: 1 : 6000	
FILE: Figure 3.jpg	
DRAWN: RSB	

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

4.0 EXISTING CONDITIONS SUMMARY

4.1 Cultural Heritage Screening

The Cultural Heritage Evaluation Screen involved a review of the County of Wellington Official Plan and Township of Wellington Official Plan policies with respect to cultural heritage resources, a review of the Township of Centre Wellington's Heritage Property Mapping and Cultural Heritage Landscape Study, as well as correspondence with Township Staff. **Figure 7** indicates identified Cultural Heritage Resources in the Study Area.

Section 2.6.2 of the PPS states that the development and site alteration of lands containing archaeological resources or archaeological potential shall not be permitted unless they have been conserved. Policy 2.6.3 of the PPS states that planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property except 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.

Section 4.1.5a)-k) of the County Official Plan provide that significant built heritage resources and significant cultural heritage landscapes shall be conserved. The County encourages the conservation of significant built heritage resources through heritage designation and planning policies which protect these resources.

Section C.2 of the Township Official Plan provides policies regarding cultural heritage resources. These policies provide that the Township may designate buildings and structures or sites which are considered to be architecturally and/or historically significant, under Part IV of the Ontario Heritage Act, and may also designate heritage conservation districts, under Part V of the Ontario Heritage act. Schedule A to the Township Official Plan also establishes Heritage Areas within each of the Urban Centres. Section C.2.15 of the Centre Wellington Official Plan provides that the Township will undertake, complete and maintain an inventory of all heritage resources in the municipality.

The subject lands do not contain any buildings or structured designated under Part IV of the Ontario Heritage Act or any Heritage Conservation Districts designated under Part V of the Ontario Heritage Act. Further, the Study Area is not located within a Heritage Area identified on Schedule A.

There is one property within the Study Area which is listed on the Township of Centre Wellington Heritage Register. This property is municipally known as 7856 Second Line and it is located on the north side of Second Line, east of Highway 6. The information on the Township's Heritage Register identifies a 1.5 storey dwelling built in 1880 with stretcher brick, medium gable roof, yellow quoins and voussoirs and restored front food and windows. As this property is not designated under Part IV or V of the Ontario Heritage Act, no additional information is available.

The Secondary Plan and MESP process will consider the location of the house identified on 7856 Second Line in the Township's Municipal Heritage Register.

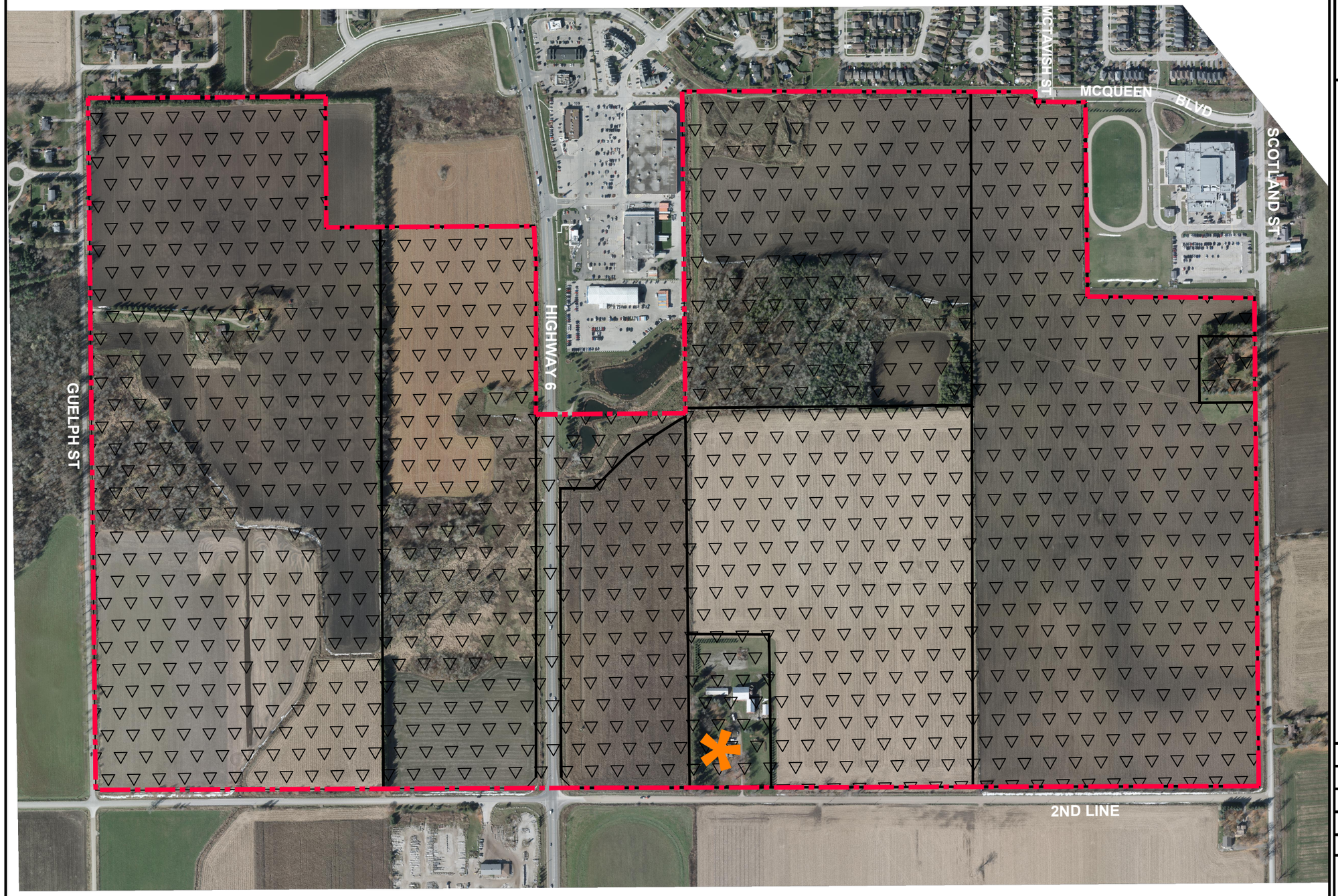


Figure # 7

Cultural Heritage Resources

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

- Study Area (±151 ha)
- Properties of Cultural Heritage Value or Interest 7856 Second Line
- Stage 1 and 2 Archaeological Assessment Completed
- Parcel Fabric*

Base Map Source:

Imagery: Northway\Photomap\Remote Sensing Ltd, 2020 and GRCA 2015
Archaeology: Stage 1-2 Archaeological Assessment, AMICK Consultants Limited, April 2021
Heritage: Township of Centre Wellington Heritage Property Mapping

*Parcel fabric digitized from GRCA web mapping and is approximate in size and location

DATE: May 2021
SCALE: NTS
FILE: 19144A
DRAWN: DGS

north

K:\19144A - South Fergus MESP and Secondary Plan\RPT\Cultural Heritage Resources.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
FRICORP ECOLOGICAL SERVICES
TATHAM ENGINEERING

4.2 Archaeological Resources

Section C.2.17 of the Township Official Plan encourages archaeological survey and the preservation or rescue evacuation of significant archaeological resources that might be affected in any future development.

A Stage I and II Archaeological Assessment has been prepared for the Study Area. The recommendations contained in this assessment provided that no further archaeological assessment of the study area is warranted and the Study Area is clear of any archaeological concern. This Assessment is included as **Appendix A** to this report.

4.3 Natural Heritage Existing Conditions

FRi Ecological Services has completed a Natural Heritage Existing Conditions Report. To complete this report, background information was reviewed and field surveys occurred over at least three seasons. This report is included as **Appendix B.**

A number of natural heritage features were identified through the review. The natural heritage features identified include:

- Provincially Significant Wetlands – The Speed-Lutteral-Swan Creek Wetland Complex is a large system that bisects the study area and has been designated provincially significant. Field work identified the wetlands are associated with the identified Core Greenlands Area. Field work was reviews in a site walk with GRCA staff. In general, there was agreement on delineation with further discussion to occur on some specific locations.
- Significant Woodlands – there are three areas that are identified as significant woodlands. These significant woodlands each have multiple natural heritage values and form part of the Core Greenlands.
- Habitat of Endangered Species and Threatened Species – the confirmed species at risk that have potential for habitat within the Study Area include: Bobolink, Eastern Meadowlark, Chimney Swift, Barn Swallow and Bank Swallow. Through field studies, no Bank Swallow Habitat was detected within the Study Area. Additional field surveys to confirm the presence or absence of Bobolink, Eastern Meadowlark Chimney Swifts are required. Barn swallow habitat was detected within the barn at the 7856 Second Line.
- Significant Wildlife Habitat – turtle nesting areas and amphibian breeding habitat was detected within the Study Area. Potential habitat for bat maternity colonies and terrestrial crayfish was also detected within the Core Greenlands.
- Fish Habitat – Additional study is planned to confirm the presence of fish habitat.

All identified natural heritage values identified are generally located within the Core Greenlands designated portion of the Study Area, with the exception of the Barn Swallow Nesting Area.

At present, there are no natural functional buffers to natural heritage systems as the surrounding lands are primarily under agricultural use. The Natural Heritage Existing Conditions Report has identified a preliminary 30 metre buffer for the entire Core Greenlands Area. The intent is that this buffer will be evaluated and refined based on the adjacent land uses proposed through the Secondary Plan process. Within the Study Area, there are opportunities to improve natural heritage systems through creating naturalized buffers and natural spaces that will remain undeveloped.

4.4 Surface Water, Floodplain Hydraulics and Erosion Assessment

Tatham Engineering Limited has prepared a Surface Water, Floodplain Hydraulics and Erosion Assessment which summarizes existing drainage patterns, drainage infrastructure and drainage issues in the Study Area and established the natural hazard limits associated with Nichol Drain No. 2. This information will be used to inform the stormwater management strategy for the Secondary Plan Area and identify key development constraints. This report is included as **Appendix C.**

The existing drainage conditions in the South Fergus Secondary Plan Area were established through a review of the available topographic matting and aerial photos, topographic survey, site reconnaissance and a review of the available background information.

Topography
The lands within the Study Area generally drain overland as sheet flow to Nichol Drain No. 2. The drain runs southwest through the Study Area crossing Tower Street (Highway 6) and Second Line.

Soil Conditions
A geotechnical investigation identified the on-site soils as sand and gravel to silty clay. The soils are generally sand, silty sand and till near the surface in the agricultural areas and clayey silt to silty clay in the wetland areas.

Drainage Patterns
Surface runoff from the Study Area is conveyed through a municipal drain complex (Nichol Drain No. 2) that drains to Swan Creek, south of the Secondary Plan Area. Nichol Drain No. 2 conveys drainage generated on-site and surface runoff from external lands downstream.

Stormwater Infrastructure
The storm infrastructure in the Study Area is limited to drainage channels, municipal drains, a stormwater management facility, tile trains and three culvert crossings. The stormwater management facility was designed to provide water quantity and quality control for the Cherry Hills Estates Subdivision, the Highway Commercial lands and a portion of the lands within the Study Area. On-site wetlands also provide water quantity and quality control, though not explicitly stormwater infrastructure.

Hydrologic Analysis
A hydrologic analysis of the Nichol Drain No. 2 watershed has been completed to quantify the existing condition peak flows generated within and draining through the Study Area. Hydrologic modelling has been completed to inform the MESP and Secondary Plan. The peak flows generated correlate with the previously completed Subwatershed Study for minor storm and regional storm events. For the 1 in 25 year through 1 in 100 year design storms, the Subwatershed Study peak flows exceed through predicted through the Hydrologic Analysis. Streamflow monitoring stations and a rain gauge have been installed in the Study Area to collect streamflow and precipitation data to validate the hydrologic model.

Natural Hazards
A preliminary natural hazards study related to flood and erosion hazards has been prepared to establish the flood and erosion hazard limits associated with Nichol Drain No. 2 across the Study Area. Natural hazards have been mapped to delineate the extent of the natural hazard limit.

During the flood hazard assessment, it was noted that a spill occurs across Guelph Line during the Regional Storm due to insufficient channel capacity in Nichol Drain No. 2 which is exacerbated by a flow constriction at the Second Line culvert crossing. The modelling predicts that water will backup through Nichol Drain No. 2, through the adjoining municipal drains into the wetland north of Guelph Line and overtop Guelph Line during the Regional Storm. Once Guelph Line overtops, the water spills southwest across the intersection of Guelph Line and Second Line until it is reintroduced backing the Nichol Drain No. 2, approximately 360 metres downstream of Second Line.

Next Steps

The existing drainage conditions and natural hazards within the Study Area will be used to identify development constrains and inform the stormwater management strategy for the MESP and Secondary Plan. Next steps include: develop initial stormwater management concepts and strategies; review channel improvements and realignments to evaluate their impact on the regulatory floodplain and development limits; refine the natural hazards plan to include the revised regulatory floodplain and erosion hazard limits associated with the channel improvements and realignment scenario to establish the proposed development constraints; and select a preferred stormwater management strategy.

4.5 Hydrogeological Investigation Results

Golder Associates Ltd. has conducted a hydrogeological investigation for the Study Area. This technical memorandum provides a summary of the existing soil and groundwater conditions at the site. The results contained in the technical memorandum represent preliminary findings The Technical Memorandum is included as **Appendix D.**

- Subsurface soils are consistent with geological mapping for the area and generally consist of topsoil and localized fill soils overlaying non-cohesive and/or glacial till deposits. Localized deposits of silty clay to clayey silt and a deposit of wet sand and gravel were also encountered.
- Shallow groundwater flow is inferred to follow topography with a flow in eastern or western direction toward the tributary of Swan Creek.
- Groundwater level monitoring is ongoing with results to be provided under separate cover.
- Preliminary groundwater sampling results indicated that groundwater samples exceed total cobalt and total iron at the location of some monitoring wells. Further groundwater sampling is required.

Hydrogeological investigations are ongoing, scheduled until January 2022. Additional reporting based on the findings of ongoing monitoring, sampling and analysis is required. This will occur throughout the MESP and Secondary Plan process.

4.6 Existing Water and Sanitary Servicing Summary

Tatham Engineering Limited has prepared an Existing Water and Sanitary Servicing Summary is to summarize relevant information on the existing water and sanitary servicing infrastructure in Fergus. This Report is included as **Appendix E.**

The description of the existing and planned water and sanitary infrastructure is as follows:

Existing Water System

- The Study Area will be supplied by the Centre Wellington Drinking Water System.

- The South Fergus area is within the Fergus South pressure zone. The closes production well is located at 886 Scotland Street (well F5).
- The Centre Wellington Drinking Water System maximum day water taking in 2020 was 51% of the overall maximum day volume.
-

Proposed Water System Upgrades

- Replace two existing wells (wells F2 and F5) with larger capacity wells
- Drill new groundwater wells within the Study Areas

Wastewater System

- Fergus is serviced by the Fergus Wastewater Treatment Plant (WWTP)
- In 2020 the WWTP treated 54% of its related capacity and received 97% of its peak flow capacity.

Additional information is required to complete the description of the existing and planned water and sanitary infrastructure.

4.7 Transportation Plan – Existing Conditions

Tatham Engineering Limited has prepared a Transportation Plan – Existing Conditions to assess the existing road network, determine the suitability of new roads and assess the overall impact of the Secondary Plan on the existing and proposed road network. The existing conditions report describes the road network, traffic volumes and operations for existing conditions. This report is included as **Appendix F.**

The road network addressed by the Study consists of Tower Street South (Highway 6), McQueen Boulevard, Guelph Street, Scotland Street and Second Line as well as their respective intersections. An inventory of the existing active transportation network, including sidewalks and trails within the Study Area was also prepared. Within the Study Area, Tower Street (Highway 6) is designated as an arterial road and McQueen Boulevard is designated as a collector road. All other adjacent roadways are currently local roads.

The findings of existing traffic operations within the Study Area Road network determined the following:

- Mid-Block Traffic Operations – road sections reviewed included Second Line, Guelph Street and Scotland Street. The analysis indicated that are operating well within their available capacity indicating there is significant reserve capacity to accommodate additional growth. Additional traffic counts will be undertaken to confirm preliminary findings.
- Intersection and Queue Operations – the completion of intersection and queue operations will occur following completion of intersection turning movement counts.

The need for improvements to the existing road system will be established following queue analysis.

Next steps include completion of traffic counts, preparation of future background traffic projections and analysis to address operation conditions and level of services without consideration for the Secondary Plan area, determination of the volume of traffic generated by the Secondary Plan, operational review of the transportation system with consideration of the Secondary Plan and identification of any system deficiencies and mitigating measures.

5.0 ASSESSMENT OF CONSTRAINTS & PRELIMINARY IMPACT ASSESSMENT

This section of the Report will document and summarize the various constrains within the Study Area that have potential to cause limitations to how the lands can be planned and developed. Constraints are based on the technical work completed by Tatham Engineering Limited, Fri Ecological Services and the review of the existing background information available for the subject lands and include natural heritage features, transportation networks, cultural heritage resources and surrounding development.

As a result, the following section provides an analysis and summary of the constraints that were identified through the background review and the technical studies completed for the lands and provides a conclusion as to how the constraints may affect future development of the Secondary Plan area. Constraints have been consolidated to establish a Structure Plan (**Figure 8**) that will be used for determining the land use options.

5.1 Natural Features

Fri Ecological Services completed a Natural Heritage Existing Conditions Technical Memorandum in order to determine the physical and ecological characteristics of the natural heritage features found on the subject lands. The following natural heritage constraints were encountered as a result of field investigations completed within the Study Area between April 2020 and June 2021:

- Provincially Significant Wetlands ("PSW")
- Significant Woodlands
- Habitat of Endangered Species and Threatened Species
- Significant Wildlife Habitat
- Fish Habitat

All identified natural heritage features identified are generally located within the Core Greenlands designated portion of the Study Area, with the exception of the Barn Swallow Nesting Area. The natural heritage features are generally located along the Speed-Lutteral-Swan Creek PSW complex and watercourse that bisect the Study Area. This watercourse is a tributary to Swan Creek and is part of the Nichol Drain system.

As part of the design of the preferred land use options for the Secondary Plan and future policy framework, appropriate buffering and setbacks will be recommended in order to ensure the protection of the identified natural heritage feature. A preliminary buffer of 30 metres has been suggested and will be further refined through the assessment of land use options within the Study Area. The natural heritage features and 30 metre buffer have been included in the Structure Plan.

In addition to natural heritage features, a natural hazard study has been prepared. This study establishes the flood and erosion hazard limits associated with Nichol Drain No. 2. The identified natural hazard limit has been mapped and delineated on the Structure Plan.

5.2 Transportation

Based on the findings of the Transportation Plan – Background Conditions, within the Study Area, Tower Street (Highway 6) is designated as an arterial road and McQueen Boulevard is designated as a collector road. All other adjacent roadways are currently local roads.

As part of the completion go the Secondary Plan and MESP, appropriate connections to Tower Street will be determined based on traffic conditions, road network design requirements and identified natural heritage features and natural hazards. The extension of McQueen Boulevard to the Study Area will also be considered in the design of the road network for the Study Area.

5.3 Archaeology and Cultural Heritage

Based on the findings of the Stage 1 and 2 Archaeological Assessment, there are no archaeological constraints within the Study Area.

In terms of cultural heritage, the property municipally known as 7856 Second Line has been identified as being of Cultural Heritage Value or Interest as it is included on the Township of Centre Wellington's Municipal Heritage Register. This property is identified on the enclosed Structure Plan and cultural heritage considerations will be included in the Secondary Plan land use plan and policies.

5.4 Land Use Compatibility

There are no major land use compatibility issues related to adjacent land uses. The land use designations and policies proposed through the Secondary Plan process will have regard to existing land uses surrounding the Study Area, including, but not limited to:

- Residential uses to the north;
- Highway commercial uses along Tower Street (Highway 6);
- Centre Wellington District High School located at 905 Scotland Street;
- The existing landscape operation on the southwest corner of Second Line and Tower Street (Grand River Natural Stone)

With regard to with Minimum Distance Separation ("MDS") setbacks, it is noted that MDS setbacks are not required for proposed land use changes within approved settlement areas, as it is generally understood that the long-term use of the land is intended to be for non-agricultural purposes. As such, there are no constraints associated with MDS setbacks within the Study Area as all of the lands are within the Urban Boundary.

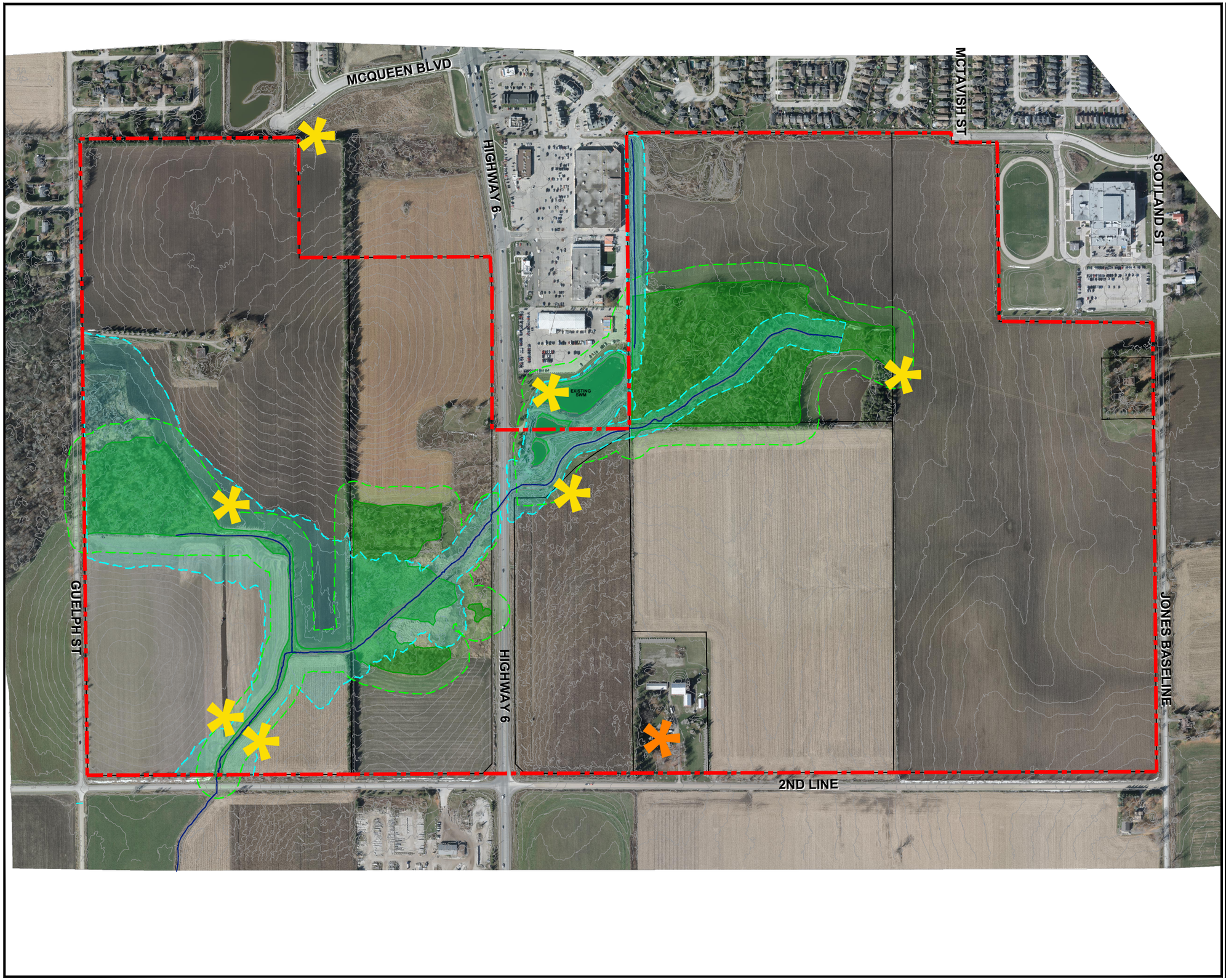


Figure # 8

Structure Plan

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

- Study Area (±151 ha)
- Parcel Fabric*
- Properties of Cultural Heritage Value or Interest 7856 Second Line
- Preliminary SWM Locations
- Natural Heritage Features
- 30 m Natural Heritage Feature Buffer
- Natural Hazard Limit (Includes flood and erosion hazard limits)
- Centreline of Creek

Sources:

- Imagery and Topo: Northway\Photomap\Remote Sensing Ltd, 2020
- Floodplain/Hazard mapping: Final Existing Condition Hydrogeological Report, Tatham Engineering, 2021
- Natural Heritage Features and Buffer: FRICORP Ecological Services, 2021
- Preferred SWM Locations: Tatham Engineering, 2021

*Parcel fabric digitized from GRCA web mapping and is approximate in size and location

DATE: August 2021

SCALE: NTS

FILE: 19144A

DRAWN: JB

north

K:\19144A - South Fergus MESP and Secondary Plan\CP\Structure Plan_10Aug2021.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

6.0 DIRECTION ON LAND USE OPTIONS

The purpose of completing the background review and constraints investigation was to evaluate the existing conditions of the Study Area and surrounding lands. The findings obtained from the technical analysis will assist in the preparation of three conceptual land use options for the Study Area.

The land use options will be based on consideration of the existing land use needs within the Study Area, the technical analysis prepared by Tatham Engineering Services Limited and FRi Ecological Services, the various constraints that were analyzed as part of this report and further details from the impact assessment. The land use options will include:

- Determination of the location and preliminary design of stormwater management facilities;
- The collector road alignment, including the extension of McQueen Boulevard;
- Access connections to Tower Street (Highway 6) and surrounding areas;
- Conceptual park locations and trail alignment; and
- Mix of land uses, including residential, commercial and employment.

Land use options will be developed and assessed in a supplementary report. The goal is that through the evaluation process of the land use options, a preferred concept is selected. Conceptual land use options, including the preferred scenario, will be presented to the public for their review and feedback. The preferred Land Use Concept will contribute to the land use designations and policies of the Secondary Plan.

7.0 CONCLUSIONS & NEXT STEPS

In conclusion, the Secondary Plan and Master Environmental Servicing Plan for South Fergus will establish the preferred land use plan and master servicing strategy for South Fergus.

The Secondary Plan will address the policies of the Official Plan related to the detailed planning of the South Fergus Secondary Planning Area in order to facilitate its orderly development. The Secondary Plan will address the mix, arrangement and density of land uses and recommend street patterns, the size and location of neighbourhood parks and schools site and the location of major services. The Secondary Plan will provide a conceptual framework for the area and will provide the basis for the preparation of future Planning Act applications.

This Report, together with the technical appendices attached, represents the completion of the Study Context, Existing Condition Study Cultural Heritage Screen and Archaeological Assessment, Preliminary. Next steps include:

- Preparation of Supplementary Reports and Analysis - including a Transportation Plan, Urban Design Guidelines and Parks Concept, and Fiscal Impact Study.
- Detailed Impact Assessment - Preliminary Impact Assessment, including assessment of impacts related to land use, infrastructure and trails in terms of ground water recharge and quality, surface water quality and quantity and the integrity of the surrounding environmental features, has been completed. Detailed assessment will occur through the review of the Land Use Options.

The next steps include:

- Analysis of land use options and determination of the preferred land use plan
- Public consultation on the land use plan
- Completion of the MESP and Secondary Plan

The results of the data will provide for the completion of the MESP and recommendations for the Secondary Plan, including: limits of natural features and constraints, hydrological model for proposed conditions; stormwater management strategy; floodplain modelling for future conditions; identification of enhancement and restoration opportunities and natural heritage feature enhancement opportunities and mitigation measures.

APPENDIX A

Stage 1 & 2 Archaeological Assessment
Prepared by AMICK Consultants Limited

1.0 PROJECT REPORT COVER PAGE

LICENSEE INFORMATION:

Contact Information:	Michael B. Henry CD BA FRAI FRSA Southwestern District Office 237 Sanders Street East Exeter, N0M 1S1 Phone: (419) 432-4435 Email: mhenry@amick.ca www.amick.ca
Licensee:	Michael B. Henry CD BA FRAI FRSA
Ontario Archaeology Licence:	P058

PROJECT INFORMATION:

Corporate Project Number:	2020-168
MHSTCI Project Number:	P058-1931-2020
Investigation Type:	Stage 1-2 Archaeological Property Assessment
Project Name:	South Fergus MESP & Secondary Plan
Project Location:	7856 2nd Line, Fergus, Part of Lots 11, 12 & 14, & All of Lot 13, Concession 2, (Geographic Township of Nichol), Township of Centre Wellington, County of Wellington
Project Designation Number:	Not Currently Available

MHSTCI FILING INFORMATION:

Site Record/Update Form(s):	N/A
Date of Report Filing:	15 August 2021
Type of Report:	**ORIGINAL**

2.0 EXECUTIVE SUMMARY

This report describes the results of the 2020 & 2021 Stage 1-2 Archaeological Assessment of 7856 2nd Line, Fergus, Part of Lots 11, 12 & 14, & All of Lot 13, Concession 2, (Geographic Township of Nichol), Township of Centre Wellington, County of Wellington, conducted by AMICK Consultants Limited. This study was conducted under Professional Archaeologist License #P058 issued to Michael Henry by the Minister of Heritage, Sport, Tourism and Culture Industries for the Province of Ontario. This assessment was undertaken as a requirement under the Planning Act (RSO 1990) and the Provincial Policy Statement (2020) in order to support a Draft Plan of Subdivision and companion Zoning By-law Amendment application as part of the pre-submission process. Within the land use planning and development context, Ontario Regulation 544/06 under the Planning Act (1990b) requires an evaluation of archaeological potential and, where applicable, an archaeological assessment report completed by an archaeologist licensed by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI). Policy 2.6 of the Provincial Policy Statement (PPS 2020) addresses archaeological resources. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011), the Ontario Heritage Act (RSO 1990a).

AMICK Consultants Limited was engaged by the proponent to undertake a Stage 1-2 Archaeological Assessment of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological fieldwork. The entirety of the study area was subject to property inspection and photographic documentation concurrently with the Stage 2 Property Assessment by high intensity test pit methodology at a five-metre interval between individual test pits, test pit methodology at ten metre intervals to confirm disturbance and by high intensity pedestrian survey at an interval of five metres between individual transects on 15,16, 18, 19 & 20 November 2020 and 5 April 2021. All records, documentation, field notes, photographs and artifacts (as applicable) related to the conduct and findings of these investigations are held at the Southwestern District corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) on behalf of the government and citizens of Ontario.

STAGE 2 RECOMMENDATIONS:

As a result of the Stage 2 Property Assessment of the study area, no archaeological resources were encountered. Consequently, the following recommendations are made:

1. *No further archaeological assessment of the study area is warranted;*
2. *The Provincial interest in archaeological resources with respect to the proposed undertaking has been addressed;*
3. *The proposed undertaking is clear of any archaeological concern.*

3.0 TABLE OF CONTENTS

4.0 PROJECT PERSONNEL

AMICK CONSULTANTS LIMITED PARTNERS
Michael Henry (MHSTCI Professional Archaeologist Licence #P058)
Marilyn Cornies (MHSTCI Professional Archaeologist Licence #P038)

PROJECT COORDINATOR
Michael Henry (MHSTCI Professional Archaeologist Licence #P058)

PROJECT LICENSEE ARCHAEOLOGIST
Michael Henry (MHSTCI Professional Archaeologist Licence #P058)

PROJECT FIELD DIRECTORS
Katrina Mason (MHSTCI Applied Research Archaeologist Licence #R1226)
Michael Henry (MHSTCI Professional Archaeologist Licence #P058)
Marilyn Cornies (MHSTCI Professional Archaeologist Licence #P038)

PROJECT FIELD ASSISTANTS
Jessica Watson Ryan Crowe Garrett Gribbin

PROJECT REPORT PREPARATION
Katrina Mason (MHSTCI Applied Research Archaeologist Licence #R1226)

PROJECT GRAPHICS
Katrina Mason (MHSTCI Applied Research Archaeologist Licence #R1226)

PROJECT PHOTOGRAPHY
Katrina Mason (MHSTCI Applied Research Archaeologist Licence #R1226)

5.0 PROJECT CONTEXT

5.1 DEVELOPMENT CONTEXT

This report describes the results of the 2020 & 2021 Stage 1-2 Archaeological Assessment of 7856 2nd Line, Fergus, Part of Lots 11, 12 & 14, & All of Lot 13, Concession 2, (Geographic Township of Nichol), Township of Centre Wellington, County of Wellington, conducted by AMICK Consultants Limited. This study was conducted under Professional Archaeologist License #P058 issued to Michael Henry by the Minister of Heritage, Sport, Tourism and Culture Industries for the Province of Ontario. This assessment was undertaken as a requirement under the Planning Act (RSO 1990) and the Provincial Policy Statement (2020) in order to support a Draft Plan of Subdivision and companion Zoning By-law Amendment application as part of the pre-submission process. Within the land use planning and development context, Ontario Regulation 544/06 under the Planning Act (1990b) requires an evaluation of archaeological potential and, where applicable, an archaeological assessment report completed by an archaeologist licensed by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI). Policy 2.6 of the Provincial Policy Statement (PPS 2020) addresses archaeological resources. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011), the Ontario Heritage Act (RSO 1990a).

AMICK Consultants Limited was engaged by the proponent to undertake a Stage 1-2 Archaeological Assessment of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological fieldwork. The entirety of the study area was subject to property inspection and photographic documentation concurrently with the Stage 2 Property Assessment by high intensity test pit methodology at a five-metre interval between individual test pits, test pit methodology at ten metre intervals to confirm disturbance and by high intensity pedestrian survey at an interval of five metres between individual transects on 15,16, 18, 19 & 20 November 2020 and 5 April 2021. All records, documentation, field notes, photographs and artifacts (as applicable) related to the conduct and findings of these investigations are held at the Southwestern District corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) on behalf of the government and citizens of Ontario.

A detailed plan of the development was not available at the time of filing. A map was provided by the South Fergus Landowner Group that indicates the area will be divided into Parcels 1, 2, 3a-b, and 4a-4c. This map has been submitted together with this report to MHSTCI for review and reproduced within this report as Map 4.

5.2 HISTORICAL CONTEXT

5.2.1 PRE-CONTACT LAND-USE OUTLINE

What follows is an outline of Aboriginal occupation in the area during the Pre-Contact Era from the earliest known period, about 9000 B.C. up to approximately 1650 AD.

5.2.1.1 PALAEO-INDIAN PERIOD (APPROXIMATELY 9000-7500 B.C.)

North of Lake Ontario, evidence suggests that early occupation began around 9000 B.C. People probably began to move into this area as the glaciers retreated and glacial lake levels began to recede. The early occupation of the area probably occurred in conjunction with environmental conditions that would be comparable to modern Sub-Arctic conditions. Due to the great antiquity of these sites, and the relatively small populations likely involved, evidence of these early inhabitants is sparse and generally limited to tools produced from stone or to by-products of the manufacture of these implements.

5.2.1.2 ARCHAIC PERIOD (APPROXIMATELY 8000-1000 B.C.)

By about 8000 B.C. the gradual transition from a postglacial tundra-like environment to an essentially modern environment was largely complete. Prior to European clearance of the landscape for timber and cultivation, the area was characterized by forest. The Archaic Period is the longest and the most apparently stable of the cultural periods identified through archaeology. The Archaic Period is divided into the Early, Middle and Late Sub-Periods, each represented by specific styles in projectile point manufacture. Many more sites of this period are found throughout Ontario, than of the Palaeo-Indian Period. This is probably a reflection of two factors: the longer period of time reflected in these sites, and a greater population density. The greater population was likely the result of a more diversified subsistence strategy carried out in an environment offering a greater variety of abundant resources. (Smith 2002:58-59)

Current interpretations suggest that the Archaic Period populations followed a seasonal cycle of resource exploitation. Although similar in concept to the practices speculated for the big game hunters of the Palaeo-Indian Period, the Archaic populations utilized a much broader range of resources, particularly with respect to plants. It is suggested that in the spring and early summer, bands would gather at the mouths of rivers and at rapids to take advantage of fish spawning runs. Later in the summer and into the fall season, smaller groups would move to areas of wetlands to harvest nuts and wild rice. During the winter, they would break into yet smaller groups probably based on the nuclear family and perhaps some additional relatives to move into the interior for hunting. The result of such practices would be to create a distribution of sites across much of the landscape. (Smith 2002: 59-60).

The material culture of this period is much more extensive than that of the Palaeo-Indians. Stylistic changes between Sub-Periods and cultural groups are apparent, although the overall quality in production of chipped lithic tools seems to decline. This period sees the introduction of ground stone technology in the form of celts (axes and adzes), manos and metates for grinding nuts and fibres, and decorative items like gorgets, pendants, birdstones, and bannerstones. Bone tools are also evident from this time period. Their presence may be a result of better preservation from these more recent sites rather than a lack of such items in

earlier occupations. In addition, copper and exotic chert types appear during the period and are indicative of extensive trading (Smith 2002: 58-59).

5.2.1.3 WOODLAND PERIOD (APPROXIMATELY 1000 B.C.-1650 A.D.)

The primary difference in archaeological assemblages that differentiates the beginning of the Woodland Period from the Archaic Period is the introduction of ceramics to Ontario populations. This division is probably not a reflection of any substantive cultural changes, as the earliest sites of this period seem to be in all other respects a continuation of the Archaic mode of life with ceramics added as a novel technology. The seasonally based system of resource exploitation and associated population mobility persists for at least 1500 years into the Woodland Period. (Smith 2002: 61-62)

The Early Woodland Sub-Period dates from about 1000-400 B.C. Many of the artifacts from this time are similar to the late Archaic and suggest a direct cultural continuity between these two temporal divisions. The introduction of pottery represents and entirely new technology that was probably acquired through contact with more southerly populations from which it likely originates. (Smith 2002:62)

The Middle Woodland Sub-Period dates from about 400 B.C.-800 A.D. Within the region including the study area, a complex emerged at this time termed "Point Peninsula". Point Peninsula pottery reflects a greater sophistication in pottery manufacture compared with the earlier industry. The paste and temper of the new pottery is finer and new decorative techniques such as dentate and pseudo-scallop stamping appear. There is a noted Hopewellian influence in southern Ontario populations at this time. Hopewell influences from south of the Great Lakes include a widespread trade in exotic materials and the presence of distinct Hopewell style artifacts such as platform pipes, copper or silver panpipe covers and shark's teeth. The populations of the Middle Woodland participated in a trade network that extended well beyond the Great Lakes Region.

The Late Woodland Sub-Period dates from about 500-1650 A.D. The Late Woodland includes four separate phases: Princess Point, Early Ontario Iroquoian, Middle Ontario Iroquoian and Late Ontario Iroquoian.

The Princess Point phase dates to approximately 500-1000 A.D. Pottery of this phase is distinguished from earlier technology in that it is produced by the paddle method instead of coil and the decoration is characterized by the cord wrapped stick technique. Ceramic smoking pipes appear at this time in noticeable quantities. Princess Point sites cluster along major stream valleys and wetland areas. Maize cultivation is introduced by these people to Ontario. These people were not fully committed to horticulture and seemed to be experimenting with maize production. They generally adhere to the seasonal pattern of occupation practiced by earlier occupations, perhaps staying at certain locales repeatedly and for a larger portion of each year (Smith 2002: 65-66)

The Early Ontario Iroquoian stage dates to approximately 950-1050 A.D. This stage marks the beginning of a cultural development that led to the historically documented Ontario Iroquoian groups that were first contacted by Europeans during the early 1600s (Petun, Neutral, and Huron). At this stage formal semi-sedentary villages emerge. The Early stage of this cultural development is divided into two cultural groups in southern Ontario. The areas occupied by each being roughly divided by the Niagara Escarpment. To the west were located the Glen Meyer populations, and to the east were situated the Pickering people (Smith 2002: 67).

The Middle Ontario Iroquoian stage dates to approximately 1300-1400 A.D. This stage is divided into two sub-stages. The first is the Uren sub-stage lasting from approximately 1300-1350 A.D. The second of the two sub-stages is known as the Middleport sub-stage lasting from roughly 1350-1400 A.D. Villages tend to be larger throughout this stage than formerly (Smith 2002: 67).

The Late Ontario Iroquoian stage dates to approximately 1400-1650 A.D. During this time the cultural divisions identified by early European explorers are under development and the geographic distribution of these groups within Ontario begins to be defined.

5.2.2 General Historical Outline

In 1837 by Act of Parliament the new District of Wellington was formed and a court house and jail in the town of Guelph were authorized. The District was named after England's Duke of Wellington and initially included the counties of Wellington, Waterloo, Grey and parts of Dufferin (Wikipedia 2017).

By January 1854, Wellington County became an individual entity. At the time, it included the Townships and Towns of Amaranth, Arthur, Eramosa, Erin, Guelph, Guelph (Town), Garafraxa, Maryborough, Nichol, Peel, Pilkington, and Puslinch. Other municipalities were added between 1857 and 1881. Guelph separated in 1879 and was incorporated as a City; it lost representation on the County Council. Orangeville and Garafraxa East were annexed by Dufferin County (Wikipedia 2017).

The community of Fergus was settled in 1833 when settlers moved into the area. The town was first called “Little Falls” due to the scenic waterfalls in the area. The primary developers of the area were Adam Fergusson and James Webster. Both of these men were lawyers and in 1834 Fergusson built the first bridge in the area over the Grand River. The first house was built in 1833, a hotel in 1844 and in 1825 a sawmill, gristmill, church and school were opened. Fergusson was also the founder of the first curling club in Ontario, which was also opened in 1834. Until approximately 1850, an unwritten policy of restricted growth was implemented. Fergusson, Webster and other Scottish emigrants owned the land; therefore only people of Scottish descent could purchase village lots. However, in order to accommodate Irish settlers, Webster founded the nearby town of Arthur in 1840. Another settlement was established along what is currently known as Scotland Street. The settlers in the area were freed slaves who were part of the Pierpoint Settlement, named after Richard

Pierpoint who was a United Empire Loyalist. In 1855, a settler named James Wilson arrived and opened an oatmeal mill, flour mill, sawmill, woolen mill and a factory that supplied oatmeal for export. By this time, there was a booming economy, powered by the waterfalls on the Grand River. In 1858, the town was incorporated and renamed "Fergus" in honour of Adam Fergusson. By the year the town was incorporated, the population was 1000 but by 1869 the population had risen to 1500 (Elora & Fergus 2020).

Map 2 is a facsimile segment from the Illustrated Historical Atlas of Waterloo and Wellington Counties (Walker & Miles 1877). Map 2 illustrated the location of the study area and environs as of 1877. Lot 11 is shown to belong to J. Skock, Lot 12 is shown to belong to J. Gordon and a settlement road is shown to split the lot in half. This road is the current Highway 6. Lot 13 is shown to belong to Jason McQueen in the north half and J. Lindsay in the south half, Lot 14 is shown to belong to A.Wilkie. No structures are shown to be within any of the lots the study area is within. The surrounding lots are all owned and the town of Fergus is shown to the north of the study area. This demonstrates that the original property of which the study area is a part was settled by the time that the atlas data was compiled. Accordingly, it has been determined that there is potential for archaeological deposits related to early Post-Contact settlement within the study area. In addition, this map illustrates settlement roads adjacent to the study area to the east, west, and south as well as through the middle of Lot 12. These roads correspond to the current Guelph Street (West), Scotland Street (East), Highway 6 (through Lot 12) and 2 Line (South).

Map 3 is a facsimile segment of the Historical County Map of Wellington County (Leslie Guy 1861). Map 3 illustrates the location of the study area and environs as of 1861. Lot 11 is shown to belong to J. Skock, Lot 12 is shown to belong to Jason Gordon and a settlement road is shown to split the lot in half. This road is the current Highway 6. Lot 13 is shown to belong to Jason McQueen in the north half and Hugh McQueen in the south half, Lot 14 is shown to belong to David Wilkie. No structures are shown to be within any of the lots the study area is within. The surrounding lots are all owned and the town of Fergus is shown to the north of the study area. This demonstrates that the original property of which the study area is a part was settled by the time that the atlas data was compiled. Accordingly, it has been determined that there is potential for archaeological deposits related to early Post-Contact settlement within the study area. In addition, this map illustrates settlement roads adjacent to the study area to the east and west as well as through the middle of Lot 12. These roads correspond to the current Guelph Street (West), Scotland Street (East), Highway 6 (through Lot 12) and 2 Line (South).

It must be borne in mind that inclusion of names of property owners and depictions of structures and other features within properties on these maps were sold by subscription. Property owners paid to include information or details about their properties. While information included within these maps may provide information about the occupation of a property at a specific moment in time when the information was collected, the absence of such information does not necessarily indicate that the property was not occupied.

5.2.3 CURRENT CONDITIONS

The present use of the study area is as actively farmed agricultural land and residences. The study area is roughly 153 hectares in area. The study area includes within it mostly ploughable lands. There is a wooded area within the northern portion of the study area as well as along the southwest border. There are three residences within the study area. One is located in the western portion of the property, one is within an agricultural complex located along the southeastern border, and one along the eastern border. The residence in the western portion contains a shed and driveway that enters off of Guelph Street and continues to the residence as well as a small lawn area. Most of the lawn area at this residence is disturbed with gravel fill. The residence in the southeastern portion within the agricultural complex contains a gravel driveway off of 2 Line, a lawn, an attached garage, in-ground pool, concrete patio, and concrete pad in front of one of the two sheds, a bank barn, two silos and gravel parking area for farming equipment. The other residence along the eastern border is surrounded by lawn and a gravel driveway leads into the lot from Scotland Street. Highway 6 cuts through the centre of Lot 12. There is also an unnamed creek that flows between agricultural fields within Lot 11 and 12. The study area also contains two small streams in the meadow area within the western portion of the study area. There is a man-made pond located centrally within the study area. Sand fill soil mounds are located adjacent to the subdivision and plaza, which is likely the source of the fill. There are also permanent low-lying wet areas within the wooded area in the northern portion of the study area. The study area is bounded on the north by the town of Fergus, on the east by agricultural land and Scotland Street, on the west by Guelph Street and on the south by 2 Line. The study area is adjacent to the intersection of Highway 6 and 2 Line to the north. A plan of the study area is included within this report as Map 4. Current conditions encountered during the Stage 1-2 Property Assessment are illustrated in Map 5.

5.2.4 SUMMARY OF HISTORICAL CONTEXT

The brief overview of readily available documentary evidence indicates that the study area is situated within an area that was close to historic transportation routes and in an area well populated during the nineteenth century and therefore has potential for sites relating to early Post-Contact settlement in the region. Background research indicates the property has potential for significant archaeological resources of Native origins based on proximity to a natural source of potable water in the past.

5.3 ARCHAEOLOGICAL CONTEXT

The Archaeological Sites Database administered by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) indicates that there is one (1) previously documented site within 1 kilometre of the study area. However, it must be noted that this is based on the assumption of the accuracy of information compiled from numerous researchers using different methodologies over many years. AMICK Consultants Limited assumes no responsibility for the accuracy of site descriptions, interpretations such as cultural affiliation,

or location information derived from the Archaeological Sites Database administered by MHSTCI. In addition, it must also be noted that a lack of formerly documented sites does not indicate that there are no sites present as the documentation of any archaeological site is contingent upon prior research having been conducted within the study area.

On the basis of information supplied by MHSTCI, no archaeological assessments have been conducted within 50 metres of the study area. AMICK Consultants Limited assumes no responsibility for the accuracy of previous assessments, interpretations such as cultural affiliation, or location information derived from the Archaeological Sites Database administered by MHSTCI. In addition, it must also be noted that the lack of formerly documented previous assessments does not indicate that no assessments have been conducted.

Data contained in previous archaeological reports in close proximity to the study area that is relevant to Stage 1 Background Study is defined within the Standards and Guidelines for Consultant Archaeologists in Section 7.5.8 Standard 4 as follows:

> *"Provide descriptions of previous archaeological fieldwork carried out within the limits of, or immediately adjacent to the project area,* ***as documented by all available reports that include archaeological fieldwork carried out on the lands to be impacted by this project, or where reports document archaeological sites immediately adjacent (i.e., within 50 m) to those lands****."*
>
> (MTCS 2011: 126 Emphasis Added)

In accordance with data supplied by MHSTCI for the purposes of completing this study, there are no previous reports detailing, *"archaeological fieldwork carried out on the lands to be impacted by this project"*, nor do any previous reports document known archaeological sites within 50 metres of the study area.

The Standards and Guidelines for Consultant Archaeologists stipulates that the necessity to summarize the results of previous archaeological assessment reports, or to cite MHSTCI File Numbers in references to other archaeological reports, is reserved for reports that are directly relevant to the fieldwork and recommendations for the study area (S & Gs 7.5.7, Standard 2, MTC 2011: 125). This is further refined and elaborated upon in Section 7.5.8, Standards 4 & 5, MTC 2011:

> *"4. Provide descriptions of previous archaeological fieldwork carried out within the limits of, or immediately adjacent to the project area, as documented by all available* ***reports that include archaeological fieldwork carried out on the lands to be impacted by this project, or where reports document archaeological sites immediately adjacent (i.e., within 50m) to those lands."***
>
> *"5.* ***If previous findings and recommendations are relevant*** *to the current stage of work, provide the following:*

a. *a brief summary of previous findings and recommendations*
b. *documentation of any differences in the current work from the previously recommended work*
c. *rationale for the differences from the previously recommended work"*

(Emphasis Added)

The study area is situated in area for which there is no archaeological master plan.

It must be further noted that there are no relevant plaques associated with the study area, which would suggest an activity or occupation within, or in close proximity to, the study area that may indicate potential for associated archaeological resources of significant CHVI.

In addition, archaeological sites data is also used to determine if any archaeological resources had been formerly documented within or in close proximity to the study area and if these same resources might be subject to impacts from the proposed undertaking. This data was also collected in order to establish the relative significance of any resources that might be encountered during the conduct of the present study. For example, the relative rarity of a site can be used to assign an elevated level of significance to a site that is atypical for the immediate vicinity. The requisite archaeological sites data of previously registered archaeological sites was collected from the MHSTCI and the corporate research library of AMICK Consultants Limited. The Stage 1 Background Research methodology also includes a review of the most detailed available topographic maps, historical settlement maps, archaeological management plans (where applicable) and commemorative plaques or monuments. When previous archaeological research documents lands to be impacted by the proposed undertaking or archaeological sites within 50 metres of the study area, the reports documenting this earlier work are reviewed for pertinent information. AMICK Consultants Limited will often modify this basic methodology based on professional judgment to include additional research (such as, local historical works or documents and knowledgeable informants).

5.3.1 PRE-CONTACT REGISTERED SITES

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MHSTCI. As a result it was determined that no (0) archaeological sites relating directly to Pre-Contact habitation/activity had been formally registered within the immediate vicinity of the study area. However, the lack of formally documented archaeological sites does not mean that Pre-Contact people did not use the area; it more likely reflects a lack of systematic archaeological research in the immediate vicinity. Even in cases where one or more assessments may have been conducted in close proximity to a proposed landscape alteration, an extensive area of physical archaeological assessment coverage is required throughout the region to produce a representative sample of all potentially available archaeological data in order to provide any meaningful evidence to construct a pattern of land use and settlement in the past.

An unnamed creek flows between agricultural fields in Lots 11 and 12. This creek is not shown to be on either of the historical maps reproduced in this report. This is likely due to the small size of the creek, however it cannot be discerned that this creek was not present in the past. There are also two small streams that branch off of the creek. The distance to water criteria used to establish potential for archaeological sites suggests potential for Pre-Contact occupation and land use in the area in the past.

Table 1 illustrates the chronological development of cultures within southern Ontario prior to the arrival of European cultures to the area at the beginning of the 17th century. This general cultural outline is based on archaeological data and represents a synthesis and summary of research over a long period of time. It is necessarily generalizing and is not necessarily representative of the point of view of all researchers or stakeholders. It is offered here as a rough guideline and as a very broad outline to illustrate the relationships of broad cultural groups and time periods.

TABLE 1 PRE-CONTACT CULTURAL CHRONOLOGY FOR SOUTHERN ONTARIO

Years ago	Period	Southern Ontario
250	Terminal Woodland	Ontario and St. Lawrence Iroquois Cultures
1000 2000	Initial Woodland	Princess Point, Saugeen, Point Peninsula, and Meadowood Cultures
3000 4000 5000 6000	Archaic	Laurentian Culture
7000 8000 9000 10000 11000	Palaeo-Indian	Plano and Clovis Cultures
		(Wright 1972)

5.3.2 POST-CONTACT REGISTERED SITES

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MHSTCI. As a result it was determined that one (1) archaeological sites relating directly to Post-Contact habitation/activity had been formally registered within the immediate vicinity of the study area. The previously registered Post-Contact sites are briefly described below in Table 2:

TABLE 2 POST-CONTACT SITES WITHIN 1KM

Site Name	Borden #	Site Type	Cultural Affiliation
	AkHb-8	Farmstead	Euro-Canadian

The above noted archaeological site is not situated within 300 metres of the study area. Therefore, it has no impact on determinations of archaeological potential for further archaeological resources related to Post-Contact activity and occupation with respect to the archaeological assessment of the proposed undertaking.

5.3.4 LOCATION AND CURRENT CONDITIONS

The study area is described as 7856 2nd Line, Fergus, Part of Lots 11, 12 & 14, & All of Lot 13, Concession 2, (Geographic Township of Nichol), Township of Centre Wellington, County of Wellington. The study area was subject to this assessment as a requirement under the Planning Act (RSO 1990) and the Provincial Policy Statement (2020) in order to support a Draft Plan of Subdivision and companion Zoning By-law Amendment application as part of the pre-submission process.

The present use of the study area is as actively farmed agricultural land and residences. The study area is roughly 153 hectares in area. The study area includes within it mostly ploughable lands. There is a wooded area within the northern portion of the study area as well as along the southwest border. There are three residences within the study area. One is located in the western portion of the property, one is within an agricultural complex located along the southeastern border, and one along the eastern border. The residence in the western portion contains a shed and driveway that enters off of Guelph Street and continues to the residence as well as a small lawn area. Most of the lawn area at this residence is disturbed with gravel fill. The residence in the southeastern portion within the agricultural complex contains a gravel driveway off of 2 Line, a lawn, an attached garage, in-ground pool, concrete patio, and concrete pad in front of one of the two sheds, a bank barn, two silos and gravel parking area for farming equipment. The other residence along the eastern border is surrounded by lawn and a gravel driveway leads into the lot from Scotland Street. Highway 6 cuts through the centre of Lot 12. There is also an unnamed creek that flows between agricultural fields within Lot 11 and 12. The study area also contains two small streams in the meadow area within the western portion of the study area. There is a man-made pond located centrally within the study area. Sand fill soil mounds are located adjacent to the subdivision and plaza, which is likely the source of the fill. There are also permanent low-lying wet areas within the wooded area in the northern portion of the study area. The study area is bounded on the north by the town of Fergus, on the east by agricultural land and Scotland Street, on the west by Guelph Street and on the south by 2 Line. The study area is adjacent to the intersection of Highway 6 and 2 Line to the north. A plan of the study area is included within this report as Map 4. Current conditions encountered during the Stage 1-2 Property Assessment are illustrated in Map 5.

5.3.5 PHYSIOGRAPHIC REGION

The study area is situated within the Guelph Drumlin Field physiographic region. For the most part, these hills are of the broad oval type with slopes less steep than the Peterborough drumlins. The till in these drumlins is loamy and calcerous and was derived mostly from dolostone of the Amabel Foundation. In addition, it contains fragments of the underlying red

shale which is exposed below the escarpment. It is a pale brown in colour. The till is rather stony with large surface boulders being more numerous in some localities than others (Chapman and Putnam 1984: 137-138).

5.3.6 SURFACE WATER

Sources of potable water, access to waterborne transportation routes, and resources associated with watersheds are each considered, both individually and collectively to be the highest criteria for determination of the potential of any location to support extended human activity, land use, or occupation. Accordingly, proximity to water is regarded as the primary indicator of archaeological resource potential. The Standards and Guidelines for Consultant Archaeologists stipulates that undisturbed lands within 300 metres of a water source are considered to have archaeological potential (MTC 2011: 21).

An unnamed creek flows between agricultural fields in Lots 11 and 12. This creek is not shown on the historical atlas maps but that is likely due to its small size. There are two small streams that branch off of the creek within the meadow in the western portion of the study area. There is also a man-made pond in the centre of the study area. There are permanent low-lying and wet areas throughout the wooded areas of the property as well.

5.3.7 CURRENT PROPERTY CONDITIONS CONTEXT

Current characteristics encountered within an archaeological research study area determine if property Assessment of specific portions of the study area will be necessary and in what manner a Stage 2 Property Assessment should be conducted, if necessary. Conventional assessment methodologies include pedestrian survey on ploughable lands and test pit methodology within areas that cannot be ploughed. For the purpose of determining where property Assessment is necessary and feasible, general categories of current landscape conditions have been established as archaeological conventions. These include:

5.3.7.1 BUILDINGS AND STRUCTURAL FOOTPRINTS

A building, for the purposes of this particular study, is a structure that exists currently or has existed in the past in a given location. The footprint of a building is the area of the building formed by the perimeter of the foundation. Although the interior area of building foundations would often be subject to property Assessment when the foundation may represent a potentially significant historic archaeological site, the footprints of existing structures are not typically assessed. Existing structures commonly encountered during archaeological assessments are often residential-associated buildings (houses, garages, sheds), and/or component buildings of farm complexes (barns, silos, greenhouses). In many cases, even though the disturbance to the land may be relatively shallow and archaeological resources may be situated below the disturbed layer (e.g. a concrete garage pad), there is no practical means of assessing the area beneath the disturbed layer. However, if there were evidence to suggest that there are likely archaeological resources situated beneath the disturbance, alternative methodologies may be recommended to study such areas.

The study area contains three residences. The first residential lot contains a house and shed. The second residential lot is within an agricultural complex and contains a house, attached garage, bank barn, two silos, and two sheds. The third residence is along the eastern border and contains a house and lawn. Map 5 of this report illustrates the locations of these features.

5.3.7.2 DISTURBANCE

Areas that have been subjected to extensive and deep land alteration that has severely damaged the integrity of archaeological resources are known as land disturbances. Examples of land disturbances are areas of past quarrying, major landscaping, and sewage and infrastructure development (MTC 2011: 18), as well as driveways made of gravel or asphalt or concrete, in-ground pools, and wells or cisterns. Surfaces paved with interlocking brick, concrete, asphalt, gravel and other surfaces meant to support heavy loads or to be long wearing hard surfaces in high traffic areas, must be prepared by the excavation and removal of topsoil, grading, and the addition of aggregate material to ensure appropriate engineering values for the supporting matrix and also to ensure that the installations shed water to avoid flooding or moisture damage. All hard surfaced areas are prepared in this fashion and therefore have no or low archaeological potential. Major utility lines are conduits that provide services such as water, natural gas, hydro, communications, sewage, and others. These major installations should not be confused with minor below ground service installations not considered to represent significant disturbances removing archaeological potential, such as services leading to individual structures which tend to be comparatively very shallow and vary narrow corridors. Areas containing substantial and deeply buried services or clusters of below ground utilities are considered areas of disturbance, and may be excluded from Stage 2 Property Assessment. Disturbed areas are excluded from Stage 2 Property Assessment due to no or low archaeological potential and often because they are also not viable to assess using conventional methodology.

> *"Earthwork is one of the major works involved in road construction. This process includes excavation, material removal, filling, compaction, and construction. Moisture content is controlled, and compaction is done according to standard design procedures. Normally, rock explosion at the road bed is not encouraged. While filling a depression to reach the road level,* ***the original bed is flattened after the removal of the topsoil.*** *The fill layer is distributed and compacted to the designed specifications. This procedure is repeated until the compaction desired is reached. The* ***fill material should not contain organic elements,*** *and possess a low index of plasticity. Fill material can include gravel and decomposed rocks of a particular size, but should not consist of huge clay lumps. Sand clay can be used. The area is considered to be adequately compacted when the roller movement does not create a noticeable deformation.* ***The road surface finish is reliant on the economic aspects, and the estimated usage."*** *[Emphasis Added]*
>
> (Goel 2013)

The supporting matrix of a hard paved surface cannot contain organic material which is

subject to significant compression, decay and moisture retention. Topsoil has no engineering value and must be removed in any construction application where the surface finish at grade requires underlying support.

Installation of sewer lines and other below ground services associated with infrastructure development often involves deep excavation that can remove archaeological potential. This consideration does not apply to relatively minor below ground services that connect structures and facilities to services that support their operation and use. Major servicing corridors will be situated within adjacent road allowances with only minor, narrow and relatively shallow underground services entering into the study area to connect existing structures to servicing mainlines. The relatively minor, narrow and shallow services buried within a residential property do not require such extensive ground disturbance to remove or minimize archaeological potential within affected areas.

The study area contains three driveways that lead to the residences located within the study area. One of the residential lots on the western border is disturbed with gravel fill. The large agricultural complex has disturbance behind the bank barn, where it appears gravel was laid for parking farming equipment. There is also a concrete paved area in front of one of the sheds at the agricultural complex. A concrete patio is located where the inground pool is located. In the northern portion of the study area there are soil mounds of sand fill that appear to be dumped from the construction of the plaza and subdivision adjacent to the study area. Map 5 of this report illustrates the locations of these features.

5.3.7.3 Low-Lying and Wet Areas

Landscape features that are covered by permanently wet areas, such as marshes, swamps, or bodies of water like streams or lakes, are known as low-lying and wet areas. Low-lying and wet areas are excluded from Stage 2 Property Assessment due to inaccessibility.

The study area contains an unnamed creek that flows between agricultural fields in Lots 11 and 12. Two small streams branch off of the creek. There are sections of low-lying and wet areas throughout the wood lots. These areas are permanently wet, which is evident through the large cattail and dogwood growth. There is also an inground pool at the larger residence. There is a man-made pond located centrally in the study area. Map 5 of this report illustrates the locations of these features.

5.3.7.4 Steep Slope

Landscape which slopes at a greater than (>) 20 degree change in elevation, is known as steep slope. Areas of steep slope are considered uninhabitable, and are excluded from Stage 2 Property Assessment.

Generally, steep slopes are not assessed because steep slopes are interpreted to have low potential, not due to viability to assess, except in cases where the slope is severe enough to become a safety concern for archaeological field crews. In such cases, the Occupational

Health and Safety Act takes precedence as indicated in the introduction to the Standards and Guidelines. AMICK Consultant Limited policy is to assess all slope areas whenever it is safe to do so. Assessment of slopes, except where safety concerns arise, eliminates the invariably subjective interpretation of what might constitute a steep slope in the field. This is done to minimize delays due to conflicts in such interpretations and to increase the efficiency of review.

The study area does not contain areas of steep slope.

5.3.7.5 Wooded Areas

Areas of the property that cannot be ploughed, such as natural forest or woodlot, are known as wooded areas. These wooded areas qualify for Stage 2 Property Assessment, and are required to be assessed using test pit survey methodology.

The study area contains wooded areas within the northern portion of the study area as well as along the southwest border. There is also wooded area located centrally within the northeast portion of the study area. These wooded areas are mostly low-lying and wet and surrounded by agricultural fields. Map 5 of this report illustrates the locations of these features.

5.3.7.6 Ploughable Agricultural Lands

Areas of current or former agricultural lands that have been ploughed in the past are considered ploughable agricultural lands. Ploughing these lands regularly turns the soil, which in turn brings previously buried artifacts to the surface, which are then easily identified during visual inspection. Furthermore, by allowing the ploughed area to weather sufficiently through rainfall, soil is washed off of exposed artifacts at the surface and the visibility of artifacts at the surface of recently worked field areas is enhanced markedly. Pedestrian survey of ploughed agricultural lands is the preferred method of physical assessment because of the greater potential for finding evidence of archaeological resources if present.

The study area consists mainly of ploughable agricultural lands. Map 5 of this report illustrates the locations of these features.

5.3.7.7 Lawn, Pasture, Meadow

Landscape features consisting of former agricultural land covered in low growth, such as lawns, pastures, meadows, shrubbery, and immature trees. These are areas that may be considered too small to warrant ploughing, (i.e. less than one hectare in area), such as yard areas surrounding existing structures, and land-locked open areas that are technically workable by a plough but inaccessible to agricultural machinery. These areas may also include open area within urban contexts that do not allow agricultural tillage within municipal or city limits or the use of urban roadways by agricultural machinery. These areas are required to be assessed using test pit survey methodology.

The study area contains a small portion of lawn, which surrounds the three residences. Map 5 of this report illustrates the locations of these features.

5.3.8 SUMMARY

Background research indicates the vicinity of the study area has potential for archaeological resources of Native origins based on proximity to a source of potable water. Background research also suggests potential for archaeological resources of Post-Contact origins based on proximity to previously registered archaeological sites of Post-Contact origins, proximity to a historic roadway, and proximity to areas of documented historic settlement.

Current conditions within the study area indicate that some areas of the property may have no or low archaeological potential and do not require Stage 2 Property Assessment or should be excluded from Stage 2 Property Assessment. These areas would include the footprint of existing structures and areas paved for driveways. A significant proportion of the study area does exhibit archaeological potential and therefore a Stage 2 Property Assessment is required.

Archaeological potential does not indicate that there are necessarily sites present, but that environmental and historical factors suggest that there may be as yet undocumented archaeological sites within lands that have not been subject to systematic archaeological research in the past.

6.0 FIELD WORK METHODS AND WEATHER CONDITIONS

This report confirms that the study area was subject to Stage 2 Property Assessment by high intensity test pit methodology at a five-metre interval between individual test pits, test pit methodology at ten-metre intervals to confirm disturbance and by high intensity pedestrian survey at an interval of five metres between individual transects on 15,16, 18, 19 & 20 November 2020 and 5 April 2021.

The fieldwork undertaken as a component of this study was conducted according to the archaeological fieldwork standards and guidelines (including weather and lighting conditions). Weather conditions were appropriate for the necessary fieldwork required to complete the Stage 2 Property Assessment and to create the documentation appropriate to this study. The locations from which photographs were taken and the directions toward which the camera was aimed for each photograph are illustrated in Map 5 of this report. Upon completion of the property inspection of the study area, it was determined that select areas would require Stage 2 Property Assessment.

It must be noted that AMICK Consultants Limited has been retained to assess lands as specified by the proponent. As such, AMICK Consultants Limited is constrained by the terms of the contract in place at the time of the Archaeological Assessment and can only enter into lands for which AMICK Consultants Limited has received consent from the owner

or their agent(s). The proponent has been advised that the entire area within the planning application must be subject to archaeological assessment and that portions of the planning application may only be excluded if they are of low potential, are not viable to assess, or are subject to planning provisions that would restrict any such areas from any form of ground altering activities.

6.1 PROPERTY INSPECTION

A detailed examination and photo documentation was carried out on the study area in order to document the existing conditions of the study area to facilitate the Stage 2 Property Assessment. All areas of the study area were visually inspected and select features were photographed as a representative sample of each area defined within Map 5. Observations made of conditions within the study area at the time of the inspection were used to inform the requirement for Stage 2 Property Assessment for portions of the study area as well as to aid in the determination of appropriate Stage 2 Property Assessment strategies. The locations from which photographs were taken and the directions toward which the camera was aimed for each photograph are illustrated in Map 5 of this report.

6.2 PEDESTRIAN SURVEY

In accordance with the Standards and Guidelines for Consultant Archaeologists, pedestrian survey is required for all portions of the study area that are ploughable or can be subject to cultivation. This is the preferred method to utilize while conducting an assessment. This report confirms that the conduct of pedestrian survey within the study area conformed to the following standards:

1. *Actively or recently cultivated agricultural land must be subject to pedestrian survey.*
   [All actively or recently cultivated agricultural land was subject to pedestrian survey.]

2. *Land to be surveyed must be recently ploughed. Use of chisel ploughs is not acceptable. In heavy clay soils ensure furrows are disked after ploughing to break them up further.*
   [All land was recently ploughed.]

3. *Land to be surveyed must be weathered by one heavy rainfall or several light rains to improve visibility of archaeological resources.*
   [All land was weathered by rainfall.]

4. *Provide direction to the contractor undertaking the ploughing to plough deep enough to provide total topsoil exposure, but not deeper than previous ploughing.*
   [Direction was given to the contractor undertaking the ploughing to plough deep enough to provide total topsoil exposure, but not deeper than previous ploughing]

5. *At least 80 % of the ploughed ground surface must be visible. If surface visibility is below 80% (e.g. due to crop stubble, weeds, young crop growth), ensure the land is re-ploughed before surveying.*
   [Roughly 98% of the ploughed field surface was exposed and visible.]

6. *Space survey transects at maximum intervals of 5m (20 survey transects per hectare)*
   [All transects were conducted at an interval of 5m between individual transects.]

7. *When archaeological resources are found, decrease survey transects to 1m intervals over a minimum of a 20m radius around the find to determine whether it is an isolated find or part of a larger scatter. Continue working outward at this interval until full extent of the surface scatter has been defined.*
   [Not Applicable – No archaeological resources were encountered.]

8. *Collect all formal artifact types and diagnostic categories. For 19th century archaeological sites, collect all refined ceramic sherds (or, for larger sites collect a sufficient sample to form the basis for dating).*
   [Not Applicable – No archaeological resources were encountered.]

9. *Based on professional judgment, strike a balance between gathering enough artifacts to document the archaeological site and leaving enough in place to relocate the site if it is necessary to conduct further assessment.*
   [Not Applicable – No archaeological resources were encountered.]

(MTC 2011: 30-31)

6.3 TEST PIT SURVEY

In accordance with the Standards and Guidelines for Consultant Archaeologists, test pit survey is required to be undertaken for those portions of the study area where deep prior disturbance had not occurred prior to assessment or which were accessible to survey. Test pit survey is only used in areas that cannot be subject to ploughing or cultivation. This report confirms that the conduct of test pit survey within the study area conformed to the following standards:

1. Test pit survey only on terrain where ploughing is not possible or viable, as in the following examples:

a. wooded areas
[All wooded areas were test pit surveyed at an interval of 5 m between individual test pits. In the low-lying and wet areas within the wooded areas, test pit survey was not viable.]

b. pasture with high rock content
[Not Applicable - The study area does not contain any pastures with high rock content]

c. abandoned farmland with heavy brush and weed growth
[Not Applicable - The study area does not contain any abandoned farmland with heavy brush and weed growth]

d. orchards and vineyards that cannot be strip ploughed (planted in rows 5 m apart or less), gardens, parkland or lawns, any of which will remain in use for several years after the survey
[Not Applicable - The study area does not contain any of the above-mentioned circumstances]

e. properties where existing landscaping or infrastructure would be damaged. The presence of such obstacles must be documented in sufficient detail to demonstrate that ploughing or cultivation is not viable.
[The study area contains residential and agricultural structures as well as existing landscaping that would be damaged by ploughing. The residences are to be maintained, therefore test pit survey was employed rather than ploughing. The degree of disturbance in both of these areas also prohibited ploughing.]

f. narrow (10 m or less) linear survey corridors (e.g., water or gas pipelines, road widening). This includes situations where there are planned impacts 10 m or less beyond the previously impacted limits on both sides of an existing linear corridor (e.g., two linear survey corridors on either side of an existing roadway). Where at the time of fieldwork the lands within the linear corridor meet the standards as stated under the above section on pedestrian survey land preparation, pedestrian survey must be carried out. Space test pits at maximum intervals of 5 m (400 test pits per hectare) in areas less than 300 m from any feature of archaeological potential.
[Not Applicable – The study area does not contain any linear corridors]

2. *Space test pits at maximum intervals of 5 m (400 test pits per hectare) in areas less than 300 m from any feature of archaeological potential.*
   [All test pits were spaced at an interval of 5m between individual test pits, except in instances where disturbed gravel or sand fill was encountered, in which case test pit survey was conducted at 10 metre intervals]

3. *Space test pits at maximum intervals of 10 m (100 test pits per hectare) in areas more than 300 m from any feature of archaeological potential.*
   [The entirety of the test pitted areas of the study area were assessed using high intensity test pit methodology at an interval of 5 metres between individual test pits, except in instances where disturbed gravel or sand fill was encountered, in which case test pit survey was conducted at 10 metre intervals]

4. *Test pit to within 1 m of built structures (both intact and ruins), or until test pits show evidence of recent ground disturbance.*
   [Test pits were placed within 1m of all built structures]

5. *Ensure that test pits are at least 30 cm in diameter.*
   [All test pits were at least 30 cm in diameter]

6. *Excavate each test pit, by hand, into the first 5 cm of subsoil and examine the pit for stratigraphy, cultural features, or evidence of fill.*
   [Regardless of the interval between individual test pits, all test pits were excavated by hand into the first 5 cm of subsoil where possible and examined for stratigraphy, cultural features, or evidence of fill. In areas that consisted of fill soils, test pits were also excavated a minimum of 30 cm below grade in order to ensure disturbance extended below even deep topsoil layers such as those encountered in agricultural fields to ensure that the depth of disturbance was sufficient to remove archaeological potential in most contexts. Where other evidence indicates locations of potentially significant archaeological sites that may include cultural deposits below fill soils, alternative strategies to explore beneath the fill layers found in some areas may be necessary to complete the Stage 2 Property Assessment. In such cases, further Stage 2 Property Assessment may be recommended following completion of the property survey under conventional methodologies.]

7. *Screen soil through mesh no greater than 6 mm.*
   [All soil was screened through mesh no greater than 6 mm]

8. *Collect all artifacts according to their associated test pit.*
   [Not Applicable - No archaeological resources were encountered]

9. *Backfill all test pits unless instructed not to by the landowner.*
   [All test pits were backfilled]

(MTC 2011: 31-32)

"*A combination of property inspection and test pitting may be used when initial Stage 2 results determine that all or part of the project area may in fact be disturbed. The Stage 2 survey may then consists of a detailed inspection (equivalent to Stage 1), combined with test pitting.*"

1. *If it was not done as part of Stage 1, inspect and document the disturbed areas according to the standards described for Stage 1 property inspections.*
   [The disturbed areas of the study area were inspected and documented as per the standards described for Stage 1 property inspections. Areas of suspected disturbance where test pit survey was viable were shovel tested as described below. These areas include the gravel driveways, the footprint of existing structures, the concrete pad, the gravel parking area for farm equipment, the

concrete patio, the presence of gravel fill in the lawn, and the sand fill soil mounds in the northern portion of the study area.

Standard archaeological survey methodologies employed in Ontario for Stage 2 Archaeological Property Assessment (i.e. pedestrian survey and test pit survey) cannot determine if deeply buried cultural remains are or are not present. The purpose of Stage 2 Property Assessment is not to test for deeply buried deposits. The Standards and Guidelines for Consultants Archaeologists recognize this fact and have a whole separate section covering this specific issue. The only way to determine if deeply buried remains are present is to follow those standards not via a standard Stage 1-2 Archaeological Property Assessment.

In most cases, unless there is documentation or evidence to the contrary, areas where grading has exceeded topsoil depth are areas considered to have no or low archaeological potential because in most cases removal of the topsoil will remove archaeological sites. While archaeological sites are popularly thought of as being deeply buried, archaeological sites begin on the surface of the ground and for most of humanity's history involved no substantial excavations or significant landscape alterations. Only with the rise of urbanization and sedentary settlement do sites begin to accumulate depth. This is a result of continuous building and rebuilding over top of earlier settlements. Deep archaeological sites are created by adding to the surface of an area and building the landform up. Deeply buried archaeological deposits are relatively rare outside of urban environments in Ontario and even within urban contexts, this seldom occurs outside of the historic core of the community where redevelopment has occurred since initial settlement.

If an area was not occupied during a period of potential archaeological significance, there is no potential to locate deeply buried significant archaeological resources. There are only a few very rare exceptions related to historical significance that is not tied to the time period of activity or occupation of a site but to certain historical events and/or personalities.

Areas of suspected disturbance where test pit survey was viable were shovel tested as described below.

2. *Place Stage 2 test pits throughout the disturbed areas according to professional judgment (and where physically viable) as to confirm that these areas have been completely disturbed.*
   *[*An area of suspected disturbance was identified during the Property Inspection conducted as part of the Stage 2 Property Assessment. This area consists of an area identified probable disturbance from the gravel driveways, the footprint of existing structures, the concrete pad in front of one of the sheds, the gravel parking area for farm equipment, the concrete patio, the presence of gravel fill in the lawn, and the sand fill soil mounds in the northern portion of the study area. Test pits were excavated every 10 metres across the entirety of this portion of the study area

where physically viable. The intensity of test pit survey conducted is far in excess of the minimum standard required. AMICK Consultants Limited tested the suspected disturbed area at a 10-metre interval to confirm disturbance in a manner consistent with the objectives to ensure that the area is accurately delimited and properly identified. There is no requirement to systematically examine such areas. The Standards and Guidelines require only judgmental testing based on the professional judgment of the investigating archaeologist. In most typical archaeological assessments the entire area of presumed disturbance will be written off as an area of no archaeological potential without thorough testing to demonstrate that the entire area is disturbed or it will be tested at subjective, irregular and inconsistent intervals, and consequently such testing cannot verify that the entire area contained within the presumed limits of disturbance are, in fact, disturbed. The methodology employed here by AMICK Consultants Limited exceeds any requirements of the Standards and Guidelines and that which is generally applied within the industry.

The excavated soil and the profiles of these test pits were examined to determine if each represented an area of disturbance. Test pits were excavated a minimum of 30 cm below grade in order to ensure that test pits were excavated to depths below the surrounding natural grade. This procedure demonstrated that the entire study area consists of fill deposited within a deeply disturbed context. There is no archaeological potential within this area.]

(MTC 2011: 38)

7.0 RECORD OF FINDS

Section 7.8.2 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 137-138) outlines the requirements of the Record of Finds component of a Stage 2 report:

1. *For all archaeological resources and sites that are identified in Stage 2, provide the following:*
    a. *a general description of the types of artifacts and features that were identified*
    b. *a general description of the area within which artifacts and features were identified, including the spatial extent of the area and any relative variations in density*
    c. *a catalogue and description of all artifacts retained*
    d. *a description of the artifacts and features left in the field (nature of material, frequency, other notable traits).*
2. *Provide an inventory of the documentary record generated in the field (e.g. photographs, maps, field notes).*
3. *Submit information detailing exact site locations on the property separately from the project report, as specified in section 7.6. Information on exact site locations includes the following:*
    a. *table of GPS readings for locations of all archaeological sites*

b. maps showing detailed site location information.

7.1 ARCHAEOLOGICAL RESOURCES

No archaeological resources of any description were encountered anywhere within the study area.

7.2 ARCHAEOLOGICAL FIELDWORK DOCUMENTATION

The documentation produced during the field investigation conducted in support of this report includes: one sketch map, one page of photo log, one page of field notes, and 52 digital photographs.

8.0 ANALYSIS AND CONCLUSIONS

AMICK Consultants Limited was engaged by the proponent to undertake a Stage 1-2 Archaeological Assessment of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological fieldwork. The entirety of the study area was subject to property inspection and photographic documentation concurrently with the Stage 2 Property Assessment on 15,16, 18, 19 & 20 November 2020 and 5 April 2021, consisting of high-intensity test pit survey at an interval of five metres between individual test pits, test pit survey at ten-metre intervals to confirm disturbance and high intensity pedestrian survey at an interval of five metres between individual transects. All records, documentation, field notes, photographs and artifacts (as applicable) related to the conduct and findings of these investigations are held at the Southwestern District corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) on behalf of the government and citizens of Ontario.

8.1 STAGE 1 ANALYSIS AND CONCLUSIONS

As part of the present study, background research was conducted in order to determine the archaeological potential of the proposed project area.

"A Stage 1 background study provides the consulting archaeologist and Ministry report reviewer with information about the known and potential cultural heritage resources within a particular study area, prior to the start of the field assessment." (OMCzCR 1993)

The evaluation of potential is further elaborated Section 1.3 of the Standards and Guidelines for Consultant Archaeologist (2011) prepared by the Ontario Ministry of Tourism and Culture:

" The Stage 1 background study (and, where undertaken, property inspection) leads to an evaluation of the property's archaeological potential. If the evaluation indicates that there is archaeological potential anywhere on the property, the next step is a Stage 2 assessment."

(MTC 2011: 17)

Features or characteristics that indicate archaeological potential when documented within the study area, or within close proximity to the study area (as applicable), include:

" - previously identified archaeological sites

- *water sources (It is important to distinguish types of water and shoreline, and to distinguish natural from artificial water sources, as these features affect site locations and types to varying degrees.):*
    - *primary water sources (lakes, rivers, streams, creeks)*
    - *secondary water sources (intermittent streams and creeks, springs, marshes, swamps)*
    - *features indicating past water sources (e.g., glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches)*
    - *accessible or inaccessible shoreline (e.g., high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh)*
- *elevated topography (e.g., eskers, drumlins, large knolls, plateaux)*
- *pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground*
- *distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings.*
- *resource areas, including:*
    - *food or medicinal plants (e.g., migratory routes, spawning areas, prairie)*
    - *scarce raw materials (e.g., quartz, copper, ochre or outcrops of chert)*
    - *early Post-contact industry (e.g., fur trade, logging, prospecting, mining)*
- *areas of early Post-contact settlement. These include places of early military or pioneer settlement (e.g., pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches and early cemeteries. There may be commemorative markers of their history, such as local, provincial, or federal monuments or heritage parks.*
- *Early historical transportation routes (e.g., trails, passes, roads, railways, portage routes)*
- *property listed on a municipal register or designated under the Ontario Heritage Actor that is a federal, provincial or municipal historic landmark or site*
- *property that local histories or informants have identified with possible archaeological sties, historical events, activities, or occupations"*

(MTC 2011: 17-18)

The evaluation of potential does not indicate that sites are present within areas affected by proposed development. Evaluation of potential considers the possibility for as yet undocumented sites to be found in areas that have not been subject to systematic archaeological investigation in the past. Potential for archaeological resources is used to determine if property assessment of a study area or portions of a study area is required.

> *"Archaeological resources not previously documented may also be present in the affected area. If the alternative areas being considered, or the preferred alternative selected, exhibit either high or medium potential for the discovery of archaeological remains an archaeological assessment will be required."*
>
> (MCC & MOE 1992: 6-7)

> *"The Stage 1 background study (and, where undertaken, property inspection) leads to an evaluation of the property's archaeological potential. If the evaluation indicates that there is archaeological potential anywhere on the property, the next step is a Stage 2 assessment."*
>
> (MTC 2011: 17)

In addition, archaeological sites data is also used to determine if any archaeological resources had been formerly documented within or in close proximity to the study area and if these same resources might be subject to impacts from the proposed undertaking. This data was also collected in order to establish the relative cultural heritage value or interest of any resources that might be encountered during the conduct of the present study. For example, the relative rarity of a site can be used to assign an elevated level of cultural heritage value or interest to a site that is atypical for the immediate vicinity. The requisite archaeological sites data of previously registered archaeological sites was collected from the MHSTCI and the corporate research library of AMICK Consultants Limited. The Stage 1 Background Research methodology also includes a review of the most detailed available topographic maps, historical settlement maps, archaeological management plans (where applicable) and commemorative plaques or monuments. When previous archaeological research documents lands to be impacted by the proposed undertaking or archaeological sites within 50 metres of the study area, the reports documenting this earlier work are reviewed for pertinent information. AMICK Consultants Limited will often modify this basic methodology based on professional judgment to include additional research (such as, local historical works or documents and knowledgeable informants).

Section 7.7.3 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 132) outlines the requirements of the Analysis and Conclusions component of a Stage 1 Background Study.

1) *"Identify and describe areas of archaeological potential within the project area.*
2) *Identify and describe areas that have been subject to extensive and deep land alterations. Describe the nature of alterations (e.g., development or other activity) that have severely damaged the integrity of archaeological resources and have removed archaeological potential."*

CHARACTERISTICS INDICATING ARCHAEOLOGICAL POTENTIAL

Section 1.3.1 of the Standards and Guidelines for Consultant Archaeologists specifies the property characteristics that indicate archaeological potential (MTC 2011: 17-18). Factors that indicate archaeological potential are features of the local landscape and environment that may have attracted people to either occupy the land or to conduct activities within the study area. One or more of these characteristics found to apply to a study area would necessitate a Stage 2 Property Assessment to determine if archaeological resources are present. These characteristics are listed below together with considerations derived from the conduct of this study.

1) *Previously Identified Archaeological Sites*
   Previously registered archaeological sites have not been documented within 300 metres of the study area.

2) *Water Sources*
   Primary water sources are described as including lakes, rivers streams and creeks. Close proximity to primary water sources (300 metres) indicates that people had access to readily available sources of potable water and routes of waterborne trade and communication should the study area have been used or occupied in the past.

   There are no identified primary water sources within 300 metres of the study area.

   Secondary water sources are described as including intermittent streams and creeks, springs, marshes, and swamps. Close proximity (300 metres) to secondary water sources indicates that people had access to readily available sources of potable water, at least on a seasonal basis, and in some cases seasonal access to routes of waterborne trade and communication should the study area have been used or occupied in the past.

   There is an unnamed creek that flows between agricultural fields within Lots 11 and 12. There are also two small streams within the meadow area that connect to the creek and a man-made pond in the centre of the study area.

3) *Features Indicating Past Water Sources*
   Features indicating past water resources are described as including glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, and cobble beaches. Close proximity (300 metres) to features indicating past water sources indicates that people had access to readily available sources of potable water, at least on a seasonal basis, and in some cases seasonal access to routes of waterborne trade and communication should the study area have been used or occupied in the past.

There are no identified features indicating past water sources within 300 metres of the study area.

4) *Accessible or Inaccessible Shoreline*
This form of landscape feature would include high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.

There are no shorelines within 300 metres of the study area.

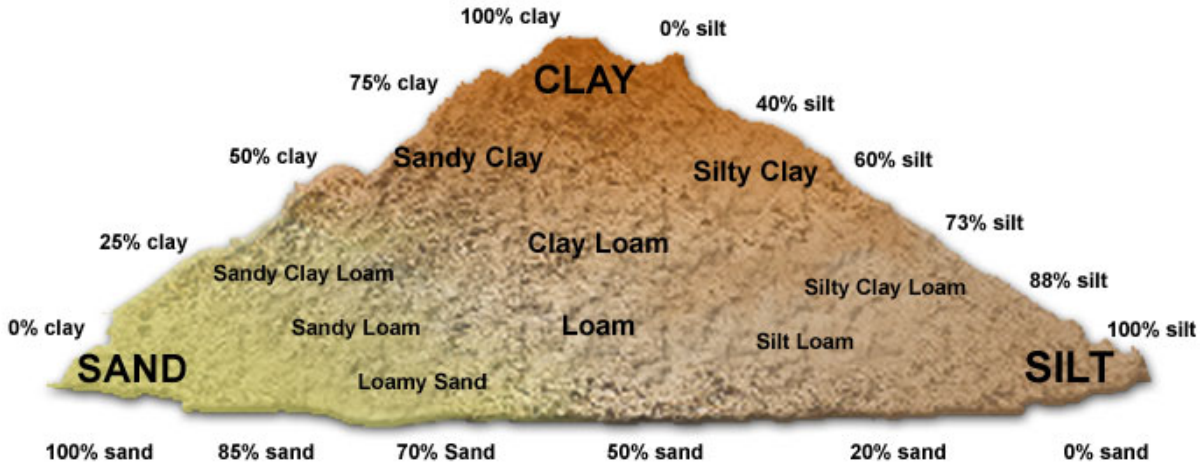
5) *Elevated Topography*
Features of elevated topography that indicate archaeological potential include eskers, drumlins, large knolls, and plateaux.

There are no identified features of elevated topography within the study area.

6) *Pockets of Well-drained Sandy Soil*
Pockets of sandy soil are considered to be especially important near areas of heavy soil or rocky ground.

The soil throughout the study area is medium brown loamy clay, which is consistent with the wider area surrounding the property. Therefore, the presence of this soil has no impact on potential within the study area, as the wider area is not known for clay soils or exposed bedrock.

The image below (Kuhlmann, Stacy 2017) shows the consistencies of soil types and how they compare to one another. The soil found within the study area was loamy clay, which contains a higher percentage of loam with a lower percentage of clay. The lower percentage of clay allows the soil to break up from the action of ploughing alone when not compacted or bound by extensive root masses.



(Kuhlmann, Stacy 2017)

7) *Distinctive Land Formations*
These are landscape features that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings.

There are no identified distinctive land formations within the study area.

8) *Resource Areas*
Resource areas that indicate archaeological potential include food or medicinal plants (e.g., migratory routes, spawning areas, and prairie), scarce raw materials (e.g., quartz, copper, ochre or outcrops of chert) and resources of importance to early Post-contact industry (e.g., logging, prospecting, and mining).

There are no identified resource areas within the study area.

9) *Areas of Early Post-Contact Settlement*
These include places of early military or pioneer settlement (e.g., pioneer homesteads, isolated cabins, and farmstead complexes), early wharf or dock complexes, pioneer churches and early cemeteries. There may be commemorative markers of their history, such as local, provincial, or federal monuments or heritage parks.

The study area is not situated within close proximity to an area of early Post-Contact Settlement. The town of Fergus is shown to be almost a kilometer away from the study area in the 1861 and 1877 historical maps.

10) *Early Historical Transportation Routes*
This includes evidence of trails, passes, roads, railways, portage routes.

The study area is situated within 100 metres of early settlement roads that appear on the Historic Atlas Map of 1861 and 1877. These historic roads correspond to the roads presently known as 2 Line, Guelph Street, Scotland Street and Highway 6.

11) *Heritage Property*
Property listed on a municipal register or designated under the *Ontario Heritage Act* or is a federal, provincial or municipal historic landmark or site.

There are no listed or designated heritage buildings or properties that form a part of the study area. There are no listed or designated heritage buildings or properties that are adjacent to the study area.

12) *Documented Historical or Archaeological Sites*
This includes property that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations. These are properties which have not necessarily been formally recognized or for which there is additional

evidence identifying possible archaeological resources associated with historic properties in addition to the rationale for formal recognition.

There are no known heritage features, or known historic sites, or known archaeological sites within the study area in addition to those formally documented with the appropriate agencies or previously noted under a different criterion.

CHARACTERISTICS INDICATING REMOVAL OF ARCHAEOLOGICAL POTENTIAL

Section 1.3.2 of the Standards and Guidelines for Consultant Archaeologists specifies the property characteristics which indicate no archaeological potential or for which archaeological potential has been removed (MTC 2011: 18-19). These characteristics are listed below together with considerations derived from the conduct of this study.
The introduction of Section 1.3.2 (MTC 2011: 18) notes that *"Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. This is commonly referred to as 'disturbed' or 'disturbance', and may include:"*

1) *Quarrying*
   There is no evidence to suggest that quarrying operations were ever carried out within the study area.

2) *Major Landscaping Involving Grading Below Topsoil*
   Unless there is evidence to suggest the presence of buried archaeological deposits, such deeply disturbed areas are considered to have lost their archaeological potential. Properties that do not have a long history of Post-Contact occupation can have archaeological potential removed through extensive landscape alterations that penetrate below the topsoil layer. This is because most archaeological sites originate at grade with relatively shallow associated excavations into the soil. Pre-Contact sites and early historic sites are vulnerable to extensive damage and complete removal due to landscape modification activities. In urban contexts where a lengthy history of occupation has occurred, properties may have deeply buried archaeological deposits covered over and sealed through redevelopment activities that do not include the deep excavation of the entire property for subsequent uses. Buildings are often erected directly over older foundations preserving archaeological deposits associated with the earlier occupation.

   There is evidence to suggest that major landscaping operations involving grading below topsoil were carried out within the study area. In this instance, the gravel driveways, concrete pad, concrete patio, and gravel parking area are examples of major landscaping operations. Surfaces paved with interlocking brick, concrete, asphalt, gravel and other surfaces meant to support heavy loads or to be long wearing hard surfaces in high traffic areas, must be prepared by the excavation and removal of topsoil, grading, and the addition of aggregate material to ensure appropriate

engineering values for the supporting matrix and also to ensure that the installations shed water to avoid flooding or moisture damage. All hard surfaced areas are prepared in this fashion and therefore have no or low archaeological potential. Disturbed areas are excluded from Stage 2 Property Assessment due to no or low archaeological potential and often because they are also not viable to assess using conventional methodology.

3) *Building Footprints*
Typically, the construction of buildings involves the deep excavation of foundations, footings and cellars that often obliterate archaeological deposits situated close to the surface.

There are several buildings within the study area. These consist of three residences, a bank barn, two silos and three sheds.

4) *Sewage and Infrastructure Development*
Installation of sewer lines and other below ground services associated with infrastructure development often involves deep excavation that can remove archaeological potential.

There is no evidence to suggest that substantial below ground services of any kind have resulted in significant impacts to any significant portion of the study area. Major utility lines are conduits that provide services such as water, natural gas, hydro, communications, sewage, and others. These major installations should not be confused with minor below ground service installations not considered to represent significant disturbances removing archaeological potential, such as services leading to individual structures which tend to be comparatively very shallow and vary narrow corridors. Areas containing substantial and deeply buried services or clusters of below ground utilities are considered areas of disturbance, and may be excluded from Stage 2 Property Assessment.

"Activities such as agricultural cultivation, gardening, minor grading and landscaping do not necessarily affect archaeological potential."

(MTC 2011: 18)

"Archaeological potential is not removed where there is documented potential for deeply buried intact archaeological resources beneath land alterations, or where it cannot be clearly demonstrated through background research and property inspection that there has been complete and intensive disturbance of an area. Where complete disturbance cannot be demonstrated in Stage 1, it will be necessary to undertake Stage 2 assessment."

(MTC 2011: 18)

SUMMARY

Table 3 below summarizes the evaluation criteria of the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) together with the results of the Stage 1 Background Study for the proposed undertaking. Based on the criteria, the property is deemed to have archaeological potential on the basis of proximity to water and the location of early historic settlement roads adjacent to the study area.

TABLE 3 EVALUATION OF ARCHAEOLOGICAL POTENTIAL

FEATURE OF ARCHAEOLOGICAL POTENTIAL		YES	NO	N/A	COMMENT
1	Known archaeological sites within 300m		**N**		If Yes, potential determined
PHYSICAL FEATURES					
2	Is there water on or near the property?	**Y**			If Yes, what kind of water?
2a	Primary water source within 300 m. (lakeshore, river, large creek, etc.)		**N**		If Yes, potential determined
2b	Secondary water source within 300 m. (stream, spring, marsh, swamp, etc.)	**Y**			If Yes, potential determined
2c	Past water source within 300 m. (beach ridge, river bed, relic creek, etc.)		**N**		If Yes, potential determined
2d	Accessible or Inaccessible shoreline within 300 m. (high bluffs, marsh, swamp, sand bar, etc.)		**N**		If Yes, potential determined
3	Elevated topography (knolls, drumlins, eskers, plateaus, etc.)		**N**		If Yes, and Yes for any of 4-9, potential determined
4	Pockets of sandy soil in a clay or rocky area		**N**		If Yes and Yes for any of 3, 5-9, potential determined
5	Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)		**N**		If Yes and Yes for any of 3-4, 6-9, potential determined
HISTORIC/PREHISTORIC USE FEATURES					
6	Associated with food or scarce resource harvest areas (traditional fishing locations, agricultural/berry extraction areas, etc.)		**N**		If Yes, and Yes for any of 3-5, 7-9, potential determined.
7	Early Post-Contact settlement area within 300 m.		**N**		If Yes, and Yes for any of 3-6, 8-9, potential determined
8	Historic Transportation route within 100 m. (historic road, trail, portage, rail corridors, etc.)	**Y**			If Yes, and Yes for any 3-7 or 9, potential determined
9	Contains property designated and/or listed under the Ontario Heritage Act (municipal heritage committee, municipal register, etc.)		**N**		If Yes and, Yes to any of 3-8, potential determined
APPLICATION-SPECIFIC INFORMATION					
10	Local knowledge (local heritage organizations, Pre-Contact, etc.)		**N**		If Yes, potential determined
11	Recent disturbance not including agricultural cultivation (post-1960-confirmed extensive and intensive including industrial sites, aggregate areas, etc.)	**Y**			If Yes, no potential or low potential in affected part (s) of the study area.

If **YES** to any of 1, 2a-c, or 10 Archaeological Potential is **confirmed**
If **YES** to 2 or more of 3-9, Archaeological Potential is **confirmed**
If **YES** to 11 or No to 1-10 Low Archaeological Potential is **confirmed** for at least a portion of the study area.

8.2 STAGE 2 ANALYSIS AND CONCLUSIONS

Section 7.8.3 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 138-139) outlines the requirements of the Analysis and Conclusions component of a Stage 2 Property Assessment.

1. *Summarize all finding from the Stage 2 survey, or state that no archaeological sites were identified.*
2. *For each archaeological site, provide the following analysis and conclusions:*
   a. *A preliminary determination, to the degree possible, of the age and cultural affiliation of any archaeological sites identified.*
   b. *A comparison against the criteria in 2 Stage 2: Property Assessment to determine whether further assessment is required*
   c. *A preliminary determination regarding whether any archaeological sites identified in Stage 2 show evidence of a high level cultural heritage value or interest and will thus require Stage 4 mitigation.*

No archaeological sites or resources were found during the Stage 2 survey of the study area.

9.0 RECOMMENDATIONS

9.1 STAGE 2 RECOMMENDATIONS

Under Section 7.8.4 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 139) the recommendations to be made as a result of a Stage 2 Property Assessment are described.

1) For each archaeological site, provide a statement of the following:
   a. Borden number or other identifying number
   b. Whether or not it is of further cultural heritage value or interest
   c. Where it is of further cultural heritage value or interest, appropriate Stage 3 assessment strategies

2) Make recommendations only regarding archaeological matters. Recommendations regarding built heritage or cultural heritage landscapes should not be included.

3) If the Stage 2 survey did not identify any archaeological sites requiring further assessment or mitigation of impacts, recommend that no further archaeological assessment of the property be required.

As a result of the Stage 2 Property Assessment of the study area, no archaeological resources were encountered. Consequently, the following recommendations are made:

1. *No further archaeological assessment of the study area is warranted;*

2. *The Provincial interest in archaeological resources with respect to the proposed undertaking has been addressed;*
3. *The proposed undertaking is clear of any archaeological concern.*

10.0 ADVICE ON COMPLIANCE WITH LEGISLATION

While not part of the archaeological record, this report must include the following standard advisory statements for the benefit of the proponent and the approval authority in the land use planning and development process:

a. *This report is submitted to the Minister of Heritage, Sport, Tourism and Culture Industries 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 it complies with the standards and guidelines issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.*

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 artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist 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 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 Cremation 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 at the Ministry of Consumer Services.*

e. *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 from them, except by a person holding an archaeological licence.*

11.0 BIBLIOGRAPHY AND SOURCES

Chapman, L.J. & D.F. Putnam. (1984). *The Physiography of Southern Ontario (Third Edition).* Ontario Geological Survey, Special Report #2. Ontario Ministry of Natural Resources, Toronto.

Elora & Fergus. *Sharing the Secrets of Centre Wellington.* Retrieved from URL: https://www.fergusfilming.ca/fergusontario#:~:text=With%20a%20population%20of%2020%2C767,it's%20Scottish%20founders%2C%20Adam%20Fergusson.

Esri. "Topographic" [basemap]. Scale Not Given. "World Topographic Map". April 5 2021. http://www.arcgis.com/home/item.html?id=30e5fe3149c34df1ba922e6f5bbf808f.

Goel, Tarun (2013). Road Construction: History and Procedure. Bright Hub Engineering. Retrieved 24 May 2015 from URL: http://www.brighthubengineering.com/structural-engineering/59665-road-construction-history-and-procedure/

Google Earth (Version 6.0.3.2197) [Software]. (2021). Available from http://www.google.com/earth/index.html.

Kuhlmann, Stacy. (2017). *Types of Soil.* Diagram of Soil Types available from http://www.tes.com/lessons/AKChU3fbfZKo9g/types-of-soil.

Leslie, Guy. (1861). *Historical County Map of Wellington County.* Charles Wheelock and W.C. Chewett, W.C. Chewett & Co., Orangeville.

Ontario Heritage Act, RSO 1990a, Government of Ontario. (Queen's Printer, Toronto).

Ontario Heritage Amendment Act, SO 2005, Government of Ontario. (Queen's Printer, Toronto).

Ontario Ministry of Citizenship, Culture and Recreation (OMCzCR). (1993). *Archaeological Assessment Technical Guidelines, Stages 1-3 and Reporting Format.* (Queen's Printer for Ontario 1993)

Ontario Ministry of Culture (MCL). (2005). *Conserving a Future for Our Past: Archaeology, Land Use Planning & Development in Ontario (An Educational Primer and Comprehensive Guide for Non-Specialists).* (Heritage & Libraries Branch, Heritage Operations Unit: Toronto).

Ontario Ministry of Culture and Communications (MCC) & Ministry of Environment (MOE). (1992). *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments.* (Cultural Programs Branch, Archaeology and Heritage Planning: Toronto).

Ontario Ministry of Tourism and Culture (MTC). (2011). *Standards and Guidelines for Consultant Archaeologist.* (Programs and Services Branch: Culture Programs Unit, Toronto).

Ontario Planning Act, RSO 1990b, Government of Ontario. (Queen's Printer, Toronto).

Provincial Policy Statement (2020). Government of Ontario. (Queen's Printer, Toronto).

Smith, David G. (2002). "Ten Thousand Years: Aboriginal Heritage in Mississauga." In *Mississauga: The First 10,000 Years*. Frank Dieterman, Ed. Mississauga Heritage Foundation, Eastendbooks, Toronto.

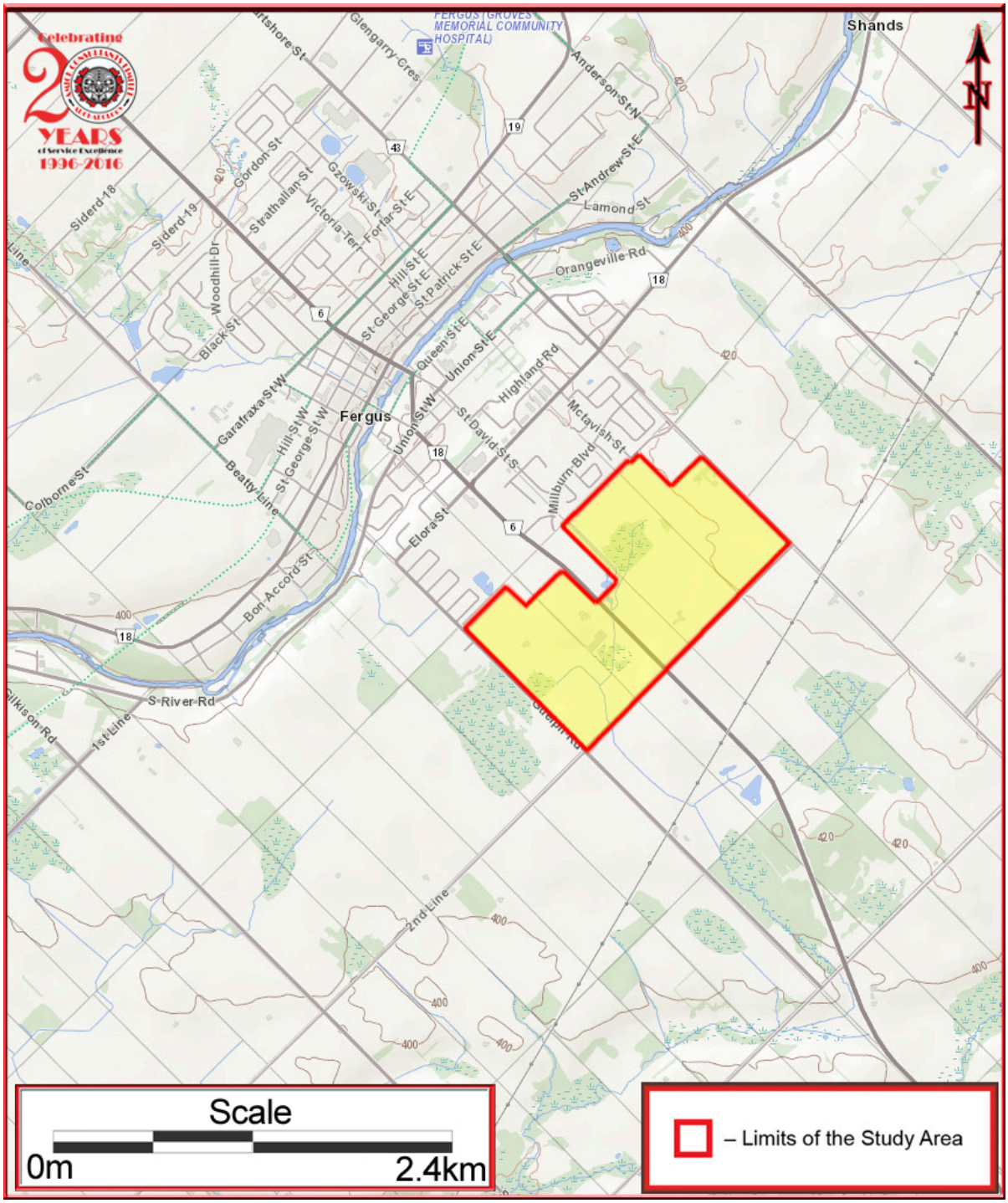
South Fergus Landowner Group. (2020). *South Fergus MESP & Secondary Plan.* South Fergus Landowner Group, Fergus.

Walker & Miles. (1877). *Illustrated Historical Atlas of Waterloo and Wellington Counties.* Walker & Miles, Toronto.

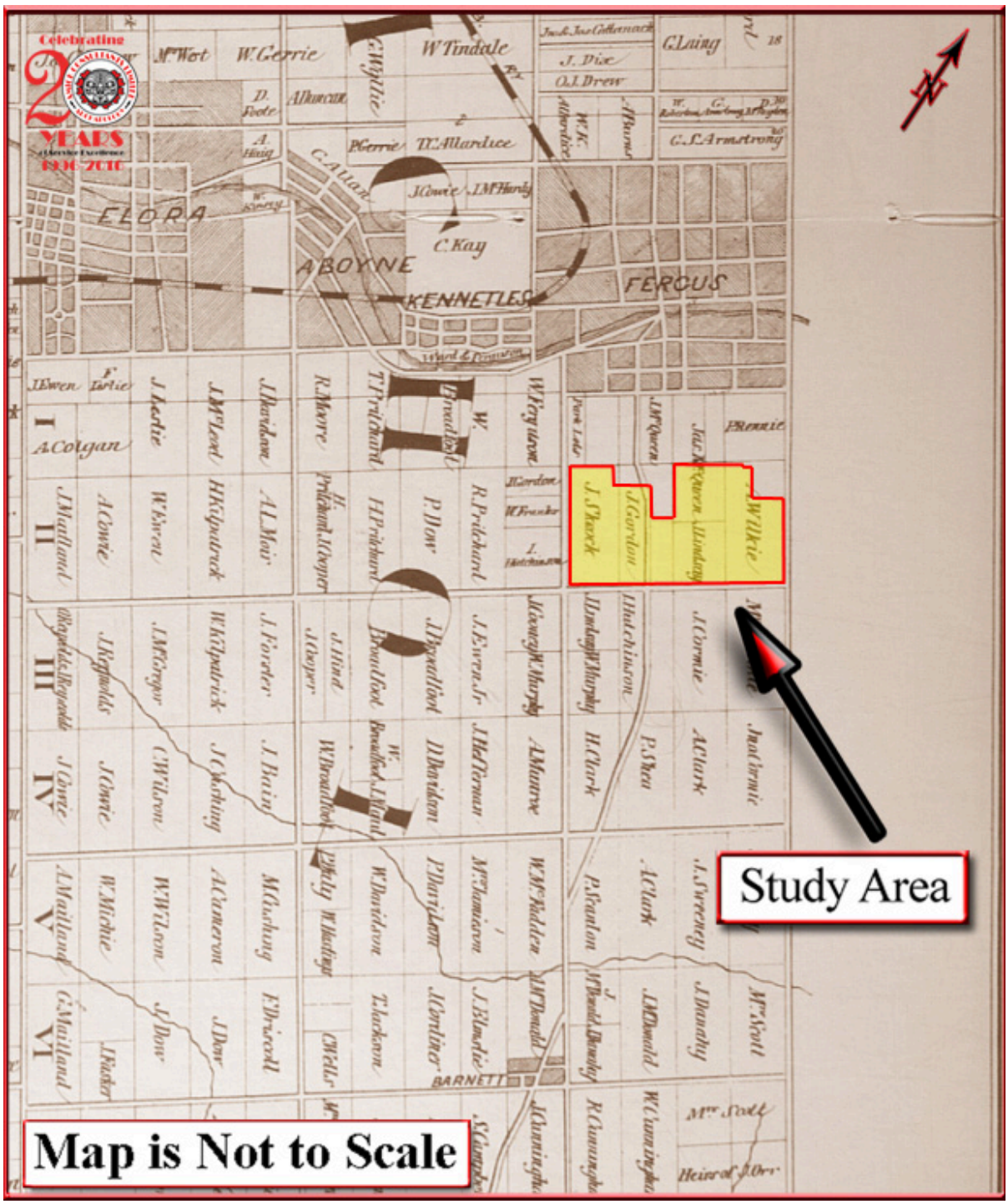
Wikipedia. (2017). *Wellington County, Ontario.* Retrieved 29 August, 2017 from URL: https://en.wikipedia.org/wiki/Wellington_County,_Ontario#History

Wright, J.V. (1972). *Ontario Prehistory: an Eleven-thousand-year Archaeological Outline*. Archaeological Survey of Canada. National Museum of Man, Ottawa.

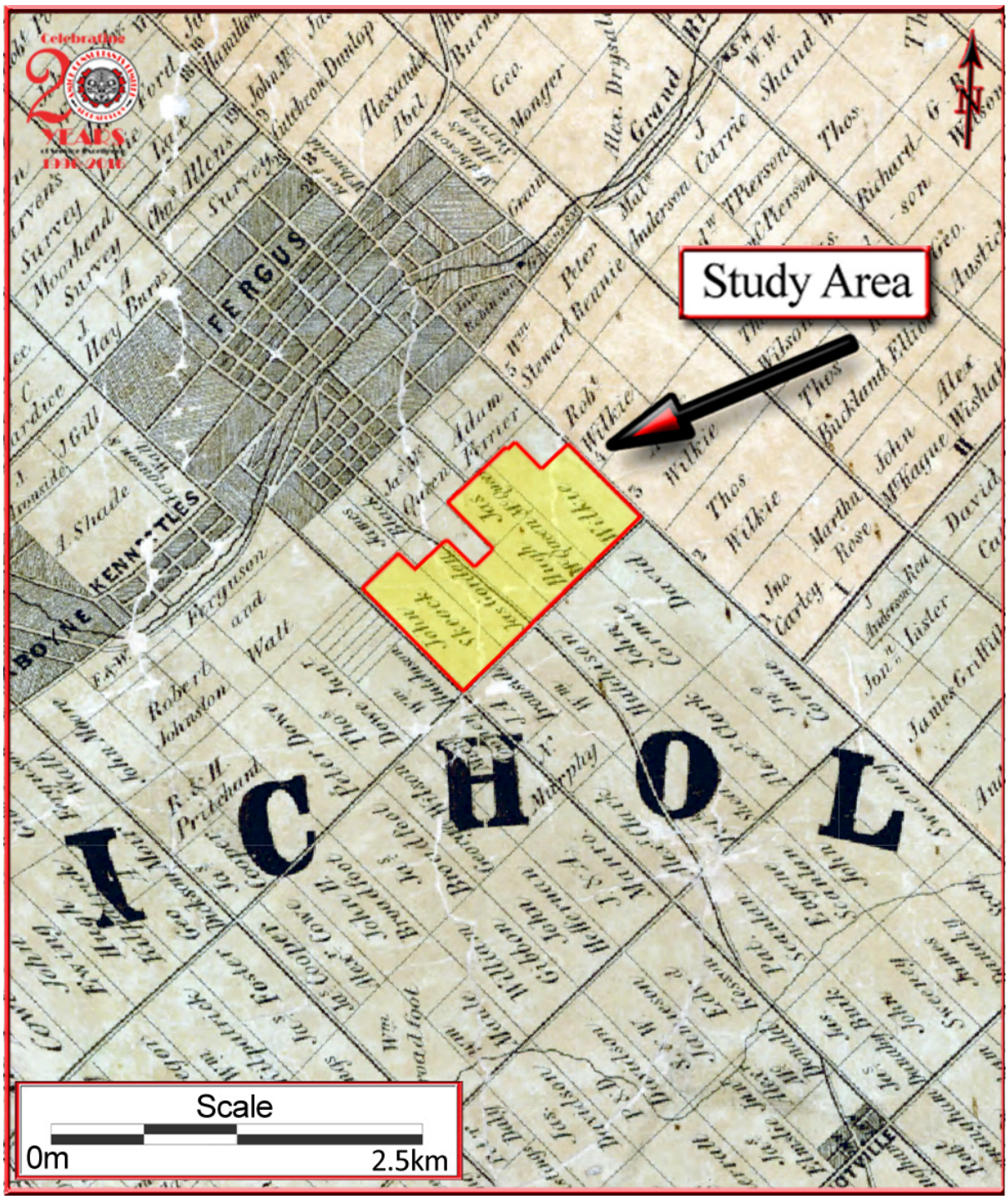
12.0 MAPS



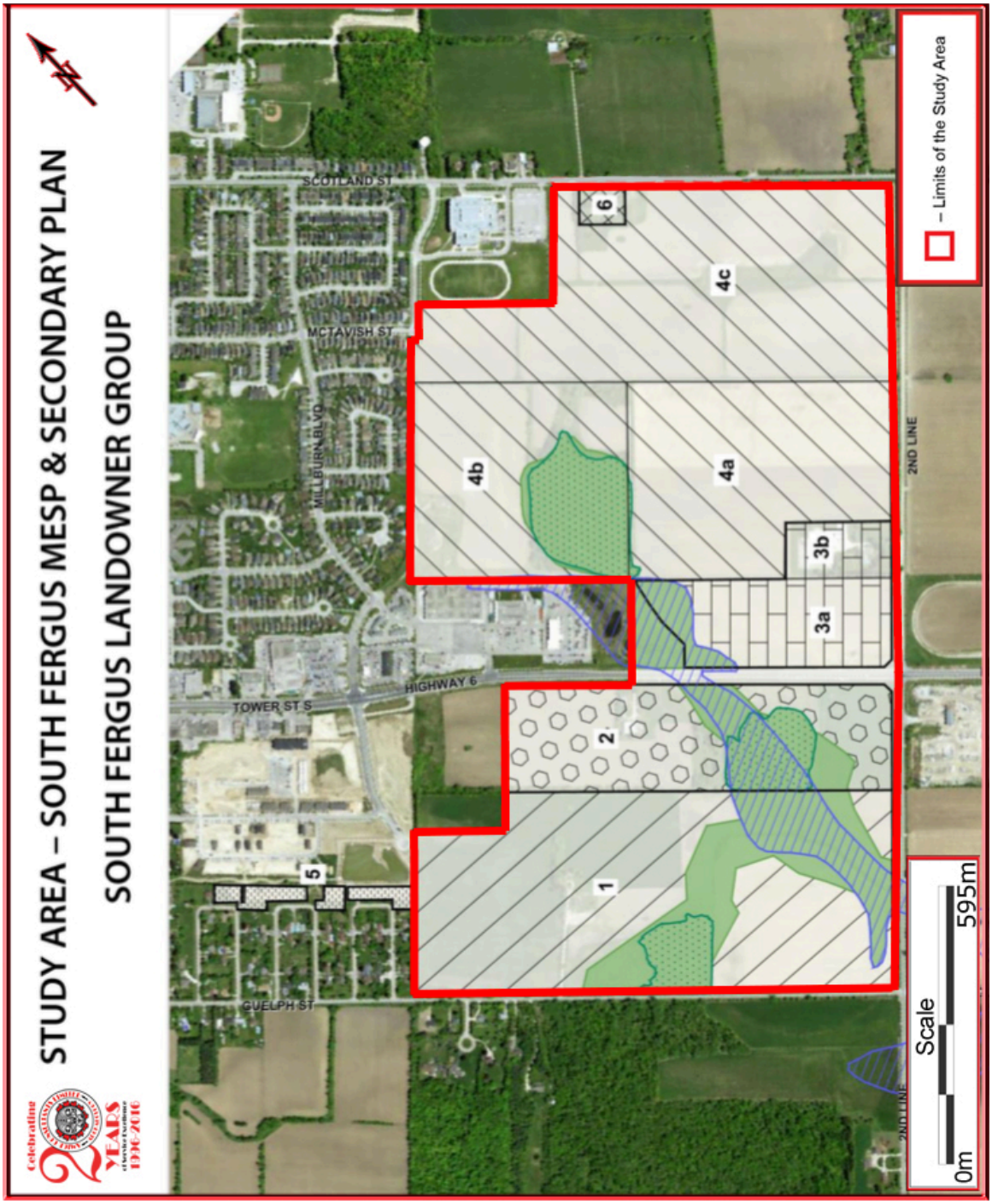
MAP 1 LOCATION OF THE STUDY AREA (ESRI 2021)



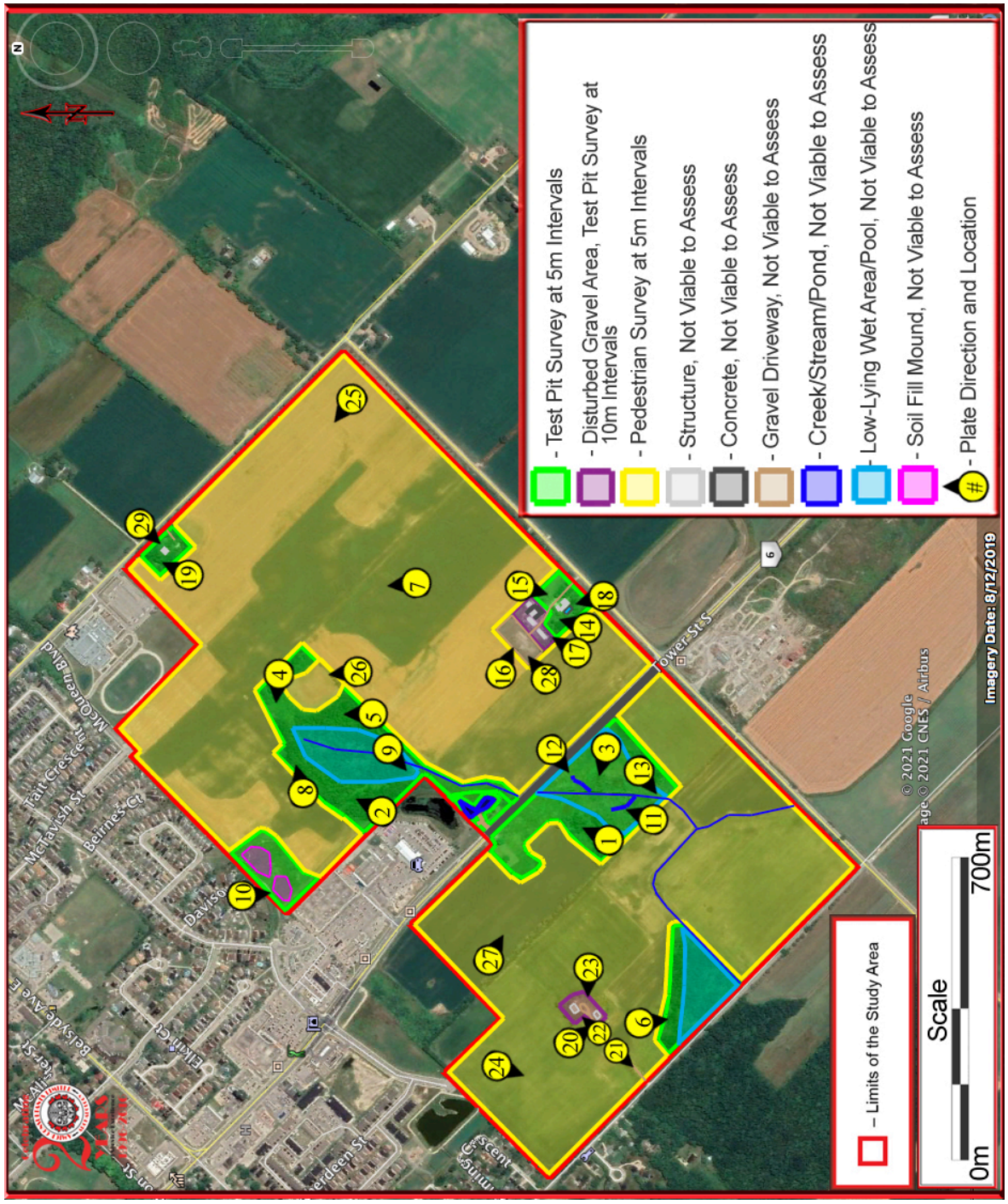
MAP 2 FACSIMILE SEGMENT OF THE ILLUSTRATED HISTORICAL ATLAS OF WATERLOO AND WELLINGTON COUNTIES (WALKER & MILES 1877)



MAP 3 FACSIMILE SEGMENT OF THE HISTORICAL COUNTY MAP OF WELLINGTON COUNTY (LESLIE GUY 1861)



MAP 4 SECONDARY PLAN (SOUTH FERGUS LANDOWNER GROUP 2020)



MAP 5 AERIAL PHOTO OF THE STUDY AREA (GOOGLE EARTH 2021)

13.0 IMAGES

IMAGE 1 SURVEY CONDITIONS IN WOODED AREA

IMAGE 2 SURVEY CONDITIONS IN WOODED AREA

IMAGE 3 DOGWOOD IN LOW-LYING WET AREA

IMAGE 4 MEADOW AREA SURVEY CONDITIONS

IMAGE 5 TEST PIT IN PROGRESS

IMAGE 6 CREW AT WORK

IMAGE 7 PEDESTRIAN SURVEY CONDITIONS

IMAGE 8 CREW AT WORK

IMAGE 9 LOW-LYING WET AREA

IMAGE 10 SAND FILL SOIL MOUNDS

IMAGE 11 SMALL STREAM IN MEADOW

IMAGE 12 SMALL STREAM IN MEADOW

IMAGE 13 CREEK THROUGH MEADOW

IMAGE 14 BANK BARN AND SHED WITH CONCRETE PAD

IMAGE 15 GRAVEL DRIVEWAY AND RESIDENCE

IMAGE 16 BANK BARN AND SILOS

IMAGE 17 SHED AND GRAVEL ON TOPSOIL

IMAGE 18 IN-GROUND POOL AND CONCRETE PATIO

IMAGE 19 TEST PIT IN PROGRESS

IMAGE 20 SHED

IMAGE 21 GRAVEL DRIVEWAY

IMAGE 22 RESIDENCE AND DISTURBED LAWN

IMAGE 23 DISTURBED TEST PIT

IMAGE 24 CREW CONDUCTING PEDESTRIAN SURVEY

IMAGE 25 SOIL CONDITIONS IN PLOUGHED FIELD

IMAGE 26 PEDESTRIAN SURVEY CONDITIONS

IMAGE 27 CREW CONDUCTING PEDESTRIAN SURVEY

IMAGE 28 GRAVEL PARKING AREA BEHIND BARN

IMAGE 29 RESIDENCE ON EASTERN BORDER

APPENDIX B

Natural Heritage Existing Conditions
Prepared by FRi Ecological Services

TECHNICAL MEMORANDUM

TO: Dave Aston

FROM: FRi Ecological Services

COPY:

AUTHOR: Rod Bilz

DATE: August 4, 2021

SUBJECT: South Fergus MESP and Secondary Plan - Natural Heritage Existing Conditions

EXECUTIVE SUMMARY

FRi Ecological Services was retained on March 10, 2020 to provide environmental services for the South Fergus Master Environmental Servicing Plan. Field work commenced in April 2020 and was completed on June 3, 2021 for the purposes of this Natural Heritage Existing Conditions Report.

The key natural heritage features investigated included Provincially Significant Wetlands (PSW), Significant Woodlands, Habitat of Endangered Species and Threatened Species, Significant Wildlife Habitat (SWH) and Fish Habitat. Virtually all of these values occur in the identified Core Greenlands and the remainder of the study area is primarily agricultural. The study area contains PSW, Significant Woodlands, habitat for at least one threatened species, SWH and fish habitat.

One threatened species, Barn Swallow, was detected within the study area and approximately 79 nests were identified in a barn at the Second Line heritage residence. The tributary to Swan Creek is part of the Nichol Drain and has been identified as a coldwater system but fish community sampling only yielded warmwater baitfish species within the study area.

INTRODUCTION

The overall purpose of the South Fergus Master Environmental Servicing Plan (MESP) and Secondary Plan is to guide the development of the remaining designated greenfield lands in South Fergus. The study area is approximately 152ha and includes Part of Lots 11, 12 and 14, and all of Lot 13, Concession 2, Geographic Township of Nichol, Township of Centre Wellington in the County of Wellington (Figure 1).

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

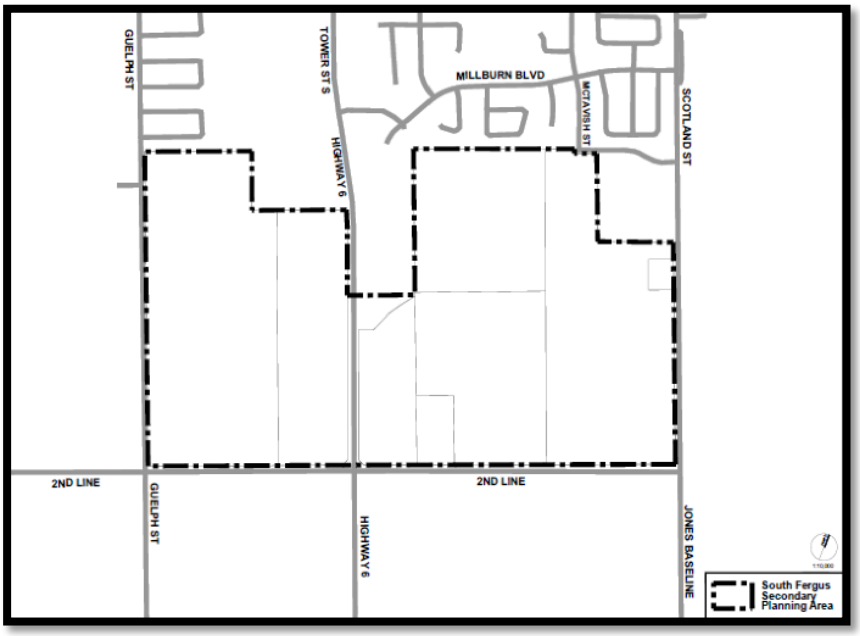


Figure 1 Study Area

METHODS AND PROCEDURES

Prior to field investigations, background information was gathered for the site including the review of the following sources:

- Natural Heritage Information Centre
- Ontario Breeding Bird Atlas Square 17NJ53
- eBird
- iNaturalist
- Ontario Reptile and Amphibian Atlas
- Schedules A-1 and C of the Official Plan Centre Wellington
- Schedule A-1 and Appendix 3 of the Official Plan for Wellington County

Standardized survey protocols were used where applicable and available including:

- Marsh Monitoring Program for Surveying Amphibians (2008)
- Survey Methodology under the Endangered Species Act, 2007 Dolichonyx oryzixorous (Bobolink)(2011)
- Survey Protocol for Eastern Meadowlark (Sturnella magna) in Ontario (2013)
- Survey Protocol for Blanding's turtle (Emydoidea blandingii) in Ontario (2015)
- Chimney Swift (Chaetura Pelagica) Monitoring Protocol (2009)
- Forest Bird Monitoring Program (2008)
- Adapted Methods for Monitoring Fish Populations (2011)

To meet the requirements for the various surveys and capture the information required to adequately address the natural heritage features of the site, multiple site investigations

were required over at least three seasons. Table 1 below documents the investigation effort and conditions.

The total person-hours of field investigations within the study area to date is 60.5 hours. In addition to this the Wildlife Acoustics SM3 bat and bird song recorder supplemented an additional 96 hours of recording time.

The ecological land classification required to map and identify the individual ecosites forms the foundation for much of the natural heritage evaluation. The Ecological Land Classification for Southern Ontario -First Approximation and its Application (1998) was used.

A number of policies, plans and legislation will be considered including:

- Provincial Policy Statement, 2020
- Municipal Official Plan Township of Centre Wellington, 2013
- County of Wellington Official Plan, 2021
- A Place to Grow-Growth Plan for the Greater Golden Horseshoe, 2020
- Endangered Species Act, 2007
- Fisheries Act, 1985
- Migratory Birds Convention Act, 1994

Table 1. Field Investigation Effort and Weather Conditions

Date	Air Temp. (°C)	Cloud Cover	Wind Direction	Wind Speed (kmh)	Precipitation	Activities	Hours
1APR20	11	Mainly Sunny	N	15	Nil	Reconnaisance, install bat/bird recorder, start ELC mapping, stick nest survey, turtle survey	7.0
16APR20	3	Mostly Cloudy	W	20	Nil	Change batteries in recorder, ELC mapping, amphibian surveys, turtle surveys	7.0
7MAY20	13	Mostly Cloudy	NNW	20	Nil	Change batteries in recorder, ELC mapping, amphibian and turtle surveys	6.0
27MAY20	29	Sunny	S	15	Nil	Forest Bird Monitoring, amphibian and turtle survey, Grassland Bird Survey, Chimney Swift,change batteries in recorder	4.0
24JUN20	20	Partly Sunny	WSW	20	Nil	Retrieve recorder, Forest Bird Monitoring, Grassland Bird Surveys, Chimney Swift	2.5
1JUL20	30	Sunny	N	10	Nil	ELC mapping, Chimney Swift	2.0
2JUL20	24	Sunny	NW	15	Nil	Forest Bird Monitoring, Grassland Bird Survey, Fish Habitat Survey	7.0
17AUG20	24	Partly Sunny	NW	10	Trace	ELC mapping	5.0
26NOV20	9	Overcast	W	15	Misty Drizzle	Hedgerow ELC and sticknest survey	5.0
3MAR21	4	Partly Sunny	NW	15	Nil	Spring wetland boundaries	2.0
4MAR21	0	Partly Sunny	N	20	Nil	Spring wetland boundaries, ELC mapping	4.5
2JUN21	24	Mostly Cloudy	S	15	Nil	Property addition ELC, Barn Swallow Nesting Survey, Wetland boundary refinement	1.0
3JUN21	20	Overcast	ESE	10	Light Rain	Barn Swallow Nesting Survey, Wetland boundary refinement	4.5

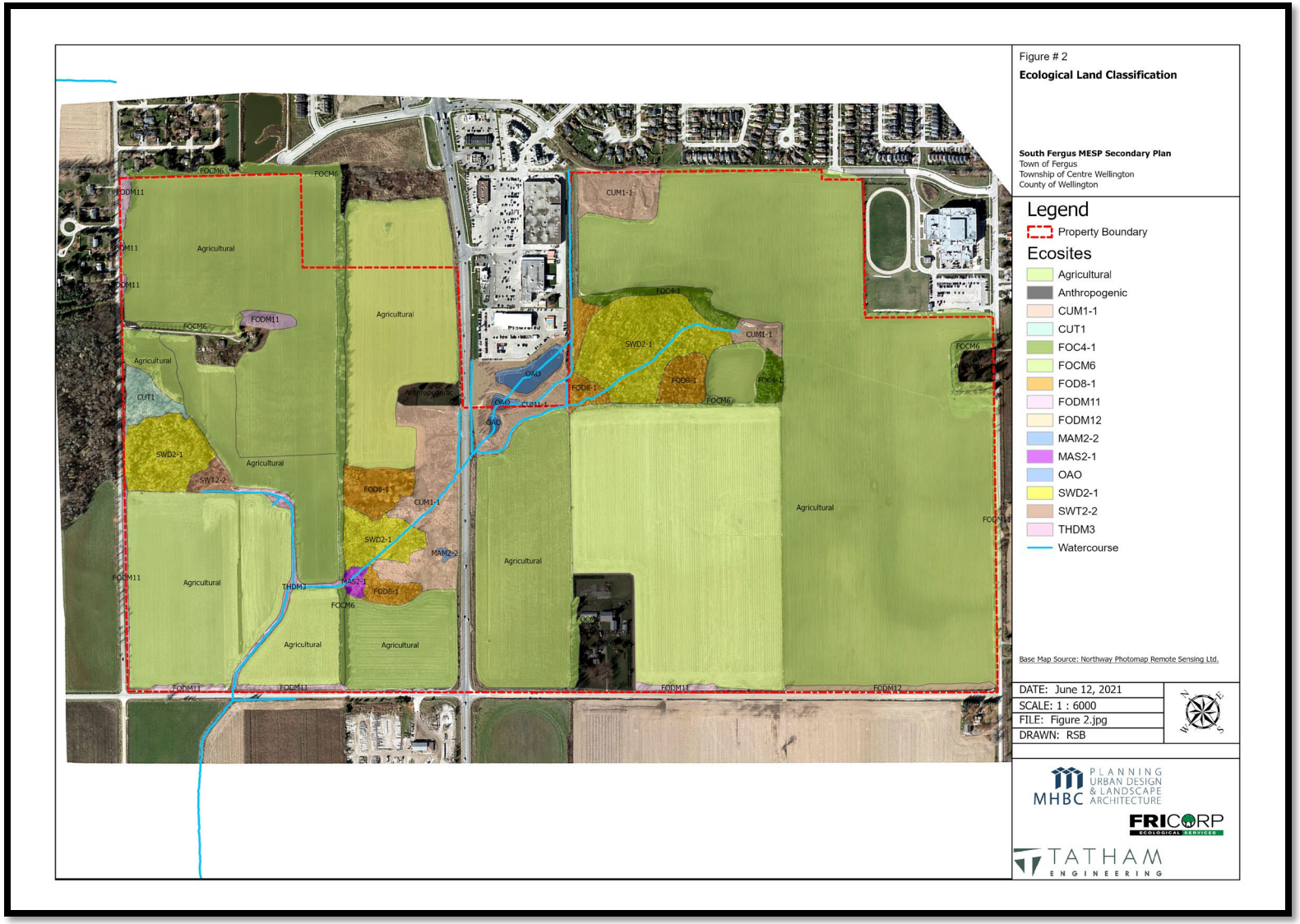


Figure 2 Ecological Land Classification

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

RESULTS AND DISCUSSION

There is a total of 15 ecosites within the study area. Each one will be discussed in brief detail below (**Figure 2**).

Ecosites

1. Agricultural

This is by far the most common ecosite within the study area. Much of this area continues to be under agricultural land use. Crops like soy bean and corn are the most common. The monoculture produced by this land use does not have any natural analog and wildlife use mainly occurs at the edges.

2. Anthropogenic

There is an active farmhouse and outbuildings located on Guelph Street within the study area, a heritage farmhouse, barn and outbuildings on Second Line east of Highway 6 and a former residential site on the west side of Highway 6 across from the stormwater ponds.

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

This ecosite occurs in four locations and is essentially areas that are not currently under intensive agricultural practices and are dominated mainly by grasses and forbs. Given time they will likely develop into a cultural thicket.

4. Mineral Cultural Thicket (CUT1)

This area has likely transitioned from an old field meadow as shrub species have become established. A variety of shrub species are present.

5. Fresh to Moist White Cedar Coniferous Forest Type (FOC4-1)

This ecosite occurs mainly as a fringe around the edge of the easterly wetland feature. The white cedar transitions from the drier aspen sites along the edge.

6. Naturalized Spruce or Cedar Hedgerow (FOCM6)

This is mainly a planted hedgerow of Norway spruce with some Eastern white cedar mixed in. It is a relatively narrow hedgerow two trees wide.

7. Fresh to Moist Poplar Deciduous Forest Type (FOD8-1)

This ecosite occupies areas adjacent to wetland features in the central and eastern portion of the study area. It grades from the edge of the wetland into the upland area and is composed of trembling aspen and balsam poplar.

8. Naturalized Maple Hardwood Treed Hedgerow (FODM11)

This is mainly represented as a silver maple single row along Second Line and Scotland Street.

9. Naturalized Ash Hardwood Treed Hedgerow (FODM12)

This hedgerow ecosite is also along Second Line and the ash trees are in various levels of decline.

10. Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2)

There is only one small area represented by this ecosite and although it functions somewhat like a MAM2-2 it is mainly colonized by the invasive species *Phragmites australis*.

11. Cattail Mineral Shallow Marsh Type (MAS2-1)

The water levels within this ecosite are largely determined by beaver activity in the system and since the start of our field investigations, the water levels have lowered considerably, as a result of removal or natural deterioration of beaver dams. This is essentially a monoculture of cattails.

12. Open Aquatic (OAO)

The three stormwater ponds that straddle the study area boundary on the east side of Highway 6 are man-made but are somewhat naturalized and functioning as an open aquatic habitat.

13. Black Ash Mineral Deciduous Swamp Type (SWD2-1)

This ecosite forms the bulk of the wetland habitat within the study area. The species mix varies from one location to another but functions as an ash swamp throughout. It seasonally floods and is mainly dry during the summer months.

14. Willow Mineral Thicket Swamp Type (SWT2-2)

This willow thicket swamp is an extension of the ash deciduous swamp on the westerly wetland. It seasonally floods like the remainder of the wetland feature.

15. Deciduous Thicket Hedgerow (THDM3)

This is essentially a shrub thicket hedgerow that borders the banks of the small stream within the study area. It occupies a very narrow band of less than 2m along the banks of the stream.

Provincially Significant Wetlands

The Speed-Lutteral-Swan Creek Wetland Complex is a large system that bisects the study area and has been designated provincially significant. It is a 5,683 ha complex of deciduous and coniferous swamp (95% of the complex) and marsh (5%) communities located within glacial meltwater channels associated with the Guelph Drumlin Field. Considerable portions of the wetland (60% of complex area) is underlain by organic soils, where carbon storage is expected to be proportionately high, and is sustained by and/or contributes groundwater to local watercourses known to contain brook trout.

Schedule A-1 Land Use of the Official Plan (OP) for the Township of Centre Wellington identifies the wetlands and watercourses as part of the Core Greenlands (Appendix 1). Section C.3.1 identifies the Core Greenlands designation on the land use schedules as:

- Provincially significant wetlands;
- Habitat of endangered or threatened species; and/or
- Floodways and hazardous lands

Section C.3.2 indicates that all provincially and locally significant wetlands are included in the Core Greenlands designation as well. Section C.3.7 specifies that areas of natural and scientific interest (ANSI's) may be included in the Core Greenlands designation where they have been determined to be provincially significant or determined by the County to be regionally significant. Section C.3.9 directs that the Core Greenlands designation may include wooded areas, particularly where these are also associated with other Natural Heritage features such as wetlands. Otherwise, the Core Greenlands designation includes only upland woodlands over 10 hectares in area. However, Section 5.5.4 of the Wellington County Official Plan indicates that in the Urban System, woodlands over 1 hectare are considered to be significant by the County and are included in the Greenlands System.

Schedule C Groundwater Management Plan identifies areas of the westerly wetlands and watercourses in the study area as high aquifer vulnerability and potential groundwater recharge areas (Appendix 1).

Figure 3 documents the Grand River Conservation Authority data including wetlands, regulatory flood plain and regulation limits.

Significant Woodlands

There are three areas that are identified as significant woodlands, roughly corresponding with the three wetland areas. The ecosites SWD2-1, SWT2-2 and FOD8-1 where they exceed an area of one hectare, qualifies as a significant woodland (Figure 2). All of these significant woodlands have multiple natural heritage values and form a component of the Core Greenlands.

Significant Valleylands

There are no significant valleylands within the study area.

Habitat of Endangered Species and Threatened Species

A Preliminary Screening Form was prepared and sent to the Ministry of Environment, Conservation and Parks (Appendix 2). The confirmed species at risk that have potential for the study area are Bobolink, Eastern Meadowlark, Chimney Swift, Barn Swallow and Bank Swallow.

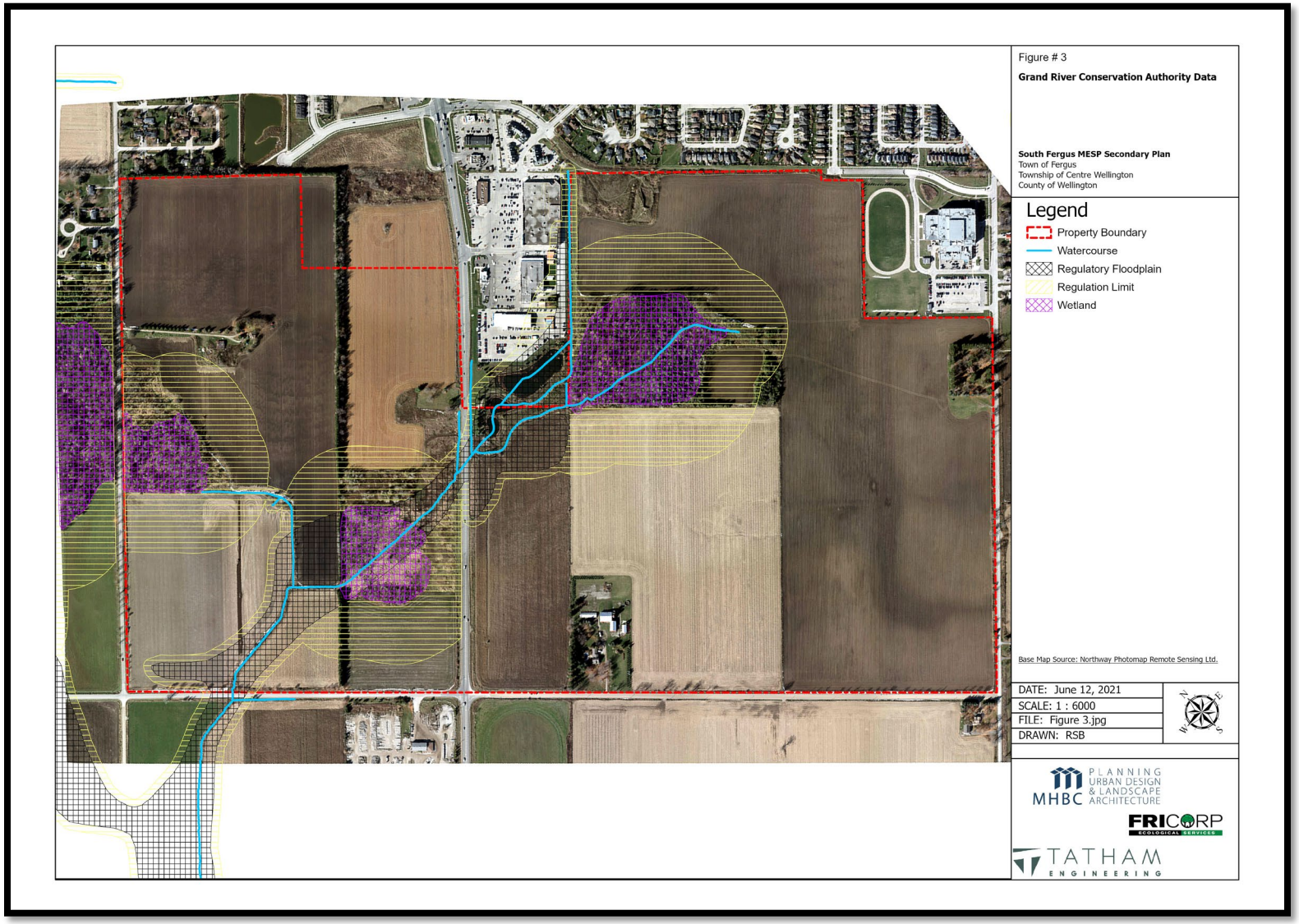


Figure 3 Grand River Conservation Authority Data

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

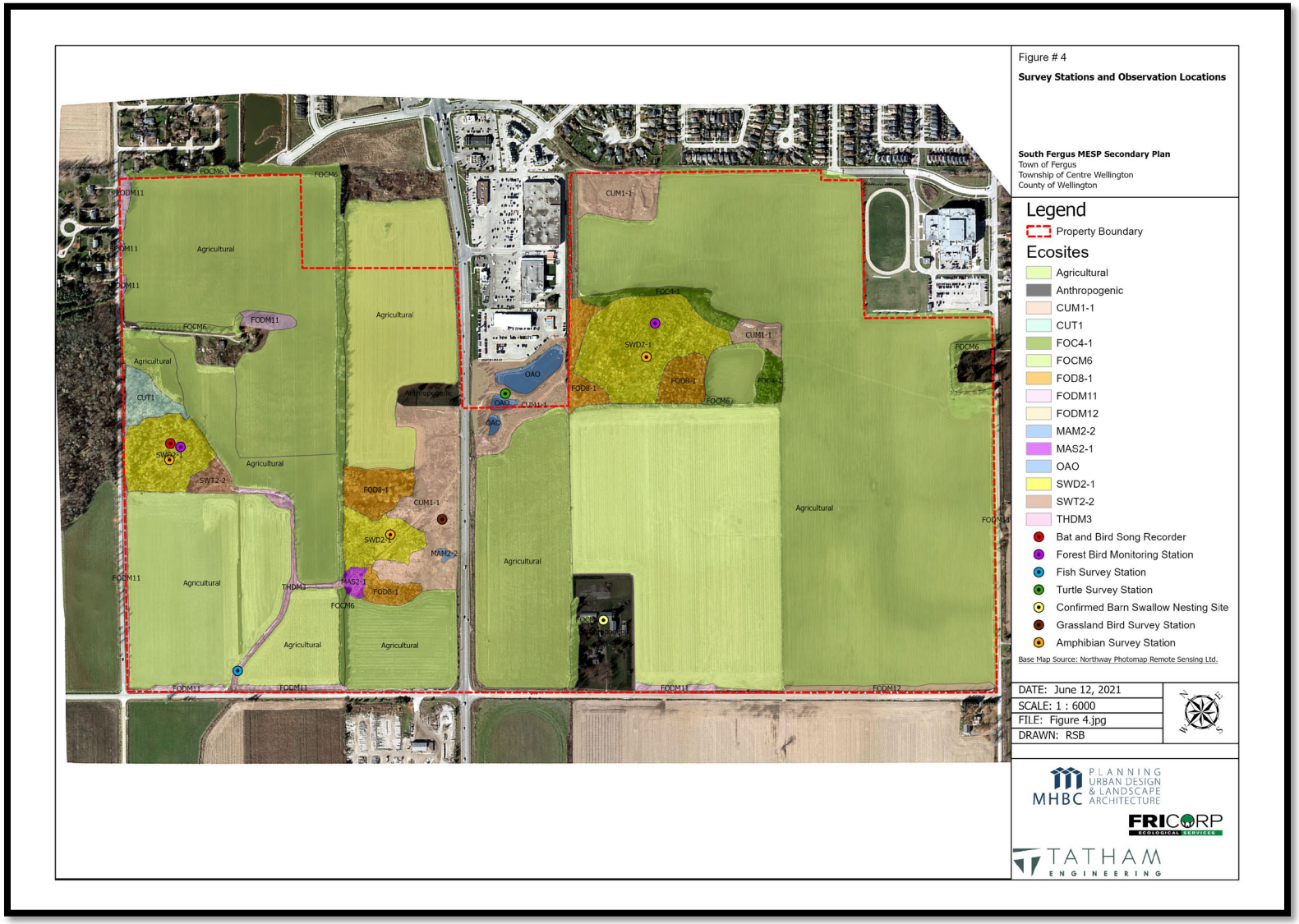


Figure 4 Survey Stations and Observation Locations

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

Bobolink and Eastern Meadowlark

Bobolinks are associated with open habitats, specifically grasslands, meadows and agricultural fields. They use fields with a mix of grasses and broad-leaved forbs like clover (*Trifolum* sp.); generally avoiding habitats with woody vegetation. A dense thatch layer is required for nests which are built out of sight close to the ground. Defended territories average 0.33 – 2 hectares, while much larger habitat patches are required to avoid predators and reduce brood parasitism by cowbirds. Literature suggests a minimum 5 hectares is required to support breeding, while sites 10 – 30 hectares are more likely to support successful nests. Areas that have little interior habitat, defined as 100 metres or more from an edge, are not likely to be suitable for breeding. Nesting occurs in mid-May and subsequent broods have usually fledged by early July. Nestlings in July are likely a result of a second brood or renesting. Bobolinks have usually left Ontario by the end of July on their migration south for the winter.[1 2 3 4 5]

The Eastern Meadowlark is most often found in grasslands, pastures, hay fields, old fields and native prairies in Ontario. They prefer habitats with good grass and litter cover, with defended territories averaging 2.8 – 3.2 hectares and are not deterred by the presence of shrubs and low woody vegetation.

They don't appear to be as area-sensitive as other grassland species like Bobolink. According to some researchers, Meadowlark breeding density doesn't seem to be influenced by patch size or edge density while others note that larger tracts of grasslands are preferred over smaller patches.

---

[1] Martin, Stephen G. and Thomas A. Gavin. 1995. Bobolink (Dolichonyx oryzivorus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/176

[2] McCracken, J.D., R.A. Reid, R.B. Renfrew, B. Frei, J.V. Jalava, A. Cowie, and A.R. Couturier. 2013. Recovery Strategy for the Bobolink (Dolichonyx oryzivorus) and Eastern Meadowlark (Sturnella magna) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. viii+ 88 pp.

[3] Ontario Ministry of Natural Resources. 2011. Draft Survey Methodology under the Endangered Species Act, 2007: D*olichonyx oryzivorus* (Bobolink). Ministry of Natural Resources Policy Division, Species at Risk Branch. 2pp.

[4] http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_BBLNK_EN.html

[5] Ontario Ministry of Natural Resources. 2013. General Habitat Description for the Bobolink (*Dolichonyx oryzivorus*) http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@species/documents/document/mnr_sar_ghd_bblnk_en.pdf

Nesting begins in early May; females construct the nest, usually partly covered or roofed by woven vegetation. The last broods leave the nest in early August. Simultaneous and shortly following this, meadowlarks leave breeding habitat for southern wintering areas. [6] [7] [8]

Grassland Bird Surveys were undertaken in the CUM1-1 Old Field Meadow ecosite on May 27, June 24 and July 2, 2020. Neither Bobolink nor Eastern Meadowlark were detected during these surveys or through casual observations during other field investigations. The ecosite is relatively small and would not meet the interior habitat required for Bobolink. Follow-up surveys will occur in 2021 to definitely confirm presence or absence.

Chimney Swift

Chimney swifts are an aerial insectivore; commonly seen foraging over open areas and wetlands. According to the Chimney Swift COSEWIC Status Report (2007), cavity trees with a diameter breast height (DBH) greater than 50 cm are required for nesting. Common tree species hosting nesting or roosting sites are white pine, yellow birch and sometimes aspen. While not common, pileated woodpecker cavities are sometimes used for nesting and roosting. Communities supporting trees >50 cm DBH and pileated woodpecker cavities are typical of old growth forests.

More typically, swifts nest and roost in human-created structures such as brick chimneys. At times, especially during migration and inclement weather, roosts may host hundreds or even thousands of birds. Structures functioning as nest features are usually occupied by a single breeding pair. Breeding pairs exhibit high site fidelity for structures used as nests and roosts and will continue to use these features as long as they are functional. In Ontario, swifts return in late April through early May and breed May through July. Migration begins in late August and is usually complete by mid-October.

---

[6] Jaster, Levi A., William E. Jensen and Wesley E. Lanyon. 2012. Eastern Meadowlark (Sturnella magna), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/160

[7] http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_ESTRN_MDWLRK_EN.html

[8] Ontario Ministry of Natural Resources. 2013. General Habitat Description for the Eastern Meadowlark (*Sturnella magna*) http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@species/documents/document/mnr_sar_ghd_est_mdwlrk_en.pdf

The loss of artificial nest features (brick chimneys) has resulted in significant population declines over a short time period. Secondarily, the loss of old growth forests and large cavity trees has resulted in fewer natural nesting (and roosting) structures. [9] [10] [11] [12] [13]

Chimney Swift surveys were conducted on May 27, June 24, and July 1 at the two residences/farms within the study area. No Chimney Swifts were detected. Follow-up surveys will occur in 2021 to definitely confirm presence or absence.

Bank Swallow

As their latin name suggests, Bank Swallows are most often found in riparian areas, specifically nesting along the steep, sandy banks of rivers. Less often, they use steep sandy slopes in aggregate pits/quarries and cut banks along roadways. They nest colonially, with males excavating a burrow prior to pair formation. Once pairs are formed, nest-building begins immediately in the excavated burrow.[14]

They are an aerial insectivore, eating a variety of insects on the wing; though sometimes they take land and water-based insects when they are available.[15] They forage in open areas, including lakes, ponds, rivers, meadows, fields, pastures, and bogs; occasionally over forests and woodlands. During the breeding season, adults are usually within 200 metres of their young for feeding purposes.

There is no suitable habitat for this species within the study area. No further study is required.

---

[9] OMNR. 2013. General Habitat Description for the Chimney Swift. http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@species/documents/document/mnr_sar_ghd_chmny_swft_en.pdf

[10] http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=951

[11] http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_CHMNY_SWFT_EN.html

[12] Cink, Calvin L. and Charles T. Collins. 2002. Chimney Swift (Chaetura pelagica), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/646

[13] COSEWIC 2007. COSEWIC assessment and status report on the Chimney Swift Chaetura pelagica in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 49 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

[14] Garrison, Barrett A. 1999. Bank Swallow (Riparia riparia), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/414

[15] http://www.ontario.ca/page/bank-swallow

Barn Swallow

Barn swallows are an aerial insectivore, known to build nests on barns, bridges and other buildings especially in open areas near water. Open habitats including grasslands, fields, right-of-ways, shorelines and wetlands are particularly important for foraging. They live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures. Swallows prefer structures with rough-surfaced ledges where they can build their nests. The cup-shaped mud nests are the critical habitat feature used for egg laying, incubation, feeding, resting and rearing of young. Barn swallows will use artificial nest cups and ledges; and are known to use the same nests in subsequent years. They are often found in colonies; breeding takes place from May through August. [16] [17] [18]

Permission was received in 2021 to inspect the buildings at both residential/farm locations and surveys were conducted on June 3, 2021. The residence and outbuildings on Guelph Street yielded no observations of Barn Swallow or their nests.

The residence and outbuildings on Second Line were inspected as well. The first floor of the large barn at this location had upwards of 79 Barn Swallow nests. At least half of these appeared to be active. There were also a few inactive Cliff Swallow nests in the same building. There may be additional nests on the upper floor of the barn, but it was not inspected at this time. Barn Swallows were seen foraging over the fields adjacent to the barn in 2020 and again in 2021.

Significant Wildlife Habitat

The key policy document for the review of Significant Wildlife is the Significant Wildlife Habitat Criteria Schedules For Ecoregion 6E (2015). This document relies heavily on the ecosites present within the study area to develop a list of potential significant wildlife habitat features. FRi Ecological Services uses a filtering tool where the ecosites present are input and it provides a list of all potential significant wildlife habitat features that may be present. This filtered list is described in more detail in Table 2.

---

[16] COSEWIC. 2011. COSEWIC assessment and status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

[17] http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_BRN_SWLLW_EN.html

[18] Ontario Ministry of Natural Resources. 2013. General Habitat Description for the Barn Swallow *Hirundo rustica*. http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@species/documents/document/mnr_sar_ghd_brn_swllw_en.pdf

Table 2 Summary of Screened Potential Significant Wildlife Values

	Significant Wildlife Habitat	Type	Ecosite	Present
1	Waterfowl Stopover and Staging Area	Seasonal Concentration Area	CUM1-1, CUT1, MAS2-1, SWD2-1	No
2	Shorebird Migratory Stopover Area	Seasonal Concentration Area	MAM2-2	No
3	Raptor Wintering Areas	Seasonal Concentration Area	FOC4-1, FOD8-1, CUM1-1, CUT1, SWD2-1	No
4	Bat Maternity Colonies	Seasonal Concentration Area	FOD8-1, SWD2-1	Potential
5	Turtle Wintering Areas	Seasonal Concentration Area	SWD2-1, SWT2-2, MAM2-2, MAS2-1, OAO	No
6	Lizard Hibernaculum	Seasonal Concentration Area	FOD8-1	No
7	Colonially – Nesting Bird Breeding Habitat (bank/cliff)	Seasonal Concentration Area	CUM1-1, CUT1	No
8	Colonially – Nesting Bird Breeding Habitat (Tree/Shrub)	Seasonal Concentration Area	SWD2-1	No
9	Colonially – Nesting Bird Breeding Habitat (Ground)	Seasonal Concentration Area	MAM2-2, MAS2-1,	No
10	Migratory Butterfly Stopover Area	Seasonal Concentration Area	CUM1-1, CUT1, FOC4-1, FOD8-1	No
11	Landbird Migratory Stopover Area	Seasonal Concentration Area	FOC4-1, FOD8-1, SWD2-1	No
12	Deer Wintering Concentration Areas	Seasonal Concentration Area	FOC4-1, FOD8-1, SWD2-1, CUT1	No
13	Old Growth Forest	Rare Vegetation Community	FOC4-1, FOD8-1, SWD2-1	No

	Significant Wildlife Habitat	Type	Ecosite	Present
14	Waterfowl Nesting Area	Specialized Habitat for Wildlife	SWD2-1, SWT2-2, MAM2-2, MAS2-1	No
15	Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Specialized Habitat for Wildlife	FOC4-1, FOD8-1, SWD2-1	No
16	Turtle Nesting Area	Specialized Habitat for Wildlife	MAS2-1	Yes
17	Amphibian Breeding Habitat (Woodland)	Specialized Habitat for Wildlife	FOC4-1, FOD8-1, SWD2-1	Yes
18	Amphibian Breeding Habitat (Wetlands)	Specialized Habitat for Wildlife	SWD2-1, SWT2-2, MAM2-2, MAS2-1, OAO	Yes
19	Woodland Area-Sensitive Bird Breeding Habitat	Specialized Habitat for Wildlife	FOC4-1, FOD8-1, SWD2-1	Potential
20	Marsh Bird Breeding Habitat	Habitat for Species of Conservation Concern	MAM2-2	No
21	Open Country Bird Breeding Habitat	Habitat for Species of Conservation Concern	CUM1-1	No
22	Shrub/Early Successional Bird Breeding Habitat	Habitat for Species of Conservation Concern	CUT1	No
23	Terrestrial Crayfish	Habitat for Species of Conservation Concern	SWD2-1, SWT2-2, MAM2-2, MAS2-1	Potential

Waterfowl Stopover and Staging Area (CUM1-1, CUT1, MAS2-1, SWD2-1)

The criterion for this value requires that aggregations of 100 or more of listed species for 7 days, results in > 700 waterfowl use days. All of the listed ecosites are quite small in size with less than optimal waterfowl habitat. In all of the field visits conducted, there were fewer than 10 waterfowl observed. No further study required.

Shorebird Migratory Stopover Area (MAM2-2)

The only listed species observed was the Spotted Sandpiper that was observed foraging in the stormwater ponds (OAO). The criterion requires the presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period). It is unlikely these small areas could reach this threshold. No further study is required.

Raptor Wintering Area (FOC4-1, FOD8-1, CUM1-1, CUT1, SWD2-1)

Raptor wintering areas must be a minimum of 20ha in area and include at least 15ha of idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands. These conditions do not exist within the study area. No further study is required.

Bat Maternity Colonies (FOD8-1, SWD2-1)

This feature is associated with Big Brown Bats and Silver-haired Bats. Neither of these species were detected with the passive ultrasonic recorder that was deployed in May in these ecosites. The only species that was present was the Hoary Bat. However, there are some suitable roost trees within these ecosites. The recommended mitigation measure would be to protect the ecosite in its entirety. These ecosites will be retained for multiple values. No further study required.

Turtle Wintering Areas (SWD2-1, SWT2-2, MAM2-2, MAS2-1, OAO)

The only ecosite where turtles were observed was the stormwater ponds (OAO). One painted turtle and one snapping turtle were observed during the turtle basking surveys that were conducted over 4 site investigations. It is possible that this value does exist within the OAO ecosite. However, the criteria states that man-made ponds such as sewage lagoons or storm water ponds should not be considered significant wildlife habitat. No further study required.

Lizard Hibernaculum (FOD8-1)

The study area is out of the typical range of the Common five-lined skink. No further study is required.

Colonially – Nesting Bird Breeding Habitat (bank/cliff) (CUM1-1, CUT1)

There are no eroding banks, sandy hills, borrow pits, steep slopes, or sand piles that would be suitable for the species listed. However, one species listed, Cliff Swallow, may be present on the site. Three Cliff Swallow nests were observed in the same barn where Barn Swallows are currently nesting. The criteria states that man-made structures do not qualify as significant wildlife habitat.

Colonially – Nesting Bird Breeding Habitat (Tree/Shrub) (SWD2-1)

Early spring and late fall assessments were conducted in the woodlands specifically to identify any sticknests for raptors or herons. None were observed. No further study is required.

Colonially – Nesting Bird Breeding Habitat (Ground)(MAM2-2, MAS2-1)

There is no suitable habitat for this feature. No further study is required.

Migratory Butterfly Stopover Area (CUM1-1, CUT1, FOC4-1, FOD8-1)

A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario. The study area does not meet this requirement. No further study is required.

Landbird Migratory Stopover Area (FOC4-1, FOD8-1, SWD2-1)

Woodlots will be a minimum of 10 ha in size and will be located within 5 km of Lake Ontario. The study area does not meet this requirement. No further study is required.

Deer Wintering Concentration Area (FOC4-1, FOD8-1, SWD2-1, CUT1)

Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on Ministry of Natural Resources and Forestry (MNRF) studies or assessment. Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. None of the woodlands have been identified by MNRF as significant. However, the woodlands have multiple values and will be retained.

Old Growth Forest (FOC4-1, FOD8-1, SWD2-1)

This criterion requires woodland areas 30 ha or greater in size or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest and if dominant trees species of the are >140 years old, then the area containing these trees is Significant Wildlife Habitat. This feature is not present withn the study area. No further studies are required.

Waterfowl Nesting Area (SWD2-1, SWT2-2, MAM2-2, MAS2-1)

This criterion requires the presence of 3 or more nesting pairs for listed species excluding Mallards, or; 10 or more nesting pairs for listed species including Mallards. One nesting pair of Mallards and two nesting pairs of Canada Geese were confirmed for the site. This does not meet the threshold of significance. No further studies are required.

Bald Eagle and Osprey Nesting, Foraging and Perching Habitat (FOC4-1, FOD8-1, SWD2-1)

There is a man-made osprey nesting platform on the south side of Second Line just west of Highway 6. There was a nesting pair using the site in 2020 and they were observed foraging within the study area as well. However, the criteria specifies that nests located on man-made objects are not to be included as significant wildlife habitat (e.g. telephone poles and constructed nesting platforms). No further study is required.

Turtle Nesting Area (MAS2-1)

Only one location has been identified as a confirmed turtle nesting area. Two snapping turtle nests were observed between the stormwater ponds (OAO) in the granular substrate used for the access road. No other turtle nesting sites have been confirmed.

Amphibian Breeding Habitat (Woodland)(FOC4-1, FOD8-1, SWD2-1)

The woodlands all meet the minimum size requirement and the call recorders as well as casual observations confirm at least three species (wood frog, spring peeper, gray tree frog) from the designated list confirming that this would be considered significant wildlife habitat.

Amphibian Breeding Habitat (Wetland)(SWD2-1, SWT2-2, MAM2-2, MAS2-1, OAO)

At least three of the listed species (American toad, gray treefrog, green frog) appear to be breeding in numbers that would qualify these ecosites as significant wildlife habitat. Again, these calls were confirmed through the call recorders, amphibian surveys and casual observations.

Woodland Area-Sensitive Bird Breeding Habitat (FOC4-1, FOD8-1, SWD2-1)

Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha and interior forest habitat is at least 200 m from forest edge habitat. None of the woodlands meet the habitat description but two listed species (Winter Wren, Yellow-bellied sapsucker) were present during the breeding season. This would not be considered significant wildlife habitat since it does not meet the criterion.

Marsh Bird Breeding Habitat (MAM2-2)

The Phragmites dominated mineral meadow marsh is very small and poor quality. Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species is necessary to be considered significant wildlife habitat. None of the listed species are present. No further study is required.

Open Country Bird Breeding Habitat (CUM1-1)

The criterion requires large grassland areas (includes natural and cultural fields and meadows) >30 ha and presence of nesting or breeding of 2 or more of the listed species. The CUM1-1 ecosite is well below the minimum threshold size and there is no evidence of 2 or more nesting pairs of the listed species. A single calling male Vesper Sparrow was observed early in the breeding season within this ecosite but was not heard again later in the breeding season.

Shrub/Early Successional Bird Breeding Habitat (CUT1)

The criterion requires large field areas succeeding to shrub and thicket habitats>10ha in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing) in the last 5 years. Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. The cultural thicket that is present is much smaller than the minimum

requirement and it has been used for agricultural purposes on and off over the years. No further study required.

Terrestrial Crayfish (SWD2-1, SWT2-2, MAM2-2, MAS2-1)

The criterion requires the presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. None have been observed to date, but follow-up investigations will continue this season.

SIGNIFICANT AREAS OF NATURAL AND SCIENTIFIC INTEREST

There are no significant areas of natural and scientific interest within the study area.

FISH HABITAT

The tributary to Swan Creek is part of the Nichol Drain system. Fish community investigations were undertaken on July 2, 2020. At the time of the survey, portions of the watercourse were dry or just isolated pools about 100m upstream of Second Line. Common shiner, Northern redbelly dace and creek chub were captured. None of these species would be indicative of a coldwater thermal regime. However, Swan Creek and its tributaries are classified as a coldwater system and certain reaches of Swan Creek support brook trout populations. Agricultural activities have occurred right up to the top of the bank in many locations. There is localized erosion of the banks and sediment deposition in some areas. There is a culvert under Highway 6, another culvert supporting an agricultural access in one of the fields and the last culvert conveys flow under Second Line. Thermal imaging of reaches of the tributary will be completed in the summer of 2021 to identify any groundwater seepages and discharges into the stream to ensure protection.

CONCLUSIONS

With the exception of the Barn Swallow nesting site, all of the natural heritage values were associated with the Core Greenlands area where multiple and overlapping values exist. The remainder of the study area is mainly active agricultural lands with crops such as soybean and corn crops. There are no natural functional buffers currently for the natural heritage systems that are present. As a starting point, a 30m buffer has been suggested for the entire Core Greenlands area. This buffer will be further refined once there is more information about the individual development blocks and the appropriateness of a 30m buffer can be better evaluated at that stage. There are opportunities to improve the natural heritage systems by creating a naturalized buffer area and create natural spaces that are not required for development.

RECOMMENDATIONS

A site visit was conducted with Tony Zammit from the Grand River Conservation Authority on July 6, 2021. The intent of the site visit was to confirm the extent and boundaries of the key wetland units. Several of the wetland units grade very gradually into upland forest or

cultural meadow ecosites. The boundary of the wetland is difficult to accurately map and there were some locations where additional field investigations may be required to definitively define the wetland boundary. Appendix 3 shows the areas of the wetland boundary that will require further examination before the Grand River Conservation Authority is confident that the boundaries are accurate.

It is suggested that at each of the boundary sections to be confirmed, perpendicular transects should be established at regular intervals and stations established at regular intervals along the transect. At each of the stations, soil auger samples will be taken to identify mottling or gleying in the soil profile indicating hydric soils. At each of the stations, detailed vegetation assessment will be conducted using the 50% wetland plant rule as per the Ontario Wetland Evaluation System process for determining cryptic wetland boundaries.

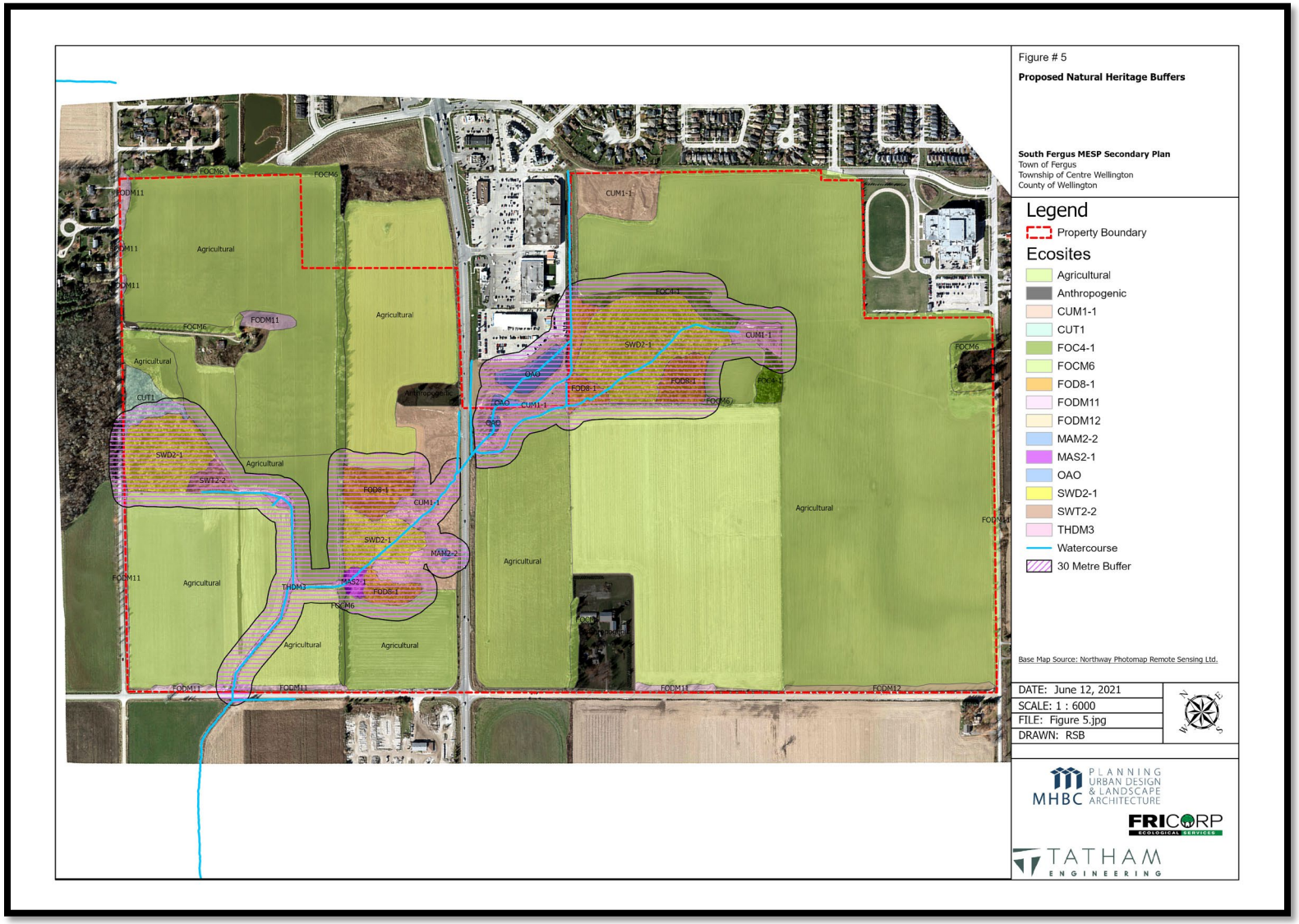


Figure 5 Proposed Natural Heritage Buffers

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

Appendix 1

Applicable Schedules from the

Official Plan of the

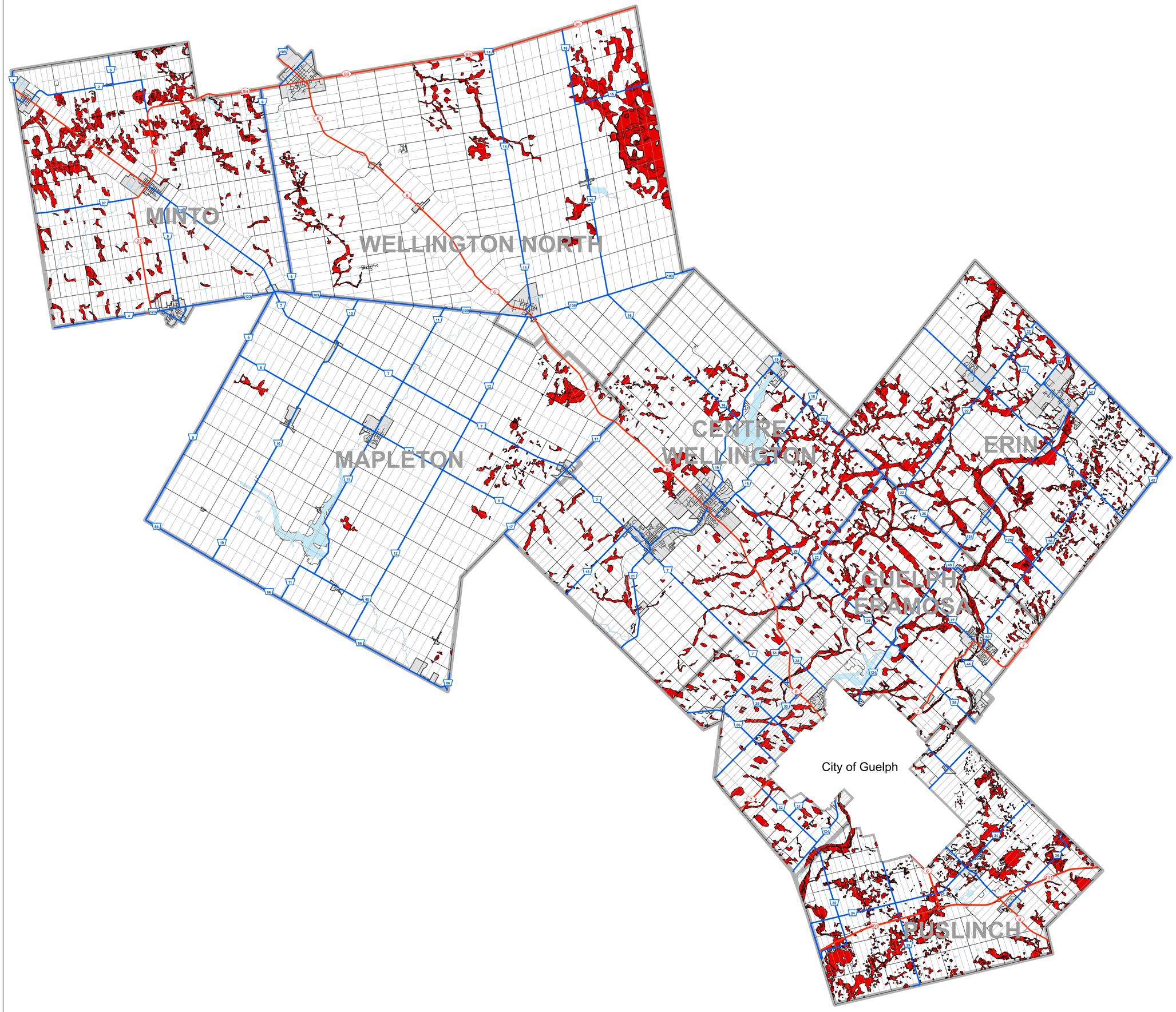
Township of Centre Wellington

FRICORP ECOLOGICAL SERVICES

1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

Appendix 3

County of Wellington



Legend

Provincially Significant Wetlands

N

Sources:

County of Wellington Planning and Development Department 2017.

Produced using natural resource information by the Ministry of Natural Resources (Copyright Queen's Printer 1997).

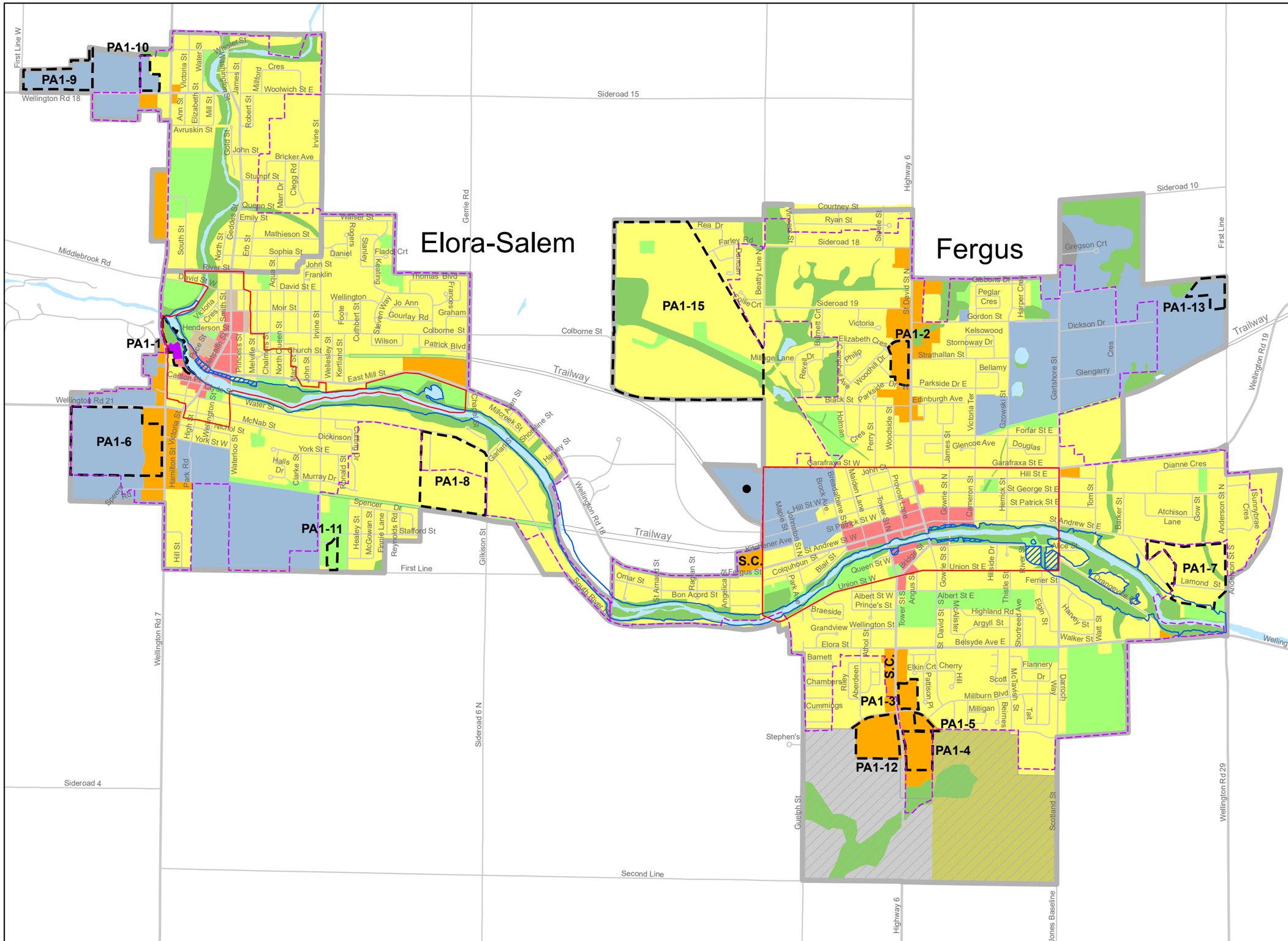
Updated: May 3, 2017.

Date Printed: May 3, 2017.

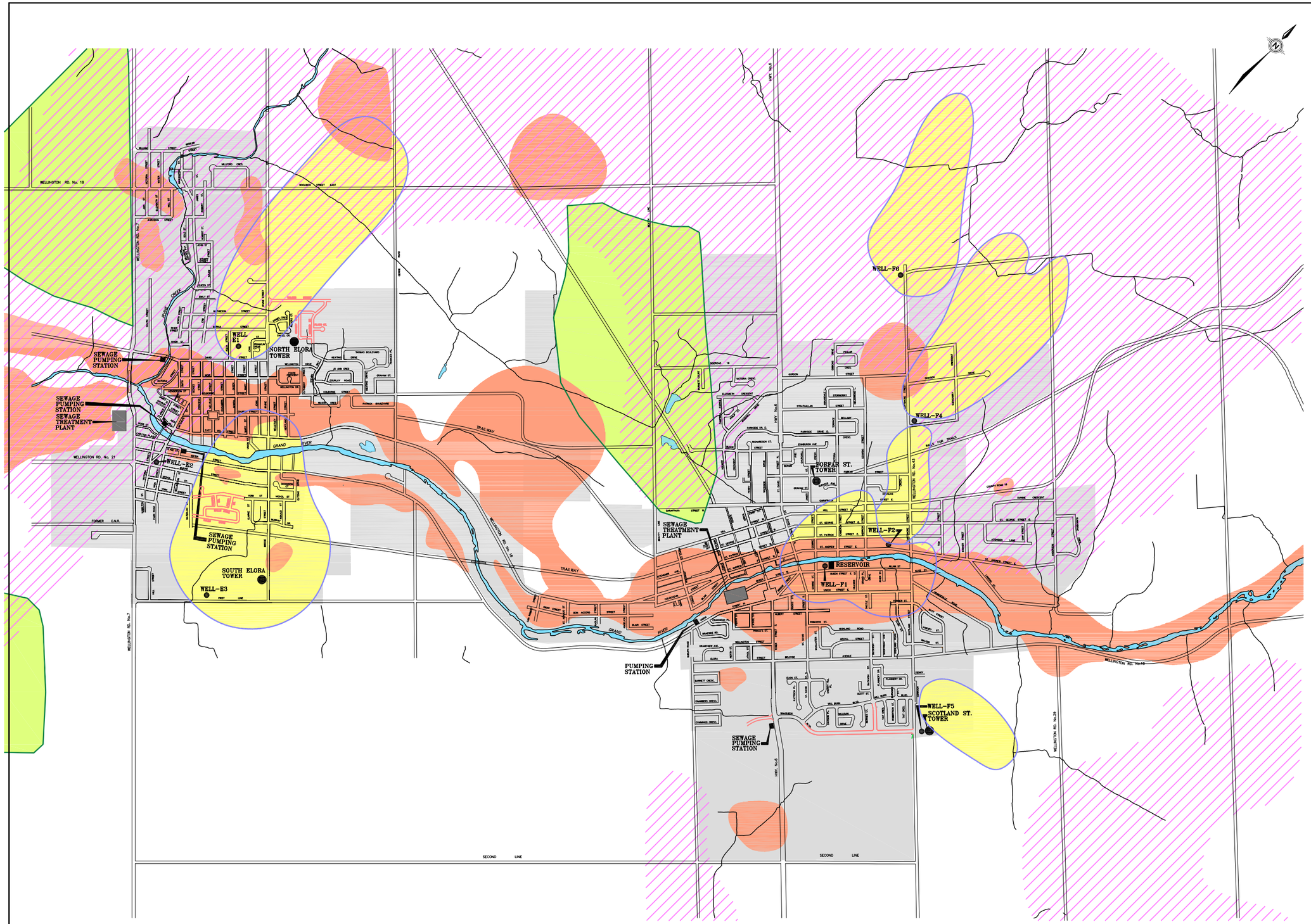
May 6, 1999

0 2.5 5 10
Kilometres

Document Path: F:\Land Information System\Nad83OP\Appendix 3.mxd


Elora-Salem
Fergus
PA1-1
PA1-2
PA1-3
PA1-4
PA1-5
PA1-6
PA1-7
PA1-8
PA1-9
PA1-10
PA1-11
PA1-12
PA1-13
PA1-15
S.C.
Sideroad 15
Sideroad 10
Sideroad 18
Sideroad 19
Sideroad 4
Sideroad 6 N
Wellington Rd 18
Wellington Rd 21
Wellington Rd 7
Wellington Rd 19
Wellington Rd 29
Highway 6
Trailway
Colborne St
Gerrie Rd
Middlebrook Rd
First Line
First Line W
Second Line
Gilkison St
Guelph St
Scotland St
Jones Baseline
Stephen's
Residential
Highway Commercial
Central Business District
Residential Transition
Industrial
Core Greenlands
Recreational
Future Development
Mixed Use
Secondary Planning Area
Future Residential
Future Employment Lands
Note: The identification of Future Residential and Future Employment Lands is for public notice only and is subject to future considerations through Secondary Plan requirements.
Urban Boundary
Built Boundary
Heritage Area
Policy Area
Regulatory Flood Line
Regulatory Flood Fringe
S.C. Shopping Centre
Former Waste Disposal Site
Schedule A-1
Land Use Plan
Fergus, Elora-Salem
Township of Centre Wellington
Built Boundary: Wellington County, 2008
Projection: UTM, NAD 83, Zone 17
Note: This product is not survey data.
All rights reserved.
May not be reproduced without permission.
© 2005 Township of Centre Wellington
Updated: November, 2016
0 200 400 800m
1:25,000

GROUNDWATER MANAGEMENT PLAN
FERGUS - ELORA - SALEM
TOWNSHIP OF CENTRE WELLINGTON
SCHEDULE C



LEGEND:

- POTENTIAL AREAS FOR FUTURE WATER SUPPLY TAKING
- 2 YEAR CAPTURE ZONE
- HIGH AQUIFER VULNERABLITY
- POTENTIAL RECHARGE AREAS
- URBAN CENTRE LIMITS

APRIL 2003

SCALE:
0 100 250 500

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SOURCE DATA:
TOWNSHIP OF CENTRE WELLINGTON
GROUNDWATER MANAGEMENT STUDY

Appendix 2

Ministry of Environment, Conservation and Parks

Species at Risk Preliminary Screening Form and Response

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

To: Ministry of Environment, Conservation and Parks

From: Rod Bilz

Date:

Subject: South Fergus Master Environmental Servicing Plan, Proposed Development

Township of Centre Wellington

As per the Client's Guide to Preliminary Screening for Species at Risk I am providing some background information to the ministry to determine if there are any potential SAR concerns and whether the client is required to proceed to Phase 1: Information Gathering. The following information follows the checklist in Section 4.0 of the guidance document.

1. **Land Information Ontario (LIO):** The information from LIO is mirrored on the NHIC Natural Heritage Make-A-Map.
2. **Natural Heritage Information Centre(NHIC):** The study area is overlapped by six 1km squares.

Atlas Square	OGF Id.	Element Type	Common Name
17NJ5038	957442	Natural Area	Grand River
17NJ5138	957452	Natural Area	Speed Lutteral Swan Creek Wetland Complex
	957452	Species	Barn Swallow
17NJ5238	957462	Natural Area	Speed Lutteral Swan Creek Wetland Complex
	957462	Species	Eastern Meadowlark
	957462	Species	Eastern Meadowlark
	957462	Species	Barn Swallow

17NJ5037	957441	Natural Area	Speed Lutteral Swan Creek Wetland Complex
17NJ5137	957451	Natural Area	Speed Lutteral Swan Creek Wetland Complex
17NJ5237	957461	Species	Eastern Meadowlark
	957461	Natural Area	Speed Lutteral Swan Creek Wetland Complex

3. **The Breeding Bird Atlas:** The site occurs within square 17NJ53. Eastern Whip-poor-will (threatened); Chimney Swift (threatened); Bank Swallow (threatened); Barn Swallow (threatened); Bobolink (threatened); Eastern Meadowlark (threatened).
4. **eBird:** No data for the study area.
5. **iNaturalist:** There are a number of documented observations but none are of threatened or endangered species.
6. **Ontario Reptile and Amphibian Atlas:** No data for the study area.
7. **Conservation Authority:** GRCA
8. **Local Naturalist Groups:** None locally
9. **Indigenous Communities:** None contacted
10. **Non-Governmental Organizations:** None contacted
11. **Field Studies Conducted:** Forest bird monitoring, passive bird and amphibian recorders. Barn Swallows have been confirmed foraging over the study area.
12. **Likely Impacts of Your Activity:**

APPENDIX 1

Study Area Map

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085


Legend
Property Boundary
Watercourse
Ecosites
Agricultural
Anthropogenic
CUM1-1
CUT1
FOC4-1
FOCM6
FOD8-1
FODM11
FODM12
MAM2-2
MAS2-1
OAO
SWD2-1
SWT2-2
THDM3
N
W
E
S
1:3,000

From:	Species at Risk (MECP)
To:	rod.bilz@fricorp.com
Subject:	RE: Preliminary Screening - South Fergus Master Environmental Servicing Plan, Proposed Development in the Township of Centre Wellington
Date:	February 1, 2021 1:40:58 PM
Attachments:	image001.png

Thank you Rod, the map definitely helped.
I can confirm the species you have found in your research; bobolink, meadowlark, chimney swift, barn swallow and bank swallow.
Lisa

Lisa McShane
Management Biologist | Permissions and Compliance Section, Species at Risk Branch|Land and Water Division | Ministry of the Environment, Conservation and Parks | lisa.mcshane@ontario.ca | (226) 668-0527

From: Rod Bilz <rod.bilz@fricorp.com>
Sent: Thursday, January 14, 2021 8:24 AM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Subject: RE: Preliminary Screening - South Fergus Master Environmental Servicing Plan, Proposed Development in the Township of Centre Wellington

Hi Lisa,

I am not sure why the map did not show up in the first copy but I have attached another copy of the screening with the map on the last page. Let me know if you have any issues reading the document now.

Cheers

Rod Bilz | Environmental Specialist
rod.bilz@fricorp.com / M: 705-840-6383

FRi Ecological Services |
T: 705-476-0085 / F: 705-476-5631 |
1875A Seymour Street, North Bay, ON P1A 0C7 |
http://fricorp.com

From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: January 13, 2021 10:35 AM
To: rod.bilz@fricorp.com
Subject: RE: Preliminary Screening - South Fergus Master Environmental Servicing Plan, Proposed Development in the Township of Centre Wellington

Hi Rod,
I am sorry I am just getting back to you now, there is quite a backlog of inquiries.
I opened the pdf that you sent, but I am afraid the maps are not showing up, so I have no way to find this proposal area.
Could you send me the coordinates for the area you are screening, to allow me to quickly zoom to the area and a map of the study area as well.
Thank you so much,
Lisa

Lisa McShane
Management Biologist | Permissions and Compliance Section, Species at Risk Branch|Land and Water Division | Ministry of the Environment, Conservation and Parks | (226) 668-0527

From: Rod Bilz <rod.bilz@fricorp.com>
Sent: Thursday, October 1, 2020 9:33 AM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Subject: Preliminary Screening - South Fergus Master Environmental Servicing Plan, Proposed Development in the Township of Centre Wellington

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good Morning,

Please find attached our Preliminary Screening for the project above.

Cheers

FRICORP ECOLOGICAL SERVICES

Rod Bilz | Environmental Specialist

rod.bilz@fricorp.com / M: 705-840-6383

FRi Ecological Services |
T: 705-476-0085 / F: 705-476-5631 |
1875A Seymour Street, North Bay, ON P1A 0C7 |
http://fricorp.com

Appendix 3

Proposed Supplementary Wetland Assessments to Definitively Identify Wetland Boundaries

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

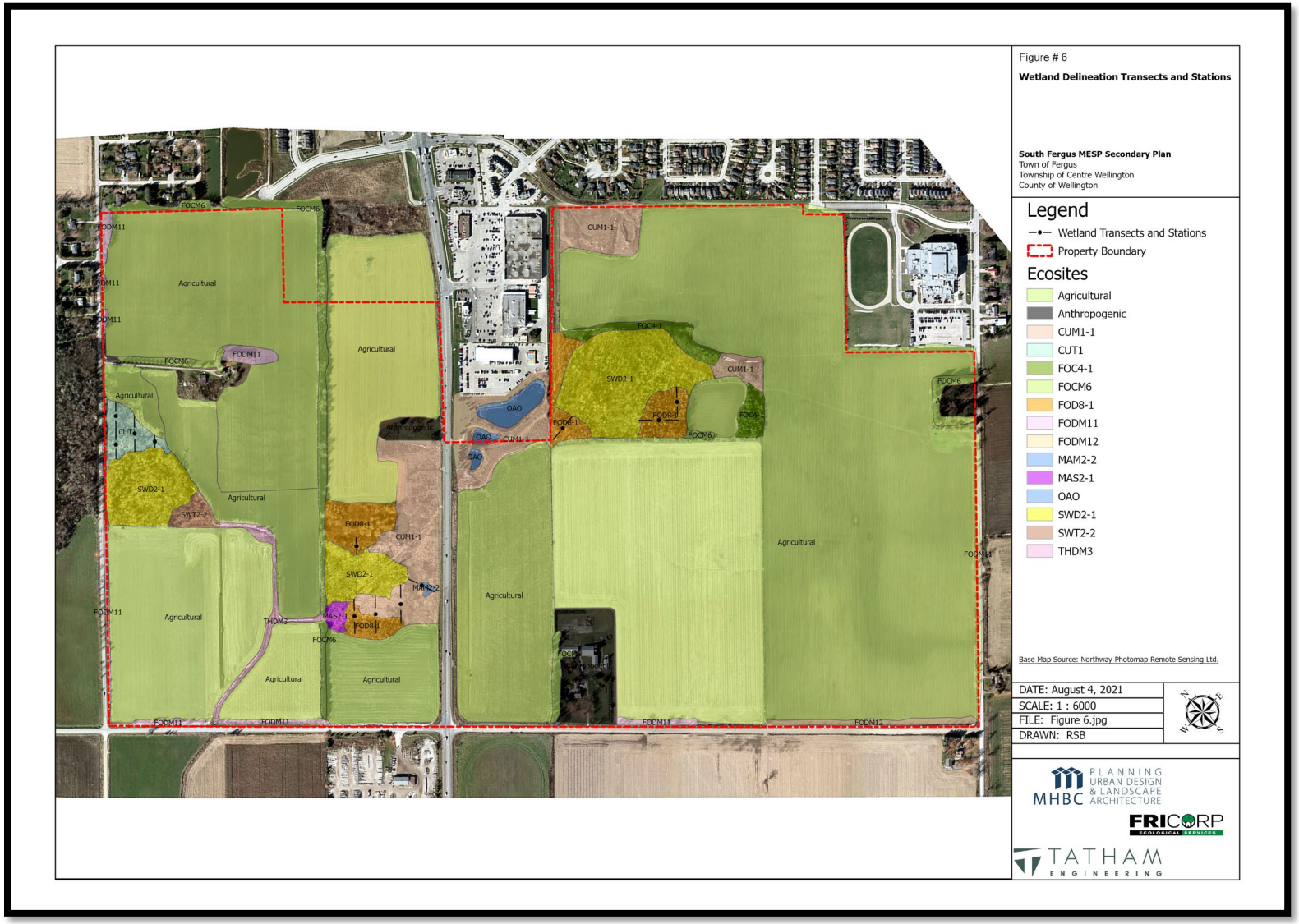


Figure 6 Wetland Delineation Transects and Stations

FRICORP ECOLOGICAL SERVICES
1875A Seymour Street
North Bay ON P1A0C7
705-476-0085

APPENDIX C

Surface Water Resources, Floodplain Hydraulics & Erosion Assessment - Existing Conditions
Prepared by Tatham Engineering

TATHAM ENGINEERING

Enhancing our communities

South Fergus MESP & Secondary Plan

SURFACE WATER RESOURCES, FLOODPLAIN HYDRAULICS & EROSION ASSESSMENT – EXISTING CONDITIONS

South Fergus Landowners Group

File 120157 | July 26, 2021

Document Control

File:	Prepared by:	Prepared for:
120157	**Tatham Engineering Limited** 115 Sandford Fleming Drive, Suite 200 Collingwood, Ontario L9Y 5A6 **T** 705-444-2565 **tathameng.com**	**South Fergus Landowners Group**
Date: **July 26, 2021**		

Authored by:	Reviewed by:
Andrew Trevers, M.Eng. (Hons)., P.Eng. Senior Engineer, Project Manager	Daniel Twigger, B.Sc.Eng., P.Eng. Manager – Water Resources Engineering

Disclaimer	Copyright
The information contained in this document is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Tatham Engineering Limited undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.	This document may not be used for any purpose other than that provided in the contract between the Owner/Client and the Engineer nor may any section or element of this document be removed, reproduced, electronically stored or transmitted in any form without the express written consent of Tatham Engineering Limited.

Issue	Date	Description
1	July 26, 2021	Existing Conditions Study

Document Contents

Tables

Figures

Appendices

1 Introduction

Tatham Engineering Limited has been retained by the South Fergus Landowners Group to provide engineering support in the development of a Master Environmental Servicing Study (MESP) and Secondary Plan outlining the objectives, constraints, design criteria, development concept and implementation plan for a proposed mixed use development in the South Fergus Secondary Plan area within the Township of Centre Wellington.

This report has been prepared to document the existing conditions within the Secondary Plan area. Specifically, it summarizes the existing drainage patterns, drainage infrastructure and drainage issues in the Secondary Plan area and establishes the natural hazard limits associated with Nichol Drain No. 2 through the study area. This information will be used to inform the stormwater management strategy and identify key development constraints within the Secondary Plan area.

1.1 SECONDARY PLAN AREA

The South Fergus Secondary Plan area consists of approximately 147.5 ha of undeveloped land in the south end of Fergus, Township of Centre Wellington, County of Wellington. It is generally bound by 2nd Line to the south, Guelph Line to the west, McQueen Boulevard to the north and Scotland Street to the east as illustrated on the Site Location Plan (Figure 1) enclosed. The Secondary Plan area consists of properties both east and west of Tower Street South (Highway 6) as follows:

- 925 and 935 Scotland Street;
- 200 McQueen Boulevard;
- 7856 and 7872 2nd Line;
- 963 and 1000 Tower Street South; and
- 936 Guelph Street.

1.2 NICHOL DRAIN NO. 2 SUBWATERSHED STUDY

In 1996, R.J. Burnside & Associates Ltd. issued the Nichol Drain No. 2 Subwatershed Study to provide a general overview of the environmental features within the Nichol Drain No. 2 watershed and to establish an approved stormwater management strategy for the lands in the Secondary Plan area east of Tower Street South (Highway 6). The approved stormwater management strategy aimed at reducing the adverse effects of future development in the watershed.

The key conclusions and recommendations of the Subwatershed Study are summarized below.

- Nichol Drain No. 2 is an intermittent watercourse with limited fish potential (Type 3 habitat) although Swan Creek (receiving waterbody of Nichol Drain No. 2) is a coldwater fishery in excellent condition.
- Groundwater discharge into Nichol Drain No. 2 is limited in the headwater reaches in the Secondary Plan area.
- The soils in the Nichol Drain No. 2 watershed are composed of several soil types including Harriston Loam (predominate soil type), Listowel Loam and Parkhill Loam.
- The wetlands in the Secondary Plan area east of Tower Street South (Highway 6) are located more than 750 m from the Provincially Significant Speed – Lutteral Swam Creek Wetland Complex meaning the on-site wetlands are not part of this Provincially significant Wetland Complex.
- The Nichol Drain No. 2 watershed covers an area of 559.4 ha at the downstream study limit (confluence with Drain No. 11) and an existing condition (1996) peak flow summary was presented as provided in Table 1

Table 1: Nichol Drain No. 2 Subwatershed Study Peak Flow Summary

STORM	PEAK FLOW (m^3/s)			
	Outlet of Wetland (Node 11)	Upstream of Hwy 6 (Node 14)	At 2ND Line (Node 19)	Study Limit
25 mm	0.4	0.4	0.6	1.1
1:2-Year	1.0	1.1	1.4	2.4
1:5-Year	2.8	3.0	4.0	7.2
1:10-Year	3.9	4.3	5.6	10.3
1:25-Year	6.5	7.1	9.2	16.4
1:50-Year	8.5	9.3	11.9	21.5
1:100-Year	10.1	11.3	15.5	29.1
Regional	12.7	14.2	20.0	45.9

- Two stormwater management strategies were developed, assessed and evaluated. Alternative 2 – Peak Flow Control was identified as the preferred solution for the lands east of Tower Street South (Highway 6) in the Secondary Plan area.

- The preferred solution consists of the following:
  - construct a water quantity and quality control stormwater management facility (SWMF) west of Nichol Drain No. 2 immediately east of Tower Street South (Highway 6) to service Phase 1 of development;
  - construct a stormwater quality control SWMF immediately upstream of the existing wetland on-site to treat surface runoff from future development prior to discharging into the wetland;
  - modify the wetland outlet as necessary to provide the requisite water quantity control for the future development lands draining through the wetland;
  - construct a water quantity and quality control SWMF east of Nichol Drain No. 2 immediately east of Tower Street South (Highway 6) to service future development;
  - abandon Nichol Drain No. 2 upstream of Tower Street South (Highway 6);
  - enclose the drain at the rear of the Highway Commercial lands in a storm sewer with an overland flow route sized to convey the Regional Storm peak flow as part of future development;
  - lot level and conveyance SWM best management practices (BMPs) are to be evaluated as part of the detailed design of each individual development in the Secondary Plan area;
  - appropriate environmental setbacks are to be established and respected and enhancement opportunities explored for each natural heritage feature identified on-site; and
  - Development be restricted to areas outside the establish Regional floodplain.

To date, the Highway Commercial lands have been developed and the conveyance channel along the rear of the Highway Commercial lands has been constructed. Also, Phase 1 of the preferred SWM strategy, specifically the construction of the water quantity and quality SWMF west of Nichol Drain No. 2, has been implemented.

It is noted that the Subwatershed Study focused on the lands east of Tower Street South (Highway 6) and did not provide a recommended SWM strategy for the lands west of Tower Street South (Highway 6) in the Secondary Plan area.

1.3 ADDITIONAL BACKGROUND DOCUMENTS

In addition to the Nichol Drain No. 2 Subwatershed Study, the following documents and guidelines were reviewed in preparation of this report:

- *Nichol Drain No. 2 Subwatershed Study*, R.J. Burnside & Associates Limited, 1996;
- *Development Manual (Draft)*, Township of Centre Wellington, 2018;
- *Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation*, Grand River Conservation Authority, 2015;
- *Policies and Procedures for Compliance with the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation*, Grand River Conservation Authority, 2009;
- *Technical Guide – River & Stream System: Flood Hazard Limit*, Ontario Ministry of Natural Resources, 2002; and
- *Technical Guide – River & Stream Systems: Erosion Hazard Limit*, Ontario Ministry of Natural resources, 2002.

2 Existing Drainage Conditions

The existing drainage conditions in the South Fergus Secondary Plan Area were established through a review of the available topographic mapping and aerial photos, topographic survey, site reconnaissance, and a review of the available background information. The existing drainage conditions are illustrated on the Existing Conditions Drainage Plan (Drawing DP-1) enclosed and summarized in the following sections.

2.1 TOPOGRAPHY

In support of the South Fergus MESP and Secondary Plan, Northway/Photomap Remote Sensing Ltd. conducted a drone survey capturing new aerial photography and topographic mapping of the Secondary Plan area in the fall of 2020. To supplement the drone survey data, Tatham Engineering conducted a topographic survey of Nichol Drain No. 2 and other key hydrologic features in the area. This topographic data was used to establish the existing drainage patterns in the Secondary Plan area.

The lands within the Secondary Plan area generally drain overland as sheet flow to Nichol Drain No. 2. The drain runs southwest through the Secondary Plan area, crossing Tower Street South (Highway 6) and 2nd Line.

2.2 SOIL CONDITIONS

The *Soils Survey of Wellington County* defines the soils in the Secondary Plan area as:

- Harriston Loam – well drained soils belonging to soils group BC;
- Listowel Loam – imperfectly drained soils belonging to soils group BC;
- Parkhill Loam – poorly drained soils belonging to soils group BC; and
- Muck – organic deposits accumulated in wet undrained depressions.

A geotechnical investigation conducted by Golder in support of the MESP and Secondary Plan identified the on-site soils as sand and gravel to silty clay. The soils are generally sand, silty sand and till near the surface in the agricultural areas on-site and clayey silt to silty clay in the wetland areas. The geotechnical investigation is summarized in the Interim Hydrogeological Investigation Results submitted under separate cover.

2.3 GROUNDWATER CONDITIONS

To characterise the regional geological setting, existing hydrogeological conditions and groundwater levels in the Secondary Plan area, a hydrogeological study is underway and the

existing groundwater conditions are described in the Interim Hydrogeological Investigation Results under separate cover. In accordance with the Terms of Reference (ToR), a groundwater monitoring program is currently underway to track seasonal groundwater elevations and infiltration testing is to occur on-site to determine the suitability of infiltration based low impact development (LID) measures on-site and establish groundwater recharge requirements within the Secondary Plan area.

2.4 DRAINAGE PATTERNS

As noted, surface runoff from the study area is conveyed through a municipal drain complex (Nichol Drain No. 2) that drains into Swan Creek, south of the Secondary Plan area. The drainage network consists of a series of municipal drains which are characterised as part of the Fluvial Geomorphological Characterization and Erosion Threshold Assessment (Water's Edge Environmental Solutions Team, June 2021) included in Appendix A. Nichol Drain No. 2 conveys drainage generated on-site and surface runoff from external lands downstream. The drainage patterns within and external to the Secondary Plan area are described as follows:

- north of the Secondary Plan area, the Cherry Hills Estates subdivision drains to the upstream end of the drainage channel (Point of Interest D) constructed at the rear of the Highway Commercial lands fronting Tower Street South (Highway 6);
- the Highway Commercial lands also drain into this drainage channel via a series of storm sewers and culverts;
- approximately 12.4 ha of agricultural land within the Secondary Plan area also drains overland as sheet flow into the drainage channel;
- the drainage channel drains into the water quantity and quality control SWMF constructed west of Nichol Drain No. 2, immediately east of Tower Street South (Highway 6) as part of the Highway Commercial development;
- the SWMF outlets into Nichol Drain No. 2 immediately upstream of Tower Street South (Highway 6);
- approximately 29.6 ha of agricultural land north of Scotland Street drains overland as sheet flow to a culvert crossing Scotland Street (Point of Interest A) and onto the subject property at the location of the former Turner Drain;
- surface runoff from the external drainage area combined with runoff from agricultural lands within the Secondary Plan area drains overland into the upstream end of Nichol Drain No. 2 (Point of Interest B) and into the on-site wetland;
- the wetland stores runoff releasing it into Nichol Drain No. 2 at Point of Interest C;

- Nichol Drain No. 2 crosses Tower Street South (Highway 6) via an 1820 mm × 3020 mm concrete box culvert at Point of Interest F after receiving flow from the existing SWMF;
- approximately 4.9 ha of land south of Guelph Street drains overland as sheet flow to a culvert crossing Guelph Street (Point of Interest G) and onto the subject property and into a wetland identified immediately north of Guelph Street;
- this wetland drains via a municipal drain which converges with Nichol Drain No. 2 at Point of Interest I;
- at this confluence, a crossing (1200 mm diameter CSP culvert) has been installed to provide access to either side of Nichol Drain No. 2;
- west of Tower Street South (Highway 6) Nichol Drain No. 2 runs southeast to 2nd Line (Point of Interest J), crossing 2nd Line via an 1800 mm × 3000 mm concrete box culvert;
- at Point of Interest J, the Nichol Drain No. 2 watershed encompasses a total of 217.1 ha of mixed use residential, commercial and agricultural land;
- downstream of 2nd Line at the limit of this study and confluence with Drain No. 11, the Nichol Drain No. 2 watershed has a total drainage area of 542.8 ha; and
- the southwest corner of the Secondary Plan area is located outside the Nichol Drain No. 2 watershed and drains west overland as sheet flow towards the Grand River.

2.5 STORMWATER INFRASTRUCTURE

The storm infrastructure located in the Secondary Plan area is limited to drainage channels, municipal drains, a stormwater management facility, tile drains and various culvert crossings.

As discussed, surface runoff from the study area is conveyed through a municipal drain complex (Nichol Drain No. 2) that drains into Swan Creek, south of the Secondary Plan area. Surface runoff from the Cherry Hill Estates subdivision is conveyed via storm sewer and the municipal road allowance to the drainage channel constructed at the rear of the Highway Commercial lands fronting Tower Street South (Highway 6). The drainage channel conveys runoff to the water quantity and quality control SWMF constructed west of Nichol Drain No. 2, immediately east of Tower Street South (Highway 6) as part of the Highway Commercial development.

The SWMF was designed to provide the requisite water quantity and quality controls for the Cherry Hills Estates subdivision, the Highway Commercial lands and a portion of the future development lands within the Secondary Plan area. The SWMF was designed with the following storage volumes:

- 5,100 m^3 of permanent pool storage;

- 6,175 m^3 of extended detention storage; and
- 21,030 m^3 of total active storage.

Discharge from the SWMF into Nichol Drain No. 2 occurs via:

- primary outlet – 1200 mm diameter CSP culvert complete with inlet and outlet headwalls; and
- overflow spillway – 20 m wide broad crested weir with an invert elevation of 411.00 m.

Within the Secondary Plan area, there are three culvert crossing located on Nichol Drain No. 2, two road crossings and a farm access crossing as follows:

- Tower Street South (Highway 6) - 1820 mm × 3020 mm concrete box culvert;
- Farm Access – 1200 mm diameter CSP culvert; and
- 2nd Line - 1800 mm × 3000 mm concrete box culvert.

Although not explicitly stormwater infrastructure, the on-site wetlands also provide water quantity and quality control. The wetlands attenuate peak flows by storing runoff and releasing it into the downstream drainage system at reduced rates. In storing the water, the wetland also provides time for sediment and contaminates to settle out of the runoff and nutrient uptake through wetland vegetation, treating the runoff.

3 Hydrologic Analysis

A hydrologic analysis of the Nichol Drain No. 2 watershed upstream of the downstream study limit (Point of Interest K) has been completed to quantify the existing condition peak flows generated within and draining through the Secondary Plan area. A Visual OTTHYMO (VO6) hydrologic model has been created to quantify the peak flows for the 25 mm storm, 1:2-year though 1:100-year design storms and the Regional (Hurricane Hazel) Storm. The 1:2-year through 1:100-year design storms have been simulated using the 4-hour Chicago and 12-hour and 24-hour SCS Type II design storm distributions. The hydrologic analysis completed is described in the following sections.

3.1 DESIGN STORMS

Design storm distributions were developed from rainfall Intensity-Duration-Frequency (IDF) curves obtained from the Ministry of Transportation's (MTO) IDF lookup tool. The IDF coefficients for the study area are summarised in Table 2.

Table 2: IDF Coefficient Summary

RETURN PERIOD	A	B
1:2-Year	23.3	-0.699
1:5-Year	30.8	-0.699
1:10-Year	35.7	-0.699
1:25-Year	41.8	-0.699
1:50-Year	46.4	-0.699
1:100-Year	51.0	-0.699

3.2 MODEL PARAMETERS

Curve Numbers (CN) for the delineated subcatchments were calculated based on the soil group classification and land use. As previously noted, soil group coverage was obtained from the *Soils Survey of Wellington County*. Land use data for the study area was obtained from the Ministry of Natural Resources and Forestry's (MNRF) Southern Ontario Land Resource Information System (SOLRIS). A summary of the hydrologic model input parameters is provided Table 3.

Table 3: Existing Catchment Characteristics

CATCHMENT ID	AREA (HA)	CN	% IMPERVIOUS
101	29.6	81.9	4%
102	33.3	81.0	8%
103	30.2	79.7	3%
104	9.0	72.9	0%
105	12.1	79.4	6%
106	4.7	71.4	60%
107	12.4	78.9	86%
108	5.7	74.2	67%
109	9.7	81.0	12%
110	3.8	85.6	10%
111	15.2	83.9	6%
112	10.1	76.9	0%
113	13.2	76.9	4%
114	10.4	76.6	6%
115	5.3	79.6	8%
116	9.7	81.4	23%
117	15.4	81.2	4%
118	5.3	80.7	17%
119	61.5	75.5	3%
120	19.7	78.0	5%
121	23.8	83.5	4%

CATCHMENT ID	AREA (HA)	CN	% IMPERVIOUS
122	47.1	81.9	4%
123	27.6	81	5%
124	59.1	77	2%
125	50.7	76.6	0%
126	34.0	83.9	6%

3.3 RESULTS SUMMARY

Summaries of the watershed response at key areas of interest within the Secondary Plan area are provided in Tables 4 and 5, whereas detailed results of the hydrologic analysis are included in Appendix B for reference. As illustrated, the peak flows generated as part of this study correlate well with the previously completed Subwatershed Study for the minor storms (1:2-year through 1:10-year design storms) and Regional (Hurricane Hazel) Storm. For the 1:25-year through 1:100-year design storms, the Subwatershed Study peak flows exceed those predicted through this study. This may be due to the overcontrol of peak flows released from the existing SWMF as it was designed to provide water quantity control for a larger area than currently developed.

Table 4: Existing Conditions Peak Flow Summary – Upstream of Highway 6 (POI F)

STORM	4-HOUR CHICAGO	12-HOUR SCS	24-HOUR SCS	SUBWATERSHED STUDY (1996)
1:2-Year	0.8	1.7	2.2	1.1
1:5-Year	1.8	3.0	4.0	3.0
1:10-Year	2.4	4.1	5.0	4.3
1:25-Year	3.3	5.5	6.6	7.1
1:50-Year	4.0	6.6	7.8	9.3
1:100-Year	4.7	7.7	9.1	11.3
Regional		14.0		14.2

Table 5: Existing Conditions Peak Flow Summary – Upstream of Line 2 (POI J)

STORM	4-HOUR CHICAGO	12-HOUR SCS	24-HOUR SCS	SUBWATERSHED STUDY(1996)
1:2-Year	1.2	2.4	2.6	1.4
1:5-Year	2.4	4.3	4.7	4.0
1:10-Year	3.3	5.5	6.0	5.6
1:25-Year	4.5	7.1	8.0	9.2
1:50-Year	5.4	8.5	9.5	11.9
1:100-Year	6.3	7.7	11.1	15.5
Regional		19.6		20.0

3.4 STREAMFLOW MONITORING AND CALIBRATION

In accordance with the ToR, three streamflow monitoring stations and a rain gauge have been installed in the Secondary Plan area to collect streamflow and precipitation data. The streamflow and precipitation data will be used moving forward to calibrate and validate the hydrologic model described previously.

Each streamflow monitoring station utilises a data logger and collects water level measurements every 15 minutes. Monthly manual streamflow measurements and water level readings are being collected to develop a streamflow rating curve (depth versus streamflow) at each streamflow monitoring location which is then used to convert water depth to streamflow from the recorded data. The streamflow monitoring locations and location of the rain gauge are illustrated on the Existing Condition Drainage Plan (Drawing DP-1) enclosed.

4 Natural Hazards

Nichol Drain No. 2 is regulated by the Grand River Conservation Authority for natural hazards. A preliminary natural hazards study has been prepared to establish the flood and erosion hazard limits associated with Nichol Drain No. 2 across the Secondary Plan area in accordance with:

- *Technical Guide – River & Stream System: Flood Hazard Limit*, Ontario Ministry of Natural Resources, 2002; and
- *Technical Guide – River & Stream Systems: Erosion Hazard Limit*, Ontario Ministry of Natural resources, 2002.

The natural hazards assessment completed is described in the following sections.

4.1 FLOOD HAZARD ANALYSIS

To establish the flood hazard limits within the Secondary Plan area, a topographic survey of Nichol Drain No. 2 was completed and a HEC-RAS hydraulic model of the municipal drain was created. A description of the key hydrologic and hydraulic model parameters used to define Nichol Drain No. 2 in the HEC-RAS hydraulic model is provided in the following sections.

4.1.1 Boundary Conditions

Similar to the Subwatershed Study, the HEC-RAS model was extended approximately 700 m downstream of 2nd Line to the downstream study limit and the confluence with Drain No. 11. The hydraulic model was extended downstream to ensure any potential issues/errors regarding the downstream boundary condition are resolved downstream of the Secondary Plan area. The downstream boundary condition has been set as 0.3% or the normal depth of Nichol Drain No. 2 at the downstream study limit.

4.1.2 Cross-Section Geometry

The cross-section geometry was developed from the topographic survey undertaken in November 2020, and a Digital Elevation Model (DEM) developed from topographic mapping prepared by Northway/Photomap Remote Sensing Inc. in the fall of 2020. The topographic survey data was used to define the main channel reaches of Nichol Drain No. 2 while the topographic mapping defined the channel overbanks. The reach lengths were determined based on the distance between consecutive cross-sections along the river centreline. The overbank reach lengths were determined based on the anticipated path of the center of mass of the overbank flow.

4.1.3 Manning's Roughness Coefficient

The Manning's roughness coefficient depends on several factors including surface roughness, vegetation, channel irregularities and obstructions. The HEC-RAS Reference Manual provides standard values for various channel and floodplain types. Based on field observations, the Manning's roughness coefficients were set as follows:

- 0.045 for the main channel where it was observed to contain some weeds and stones, and some pooled areas (a value of 0.040 was adopted for the areas of the main channel which have been artificially straightened and contain lower and less dense vegetation);
- 0.100 for the channel overbanks through weedy and wooded areas, including the identified wetland areas; and
- 0.060 within the floodplain with less dense tree cover.

4.1.4 Contraction and Expansion Coefficients

Energy losses occur due to the contraction and expansion of flow between cross-sections. This is most significant at culverts or bridges. Contraction and expansion coefficients have been set according to Table 5-2 of the HEC-RAS Reference Manual. Entrance losses for culverts have been set according to Tables 6-3 and 6-4 of the HEC-RAS Reference Manual and exit losses have been set to 1.0 which is typical for an abrupt transition.

4.1.5 Culverts

The culvert shape, size, length and inverts were determined from field observations and topographic survey data. Manning's roughness coefficients of 0.013 were used for the concrete box culverts, and 0.024 for CSP culverts. A summary of the culverts modelled in the HEC-RAS hydraulic model is provided in Table 6.

Table 6: Existing Culvert Summary

LOCATION	TYPE	LENGTH (M)	UPSTREAM INVERT (M)	DOWNSTREAM INVERT (M)
Highway 6	3.02 x 1.82 m Concrete Box	39	408.7	408.6
Field Crossing	1.2 m dia. CSP	6	406.1	406.2
Line 2	3.0 x 2.0 m Concrete Box	17	405.9	405.9

4.1.6 Hydraulic Analysis

The Regional (Hurricane Hazel) Storm peak flows generated through the hydrologic analysis were simulated in the HEC-RAS hydraulic model to establish the Regional floodplain associated with Nichol Drain No. 2 through the Secondary Plan area. The Regional floodplain is illustrated on the Natural Hazards Plan (Drawing NH-1) enclosed and the detailed hydraulic analysis results are included in Appendix C for reference.

During the flood hazard assessment, it was noted that a spill occurs across Guelph Line during the Regional Storm due to insufficient channel capacity in Nichol Drain No. 2 which is exacerbated by the flow constriction caused by the 2nd Line culvert crossing. An unsteady 1D/2D HEC-RAS model was developed to evaluate the impacts floodplain storage, peak flow attenuation and the spill have on the Regional Storm floodplain upstream of 2nd Line. The model predicts that water will backup through Nichol Drain No. 2, through the adjoining municipal drain into the wetland immediately north of Guelph Line and overtop Guelph Line during the Regional Storm. Once Guelph Line overtops, the water spills southeast to the intersection of Guelph Line and 2nd Line and continues southeast until it is reintroduced back into Nichol Drain No. 2 approximately 360 m downstream of 2nd Line.

4.2 EROSION HAZARD ANALYSIS

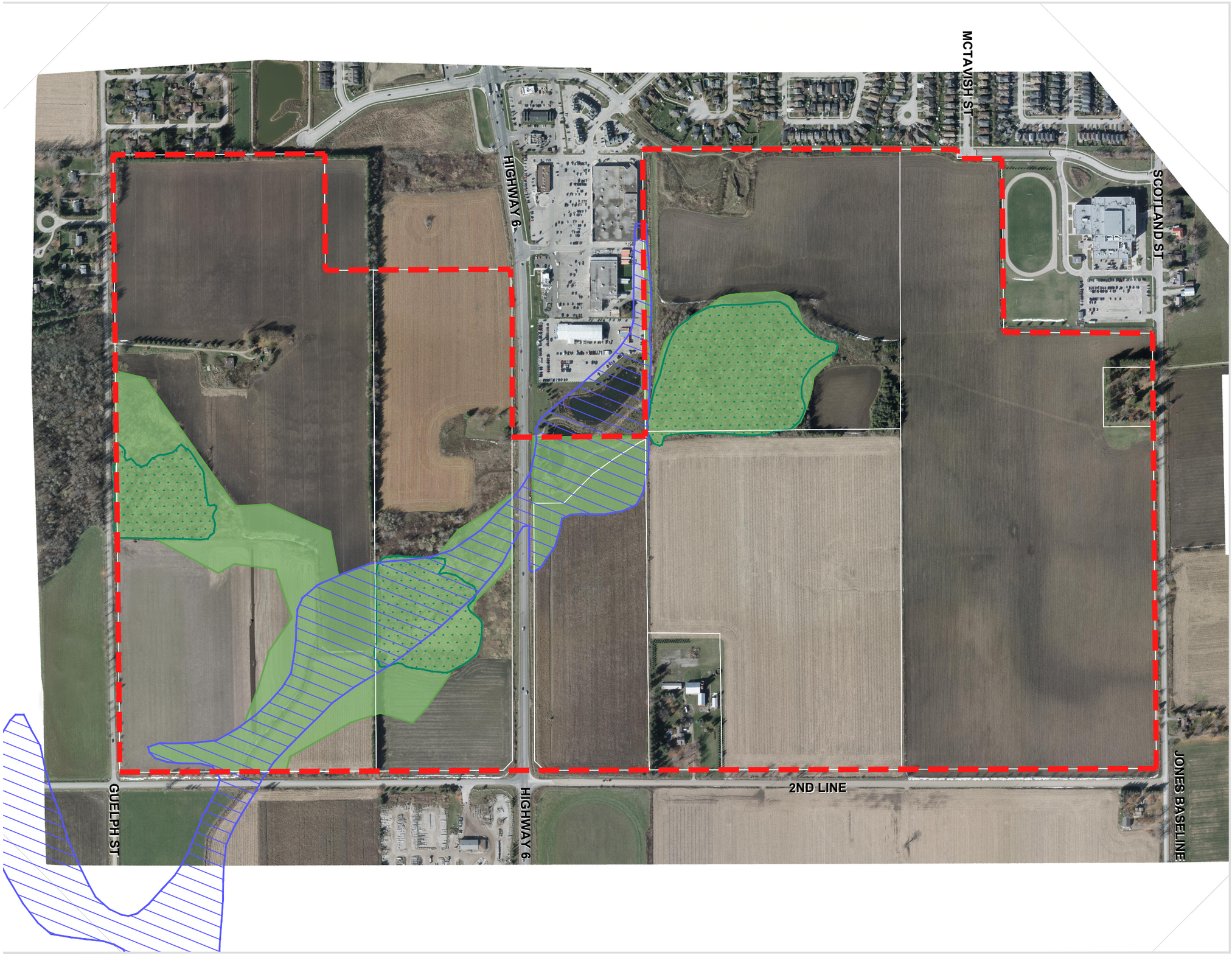
The MNRF Technical Guide – River and Stream Systems: Erosion Hazard Limit defines the erosion hazard limit for an unconfined system as 20 times the bankfull channel width centered on the meander belt axis. The Fluvial Geomorphological Characterization and Erosion Threshold Assessment included in Appendix A provides a preliminary assessment of potential geomorphic change and erosion potential of Nichol Drain No. 2. The geomorphological characterisation indicates the channel reaches through the Secondary Plan area are susceptible to erosion and channel instability. The erosion hazard limits have therefore been established as 20 times the assessed bankfull width of each respective channel reach in accordance with the MNRF guidelines. The erosion hazard limits are shown on the Natural Hazards Plan (Drawing NH-1) enclosed.

5 Summary and Next Steps

This report summarises the work completed to date to establish the existing drainage conditions and delineate the natural hazards associated with Nichol Drain No. 2 within the Secondary Plan area. These elements will be used to identify development constraints and inform the stormwater management strategy for the Secondary Plan area moving forward.

The next steps of this study include:

- develop initial SWM concepts/strategies for the Secondary Plan area in conjunction with proposed development concepts;
- review channel improvements and realignment scenarios identified through the Fluvial Geomorphological Characterization and Erosion Threshold Assessment to evaluate their impact on the Regulatory floodplain and development limits;
- refine the Natural Hazards Plan to include the revised Regulatory floodplain and erosion hazard limits associated with the channel improvement and realignment scenarios to establish the proposed development constraints; and
- select a preferred stormwater management strategy for the Secondary Plan area considering the impacts to the natural, cultural, physical and economic environments.



Location Plan
South Fergus Secondary Planning Area

Town of Fergus
Township of Centre Wellington

LEGEND

- South Fergus Secondary Planning Area
- Parcel Fabric*
- Environmental Features (Core Greenlands, Wetlands, & Floodplain)
- Floodplain (GRCA)
- Wetlands (GRCA)

Sources
- Imagery: Northway\Photomap\Remote Sensing Ltd, 2020
- Floodplain and Wetland data: GRCA Open Data 2018
- Core Greenlands digitized from Township of Centre Wellington Official Plan Schedule A-1 *Land Use Plan - Fergus, Elora 2016*

**Parcel fabric digitized from GRCA web mapping and is approximate in size and location*

Date: December 21, 2020

Scale: 1:6,000

File: 19144A

Drawn: JB

north

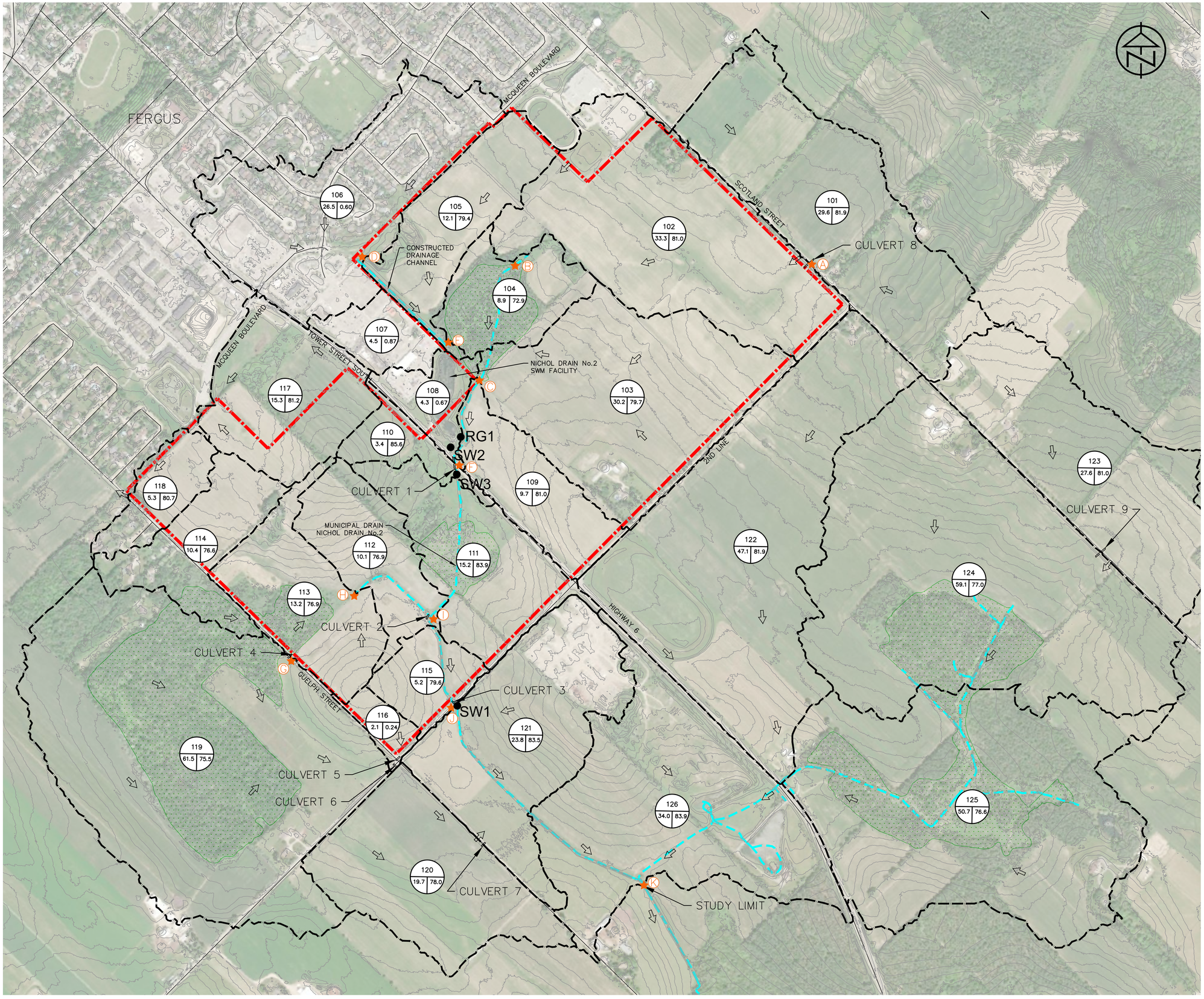
K:\19144A - SOUTH FERGUS MESP AND SECONDARY PLAN\CP\LOCATION PLAN_21DEC2020.DWG

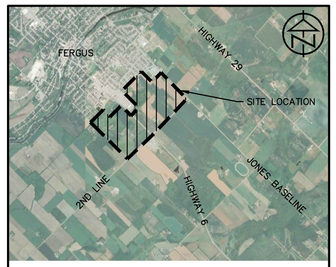
MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9
P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

DP-1

EXISTING DRAINAGE PLAN

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington





KEY PLAN
SCALE (N.T.S.)

CULVERTS

CULVET 1:	3.02m X 1.82m BOX CULVERT
CULVERT 2:	1.2mø CSP
CULVERT 3:	3.0m X 2.0m BOX CULVERT
CULVERT 4:	0.55mø & 0.6mø HDPE
CULVERT 5:	TO BE DETERMINED
CULVERT 6:	TO BE DETERMINED
CULVERT 7:	TO BE DETERMINED
CULVERT 8:	0.45mø CSP
CULVERT 9:	0.45mø CSP

LEGEND

- SOUTH FERGUS SECONDARY PLAN AREA
- OVERLAND FLOW DIRECTION
- CATCHMENT BOUNDARY
- WETLANDS
- CATCHMENT ID
- 12-101 / 2.75 / 0.60 — CURVE NUMBER / IMPERVIOUS FRACTION / CATCHMENT AREA
- ●SW STREAMFLOW MONITORING LOCATION
- ●RG RAIN GAUGE LOCATION
- ★ Ⓐ POINT OF INTEREST

Base Map Source: TOPOGRAPHIC SURVEY (TATHAM) COMBINED WITH TOPOGRAPHIC MAPPING (NORTHWAY/PHOTOMAP REMOTE SENSING LTD.)

DATE:	JUNE 14, 2021
SCALE:	1:2500
FILE:	120157
DRAWN:	KF

DP-01

I:\2020 Projects\120157 - South Fergus MESP and Secondary Plan\CSD\Creek Analysis - Design\Reports\Report

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

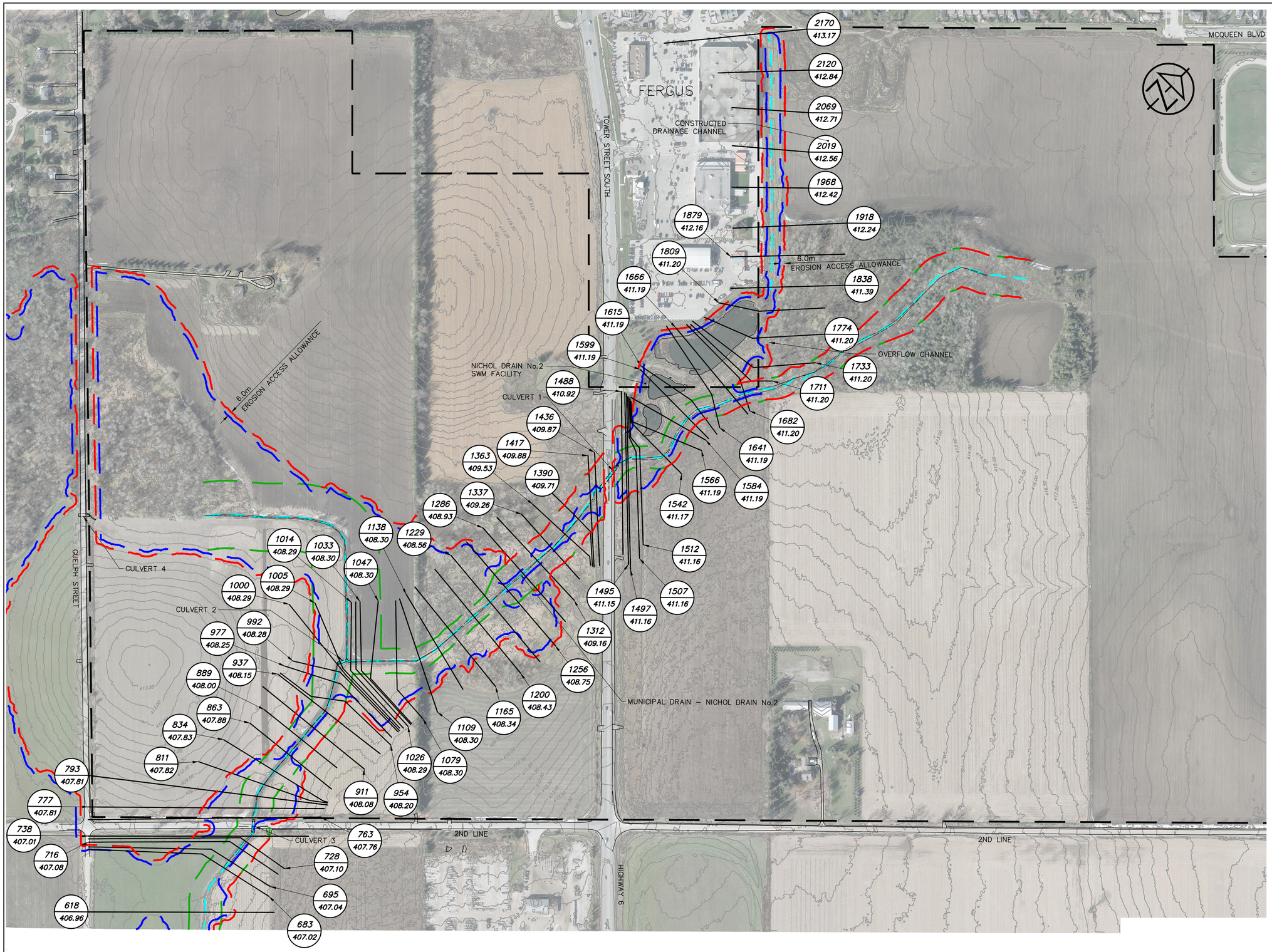
FRICORP ECOLOGICAL SERVICES

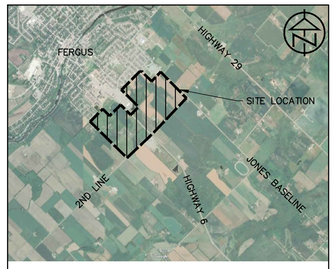
TATHAM ENGINEERING

FM-1

NATURAL HAZARDS PLAN

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington





KEY PLAN
SCALE (N.T.S.)

CULVERTS

CULVERT 1:	3.05m x 1.82m CONCRETE BOX CULVERT
CULVERT 2:	1.20mø CSP
CULVERT 3:	3.0m x 2.0m CONCRETE BOX CULVERT
CULVERT 4:	0.6mø HDPE CULVERT AND 0.55mø HDPE CULVERT

LEGEND

- FLOOD HAZARD LIMIT
- NATURAL HAZARD LIMIT
- CENTERLINE OF DRAIN
- EROSION HAZARD LIMIT
- SOUTH FERGUS SECONDARY PLAN AREA
- HEC–RAS RIVER STATION → 90
- REGIONAL WATER SURFACE ELEVATION → 411.24
- EXISTING CONTOUR 419.50

Base Map Source: TOPOGRAPHIC SURVEY (TATHAM) COMBINED WITH TOPOGRAPHIC MAPPING (NORTHWAY/PHOTOMAP REMOTE SENSING LTD.)

DATE:	JUNE 14, 2021
SCALE:	1:2500
FILE:	120157
DRAWN:	KF

1:\2020 Projects\120157 - South Fergus MESP and Secondary Plan\C3D\Civnet Analysis - Design\Received\Report
Drawing Specification of Fergus Template.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

Appendix A: Fluvial Geomorphic Characterization and Erosion Threshold Assessment

June 14, 2021
WE 20035

Daniel Twigger. B. Sc.Eng., P.Eng
Tatham Engineering Limited
115 Sandford Fleming Dr., Suite 200
Collingwood, Ontario
L9Y 5A6

Dear Mr. Twigger:

RE: South Fergus, Wellington County
Fluvial Geomorphic Characterization and Erosion Threshold Assessment

Water's Edge was authorized by Tatham Engineering Limited to complete a fluvial geomorphic characterization and erosion threshold assessment on the Nichol Drain No.2 watercourse located in South Fergus, formally Township of Nichol. In preparation for a proposed development on the land, a Master Environmental Servicing Plan is being performed. The following report is a summary of existing conditions at the development site based on background review and field study.

This report first characterizes the existing watercourse and watershed conditions within the study area based on the desktop assessments and field investigations. Secondly, the report establishes the erosion threshold criteria through an erosion threshold assessment. Relevant literature on the site was reviewed and confirmed and if necessary, updated based on a desktop analysis and synoptic level field survey(s). Results from the desktop assessments were used to determine cross-sections to undertake detailed field surveys sufficient to determine erosion thresholds.

1.0 Background Review

We have completed our assessment of the creek in accordance with the approved project Terms of Reference. Data sources for the analysis include:

- Background Information: Nichol Drain No. 2 Plan
  - Nichol Drain No. 2 Phase I Storm Water Management Facility: Final Design Report prepared by Totten Sims Hubicki Associates (Rev. 2, 1997)
  - Nichol Drain No. 2 Subwatershed Study prepared by R.J. Burnside & Associates Limited (1996)
  - Nichol Drain No. 2 Watershed Study prepared by Ecological Services Group for Planning LTD. (1996)
- Physiography of Southern Ontario by Chapman & Putnam (digital data from Ministry of Northern Development and Mines (MNDM));
- Ontario Flow Assessment Tool (OFAT);
- Ontario Base Mapping (OBM);
- Site Survey and Field Assessments

Relevant literature on the site was reviewed and confirmed and if necessary, updated based on a desktop analysis and synoptic geomorphic survey(s). The drain has been well studied in the past in preparation for the construction of the present Stormwater Management Facility. The study site, named Nichol Drain No. 2, is part of a municipal drain complex that drains into the Swan Creek Wetland complex, a tributary of the Grand River. While the drain complex is not necessarily a pristine natural feature, the downstream Swan Creek has been identified by the MNRF as a cold-water stream with important fish habitat. The previous ecological study from 1996 has concluded the area does not apply as a part of the Swan Creek complex but has some limited wetland function. Several isolated broadleaf swamp stands have been identified in the previous reports which still

stand on present day farmland. Most notably on the western edge of the study site (**Figure 1).** In a watershed study, the Turner Drain coming out of Scotland Street (now called Jones Baseline) has been identified as the originating drain for this complex.

The Subwatershed study done in 1996 has noted the Nichol Drain No. 2 does not exhibit characteristics of natural stream with silt buildup limiting habitats for fish. There is little riparian cover and some groundwater input, however, has limited fish population. There is also an existing tile drain system, something the designers of the stormwater facility was careful to avoid impacting. The soil in the is mostly loam with poor drainage characteristics. These features noted in the 1996 study are still true of the current drainage system.

However, the study site has also changed significantly since the data collection done in these reports. Since the 1996 study, the Stormwater Management facility has been built on Tower Street South and the area north of the study site has developed into commercial land. Currently, the study site itself is mostly agricultural with patches of naturalized forest and wetland. Tower Street South bisects the study site with a stormwater management facility (SWM) located right of the road. A creek drains through a culvert under Tower Street South which has been lined with riverstone. The facility has been designed to hold 100-year flow. Some drains noted on the 1996 report do not exist anymore, most notable the Turner Drain from Jones Baseline (previously Scotland Road). Some culverts in the 1996 reports could not be found, such as the Turner Drain culvert and the culvert on the northeast boundary, close to Millburn road. Instead, an informal path with a small pile of dirt has been put in by the farmer.

Figure 1: Location of study area within Fergus, Ontario

Figure 2: Reach map for study area

1.1. Physiography and Surficial Geology

Understanding the surficial and underlying geology for the study area provides insight into the geological influence on channel geometry, expected rates of erosion, and helps define the quantity and type of sediment available for watercourses to transport and deposit.

The study area is located in the Guelph Drumlin Field, with the watercourse in a drumlinized till plain. The physical landforms around the site are mostly drumlins, spillways, and till plain. The underlying quaternary geology is Pleistocene in age (**Figure 2**). Directly under the watercourses are glaciofluvial deposits, consisting of sand to gravel deposits while sandy silt till surrounds the watercourse (**Figure 3**). The soil underlying the watercourse is mostly loam with some muck/peat.

1.2 General Watershed Characteristics

The Nichol Drainage No. 2 watercourses run collect agricultural drainage, flow into Swan Creek and eventually the Grand River. **Table 1** shows the land use breakdown for the watersheds in the study area and the total watercourse length within the study area.

Figure 3: Physiographic landforms of Study Area

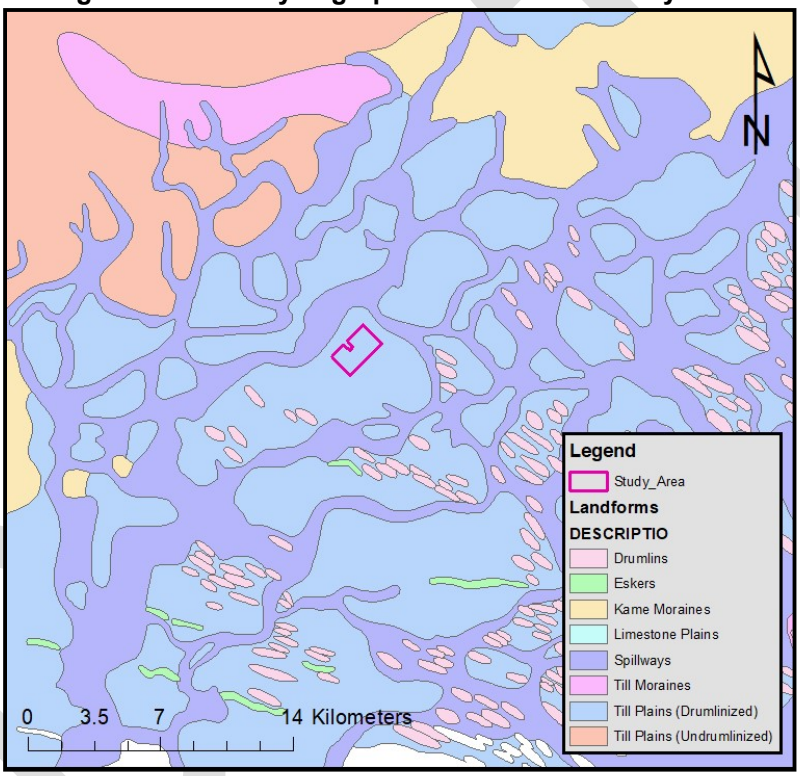


Figure 4: Quaternary Geology of Study Area

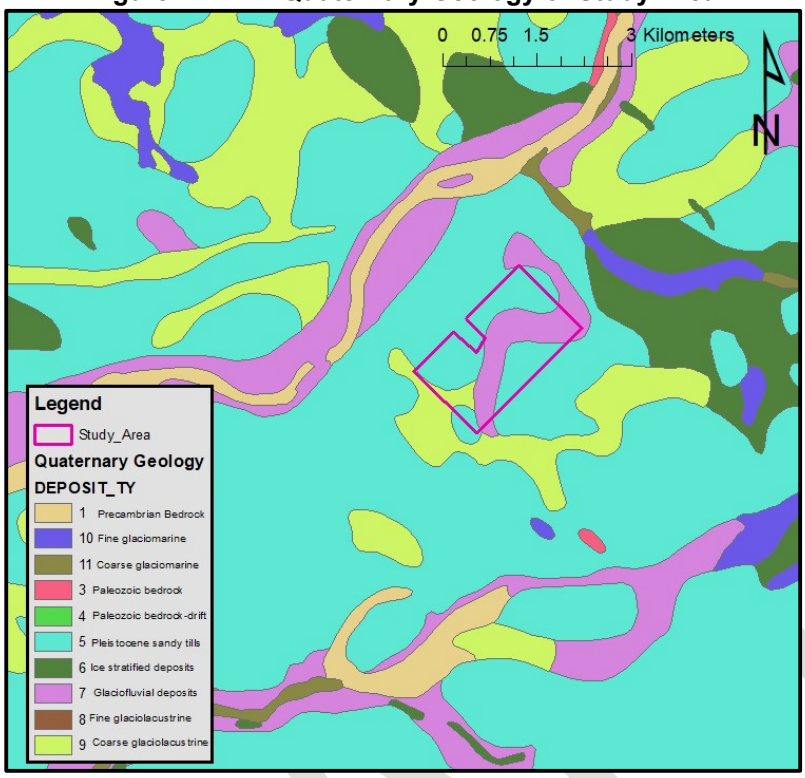


Table 1: Watershed Characteristics

Reach	Watercourse Length in watershed (m)	Watershed Area (km^2)	Land use Characteristics		
			Rural/ Agricultural (%)	Urbanized (%)	Other (%)
1	538	NA*	NA	NA	NA
2	105	0.99**	90	4	6
3	168	0.99**	90	4	6
4	196	0.99**	90	4	6
5	209	1.6	70	25	5
6	222	1.8	72	24	3
7	131	2.0	74	22	4
8	327	2.0	74	21	5
9	503	0.11	91	0	9

**No OFAT information available*
***Watershed for reach 2, 3, and 4 combined as one.*

2.0 Field Investigations

The study reaches of the watercourse within the subject property is located just south of Fergus, Ontario (**Figure 1**). Staff visited the study site in November 2020 to gather a synoptic level understanding of the trends and channel condition through the application of rapid assessments (check sheets). In erosion assessments in which the aim is to determine threshold values to guide water discharge to local creeks, these rapid assessments often identify the most sensitive locations. Therefore, the identified areas are often the focus of the erosion assessment. Locations for detailed surveys of profile, cross-section, and particle analysis were selected based on the potential discharge location, and at appropriate locations downstream. **Appendix A** contains a series of ground photography taken during the site visits.

2.1 Reach Delineation

Channel morphology and substrate characteristics can change along a watercourse. Hence, it becomes imperative to account for this variation by delineating lengths of a watercourse that exhibit similar planform, sediment substrate, land use, local geology, valley confinement, hydrology and gradient. The channel reaches in the study area can be characterized as small and silty channelized waterways and others feature grass and wood-dominated wetlands (**Figure 1**). The study area channels are similar with low gradients and relatively fine bed material. For this study, channel geometries and sediment conditions have been examined in detail at nine reaches.

2.2 Geomorphic Characteristics

The study reaches can be described as a single threaded channel with two major confluences. Nine sections or reaches were surveyed and with their local longitudinal profile to obtain bankfull slopes. The reach characteristics of the delineated reaches are described below and the reach summary of the geomorphic characteristics of the cross sections surveyed are shown in **Table 2**.

Table 2: Summary of Study Area Geomorphic Parameters

Parameter	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Reach 8*	Reach 9
Bankfull Width (m)	6.4	3.7	1.4	2.5	2.4	1.1	1.6	2.1	6.9
Bankfull Mean Depth (m)	2.2	0.1	0.2	0.2	0.3	0.2	0.3	0.2	1.0
Bankfull Max Depth (m)	1.0	0.3	0.3	0.3	0.4	0.3	0.5	0.3	1.7
Bankfull Area (m^2)	3.7	0.6	0.3	0.5	0.7	0.2	0.5	0.4	4.9
Wetted Perimeter (m)	6.8	3.8	4.6	2.6	2.6	1.3	2.0	2.2	7.2
Hydraulic Radius (m)	0.6	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.6
Width-Depth Ratio	11.0 Low	27.7 Mod. – High	6.4 Low	39.8 Very High	9.4 Low	6.1 Low	5.4 Low	11.6 Mod. – High	10.9 Mod.
Entrenchment Ratio	2.2 Mod.	1.8 Mod.	2.4 Slightly	2.4 Slightly	2.8 Slightly – Mod.	4.5 Slightly	3.7 Slightly	2.3 Mod.	1.69 Mod.
Channel Substrate D_{50} (mm)	0.3	0.3	0.4	0.4	14.1	0.8	0.8	5.3	0.7
Channel Substrate D_{84} (mm)	4.0	4.0	2.4	2.4	41.0	2.0	1.9	31.6	1.8
Rosgen Classification	B	B	E	C-D	E-B	E	E	B	A-G

Reach 1
This reach is a channelized drainage ditch not noted in the 1996 watershed reports. This channel runs along the east side of commercial land. Several culverts from the parking lot drain into this channel. The water originates from a culvert on the north end. A culvert diverts water into the current SWM facility; however, the channelized reach also continues past the SWM facility to become Reach 2. The channel is entrenched with a bankfull width of approximately 1.95 m. The channel has almost no pool-riffle structure and is highly silted. The bank slopes are vegetated with cat tails and grasses, but the riparian zone is otherwise bare with a farmer field to the east and a parking lot to the west. There is little evidence of scour or planimetric adjustment, however the bank may have been obscured by grassy vegetation. As the reach reaches the SWM facility, the channel develops backwater characteristics. The channel widens, deepens, and is very silted. This may be because of the known beaver activity in the area. In fact, at that location was a freshly felled tree stump.

Reach 2
This is a single-threaded channel has also been channelized or dug out and runs parallel to the SWM facility. Compared to Reach 1, it is wide, shallow, and less entrenched and well canopied. The reach is also heavily silted with few riffle-pool structures. The creek substrate is mostly fallen leaves and vegetation from surrounding trees. Several trees are growing out of this channel with some leaning from the bank sides. There is some bank scour on the bottom fifth of bank but otherwise this channel shows poor flow. The channel narrows and splits into three segments near the end of the SWM facility connecting to Reach 3 and Reach 4. Here, the creek substrate is small boulder and an overflow spillway also drains from here, however there is no evidence of flow. There is also a palette placed here as an informal bridge. The riparian zone is well canopied and well vegetation although the water is cloudy and stagnant.

Reach 3
This channel runs through a naturalized patch in what was classified as 'broadleaf swamp in the 1996 watershed study repots'. The channel is small, shallow, and not entrenched at all. It can be difficult to follow and in the low flow conditions of the site visit, would appear and reappear. The channel is dynamic and flows through patches of grass, swamp, and often divides and rejoins itself throughout the naturalized patch. The channel has some riffle-pool structures developing in sections with consistent flow and past areas of wetland flow. The creek substrate is a sandy soil mixed with surrounding vegetation. In some areas, trees and shrubs would grow out of the creek. The riparian zone is well canopied and wide, but the creek lacks good in-stream habitats.

Reach 4
Although this section is extremely short, it has been classified as its own reach for ease of description. This reach is the end of what was previously labelled the Turner Drain in 1996 reports. The Turner Drain as a channel with moving water does not exist anymore. Instead, the farmer has piled dirt on top of several culverts to drain their agricultural fields. These culverts drain into a scour pool which flow into a grassy wetland patch. This water is what eventually becomes Reach 4. The riparian zone here is poorly canopied, excavated and contains most grassy vegetation. It is possible further work is planned here.

Reach 5
This reach is downstream of the SWM facility where a creek runs out of the SWM ponds and through a culvert under Tower Street South which discharges into a wetland patch. This creek has the most defined riffle-pool structure seen in the study area with meandering and gravel point bar formation. The creek is entrenched with grass vegetation and almost no tree canopy. The riparian zone is narrow but fenced and protected from the surrounding farmland. The banks are highly scoured, especially on outside bends, showing signs of recent erosion as high as 1 m above the water level seen during field inspection. There are recent terraces formed from previous high flow. This is likely because the channel narrows significantly at the culvert outlet and high flows scour the entrenched channel, created huge scours. The creek substrate at riffles are small cobbles with

little siltation and occasional small boulders. As you go downstream the reach, the channel widens and flows backwater characteristics. Reach 6 ends at the pond created by a beaver dam.

Reach 6
Reach 7 is characterized by significant woody debris jams, a beaver dam, and tall grassy vegetation. The beaver dam is the controlling feature of this reach. From historical air photos, a backwater pond drains and fills regularly, likely due to beaver activity. The channel is formed in soil and has poor riffle-pool structure and is highly silted. In some parts of the channel, grassy vegetation has fallen in, forming the creek bed. Large woody debris has fallen into the channel at some spot acting as riffles. There is little scour or evidence of degradation or planimetric adjustment.

Reach 7
This reach is short and distinguished from Reach 6 because it is artificially straightened and meant to drain two agricultural fields on the north and south sides. The riparian zone is poorly canopied and narrow with mostly grassy vegetation and some shrubs. The channel is slightly entrenched and shows some scour on small meanders that are beginning to form. The channel substrate is mostly soil and has poor riffle-pool structure. The banks are protected by the grassy vegetation and roots. The reach ends at a three-way intersection with Reach 9 and 10 with a culvert joining Reach 10. This intersection has been excavated and Reach 8 and 9 join here before discharging through a culvert into Reach 10.

Reach 8
This reach is an artificially straightened drainage channel that is the final reach downstream of Reach 1, 2, 3, 4, 5, 6, 7, and 9. It begins at a culvert which diverts flow from Reach 7 and 9. This channel is highly entrenched with very steep banks of short grass vegetation. Just beyond the banks are agricultural fields. This reach contains good riffle-pool structure and has less siltation issues seen in other reaches. The creek substrate at riffles is between coarse gravel and fine cobbles, similar to riffles in Reach 5. There is some minor scour but overall, the channel shows few signs of aggradation, degradation, or planimetric adjustment.

The reach terminates at 2 Line Road, where is flows beneath a road bridge. Here, a wooden pedestrian bridge has been built over the creek as well.

Reach 9
This reach was originally have thought to discharge from culvert 5, noted in the 1996 watershed studies. However, upon field inspection, culvert 5 discharges little to no water with no discernable channel to follow. Instead, reach 10 originates at the border between broadleaf swamp and agricultural fields. This reach has been straightened and acts as a drainage channel for the surrounding agricultural fields and upstream broadleaf swamp.

The channel itself is not entrenched, and similar in nature to Reach 1. This reach has narrow riparian buffer one tree thick and is otherwise surrounded by agricultural fields. The creek substrate is soil and decaying vegetation, and the banks show little to no sign of erosion. The channel is dry for much of its length, at least during field inspections in Autumn. The channel ends at the culvert leading to Reach 8, which eventually flows under 2 Line Road.

2.3 Stream Assessment Scores

In addition to classification of a stream system, various techniques for geomorphic assessments are used to better understand general stream conditions (stability, habitat, erosion/degradation, riparian, etc.). Rapid field assessments provide an indication of the channel stability and ecological stream condition, while also identifying primary processes in action (e.g. widening). The Rapid Geomorphic Assessment (RGA) and the Rapid Stream Assessment Technique (RSAT) together provide a thorough description of the existing channel conditions. The field sheets of these assessments are provided in **Appendix C**.

The RGA assessment focuses entirely on the geomorphic component of a river system. The RGA method consists of four factors that summarize various components of channel adjustment. The RGA check sheet documents indicators of different modes of channel adjustment: widening, aggradation, degradation, and planform adjustment. These observations are quantified to produce a value that indicates the state of channel stability: "In Regime/Stable" (<0.20), "Transitional/Stressed" (0.21-0.40), or "In Adjustment/Unstable" (>0.40).

Results for the RGA (**Table 3**) show that the study reach is in a state of adjustment which indicates that the channel morphology is not within the range of variance and evidence of instability is widespread. The primary indicators of geomorphic change were noted to be those of widening and degradation, specifically in Reach 1 which has contributed to a poor overall score.

Table 3: **RGA Results**

Reach	Form of Adjustment				Stability Index	Condition
	Aggradation	Degradation	Widening	Planform Adjustment		
Reach 1	0.29	0.11	0.22	0.17	0.20	In Regime
Reach 2	0.17	0.00	0.22	0.14	0.13	In Regime
Reach 3	0.43	0.25	0.33	0.43	0.36	Transitional
Reach 4	0.29	0.00	0.22	0.14	0.16	In Regime
Reach 5	0.43	0.38	0.33	0.00	0.28	Transitional
Reach 6	0.29	0.25	0.11	0.43	0.27	Transitional
Reach 7	0.29	0.00	0.11	0.29	0.17	In Regime
Reach 8	0.43	0.38	0.33	0.29	0.36	Transitional
Reach 9	0.29	0.13	0.00	0.14	0.14	In Regime

RSAT employs a semi-quantitative approach to characterize stream conditions whereby the user assigns a score to 6 different evaluation criteria. Abiotic and biotic indicators which influence overall stream quality have been streamlined and weighted appropriately within each of the evaluation criteria. The six criteria are:

1. Channel stability;
2. Channel scouring and sediment deposition;
3. Physical in-stream habitat;
4. Water quality;
5. Riparian habitat conditions; and
6. Biological conditions

River channel stability and cross-sectional characterization is a critical component of RSAT. The entire channel was inspected for signs of instability (such as bank sloughing, recently exposed non-woody tree roots, general absence of vegetation within the bottom third of the bank, recent tree falls, etc.) and channel degradation or downcutting (such as high banks in small headwater streams and erosion around man-made structures). Observations were noted and cross-section measurements were made.

A rapid assessment of soil conditions along the river banks was also conducted to determine soil texture and potential erodibility of the watercourse bank. Qualitative water quality measurements were also made (temperature, turbidity, colour and odour) along with an indication of substrate

fouling (i.e., the unwanted accumulation of sediment). RSAT also typically involves a quantitative sampling and evaluation of benthic organisms. As no benthic sampling was undertaken, the score was based on site conditions and general observations of water quality. Reach 9 did not contain any water at the time of assessment, and so, has an incomplete RSAT score.

Each category was assigned a value which was then summed to provide an overall score and ranking. **Table 4** details the range of scores and rankings with a higher score suggesting a healthier system. Within these broad categories, we evaluated the study area and determined a RSAT score of 21.7. The channel is of "Fair" quality.

Table 4: RSAT Summary Results

Category	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Reach 8	Reach 9	Max Possible Score
Channel Stability	8	9	8	8	8	9	7	6	10	11
Channel Scour & Sediment Deposition	5	5	6	6	6	6	6	6	6	8
Physical In-Stream Habitat	3	4	5	5	6	5	6	6	1	8
Water Quality	5	3	6	7	6	6	6	7	NA	8
Riparian Habitat Conditions	6	4	6	6	5	6	1	1	4	7
Biological Indicators	4	5	6	6	7	7	5	6	NA	8
Total Score	**22**	**21**	**28**	**30**	**29**	**29**	**23**	**26**	**NA**	**50**
Condition	**Fair**	**Fair**	**Fair**	**Fair**	**Fair**	**Fair**	**Fair**	**Fair**	**NA**	

3.0 Erosion Threshold Analysis

To establish the appropriate erosion control criteria, an erosion threshold analysis supports and directs various control methods for land development to mitigate increased runoff that may adversely affect stream channel form and process.

3.1 General

A fluvial geomorphological survey was completed on November 4, 2020. For an erosion threshold assessment, bankfull cross-sections were surveyed at a few locations because it can be expected that channel velocities and shear stresses on the bed are greatest through these sections therefore providing the most representative values. The longitudinal profile was also surveyed to determine the channel slopes.

This detailed field data (cross-section, gradient, and particle distribution) is used to estimate the bankfull discharge, shear stress, and critical discharge values. Specifically, the critical discharge indicates the point at which sustained flows tend to entrain and transport sediment. In this analysis, the critical shear stress was determined using a suite of calculations based off sediment size, determined by sieve analysis and pebble counts. Based on the critical shear stress, a critical depth is back-calculated and a critical discharge is determined. This critical discharge can then be applied as an erosion threshold target when controlling effluent input to the watercourse.

3.3 Erosion Threshold Considerations and Discussion

Specific cross-section locations were surveyed within the site. Critical threshold parameters were computed for those cross-sections where bankfull indicators were reliable. Attempts were made to locate naturally formed riffles for cross-sectional surveys as these provide locations where flows are concentrated, and their composition is indicative of the type of material that becomes mobilized under frequent flow conditions below and up to the bankfull discharge. However, some of the reaches of Nichol Drain No. 2 had poor riffle-pool structure and thus, indicative cross-sections were taken used, regardless of riffle structure. Reaches 1, 2, 3, 4, 6, 7, and 9 were calculated as vegetated channels given they were lined with either grasses or leaf litter.

Using the data collected during the field investigations and desktop analysis, bankfull characteristics for cross-sections were summarized. The bankfull energy gradient, bed materials, and channel classification are also summarized (**Table 2**). Erosion threshold values were completed for cross-sections and are presented in **Table 5.**

Table 5: **Summary Hydraulics**

Reach	Unit Stream Power (W/m^2)	Bed Ratio	Critical Shear Stress (N/m^2)	Critical Bed Flow Depth (m)	Critical Bed Flow (cms)
1*	15.4	0.02	16.8	1.13	6.63
2*	0.73	0.00	16.8	0.39	0.39
3*	35.7	0.02	16.8	1.97	0.20
4*	27.3	0.02	16.8	0.27	0.22
5	18.6	0.34	30.6	0.62	0.50
6*	19.6	0.01	16.8	0.33	0.19
7*	17.6	0.03	16.8	0.40	0.56
8	2.1	0.18	0.87	0.16	0.16
9*	17.0	0.04	16.8	0.96	2.85

**Using formulas for vegetated channels*

Critical flows were calculated by the back calculation of the critical hydraulic radiuses and corresponded area of the critical hydraulic radiuses. These values generally vary with respect to the slope, roughness, and grain size. Influencing factors such as prevailing flows, land use, geology, human intervention, and in-channel structures will cause variation along the channel and need careful consideration when observing natural thresholds of erosion. The critical bed flow for mobilizing the sediment in the ten cross-sections ranged from 0.16 to 6.63 cms. Overall, the results from each of the methods are very similar for the reaches where erosion threshold could be calculated with grain size. For the reaches with vegetated channels, a critical shear stress of 16.8 N/m^2 is used for each of them, regardless of particle size. This value is derived from the maximum shear stress of grass.

3.4 Major Issues, Concerns, and Constraints

There are a few minor issues and concerns for the future development of the area, including a new SWM facility. The major one is the beaver dams in the area are likely contributing to blockages in the current stormwater management pond. On the day of field work, City crew were removing beaver dams in the culverts and warned of beaver traps within the wetland on Reach 1. Even downstream, there is more beaver activity which has shaped the area significantly. These beavers alter landscape significantly and can be difficult to remove. In the future, it will be useful to watch

out for beaver activity as it may interfere with the proper functioning of the stormwater management facility.

4.0 Summary and Conclusion

In order to carry out an erosion threshold analysis for the proposed development, a geomorphic survey was completed at the site, including sieve analyses to characterize channel materials. Erosion threshold analysis for the watercourse was performed to provide direction on stormwater management.

Based on our site investigations, assessments, and analyses, we conclude that:

1. Reaches in the South Fergus Study area were identified delineated based on similar geomorphic properties including but not limited to: size, flow, biological indicators, riparian cover, erosive features, sedimentation, and planimetric adjustment.
2. Ten cross-sections were identified in the study reach where erosion threshold parameters could be identified.
3. An RGA, RSAT, and general geomorphic characteristics were calculated for each reach, including an initial erosion threshold assessment.
4. The system can be classified as mostly farmer's channelized drainage channels with a stormwater management facility and beaver activity.
5. The next steps of this study will include an impact study to determine impacts of proposed stormwater management facility on reach geomorphology

Respectfully submitted,

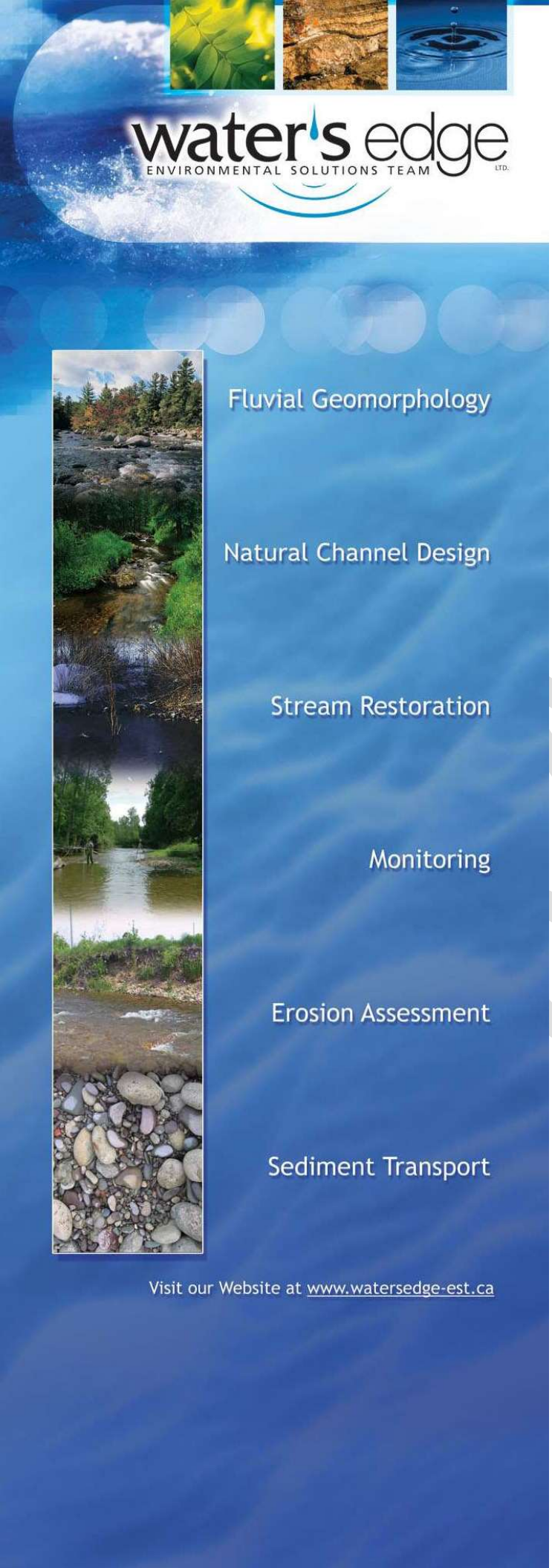
DRAFT COPY

Ed Gazendam, Ph.D., P. Eng.,
President, Sr. Geomorphologist

Lucy Lu, M. Sc., G. I. T.
River Scientist

Water's Edge Environmental Solutions Team Ltd.

ATTACHMENTS
Appendix A: Photographs



APPENDIX A:

Photographs

REACH 1

PHOTOGRAPH NO.: 1
FROM: Centre of Creek
LOOKING: Downstream

PHOTOGRAPH NO.:2
FROM: Centre of Creek
LOOKING: Downstream

PHOTOGRAPH NO.: 3
FROM: Right bank
LOOKING: Upstream

REACH 2

PHOTOGRAPH NO.: 4
FROM: Centre of Creek
LOOKING: Downstream

PHOTOGRAPH NO.: 5
FROM: Left Bank
LOOKING: Downstream

REACH 3

PHOTOGRAPH NO.: 6
FROM: Culvert
LOOKING: Downstream
NOTES: Scoured, soil banks

PHOTOGRAPH NO.: 7
FROM: Centre of Creek
LOOKING: Downstream

PHOTOGRAPH NO.: 8
FROM: Culvert
LOOKING: Upstream at culvert

REACH 4

PHOTOGRAPH NO.: 9
FROM: Centre of crossing
LOOKING: Downstream

PHOTOGRAPH NO.: 10
FROM: Centre of crossing
LOOKING: Downstream
NOTES: Creek begins to disappear

PHOTOGRAPH NO.: 11
FROM: Right bank
LOOKING: Downstream

PHOTOGRAPH NO.: 12
FROM: Centre of Creek
LOOKING: Downstream

REACH 5

PHOTOGRAPH NO.: 13
FROM: Centre of creek, at road
LOOKING: Downstream
NOTE: Cobble inflection points

PHOTOGRAPH NO.: 14
FROM: Left Bank
LOOKING: Downstream

PHOTOGRAPH NO.: 15
FROM: Road Culvert
LOOKING: Upstream, towards current stormwater management facility

PHOTOGRAPH NO.: 16
FROM: Centre of creek
LOOKING: Downstream

PHOTOGRAPH NO.: 17
FROM: At major riffle
LOOKING: Downstream
NOTE: High scour along right bank

REACH 6

PHOTOGRAPH NO.: 18
FROM: Centre of Creek
LOOKING: Downstream

PHOTOGRAPH NO.: 19
FROM: Left bank
LOOKING: Downstream

PHOTOGRAPH NO.: 20
FROM: Beaver Dam
LOOKING: Downstream

REACH 7

PHOTOGRAPH NO.: 21
FROM: Centre of Creek
LOOKING: Downstream

REACH 8

PHOTOGRAPH NO.: 22
FROM: Left bank
LOOKING: Onto left bank

PHOTOGRAPH NO.: 23
FROM: Centre of creek, close to road crossing
LOOKING: Downstream

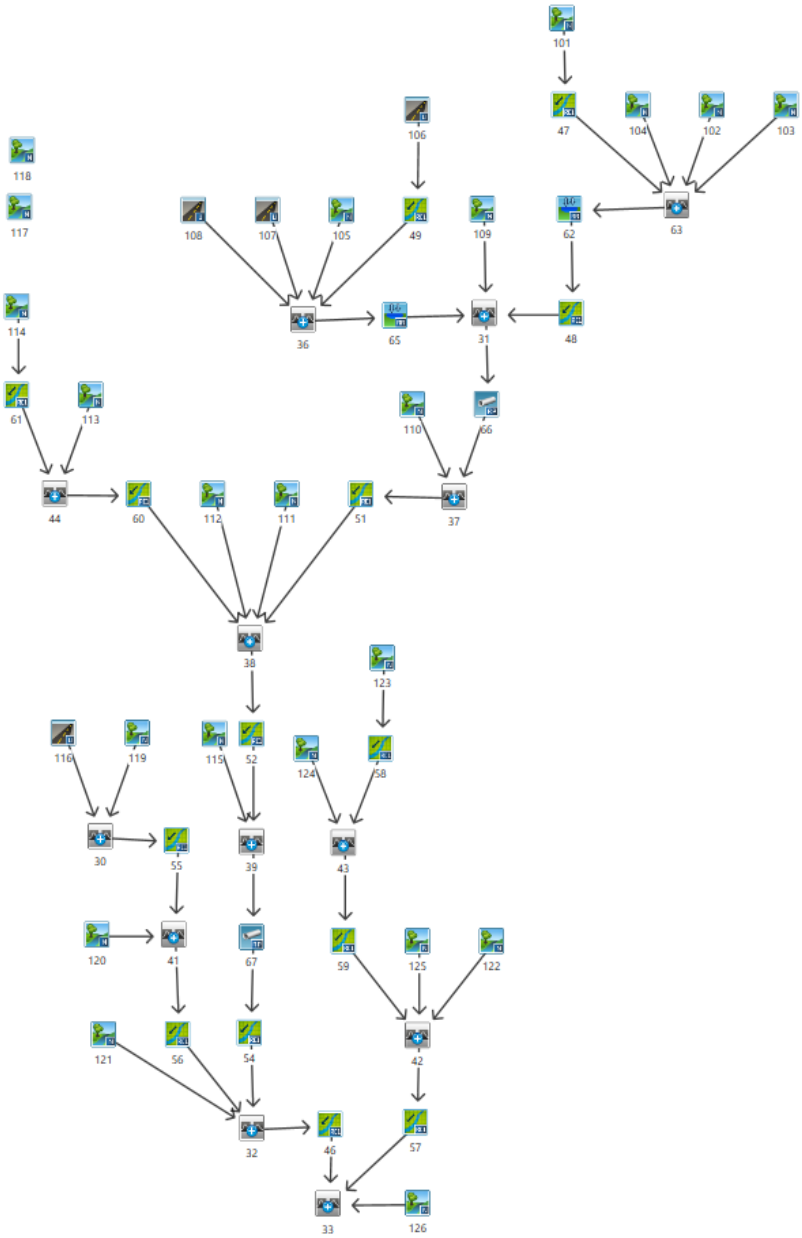
REACH 9

PHOTOGRAPH NO.: 24
FROM: Confluence of all three reaches
LOOKING: Upstream

PHOTOGRAPH NO.: 25
FROM: Confluence of all three reaches
LOOKING: onto culvert

Appendix B:
Hydrologic Analysis

PROJECT	South Fergus	FILE	120157
		DATE	2021-06-18
SUBJECT	VO6 Schematic	NAME	A. Trevers
		PAGE	1 OF 1




NASHYD


ROUTE PIPE


DUHYD


STANDHYD


ROUTE CHANNEL


DIVERT HYD


ADDHYD


ROUTE RESERVOIR

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	101
Catchment Area (ha):	29.6
Impervious %:	4%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		12.48						17.15					
Percentage of Catchment		42%						58%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.40	100	0.95		100	0.95	0.65	100	0.95			
Gravel	3	4.08	89	0.27		89	0.27	4.43	89	0.27			
Woodland	10		67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	8.00	78	0.35		74	0.35	12.06	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		82.30						81.68					
Average C		0.34						0.35					
Average IA		5.53						5.78					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	480
Catchment Slope (%):	1.16%
Method: Airport Method	
Time of Concentration (mins):	51.19

Summary

Catchment CN:	81.9
Catchment C:	0.35
Catchment IA (mm):	5.67
Time of Concentration (hrs):	0.85
Catchment Time to Peak (hrs):	0.57
Catchment Time Step (mins):	6.83

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	102
Catchment Area (ha):	33.3
Impervious %:	8%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		20.66						12.63					
Percentage of Catchment		62%						38%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	2.11	100	0.95		100	0.95	0.62	100	0.95			
Gravel	3	3.37	89	0.27		89	0.27	1.16	89	0.27			
Woodland	10	0.79	67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	14.38	78	0.35		74	0.35	10.85	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		81.62						80.09					
Average C		0.39						0.37					
Average IA		5.95						6.39					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	650
Catchment Slope (%):	0.89%
Method: Airport Method	
Time of Concentration (mins):	61.81

Summary

Catchment CN:	81.0
Catchment C:	0.39
Catchment IA (mm):	6.12
Time of Concentration (hrs):	1.03
Catchment Time to Peak (hrs):	0.69
Catchment Time Step (mins):	8.24

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	103
Catchment Area (ha):	30.2
Impervious %:	3%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		19.90						10.28					
Percentage of Catchment		66%						34%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.90	100	0.95		100	0.95	0.02	100	0.95			
Gravel	3	3.06	89	0.27		89	0.27	0.00	89	0.27			
Woodland	10		67	0.25		60	0.25	0.36	67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	15.93	78	0.35		74	0.35	9.91	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		80.69						77.66					
Average C		0.36						0.35					
Average IA		6.16						7.09					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	650
Catchment Slope (%):	1.02%
Method: Airport Method	
Time of Concentration (mins):	61.17

Summary

Catchment CN:	79.7
Catchment C:	0.36
Catchment IA (mm):	6.48
Time of Concentration (hrs):	1.02
Catchment Time to Peak (hrs):	0.68
Catchment Time Step (mins):	8.16

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	104
Catchment Area (ha):	8.9
Impervious %:	

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		2.79						6.15					
Percentage of Catchment		31%						69%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.00	100	0.95		100	0.95	0.01	100	0.95			
Gravel	3	1.01	89	0.27		89	0.27	0.07	89	0.27			
Woodland	10	0.72	67	0.25		60	0.25	4.56	67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	1.06	78	0.35		74	0.35	1.52	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		79.14						70.00					
Average C		0.29						0.28					
Average IA		6.33						9.17					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	250
Catchment Slope (%):	1.53%
Method: Airport Method	
Time of Concentration (mins):	36.66

Summary

Catchment CN:	72.9
Catchment C:	0.28
Catchment IA (mm):	8.28
Time of Concentration (hrs):	0.61
Catchment Time to Peak (hrs):	0.41
Catchment Time Step (mins):	4.89

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	105
Catchment Area (ha):	12.1
Impervious %:	6%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		11.96						0.16					
Percentage of Catchment		99%						1%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.67	100	0.95		100	0.95	0.03	100	0.95			
Gravel	3	0.57	89	0.27		89	0.27	0.04	89	0.27			
Woodland	10	0.02	67	0.25		60	0.25	0.08	67	0.25			
Pasture/Lawns	5	1.14	74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	9.56	78	0.35		74	0.35		78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		79.36						80.31					
Average C		0.37						0.41					
Average IA		6.34						6.32					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	360
Catchment Slope (%):	2.42%
Method: Airport Method	
Time of Concentration (mins):	33.61

Summary

Catchment CN:	79.4
Catchment C:	0.37
Catchment IA (mm):	6.34
Time of Concentration (hrs):	0.56
Catchment Time to Peak (hrs):	0.37
Catchment Time Step (mins):	4.48

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	109
Catchment Area (ha):	9.7
Impervious %:	12%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		6.23						3.52					
Percentage of Catchment		64%						36%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.96	100	0.95		100	0.95	0.29	100	0.95			
Gravel	3	0.18	89	0.33		89	0.33		89	0.33			
Woodland	10		67	0.30		60	0.30		67	0.30			
Pasture/Lawns	5		74	0.35		69	0.35		74	0.35			
Meadows	8		71	0.33		65	0.33		71	0.33			
Cultivated	7	5.09	78	0.45		74	0.45	3.23	78	0.45			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		81.69						79.81					
Average C		0.52						0.49					
Average IA		6.12						6.59					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	230
Catchment Slope (%):	7.22%
Method: Bransby-Williams Formula	
Time of Concentration (mins):	7.03

Summary

Catchment CN:	81.0
Catchment C:	0.51
Catchment IA (mm):	6.29
Time of Concentration (hrs):	0.12
Catchment Time to Peak (hrs):	0.08
Catchment Time Step (mins):	0.94

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	110
Catchment Area (ha):	3.8
Impervious %:	10%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		2.74						1.10					
Percentage of Catchment		71%						29%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.14	100	0.95		100	0.95	0.27	100	0.95			
Gravel	3	1.01	89	0.27		89	0.27	0.83	89	0.27			
Woodland	10		67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	1.59	78	0.35		74	0.35		78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		83.18						91.68					
Average C		0.35						0.43					
Average IA		5.27						2.76					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	450
Catchment Slope (%):	4.56%
Method: Airport Method	
Time of Concentration (mins):	30.47

Summary

Catchment CN:	85.6
Catchment C:	0.37
Catchment IA (mm):	4.55
Time of Concentration (hrs):	0.51
Catchment Time to Peak (hrs):	0.34
Catchment Time Step (mins):	4.06

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	111
Catchment Area (ha):	15.2
Impervious %:	6%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		7.05			2.37			5.75					
Percentage of Catchment		46%			16%			38%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.87	100	0.95		100	0.95	0.07	100	0.95			
Gravel	3	3.37	89	0.27	0.75	89	0.27	4.34	89	0.27			
Woodland	10	0.03	67	0.25	0.63	60	0.25	0.86	67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	2.78	78	0.35	1.00	74	0.35	0.48	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		85.94			75.08			84.93					
Average C		0.38			0.30			0.28					
Average IA		4.48			6.52			4.37					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	460
Catchment Slope (%):	1.42%
Method: Airport Method	
Time of Concentration (mins):	48.01

Summary

Catchment CN:	83.9
Catchment C:	0.33
Catchment IA (mm):	4.76
Time of Concentration (hrs):	0.80
Catchment Time to Peak (hrs):	0.53
Catchment Time Step (mins):	6.40

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	112
Catchment Area (ha):	10.1
Impervious %:	

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		4.35			2.54			3.24					
Percentage of Catchment		43%			25%			32%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2		100	0.95		100	0.95		100	0.95			
Gravel	3		89	0.27	0.07	89	0.27	0.34	89	0.27			
Woodland	10	0.34	67	0.25		60	0.25	0.21	67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	4.02	78	0.35	2.46	74	0.35	2.69	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		77.15			74.44			78.45					
Average C		0.34			0.35			0.33					
Average IA		7.23			6.88			6.77					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	100
Catchment Slope (%):	0.33%
Method: Airport Method	
Time of Concentration (mins):	35.70

Summary

Catchment CN:	76.9
Catchment C:	0.34
Catchment IA (mm):	7.00
Time of Concentration (hrs):	0.60
Catchment Time to Peak (hrs):	0.40
Catchment Time Step (mins):	4.76

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	113
Catchment Area (ha):	13.2
Impervious %:	4%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		6.65			2.80			3.74					
Percentage of Catchment		50%			21%			28%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.20	100	0.95	0.15	100	0.95	0.11	100	0.95			
Gravel	3	1.35	89	0.27	0.83	89	0.27	1.26	89	0.27			
Woodland	10	0.36	67	0.25	1.46	60	0.25	0.27	67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	4.75	78	0.35	0.33	74	0.35	1.15	78	0.35			
Waterbody	12		50	0.05	0.03	50	0.05	0.96	50	0.05			
Average CN		80.29			72.21			74.36					
Average C		0.35			0.30			0.25					
Average IA		6.20			7.18			7.01					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	1220
Catchment Slope (%):	1.25%
Method: Airport Method	
Time of Concentration (mins):	83.58

Summary

Catchment CN:	76.9
Catchment C:	0.31
Catchment IA (mm):	6.64
Time of Concentration (hrs):	1.39
Catchment Time to Peak (hrs):	0.93
Catchment Time Step (mins):	11.14

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	114
Catchment Area (ha):	10.4
Impervious %:	6%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		8.09			1.08			1.23					
Percentage of Catchment		78%			10%			12%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.31	100	0.95	0.16	100	0.95	0.17	100	0.95			
Gravel	3	0.69	89	0.27	0.02	89	0.27		89	0.27			
Woodland	10	0.05	67	0.25	0.90	60	0.25	0.87	67	0.25			
Pasture/Lawns	5	2.46	74	0.28		69	0.28	0.09	74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	4.58	78	0.35	0.00	74	0.35	0.10	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		78.51			66.37			73.04					
Average C		0.34			0.35			0.36					
Average IA		5.88			8.70			8.28					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	1130
Catchment Slope (%):	0.89%
Method: Airport Method	
Time of Concentration (mins):	85.68

Summary

Catchment CN:	76.6
Catchment C:	0.35
Catchment IA (mm):	6.45
Time of Concentration (hrs):	1.43
Catchment Time to Peak (hrs):	0.95
Catchment Time Step (mins):	11.42

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	115
Catchment Area (ha):	5.2
Impervious %:	8%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		5.25											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.38	100	0.95		100	0.95		100	0.95			
Gravel	3		89	0.27		89	0.27		89	0.27			
Woodland	10		67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	4.87	78	0.35		74	0.35		78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		79.58											
Average C		0.39											
Average IA		6.64											

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	310
Catchment Slope (%):	0.68%
Method: Airport Method	
Time of Concentration (mins):	45.99

Summary

Catchment CN:	79.6
Catchment C:	0.39
Catchment IA (mm):	6.64
Time of Concentration (hrs):	0.77
Catchment Time to Peak (hrs):	0.51
Catchment Time Step (mins):	6.13

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	117
Catchment Area (ha):	15.3
Impervious %:	4%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		15.35											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.60	100	0.95		100	0.95		100	0.95			
Gravel	3	3.90	89	0.27		89	0.27		89	0.27			
Woodland	10	0.70	67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	10.14	78	0.35		74	0.35		78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		81.16											
Average C		0.35											
Average IA		5.92											

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	440
Catchment Slope (%):	1.25%
Method: Airport Method	
Time of Concentration (mins):	47.85

Summary

Catchment CN:	81.2
Catchment C:	0.35
Catchment IA (mm):	5.92
Time of Concentration (hrs):	0.80
Catchment Time to Peak (hrs):	0.53
Catchment Time Step (mins):	6.38

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	118
Catchment Area (ha):	5.3
Impervious %:	17%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		5.32						0.01					
Percentage of Catchment		100%						0%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.89	100	0.95		100	0.95		100	0.95			
Gravel	3		89	0.27		89	0.27		89	0.27			
Woodland	10	0.00	67	0.25		60	0.25	0.01	67	0.25			
Pasture/Lawns	5	1.32	74	0.28		69	0.28	0.00	74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	3.11	78	0.35		74	0.35		78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		80.68						68.98					
Average C		0.43						0.26					
Average IA		5.67						8.59					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	430
Catchment Slope (%):	1.02%
Method: Bransby-Williams Formula	
Time of Concentration (mins):	20.67

Summary

Catchment CN:	80.7
Catchment C:	0.43
Catchment IA (mm):	5.67
Time of Concentration (hrs):	0.34
Catchment Time to Peak (hrs):	0.23
Catchment Time Step (mins):	2.76

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	119
Catchment Area (ha):	61.5
Impervious %:	3%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		22.86			7.54			31.13					
Percentage of Catchment		37%			12%			51%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	1.36	100	0.95	0.32	100	0.95	0.08	100	0.95			
Gravel	3	5.38	89	0.27	3.65	89	0.27	3.45	89	0.27			
Woodland	10	2.44	67	0.25	3.54	60	0.25	21.37	67	0.25			
Pasture/Lawns	5	0.69	74	0.28		69	0.28	0.13	74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	12.97	78	0.35	0.03	74	0.35	6.10	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		80.60			75.80			71.71					
Average C		0.35			0.29			0.27					
Average IA		6.02			6.26			8.60					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	420
Catchment Slope (%):	0.49%
Method: Airport Method	
Time of Concentration (mins):	67.39

Summary

Catchment CN:	75.5
Catchment C:	0.30
Catchment IA (mm):	7.35
Time of Concentration (hrs):	1.12
Catchment Time to Peak (hrs):	0.75
Catchment Time Step (mins):	8.99

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	120
Catchment Area (ha):	19.7
Impervious %:	5%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		14.61			5.09			0.00					
Percentage of Catchment		74%			26%			0%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.47	100	0.95	0.42	100	0.95		100	0.95			
Gravel	3		89	0.27		89	0.27		89	0.27			
Woodland	10		67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	14.14	78	0.35	4.66	74	0.35	0.00	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		78.71			76.16			78.00					
Average C		0.37			0.40			0.35					
Average IA		6.84			6.58			7.00					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	380
Catchment Slope (%):	0.79%
Method: Airport Method	
Time of Concentration (mins):	49.74

Summary

Catchment CN:	78.0
Catchment C:	0.38
Catchment IA (mm):	6.77
Time of Concentration (hrs):	0.83
Catchment Time to Peak (hrs):	0.55
Catchment Time Step (mins):	6.63

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	121
Catchment Area (ha):	23.8
Impervious %:	4%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		20.98			2.80								
Percentage of Catchment		88%			12%								
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.76	100	0.95	0.22	100	0.95		100	0.95			
Gravel	3	7.58	89	0.27	2.40	89	0.27		89	0.27			
Woodland	10		67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	12.65	78	0.35	0.18	74	0.35		78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		82.77			88.90								
Average C		0.34			0.32								
Average IA		5.38			3.18								

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	390
Catchment Slope (%):	2.52%
Method: Airport Method	
Time of Concentration (mins):	36.10

Summary

Catchment CN:	83.5
Catchment C:	0.34
Catchment IA (mm):	5.12
Time of Concentration (hrs):	0.60
Catchment Time to Peak (hrs):	0.40
Catchment Time Step (mins):	4.81

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	122
Catchment Area (ha):	47.1
Impervious %:	4%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		46.45						0.68					
Percentage of Catchment		99%						1%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	1.83	100	0.95		100	0.95	0.13	100	0.95			
Gravel	3	12.26	89	0.27		89	0.27	0.55	89	0.27			
Woodland	10		67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	32.37	78	0.35		74	0.35		78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		81.77						91.03					
Average C		0.35						0.39					
Average IA		5.75						2.82					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	600
Catchment Slope (%):	1.82%
Method: Airport Method	
Time of Concentration (mins):	49.03

Summary

Catchment CN:	81.9
Catchment C:	0.35
Catchment IA (mm):	5.71
Time of Concentration (hrs):	0.82
Catchment Time to Peak (hrs):	0.54
Catchment Time Step (mins):	6.54

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	123
Catchment Area (ha):	27.6
Impervious %:	5%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		27.62											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	1.29	100	0.95		100	0.95		100	0.95			
Gravel	3	4.99	89	0.27		89	0.27		89	0.27			
Woodland	10		67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	21.34	78	0.35		74	0.35		78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		81.02											
Average C		0.36											
Average IA		6.04											

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	630
Catchment Slope (%):	1.02%
Method: Airport Method	
Time of Concentration (mins):	59.94

Summary

Catchment CN:	81.0
Catchment C:	0.36
Catchment IA (mm):	6.04
Time of Concentration (hrs):	1.00
Catchment Time to Peak (hrs):	0.67
Catchment Time Step (mins):	7.99

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	124
Catchment Area (ha):	59.1
Impervious %:	2%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		52.29						6.79					
Percentage of Catchment		89%						11%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.86	100	0.95		100	0.95		100	0.95			
Gravel	3	5.06	89	0.27		89	0.27	0.10	89	0.27			
Woodland	10	5.41	67	0.25		60	0.25	6.69	67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	40.96	78	0.35		74	0.35	0.00	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		78.29						67.32					
Average C		0.34						0.25					
Average IA		6.84						9.90					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	410
Catchment Slope (%):	1.35%
Method: Airport Method	
Time of Concentration (mins):	46.00

Summary

Catchment CN:	77.0
Catchment C:	0.33
Catchment IA (mm):	7.19
Time of Concentration (hrs):	0.77
Catchment Time to Peak (hrs):	0.51
Catchment Time Step (mins):	6.13

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	125
Catchment Area (ha):	50.7
Impervious %:	0%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Hl**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		42.18						8.48					
Percentage of Catchment		83%						17%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.16	100	0.95		100	0.95		100	0.95			
Gravel	3	6.43	89	0.27		89	0.27	0.65	89	0.27			
Woodland	10	6.20	67	0.25		60	0.25	7.53	67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	29.40	78	0.35		74	0.35	0.30	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		78.14						69.07					
Average C		0.32						0.25					
Average IA		6.81						9.36					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	460
Catchment Slope (%):	0.91%
Method: Airport Method	
Time of Concentration (mins):	56.73

Summary

Catchment CN:	76.6
Catchment C:	0.31
Catchment IA (mm):	7.24
Time of Concentration (hrs):	0.95
Catchment Time to Peak (hrs):	0.63
Catchment Time Step (mins):	7.56

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	126
Catchment Area (ha):	34.0
Impervious %:	6%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**HI**			**M**			**Pal**					
Soil Series		Harriston			Muck			Parkhill					
Hydrologic Soils Group		BC			B			BC					
Soil Texture		Loam or Silt Loam			Muck			Loam or Silt Loam					
Runoff Coefficient Type		2			2			2					
Area (ha)		28.43			1.66			3.90					
Percentage of Catchment		84%			5%			11%					
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	1.81	100	0.95		100	0.95	0.04	100	0.95			
Gravel	3	12.54	89	0.27	0.71	89	0.27	1.61	89	0.27			
Woodland	10		67	0.25		60	0.25		67	0.25			
Pasture/Lawns	5		74	0.28		69	0.28		74	0.28			
Meadows	8		71	0.27		65	0.27		71	0.27			
Cultivated	7	14.08	78	0.35	0.95	74	0.35	2.25	78	0.35			
Waterbody	12		50	0.05		50	0.05		50	0.05			
Average CN		84.25			80.44			82.76					
Average C		0.35			0.31			0.32					
Average IA		4.92			5.28			5.30					

Time to Peak Calculations

Max. Catchment Elev. (m):	
Min. Catchment Elev. (m):	
Catchment Length (m):	340
Catchment Slope (%):	1.63%
Method: Airport Method	
Time of Concentration (mins):	38.58

Summary

Catchment CN:	83.9
Catchment C:	0.35
Catchment IA (mm):	4.98
Time of Concentration (hrs):	0.64
Catchment Time to Peak (hrs):	0.43
Catchment Time Step (mins):	5.14

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	106
Catchment Area (ha):	26.50
Impervious %:	60%
Pervious Area (ha):	10.60

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**HI**		**M**		**Pal**		**LI**	
Soil Series		Harriston		Muck		Parkhill		Lyons	
Hydrologic Soils Group		BC		B		BC		B	
Soil Texture		Loam or Silt Loam		Muck		Loam or Silt Loam		Loam or Silt Loam	
Runoff Coefficient Type		2		2		2		2	
Area (ha)		10.60							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100		100		100		100
Gravel	3		89		89		89		89
Woodland	10		67		60		67		60
Pasture/Lawns	5	10.41	74		69	3.69	74		69
Meadows	8		71		65		71		65
Cultivated	7	0.19	78		74	-3.69	78		74
Waterbody	12		50		50		50		50
Average CN		74.07							
Average IA		5.04							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	74.1
Catchment IA (mm):	5.04

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	107
Catchment Area (ha):	4.50
Impervious %:	86%
Pervious Area (ha):	0.63

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**HI**		**M**		**Pal**		**LI**	
Soil Series		Harriston		Muck		Parkhill		Lyons	
Hydrologic Soils Group		BC		B		BC		B	
Soil Texture		Loam or Silt Loam		Muck		Loam or Silt Loam		Loam or Silt Loam	
Runoff Coefficient Type		2		2		2		2	
Area (ha)		0.63							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100		100		100		100
Gravel	3		89		89		89		89
Woodland	10		67		60		67		60
Pasture/Lawns	5	0.63	74		69	3.69	74		69
Meadows	8		71		65		71		65
Cultivated	7		78		74	-3.69	78		74
Waterbody	12		50		50		50		50
Average CN		74.00							
Average IA		5.00							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	74.0
Catchment IA (mm):	5.00

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	108
Catchment Area (ha):	4.30
Impervious %:	67%
Pervious Area (ha):	1.42

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**HI**		**M**		**Pal**		**LI**	
Soil Series		Harriston		Muck		Parkhill		Lyons	
Hydrologic Soils Group		BC		B		BC		B	
Soil Texture		Loam or Silt Loam		Muck		Loam or Silt Loam		Loam or Silt Loam	
Runoff Coefficient Type		2		2		2		2	
Area (ha)		1.42							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100		100		100		100
Gravel	3		89		89		89		89
Woodland	10	0.12	67		60		67		60
Pasture/Lawns	5	1.30	74		69		74		69
Meadows	8		71		65		71		65
Cultivated	7		78		74		78		74
Waterbody	12		50		50		50		50
Average CN		73.41							
Average IA		5.42							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	73.4
Catchment IA (mm):	5.42

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Data Sources

Detailed Soil Survey Reports for Ontario, MTO
Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	Not within CA
Catchment ID:	116
Catchment Area (ha):	2.10
Impervious %:	23%
Pervious Area (ha):	1.62

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**HI**		**M**		**Pal**		**LI**	
Soil Series		Harriston		Muck		Parkhill		Lyons	
Hydrologic Soils Group		BC		B		BC		B	
Soil Texture		Loam or Silt Loam		Muck		Loam or Silt Loam		Loam or Silt Loam	
Runoff Coefficient Type		2		2		2		2	
Area (ha)		1.62							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100		100		100		100
Gravel	3	0.03	89		89		89		89
Woodland	10		67		60		67		60
Pasture/Lawns	5		74		69		74		69
Meadows	8		71		65		71		65
Cultivated	7	1.59	78		74		78		74
Waterbody	12		50		50		50		50
Average CN		78.20							
Average IA		6.93							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	78.2
Catchment IA (mm):	6.93

CN* And AMC Conversion Calculation

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Municipality

CN* Calculation Requirement

Yes

Precipitation threshold to create AMCIII soil moisture conditions (mm):	80.00
Initial Abstraction (Ia) (mm):	5.00

Catchment ID	AMC II CN	AMC I CN	AMC III CN	AMC III CN*	AMC II CN*	AMC I CN*
101	81.90	65.63	92.28	92.68	83.46	67.98
102	81.00	64.31	91.77	92.01	82.21	66.08
103	79.70	62.46	91.02	91.01	80.36	63.40
104	72.90	53.57	86.74	85.03	70.27	50.45
105	79.40	62.04	90.84	90.77	79.93	62.79
106	74.10	55.05	87.53	86.18	72.09	52.60
107	74.00	54.93	87.47	86.08	71.94	52.42
108	73.40	54.18	87.07	85.51	71.03	51.34
109	81.00	64.31	91.77	92.01	82.21	66.08
110	85.60	71.33	94.27	95.20	88.40	76.00
111	83.90	68.65	93.38	94.08	86.18	72.27
112	76.90	58.64	89.32	88.70	76.28	57.83
113	76.90	58.64	89.32	88.70	76.28	57.83
114	76.60	58.25	89.13	88.44	75.84	57.26

AMC Conversion is determined using equations derived from MTO Design Chart 1.10

CN* And AMC Conversion Calculation

Project Details

South Fergus	120157

Prepared By

A. Trevers	June 18, 2021

Municipality

CN* Calculation Requirement

Yes

Precipitation threshold to create AMCIII soil moisture conditions (mm):	80.00
Initial Abstraction (Ia) (mm):	5.00

Catchment ID	AMC II CN	AMC I CN	AMC III CN	AMC III CN*	AMC II CN*	AMC I CN*
115	79.60	62.32	90.96	90.93	80.22	63.19
116	78.20	60.39	90.12	89.80	78.19	60.38
117	81.20	64.60	91.89	92.16	82.49	66.50
118	80.70	63.88	91.60	91.78	81.78	65.46
119	75.50	56.82	88.43	87.46	74.20	55.17
120	78.00	60.12	89.99	89.63	77.90	59.98
121	83.50	68.04	93.17	93.81	85.64	71.40
122	47.10	28.09	66.85	49.09	29.92	15.17
123	81.00	64.31	91.77	92.01	82.21	66.08
124	77.00	58.78	89.38	88.78	76.43	58.03
125	76.60	58.25	89.13	88.44	75.84	57.26
126	83.90	68.65	93.38	94.08	86.18	72.27

AMC Conversion is determined using equations derived from MTO Design Chart 1.10

```
==========================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


                    *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\ATrevers\AppData\Local\Civica\VH5\c1a411b8-f6bf-49d9-879b-0deef97c7539\78eabad3-5
  Summary filename: C:\Users\ATrevers\AppData\Local\Civica\VH5\c1a411b8-f6bf-49d9-879b-0deef97c7539\78eabad3-5


DATE: 06-17-2021                          TIME: 05:05:05

USER:


COMMENTS: ____________________________________________________________


------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : Hazel                         **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\ATrevers\AppD
|                  |              ata\Local\Temp\
|                  |              d113c5b3-c08f-4500-8463-a71c1b83f58a\d32d31d1
| Ptotal=212.00 mm |    Comments: Hazel
--------------------
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 1.00    6.00 |  4.00   13.00 |  7.00   23.00 | 10.00   53.00
                 2.00    4.00 |  5.00   17.00 |  8.00   13.00 | 11.00   38.00
                 3.00    6.00 |  6.00   13.00 |  9.00   13.00 | 12.00   13.00

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

--------------------
| CALIB            |
| NASHYD   (  0118)|   Area    (ha)=   5.33   Curve Number   (CN)= 91.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.67   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.885

     PEAK FLOW       (cms)=   0.765 (i)
     TIME TO PEAK    (hrs)=  10.000
     RUNOFF VOLUME    (mm)= 185.636
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.876

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0117)|   Area    (ha)=  15.35   Curve Number   (CN)= 92.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.53

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.106

     PEAK FLOW       (cms)=   1.926 (i)
     TIME TO PEAK    (hrs)=  10.333
     RUNOFF VOLUME    (mm)= 186.516
```

TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.880

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0121)|   Area    (ha)=  23.78   Curve Number   (CN)= 93.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.12   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.40
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 2.271

PEAK FLOW (cms)= 3.222 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 191.352
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.903

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0110)|   Area    (ha)=   3.84   Curve Number   (CN)= 95.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.55   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.34
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.431

PEAK FLOW (cms)= 0.539 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 195.342
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.921

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0105)|   Area    (ha)=  12.11   Curve Number   (CN)= 90.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.34   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.37
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00

2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
Unit Hyd Qpeak  (cms)=   1.250

PEAK FLOW       (cms)=   1.644 (i)
TIME TO PEAK    (hrs)=  10.083
RUNOFF VOLUME    (mm)= 182.683
TOTAL RAINFALL   (mm)= 212.000
RUNOFF COEFFICIENT   =   0.862

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0106)|   Area    (ha)=  26.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  60.00   Dir. Conn.(%)=  60.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.88        10.59
     Dep. Storage     (mm)=       0.23         5.04
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     420.08        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        51.03
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.79 (ii)   17.03 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=       0.13         0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.34         1.43          3.767 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME    (mm)=     211.77       176.16         197.53
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       1.00         0.83           0.93

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  87.5    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0049)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
                <------ DATA FOR SECTION (   1.1) ------>
                Distance      Elevation       Manning
                    0.00        412.15        0.0500
                   40.00        412.05    0.0500 /0.0500  Main Channel
                   80.00        411.85        0.0500      Main Channel
                  120.00        412.08    0.0500 /0.0500  Main Channel
                  160.00        413.01        0.0500
                  200.00        413.28        0.0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.01   411.86    .131E+02       0.0          0.01     727.53
       0.03   411.88    .524E+02       0.0          0.01     458.32
       0.04   411.89    .118E+03       0.0          0.02     349.76
       0.06   411.91    .209E+03       0.0          0.02     288.72
       0.07   411.92    .327E+03       0.0          0.02     248.81
       0.09   411.94    .471E+03       0.0          0.02     220.33
       0.10   411.95    .642E+03       0.1          0.03     198.82
       0.12   411.97    .838E+03       0.1          0.03     181.88
       0.13   411.98    .106E+04       0.1          0.03     168.15
       0.15   411.99    .131E+04       0.1          0.04     156.74
       0.16   412.01    .158E+04       0.2          0.04     147.09
       0.18   412.02    .189E+04       0.2          0.04     138.80
       0.19   412.04    .221E+04       0.3          0.04     131.59
       0.21   412.05    .257E+04       0.3          0.04     125.25
       0.22   412.07    .295E+04       0.4          0.05     117.51
       0.24   412.09    .350E+04       0.5          0.05     109.19
       0.26   412.11    .410E+04       0.7          0.05     101.58
       0.28   412.12    .476E+04       0.8          0.06      95.62
       0.29   412.14    .547E+04       1.0          0.06      90.75

     **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0106)   26.47     3.77   10.00 197.53      0.29      0.06
   OUTFLOW: ID= 1 (  0049)   26.47     2.46   11.08 197.27      0.29      0.06


     **** WARNING:  COMPUTATIONS FAILED TO CONVERGE.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0107)|   Area    (ha)=   4.51
|ID= 1 DT= 5.0 min |   Total Imp(%)=  87.00   Dir. Conn.(%)=  87.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.92         0.59
     Dep. Storage     (mm)=       5.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     173.40        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
```

0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
Max.Eff.Inten.(mm/hr)=      53.00        51.01
            over (min)       5.00        10.00
Storage Coeff.  (min)=       4.58 (ii)    8.84 (ii)
Unit Hyd. Tpeak (min)=       5.00        10.00
Unit Hyd. peak  (cms)=       0.23         0.12
                                                    *TOTALS*
PEAK FLOW       (cms)=       0.58         0.08        0.660 (iii)
TIME TO PEAK    (hrs)=      10.00        10.00        10.00
RUNOFF VOLUME    (mm)=     207.00       176.05       202.98
TOTAL RAINFALL   (mm)=     212.00       212.00       212.00
RUNOFF COEFFICIENT   =       0.98         0.83         0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  87.5    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0108)|   Area    (ha)=   4.35
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.91         1.44
     Dep. Storage     (mm)=       5.00         5.42
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     170.29        40.00
     Mannings n          =       0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
Max.Eff.Inten.(mm/hr)=      53.00        50.89
            over (min)       5.00        15.00
Storage Coeff.  (min)=       4.53 (ii)   13.78 (ii)
Unit Hyd. Tpeak (min)=       5.00        15.00
Unit Hyd. peak  (cms)=       0.23         0.08
                                                    *TOTALS*
PEAK FLOW       (cms)=       0.43         0.20        0.628 (iii)
TIME TO PEAK    (hrs)=      10.00        10.00        10.00
RUNOFF VOLUME    (mm)=     207.00       174.68       196.33
TOTAL RAINFALL   (mm)=     212.00       212.00       212.00
RUNOFF COEFFICIENT   =       0.98         0.82         0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  87.1    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0036)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0105):    12.11   1.644    10.08   182.68
      + ID2= 2 (  0107):     4.51   0.660    10.00   202.98
        ==================================================
        ID = 3 (  0036):    16.62   2.288    10.00   188.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0036)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0036):    16.62   2.288    10.00   188.19
      + ID2= 2 (  0108):     4.35   0.628    10.00   196.33
        ==================================================
        ID = 1 (  0036):    20.97   2.916    10.00   189.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0036)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0036):    20.97   2.916    10.00   189.88
      + ID2= 2 (  0049):    26.47   2.455    11.08   197.27
        ==================================================
        ID = 3 (  0036):    47.44   4.885    10.00   194.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0065)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   2.8000      1.6671
                          0.0700     0.0631   |   7.0000      2.4628
                          0.0800     0.3604   |   8.5000      3.0240
```

0.0900	0.5216	10.8000	3.6095
1.2000	0.6952	13.0000	4.5332
1.8000	1.0799	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0036)	47.440	4.885	10.00	194.01
OUTFLOW: ID= 1 (0065)	47.440	4.367	11.08	194.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 89.40
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 1.9648

CALIB NASHYD (0104) ID= 1 DT= 5.0 min	Area (ha)= 8.95	Curve Number (CN)= 85.0
	Ia (mm)= 8.28	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.41	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.834

PEAK FLOW (cms)= 1.142 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 167.032
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.788

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0101) ID= 1 DT= 5.0 min	Area (ha)= 29.62	Curve Number (CN)= 92.7
	Ia (mm)= 5.67	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.57	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.985

PEAK FLOW (cms)= 3.655 (i)
TIME TO PEAK (hrs)= 10.333
RUNOFF VOLUME (mm)= 188.041
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.887

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(0047) IN= 2---> OUT= 1	Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	421.29	0.0500	
40.00	420.98	0.0500 /0.0500	Main Channel
80.00	420.17	0.0500	Main Channel
120.00	420.54	0.0500 /0.0500	Main Channel
160.00	421.41	0.0500	
200.00	421.88	0.0500	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.05	420.22	.207E+03	0.0	0.13	118.83
0.10	420.27	.827E+03	0.2	0.21	74.86
0.16	420.33	.186E+04	0.5	0.28	57.13
0.21	420.38	.331E+04	1.2	0.34	47.16
0.26	420.43	.517E+04	2.1	0.39	40.64
0.31	420.48	.745E+04	3.4	0.44	35.99
0.37	420.54	.101E+05	5.2	0.49	32.47
0.43	420.60	.138E+05	8.3	0.57	27.65
0.49	420.66	.178E+05	12.1	0.65	24.51
0.55	420.72	.221E+05	16.5	0.71	22.27
0.62	420.79	.268E+05	21.7	0.77	20.55
0.68	420.85	.319E+05	27.7	0.83	19.18
0.74	420.91	.373E+05	34.4	0.88	18.05
0.81	420.98	.430E+05	41.9	0.93	17.10
0.87	421.04	.493E+05	51.3	0.99	16.00
0.93	421.10	.562E+05	61.8	1.04	15.15
0.99	421.16	.637E+05	73.4	1.09	14.47
1.06	421.23	.719E+05	86.2	1.14	13.91

```
      1.12   421.29    .808E+05     100.4          1.18      13.42

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0101)   29.62     3.65   10.33 188.04      0.32      0.45
   OUTFLOW: ID= 1 (  0047)   29.62     3.31   11.00 188.02      0.31      0.43


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=  33.29   Curve Number   (CN)= 92.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.12   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.69

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.843

     PEAK FLOW       (cms)=   3.886 (i)
     TIME TO PEAK    (hrs)=  10.583
     RUNOFF VOLUME    (mm)= 185.955
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.877

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=  30.18   Curve Number   (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.48   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.695

     PEAK FLOW       (cms)=   3.519 (i)
     TIME TO PEAK    (hrs)=  10.583
     RUNOFF VOLUME    (mm)= 183.157
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.864

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0063)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0102):    33.29   3.886    10.58   185.95
      + ID2= 2 (  0103):    30.18   3.519    10.58   183.16
        ==================================================
        ID = 3 (  0063):    63.47   7.405    10.58   184.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0063)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0063):    63.47   7.405    10.58   184.62
      + ID2= 2 (  0104):     8.95   1.142    10.17   167.03
        ==================================================
        ID = 1 (  0063):    72.42   8.442    10.50   182.45

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0063)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0063):    72.42   8.442    10.50   182.45
      + ID2= 2 (  0047):    29.62   3.313    11.00   188.02
        ==================================================
        ID = 3 (  0063):   102.04  11.627    10.67   184.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
```

```
| RESERVOIR(  0062)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   3.5000      1.2000
                          0.1500     0.1200   |   8.0000      2.0000
                          0.3500     0.2000   |  12.0000      6.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0063)    102.040     11.627     10.67     184.07
   OUTFLOW: ID= 1 (  0062)    102.040      9.171     11.58     184.06

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 78.88
                  TIME SHIFT OF PEAK FLOW         (min)= 55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  3.1719

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0048)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00        412.71        0.0500
                  40.00        412.40    0.0500 /0.0500  Main Channel
                  80.00        411.89        0.0500      Main Channel
                 120.00        411.75    0.0500 /0.0500  Main Channel
                 160.00        409.65        0.0500
                 200.00        412.15        0.0500

     <--------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)     (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.13   409.78    .964E+02       0.0         0.15      35.83
      0.26   409.91    .386E+03       0.3         0.24      22.57
      0.39   410.05    .868E+03       0.8         0.31      17.22
      0.52   410.18    .154E+04       1.8         0.38      14.22
      0.66   410.31    .241E+04       3.3         0.44      12.25
      0.79   410.44    .347E+04       5.3         0.49      10.85
      0.92   410.57    .472E+04       8.0         0.54       9.79
      1.05   410.70    .617E+04      11.5         0.60       8.96
      1.18   410.83    .781E+04      15.7         0.64       8.28
      1.31   410.96    .964E+04      20.8         0.69       7.72
      1.44   411.09    .117E+05      26.8         0.74       7.24
      1.57   411.23    .139E+05      33.9         0.78       6.84
      1.70   411.36    .163E+05      41.9         0.82       6.48
      1.84   411.49    .189E+05      51.1         0.86       6.17
      1.97   411.62    .217E+05      61.4         0.91       5.89
      2.10   411.75    .247E+05      72.9         0.95       5.64
      2.23   411.88    .286E+05      87.7         0.98       5.44
      2.36   412.02    .338E+05     105.7         1.00       5.34
      2.50   412.15    .396E+05     126.6         1.02       5.22

                                 <---- hydrograph ---->   <-pipe / channel->
                          AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                          (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0062)  102.04     9.17   11.58 184.06      0.96      0.56
   OUTFLOW: ID= 1 (  0048)  102.04     9.14   11.75 184.06      0.96      0.56


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0109)|   Area    (ha)=   9.74   Curve Number   (CN)= 92.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.29   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.08

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   4.650

     PEAK FLOW       (cms)=   1.331 (i)
     TIME TO PEAK    (hrs)=  10.000
     RUNOFF VOLUME    (mm)= 175.269
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.827

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0109):     9.74   1.331    10.00   175.27
      + ID2= 2 (  0048):   102.04   9.141    11.75   184.06
        ==================================================
        ID = 3 (  0031):   111.78   9.681    11.00   183.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0031)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0031):   111.78   9.681    11.00   183.30
      + ID2= 2 (  0065):    47.44   4.367    11.08   194.00
        ==================================================
        ID = 1 (  0031):   159.22  14.027    11.00   186.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0066)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Width       (mm)=3000.00     Height   (mm)=2000.00
| DT=  5.0 min     |     Length       (m)=  39.00
--------------------     Slope      (m/m)=  0.005
                         Manning n        =  0.013

     <----------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)      (cms)        (m/s)        min
       0.11     .123E+02       0.4         1.16         0.56
       0.21     .246E+02       1.1         1.76         0.37
       0.32     .369E+02       2.1         2.22         0.29
       0.42     .493E+02       3.3         2.59         0.25
       0.53     .616E+02       4.6         2.90         0.22
       0.63     .739E+02       6.0         3.17         0.21
       0.74     .862E+02       7.5         3.40         0.19
       0.84     .985E+02       9.1         3.61         0.18
       0.95     .111E+03      10.8         3.79         0.17
       1.05     .123E+03      12.5         3.95         0.16
       1.16     .135E+03      14.2         4.10         0.16
```

1.26	.148E+03	16.0	4.23	0.15
1.37	.160E+03	17.9	4.35	0.15
1.47	.172E+03	19.7	4.47	0.15
1.58	.185E+03	21.6	4.57	0.14
1.68	.197E+03	23.6	4.67	0.14
1.79	.209E+03	25.5	4.75	0.14
1.89	.222E+03	27.5	4.84	0.13
2.00	.234E+03	29.5	4.91	0.13

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0031)	159.22	14.03	11.00	186.49	1.15	4.08
OUTFLOW:	ID= 1 (0066)	159.22	14.02	11.00	186.49	1.15	4.08

ADD HYD (0037)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0110):	3.84	0.539	10.08	195.34
+ ID2= 2 (0066):	159.22	14.022	11.00	186.49
ID = 3 (0037):	163.06	14.434	11.00	186.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0051)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	410.33	0.0500	
40.00	409.37	0.0500 /0.0500	Main Channel
80.00	408.89	0.0500	Main Channel
120.00	409.11	0.0500 /0.0500	Main Channel
160.00	409.15	0.0500	
200.00	410.76	0.0500	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.06	408.94	.176E+03	0.0	0.11	65.30
0.11	409.00	.704E+03	0.3	0.17	41.13
0.17	409.06	.158E+04	0.8	0.22	31.39
0.23	409.11	.282E+04	1.8	0.27	25.91
0.31	409.20	.601E+04	4.8	0.33	21.07
0.39	409.28	.979E+04	9.5	0.41	17.12
0.47	409.36	.139E+05	15.9	0.48	14.53
0.55	409.44	.182E+05	24.4	0.56	12.41
0.63	409.52	.227E+05	34.7	0.64	10.92
0.71	409.60	.274E+05	46.4	0.71	9.84
0.80	409.68	.323E+05	59.8	0.78	9.01
0.88	409.76	.374E+05	74.6	0.84	8.35
0.96	409.84	.426E+05	91.0	0.90	7.81
1.04	409.92	.481E+05	108.9	0.95	7.36
1.12	410.01	.537E+05	128.3	1.00	6.97
1.20	410.09	.595E+05	149.3	1.05	6.64
1.28	410.17	.655E+05	171.8	1.10	6.35
1.36	410.25	.716E+05	196.0	1.15	6.09
1.44	410.33	.780E+05	221.7	1.19	5.86

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0037)	163.06	14.43	11.00	186.70	0.45	0.46
OUTFLOW:	ID= 1 (0051)	163.06	14.12	11.08	186.69	0.45	0.46

CALIB
NASHYD (0112) | Area (ha)= 10.13 Curve Number (CN)= 88.7
ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.40

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.967

PEAK FLOW (cms)= 1.335 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 177.031
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.835

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0113) | Area (ha)= 13.19 Curve Number (CN)= 88.7
ID= 1 DT= 5.0 min | Ia (mm)= 6.64 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.93

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00

1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.542

PEAK FLOW (cms)= 1.407 (i)
TIME TO PEAK (hrs)= 11.083
RUNOFF VOLUME (mm)= 177.406
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.837

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0114)|   Area    (ha)=  10.41   Curve Number   (CN)= 88.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.45   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.95
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.419

PEAK FLOW (cms)= 1.103 (i)
TIME TO PEAK (hrs)= 11.083
RUNOFF VOLUME (mm)= 176.966
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.835

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0061)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	407.05	0.0500	
40.00	407.32	0.0500 /0.0500	Main Channel
80.00	406.85	0.0500	Main Channel
120.00	406.99	0.0500 /0.0500	Main Channel
160.00	407.77	0.0500	
200.00	408.32	0.0500	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.01	406.86	.647E+01	0.0	0.02	259.26
0.02	406.87	.259E+02	0.0	0.03	163.33
0.03	406.88	.582E+02	0.0	0.04	124.64
0.04	406.89	.103E+03	0.0	0.05	102.89
0.05	406.90	.162E+03	0.0	0.06	88.67
0.06	406.91	.233E+03	0.0	0.07	78.52
0.07	406.92	.317E+03	0.1	0.08	70.85
0.08	406.93	.414E+03	0.1	0.08	64.82
0.09	406.95	.524E+03	0.1	0.09	59.92
0.10	406.96	.647E+03	0.2	0.10	55.86
0.11	406.97	.782E+03	0.2	0.10	52.42
0.12	406.98	.931E+03	0.3	0.11	49.46
0.13	406.99	.109E+04	0.4	0.11	46.89
0.14	407.00	.127E+04	0.5	0.12	42.90
0.15	407.01	.146E+04	0.6	0.13	39.75
0.17	407.02	.165E+04	0.7	0.14	37.17
0.18	407.03	.185E+04	0.9	0.15	35.02
0.19	407.04	.205E+04	1.0	0.16	33.19
0.20	407.05	.225E+04	1.2	0.17	31.61

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0114)	10.41	1.10	11.08	176.97	0.19	0.16
OUTFLOW: ID= 1 (0061)	10.41	1.04	11.42	176.83	0.19	0.16

```
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0044)|
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0113):	13.19	1.407	11.08	177.41
+ ID2= 2 (0061):	10.41	1.043	11.42	176.83
ID = 3 (0044):	23.60	2.433	11.17	177.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0060)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	409.04	0.0500	
40.00	407.85	0.0500	Main Channel
80.00	407.42	0.0500	Main Channel
120.00	407.63	0.0500 /0.0500	Main Channel
160.00	408.37	0.0500	
200.00	409.57	0.0500	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.07	407.49	.189E+03	0.0	0.05	93.75
0.14	407.56	.755E+03	0.2	0.08	59.06
0.21	407.63	.170E+04	0.6	0.10	45.07
0.30	407.72	.327E+04	1.7	0.14	32.46
0.39	407.80	.514E+04	3.2	0.17	26.65
0.47	407.89	.731E+04	5.4	0.20	22.47
0.56	407.98	.967E+04	8.3	0.23	19.34
0.65	408.07	.122E+05	11.8	0.26	17.21
0.74	408.16	.149E+05	15.9	0.29	15.63

0.83	408.24	.179E+05	20.7	0.31	14.41
0.91	408.33	.210E+05	26.0	0.33	13.43
1.00	408.42	.242E+05	32.1	0.36	12.60
1.09	408.51	.276E+05	38.8	0.38	11.88
1.18	408.60	.312E+05	46.2	0.40	11.26
1.27	408.68	.349E+05	54.2	0.42	10.73
1.35	408.77	.387E+05	62.9	0.44	10.26
1.44	408.86	.427E+05	72.3	0.46	9.85
1.53	408.95	.468E+05	82.3	0.47	9.48
1.62	409.04	.511E+05	93.1	0.49	9.15

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0044)	23.60	2.43	11.17	177.15	0.34	0.15
OUTFLOW: ID= 1 (0060)	23.60	2.29	11.42	177.13	0.33	0.15

```
--------------------
| CALIB            |
| NASHYD   (  0111)|   Area    (ha)=  15.18   Curve Number   (CN)= 94.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.76   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.53
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
Unit Hyd Qpeak  (cms)=   1.094

PEAK FLOW       (cms)=   1.921 (i)
TIME TO PEAK    (hrs)=  10.250
RUNOFF VOLUME    (mm)= 192.394
TOTAL RAINFALL   (mm)= 212.000
RUNOFF COEFFICIENT   =   0.908

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0111):    15.18   1.921    10.25   192.39
      + ID2= 2 (  0112):    10.13   1.335    10.08   177.03
        ==================================================
        ID = 3 (  0038):    25.31   3.236    10.25   186.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------
| ADD HYD  (  0038)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0038):    25.31   3.236    10.25   186.24
      + ID2= 2 (  0051):   163.06  14.122    11.08   186.69
        ==================================================
        ID = 1 (  0038):   188.37  16.862    11.08   186.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0038):   188.37  16.862    11.08   186.63
      + ID2= 2 (  0060):    23.60   2.285    11.42   177.13
        ==================================================
        ID = 3 (  0038):   211.97  19.063    11.08   185.58

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------
| ROUTE CHN(  0052)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	410.25	0.0500	
40.00	409.28	0.0500 /0.0500	Main Channel
80.00	408.14	0.0500	Main Channel
120.00	408.21	0.0500 /0.0500	Main Channel
160.00	408.82	0.0500	
200.00	410.08	0.0500	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	408.21	.400E+03	0.3	0.17	24.63
0.17	408.31	.157E+04	2.4	0.38	11.06
0.27	408.41	.299E+04	6.2	0.52	8.03
0.37	408.51	.465E+04	11.8	0.63	6.59
0.47	408.61	.656E+04	19.2	0.73	5.71
0.57	408.71	.872E+04	28.5	0.82	5.10
0.67	408.81	.111E+05	39.8	0.90	4.65
0.76	408.90	.137E+05	53.7	0.98	4.26
0.86	409.00	.165E+05	69.8	1.06	3.94
0.96	409.10	.195E+05	88.1	1.13	3.68
1.06	409.20	.226E+05	108.5	1.20	3.46
1.16	409.30	.258E+05	131.7	1.28	3.27
1.26	409.40	.292E+05	159.4	1.36	3.06
1.35	409.49	.329E+05	189.6	1.44	2.89
1.45	409.59	.366E+05	222.4	1.52	2.74
1.55	409.69	.406E+05	258.0	1.59	2.62
1.65	409.79	.447E+05	296.3	1.66	2.52
1.75	409.89	.490E+05	337.5	1.72	2.42
1.85	409.99	.535E+05	381.6	1.78	2.34

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0038)	211.97	19.06	11.08	185.58	0.47	0.73
OUTFLOW: ID= 1 (0052)	211.97	19.00	11.08	185.58	0.46	0.73

```
--------------------
| CALIB            |
| NASHYD   (  0115)|   Area    (ha)=   5.25   Curve Number   (CN)= 90.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.65   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```
                    ---- TRANSFORMED HYETOGRAPH ----
 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
  hrs   mm/hr |   hrs   mm/hr '   hrs   mm/hr |   hrs   mm/hr
0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.393

     PEAK FLOW       (cms)=   0.662 (i)
     TIME TO PEAK    (hrs)=  10.250
     RUNOFF VOLUME    (mm)= 182.788
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.862

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0115):      5.25   0.662    10.25   182.79
      + ID2= 2 (  0052):    211.97  19.001    11.08   185.58
        ==================================================
        ID = 3 (  0039):    217.22  19.573    11.08   185.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0067)|     PIPE Number      =   1.00
| IN= 2---> OUT= 1 |     Width        (mm)=3000.00     Height   (mm)=2000.00
| DT=  5.0 min     |     Length       (m)=  17.00
--------------------     Slope       (m/m)=  0.005
                         Manning n        =  0.013

     <---------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)      (cms)        (m/s)        min
       0.11     .537E+01       0.4          1.16         0.24
       0.21     .107E+02       1.1          1.76         0.16
       0.32     .161E+02       2.1          2.22         0.13
       0.42     .215E+02       3.3          2.59         0.11
       0.53     .268E+02       4.6          2.90         0.10
       0.63     .322E+02       6.0          3.17         0.09
       0.74     .376E+02       7.5          3.40         0.08
       0.84     .429E+02       9.1          3.61         0.08
       0.95     .483E+02      10.8          3.79         0.07
       1.05     .537E+02      12.5          3.95         0.07
       1.16     .591E+02      14.2          4.10         0.07
       1.26     .644E+02      16.0          4.23         0.07
       1.37     .698E+02      17.9          4.35         0.07
       1.47     .752E+02      19.7          4.47         0.06
       1.58     .805E+02      21.6          4.57         0.06
       1.68     .859E+02      23.6          4.67         0.06
       1.79     .913E+02      25.5          4.75         0.06
       1.89     .966E+02      27.5          4.84         0.06
       2.00     .102E+03      29.5          4.91         0.06
                                     <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)       (m/s)
   INFLOW : ID= 2 (  0039)  217.22    19.57   11.08 185.51      1.46       4.46
   OUTFLOW: ID= 1 (  0067)  217.22    19.58   11.08 185.51      1.46       4.45


--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0054)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
                <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                  0.00         409.72        0.0500
                 40.00         408.17    0.0500 /0.0500  Main Channel
                 80.00         407.19        0.0500      Main Channel
                120.00         406.75    0.0500 /0.0500  Main Channel
                160.00         408.01        0.0500
                200.00         408.83        0.0500

     <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)      (cu.m.)      (cms)        (m/s)      (min)
       0.11   406.86    .266E+03       0.1          0.18      33.79
       0.22   406.97    .106E+04       0.8          0.28      21.29
       0.33   407.08    .240E+04       2.5          0.37      16.25
       0.44   407.19    .426E+04       5.3          0.45      13.39
       0.55   407.30    .654E+04       9.9          0.54      11.01
       0.66   407.41    .913E+04      16.0          0.63       9.54
       0.77   407.52    .120E+05      23.6          0.70       8.52
       0.87   407.63    .153E+05      32.8          0.77       7.76
       0.98   407.73    .188E+05      43.7          0.84       7.16
       1.09   407.84    .226E+05      56.5          0.90       6.68
       1.20   407.95    .268E+05      71.1          0.96       6.27
       1.31   408.06    .312E+05      87.5          1.01       5.95
       1.42   408.17    .361E+05     105.7          1.05       5.69
       1.53   408.28    .413E+05     129.0          1.13       5.33
       1.64   408.39    .468E+05     154.9          1.19       5.04
       1.75   408.50    .526E+05     183.4          1.25       4.78
       1.86   408.61    .588E+05     214.6          1.31       4.57
       1.97   408.72    .653E+05     248.5          1.37       4.38
       2.08   408.83    .721E+05     285.3          1.42       4.21
                                     <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)       (m/s)
   INFLOW : ID= 2 (  0067)  217.22    19.58   11.08 185.51      0.71       0.66
   OUTFLOW: ID= 1 (  0054)  217.22    19.44   11.17 185.51      0.70       0.66


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0119)|   Area    (ha)=  61.53   Curve Number   (CN)= 87.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.35   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.75

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                    ---- TRANSFORMED HYETOGRAPH ----
 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
  hrs   mm/hr |   hrs   mm/hr '   hrs   mm/hr |   hrs   mm/hr
0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
```

0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
Unit Hyd Qpeak  (cms)=   3.134

PEAK FLOW       (cms)=   6.847 (i)
TIME TO PEAK    (hrs)=  10.750
RUNOFF VOLUME    (mm)= 173.732
TOTAL RAINFALL   (mm)= 212.000
RUNOFF COEFFICIENT   =   0.819

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0116)|   Area    (ha)=   2.14
|ID= 1 DT= 5.0 min |   Total Imp(%)=  24.00   Dir. Conn.(%)=  24.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        0.51          1.63
Dep. Storage     (mm)=        5.72          6.92
Average Slope     (%)=        1.00          2.00
Length            (m)=      119.44         15.00
Mannings n           =       0.013         0.250

    NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
Max.Eff.Inten.(mm/hr)=      53.00        51.69
           over (min)        5.00        10.00
Storage Coeff.  (min)=       3.66 (ii)    8.77 (ii)
Unit Hyd. Tpeak (min)=       5.00        10.00
Unit Hyd. peak  (cms)=       0.25         0.12
                                                        *TOTALS*
PEAK FLOW       (cms)=       0.08         0.23          0.308 (iii)
TIME TO PEAK    (hrs)=       9.92        10.00          10.00
RUNOFF VOLUME    (mm)=     206.28       180.56         186.73
TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
RUNOFF COEFFICIENT   =       0.97         0.85           0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  90.1    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0030)|
|   1 +   2 =  3   |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0116):      2.14    0.308    10.00   186.73
     + ID2= 2 (  0119):     61.53    6.847    10.75   173.73
       ==================================================
       ID = 3 (  0030):     63.67    7.071    10.75   174.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0055)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                  0.00         407.05        0.0500
                 40.00         407.32    0.0500 /0.0500  Main Channel
                 80.00         406.85        0.0500      Main Channel
                120.00         406.99    0.0500 /0.0500  Main Channel
                160.00         407.77        0.0500
                200.00         408.32        0.0500
```

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.01	406.86	.525E+01	0.0	0.01	421.30
0.02	406.87	.210E+02	0.0	0.02	265.40
0.03	406.88	.473E+02	0.0	0.02	202.54
0.04	406.89	.841E+02	0.0	0.03	167.19
0.05	406.90	.131E+03	0.0	0.03	144.08
0.06	406.91	.189E+03	0.0	0.03	127.59
0.07	406.92	.257E+03	0.0	0.04	115.13
0.08	406.93	.336E+03	0.1	0.04	105.33
0.09	406.95	.426E+03	0.1	0.04	97.37
0.10	406.96	.525E+03	0.1	0.05	90.77
0.11	406.97	.636E+03	0.1	0.05	85.18
0.12	406.98	.757E+03	0.2	0.05	80.38
0.13	406.99	.888E+03	0.2	0.06	76.20
0.14	407.00	.103E+04	0.2	0.06	69.72
0.15	407.01	.119E+04	0.3	0.07	64.59
0.17	407.02	.134E+04	0.4	0.07	60.40
0.18	407.03	.150E+04	0.4	0.08	56.90
0.19	407.04	.166E+04	0.5	0.08	53.93
0.20	407.05	.183E+04	0.6	0.08	51.36

**** WARNING: TRAVEL TIME TABLE EXCEEDED

<---- hydrograph ---->				<-pipe / channel->	
AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)

```
   INFLOW : ID= 2 (  0030)   63.67     7.07   10.75 174.17      0.19      0.08
   OUTFLOW: ID= 1 (  0055)   63.67     6.18   11.42 174.13      0.20      0.08

     **** WARNING:  COMPUTATIONS FAILED TO CONVERGE.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0120)|   Area    (ha)=  19.69   Curve Number   (CN)= 89.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.77   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.367

     PEAK FLOW       (cms)=   2.414 (i)
     TIME TO PEAK    (hrs)=  10.333
     RUNOFF VOLUME    (mm)= 179.518
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.847

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0041)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0120):    19.69   2.414    10.33   179.52
      + ID2= 2 (  0055):    63.67   6.179    11.42   174.13
        ==================================================
        ID = 3 (  0041):    83.36   8.163    11.17   175.40

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0056)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
                Distance      Elevation       Manning
                    0.00        406.96        0.0500
                   40.00        406.80    0.0500 /0.0500  Main Channel
                   80.00        406.11        0.0500      Main Channel
                  120.00        405.99    0.0500 /0.0500  Main Channel
                  160.00        406.15        0.0500
                  200.00        406.19        0.0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.01   406.00    .789E+01       0.0          0.05      81.15
       0.02   406.01    .316E+02       0.0          0.08      51.12
       0.03   406.02    .710E+02       0.0          0.10      39.01
       0.04   406.03    .126E+03       0.1          0.12      32.20
       0.05   406.04    .197E+03       0.1          0.14      27.75
       0.06   406.05    .284E+03       0.2          0.16      24.58
       0.07   406.06    .387E+03       0.3          0.18      22.18
       0.08   406.08    .505E+03       0.4          0.20      20.29
       0.10   406.09    .639E+03       0.6          0.21      18.76
       0.11   406.10    .789E+03       0.8          0.23      17.48
       0.12   406.11    .955E+03       1.0          0.24      16.41
       0.13   406.12    .113E+04       1.2          0.26      15.16
       0.14   406.13    .132E+04       1.6          0.28      14.08
       0.15   406.14    .152E+04       1.9          0.30      13.19
       0.16   406.15    .172E+04       2.3          0.32      12.44
       0.17   406.16    .194E+04       2.6          0.33      12.24
       0.18   406.17    .219E+04       3.0          0.33      12.00
       0.19   406.18    .246E+04       3.5          0.34      11.72
       0.20   406.19    .276E+04       4.0          0.35      11.43

     **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                     <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
   INFLOW : ID= 2 (  0041)   83.36     8.16   11.17 175.40      0.20      0.35
   OUTFLOW: ID= 1 (  0056)   83.36     8.07   11.33 175.40      0.20      0.35


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

--------------------
| ADD HYD  (  0032)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0121):    23.78   3.222    10.08   191.35
      + ID2= 2 (  0054):   217.22  19.437    11.17   185.51
        ==================================================
        ID = 3 (  0032):   241.00  21.841    11.17   186.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0032)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0032):   241.00  21.841    11.17   186.08
      + ID2= 2 (  0056):    83.36   8.069    11.33   175.40
        ==================================================
        ID = 1 (  0032):   324.36  29.836    11.17   183.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0046)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
                Distance      Elevation       Manning
                    0.00        408.76        0.0500
                   40.00        407.46    0.0500 /0.0500  Main Channel
                   80.00        406.33        0.0500      Main Channel
                  120.00        406.42    0.0500 /0.0500  Main Channel
                  160.00        407.97        0.0500
                  200.00        408.95        0.0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.08   406.42    .642E+03       0.2          0.12      49.09
       0.21   406.54    .271E+04       2.2          0.29      20.62
       0.33   406.66    .512E+04       5.8          0.41      14.76
```

0.45	406.79	.786E+04	10.9	0.50	12.01
0.58	406.91	.109E+05	17.6	0.58	10.36
0.70	407.03	.144E+05	25.9	0.65	9.23
0.82	407.16	.181E+05	35.9	0.71	8.40
0.95	407.28	.222E+05	47.7	0.77	7.75
1.07	407.40	.266E+05	61.3	0.83	7.23
1.19	407.52	.313E+05	78.1	0.90	6.69
1.31	407.65	.364E+05	97.9	0.97	6.20
1.44	407.77	.418E+05	120.0	1.03	5.80
1.56	407.89	.475E+05	144.4	1.10	5.48
1.68	408.02	.534E+05	170.8	1.15	5.21
1.81	408.14	.598E+05	199.3	1.20	5.00
1.93	408.26	.666E+05	230.6	1.25	4.81
2.05	408.39	.737E+05	264.6	1.29	4.64
2.18	408.51	.813E+05	301.6	1.34	4.49
2.30	408.63	.892E+05	341.5	1.38	4.35

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0032)	324.36	29.84	11.17	183.34	0.75	0.67
OUTFLOW: ID= 1 (0046)	324.36	29.63	11.25	183.34	0.74	0.67

CALIB			
NASHYD (0125)	Area (ha)= 50.67	Curve Number (CN)= 88.4	
ID= 1 DT= 5.0 min	Ia (mm)= 7.24	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.63		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 3.072

PEAK FLOW (cms)= 5.938 (i)
TIME TO PEAK (hrs)= 10.500
RUNOFF VOLUME (mm)= 176.188
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.831

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0122)	Area (ha)= 47.13	Curve Number (CN)= 49.1	
ID= 1 DT= 5.0 min	Ia (mm)= 5.71	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.54		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 3.334

PEAK FLOW (cms)= 3.395 (i)
TIME TO PEAK (hrs)= 10.417
RUNOFF VOLUME (mm)= 90.597
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.427

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0124)	Area (ha)= 59.08	Curve Number (CN)= 88.8	
ID= 1 DT= 5.0 min	Ia (mm)= 7.19	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.51		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00

0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 4.425

PEAK FLOW (cms)= 7.352 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 177.051
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.835

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------
| CALIB            |
| NASHYD   (  0123)|   Area    (ha)=  27.62   Curve Number   (CN)= 92.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.04   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.67
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.575

PEAK FLOW (cms)= 3.249 (i)
TIME TO PEAK (hrs)= 10.583
RUNOFF VOLUME (mm)= 186.034
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.878

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------
| ROUTE CHN(  0058)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	415.69	0.0500	
40.00	414.82	0.0500 /0.0500	Main Channel
80.00	414.16	0.0500	Main Channel
120.00	412.49	0.0500 /0.0500	Main Channel
160.00	413.40	0.0500	
200.00	413.56	0.0500	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.06	412.54	.663E+02	0.0	0.19	53.44
0.11	412.60	.265E+03	0.1	0.30	33.66
0.17	412.66	.597E+03	0.4	0.40	25.69
0.23	412.71	.106E+04	0.8	0.48	21.21
0.28	412.77	.166E+04	1.5	0.56	18.28
0.34	412.83	.239E+04	2.5	0.63	16.18
0.40	412.88	.325E+04	3.7	0.70	14.60
0.45	412.94	.425E+04	5.3	0.76	13.36
0.51	413.00	.537E+04	7.3	0.82	12.35
0.57	413.05	.663E+04	9.6	0.88	11.51
0.62	413.11	.803E+04	12.4	0.94	10.80
0.68	413.17	.955E+04	15.6	1.00	10.20
0.74	413.22	.112E+05	19.3	1.05	9.67
0.79	413.28	.130E+05	23.6	1.11	9.20
0.85	413.34	.149E+05	28.3	1.16	8.79
0.91	413.39	.170E+05	33.6	1.21	8.42
0.96	413.45	.193E+05	36.5	1.15	8.82
1.02	413.51	.222E+05	41.2	1.13	8.99
1.08	413.56	.256E+05	47.5	1.13	8.99

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0123)	27.62	3.25	10.58	186.03	0.38	0.67
OUTFLOW: ID= 1 (0058)	27.62	3.19	10.83	186.02	0.37	0.67

```
--------------------
| ADD HYD  (  0043)|
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0124):	59.08	7.352	10.25	177.05
+ ID2= 2 (0058):	27.62	3.194	10.83	186.02
ID = 3 (0043):	86.70	10.285	10.42	179.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN(  0059)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	412.53	0.0500	
40.00	412.08	0.0500 /0.0500	Main Channel
80.00	411.53	0.0500	Main Channel
120.00	411.93	0.0500 /0.0500	Main Channel
160.00	412.26	0.0500	
200.00	413.36	0.0500	

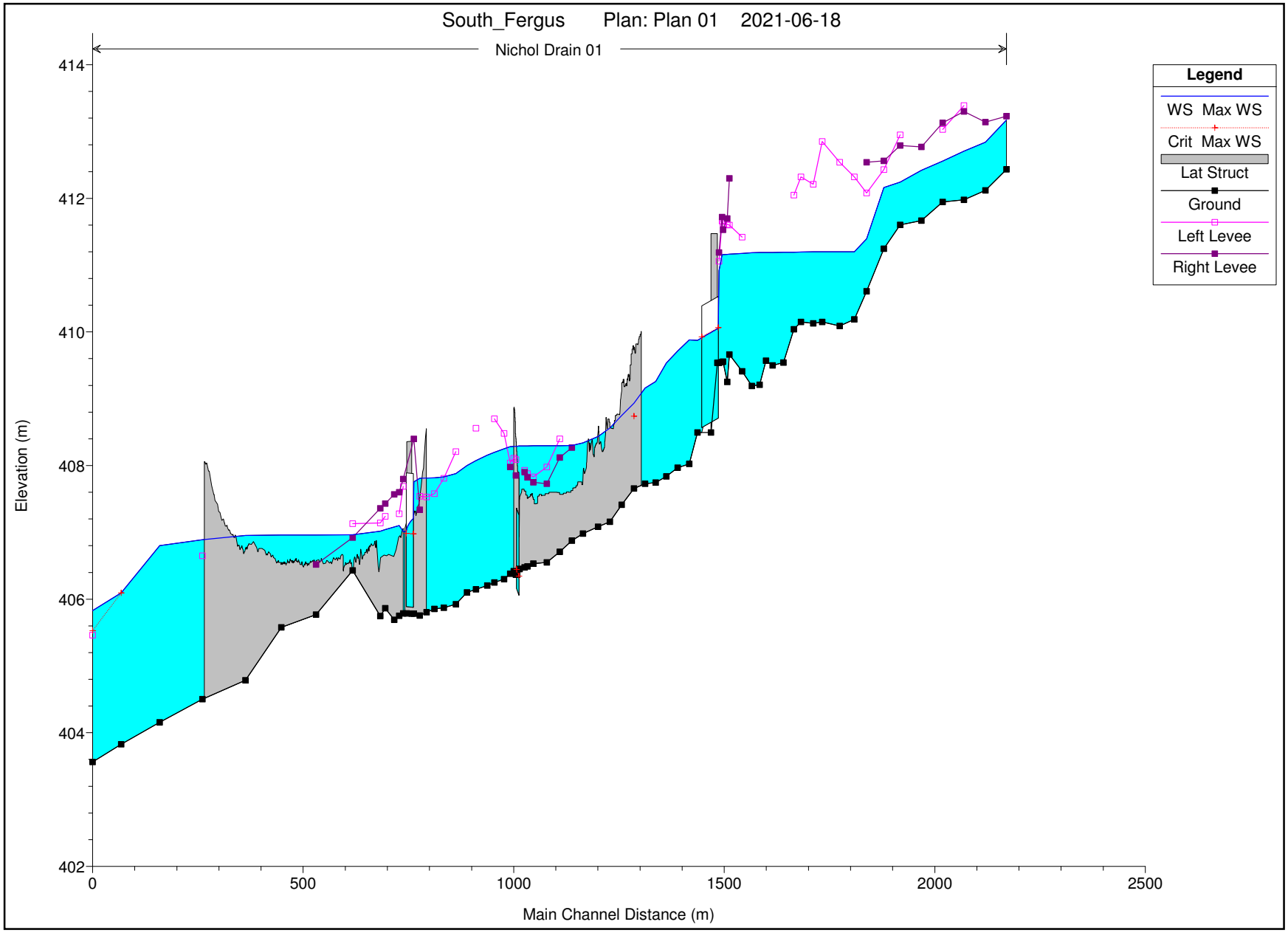
```
     <--------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.05   411.58    .190E+03       0.0          0.10     144.01
      0.10   411.63    .759E+03       0.1          0.17      90.72
      0.15   411.68    .171E+04       0.4          0.22      69.23
      0.20   411.73    .304E+04       0.9          0.26      57.15
      0.25   411.78    .475E+04       1.6          0.30      49.25
      0.29   411.83    .683E+04       2.6          0.34      43.61
      0.34   411.88    .930E+04       3.9          0.38      39.35
      0.39   411.93    .122E+05       5.6          0.42      36.00
      0.44   411.98    .154E+05       8.0          0.47      32.20
      0.50   412.03    .195E+05      11.1          0.51      29.30
      0.55   412.09    .242E+05      14.9          0.55      27.07
      0.61   412.14    .295E+05      19.8          0.61      24.78
      0.66   412.20    .353E+05      25.5          0.65      23.07
      0.72   412.25    .416E+05      32.0          0.69      21.72
      0.77   412.31    .485E+05      39.5          0.73      20.49
      0.83   412.36    .557E+05      47.8          0.77      19.41
      0.88   412.42    .633E+05      57.1          0.81      18.47
      0.94   412.47    .711E+05      67.2          0.85      17.64
      0.99   412.53    .794E+05      78.2          0.89      16.91

                                  <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
   INFLOW : ID= 2 (  0043)   86.70    10.29   10.42 179.91     0.48      0.50
   OUTFLOW: ID= 1 (  0059)   86.70     9.59   11.00 179.90     0.47      0.49


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

--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0122):    47.13   3.395    10.42    90.60
      + ID2= 2 (  0125):    50.67   5.938    10.50   176.19
        ====================================================
        ID = 3 (  0042):    97.80   9.333    10.50   134.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0042)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0042):    97.80   9.333    10.50   134.94
      + ID2= 2 (  0059):    86.70   9.592    11.00   179.90
        ====================================================
        ID = 1 (  0042):   184.50  18.685    10.75   156.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0057)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00        408.12        0.0500
                  40.00        407.72    0.0500 /0.0500  Main Channel
                  80.00        406.92        0.0500      Main Channel
                 120.00        406.45    0.0500 /0.0500  Main Channel
                 160.00        407.75        0.0500
                 200.00        408.46        0.0500

     <--------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.09   406.53    .210E+03       0.1          0.29      26.58
      0.18   406.62    .838E+03       0.8          0.47      16.74
      0.27   406.71    .189E+04       2.5          0.61      12.78
      0.35   406.80    .335E+04       5.3          0.74      10.55
      0.44   406.89    .524E+04       9.6          0.86       9.09
      0.53   406.98    .752E+04      15.9          0.99       7.91
      0.62   407.06    .101E+05      24.1          1.12       7.01
      0.71   407.15    .130E+05      34.2          1.23       6.34
      0.80   407.24    .162E+05      46.3          1.34       5.83
      0.88   407.33    .197E+05      60.5          1.45       5.42
      0.97   407.42    .235E+05      77.0          1.54       5.08
      1.06   407.51    .275E+05      95.8          1.63       4.79
      1.15   407.59    .319E+05     117.0          1.72       4.54
      1.24   407.68    .366E+05     140.8          1.81       4.33
      1.33   407.77    .416E+05     169.3          1.91       4.09
      1.41   407.86    .471E+05     201.4          2.01       3.90
      1.50   407.95    .532E+05     237.2          2.10       3.74
      1.59   408.04    .599E+05     277.1          2.18       3.60
      1.68   408.12    .671E+05     321.3          2.25       3.48

                                  <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
   INFLOW : ID= 2 (  0042)  184.50    18.68   10.75 156.07      0.56      1.03
   OUTFLOW: ID= 1 (  0057)  184.50    18.64   10.92 156.07      0.56      1.03


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0126)|   Area    (ha)=  33.99   Curve Number   (CN)= 94.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.98   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.43

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   3.019

     PEAK FLOW       (cms)=   4.541 (i)
     TIME TO PEAK    (hrs)=  10.167
     RUNOFF VOLUME    (mm)= 192.165
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.906

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0126):    33.99   4.541    10.17   192.16
      + ID2= 2 (  0046):   324.36  29.634    11.25   183.34
```

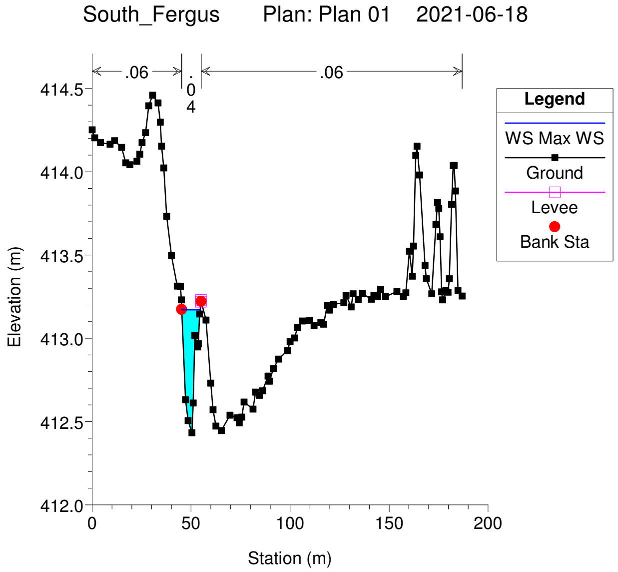
```
        ==================================================
        ID = 3 (  0033):   358.35  33.037    11.17   184.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0033)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0033):   358.35  33.037    11.17   184.17
      + ID2= 2 (  0057):   184.50  18.636    10.92   156.07
        ==================================================
        ID = 1 (  0033):   542.85  51.472    11.08   174.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

 FINISH
==================================================================================================
```

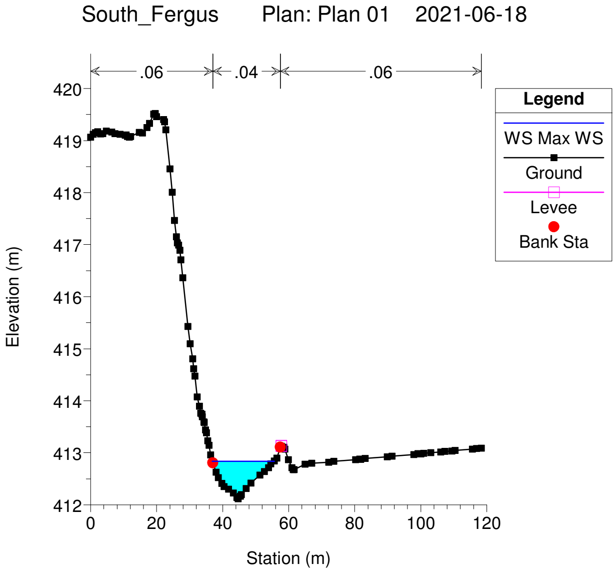
Appendix C:
Hydraulic Analysis

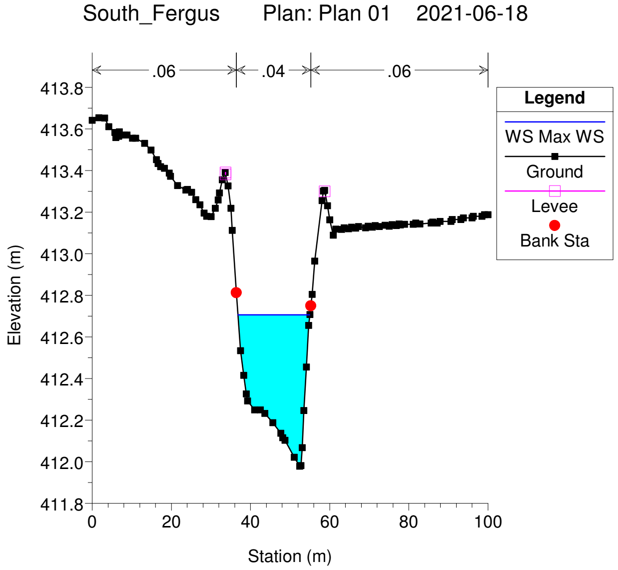
HEC-RAS Plan: Plan 01 Profile: Max WS

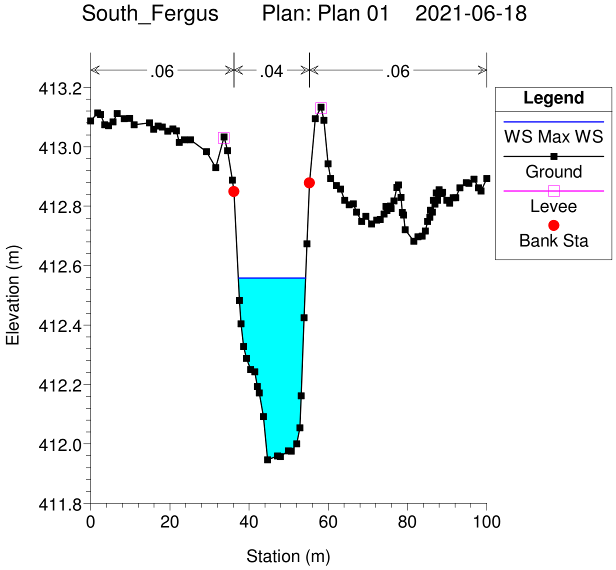
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Nichol Drain	01	2170	Max WS	6.30	412.43	413.17		413.31	0.015191	1.66	3.78	9.29	0.83
Nichol Drain	01	2120	Max WS	6.29	412.12	412.84		412.88	0.004234	0.87	7.26	18.74	0.44
Nichol Drain	01	2069	Max WS	6.29	411.98	412.71		412.73	0.002210	0.72	8.75	18.12	0.33
Nichol Drain	01	2019	Max WS	6.28	411.95	412.56		412.59	0.003270	0.83	7.57	17.00	0.40
Nichol Drain	01	1968	Max WS	6.28	411.67	412.42		412.45	0.002456	0.75	8.57	21.92	0.35
Nichol Drain	01	1918	Max WS	6.01	411.60	412.24		412.28	0.003933	0.82	7.34	16.22	0.39
Nichol Drain	01	1879	Max WS	5.91	411.25	412.16		412.18	0.001243	0.57	10.38	16.63	0.23
Nichol Drain	01	1838	Max WS	5.07	410.61	411.39		411.48	0.016380	1.33	3.82	11.70	0.74
Nichol Drain	01	1809	Max WS	4.48	410.19	411.20		411.20	0.000052	0.13	33.66	44.29	0.05
Nichol Drain	01	1774	Max WS	4.42	410.09	411.20		411.20	0.000021	0.09	50.04	61.58	0.03
Nichol Drain	01	1733	Max WS	4.43	410.15	411.20		411.20	0.000019	0.08	57.74	80.25	0.03
Nichol Drain	01	1711	Max WS	4.42	410.13	411.20		411.20	0.000012	0.07	65.68	82.26	0.02
Nichol Drain	01	1682	Max WS	4.41	410.15	411.20		411.20	0.000010	0.06	72.97	91.02	0.02
Nichol Drain	01	1666	Max WS	15.10	410.04	411.19		411.20	0.000113	0.20	76.64	100.43	0.07
Nichol Drain	01	1641	Max WS	15.09	409.54	411.19		411.19	0.000072	0.17	88.61	102.96	0.06
Nichol Drain	01	1615	Max WS	15.09	409.50	411.19		411.19	0.000040	0.15	98.81	86.25	0.05
Nichol Drain	01	1599	Max WS	15.09	409.57	411.19		411.19	0.000070	0.20	74.41	64.59	0.06
Nichol Drain	01	1584	Max WS	15.09	409.21	411.19		411.19	0.000056	0.20	76.69	58.74	0.05
Nichol Drain	01	1566	Max WS	15.09	409.19	411.19		411.19	0.000115	0.25	60.51	55.94	0.08
Nichol Drain	01	1542	Max WS	15.09	409.41	411.17		411.18	0.000408	0.39	38.54	46.48	0.14
Nichol Drain	01	1512	Max WS	15.09	409.66	411.16		411.17	0.000395	0.37	40.80	51.71	0.13
Nichol Drain	01	1507	Max WS	15.09	409.25	411.16		411.17	0.000294	0.34	43.80	50.00	0.12
Nichol Drain	01	1497	Max WS	15.09	409.55	411.16		411.16	0.000441	0.40	38.14	48.18	0.14
Nichol Drain	01	1495	Max WS	15.09	409.55	411.15		411.16	0.000834	0.44	34.24	59.50	0.19
Nichol Drain	01	1488	Max WS	15.09	409.54	410.92		411.20	0.025473	2.37	6.36	58.28	1.00
Nichol Drain	01	1476		Culvert									
Nichol Drain	01	1436	Max WS	15.08	408.50	409.87		410.00	0.007265	1.58	9.60	80.41	0.56
Nichol Drain	01	1417	Max WS	15.08	408.02	409.88		409.91	0.000841	0.72	21.09	23.91	0.23
Nichol Drain	01	1390	Max WS	15.08	407.97	409.71		409.82	0.006097	1.48	10.59	17.23	0.52
Nichol Drain	01	1363	Max WS	15.08	407.84	409.53		409.65	0.006382	1.53	9.88	11.67	0.53
Nichol Drain	01	1337	Max WS	15.08	407.74	409.26		409.45	0.009461	1.94	7.76	8.38	0.65
Nichol Drain	01	1312	Max WS	15.08	407.73	409.16		409.25	0.005111	1.37	17.01	67.06	0.48
Nichol Drain	01	1305		Lat Struct									
Nichol Drain	01	1286	Max WS	15.08	407.66	408.93	408.74	409.08	0.008982	1.77	11.21	36.88	0.63
Nichol Drain	01	1256	Max WS	15.07	407.41	408.75		408.84	0.006269	1.57	21.55	89.45	0.53
Nichol Drain	01	1229	Max WS	15.03	407.16	408.56		408.64	0.007998	1.46	21.64	102.57	0.58
Nichol Drain	01	1200	Max WS	13.90	407.09	408.43		408.48	0.002569	0.96	24.59	96.81	0.34
Nichol Drain	01	1165	Max WS	10.42	406.98	408.34		408.37	0.004214	0.99	25.07	99.11	0.41
Nichol Drain	01	1138	Max WS	6.03	406.88	408.30		408.30	0.000204	0.30	53.01	107.83	0.10
Nichol Drain	01	1109	Max WS	5.98	406.71	408.30		408.30	0.000031	0.14	73.24	107.23	0.04
Nichol Drain	01	1079	Max WS	6.25	406.55	408.30		408.30	0.000027	0.12	84.74	131.24	0.04
Nichol Drain	01	1047	Max WS	7.07	406.53	408.30		408.30	0.000026	0.12	98.54	153.24	0.04
Nichol Drain	01	1033	Max WS	6.04	406.49	408.30		408.30	0.000024	0.11	92.87	157.80	0.04
Nichol Drain	01	1026	Max WS	5.57	406.48	408.29		408.30	0.000026	0.12	87.52	162.84	0.04
Nichol Drain	01	1014	Max WS	10.68	406.45	408.29		408.29	0.000074	0.24	95.03	168.18	0.07
Nichol Drain	01	1010		Culvert									
Nichol Drain	01	1005	Max WS	10.68	406.37	408.29		408.29	0.000194	0.35	65.62	167.01	0.11
Nichol Drain	01	1000	Max WS	10.67	406.42	408.29		408.29	0.000267	0.40	54.42	138.75	0.13
Nichol Drain	01	992	Max WS	10.67	406.38	408.28		408.29	0.000382	0.55	46.25	127.37	0.15
Nichol Drain	01	977	Max WS	10.67	406.30	408.25		408.29	0.001278	0.98	16.19	36.34	0.28
Nichol Drain	01	954	Max WS	10.67	406.25	408.20		408.26	0.002048	1.14	13.03	42.31	0.34
Nichol Drain	01	937	Max WS	10.67	406.20	408.15		408.22	0.002466	1.20	11.29	40.45	0.37
Nichol Drain	01	911	Max WS	10.67	406.15	408.08		408.16	0.002527	1.26	8.92	21.09	0.38
Nichol Drain	01	889	Max WS	10.66	406.10	408.00		408.09	0.003435	1.35	7.89	8.17	0.43
Nichol Drain	01	863	Max WS	10.63	405.93	407.88		407.99	0.004148	1.51	7.05	6.64	0.47
Nichol Drain	01	834	Max WS	10.63	405.87	407.83		407.88	0.002825	1.09	14.51	56.89	0.34
Nichol Drain	01	811	Max WS	10.63	405.85	407.82		407.83	0.000609	0.66	31.84	77.68	0.19
Nichol Drain	01	793	Max WS	10.62	405.80	407.81		407.82	0.000385	0.51	42.83	93.51	0.15
Nichol Drain	01	788		Lat Struct									
Nichol Drain	01	777	Max WS	10.58	405.75	407.81		407.81	0.000223	0.40	53.78	112.87	0.12
Nichol Drain	01	763	Max WS	10.79	405.78	407.76		407.84	0.002173	1.32	8.19	93.97	0.36
Nichol Drain	01	747		Culvert									
Nichol Drain	01	738	Max WS	10.27	405.79	407.01		407.35	0.014197	2.57	4.05	54.95	0.85
Nichol Drain	01	737		Lat Struct									
Nichol Drain	01	728	Max WS	9.98	405.75	407.10		407.12	0.001657	0.83	22.45	66.37	0.30
Nichol Drain	01	716	Max WS	9.52	405.69	407.08		407.10	0.002184	0.81	20.14	67.31	0.28
Nichol Drain	01	695	Max WS	8.53	405.86	407.04		407.07	0.001886	0.87	18.47	67.81	0.32
Nichol Drain	01	683	Max WS	8.03	405.75	407.02		407.05	0.002079	0.90	15.62	66.85	0.33
Nichol Drain	01	618	Max WS	1.64	406.43	406.96		406.96	0.000003	0.02	79.83	156.67	0.01
Nichol Drain	01	530	Max WS	6.84	405.77	406.96		406.96	0.000024	0.10	104.84	166.56	0.04
Nichol Drain	01	448	Max WS	12.75	405.58	406.96		406.96	0.000019	0.11	169.05	184.80	0.03
Nichol Drain	01	363	Max WS	23.25	404.79	406.95		406.95	0.000076	0.26	157.71	185.17	0.07
Nichol Drain	01	261	Max WS	23.47	404.50	406.89		406.92	0.000927	0.96	50.90	102.58	0.25
Nichol Drain	01	159	Max WS	14.89	404.16	406.80		406.82	0.000427	0.69	37.36	66.89	0.17
Nichol Drain	01	68	Max WS	35.45	403.83	406.09	406.09	406.42	0.009585	2.60	17.27	42.41	0.77
Nichol Drain	01	0	Max WS	35.45	403.56	405.83	405.53	405.94	0.003104	1.66	34.65	61.11	0.45
		road		Lat Struct									

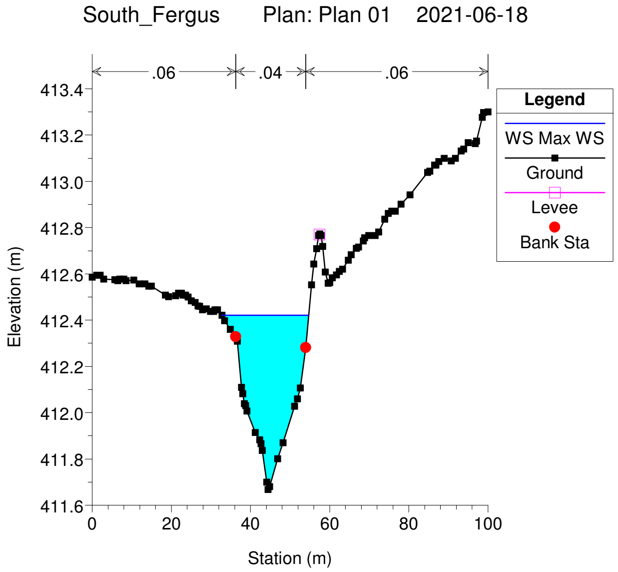

South_Fergus Plan: Plan 01 2021-06-18
Nichol Drain 01
Legend
WS Max WS
Crit Max WS
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
414
412
410
408
406
404
402
0
500
1000
1500
2000
2500
Main Channel Distance (m)

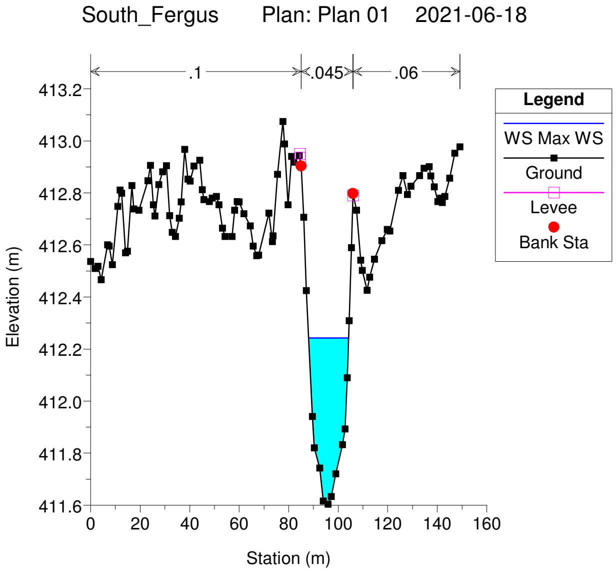

South_Fergus Plan: Plan 01 2021-06-18

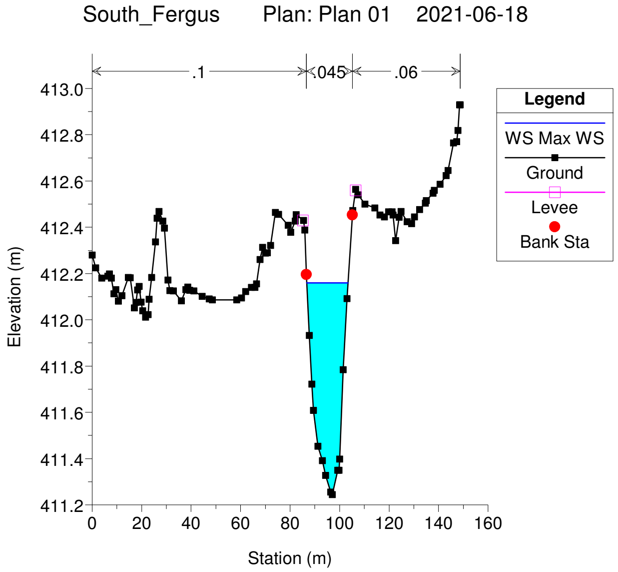

South_Fergus Plan: Plan 01 2021-06-18

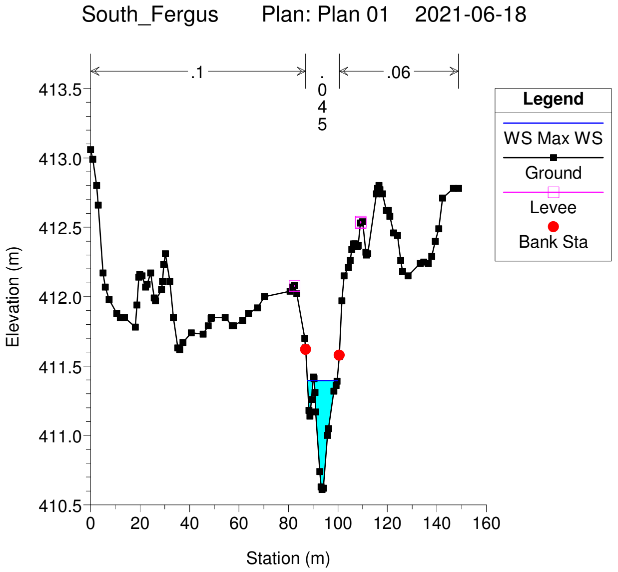

South_Fergus Plan: Plan 01 2021-06-18

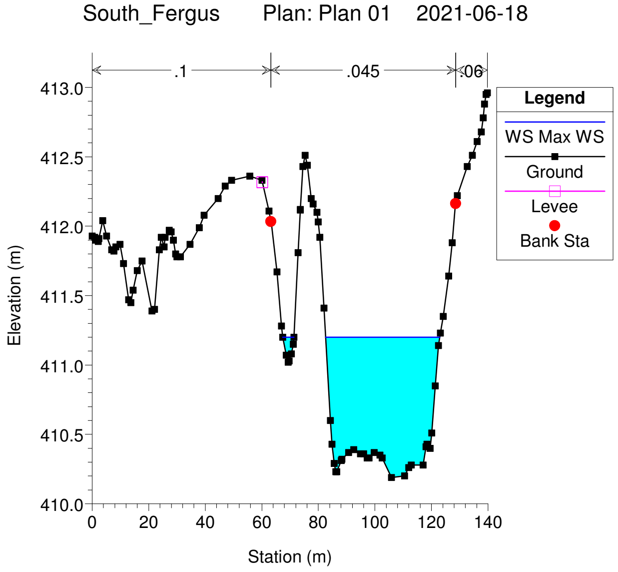

South_Fergus Plan: Plan 01 2021-06-18

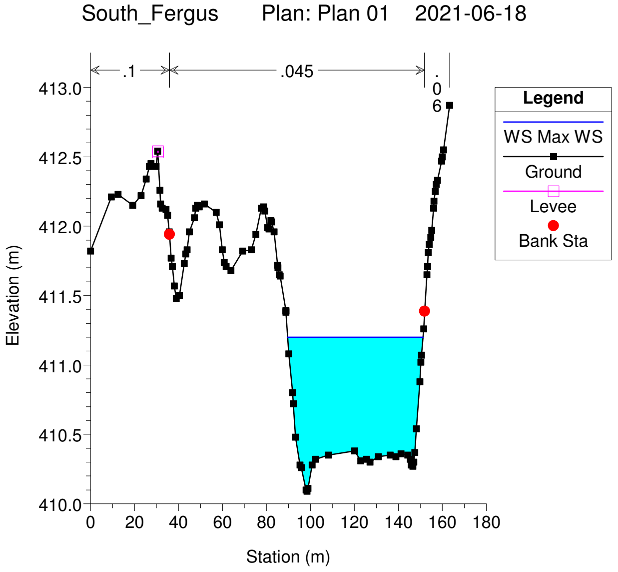

South_Fergus Plan: Plan 01 2021-06-18

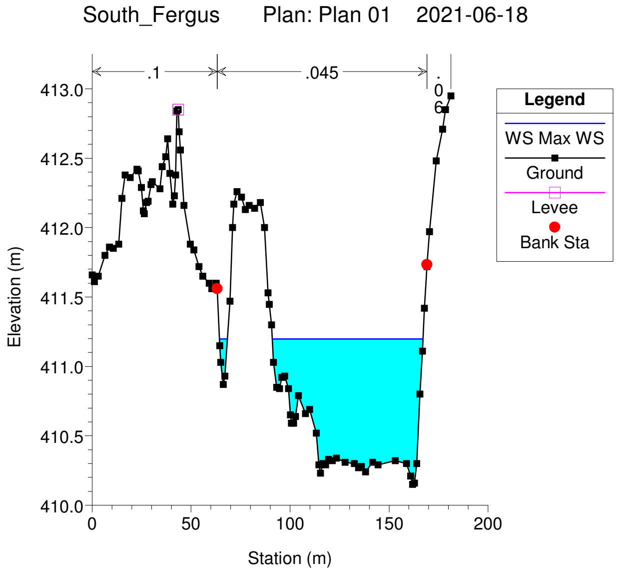

South_Fergus Plan: Plan 01 2021-06-18

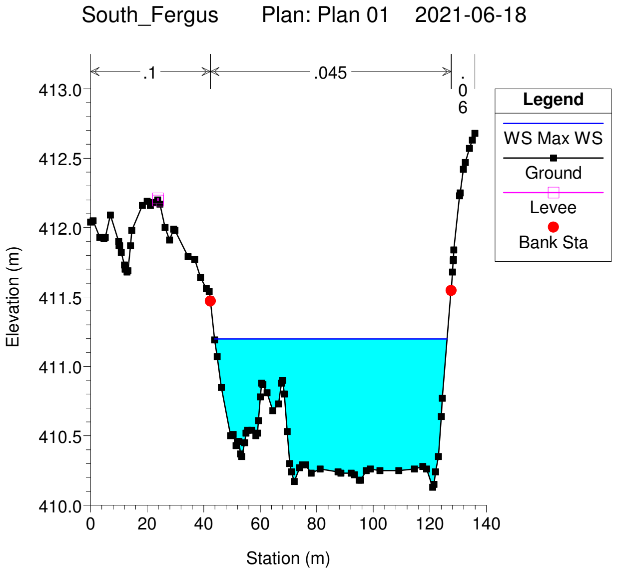

South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
413.0
412.8
412.6
412.4
412.2
412.0
411.8
411.6
411.4
411.2
0
20
40
60
80
100
120
140
160
Station (m)

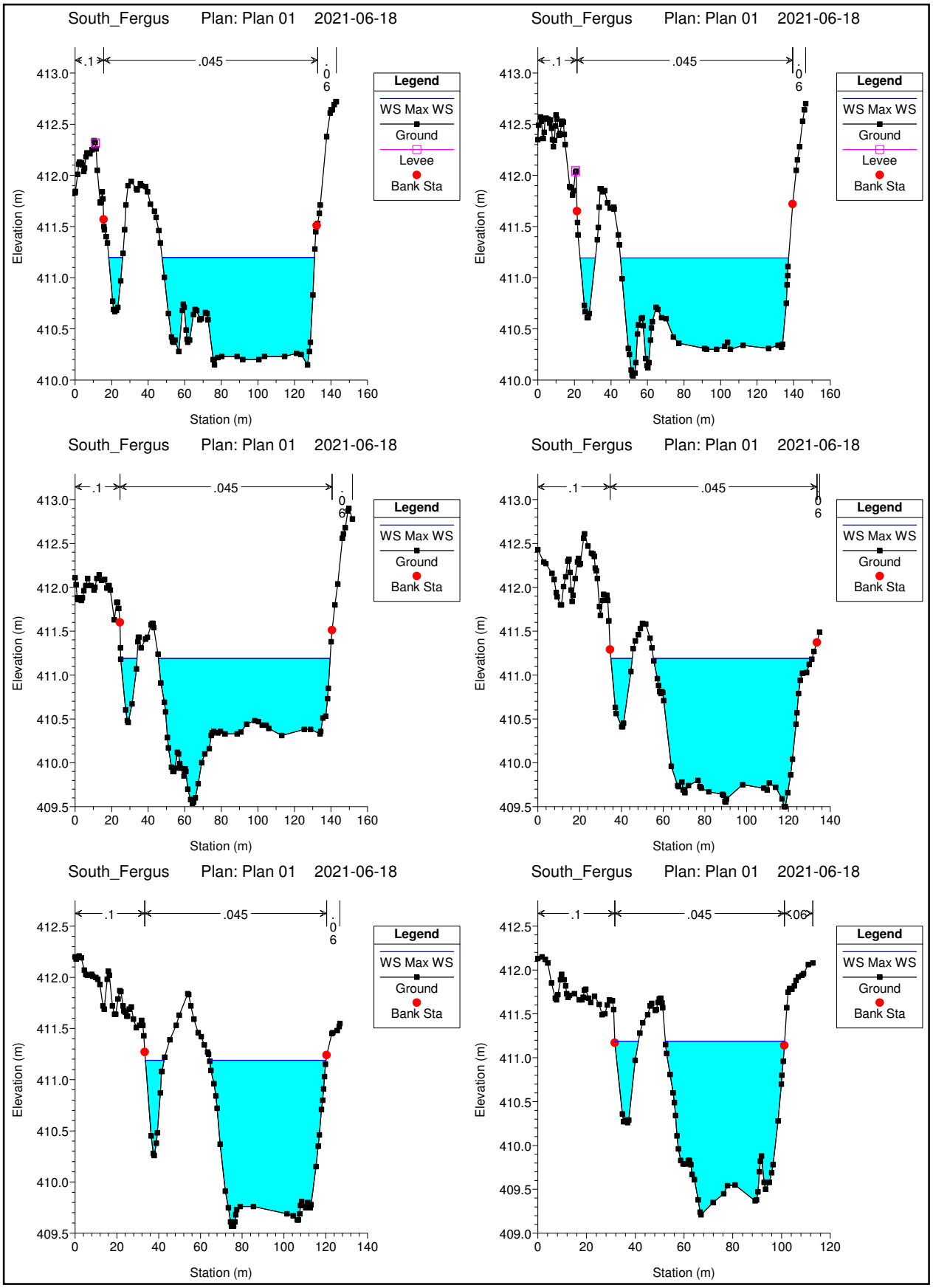

South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
413.5
413.0
412.5
412.0
411.5
411.0
410.5
0
20
40
60
80
100
120
140
160
Station (m)


South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
413.0
412.5
412.0
411.5
411.0
410.5
410.0
0
20
40
60
80
100
120
140
Station (m)

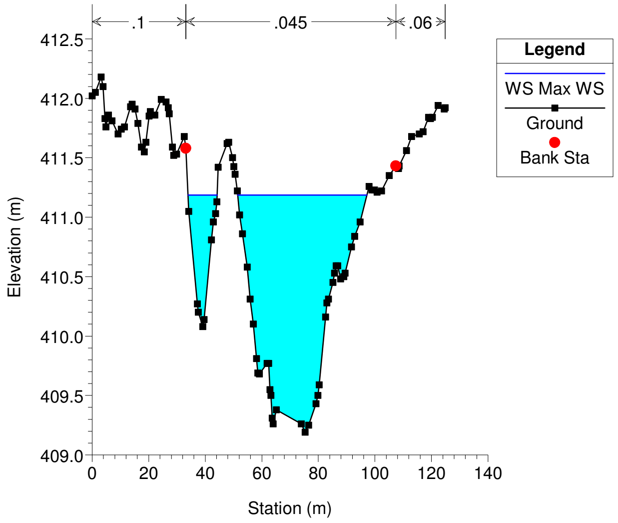

South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
413.0
412.5
412.0
411.5
411.0
410.5
410.0
0
20
40
60
80
100
120
140
160
180
Station (m)


South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
413.0
412.5
412.0
411.5
411.0
410.5
410.0
0
50
100
150
200
Station (m)

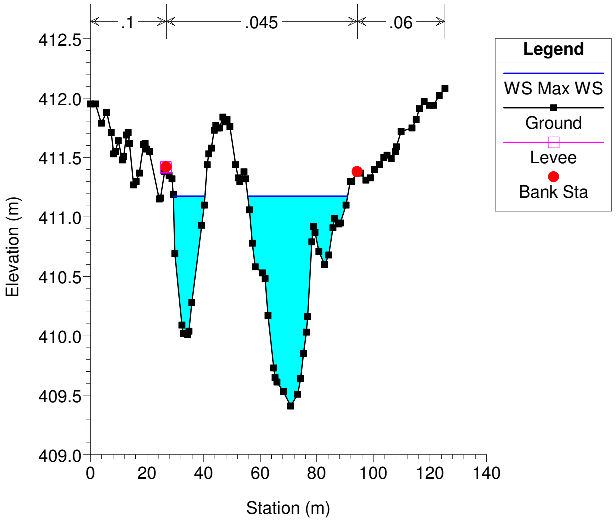

South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
413.0
412.5
412.0
411.5
411.0
410.5
410.0
0
20
40
60
80
100
120
140
Station (m)


South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)

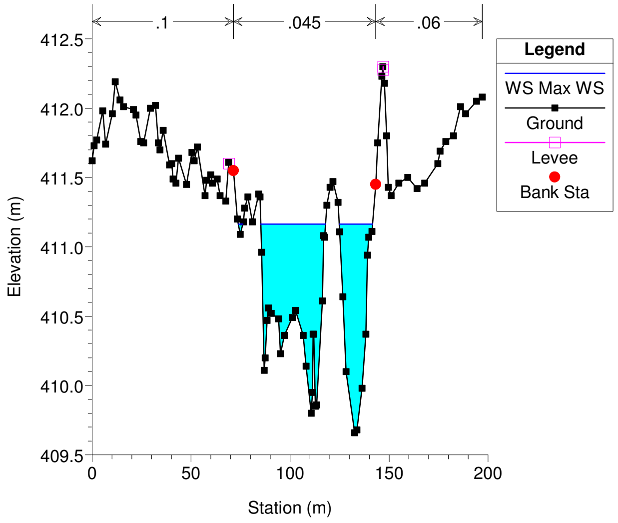
South_Fergus Plan: Plan 01 2021-06-18



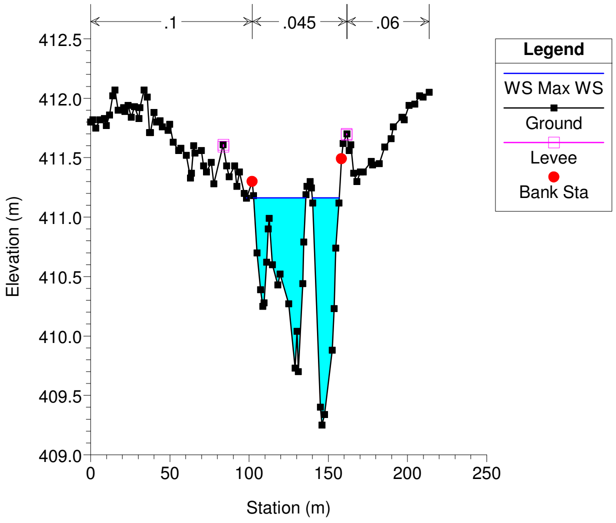
South_Fergus Plan: Plan 01 2021-06-18



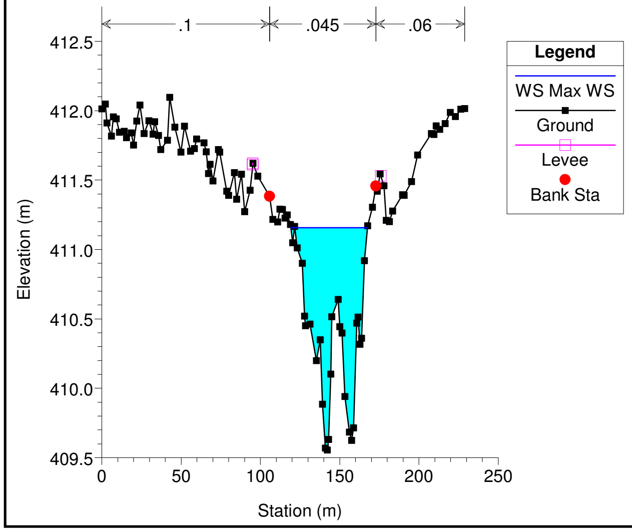
South_Fergus Plan: Plan 01 2021-06-18



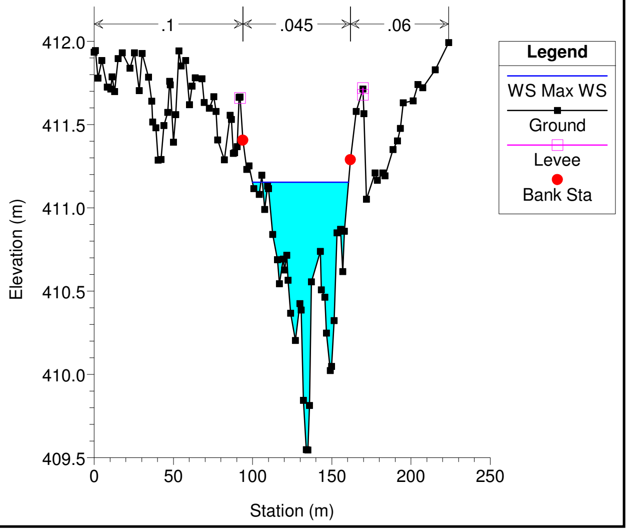
South_Fergus Plan: Plan 01 2021-06-18

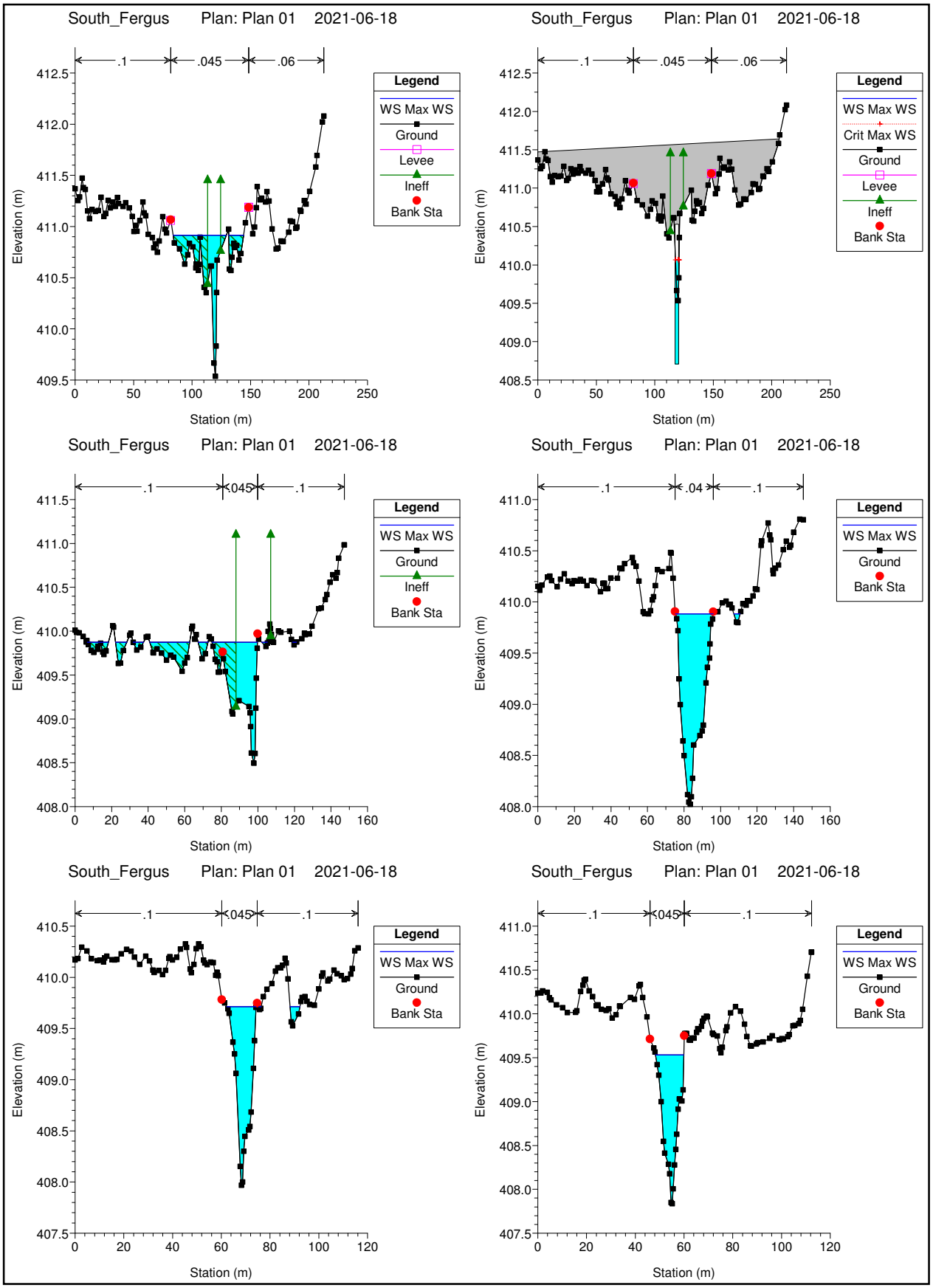


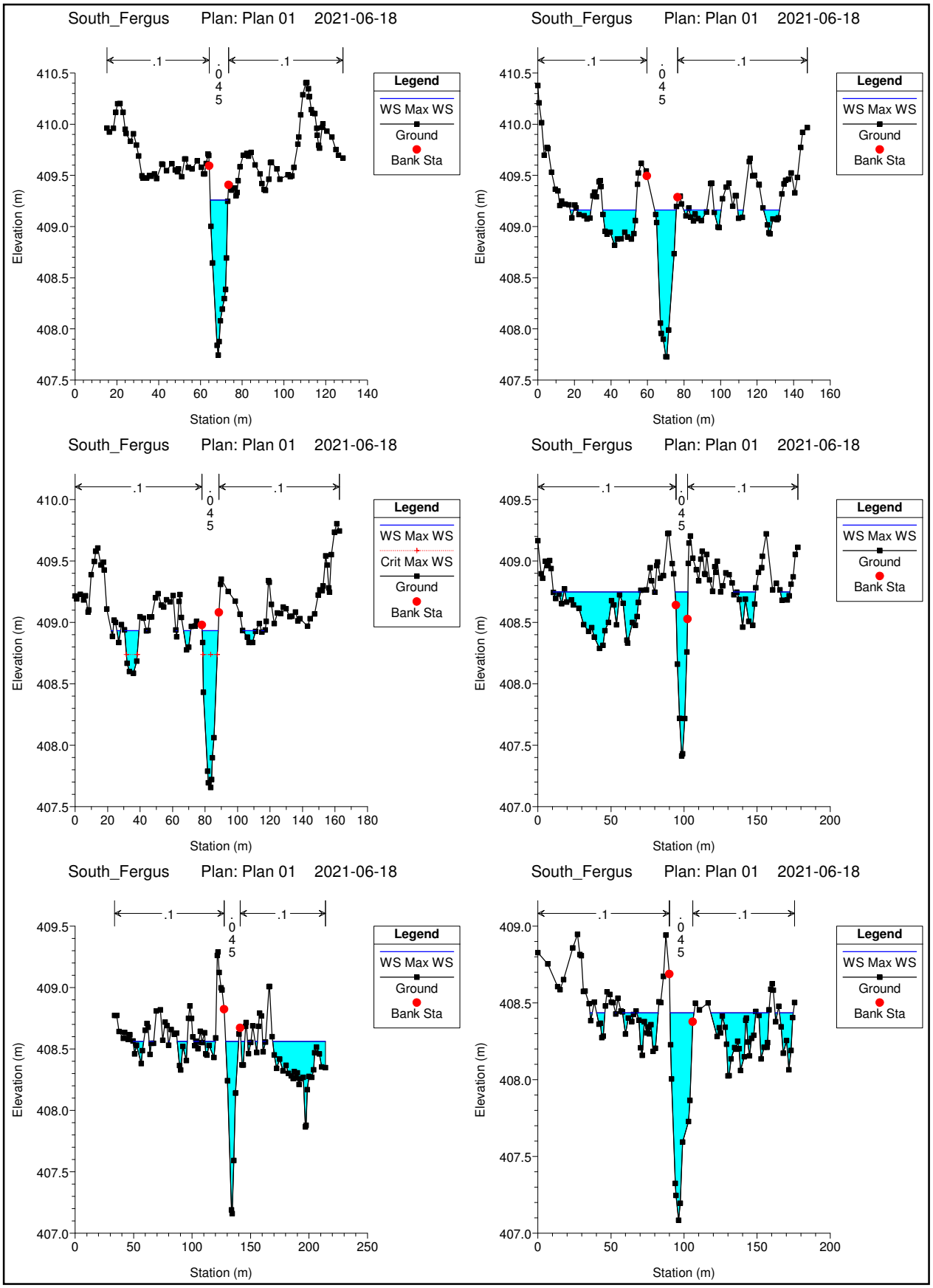
South_Fergus Plan: Plan 01 2021-06-18

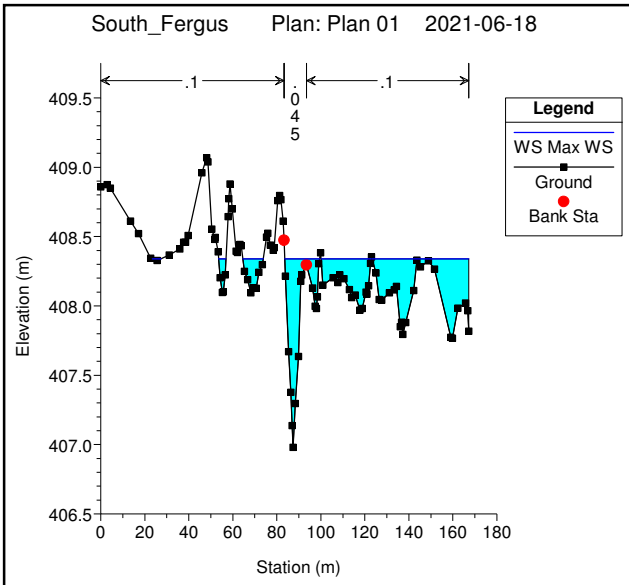


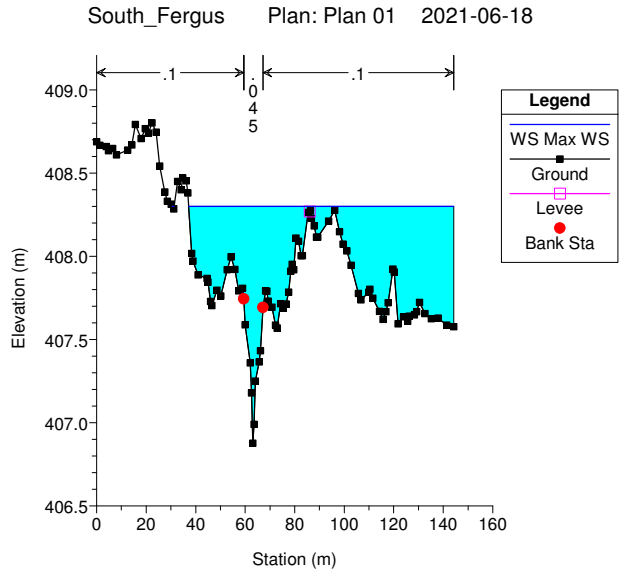
South_Fergus Plan: Plan 01 2021-06-18

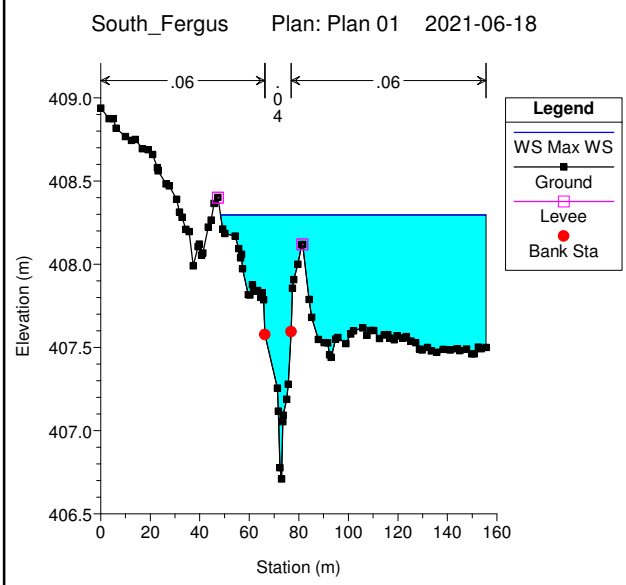


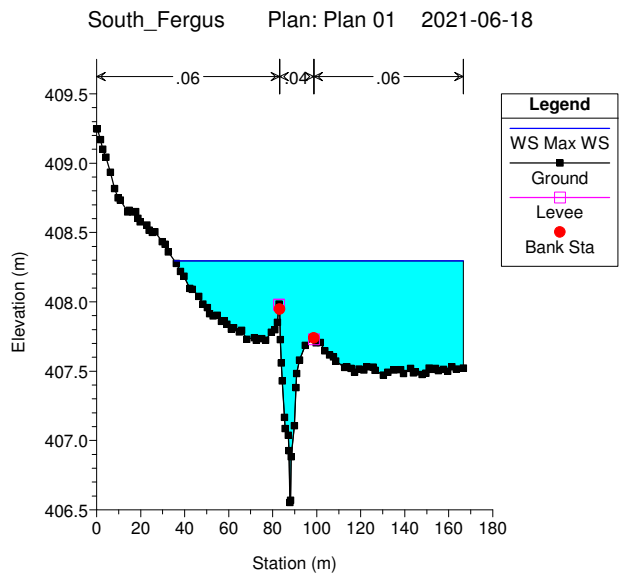

South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.06
Legend
WS Max WS
Crit Max WS
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.04
.1
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)

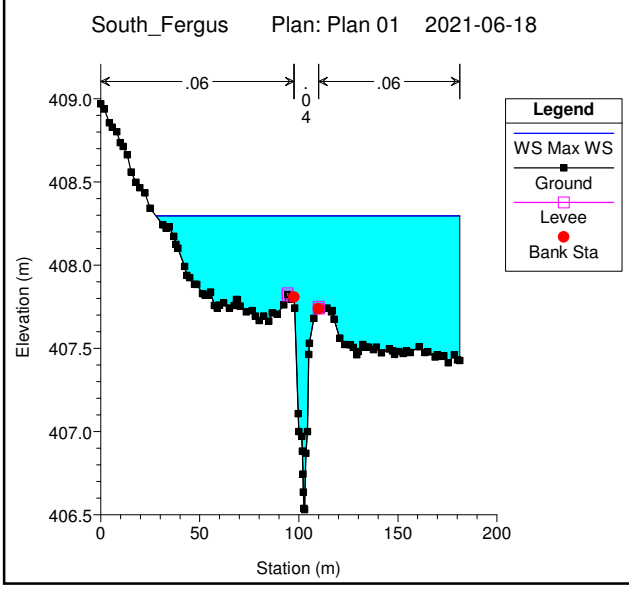

South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Crit Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)

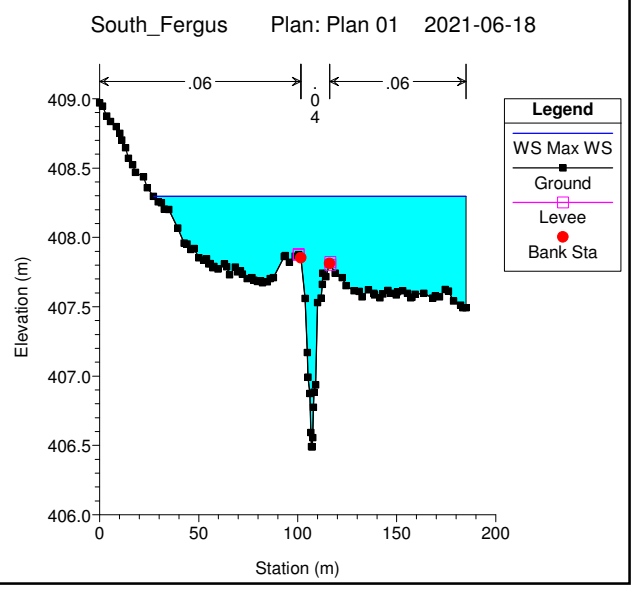

South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Elevation (m)
409.5
409.0
408.5
408.0
407.5
407.0
406.5
0
20
40
60
80
100
120
140
160
180
Station (m)
Legend
WS Max WS
Ground
Bank Sta

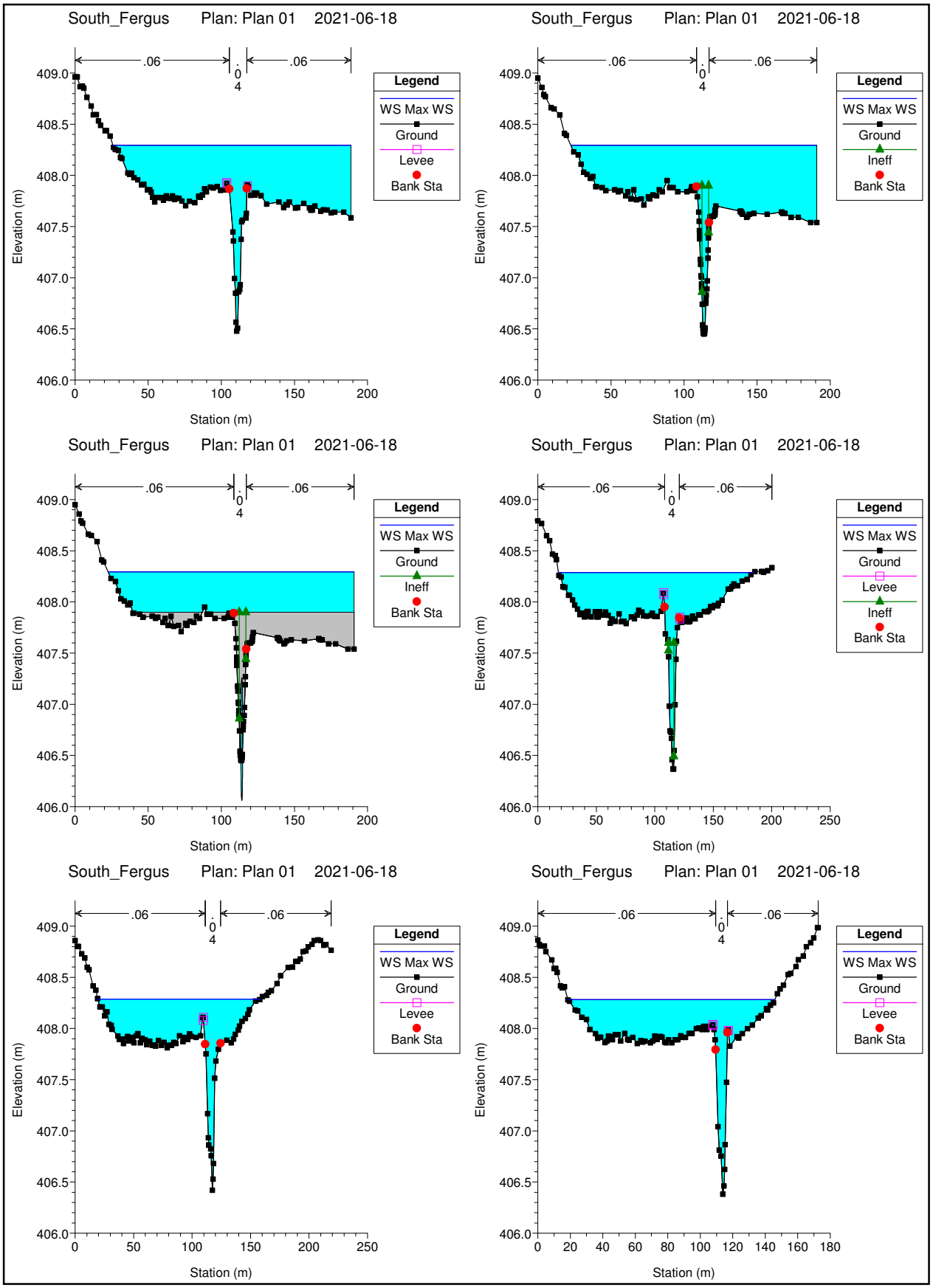

South_Fergus Plan: Plan 01 2021-06-18
.1
.045
.1
Elevation (m)
409.0
408.5
408.0
407.5
407.0
406.5
0
20
40
60
80
100
120
140
160
Station (m)
Legend
WS Max WS
Ground
Levee
Bank Sta

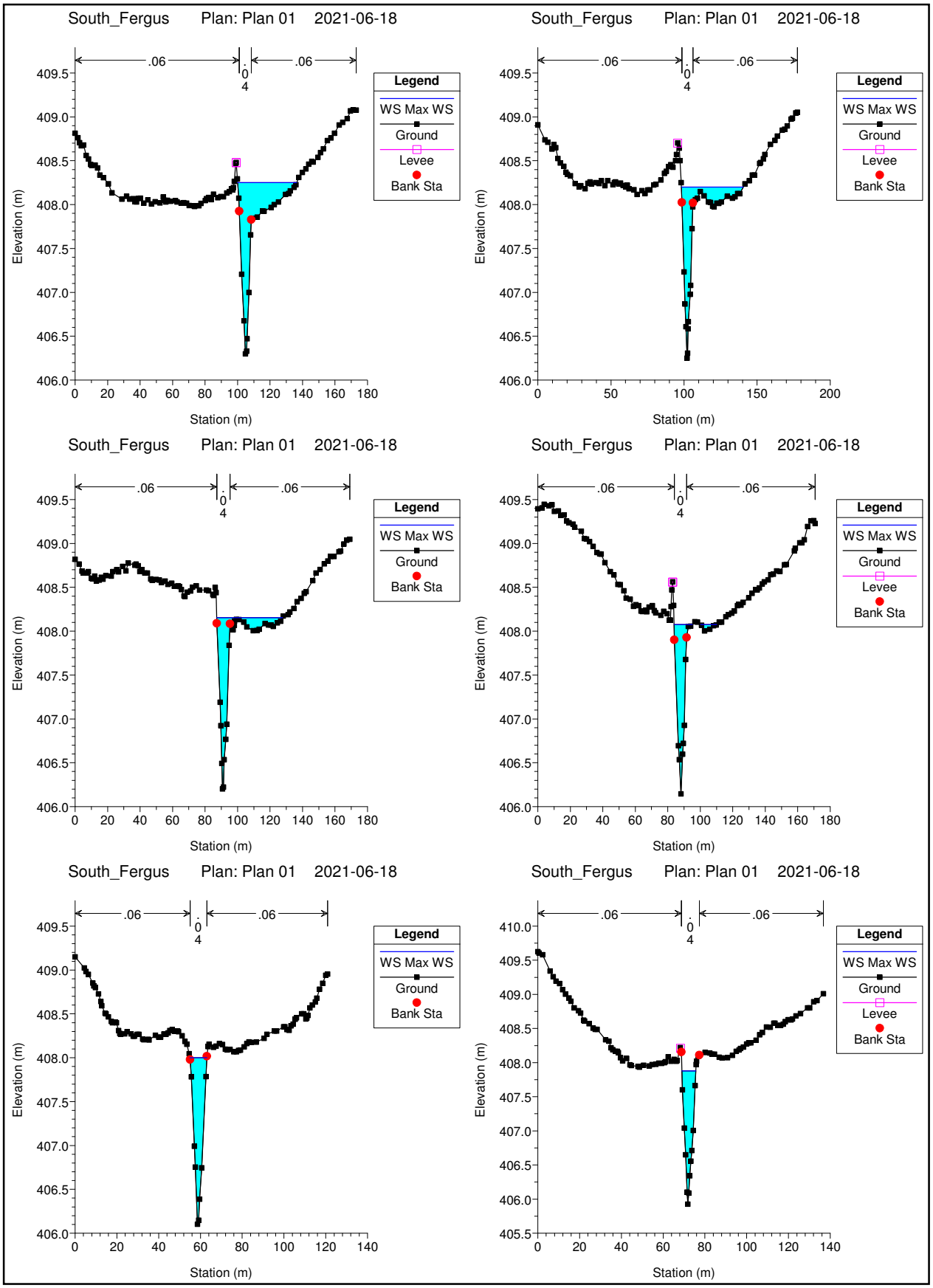

South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Elevation (m)
409.0
408.5
408.0
407.5
407.0
406.5
0
20
40
60
80
100
120
140
160
Station (m)
Legend
WS Max WS
Ground
Levee
Bank Sta

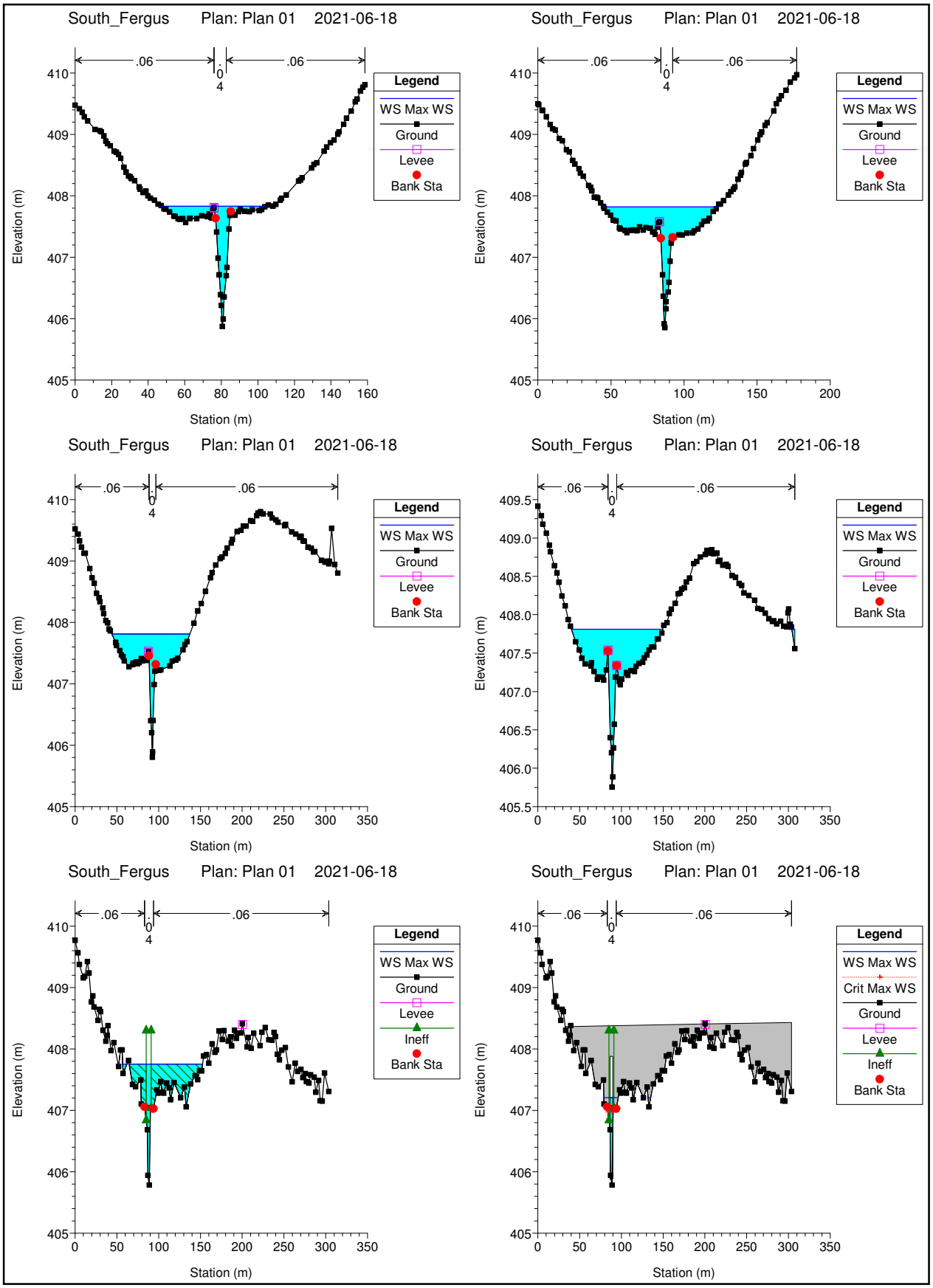

South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Elevation (m)
409.5
409.0
408.5
408.0
407.5
407.0
406.5
0
20
40
60
80
100
120
140
160
180
Station (m)
Legend
WS Max WS
Ground
Levee
Bank Sta

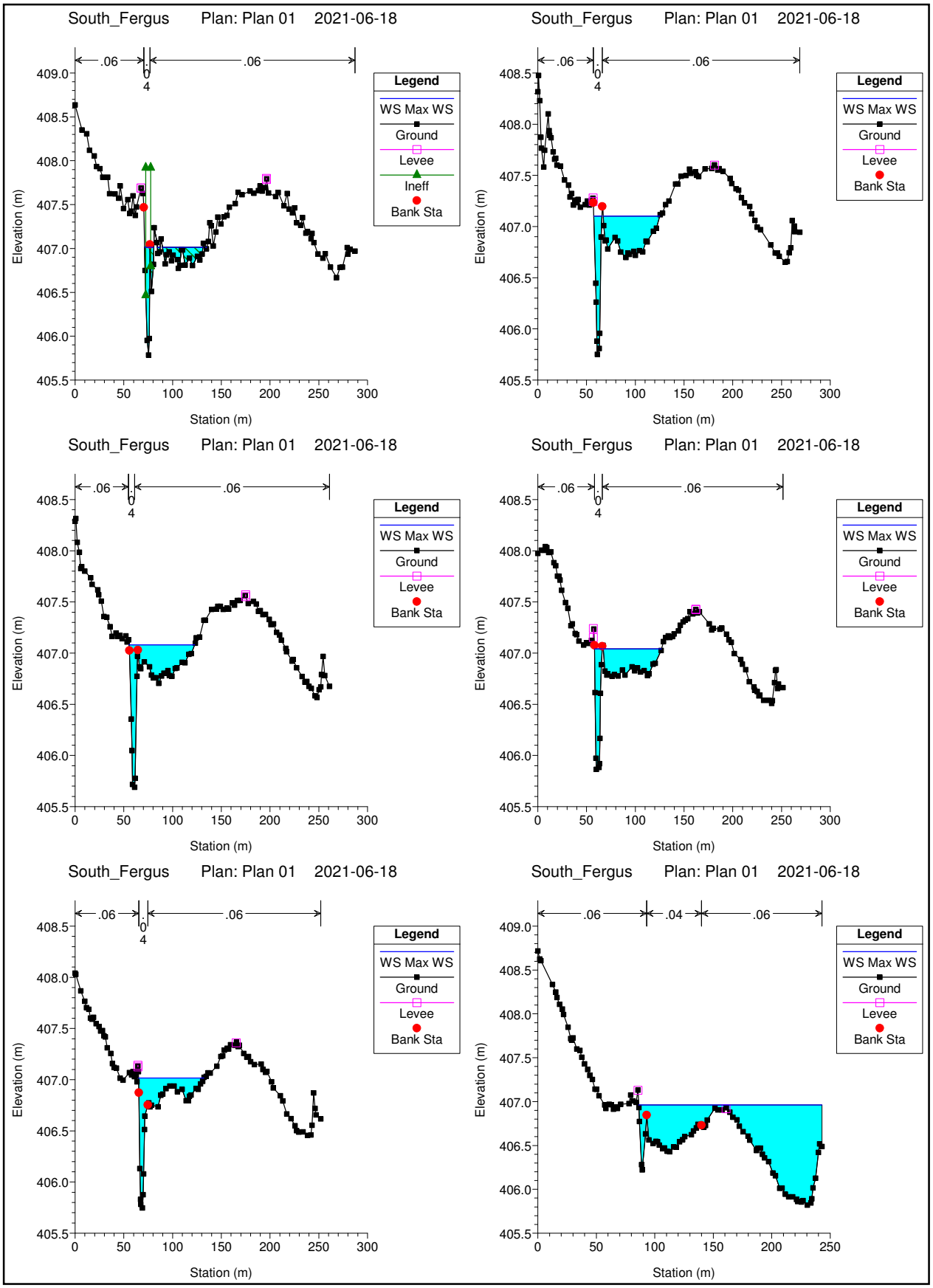

South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Elevation (m)
409.0
408.5
408.0
407.5
407.0
406.5
0
50
100
150
200
Station (m)
Legend
WS Max WS
Ground
Levee
Bank Sta

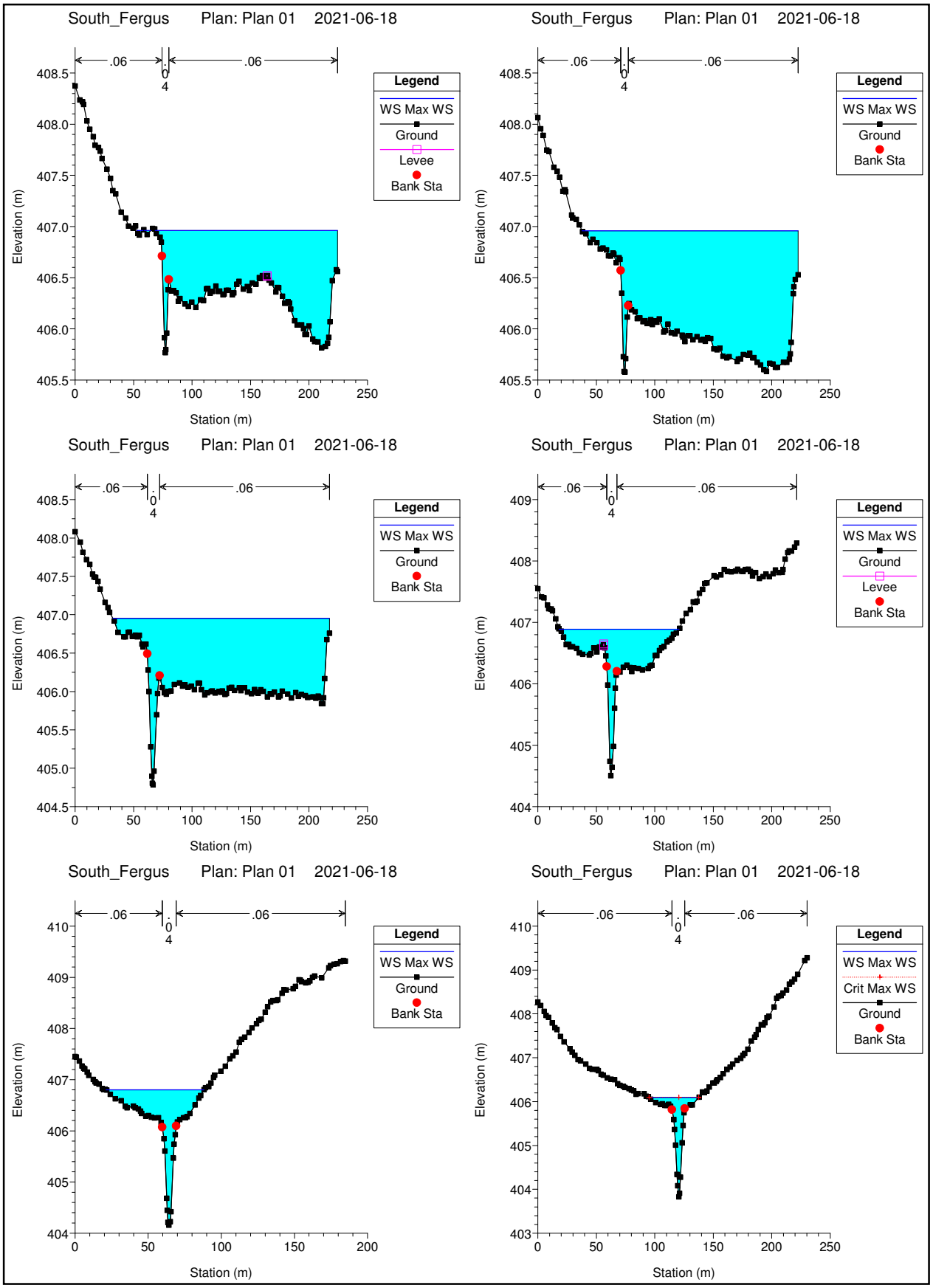

South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Elevation (m)
409.0
408.5
408.0
407.5
407.0
406.5
406.0
0
50
100
150
200
Station (m)
Legend
WS Max WS
Ground
Levee
Bank Sta


South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
409.0
408.5
408.0
407.5
407.0
406.5
406.0
0
50
100
150
200
250
20
40
60
80
120
140
160
180

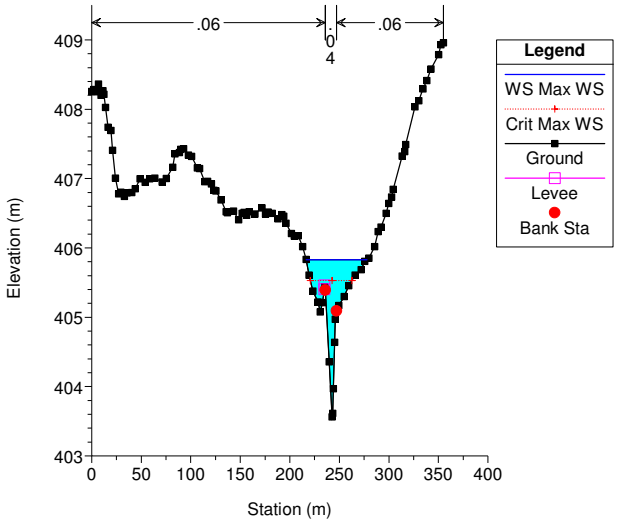

South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Crit Max WS
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)


South_Fergus Plan: Plan 01 2021-06-18
.06
.06
0
4
Legend
WS Max WS
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.06
0
4
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.06
0
4
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.06
0
4
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.06
0
4
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Ground
Bank Sta
Elevation (m)
Station (m)
South_Fergus Plan: Plan 01 2021-06-18
.06
.04
.06
Legend
WS Max WS
Crit Max WS
Ground
Bank Sta
Elevation (m)
Station (m)

South_Fergus Plan: Plan 01 2021-06-18



APPENDIX D

Hydrogeological Investigation Results
Prepared by Golder Associates

TECHNICAL MEMORANDUM

DATE August 3, 2021 **Project No.** 20141301 (Rev0)

TO Mr. Daniel Twigger
Tatham Engineering Ltd.

CC

FROM Joel Gopaul, John Piersol **EMAIL joel_gopaul2@golder.com**

INTERIM HYDROGEOLOGICAL INVESTIGATION RESULTS
PROPOSED INDUSTRIAL & RESIDENTIAL DEVELOPMENT
FERGUS, ONTARIO

Golder Associates Ltd. (Golder) has been retained by Tatham Engineering Ltd. (Tatham) to conduct a hydrogeological investigation for a proposed industrial and residential development located in Fergus, Ontario (the site).

The purpose of this technical memorandum is to provide a summary of the existing soil and groundwater conditions at the site based on the data obtained to date as part of Golder's subsurface investigation. It is noted that Golder's investigation at the site is ongoing, and the information contained herein is being provided in advance of the findings of the full scope of the hydrogeological field program. The hydrogeological field program has been in progress since January 2021 and is currently scheduled to continue until January 2022. At the time of preparation of this memorandum, Golder has completed the borehole drilling program and installation of monitoring wells at the site, the installation of staff gauge/mini-piezometer pairs, a total of four monitoring events and one groundwater sampling event. Further groundwater and surface water monitoring, groundwater sampling, hydraulic testing and field-saturated hydraulic conductivity testing will be completed.

1.0 SITE AND PROJECT DESCRIPTION

As shown below in Figure A, Site Location, the site is located in Fergus, Ontario and is bounded by Guelph Street to the west, Scotland Street to the east, Second Line to the south and generally the limit of existing urban development to the north. The site is approximately 161.7 ha in size and is divided by Tower Street (Highway 6). Currently, the site is a mixture of treed areas and agricultural fields. A tributary of Swan Creek is located in the central portion of the site, beginning east of Tower Street and flowing in a southwest direction towards Swan Creek.

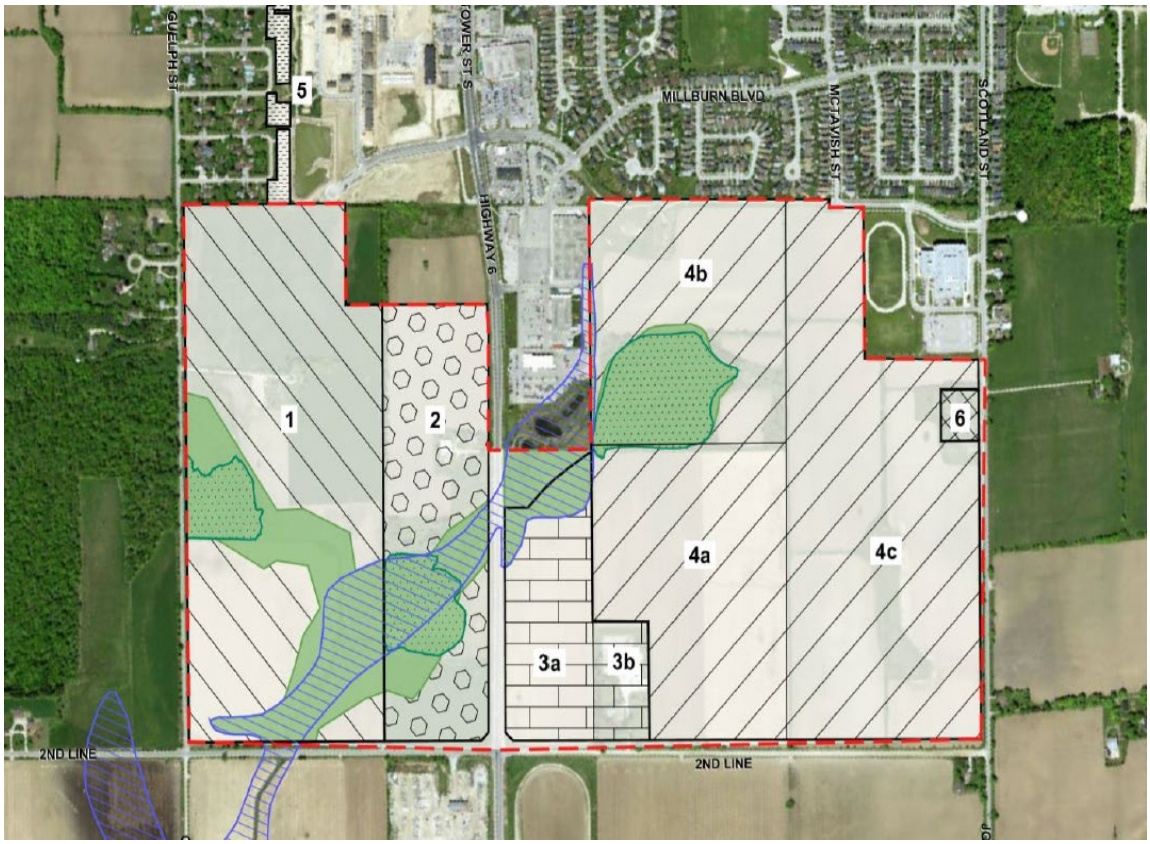


Figure A: Site Location

Based on the information provided, we understand that the proposed development of the site includes a mix of industrial and residential development, including single family, multiple density residential, parks, open space and stormwater management blocks.

2.0 SITE CHARACTERIZATION

2.1 Drilling and Monitoring Well Installation

As a part of this hydrogeological investigation, ten boreholes (BH20-1 to BH20-10) were advanced to depths ranging from approximately 7.7 m below ground surface (mbgs) to 12.7 mbgs in December 2020 and January 2021. The locations of the boreholes are provided in Figure 1, attached. Single 50 mm diameter monitoring wells were installed in BH20-2 to BH20-10, with nested wells (i.e., one deep and one shallow monitoring well) installed in BH20-6, BH20-8 and BH20-10. A sand filter pack was placed to surround the screen in each well. Above the screen, the annulus surrounding the PVC standpipe was backfilled to the ground surface with bentonite pellets. Each monitoring well was completed with a protective monument-style protective casing set in concrete.

The field work for this investigation was monitored by a member of our field staff, who arranged for the clearance of underground services, observed the drilling and logged the boreholes. The soil samples obtained during this investigation were described in the field, placed in appropriate containers, labelled and transported to our Whitby laboratory for further examination and selective classification testing (natural water content and grain size distribution).

In addition, three shallow staff gauge (SG) and piezometer (P) pairs, SG1/P1 to SG3/P3, were manually installed in the tributary of Swan Creek, as shown in Figure 1. All piezometers are 19 mm inside diameter stainless steel drive points, installed to approximate depths of 1.0 to 1.5 mbgs. The three pairs were installed at the tributary to assess the vertical hydraulic gradient.

The as-installed borehole, staff gauge and piezometer locations and elevations (referenced to a geodetic datum) were surveyed by the project surveyor and provided to Golder.

The subsurface soil and groundwater conditions encountered in the boreholes, and details of the monitoring well installations are provided on the Record of Borehole sheets (Attachment A). It should be noted that the boundaries between the strata on the borehole records have been inferred from drilling observations and non-continuous sampling. They generally represent a transition from one soil type to another and should not be inferred to represent an exact plane of geological change. Further, conditions will vary between and beyond the boreholes.

2.2 Subsurface Soil Conditions

The subsurface soils encountered are consistent with geological mapping for the area, and generally consist of topsoil and localized fill soils overlying non-cohesive deposits (ranging in gradation from gravel and sand to sandy silt) and/or glacial till deposits (ranging in gradation from gravelly silty sand till to silty clay till). Localized cohesive deposits of silty clay to clayey silt were encountered at varying depths in BH20-2, BH20-3 and BH20-7.

A deposit of wet sand and gravel was encountered in BH20-1 beneath the glacial till soils at an approximate depth of 6.8 mbgs, and a deposit of wet sand was encountered beneath the silty clay soils in BH20-7 at an approximate depth of 5.3 mbgs.

The Record of Borehole sheets and grain size distribution curves for selected soil samples are provided in Attachment A. Cross-sectional drawings are provided in Figures 2 and 3.

2.3 Water Level Monitoring

Groundwater levels were manually measured at the monitoring wells on January 8, 11, 19 and 29, March 12 and June 11, 2021. Water level depths and elevations are provided in Table B-1, Water Level Depths and Elevations (Attachment B). It should be noted that these observations reflect the groundwater conditions encountered at the time of the field investigation and some seasonal and annual fluctuations should be anticipated. As mentioned previously, the hydrogeological field program is currently still in progress.

The depth to groundwater at the monitoring wells ranged from -0.12 mbgs (i.e., 0.12 m above ground surface; measured in BH20-7 on March 12, 2021) to 3.92 mbgs (BH20-10-D [deep] on January 29, 2021) and from elevations of 405.01 m (BH20-8-D [deep] on June 11, 2021) to 420.28 m (BH20-10-D [deep] and BH20-10-S [shallow] on March 12, 2021) on the dates monitored. The groundwater elevation data on June 11, 2021, are shown on the Record of Borehole Sheets (Attachment A), and the groundwater elevation data on March 12, 2021, are shown on Figures 1 to 3. In general, shallow groundwater flow is inferred to follow topography, with flow in an eastern or western direction towards the tributary of Swan Creek, depending on location (refer to Figure 1).

A total of 3 nested wells were installed at the site (BH20-6-S/D, BH20-8-S/D and BH20-10-S/D). The groundwater elevations in BH20-6-S (shallow) and BH20-8-S (shallow) were higher than the groundwater elevations in the deeper wells on all monitoring events, indicating a downward vertical gradient at those locations on those dates. Therefore, the groundwater levels measured in BH20-6-D (deep) and BH20-8-D (deep) are not considered

representative of water table conditions. The groundwater elevations in BH20-10-S (shallow) and BH20-10-D (deep) were approximately equal on all monitoring events, indicating a neutral vertical gradient.

At the three staff gauge and piezometer pairs (SG1/P1 to SG3/P3), the vertical gradient was upwards on the monitoring events on January 19, March 12 and June 11, 2021, with the exception of SG1/P1 and SG3/P3 on June 11, 2021, where a downward gradient was observed, and at SG3/P3 on January 19, 2021, where the watercourse was observed to be frozen and a staff gauge reading could not be measured. The watercourse was also observed to be frozen at the locations of SG1, SG2 and SG3 on January 29, 2021.

Automatic data loggers (i.e., pressure transducers) were installed in BH20-2, BH20-4, BH20-6-S (shallow), BH20-8-S (shallow), BH20-8-D (deep), BH20-10-S (shallow) and P2 on January 29, 2021 and set to record every six hours. The data loggers were downloaded on June 11, 2021. It is noted that the data logger installed in P2 appears to have malfunctioned and therefore no data could be obtained; a new data logger will be installed in P2 for the remainder of the monitoring program. Daily precipitation data was obtained from Environment and Climate Change Canada (ECCC) for the Fergus Shand Dam Meteorological Station (ID 6142400), which was the nearest station to the site with daily precipitation data for this period. Hydrographs of the logger data with daily precipitation data are provided as Figure B-2, Attachment B. The data indicate that the groundwater elevation in all monitoring wells increased around early March, likely in response to warmer seasonal temperatures and snowmelt. As shown, the groundwater elevation in monitoring wells BH20-2, BH20-4, BH20-6-S (shallow), BH20-8-S (shallow) and BH20-8-D (deep) increases with a delayed response to some rain events during this period. A similar but muted groundwater elevation trend is observed at BH20-10-S (shallow). It is noted that the data loggers are currently planned to remain in these monitoring wells until January 2022 to monitor seasonal groundwater levels at the site, the results of which will be reported under separate cover.

2.4 Groundwater Quality

Groundwater samples were collected from monitoring wells BH20-3, BH20-8-S (shallow) and BH20-10-S (shallow) on March 12, 2021. The samples were collected using a peristaltic pump, low flow sampling techniques, and generally accepted environmental engineering protocols, and stored on ice in coolers until delivered, under chain-of-custody documentation, to AGAT Laboratories of Mississauga, Ontario for chemical analysis.

The samples were analyzed for inorganic and general chemistry parameters and selected metals, and compared to the MECP *Policies, Guidelines and Provincial Water Quality Objectives of the Ministry of Environment and Energy* (PWQO), *Table 2 – Table of PWQOs and Interim PWQOs* (July 1994, Reprinted February 1999). The laboratory analytical reports are included in Attachment C.

The following Table 1 summarizes the exceedances of the PWQO for the groundwater samples collected from monitoring wells BH20-3, BH20-8-S (shallow) and BH20-10-S (shallow) on March 12, 2021.

Table 1: Summary of Groundwater Quality Exceedances

Parameter	Units	PWQO	BH20-3	BH20-8-S (shallow)	BH20-10-S (shallow)
Total Cobalt	mg/L	0.0009	0.0005	**0.0015**	<0.0005
Total Iron	mg/L	0.30	**1.84**	**3.30**	0.049

Note:
Bold font values exceed the PWQO.

The analytical results for the groundwater samples collected indicate that the PWQO were exceeded for Total Cobalt and Total Iron in monitoring well BH20-8-S (shallow) and for Total Iron in BH20-3. As mentioned previously, the hydrogeological field program is currently still in progress with further groundwater sampling to be conducted at the site.

3.0 CLOSURE

We trust that this submission meets your current requirements. If you have any questions regarding the contents of this technical memorandum, please contact the undersigned.

Joel Gopaul, B.A.Sc.
Geo-Environmental Consultant

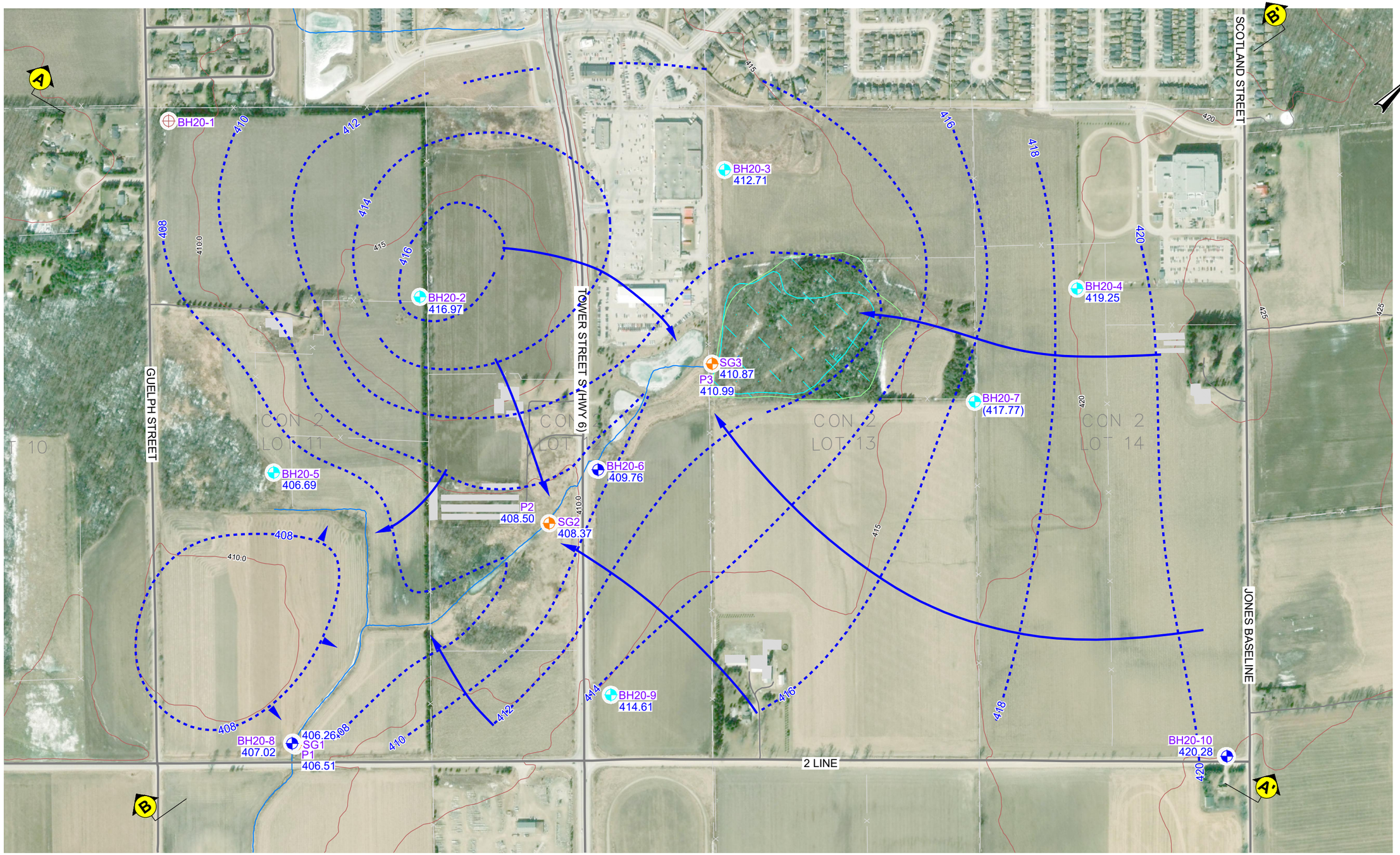
John Piersol, P.Geo.
Associate, Senior Hydrogeologist

JJG/JP/lb

Attachments: Figure 1 – Groundwater Flow
Figure 2 and 3 – Site Section A-A' and B-B'
Attachment A: Record of Borehole Sheets
Grain Size Distribution Curves
Attachment B: Table B-1 – Water Level Depths and Elevations
Figure B-2 – BH20-2, BH20-4, BH20-6-S, BH20-8-S, BH20-8-D & BH20-10-S Hydrograph
Attachment C: Groundwater Quality Analytical Results

https://golderassociates.sharepoint.com/sites/124833/project files/6 deliverables/interim memo/20141301 tm 3aug2021 interim hydrogeological investigation results - south fergus (rev0).docx

FIGURES



PLAN LEGEND

- DEVELOPMENT BOUNDARY
- TEST BOREHOLE
- SHALLOW MONITORING WELL
- SHALLOW & DEEP NESTED MONITORING WELL
- STAFF GAUGE / MINI-PIEZOMETER
- 435.67 STATIC WATER LEVEL, VALUE IN BRACKETS FROM DEEPER SCREENED PORTION () ARTESIAN
- INTERPOLATED GROUNDWATER FLOW

MAP KEY

ALL MAPPED LOCATIONS ARE APPROXIMATE AND NOT TO SCALE

ALIGNMENT OF ORTHOGRAPHIC IMAGERY IS APPROXIMATED TO SELECT FEATURES ON DATUM. AWAY FROM POINTS OF ALIGNMENT THE ORTHOGRAPHIC IMAGE MAY BE DIMENSIONALLY SKEWED OR PROJECTED OFF THE MAP DATUM PLANE.

0 120 240 360 m

1:6000

PLOTTED 11X17" TABLOID

PROJECTION IS UTM NAD 83 ZONE 17

CLIENT
TATHAM ENGINEERING LIMITED

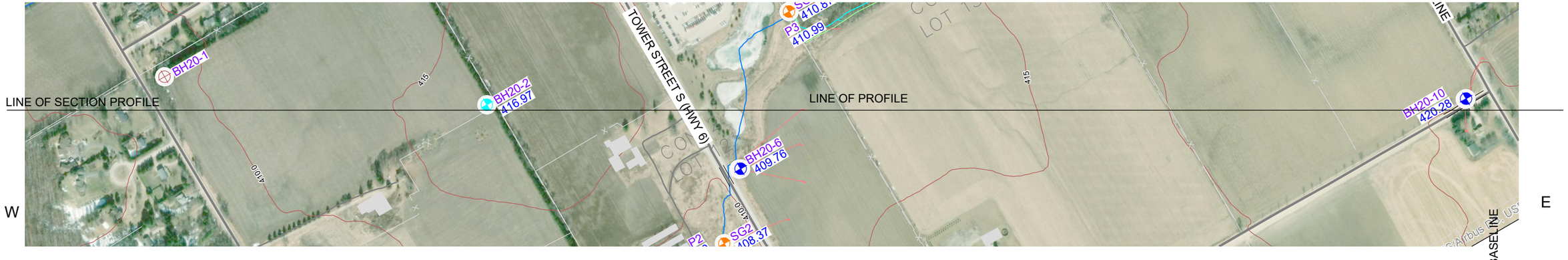
CONSULTANT
GOLDER

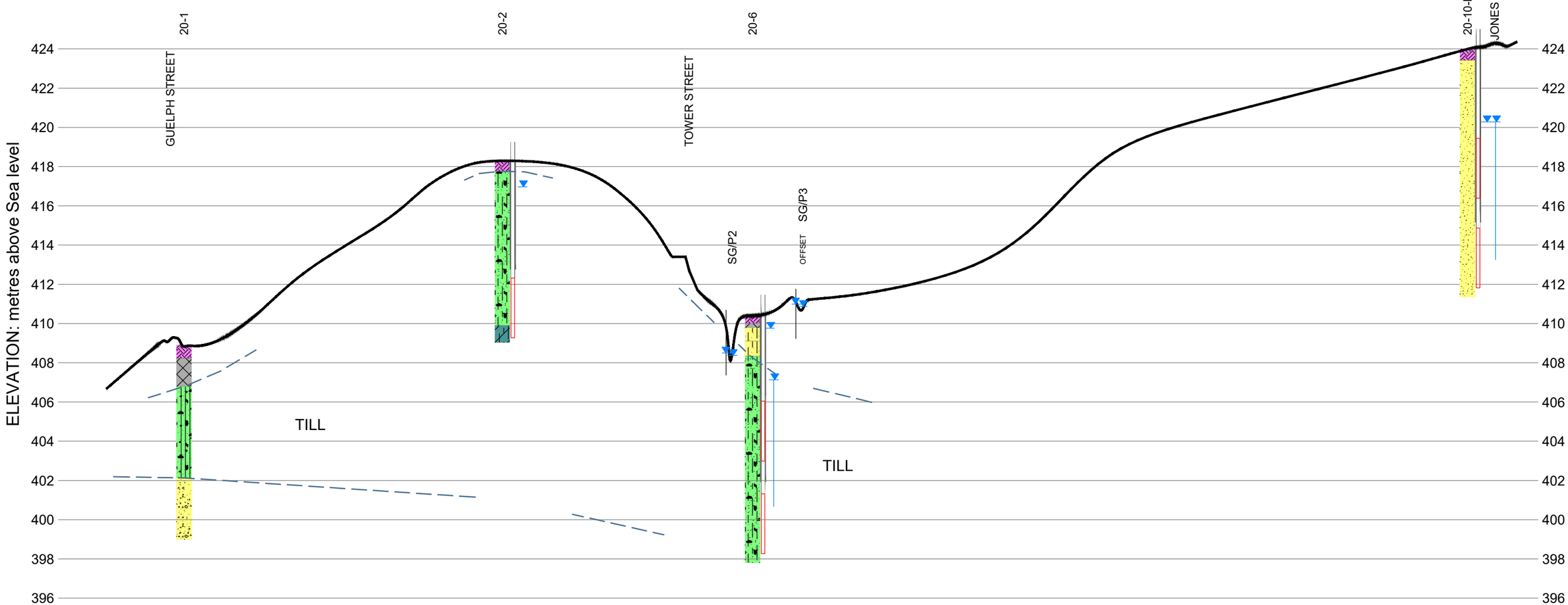
YYYY-MM-DD	2020-09-17
DESIGNED	XXX
PREPARED	XXX
REVIEWED	XXX
APPROVED	XXX

PROJECT
SOUTH FERGUS
HYDROGEOLOGICAL INVESTIGATION

TITLE
GROUNDWATER FLOW

PROJECT NO.	CONTROL	REV.	FIGURE
20141301		----	1





Fill
Sand & Gravel
Sand
Sand Trace Silt
Silty Sand
Sandy Silt
Silt with to trace Sand
Clayey Silt
Silty Clay
Granular Till
Silt Till
Silty Sand / Sandy Silt Till
Silty Clay Till
BH1 Borehole ID
Recorded Static Water Level
Screen
0 40 80 120 m
1:2000

CLIENT
TATHAM ENGINEERING LIMITED

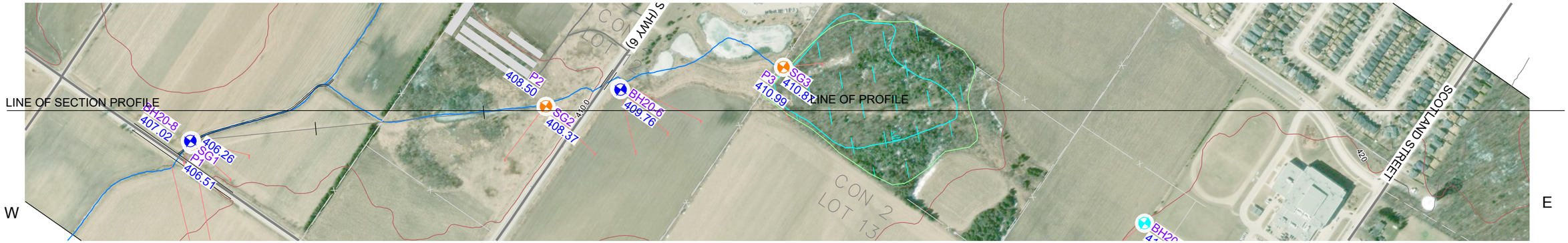
CONSULTANT
GOLDER

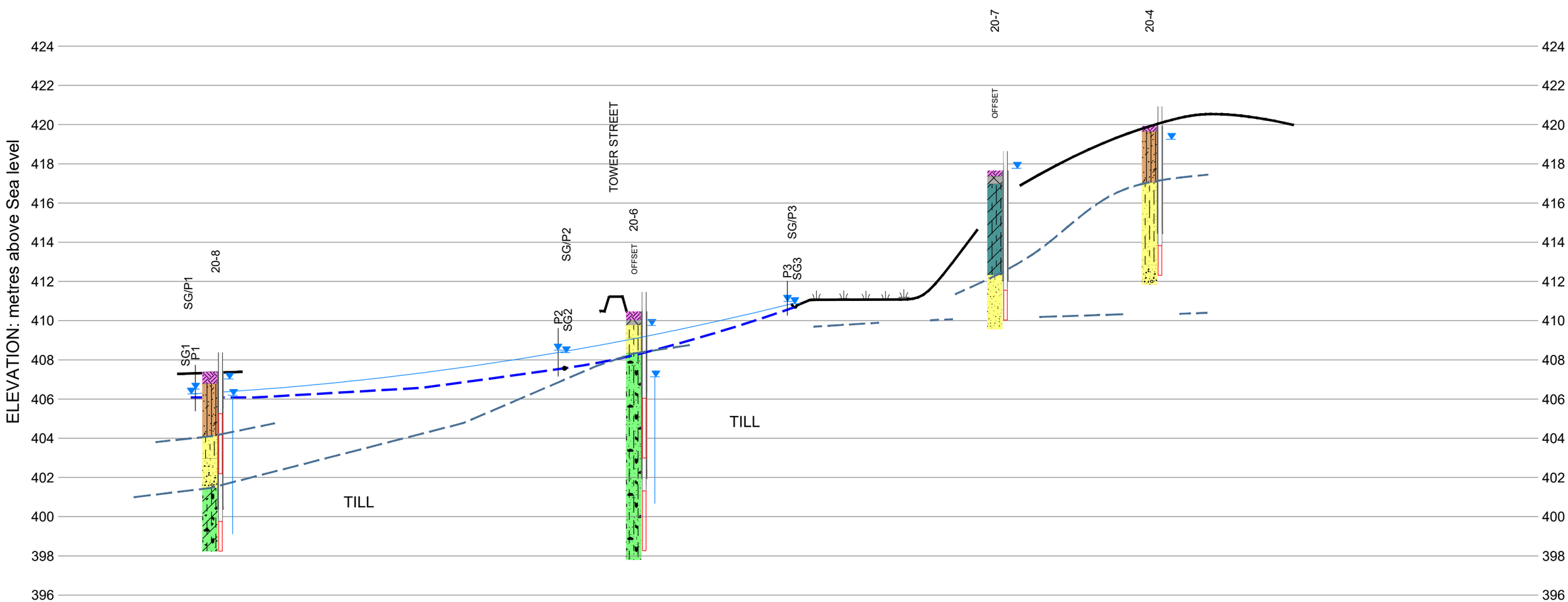
YYYY-MM-DD	2020-09-17
DESIGNED	XXX
PREPARED	XXX
REVIEWED	XXX
APPROVED	XXX

PROJECT
SOUTH FERGUS
HYDROGEOLOGICAL INVESTIGATION

TITLE
SITE SECTION A - A'

PROJECT NO.	CONTROL	REV.	FIGURE
20141301	0001	----	2





Fill
Sand & Gravel
Sand
Sand Trace Silt
Silty Sand
Sandy Silt
Silt with to trace Sand
Clayey Silt
Silty Clay
Granular Till
Silt Till
Silty Sand / Sandy Silt Till
Silty Clay Till

BH1 Borehole ID
Recorded Static Water Level
Screen

0 40 80 120 m
1:2000

CLIENT
TATHAM ENGINEERING LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-09-17
DESIGNED	XXX
PREPARED	XXX
REVIEWED	XXX
APPROVED	XXX

PROJECT
SOUTH FERGUS
HYDROGEOLOGICAL INVESTIGATION

TITLE
SITE SECTION B - B'

PROJECT NO.	CONTROL	REV.	FIGURE
20141301		----	3

ATTACHMENT A

Record of Borehole Sheets
Grain Size Distribution Curves

PROJECT: 20141301 (1000)

LOCATION: N 4837829.60; E 550594.30

RECORD OF BOREHOLE: 20-1

BORING DATE: December 14, 15 and 18, 2020

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊢—○ W —⊣ Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		408.91							
0	Track Mounted CME 75 – 215 mm O.D. Hollow Stem Augers	TOPSOIL		0.00	1	SS	10				
				408.22							
		FILL - (ML) sandy SILT, some gravel; brown, oxidation staining; non-cohesive, moist to wet, loose to compact		0.69	2	SS	9				
1		- Auger grinding from depths of 1.5 m to 1.7 m			3	SS	20				
2				406.78							
		(ML) sandy SILT, trace plastic fines; some gravel; brown to grey (TILL), non-cohesive, moist, very dense		2.13	4	SS	95/ 0.28				
3					5	SS	95				
4					6	SS	100/ 0.18				
5		- Auger grinding from depths of 5.2 m to 5.5 m - Becoming grey at a depth of 5.5 m									
6		- Auger grinding from depths of 5.6 m to 5.9 m - Auger grinding from depths of 6.3 m to 6.6 m			7	SS	50/ 0.13				
	110 mm O.D. Tricone			402.13							
		(SP) SAND and GRAVEL, brown; non-cohesive, wet, very dense		6.78							
7		- Auger grinding from depths of 7.0 m to 7.3 m			8	SS	50/ 0.03				
		- Auger grinding from depths of 7.6 m to 9.1 m									
8											
9					9	SS	75				
		- Auger grinding from depths of 9.5 m to 9.9 m			10	SS	50/ 0.03				
				399.00							
10				9.91							

CONTINUED NEXT PAGE

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4837829.60; E 550594.30

RECORD OF BOREHOLE: 20-1

BORING DATE: December 14, 15 and 18, 2020

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊖W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10		END OF BOREHOLE NOTE: 1. Rock fragments recovered from casing upon completion of drilling.									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

RECORD OF BOREHOLE: 20-2

PROJECT: 20141301 (1000)
LOCATION: N 4837914.60; E 551074.40
BORING DATE: December 17, 2020
SHEET 1 OF 2
DATUM: Geodetic
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm
HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊢—○W—⊣ Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		418.26							
0	Track Mounted CME 75 / 150 mm Solid Stem Augers	TOPSOIL		0.00	1	SS	5				50 mm Stick-up Casing
				417.75							
		(SM) gravelly SILTY SAND, brown (TILL); non-cohesive, moist, dense to very dense		0.51							
1					2	SS	40				
		- Auger grinding at depth of 1.7 m			3	SS	39				
2					4	SS	94				11-Jun-21
											Bentonite
3					5	SS	95/ 0.28				
4		- Auger grinding from depths of 4.0 m to 5.3 m			6	SS	50/ 0.08				
5		- Auger grinding from depths of 4.9 m to 5.3 m									Sand
6		- Auger grinding from depths of 6.1 m to 6.7 m			7	SS	50/ 0.05				
7		- Auger grinding from depths of 7.2 m to 7.6 m									Screen and Sand
					8	SS	50/ 0.1			MH	
8				409.88							
		(CL) SILTY CLAY, trace sand, grey; cohesive, w<PL, hard		8.38							
9				409.04	9	SS	50/ 0.08				
		END OF BOREHOLE		9.22							
		NOTE:									
		1. Ground water level measured in monitoring well as follows:									
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AGB
CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4837914.60; E 551074.40

RECORD OF BOREHOLE: 20-2

BORING DATE: December 17, 2020

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊖W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10		Date / Depth(m) / Elev. (m) 19-Jan-21 / 2.52 / 415.74 29-Jan-21 / 2.48 / 415.79 12-Mar-21 / 1.30 / 416.97 11-Jun-21 / 2.39 / 415.87									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4838399.70; E 551274.30

RECORD OF BOREHOLE: 20-3

BORING DATE: January 6, 2021

SHEET 1 OF 1

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		413.40					
0	Track Mounted CME 75; 150 mm Solid Stem Augers	TOPSOIL		0.00 / 413.20					
		FILL - (SM) SILTY SAND, some gravel, trace plastic fines; brown; organic inclusions; non-cohesive, moist to wet, compact to loose		0.20	1	SS	13		50 mm Stick-up Casing
1					2	SS	9		
		(ML) sandy SILT, some gravel; trace plastic fines; brown; non-cohesive, moist, compact to dense - Oxidation stain from 1.5 m to 2.0 m - Auger grinding from depths of 1.8 m to 2.1 m		412.03 / 1.37	3	SS	13		11-Jun-21
2									Bentonite
					4	SS	36		
3					5	SS	36		
		(CL) SILTY CLAY, some sand, grey; cohesive, w<PL, hard		409.59 / 3.81					
4									Sand
					6	SS	76		
5									
		(ML) sandy SILT, trace plastic fines; grey; non-cohesive, moist, dense		407.84 / 5.56					
6									Screen and Sand
					7	SS	39		
		(ML) sandy SILT, some gravel; grey (TILL); non-cohesive, wet, very dense		406.53 / 6.87					
7									
					8	SS	92/0.25		
8		END OF BOREHOLE		405.37 / 8.03					
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ○; 20, 40, 60, 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6}, 10^{-5}, 10^{-4}, 10^{-3}

WATER CONTENT PERCENT: Wp ⊢—○W—⊣ Wl; 10, 20, 30, 40

NOTE:

1. Ground water level measured in monitoring well as follows:

Date	Depth(m)	Elev. (m)
19-Jan-21	1.12	412.28
29-Jan-21	1.49	411.92
12-Mar-21	0.69	412.71
11-Jun-21	1.92	411.48

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4838662.50; E 551803.90

RECORD OF BOREHOLE: 20-4

BORING DATE: January 6, 2021

SHEET 1 OF 1

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		419.93					
0	Track Mounted CME 75; 215 mm O.D. Hollow Stem Augers	TOPSOIL		0.00					
		(ML) sandy SILT, some gravel; trace plastic fines; brown; non-cohesive, moist, compact		419.63 / 0.30	1	SS	12		50 mm Stick-up Casing
1					2	SS	10		
					3	SS	25		11-Jun-21
2					4	SS	15		Bentonite
		(SM) gravelly SILTY SAND, brown; non-cohesive, wet, compact to dense		417.03 / 2.90	5	SS	27		
3									
4		- Auger grinding from depths of 4.6 m to 5.2 m			6	SS	32	MH	
5									Sand
6					7	SS	32		
7				412.84					Screen and Sand
		(SP) SAND and GRAVEL, brown; non-cohesive, moist, loose		7.09	8	SS	6		
8				411.85					
		END OF BOREHOLE		8.08					
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ○; 20, 40, 60, 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6}, 10^{-5}, 10^{-4}, 10^{-3}

WATER CONTENT PERCENT: Wp ⊢—○W—⊣ Wl; 10, 20, 30, 40

NOTE:

1. Ground water level measured in monitoring well as follows:

Date	Depth(m)	Elev. (m)
19-Jan-21	1.17	418.76
29-Jan-21	1.51	418.42
12-Mar-21	0.68	419.25
11-Jun-21	1.80	418.13

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4837552.60; E 551107.40

RECORD OF BOREHOLE: 20-5

BORING DATE: December 16, 2020

SHEET 1 OF 1

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		407.29					
0	Track Mounted CME 75, 100 mm O.D. Tricone	TOPSOIL		0.00	1	SS	5		50 mm Stick-up Casing
		FILL - (SM) SILTY SAND, grey; non-cohesive, moist, loose		406.83 / 0.46					
		FILL - (CL) sandy SILTY CLAY, some gravel; brown; rootlets; cohesive, w~PL, stiff		406.60 / 0.69	2	SS	10		
1									11-Jun-21
		(SM) gravelly SILTY SAND, grey (TILL); non-cohesive, moist, very dense		405.92 / 1.37	3	SS	10		
2									Bentonite
					4	SS	72		
3		- Auger grinding from depths of 3.1 m to 3.8 m			5	SS	50/0.08		
4									Sand
					6	SS	50/0.08	MH	
5									
6					7	SS	50/0.15		Screen and Sand
7				399.64	8	SS	50/0.03		
		END OF BOREHOLE		7.65					
8		NOTE:							
9		1. Ground water level measured in monitoring well as follows:							
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6} 10^{-5} 10^{-4} 10^{-3}

WATER CONTENT PERCENT: Wp ⊢—○W—⊣ Wl; 10 20 30 40

Date	Depth(m)	Elev. (m)
19-Jan-21	0.65	406.65
29-Jan-21	0.75	406.55
12-Mar-21	0.60	406.69
11-Jun-21	1.17	406.12

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

RECORD OF BOREHOLE: 20-6

PROJECT: 20141301 (1000)
LOCATION: N 4837920.60; E 551468.90
BORING DATE: January 8, 2021
SHEET 1 OF 2
DATUM: Geodetic
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm
HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊢—○W—⊣ Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION (20-6-S, 20-6-D)
		GROUND SURFACE		410.46							
0	Track Mounted CME 75, 125 mm O.D. Tricone	TOPSOIL		0.00	1	SS	8				
				410.00							
		FILL - (ML) sandy SILT, some gravel; brown, oxidation staining; organic inclusions, non-cohesive, moist, loose		0.46 / 409.77							
		(SM) SILTY SAND, some gravel; brown; non-cohesive, moist, compact		0.69	2	SS	23				
1				409.09							
		(SP) SAND, non-cohesive, wet, compact		1.37	3	SS	21				
2				408.33							
		(ML) SILT and SAND, some gravel; grey (TILL); non-cohesive, moist, very dense		2.13	4	SS	70				
3					5	SS	95				
4					6	SS	50/0.08				
5											
6					7	SS	50/0.1				
7		- Auger grinding from depths of 7.6 m to 8.2 m			8	SS	50/0.03				
8					9	SS	100/0.25			MH	Bentonite
											Sand
9		- Auger grinding from depths of 9.0 m to 9.1 m			10	SS	50/0.13				
		- Auger grinding from depths of 9.5 m to 9.8 m									Screen and Sand
10											

CONTINUED NEXT PAGE

DEPTH SCALE
1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AGB
CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4837920.60; E 551468.90

RECORD OF BOREHOLE: 20-6

BORING DATE: January 8, 2021

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊢—○W—⊣ Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									20-6-S 20-6-D
10	Track Mounted CME 75, 125 mm O.D. Tricone	(ML) SILT and SAND, some gravel; grey (TILL); non-cohesive, moist, very dense			11	SS	50/ 0.05		○		Screen and Sand
11											
12					12	SS	50/ 0.08		○		
				397.81 / 12.65							
		END OF BOREHOLE									
13		NOTES:									
14		1. Ground water level measured in shallow monitoring well (20-6-S) as follows:									
15		2. Ground water level measured in deep monitoring well (20-6-D) as follows:									
16											
17											
18											
19											
20											

1. Ground water level measured in shallow monitoring well (20-6-S) as follows:

Date	Depth(m)	Elev. (m)
19-Jan-21	1.11	409.37
29-Jan-21	1.06	409.42
12-Mar-21	0.71	409.76
11-Jun-21	1.27	409.21

2. Ground water level measured in deep monitoring well (20-6-D) as follows:

Date	Depth(m)	Elev. (m)
19-Jan-21	3.24	407.22
29-Jan-21	3.33	407.14
12-Mar-21	3.34	407.13
11-Jun-21	3.75	406.71

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

RECORD OF BOREHOLE: 20-7

PROJECT: 20141301 (1000)
LOCATION: N 4838420.40; E 551815.90
BORING DATE: January 8, 2021
SHEET 1 OF 1
DATUM: Geodetic
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm
HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		417.65					
0	Track Mounted CME 75, 150 mm Solid Stem Augers	TOPSOIL		0.00					
		FILL - (ML) sandy SILT, some gravel; brown to black; organic inclusions; non-cohesive, moist, loose		417.35 / 0.30	1	SS	7		50 mm Stick-up Casing; 11-Jun-21
		(CL-ML) sandy SILTY CLAY to CLAYEY SILT, some gravel; brown; cohesive, w>PL to w<PL, very stiff to hard		416.96 / 0.69	2	SS	17		
1									
					3	SS	17		
2									
					4	SS	27		
									Bentonite
3					5	SS	41		
4				413.61					
		(CL) sandy SILTY CLAY, brown; cohesive, w<PL, hard		4.04					
					6	SS	57		
5				412.32					
		(SP) SAND, brown; non-cohesive, wet, compact to dense		5.33					
6									Sand
	130 mm O.D. Washbore				7	SS	16	MH	
7									Screen and Sand
					8	SS	33		
8				409.57					
		EN OF BOREHOLE		8.08					
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ○; 20, 40, 60, 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6}, 10^{-5}, 10^{-4}, 10^{-3}

WATER CONTENT PERCENT: Wp ⊢—○ W —⊣ Wl; 10, 20, 30, 40

NOTE:

1. Ground water level measured in monitoring well as follows:

Date	Depth(m)	Elev. (m)
19-Jan-21	0.22	417.43
29-Jan-21	0.42	417.23
12-Mar-21	-0.12	417.77
11-Jun-21	0.48	417.17

DEPTH SCALE
1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB
CHECKED: MJB

RECORD OF BOREHOLE: 20-8

PROJECT: 20141301 (1000)
LOCATION: N 4837269.10; E 551432.50
BORING DATE: December 21, 2020
SHEET 1 OF 2
DATUM: Geodetic
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm
HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING
		GROUND SURFACE		407.38				
0	Track Mounted CME 75, 100 mm O.D. Tricone	TOPSOIL		0.00	1	SS	6	
				406.69				
1		(ML) sandy SILT, some gravel; brown, oxidation staining; non-cohesive, moist, compact		0.69	2	SS	10	
					3	SS	19	
2					4	SS	16	
3				404.10	5	SS	9	
		(SM) SILTY SAND, brown; non-cohesive, wet, loose to compact		3.28				
4					6	SS	22	
				402.96				
		(GP) GRAVEL and SAND, grey; non-cohesive, wet, dense to very dense		4.42	7	SS	41	
5		- Auger grinding from depths of 5.0 m to 5.2 m			8A	SS	100/0.25	
					8B			
				401.46				
6		(CL-ML) sandy SILTY CLAY to CLAYEY SILT, some gravel; grey (TILL); cohesive, w<PL, hard - Auger grinding from depths of 6.1 m to 6.4 m - Auger grinding from depths of 6.6 m to 7.0 m		5.92	9	SS	50/0.08	
7					10	SS	50/0.1	
8								
9				398.24				
		END OF BOREHOLE		9.14				
10		NOTES: 1. SPT attempted at 9.1 m termninated due to split spoon refusal.						
		CONTINUED NEXT PAGE						

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80
SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ○; 20, 40, 60, 80
HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6}, 10^{-5}, 10^{-4}, 10^{-3}
WATER CONTENT PERCENT: Wp ⊢—○W—⊣ Wl; 10, 20, 30, 40

PIEZOMETER OR STANDPIPE INSTALLATION: 20-8-S, 20-8-D
Bentonite
Sand
Screen and Sand

DEPTH SCALE
1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB
CHECKED: MJB

GTA-BHS 001 S:\CLIENTS\CC_TATHAM\SOUTH_FERGUS_LINE2\02_DATA\GINT\SOUTH_FERGUS_LINE2.GPJ GAL-MIS.GDT 6/14/21

PROJECT: 20141301 (1000)

LOCATION: N 4837269.10; E 551432.50

RECORD OF BOREHOLE: 20-8

BORING DATE: December 21, 2020

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊖W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									20-8-S 20-8-D
10		2. Ground water level measured in shallow monitoring well (20-8-S) as follows:									
		Date / Depth(m) / Elev. (m) 19-Jan-21 / 0.63 / 406.82 29-Jan-21 / 0.87 / 406.58 12-Mar-21 / 0.43 / 407.02 11-Jun-21 / 1.29 / 406.16									
11		3. Ground water level measured in deep monitoring well (20-8-D) as follows:									
		Date / Depth(m) / Elev. (m) 19-Jan-21 / 0.62 / 406.76 29-Jan-21 / 1.23 / 406.15 12-Mar-21 / 1.20 / 406.19 11-Jun-21 / 2.37 / 405.01									
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4837682.00; E 551736.20

RECORD OF BOREHOLE: 20-9

BORING DATE: January 5, 2021

SHEET 1 OF 1

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊢—○W—⊣ Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		414.98							
0	Track Mounted CME 75, 150 mm O.D. Tricone	TOPSOIL		0.00							
		(CL-ML) sandy SILTY CLAY to CLAYEY SILT, some gravel; brown (TILL); cohesive, w<PL, very stiff to hard		414.68 / 0.30	1	SS	4		○		50 mm Stick-up Casing
1					2	SS	15		○		
		- Auger grinding from depths of 1.5 m to 2.3 m			3	SS	18		○		Bentonite
2											11-Jun-21
					4	SS	64		○		
		- Auger grinding from depths of 2.7 m to 3.1 m									
3					5	SS	50/0.13		○		
4											Sand
					6	SS	50/0.2		○		
5		- Auger grinding from depths of 4.9 m to 6.1 m									
6											Screen and Sand
		- Auger grinding from depths of 6.1 m to 7.0 m			7	SS	50/0.05		○		
7											
				407.26	8	SS	50/0.1		○		
		END OF BOREHOLE		7.72							
8		NOTE:									
		1. Ground water level measured in monitoring well as follows:									
9		Date / Depth(m) / Elev. (m): 19-Jan-21 / 0.41 / 414.58; 29-Jan-21 / 0.88 / 414.11; 12-Mar-21 / 0.37 / 414.61; 11-Jun-21 / 2.11 / 412.88									
10											

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4838305.50; E 552497.70

RECORD OF BOREHOLE: 20-10

BORING DATE: January 11, 2021

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING
		GROUND SURFACE		424.01				
0	Track Mounted CME 75, 150 mm Solid Stem Augers	TOPSOIL		0.00	1	SS	7	
				423.40				
		(SP) SAND, trace gravel, trace to some fines; brown; non-cohesive, moist to wet, compact to very dense		0.61	2	SS	25	
1					3	SS	35	
2					4	SS	32	
3					5	SS	70	
4								
5					6	SS	47	
6					7	SS	28	
7								
8					8	SS	34	MH
9					9	SS	67	
10								

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ○; 20, 40, 60, 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6}, 10^{-5}, 10^{-4}, 10^{-3}

WATER CONTENT PERCENT: Wp ⊢—○W—⊣ Wl; 10, 20, 30, 40

PIEZOMETER OR STANDPIPE INSTALLATION: 20-10-S, 20-10-D

Bentonite

Sand

Screen and Sand

CONTINUED NEXT PAGE

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

LOGGED: AGB

CHECKED: MJB

PROJECT: 20141301 (1000)

LOCATION: N 4838305.50; E 552497.70

RECORD OF BOREHOLE: 20-10

BORING DATE: January 11, 2021

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. + Q - ●; rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp ⊢—○W—⊣ Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---											20-10-S 20-10-D
10	Track Mounted CME 75, 150 mm Solid Stem Augers	(SP) SAND, trace gravel, trace to some fines; brown; non-cohesive, moist to wet, compact to very dense											
					10	SS	84			○			Screen and Sand
11													
12													
					11	SS	81			○			
				411.36									
		END OF BOREHOLE		12.65									
13		NOTES:											
		1. Ground water level measured in shallow monitoring well (20-6-S) as follows:											
14		Date / Depth(m) / Elev. (m) 19-Jan-21 / 3.80 / 420.18 29-Jan-21 / 3.87 / 420.11 12-Mar-21 / 3.71 / 420.28 11-Jun-21 / 3.84 / 420.14											
		2. Ground water level measured in deep monitoring well (20-6-D) as follows:											
15		Date / Depth(m) / Elev. (m) 19-Jan-21 / 3.83 / 420.18 29-Jan-21 / 3.92 / 420.10 12-Mar-21 / 3.73 / 420.28 11-Jun-21 / 3.87 / 420.14											
16													
17													
18													
19													
20													

DEPTH SCALE

1 : 50

GOLDER MEMBER OF WSP

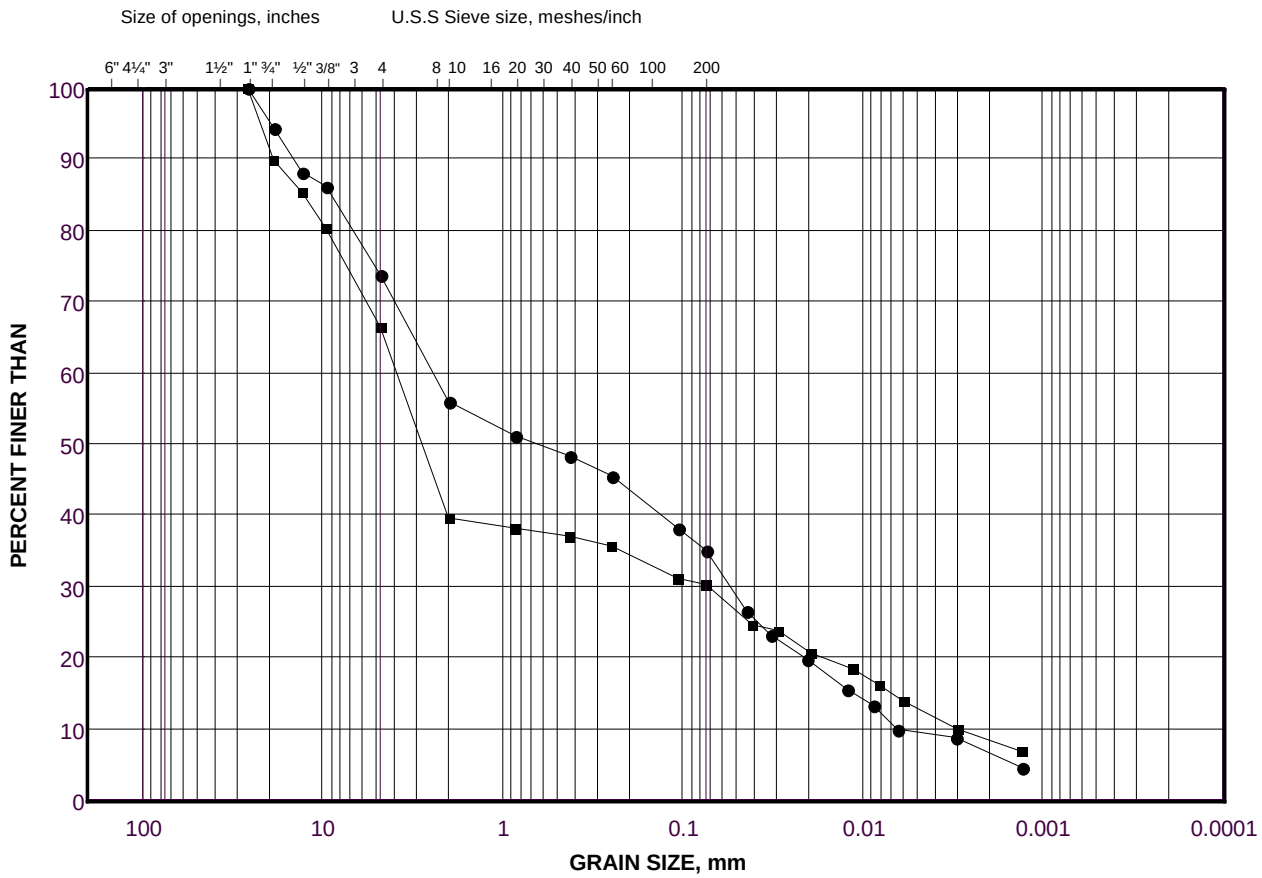
LOGGED: AGB

CHECKED: MJB

GRAIN SIZE DISTRIBUTION

(SM) gravelly SILTY SAND (TILL)

FIGURE i



COBBLE	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY SIZES
SIZE	GRAVEL SIZE		SAND SIZE			FINE GRAINED

LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(m)
●	20-5	6	4.6 - 4.7
■	20-2	8	7.6 - 7.7

Project Number: 20141301

Checked By: _____

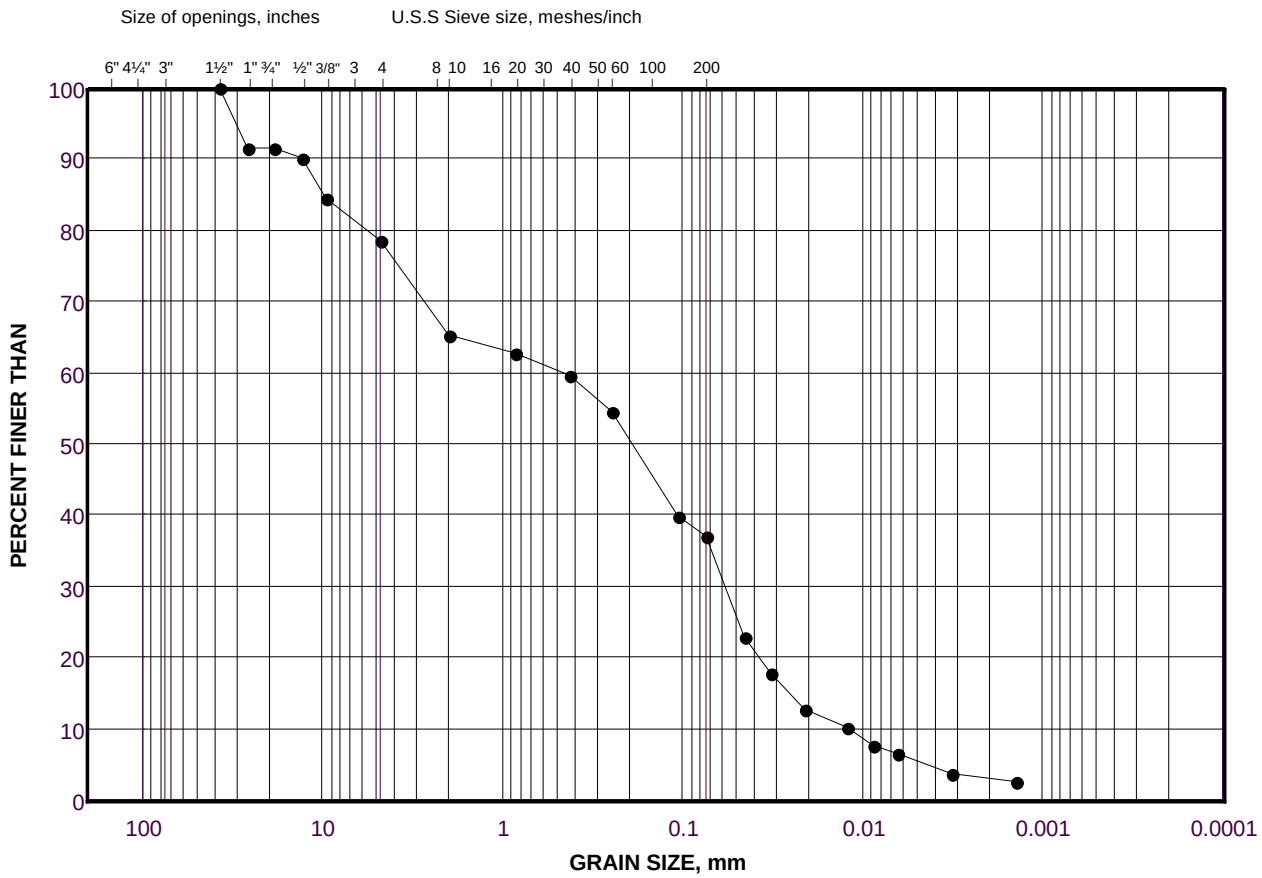
Golder Associates

Date: 14-Jun-21

GRAIN SIZE DISTRIBUTION

(SM) gravelly SILTY SAND

FIGURE ii



COBBLE	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY SIZES
SIZE	GRAVEL SIZE		SAND SIZE			FINE GRAINED

LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(m)
●	20-4	6	4.6 - 5.0

Project Number: 20141301

Checked By: _____

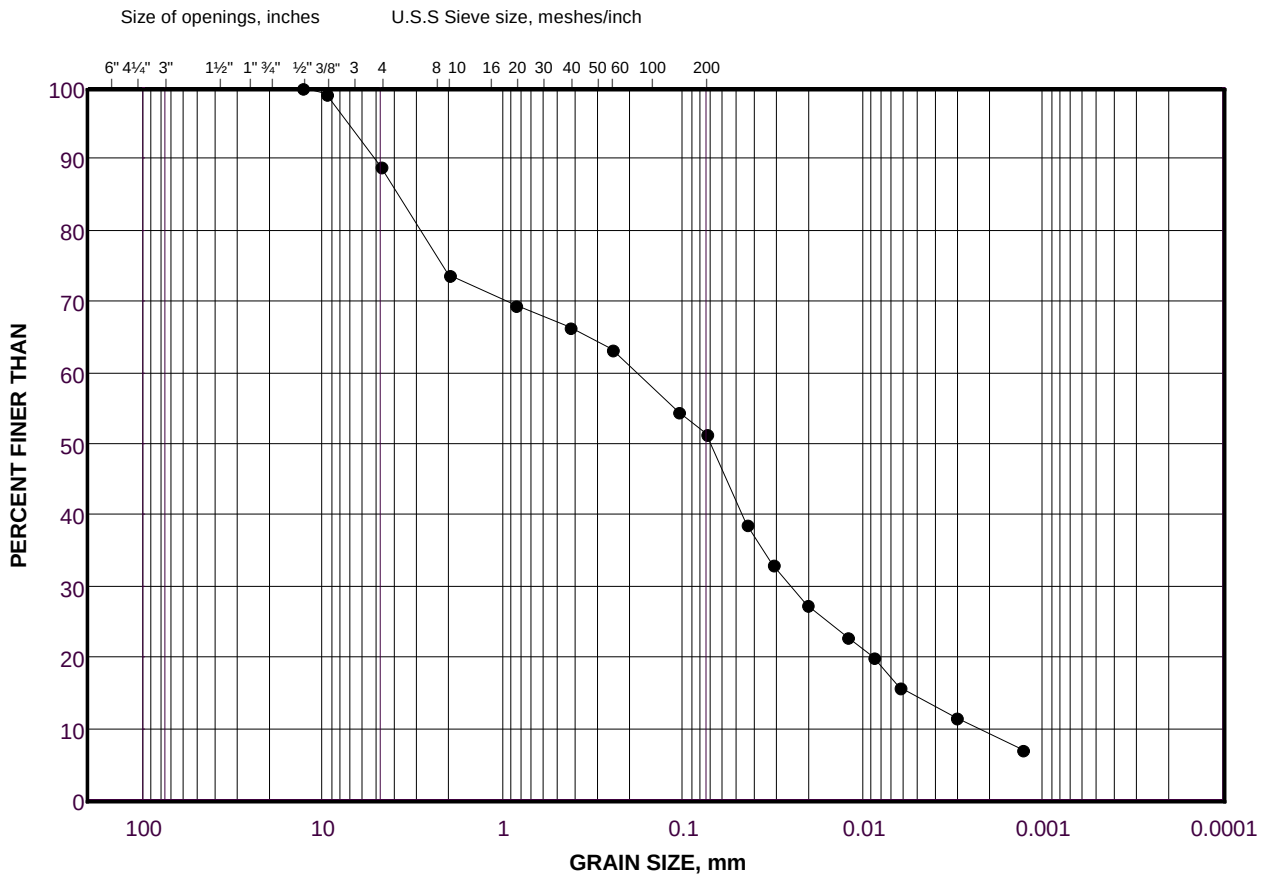
Golder Associates

Date: 14-Jun-21

GRAIN SIZE DISTRIBUTION

(ML) SILT and SAND (TILL)

FIGURE iii



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(m)
●	20-6	9	8.2 - 8.6

Project Number: 20141301

Checked By: _____

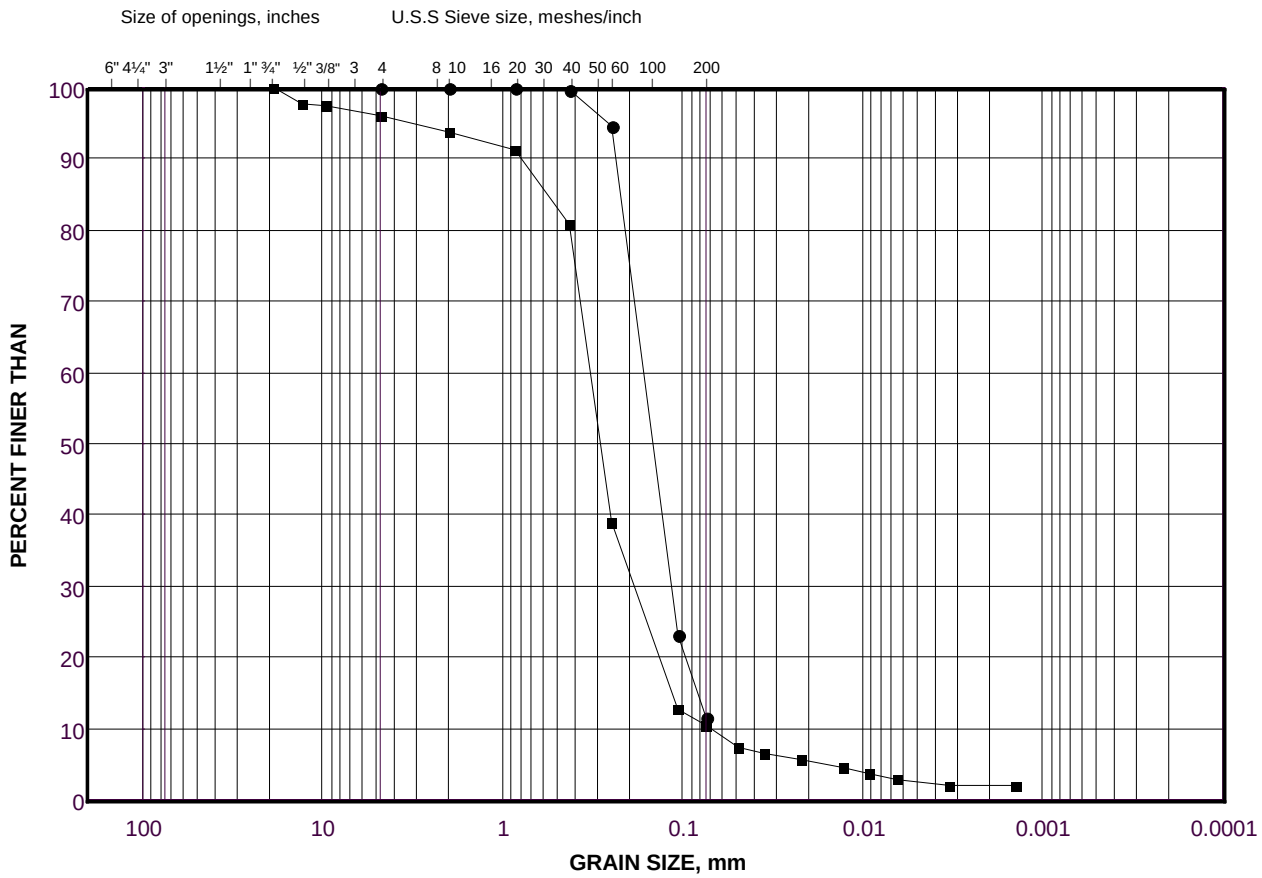
Golder Associates

Date: 14-Jun-21

GRAIN SIZE DISTRIBUTION

(SP) SAND

FIGURE iv



COBBLE	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY SIZES
SIZE	GRAVEL SIZE		SAND SIZE			FINE GRAINED

LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(m)
●	20-7	7	6.1 - 6.6
■	20-10	8	7.6 - 8.1

Project Number: 20141301

Checked By: _____

Golder Associates

Date: 14-Jun-21

ATTACHMENT B

Table B-1 – Water Level Depths and Elevations
Figure B-2 – BH20-2, BH20-4, BH20-6-S, BH20-8-S, BH20-8-D & BH20-10-S Hydrograph

Table B-1 - Water Level Depths and Elevations
South Fergus, Ontario

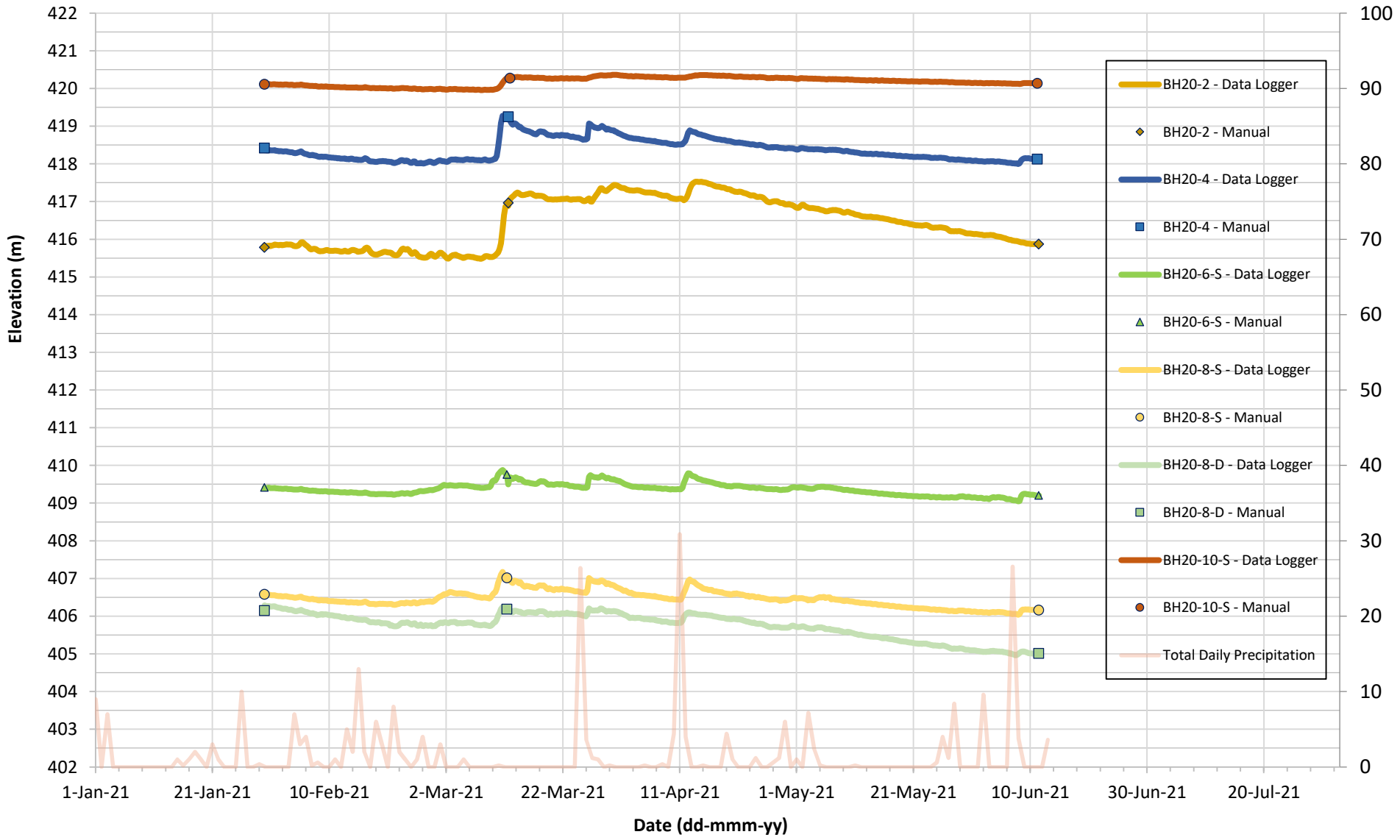
Monitoring Well ID	Ground Surface Elevation (m)	19-Jan-21		29-Jan-21		12-Mar-21		11-Jun-21	
		Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)
BH20-2	418.26	2.52	415.74	2.48	415.79	1.30	416.97	2.39	415.87
BH20-3	413.40	1.12	412.28	1.49	411.92	0.69	412.71	1.92	411.48
BH20-4	419.93	1.17	418.76	1.51	418.42	0.68	419.25	1.80	418.13
BH20-5	407.29	0.65	406.65	0.75	406.55	0.60	406.69	1.17	406.12
BH20-6-S	410.47	1.11	409.37	1.06	409.42	0.71	409.76	1.27	409.21
BH20-6-D	410.46	3.24	407.22	3.33	407.14	3.34	407.13	3.75	406.71
BH20-7	417.65	0.22	417.43	0.42	417.23	-0.12	417.77	0.48	417.17
BH20-8-S	407.45	0.63	406.82	0.87	406.58	0.43	407.02	1.29	406.16
BH20-8-D	407.38	0.62	406.76	1.23	406.15	1.20	406.19	2.37	405.01
BH20-9	414.98	0.41	414.58	0.88	414.11	0.37	414.61	2.11	412.88
BH20-10-S	423.98	3.80	420.18	3.87	420.11	3.71	420.28	3.84	420.14
BH20-10-D	424.01	3.83	420.18	3.92	420.10	3.73	420.28	3.87	420.14
Piezometer									
P1	406.55	0.31	406.24	0.34	406.21	0.04	406.51	0.49	406.06
P2	408.49	0.21	408.29	0.26	408.24	-0.01	408.50	0.46	408.03
P3	411.11	0.27	410.84	0.32	410.80	0.12	410.99	0.40	410.72
Staff Gauge									
SG1	405.82	-0.35	406.17	N/A - Frozen		-0.44	406.26	-0.40	406.22
SG2	407.57	-0.54	408.11	N/A - Frozen		-0.795	408.37	-0.42	407.99
SG3	410.72	N/A - Frozen		N/A - Frozen		-0.15	410.87	-0.02	410.74

Notes:

1) mbgs = metres below ground surface
2) A negative water level depth represents an above ground surface water level.

Input by: JJG
Checked by: JP

Figure B-2: BH20-2, BH20-4, BH20-6-S, BH20-8-S, BH20-8-D & BH20-10-S Hydrograph
Proposed Industrial & Residential Development
Fergus, Ontario



Entered by: JJG
Checked by: JP

Golder Associates Ltd.

ATTACHMENT C

Groundwater Quality Analytical Results

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD.
100 SCOTIA COURT
WHITBY, ON L1N8Y6
(905) 723-2727
ATTENTION TO: Joel Gopaul
PROJECT: 20141301
AGAT WORK ORDER: 21T721685
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: Mar 23, 2021
PAGES (INCLUDING COVER): 11
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21T721685

PROJECT: 20141301

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Joel Gopaul

SAMPLING SITE:

SAMPLED BY:

Dissolved Al & Hg

DATE RECEIVED: 2021-03-15

DATE REPORTED: 2021-03-23

		SAMPLE DESCRIPTION:		20-3-F	20-8-SF	20-10-SF
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2021-03-12 10:00	2021-03-12 12:00	2021-03-12 16:00
Parameter	Unit	G / S	RDL	2217740	2217743	2217745
Aluminum-dissolved	mg/L	*	0.004	<0.004	<0.004	<0.004
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

2217740-2217745 Metals analysis completed on a filtered sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21T721685

PROJECT: 20141301

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Joel Gopaul

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2021-03-15

DATE REPORTED: 2021-03-23

		SAMPLE DESCRIPTION:		20-3		20-8-S		20-10-S
		SAMPLE TYPE:		Water		Water		Water
		DATE SAMPLED:		2021-03-12 10:00		2021-03-12 12:00		2021-03-12 16:00
Parameter	Unit	G / S	RDL	2217736	RDL	2217742	RDL	2217744
Electrical Conductivity	µS/cm		2	920	2	663	2	2210
pH	pH Units	6.5-8.5	NA	7.87	NA	7.90	NA	7.71
Saturation pH (Calculated)				6.52		6.79		6.75
Langelier Index (Calculated)				1.35		1.11		0.960
Hardness (as CaCO3) (Calculated)	mg/L		0.5	583	0.5	430	0.5	508
Total Dissolved Solids	mg/L		20	530	20	354	20	1150
Alkalinity (as CaCO3)	mg/L		5	401	5	276	5	278
Bicarbonate (as CaCO3)	mg/L		5	401	5	276	5	278
Carbonate (as CaCO3)	mg/L		5	<5	5	<5	5	<5
Hydroxide (as CaCO3)	mg/L		5	<5	5	<5	5	<5
Fluoride	mg/L		0.05	<0.05	0.05	<0.05	0.07	<0.07
Chloride	mg/L		0.50	24.4	0.20	25.3	1.0	528
Nitrate as N	mg/L		0.25	<0.25	0.10	0.65	0.5	0.6
Nitrite as N	mg/L		0.25	<0.25	0.10	<0.10	0.5	<0.5
Bromide	mg/L		0.25	<0.25	0.10	<0.10	0.5	<0.5
Sulphate	mg/L		0.50	70.9	0.20	35.0	1.0	16.2
Ortho Phosphate as P	mg/L		0.50	<0.50	0.20	<0.20	1.0	<1.0
Reactive Silica	mg/L		0.25	21.6	0.05	15.1	0.05	8.09
Ammonia as N	mg/L		0.02	<0.02	0.02	0.04	0.02	0.14
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	<0.000002	0.000002	0.00173	0.000002	0.00400
Total Phosphorus	mg/L	*	0.02	0.05	0.06	0.19	0.02	<0.02
Total Organic Carbon	mg/L		0.5	1.4	0.5	1.2	0.5	2.3
True Colour	TCU		5	<5	5	<5	5	<5
Turbidity	NTU		0.5	39.4	0.5	234	0.5	4.4
Total Calcium	mg/L		0.05	137	0.05	115	0.05	166
Total Magnesium	mg/L		0.05	58.5	0.05	34.7	0.05	22.7
Total Potassium	mg/L		0.05	1.60	0.05	2.15	0.05	1.34
Total Sodium	mg/L		0.05	8.05	0.05	5.56	0.05	234
Total Antimony	mg/L	0.020	0.001	<0.001	0.001	<0.001	0.001	<0.001

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21T721685
PROJECT: 20141301

CLIENT NAME: GOLDER ASSOCIATES LTD.
SAMPLING SITE:

ATTENTION TO: Joel Gopaul
SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2021-03-15

DATE REPORTED: 2021-03-23

		SAMPLE DESCRIPTION:		20-3		20-8-S		20-10-S
		SAMPLE TYPE:		Water		Water		Water
		DATE SAMPLED:		2021-03-12 10:00		2021-03-12 12:00		2021-03-12 16:00
Parameter	Unit	G / S	RDL	2217736	RDL	2217742	RDL	2217744
Total Arsenic	mg/L	0.1	0.003	0.004	0.003	0.004	0.003	<0.003
Total Barium	mg/L		0.002	0.120	0.002	0.134	0.002	0.101
Total Beryllium	mg/L	*	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Total Boron	mg/L	0.2	0.010	0.018	0.010	0.015	0.010	0.023
Total Cadmium	mg/L	0.0002	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003	0.003	0.003	0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	0.0008	0.0005	0.0015	0.0005	<0.0005
Total Copper	mg/L	0.005	0.001	0.001	0.001	0.003	0.001	<0.001
Total Iron	mg/L	0.3	0.010	1.84	0.010	3.30	0.010	0.049
Total Lead	mg/L	*	0.001	<0.001	0.001	0.004	0.001	<0.001
Total Manganese	mg/L		0.002	0.160	0.002	0.287	0.002	0.115
Total Molybdenum	mg/L	0.040	0.002	<0.002	0.002	0.002	0.002	<0.002
Total Nickel	mg/L	0.025	0.003	<0.003	0.003	0.004	0.003	0.021
Total Selenium	mg/L	0.1	0.004	<0.004	0.004	<0.004	0.004	<0.004
Total Silver	mg/L	0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	0.288	0.005	0.222	0.005	0.717
Total Thallium	mg/L	0.0003	0.0003	<0.0003	0.0003	<0.0003	0.0003	<0.0003
Total Tin	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002
Total Titanium	mg/L		0.002	0.016	0.002	0.122	0.002	<0.002
Total Tungsten	mg/L	0.030	0.010	<0.010	0.010	<0.010	0.010	<0.010
Total Uranium	mg/L	0.005	0.002	<0.002	0.002	0.002	0.002	<0.002
Total Vanadium	mg/L	0.006	0.002	<0.002	0.002	0.005	0.002	<0.002
Total Zinc	mg/L	0.030	0.005	<0.005	0.005	0.014	0.005	<0.005
Total Zirconium	mg/L	0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21T721685

PROJECT: 20141301

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Joel Gopaul

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2021-03-15

DATE REPORTED: 2021-03-23

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

2217736 Dilution required, RDL has been increased accordingly.
Un-ionized Ammonia detection limit is a calculated RDL. The calculation of Un-ionized Ammonia is based on lab measured parameters (ammonia as N, pH and temperature).Values are reported as calculated.

2217742-2217744 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 21T721685

PROJECT: 20141301

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Joel Gopaul

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
2217736	20-3	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	1.84
2217742	20-8-S	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0015
2217742	20-8-S	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	3.30

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.
PROJECT: 20141301
SAMPLING SITE:

AGAT WORK ORDER: 21T721685
ATTENTION TO: Joel Gopaul
SAMPLED BY:

Water Analysis

RPT Date: Mar 23, 2021

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
Water Quality Assessment - PWQO (mg/L)															
Electrical Conductivity	2217742	2217742	663	665	0.3%	< 2	102%	90%	110%						
pH	2217742	2217742	7.90	7.63	3.5%	NA	101%	90%	110%						
Total Dissolved Solids	2207987		172	180	4.5%	< 20	98%	80%	120%						
Alkalinity (as CaCO3)	2217742	2217742	276	273	1.1%	< 5	88%	80%	120%						
Bicarbonate (as CaCO3)	2217742	2217742	276	273	1.1%	< 5	NA								
Carbonate (as CaCO3)	2217742	2217742	<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	2217742	2217742	<5	<5	NA	< 5	NA								
Fluoride	2217736	2217736	<0.05	<0.05	NA	< 0.05	99%	90%	110%	104%	90%	110%	100%	85%	115%
Chloride	2217736	2217736	24.4	25.0	2.4%	< 0.10	90%	70%	130%	104%	80%	120%	107%	70%	130%
Nitrate as N	2217736	2217736	<0.25	<0.25	NA	< 0.05	94%	70%	130%	105%	80%	120%	107%	70%	130%
Nitrite as N	2217736	2217736	<0.25	<0.25	NA	< 0.05	94%	70%	130%	102%	80%	120%	102%	70%	130%
Bromide	2217736	2217736	<0.25	<0.25	NA	< 0.05	107%	90%	110%	107%	90%	110%	111%	85%	115%
Sulphate	2217736	2217736	70.9	70.6	0.4%	< 0.10	98%	70%	130%	105%	80%	120%	105%	70%	130%
Ortho Phosphate as P	2217736	2217736	<0.50	<0.50	NA	< 0.10	98%	70%	130%	101%	80%	120%	100%	70%	130%
Reactive Silica	2222108		18.1	18.3	1.1%	< 0.05	98%	90%	110%	100%	90%	110%	115%	80%	120%
Ammonia as N	2220598		<0.02	<0.02	NA	< 0.02	106%	70%	130%	99%	80%	120%	117%	70%	130%
Total Phosphorus	2222108		<0.02	<0.02	NA	< 0.02	101%	70%	130%	102%	80%	120%	105%	70%	130%
Total Organic Carbon	2217736	2217736	1.4	1.3	NA	< 0.5	92%	90%	110%	91%	90%	110%	90%	80%	120%
True Colour	2217736	2217736	<5	<5	NA	< 5	102%	90%	110%						
Turbidity	2217736	2217736	39.4	39.2	0.5%	< 0.5	101%	80%	120%						
Total Calcium	2213263		7.79	7.10	9.3%	< 0.05	102%	70%	130%	101%	80%	120%	98%	70%	130%
Total Magnesium	2213263		0.83	0.87	4.7%	< 0.05	108%	70%	130%	107%	80%	120%	105%	70%	130%
Total Potassium	2213263		0.31	0.08	NA	< 0.05	107%	70%	130%	103%	80%	120%	102%	70%	130%
Total Sodium	2213263		2.74	2.46	10.8%	< 0.05	106%	70%	130%	101%	80%	120%	104%	70%	130%
Total Antimony	2213263		<0.001	<0.001	NA	< 0.001	107%	70%	130%	105%	80%	120%	98%	70%	130%
Total Arsenic	2213263		<0.003	<0.003	NA	< 0.003	94%	70%	130%	104%	80%	120%	101%	70%	130%
Total Barium	2213263		0.015	0.015	0.0%	< 0.002	99%	70%	130%	100%	80%	120%	97%	70%	130%
Total Beryllium	2213263		<0.0005	<0.0005	NA	< 0.0005	100%	70%	130%	102%	80%	120%	95%	70%	130%
Total Boron	2213263		<0.010	<0.010	NA	< 0.010	100%	70%	130%	100%	80%	120%	95%	70%	130%
Total Cadmium	2213263		0.0001	0.0001	NA	< 0.0001	101%	70%	130%	101%	80%	120%	96%	70%	130%
Total Chromium	2213263		<0.003	<0.003	NA	< 0.003	100%	70%	130%	98%	80%	120%	98%	70%	130%
Total Cobalt	2213263		0.0038	0.0037	2.7%	< 0.0005	99%	70%	130%	104%	80%	120%	100%	70%	130%
Total Copper	2213263		0.001	0.002	NA	< 0.001	101%	70%	130%	102%	80%	120%	99%	70%	130%
Total Iron	2213263		0.308	0.336	8.7%	< 0.010	99%	70%	130%	101%	80%	120%	98%	70%	130%
Total Lead	2213263		<0.001	<0.001	NA	< 0.001	98%	70%	130%	100%	80%	120%	97%	70%	130%
Total Manganese	2213263		1.45	1.50	3.4%	< 0.002	98%	70%	130%	101%	80%	120%	95%	70%	130%
Total Molybdenum	2213263		<0.002	<0.002	NA	< 0.002	103%	70%	130%	104%	80%	120%	102%	70%	130%
Total Nickel	2213263		<0.003	<0.003	NA	< 0.003	100%	70%	130%	104%	80%	120%	100%	70%	130%
Total Selenium	2213263		<0.004	<0.004	NA	< 0.004	107%	70%	130%	107%	80%	120%	106%	70%	130%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.
PROJECT: 20141301
SAMPLING SITE:

AGAT WORK ORDER: 21T721685
ATTENTION TO: Joel Gopaul
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Mar 23, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Silver	2213263		<0.0001	<0.0001	NA	< 0.0001	103%	70%	130%	105%	80%	120%	100%	70%	130%
Total Strontium	2213263		0.035	0.041	15.8%	< 0.005	99%	70%	130%	102%	80%	120%	103%	70%	130%
Total Thallium	2213263		<0.0003	<0.0003	NA	< 0.0003	94%	70%	130%	105%	80%	120%	98%	70%	130%
Total Tin	2213263		<0.002	<0.002	NA	< 0.002	101%	70%	130%	105%	80%	120%	98%	70%	130%
Total Titanium	2213263		0.004	<0.002	NA	< 0.002	102%	70%	130%	109%	80%	120%	102%	70%	130%
Total Tungsten	2213263		<0.010	<0.010	NA	< 0.010	97%	70%	130%	100%	80%	120%	95%	70%	130%
Total Uranium	2213263		<0.002	<0.002	NA	< 0.002	103%	70%	130%	101%	80%	120%	101%	70%	130%
Total Vanadium	2213263		<0.002	<0.002	NA	< 0.002	99%	70%	130%	104%	80%	120%	100%	70%	130%
Total Zinc	2213263		<0.005	0.014	NA	< 0.005	103%	70%	130%	105%	80%	120%	110%	70%	130%
Total Zirconium	2213263		<0.004	<0.004	NA	< 0.004	98%	70%	130%	100%	80%	120%	98%	70%	130%
Dissolved Al & Hg															
Aluminum-dissolved	2217740	2217740	<0.004	0.005	NA	< 0.004	107%	70%	130%	111%	80%	120%	93%	70%	130%
Dissolved Mercury	2211353		< 0.0001	< 0.0001	NA	< 0.0001	102%	70%	130%	103%	80%	120%	99%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD.
AGAT WORK ORDER: 21T721685
PROJECT: 20141301
ATTENTION TO: Joel Gopaul
SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6070	QuickChem 10-114-27-1-A & SM 4500 Si-F	LACHAT FIA
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Ammonia-Un-ionized (Calculated)		MOE REFERENCE, PWQOs Tab 2	CALCULATION
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
True Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 21T721685

PROJECT: 20141301

ATTENTION TO: Joel Gopaul

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 21T721685

Cooler Quantity:

Arrival Temperatures: 1.7 | .8 | .8 | 3.8 | 3.5 | 4.1

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: FREE ICE

Report Information:

Company: Golder
Contact: Joel Gopaul
Address: 100 Scotia Crt

Phone: Fax:

Reports to be sent to:
1. Email: Joel_Gopaul2@golder.com
2. Email: Aaron_Beard@golder.com

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Excess Soils R406
Table _____ *Indicate One*

☐ Regulation 558

☐ CCME

☐ Sewer Use
☐ Sanitary ☐ Storm
_____ *Region*

☒ Prov. Water Quality Objectives (PWQO)

☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition**? ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT (Most Analysis) ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 20141301
Site Location: South Fergus
Sampled By: AGB
AGAT ID #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company: Golder
Contact: Joel Gopaul
Address:
Email: Joel_Gopaul2@golder.com

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs Analyze F4G if required ☐ Yes ☐ No	PAHs	Total PCBs ☐ Aroclor	VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	WQA	dissolved Al	dissolved Hg					Potentially Hazardous or High Concentration (Y/N)
20-3	12/03/21	10:00 AM/PM	7	GW	~~diss~~	N											X								N
20-3-F	↓	10:00 AM/PM	3	↓	dissolved Al, Hg	Y												X	X						N
20-8-S	↓	12:00 AM/PM	7	↓		N											X								N
20-8-SF	↓	12:00 AM/PM	3	↓	dissolved Al, Hg	Y												X	X						N
20-10-S	↓	4:00 AM/PM	7	↓		N											X								N
20-10-SF	↓	4:00 AM/PM	3	↓	dissolved Al, Hg	Y												X	X						N
		AM/PM																							
		AM/PM																							
		AM/PM																							
		AM/PM																							
		AM/PM																							

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Aaron Beard (aBeard)	14/03/21	11:00		03/15/21	11:25
	03/15/21	2:00			

Page 1 of 1

Nº: T116062

APPENDIX E

Existing Water and Sanitary Servicing Summary
Prepared by Tatham Engineering

TATHAM ENGINEERING

115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario L9Y 5A6

T 705-444-2565
E info@tathameng.com
tathameng.com

Memo

File	Recipient	Company
120157	**David Aston**	**MHBC**

Date	Purpose
June 11, 2021	**South Fergus Master Environmental Servicing Plan, Township of Centre Wellington Existing Water and Sanitary Servicing Summary**

Message

Introduction

The following summarizes relevant information on the existing water and sanitary servicing infrastructure in Fergus that was obtained from the Draft Water Supply Master Plan (AECOM, 2019) and the 2019 and 2020 Water and Wastewater Annual Reports prepared by the Township of Centre Wellington.

This description of the existing and planned water and sanitary infrastructure will be updated once the requested background documents are received.

Existing Water System

The South Fergus Secondary Plan area will be supplied by the Centre Wellington Drinking Water System (DWS), which is supplied by nine groundwater wells (5 in operation in Fergus and 4 in Elora).

The wells supply the combined Elora-Fergus water distribution system that is comprised of three pressure zones: Elora, Fergus South, and Fergus North East Industrial Area.

The South Fergus area is within the Fergus South pressure zone. The closest production well is Fergus Well 5 (Well F5) located at 886 Scotland Street.

Well F5 operated at 21% of its approved capacity in 2020 and at 18% in 2019.

Overall, the Centre Wellington DWS' maximum day water taking in 2020 was 51% of the approved maximum day volume.

The water distribution system is comprised of approximately 121 km of watermains and four elevated storage tanks (unknown locations). Water is pumped from Elora to Fergus by the Aboyne BPS. Water from the higher Fergus pressure zone can flow back to Elora through a pressure reducing valve.

Groundwater is treated with chlorine gas at all production well sites and, if needed, re-chlorinated at the BPS and two of the water towers.

No other information is currently available regarding the water supply and distribution systems.

Proposed Water System Upgrades

The Draft Water Supply Master Plan (AECOM, 2019) identified preferred upgrades to the water supply system to meet future water demands, including:

- Replace Wells F2 and F5 with larger capacity wells, subject to further investigation;
- Drill new groundwater wells (sites TBD).

The Draft Water Supply Master Plan used future demands taken from the *Wellington County Population, Household and Employment Forecast Update, 2011-2041* (Watson & Associates, 2015). We have not reviewed this document to determine the values used for the South Fergus Secondary Plan area.

Wastewater System

Fergus is serviced by the Fergus Wastewater Treatment Plant (WWTP), located at 350 Queen Street West.

In 2020, the WWTP treated an average daily flow of 4,295 m^3/day, which is 54% of its rated capacity of 8,000 m^3/day. The WWTP received a peak flow of 22,728 m^3/day, 97% of its peak flow capacity of 23,360 m^3/day.

No other information is currently available on the existing sewage collection system and sewage pumping stations, to determine the sanitary infrastructure that will be affected by the South Fergus Secondary Plan area. No information is currently available on any plans to upgrade or expand the sanitary system.

From

Suzanne Troxler, B.Eng., M.Sc., P.Eng.

APPENDIX F

Transportation Plan – Existing Conditions
Prepared by Tatham Engineering

TATHAM ENGINEERING

Enhancing our communities

South Fergus MESP & Secondary Plan

TRANSPORTATION PLAN – EXISTING CONDITIONS

South Fergus Landowners Group

File 120157 | July 26, 2021

Document Control

File:	Prepared by:	Prepared for:
120157	**Tatham Engineering Limited** 115 Sandford Fleming Drive, Suite 200 Collingwood, Ontario L9Y 5A6 **T** 705-444-2565 **tathameng.com**	**South Fergus Landowners Group**
Date: **July 26, 2021**		

Authored by:	Reviewed by:
	
Michael Cullip B.Eng. & Mgmt., M.Eng. P.Eng. Vice President Head Office Operations	David Perks M.Sc., PTP Transportation Planner, Project Manager

Disclaimer	Copyright
The information contained in this document is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Tatham Engineering Limited undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.	

Issue	Date	Description
1	July 26, 2021	Existing Conditions Study

Document Contents

Tables

Figures

Appendices

1 Introduction

Tatham Engineering Limited has been retained by the South Fergus Landowners Group to provide engineering support in the development of a Master Environmental Servicing Study (MESP) and Secondary Plan outlining the objectives, constraints, design criteria, development concept and implementation plan for a proposed mixed use development in the South Fergus Secondary Plan area.

1.1 SECONDARY PLAN AREA

The South Fergus Secondary Plan area consists of approximately 147.5 ha of undeveloped land in the south end of Fergus, Township of Centre Wellington, County of Wellington. It is generally bound by 2nd Line to the south, Guelph Line to the west, McQueen Boulevard to the north and Scotland Street to the east as illustrated in Figure 1.

The Secondary Plan area consists of properties both east and west of Tower Street South (Highway 6) as follows:

- 925 and 935 Scotland Street;
- 200 McQueen Boulevard;
- 7856 and 7872 2nd Line;
- 963 and 1000 Tower Street South; and
- 936 Guelph Street.

1.2 STUDY PURPOSE

The purpose of the Transportation Plan is to assess the existing road network, determine the location and suitability of new roads and assess the overall impact of the Secondary Plan on the existing and proposed road network. The plan includes:

1. Identify and inventory the surrounding external road system and their respective intersections. The inventory will address jurisdiction, number of lanes, cross-sections, speed limits, intersection configurations, vertical and horizontal alignment constraints, etc.
2. Compile traffic data from the appropriate road jurisdictions for the subject road sections and intersections.
3. Conduct additional traffic counts as may be required to address data gaps and ensure traffic data represents current conditions. It is noted that due to the COVID-19 pandemic, travel demands have changed significantly and thus any new counts completed at this time may

not be representative of typical conditions. This will be further reviewed and resolved with the road authorities and an appropriate course of action resolved (eg. use historic growth, apply factors, etc.). For purposes of this proposal, we have allowed for 7 new intersection traffic counts (to be completed at the major boundary road intersections).

4. Complete an assessment of the existing road system traffic operations and establish any system needs based on existing conditions.
5. Establish traffic projections for the future horizon years (to correspond to full build-out, 10 years beyond build-out and 2 interim horizon years to consider a phased development approach). In addition to historic growth, consideration will be given to other development in the immediate and surrounding areas that could have a bearing on future traffic volumes.
6. Identify the future road system, considering any planned road improvements or developments that would otherwise occur independent of the Secondary Plan.
7. Complete an assessment of the future road system traffic operations (prior to consideration for the Secondary Plan development) and establish any system needs based on future background conditions. This could include road widenings, provision of turn lanes, traffic signal and/or roundabout control, etc.
8. Establish and review potential road system connection points to the existing system and related receiving system capacities, including consideration for any growth-related upgrades planned or underway.

The focus of this report is on the existing conditions.

2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

The existing road network to be addressed by this study consists of Tower Street South (Highway 6), McQueen Boulevard, Guelph Street, Scotland Street and 2nd Line, and their respective intersections. Mapping and photographs of the road network are provided in Figure 2 through Figure 4, with further details provided below.

2.1.1 Key Road Sections

Tower Street South (Highway 6)

Key elements/characteristics of Tower Street South (Highway 6), which bisects the Secondary Plan area, are as follows:

- provincial highway under the jurisdiction of MTO;
- designated an arterial road under the *Township of Centre Wellington Transportation Master Plan*;
- oriented north-south through the study area;
- from 2nd Line to the south limits of the Gates of Fergus commercial development (approximately 400 metres south of McQueen Boulevard), it has 1 travel lane per direction within a rural cross-section;
- from the south limits of the Gates of Fergus to McQueen Boulevard, it has 2 northbound lanes, 1 southbound lane and select left turn lanes with an urban cross-section along the east side and rural cross-section on the west side;
- sidewalk on the east side of the road through the urban area (ie. from the south limits of the Gates of Fergus to McQueen Boulevard);
- posted speed limit of 80 km/h, decreasing to 60 km/h approximately 710 metres south of McQueen Boulevard upon entry into the built area with a further reduction to 50 km/h approximately 210 metres south of McQueen Boulevard;
- relatively straight and flat alignment albeit there is a slight horizontal curve in the area of the signalized commercial access to the Gates of Fergus; and

- planning capacity of 1000 vehicles per hour per lane (vphpl) as per the *Transportation Master Plan* reflective of its highway designation.

McQueen Boulevard

McQueen Boulevard is detailed as follows:

- under the jurisdiction of the Township of Centre Wellington;
- designated a collector road under the *Transportation Master Plan*;
- oriented east-west through the study area;
- urban cross-section;
- from Tower Street South (Highway 6) to its westerly terminus (cul-de-sac approximately 275 metres to the west), it has a 14 metre paved road width which accommodates 2 lanes of travel per direction, albeit the road is currently configured (via pavement markings) to provide only 1 lane of travel per direction;
- from Tower Street South (Highway 6) to Millburn Boulevard (230 metres), it has a similar 14 metre width configured to provide 1 travel lane per direction;
- from McTavish Street to Scotland Street (320 metres), it has a 10.5 metre paved surface providing 1 lane of travel per direction;
- sidewalks are provided on both sides of the road through all of the noted sections;
- a westerly extension to Guelph Street and an extension from Millburn Boulevard to McTavish Street are planned in conjunction with the development of the South Fergus Secondary Plan area,
- unposted speed limit of 50 km/h, reflective of the urban area (ie. 50 km/h unless otherwise posted);
- relatively flat alignment albeit there are horizontal curves both west and east of Tower Street South; and
- assumed planning capacity of 700 vehicles per hour per lane (vphpl) reflective of its urban arterial road designation, as per the *Transportation Master Plan*.

Guelph Street

Guelph Street, which serves as the west development boundary, is characterized as follows:

- local road under the jurisdiction of the Township of Centre Wellington;
- oriented north-south through the study area;

- rural cross-section with a 6.0 to 7.0 metre paved surface and minimal gravel shoulders, providing 1 travel lane per direction;
- paved surface is in relatively poor condition with significant alligator and longitudinal cracking throughout;
- posted speed limit of 50 km/h;
- relatively straight horizontal alignment with a number of relatively minor vertical curves; and
- planning capacity of 500 vehicles per hour per lane (vphpl) as per the *Transportation Master Plan* reflective of its rural local road designation.

Scotland Street

Scotland Street, which serves as the east development boundary, is characterized as follows:

- local road under the jurisdiction of the Township of Centre Wellington;
- oriented north-south through the study area;
- from 2nd Line to the south limit of the Centre Wellington District High School, the road has a rural cross-section with an 8.5 to 9.0 metre paved surface and minimal gravel shoulders, providing 1 travel lane per direction;
- from the high school to the north, the road has an urban cross-section with a 10.25 metre paved surface providing 1 lane per direction and a sidewalk on the west side;
- the paved surface through the rural section is in relatively poor condition with alligator and longitudinal cracking, and rutting throughout;
- posted speed limit of 80 km/h which transitions to 50 km/h just south of the Centre Wellington District High School reflective of the residential nature of the surroundings;
- relatively straight horizontal alignment and consistent vertical alignment; and
- planning capacity of 500 vehicles per hour per lane (vphpl) as per the *Transportation Master Plan* reflective of its rural/urban local road designation.

2nd Line

2nd Line is the south boundary of the Secondary Plan area, details of which are as follows:

- local road under the jurisdiction of the Township of Centre Wellington;
- oriented east-west through the study area;

- to the west of Tower Street South (Highway 6), the road has a rural cross-section with a 9.0 metre platform which accommodates a 7.0 metre paved surface (1 lane per direction) with gravel shoulders;
- to the east of Tower Street South (Highway 6), the road has a rural cross-section with an approximate 10 metre platform width accommodating an 8 metre surface treated road (1 lane per direction) with gravel shoulders;
- there is a 5 tonne per axle posted load limit in effect from March 1 to April 30;
- posted speed limit of 80 km/h;
- relatively straight horizontal alignment and with some minor vertical curves and
- planning capacity of 500 vehicles per hour per lane (vphpl) as per the *Transportation Master Plan* reflective of its rural local road designation.

2.1.2 Key Intersections

The following key intersections will be considered in the transportation study:

- Tower Street South (Highway 6) with McQueen Boulevard – signalized;
- Tower Street South (Highway 6) with Gates of Fergus access - signalized;
- Tower Street South (Highway 6) with 2nd Line - stop controlled on 2nd Line;
- Guelph Street with 2nd Line – stop controlled on Guelph Street;
- Scotland Street with McQueen Boulevard - stop controlled on McQueen Boulevard; and
- Scotland Street with 2nd Line – stop controlled on 2nd Line.

The configurations of the above noted intersections are illustrated in Figure 5. As evident, all of the intersections have single lane, shared approaches except the Tower Street South intersections which are summarized below.

Tower Street South (Highway 6) with McQueen Boulevard

- NB: left turn lane + through lane + through-right lane
- SB: left turn lane + through lane + through-right lane
- WB: left turn lane + through lane + right turn lane
- EB: left turn lane + through-right lane

Tower Street South (Highway 6) with Gates of Fergus Access

- NB: through lane + through-right lane

- SB: left turn lane + through lane
- WB: left turn lane + right turn lane

Tower Street South (Highway 6) with 2nd Line

- NB: left turn lane + through-right lane
- SB: left turn lane + through-right lane
- WB: left-through-right lane
- EB: left-through-right lane

2.2 ACTIVE TRANSPORTATION NETWORK

As noted in the previous section, the following sidewalks are currently provided:

- east side of Tower Street South (Highway 6) from the south limit of Gates of Fergus to McQueen Street (and extending further north beyond the study area);
- both sides of all sections of McQueen Boulevard; and
- west side of Scotland Street across the frontage of the Centre Wellington District High School (and extending further north beyond McQueen Boulevard).

An inventory of existing trails within the study area and immediate surroundings is provided in Figure 6.

2.3 TRANSIT NETWORK

Neither the Township nor the County operates a public transit service within the Township of Centre Wellington.

2.4 TRAFFIC VOLUMES

2.4.1 Mid-Block Counts

Traffic data through and adjacent to the study area was obtained from the Township as collected through mid-block traffic counts over 2-day periods in April or May of 2016, 2017 or 2019; count locations are illustrated in Figure 7. A summary of the available count data is provided in Table 1 (reflective of the average volumes over the 2-day count periods), whereas additional details are provided in Appendix A. Given the completion of counts in April or May, the volumes are considered representative of average conditions.

Volumes for Highway 6 immediately south of the Fergus south limits have been obtained from MTO published traffic data (the most current year of which is 2016) and are also provided in

Table 1, reflective of Average Annual Daily Traffic (AADT) volumes. For comparative purposes, the Summer Average Daily Traffic (SADT) volumes are also noted.

Table 1: Mid-Block Traffic Volumes

LOCATION		COUNT PERIOD	DAILY VOLUME	AM PEAK HOUR VOLUME		PM PEAK HOUR VOLUME	
				E/N	S/W	E/N	S/W
2nd Line	E of Guelph St	April 2019	1546	54	74	60	132
	E of Hwy 6	May 2016	911	54	40	99	155
Guelph St	N of 2nd Line	May 2019	661	33	32	66	93
	S of 2nd Line	April 2017	94	6	7	8	13
Scotland St	S of McQueen	May 2019	1549	58	80	125	204
Highway 6	Wellington 38 to Fergus	Average 2016	15,100	-	-	-	-
		Summer 2016	16,800	-	-	-	-

2.4.2 Intersection Counts

Traffic counts will be completed as part of this study at the key intersections within the study area, as illustrated in Figure 7, to capture weekday peak hour volumes by movement To minimize the potential impacts of COVID-19 on the count data, recognizing that travel demands have been impacted due to provincial travel restrictions, the counts are expected to be completed in July 2021, following elevation to Step 2 in the provincial reopening program.

The resulting counts will also represent the peak summer traffic volumes, given completion in the summer period (as per the traffic volumes for Highway 6, summer volumes are 11% greater than average conditions).

2.5 TRAFFIC OPERATIONS

In considering traffic operations on the study area road network, the following have been reviewed:

- mid-block traffic operations;

- intersection operations; and
- queue operations.

2.5.1 Mid-Block Operations

Mid-block operations consider the peak hour directional volumes on the subject road sections in consideration of the assumed road capacity (as per the *Transportation Master Plan*). A summary of the volume to capacity ratios (ie. the degree to which the available capacity is utilized) is provided in Table 2.

Table 2: Mid-Block Traffic Operations

LOCATION		COUNT PERIOD	CAPACITY	AM PEAK HOUR VOLUME		PM PEAK HOUR VOLUME	
				E/N	S/W	E/N	S/W
2nd Line	E of Guelph St	April 2019	500 vphpl	0.11	0.15	0.12	0.26
	E of Hwy 6	May 2016	500	0.11	0.08	0.20	0.31
Guelph St	N of 2nd Line	May 2019	500	0.07	0.06	0.13	0.19
	S of 2nd Line	April 2017	500	0.01	0.01	0.02	0.03
Scotland St	S of McQueen	May 2019	500	0.12	0.16	0.25	0.41

As noted, the subject road sections are operating in the order of 1 to 41% of the available road capacity, suggesting that there is significant reserve capacity to accommodate additional growth. While it is acknowledged that some of the traffic volumes are somewhat dated (ie. from 2016 and 2017), the results are such that any increase in volumes realized through to the current period can readily be serviced without issue. Typically, volumes increase 2 to 5% per annum, which would realize increases of 10 to 30% over the past 5 years. However, as the reported volumes are relatively minor, so too will be the increases.

2.5.2 Intersection Operations

Intersection operations will be investigated following completion of the intersection turning movement counts. The corresponding analyses will confirm the appropriateness of the existing

intersection configurations and control in serving the existing traffic volumes. Any deficiencies will be identified and appropriate mitigating measures recommended.

2.5.3 Queue Operations

Similarly, queue operations will be investigated following completion of the intersection turning movement counts. This will provide a basis to confirm that existing intersection configurations, particularly those with exclusive turn lanes, are appropriately sized to accommodate existing traffic queues.

2.6 ROAD NETWORK IMPROVEMENTS

Based on the results of the existing mid-block, intersection and queue analyses, the need for improvements to the existing road system will be established.

3 Summary & Next Steps

This report summarises the work completed to date to establish the existing transportation and traffic operating conditions. The resulting analyses will be used to identify development constraints and inform the transportation strategy for the Secondary Plan area moving forward.

The next steps of this study include:

1. Complete the noted traffic counts (following Step 2 in the province's reopening program) and operational analyses.
2. Prepare future background traffic projections for future planning horizons and undertake analyses to address the operating conditions and levels of service that the road system will provide without consideration for the Secondary Plan area.
3. Based on the proposed Secondary Plan area development proposal (eg. land uses, extent of employment uses, number of residential units, etc.) determine the volume of traffic that will be generated by the subject lands and assign such to the study area road network.
4. Repeat the operational review of the transportation system with consideration for the South Fergus lands and identify any system deficiencies and mitigating measures.

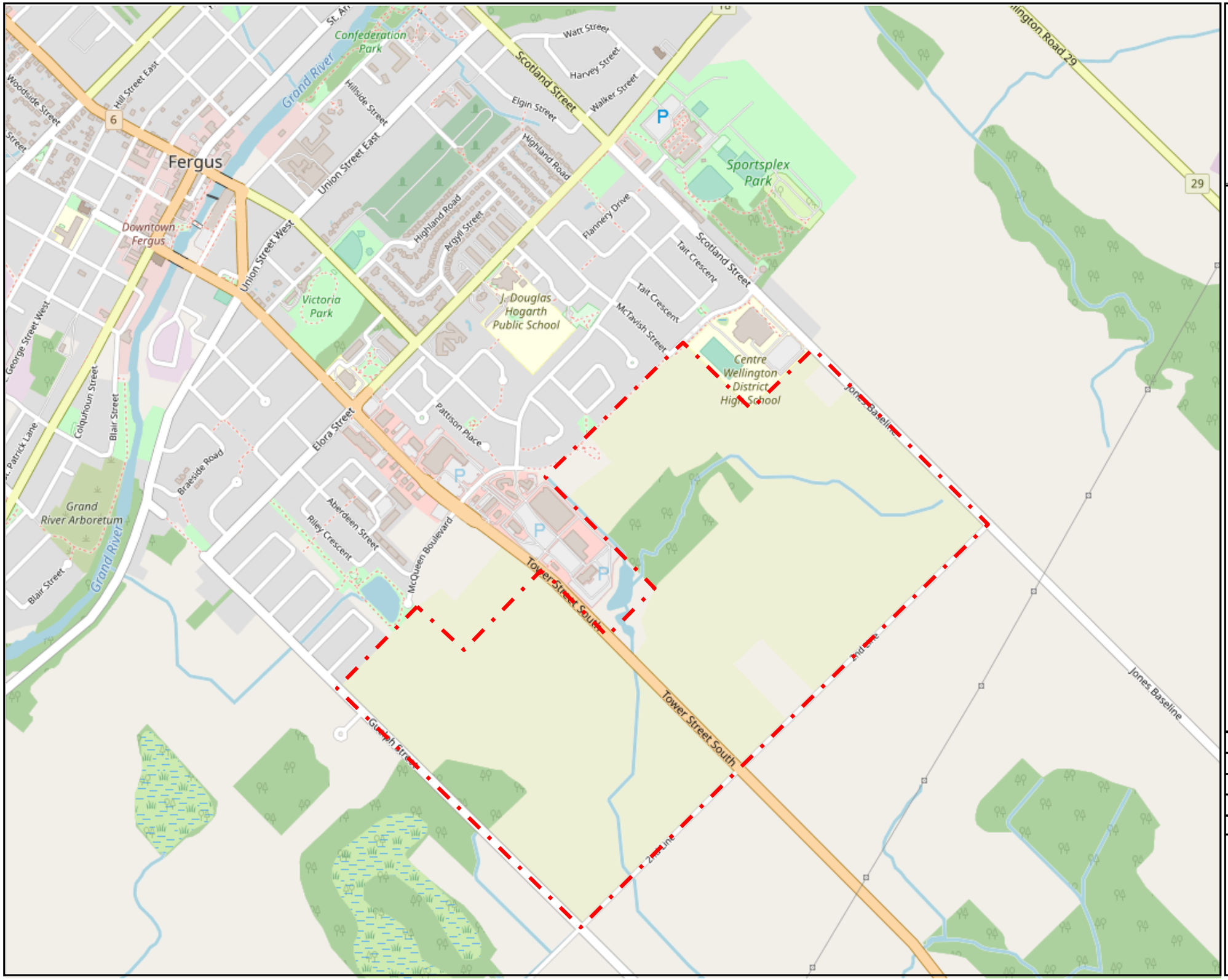


Figure 1

Site Location

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

Study Area

Source: OpenStreetMap

DATE:	
SCALE:	
FILE:	
DRAWN:	

north

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

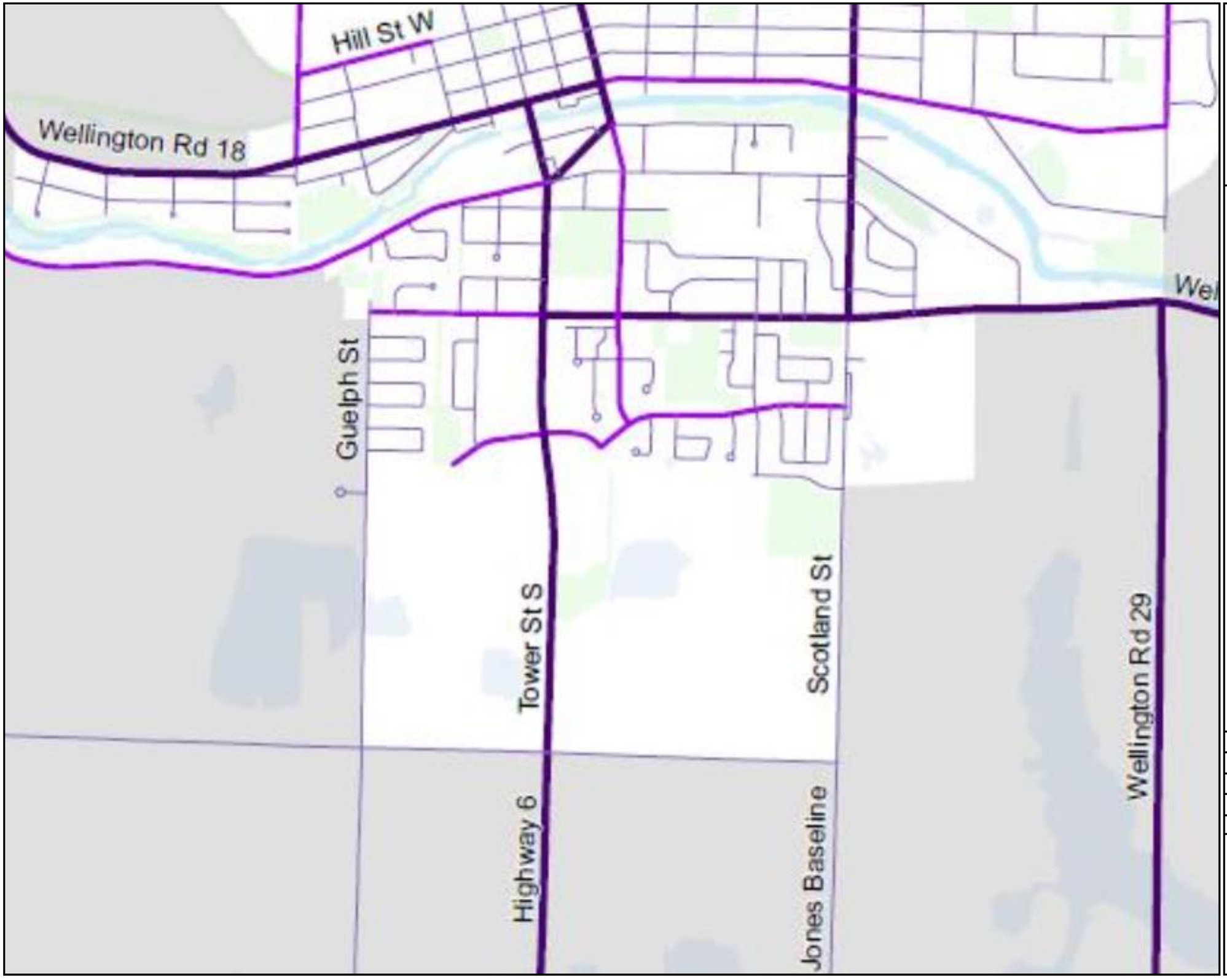


Figure 2

Roadway Classification

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

- Arterial
- Collector
- Local
- Urban Area

Source: *Township of Centre Wellington Transportation Master Plan*

DATE:	
SCALE:	
FILE:	
DRAWN:	

north

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

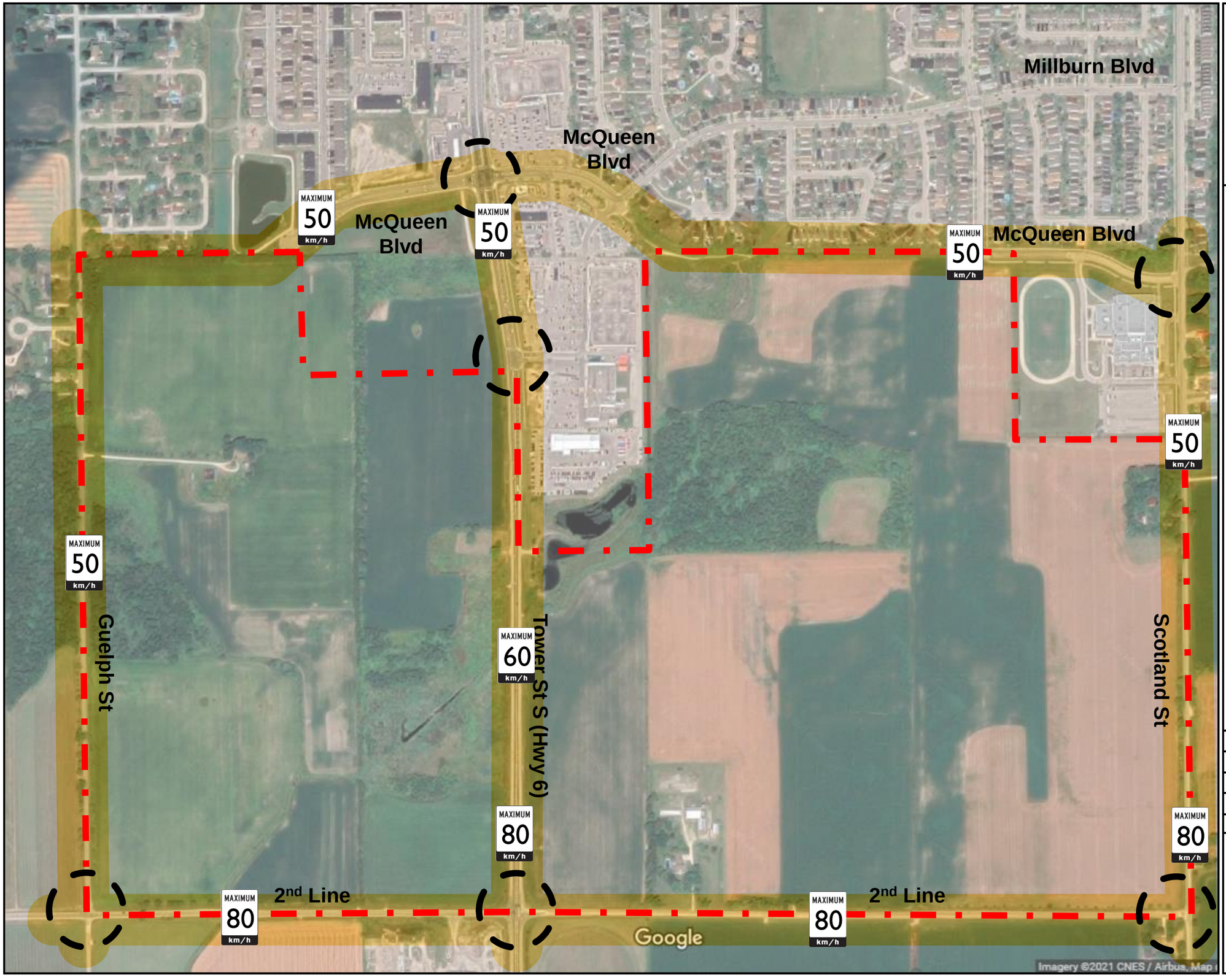


Figure 3

Road Network - Aerial View

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

- Key Road Section
- Key Intersection
- Speed Limit (MAXIMUM 50 km/h)

Source: Google Earth

DATE:	
SCALE:	
FILE:	
DRAWN:	

north

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

Figure 4a

Road Network - Street View

Tower Street South (Highway 6) looking north to McQueen Boulevard

Guelph Street looking north at north limit of South Fergus Secondary Plan area

Tower Street South (Highway 6) looking north to Gates of Fergus Access

Guelph Street looking north at mid-point of South Fergus Secondary Plan area

Tower Street South (Highway 6) looking north at 2nd Line

Guelph Street looking north at 2nd Line

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

Source: Google Streetview

DATE:	
SCALE:	
FILE:	
DRAWN:	

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

Figure 4b

Road Network - Street View

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Scotland Street looking north to McQueen Boulevard

2nd Line looking east to Scotland Street

Scotland Street looking north to Centre Wellington District High School

2nd Line looking east from Tower Street South (Highway 6)

Scotland Street looking north at 2nd Line

2nd Line looking west from Tower Street South (Highway 6)

Legend

Source: Google Streetview

DATE:	
SCALE:	
FILE:	
DRAWN:	

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

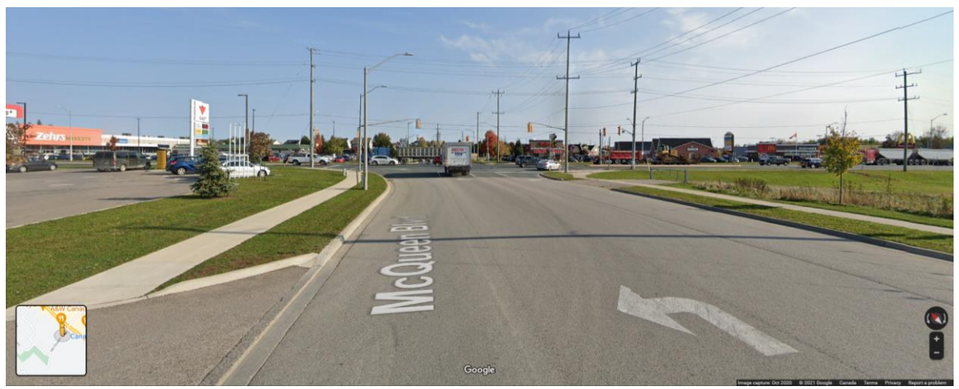
Figure 4c

Road Network - Street View

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

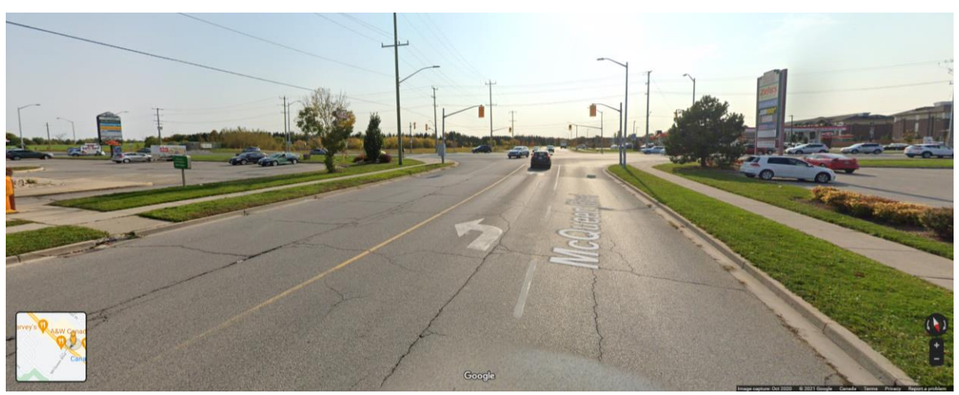
McQueen Boulevard looking west to West Limits

McQueen Boulevard looking east to Millburn Boulevard

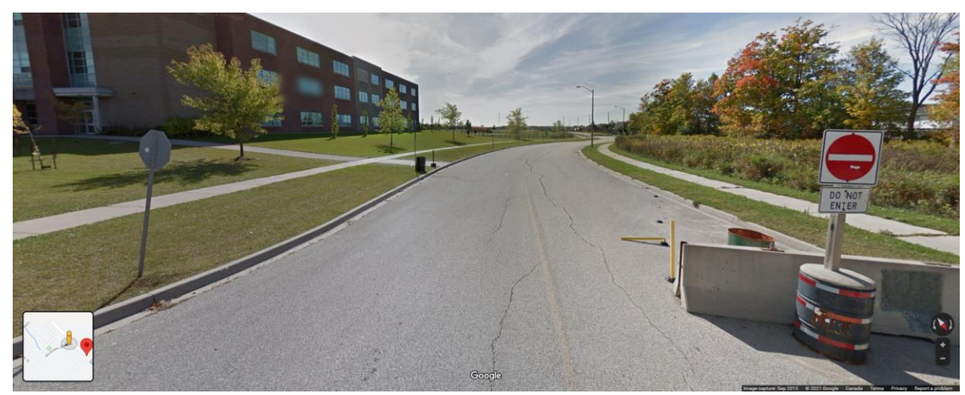


McQueen Boulevard looking east to Tower Street South (Highway 6)

McQueen Boulevard looking west at McTavish Street (prior to road opening)



McQueen Boulevard looking west to Tower Street South (Highway 6)



McQueen Boulevard looking west from Scotland Street (prior to road opening)

Legend

Source: Google Streetview

DATE:	
SCALE:	
FILE:	
DRAWN:	

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

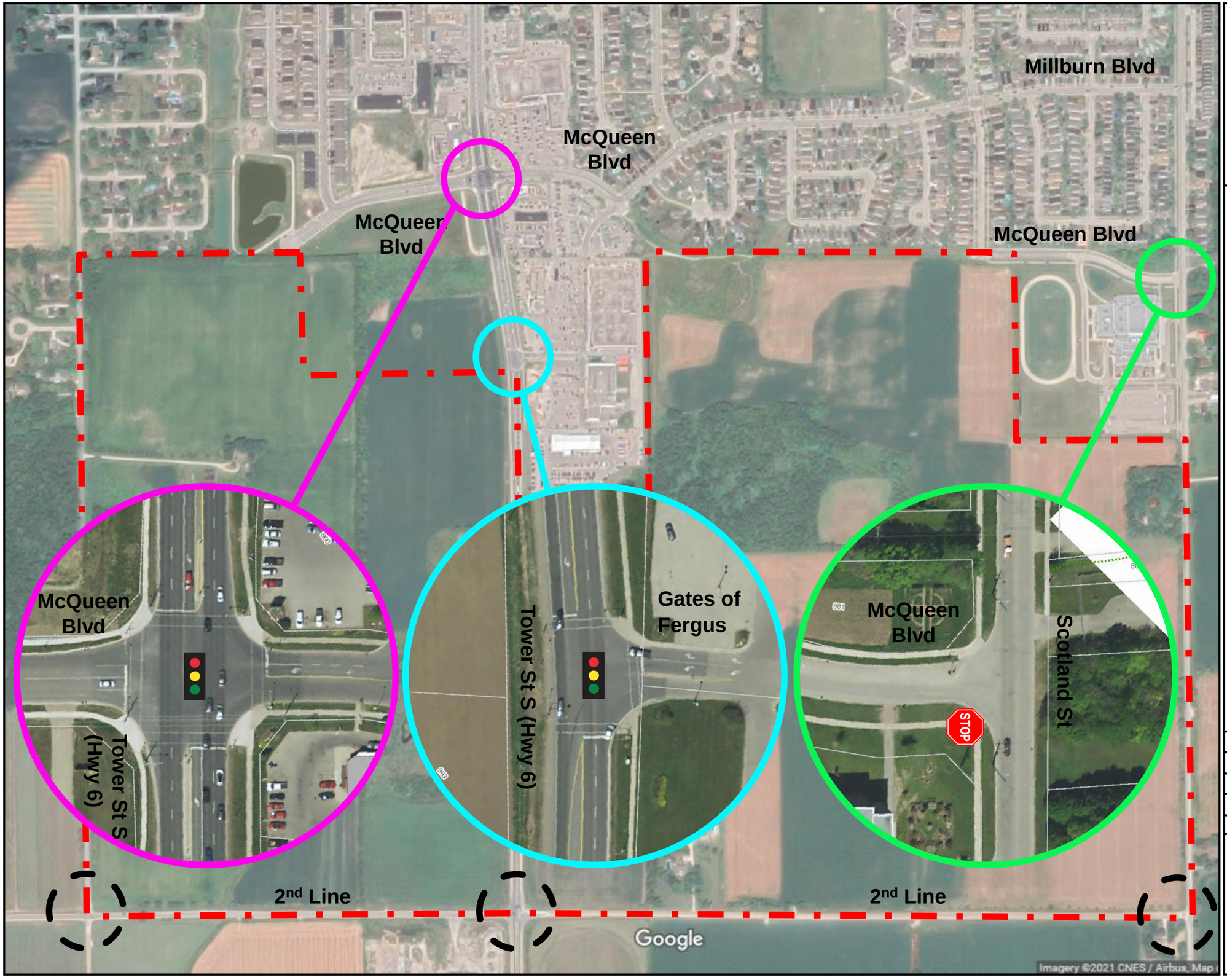
FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

Figure 5a

Key Intersections

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington



Legend

- Key Intersection
- Signal Control
- Stop Control

Source: Google Earth

DATE:	
SCALE:	
FILE:	
DRAWN:	

north

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

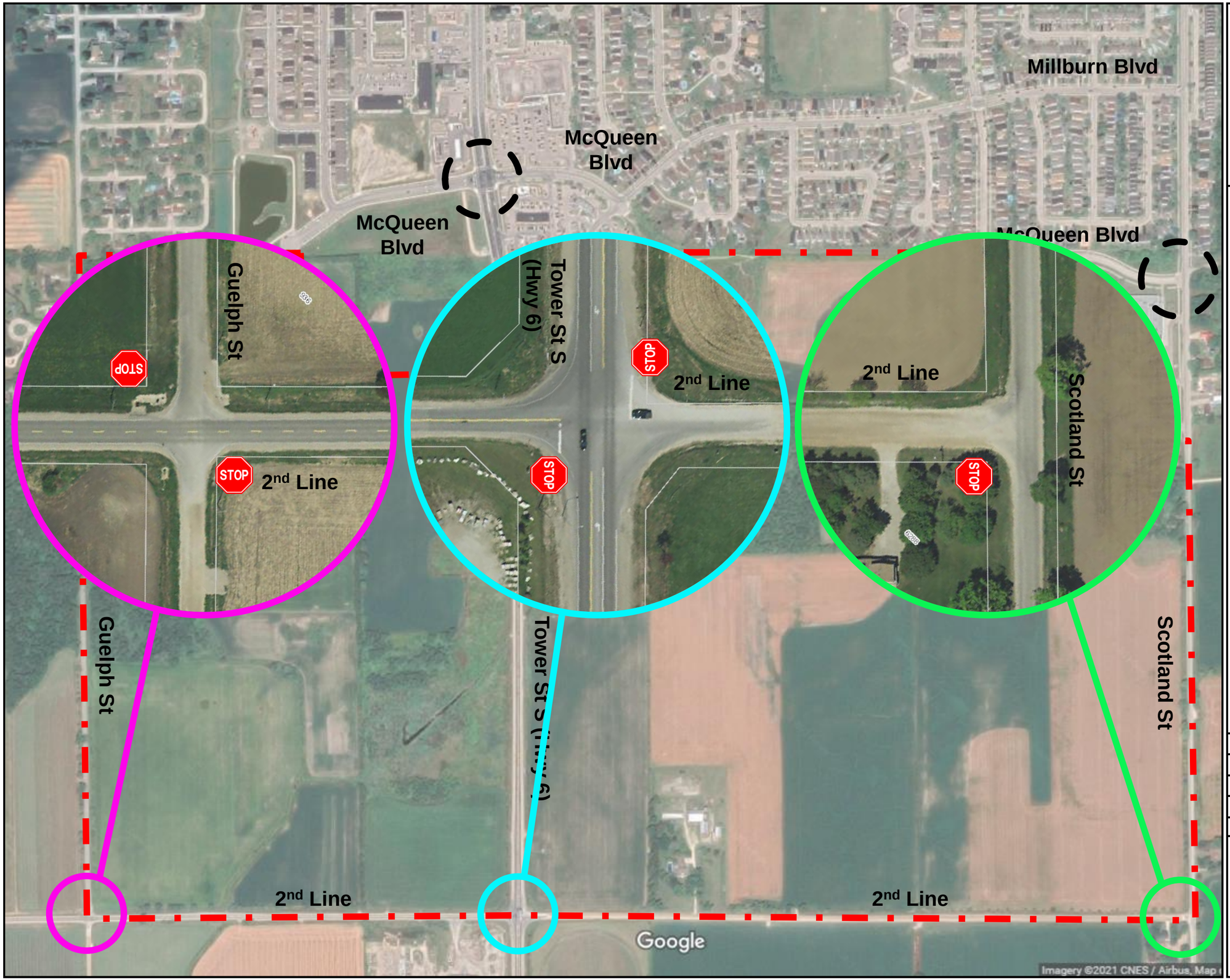


Figure 5b

Key Intersections

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

- Key Intersection
- Signal Control
- Stop Control

Source: Google Earth

DATE:	
SCALE:	
FILE:	
DRAWN:	

north

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

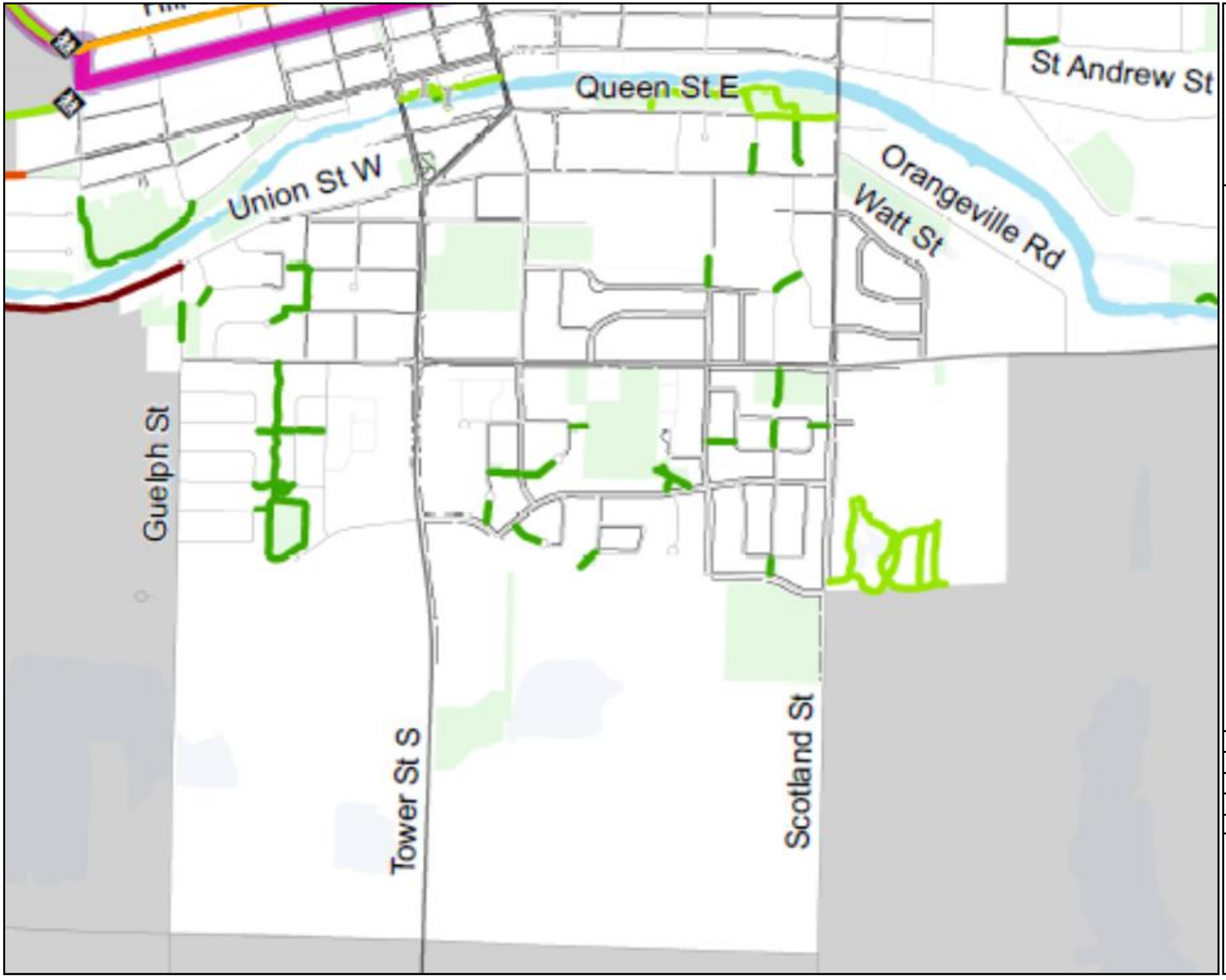


Figure 6

Existing Trail System

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

- Existing Off-Road Trail (County)
- Existing Off-Road Trail (Township)
- Existing Paved Shoulder (County)
- Existing Paved Shoulder (Township)
- Existing Signed Route (Township)
- Sidewalks
- Elora Cataract Trail
- Trans Canada Trail
- Trailhead

Source: *Township of Centre Wellington Transportation Master Plan*

DATE:	
SCALE:	
FILE:	
DRAWN:	

north

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

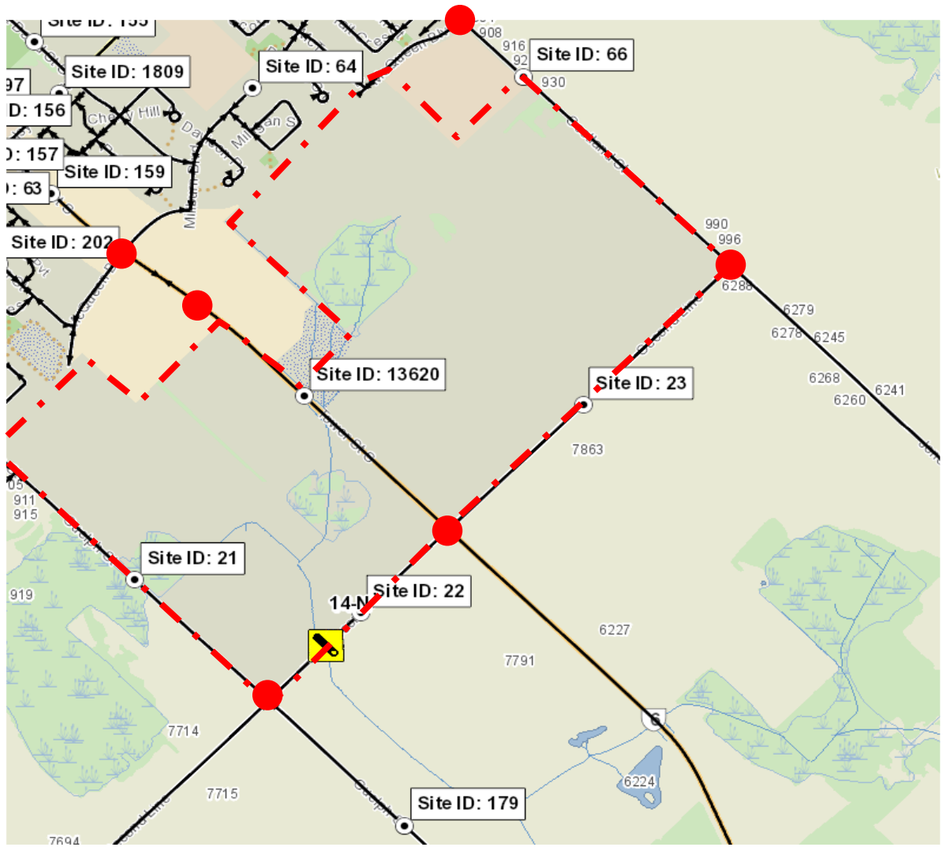


Figure 7

Traffic Count Locations

South Fergus MESP and Secondary Plan
Town of Fergus
Township of Centre Wellington
County of Wellington

Legend

Study Area

Site ID: 65 — Count Station

Intersection Count
(to be completed)

Source: Township of Centre Wellington

DATE:	
SCALE:	
FILE:	
DRAWN:	

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FRICORP ECOLOGICAL SERVICES

TATHAM ENGINEERING

Appendix A: Traffic Counts

Report-1.1

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **East**

Dates : **5/10/2016**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
2:00	**2:15**				1										**1**	0.2%
2:15	**2:30**															
2:30	**2:45**			1											**1**	0.2%
2:45	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**		1												**1**	0.2%
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**			1											**1**	0.2%
5:00	**5:15**		2	1											**3**	0.7%
5:15	**5:30**		4												**4**	0.9%
5:30	**5:45**		1	1											**2**	0.4%
5:45	**6:00**		1	1											**2**	0.4%
6:00	**6:15**			3											**3**	0.7%
6:15	**6:30**		1	1											**2**	0.4%
6:30	**6:45**		2	1											**3**	0.7%
6:45	**7:00**		4	2											**6**	1.3%
7:00	**7:15**		2	1											**3**	0.7%
7:15	**7:30**		11	2	1		1								**15**	3.3%
7:30	**7:45**		4	1	1		1								**7**	1.5%
7:45	**8:00**		6	3	1										**10**	2.2%
8:00	**8:15**		9	7											**16**	3.5%
8:15	**8:30**		10	1											**11**	2.4%
8:30	**8:45**	1	11	4	1		1								**18**	4.0%
8:45	**9:00**		2												**2**	0.4%
9:00	**9:15**		3	3											**6**	1.3%
9:15	**9:30**		1	6											**7**	1.5%
9:30	**9:45**		4	4	1										**9**	2.0%
9:45	**10:00**		3			1	1		1						**6**	1.3%
10:00	**10:15**		1												**1**	0.2%
10:15	**10:30**		2	1											**3**	0.7%
10:30	**10:45**		1	1										1	**3**	0.7%
10:45	**11:00**		2		1										**3**	0.7%
11:00	**11:15**		2	2											**4**	0.9%
11:15	**11:30**		3												**3**	0.7%
11:30	**11:45**		2	1		1			1						**5**	1.1%
11:45	**12:00**		4	1	1										**6**	1.3%

12:00	**12:15**		5	1									**6**	1.3%
12:15	**12:30**		6	1									**7**	1.5%
12:30	**12:45**		5	1	1								**7**	1.5%
12:45	**13:00**		4	1									**5**	1.1%
13:00	**13:15**		6	1									**7**	1.5%
13:15	**13:30**		5	2									**7**	1.5%
13:30	**13:45**		7	2									**9**	2.0%
13:45	**14:00**		2	2									**4**	0.9%
14:00	**14:15**		1	2									**3**	0.7%
14:15	**14:30**		4		1					1			**6**	1.3%
14:30	**14:45**		1	4		1	1						**7**	1.5%
14:45	**15:00**		8	2	1								**11**	2.4%
15:00	**15:15**		6	2									**8**	1.8%
15:15	**15:30**		5	3		1							**9**	2.0%
15:30	**15:45**		1	2				1					**4**	0.9%
15:45	**16:00**		7	2	1			1					**11**	2.4%
16:00	**16:15**		5	1				1	1				**8**	1.8%
16:15	**16:30**		7	2									**9**	2.0%
16:30	**16:45**		10										**10**	2.2%
16:45	**17:00**		11	4									**15**	3.3%
17:00	**17:15**		14	3									**17**	3.8%
17:15	**17:30**		8	5							1		**14**	3.1%
17:30	**17:45**		9	2	1								**12**	2.6%
17:45	**18:00**		4	4									**8**	1.8%
18:00	**18:15**		2	1									**3**	0.7%
18:15	**18:30**		5	3									**8**	1.8%
18:30	**18:45**		4	5									**9**	2.0%
18:45	**19:00**		7	2									**9**	2.0%
19:00	**19:15**		1	1									**2**	0.4%
19:15	**19:30**		3	2									**5**	1.1%
19:30	**19:45**		8	1									**9**	2.0%
19:45	**20:00**		3	1									**4**	0.9%
20:00	**20:15**		2										**2**	0.4%
20:15	**20:30**		2	1									**3**	0.7%
20:30	**20:45**		3	1									**4**	0.9%
20:45	**21:00**		3	3									**6**	1.3%
21:00	**21:15**		3	4									**7**	1.5%
21:15	**21:30**		1						1				**2**	0.4%
21:30	**21:45**													
21:45	**22:00**													
22:00	**22:15**													
22:15	**22:30**		2										**2**	0.4%
22:30	**22:45**													
22:45	**23:00**		3										**3**	0.7%
23:00	**23:15**													
23:15	**23:30**													
23:30	**23:45**		2										**2**	0.4%
23:45	**OO:OO**		1	1									**2**	0.4%
Total		**1**	**295**	**125**	**13**	**4**	**5**	**5**	**2**	**1**	**1**	**1**	**453**	
		0.2%	65.1%	27.6%	2.9%	0.9%	1.1%	1.1%	0.4%	0.2%	0.2%	0.2%		
AM PEAK		**1**	**11**	**7**	**1**	**1**	**1**	**1**				**1**	**18**	
period		8:30	7:15	8:00	2:00	9:45	7:15	9:45				10:30	8:30	
% of class		100.0%	3.7%	5.6%	7.7%	25.0%	20.0%	20.0%				100.0%		4.0%
PM PEAK			**14**	**5**	**1**	**1**	**1**	**1**	**1**	**1**	**1**		**17**	
period			17:00	17:15	12:30	14:30	14:30	15:30	16:00	14:15	17:15		17:00	
% of class			4.7%	4.0%	7.7%	25.0%	20.0%	20.0%	50.0%	100.0%	100.0%			3.8%

Report-1.2

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **East**

Dates : **5/11/2016**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**		1												**1**	0.2%
0:15	**0:30**															
0:30	**0:45**			1	1										**2**	0.3%
0:45	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**			1											**1**	0.2%
1:45	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**			2											**2**	0.3%
2:45	**3:00**															
3:00	**3:15**															
3:15	**3:30**			1											**1**	0.2%
3:30	**3:45**															
3:45	**4:00**			1											**1**	0.2%
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
5:00	**5:15**		2	1											**3**	0.5%
5:15	**5:30**		1	1											**2**	0.3%
5:30	**5:45**		1	1											**2**	0.3%
5:45	**6:00**			2											**2**	0.3%
6:00	**6:15**			1											**1**	0.2%
6:15	**6:30**			2											**2**	0.3%
6:30	**6:45**		3	1		1									**5**	0.9%
6:45	**7:00**		5	2											**7**	1.2%
7:00	**7:15**			3	1										**4**	0.7%
7:15	**7:30**		7	2			1								**10**	1.7%
7:30	**7:45**		12	1	2		1								**16**	2.8%
7:45	**8:00**		10	3											**13**	2.3%
8:00	**8:15**		6	4											**10**	1.7%
8:15	**8:30**		8	3	1										**12**	2.1%
8:30	**8:45**		14	1	1										**16**	2.8%
8:45	**9:00**	1	12	1											**14**	2.4%
9:00	**9:15**		3		1										**4**	0.7%
9:15	**9:30**		3	3					1						**7**	1.2%
9:30	**9:45**		4	1						1					**6**	1.0%
9:45	**10:00**		3	2											**5**	0.9%
10:00	**10:15**		2	1											**3**	0.5%
10:15	**10:30**		1	1											**2**	0.3%
10:30	**10:45**		3	3											**6**	1.0%
10:45	**11:00**		1		1		1								**3**	0.5%
11:00	**11:15**		2	1	2										**5**	0.9%
11:15	**11:30**		2	1											**3**	0.5%
11:30	**11:45**		6	2			1					1			**10**	1.7%
11:45	**12:00**		3	3		1									**7**	1.2%

12:00	**12:15**		4	3							**7**	1.2%
12:15	**12:30**		2	1							**3**	0.5%
12:30	**12:45**		3	2							**5**	0.9%
12:45	**13:00**		4	2							**6**	1.0%
13:00	**13:15**		1	3							**4**	0.7%
13:15	**13:30**		1	2			2				**5**	0.9%
13:30	**13:45**		2	2							**4**	0.7%
13:45	**14:00**		3	1		1					**5**	0.9%
14:00	**14:15**		6								**6**	1.0%
14:15	**14:30**		5	1			1		1		**8**	1.4%
14:30	**14:45**		5	1				1			**7**	1.2%
14:45	**15:00**		2								**2**	0.3%
15:00	**15:15**		4	1							**5**	0.9%
15:15	**15:30**		5	1	1						**7**	1.2%
15:30	**15:45**		11	2							**13**	2.3%
15:45	**16:00**		4	1	1				1		**7**	1.2%
16:00	**16:15**		5	2							**7**	1.2%
16:15	**16:30**		14	7			1	1			**23**	4.0%
16:30	**16:45**		27	16							**43**	7.5%
16:45	**17:00**		11								**11**	1.9%
17:00	**17:15**		53	8	1			1	1	1	**65**	11.3%
17:15	**17:30**		11	9	1						**21**	3.6%
17:30	**17:45**		11	3							**14**	2.4%
17:45	**18:00**		10	7							**17**	3.0%
18:00	**18:15**		7	4							**11**	1.9%
18:15	**18:30**		4	5							**9**	1.6%
18:30	**18:45**		6	1							**7**	1.2%
18:45	**19:00**		5	2							**7**	1.2%
19:00	**19:15**		4	1	1						**6**	1.0%
19:15	**19:30**		6	6							**12**	2.1%
19:30	**19:45**		3								**3**	0.5%
19:45	**20:00**		1	1							**2**	0.3%
20:00	**20:15**		4	1							**5**	0.9%
20:15	**20:30**		2	1							**3**	0.5%
20:30	**20:45**		3								**3**	0.5%
20:45	**21:00**		3								**3**	0.5%
21:00	**21:15**		5								**5**	0.9%
21:15	**21:30**			1							**1**	0.2%
21:30	**21:45**		2								**2**	0.3%
21:45	**22:00**		2								**2**	0.3%
22:00	**22:15**		1	1							**2**	0.3%
22:15	**22:30**			1							**1**	0.2%
22:30	**22:45**		1								**1**	0.2%
22:45	**23:00**											
23:00	**23:15**		1	1							**2**	0.3%
23:15	**23:30**		1	2							**3**	0.5%
23:30	**23:45**		2								**2**	0.3%
23:45	**OO:OO**		1								**1**	0.2%
Total		**1**	**383**	**156**	**15**	**3**	**8**	**4**	**4**	**2**	**576**	
		0.2%	66.5%	27.1%	2.6%	0.5%	1.4%	0.7%	0.7%	0.3%		
AM PEAK		**1**	**14**	**4**	**2**	**1**	**1**	**1**	**1**	**1**	**16**	
period		8:45	8:30	8:00	7:30	6:30	7:15	9:15	9:30	11:30	7:30	
% of class		100.0%	3.7%	2.6%	13.3%	33.3%	12.5%	25.0%	25.0%	50.0%		2.8%
PM PEAK			**53**	**16**	**1**	**1**	**2**	**1**	**1**	**1**	**65**	
period			17:00	16:30	15:15	13:45	13:15	14:30	14:15	17:00	17:00	
% of class			13.8%	10.3%	6.7%	33.3%	25.0%	25.0%	25.0%	50.0%		11.3%

Report-1.3

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **West**

Dates : **5/10/2016**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**			1	1										**2**	0.5%
2:45	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
5:00	**5:15**															
5:15	**5:30**		1												**1**	0.3%
5:30	**5:45**		2												**2**	0.5%
5:45	**6:00**															
6:00	**6:15**		1	1											**2**	0.5%
6:15	**6:30**		1	2											**3**	0.8%
6:30	**6:45**		1	1											**2**	0.5%
6:45	**7:00**		1	1											**2**	0.5%
7:00	**7:15**		4	3											**7**	1.9%
7:15	**7:30**		11	4											**15**	4.0%
7:30	**7:45**		1	3											**4**	1.1%
7:45	**8:00**		5	1											**6**	1.6%
8:00	**8:15**		5	6											**11**	3.0%
8:15	**8:30**		3	1											**4**	1.1%
8:30	**8:45**		3	3					1						**7**	1.9%
8:45	**9:00**		8	5											**13**	3.5%
9:00	**9:15**		4	1											**5**	1.3%
9:15	**9:30**		4	1											**5**	1.3%
9:30	**9:45**			3											**3**	0.8%
9:45	**10:00**		3	3											**6**	1.6%
10:00	**10:15**			8											**8**	2.2%
10:15	**10:30**		4			1	1								**6**	1.6%
10:30	**10:45**			1		1									**2**	0.5%
10:45	**11:00**			1											**1**	0.3%
11:00	**11:15**		2	2											**4**	1.1%
11:15	**11:30**		4												**4**	1.1%
11:30	**11:45**		3	2					1						**6**	1.6%
11:45	**12:00**		4	2	1	1									**8**	2.2%

12:00	**12:15**		1	2					**3**	0.8%
12:15	**12:30**		8	1					**9**	2.4%
12:30	**12:45**		5						**5**	1.3%
12:45	**13:00**		1	2					**3**	0.8%
13:00	**13:15**		3						**3**	0.8%
13:15	**13:30**		3	1					**4**	1.1%
13:30	**13:45**			1					**1**	0.3%
13:45	**14:00**		3	2					**5**	1.3%
14:00	**14:15**		3	1					**4**	1.1%
14:15	**14:30**		4						**4**	1.1%
14:30	**14:45**		2		1				**3**	0.8%
14:45	**15:00**		2	1	1			1	**5**	1.3%
15:00	**15:15**		5	1		1			**7**	1.9%
15:15	**15:30**		20	4	1				**25**	6.7%
15:30	**15:45**		7	2	1				**10**	2.7%
15:45	**16:00**		6	1					**7**	1.9%
16:00	**16:15**		2	4					**6**	1.6%
16:15	**16:30**		5						**5**	1.3%
16:30	**16:45**		4	5					**9**	2.4%
16:45	**17:00**		3	2					**5**	1.3%
17:00	**17:15**		7						**7**	1.9%
17:15	**17:30**		2	3					**5**	1.3%
17:30	**17:45**		11	3					**14**	3.8%
17:45	**18:00**		3	1					**4**	1.1%
18:00	**18:15**		10	3					**13**	3.5%
18:15	**18:30**		5	3					**8**	2.2%
18:30	**18:45**		1						**1**	0.3%
18:45	**19:00**		5	5					**10**	2.7%
19:00	**19:15**		2	1			1		**4**	1.1%
19:15	**19:30**		3	1					**4**	1.1%
19:30	**19:45**		1	2					**3**	0.8%
19:45	**20:00**		4	2					**6**	1.6%
20:00	**20:15**		3	2				1	**6**	1.6%
20:15	**20:30**		2	1					**3**	0.8%
20:30	**20:45**		1						**1**	0.3%
20:45	**21:00**			2					**2**	0.5%
21:00	**21:15**		4						**4**	1.1%
21:15	**21:30**		3						**3**	0.8%
21:30	**21:45**		2						**2**	0.5%
21:45	**22:00**									
22:00	**22:15**		3						**3**	0.8%
22:15	**22:30**			2					**2**	0.5%
22:30	**22:45**									
22:45	**23:00**		1						**1**	0.3%
23:00	**23:15**	1	1						**2**	0.5%
23:15	**23:30**									
23:30	**23:45**									
23:45	**OO:OO**			1					**1**	0.3%
Total		**1**	**236**	**118**	**6**	**4**	**2**	**4**	**371**	
		0.3%	63.6%	31.8%	1.6%	1.1%	0.5%	1.1%		
AM PEAK			**11**	**8**	**1**	**1**	**1**	**1**	**15**	
period			7:15	10:00	2:30	10:15	10:15	8:30	7:15	
% of class			4.7%	6.8%	16.7%	25.0%	50.0%	25.0%		4.0%
PM PEAK		**1**	**20**	**5**	**1**	**1**	**1**	**1**	**25**	
period		23:00	15:15	16:30	14:30	15:00	19:00	14:45	15:15	
% of class		100.0%	8.5%	4.2%	16.7%	25.0%	50.0%	25.0%		6.7%

Report-1.4

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **West**

Dates : **5/11/2016**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**		1		1										**2**	0.5%
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**			1											**1**	0.2%
2:45	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**			1											**1**	0.2%
3:45	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**			1						1					**2**	0.5%
5:00	**5:15**			1											**1**	0.2%
5:15	**5:30**		2												**2**	0.5%
5:30	**5:45**		1	1											**2**	0.5%
5:45	**6:00**			1											**1**	0.2%
6:00	**6:15**		1	2											**3**	0.7%
6:15	**6:30**		1	1											**2**	0.5%
6:30	**6:45**		2	2											**4**	1.0%
6:45	**7:00**		4	3											**7**	1.7%
7:00	**7:15**		2	4											**6**	1.4%
7:15	**7:30**		7	2											**9**	2.1%
7:30	**7:45**		2	1											**3**	0.7%
7:45	**8:00**		5	2			1								**8**	1.9%
8:00	**8:15**	1	4	6											**11**	2.6%
8:15	**8:30**		4	6											**10**	2.4%
8:30	**8:45**		9	4	1										**14**	3.3%
8:45	**9:00**		4	2											**6**	1.4%
9:00	**9:15**		6		1										**7**	1.7%
9:15	**9:30**		2	3											**5**	1.2%
9:30	**9:45**		1	4											**5**	1.2%
9:45	**10:00**		1	1	1										**3**	0.7%
10:00	**10:15**		2	2											**4**	1.0%
10:15	**10:30**		1	1											**2**	0.5%
10:30	**10:45**		4	4											**8**	1.9%
10:45	**11:00**		3												**3**	0.7%
11:00	**11:15**		2	1											**3**	0.7%
11:15	**11:30**		6	1											**7**	1.7%
11:30	**11:45**			4											**4**	1.0%
11:45	**12:00**		2	5											**7**	1.7%

12:00	**12:15**			1						**1**	0.2%
12:15	**12:30**		7							**7**	1.7%
12:30	**12:45**		3	4						**7**	1.7%
12:45	**13:00**		3	2						**5**	1.2%
13:00	**13:15**		6	4		1			1	**12**	2.9%
13:15	**13:30**		1	5						**6**	1.4%
13:30	**13:45**		2	2						**4**	1.0%
13:45	**14:00**										
14:00	**14:15**		3	3	1					**7**	1.7%
14:15	**14:30**		4							**4**	1.0%
14:30	**14:45**			5						**5**	1.2%
14:45	**15:00**		2	6						**8**	1.9%
15:00	**15:15**		5	5						**10**	2.4%
15:15	**15:30**		18	9	2		1			**30**	7.1%
15:30	**15:45**		10	3						**13**	3.1%
15:45	**16:00**		3	5			1			**9**	2.1%
16:00	**16:15**		1	1			1			**3**	0.7%
16:15	**16:30**		5	1						**6**	1.4%
16:30	**16:45**		5	1			1			**7**	1.7%
16:45	**17:00**		4	8						**12**	2.9%
17:00	**17:15**		6	5						**11**	2.6%
17:15	**17:30**		4	2	1					**7**	1.7%
17:30	**17:45**		4	2				1		**7**	1.7%
17:45	**18:00**		4	7				1		**12**	2.9%
18:00	**18:15**		3	3				1		**7**	1.7%
18:15	**18:30**		5	4						**9**	2.1%
18:30	**18:45**		5	1						**6**	1.4%
18:45	**19:00**		3	1		1				**5**	1.2%
19:00	**19:15**		2	1						**3**	0.7%
19:15	**19:30**			2						**2**	0.5%
19:30	**19:45**		1	3						**4**	1.0%
19:45	**20:00**		2	3	1					**6**	1.4%
20:00	**20:15**		1	3						**4**	1.0%
20:15	**20:30**		2	1						**3**	0.7%
20:30	**20:45**		6	1						**7**	1.7%
20:45	**21:00**		2							**2**	0.5%
21:00	**21:15**		2	1						**3**	0.7%
21:15	**21:30**		2							**2**	0.5%
21:30	**21:45**		1	1						**2**	0.5%
21:45	**22:00**										
22:00	**22:15**		2							**2**	0.5%
22:15	**22:30**		2							**2**	0.5%
22:30	**22:45**		1							**1**	0.2%
22:45	**23:00**										
23:00	**23:15**										
23:15	**23:30**		3							**3**	0.7%
23:30	**23:45**			1						**1**	0.2%
23:45	**OO:OO**		1							**1**	0.2%
Total		**1**	**225**	**174**	**9**	**2**	**5**	**3**	**2**	**421**	
		0.2%	53.4%	41.3%	2.1%	0.5%	1.2%	0.7%	0.5%		
AM PEAK		**1**	**9**	**6**	**1**		**1**		**1**	**14**	
period		8:00	8:30	8:00	0:45		7:45		4:45	8:30	
% of class		100.0%	4.0%	3.4%	11.1%		20.0%		50.0%		3.3%
PM PEAK			**18**	**9**	**2**	**1**	**1**	**1**	**1**	**30**	
period			15:15	15:15	15:15	13:00	15:15	17:30	13:00	15:15	
% of class			8.0%	5.2%	22.2%	50.0%	20.0%	33.3%	50.0%		7.1%

Report-1.5

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **East + West**

Dates : **5/10/2016**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
2:00	**2:15**				1										**1**	0.1%
2:15	**2:30**															
2:30	**2:45**			2	1										**3**	0.4%
2:45	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**		1												**1**	0.1%
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**			1											**1**	0.1%
5:00	**5:15**		2	1											**3**	0.4%
5:15	**5:30**		5												**5**	0.6%
5:30	**5:45**		3	1											**4**	0.5%
5:45	**6:00**		1	1											**2**	0.2%
6:00	**6:15**		1	4											**5**	0.6%
6:15	**6:30**		2	3											**5**	0.6%
6:30	**6:45**		3	2											**5**	0.6%
6:45	**7:00**		5	3											**8**	1.0%
7:00	**7:15**		6	4											**10**	1.2%
7:15	**7:30**		22	6	1		1								**30**	3.6%
7:30	**7:45**		5	4	1		1								**11**	1.3%
7:45	**8:00**		11	4	1										**16**	1.9%
8:00	**8:15**		14	13											**27**	3.3%
8:15	**8:30**		13	2											**15**	1.8%
8:30	**8:45**	1	14	7	1		1		1						**25**	3.0%
8:45	**9:00**		10	5											**15**	1.8%
9:00	**9:15**		7	4											**11**	1.3%
9:15	**9:30**		5	7											**12**	1.5%
9:30	**9:45**		4	7	1										**12**	1.5%
9:45	**10:00**		6	3		1	1		1						**12**	1.5%
10:00	**10:15**		1	8											**9**	1.1%
10:15	**10:30**		6	1		1	1								**9**	1.1%
10:30	**10:45**		1	2		1								1	**5**	0.6%
10:45	**11:00**		2	1	1										**4**	0.5%
11:00	**11:15**		4	4											**8**	1.0%
11:15	**11:30**		7												**7**	0.8%
11:30	**11:45**		5	3		1			2						**11**	1.3%
11:45	**12:00**		8	3	2	1									**14**	1.7%

12:00	**12:15**		6	3									**9**	1.1%
12:15	**12:30**		14	2									**16**	1.9%
12:30	**12:45**		10	1	1								**12**	1.5%
12:45	**13:00**		5	3									**8**	1.0%
13:00	**13:15**		9	1									**10**	1.2%
13:15	**13:30**		8	3									**11**	1.3%
13:30	**13:45**		7	3									**10**	1.2%
13:45	**14:00**		5	4									**9**	1.1%
14:00	**14:15**		4	3									**7**	0.8%
14:15	**14:30**		8		1					1			**10**	1.2%
14:30	**14:45**		3	4	1	1	1						**10**	1.2%
14:45	**15:00**		10	3	2			1					**16**	1.9%
15:00	**15:15**		11	3		1							**15**	1.8%
15:15	**15:30**		25	7	1	1							**34**	4.1%
15:30	**15:45**		8	4	1			1					**14**	1.7%
15:45	**16:00**		13	3	1			1					**18**	2.2%
16:00	**16:15**		7	5				1	1				**14**	1.7%
16:15	**16:30**		12	2									**14**	1.7%
16:30	**16:45**		14	5									**19**	2.3%
16:45	**17:00**		14	6									**20**	2.4%
17:00	**17:15**		21	3									**24**	2.9%
17:15	**17:30**		10	8							1		**19**	2.3%
17:30	**17:45**		20	5	1								**26**	3.2%
17:45	**18:00**		7	5									**12**	1.5%
18:00	**18:15**		12	4									**16**	1.9%
18:15	**18:30**		10	6									**16**	1.9%
18:30	**18:45**		5	5									**10**	1.2%
18:45	**19:00**		12	7									**19**	2.3%
19:00	**19:15**		3	2			1						**6**	0.7%
19:15	**19:30**		6	3									**9**	1.1%
19:30	**19:45**		9	3									**12**	1.5%
19:45	**20:00**		7	3									**10**	1.2%
20:00	**20:15**		5	2				1					**8**	1.0%
20:15	**20:30**		4	2									**6**	0.7%
20:30	**20:45**		4	1									**5**	0.6%
20:45	**21:00**		3	5									**8**	1.0%
21:00	**21:15**		7	4									**11**	1.3%
21:15	**21:30**		4						1				**5**	0.6%
21:30	**21:45**		2										**2**	0.2%
21:45	**22:00**													
22:00	**22:15**		3										**3**	0.4%
22:15	**22:30**		2	2									**4**	0.5%
22:30	**22:45**													
22:45	**23:00**		4										**4**	0.5%
23:00	**23:15**	1	1										**2**	0.2%
23:15	**23:30**													
23:30	**23:45**		2										**2**	0.2%
23:45	**OO:OO**		1	2									**3**	0.4%
Total		**2**	**531**	**243**	**19**	**8**	**7**	**9**	**2**	**1**	**1**	**1**	**824**	
		0.2%	64.4%	29.5%	2.3%	1.0%	0.8%	1.1%	0.2%	0.1%	0.1%	0.1%		
AM PEAK		**1**	**22**	**13**	**2**	**1**	**1**	**2**				**1**	**30**	
period		8:30	7:15	8:00	11:45	9:45	7:15	11:30				10:30	7:15	
% of class		50.0%	4.1%	5.3%	10.5%	12.5%	14.3%	22.2%				100.0%		3.6%
PM PEAK		**1**	**25**	**8**	**2**	**1**	**1**	**1**	**1**	**1**	**1**		**34**	
period		23:00	15:15	17:15	14:45	14:30	14:30	14:45	16:00	14:15	17:15		15:15	
% of class		50.0%	4.7%	3.3%	10.5%	12.5%	14.3%	11.1%	50.0%	100.0%	100.0%			4.1%

Report-1.6

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **East + West**

Dates : **5/11/2016**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**		1												**1**	0.1%
0:15	**0:30**															
0:30	**0:45**			1	1										**2**	0.2%
0:45	**1:00**		1		1										**2**	0.2%
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**			1											**1**	0.1%
1:45	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**			3											**3**	0.3%
2:45	**3:00**															
3:00	**3:15**															
3:15	**3:30**			1											**1**	0.1%
3:30	**3:45**			1											**1**	0.1%
3:45	**4:00**			1											**1**	0.1%
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**			1						1					**2**	0.2%
5:00	**5:15**		2	2											**4**	0.4%
5:15	**5:30**		3	1											**4**	0.4%
5:30	**5:45**		2	2											**4**	0.4%
5:45	**6:00**			3											**3**	0.3%
6:00	**6:15**		1	3											**4**	0.4%
6:15	**6:30**		1	3											**4**	0.4%
6:30	**6:45**		5	3		1									**9**	0.9%
6:45	**7:00**		9	5											**14**	1.4%
7:00	**7:15**		2	7	1										**10**	1.0%
7:15	**7:30**		14	4			1								**19**	1.9%
7:30	**7:45**		14	2	2		1								**19**	1.9%
7:45	**8:00**		15	5			1								**21**	2.1%
8:00	**8:15**	1	10	10											**21**	2.1%
8:15	**8:30**		12	9	1										**22**	2.2%
8:30	**8:45**		23	5	2										**30**	3.0%
8:45	**9:00**	1	16	3											**20**	2.0%
9:00	**9:15**		9		2										**11**	1.1%
9:15	**9:30**		5	6					1						**12**	1.2%
9:30	**9:45**		5	5						1					**11**	1.1%
9:45	**10:00**		4	3	1										**8**	0.8%
10:00	**10:15**		4	3											**7**	0.7%
10:15	**10:30**		2	2											**4**	0.4%
10:30	**10:45**		7	7											**14**	1.4%
10:45	**11:00**		4		1		1								**6**	0.6%
11:00	**11:15**		4	2	2										**8**	0.8%
11:15	**11:30**		8	2											**10**	1.0%
11:30	**11:45**		6	6			1					1			**14**	1.4%
11:45	**12:00**		5	8		1									**14**	1.4%

12:00	**12:15**		4	4							**8**	0.8%
12:15	**12:30**		9	1							**10**	1.0%
12:30	**12:45**		6	6							**12**	1.2%
12:45	**13:00**		7	4							**11**	1.1%
13:00	**13:15**		7	7		1			1		**16**	1.6%
13:15	**13:30**		2	7			2				**11**	1.1%
13:30	**13:45**		4	4							**8**	0.8%
13:45	**14:00**		3	1		1					**5**	0.5%
14:00	**14:15**		9	3	1						**13**	1.3%
14:15	**14:30**		9	1			1		1		**12**	1.2%
14:30	**14:45**		5	6				1			**12**	1.2%
14:45	**15:00**		4	6							**10**	1.0%
15:00	**15:15**		9	6							**15**	1.5%
15:15	**15:30**		23	10	3		1				**37**	3.7%
15:30	**15:45**		21	5							**26**	2.6%
15:45	**16:00**		7	6	1		1		1		**16**	1.6%
16:00	**16:15**		6	3			1				**10**	1.0%
16:15	**16:30**		19	8			1	1			**29**	2.9%
16:30	**16:45**		32	17			1				**50**	5.0%
16:45	**17:00**		15	8							**23**	2.3%
17:00	**17:15**		59	13	1			1	1	1	**76**	7.6%
17:15	**17:30**		15	11	2						**28**	2.8%
17:30	**17:45**		15	5				1			**21**	2.1%
17:45	**18:00**		14	14				1			**29**	2.9%
18:00	**18:15**		10	7				1			**18**	1.8%
18:15	**18:30**		9	9							**18**	1.8%
18:30	**18:45**		11	2							**13**	1.3%
18:45	**19:00**		8	3		1					**12**	1.2%
19:00	**19:15**		6	2	1						**9**	0.9%
19:15	**19:30**		6	8							**14**	1.4%
19:30	**19:45**		4	3							**7**	0.7%
19:45	**20:00**		3	4	1						**8**	0.8%
20:00	**20:15**		5	4							**9**	0.9%
20:15	**20:30**		4	2							**6**	0.6%
20:30	**20:45**		9	1							**10**	1.0%
20:45	**21:00**		5								**5**	0.5%
21:00	**21:15**		7	1							**8**	0.8%
21:15	**21:30**		2	1							**3**	0.3%
21:30	**21:45**		3	1							**4**	0.4%
21:45	**22:00**		2								**2**	0.2%
22:00	**22:15**		3	1							**4**	0.4%
22:15	**22:30**		2	1							**3**	0.3%
22:30	**22:45**		2								**2**	0.2%
22:45	**23:00**											
23:00	**23:15**		1	1							**2**	0.2%
23:15	**23:30**		4	2							**6**	0.6%
23:30	**23:45**		2	1							**3**	0.3%
23:45	**OO:OO**		2								**2**	0.2%
Total		**2**	**608**	**330**	**24**	**5**	**13**	**7**	**6**	**2**	**997**	
		0.2%	61.0%	33.1%	2.4%	0.5%	1.3%	0.7%	0.6%	0.2%		
AM PEAK		**1**	**23**	**10**	**2**	**1**	**1**	**1**	**1**	**1**	**30**	
period		8:00	8:30	8:00	7:30	6:30	7:15	9:15	4:45	11:30	8:30	
% of class		50.0%	3.8%	3.0%	8.3%	20.0%	7.7%	14.3%	16.7%	50.0%		3.0%
PM PEAK			**59**	**17**	**3**	**1**	**2**	**1**	**1**	**1**	**76**	
period			17:00	16:30	15:15	13:00	13:15	14:30	13:00	17:00	17:00	
% of class			9.7%	5.2%	12.5%	20.0%	15.4%	14.3%	16.7%	50.0%		7.6%

Report-2.1

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **East**

Dates : **5/10/2016**

Speeds,km/h ------->		25	32	38	42	46	50	54	59	62	67	75	90		Total	Pace Speed	Number in Pace
		25	32	38	42	46	50	54	59	62	67	75	90	97			
OO:OO	**0:15**																
0:15	**0:30**																
0:30	**0:45**																
0:45	**1:00**																
1:00	**1:15**																
1:15	**1:30**																
1:30	**1:45**																
1:45	**2:00**																
2:00	**2:15**											1			**1**	59.6-74.6	1
2:15	**2:30**																
2:30	**2:45**											1			**1**	52.7-67.7	1
2:45	**3:00**																
3:00	**3:15**																
3:15	**3:30**																
3:30	**3:45**																
3:45	**4:00**												1		**1**	61.0-76.0	1
4:00	**4:15**																
4:15	**4:30**																
4:30	**4:45**																
4:45	**5:00**												1		**1**	66.1-81.1	1
5:00	**5:15**					1				2					**3**	47.8-62.8	2
5:15	**5:30**									1			2		**4**	65.8-80.8	2
5:30	**5:45**											2			**2**	52.8-67.8	2
5:45	**6:00**									1			1		**2**	48.6-63.6	1
6:00	**6:15**									1		1		1	**3**	54.1-69.1	2
6:15	**6:30**												1	1	**2**	75.3-90.3	2
6:30	**6:45**									1		1		1	**3**	54.8-69.8	2
6:45	**7:00**									1	1	1	2	1	**6**	57.6-72.6	3
7:00	**7:15**											2		1	**3**	58.8-73.8	2
7:15	**7:30**								1	1	2	5	5		**15**	59.7-74.7	8
7:30	**7:45**								1		1	2	3		**7**	64.4-79.4	5
7:45	**8:00**										1	6	2	1	**10**	62.3-77.3	8
8:00	**8:15**									1	2	8	5		**16**	60.8-75.8	13
8:15	**8:30**									1	2	1	6	1	**11**	66.2-81.2	7
8:30	**8:45**				1			3			1	5	7	1	**18**	66.5-81.5	12
8:45	**9:00**											1	1		**2**	63.8-78.8	2
9:00	**9:15**										1	3	1	1	**6**	61.4-76.4	5
9:15	**9:30**									1	1	3	2		**7**	61.4-76.4	6
9:30	**9:45**								1		1	3	4		**9**	66.8-81.8	7
9:45	**10:00**				1			1			1	2	1		**6**	54.4-69.4	3
10:00	**10:15**												1		**1**	63.2-78.2	1
10:15	**10:30**							1			1		1		**3**	47.5-62.5	2
10:30	**10:45**											2	1		**3**	63.7-78.7	3
10:45	**11:00**											1	2		**3**	63.6-78.6	3
11:00	**11:15**					1							3		**4**	71.4-86.4	3
11:15	**11:30**							1			2				**3**	50.2-65.2	3
11:30	**11:45**							1				3	1		**5**	56.9-71.9	3
11:45	**12:00**								3		1	2			**6**	56.2-71.2	6

12:00	**12:15**				2			1	1	1		**6**	51.7-66.7	3
12:15	**12:30**					1	1	2	1	1	1	**7**	55.7-70.7	5
12:30	**12:45**						1	1	3	2		**7**	61.6-76.6	6
12:45	**13:00**				1			1	1	1	1	**5**	47.9-62.9	2
13:00	**13:15**							1	2	4		**7**	60.6-75.6	6
13:15	**13:30**					1		1	4	1		**7**	62.3-77.3	6
13:30	**13:45**	1			1	1		2	2	2		**9**	60.8-75.8	5
13:45	**14:00**									4		**4**	72.8-87.8	4
14:00	**14:15**					1				2		**3**	67.3-82.3	2
14:15	**14:30**					1		1	2	1	1	**6**	55.4-70.4	4
14:30	**14:45**				1	2	3		1			**7**	45.5-60.5	6
14:45	**15:00**					1	1	1	2	5		**11**	70.2-85.2	6
15:00	**15:15**				1			2	1	4		**8**	71.0-86.0	5
15:15	**15:30**					1		1	1	5		**9**	67.7-82.7	5
15:30	**15:45**		1							2	1	**4**	68.4-83.4	2
15:45	**16:00**						1		5	4		**11**	67.5-82.5	8
16:00	**16:15**						2	1	4	1		**8**	58.9-73.9	7
16:15	**16:30**							1	3	4	1	**9**	64.5-79.5	5
16:30	**16:45**							3	2	5		**10**	60.7-75.7	6
16:45	**17:00**		1		1			1	4	7	1	**15**	68.9-83.9	10
17:00	**17:15**				1		1	2	6	7		**17**	60.5-75.5	10
17:15	**17:30**					1			2	9	2	**14**	71.6-86.6	10
17:30	**17:45**				1				2	7	1	**12**	67.3-82.3	8
17:45	**18:00**				1			2	1	3	1	**8**	62.2-77.2	4
18:00	**18:15**							1	1	1		**3**	59.9-74.9	2
18:15	**18:30**						1	1	2	4		**8**	61.7-76.7	5
18:30	**18:45**		1			1		1	3	3		**9**	61.0-76.0	6
18:45	**19:00**							3	3	2		**9**	56.5-71.5	6
19:00	**19:15**								1	1		**2**	64.4-79.4	2
19:15	**19:30**							1	1	3		**5**	62.5-77.5	5
19:30	**19:45**				1	1		1	2	4		**9**	62.6-77.6	6
19:45	**20:00**								2	2		**4**	70.3-85.3	3
20:00	**20:15**		1					1				**2**	31.8-46.8	1
20:15	**20:30**					1				2		**3**	72.8-87.8	2
20:30	**20:45**							1		1	1	**4**	63.9-78.9	2
20:45	**21:00**						1	3	1		1	**6**	54.1-69.1	5
21:00	**21:15**							2	3	2		**7**	60.2-75.2	6
21:15	**21:30**						1	1				**2**	49.2-64.2	2
21:30	**21:45**													
21:45	**22:00**													
22:00	**22:15**													
22:15	**22:30**									1	1	**2**	77.2-92.2	2
22:30	**22:45**													
22:45	**23:00**	1	1						1			**3**	33.3-48.3	2
23:00	**23:15**													
23:15	**23:30**													
23:30	**23:45**								2			**2**	59.5-74.5	2
23:45	**OO:OO**								1	1		**2**	68.6-83.6	2
Total		**4**	**7**	**18**	**19**	**18**	**64**	**129**	**163**	**22**		**453**		
		0.9%	1.5%	4.0%	4.2%	4.0%	14.1%	28.5%	36.0%	4.9%				
AM PEAK		**1**	**1**	**3**	**3**	**1**	**2**	**8**	**7**	**1**		**18**		
period		8:30	5:00	8:30	11:45	6:45	5:00	8:00	8:30	6:00		8:30		
% of class		25.0%	14.3%	16.7%	15.8%	5.6%	3.1%	6.2%	4.3%	4.5%			4.0%	
PM PEAK		**1**	**1**	**2**	**2**	**3**	**3**	**6**	**9**	**2**		**17**		
period		13:30	15:30	12:00	14:30	14:30	16:30	17:00	17:15	17:15		17:00		
% of class		25.0%	14.3%	11.1%	10.5%	16.7%	4.7%	4.7%	5.5%	9.1%			3.8%	

15% Percentile :	**62**	KPH
50% Percentile :	**73**	KPH
85% Percentile :	**87**	KPH
95% Percentile :	**93**	KPH

15 KPH Pace Speed:	**64.6-79.6**	KPH
Number in Pace:	**240**	
Percent in Pace:	**53.0**	%
Number of Vehicles >80 KPH:	**131**	
Percent of Vehicles >80 KPH:	**28.9**	%
Mean Speed(average):	**71**	KPH

Report-2.2

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **East**

Dates : **5/11/2016**

Speeds,km/h -------->		25	32	38	42	46	50	54	59	62	67	75	90		Total	Pace Speed	Number in Pace
		25	32	38	42	46	50	54	59	62	67	75	90	97			
OO:OO	**0:15**										1				**1**	50.7-65.7	1
0:15	**0:30**																
0:30	**0:45**											1	1		**2**	70.2-85.2	2
0:45	**1:00**																
1:00	**1:15**																
1:15	**1:30**																
1:30	**1:45**											1			**1**	52.2-67.2	1
1:45	**2:00**																
2:00	**2:15**																
2:15	**2:30**																
2:30	**2:45**							1				1			**2**	43.1-58.1	1
2:45	**3:00**																
3:00	**3:15**																
3:15	**3:30**								1						**1**	47.0-62.0	1
3:30	**3:45**																
3:45	**4:00**						1								**1**	38.9-53.9	1
4:00	**4:15**																
4:15	**4:30**																
4:30	**4:45**																
4:45	**5:00**																
5:00	**5:15**						1			1			1		**3**	49.4-64.4	2
5:15	**5:30**								1				1		**2**	46.3-61.3	1
5:30	**5:45**											2			**2**	56.1-71.1	2
5:45	**6:00**												1	1	**2**	77.9-92.9	2
6:00	**6:15**								1						**1**	46.5-61.5	1
6:15	**6:30**									1				1	**2**	50.8-65.8	1
6:30	**6:45**											1	4		**5**	72.1-87.1	5
6:45	**7:00**							2				3	1	1	**7**	52.4-67.4	4
7:00	**7:15**									1		1	2		**4**	62.4-77.4	3
7:15	**7:30**									1		2	4	3	**10**	63.5-78.5	5
7:30	**7:45**						1		1	2		5	4	2	**16**	57.8-72.8	8
7:45	**8:00**									3		4	4	2	**13**	64.1-79.1	10
8:00	**8:15**						1			2		3	4		**10**	62.3-77.3	7
8:15	**8:30**				1	1			1	4		3	2		**12**	53.0-68.0	8
8:30	**8:45**							1		4		5	5	1	**16**	61.7-76.7	12
8:45	**9:00**							1		1		7	4	1	**14**	63.3-78.3	11
9:00	**9:15**									1		2	1		**4**	60.5-75.5	4
9:15	**9:30**							1				4	2		**7**	65.4-80.4	6
9:30	**9:45**						1					3	1	1	**6**	58.4-73.4	3
9:45	**10:00**				2			1	1			1			**5**	24.6-39.6	2
10:00	**10:15**							1		1		1			**3**	52.6-67.6	3
10:15	**10:30**												2		**2**	71.2-86.2	2
10:30	**10:45**									1		2	2	1	**6**	62.2-77.2	5
10:45	**11:00**									1			1	1	**3**	49.1-64.1	1
11:00	**11:15**									1		3			**5**	57.4-72.4	4
11:15	**11:30**									1		1	1		**3**	58.0-73.0	2
11:30	**11:45**					1	1					1	6	1	**10**	67.5-82.5	6
11:45	**12:00**								1	1		3	1	1	**7**	54.8-69.8	5

12:00	**12:15**				1					1	1	2	2		**7**	57.5-72.5	4
12:15	**12:30**										2	1			**3**	53.7-68.7	3
12:30	**12:45**						1			1		1	1		**5**	52.5-67.5	3
12:45	**13:00**											2	3	1	**6**	69.1-84.1	5
13:00	**13:15**							1					2	1	**4**	63.1-78.1	2
13:15	**13:30**					1					1	1	2		**5**	67.4-82.4	3
13:30	**13:45**										1		3		**4**	73.7-88.7	3
13:45	**14:00**				1							1	2		**5**	69.5-84.5	3
14:00	**14:15**									1	4	1			**6**	54.2-69.2	6
14:15	**14:30**							1		1	2	1	2	1	**8**	53.7-68.7	5
14:30	**14:45**							1			2	2	2		**7**	64.0-79.0	6
14:45	**15:00**				1			1							**2**	41.8-56.8	2
15:00	**15:15**							1		1	1		1	1	**5**	47.2-62.2	3
15:15	**15:30**										1	3	1	2	**7**	62.9-77.9	5
15:30	**15:45**										3	6	3		**13**	64.5-79.5	11
15:45	**16:00**						1					5	1		**7**	60.0-75.0	5
16:00	**16:15**							1			1	1	4		**7**	69.1-84.1	5
16:15	**16:30**							2			4	9	7		**23**	62.6-77.6	16
16:30	**16:45**				1			1			5	20	16		**43**	61.1-76.1	31
16:45	**17:00**										1	5	5		**11**	67.5-82.5	10
17:00	**17:15**						4	2		12	18	11	17		**65**	58.7-73.7	40
17:15	**17:30**							1			1	8	9	1	**21**	64.2-79.2	13
17:30	**17:45**							2			3	4	3	2	**14**	56.2-71.2	9
17:45	**18:00**							2			3	4	5	2	**17**	60.1-75.1	8
18:00	**18:15**		1				1					2	5	2	**11**	71.3-86.3	6
18:15	**18:30**											4	4		**9**	72.7-87.7	8
18:30	**18:45**							1		1		2	1	1	**7**	55.3-70.3	3
18:45	**19:00**											1	4	2	**7**	71.9-86.9	5
19:00	**19:15**										1	2	3		**6**	71.4-86.4	4
19:15	**19:30**						1	1		1	3	2	4		**12**	52.2-67.2	7
19:30	**19:45**										1	2			**3**	59.8-74.8	3
19:45	**20:00**						1						1		**2**	38.3-53.3	1
20:00	**20:15**										1		4		**5**	72.7-87.7	4
20:15	**20:30**						1	1				1			**3**	43.8-58.8	2
20:30	**20:45**												2	1	**3**	64.2-79.2	2
20:45	**21:00**											1	2		**3**	61.3-76.3	3
21:00	**21:15**										1	2	2		**5**	64.6-79.6	4
21:15	**21:30**												1		**1**	64.6-79.6	1
21:30	**21:45**											1	1		**2**	64.0-79.0	2
21:45	**22:00**											1	1		**2**	65.9-80.9	2
22:00	**22:15**											2			**2**	59.0-74.0	2
22:15	**22:30**												1		**1**	63.1-78.1	1
22:30	**22:45**											1			**1**	58.0-73.0	1
22:45	**23:00**																
23:00	**23:15**											1	1		**2**	62.5-77.5	2
23:15	**23:30**									1	1	1			**3**	57.5-72.5	3
23:30	**23:45**										1		1		**2**	48.8-63.8	1
23:45	**OO:OO**											1			**1**	59.1-74.1	1
Total			**1**	**3**	**4**	**3**	**16**	**27**	**27**	**91**	**175**	**184**	**34**		**576**		
			0.2%	0.5%	0.7%	0.5%	2.8%	4.7%	4.7%	15.8%	30.4%	31.9%	5.9%				
AM PEAK				**2**		**1**	**1**	**2**	**1**	**4**	**7**	**6**	**3**		**16**		
period				9:45		8:15	3:45	6:45	3:15	8:15	8:45	11:30	7:15		7:30		
% of class				66.7%		33.3%	6.3%	7.4%	3.7%	4.4%	4.0%	3.3%	8.8%			2.8%	
PM PEAK			**1**		**1**	**1**	**4**	**2**	**12**	**18**	**20**	**17**	**2**		**65**		
period			18:00		12:00	13:15	17:00	16:15	17:00	17:00	16:30	17:00	15:15		17:00		
% of class			100.0%		25.0%	33.3%	25.0%	7.4%	44.4%	19.8%	11.4%	9.2%	5.9%			11.3%	

15% Percentile :	**62**	KPH
50% Percentile :	**72**	KPH
85% Percentile :	**87**	KPH
95% Percentile :	**93**	KPH

15 KPH Pace Speed:	**62.6-77.6**	KPH
Number in Pace:	**312**	
Percent in Pace:	**54.2**	%
Number of Vehicles >80 KPH:	**157**	
Percent of Vehicles >80 KPH:	**27.3**	%
Mean Speed(average):	**71**	KPH

Report-2.3

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **West**

Dates : **5/10/2016**

Speeds,km/h -------->		25	32	38	42	46	50	54	59	62	67	75	90		Total	Pace Speed	Number in Pace
		25	32	38	42	46	50	54	59	62	67	75	90	97			
OO:OO	**0:15**																
0:15	**0:30**																
0:30	**0:45**																
0:45	**1:00**																
1:00	**1:15**																
1:15	**1:30**																
1:30	**1:45**																
1:45	**2:00**																
2:00	**2:15**																
2:15	**2:30**																
2:30	**2:45**											1			**2**	73.6-88.6	1
2:45	**3:00**																
3:00	**3:15**																
3:15	**3:30**																
3:30	**3:45**																
3:45	**4:00**																
4:00	**4:15**																
4:15	**4:30**																
4:30	**4:45**																
4:45	**5:00**																
5:00	**5:15**																
5:15	**5:30**											1			**1**	69.0-84.0	1
5:30	**5:45**											1			**2**	68.7-83.7	1
5:45	**6:00**																
6:00	**6:15**													2	**2**	80.5-95.5	2
6:15	**6:30**										1	1			**3**	74.7-89.7	2
6:30	**6:45**											1			**2**	72.4-87.4	1
6:45	**7:00**										1	1			**2**	65.0-80.0	2
7:00	**7:15**											5			**7**	74.8-89.8	5
7:15	**7:30**							1			3	5		2	**15**	67.3-82.3	7
7:30	**7:45**									1				1	**4**	87.9-102.9	2
7:45	**8:00**											5			**6**	69.0-84.0	5
8:00	**8:15**									1	1	6		1	**11**	73.0-88.0	7
8:15	**8:30**										1	2			**4**	70.9-85.9	3
8:30	**8:45**							1	1			5			**7**	69.5-84.5	5
8:45	**9:00**										4	8			**13**	71.2-86.2	9
9:00	**9:15**									1		3		1	**5**	71.1-86.1	3
9:15	**9:30**										1	3		1	**5**	68.0-83.0	4
9:30	**9:45**										1	2			**3**	70.5-85.5	3
9:45	**10:00**										1	5			**6**	70.8-85.8	6
10:00	**10:15**											4		2	**8**	83.5-98.5	6
10:15	**10:30**							2			1	2			**6**	53.4-68.4	3
10:30	**10:45**											1		1	**2**	78.0-93.0	2
10:45	**11:00**													1	**1**	79.7-94.7	1
11:00	**11:15**											2		1	**4**	77.1-92.1	3
11:15	**11:30**											3			**4**	73.4-88.4	3
11:30	**11:45**									1	2	2			**6**	63.6-78.6	4
11:45	**12:00**							2		2	1	3			**8**	54.6-69.6	5

12:00	**12:15**			1			1			1		**3**	49.3-64.3	2
12:15	**12:30**						1		2	4	2	**9**	69.6-84.6	5
12:30	**12:45**				1				3	1		**5**	58.1-73.1	4
12:45	**13:00**								1	1		**3**	63.9-78.9	2
13:00	**13:15**								1	2		**3**	64.6-79.6	3
13:15	**13:30**					1			1	2		**4**	54.8-69.8	2
13:30	**13:45**									1		**1**	72.2-87.2	1
13:45	**14:00**						1			4		**5**	74.8-89.8	4
14:00	**14:15**									3	1	**4**	76.0-91.0	4
14:15	**14:30**								1	2	1	**4**	77.5-92.5	3
14:30	**14:45**								1	2		**3**	67.9-82.9	2
14:45	**15:00**					2	1			2		**5**	51.0-66.0	3
15:00	**15:15**			1						5	1	**7**	72.4-87.4	5
15:15	**15:30**						1		6	14	2	**25**	72.3-87.3	18
15:30	**15:45**						3		2	2	3	**10**	61.6-76.6	6
15:45	**16:00**					1			4	1	1	**7**	64.8-79.8	5
16:00	**16:15**									5	1	**6**	68.5-83.5	5
16:15	**16:30**				1		1			2		**5**	52.0-67.0	2
16:30	**16:45**									6	1	**9**	74.8-89.8	6
16:45	**17:00**								1	4		**5**	72.9-87.9	4
17:00	**17:15**									5	1	**7**	74.4-89.4	5
17:15	**17:30**						1		1	1	1	**5**	57.2-72.2	2
17:30	**17:45**					1				8	3	**14**	75.7-90.7	9
17:45	**18:00**									4		**4**	73.0-88.0	4
18:00	**18:15**		1			1			2	5	2	**13**	72.8-87.8	6
18:15	**18:30**						1		1	2	3	**8**	64.2-79.2	4
18:30	**18:45**										1	**1**	76.8-91.8	1
18:45	**19:00**		1							5	4	**10**	79.4-94.4	7
19:00	**19:15**						4					**4**	51.9-66.9	4
19:15	**19:30**								1	2	1	**4**	63.5-78.5	3
19:30	**19:45**									2	1	**3**	79.2-94.2	3
19:45	**20:00**								1	5		**6**	71.8-86.8	5
20:00	**20:15**			1					4	1		**6**	57.2-72.2	4
20:15	**20:30**	1							1	1		**3**	73.8-88.8	2
20:30	**20:45**						1					**1**	50.3-65.3	1
20:45	**21:00**					1			1			**2**	54.9-69.9	2
21:00	**21:15**					2			2			**4**	54.3-69.3	4
21:15	**21:30**				1				1	1		**3**	54.0-69.0	2
21:30	**21:45**								1	1		**2**	62.2-77.2	2
21:45	**22:00**													
22:00	**22:15**								1	1		**3**	87.9-102.9	2
22:15	**22:30**								1			**2**	52.4-67.4	1
22:30	**22:45**													
22:45	**23:00**				1							**1**	44.0-59.0	1
23:00	**23:15**	1								1		**2**	30.8-45.8	1
23:15	**23:30**													
23:30	**23:45**													
23:45	**OO:OO**				1							**1**	39.3-54.3	1
Total		**2**	**2**	**3**	**11**	**10**	**22**	**59**	**181**	**43**	**371**			
		0.5%	0.5%	0.8%	3.0%	2.7%	5.9%	15.9%	48.8%	11.6%				
AM PEAK					**2**	**1**	**2**	**4**	**8**	**2**	**15**			
period					10:15	8:30	11:45	8:45	8:45	6:00	7:15			
% of class					18.2%	10.0%	9.1%	6.8%	4.4%	4.7%			4.0%	
PM PEAK		**1**	**1**	**1**	**1**	**2**	**4**	**6**	**14**	**4**	**25**			
period		20:15	18:00	12:00	12:30	14:45	19:00	15:15	15:15	18:45	15:15			
% of class		50.0%	50.0%	33.3%	9.1%	20.0%	18.2%	10.2%	7.7%	9.3%			6.7%	

15% Percentile :	**68**	KPH
50% Percentile :	**81**	KPH
85% Percentile :	**94**	KPH
95% Percentile :	**97**	KPH

15 KPH Pace Speed:	**74.8-89.8**	KPH
Number in Pace:	**181**	
Percent in Pace:	**48.8**	%
Number of Vehicles >80 KPH:	**164**	
Percent of Vehicles >80 KPH:	**44.2**	%
Mean Speed(average):	**70**	KPH

Report-2.4

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **West**

Dates : **5/11/2016**

Speeds,km/h -------->		25	32	38	42	46	50	54	59	62	67	75	90		Total	Pace Speed	Number in Pace
		25	32	38	42	46	50	54	59	62	67	75	90	97			
OO:OO	**0:15**																
0:15	**0:30**																
0:30	**0:45**																
0:45	**1:00**													2	**2**	80.1-95.1	2
1:00	**1:15**																
1:15	**1:30**																
1:30	**1:45**																
1:45	**2:00**																
2:00	**2:15**																
2:15	**2:30**																
2:30	**2:45**														**1**		
2:45	**3:00**																
3:00	**3:15**																
3:15	**3:30**																
3:30	**3:45**												1		**1**	60.7-75.7	1
3:45	**4:00**																
4:00	**4:15**																
4:15	**4:30**																
4:30	**4:45**																
4:45	**5:00**													2	**2**	82.0-97.0	2
5:00	**5:15**												1		**1**	70.4-85.4	1
5:15	**5:30**												2		**2**	65.9-80.9	2
5:30	**5:45**												1	1	**2**	60.5-75.5	1
5:45	**6:00**												1		**1**	69.3-84.3	1
6:00	**6:15**												1	1	**3**	85.7-100.7	3
6:15	**6:30**									1				1	**2**	48.4-63.4	1
6:30	**6:45**												1	2	**4**	80.2-95.2	3
6:45	**7:00**												4	1	**7**	70.5-85.5	4
7:00	**7:15**								1			1	2	1	**6**	52.1-67.1	2
7:15	**7:30**									1		2	3	1	**9**	85.5-100.5	5
7:30	**7:45**											1		1	**3**	83.1-98.1	2
7:45	**8:00**											1	3	1	**8**	68.8-83.8	4
8:00	**8:15**											2	4	2	**11**	68.2-83.2	5
8:15	**8:30**									1		1	5	2	**10**	76.7-91.7	7
8:30	**8:45**							1		1		3	8		**14**	70.3-85.3	9
8:45	**9:00**											1	4	1	**6**	65.6-80.6	4
9:00	**9:15**								1				4	1	**7**	82.6-97.6	5
9:15	**9:30**					1		2					1		**5**	41.0-56.0	3
9:30	**9:45**									2		1		1	**5**	58.1-73.1	3
9:45	**10:00**				1				1	1					**3**	50.6-65.6	2
10:00	**10:15**											1	2		**4**	70.9-85.9	3
10:15	**10:30**												1		**2**	61.7-76.7	1
10:30	**10:45**									2		2	3	1	**8**	59.7-74.7	4
10:45	**11:00**									1		2			**3**	58.9-73.9	3
11:00	**11:15**												2	1	**3**	77.2-92.2	3
11:15	**11:30**			1		1			3			1	1		**7**	58.4-73.4	4
11:30	**11:45**						1					1	2		**4**	63.1-78.1	2
11:45	**12:00**											1	3	2	**7**	69.3-84.3	4

12:00	**12:15**										1		**1**	61.3-76.3	1
12:15	**12:30**								1	3	3		**7**	60.1-75.1	5
12:30	**12:45**								1	2	4		**7**	71.9-86.9	6
12:45	**13:00**								1	1	2		**5**	71.7-86.7	3
13:00	**13:15**						1		1	2	7	1	**12**	76.6-91.6	8
13:15	**13:30**						1	1			2	2	**6**	79.4-94.4	4
13:30	**13:45**						1				3		**4**	70.6-85.6	3
13:45	**14:00**														
14:00	**14:15**						1	1			4		**7**	74.0-89.0	4
14:15	**14:30**							1			1	1	**4**	83.1-98.1	3
14:30	**14:45**							1		2	1		**5**	58.2-73.2	3
14:45	**15:00**									1	6	1	**8**	65.4-80.4	6
15:00	**15:15**						1		1	2	4	1	**10**	77.9-92.9	5
15:15	**15:30**								3	11	10	3	**30**	62.4-77.4	20
15:30	**15:45**										8	3	**13**	76.5-91.5	10
15:45	**16:00**								1	3	5		**9**	72.0-87.0	8
16:00	**16:15**								1		2		**3**	71.1-86.1	2
16:15	**16:30**								1	1	2		**6**	65.6-80.6	3
16:30	**16:45**								2		4		**7**	72.3-87.3	4
16:45	**17:00**								1	1	6	3	**12**	75.6-90.6	7
17:00	**17:15**									3	6	1	**11**	67.1-82.1	8
17:15	**17:30**								1		5	1	**7**	73.4-88.4	5
17:30	**17:45**									1	2	2	**7**	77.9-92.9	4
17:45	**18:00**			1					1	1	2	4	**12**	86.0-101.0	7
18:00	**18:15**									3	1	2	**7**	66.2-81.2	4
18:15	**18:30**									4	4	1	**9**	67.4-82.4	8
18:30	**18:45**									3	3		**6**	58.6-73.6	3
18:45	**19:00**									1	1	1	**5**	62.8-77.8	2
19:00	**19:15**										1	1	**3**	77.0-92.0	2
19:15	**19:30**									1	1		**2**	65.1-80.1	2
19:30	**19:45**							1		1	1	1	**4**	52.5-67.5	2
19:45	**20:00**								2	2	2		**6**	59.7-74.7	4
20:00	**20:15**										2		**4**	74.7-89.7	2
20:15	**20:30**							1	1		1		**3**	49.5-64.5	2
20:30	**20:45**								1	2	1	2	**7**	83.9-98.9	4
20:45	**21:00**								1		1		**2**	47.8-62.8	1
21:00	**21:15**									1	2		**3**	71.2-86.2	3
21:15	**21:30**								1		1		**2**	49.2-64.2	1
21:30	**21:45**										2		**2**	66.2-81.2	2
21:45	**22:00**														
22:00	**22:15**										1	1	**2**	79.9-94.9	2
22:15	**22:30**										1	1	**2**	77.4-92.4	2
22:30	**22:45**										1		**1**	72.5-87.5	1
22:45	**23:00**														
23:00	**23:15**														
23:15	**23:30**										1	1	**3**	83.2-98.2	3
23:30	**23:45**											1	**1**	75.5-90.5	1
23:45	**OO:OO**										1		**1**	72.9-87.9	1
Total		**1**	**1**	**2**	**1**	**1**	**8**	**12**	**32**	**73**	**179**	**60**	**421**		
		0.2%	0.2%	0.5%	0.2%	0.2%	1.9%	2.9%	7.6%	17.3%	42.5%	14.3%			
AM PEAK		**1**	**1**	**1**	**1**	**1**	**2**	**3**	**2**	**3**	**8**	**2**	**14**		
period		11:15	9:45	11:15	9:15	11:30	9:15	11:15	9:30	8:30	8:30	0:45	8:30		
% of class		100.0%	100.0%	50.0%	100.0%	100.0%	25.0%	25.0%	6.3%	4.1%	4.5%	3.3%		3.3%	
PM PEAK				**1**			**1**	**1**	**3**	**11**	**10**	**4**	**30**		
period				17:45			13:00	13:15	15:15	15:15	15:15	17:45	15:15		
% of class				50.0%			12.5%	8.3%	9.4%	15.1%	5.6%	6.7%		7.1%	

15% Percentile :	**68**	KPH
50% Percentile :	**82**	KPH
85% Percentile :	**96**	KPH
95% Percentile :	**97**	KPH

15 KPH Pace Speed:	**75.6-90.6**	KPH
Number in Pace:	**183**	
Percent in Pace:	**43.5**	%
Number of Vehicles >80 KPH:	**179**	
Percent of Vehicles >80 KPH:	**42.5**	%
Mean Speed(average):	**69**	KPH

Report-2.5

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **East + West**

Dates : **5/10/2016**

Speeds,km/h -------->		25	32	38	42	46	50	54	59	62	67	75	90		Total	Pace Speed	Number in Pace
		25	32	38	42	46	50	54	59	62	67	75	90	97			
OO:OO	**0:15**																
0:15	**0:30**																
0:30	**0:45**																
0:45	**1:00**																
1:00	**1:15**																
1:15	**1:30**																
1:30	**1:45**																
1:45	**2:00**																
2:00	**2:15**											1			**1**	59.6-74.6	1
2:15	**2:30**																
2:30	**2:45**											1	1		**3**	52.7-67.7	1
2:45	**3:00**																
3:00	**3:15**																
3:15	**3:30**																
3:30	**3:45**																
3:45	**4:00**												1		**1**	61.0-76.0	1
4:00	**4:15**																
4:15	**4:30**																
4:30	**4:45**																
4:45	**5:00**												1		**1**	66.1-81.1	1
5:00	**5:15**						1				2				**3**	47.8-62.8	2
5:15	**5:30**										1		3		**5**	69.0-84.0	3
5:30	**5:45**											2	1		**4**	52.8-67.8	2
5:45	**6:00**										1		1		**2**	48.6-63.6	1
6:00	**6:15**										1	1		3	**5**	80.5-95.5	3
6:15	**6:30**											1	2	1	**5**	74.7-89.7	3
6:30	**6:45**										1	1	1	1	**5**	54.8-69.8	2
6:45	**7:00**								1		1	2	3	1	**8**	58.1-73.1	4
7:00	**7:15**											2	5	1	**10**	79.6-94.6	6
7:15	**7:30**							2	1		2	8	10	2	**30**	64.5-79.5	13
7:30	**7:45**							1			2	2	3	1	**11**	64.4-79.4	6
7:45	**8:00**										1	6	7	1	**16**	62.8-77.8	10
8:00	**8:15**								1		3	9	11	1	**27**	62.2-77.2	17
8:15	**8:30**								1		2	2	8	1	**15**	70.9-85.9	10
8:30	**8:45**				1			3	1		1	5	12	1	**25**	66.5-81.5	16
8:45	**9:00**											5	9		**15**	71.2-86.2	11
9:00	**9:15**										2	3	4	2	**11**	63.1-78.1	7
9:15	**9:30**								1		1	4	5	1	**12**	61.4-76.4	8
9:30	**9:45**							1			1	4	6		**12**	66.8-81.8	8
9:45	**10:00**				1			1			1	3	6		**12**	63.6-78.6	7
10:00	**10:15**												5	2	**9**	76.1-91.1	6
10:15	**10:30**							1	2		1	1	3		**9**	47.5-62.5	4
10:30	**10:45**											2	2	1	**5**	65.9-80.9	4
10:45	**11:00**											1	2	1	**4**	63.6-78.6	3
11:00	**11:15**						1						5	1	**8**	77.1-92.1	6
11:15	**11:30**							1			2		3		**7**	50.2-65.2	3
11:30	**11:45**							1			1	5	3		**11**	63.6-78.6	7
11:45	**12:00**								5		3	3	3		**14**	56.2-71.2	11

12:00	**12:15**					3			2	1	2		**9**	51.7-66.7	5
12:15	**12:30**						1	1	3	3	5	3	**16**	57.8-72.8	7
12:30	**12:45**						1	1	1	6	3		**12**	58.1-73.1	9
12:45	**13:00**					1			1	2	2	1	**8**	63.9-78.9	4
13:00	**13:15**								1	3	6		**10**	66.7-81.7	9
13:15	**13:30**						1	1	1	5	3		**11**	66.4-81.4	8
13:30	**13:45**	1				1	1		2	2	3		**10**	60.8-75.8	5
13:45	**14:00**								1		8		**9**	74.8-89.8	8
14:00	**14:15**						1				5	1	**7**	76.0-91.0	6
14:15	**14:30**						1		1	3	3	2	**10**	55.4-70.4	5
14:30	**14:45**					1	2	3		2	2		**10**	45.5-60.5	6
14:45	**15:00**						1	3	2	2	7		**16**	72.2-87.2	8
15:00	**15:15**					2			2	1	9	1	**15**	71.0-86.0	9
15:15	**15:30**						1		2	7	19	2	**34**	68.7-83.7	22
15:30	**15:45**			1					3	2	4	4	**14**	61.6-76.6	7
15:45	**16:00**							2		9	5	1	**18**	64.8-79.8	12
16:00	**16:15**							2	1	4	6	1	**14**	67.1-82.1	9
16:15	**16:30**						1		2	3	6	1	**14**	56.1-71.1	6
16:30	**16:45**								3	2	11	1	**19**	74.8-89.8	11
16:45	**17:00**			1		1			1	5	11	1	**20**	67.9-82.9	12
17:00	**17:15**					1		1	2	6	12	1	**24**	69.4-84.4	13
17:15	**17:30**						1		1	3	10	3	**19**	71.6-86.6	12
17:30	**17:45**					1		1		2	15	4	**26**	75.7-90.7	16
17:45	**18:00**					1			2	1	7	1	**12**	73.0-88.0	7
18:00	**18:15**			1				1	1	3	6	2	**16**	72.8-87.8	8
18:15	**18:30**							1	2	3	6	3	**16**	64.2-79.2	9
18:30	**18:45**			1			1		1	3	3	1	**10**	61.0-76.0	6
18:45	**19:00**			1					3	3	7	4	**19**	79.4-94.4	9
19:00	**19:15**								4	1	1		**6**	56.1-71.1	5
19:15	**19:30**								1	2	5	1	**9**	63.5-78.5	8
19:30	**19:45**					1	1		1	2	6	1	**12**	68.8-83.8	8
19:45	**20:00**									3	7		**10**	71.8-86.8	8
20:00	**20:15**			1		1			1	4	1		**8**	57.2-72.2	5
20:15	**20:30**		1				1			1	3		**6**	73.8-88.8	4
20:30	**20:45**								2		1	1	**5**	63.9-78.9	3
20:45	**21:00**							2	3	2		1	**8**	54.9-69.9	7
21:00	**21:15**							2	2	5	2		**11**	60.2-75.2	10
21:15	**21:30**						1	1	1	1	1		**5**	54.0-69.0	4
21:30	**21:45**									1	1		**2**	62.2-77.2	2
21:45	**22:00**														
22:00	**22:15**									1	1		**3**	87.9-102.9	2
22:15	**22:30**									1	1	1	**4**	66.3-81.3	2
22:30	**22:45**														
22:45	**23:00**	1		1			1			1			**4**	33.3-48.3	2
23:00	**23:15**		1								1		**2**	30.8-45.8	1
23:15	**23:30**														
23:30	**23:45**									2			**2**	59.5-74.5	2
23:45	**OO:OO**						1			1	1		**3**	68.6-83.6	2
Total		**4**	**2**	**9**	**21**	**30**	**28**	**86**	**188**	**344**	**65**	**824**			
		0.5%	0.2%	1.1%	2.5%	3.6%	3.4%	10.4%	22.8%	41.7%	7.9%				
AM PEAK		**1**		**1**	**3**	**5**	**1**	**3**	**9**	**12**	**3**	**30**			
period		8:30		5:00	8:30	11:45	6:45	8:00	8:00	8:30	6:00	7:15			
% of class		25.0%		11.1%	14.3%	16.7%	3.6%	3.5%	4.8%	3.5%	4.6%			3.6%	
PM PEAK		**1**	**1**	**1**	**3**	**2**	**3**	**4**	**9**	**19**	**4**	**34**			
period		13:30	20:15	15:30	12:00	14:30	14:30	19:00	15:45	15:15	15:30	15:15			
% of class		25.0%	50.0%	11.1%	14.3%	6.7%	10.7%	4.7%	4.8%	5.5%	6.2%			4.1%	

15% Percentile :	**64**	KPH
50% Percentile :	**77**	KPH
85% Percentile :	**89**	KPH
95% Percentile :	**97**	KPH

15 KPH Pace Speed:	**66.3-81.3**	KPH
Number in Pace:	**378**	
Percent in Pace:	**45.9**	%
Number of Vehicles >80 KPH:	**294**	
Percent of Vehicles >80 KPH:	**35.7**	%
Mean Speed(average):	**71**	KPH

Report-2.6

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Direction : **East + West**

Dates : **5/11/2016**

		25	32	38	42	46	50	54	59	62	67	75	90			
Speeds,km/h ------->		25	32	38	42	46	50	54	59	62	67	75	90	97	**Total**	**Pace Speed**	**Number in Pace**
OO:OO	**0:15**										1				**1**	50.7-65.7	1
0:15	**0:30**																
0:30	**0:45**											1	1		**2**	70.2-85.2	2
0:45	**1:00**													2	**2**	80.1-95.1	2
1:00	**1:15**																
1:15	**1:30**																
1:30	**1:45**											1			**1**	52.2-67.2	1
1:45	**2:00**																
2:00	**2:15**																
2:15	**2:30**																
2:30	**2:45**								1			1			**3**	43.1-58.1	1
2:45	**3:00**																
3:00	**3:15**																
3:15	**3:30**									1					**1**	47.0-62.0	1
3:30	**3:45**												1		**1**	60.7-75.7	1
3:45	**4:00**						1								**1**	38.9-53.9	1
4:00	**4:15**																
4:15	**4:30**																
4:30	**4:45**																
4:45	**5:00**													2	**2**	82.0-97.0	2
5:00	**5:15**						1				1		2		**4**	49.4-64.4	2
5:15	**5:30**									1			3		**4**	73.6-88.6	3
5:30	**5:45**											2	1	1	**4**	60.5-75.5	3
5:45	**6:00**												2	1	**3**	77.9-92.9	3
6:00	**6:15**									1			1	1	**4**	85.7-100.7	3
6:15	**6:30**										2			2	**4**	50.8-65.8	2
6:30	**6:45**											1	5	2	**9**	72.1-87.1	6
6:45	**7:00**								2			3	5	2	**14**	70.5-85.5	6
7:00	**7:15**									1	1	2	4	1	**10**	62.4-77.4	5
7:15	**7:30**										2	4	7	4	**19**	81.9-96.9	9
7:30	**7:45**						1			1	2	6	4	3	**19**	57.8-72.8	9
7:45	**8:00**										3	5	7	3	**21**	64.1-79.1	12
8:00	**8:15**						1				2	5	8	2	**21**	66.1-81.1	11
8:15	**8:30**				1			1		1	5	4	7	2	**22**	62.6-77.6	11
8:30	**8:45**								2		5	8	13	1	**30**	66.5-81.5	17
8:45	**9:00**								1		1	8	8	2	**20**	65.6-80.6	15
9:00	**9:15**									1	1	2	5	1	**11**	61.2-76.2	5
9:15	**9:30**					1			3			4	3		**12**	67.4-82.4	7
9:30	**9:45**						1				2	4	1	2	**11**	58.4-73.4	6
9:45	**10:00**				3				1	2	1	1			**8**	50.6-65.6	4
10:00	**10:15**								1		1	2	2		**7**	52.6-67.6	3
10:15	**10:30**												3		**4**	71.2-86.2	3
10:30	**10:45**										3	4	5	2	**14**	60.3-75.3	8
10:45	**11:00**										2	2	1	1	**6**	58.9-73.9	4
11:00	**11:15**										1	3	2	1	**8**	57.4-72.4	4
11:15	**11:30**			1		1				3	1	2	2		**10**	58.4-73.4	6
11:30	**11:45**						1	2				2	8	1	**14**	67.5-82.5	8
11:45	**12:00**									1	1	4	4	3	**14**	60.4-75.4	7

12:00	**12:15**				1					1	1	2	3		**8**	62.1-77.1	5
12:15	**12:30**										3	4	3		**10**	60.1-75.1	8
12:30	**12:45**						1			1	1	3	5		**12**	71.9-86.9	7
12:45	**13:00**										1	3	5	1	**11**	71.7-86.7	7
13:00	**13:15**								2		1	2	9	2	**16**	74.6-89.6	9
13:15	**13:30**					1			1	1	1	1	4	2	**11**	79.4-94.4	6
13:30	**13:45**								1		1		6		**8**	73.7-88.7	6
13:45	**14:00**				1							1	2		**5**	69.5-84.5	3
14:00	**14:15**								1	2	4	1	4		**13**	54.2-69.2	8
14:15	**14:30**								1	2	2	1	3	2	**12**	53.7-68.7	6
14:30	**14:45**								1	1	2	4	3		**12**	65.2-80.2	9
14:45	**15:00**				1				1			1	6	1	**10**	65.4-80.4	6
15:00	**15:15**								2	1	2	2	5	2	**15**	54.2-69.2	7
15:15	**15:30**										4	14	11	5	**37**	62.4-77.4	24
15:30	**15:45**										3	6	11	3	**26**	67.9-82.9	16
15:45	**16:00**						1				1	8	6		**16**	66.3-81.3	11
16:00	**16:15**								1		2	1	6		**10**	69.1-84.1	6
16:15	**16:30**								2		5	10	9		**29**	62.6-77.6	18
16:30	**16:45**				1				1		7	20	20		**50**	69.0-84.0	34
16:45	**17:00**										2	6	11	3	**23**	63.6-78.6	13
17:00	**17:15**						4		2	12	18	14	23	1	**76**	58.7-73.7	43
17:15	**17:30**								1		2	8	14	2	**28**	62.2-77.2	15
17:30	**17:45**								2		3	5	5	4	**21**	56.2-71.2	9
17:45	**18:00**				1				2		4	5	7	6	**29**	81.9-96.9	12
18:00	**18:15**		1				1					5	6	4	**18**	80.9-95.9	9
18:15	**18:30**											8	8	1	**18**	67.7-82.7	15
18:30	**18:45**								1	1		5	4	1	**13**	58.6-73.6	6
18:45	**19:00**											2	5	3	**12**	75.7-90.7	7
19:00	**19:15**										1	2	4	1	**9**	77.0-92.0	5
19:15	**19:30**						1		1	1	3	3	5		**14**	56.9-71.9	8
19:30	**19:45**									1	1	3	1	1	**7**	59.8-74.8	5
19:45	**20:00**						1				2	2	3		**8**	71.5-86.5	5
20:00	**20:15**										1		6		**9**	74.7-89.7	6
20:15	**20:30**						1		1	1	1	1	1		**6**	49.5-64.5	4
20:30	**20:45**										1	2	3	3	**10**	78.9-93.9	5
20:45	**21:00**										1	1	3		**5**	61.3-76.3	4
21:00	**21:15**										1	3	4		**8**	71.2-86.2	7
21:15	**21:30**										1		2		**3**	72.0-87.0	2
21:30	**21:45**											1	3		**4**	66.2-81.2	4
21:45	**22:00**											1	1		**2**	65.9-80.9	2
22:00	**22:15**											2	1	1	**4**	65.3-80.3	3
22:15	**22:30**												2	1	**3**	77.4-92.4	3
22:30	**22:45**											1	1		**2**	72.5-87.5	2
22:45	**23:00**																
23:00	**23:15**											1	1		**2**	62.5-77.5	2
23:15	**23:30**									1	1	1	1	1	**6**	57.5-72.5	3
23:30	**23:45**										1		1	1	**3**	75.5-90.5	2
23:45	**OO:OO**											1	1		**2**	72.9-87.9	2
Total			**2**	**4**	**6**	**4**	**17**	**35**	**39**	**123**	**248**	**363**	**94**		**997**		
			0.2%	0.4%	0.6%	0.4%	1.7%	3.5%	3.9%	12.3%	24.9%	36.4%	9.4%				
AM PEAK			**1**	**3**	**1**	**1**	**2**	**3**	**3**	**5**	**8**	**13**	**4**		**30**		
period			11:15	9:45	11:15	8:15	11:30	9:15	11:15	8:15	8:30	8:30	7:15		8:30		
% of class			50.0%	75.0%	16.7%	25.0%	11.8%	8.6%	7.7%	4.1%	3.2%	3.6%	4.3%			3.0%	
PM PEAK			**1**		**1**	**1**	**4**	**2**	**12**	**18**	**20**	**23**	**6**		**76**		
period			18:00		12:00	13:15	17:00	13:00	17:00	17:00	16:30	17:00	17:45		17:00		
% of class			50.0%		16.7%	25.0%	23.5%	5.7%	30.8%	14.6%	8.1%	6.3%	6.4%			7.6%	

15% Percentile :	**64**	KPH
50% Percentile :	**76**	KPH
85% Percentile :	**90**	KPH
95% Percentile :	**97**	KPH

15 KPH Pace Speed:	**65.6-80.6**	KPH
Number in Pace:	**450**	
Percent in Pace:	**45.1**	%
Number of Vehicles >80 KPH:	**336**	
Percent of Vehicles >80 KPH:	**33.7**	%
Mean Speed(average):	**70**	KPH

Report-3.1

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Dates : 5/9/2016

Directions ---------->		North Volume	%	South Volume	%	East Volume	%	West Volume	%	Total Volume	%
00:00	0:15										
0:15	0:30										
0:30	0:45										
0:45	1:00										
1:00	1:15										
1:15	1:30										
1:30	1:45										
1:45	2:00										
2:00	2:15					1	0.2%			1	0.1%
2:15	2:30										
2:30	2:45					1	0.2%	2	0.5%	3	0.4%
2:45	3:00										
3:00	3:15										
3:15	3:30										
3:30	3:45										
3:45	4:00					1	0.2%			1	0.1%
4:00	4:15										
4:15	4:30										
4:30	4:45										
4:45	5:00					1	0.2%			1	0.1%
5:00	5:15					3	0.7%			3	0.4%
5:15	5:30					4	0.9%	1	0.3%	5	0.6%
5:30	5:45					2	0.4%	2	0.5%	4	0.5%
5:45	6:00					2	0.4%			2	0.2%
6:00	6:15					3	0.7%	2	0.5%	5	0.6%
6:15	6:30					2	0.4%	3	0.8%	5	0.6%
6:30	6:45					3	0.7%	2	0.5%	5	0.6%
6:45	7:00					6	1.3%	2	0.5%	8	1.0%
7:00	7:15					3	0.7%	7	1.9%	10	1.2%
7:15	7:30					15	3.3%	15	4.0%	30	3.6%
7:30	7:45					7	1.5%	4	1.1%	11	1.3%
7:45	8:00					10	2.2%	6	1.6%	16	1.9%
8:00	8:15					16	3.5%	11	3.0%	27	3.3%
8:15	8:30					11	2.4%	4	1.1%	15	1.8%
8:30	8:45					18	4.0%	7	1.9%	25	3.0%
8:45	9:00					2	0.4%	13	3.5%	15	1.8%
9:00	9:15					6	1.3%	5	1.3%	11	1.3%
9:15	9:30					7	1.5%	5	1.3%	12	1.5%
9:30	9:45					9	2.0%	3	0.8%	12	1.5%
9:45	10:00					6	1.3%	6	1.6%	12	1.5%
10:00	10:15					1	0.2%	8	2.2%	9	1.1%
10:15	10:30					3	0.7%	6	1.6%	9	1.1%
10:30	10:45					3	0.7%	2	0.5%	5	0.6%
10:45	11:00					3	0.7%	1	0.3%	4	0.5%
11:00	11:15					4	0.9%	4	1.1%	8	1.0%
11:15	11:30					3	0.7%	4	1.1%	7	0.8%
11:30	11:45					5	1.1%	6	1.6%	11	1.3%
11:45	12:00					6	1.3%	8	2.2%	14	1.7%

12:00	12:15			6	1.3%	3	0.8%	9	1.1%		
12:15	12:30			7	1.5%	9	2.4%	16	1.9%		
12:30	12:45			7	1.5%	5	1.3%	12	1.5%		
12:45	13:00			5	1.1%	3	0.8%	8	1.0%		
13:00	13:15			7	1.5%	3	0.8%	10	1.2%		
13:15	13:30			7	1.5%	4	1.1%	11	1.3%		
13:30	13:45			9	2.0%	1	0.3%	10	1.2%		
13:45	14:00			4	0.9%	5	1.3%	9	1.1%		
14:00	14:15			3	0.7%	4	1.1%	7	0.8%		
14:15	14:30			6	1.3%	4	1.1%	10	1.2%		
14:30	14:45			7	1.5%	3	0.8%	10	1.2%		
14:45	15:00			11	2.4%	5	1.3%	16	1.9%		
15:00	15:15			8	1.8%	7	1.9%	15	1.8%		
15:15	15:30			9	2.0%	25	6.7%	34	4.1%		
15:30	15:45			4	0.9%	10	2.7%	14	1.7%		
15:45	16:00			11	2.4%	7	1.9%	18	2.2%		
16:00	16:15			8	1.8%	6	1.6%	14	1.7%		
16:15	16:30			9	2.0%	5	1.3%	14	1.7%		
16:30	16:45			10	2.2%	9	2.4%	19	2.3%		
16:45	17:00			15	3.3%	5	1.3%	20	2.4%		
17:00	17:15			17	3.8%	7	1.9%	24	2.9%		
17:15	17:30			14	3.1%	5	1.3%	19	2.3%		
17:30	17:45			12	2.6%	14	3.8%	26	3.2%		
17:45	18:00			8	1.8%	4	1.1%	12	1.5%		
18:00	18:15			3	0.7%	13	3.5%	16	1.9%		
18:15	18:30			8	1.8%	8	2.2%	16	1.9%		
18:30	18:45			9	2.0%	1	0.3%	10	1.2%		
18:45	19:00			9	2.0%	10	2.7%	19	2.3%		
19:00	19:15			2	0.4%	4	1.1%	6	0.7%		
19:15	19:30			5	1.1%	4	1.1%	9	1.1%		
19:30	19:45			9	2.0%	3	0.8%	12	1.5%		
19:45	20:00			4	0.9%	6	1.6%	10	1.2%		
20:00	20:15			2	0.4%	6	1.6%	8	1.0%		
20:15	20:30			3	0.7%	3	0.8%	6	0.7%		
20:30	20:45			4	0.9%	1	0.3%	5	0.6%		
20:45	21:00			6	1.3%	2	0.5%	8	1.0%		
21:00	21:15			7	1.5%	4	1.1%	11	1.3%		
21:15	21:30			2	0.4%	3	0.8%	5	0.6%		
21:30	21:45					2	0.5%	2	0.2%		
21:45	22:00										
22:00	22:15					3	0.8%	3	0.4%		
22:15	22:30			2	0.4%	2	0.5%	4	0.5%		
22:30	22:45										
22:45	23:00			3	0.7%	1	0.3%	4	0.5%		
23:00	23:15					2	0.5%	2	0.2%		
23:15	23:30										
23:30	23:45			2	0.4%			2	0.2%		
23:45	00:00			2	0.4%	1	0.3%	3	0.4%		
Total				453		371		824	100.0%		
				55.0%		45.0%		100.0%			
AM PEAK				18		15		30			
period				8:30		7:15		7:15			
% of class					4.0%		4.0%		3.6%		
PM PEAK				17		25		34			
period				17:00		15:15		15:15			
% of class					3.8%		6.7%		4.1%		

Report-3.2

Location : **CW16-23EW** **Second Line - 500m E of Highway 6**

Dates : 5/11/2016

Directions ---------->		North		South		East		West		Total	
		Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
00:00	0:15					1	0.2%			1	0.1%
0:15	0:30										
0:30	0:45					2	0.3%			2	0.2%
0:45	1:00							2	0.5%	2	0.2%
1:00	1:15										
1:15	1:30										
1:30	1:45					1	0.2%			1	0.1%
1:45	2:00										
2:00	2:15										
2:15	2:30										
2:30	2:45					2	0.3%	1	0.2%	3	0.3%
2:45	3:00										
3:00	3:15										
3:15	3:30					1	0.2%			1	0.1%
3:30	3:45							1	0.2%	1	0.1%
3:45	4:00					1	0.2%			1	0.1%
4:00	4:15										
4:15	4:30										
4:30	4:45										
4:45	5:00							2	0.5%	2	0.2%
5:00	5:15					3	0.5%	1	0.2%	4	0.4%
5:15	5:30					2	0.3%	2	0.5%	4	0.4%
5:30	5:45					2	0.3%	2	0.5%	4	0.4%
5:45	6:00					2	0.3%	1	0.2%	3	0.3%
6:00	6:15					1	0.2%	3	0.7%	4	0.4%
6:15	6:30					2	0.3%	2	0.5%	4	0.4%
6:30	6:45					5	0.9%	4	1.0%	9	0.9%
6:45	7:00					7	1.2%	7	1.7%	14	1.4%
7:00	7:15					4	0.7%	6	1.4%	10	1.0%
7:15	7:30					10	1.7%	9	2.1%	19	1.9%
7:30	7:45					16	2.8%	3	0.7%	19	1.9%
7:45	8:00					13	2.3%	8	1.9%	21	2.1%
8:00	8:15					10	1.7%	11	2.6%	21	2.1%
8:15	8:30					12	2.1%	10	2.4%	22	2.2%
8:30	8:45					16	2.8%	14	3.3%	30	3.0%
8:45	9:00					14	2.4%	6	1.4%	20	2.0%
9:00	9:15					4	0.7%	7	1.7%	11	1.1%
9:15	9:30					7	1.2%	5	1.2%	12	1.2%
9:30	9:45					6	1.0%	5	1.2%	11	1.1%
9:45	10:00					5	0.9%	3	0.7%	8	0.8%
10:00	10:15					3	0.5%	4	1.0%	7	0.7%
10:15	10:30					2	0.3%	2	0.5%	4	0.4%
10:30	10:45					6	1.0%	8	1.9%	14	1.4%
10:45	11:00					3	0.5%	3	0.7%	6	0.6%
11:00	11:15					5	0.9%	3	0.7%	8	0.8%
11:15	11:30					3	0.5%	7	1.7%	10	1.0%
11:30	11:45					10	1.7%	4	1.0%	14	1.4%
11:45	12:00					7	1.2%	7	1.7%	14	1.4%

12:00	12:15			7	1.2%	1	0.2%	8	0.8%
12:15	12:30			3	0.5%	7	1.7%	10	1.0%
12:30	12:45			5	0.9%	7	1.7%	12	1.2%
12:45	13:00			6	1.0%	5	1.2%	11	1.1%
13:00	13:15			4	0.7%	12	2.9%	16	1.6%
13:15	13:30			5	0.9%	6	1.4%	11	1.1%
13:30	13:45			4	0.7%	4	1.0%	8	0.8%
13:45	14:00			5	0.9%			5	0.5%
14:00	14:15			6	1.0%	7	1.7%	13	1.3%
14:15	14:30			8	1.4%	4	1.0%	12	1.2%
14:30	14:45			7	1.2%	5	1.2%	12	1.2%
14:45	15:00			2	0.3%	8	1.9%	10	1.0%
15:00	15:15			5	0.9%	10	2.4%	15	1.5%
15:15	15:30			7	1.2%	30	7.1%	37	3.7%
15:30	15:45			13	2.3%	13	3.1%	26	2.6%
15:45	16:00			7	1.2%	9	2.1%	16	1.6%
16:00	16:15			7	1.2%	3	0.7%	10	1.0%
16:15	16:30			23	4.0%	6	1.4%	29	2.9%
16:30	16:45			43	7.5%	7	1.7%	50	5.0%
16:45	17:00			11	1.9%	12	2.9%	23	2.3%
17:00	17:15			65	11.3%	11	2.6%	76	7.6%
17:15	17:30			21	3.6%	7	1.7%	28	2.8%
17:30	17:45			14	2.4%	7	1.7%	21	2.1%
17:45	18:00			17	3.0%	12	2.9%	29	2.9%
18:00	18:15			11	1.9%	7	1.7%	18	1.8%
18:15	18:30			9	1.6%	9	2.1%	18	1.8%
18:30	18:45			7	1.2%	6	1.4%	13	1.3%
18:45	19:00			7	1.2%	5	1.2%	12	1.2%
19:00	19:15			6	1.0%	3	0.7%	9	0.9%
19:15	19:30			12	2.1%	2	0.5%	14	1.4%
19:30	19:45			3	0.5%	4	1.0%	7	0.7%
19:45	20:00			2	0.3%	6	1.4%	8	0.8%
20:00	20:15			5	0.9%	4	1.0%	9	0.9%
20:15	20:30			3	0.5%	3	0.7%	6	0.6%
20:30	20:45			3	0.5%	7	1.7%	10	1.0%
20:45	21:00			3	0.5%	2	0.5%	5	0.5%
21:00	21:15			5	0.9%	3	0.7%	8	0.8%
21:15	21:30			1	0.2%	2	0.5%	3	0.3%
21:30	21:45			2	0.3%	2	0.5%	4	0.4%
21:45	22:00			2	0.3%			2	0.2%
22:00	22:15			2	0.3%	2	0.5%	4	0.4%
22:15	22:30			1	0.2%	2	0.5%	3	0.3%
22:30	22:45			1	0.2%	1	0.2%	2	0.2%
22:45	23:00								
23:00	23:15			2	0.3%			2	0.2%
23:15	23:30			3	0.5%	3	0.7%	6	0.6%
23:30	23:45			2	0.3%	1	0.2%	3	0.3%
23:45	00:00			1	0.2%	1	0.2%	2	0.2%
Total				**576**		**421**		**997**	100.0%
				57.8%		**42.2%**		100.0%	
AM PEAK				**16**		**14**		**30**	
period				**7:30**		**8:30**		**8:30**	
% of class					2.8%		3.3%		3.0%
PM PEAK				**65**		**30**		**76**	
period				**17:00**		**15:15**		**17:00**	
% of class					11.3%		7.1%		7.6%

Report-1.1

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **East** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**		1												**1**	0.1%
0:15	**0:30**									4					**4**	0.5%
0:30	**0:45**		1							2					**3**	0.4%
0:45	**1:00**		1	1											**2**	0.3%
OO:OO	**1:00**		3	1						6					**10**	1.3%
1:00	**1:15**		1							1					**2**	0.3%
1:15	**1:30**									3					**3**	0.4%
1:30	**1:45**															
1:45	**2:00**									1					**1**	0.1%
1:00	**2:00**		1							5					**6**	0.8%
2:00	**2:15**									2					**2**	0.3%
2:15	**2:30**		1												**1**	0.1%
2:30	**2:45**		1		1										**2**	0.3%
2:45	**3:00**															
2:00	**3:00**		2		1					2					**5**	0.7%
3:00	**3:15**		1												**1**	0.1%
3:15	**3:30**									1					**1**	0.1%
3:30	**3:45**															
3:45	**4:00**		2												**2**	0.3%
3:00	**4:00**		3							1					**4**	0.5%
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**			1		1				3					**5**	0.7%
5:15	**5:30**			2											**2**	0.3%
5:30	**5:45**		2	1											**3**	0.4%
5:45	**6:00**		2	1		1									**4**	0.5%
5:00	**6:00**		4	5		2				3					**14**	1.9%
6:00	**6:15**		1	1	1										**3**	0.4%
6:15	**6:30**		3	2		1									**6**	0.8%
6:30	**6:45**		3			1									**4**	0.5%
6:45	**7:00**		4	3		2				3					**12**	1.6%
6:00	**7:00**		11	6	1	4				3					**25**	3.3%
7:00	**7:15**		7	2	1	2	2								**14**	1.9%
7:15	**7:30**		9	2		1	1								**13**	1.7%
7:30	**7:45**		5	3						1					**9**	1.2%
7:45	**8:00**		10	2		2	1								**15**	2.0%
7:00	**8:00**		31	9	1	5	4			1					**51**	6.8%
8:00	**8:15**		9	1	2				1	1					**14**	1.9%
8:15	**8:30**		6	3						1					**10**	1.3%
8:30	**8:45**		7	3	1	1				1					**13**	1.7%
8:45	**9:00**		11	2	1	2	1			1					**18**	2.4%
8:00	**9:00**		33	9	4	3	1		1	4					**55**	7.4%
9:00	**9:15**		9	3	1		1		1	1					**16**	2.1%
9:15	**9:30**		4	3		1									**8**	1.1%
9:30	**9:45**		7	4		2									**13**	1.7%
9:45	**10:00**		4	5		1									**10**	1.3%
9:00	**10:00**		24	15	1	4	1		1	1					**47**	6.3%
10:00	**10:15**		5	2											**7**	0.9%
10:15	**10:30**		7	2			1								**10**	1.3%
10:30	**10:45**		6	2		2	1								**11**	1.5%
10:45	**11:00**	1	4	3		1	2		3		1				**15**	2.0%
10:00	**11:00**	1	22	9		3	4		3		1				**43**	5.7%
11:00	**11:15**		3	4											**7**	0.9%
11:15	**11:30**		9	1											**10**	1.3%
11:30	**11:45**		7			1			1						**9**	1.2%
11:45	**12:00**		8	2			1								**11**	1.5%
11:00	**12:00**		27	7		1	1		1						**37**	4.9%

12:00	**12:15**		7	9		1		1	1				**19**	2.5%
12:15	**12:30**		7	2	1								**10**	1.3%
12:30	**12:45**		6	3	1		1					2	**13**	1.7%
12:45	**13:00**		5	3									**8**	1.1%
12:00	**13:00**		25	17	2	1	1	1	1			2	**50**	6.7%
13:00	**13:15**		6	5	1								**12**	1.6%
13:15	**13:30**		4	3									**7**	0.9%
13:30	**13:45**		5	3									**8**	1.1%
13:45	**14:00**		8	2	1	1		1					**13**	1.7%
13:00	**14:00**		23	13	2	1		1					**40**	5.3%
14:00	**14:15**		4	6		2							**12**	1.6%
14:15	**14:30**		7	3		1	1	1		1			**14**	1.9%
14:30	**14:45**		11			1		1					**13**	1.7%
14:45	**15:00**		10	1	1	2							**14**	1.9%
14:00	**15:00**		32	10	1	6	1	2		1			**53**	7.1%
15:00	**15:15**		8	2				1					**11**	1.5%
15:15	**15:30**		11	3	1								**15**	2.0%
15:30	**15:45**		5	4					1				**10**	1.3%
15:45	**16:00**		11	2	1	3		1					**18**	2.4%
15:00	**16:00**		35	11	2	3		2	1				**54**	7.2%
16:00	**16:15**		8	2		2				1			**13**	1.7%
16:15	**16:30**		8	5		3							**16**	2.1%
16:30	**16:45**		12	4		2							**18**	2.4%
16:45	**17:00**		8	3									**11**	1.5%
16:00	**17:00**		36	14		7				1			**58**	7.8%
17:00	**17:15**		11	3									**14**	1.9%
17:15	**17:30**		7	4		1							**12**	1.6%
17:30	**17:45**		10	4		1			2				**17**	2.3%
17:45	**18:00**		8										**8**	1.1%
17:00	**18:00**		36	11		2			2				**51**	6.8%
18:00	**18:15**		9	2		1			1				**13**	1.7%
18:15	**18:30**		5	4					1				**10**	1.3%
18:30	**18:45**		4	2					2				**8**	1.1%
18:45	**19:00**		19	2	2				1				**24**	3.2%
18:00	**19:00**		37	10	2	1			5				**55**	7.4%
19:00	**19:15**		3	1									**4**	0.5%
19:15	**19:30**		7	3									**10**	1.3%
19:30	**19:45**		7	1					1				**9**	1.2%
19:45	**20:00**		3	3									**6**	0.8%
19:00	**20:00**		20	8					1				**29**	3.9%
20:00	**20:15**		5	1									**6**	0.8%
20:15	**20:30**		4	1		2							**7**	0.9%
20:30	**20:45**		3	1									**4**	0.5%
20:45	**21:00**		3	3		1			1				**8**	1.1%
20:00	**21:00**		15	6		3			1				**25**	3.3%
21:00	**21:15**		2	1		1			1				**5**	0.7%
21:15	**21:30**		5	1									**6**	0.8%
21:30	**21:45**		1						1				**2**	0.3%
21:45	**22:00**		1	3					1				**5**	0.7%
21:00	**22:00**		9	5		1			3				**18**	2.4%
22:00	**22:15**		2						3				**5**	0.7%
22:15	**22:30**			1		1							**2**	0.3%
22:30	**22:45**		1										**1**	0.1%
22:45	**23:00**		3						2				**5**	0.7%
22:00	**23:00**		6	1		1			5				**13**	1.7%
23:00	**23:15**		1										**1**	0.1%
23:15	**23:30**		2	1									**3**	0.4%
23:30	**23:45**													
23:45	**OO:OO**								1				**1**	0.1%
23:00	**OO:OO**		3	1					1				**5**	0.7%
Total		**1**	**438**	**168**	**17**	**48**	**13**	**12**	**46**	**3**		**2**	**748**	
		0.1%	58.6%	22.5%	2.3%	6.4%	1.7%	1.6%	6.1%	0.4%		0.3%		
AM PEAK		**1**	**11**	**5**	**2**	**2**	**2**	**3**	**4**	**1**			**18**	
period		10:45	8:45	9:45	8:00	6:45	7:00	10:45	0:15	10:45			8:45	
% of class		100.0%	2.5%	3.0%	11.8%	4.2%	15.4%	25.0%	8.7%	33.3%				2.4%
PM PEAK			**19**	**9**	**2**	**3**	**1**	**1**	**3**	**1**		**2**	**24**	
period			18:45	12:00	18:45	15:45	12:30	12:00	22:00	14:15		12:30	18:45	
% of class			4.3%	5.4%	11.8%	6.3%	7.7%	8.3%	6.5%	33.3%		100.0%		3.2%

Report-1.2

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **East** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**		1												**1**	0.1%
0:15	**0:30**		1							2					**3**	0.4%
0:30	**0:45**		2												**2**	0.3%
0:45	**1:00**															
OO:OO	**1:00**		4							2					**6**	0.9%
1:00	**1:15**		1							3					**4**	0.6%
1:15	**1:30**		2							1					**3**	0.4%
1:30	**1:45**									2					**2**	0.3%
1:45	**2:00**		2												**2**	0.3%
1:00	**2:00**		5							6					**11**	1.6%
2:00	**2:15**															
2:15	**2:30**		1							1					**2**	0.3%
2:30	**2:45**		1												**1**	0.1%
2:45	**3:00**		1												**1**	0.1%
2:00	**3:00**		3							1					**4**	0.6%
3:00	**3:15**									1					**1**	0.1%
3:15	**3:30**		1												**1**	0.1%
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**		1							1					**2**	0.3%
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**			1											**1**	0.1%
4:00	**5:00**			1											**1**	0.1%
5:00	**5:15**		1	1						1					**3**	0.4%
5:15	**5:30**		1	2											**3**	0.4%
5:30	**5:45**		2	1						1					**4**	0.6%
5:45	**6:00**		2	4		1									**7**	1.0%
5:00	**6:00**		6	8		1				2					**17**	2.5%
6:00	**6:15**		3				1			1					**5**	0.7%
6:15	**6:30**		4	1						1					**6**	0.9%
6:30	**6:45**		3	1					1						**5**	0.7%
6:45	**7:00**		9	6		1				2	1				**19**	2.8%
6:00	**7:00**		19	8		1	1		1	4	1				**35**	5.2%
7:00	**7:15**		2		1						1				**4**	0.6%
7:15	**7:30**		8	4		1				2					**15**	2.2%
7:30	**7:45**		6	2		1									**9**	1.3%
7:45	**8:00**		4	3	1					2					**10**	1.5%
7:00	**8:00**		20	9	2	2				4	1				**38**	5.7%
8:00	**8:15**		8	1	2					3					**14**	2.1%
8:15	**8:30**		5	1	1	1				2				1	**11**	1.6%
8:30	**8:45**		7												**7**	1.0%
8:45	**9:00**		10								1				**11**	1.6%
8:00	**9:00**		30	2	3	1				5	1			1	**43**	6.4%
9:00	**9:15**		7	3						1					**11**	1.6%
9:15	**9:30**	1	10			1									**12**	1.8%
9:30	**9:45**		7	4						1					**12**	1.8%
9:45	**10:00**		11	3		1				2					**17**	2.5%
9:00	**10:00**	1	35	10		2				4					**52**	7.7%
10:00	**10:15**		7	1						1					**9**	1.3%
10:15	**10:30**		6	2		3					1				**12**	1.8%
10:30	**10:45**		5	4		3	1								**13**	1.9%
10:45	**11:00**		6	4			1			2					**13**	1.9%
10:00	**11:00**		24	11		6	2			3	1				**47**	7.0%
11:00	**11:15**		1	4		1									**6**	0.9%
11:15	**11:30**		8	2		2				1					**13**	1.9%
11:30	**11:45**		2	1		1				1					**5**	0.7%
11:45	**12:00**		7	3							1				**11**	1.6%
11:00	**12:00**		18	10		4				2	1				**35**	5.2%

12:00	**12:15**		4	5		1						**10**	1.5%
12:15	**12:30**		3	2					1			**6**	0.9%
12:30	**12:45**		2	2				1				**5**	0.7%
12:45	**13:00**		8	6				1	1			**16**	2.4%
12:00	**13:00**		17	15		1		2	2			**37**	5.5%
13:00	**13:15**		3	2					2			**7**	1.0%
13:15	**13:30**		9									**9**	1.3%
13:30	**13:45**		5	2					2			**9**	1.3%
13:45	**14:00**		4	1	1							**6**	0.9%
13:00	**14:00**		21	5	1				4			**31**	4.6%
14:00	**14:15**		4	2	1			1				**8**	1.2%
14:15	**14:30**		5	2					2			**9**	1.3%
14:30	**14:45**		3	4		2		1				**10**	1.5%
14:45	**15:00**		5	2				1	1			**9**	1.3%
14:00	**15:00**		17	10	1	2		3	3			**36**	5.4%
15:00	**15:15**		6	1		2						**9**	1.3%
15:15	**15:30**		7	2	1	1						**11**	1.6%
15:30	**15:45**		7	4					1			**12**	1.8%
15:45	**16:00**		9	5	1	1				1		**17**	2.5%
15:00	**16:00**		29	12	2	4			1	1		**49**	7.3%
16:00	**16:15**		8	2	1							**11**	1.6%
16:15	**16:30**		5	6	1	1						**13**	1.9%
16:30	**16:45**		11			2						**13**	1.9%
16:45	**17:00**		9	2		1			1			**13**	1.9%
16:00	**17:00**		33	10	2	4			1			**50**	7.4%
17:00	**17:15**		14	1		1						**16**	2.4%
17:15	**17:30**		9	2								**11**	1.6%
17:30	**17:45**		12	4		2						**18**	2.7%
17:45	**18:00**		11	3					1	1		**16**	2.4%
17:00	**18:00**		46	10		3			1	1		**61**	9.1%
18:00	**18:15**		7	1		1						**9**	1.3%
18:15	**18:30**		12	3					1			**16**	2.4%
18:30	**18:45**		6			1			1			**8**	1.2%
18:45	**19:00**		6	1		1			2			**10**	1.5%
18:00	**19:00**		31	5		3			4			**43**	6.4%
19:00	**19:15**		3	2								**5**	0.7%
19:15	**19:30**		8	2					1			**11**	1.6%
19:30	**19:45**		3									**3**	0.4%
19:45	**20:00**		6	1		1						**8**	1.2%
19:00	**20:00**		20	5		1			1			**27**	4.0%
20:00	**20:15**		2			1						**3**	0.4%
20:15	**20:30**		2	1								**3**	0.4%
20:30	**20:45**		5	3					1			**9**	1.3%
20:45	**21:00**		2	1								**3**	0.4%
20:00	**21:00**		11	5		1			1			**18**	2.7%
21:00	**21:15**		3	3					1			**7**	1.0%
21:15	**21:30**		2									**2**	0.3%
21:30	**21:45**		2						2			**4**	0.6%
21:45	**22:00**		1	1								**2**	0.3%
21:00	**22:00**		8	4					3			**15**	2.2%
22:00	**22:15**		1						3			**4**	0.6%
22:15	**22:30**		3						1			**4**	0.6%
22:30	**22:45**			1								**1**	0.1%
22:45	**23:00**		1						1			**2**	0.3%
22:00	**23:00**		5	1					5			**11**	1.6%
23:00	**23:15**												
23:15	**23:30**		1						1			**2**	0.3%
23:30	**23:45**												
23:45	**OO:OO**								1			**1**	0.1%
23:00	**OO:OO**		1						2			**3**	0.4%
Total		**1**	**404**	**141**	**11**	**36**	**3**	**6**	**62**	**7**	**1**	**672**	
		0.1%	60.1%	21.0%	1.6%	5.4%	0.4%	0.9%	9.2%	1.0%	0.1%		
AM PEAK		**1**	**11**	**6**	**2**	**3**	**1**	**1**	**3**	**1**	**1**	**19**	
period		9:15	9:45	6:45	8:00	10:15	6:00	6:30	1:00	6:45	8:15	6:45	
% of class		100.0%	2.7%	4.3%	18.2%	8.3%	33.3%	16.7%	4.8%	14.3%	100.0%		2.8%
PM PEAK			**14**	**6**	**1**	**2**		**1**	**3**	**1**		**18**	
period			17:00	12:45	13:45	14:30		12:30	22:00	15:45		17:30	
% of class			3.5%	4.3%	9.1%	5.6%		16.7%	4.8%	14.3%			2.7%

Report-1.3

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **West** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**									2					**2**	0.2%
0:15	**0:30**		1												**1**	0.1%
0:30	**0:45**									2					**2**	0.2%
0:45	**1:00**			1						2					**3**	0.4%
OO:OO	**1:00**		1	1						6					**8**	1.0%
1:00	**1:15**									2					**2**	0.2%
1:15	**1:30**									1					**1**	0.1%
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**									3					**3**	0.4%
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**									1					**1**	0.1%
2:45	**3:00**															
2:00	**3:00**									1					**1**	0.1%
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**			1											**1**	0.1%
4:30	**4:45**			1						2					**3**	0.4%
4:45	**5:00**		2	1						1					**4**	0.5%
4:00	**5:00**		2	3						3					**8**	1.0%
5:00	**5:15**		1												**1**	0.1%
5:15	**5:30**		1	1						1					**3**	0.4%
5:30	**5:45**		3	3											**6**	0.7%
5:45	**6:00**		1												**1**	0.1%
5:00	**6:00**		6	4						1					**11**	1.3%
6:00	**6:15**		9	3						1	2				**15**	1.8%
6:15	**6:30**		5	6						1					**12**	1.4%
6:30	**6:45**		10	5		1				2					**18**	2.1%
6:45	**7:00**		3	2										1	**6**	0.7%
6:00	**7:00**		27	16		1				4	2			1	**51**	6.1%
7:00	**7:15**		16	4				1							**21**	2.5%
7:15	**7:30**		10	5		1									**16**	1.9%
7:30	**7:45**		10	11											**21**	2.5%
7:45	**8:00**		5	3	4	1				3	2				**18**	2.1%
7:00	**8:00**		41	23	4	2		1		3	2				**76**	9.0%
8:00	**8:15**		10	2	1	2			1	2					**18**	2.1%
8:15	**8:30**		14	3	2										**19**	2.3%
8:30	**8:45**		8	1											**9**	1.1%
8:45	**9:00**		8	1			1			1					**11**	1.3%
8:00	**9:00**		40	7	3	2	1		1	3					**57**	6.8%
9:00	**9:15**		4	1											**5**	0.6%
9:15	**9:30**		9	2											**11**	1.3%
9:30	**9:45**		3	5		1				1					**10**	1.2%
9:45	**10:00**		1	1	1					2					**5**	0.6%
9:00	**10:00**		17	9	1	1				3					**31**	3.7%
10:00	**10:15**		8	4						1					**13**	1.5%
10:15	**10:30**		7	3		1									**11**	1.3%
10:30	**10:45**		6	3											**9**	1.1%
10:45	**11:00**		5	1		1	1								**8**	1.0%
10:00	**11:00**		26	11		2	1			1					**41**	4.9%
11:00	**11:15**		9	1	1	1	1								**13**	1.5%
11:15	**11:30**		8	3	1										**12**	1.4%
11:30	**11:45**		6	3	1	1				1				1	**13**	1.5%
11:45	**12:00**		6	2		2					1				**11**	1.3%
11:00	**12:00**		29	9	3	4	1			1	1			1	**49**	5.8%

12:00	**12:15**	7	5	1	1				1			**15**	1.8%
12:15	**12:30**	11	4			2			1			**18**	2.1%
12:30	**12:45**	8	6									**14**	1.7%
12:45	**13:00**	7	5	1								**13**	1.5%
12:00	**13:00**	33	20	2	1	2			2			**60**	7.1%
13:00	**13:15**	4	2		1				5			**12**	1.4%
13:15	**13:30**	9			1				1			**11**	1.3%
13:30	**13:45**	4	1		1				1			**7**	0.8%
13:45	**14:00**	7	1			1						**9**	1.1%
13:00	**14:00**	24	4		3	1			7			**39**	4.6%
14:00	**14:15**	6						1				**7**	0.8%
14:15	**14:30**	6	4		1	2				1		**14**	1.7%
14:30	**14:45**	7	3	1								**11**	1.3%
14:45	**15:00**	10	2		1							**13**	1.5%
14:00	**15:00**	29	9	1	2	2		1		1		**45**	5.3%
15:00	**15:15**	10	4		1				2			**17**	2.0%
15:15	**15:30**	14	5									**19**	2.3%
15:30	**15:45**	10	5									**15**	1.8%
15:45	**16:00**	9	6	2	3				1			**21**	2.5%
15:00	**16:00**	43	20	2	4				3			**72**	8.6%
16:00	**16:15**	9	2		3							**14**	1.7%
16:15	**16:30**	14	11									**25**	3.0%
16:30	**16:45**	8	7		2				1			**18**	2.1%
16:45	**17:00**	14	2			1						**17**	2.0%
16:00	**17:00**	45	22		5	1			1			**74**	8.8%
17:00	**17:15**	20	2	1	2			1	1			**27**	3.2%
17:15	**17:30**	10	4		1							**15**	1.8%
17:30	**17:45**	12	5	1	2				1			**21**	2.5%
17:45	**18:00**	8	3						1	1		**13**	1.5%
17:00	**18:00**	50	14	2	5			1	3	1		**76**	9.0%
18:00	**18:15**	9	1		1	2			1			**14**	1.7%
18:15	**18:30**	13	2									**15**	1.8%
18:30	**18:45**	4	1									**5**	0.6%
18:45	**19:00**	13	1						1			**15**	1.8%
18:00	**19:00**	39	5		1	2			2			**49**	5.8%
19:00	**19:15**	7	1		1							**9**	1.1%
19:15	**19:30**	3										**3**	0.4%
19:30	**19:45**	6										**6**	0.7%
19:45	**20:00**	3	2									**5**	0.6%
19:00	**20:00**	19	3		1							**23**	2.7%
20:00	**20:15**	5	1									**6**	0.7%
20:15	**20:30**	3	1						1			**5**	0.6%
20:30	**20:45**	2	3		2				1			**8**	1.0%
20:45	**21:00**	5	1						1			**7**	0.8%
20:00	**21:00**	15	6		2				3			**26**	3.1%
21:00	**21:15**		2									**2**	0.2%
21:15	**21:30**	6	1						4			**11**	1.3%
21:30	**21:45**	3	2						1			**6**	0.7%
21:45	**22:00**	3	1		1							**5**	0.6%
21:00	**22:00**	12	6		1				5			**24**	2.9%
22:00	**22:15**	2	1						1			**4**	0.5%
22:15	**22:30**	1							1			**2**	0.2%
22:30	**22:45**	2	1									**3**	0.4%
22:45	**23:00**		1									**1**	0.1%
22:00	**23:00**	5	3						2			**10**	1.2%
23:00	**23:15**	1										**1**	0.1%
23:15	**23:30**	2							1			**3**	0.4%
23:30	**23:45**								1			**1**	0.1%
23:45	**OO:OO**	1	1						1			**3**	0.4%
23:00	**OO:OO**	4	1						3			**8**	1.0%
Total		**507**	**196**	**18**	**37**	**11**	**1**	**3**	**60**	**7**	**2**	**842**	
		60.2%	23.3%	2.1%	4.4%	1.3%	0.1%	0.4%	7.1%	0.8%	0.2%		
AM PEAK		**16**	**11**	**4**	**2**	**1**	**1**	**1**	**3**	**2**	**1**	**21**	
period		7:00	7:30	7:45	8:00	8:45	7:00	8:00	7:45	6:00	6:45	7:00	
% of class		3.2%	5.6%	22.2%	5.4%	9.1%	100.0%	33.3%	5.0%	28.6%	50.0%		2.5%
PM PEAK		**20**	**11**	**2**	**3**	**2**		**1**	**5**	**1**		**27**	
period		17:00	16:15	15:45	15:45	12:15		14:00	13:00	14:15		17:00	
% of class		3.9%	5.6%	11.1%	8.1%	18.2%		33.3%	8.3%	14.3%			3.2%

Report-1.4

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **West** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**									1					**1**	0.1%
0:30	**0:45**									2					**2**	0.2%
0:45	**1:00**									1					**1**	0.1%
OO:OO	**1:00**									4					**4**	0.5%
1:00	**1:15**									2					**2**	0.2%
1:15	**1:30**															
1:30	**1:45**									1					**1**	0.1%
1:45	**2:00**															
1:00	**2:00**									3					**3**	0.4%
2:00	**2:15**															
2:15	**2:30**									1					**1**	0.1%
2:30	**2:45**			1											**1**	0.1%
2:45	**3:00**		1												**1**	0.1%
2:00	**3:00**		1	1						1					**3**	0.4%
3:00	**3:15**		1												**1**	0.1%
3:15	**3:30**						1								**1**	0.1%
3:30	**3:45**		1	1											**2**	0.2%
3:45	**4:00**															
3:00	**4:00**		2	1			1								**4**	0.5%
4:00	**4:15**															
4:15	**4:30**			1						1					**2**	0.2%
4:30	**4:45**			1											**1**	0.1%
4:45	**5:00**		2	1											**3**	0.4%
4:00	**5:00**		2	3						1					**6**	0.7%
5:00	**5:15**		2							1					**3**	0.4%
5:15	**5:30**															
5:30	**5:45**		2	2											**4**	0.5%
5:45	**6:00**		1	1			1			1					**4**	0.5%
5:00	**6:00**		5	3			1			2					**11**	1.3%
6:00	**6:15**		4	4						1					**9**	1.1%
6:15	**6:30**		7	4		3				2					**16**	1.9%
6:30	**6:45**		9	5							1				**15**	1.8%
6:45	**7:00**		5	4		1				2					**12**	1.4%
6:00	**7:00**		25	17		4				5	1				**52**	6.3%
7:00	**7:15**		9	6											**15**	1.8%
7:15	**7:30**		4	3		1			1	3					**12**	1.4%
7:30	**7:45**		17	5	1	1				2					**26**	3.1%
7:45	**8:00**		8	4	2	2	1			1					**18**	2.2%
7:00	**8:00**		38	18	3	4	1		1	6					**71**	8.6%
8:00	**8:15**		5		2										**7**	0.8%
8:15	**8:30**		13	5	2						1				**21**	2.5%
8:30	**8:45**		9	5		1				2					**17**	2.0%
8:45	**9:00**		6	2		2									**10**	1.2%
8:00	**9:00**		33	12	4	3				2	1				**55**	6.6%
9:00	**9:15**		7		1	1				1					**10**	1.2%
9:15	**9:30**		7	4		1				1					**13**	1.6%
9:30	**9:45**		9	3											**12**	1.4%
9:45	**10:00**		9	1		2	1				2				**15**	1.8%
9:00	**10:00**		32	8	1	4	1			2	2				**50**	6.0%
10:00	**10:15**	1	12	3	1	1					1				**19**	2.3%
10:15	**10:30**		8	5						1					**14**	1.7%
10:30	**10:45**		6	3		3				1					**13**	1.6%
10:45	**11:00**		7	2		1	1			1					**12**	1.4%
10:00	**11:00**	1	33	13	1	5	1			3	1				**58**	7.0%
11:00	**11:15**		13	4		2									**19**	2.3%
11:15	**11:30**		6	2		2					1				**11**	1.3%
11:30	**11:45**		13	2		2									**17**	2.0%
11:45	**12:00**		9	1						1					**11**	1.3%
11:00	**12:00**		41	9		6				1	1				**58**	7.0%

12:00	**12:15**		6	6		1	1					**14**	1.7%
12:15	**12:30**		8	1			1		1			**11**	1.3%
12:30	**12:45**		11	2					1			**14**	1.7%
12:45	**13:00**		3	2		1			1			**7**	0.8%
12:00	**13:00**		28	11		2	2		3			**46**	5.5%
13:00	**13:15**		7	5				1				**13**	1.6%
13:15	**13:30**		5	6		1	1		1			**14**	1.7%
13:30	**13:45**		7	4		1						**12**	1.4%
13:45	**14:00**		6	2	2				2			**12**	1.4%
13:00	**14:00**		25	17	2	2	1	1	3			**51**	6.1%
14:00	**14:15**		6	2					2			**10**	1.2%
14:15	**14:30**		7	2					1	1		**11**	1.3%
14:30	**14:45**		4	1		3						**8**	1.0%
14:45	**15:00**		7	2	1		1		2			**13**	1.6%
14:00	**15:00**		24	7	1	3	1		5	1		**42**	5.1%
15:00	**15:15**		6	7		1			1	1		**16**	1.9%
15:15	**15:30**		11	1								**12**	1.4%
15:30	**15:45**		11	4		1						**16**	1.9%
15:45	**16:00**		8	5		1			1			**15**	1.8%
15:00	**16:00**		36	17		3			2	1		**59**	7.1%
16:00	**16:15**		8	3	1	1						**13**	1.6%
16:15	**16:30**		11	3	1							**15**	1.8%
16:30	**16:45**		14	4								**18**	2.2%
16:45	**17:00**		13	1								**14**	1.7%
16:00	**17:00**		46	11	2	1						**60**	7.2%
17:00	**17:15**		15	6	1	1			1	1		**25**	3.0%
17:15	**17:30**		11	1								**12**	1.4%
17:30	**17:45**		8	4		2						**14**	1.7%
17:45	**18:00**		9	6					2			**17**	2.0%
17:00	**18:00**		43	17	1	3			3	1		**68**	8.2%
18:00	**18:15**		8	1					2			**11**	1.3%
18:15	**18:30**		6	1								**7**	0.8%
18:30	**18:45**		6	3		1						**10**	1.2%
18:45	**19:00**		2									**2**	0.2%
18:00	**19:00**		22	5		1			2			**30**	3.6%
19:00	**19:15**		4	2		1						**7**	0.8%
19:15	**19:30**		6	3								**9**	1.1%
19:30	**19:45**		9	1		1						**11**	1.3%
19:45	**20:00**		4								1	**5**	0.6%
19:00	**20:00**		23	6		2					1	**32**	3.9%
20:00	**20:15**		7	1								**8**	1.0%
20:15	**20:30**		6	1					1			**8**	1.0%
20:30	**20:45**		2									**2**	0.2%
20:45	**21:00**		5	1		1			1			**8**	1.0%
20:00	**21:00**		20	3		1			2			**26**	3.1%
21:00	**21:15**		5	2					1			**8**	1.0%
21:15	**21:30**		5	2			1		3			**11**	1.3%
21:30	**21:45**		3	1								**4**	0.5%
21:45	**22:00**		1	1		1			1			**4**	0.5%
21:00	**22:00**		14	6		1	1		5			**27**	3.3%
22:00	**22:15**		2									**2**	0.2%
22:15	**22:30**								1			**1**	0.1%
22:30	**22:45**		3	1								**4**	0.5%
22:45	**23:00**		1							1		**2**	0.2%
22:00	**23:00**		6	1					1	1		**9**	1.1%
23:00	**23:15**		2							1		**3**	0.4%
23:15	**23:30**												
23:30	**23:45**												
23:45	**OO:OO**								2			**2**	0.2%
23:00	**OO:OO**		2						2	1		**5**	0.6%
Total		**1**	**501**	**186**	**15**	**45**	**10**	**2**	**58**	**11**	**1**	**830**	
		0.1%	60.4%	22.4%	1.8%	5.4%	1.2%	0.2%	7.0%	1.3%	0.1%		
AM PEAK		**1**	**17**	**6**	**2**	**3**	**1**	**1**	**3**	**2**		**26**	
period		10:00	7:30	7:00	7:45	6:15	3:15	7:15	7:15	9:45		7:30	
% of class		100.0%	3.4%	3.2%	13.3%	6.7%	10.0%	50.0%	5.2%	18.2%			3.1%
PM PEAK			**15**	**7**	**2**	**3**	**1**	**1**	**3**	**1**	**1**	**25**	
period			17:00	15:00	13:45	14:30	12:00	13:00	21:15	14:15	19:45	17:00	
% of class			3.0%	3.8%	13.3%	6.7%	10.0%	50.0%	5.2%	9.1%	100.0%		3.0%

Report-1.5

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **East + West** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**		1							2					**3**	0.2%
0:15	**0:30**		1							4					**5**	0.3%
0:30	**0:45**		1							4					**5**	0.3%
0:45	**1:00**		1	2						2					**5**	0.3%
OO:OO	**1:00**		4	2						12					**18**	1.1%
1:00	**1:15**		1							3					**4**	0.3%
1:15	**1:30**									4					**4**	0.3%
1:30	**1:45**															
1:45	**2:00**									1					**1**	0.1%
1:00	**2:00**		1							8					**9**	0.6%
2:00	**2:15**									2					**2**	0.1%
2:15	**2:30**		1												**1**	0.1%
2:30	**2:45**		1		1					1					**3**	0.2%
2:45	**3:00**															
2:00	**3:00**		2		1					3					**6**	0.4%
3:00	**3:15**		1												**1**	0.1%
3:15	**3:30**									1					**1**	0.1%
3:30	**3:45**															
3:45	**4:00**		2												**2**	0.1%
3:00	**4:00**		3							1					**4**	0.3%
4:00	**4:15**															
4:15	**4:30**			1											**1**	0.1%
4:30	**4:45**			1						2					**3**	0.2%
4:45	**5:00**		2	1						1					**4**	0.3%
4:00	**5:00**		2	3						3					**8**	0.5%
5:00	**5:15**		1	1		1				3					**6**	0.4%
5:15	**5:30**		1	3						1					**5**	0.3%
5:30	**5:45**		5	4											**9**	0.6%
5:45	**6:00**		3	1		1									**5**	0.3%
5:00	**6:00**		10	9		2				4					**25**	1.6%
6:00	**6:15**		10	4	1					1	2				**18**	1.1%
6:15	**6:30**		8	8		1				1					**18**	1.1%
6:30	**6:45**		13	5		2				2					**22**	1.4%
6:45	**7:00**		7	5		2				3				1	**18**	1.1%
6:00	**7:00**		38	22	1	5				7	2			1	**76**	4.8%
7:00	**7:15**		23	6	1	2	2	1							**35**	2.2%
7:15	**7:30**		19	7		2	1								**29**	1.8%
7:30	**7:45**		15	14						1					**30**	1.9%
7:45	**8:00**		15	5	4	3	1			3	2				**33**	2.1%
7:00	**8:00**		72	32	5	7	4	1		4	2				**127**	8.0%
8:00	**8:15**		19	3	3	2			2	3					**32**	2.0%
8:15	**8:30**		20	6	2					1					**29**	1.8%
8:30	**8:45**		15	4	1	1				1					**22**	1.4%
8:45	**9:00**		19	3	1	2	2			2					**29**	1.8%
8:00	**9:00**		73	16	7	5	2		2	7					**112**	7.0%
9:00	**9:15**		13	4	1		1		1	1					**21**	1.3%
9:15	**9:30**		13	5		1									**19**	1.2%
9:30	**9:45**		10	9		3				1					**23**	1.4%
9:45	**10:00**		5	6	1	1				2					**15**	0.9%
9:00	**10:00**		41	24	2	5	1		1	4					**78**	4.9%
10:00	**10:15**		13	6						1					**20**	1.3%
10:15	**10:30**		14	5		1	1								**21**	1.3%
10:30	**10:45**		12	5		2	1								**20**	1.3%
10:45	**11:00**	1	9	4		2	3		3		1				**23**	1.4%
10:00	**11:00**	1	48	20		5	5		3	1	1				**84**	5.3%
11:00	**11:15**		12	5	1	1	1								**20**	1.3%
11:15	**11:30**		17	4	1										**22**	1.4%
11:30	**11:45**		13	3	1	2			1	1				1	**22**	1.4%
11:45	**12:00**		14	4		2	1				1				**22**	1.4%
11:00	**12:00**		56	16	3	5	2		1	1	1			1	**86**	5.4%

12:00	**12:15**		14	14	1	2			1	2			**34**	2.1%
12:15	**12:30**		18	6	1		2			1			**28**	1.8%
12:30	**12:45**		14	9	1		1					2	**27**	1.7%
12:45	**13:00**		12	8	1								**21**	1.3%
12:00	**13:00**		58	37	4	2	3		1	3		2	**110**	6.9%
13:00	**13:15**		10	7	1	1				5			**24**	1.5%
13:15	**13:30**		13	3		1				1			**18**	1.1%
13:30	**13:45**		9	4		1				1			**15**	0.9%
13:45	**14:00**		15	3	1	1	1		1				**22**	1.4%
13:00	**14:00**		47	17	2	4	1		1	7			**79**	5.0%
14:00	**14:15**		10	6		2			1				**19**	1.2%
14:15	**14:30**		13	7		2	3		1		2		**28**	1.8%
14:30	**14:45**		18	3	1	1			1				**24**	1.5%
14:45	**15:00**		20	3	1	3							**27**	1.7%
14:00	**15:00**		61	19	2	8	3		3		2		**98**	6.2%
15:00	**15:15**		18	6		1			1	2			**28**	1.8%
15:15	**15:30**		25	8	1								**34**	2.1%
15:30	**15:45**		15	9						1			**25**	1.6%
15:45	**16:00**		20	8	3	6			1	1			**39**	2.5%
15:00	**16:00**		78	31	4	7			2	4			**126**	7.9%
16:00	**16:15**		17	4		5					1		**27**	1.7%
16:15	**16:30**		22	16		3							**41**	2.6%
16:30	**16:45**		20	11		4				1			**36**	2.3%
16:45	**17:00**		22	5			1						**28**	1.8%
16:00	**17:00**		81	36		12	1			1	1		**132**	8.3%
17:00	**17:15**		31	5	1	2			1	1			**41**	2.6%
17:15	**17:30**		17	8		2							**27**	1.7%
17:30	**17:45**		22	9	1	3				3			**38**	2.4%
17:45	**18:00**		16	3						1	1		**21**	1.3%
17:00	**18:00**		86	25	2	7			1	5	1		**127**	8.0%
18:00	**18:15**		18	3		2	2			2			**27**	1.7%
18:15	**18:30**		18	6						1			**25**	1.6%
18:30	**18:45**		8	3						2			**13**	0.8%
18:45	**19:00**		32	3	2					2			**39**	2.5%
18:00	**19:00**		76	15	2	2	2			7			**104**	6.5%
19:00	**19:15**		10	2		1							**13**	0.8%
19:15	**19:30**		10	3									**13**	0.8%
19:30	**19:45**		13	1						1			**15**	0.9%
19:45	**20:00**		6	5									**11**	0.7%
19:00	**20:00**		39	11		1				1			**52**	3.3%
20:00	**20:15**		10	2									**12**	0.8%
20:15	**20:30**		7	2		2				1			**12**	0.8%
20:30	**20:45**		5	4		2				1			**12**	0.8%
20:45	**21:00**		8	4		1				2			**15**	0.9%
20:00	**21:00**		30	12		5				4			**51**	3.2%
21:00	**21:15**		2	3		1				1			**7**	0.4%
21:15	**21:30**		11	2						4			**17**	1.1%
21:30	**21:45**		4	2						2			**8**	0.5%
21:45	**22:00**		4	4		1				1			**10**	0.6%
21:00	**22:00**		21	11		2				8			**42**	2.6%
22:00	**22:15**		4	1						4			**9**	0.6%
22:15	**22:30**		1	1		1				1			**4**	0.3%
22:30	**22:45**		3	1									**4**	0.3%
22:45	**23:00**		3	1						2			**6**	0.4%
22:00	**23:00**		11	4		1				7			**23**	1.4%
23:00	**23:15**		2										**2**	0.1%
23:15	**23:30**		4	1						1			**6**	0.4%
23:30	**23:45**									1			**1**	0.1%
23:45	**OO:OO**		1	1						2			**4**	0.3%
23:00	**OO:OO**		7	2						4			**13**	0.8%
Total		**1**	**945**	**364**	**35**	**85**	**24**	**1**	**15**	**106**	**10**	**4**	**1590**	
		0.1%	59.4%	22.9%	2.2%	5.3%	1.5%	0.1%	0.9%	6.7%	0.6%	0.3%		
AM PEAK		**1**	**23**	**14**	**4**	**3**	**3**	**1**	**3**	**4**	**2**	**1**	**35**	
period		10:45	7:00	7:30	7:45	7:45	10:45	7:00	10:45	0:15	6:00	6:45	7:00	
% of class		100.0%	2.4%	3.8%	11.4%	3.5%	12.5%	100.0%	20.0%	3.8%	20.0%	25.0%		2.2%
PM PEAK			**32**	**16**	**3**	**6**	**3**		**1**	**5**	**2**	**2**	**41**	
period			18:45	16:15	15:45	15:45	14:15		12:00	13:00	14:15	12:30	16:15	
% of class			3.4%	4.4%	8.6%	7.1%	12.5%		6.7%	4.7%	20.0%	50.0%		2.6%

Report-1.6

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **East + West** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**		1												**1**	0.1%
0:15	**0:30**		1							3					**4**	0.3%
0:30	**0:45**		2							2					**4**	0.3%
0:45	**1:00**									1					**1**	0.1%
OO:OO	**1:00**		4							6					**10**	0.7%
1:00	**1:15**		1							5					**6**	0.4%
1:15	**1:30**		2							1					**3**	0.2%
1:30	**1:45**									3					**3**	0.2%
1:45	**2:00**		2												**2**	0.1%
1:00	**2:00**		5							9					**14**	0.9%
2:00	**2:15**															
2:15	**2:30**		1							2					**3**	0.2%
2:30	**2:45**		1	1											**2**	0.1%
2:45	**3:00**		2												**2**	0.1%
2:00	**3:00**		4	1						2					**7**	0.5%
3:00	**3:15**		1							1					**2**	0.1%
3:15	**3:30**		1				1								**2**	0.1%
3:30	**3:45**		1	1											**2**	0.1%
3:45	**4:00**															
3:00	**4:00**		3	1			1			1					**6**	0.4%
4:00	**4:15**															
4:15	**4:30**			1						1					**2**	0.1%
4:30	**4:45**			1											**1**	0.1%
4:45	**5:00**		2	2											**4**	0.3%
4:00	**5:00**		2	4						1					**7**	0.5%
5:00	**5:15**		3	1						2					**6**	0.4%
5:15	**5:30**		1	2											**3**	0.2%
5:30	**5:45**		4	3						1					**8**	0.5%
5:45	**6:00**		3	5		1	1			1					**11**	0.7%
5:00	**6:00**		11	11		1	1			4					**28**	1.9%
6:00	**6:15**		7	4			1			2					**14**	0.9%
6:15	**6:30**		11	5		3				3					**22**	1.5%
6:30	**6:45**		12	6					1		1				**20**	1.3%
6:45	**7:00**		14	10		2				4	1				**31**	2.1%
6:00	**7:00**		44	25		5	1		1	9	2				**87**	5.8%
7:00	**7:15**		11	6	1						1				**19**	1.3%
7:15	**7:30**		12	7		2			1	5					**27**	1.8%
7:30	**7:45**		23	7	1	2				2					**35**	2.3%
7:45	**8:00**		12	7	3	2	1			3					**28**	1.9%
7:00	**8:00**		58	27	5	6	1		1	10	1				**109**	7.3%
8:00	**8:15**		13	1	4					3					**21**	1.4%
8:15	**8:30**		18	6	3	1				2	1			1	**32**	2.1%
8:30	**8:45**		16	5		1				2					**24**	1.6%
8:45	**9:00**		16	2		2					1				**21**	1.4%
8:00	**9:00**		63	14	7	4				7	2			1	**98**	6.5%
9:00	**9:15**		14	3	1	1				2					**21**	1.4%
9:15	**9:30**	1	17	4		2				1					**25**	1.7%
9:30	**9:45**		16	7						1					**24**	1.6%
9:45	**10:00**		20	4		3	1			2	2				**32**	2.1%
9:00	**10:00**	1	67	18	1	6	1			6	2				**102**	6.8%
10:00	**10:15**	1	19	4	1	1				1	1				**28**	1.9%
10:15	**10:30**		14	7		3				1	1				**26**	1.7%
10:30	**10:45**		11	7		6	1			1					**26**	1.7%
10:45	**11:00**		13	6		1	2			3					**25**	1.7%
10:00	**11:00**	1	57	24	1	11	3			6	2				**105**	7.0%
11:00	**11:15**		14	8		3									**25**	1.7%
11:15	**11:30**		14	4		4				1	1				**24**	1.6%
11:30	**11:45**		15	3		3				1					**22**	1.5%
11:45	**12:00**		16	4						1	1				**22**	1.5%
11:00	**12:00**		59	19		10				3	2				**93**	6.2%

12:00	**12:15**		10	11		2	1					**24**	1.6%
12:15	**12:30**		11	3			1		2			**17**	1.1%
12:30	**12:45**		13	4				1	1			**19**	1.3%
12:45	**13:00**		11	8		1		1	2			**23**	1.5%
12:00	**13:00**		45	26		3	2	2	5			**83**	5.5%
13:00	**13:15**		10	7				1	2			**20**	1.3%
13:15	**13:30**		14	6		1	1		1			**23**	1.5%
13:30	**13:45**		12	6		1			2			**21**	1.4%
13:45	**14:00**		10	3	3				2			**18**	1.2%
13:00	**14:00**		46	22	3	2	1	1	7			**82**	5.5%
14:00	**14:15**		10	4	1			1	2			**18**	1.2%
14:15	**14:30**		12	4					3	1		**20**	1.3%
14:30	**14:45**		7	5		5		1				**18**	1.2%
14:45	**15:00**		12	4	1		1	1	3			**22**	1.5%
14:00	**15:00**		41	17	2	5	1	3	8	1		**78**	5.2%
15:00	**15:15**		12	8		3			1	1		**25**	1.7%
15:15	**15:30**		18	3	1	1						**23**	1.5%
15:30	**15:45**		18	8		1			1			**28**	1.9%
15:45	**16:00**		17	10	1	2			1	1		**32**	2.1%
15:00	**16:00**		65	29	2	7			3	2		**108**	7.2%
16:00	**16:15**		16	5	2	1						**24**	1.6%
16:15	**16:30**		16	9	2	1						**28**	1.9%
16:30	**16:45**		25	4		2						**31**	2.1%
16:45	**17:00**		22	3		1			1			**27**	1.8%
16:00	**17:00**		79	21	4	5			1			**110**	7.3%
17:00	**17:15**		29	7	1	2			1	1		**41**	2.7%
17:15	**17:30**		20	3								**23**	1.5%
17:30	**17:45**		20	8		4						**32**	2.1%
17:45	**18:00**		20	9					3	1		**33**	2.2%
17:00	**18:00**		89	27	1	6			4	2		**129**	8.6%
18:00	**18:15**		15	2		1			2			**20**	1.3%
18:15	**18:30**		18	4					1			**23**	1.5%
18:30	**18:45**		12	3		2			1			**18**	1.2%
18:45	**19:00**		8	1		1			2			**12**	0.8%
18:00	**19:00**		53	10		4			6			**73**	4.9%
19:00	**19:15**		7	4		1						**12**	0.8%
19:15	**19:30**		14	5					1			**20**	1.3%
19:30	**19:45**		12	1		1						**14**	0.9%
19:45	**20:00**		10	1		1					1	**13**	0.9%
19:00	**20:00**		43	11		3			1		1	**59**	3.9%
20:00	**20:15**		9	1		1						**11**	0.7%
20:15	**20:30**		8	2					1			**11**	0.7%
20:30	**20:45**		7	3					1			**11**	0.7%
20:45	**21:00**		7	2		1			1			**11**	0.7%
20:00	**21:00**		31	8		2			3			**44**	2.9%
21:00	**21:15**		8	5					2			**15**	1.0%
21:15	**21:30**		7	2			1		3			**13**	0.9%
21:30	**21:45**		5	1					2			**8**	0.5%
21:45	**22:00**		2	2		1			1			**6**	0.4%
21:00	**22:00**		22	10		1	1		8			**42**	2.8%
22:00	**22:15**		3						3			**6**	0.4%
22:15	**22:30**		3						2			**5**	0.3%
22:30	**22:45**		3	2								**5**	0.3%
22:45	**23:00**		2						1	1		**4**	0.3%
22:00	**23:00**		11	2					6	1		**20**	1.3%
23:00	**23:15**		2							1		**3**	0.2%
23:15	**23:30**		1						1			**2**	0.1%
23:30	**23:45**												
23:45	**OO:OO**								3			**3**	0.2%
23:00	**OO:OO**		3						4	1		**8**	0.5%
Total		**2**	**905**	**327**	**26**	**81**	**13**	**8**	**120**	**18**	**2**	**1502**	
		0.1%	60.3%	21.8%	1.7%	5.4%	0.9%	0.5%	8.0%	1.2%	0.1%		
AM PEAK		**1**	**23**	**10**	**4**	**6**	**2**	**1**	**5**	**2**	**1**	**35**	
period		9:15	7:30	6:45	8:00	10:30	10:45	6:30	1:00	9:45	8:15	7:30	
% of class		50.0%	2.5%	3.1%	15.4%	7.4%	15.4%	12.5%	4.2%	11.1%	50.0%		2.3%
PM PEAK			**29**	**11**	**3**	**5**	**1**	**1**	**3**	**1**	**1**	**41**	
period			17:00	12:00	13:45	14:30	12:00	12:30	14:15	14:15	19:45	17:00	
% of class			3.2%	3.4%	11.5%	6.2%	7.7%	12.5%	2.5%	5.6%	50.0%		2.7%

Report-2.1

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **East** Road :

Dates : 1 **4/30/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	**Total**	**Pace Speed**	**Number in Pace**
OO:OO	**0:15**							1								**1**	50.1-70.1	1
0:15	**0:30**							2	2							**4**	52.0-72.0	4
0:30	**0:45**							1	2							**3**	57.3-77.3	3
0:45	**1:00**								2							**2**	57.8-77.8	2
OO:OO	**1:00**							4	6							**2**	57.8-77.8	
1:00	**1:15**								2							**2**	58.0-78.0	2
1:15	**1:30**							1	2							**3**	55.9-75.9	3
1:30	**1:45**																	
1:45	**2:00**							1								**1**	44.0-64.0	1
1:00	**2:00**							2	4							**2**	58.0-78.0	
2:00	**2:15**							1	1							**2**	60.5-80.5	2
2:15	**2:30**								1							**1**	53.7-73.7	1
2:30	**2:45**						1		1							**2**	53.9-73.9	2
2:45	**3:00**																	
2:00	**3:00**						1	1	3							**2**	60.5-80.5	
3:00	**3:15**								1							**1**	58.4-78.4	1
3:15	**3:30**								1							**1**	56.4-76.4	1
3:30	**3:45**																	
3:45	**4:00**									2						**2**	67.8-87.8	2
3:00	**4:00**								2	2						**2**	67.8-87.8	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**								5							**5**	60.3-80.3	5
5:15	**5:30**									1	1					**2**	72.2-92.2	2
5:30	**5:45**								1	1	1					**3**	72.6-92.6	3
5:45	**6:00**							2	2							**4**	57.3-77.3	4
5:00	**6:00**							2	8	2	2					**3**	72.6-92.6	
6:00	**6:15**						1		1	1						**3**	53.6-73.6	2
6:15	**6:30**								1	5						**6**	68.9-88.9	6
6:30	**6:45**								2	2						**4**	69.9-89.9	4
6:45	**7:00**								4	4	3	1				**12**	71.6-91.6	9
6:00	**7:00**						1		8	12	3	1				**12**	71.6-91.6	
7:00	**7:15**						2	4	5	3						**14**	55.3-75.3	11
7:15	**7:30**							4	3	5	1					**13**	62.6-82.6	9
7:30	**7:45**								5	2	2					**9**	75.4-95.4	8
7:45	**8:00**						1	2	9	2	1					**15**	61.5-81.5	12
7:00	**8:00**						3	10	22	12	4					**9**	75.4-95.4	
8:00	**8:15**							3	8	3						**14**	68.7-88.7	13
8:15	**8:30**						1	1	4	4						**10**	68.6-88.6	8
8:30	**8:45**							3	6	2	2					**13**	64.1-84.1	10
8:45	**9:00**						2	5	6	4	1					**18**	58.7-78.7	12
8:00	**9:00**						3	12	24	13	3					**14**	68.7-88.7	
9:00	**9:15**							5	5	6						**16**	65.3-85.3	13
9:15	**9:30**								3	3	1	1				**8**	75.4-95.4	7
9:30	**9:45**					1	3	2	3	3	1					**13**	64.4-84.4	7
9:45	**10:00**							1	5	4						**10**	70.1-90.1	9
9:00	**10:00**					1	3	8	16	16	2	1				**8**	75.4-95.4	
10:00	**10:15**							1	2	3	1					**7**	68.4-88.4	6
10:15	**10:30**							3	4	2	1					**10**	66.8-86.8	9
10:30	**10:45**							5	3	3						**11**	62.9-82.9	9
10:45	**11:00**						2	2	8	2	1					**15**	58.6-78.6	11
10:00	**11:00**						2	11	17	10	3					**7**	68.4-88.4	
11:00	**11:15**							1	2	2	1	1				**7**	69.1-89.1	5
11:15	**11:30**						1		2	5	1	1				**10**	68.2-88.2	7
11:30	**11:45**							2	4	3						**9**	68.6-88.6	9
11:45	**12:00**		1				1	3	3	2	1					**11**	64.6-84.6	7
11:00	**12:00**		1				2	6	11	12	3	2				**7**	69.1-89.1	

12:00	**12:15**			1	4	9	3	2			**19**	64.4-84.4	16
12:15	**12:30**				4	4	1	1			**10**	62.2-82.2	9
12:30	**12:45**				6	4	1	2			**13**	60.5-80.5	10
12:45	**13:00**				4	3		1			**8**	60.2-80.2	7
12:00	**13:00**			1	18	20	5	6			**19**	64.4-84.4	
13:00	**13:15**				2	7	2		1		**12**	61.7-81.7	11
13:15	**13:30**					3	3	1			**7**	69.4-89.4	6
13:30	**13:45**					5	3				**8**	69.6-89.6	8
13:45	**14:00**				2	9	2				**13**	61.3-81.3	12
13:00	**14:00**				4	24	10	1	1		**8**	69.6-89.6	
14:00	**14:15**					8	4				**12**	71.0-91.0	12
14:15	**14:30**				2	8	4				**14**	67.9-87.9	12
14:30	**14:45**					5	5	3			**13**	74.2-94.2	11
14:45	**15:00**			1	4	7	2				**14**	65.9-85.9	13
14:00	**15:00**			1	6	28	15	3			**13**	74.2-94.2	
15:00	**15:15**			1		4	4		2		**11**	69.1-89.1	8
15:15	**15:30**				5	3	5	1	1		**15**	66.4-86.4	12
15:30	**15:45**				1	6	2	1			**10**	64.5-84.5	9
15:45	**16:00**			1	4	7	5	1			**18**	63.8-83.8	14
15:00	**16:00**			2	10	20	16	3	3		**11**	69.1-89.1	
16:00	**16:15**				1	5	3	4			**13**	69.6-89.6	9
16:15	**16:30**				3	10	3				**16**	62.9-82.9	15
16:30	**16:45**					15	2	1			**18**	69.0-89.0	17
16:45	**17:00**				3	3	4	1			**11**	72.2-92.2	8
16:00	**17:00**				7	33	12	6			**11**	72.2-92.2	
17:00	**17:15**				1	7	6				**14**	71.0-91.0	13
17:15	**17:30**					4	2	5		1	**12**	75.7-95.7	9
17:30	**17:45**					7	6	4			**17**	74.7-94.7	15
17:45	**18:00**				1	3	3	1			**8**	69.8-89.8	7
17:00	**18:00**				2	21	17	10		1	**12**	75.7-95.7	
18:00	**18:15**				1	4	6	2			**13**	68.0-88.0	11
18:15	**18:30**					3	6	1			**10**	66.1-86.1	9
18:30	**18:45**				1	4	1	1	1		**8**	62.0-82.0	6
18:45	**19:00**				2	12	7	2	1		**24**	68.2-88.2	21
18:00	**19:00**				4	23	20	6	2		**24**	68.2-88.2	
19:00	**19:15**					3		1			**4**	74.7-94.7	4
19:15	**19:30**				2	3	3	2			**10**	67.1-87.1	8
19:30	**19:45**			1	1	2	5				**9**	63.8-83.8	8
19:45	**20:00**				1	4	1				**6**	64.9-84.9	6
19:00	**20:00**			1	4	12	9	3			**4**	74.7-94.7	
20:00	**20:15**					1	4	1			**6**	77.4-97.4	6
20:15	**20:30**				2	3	1	1			**7**	59.8-79.8	5
20:30	**20:45**				1	1	1	1			**4**	66.3-86.3	3
20:45	**21:00**				1	4	2	1			**8**	67.8-87.8	7
20:00	**21:00**				4	9	8	4			**6**	77.4-97.4	
21:00	**21:15**			1		2	1	1			**5**	56.8-76.8	3
21:15	**21:30**				2	2	2				**6**	61.1-81.1	5
21:30	**21:45**				1	1					**2**	61.0-81.0	2
21:45	**22:00**			1	2	1	1				**5**	54.3-74.3	4
21:00	**22:00**			2	5	6	4	1			**6**	61.1-81.1	
22:00	**22:15**			1	2	2					**5**	52.3-72.3	4
22:15	**22:30**				1		1				**2**	62.4-82.4	2
22:30	**22:45**			1							**1**	37.2-57.2	1
22:45	**23:00**				2	3					**5**	59.7-79.7	5
22:00	**23:00**			2	5	5	1				**2**	62.4-82.4	
23:00	**23:15**							1			**1**	75.0-95.0	1
23:15	**23:30**				2		1				**3**	49.5-69.5	2
23:30	**23:45**												
23:45	**OO:OO**					1					**1**	56.6-76.6	1
23:00	**OO:OO**				2	1	1	1			**1**	75.0-95.0	
Total		**1**	**1**	**24**	**127**	**323**	**197**	**64**	**10**	**1**	**748**		
		0.1%	0.1%	3.2%	17.0%	43.2%	26.3%	8.6%	1.3%	0.1%			
AM PEAK		**1**	**1**	**3**	**5**	**9**	**6**	**3**	**1**		**18**		
period		11:45	9:30	9:30	8:45	7:45	9:00	6:45	6:45		8:45		
% of class		100.0%	100.0%	12.5%	3.9%	2.8%	3.0%	4.7%	10.0%			2.4%	
PM PEAK				**1**	**6**	**15**	**7**	**5**	**2**	**1**	**24**		
period				12:00	12:30	16:30	18:45	17:15	15:00	17:15	18:45		
% of class				4.2%	4.7%	4.6%	3.6%	7.8%	20.0%	100.0%		3.2%	

15% Percentile :	**68**	KPH
50% Percentile :	**78**	KPH
85% Percentile :	**89**	KPH
95% Percentile :	**97**	KPH

20 KPH Pace Speed:	**69.0-89.0**	KPH
Number in Pace:	**545**	
Percent in Pace:	**72.9**	%
Number of Vehicles >80 KPH:	**304**	
Percent of Vehicles >80 KPH:	**40.6**	%
Mean Speed(average):	**78**	KPH

Report-2.2

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **East** Road :

Dates : 1 **5/1/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**							1								**1**	49.9-69.9	1
0:15	**0:30**						1		1		1					**3**	56.1-76.1	2
0:30	**0:45**							2								**2**	50.3-70.3	2
0:45	**1:00**																	
OO:OO	**1:00**						1	3	1		1					**3**	56.1-76.1	
1:00	**1:15**							1	3							**4**	57.0-77.0	4
1:15	**1:30**							1	1	1						**3**	61.3-81.3	3
1:30	**1:45**							1	1							**2**	60.6-80.6	2
1:45	**2:00**						1		1							**2**	51.4-71.4	2
1:00	**2:00**						1	3	6	1						**3**	61.3-81.3	
2:00	**2:15**																	
2:15	**2:30**						1	1								**2**	46.9-66.9	2
2:30	**2:45**									1						**1**	64.1-84.1	1
2:45	**3:00**								1							**1**	60.1-80.1	1
2:00	**3:00**						1	1	1	1						**1**	64.1-84.1	
3:00	**3:15**						1									**1**	38.9-58.9	1
3:15	**3:30**									1						**1**	65.4-85.4	1
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**						1			1						**1**	65.4-85.4	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**									1						**1**	65.3-85.3	1
4:00	**5:00**									1						**1**	65.3-85.3	
5:00	**5:15**								3							**3**	58.9-78.9	3
5:15	**5:30**								3							**3**	59.5-79.5	3
5:30	**5:45**						1	1	1	1						**4**	57.4-77.4	3
5:45	**6:00**						1	2	3	1						**7**	56.7-76.7	6
5:00	**6:00**						2	3	10	2						**3**	59.5-79.5	
6:00	**6:15**								5							**5**	55.2-75.2	5
6:15	**6:30**							2	3	1						**6**	61.5-81.5	6
6:30	**6:45**							1	2	1	1					**5**	66.8-86.8	4
6:45	**7:00**						2	4	6	6	1					**19**	66.5-86.5	14
6:00	**7:00**						2	7	16	8	2					**5**	66.8-86.8	
7:00	**7:15**							1	2		1					**4**	57.0-77.0	3
7:15	**7:30**							6	7	2						**15**	61.7-81.7	14
7:30	**7:45**							1	5	2	1					**9**	62.5-82.5	7
7:45	**8:00**						1	1	5	3						**10**	69.0-89.0	8
7:00	**8:00**						1	9	19	7	2					**10**	69.0-89.0	
8:00	**8:15**							7	6		1					**14**	59.4-79.4	13
8:15	**8:30**							5	4	1	1					**11**	59.4-79.4	9
8:30	**8:45**							1	3	2	1					**7**	63.7-83.7	6
8:45	**9:00**							3	4	3	1					**11**	62.8-82.8	9
8:00	**9:00**							16	17	6	4					**7**	63.7-83.7	
9:00	**9:15**							1	5	4	1					**11**	68.2-88.2	10
9:15	**9:30**							1	3	6	2					**12**	76.8-96.8	11
9:30	**9:45**						1	2	4	4	1					**12**	68.0-88.0	9
9:45	**10:00**							1	6	10						**17**	69.6-89.6	17
9:00	**10:00**						1	5	18	24	4					**12**	76.8-96.8	
10:00	**10:15**							4	1	2	2					**9**	65.6-85.6	7
10:15	**10:30**							3	5	3		1				**12**	63.8-83.8	10
10:30	**10:45**							2	5	3	2					**13**	65.8-85.8	9
10:45	**11:00**						1	3	7	2						**13**	62.2-82.2	12
10:00	**11:00**						1	12	18	10	4	1				**13**	65.8-85.8	
11:00	**11:15**								2	4						**6**	70.0-90.0	6
11:15	**11:30**								8	2	3					**13**	66.2-86.2	10
11:30	**11:45**								2	3						**5**	63.6-83.6	5
11:45	**12:00**								3	5	3					**11**	77.2-97.2	9
11:00	**12:00**								15	14	6					**11**	77.2-97.2	

12:00	**12:15**				4	5	1					**10**	62.4-82.4	10
12:15	**12:30**				1	2	1	2				**6**	71.8-91.8	4
12:30	**12:45**					4	1					**5**	65.1-85.1	5
12:45	**13:00**				2	10	4					**16**	65.0-85.0	16
12:00	**13:00**				7	21	7	2				**6**	71.8-91.8	
13:00	**13:15**		1		3	1	2					**7**	65.3-85.3	6
13:15	**13:30**					5	2	2				**9**	75.5-95.5	8
13:30	**13:45**				1	4	4					**9**	64.8-84.8	8
13:45	**14:00**				1	3	2					**6**	64.7-84.7	6
13:00	**14:00**		1		5	13	10	2				**9**	75.5-95.5	
14:00	**14:15**				1	4	3					**8**	70.9-90.9	7
14:15	**14:30**		1		1	2	4	1				**9**	70.5-90.5	7
14:30	**14:45**				5	4	1					**10**	59.1-79.1	9
14:45	**15:00**				3	4	1	1				**9**	58.8-78.8	7
14:00	**15:00**		1		10	14	9	2				**8**	70.9-90.9	
15:00	**15:15**				2	2	4		1			**9**	68.5-88.5	6
15:15	**15:30**				2	2	3	4				**11**	76.1-96.1	8
15:30	**15:45**					3	7	2				**12**	75.5-95.5	12
15:45	**16:00**				2	8	7					**17**	67.1-87.1	15
15:00	**16:00**				6	15	21	6	1			**11**	76.1-96.1	
16:00	**16:15**				3	6	2					**11**	60.9-80.9	9
16:15	**16:30**		3		3	5	1	1				**13**	57.6-77.6	9
16:30	**16:45**		1		1	5	3	2			1	**13**	69.3-89.3	9
16:45	**17:00**		1		3	5	3	1				**13**	66.0-86.0	11
16:00	**17:00**		5		10	21	9	4			1	**13**	69.3-89.3	
17:00	**17:15**				2	9	4		1			**16**	65.2-85.2	14
17:15	**17:30**				3	4	4					**11**	65.2-85.2	9
17:30	**17:45**					9	8	1				**18**	69.3-89.3	17
17:45	**18:00**				2	4	8	2				**16**	71.5-91.5	13
17:00	**18:00**				7	26	24	3	1			**16**	71.5-91.5	
18:00	**18:15**					5	3		1			**9**	66.7-86.7	8
18:15	**18:30**				2	6	5	3				**16**	68.6-88.6	12
18:30	**18:45**				1	3	4					**8**	68.9-88.9	7
18:45	**19:00**				1	1	5	3				**10**	74.0-94.0	8
18:00	**19:00**				4	15	17	6	1			**10**	74.0-94.0	
19:00	**19:15**				2	3						**5**	59.3-79.3	5
19:15	**19:30**					2	6	2	1			**11**	73.3-93.3	9
19:30	**19:45**					1	2					**3**	68.8-88.8	3
19:45	**20:00**				2	4		1		1		**8**	57.9-77.9	6
19:00	**20:00**				4	10	8	3	1	1		**11**	73.3-93.3	
20:00	**20:15**					1	1	1				**3**	74.1-94.1	3
20:15	**20:30**					1	2					**3**	67.6-87.6	3
20:30	**20:45**	1	2			2	4					**9**	69.4-89.4	6
20:45	**21:00**				2		1					**3**	64.3-84.3	3
20:00	**21:00**	1	2		2	4	8	1				**3**	74.1-94.1	
21:00	**21:15**				4	2	1					**7**	61.1-81.1	7
21:15	**21:30**					1	1					**2**	63.6-83.6	2
21:30	**21:45**		1		1	1	1					**4**	62.7-82.7	3
21:45	**22:00**					2						**2**	54.1-74.1	2
21:00	**22:00**		1		5	6	3					**2**	63.6-83.6	
22:00	**22:15**				1	3						**4**	55.3-75.3	4
22:15	**22:30**				2	2						**4**	57.3-77.3	4
22:30	**22:45**					1						**1**	53.3-73.3	1
22:45	**23:00**				1			1				**2**	45.2-65.2	1
22:00	**23:00**				4	6		1				**4**	57.3-77.3	
23:00	**23:15**													
23:15	**23:30**				1		1					**2**	44.6-64.6	1
23:30	**23:45**													
23:45	**OO:OO**					1						**1**	52.4-72.4	1
23:00	**OO:OO**				1	1	1					**1**	52.4-72.4	
Total		**1**	**21**	**124**	**273**	**192**	**53**	**5**	**1**	**1**		**672**		
		0.1%	3.1%	18.5%	40.6%	28.6%	7.9%	0.7%	0.1%	0.1%				
AM PEAK			**2**	**7**	**8**	**10**	**3**	**1**				**19**		
period			6:45	8:00	11:15	9:45	11:15	10:15			6:45			
% of class			9.5%	5.6%	2.9%	5.2%	5.7%	20.0%					2.8%	
PM PEAK		**1**	**3**	**5**	**10**	**8**	**4**	**1**	**1**	**1**		**18**		
period		20:30	16:15	14:30	12:45	17:30	15:15	15:00	19:45	16:30	17:30			
% of class		100.0%	14.3%	4.0%	3.7%	4.2%	7.5%	20.0%	100.0%	100.0%			2.7%	

15% Percentile :	**67**	KPH
50% Percentile :	**78**	KPH
85% Percentile :	**89**	KPH
95% Percentile :	**96**	KPH

20 KPH Pace Speed:	**67.6-87.6**	KPH
Number in Pace:	**486**	
Percent in Pace:	**72.3**	%
Number of Vehicles >80 KPH:	**279**	
Percent of Vehicles >80 KPH:	**41.5**	%
Mean Speed(average):	**78**	KPH

Report-2.3

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **West** Road :

Dates : 1 **4/30/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**							1	1							**2**	53.0-73.0	2
0:15	**0:30**								1							**1**	56.2-76.2	1
0:30	**0:45**							1	1							**2**	52.1-72.1	2
0:45	**1:00**							3								**3**	47.3-67.3	3
OO:OO	**1:00**							5	3							**1**	56.2-76.2	
1:00	**1:15**							2								**2**	48.8-68.8	2
1:15	**1:30**							1								**1**	49.4-69.4	1
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**							3								**1**	49.4-69.4	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**								1							**1**	52.8-72.8	1
2:45	**3:00**																	
2:00	**3:00**								1							**1**	52.8-72.8	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**						1									**1**	34.3-54.3	1
4:30	**4:45**							3								**3**	49.9-69.9	3
4:45	**5:00**							1		2		1				**4**	67.6-87.6	3
4:00	**5:00**						1	4		2		1				**4**	67.6-87.6	
5:00	**5:15**								1							**1**	58.1-78.1	1
5:15	**5:30**							1		2						**3**	63.7-83.7	2
5:30	**5:45**								4		2					**6**	57.0-77.0	4
5:45	**6:00**									1						**1**	69.6-89.6	1
5:00	**6:00**							1	5	3	2					**1**	69.6-89.6	
6:00	**6:15**							3	3	7	2					**15**	71.3-91.3	11
6:15	**6:30**							2	3	4	2	1				**12**	65.5-85.5	8
6:30	**6:45**						1	2	7	5	1	2				**18**	66.5-86.5	12
6:45	**7:00**							1	2	3						**6**	61.8-81.8	5
6:00	**7:00**						1	8	15	19	5	3				**15**	71.3-91.3	
7:00	**7:15**						1		9	8	2	1				**21**	71.4-91.4	18
7:15	**7:30**							1	3	11	1					**16**	70.6-90.6	14
7:30	**7:45**							1	5	7	5	3				**21**	74.2-94.2	15
7:45	**8:00**						2	2	9	2	3					**18**	59.4-79.4	12
7:00	**8:00**						3	4	26	28	11	4				**21**	74.2-94.2	
8:00	**8:15**							6	6	3	3					**18**	63.5-83.5	13
8:15	**8:30**							1	8	9	1					**19**	70.3-90.3	17
8:30	**8:45**									6	3					**9**	75.1-95.1	9
8:45	**9:00**						1	2	1	4	3					**11**	73.8-93.8	8
8:00	**9:00**						1	9	15	22	10					**9**	75.1-95.1	
9:00	**9:15**								2	3						**5**	64.0-84.0	5
9:15	**9:30**							3	2	4	2					**11**	62.6-82.6	6
9:30	**9:45**							2	5	3						**10**	62.9-82.9	10
9:45	**10:00**							2	1	1	1					**5**	63.9-83.9	4
9:00	**10:00**							7	10	11	3					**5**	64.0-84.0	
10:00	**10:15**							2	10			1				**13**	60.9-80.9	12
10:15	**10:30**							3	4	4						**11**	66.8-86.8	9
10:30	**10:45**				1		1	2	2	3						**9**	61.3-81.3	6
10:45	**11:00**							1	4	2	1					**8**	68.1-88.1	7
10:00	**11:00**				1		1	8	20	9	1	1				**8**	68.1-88.1	
11:00	**11:15**					1		5	3	2	1		1			**13**	58.3-78.3	8
11:15	**11:30**							2	5	4	1					**12**	69.0-89.0	10
11:30	**11:45**						1	4	6	1	1					**13**	60.4-80.4	10
11:45	**12:00**						1	3	3	2	2					**11**	54.6-74.6	7
11:00	**12:00**					1	2	14	17	9	5		1			**12**	69.0-89.0	

12:00	**12:15**				1	1	1	3	6	3				**15**	73.8-93.8	10
12:15	**12:30**						5	4	5	3	1			**18**	64.1-84.1	11
12:30	**12:45**						5	2	6	1				**14**	66.1-86.1	10
12:45	**13:00**					1	1	4	3	4				**13**	72.3-92.3	10
12:00	**13:00**				1	2	12	13	20	11	1			**15**	73.8-93.8	
13:00	**13:15**				1	1	5	3	2					**12**	64.4-84.4	9
13:15	**13:30**						1	3	6	1				**11**	70.5-90.5	9
13:30	**13:45**					1	1	3	2					**7**	66.5-86.5	5
13:45	**14:00**						3	2	4					**9**	65.7-85.7	8
13:00	**14:00**				1	2	10	11	14	1				**11**	70.5-90.5	
14:00	**14:15**						1	1	4		1			**7**	70.2-90.2	5
14:15	**14:30**						3	7	3	1				**14**	63.8-83.8	12
14:30	**14:45**						1	3	6	1				**11**	69.5-89.5	9
14:45	**15:00**					1	3	3	6					**13**	64.8-84.8	11
14:00	**15:00**					1	8	14	19	2	1			**7**	70.2-90.2	
15:00	**15:15**					1	5	6	4			1		**17**	62.1-82.1	13
15:15	**15:30**				1		2	7	5	3				**19**	66.7-86.7	12
15:30	**15:45**						2	4	6	2	1			**15**	73.5-93.5	12
15:45	**16:00**					1	2	9	3	4	1	1		**21**	64.9-84.9	13
15:00	**16:00**				1	2	11	26	18	9	2	2		**15**	73.5-93.5	
16:00	**16:15**					1	1	3	6	2	1			**14**	71.6-91.6	11
16:15	**16:30**				1	1	1	8	7	7				**25**	78.4-98.4	19
16:30	**16:45**						1	9	6	2				**18**	68.4-88.4	16
16:45	**17:00**						2	6	7	2				**17**	72.6-92.6	14
16:00	**17:00**				1	2	5	26	26	13	1			**25**	78.4-98.4	
17:00	**17:15**						4	9	12	2				**27**	68.6-88.6	21
17:15	**17:30**						1	6	5	3				**15**	69.7-89.7	11
17:30	**17:45**				1		2	7	6	4	1			**21**	67.3-87.3	15
17:45	**18:00**						2	3	6	2				**13**	69.9-89.9	9
17:00	**18:00**				1		9	25	29	11	1			**13**	69.9-89.9	
18:00	**18:15**					2	3	2	6	1				**14**	66.9-86.9	9
18:15	**18:30**	1	1			1	2	2	7		1			**15**	70.7-90.7	9
18:30	**18:45**						1		3		1			**5**	67.2-87.2	4
18:45	**19:00**						1	8	3	3				**15**	74.9-94.9	13
18:00	**19:00**	1	1			3	7	12	19	4	2			**15**	74.9-94.9	
19:00	**19:15**							4	2	2	1			**9**	73.6-93.6	7
19:15	**19:30**							1	1	1				**3**	71.4-91.4	3
19:30	**19:45**						2	2	2					**6**	64.2-84.2	5
19:45	**20:00**						1	1	3					**5**	63.8-83.8	5
19:00	**20:00**						3	8	8	3	1			**9**	73.6-93.6	
20:00	**20:15**							2	4					**6**	68.6-88.6	6
20:15	**20:30**						3	2						**5**	55.0-75.0	5
20:30	**20:45**						1	4	2	1				**8**	64.6-84.6	7
20:45	**21:00**						2	1	3			1		**7**	65.2-85.2	6
20:00	**21:00**						6	9	9	1		1		**6**	68.6-88.6	
21:00	**21:15**								2					**2**	65.2-85.2	2
21:15	**21:30**						2	6	2	1				**11**	61.1-81.1	9
21:30	**21:45**						2	1	2	1				**6**	70.1-90.1	4
21:45	**22:00**							4			1			**5**	60.6-80.6	4
21:00	**22:00**						4	11	6	2	1			**6**	70.1-90.1	
22:00	**22:15**						2		1	1				**4**	62.5-82.5	3
22:15	**22:30**						1	1						**2**	58.2-78.2	2
22:30	**22:45**					1	1	1						**3**	60.5-80.5	3
22:45	**23:00**						1							**1**	43.0-63.0	1
22:00	**23:00**					1	5	2	1	1				**4**	62.5-82.5	
23:00	**23:15**							1						**1**	59.5-79.5	1
23:15	**23:30**						2		1					**3**	49.9-69.9	2
23:30	**23:45**							1						**1**	51.7-71.7	1
23:45	**OO:OO**						1	2						**3**	57.8-77.8	3
23:00	**OO:OO**						3	4	1					**1**	59.5-79.5	
Total		**1**	**1**	**1**	**6**	**22**	**146**	**273**	**273**	**95**	**19**	**4**		**842**		
		0.1%	0.1%	0.1%	0.7%	2.6%	17.3%	32.4%	32.4%	11.3%	2.3%	0.5%				
AM PEAK				**1**	**1**	**2**	**6**	**10**	**11**	**5**	**3**	**1**		**21**		
period				10:30	11:00	7:45	8:00	10:00	7:15	7:30	7:30	11:00	7:00			
% of class				100.0%	16.7%	9.1%	4.1%	3.7%	4.0%	5.3%	15.8%	25.0%			2.5%	
PM PEAK		**1**	**1**		**1**	**2**	**5**	**9**	**12**	**7**	**1**	**1**		**27**		
period		18:15	18:15		12:00	18:00	12:15	15:45	17:00	16:15	12:15	15:00	17:00			
% of class		100.0%	100.0%		16.7%	9.1%	3.4%	3.3%	4.4%	7.4%	5.3%	25.0%			3.2%	

15% Percentile :	**68**	KPH
50% Percentile :	**80**	KPH
85% Percentile :	**91**	KPH
95% Percentile :	**99**	KPH

20 KPH Pace Speed:	**71.5-91.5**	KPH
Number in Pace:	**554**	
Percent in Pace:	**65.8**	%
Number of Vehicles >80 KPH:	**418**	
Percent of Vehicles >80 KPH:	**49.6**	%
Mean Speed(average):	**80**	KPH

Report-2.4

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **West** Road :

Dates : 1 **5/1/2019**

Speeds,km/h ------->		11	11 21	21 31	31 41	41 51	51 61	61 71	71 81	81 91	91 101	101 111	111 121	121 131	131 140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**							1								**1**	43.9-63.9	1
0:30	**0:45**							2								**2**	50.8-70.8	2
0:45	**1:00**							1								**1**	48.6-68.6	1
OO:OO	**1:00**							4								**2**	50.8-70.8	
1:00	**1:15**							1	1							**2**	54.0-74.0	2
1:15	**1:30**																	
1:30	**1:45**							1								**1**	46.7-66.7	1
1:45	**2:00**																	
1:00	**2:00**							2	1							**2**	54.0-74.0	
2:00	**2:15**																	
2:15	**2:30**						1									**1**	38.1-58.1	1
2:30	**2:45**							1								**1**	49.0-69.0	1
2:45	**3:00**											1				**1**	90.7-110.7	1
2:00	**3:00**						1	1				1				**1**	90.7-110.7	
3:00	**3:15**												1			**1**	97.7-117.7	1
3:15	**3:30**						1									**1**	39.5-59.5	1
3:30	**3:45**									2						**2**	68.9-88.9	2
3:45	**4:00**																	
3:00	**4:00**						1			2			1			**1**	97.7-117.7	
4:00	**4:15**																	
4:15	**4:30**						1	1								**2**	48.9-68.9	2
4:30	**4:45**						1									**1**	31.5-51.5	1
4:45	**5:00**							1	1		1					**3**	52.8-72.8	2
4:00	**5:00**						2	2	1		1					**3**	52.8-72.8	
5:00	**5:15**							2	1							**3**	59.5-79.5	3
5:15	**5:30**																	
5:30	**5:45**						1	1	1	1						**4**	54.1-74.1	3
5:45	**6:00**							3	1							**4**	58.0-78.0	4
5:00	**6:00**						1	6	3	1						**3**	59.5-79.5	
6:00	**6:15**							2	3	3	1					**9**	68.1-88.1	7
6:15	**6:30**							2	2	9	2	1				**16**	69.7-89.7	12
6:30	**6:45**						1		4	7	3					**15**	67.7-87.7	11
6:45	**7:00**							1	5	2	3	1				**12**	64.0-84.0	8
6:00	**7:00**						1	5	14	21	9	2				**16**	69.7-89.7	
7:00	**7:15**								7	7	1					**15**	70.7-90.7	14
7:15	**7:30**							3	6	3						**12**	68.1-88.1	11
7:30	**7:45**							3	8	11	4					**26**	73.7-93.7	22
7:45	**8:00**							4	8	3	3					**18**	62.9-82.9	13
7:00	**8:00**							10	29	24	8					**26**	73.7-93.7	
8:00	**8:15**							1	4	1	1					**7**	61.9-81.9	6
8:15	**8:30**						1	1	3	13	3					**21**	74.1-94.1	18
8:30	**8:45**							3	4	8	2					**17**	67.6-87.6	13
8:45	**9:00**							3	2	4		1				**10**	66.6-86.6	8
8:00	**9:00**						1	8	13	26	6	1				**21**	74.1-94.1	
9:00	**9:15**						1	2	3	4						**10**	65.1-85.1	7
9:15	**9:30**							4		7	2					**13**	73.3-93.3	9
9:30	**9:45**							2	4	5	1					**12**	70.3-90.3	9
9:45	**10:00**						1	1	9	4						**15**	67.9-87.9	13
9:00	**10:00**						2	9	16	20	3					**13**	73.3-93.3	
10:00	**10:15**							8	6	3	2					**19**	63.7-83.7	17
10:15	**10:30**						1	2	5	4	2					**14**	66.1-86.1	11
10:30	**10:45**							2	6	2	2		1			**13**	75.6-95.6	10
10:45	**11:00**					1		6	1	2	2					**12**	62.9-82.9	8
10:00	**11:00**					1	1	18	18	11	8		1			**13**	75.6-95.6	
11:00	**11:15**							2	6	7	3	1				**19**	64.9-84.9	14
11:15	**11:30**						1		6	4						**11**	70.0-90.0	10
11:30	**11:45**								8	7	1	1				**17**	68.6-88.6	15
11:45	**12:00**							1	8	2						**11**	62.8-82.8	10
11:00	**12:00**						1	3	28	20	4	2				**11**	70.0-90.0	

12:00	**12:15**							2	8	2	2				**14**	61.5-81.5	11
12:15	**12:30**	2							3	5	1				**11**	71.2-91.2	9
12:30	**12:45**							3	6	4			1		**14**	69.0-89.0	13
12:45	**13:00**							2	1	4					**7**	68.5-88.5	5
12:00	**13:00**	2						7	18	15	3		1		**11**	71.2-91.2	
13:00	**13:15**							3	6	3	1				**13**	59.9-79.9	9
13:15	**13:30**							5	2	5	2				**14**	71.2-91.2	8
13:30	**13:45**								1	6	3	1			**12**	77.6-97.6	9
13:45	**14:00**							4	4	2	2				**12**	65.1-85.1	10
13:00	**14:00**							12	13	16	8	1			**12**	77.6-97.6	
14:00	**14:15**							4	2	3	1				**10**	64.6-84.6	8
14:15	**14:30**					1		4	1	3		1		1	**11**	68.4-88.4	7
14:30	**14:45**							1	5	2					**8**	61.1-81.1	7
14:45	**15:00**						1	1	5	6					**13**	67.3-87.3	12
14:00	**15:00**					1	1	10	13	14	1	1		1	**11**	68.4-88.4	
15:00	**15:15**						1	1	7	5	2				**16**	72.1-92.1	14
15:15	**15:30**						1	2	3	4	2				**12**	76.7-96.7	8
15:30	**15:45**								1	11	4				**16**	76.0-96.0	15
15:45	**16:00**						1	1	4	7	2				**15**	67.5-87.5	11
15:00	**16:00**						3	4	15	27	10				**12**	76.7-96.7	
16:00	**16:15**		1						8	3	1				**13**	64.1-84.1	11
16:15	**16:30**							1	7	5	2				**15**	66.9-86.9	13
16:30	**16:45**						1	1	4	10	2				**18**	70.4-90.4	14
16:45	**17:00**								4	10					**14**	70.7-90.7	14
16:00	**17:00**		1				1	2	23	28	5				**14**	70.7-90.7	
17:00	**17:15**						1	5	9	9	1				**25**	65.5-85.5	20
17:15	**17:30**			1			1	1	4	3	2				**12**	66.6-86.6	8
17:30	**17:45**							1	7	5	1				**14**	68.7-88.7	13
17:45	**18:00**						2	2	7	5	1				**17**	65.3-85.3	13
17:00	**18:00**			1			4	9	27	22	5				**14**	68.7-88.7	
18:00	**18:15**							2	2	3	3	1			**11**	73.3-93.3	8
18:15	**18:30**								3	3		1			**7**	65.0-85.0	6
18:30	**18:45**								5	4		1			**10**	65.1-85.1	9
18:45	**19:00**							1	1						**2**	58.3-78.3	2
18:00	**19:00**							3	11	10	3	3			**11**	73.3-93.3	
19:00	**19:15**							2	2	1	2				**7**	67.8-87.8	5
19:15	**19:30**							2	2	2	2			1	**9**	69.1-89.1	6
19:30	**19:45**							2	1	5	2	1			**11**	71.8-91.8	8
19:45	**20:00**							1	1	1	2				**5**	78.6-98.6	4
19:00	**20:00**							7	6	9	8	1		1	**5**	78.6-98.6	
20:00	**20:15**								2	4	1		1		**8**	74.7-94.7	7
20:15	**20:30**							3	5						**8**	60.6-80.6	8
20:30	**20:45**								1	1					**2**	66.0-86.0	2
20:45	**21:00**							3	3		2				**8**	58.6-78.6	6
20:00	**21:00**							6	11	5	3		1		**8**	74.7-94.7	
21:00	**21:15**						2		5	1					**8**	58.1-78.1	6
21:15	**21:30**						1	8	2						**11**	54.8-74.8	11
21:30	**21:45**								1	2	1				**4**	68.9-88.9	3
21:45	**22:00**						1	3							**4**	50.1-70.1	4
21:00	**22:00**						4	11	8	3	1				**4**	68.9-88.9	
22:00	**22:15**								2						**2**	59.1-79.1	2
22:15	**22:30**							1							**1**	49.0-69.0	1
22:30	**22:45**								2	2					**4**	62.4-82.4	4
22:45	**23:00**							1	1						**2**	54.6-74.6	2
22:00	**23:00**							2	5	2					**4**	62.4-82.4	
23:00	**23:15**							1	1	1					**3**	63.0-83.0	3
23:15	**23:30**																
23:30	**23:45**																
23:45	**OO:OO**							2							**2**	49.6-69.6	2
23:00	**OO:OO**							3	1	1					**3**	63.0-83.0	
Total		**2**	**1**	**1**	**2**	**24**	**144**	**274**	**277**	**86**	**12**	**4**	**2**		**830**		
		0.2%	0.1%	0.1%	0.2%	2.9%	17.3%	33.0%	33.4%	10.4%	1.4%	0.5%	0.2%				
AM PEAK					**1**	**1**	**8**	**9**	**13**	**4**	**1**	**1**			**26**		
period					10:45	2:15	10:00	9:45	8:15	7:30	2:45	3:00		7:30			
% of class					50.0%	4.2%	5.6%	3.3%	4.7%	4.7%	8.3%	25.0%				3.1%	
PM PEAK		**2**	**1**	**1**	**1**	**2**	**8**	**9**	**11**	**4**	**1**	**1**	**1**		**25**		
period		12:15	16:00	17:15	14:15	17:45	21:15	17:00	15:30	15:30	13:30	12:30	14:15	17:00			
% of class		100.0%	100.0%	100.0%	50.0%	8.3%	5.6%	3.3%	4.0%	4.7%	8.3%	25.0%	50.0%			3.0%	

15% Percentile :	**68**	KPH
50% Percentile :	**80**	KPH
85% Percentile :	**90**	KPH
95% Percentile :	**98**	KPH

20 KPH Pace Speed:	**68.9-88.9**	KPH
Number in Pace:	**572**	
Percent in Pace:	**68.9**	%
Number of Vehicles >80 KPH:	**408**	
Percent of Vehicles >80 KPH:	**49.2**	%
Mean Speed(average):	**80**	KPH

Report-2.5

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **East + West** Road :

Dates : 1 **4/30/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h	-------->	11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	0:15							2	1							3	53.0-73.0	3
0:15	0:30							2	3							5	56.2-76.2	5
0:30	0:45							2	3							5	57.3-77.3	5
0:45	1:00							3	2							5	57.8-77.8	5
OO:OO	1:00							9	9							5	57.8-77.8	
1:00	1:15							2	2							4	58.0-78.0	4
1:15	1:30							2	2							4	55.9-75.9	4
1:30	1:45																	
1:45	2:00							1								1	44.0-64.0	1
1:00	2:00							5	4							4	58.0-78.0	
2:00	2:15							1	1							2	60.5-80.5	2
2:15	2:30								1							1	53.7-73.7	1
2:30	2:45						1		2							3	53.9-73.9	3
2:45	3:00																	
2:00	3:00						1	1	4							2	60.5-80.5	
3:00	3:15								1							1	58.4-78.4	1
3:15	3:30								1							1	56.4-76.4	1
3:30	3:45																	
3:45	4:00									2						2	67.8-87.8	2
3:00	4:00								2	2						2	67.8-87.8	
4:00	4:15																	
4:15	4:30						1									1	34.3-54.3	1
4:30	4:45							3								3	49.9-69.9	3
4:45	5:00							1		2		1				4	67.6-87.6	3
4:00	5:00						1	4		2		1				4	67.6-87.6	
5:00	5:15								6							6	60.3-80.3	6
5:15	5:30							1		3	1					5	72.2-92.2	4
5:30	5:45								5	1	3					9	73.1-93.1	7
5:45	6:00							2	2	1						5	57.3-77.3	4
5:00	6:00							3	13	5	4					9	73.1-93.1	
6:00	6:15						1	3	4	8	2					18	71.3-91.3	13
6:15	6:30							2	4	9	2	1				18	66.4-86.4	13
6:30	6:45						1	2	9	7	1	2				22	70.9-90.9	16
6:45	7:00							1	6	7	3	1				18	71.6-91.6	14
6:00	7:00						2	8	23	31	8	4				18	71.6-91.6	
7:00	7:15						3	4	14	11	2	1				35	71.4-91.4	26
7:15	7:30							5	6	16	2					29	72.4-92.4	23
7:30	7:45							1	10	9	7	3				30	74.2-94.2	22
7:45	8:00						3	4	18	4	4					33	61.5-81.5	23
7:00	8:00						6	14	48	40	15	4				30	74.2-94.2	
8:00	8:15							9	14	6	3					32	63.5-83.5	24
8:15	8:30						1	2	12	13	1					29	70.3-90.3	25
8:30	8:45							3	6	8	5					22	71.5-91.5	16
8:45	9:00						3	7	7	8	4					29	69.3-89.3	18
8:00	9:00						4	21	39	35	13					22	71.5-91.5	
9:00	9:15							5	7	9						21	65.3-85.3	18
9:15	9:30							3	5	7	3	1				19	75.4-95.4	13
9:30	9:45					1	3	4	8	6	1					23	64.4-84.4	17
9:45	10:00							3	6	5	1					15	63.9-83.9	12
9:00	10:00					1	3	15	26	27	5	1				19	75.4-95.4	
10:00	10:15							3	12	3	1	1				20	61.1-81.1	16
10:15	10:30							6	8	6	1					21	66.8-86.8	18
10:30	10:45				1		1	7	5	6						20	65.2-85.2	15
10:45	11:00						2	3	12	4	2					23	61.1-81.1	17
10:00	11:00				1		3	19	37	19	4	1				21	66.8-86.8	
11:00	11:15					1		6	5	4	2	1	1			20	58.3-78.3	11
11:15	11:30						1	2	7	9	2	1				22	69.0-89.0	17
11:30	11:45						1	6	10	4	1					22	68.6-88.6	18
11:45	12:00		1				2	6	6	4	3					22	64.6-84.6	14
11:00	12:00		1			1	4	20	28	21	8	2	1			22	69.0-89.0	

12:00	**12:15**				1	2	5	12	9	5				**34**	68.0-88.0	22
12:15	**12:30**						9	8	6	4	1			**28**	64.1-84.1	20
12:30	**12:45**						11	6	7	3				**27**	66.1-86.1	20
12:45	**13:00**					1	5	7	3	5				**21**	72.7-92.7	14
12:00	**13:00**				1	3	30	33	25	17	1			**21**	72.7-92.7	
13:00	**13:15**				1	1	7	10	4		1			**24**	64.4-84.4	20
13:15	**13:30**						1	6	9	2				**18**	70.5-90.5	15
13:30	**13:45**					1	1	8	5					**15**	71.0-91.0	13
13:45	**14:00**						5	11	6					**22**	65.7-85.7	20
13:00	**14:00**				1	2	14	35	24	2	1			**15**	71.0-91.0	
14:00	**14:15**						1	9	8		1			**19**	71.0-91.0	17
14:15	**14:30**						5	15	7	1				**28**	61.7-81.7	22
14:30	**14:45**						1	8	11	4				**24**	69.5-89.5	19
14:45	**15:00**					2	7	10	8					**27**	65.9-85.9	24
14:00	**15:00**					2	14	42	34	5	1			**19**	71.0-91.0	
15:00	**15:15**					2	5	10	8		2	1		**28**	69.1-89.1	21
15:15	**15:30**				1		7	10	10	4	1			**34**	66.7-86.7	24
15:30	**15:45**						3	10	8	3	1			**25**	68.7-88.7	19
15:45	**16:00**					2	6	16	8	5	1	1		**39**	64.9-84.9	27
15:00	**16:00**				1	4	21	46	34	12	5	2		**28**	69.1-89.1	
16:00	**16:15**					1	2	8	9	6	1			**27**	71.6-91.6	19
16:15	**16:30**				1	1	4	18	10	7				**41**	72.2-92.2	30
16:30	**16:45**						1	24	8	3				**36**	69.0-89.0	33
16:45	**17:00**						5	9	11	3				**28**	72.2-92.2	21
16:00	**17:00**				1	2	12	59	38	19	1			**41**	72.2-92.2	
17:00	**17:15**						5	16	18	2				**41**	71.0-91.0	34
17:15	**17:30**						1	10	7	8			1	**27**	75.8-95.8	20
17:30	**17:45**				1		2	14	12	8	1			**38**	72.2-92.2	27
17:45	**18:00**						3	6	9	3				**21**	69.9-89.9	16
17:00	**18:00**				1		11	46	46	21	1		1	**27**	75.8-95.8	
18:00	**18:15**					2	4	6	12	3				**27**	68.0-88.0	20
18:15	**18:30**	1	1			1	2	5	13	1	1			**25**	70.7-90.7	18
18:30	**18:45**						2	4	4	1	2			**13**	67.2-87.2	9
18:45	**19:00**						3	20	10	5	1			**39**	72.3-92.3	32
18:00	**19:00**	1	1			3	11	35	39	10	4			**39**	72.3-92.3	
19:00	**19:15**							7	2	3	1			**13**	74.7-94.7	11
19:15	**19:30**						2	4	4	3				**13**	67.1-87.1	10
19:30	**19:45**					1	3	4	7					**15**	64.2-84.2	13
19:45	**20:00**						2	5	4					**11**	64.9-84.9	11
19:00	**20:00**					1	7	20	17	6	1			**13**	74.7-94.7	
20:00	**20:15**							3	8	1				**12**	69.2-89.2	11
20:15	**20:30**						5	5	1	1				**12**	59.8-79.8	10
20:30	**20:45**						2	5	3	2				**12**	64.6-84.6	9
20:45	**21:00**						3	5	5	1		1		**15**	67.8-87.8	13
20:00	**21:00**						10	18	17	5		1		**12**	69.2-89.2	
21:00	**21:15**					1		2	3	1				**7**	65.2-85.2	5
21:15	**21:30**						4	8	4	1				**17**	61.1-81.1	14
21:30	**21:45**						3	2	2	1				**8**	61.0-81.0	5
21:45	**22:00**					1	2	5	1		1			**10**	62.7-82.7	8
21:00	**22:00**					2	9	17	10	3	1			**7**	65.2-85.2	
22:00	**22:15**					1	4	2	1	1				**9**	62.5-82.5	7
22:15	**22:30**						2	1	1					**4**	62.4-82.4	4
22:30	**22:45**					2	1	1						**4**	47.2-67.2	3
22:45	**23:00**						3	3						**6**	59.7-79.7	6
22:00	**23:00**					3	10	7	2	1				**9**	62.5-82.5	
23:00	**23:15**							1		1				**2**	75.0-95.0	2
23:15	**23:30**						4		2					**6**	49.9-69.9	4
23:30	**23:45**							1						**1**	51.7-71.7	1
23:45	**OO:OO**						1	3						**4**	57.8-77.8	4
23:00	**OO:OO**						5	5	2	1				**2**	75.0-95.0	
Total		**2**	**1**	**1**	**7**	**46**	**273**	**596**	**470**	**159**	**29**	**4**	**1**	**1590**		
		0.1%	0.1%	0.1%	0.4%	2.9%	17.2%	37.5%	29.6%	10.0%	1.8%	0.3%	0.1%			
AM PEAK		**1**		**1**	**1**	**3**	**9**	**18**	**16**	**7**	**3**	**1**		**35**		
period		11:45		10:30	9:30	7:00	8:00	7:45	7:15	7:30	7:30	11:00		7:00		
% of class		50.0%		100.0%	14.3%	6.5%	3.3%	3.0%	3.4%	4.4%	10.3%	25.0%			2.2%	
PM PEAK		**1**	**1**		**1**	**2**	**11**	**24**	**18**	**8**	**2**	**1**	**1**	**41**		
period		18:15	18:15		12:00	12:00	12:30	16:30	17:00	17:15	15:00	15:00	17:15	16:15		
% of class		50.0%	100.0%		14.3%	4.3%	4.0%	4.0%	3.8%	5.0%	6.9%	25.0%	100.0%		2.6%	

15% Percentile :	**68**	KPH
50% Percentile :	**79**	KPH
85% Percentile :	**90**	KPH
95% Percentile :	**98**	KPH

20 KPH Pace Speed:	**68.6-88.6**	KPH
Number in Pace:	**1086**	
Percent in Pace:	**68.3**	%
Number of Vehicles >80 KPH:	**723**	
Percent of Vehicles >80 KPH:	**45.5**	%
Mean Speed(average):	**79**	KPH

Report-2.6

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Direction : **East + West** Road :

Dates : 1 **5/1/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**							1								**1**	49.9-69.9	1
0:15	**0:30**						1	1	1		1					**4**	56.1-76.1	3
0:30	**0:45**							4								**4**	50.8-70.8	4
0:45	**1:00**							1								**1**	48.6-68.6	1
OO:OO	**1:00**						1	7	1		1					**4**	56.1-76.1	
1:00	**1:15**							2	4							**6**	57.0-77.0	6
1:15	**1:30**							1	1	1						**3**	61.3-81.3	3
1:30	**1:45**							2	1							**3**	60.6-80.6	3
1:45	**2:00**						1		1							**2**	51.4-71.4	2
1:00	**2:00**						1	5	7	1						**3**	61.3-81.3	
2:00	**2:15**																	
2:15	**2:30**						2	1								**3**	46.9-66.9	3
2:30	**2:45**							1		1						**2**	64.1-84.1	2
2:45	**3:00**								1			1				**2**	60.1-80.1	1
2:00	**3:00**						2	2	1	1		1				**2**	64.1-84.1	
3:00	**3:15**						1						1			**2**	38.9-58.9	1
3:15	**3:30**						1			1						**2**	39.5-59.5	1
3:30	**3:45**									2						**2**	68.9-88.9	2
3:45	**4:00**																	
3:00	**4:00**						2			3			1			**2**	68.9-88.9	
4:00	**4:15**																	
4:15	**4:30**						1	1								**2**	48.9-68.9	2
4:30	**4:45**						1									**1**	31.5-51.5	1
4:45	**5:00**							1	1	1	1					**4**	65.3-85.3	3
4:00	**5:00**						2	2	1	1	1					**4**	65.3-85.3	
5:00	**5:15**							2	4							**6**	59.5-79.5	6
5:15	**5:30**								3							**3**	59.5-79.5	3
5:30	**5:45**						2	2	2	2						**8**	57.4-77.4	6
5:45	**6:00**						1	5	4	1						**11**	58.0-78.0	10
5:00	**6:00**						3	9	13	3						**6**	59.5-79.5	
6:00	**6:15**							2	8	3	1					**14**	68.1-88.1	12
6:15	**6:30**							4	5	10	2	1				**22**	67.9-87.9	17
6:30	**6:45**						1	1	6	8	4					**20**	67.7-87.7	15
6:45	**7:00**						2	5	11	8	4	1				**31**	66.5-86.5	22
6:00	**7:00**						3	12	30	29	11	2				**14**	68.1-88.1	
7:00	**7:15**							1	9	7	2					**19**	70.7-90.7	16
7:15	**7:30**							9	13	5						**27**	61.7-81.7	24
7:30	**7:45**							4	13	13	5					**35**	73.7-93.7	29
7:45	**8:00**						1	5	13	6	3					**28**	69.0-89.0	21
7:00	**8:00**						1	19	48	31	10					**35**	73.7-93.7	
8:00	**8:15**							8	10	1	2					**21**	59.4-79.4	18
8:15	**8:30**						1	6	7	14	4					**32**	74.1-94.1	22
8:30	**8:45**							4	7	10	3					**24**	67.6-87.6	19
8:45	**9:00**							6	6	7	1	1				**21**	63.6-83.6	16
8:00	**9:00**						1	24	30	32	10	1				**32**	74.1-94.1	
9:00	**9:15**						1	3	8	8	1					**21**	68.2-88.2	17
9:15	**9:30**							5	3	13	4					**25**	76.8-96.8	20
9:30	**9:45**						1	4	8	9	2					**24**	68.6-88.6	17
9:45	**10:00**						1	2	15	14						**32**	69.6-89.6	30
9:00	**10:00**						3	14	34	44	7					**25**	76.8-96.8	
10:00	**10:15**							12	7	5	4					**28**	65.6-85.6	24
10:15	**10:30**						1	5	10	7	2	1				**26**	66.1-86.1	21
10:30	**10:45**							4	11	5	4		1			**26**	73.6-93.6	17
10:45	**11:00**					1	1	9	8	4	2					**25**	62.9-82.9	20
10:00	**11:00**					1	2	30	36	21	12	1	1			**26**	73.6-93.6	
11:00	**11:15**							2	8	11	3	1				**25**	70.0-90.0	20
11:15	**11:30**						1		14	6	3					**24**	70.0-90.0	20
11:30	**11:45**								10	10	1	1				**22**	68.6-88.6	20
11:45	**12:00**							1	11	7	3					**22**	68.0-88.0	18
11:00	**12:00**						1	3	43	34	10	2				**25**	70.0-90.0	

12:00	**12:15**						6	13	3	2				**24**	62.4-82.4	21
12:15	**12:30**	2					1	5	6	3				**17**	71.2-91.2	12
12:30	**12:45**						3	10	5			1		**19**	69.0-89.0	18
12:45	**13:00**						4	11	8					**23**	65.0-85.0	20
12:00	**13:00**	2					14	39	22	5		1		**17**	71.2-91.2	
13:00	**13:15**					1	6	7	5	1				**20**	67.8-87.8	15
13:15	**13:30**						5	7	7	4				**23**	75.9-95.9	16
13:30	**13:45**						1	5	10	3	1			**21**	66.9-86.9	15
13:45	**14:00**						5	7	4	2				**18**	65.1-85.1	16
13:00	**14:00**					1	17	26	26	10	1			**23**	75.9-95.9	
14:00	**14:15**						5	6	6	1				**18**	64.6-84.6	14
14:15	**14:30**				1	1	5	3	7	1	1		1	**20**	68.4-88.4	13
14:30	**14:45**						6	9	3					**18**	61.1-81.1	16
14:45	**15:00**					1	4	9	7	1				**22**	67.3-87.3	19
14:00	**15:00**				1	2	20	27	23	3	1		1	**20**	68.4-88.4	
15:00	**15:15**					1	3	9	9	2	1			**25**	72.1-92.1	20
15:15	**15:30**					1	4	5	7	6				**23**	76.2-96.2	15
15:30	**15:45**							4	18	6				**28**	76.0-96.0	27
15:45	**16:00**					1	3	12	14	2				**32**	67.5-87.5	26
15:00	**16:00**					3	10	30	48	16	1			**23**	76.2-96.2	
16:00	**16:15**		1				3	14	5	1				**24**	67.3-87.3	20
16:15	**16:30**					3	4	12	6	3				**28**	66.9-86.9	20
16:30	**16:45**					2	2	9	13	4			1	**31**	70.1-90.1	22
16:45	**17:00**					1	3	9	13	1				**27**	70.7-90.7	22
16:00	**17:00**		1			6	12	44	37	9			1	**27**	70.7-90.7	
17:00	**17:15**					1	7	18	13	1	1			**41**	65.5-85.5	34
17:15	**17:30**			1		1	4	8	7	2				**23**	66.6-86.6	17
17:30	**17:45**						1	16	13	2				**32**	69.3-89.3	30
17:45	**18:00**					2	4	11	13	3				**33**	69.6-89.6	25
17:00	**18:00**			1		4	16	53	46	8	1			**33**	69.6-89.6	
18:00	**18:15**						2	7	6	3	2			**20**	73.3-93.3	16
18:15	**18:30**						2	9	8	3	1			**23**	68.6-88.6	18
18:30	**18:45**						1	8	8		1			**18**	68.9-88.9	16
18:45	**19:00**						2	2	5	3				**12**	74.0-94.0	9
18:00	**19:00**						7	26	27	9	4			**12**	74.0-94.0	
19:00	**19:15**						4	5	1	2				**12**	59.3-79.3	9
19:15	**19:30**						2	4	8	4	1		1	**20**	71.3-91.3	14
19:30	**19:45**						2	2	7	2	1			**14**	71.8-91.8	11
19:45	**20:00**						3	5	1	3		1		**13**	59.5-79.5	8
19:00	**20:00**						11	16	17	11	2	1	1	**14**	71.8-91.8	
20:00	**20:15**							3	5	2		1		**11**	74.7-94.7	10
20:15	**20:30**						3	6	2					**11**	64.3-84.3	10
20:30	**20:45**				1	2		3	5					**11**	69.4-89.4	8
20:45	**21:00**						5	3	1	2				**11**	58.6-78.6	8
20:00	**21:00**				1	2	8	15	13	4		1		**11**	74.7-94.7	
21:00	**21:15**					2	4	7	2					**15**	61.1-81.1	12
21:15	**21:30**					1	8	3	1					**13**	63.6-83.6	12
21:30	**21:45**					1	1	2	3	1				**8**	62.7-82.7	5
21:45	**22:00**					1	3	2						**6**	54.1-74.1	5
21:00	**22:00**					5	16	14	6	1				**13**	63.6-83.6	
22:00	**22:15**						1	5						**6**	59.1-79.1	6
22:15	**22:30**						3	2						**5**	57.3-77.3	5
22:30	**22:45**							3	2					**5**	62.4-82.4	5
22:45	**23:00**						2	1		1				**4**	54.6-74.6	3
22:00	**23:00**						6	11	2	1				**5**	62.4-82.4	
23:00	**23:15**						1	1	1					**3**	63.0-83.0	3
23:15	**23:30**						1		1					**2**	44.6-64.6	1
23:30	**23:45**															
23:45	**OO:OO**						2	1						**3**	52.4-72.4	3
23:00	**OO:OO**						4	2	2					**3**	63.0-83.0	
Total		**2**	**1**	**1**	**3**	**45**	**268**	**547**	**469**	**139**	**17**	**5**	**3**	**1502**		
		0.1%	0.1%	0.1%	0.2%	3.0%	17.8%	36.4%	31.2%	9.3%	1.1%	0.3%	0.2%			
AM PEAK					**1**	**2**	**12**	**15**	**14**	**5**	**1**	**1**		**35**		
period					10:45	2:15	10:00	9:45	8:15	7:30	2:45	3:00		7:30		
% of class					33.3%	4.4%	4.5%	2.7%	3.0%	3.6%	5.9%	20.0%			2.3%	
PM PEAK		**2**	**1**	**1**	**1**	**3**	**8**	**18**	**18**	**6**	**2**	**1**	**1**	**41**		
period		12:15	16:00	17:15	14:15	16:15	21:15	17:00	15:30	15:15	18:00	12:30	14:15	17:00		
% of class		100.0%	100.0%	100.0%	33.3%	6.7%	3.0%	3.3%	3.8%	4.3%	11.8%	20.0%	33.3%		2.7%	

15% Percentile :	**67**	KPH
50% Percentile :	**79**	KPH
85% Percentile :	**90**	KPH
95% Percentile :	**98**	KPH

20 KPH Pace Speed:	**68.7-88.7**	KPH
Number in Pace:	**1050**	
Percent in Pace:	**69.9**	%
Number of Vehicles >80 KPH:	**688**	
Percent of Vehicles >80 KPH:	**45.8**	%
Mean Speed(average):	**79**	KPH

Report-3.1

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Road :

Dates : **4/30/2019**

Directions ---------->		North Volume	%	South Volume	%	East Volume	%	West Volume	%	Total Volume	%
00:00	0:15					1	0.1%	2	0.2%	3	0.2%
0:15	0:30					4	0.5%	1	0.1%	5	0.3%
0:30	0:45					3	0.4%	2	0.2%	5	0.3%
0:45	1:00					2	0.3%	3	0.4%	5	0.3%
00:00	1:00					10	1.3%	8	1.0%	18	1.1%
1:00	1:15					2	0.3%	2	0.2%	4	0.3%
1:15	1:30					3	0.4%	1	0.1%	4	0.3%
1:30	1:45										
1:45	2:00					1	0.1%			1	0.1%
1:00	2:00					6	0.8%	3	0.4%	9	0.6%
2:00	2:15					2	0.3%			2	0.1%
2:15	2:30					1	0.1%			1	0.1%
2:30	2:45					2	0.3%	1	0.1%	3	0.2%
2:45	3:00										
2:00	3:00					5	0.7%	1	0.1%	6	0.4%
3:00	3:15					1	0.1%			1	0.1%
3:15	3:30					1	0.1%			1	0.1%
3:30	3:45										
3:45	4:00					2	0.3%			2	0.1%
3:00	4:00					4	0.5%			4	0.3%
4:00	4:15										
4:15	4:30							1	0.1%	1	0.1%
4:30	4:45							3	0.4%	3	0.2%
4:45	5:00							4	0.5%	4	0.3%
4:00	5:00							8	1.0%	8	0.5%
5:00	5:15					5	0.7%	1	0.1%	6	0.4%
5:15	5:30					2	0.3%	3	0.4%	5	0.3%
5:30	5:45					3	0.4%	6	0.7%	9	0.6%
5:45	6:00					4	0.5%	1	0.1%	5	0.3%
5:00	6:00					14	1.9%	11	1.3%	25	1.6%
6:00	6:15					3	0.4%	15	1.8%	18	1.1%
6:15	6:30					6	0.8%	12	1.4%	18	1.1%
6:30	6:45					4	0.5%	18	2.1%	22	1.4%
6:45	7:00					12	1.6%	6	0.7%	18	1.1%
6:00	7:00					25	3.3%	51	6.1%	76	4.8%
7:00	7:15					14	1.9%	21	2.5%	35	2.2%
7:15	7:30					13	1.7%	16	1.9%	29	1.8%
7:30	7:45					9	1.2%	21	2.5%	30	1.9%
7:45	8:00					15	2.0%	18	2.1%	33	2.1%
7:00	8:00					51	6.8%	76	9.0%	127	8.0%
8:00	8:15					14	1.9%	18	2.1%	32	2.0%
8:15	8:30					10	1.3%	19	2.3%	29	1.8%
8:30	8:45					13	1.7%	9	1.1%	22	1.4%
8:45	9:00					18	2.4%	11	1.3%	29	1.8%
8:00	9:00					55	7.4%	57	6.8%	112	7.0%
9:00	9:15					16	2.1%	5	0.6%	21	1.3%
9:15	9:30					8	1.1%	11	1.3%	19	1.2%
9:30	9:45					13	1.7%	10	1.2%	23	1.4%
9:45	10:00					10	1.3%	5	0.6%	15	0.9%
9:00	10:00					47	6.3%	31	3.7%	78	4.9%
10:00	10:15					7	0.9%	13	1.5%	20	1.3%
10:15	10:30					10	1.3%	11	1.3%	21	1.3%
10:30	10:45					11	1.5%	9	1.1%	20	1.3%
10:45	11:00					15	2.0%	8	1.0%	23	1.4%
10:00	11:00					43	5.7%	41	4.9%	84	5.3%
11:00	11:15					7	0.9%	13	1.5%	20	1.3%
11:15	11:30					10	1.3%	12	1.4%	22	1.4%
11:30	11:45					9	1.2%	13	1.5%	22	1.4%
11:45	12:00					11	1.5%	11	1.3%	22	1.4%
11:00	12:00					37	4.9%	49	5.8%	86	5.4%

12:00	12:15			19	2.5%	15	1.8%	34	2.1%
12:15	12:30			10	1.3%	18	2.1%	28	1.8%
12:30	12:45			13	1.7%	14	1.7%	27	1.7%
12:45	13:00			8	1.1%	13	1.5%	21	1.3%
12:00	13:00			50	6.7%	60	7.1%	110	6.9%
13:00	13:15			12	1.6%	12	1.4%	24	1.5%
13:15	13:30			7	0.9%	11	1.3%	18	1.1%
13:30	13:45			8	1.1%	7	0.8%	15	0.9%
13:45	14:00			13	1.7%	9	1.1%	22	1.4%
13:00	14:00			40	5.3%	39	4.6%	79	5.0%
14:00	14:15			12	1.6%	7	0.8%	19	1.2%
14:15	14:30			14	1.9%	14	1.7%	28	1.8%
14:30	14:45			13	1.7%	11	1.3%	24	1.5%
14:45	15:00			14	1.9%	13	1.5%	27	1.7%
14:00	15:00			53	7.1%	45	5.3%	98	6.2%
15:00	15:15			11	1.5%	17	2.0%	28	1.8%
15:15	15:30			15	2.0%	19	2.3%	34	2.1%
15:30	15:45			10	1.3%	15	1.8%	25	1.6%
15:45	16:00			18	2.4%	21	2.5%	39	2.5%
15:00	16:00			54	7.2%	72	8.6%	126	7.9%
16:00	16:15			13	1.7%	14	1.7%	27	1.7%
16:15	16:30			16	2.1%	25	3.0%	41	2.6%
16:30	16:45			18	2.4%	18	2.1%	36	2.3%
16:45	17:00			11	1.5%	17	2.0%	28	1.8%
16:00	17:00			58	7.8%	74	8.8%	132	8.3%
17:00	17:15			14	1.9%	27	3.2%	41	2.6%
17:15	17:30			12	1.6%	15	1.8%	27	1.7%
17:30	17:45			17	2.3%	21	2.5%	38	2.4%
17:45	18:00			8	1.1%	13	1.5%	21	1.3%
17:00	18:00			51	6.8%	76	9.0%	127	8.0%
18:00	18:15			13	1.7%	14	1.7%	27	1.7%
18:15	18:30			10	1.3%	15	1.8%	25	1.6%
18:30	18:45			8	1.1%	5	0.6%	13	0.8%
18:45	19:00			24	3.2%	15	1.8%	39	2.5%
18:00	19:00			55	7.4%	49	5.8%	104	6.5%
19:00	19:15			4	0.5%	9	1.1%	13	0.8%
19:15	19:30			10	1.3%	3	0.4%	13	0.8%
19:30	19:45			9	1.2%	6	0.7%	15	0.9%
19:45	20:00			6	0.8%	5	0.6%	11	0.7%
19:00	20:00			29	3.9%	23	2.7%	52	3.3%
20:00	20:15			6	0.8%	6	0.7%	12	0.8%
20:15	20:30			7	0.9%	5	0.6%	12	0.8%
20:30	20:45			4	0.5%	8	1.0%	12	0.8%
20:45	21:00			8	1.1%	7	0.8%	15	0.9%
20:00	21:00			25	3.3%	26	3.1%	51	3.2%
21:00	21:15			5	0.7%	2	0.2%	7	0.4%
21:15	21:30			6	0.8%	11	1.3%	17	1.1%
21:30	21:45			2	0.3%	6	0.7%	8	0.5%
21:45	22:00			5	0.7%	5	0.6%	10	0.6%
21:00	22:00			18	2.4%	24	2.9%	42	2.6%
22:00	22:15			5	0.7%	4	0.5%	9	0.6%
22:15	22:30			2	0.3%	2	0.2%	4	0.3%
22:30	22:45			1	0.1%	3	0.4%	4	0.3%
22:45	23:00			5	0.7%	1	0.1%	6	0.4%
22:00	23:00			13	1.7%	10	1.2%	23	1.4%
23:00	23:15			1	0.1%	1	0.1%	2	0.1%
23:15	23:30			3	0.4%	3	0.4%	6	0.4%
23:30	23:45					1	0.1%	1	0.1%
23:45	OO:OO			1	0.1%	3	0.4%	4	0.3%
23:00	OO:OO			5	0.7%	8	1.0%	13	0.8%
Total				748		842		1590	100.0%
				47.0%		53.0%		100.0%	
AM PEAK				18		21		35	
period				8:45		7:00		7:00	
% of class					2.4%		2.5%		2.2%
PM PEAK				24		27		41	
period				18:45		17:00		16:15	
% of class					3.2%		3.2%		2.6%

Report-3.2

Location : **CW-22EW** **SECOND LINE - EAST OF GUELPH LINE**

Road :

Dates : **5/1/2019**

Directions ---------->		North Volume	%	South Volume	%	East Volume	%	West Volume	%	Total Volume	%
OO:OO	**0:15**					**1**	0.1%			**1**	0.1%
0:15	**0:30**					**3**	0.4%	**1**	0.1%	**4**	0.3%
0:30	**0:45**					**2**	0.3%	**2**	0.2%	**4**	0.3%
0:45	**1:00**							**1**	0.1%	**1**	0.1%
OO:OO	**1:00**					**6**	0.9%	**4**	0.5%	**10**	0.7%
1:00	**1:15**					**4**	0.6%	**2**	0.2%	**6**	0.4%
1:15	**1:30**					**3**	0.4%			**3**	0.2%
1:30	**1:45**					**2**	0.3%	**1**	0.1%	**3**	0.2%
1:45	**2:00**					**2**	0.3%			**2**	0.1%
1:00	**2:00**					**11**	1.6%	**3**	0.4%	**14**	0.9%
2:00	**2:15**										
2:15	**2:30**					**2**	0.3%	**1**	0.1%	**3**	0.2%
2:30	**2:45**					**1**	0.1%	**1**	0.1%	**2**	0.1%
2:45	**3:00**					**1**	0.1%	**1**	0.1%	**2**	0.1%
2:00	**3:00**					**4**	0.6%	**3**	0.4%	**7**	0.5%
3:00	**3:15**					**1**	0.1%	**1**	0.1%	**2**	0.1%
3:15	**3:30**					**1**	0.1%	**1**	0.1%	**2**	0.1%
3:30	**3:45**							**2**	0.2%	**2**	0.1%
3:45	**4:00**										
3:00	**4:00**					**2**	0.3%	**4**	0.5%	**6**	0.4%
4:00	**4:15**										
4:15	**4:30**							**2**	0.2%	**2**	0.1%
4:30	**4:45**							**1**	0.1%	**1**	0.1%
4:45	**5:00**					**1**	0.1%	**3**	0.4%	**4**	0.3%
4:00	**5:00**					**1**	0.1%	**6**	0.7%	**7**	0.5%
5:00	**5:15**					**3**	0.4%	**3**	0.4%	**6**	0.4%
5:15	**5:30**					**3**	0.4%			**3**	0.2%
5:30	**5:45**					**4**	0.6%	**4**	0.5%	**8**	0.5%
5:45	**6:00**					**7**	1.0%	**4**	0.5%	**11**	0.7%
5:00	**6:00**					**17**	2.5%	**11**	1.3%	**28**	1.9%
6:00	**6:15**					**5**	0.7%	**9**	1.1%	**14**	0.9%
6:15	**6:30**					**6**	0.9%	**16**	1.9%	**22**	1.5%
6:30	**6:45**					**5**	0.7%	**15**	1.8%	**20**	1.3%
6:45	**7:00**					**19**	2.8%	**12**	1.4%	**31**	2.1%
6:00	**7:00**					**35**	5.2%	**52**	6.3%	**87**	5.8%
7:00	**7:15**					**4**	0.6%	**15**	1.8%	**19**	1.3%
7:15	**7:30**					**15**	2.2%	**12**	1.4%	**27**	1.8%
7:30	**7:45**					**9**	1.3%	**26**	3.1%	**35**	2.3%
7:45	**8:00**					**10**	1.5%	**18**	2.2%	**28**	1.9%
7:00	**8:00**					**38**	5.7%	**71**	8.6%	**109**	7.3%
8:00	**8:15**					**14**	2.1%	**7**	0.8%	**21**	1.4%
8:15	**8:30**					**11**	1.6%	**21**	2.5%	**32**	2.1%
8:30	**8:45**					**7**	1.0%	**17**	2.0%	**24**	1.6%
8:45	**9:00**					**11**	1.6%	**10**	1.2%	**21**	1.4%
8:00	**9:00**					**43**	6.4%	**55**	6.6%	**98**	6.5%
9:00	**9:15**					**11**	1.6%	**10**	1.2%	**21**	1.4%
9:15	**9:30**					**12**	1.8%	**13**	1.6%	**25**	1.7%
9:30	**9:45**					**12**	1.8%	**12**	1.4%	**24**	1.6%
9:45	**10:00**					**17**	2.5%	**15**	1.8%	**32**	2.1%
9:00	**10:00**					**52**	7.7%	**50**	6.0%	**102**	6.8%
10:00	**10:15**					**9**	1.3%	**19**	2.3%	**28**	1.9%
10:15	**10:30**					**12**	1.8%	**14**	1.7%	**26**	1.7%
10:30	**10:45**					**13**	1.9%	**13**	1.6%	**26**	1.7%
10:45	**11:00**					**13**	1.9%	**12**	1.4%	**25**	1.7%
10:00	**11:00**					**47**	7.0%	**58**	7.0%	**105**	7.0%
11:00	**11:15**					**6**	0.9%	**19**	2.3%	**25**	1.7%
11:15	**11:30**					**13**	1.9%	**11**	1.3%	**24**	1.6%
11:30	**11:45**					**5**	0.7%	**17**	2.0%	**22**	1.5%
11:45	**12:00**					**11**	1.6%	**11**	1.3%	**22**	1.5%
11:00	**12:00**					**35**	5.2%	**58**	7.0%	**93**	6.2%

12:00	12:15			10	1.5%	14	1.7%	24	1.6%
12:15	12:30			6	0.9%	11	1.3%	17	1.1%
12:30	12:45			5	0.7%	14	1.7%	19	1.3%
12:45	13:00			16	2.4%	7	0.8%	23	1.5%
12:00	13:00			37	5.5%	46	5.5%	83	5.5%
13:00	13:15			7	1.0%	13	1.6%	20	1.3%
13:15	13:30			9	1.3%	14	1.7%	23	1.5%
13:30	13:45			9	1.3%	12	1.4%	21	1.4%
13:45	14:00			6	0.9%	12	1.4%	18	1.2%
13:00	14:00			31	4.6%	51	6.1%	82	5.5%
14:00	14:15			8	1.2%	10	1.2%	18	1.2%
14:15	14:30			9	1.3%	11	1.3%	20	1.3%
14:30	14:45			10	1.5%	8	1.0%	18	1.2%
14:45	15:00			9	1.3%	13	1.6%	22	1.5%
14:00	15:00			36	5.4%	42	5.1%	78	5.2%
15:00	15:15			9	1.3%	16	1.9%	25	1.7%
15:15	15:30			11	1.6%	12	1.4%	23	1.5%
15:30	15:45			12	1.8%	16	1.9%	28	1.9%
15:45	16:00			17	2.5%	15	1.8%	32	2.1%
15:00	16:00			49	7.3%	59	7.1%	108	7.2%
16:00	16:15			11	1.6%	13	1.6%	24	1.6%
16:15	16:30			13	1.9%	15	1.8%	28	1.9%
16:30	16:45			13	1.9%	18	2.2%	31	2.1%
16:45	17:00			13	1.9%	14	1.7%	27	1.8%
16:00	17:00			50	7.4%	60	7.2%	110	7.3%
17:00	17:15			16	2.4%	25	3.0%	41	2.7%
17:15	17:30			11	1.6%	12	1.4%	23	1.5%
17:30	17:45			18	2.7%	14	1.7%	32	2.1%
17:45	18:00			16	2.4%	17	2.0%	33	2.2%
17:00	18:00			61	9.1%	68	8.2%	129	8.6%
18:00	18:15			9	1.3%	11	1.3%	20	1.3%
18:15	18:30			16	2.4%	7	0.8%	23	1.5%
18:30	18:45			8	1.2%	10	1.2%	18	1.2%
18:45	19:00			10	1.5%	2	0.2%	12	0.8%
18:00	19:00			43	6.4%	30	3.6%	73	4.9%
19:00	19:15			5	0.7%	7	0.8%	12	0.8%
19:15	19:30			11	1.6%	9	1.1%	20	1.3%
19:30	19:45			3	0.4%	11	1.3%	14	0.9%
19:45	20:00			8	1.2%	5	0.6%	13	0.9%
19:00	20:00			27	4.0%	32	3.9%	59	3.9%
20:00	20:15			3	0.4%	8	1.0%	11	0.7%
20:15	20:30			3	0.4%	8	1.0%	11	0.7%
20:30	20:45			9	1.3%	2	0.2%	11	0.7%
20:45	21:00			3	0.4%	8	1.0%	11	0.7%
20:00	21:00			18	2.7%	26	3.1%	44	2.9%
21:00	21:15			7	1.0%	8	1.0%	15	1.0%
21:15	21:30			2	0.3%	11	1.3%	13	0.9%
21:30	21:45			4	0.6%	4	0.5%	8	0.5%
21:45	22:00			2	0.3%	4	0.5%	6	0.4%
21:00	22:00			15	2.2%	27	3.3%	42	2.8%
22:00	22:15			4	0.6%	2	0.2%	6	0.4%
22:15	22:30			4	0.6%	1	0.1%	5	0.3%
22:30	22:45			1	0.1%	4	0.5%	5	0.3%
22:45	23:00			2	0.3%	2	0.2%	4	0.3%
22:00	23:00			11	1.6%	9	1.1%	20	1.3%
23:00	23:15					3	0.4%	3	0.2%
23:15	23:30			2	0.3%			2	0.1%
23:30	23:45								
23:45	OO:OO			1	0.1%	2	0.2%	3	0.2%
23:00	OO:OO			3	0.4%	5	0.6%	8	0.5%
Total				672		830		1502	100.0%
				44.7%		55.3%		100.0%	
AM PEAK				19		26		35	
period				6:45		7:30		7:30	
% of class					2.8%		3.1%		2.3%
PM PEAK				18		25		41	
period				17:30		17:00		17:00	
% of class					2.7%		3.0%		2.7%

Report-1.1

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **North** Road :

Dates : **4/25/2017**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
OO:OO	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**															
5:30	**5:45**															
5:45	**6:00**															
5:00	**6:00**															
6:00	**6:15**															
6:15	**6:30**															
6:30	**6:45**		1												**1**	2.2%
6:45	**7:00**															
6:00	**7:00**		1												**1**	2.2%
7:00	**7:15**															
7:15	**7:30**		2												**2**	4.4%
7:30	**7:45**		1	1											**2**	4.4%
7:45	**8:00**															
7:00	**8:00**		3	1											**4**	8.9%
8:00	**8:15**				1										**1**	2.2%
8:15	**8:30**		1	3											**4**	8.9%
8:30	**8:45**															
8:45	**9:00**		1	1											**2**	4.4%
8:00	**9:00**		2	4	1										**7**	15.6%
9:00	**9:15**															
9:15	**9:30**															
9:30	**9:45**		1												**1**	2.2%
9:45	**10:00**															
9:00	**10:00**		1												**1**	2.2%
10:00	**10:15**															
10:15	**10:30**															
10:30	**10:45**			1											**1**	2.2%
10:45	**11:00**															
10:00	**11:00**			1											**1**	2.2%
11:00	**11:15**															
11:15	**11:30**			1											**1**	2.2%
11:30	**11:45**															
11:45	**12:00**		1												**1**	2.2%
11:00	**12:00**		1	1											**2**	4.4%

12:00	**12:15**						
12:15	**12:30**	1				**1**	2.2%
12:30	**12:45**						
12:45	**13:00**		1			**1**	2.2%
12:00	**13:00**	1	1			**2**	4.4%
13:00	**13:15**						
13:15	**13:30**						
13:30	**13:45**						
13:45	**14:00**	1	1			**2**	4.4%
13:00	**14:00**	1	1			**2**	4.4%
14:00	**14:15**		1			**1**	2.2%
14:15	**14:30**						
14:30	**14:45**						
14:45	**15:00**	1			1	**2**	4.4%
14:00	**15:00**	1	1		1	**3**	6.7%
15:00	**15:15**						
15:15	**15:30**		1			**1**	2.2%
15:30	**15:45**						
15:45	**16:00**	2				**2**	4.4%
15:00	**16:00**	2	1			**3**	6.7%
16:00	**16:15**			1		**1**	2.2%
16:15	**16:30**		1	1		**2**	4.4%
16:30	**16:45**	2	1			**3**	6.7%
16:45	**17:00**		1			**1**	2.2%
16:00	**17:00**	2	3	2		**7**	15.6%
17:00	**17:15**						
17:15	**17:30**	1				**1**	2.2%
17:30	**17:45**		1			**1**	2.2%
17:45	**18:00**		1			**1**	2.2%
17:00	**18:00**	1	2			**3**	6.7%
18:00	**18:15**	1				**1**	2.2%
18:15	**18:30**						
18:30	**18:45**	1				**1**	2.2%
18:45	**19:00**						
18:00	**19:00**	2				**2**	4.4%
19:00	**19:15**						
19:15	**19:30**	1	1			**2**	4.4%
19:30	**19:45**		1			**1**	2.2%
19:45	**20:00**	1				**1**	2.2%
19:00	**20:00**	2	2			**4**	8.9%
20:00	**20:15**		1			**1**	2.2%
20:15	**20:30**	1	1			**2**	4.4%
20:30	**20:45**						
20:45	**21:00**						
20:00	**21:00**	1	2			**3**	6.7%
21:00	**21:15**						
21:15	**21:30**						
21:30	**21:45**						
21:45	**22:00**						
21:00	**22:00**						
22:00	**22:15**						
22:15	**22:30**						
22:30	**22:45**						
22:45	**23:00**						
22:00	**23:00**						
23:00	**23:15**						
23:15	**23:30**						
23:30	**23:45**						
23:45	**OO:OO**						
23:00	**OO:OO**						
Total		**21**	**20**	**3**	**1**	**45**	
		46.7%	44.4%	6.7%	2.2%		
AM PEAK		**2**	**3**	**1**		**4**	
period		7:15	8:15	8:00		8:15	
% of class		9.5%	15.0%	33.3%			8.9%
PM PEAK		**2**	**1**	**1**	**1**	**3**	
period		15:45	12:45	16:00	14:45	16:30	
% of class		9.5%	5.0%	33.3%	100.0%		6.7%

Report-1.2

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **North** Road :

Dates : **4/26/2017**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
00:00	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
00:00	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**															
5:30	**5:45**															
5:45	**6:00**															
5:00	**6:00**															
6:00	**6:15**															
6:15	**6:30**															
6:30	**6:45**		1												**1**	2.1%
6:45	**7:00**															
6:00	**7:00**		1												**1**	2.1%
7:00	**7:15**															
7:15	**7:30**		2				1								**3**	6.3%
7:30	**7:45**															
7:45	**8:00**								1						**1**	2.1%
7:00	**8:00**		2				1		1						**4**	8.3%
8:00	**8:15**		2		1										**3**	6.3%
8:15	**8:30**															
8:30	**8:45**			1											**1**	2.1%
8:45	**9:00**															
8:00	**9:00**		2	1	1										**4**	8.3%
9:00	**9:15**															
9:15	**9:30**			1											**1**	2.1%
9:30	**9:45**		1												**1**	2.1%
9:45	**10:00**															
9:00	**10:00**		1	1											**2**	4.2%
10:00	**10:15**															
10:15	**10:30**															
10:30	**10:45**															
10:45	**11:00**		1												**1**	2.1%
10:00	**11:00**		1												**1**	2.1%
11:00	**11:15**		1												**1**	2.1%
11:15	**11:30**		1	1											**2**	4.2%
11:30	**11:45**															
11:45	**12:00**															
11:00	**12:00**		2	1											**3**	6.3%

12:00	**12:15**		1						**1**	2.1%
12:15	**12:30**	1							**1**	2.1%
12:30	**12:45**				1				**1**	2.1%
12:45	**13:00**									
12:00	**13:00**	1	1		1				**3**	6.3%
13:00	**13:15**									
13:15	**13:30**		1						**1**	2.1%
13:30	**13:45**									
13:45	**14:00**	1							**1**	2.1%
13:00	**14:00**	1	1						**2**	4.2%
14:00	**14:15**	1	2						**3**	6.3%
14:15	**14:30**	2							**2**	4.2%
14:30	**14:45**		1						**1**	2.1%
14:45	**15:00**									
14:00	**15:00**	3	3						**6**	12.5%
15:00	**15:15**									
15:15	**15:30**									
15:30	**15:45**									
15:45	**16:00**									
15:00	**16:00**									
16:00	**16:15**			1					**1**	2.1%
16:15	**16:30**	1		1					**2**	4.2%
16:30	**16:45**	2	2						**4**	8.3%
16:45	**17:00**	1							**1**	2.1%
16:00	**17:00**	4	2	2					**8**	16.7%
17:00	**17:15**	2							**2**	4.2%
17:15	**17:30**		1						**1**	2.1%
17:30	**17:45**		1						**1**	2.1%
17:45	**18:00**	1							**1**	2.1%
17:00	**18:00**	3	2						**5**	10.4%
18:00	**18:15**									
18:15	**18:30**	1							**1**	2.1%
18:30	**18:45**		1						**1**	2.1%
18:45	**19:00**	1							**1**	2.1%
18:00	**19:00**	2	1						**3**	6.3%
19:00	**19:15**									
19:15	**19:30**									
19:30	**19:45**	1	1						**2**	4.2%
19:45	**20:00**	1							**1**	2.1%
19:00	**20:00**	2	1						**3**	6.3%
20:00	**20:15**	1							**1**	2.1%
20:15	**20:30**									
20:30	**20:45**									
20:45	**21:00**									
20:00	**21:00**	1							**1**	2.1%
21:00	**21:15**									
21:15	**21:30**									
21:30	**21:45**		1						**1**	2.1%
21:45	**22:00**									
21:00	**22:00**		1						**1**	2.1%
22:00	**22:15**									
22:15	**22:30**									
22:30	**22:45**									
22:45	**23:00**									
22:00	**23:00**									
23:00	**23:15**									
23:15	**23:30**									
23:30	**23:45**									
23:45	**OO:OO**	1							**1**	2.1%
23:00	**OO:OO**	1							**1**	2.1%
Total		**27**	**15**	**3**	**1**	**1**	**1**		**48**	
		56.3%	31.3%	6.3%	2.1%	2.1%	2.1%			
AM PEAK		**2**	**1**	**1**		**1**	**1**		**3**	
period		7:15	8:30	8:00		7:15	7:45		7:15	
% of class		7.4%	6.7%	33.3%		100.0%	100.0%			6.3%
PM PEAK		**2**	**2**	**1**	**1**				**4**	
period		14:15	14:00	16:00	12:30				16:30	
% of class		7.4%	13.3%	33.3%	100.0%					8.3%

Report-1.3

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **South** Road :

Dates : **4/25/2017**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
OO:OO	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**															
5:30	**5:45**															
5:45	**6:00**															
5:00	**6:00**															
6:00	**6:15**															
6:15	**6:30**															
6:30	**6:45**															
6:45	**7:00**															
6:00	**7:00**															
7:00	**7:15**		1												**1**	2.4%
7:15	**7:30**															
7:30	**7:45**			1											**1**	2.4%
7:45	**8:00**		1												**1**	2.4%
7:00	**8:00**		2	1											**3**	7.3%
8:00	**8:15**															
8:15	**8:30**				1										**1**	2.4%
8:30	**8:45**			1											**1**	2.4%
8:45	**9:00**															
8:00	**9:00**			1	1										**2**	4.9%
9:00	**9:15**															
9:15	**9:30**															
9:30	**9:45**															
9:45	**10:00**			1											**1**	2.4%
9:00	**10:00**			1											**1**	2.4%
10:00	**10:15**															
10:15	**10:30**															
10:30	**10:45**															
10:45	**11:00**															
10:00	**11:00**															
11:00	**11:15**															
11:15	**11:30**			1											**1**	2.4%
11:30	**11:45**															
11:45	**12:00**															
11:00	**12:00**			1											**1**	2.4%

12:00	**12:15**							
12:15	**12:30**		2				**2**	4.9%
12:30	**12:45**					1	**1**	2.4%
12:45	**13:00**							
12:00	**13:00**		2			1	**3**	7.3%
13:00	**13:15**		1				**1**	2.4%
13:15	**13:30**	1	1				**2**	4.9%
13:30	**13:45**	1					**1**	2.4%
13:45	**14:00**							
13:00	**14:00**	2	2				**4**	9.8%
14:00	**14:15**							
14:15	**14:30**							
14:30	**14:45**		1		1		**2**	4.9%
14:45	**15:00**							
14:00	**15:00**		1		1		**2**	4.9%
15:00	**15:15**	1					**1**	2.4%
15:15	**15:30**							
15:30	**15:45**		1				**1**	2.4%
15:45	**16:00**	1					**1**	2.4%
15:00	**16:00**	2	1				**3**	7.3%
16:00	**16:15**							
16:15	**16:30**	3			1		**4**	9.8%
16:30	**16:45**	1					**1**	2.4%
16:45	**17:00**		1				**1**	2.4%
16:00	**17:00**	4	1		1		**6**	14.6%
17:00	**17:15**	2					**2**	4.9%
17:15	**17:30**							
17:30	**17:45**	1					**1**	2.4%
17:45	**18:00**	1	1				**2**	4.9%
17:00	**18:00**	4	1				**5**	12.2%
18:00	**18:15**	1					**1**	2.4%
18:15	**18:30**		1				**1**	2.4%
18:30	**18:45**							
18:45	**19:00**	2					**2**	4.9%
18:00	**19:00**	3	1				**4**	9.8%
19:00	**19:15**							
19:15	**19:30**		2				**2**	4.9%
19:30	**19:45**		1				**1**	2.4%
19:45	**20:00**							
19:00	**20:00**		3				**3**	7.3%
20:00	**20:15**							
20:15	**20:30**							
20:30	**20:45**		1				**1**	2.4%
20:45	**21:00**	1	1				**2**	4.9%
20:00	**21:00**	1	2				**3**	7.3%
21:00	**21:15**	1					**1**	2.4%
21:15	**21:30**							
21:30	**21:45**							
21:45	**22:00**							
21:00	**22:00**	1					**1**	2.4%
22:00	**22:15**							
22:15	**22:30**							
22:30	**22:45**							
22:45	**23:00**							
22:00	**23:00**							
23:00	**23:15**							
23:15	**23:30**							
23:30	**23:45**							
23:45	**OO:OO**							
23:00	**OO:OO**							
Total		**19**	**18**	**1**	**2**	**1**	**41**	
		46.3%	43.9%	2.4%	4.9%	2.4%		
AM PEAK		**1**	**1**	**1**			**1**	
period		7:00	7:30	8:15			7:00	
% of class		5.3%	5.6%	100.0%				2.4%
PM PEAK		**3**	**2**		**1**	**1**	**4**	
period		16:15	12:15		14:30	12:30	16:15	
% of class		15.8%	11.1%		50.0%	100.0%		9.8%

Report-1.4

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **South** Road :

Dates : **4/26/2017**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
OO:OO	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**															
5:30	**5:45**															
5:45	**6:00**															
5:00	**6:00**															
6:00	**6:15**															
6:15	**6:30**															
6:30	**6:45**															
6:45	**7:00**															
6:00	**7:00**															
7:00	**7:15**		2												**2**	3.8%
7:15	**7:30**						1								**1**	1.9%
7:30	**7:45**															
7:45	**8:00**		2												**2**	3.8%
7:00	**8:00**		4				1								**5**	9.4%
8:00	**8:15**															
8:15	**8:30**				1										**1**	1.9%
8:30	**8:45**															
8:45	**9:00**															
8:00	**9:00**				1										**1**	1.9%
9:00	**9:15**															
9:15	**9:30**															
9:30	**9:45**															
9:45	**10:00**															
9:00	**10:00**															
10:00	**10:15**			1											**1**	1.9%
10:15	**10:30**		1												**1**	1.9%
10:30	**10:45**															
10:45	**11:00**		1	1	1										**3**	5.7%
10:00	**11:00**		2	2	1										**5**	9.4%
11:00	**11:15**			1											**1**	1.9%
11:15	**11:30**		2												**2**	3.8%
11:30	**11:45**															
11:45	**12:00**		1												**1**	1.9%
11:00	**12:00**		3	1											**4**	7.5%

12:00	**12:15**							
12:15	**12:30**							
12:30	**12:45**				1		**1**	1.9%
12:45	**13:00**	1					**1**	1.9%
12:00	**13:00**	1			1		**2**	3.8%
13:00	**13:15**		1				**1**	1.9%
13:15	**13:30**			1			**1**	1.9%
13:30	**13:45**		4				**4**	7.5%
13:45	**14:00**		1				**1**	1.9%
13:00	**14:00**		6	1			**7**	13.2%
14:00	**14:15**							
14:15	**14:30**		1				**1**	1.9%
14:30	**14:45**							
14:45	**15:00**							
14:00	**15:00**		1				**1**	1.9%
15:00	**15:15**							
15:15	**15:30**		1				**1**	1.9%
15:30	**15:45**		1				**1**	1.9%
15:45	**16:00**	1					**1**	1.9%
15:00	**16:00**	1	2				**3**	5.7%
16:00	**16:15**		1				**1**	1.9%
16:15	**16:30**	1					**1**	1.9%
16:30	**16:45**	2					**2**	3.8%
16:45	**17:00**	1					**1**	1.9%
16:00	**17:00**	4	1				**5**	9.4%
17:00	**17:15**							
17:15	**17:30**		2				**2**	3.8%
17:30	**17:45**		1		1		**2**	3.8%
17:45	**18:00**		1				**1**	1.9%
17:00	**18:00**		4		1		**5**	9.4%
18:00	**18:15**							
18:15	**18:30**	1					**1**	1.9%
18:30	**18:45**	2	1				**3**	5.7%
18:45	**19:00**	2	1				**3**	5.7%
18:00	**19:00**	5	2				**7**	13.2%
19:00	**19:15**	1					**1**	1.9%
19:15	**19:30**	1	1				**2**	3.8%
19:30	**19:45**							
19:45	**20:00**		1				**1**	1.9%
19:00	**20:00**	2	2				**4**	7.5%
20:00	**20:15**		1				**1**	1.9%
20:15	**20:30**							
20:30	**20:45**	1					**1**	1.9%
20:45	**21:00**							
20:00	**21:00**	1	1				**2**	3.8%
21:00	**21:15**	1	1				**2**	3.8%
21:15	**21:30**							
21:30	**21:45**							
21:45	**22:00**							
21:00	**22:00**	1	1				**2**	3.8%
22:00	**22:15**							
22:15	**22:30**							
22:30	**22:45**							
22:45	**23:00**							
22:00	**23:00**							
23:00	**23:15**							
23:15	**23:30**							
23:30	**23:45**							
23:45	**OO:OO**							
23:00	**OO:OO**							
Total		**24**	**23**	**3**	**2**	**1**	**53**	
		45.3%	43.4%	5.7%	3.8%	1.9%		
AM PEAK		**2**	**1**	**1**		**1**	**3**	
period		7:00	10:00	8:15		7:15	10:45	
% of class		8.3%	4.3%	33.3%		100.0%		5.7%
PM PEAK		**2**	**4**	**1**	**1**		**4**	
period		16:30	13:30	13:15	12:30		13:30	
% of class		8.3%	17.4%	33.3%	50.0%			7.5%

Report-1.5

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **North + South** Road :

Dates : **4/25/2017**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
OO:OO	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**															
5:30	**5:45**															
5:45	**6:00**															
5:00	**6:00**															
6:00	**6:15**															
6:15	**6:30**															
6:30	**6:45**		1												**1**	1.2%
6:45	**7:00**															
6:00	**7:00**		1												**1**	1.2%
7:00	**7:15**		1												**1**	1.2%
7:15	**7:30**		2												**2**	2.3%
7:30	**7:45**		1	2											**3**	3.5%
7:45	**8:00**		1												**1**	1.2%
7:00	**8:00**		5	2											**7**	8.1%
8:00	**8:15**				1										**1**	1.2%
8:15	**8:30**		1	3	1										**5**	5.8%
8:30	**8:45**			1											**1**	1.2%
8:45	**9:00**		1	1											**2**	2.3%
8:00	**9:00**		2	5	2										**9**	10.5%
9:00	**9:15**															
9:15	**9:30**															
9:30	**9:45**		1												**1**	1.2%
9:45	**10:00**			1											**1**	1.2%
9:00	**10:00**		1	1											**2**	2.3%
10:00	**10:15**															
10:15	**10:30**															
10:30	**10:45**			1											**1**	1.2%
10:45	**11:00**															
10:00	**11:00**			1											**1**	1.2%
11:00	**11:15**															
11:15	**11:30**			2											**2**	2.3%
11:30	**11:45**															
11:45	**12:00**		1												**1**	1.2%
11:00	**12:00**		1	2											**3**	3.5%

12:00	**12:15**							
12:15	**12:30**	1	2				**3**	3.5%
12:30	**12:45**					1	**1**	1.2%
12:45	**13:00**		1				**1**	1.2%
12:00	**13:00**	1	3			1	**5**	5.8%
13:00	**13:15**		1				**1**	1.2%
13:15	**13:30**	1	1				**2**	2.3%
13:30	**13:45**	1					**1**	1.2%
13:45	**14:00**	1	1				**2**	2.3%
13:00	**14:00**	3	3				**6**	7.0%
14:00	**14:15**		1				**1**	1.2%
14:15	**14:30**							
14:30	**14:45**		1		1		**2**	2.3%
14:45	**15:00**	1			1		**2**	2.3%
14:00	**15:00**	1	2		2		**5**	5.8%
15:00	**15:15**	1					**1**	1.2%
15:15	**15:30**		1				**1**	1.2%
15:30	**15:45**		1				**1**	1.2%
15:45	**16:00**	3					**3**	3.5%
15:00	**16:00**	4	2				**6**	7.0%
16:00	**16:15**			1			**1**	1.2%
16:15	**16:30**	3	1	1	1		**6**	7.0%
16:30	**16:45**	3	1				**4**	4.7%
16:45	**17:00**		2				**2**	2.3%
16:00	**17:00**	6	4	2	1		**13**	15.1%
17:00	**17:15**	2					**2**	2.3%
17:15	**17:30**	1					**1**	1.2%
17:30	**17:45**	1	1				**2**	2.3%
17:45	**18:00**	1	2				**3**	3.5%
17:00	**18:00**	5	3				**8**	9.3%
18:00	**18:15**	2					**2**	2.3%
18:15	**18:30**		1				**1**	1.2%
18:30	**18:45**	1					**1**	1.2%
18:45	**19:00**	2					**2**	2.3%
18:00	**19:00**	5	1				**6**	7.0%
19:00	**19:15**							
19:15	**19:30**	1	3				**4**	4.7%
19:30	**19:45**		2				**2**	2.3%
19:45	**20:00**	1					**1**	1.2%
19:00	**20:00**	2	5				**7**	8.1%
20:00	**20:15**		1				**1**	1.2%
20:15	**20:30**	1	1				**2**	2.3%
20:30	**20:45**		1				**1**	1.2%
20:45	**21:00**	1	1				**2**	2.3%
20:00	**21:00**	2	4				**6**	7.0%
21:00	**21:15**	1					**1**	1.2%
21:15	**21:30**							
21:30	**21:45**							
21:45	**22:00**							
21:00	**22:00**	1					**1**	1.2%
22:00	**22:15**							
22:15	**22:30**							
22:30	**22:45**							
22:45	**23:00**							
22:00	**23:00**							
23:00	**23:15**							
23:15	**23:30**							
23:30	**23:45**							
23:45	**OO:OO**							
23:00	**OO:OO**							
Total		**40**	**38**	**4**	**3**	**1**	**86**	
		46.5%	44.2%	4.7%	3.5%	1.2%		
AM PEAK		**2**	**3**	**1**			**5**	
period		7:15	8:15	8:00			8:15	
% of class		5.0%	7.9%	25.0%				5.8%
PM PEAK		**3**	**3**	**1**	**1**	**1**	**6**	
period		15:45	19:15	16:00	14:30	12:30	16:15	
% of class		7.5%	7.9%	25.0%	33.3%	100.0%		7.0%

Report-1.6

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **North + South** Road :

Dates : **4/26/2017**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
00:00	0:15															
0:15	0:30															
0:30	0:45															
0:45	1:00															
00:00	1:00															
1:00	1:15															
1:15	1:30															
1:30	1:45															
1:45	2:00															
1:00	2:00															
2:00	2:15															
2:15	2:30															
2:30	2:45															
2:45	3:00															
2:00	3:00															
3:00	3:15															
3:15	3:30															
3:30	3:45															
3:45	4:00															
3:00	4:00															
4:00	4:15															
4:15	4:30															
4:30	4:45															
4:45	5:00															
4:00	5:00															
5:00	5:15															
5:15	5:30															
5:30	5:45															
5:45	6:00															
5:00	6:00															
6:00	6:15															
6:15	6:30															
6:30	6:45		1												1	1.0%
6:45	7:00															
6:00	7:00		1												1	1.0%
7:00	7:15		2												2	2.0%
7:15	7:30		2				2								4	4.0%
7:30	7:45															
7:45	8:00		2						1						3	3.0%
7:00	8:00		6				2		1						9	8.9%
8:00	8:15		2		1										3	3.0%
8:15	8:30				1										1	1.0%
8:30	8:45			1											1	1.0%
8:45	9:00															
8:00	9:00		2	1	2										5	5.0%
9:00	9:15															
9:15	9:30			1											1	1.0%
9:30	9:45		1												1	1.0%
9:45	10:00															
9:00	10:00		1	1											2	2.0%
10:00	10:15			1											1	1.0%
10:15	10:30		1												1	1.0%
10:30	10:45															
10:45	11:00		2	1	1										4	4.0%
10:00	11:00		3	2	1										6	5.9%
11:00	11:15		1	1											2	2.0%
11:15	11:30		3	1											4	4.0%
11:30	11:45															
11:45	12:00		1												1	1.0%
11:00	12:00		5	2											7	6.9%

12:00	**12:15**		1					**1**	1.0%
12:15	**12:30**	1						**1**	1.0%
12:30	**12:45**				2			**2**	2.0%
12:45	**13:00**	1						**1**	1.0%
12:00	**13:00**	2	1		2			**5**	5.0%
13:00	**13:15**		1					**1**	1.0%
13:15	**13:30**		1	1				**2**	2.0%
13:30	**13:45**		4					**4**	4.0%
13:45	**14:00**	1	1					**2**	2.0%
13:00	**14:00**	1	7	1				**9**	8.9%
14:00	**14:15**	1	2					**3**	3.0%
14:15	**14:30**	2	1					**3**	3.0%
14:30	**14:45**		1					**1**	1.0%
14:45	**15:00**								
14:00	**15:00**	3	4					**7**	6.9%
15:00	**15:15**								
15:15	**15:30**		1					**1**	1.0%
15:30	**15:45**		1					**1**	1.0%
15:45	**16:00**	1						**1**	1.0%
15:00	**16:00**	1	2					**3**	3.0%
16:00	**16:15**		1	1				**2**	2.0%
16:15	**16:30**	2		1				**3**	3.0%
16:30	**16:45**	4	2					**6**	5.9%
16:45	**17:00**	2						**2**	2.0%
16:00	**17:00**	8	3	2				**13**	12.9%
17:00	**17:15**	2						**2**	2.0%
17:15	**17:30**		3					**3**	3.0%
17:30	**17:45**		2		1			**3**	3.0%
17:45	**18:00**	1	1					**2**	2.0%
17:00	**18:00**	3	6		1			**10**	9.9%
18:00	**18:15**								
18:15	**18:30**	2						**2**	2.0%
18:30	**18:45**	2	2					**4**	4.0%
18:45	**19:00**	3	1					**4**	4.0%
18:00	**19:00**	7	3					**10**	9.9%
19:00	**19:15**	1						**1**	1.0%
19:15	**19:30**	1	1					**2**	2.0%
19:30	**19:45**	1	1					**2**	2.0%
19:45	**20:00**	1	1					**2**	2.0%
19:00	**20:00**	4	3					**7**	6.9%
20:00	**20:15**	1	1					**2**	2.0%
20:15	**20:30**								
20:30	**20:45**	1						**1**	1.0%
20:45	**21:00**								
20:00	**21:00**	2	1					**3**	3.0%
21:00	**21:15**	1	1					**2**	2.0%
21:15	**21:30**								
21:30	**21:45**		1					**1**	1.0%
21:45	**22:00**								
21:00	**22:00**	1	2					**3**	3.0%
22:00	**22:15**								
22:15	**22:30**								
22:30	**22:45**								
22:45	**23:00**								
22:00	**23:00**								
23:00	**23:15**								
23:15	**23:30**								
23:30	**23:45**								
23:45	**OO:OO**	1						**1**	1.0%
23:00	**OO:OO**	1						**1**	1.0%
Total		**51**	**38**	**6**	**3**	**2**	**1**	**101**	
		50.5%	37.6%	5.9%	3.0%	2.0%	1.0%		
AM PEAK		**3**	**1**	**1**		**2**	**1**	**4**	
period		11:15	8:30	8:00		7:15	7:45	7:15	
% of class		5.9%	2.6%	16.7%		100.0%	100.0%		4.0%
PM PEAK		**4**	**4**	**1**	**2**			**6**	
period		16:30	13:30	13:15	12:30			16:30	
% of class		7.8%	10.5%	16.7%	66.7%				5.9%

Report-2.1

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **North** Road :

Dates : 1 **4/25/2017**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	**Total**	**Pace Speed**	**Number in Pace**
		11	21	31	41	51	61	71	81	91	101	111	121	131 140			
OO:OO	**0:15**																
0:15	**0:30**																
0:30	**0:45**																
0:45	**1:00**																
OO:OO	**1:00**																
1:00	**1:15**																
1:15	**1:30**																
1:30	**1:45**																
1:45	**2:00**																
1:00	**2:00**																
2:00	**2:15**																
2:15	**2:30**																
2:30	**2:45**																
2:45	**3:00**																
2:00	**3:00**																
3:00	**3:15**																
3:15	**3:30**																
3:30	**3:45**																
3:45	**4:00**																
3:00	**4:00**																
4:00	**4:15**																
4:15	**4:30**																
4:30	**4:45**																
4:45	**5:00**																
4:00	**5:00**																
5:00	**5:15**																
5:15	**5:30**																
5:30	**5:45**																
5:45	**6:00**																
5:00	**6:00**																
6:00	**6:15**																
6:15	**6:30**																
6:30	**6:45**			1											**1**	18.9-38.9	1
6:45	**7:00**																
6:00	**7:00**			1											**1**	18.9-38.9	
7:00	**7:15**																
7:15	**7:30**			1	1										**2**	21.3-41.3	2
7:30	**7:45**			1	1										**2**	26.5-46.5	2
7:45	**8:00**																
7:00	**8:00**			2	2										**2**	26.5-46.5	
8:00	**8:15**				1										**1**	27.3-47.3	1
8:15	**8:30**			3		1									**4**	31.1-51.1	4
8:30	**8:45**																
8:45	**9:00**			1	1										**2**	30.0-50.0	2
8:00	**9:00**			4	2	1									**4**	31.1-51.1	
9:00	**9:15**																
9:15	**9:30**																
9:30	**9:45**			1											**1**	12.6-32.6	1
9:45	**10:00**																
9:00	**10:00**			1											**1**	12.6-32.6	
10:00	**10:15**																
10:15	**10:30**																
10:30	**10:45**		1												**1**	9.0-29.0	1
10:45	**11:00**																
10:00	**11:00**		1												**1**	9.0-29.0	
11:00	**11:15**																
11:15	**11:30**		1												**1**	5.0-25.0	1
11:30	**11:45**																
11:45	**12:00**			1											**1**	16.6-36.6	1
11:00	**12:00**		1	1											**1**	5.0-25.0	

12:00	12:15								
12:15	12:30			1			1	15.2-35.2	1
12:30	12:45								
12:45	13:00		1				1	7.0-27.0	1
12:00	13:00		1	1			1	7.0-27.0	
13:00	13:15								
13:15	13:30								
13:30	13:45								
13:45	14:00		1			1	2	7.3-27.3	1
13:00	14:00		1			1	2	7.3-27.3	
14:00	14:15		1				1	5.6-25.6	1
14:15	14:30								
14:30	14:45								
14:45	15:00	1	1				2	2.6-22.6	2
14:00	15:00	1	2				1	5.6-25.6	
15:00	15:15								
15:15	15:30			1			1	14.9-34.9	1
15:30	15:45								
15:45	16:00			2			2	18.9-38.9	2
15:00	16:00			3			2	18.9-38.9	
16:00	16:15			1			1	11.9-31.9	1
16:15	16:30			2			2	19.2-39.2	2
16:30	16:45			3			3	19.3-39.3	3
16:45	17:00				1		1	30.2-50.2	1
16:00	17:00			6	1		1	30.2-50.2	
17:00	17:15								
17:15	17:30			1			1	16.7-36.7	1
17:30	17:45		1				1	8.9-28.9	1
17:45	18:00				1		1	28.7-48.7	1
17:00	18:00		1	1	1		1	8.9-28.9	
18:00	18:15				1		1	21.4-41.4	1
18:15	18:30								
18:30	18:45			1			1	15.8-35.8	1
18:45	19:00								
18:00	19:00			1	1		1	21.4-41.4	
19:00	19:15								
19:15	19:30				1	1	2	34.8-54.8	2
19:30	19:45			1			1	16.3-36.3	1
19:45	20:00				1		1	26.8-46.8	1
19:00	20:00			1	2	1	2	34.8-54.8	
20:00	20:15			1			1	18.8-38.8	1
20:15	20:30			2			2	18.4-38.4	2
20:30	20:45								
20:45	21:00								
20:00	21:00			3			1	18.8-38.8	
21:00	21:15								
21:15	21:30								
21:30	21:45								
21:45	22:00								
21:00	22:00								
22:00	22:15								
22:15	22:30								
22:30	22:45								
22:45	23:00								
22:00	23:00								
23:00	23:15								
23:15	23:30								
23:30	23:45								
23:45	OO:OO								
23:00	OO:OO								
Total		**1**	**7**	**25**	**9**	**3**	**45**		
		2.2%	15.6%	55.6%	20.0%	6.7%			
AM PEAK			**1**	**3**	**1**	**1**	**4**		
period			10:30	8:15	7:15	8:15	8:15		
% of class			14.3%	12.0%	11.1%	33.3%		8.9%	
PM PEAK		**1**	**1**	**3**	**1**	**1**	**3**		
period		14:45	12:45	16:30	16:45	13:45	16:30		
% of class		100.0%	14.3%	12.0%	11.1%	33.3%		6.7%	

15% Percentile :	**29**	KPH
50% Percentile :	**37**	KPH
85% Percentile :	**47**	KPH
95% Percentile :	**53**	KPH

20 KPH Pace Speed:	**31.1-51.1**	KPH
Number in Pace:	**35**	
Percent in Pace:	**77.8**	%
Number of Vehicles >60 KPH:		
Percent of Vehicles >60 KPH:		%
Mean Speed(average):	**37**	KPH

Report-2.2

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **North** Road :

Dates : 1 **4/26/2017**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**																	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**																	
5:30	**5:45**																	
5:45	**6:00**																	
5:00	**6:00**																	
6:00	**6:15**																	
6:15	**6:30**																	
6:30	**6:45**				1											**1**	18.4-38.4	1
6:45	**7:00**																	
6:00	**7:00**				1											**1**	18.4-38.4	
7:00	**7:15**																	
7:15	**7:30**				3											**3**	19.6-39.6	3
7:30	**7:45**																	
7:45	**8:00**			1												**1**	3.9-23.9	1
7:00	**8:00**			1	3											**1**	3.9-23.9	
8:00	**8:15**				1	1	1									**3**	37.3-57.3	3
8:15	**8:30**																	
8:30	**8:45**				1											**1**	19.5-39.5	1
8:45	**9:00**																	
8:00	**9:00**				2	1	1									**3**	37.3-57.3	
9:00	**9:15**																	
9:15	**9:30**				1											**1**	16.9-36.9	1
9:30	**9:45**				1											**1**	19.1-39.1	1
9:45	**10:00**																	
9:00	**10:00**				2											**1**	19.1-39.1	
10:00	**10:15**																	
10:15	**10:30**																	
10:30	**10:45**																	
10:45	**11:00**				1											**1**	17.7-37.7	1
10:00	**11:00**				1											**1**	17.7-37.7	
11:00	**11:15**				1											**1**	19.1-39.1	1
11:15	**11:30**				2											**2**	19.9-39.9	2
11:30	**11:45**																	
11:45	**12:00**																	
11:00	**12:00**				3											**2**	19.9-39.9	

12:00	**12:15**				1		**1**	26.7-46.7	1
12:15	**12:30**			1			**1**	19.6-39.6	1
12:30	**12:45**				1		**1**	21.2-41.2	1
12:45	**13:00**								
12:00	**13:00**			1	2		**1**	26.7-46.7	
13:00	**13:15**								
13:15	**13:30**			1			**1**	14.5-34.5	1
13:30	**13:45**								
13:45	**14:00**			1			**1**	13.5-33.5	1
13:00	**14:00**			2			**1**	14.5-34.5	
14:00	**14:15**			2	1		**3**	28.7-48.7	3
14:15	**14:30**	1			1		**2**	0.1-20.1	1
14:30	**14:45**			1			**1**	19.4-39.4	1
14:45	**15:00**								
14:00	**15:00**	1		3	2		**3**	28.7-48.7	
15:00	**15:15**								
15:15	**15:30**								
15:30	**15:45**								
15:45	**16:00**								
15:00	**16:00**								
16:00	**16:15**			1			**1**	13.7-33.7	1
16:15	**16:30**			1	1		**2**	30.3-50.3	2
16:30	**16:45**		1	2	1		**4**	30.2-50.2	4
16:45	**17:00**					1	**1**	39.5-59.5	1
16:00	**17:00**		1	4	2	1	**1**	39.5-59.5	
17:00	**17:15**			1	1		**2**	24.9-44.9	2
17:15	**17:30**				1		**1**	22.2-42.2	1
17:30	**17:45**		1				**1**	8.8-28.8	1
17:45	**18:00**			1			**1**	18.4-38.4	1
17:00	**18:00**		1	2	2		**1**	8.8-28.8	
18:00	**18:15**								
18:15	**18:30**			1			**1**	19.5-39.5	1
18:30	**18:45**					1	**1**	34.2-54.2	1
18:45	**19:00**				1		**1**	26.7-46.7	1
18:00	**19:00**			1	1	1	**1**	34.2-54.2	
19:00	**19:15**								
19:15	**19:30**								
19:30	**19:45**		1		1		**2**	24.8-44.8	2
19:45	**20:00**			1			**1**	14.8-34.8	1
19:00	**20:00**		1	1	1		**2**	24.8-44.8	
20:00	**20:15**				1		**1**	25.4-45.4	1
20:15	**20:30**								
20:30	**20:45**								
20:45	**21:00**								
20:00	**21:00**				1		**1**	25.4-45.4	
21:00	**21:15**								
21:15	**21:30**								
21:30	**21:45**					1	**1**	40.6-60.6	1
21:45	**22:00**								
21:00	**22:00**					1	**1**	40.6-60.6	
22:00	**22:15**								
22:15	**22:30**								
22:30	**22:45**								
22:45	**23:00**								
22:00	**23:00**								
23:00	**23:15**								
23:15	**23:30**								
23:30	**23:45**								
23:45	**OO:OO**				1		**1**	21.6-41.6	1
23:00	**OO:OO**				1		**1**	21.6-41.6	
Total		**1**	**4**	**26**	**13**	**4**	**48**		
		2.1%	8.3%	54.2%	27.1%	8.3%			
AM PEAK			**1**	**3**	**1**	**1**	**3**		
period			7:45	7:15	8:00	8:00	7:15		
% of class			25.0%	11.5%	7.7%	25.0%		6.3%	
PM PEAK		**1**	**1**	**2**	**1**	**1**	**4**		
period		14:15	16:30	14:00	12:00	16:45	16:30		
% of class		100.0%	25.0%	7.7%	7.7%	25.0%		8.3%	

15% Percentile :	**32**	KPH
50% Percentile :	**38**	KPH
85% Percentile :	**49**	KPH
95% Percentile :	**55**	KPH

20 KPH Pace Speed:	**28.7-48.7**	KPH
Number in Pace:	**40**	
Percent in Pace:	**83.3**	%
Number of Vehicles >60 KPH:		
Percent of Vehicles >60 KPH:		%
Mean Speed(average):	**40**	KPH

Report-2.3

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **South** Road :

Dates : 1 **4/25/2017**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**																	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**																	
5:30	**5:45**																	
5:45	**6:00**																	
5:00	**6:00**																	
6:00	**6:15**																	
6:15	**6:30**																	
6:30	**6:45**																	
6:45	**7:00**																	
6:00	**7:00**																	
7:00	**7:15**				1											**1**	19.2-39.2	1
7:15	**7:30**																	
7:30	**7:45**				1											**1**	11.3-31.3	1
7:45	**8:00**					1										**1**	22.1-42.1	1
7:00	**8:00**				2	1										**1**	22.1-42.1	
8:00	**8:15**																	
8:15	**8:30**				1											**1**	15.5-35.5	1
8:30	**8:45**				1											**1**	16.2-36.2	1
8:45	**9:00**																	
8:00	**9:00**				2											**1**	16.2-36.2	
9:00	**9:15**																	
9:15	**9:30**																	
9:30	**9:45**																	
9:45	**10:00**			1												**1**	9.2-29.2	1
9:00	**10:00**			1												**1**	9.2-29.2	
10:00	**10:15**																	
10:15	**10:30**																	
10:30	**10:45**																	
10:45	**11:00**																	
10:00	**11:00**																	
11:00	**11:15**																	
11:15	**11:30**				1											**1**	13.9-33.9	1
11:30	**11:45**																	
11:45	**12:00**																	
11:00	**12:00**				1											**1**	13.9-33.9	

12:00	12:15							
12:15	12:30	1	1		2	18.9-38.9	2	
12:30	12:45		1		1	16.0-36.0	1	
12:45	13:00							
12:00	13:00	1	2		2	18.9-38.9		
13:00	13:15		1		1	11.6-31.6	1	
13:15	13:30		1	1	2	30.5-50.5	2	
13:30	13:45		1		1	17.5-37.5	1	
13:45	14:00							
13:00	14:00		3	1	2	30.5-50.5		
14:00	14:15							
14:15	14:30							
14:30	14:45	1		1	2	28.3-48.3	2	
14:45	15:00							
14:00	15:00	1		1	2	28.3-48.3		
15:00	15:15	1			1	3.9-23.9	1	
15:15	15:30							
15:30	15:45			1	1	22.9-42.9	1	
15:45	16:00	1			1	9.9-29.9	1	
15:00	16:00	2		1	1	9.9-29.9		
16:00	16:15							
16:15	16:30	1	1	2	4	28.0-48.0	4	
16:30	16:45		1		1	13.2-33.2	1	
16:45	17:00			1	1	24.2-44.2	1	
16:00	17:00	1	2	3	4	28.0-48.0		
17:00	17:15		2		2	16.7-36.7	2	
17:15	17:30							
17:30	17:45		1		1	17.0-37.0	1	
17:45	18:00		1	1	2	25.8-45.8	2	
17:00	18:00		4	1	2	25.8-45.8		
18:00	18:15		1		1	20.7-40.7	1	
18:15	18:30		1		1	16.0-36.0	1	
18:30	18:45							
18:45	19:00			2	2	28.4-48.4	2	
18:00	19:00		2	2	2	28.4-48.4		
19:00	19:15							
19:15	19:30		1	1	2	26.6-46.6	2	
19:30	19:45		1		1	20.1-40.1	1	
19:45	20:00							
19:00	20:00		2	1	2	26.6-46.6		
20:00	20:15							
20:15	20:30							
20:30	20:45			1	1	21.8-41.8	1	
20:45	21:00			2	2	24.0-44.0	2	
20:00	21:00			3	2	24.0-44.0		
21:00	21:15			1	1	30.9-50.9	1	
21:15	21:30							
21:30	21:45							
21:45	22:00							
21:00	22:00			1	1	30.9-50.9		
22:00	22:15							
22:15	22:30							
22:30	22:45							
22:45	23:00							
22:00	23:00							
23:00	23:15							
23:15	23:30							
23:30	23:45							
23:45	OO:OO							
23:00	OO:OO							
Total		**6**	**20**	**15**	**41**			
		14.6%	48.8%	36.6%				
AM PEAK		**1**	**1**	**1**	**1**			
period		9:45	7:00	7:45	7:00			
% of class		16.7%	5.0%	6.7%		2.4%		
PM PEAK		**1**	**2**	**2**	**4**			
period		12:15	17:00	16:15	16:15			
% of class		16.7%	10.0%	13.3%		9.8%		

15% Percentile :	**31**	KPH
50% Percentile :	**38**	KPH
85% Percentile :	**47**	KPH
95% Percentile :	**50**	KPH

20 KPH Pace Speed:	**28.3-48.3**	KPH
Number in Pace:	**37**	
Percent in Pace:	**90.2**	%
Number of Vehicles >60 KPH:		
Percent of Vehicles >60 KPH:		%
Mean Speed(average):	**38**	KPH

Report-2.4

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **South** Road :

Dates : 1 **4/26/2017**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**																	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**																	
5:30	**5:45**																	
5:45	**6:00**																	
5:00	**6:00**																	
6:00	**6:15**																	
6:15	**6:30**																	
6:30	**6:45**																	
6:45	**7:00**																	
6:00	**7:00**																	
7:00	**7:15**				1	1										**2**	26.1-46.1	2
7:15	**7:30**			1												**1**	10.8-30.8	1
7:30	**7:45**																	
7:45	**8:00**			1		1										**2**	26.1-46.1	2
7:00	**8:00**			2	1	2										**2**	26.1-46.1	
8:00	**8:15**																	
8:15	**8:30**				1											**1**	15.1-35.1	1
8:30	**8:45**																	
8:45	**9:00**																	
8:00	**9:00**				1											**1**	15.1-35.1	
9:00	**9:15**																	
9:15	**9:30**																	
9:30	**9:45**																	
9:45	**10:00**																	
9:00	**10:00**																	
10:00	**10:15**				1											**1**	11.6-31.6	1
10:15	**10:30**				1											**1**	19.6-39.6	1
10:30	**10:45**																	
10:45	**11:00**				2	1										**3**	26.9-46.9	3
10:00	**11:00**				4	1										**3**	26.9-46.9	
11:00	**11:15**				1											**1**	13.2-33.2	1
11:15	**11:30**				2											**2**	17.1-37.1	2
11:30	**11:45**																	
11:45	**12:00**					1										**1**	24.9-44.9	1
11:00	**12:00**				3	1										**1**	24.9-44.9	

12:00	**12:15**								
12:15	**12:30**								
12:30	**12:45**				1	**1**	34.0-54.0	1
12:45	**13:00**		1			**1**	13.4-33.4	1
12:00	**13:00**		1		1	**1**	34.0-54.0	
13:00	**13:15**		1			**1**	12.2-32.2	1
13:15	**13:30**		1			**1**	19.6-39.6	1
13:30	**13:45**	1	1	2		**4**	24.1-44.1	3
13:45	**14:00**			1		**1**	24.2-44.2	1
13:00	**14:00**	1	3	3		**1**	24.2-44.2	
14:00	**14:15**							
14:15	**14:30**			1		**1**	28.4-48.4	1
14:30	**14:45**							
14:45	**15:00**							
14:00	**15:00**			1		**1**	28.4-48.4	
15:00	**15:15**							
15:15	**15:30**		1			**1**	16.3-36.3	1
15:30	**15:45**				1	**1**	31.7-51.7	1
15:45	**16:00**			1		**1**	26.9-46.9	1
15:00	**16:00**		1	1	1	**1**	31.7-51.7	
16:00	**16:15**		1			**1**	13.4-33.4	1
16:15	**16:30**			1		**1**	23.9-43.9	1
16:30	**16:45**		1	1		**2**	22.4-42.4	2
16:45	**17:00**		1			**1**	19.4-39.4	1
16:00	**17:00**		3	2		**1**	23.9-43.9	
17:00	**17:15**							
17:15	**17:30**		2			**2**	18.4-38.4	2
17:30	**17:45**	1		1		**2**	23.0-43.0	2
17:45	**18:00**		1			**1**	17.3-37.3	1
17:00	**18:00**	1	3	1		**2**	23.0-43.0	
18:00	**18:15**							
18:15	**18:30**				1	**1**	34.5-54.5	1
18:30	**18:45**		1	2		**3**	25.0-45.0	3
18:45	**19:00**			2	1	**3**	33.0-53.0	3
18:00	**19:00**		1	4	2	**1**	34.5-54.5	
19:00	**19:15**		1			**1**	15.5-35.5	1
19:15	**19:30**	1	1			**2**	17.5-37.5	2
19:30	**19:45**							
19:45	**20:00**		1			**1**	12.9-32.9	1
19:00	**20:00**	1	3			**2**	17.5-37.5	
20:00	**20:15**		1			**1**	20.5-40.5	1
20:15	**20:30**							
20:30	**20:45**			1		**1**	26.3-46.3	1
20:45	**21:00**							
20:00	**21:00**		1	1		**1**	26.3-46.3	
21:00	**21:15**		2			**2**	20.3-40.3	2
21:15	**21:30**							
21:30	**21:45**							
21:45	**22:00**							
21:00	**22:00**		2			**2**	20.3-40.3	
22:00	**22:15**							
22:15	**22:30**							
22:30	**22:45**							
22:45	**23:00**							
22:00	**23:00**							
23:00	**23:15**							
23:15	**23:30**							
23:30	**23:45**							
23:45	**OO:OO**							
23:00	**OO:OO**							
Total		**5**	**27**	**17**	**4**	**53**		
		9.4%	50.9%	32.1%	7.5%			
AM PEAK		**1**	**2**	**1**		**3**		
period		7:15	10:45	7:00		10:45		
% of class		20.0%	7.4%	5.9%			5.7%	
PM PEAK		**1**	**2**	**2**	**1**	**4**		
period		13:30	17:15	13:30	12:30	13:30		
% of class		20.0%	7.4%	11.8%	25.0%		7.5%	

15% Percentile :	**32**	KPH
50% Percentile :	**39**	KPH
85% Percentile :	**49**	KPH
95% Percentile :	**54**	KPH

20 KPH Pace Speed:	**28.4-48.4**	KPH
Number in Pace:	**46**	
Percent in Pace:	**86.8**	%
Number of Vehicles >60 KPH:		
Percent of Vehicles >60 KPH:		%
Mean Speed(average):	**39**	KPH

Report-2.5

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **North + South** Road :

Dates : 1 **4/25/2017**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**																	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**																	
5:30	**5:45**																	
5:45	**6:00**																	
5:00	**6:00**																	
6:00	**6:15**																	
6:15	**6:30**																	
6:30	**6:45**				1											**1**	18.9-38.9	1
6:45	**7:00**																	
6:00	**7:00**				1											**1**	18.9-38.9	
7:00	**7:15**				1											**1**	19.2-39.2	1
7:15	**7:30**				1	1										**2**	21.3-41.3	2
7:30	**7:45**				2	1										**3**	26.5-46.5	3
7:45	**8:00**					1										**1**	22.1-42.1	1
7:00	**8:00**				4	3										**3**	26.5-46.5	
8:00	**8:15**					1										**1**	27.3-47.3	1
8:15	**8:30**				4		1									**5**	31.1-51.1	5
8:30	**8:45**				1											**1**	16.2-36.2	1
8:45	**9:00**				1	1										**2**	30.0-50.0	2
8:00	**9:00**				6	2	1									**5**	31.1-51.1	
9:00	**9:15**																	
9:15	**9:30**																	
9:30	**9:45**				1											**1**	12.6-32.6	1
9:45	**10:00**			1												**1**	9.2-29.2	1
9:00	**10:00**			1	1											**1**	9.2-29.2	
10:00	**10:15**																	
10:15	**10:30**																	
10:30	**10:45**			1												**1**	9.0-29.0	1
10:45	**11:00**																	
10:00	**11:00**			1												**1**	9.0-29.0	
11:00	**11:15**																	
11:15	**11:30**			1	1											**2**	13.9-33.9	2
11:30	**11:45**																	
11:45	**12:00**				1											**1**	16.6-36.6	1
11:00	**12:00**			1	2											**1**	16.6-36.6	

12:00	12:15									
12:15	12:30		1	2			3	18.9-38.9	3
12:30	12:45			1			1	16.0-36.0	1
12:45	13:00		1				1	7.0-27.0	1
12:00	13:00		2	3			1	7.0-27.0	
13:00	13:15			1			1	11.6-31.6	1
13:15	13:30			1	1		2	30.5-50.5	2
13:30	13:45			1			1	17.5-37.5	1
13:45	14:00		1			1	2	7.3-27.3	1
13:00	14:00		1	3	1	1	2	7.3-27.3	
14:00	14:15		1				1	5.6-25.6	1
14:15	14:30								
14:30	14:45		1		1		2	28.3-48.3	2
14:45	15:00	1	1				2	2.6-22.6	2
14:00	15:00	1	3		1		1	5.6-25.6	
15:00	15:15		1				1	3.9-23.9	1
15:15	15:30			1			1	14.9-34.9	1
15:30	15:45				1		1	22.9-42.9	1
15:45	16:00		1	2			3	18.9-38.9	3
15:00	16:00		2	3	1		1	3.9-23.9	
16:00	16:15			1			1	11.9-31.9	1
16:15	16:30		1	3	2		6	28.0-48.0	6
16:30	16:45			4			4	19.3-39.3	4
16:45	17:00				2		2	30.2-50.2	2
16:00	17:00		1	8	4		2	30.2-50.2	
17:00	17:15			2			2	16.7-36.7	2
17:15	17:30			1			1	16.7-36.7	1
17:30	17:45		1	1			2	17.0-37.0	2
17:45	18:00			1	2		3	28.7-48.7	3
17:00	18:00		1	5	2		3	28.7-48.7	
18:00	18:15			1	1		2	21.4-41.4	2
18:15	18:30			1			1	16.0-36.0	1
18:30	18:45			1			1	15.8-35.8	1
18:45	19:00				2		2	28.4-48.4	2
18:00	19:00			3	3		2	28.4-48.4	
19:00	19:15								
19:15	19:30			1	2	1	4	34.8-54.8	4
19:30	19:45			2			2	20.1-40.1	2
19:45	20:00				1		1	26.8-46.8	1
19:00	20:00			3	3	1	4	34.8-54.8	
20:00	20:15			1			1	18.8-38.8	1
20:15	20:30			2			2	18.4-38.4	2
20:30	20:45				1		1	21.8-41.8	1
20:45	21:00				2		2	24.0-44.0	2
20:00	21:00			3	3		2	24.0-44.0	
21:00	21:15				1		1	30.9-50.9	1
21:15	21:30								
21:30	21:45								
21:45	22:00								
21:00	22:00				1		1	30.9-50.9	
22:00	22:15								
22:15	22:30								
22:30	22:45								
22:45	23:00								
22:00	23:00								
23:00	23:15								
23:15	23:30								
23:30	23:45								
23:45	OO:OO								
23:00	OO:OO								
Total		**1**	**13**	**45**	**24**	**3**	**86**		
		1.2%	15.1%	52.3%	27.9%	3.5%			
AM PEAK			**1**	**4**	**1**	**1**	**5**		
period			9:45	8:15	7:15	8:15	8:15		
% of class			7.7%	8.9%	4.2%	33.3%		5.8%	
PM PEAK		**1**	**1**	**4**	**2**	**1**	**6**		
period		14:45	12:15	16:30	16:15	13:45	16:15		
% of class		100.0%	7.7%	8.9%	8.3%	33.3%		7.0%	

15% Percentile :	**30**	KPH
50% Percentile :	**37**	KPH
85% Percentile :	**47**	KPH
95% Percentile :	**50**	KPH

20 KPH Pace Speed:	**28.7-48.7**	KPH
Number in Pace:	**71**	
Percent in Pace:	**82.6**	%
Number of Vehicles >60 KPH:		
Percent of Vehicles >60 KPH:		%
Mean Speed(average):	**38**	KPH

Report-2.6

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Direction : **North + South** Road :

Dates : 1 **4/26/2017**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**																	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**																	
5:30	**5:45**																	
5:45	**6:00**																	
5:00	**6:00**																	
6:00	**6:15**																	
6:15	**6:30**																	
6:30	**6:45**				1											**1**	18.4-38.4	1
6:45	**7:00**																	
6:00	**7:00**				1											**1**	18.4-38.4	
7:00	**7:15**				1	1										**2**	26.1-46.1	2
7:15	**7:30**			1	3											**4**	19.6-39.6	4
7:30	**7:45**																	
7:45	**8:00**			2		1										**3**	9.4-29.4	2
7:00	**8:00**			3	4	2										**3**	9.4-29.4	
8:00	**8:15**				1	1	1									**3**	37.3-57.3	3
8:15	**8:30**				1											**1**	15.1-35.1	1
8:30	**8:45**				1											**1**	19.5-39.5	1
8:45	**9:00**																	
8:00	**9:00**				3	1	1									**3**	37.3-57.3	
9:00	**9:15**																	
9:15	**9:30**				1											**1**	16.9-36.9	1
9:30	**9:45**				1											**1**	19.1-39.1	1
9:45	**10:00**																	
9:00	**10:00**				2											**1**	19.1-39.1	
10:00	**10:15**				1											**1**	11.6-31.6	1
10:15	**10:30**				1											**1**	19.6-39.6	1
10:30	**10:45**																	
10:45	**11:00**				3	1										**4**	26.9-46.9	4
10:00	**11:00**				5	1										**4**	26.9-46.9	
11:00	**11:15**				2											**2**	19.1-39.1	2
11:15	**11:30**				4											**4**	19.9-39.9	4
11:30	**11:45**																	
11:45	**12:00**					1										**1**	24.9-44.9	1
11:00	**12:00**				6	1										**1**	24.9-44.9	

12:00	**12:15**				1		**1**	26.7-46.7	1
12:15	**12:30**			1			**1**	19.6-39.6	1
12:30	**12:45**				1	1	**2**	34.0-54.0	2
12:45	**13:00**			1			**1**	13.4-33.4	1
12:00	**13:00**			2	2	1	**2**	34.0-54.0	
13:00	**13:15**			1			**1**	12.2-32.2	1
13:15	**13:30**			2			**2**	19.6-39.6	2
13:30	**13:45**		1	1	2		**4**	24.1-44.1	3
13:45	**14:00**			1	1		**2**	24.2-44.2	2
13:00	**14:00**		1	5	3		**2**	24.2-44.2	
14:00	**14:15**			2	1		**3**	28.7-48.7	3
14:15	**14:30**	1			2		**3**	28.4-48.4	2
14:30	**14:45**			1			**1**	19.4-39.4	1
14:45	**15:00**								
14:00	**15:00**	1		3	3		**3**	28.7-48.7	
15:00	**15:15**								
15:15	**15:30**			1			**1**	16.3-36.3	1
15:30	**15:45**					1	**1**	31.7-51.7	1
15:45	**16:00**				1		**1**	26.9-46.9	1
15:00	**16:00**			1	1	1	**1**	31.7-51.7	
16:00	**16:15**			2			**2**	13.7-33.7	2
16:15	**16:30**			1	2		**3**	30.3-50.3	3
16:30	**16:45**		1	3	2		**6**	30.2-50.2	6
16:45	**17:00**			1		1	**2**	19.4-39.4	1
16:00	**17:00**		1	7	4	1	**3**	30.3-50.3	
17:00	**17:15**			1	1		**2**	24.9-44.9	2
17:15	**17:30**			2	1		**3**	22.2-42.2	3
17:30	**17:45**		2		1		**3**	23.0-43.0	3
17:45	**18:00**			2			**2**	18.4-38.4	2
17:00	**18:00**		2	5	3		**2**	24.9-44.9	
18:00	**18:15**								
18:15	**18:30**			1		1	**2**	34.5-54.5	2
18:30	**18:45**			1	2	1	**4**	25.0-45.0	3
18:45	**19:00**				3	1	**4**	33.0-53.0	4
18:00	**19:00**			2	5	3	**2**	34.5-54.5	
19:00	**19:15**			1			**1**	15.5-35.5	1
19:15	**19:30**		1	1			**2**	17.5-37.5	2
19:30	**19:45**		1		1		**2**	24.8-44.8	2
19:45	**20:00**			2			**2**	14.8-34.8	2
19:00	**20:00**		2	4	1		**2**	24.8-44.8	
20:00	**20:15**			1	1		**2**	25.4-45.4	2
20:15	**20:30**								
20:30	**20:45**				1		**1**	26.3-46.3	1
20:45	**21:00**								
20:00	**21:00**			1	2		**1**	26.3-46.3	
21:00	**21:15**			2			**2**	20.3-40.3	2
21:15	**21:30**								
21:30	**21:45**					1	**1**	40.6-60.6	1
21:45	**22:00**								
21:00	**22:00**			2		1	**1**	40.6-60.6	
22:00	**22:15**								
22:15	**22:30**								
22:30	**22:45**								
22:45	**23:00**								
22:00	**23:00**								
23:00	**23:15**								
23:15	**23:30**								
23:30	**23:45**								
23:45	**OO:OO**				1		**1**	21.6-41.6	1
23:00	**OO:OO**				1		**1**	21.6-41.6	
Total		**1**	**9**	**53**	**30**	**8**	**101**		
		1.0%	8.9%	52.5%	29.7%	7.9%			
AM PEAK			**2**	**4**	**1**	**1**	**4**		
period			7:45	11:15	7:00	8:00	7:15		
% of class			22.2%	7.5%	3.3%	12.5%		4.0%	
PM PEAK		**1**	**2**	**3**	**3**	**1**	**6**		
period		14:15	17:30	16:30	18:45	12:30	16:30		
% of class		100.0%	22.2%	5.7%	10.0%	12.5%		5.9%	

15% Percentile :	**32**	KPH
50% Percentile :	**39**	KPH
85% Percentile :	**49**	KPH
95% Percentile :	**55**	KPH

20 KPH Pace Speed:	**28.7-48.7**	KPH
Number in Pace:	**86**	
Percent in Pace:	**85.1**	%
Number of Vehicles >60 KPH:	**1**	
Percent of Vehicles >60 KPH:	**1.0**	%
Mean Speed(average):	**40**	KPH

Report-3.1

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Road :

Dates : **4/25/2017**

Directions ---------->		North		South		East		West		Total	
		Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
00:00	0:15										
0:15	0:30										
0:30	0:45										
0:45	1:00										
00:00	1:00										
1:00	1:15										
1:15	1:30										
1:30	1:45										
1:45	2:00										
1:00	2:00										
2:00	2:15										
2:15	2:30										
2:30	2:45										
2:45	3:00										
2:00	3:00										
3:00	3:15										
3:15	3:30										
3:30	3:45										
3:45	4:00										
3:00	4:00										
4:00	4:15										
4:15	4:30										
4:30	4:45										
4:45	5:00										
4:00	5:00										
5:00	5:15										
5:15	5:30										
5:30	5:45										
5:45	6:00										
5:00	6:00										
6:00	6:15										
6:15	6:30										
6:30	6:45	1	2.2%							1	1.2%
6:45	7:00										
6:00	7:00	1	2.2%							1	1.2%
7:00	7:15			1	2.4%					1	1.2%
7:15	7:30	2	4.4%							2	2.3%
7:30	7:45	2	4.4%	1	2.4%					3	3.5%
7:45	8:00			1	2.4%					1	1.2%
7:00	8:00	4	8.9%	3	7.3%					7	8.1%
8:00	8:15	1	2.2%							1	1.2%
8:15	8:30	4	8.9%	1	2.4%					5	5.8%
8:30	8:45			1	2.4%					1	1.2%
8:45	9:00	2	4.4%							2	2.3%
8:00	9:00	7	15.6%	2	4.9%					9	10.5%
9:00	9:15										
9:15	9:30										
9:30	9:45	1	2.2%							1	1.2%
9:45	10:00			1	2.4%					1	1.2%
9:00	10:00	1	2.2%	1	2.4%					2	2.3%
10:00	10:15										
10:15	10:30										
10:30	10:45	1	2.2%							1	1.2%
10:45	11:00										
10:00	11:00	1	2.2%							1	1.2%
11:00	11:15										
11:15	11:30	1	2.2%	1	2.4%					2	2.3%
11:30	11:45										
11:45	12:00	1	2.2%							1	1.2%
11:00	12:00	2	4.4%	1	2.4%					3	3.5%

12:00	12:15								
12:15	12:30	1	2.2%	2	4.9%			3	3.5%
12:30	12:45			1	2.4%			1	1.2%
12:45	13:00	1	2.2%					1	1.2%
12:00	13:00	2	4.4%	3	7.3%			5	5.8%
13:00	13:15			1	2.4%			1	1.2%
13:15	13:30			2	4.9%			2	2.3%
13:30	13:45			1	2.4%			1	1.2%
13:45	14:00	2	4.4%					2	2.3%
13:00	14:00	2	4.4%	4	9.8%			6	7.0%
14:00	14:15	1	2.2%					1	1.2%
14:15	14:30								
14:30	14:45			2	4.9%			2	2.3%
14:45	15:00	2	4.4%					2	2.3%
14:00	15:00	3	6.7%	2	4.9%			5	5.8%
15:00	15:15			1	2.4%			1	1.2%
15:15	15:30	1	2.2%					1	1.2%
15:30	15:45			1	2.4%			1	1.2%
15:45	16:00	2	4.4%	1	2.4%			3	3.5%
15:00	16:00	3	6.7%	3	7.3%			6	7.0%
16:00	16:15	1	2.2%					1	1.2%
16:15	16:30	2	4.4%	4	9.8%			6	7.0%
16:30	16:45	3	6.7%	1	2.4%			4	4.7%
16:45	17:00	1	2.2%	1	2.4%			2	2.3%
16:00	17:00	7	15.6%	6	14.6%			13	15.1%
17:00	17:15			2	4.9%			2	2.3%
17:15	17:30	1	2.2%					1	1.2%
17:30	17:45	1	2.2%	1	2.4%			2	2.3%
17:45	18:00	1	2.2%	2	4.9%			3	3.5%
17:00	18:00	3	6.7%	5	12.2%			8	9.3%
18:00	18:15	1	2.2%	1	2.4%			2	2.3%
18:15	18:30			1	2.4%			1	1.2%
18:30	18:45	1	2.2%					1	1.2%
18:45	19:00			2	4.9%			2	2.3%
18:00	19:00	2	4.4%	4	9.8%			6	7.0%
19:00	19:15								
19:15	19:30	2	4.4%	2	4.9%			4	4.7%
19:30	19:45	1	2.2%	1	2.4%			2	2.3%
19:45	20:00	1	2.2%					1	1.2%
19:00	20:00	4	8.9%	3	7.3%			7	8.1%
20:00	20:15	1	2.2%					1	1.2%
20:15	20:30	2	4.4%					2	2.3%
20:30	20:45			1	2.4%			1	1.2%
20:45	21:00			2	4.9%			2	2.3%
20:00	21:00	3	6.7%	3	7.3%			6	7.0%
21:00	21:15			1	2.4%			1	1.2%
21:15	21:30								
21:30	21:45								
21:45	22:00								
21:00	22:00			1	2.4%			1	1.2%
22:00	22:15								
22:15	22:30								
22:30	22:45								
22:45	23:00								
22:00	23:00								
23:00	23:15								
23:15	23:30								
23:30	23:45								
23:45	OO:OO								
23:00	OO:OO								
Total		45		41				86	100.0%
		52.3%		47.7%				100.0%	
AM PEAK		4		1				5	
period		8:15		7:00				8:15	
% of class			8.9%		2.4%				5.8%
PM PEAK		3		4				6	
period		16:30		16:15				16:15	
% of class			6.7%		9.8%				7.0%

Report-3.2

Location : **CW17-179NS** **Guelph St - 505m S of Second Line**

Road :

Dates : **4/26/2017**

Directions ---------->	North Volume	North %	South Volume	South %	East Volume	East %	West Volume	West %	Total Volume	Total %
OO:OO 0:15										
0:15 0:30										
0:30 0:45										
0:45 1:00										
OO:OO 1:00										
1:00 1:15										
1:15 1:30										
1:30 1:45										
1:45 2:00										
1:00 2:00										
2:00 2:15										
2:15 2:30										
2:30 2:45										
2:45 3:00										
2:00 3:00										
3:00 3:15										
3:15 3:30										
3:30 3:45										
3:45 4:00										
3:00 4:00										
4:00 4:15										
4:15 4:30										
4:30 4:45										
4:45 5:00										
4:00 5:00										
5:00 5:15										
5:15 5:30										
5:30 5:45										
5:45 6:00										
5:00 6:00										
6:00 6:15										
6:15 6:30										
6:30 6:45	**1**	2.1%							**1**	1.0%
6:45 7:00										
6:00 7:00	**1**	2.1%							**1**	1.0%
7:00 7:15			**2**	3.8%					**2**	2.0%
7:15 7:30	**3**	6.3%	**1**	1.9%					**4**	4.0%
7:30 7:45										
7:45 8:00	**1**	2.1%	**2**	3.8%					**3**	3.0%
7:00 8:00	**4**	8.3%	**5**	9.4%					**9**	8.9%
8:00 8:15	**3**	6.3%							**3**	3.0%
8:15 8:30			**1**	1.9%					**1**	1.0%
8:30 8:45	**1**	2.1%							**1**	1.0%
8:45 9:00										
8:00 9:00	**4**	8.3%	**1**	1.9%					**5**	5.0%
9:00 9:15										
9:15 9:30	**1**	2.1%							**1**	1.0%
9:30 9:45	**1**	2.1%							**1**	1.0%
9:45 10:00										
9:00 10:00	**2**	4.2%							**2**	2.0%
10:00 10:15			**1**	1.9%					**1**	1.0%
10:15 10:30			**1**	1.9%					**1**	1.0%
10:30 10:45										
10:45 11:00	**1**	2.1%	**3**	5.7%					**4**	4.0%
10:00 11:00	**1**	2.1%	**5**	9.4%					**6**	5.9%
11:00 11:15	**1**	2.1%	**1**	1.9%					**2**	2.0%
11:15 11:30	**2**	4.2%	**2**	3.8%					**4**	4.0%
11:30 11:45										
11:45 12:00			**1**	1.9%					**1**	1.0%
11:00 12:00	**3**	6.3%	**4**	7.5%					**7**	6.9%

12:00	12:15	1	2.1%					1	1.0%
12:15	12:30	1	2.1%					1	1.0%
12:30	12:45	1	2.1%	1	1.9%			2	2.0%
12:45	13:00			1	1.9%			1	1.0%
12:00	13:00	3	6.3%	2	3.8%			5	5.0%
13:00	13:15			1	1.9%			1	1.0%
13:15	13:30	1	2.1%	1	1.9%			2	2.0%
13:30	13:45			4	7.5%			4	4.0%
13:45	14:00	1	2.1%	1	1.9%			2	2.0%
13:00	14:00	2	4.2%	7	13.2%			9	8.9%
14:00	14:15	3	6.3%					3	3.0%
14:15	14:30	2	4.2%	1	1.9%			3	3.0%
14:30	14:45	1	2.1%					1	1.0%
14:45	15:00								
14:00	15:00	6	12.5%	1	1.9%			7	6.9%
15:00	15:15								
15:15	15:30			1	1.9%			1	1.0%
15:30	15:45			1	1.9%			1	1.0%
15:45	16:00			1	1.9%			1	1.0%
15:00	16:00			3	5.7%			3	3.0%
16:00	16:15	1	2.1%	1	1.9%			2	2.0%
16:15	16:30	2	4.2%	1	1.9%			3	3.0%
16:30	16:45	4	8.3%	2	3.8%			6	5.9%
16:45	17:00	1	2.1%	1	1.9%			2	2.0%
16:00	17:00	8	16.7%	5	9.4%			13	12.9%
17:00	17:15	2	4.2%					2	2.0%
17:15	17:30	1	2.1%	2	3.8%			3	3.0%
17:30	17:45	1	2.1%	2	3.8%			3	3.0%
17:45	18:00	1	2.1%	1	1.9%			2	2.0%
17:00	18:00	5	10.4%	5	9.4%			10	9.9%
18:00	18:15								
18:15	18:30	1	2.1%	1	1.9%			2	2.0%
18:30	18:45	1	2.1%	3	5.7%			4	4.0%
18:45	19:00	1	2.1%	3	5.7%			4	4.0%
18:00	19:00	3	6.3%	7	13.2%			10	9.9%
19:00	19:15			1	1.9%			1	1.0%
19:15	19:30			2	3.8%			2	2.0%
19:30	19:45	2	4.2%					2	2.0%
19:45	20:00	1	2.1%	1	1.9%			2	2.0%
19:00	20:00	3	6.3%	4	7.5%			7	6.9%
20:00	20:15	1	2.1%	1	1.9%			2	2.0%
20:15	20:30								
20:30	20:45			1	1.9%			1	1.0%
20:45	21:00								
20:00	21:00	1	2.1%	2	3.8%			3	3.0%
21:00	21:15			2	3.8%			2	2.0%
21:15	21:30								
21:30	21:45	1	2.1%					1	1.0%
21:45	22:00								
21:00	22:00	1	2.1%	2	3.8%			3	3.0%
22:00	22:15								
22:15	22:30								
22:30	22:45								
22:45	23:00								
22:00	23:00								
23:00	23:15								
23:15	23:30								
23:30	23:45								
23:45	OO:OO	1	2.1%					1	1.0%
23:00	OO:OO	1	2.1%					1	1.0%
Total		48		53				101	100.0%
		47.5%		52.5%				100.0%	
AM PEAK		3		3				4	
period		7:15		10:45				7:15	
% of class			6.3%		5.7%				4.0%
PM PEAK		4		4				6	
period		16:30		13:30				16:30	
% of class			8.3%		7.5%				5.9%

Report-1.1

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **North** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
OO:OO	**1:00**															
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**		1												**1**	0.3%
5:30	**5:45**		1												**1**	0.3%
5:45	**6:00**		1												**1**	0.3%
5:00	**6:00**		3												**3**	0.8%
6:00	**6:15**															
6:15	**6:30**															
6:30	**6:45**		3												**3**	0.8%
6:45	**7:00**			1											**1**	0.3%
6:00	**7:00**		3	1											**4**	1.1%
7:00	**7:15**		2												**2**	0.5%
7:15	**7:30**		2	1		1									**4**	1.1%
7:30	**7:45**		4	1											**5**	1.3%
7:45	**8:00**		4		1										**5**	1.3%
7:00	**8:00**		12	2	1	1									**16**	4.2%
8:00	**8:15**		4	2			1								**7**	1.8%
8:15	**8:30**		4	1	1										**6**	1.6%
8:30	**8:45**		8	2											**10**	2.6%
8:45	**9:00**		3	1	2										**6**	1.6%
8:00	**9:00**		19	6	3		1								**29**	7.7%
9:00	**9:15**		4	1											**5**	1.3%
9:15	**9:30**		4												**4**	1.1%
9:30	**9:45**		1												**1**	0.3%
9:45	**10:00**		3	1			1								**5**	1.3%
9:00	**10:00**		12	2			1								**15**	4.0%
10:00	**10:15**		4												**4**	1.1%
10:15	**10:30**		2												**2**	0.5%
10:30	**10:45**															
10:45	**11:00**		4	2											**6**	1.6%
10:00	**11:00**		10	2											**12**	3.2%
11:00	**11:15**		1	1	1										**3**	0.8%
11:15	**11:30**		2												**2**	0.5%
11:30	**11:45**		2	4											**6**	1.6%
11:45	**12:00**		3												**3**	0.8%
11:00	**12:00**		8	5	1										**14**	3.7%

12:00	**12:15**								
12:15	**12:30**		5					**5**	1.3%
12:30	**12:45**		1	1				**2**	0.5%
12:45	**13:00**		1					**1**	0.3%
12:00	**13:00**		7	1				**8**	2.1%
13:00	**13:15**		4	2				**6**	1.6%
13:15	**13:30**		4					**4**	1.1%
13:30	**13:45**		2	2				**4**	1.1%
13:45	**14:00**		2	1				**3**	0.8%
13:00	**14:00**		12	5				**17**	4.5%
14:00	**14:15**		5			1		**6**	1.6%
14:15	**14:30**		4					**4**	1.1%
14:30	**14:45**		3	1				**4**	1.1%
14:45	**15:00**		7	2				**9**	2.4%
14:00	**15:00**		19	3		1		**23**	6.1%
15:00	**15:15**		3	1				**4**	1.1%
15:15	**15:30**		6	2				**8**	2.1%
15:30	**15:45**		11	2	1			**14**	3.7%
15:45	**16:00**		11	3	1		2	**17**	4.5%
15:00	**16:00**		31	8	2		2	**43**	11.3%
16:00	**16:15**		5	4				**9**	2.4%
16:15	**16:30**		10	4	1			**15**	4.0%
16:30	**16:45**		10	4			1	**15**	4.0%
16:45	**17:00**		15	1			1	**17**	4.5%
16:00	**17:00**		40	13	1		2	**56**	14.8%
17:00	**17:15**		11	4			1	**16**	4.2%
17:15	**17:30**		10					**10**	2.6%
17:30	**17:45**		13	6			3	**22**	5.8%
17:45	**18:00**		12	6			1	**19**	5.0%
17:00	**18:00**		46	16			5	**67**	17.7%
18:00	**18:15**		7	3			1	**11**	2.9%
18:15	**18:30**	1	5	1				**7**	1.8%
18:30	**18:45**		9	3				**12**	3.2%
18:45	**19:00**		8	1		1		**10**	2.6%
18:00	**19:00**	1	29	8		1	1	**40**	10.6%
19:00	**19:15**		5					**5**	1.3%
19:15	**19:30**		3	1				**4**	1.1%
19:30	**19:45**		5	1				**6**	1.6%
19:45	**20:00**		1					**1**	0.3%
19:00	**20:00**		14	2				**16**	4.2%
20:00	**20:15**		2					**2**	0.5%
20:15	**20:30**								
20:30	**20:45**		1					**1**	0.3%
20:45	**21:00**								
20:00	**21:00**		3					**3**	0.8%
21:00	**21:15**		1					**1**	0.3%
21:15	**21:30**		2					**2**	0.5%
21:30	**21:45**		2	1				**3**	0.8%
21:45	**22:00**		1					**1**	0.3%
21:00	**22:00**		6	1				**7**	1.8%
22:00	**22:15**		1					**1**	0.3%
22:15	**22:30**		1					**1**	0.3%
22:30	**22:45**					1		**1**	0.3%
22:45	**23:00**								
22:00	**23:00**		2			1		**3**	0.8%
23:00	**23:15**		1					**1**	0.3%
23:15	**23:30**		1				1	**2**	0.5%
23:30	**23:45**								
23:45	**OO:OO**								
23:00	**OO:OO**		2				1	**3**	0.8%
Total		**1**	**278**	**75**	**8**	**4**	**13**	**379**	
		0.3%	73.4%	19.8%	2.1%	1.1%	3.4%		
AM PEAK			**8**	**4**	**2**	**1**	**1**	**10**	
period			8:30	11:30	8:45	7:15	8:00	8:30	
% of class			2.9%	5.3%	25.0%	25.0%	7.7%		2.6%
PM PEAK		**1**	**15**	**6**	**1**	**1**	**3**	**22**	
period		18:15	16:45	17:30	15:30	14:00	17:30	17:30	
% of class		100.0%	5.4%	8.0%	12.5%	25.0%	23.1%		5.8%

Report-1.2

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **North** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**		1												**1**	0.3%
0:45	**1:00**															
OO:OO	**1:00**		1												**1**	0.3%
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**		1												**1**	0.3%
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**		1												**1**	0.3%
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**		1												**1**	0.3%
5:30	**5:45**															
5:45	**6:00**															
5:00	**6:00**		1												**1**	0.3%
6:00	**6:15**															
6:15	**6:30**		1												**1**	0.3%
6:30	**6:45**		1				1								**2**	0.5%
6:45	**7:00**		2												**2**	0.5%
6:00	**7:00**		4				1								**5**	1.3%
7:00	**7:15**		2	1											**3**	0.8%
7:15	**7:30**		1	1											**2**	0.5%
7:30	**7:45**		2				1								**3**	0.8%
7:45	**8:00**		5	3											**8**	2.0%
7:00	**8:00**		10	5			1								**16**	4.1%
8:00	**8:15**		10												**10**	2.5%
8:15	**8:30**		5		1										**6**	1.5%
8:30	**8:45**		7	1											**8**	2.0%
8:45	**9:00**		9	1	2										**12**	3.0%
8:00	**9:00**		31	2	3										**36**	9.1%
9:00	**9:15**		2		1										**3**	0.8%
9:15	**9:30**		3	1											**4**	1.0%
9:30	**9:45**		7	1											**8**	2.0%
9:45	**10:00**		3												**3**	0.8%
9:00	**10:00**		15	2	1										**18**	4.6%
10:00	**10:15**		4												**4**	1.0%
10:15	**10:30**		2			2									**4**	1.0%
10:30	**10:45**		1	1											**2**	0.5%
10:45	**11:00**		3												**3**	0.8%
10:00	**11:00**		10	1		2									**13**	3.3%
11:00	**11:15**		2	1			1								**4**	1.0%
11:15	**11:30**			1											**1**	0.3%
11:30	**11:45**		5												**5**	1.3%
11:45	**12:00**		2	3											**5**	1.3%
11:00	**12:00**		9	5			1								**15**	3.8%

12:00	**12:15**	2	1				**3**	0.8%
12:15	**12:30**	4					**4**	1.0%
12:30	**12:45**	1	1			1	**3**	0.8%
12:45	**13:00**	4					**4**	1.0%
12:00	**13:00**	11	2			1	**14**	3.5%
13:00	**13:15**	4	1				**5**	1.3%
13:15	**13:30**	2					**2**	0.5%
13:30	**13:45**	5	1				**6**	1.5%
13:45	**14:00**	3	1				**4**	1.0%
13:00	**14:00**	14	3				**17**	4.3%
14:00	**14:15**	3	3				**6**	1.5%
14:15	**14:30**	4					**4**	1.0%
14:30	**14:45**	4	3			1	**8**	2.0%
14:45	**15:00**	4	1				**5**	1.3%
14:00	**15:00**	15	7			1	**23**	5.8%
15:00	**15:15**	2	1		1	1	**5**	1.3%
15:15	**15:30**	8	2				**10**	2.5%
15:30	**15:45**	8	1	1			**10**	2.5%
15:45	**16:00**	6	3			1	**10**	2.5%
15:00	**16:00**	24	7	1	1	2	**35**	8.9%
16:00	**16:15**	9	3	1	1		**14**	3.5%
16:15	**16:30**	11	2	1		1	**15**	3.8%
16:30	**16:45**	12	5	1	1	1	**20**	5.1%
16:45	**17:00**	12	1			1	**14**	3.5%
16:00	**17:00**	44	11	3	2	3	**63**	15.9%
17:00	**17:15**	14	2			2	**18**	4.6%
17:15	**17:30**	15	1		1	3	**20**	5.1%
17:30	**17:45**	10	2				**12**	3.0%
17:45	**18:00**	10	5				**15**	3.8%
17:00	**18:00**	49	10		1	5	**65**	16.5%
18:00	**18:15**	9					**9**	2.3%
18:15	**18:30**	5	2		1		**8**	2.0%
18:30	**18:45**	8	1			1	**10**	2.5%
18:45	**19:00**	6	1				**7**	1.8%
18:00	**19:00**	28	4		1	1	**34**	8.6%
19:00	**19:15**	3	1				**4**	1.0%
19:15	**19:30**	6	2				**8**	2.0%
19:30	**19:45**	3	1				**4**	1.0%
19:45	**20:00**	1	1				**2**	0.5%
19:00	**20:00**	13	5				**18**	4.6%
20:00	**20:15**		1				**1**	0.3%
20:15	**20:30**	1					**1**	0.3%
20:30	**20:45**	1	1				**2**	0.5%
20:45	**21:00**	3					**3**	0.8%
20:00	**21:00**	5	2				**7**	1.8%
21:00	**21:15**							
21:15	**21:30**	2	2				**4**	1.0%
21:30	**21:45**		1				**1**	0.3%
21:45	**22:00**	4					**4**	1.0%
21:00	**22:00**	6	3				**9**	2.3%
22:00	**22:15**							
22:15	**22:30**							
22:30	**22:45**	3					**3**	0.8%
22:45	**23:00**							
22:00	**23:00**	3					**3**	0.8%
23:00	**23:15**							
23:15	**23:30**					1	**1**	0.3%
23:30	**23:45**							
23:45	**OO:OO**							
23:00	**OO:OO**					1	**1**	0.3%
Total		**294**	**69**	**8**	**7**	**17**	**395**	
		74.4%	17.5%	2.0%	1.8%	4.3%		
AM PEAK		**10**	**3**	**2**	**2**	**1**	**12**	
period		8:00	7:45	8:45	10:15	6:30	8:45	
% of class		3.4%	4.3%	25.0%	28.6%	5.9%		3.0%
PM PEAK		**15**	**5**	**1**	**1**	**3**	**20**	
period		17:15	16:30	15:30	15:00	17:15	16:30	
% of class		5.1%	7.2%	12.5%	14.3%	17.6%		5.1%

Report-1.3

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **South** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**		1												**1**	0.4%
OO:OO	**1:00**		1												**1**	0.4%
1:00	**1:15**			1											**1**	0.4%
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**			1											**1**	0.4%
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**			2											**2**	0.7%
5:30	**5:45**		4	1											**5**	1.8%
5:45	**6:00**		1												**1**	0.4%
5:00	**6:00**		5	3											**8**	2.9%
6:00	**6:15**		1	1											**2**	0.7%
6:15	**6:30**		2	1											**3**	1.1%
6:30	**6:45**		4	1											**5**	1.8%
6:45	**7:00**															
6:00	**7:00**		7	3											**10**	3.6%
7:00	**7:15**		5		1										**6**	2.2%
7:15	**7:30**		5	2											**7**	2.5%
7:30	**7:45**		6	3	1										**10**	3.6%
7:45	**8:00**		7	1											**8**	2.9%
7:00	**8:00**		23	6	2										**31**	11.3%
8:00	**8:15**		5	1		1									**7**	2.5%
8:15	**8:30**		7	1											**8**	2.9%
8:30	**8:45**		6												**6**	2.2%
8:45	**9:00**		2												**2**	0.7%
8:00	**9:00**		20	2		1									**23**	8.4%
9:00	**9:15**		2	1											**3**	1.1%
9:15	**9:30**		2	1											**3**	1.1%
9:30	**9:45**		2	1		1									**4**	1.5%
9:45	**10:00**		2	1											**3**	1.1%
9:00	**10:00**		8	4		1									**13**	4.7%
10:00	**10:15**		1												**1**	0.4%
10:15	**10:30**		1												**1**	0.4%
10:30	**10:45**		2												**2**	0.7%
10:45	**11:00**		3												**3**	1.1%
10:00	**11:00**		7												**7**	2.5%
11:00	**11:15**		2	1											**3**	1.1%
11:15	**11:30**		2	2											**4**	1.5%
11:30	**11:45**		3	3											**6**	2.2%
11:45	**12:00**		3	2											**5**	1.8%
11:00	**12:00**		10	8											**18**	6.5%

12:00	**12:15**	4	4			**8**	2.9%
12:15	**12:30**	1	5			**6**	2.2%
12:30	**12:45**	5	2			**7**	2.5%
12:45	**13:00**	2	1			**3**	1.1%
12:00	**13:00**	12	12			**24**	8.7%
13:00	**13:15**	3	1			**4**	1.5%
13:15	**13:30**	2	1			**3**	1.1%
13:30	**13:45**	3				**3**	1.1%
13:45	**14:00**	1				**1**	0.4%
13:00	**14:00**	9	2			**11**	4.0%
14:00	**14:15**		2		2	**4**	1.5%
14:15	**14:30**	1	1			**2**	0.7%
14:30	**14:45**	1	1	1	1	**4**	1.5%
14:45	**15:00**	4	3	2		**9**	3.3%
14:00	**15:00**	6	7	3	3	**19**	6.9%
15:00	**15:15**	1	2			**3**	1.1%
15:15	**15:30**	5	2			**7**	2.5%
15:30	**15:45**	3				**3**	1.1%
15:45	**16:00**	3		1	2	**6**	2.2%
15:00	**16:00**	12	4	1	2	**19**	6.9%
16:00	**16:15**	3	1			**4**	1.5%
16:15	**16:30**	5	1		2	**8**	2.9%
16:30	**16:45**	5	1			**6**	2.2%
16:45	**17:00**	2	3			**5**	1.8%
16:00	**17:00**	15	6		2	**23**	8.4%
17:00	**17:15**	8	2			**10**	3.6%
17:15	**17:30**	10	3			**13**	4.7%
17:30	**17:45**	3	1			**4**	1.5%
17:45	**18:00**	3	1			**4**	1.5%
17:00	**18:00**	24	7			**31**	11.3%
18:00	**18:15**		2			**2**	0.7%
18:15	**18:30**	1	1			**2**	0.7%
18:30	**18:45**	4	2			**6**	2.2%
18:45	**19:00**	3				**3**	1.1%
18:00	**19:00**	8	5			**13**	4.7%
19:00	**19:15**	2	2			**4**	1.5%
19:15	**19:30**	1				**1**	0.4%
19:30	**19:45**	1				**1**	0.4%
19:45	**20:00**	1				**1**	0.4%
19:00	**20:00**	5	2			**7**	2.5%
20:00	**20:15**	5	1			**6**	2.2%
20:15	**20:30**	1				**1**	0.4%
20:30	**20:45**	1				**1**	0.4%
20:45	**21:00**	1				**1**	0.4%
20:00	**21:00**	8	1			**9**	3.3%
21:00	**21:15**		1			**1**	0.4%
21:15	**21:30**	2				**2**	0.7%
21:30	**21:45**	1				**1**	0.4%
21:45	**22:00**		2			**2**	0.7%
21:00	**22:00**	3	3			**6**	2.2%
22:00	**22:15**						
22:15	**22:30**						
22:30	**22:45**	1				**1**	0.4%
22:45	**23:00**						
22:00	**23:00**	1				**1**	0.4%
23:00	**23:15**						
23:15	**23:30**						
23:30	**23:45**						
23:45	**OO:OO**						
23:00	**OO:OO**						
Total		**184**	**76**	**6**	**9**	**275**	
		66.9%	27.6%	2.2%	3.3%		
AM PEAK		**7**	**3**	**1**	**1**	**10**	
period		7:45	7:30	7:00	8:00	7:30	
% of class		3.8%	3.9%	16.7%	11.1%		3.6%
PM PEAK		**10**	**5**	**2**	**2**	**13**	
period		17:15	12:15	14:45	14:00	17:15	
% of class		5.4%	6.6%	33.3%	22.2%		4.7%

Report-1.4

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **South** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**		1												**1**	0.4%
0:30	**0:45**															
0:45	**1:00**															
OO:OO	**1:00**		1												**1**	0.4%
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**			1											**1**	0.4%
4:00	**5:00**			1											**1**	0.4%
5:00	**5:15**			1											**1**	0.4%
5:15	**5:30**		1												**1**	0.4%
5:30	**5:45**		3												**3**	1.1%
5:45	**6:00**		4	1											**5**	1.8%
5:00	**6:00**		8	2											**10**	3.7%
6:00	**6:15**		3												**3**	1.1%
6:15	**6:30**			2		1									**3**	1.1%
6:30	**6:45**		5	2											**7**	2.6%
6:45	**7:00**		6	1											**7**	2.6%
6:00	**7:00**		14	5		1									**20**	7.4%
7:00	**7:15**		6		1										**7**	2.6%
7:15	**7:30**		7	2											**9**	3.3%
7:30	**7:45**		6	5	1										**12**	4.4%
7:45	**8:00**		5												**5**	1.8%
7:00	**8:00**		24	7	2										**33**	12.1%
8:00	**8:15**		9												**9**	3.3%
8:15	**8:30**		7	2											**9**	3.3%
8:30	**8:45**		5	1											**6**	2.2%
8:45	**9:00**		5	1											**6**	2.2%
8:00	**9:00**		26	4											**30**	11.0%
9:00	**9:15**		3	1											**4**	1.5%
9:15	**9:30**			1											**1**	0.4%
9:30	**9:45**		4												**4**	1.5%
9:45	**10:00**		4	1											**5**	1.8%
9:00	**10:00**		11	3											**14**	5.1%
10:00	**10:15**		1												**1**	0.4%
10:15	**10:30**		2	3		2									**7**	2.6%
10:30	**10:45**		1	1		1									**3**	1.1%
10:45	**11:00**		2	1											**3**	1.1%
10:00	**11:00**		6	5		3									**14**	5.1%
11:00	**11:15**		2												**2**	0.7%
11:15	**11:30**		1	2		1									**4**	1.5%
11:30	**11:45**			1											**1**	0.4%
11:45	**12:00**		4	1											**5**	1.8%
11:00	**12:00**		7	4		1									**12**	4.4%

12:00	**12:15**	5					**5**	1.8%
12:15	**12:30**	1	1				**2**	0.7%
12:30	**12:45**	2	2				**4**	1.5%
12:45	**13:00**	2	1				**3**	1.1%
12:00	**13:00**	10	4				**14**	5.1%
13:00	**13:15**	1					**1**	0.4%
13:15	**13:30**	3	2		1		**6**	2.2%
13:30	**13:45**	3	1				**4**	1.5%
13:45	**14:00**							
13:00	**14:00**	7	3		1		**11**	4.0%
14:00	**14:15**	3					**3**	1.1%
14:15	**14:30**	1					**1**	0.4%
14:30	**14:45**	1	1	1			**3**	1.1%
14:45	**15:00**	2	2	1			**5**	1.8%
14:00	**15:00**	7	3	2			**12**	4.4%
15:00	**15:15**	3	1		1		**5**	1.8%
15:15	**15:30**	3					**3**	1.1%
15:30	**15:45**	2	2		1		**5**	1.8%
15:45	**16:00**	4	1	1			**6**	2.2%
15:00	**16:00**	12	4	1	2		**19**	7.0%
16:00	**16:15**	5					**5**	1.8%
16:15	**16:30**	2	1				**3**	1.1%
16:30	**16:45**	7	1				**8**	2.9%
16:45	**17:00**	5	1		1		**7**	2.6%
16:00	**17:00**	19	3		1		**23**	8.5%
17:00	**17:15**	5			1		**6**	2.2%
17:15	**17:30**	7	1				**8**	2.9%
17:30	**17:45**	2					**2**	0.7%
17:45	**18:00**		2				**2**	0.7%
17:00	**18:00**	14	3		1		**18**	6.6%
18:00	**18:15**							
18:15	**18:30**	4	2				**6**	2.2%
18:30	**18:45**	4	2				**6**	2.2%
18:45	**19:00**	1	1			1	**3**	1.1%
18:00	**19:00**	9	5			1	**15**	5.5%
19:00	**19:15**	3					**3**	1.1%
19:15	**19:30**	1					**1**	0.4%
19:30	**19:45**	2					**2**	0.7%
19:45	**20:00**	2					**2**	0.7%
19:00	**20:00**	8					**8**	2.9%
20:00	**20:15**	2					**2**	0.7%
20:15	**20:30**	3					**3**	1.1%
20:30	**20:45**	2	1				**3**	1.1%
20:45	**21:00**							
20:00	**21:00**	7	1				**8**	2.9%
21:00	**21:15**	1	1				**2**	0.7%
21:15	**21:30**	1					**1**	0.4%
21:30	**21:45**	1					**1**	0.4%
21:45	**22:00**	1	1				**2**	0.7%
21:00	**22:00**	4	2				**6**	2.2%
22:00	**22:15**	1	1				**2**	0.7%
22:15	**22:30**							
22:30	**22:45**		1				**1**	0.4%
22:45	**23:00**							
22:00	**23:00**	1	2				**3**	1.1%
23:00	**23:15**							
23:15	**23:30**							
23:30	**23:45**							
23:45	**OO:OO**							
23:00	**OO:OO**							
Total		**195**	**61**	**5**	**10**	**1**	**272**	
		71.7%	22.4%	1.8%	3.7%	0.4%		
AM PEAK		**9**	**5**	**1**	**2**		**12**	
period		8:00	7:30	7:00	10:15		7:30	
% of class		4.6%	8.2%	20.0%	20.0%			4.4%
PM PEAK		**7**	**2**	**1**	**1**	**1**	**8**	
period		16:30	12:30	14:30	13:15	18:45	16:30	
% of class		3.6%	3.3%	20.0%	10.0%	100.0%		2.9%

Report-1.5

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **North + South** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**		1												**1**	0.2%
OO:OO	**1:00**		1												**1**	0.2%
1:00	**1:15**			1											**1**	0.2%
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**			1											**1**	0.2%
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**															
5:00	**5:15**															
5:15	**5:30**		1	2											**3**	0.5%
5:30	**5:45**		5	1											**6**	0.9%
5:45	**6:00**		2												**2**	0.3%
5:00	**6:00**		8	3											**11**	1.7%
6:00	**6:15**		1	1											**2**	0.3%
6:15	**6:30**		2	1											**3**	0.5%
6:30	**6:45**		7	1											**8**	1.2%
6:45	**7:00**			1											**1**	0.2%
6:00	**7:00**		10	4											**14**	2.1%
7:00	**7:15**		7		1										**8**	1.2%
7:15	**7:30**		7	3		1									**11**	1.7%
7:30	**7:45**		10	4	1										**15**	2.3%
7:45	**8:00**		11	1	1										**13**	2.0%
7:00	**8:00**		35	8	3	1									**47**	7.2%
8:00	**8:15**		9	3		1	1								**14**	2.1%
8:15	**8:30**		11	2	1										**14**	2.1%
8:30	**8:45**		14	2											**16**	2.4%
8:45	**9:00**		5	1	2										**8**	1.2%
8:00	**9:00**		39	8	3	1	1								**52**	8.0%
9:00	**9:15**		6	2											**8**	1.2%
9:15	**9:30**		6	1											**7**	1.1%
9:30	**9:45**		3	1		1									**5**	0.8%
9:45	**10:00**		5	2			1								**8**	1.2%
9:00	**10:00**		20	6		1	1								**28**	4.3%
10:00	**10:15**		5												**5**	0.8%
10:15	**10:30**		3												**3**	0.5%
10:30	**10:45**		2												**2**	0.3%
10:45	**11:00**		7	2											**9**	1.4%
10:00	**11:00**		17	2											**19**	2.9%
11:00	**11:15**		3	2	1										**6**	0.9%
11:15	**11:30**		4	2											**6**	0.9%
11:30	**11:45**		5	7											**12**	1.8%
11:45	**12:00**		6	2											**8**	1.2%
11:00	**12:00**		18	13	1										**32**	4.9%

12:00	**12:15**		4	4				**8**	1.2%
12:15	**12:30**		6	5				**11**	1.7%
12:30	**12:45**		6	3				**9**	1.4%
12:45	**13:00**		3	1				**4**	0.6%
12:00	**13:00**		19	13				**32**	4.9%
13:00	**13:15**		7	3				**10**	1.5%
13:15	**13:30**		6	1				**7**	1.1%
13:30	**13:45**		5	2				**7**	1.1%
13:45	**14:00**		3	1				**4**	0.6%
13:00	**14:00**		21	7				**28**	4.3%
14:00	**14:15**		5	2		3		**10**	1.5%
14:15	**14:30**		5	1				**6**	0.9%
14:30	**14:45**		4	2	1	1		**8**	1.2%
14:45	**15:00**		11	5	2			**18**	2.8%
14:00	**15:00**		25	10	3	4		**42**	6.4%
15:00	**15:15**		4	3				**7**	1.1%
15:15	**15:30**		11	4				**15**	2.3%
15:30	**15:45**		14	2	1			**17**	2.6%
15:45	**16:00**		14	3	2	2	2	**23**	3.5%
15:00	**16:00**		43	12	3	2	2	**62**	9.5%
16:00	**16:15**		8	5				**13**	2.0%
16:15	**16:30**		15	5	1	2		**23**	3.5%
16:30	**16:45**		15	5			1	**21**	3.2%
16:45	**17:00**		17	4			1	**22**	3.4%
16:00	**17:00**		55	19	1	2	2	**79**	12.1%
17:00	**17:15**		19	6			1	**26**	4.0%
17:15	**17:30**		20	3				**23**	3.5%
17:30	**17:45**		16	7			3	**26**	4.0%
17:45	**18:00**		15	7			1	**23**	3.5%
17:00	**18:00**		70	23			5	**98**	15.0%
18:00	**18:15**		7	5			1	**13**	2.0%
18:15	**18:30**	1	6	2				**9**	1.4%
18:30	**18:45**		13	5				**18**	2.8%
18:45	**19:00**		11	1		1		**13**	2.0%
18:00	**19:00**	1	37	13		1	1	**53**	8.1%
19:00	**19:15**		7	2				**9**	1.4%
19:15	**19:30**		4	1				**5**	0.8%
19:30	**19:45**		6	1				**7**	1.1%
19:45	**20:00**		2					**2**	0.3%
19:00	**20:00**		19	4				**23**	3.5%
20:00	**20:15**		7	1				**8**	1.2%
20:15	**20:30**		1					**1**	0.2%
20:30	**20:45**		2					**2**	0.3%
20:45	**21:00**		1					**1**	0.2%
20:00	**21:00**		11	1				**12**	1.8%
21:00	**21:15**		1	1				**2**	0.3%
21:15	**21:30**		4					**4**	0.6%
21:30	**21:45**		3	1				**4**	0.6%
21:45	**22:00**		1	2				**3**	0.5%
21:00	**22:00**		9	4				**13**	2.0%
22:00	**22:15**		1					**1**	0.2%
22:15	**22:30**		1					**1**	0.2%
22:30	**22:45**		1			1		**2**	0.3%
22:45	**23:00**								
22:00	**23:00**		3			1		**4**	0.6%
23:00	**23:15**		1					**1**	0.2%
23:15	**23:30**		1				1	**2**	0.3%
23:30	**23:45**								
23:45	**OO:OO**								
23:00	**OO:OO**		2				1	**3**	0.5%
Total		**1**	**462**	**151**	**14**	**13**	**13**	**654**	
		0.2%	70.6%	23.1%	2.1%	2.0%	2.0%		
AM PEAK			**14**	**7**	**2**	**1**	**1**	**16**	
period			8:30	11:30	8:45	7:15	8:00	8:30	
% of class			3.0%	4.6%	14.3%	7.7%	7.7%		2.4%
PM PEAK		**1**	**20**	**7**	**2**	**3**	**3**	**26**	
period		18:15	17:15	17:30	14:45	14:00	17:30	17:00	
% of class		100.0%	4.3%	4.6%	14.3%	23.1%	23.1%		4.0%

Report-1.6

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **North + South** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**		1												**1**	0.1%
0:30	**0:45**		1												**1**	0.1%
0:45	**1:00**															
OO:OO	**1:00**		2												**2**	0.3%
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**															
2:00	**2:15**		1												**1**	0.1%
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**		1												**1**	0.1%
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**															
4:30	**4:45**															
4:45	**5:00**			1											**1**	0.1%
4:00	**5:00**			1											**1**	0.1%
5:00	**5:15**			1											**1**	0.1%
5:15	**5:30**		2												**2**	0.3%
5:30	**5:45**		3												**3**	0.4%
5:45	**6:00**		4	1											**5**	0.7%
5:00	**6:00**		9	2											**11**	1.6%
6:00	**6:15**		3												**3**	0.4%
6:15	**6:30**		1	2		1									**4**	0.6%
6:30	**6:45**		6	2			1								**9**	1.3%
6:45	**7:00**		8	1											**9**	1.3%
6:00	**7:00**		18	5		1	1								**25**	3.7%
7:00	**7:15**		8	1	1										**10**	1.5%
7:15	**7:30**		8	3											**11**	1.6%
7:30	**7:45**		8	5	1		1								**15**	2.2%
7:45	**8:00**		10	3											**13**	1.9%
7:00	**8:00**		34	12	2		1								**49**	7.3%
8:00	**8:15**		19												**19**	2.8%
8:15	**8:30**		12	2	1										**15**	2.2%
8:30	**8:45**		12	2											**14**	2.1%
8:45	**9:00**		14	2	2										**18**	2.7%
8:00	**9:00**		57	6	3										**66**	9.9%
9:00	**9:15**		5	1	1										**7**	1.0%
9:15	**9:30**		3	2											**5**	0.7%
9:30	**9:45**		11	1											**12**	1.8%
9:45	**10:00**		7	1											**8**	1.2%
9:00	**10:00**		26	5	1										**32**	4.8%
10:00	**10:15**		5												**5**	0.7%
10:15	**10:30**		4	3		4									**11**	1.6%
10:30	**10:45**		2	2		1									**5**	0.7%
10:45	**11:00**		5	1											**6**	0.9%
10:00	**11:00**		16	6		5									**27**	4.0%
11:00	**11:15**		4	1			1								**6**	0.9%
11:15	**11:30**		1	3		1									**5**	0.7%
11:30	**11:45**		5	1											**6**	0.9%
11:45	**12:00**		6	4											**10**	1.5%
11:00	**12:00**		16	9		1	1								**27**	4.0%

12:00	**12:15**	7	1					**8**	1.2%
12:15	**12:30**	5	1					**6**	0.9%
12:30	**12:45**	3	3			1		**7**	1.0%
12:45	**13:00**	6	1					**7**	1.0%
12:00	**13:00**	21	6			1		**28**	4.2%
13:00	**13:15**	5	1					**6**	0.9%
13:15	**13:30**	5	2		1			**8**	1.2%
13:30	**13:45**	8	2					**10**	1.5%
13:45	**14:00**	3	1					**4**	0.6%
13:00	**14:00**	21	6		1			**28**	4.2%
14:00	**14:15**	6	3					**9**	1.3%
14:15	**14:30**	5						**5**	0.7%
14:30	**14:45**	5	4	1		1		**11**	1.6%
14:45	**15:00**	6	3	1				**10**	1.5%
14:00	**15:00**	22	10	2		1		**35**	5.2%
15:00	**15:15**	5	2		2	1		**10**	1.5%
15:15	**15:30**	11	2					**13**	1.9%
15:30	**15:45**	10	3	1	1			**15**	2.2%
15:45	**16:00**	10	4	1		1		**16**	2.4%
15:00	**16:00**	36	11	2	3	2		**54**	8.1%
16:00	**16:15**	14	3	1	1			**19**	2.8%
16:15	**16:30**	13	3	1		1		**18**	2.7%
16:30	**16:45**	19	6	1	1	1		**28**	4.2%
16:45	**17:00**	17	2		1	1		**21**	3.1%
16:00	**17:00**	63	14	3	3	3		**86**	12.9%
17:00	**17:15**	19	2		1	2		**24**	3.6%
17:15	**17:30**	22	2		1	3		**28**	4.2%
17:30	**17:45**	12	2					**14**	2.1%
17:45	**18:00**	10	7					**17**	2.5%
17:00	**18:00**	63	13		2	5		**83**	12.4%
18:00	**18:15**	9						**9**	1.3%
18:15	**18:30**	9	4		1			**14**	2.1%
18:30	**18:45**	12	3			1		**16**	2.4%
18:45	**19:00**	7	2				1	**10**	1.5%
18:00	**19:00**	37	9		1	1	1	**49**	7.3%
19:00	**19:15**	6	1					**7**	1.0%
19:15	**19:30**	7	2					**9**	1.3%
19:30	**19:45**	5	1					**6**	0.9%
19:45	**20:00**	3	1					**4**	0.6%
19:00	**20:00**	21	5					**26**	3.9%
20:00	**20:15**	2	1					**3**	0.4%
20:15	**20:30**	4						**4**	0.6%
20:30	**20:45**	3	2					**5**	0.7%
20:45	**21:00**	3						**3**	0.4%
20:00	**21:00**	12	3					**15**	2.2%
21:00	**21:15**	1	1					**2**	0.3%
21:15	**21:30**	3	2					**5**	0.7%
21:30	**21:45**	1	1					**2**	0.3%
21:45	**22:00**	5	1					**6**	0.9%
21:00	**22:00**	10	5					**15**	2.2%
22:00	**22:15**	1	1					**2**	0.3%
22:15	**22:30**								
22:30	**22:45**	3	1					**4**	0.6%
22:45	**23:00**								
22:00	**23:00**	4	2					**6**	0.9%
23:00	**23:15**								
23:15	**23:30**					1		**1**	0.1%
23:30	**23:45**								
23:45	**OO:OO**								
23:00	**OO:OO**					1		**1**	0.1%
Total		**489**	**130**	**13**	**17**	**17**	**1**	**667**	
		73.3%	19.5%	1.9%	2.5%	2.5%	0.1%		
AM PEAK		**19**	**5**	**2**	**4**	**1**		**19**	
period		8:00	7:30	8:45	10:15	6:30		8:00	
% of class		3.9%	3.8%	15.4%	23.5%	5.9%			2.8%
PM PEAK		**22**	**7**	**1**	**2**	**3**	**1**	**28**	
period		17:15	17:45	14:30	15:00	17:15	18:45	16:30	
% of class		4.5%	5.4%	7.7%	11.8%	17.6%	100.0%		4.2%

Report-2.1

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **North** Road :

Dates : 1 **4/30/2019**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**																	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**								1							**1**	56.6-76.6	1
5:30	**5:45**							1								**1**	42.3-62.3	1
5:45	**6:00**								1							**1**	54.9-74.9	1
5:00	**6:00**							1	2							**1**	56.6-76.6	
6:00	**6:15**																	
6:15	**6:30**																	
6:30	**6:45**						3									**3**	40.6-60.6	3
6:45	**7:00**							1								**1**	44.4-64.4	1
6:00	**7:00**						3	1								**1**	44.4-64.4	
7:00	**7:15**							1	1							**2**	51.6-71.6	2
7:15	**7:30**				1				2	1						**4**	65.3-85.3	3
7:30	**7:45**							2	1	1	1					**5**	63.4-83.4	4
7:45	**8:00**						1	1	2	1						**5**	63.8-83.8	4
7:00	**8:00**				1		1	4	6	3	1					**4**	65.3-85.3	
8:00	**8:15**						1	4	2							**7**	55.1-75.1	7
8:15	**8:30**						2		4							**6**	58.9-78.9	6
8:30	**8:45**							2	4	4						**10**	68.5-88.5	9
8:45	**9:00**				1		2	3								**6**	49.3-69.3	6
8:00	**9:00**				1		5	9	10	4						**10**	68.5-88.5	
9:00	**9:15**				1		1	1	1	1						**5**	45.8-65.8	3
9:15	**9:30**							3		1						**4**	50.8-70.8	3
9:30	**9:45**								1							**1**	56.4-76.4	1
9:45	**10:00**						1	2	1	1						**5**	51.8-71.8	4
9:00	**10:00**				1		2	6	3	3						**1**	56.4-76.4	
10:00	**10:15**							1	2	1						**4**	63.2-83.2	4
10:15	**10:30**						1		1							**2**	53.2-73.2	2
10:30	**10:45**																	
10:45	**11:00**						1	2	2	1						**6**	55.4-75.4	4
10:00	**11:00**						2	3	5	2						**4**	63.2-83.2	
11:00	**11:15**						1		2							**3**	59.0-79.0	2
11:15	**11:30**						1		1							**2**	53.5-73.5	2
11:30	**11:45**				1		2	2		1						**6**	47.5-67.5	4
11:45	**12:00**							1	1	1						**3**	63.2-83.2	3
11:00	**12:00**				1		4	3	4	2						**3**	63.2-83.2	

12:00	**12:15**												
12:15	**12:30**		1		1	2	1			**5**	61.4-81.4	4
12:30	**12:45**				1	1				**2**	60.1-80.1	2
12:45	**13:00**				1					**1**	49.3-69.3	1
12:00	**13:00**		1		3	3	1			**5**	61.4-81.4	
13:00	**13:15**			1	1	4				**6**	54.2-74.2	6
13:15	**13:30**				2	2				**4**	55.5-75.5	4
13:30	**13:45**			1	2	1				**4**	52.3-72.3	4
13:45	**14:00**				1	2				**3**	57.1-77.1	3
13:00	**14:00**			2	6	9				**3**	57.1-77.1	
14:00	**14:15**				4	1	1			**6**	56.9-76.9	5
14:15	**14:30**			1	2		1			**4**	44.2-64.2	3
14:30	**14:45**				1	3				**4**	60.9-80.9	4
14:45	**15:00**		1	2	4	2				**9**	55.0-75.0	8
14:00	**15:00**		1	3	11	6	2			**4**	60.9-80.9	
15:00	**15:15**			1			3			**4**	67.4-87.4	3
15:15	**15:30**			1	3	3	1			**8**	66.7-86.7	7
15:30	**15:45**			2	3	8	1			**14**	54.8-74.8	12
15:45	**16:00**			1	6	8	2			**17**	56.8-76.8	15
15:00	**16:00**			5	12	19	7			**4**	67.4-87.4	
16:00	**16:15**				5	4				**9**	58.4-78.4	9
16:15	**16:30**		1	1	6	3	2		2	**15**	56.6-76.6	10
16:30	**16:45**				3	8	3	1		**15**	61.7-81.7	12
16:45	**17:00**			4	7	6				**17**	54.4-74.4	15
16:00	**17:00**		1	5	21	21	5	1	2	**15**	61.7-81.7	
17:00	**17:15**				10	4	2			**16**	61.9-81.9	15
17:15	**17:30**				2	7	1			**10**	62.1-82.1	10
17:30	**17:45**			2	6	7	4	3		**22**	65.0-85.0	17
17:45	**18:00**			4	8	6	1			**19**	56.5-76.5	17
17:00	**18:00**			6	26	24	8	3		**22**	65.0-85.0	
18:00	**18:15**			2	5	3	1			**11**	56.4-76.4	9
18:15	**18:30**	1	1	2	2		1			**7**	43.9-63.9	5
18:30	**18:45**			1	4	6	1			**12**	63.1-83.1	11
18:45	**19:00**		1		5	3	1			**10**	60.9-80.9	8
18:00	**19:00**	1	2	5	16	12	4			**12**	63.1-83.1	
19:00	**19:15**				2	2	1			**5**	57.0-77.0	4
19:15	**19:30**			1	1	2				**4**	51.5-71.5	3
19:30	**19:45**			1	2	3				**6**	58.3-78.3	6
19:45	**20:00**				1					**1**	46.6-66.6	1
19:00	**20:00**			2	6	7	1			**6**	58.3-78.3	
20:00	**20:15**				2					**2**	50.4-70.4	2
20:15	**20:30**											
20:30	**20:45**				1					**1**	42.2-62.2	1
20:45	**21:00**											
20:00	**21:00**				3					**2**	50.4-70.4	
21:00	**21:15**				1					**1**	51.0-71.0	1
21:15	**21:30**			1	1					**2**	49.0-69.0	2
21:30	**21:45**					3				**3**	58.3-78.3	3
21:45	**22:00**				1					**1**	45.3-65.3	1
21:00	**22:00**			1	3	3				**3**	58.3-78.3	
22:00	**22:15**					1				**1**	57.8-77.8	1
22:15	**22:30**							1		**1**	72.2-92.2	1
22:30	**22:45**				1					**1**	44.0-64.0	1
22:45	**23:00**											
22:00	**23:00**				1	1		1		**1**	72.2-92.2	
23:00	**23:15**				1					**1**	43.8-63.8	1
23:15	**23:30**				2					**2**	48.7-68.7	2
23:30	**23:45**											
23:45	**OO:OO**											
23:00	**OO:OO**				3					**2**	48.7-68.7	
Total		**1**	**9**	**46**	**138**	**135**	**42**	**6**	**2**	**379**		
		0.3%	2.4%	12.1%	36.4%	35.6%	11.1%	1.6%	0.5%			
AM PEAK			**1**	**3**	**4**	**4**	**4**	**1**		**10**		
period			7:15	6:30	8:00	8:15	8:30	7:30		8:30		
% of class			11.1%	6.5%	2.9%	3.0%	9.5%	16.7%			2.6%	
PM PEAK		**1**	**1**	**4**	**10**	**8**	**4**	**3**	**2**	**22**		
period		18:15	12:15	16:45	17:00	15:30	17:30	17:30	16:15	17:30		
% of class		100.0%	11.1%	8.7%	7.2%	5.9%	9.5%	50.0%	100.0%		5.8%	

15% Percentile :	**61**	KPH
50% Percentile :	**71**	KPH
85% Percentile :	**80**	KPH
95% Percentile :	**88**	KPH

20 KPH Pace Speed:	**60.9-80.9**	KPH
Number in Pace:	**273**	
Percent in Pace:	**72.0**	%
Number of Vehicles >50 KPH:	**370**	
Percent of Vehicles >50 KPH:	**97.6**	%
Mean Speed(average):	**71**	KPH

Report-2.2

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **North** Road :

Dates : 1 **5/1/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	**Total**	**Pace Speed**	**Number in Pace**
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**						1									**1**	31.4-51.4	1
0:45	**1:00**																	
OO:OO	**1:00**						1									**1**	31.4-51.4	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**						1									**1**	37.3-57.3	1
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**						1									**1**	37.3-57.3	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**							1								**1**	45.8-65.8	1
5:30	**5:45**																	
5:45	**6:00**																	
5:00	**6:00**							1								**1**	45.8-65.8	
6:00	**6:15**																	
6:15	**6:30**										1					**1**	71.4-91.4	1
6:30	**6:45**							2								**2**	48.1-68.1	2
6:45	**7:00**				1			1								**2**	13.9-33.9	1
6:00	**7:00**				1			3			1					**1**	71.4-91.4	
7:00	**7:15**						1		1	1						**3**	51.5-71.5	2
7:15	**7:30**					1	1									**2**	35.2-55.2	2
7:30	**7:45**							2	1							**3**	52.5-72.5	3
7:45	**8:00**						2	3	2		1					**8**	51.1-71.1	6
7:00	**8:00**					1	4	5	4	1	1					**3**	52.5-72.5	
8:00	**8:15**						2	2	3	3						**10**	56.3-76.3	7
8:15	**8:30**						3	2	1							**6**	54.8-74.8	6
8:30	**8:45**						1	5	2							**8**	56.8-76.8	8
8:45	**9:00**						3	2	6	1						**12**	56.1-76.1	10
8:00	**9:00**						9	11	12	4						**8**	56.8-76.8	
9:00	**9:15**							3								**3**	46.3-66.3	3
9:15	**9:30**							2		2						**4**	65.7-85.7	3
9:30	**9:45**						1	6	1							**8**	52.7-72.7	8
9:45	**10:00**							2	1							**3**	56.3-76.3	3
9:00	**10:00**						1	13	2	2						**4**	65.7-85.7	
10:00	**10:15**					1	2	1								**4**	40.7-60.7	3
10:15	**10:30**						2	1	1							**4**	51.0-71.0	3
10:30	**10:45**					1		1								**2**	24.0-44.0	1
10:45	**11:00**						1	1	1							**3**	43.9-63.9	2
10:00	**11:00**					2	5	4	2							**4**	51.0-71.0	
11:00	**11:15**						2	1	1							**4**	48.4-68.4	3
11:15	**11:30**							1								**1**	47.6-67.6	1
11:30	**11:45**					1	1	1	2							**5**	53.3-73.3	4
11:45	**12:00**						1	1	1	2						**5**	54.0-74.0	3
11:00	**12:00**					1	4	4	4	2						**5**	54.0-74.0	

12:00	**12:15**					1	2				**3**	54.1-74.1	3
12:15	**12:30**				1	1	1	1			**4**	56.0-76.0	3
12:30	**12:45**			1		2					**3**	49.4-69.4	3
12:45	**13:00**				1	1	1	1			**4**	62.8-82.8	3
12:00	**13:00**			1	2	5	4	2			**4**	62.8-82.8	
13:00	**13:15**					3	2				**5**	60.9-80.9	5
13:15	**13:30**					1	1				**2**	55.0-75.0	2
13:30	**13:45**				1	1	2	2			**6**	68.6-88.6	5
13:45	**14:00**					1	2		1		**4**	60.9-80.9	3
13:00	**14:00**				1	6	7	2	1		**6**	68.6-88.6	
14:00	**14:15**				1	3	2				**6**	53.5-73.5	5
14:15	**14:30**				3	1					**4**	46.5-66.5	4
14:30	**14:45**				1	1	5	1			**8**	62.3-82.3	7
14:45	**15:00**				1	1	3				**5**	56.1-76.1	4
14:00	**15:00**				6	6	10	1			**8**	62.3-82.3	
15:00	**15:15**				1	1	2	1			**5**	54.4-74.4	4
15:15	**15:30**					4	4	2			**10**	60.1-80.1	8
15:30	**15:45**				1	2	6	1			**10**	58.1-78.1	9
15:45	**16:00**			1	1	4	4				**10**	57.2-77.2	9
15:00	**16:00**			1	3	11	16	4			**10**	60.1-80.1	
16:00	**16:15**					8	5	1			**14**	60.5-80.5	13
16:15	**16:30**				3	7	3	2			**15**	54.8-74.8	12
16:30	**16:45**				5	10	4	1			**20**	59.7-79.7	16
16:45	**17:00**				1	8	5				**14**	60.0-80.0	13
16:00	**17:00**				9	33	17	4			**14**	60.5-80.5	
17:00	**17:15**					8	10				**18**	61.0-81.0	18
17:15	**17:30**				2	9	7	2			**20**	60.0-80.0	17
17:30	**17:45**					2	8	2			**12**	61.1-81.1	11
17:45	**18:00**			1		6	7	1			**15**	59.9-79.9	13
17:00	**18:00**			1	2	25	32	5			**12**	61.1-81.1	
18:00	**18:15**				1	4	3	1			**9**	59.9-79.9	7
18:15	**18:30**					3	5				**8**	57.7-77.7	8
18:30	**18:45**					6	2	1	1		**10**	57.7-77.7	8
18:45	**19:00**				1	1	3	1	1		**7**	64.0-84.0	5
18:00	**19:00**				2	14	13	3	2		**7**	64.0-84.0	
19:00	**19:15**					3	1				**4**	57.2-77.2	4
19:15	**19:30**				1	3	2		1	1	**8**	54.9-74.9	6
19:30	**19:45**			1		2	1				**4**	56.2-76.2	3
19:45	**20:00**				1	1					**2**	43.9-63.9	2
19:00	**20:00**			1	2	9	4		1	1	**4**	57.2-77.2	
20:00	**20:15**				1						**1**	34.7-54.7	1
20:15	**20:30**							1			**1**	62.1-82.1	1
20:30	**20:45**				1	1					**2**	41.5-61.5	2
20:45	**21:00**				1	2					**3**	48.0-68.0	3
20:00	**21:00**				3	3		1			**1**	62.1-82.1	
21:00	**21:15**												
21:15	**21:30**				2	1	1				**4**	51.2-71.2	4
21:30	**21:45**					1					**1**	48.5-68.5	1
21:45	**22:00**					3	1				**4**	53.4-73.4	4
21:00	**22:00**				2	5	2				**4**	53.4-73.4	
22:00	**22:15**												
22:15	**22:30**												
22:30	**22:45**				1	2					**3**	50.1-70.1	3
22:45	**23:00**												
22:00	**23:00**				1	2					**3**	50.1-70.1	
23:00	**23:15**												
23:15	**23:30**						1				**1**	60.9-80.9	1
23:30	**23:45**												
23:45	**OO:OO**												
23:00	**OO:OO**						1				**1**	60.9-80.9	
Total		**1**	**8**	**58**	**160**	**130**	**31**	**6**	**1**		**395**		
		0.3%	2.0%	14.7%	40.5%	32.9%	7.8%	1.5%	0.3%				
AM PEAK		**1**	**1**	**3**	**6**	**6**	**3**	**1**			**12**		
period		6:45	7:15	8:15	9:30	8:45	8:00	6:15		8:45			
% of class		100.0%	12.5%	5.2%	3.8%	4.6%	9.7%	16.7%				3.0%	
PM PEAK			**1**	**5**	**10**	**10**	**2**	**1**	**1**		**20**		
period			12:30	16:30	16:30	17:00	13:30	13:45	19:15	16:30			
% of class			12.5%	8.6%	6.3%	7.7%	6.5%	16.7%	100.0%			5.1%	

15% Percentile :	**60**	KPH
50% Percentile :	**69**	KPH
85% Percentile :	**79**	KPH
95% Percentile :	**87**	KPH

20 KPH Pace Speed:	**58.1-78.1**	KPH
Number in Pace:	**294**	
Percent in Pace:	**74.4**	%
Number of Vehicles >50 KPH:	**387**	
Percent of Vehicles >50 KPH:	**98.0**	%
Mean Speed(average):	**70**	KPH

Report-2.3

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **South** Road :

Dates : 1 **4/30/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	**Total**	**Pace Speed**	**Number in Pace**
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**								1							**1**	56.2-76.2	1
OO:OO	**1:00**								1							**1**	56.2-76.2	
1:00	**1:15**								1							**1**	51.4-71.4	1
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**								1							**1**	51.4-71.4	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**								1		1					**2**	71.2-91.2	2
5:30	**5:45**							1	1	1	1	1				**5**	76.5-96.5	3
5:45	**6:00**								1							**1**	60.9-80.9	1
5:00	**6:00**							1	3	1	2	1				**5**	76.5-96.5	
6:00	**6:15**							1					1			**2**	48.7-68.7	1
6:15	**6:30**						1	2								**3**	50.8-70.8	3
6:30	**6:45**									4		1				**5**	81.2-101.2	5
6:45	**7:00**																	
6:00	**7:00**						1	3		4		1	1			**5**	81.2-101.2	
7:00	**7:15**						1	1	1	2	1					**6**	60.2-80.2	3
7:15	**7:30**						1	1	1	2	1	1				**7**	76.2-96.2	4
7:30	**7:45**						1		3	6						**10**	70.4-90.4	9
7:45	**8:00**							2	1	5						**8**	66.4-86.4	6
7:00	**8:00**						3	4	6	15	2	1				**7**	76.2-96.2	
8:00	**8:15**							1	4		2					**7**	60.9-80.9	5
8:15	**8:30**						1	1	2	4						**8**	64.3-84.3	6
8:30	**8:45**							1	5							**6**	58.8-78.8	6
8:45	**9:00**							1	1							**2**	56.0-76.0	2
8:00	**9:00**						1	4	12	4	2					**8**	64.3-84.3	
9:00	**9:15**								1	2						**3**	65.0-85.0	3
9:15	**9:30**								3							**3**	56.6-76.6	3
9:30	**9:45**			1				1	1	1						**4**	54.3-74.3	2
9:45	**10:00**								1	1	1					**3**	61.7-81.7	2
9:00	**10:00**			1				1	6	4	1					**3**	65.0-85.0	
10:00	**10:15**								1							**1**	53.1-73.1	1
10:15	**10:30**								1							**1**	59.3-79.3	1
10:30	**10:45**							2								**2**	47.8-67.8	2
10:45	**11:00**							1	2							**3**	55.7-75.7	3
10:00	**11:00**							3	4							**1**	59.3-79.3	
11:00	**11:15**								3							**3**	60.0-80.0	3
11:15	**11:30**			1				1	2							**4**	59.8-79.8	3
11:30	**11:45**							1	2	3						**6**	67.7-87.7	5
11:45	**12:00**							1	1	2	1					**5**	72.3-92.3	4
11:00	**12:00**			1				3	8	5	1					**5**	72.3-92.3	

12:00	**12:15**					1	6	1				**8**	60.8-80.8	7
12:15	**12:30**			1		2	1	1			1	**6**	56.4-76.4	4
12:30	**12:45**					3	1	1	2			**7**	51.1-71.1	4
12:45	**13:00**		1				2					**3**	58.3-78.3	2
12:00	**13:00**		1	1		6	10	3	2		1	**8**	60.8-80.8	
13:00	**13:15**						2	1		1		**4**	67.9-87.9	3
13:15	**13:30**		1				1	1				**3**	61.2-81.2	2
13:30	**13:45**					2		1				**3**	50.9-70.9	2
13:45	**14:00**							1				**1**	69.6-89.6	1
13:00	**14:00**		1			2	3	4		1		**1**	69.6-89.6	
14:00	**14:15**					1	1	2				**4**	61.8-81.8	3
14:15	**14:30**						1	1				**2**	62.9-82.9	2
14:30	**14:45**			1		1		2				**4**	62.7-82.7	3
14:45	**15:00**			4		2	2		1			**9**	42.3-62.3	6
14:00	**15:00**			5		4	4	5	1			**2**	62.9-82.9	
15:00	**15:15**					2		1				**3**	65.5-85.5	3
15:15	**15:30**			1		1		4	1			**7**	74.8-94.8	5
15:30	**15:45**					1	2					**3**	56.2-76.2	3
15:45	**16:00**					3	2	1				**6**	56.3-76.3	5
15:00	**16:00**			1		7	4	6	1			**7**	74.8-94.8	
16:00	**16:15**					1	1		1		1	**4**	54.3-74.3	2
16:15	**16:30**			1		2	2	3				**8**	64.7-84.7	7
16:30	**16:45**					1	5					**6**	60.8-80.8	6
16:45	**17:00**			1		2	1	1				**5**	58.5-78.5	4
16:00	**17:00**			2		6	9	4	1		1	**8**	64.7-84.7	
17:00	**17:15**					3	3	3	1			**10**	54.2-74.2	6
17:15	**17:30**			1		4	6	2				**13**	64.3-84.3	12
17:30	**17:45**						3	1				**4**	63.7-83.7	4
17:45	**18:00**					1	2		1			**4**	57.4-77.4	3
17:00	**18:00**			1		8	14	6	2			**13**	64.3-84.3	
18:00	**18:15**					1	1					**2**	54.8-74.8	2
18:15	**18:30**			1			1					**2**	37.1-57.1	1
18:30	**18:45**						5		1			**6**	59.1-79.1	5
18:45	**19:00**						2	1				**3**	68.7-88.7	3
18:00	**19:00**			1		1	9	1	1			**3**	68.7-88.7	
19:00	**19:15**						3	1				**4**	61.7-81.7	4
19:15	**19:30**						1					**1**	51.2-71.2	1
19:30	**19:45**		1									**1**	30.6-50.6	1
19:45	**20:00**					1						**1**	45.5-65.5	1
19:00	**20:00**		1			1	4	1				**4**	61.7-81.7	
20:00	**20:15**					2	2	2				**6**	56.3-76.3	4
20:15	**20:30**							1				**1**	66.3-86.3	1
20:30	**20:45**								1			**1**	71.6-91.6	1
20:45	**21:00**								1			**1**	72.3-92.3	1
20:00	**21:00**					2	2	3	2			**1**	72.3-92.3	
21:00	**21:15**					1						**1**	50.5-70.5	1
21:15	**21:30**						2					**2**	58.5-78.5	2
21:30	**21:45**					1						**1**	46.0-66.0	1
21:45	**22:00**			1		1						**2**	45.1-65.1	2
21:00	**22:00**			1		3	2					**2**	58.5-78.5	
22:00	**22:15**													
22:15	**22:30**													
22:30	**22:45**			1								**1**	33.2-53.2	1
22:45	**23:00**													
22:00	**23:00**			1								**1**	33.2-53.2	
23:00	**23:15**													
23:15	**23:30**													
23:30	**23:45**													
23:45	**OO:OO**													
23:00	**OO:OO**													
Total		**2**	**3**	**18**	**59**	**102**	**66**	**18**	**4**	**3**		**275**		
		0.7%	1.1%	6.5%	21.5%	37.1%	24.0%	6.5%	1.5%	1.1%				
AM PEAK		**1**		**1**	**2**	**5**	**6**	**2**	**1**	**1**		**10**		
period		9:30		6:15	6:15	8:30	7:30	8:00	5:30	6:00	7:30			
% of class		50.0%		5.6%	3.4%	4.9%	9.1%	11.1%	25.0%	33.3%			3.6%	
PM PEAK			**1**	**4**	**4**	**6**	**4**	**2**	**1**	**1**		**13**		
period			12:45	14:45	17:15	12:00	15:15	12:30	13:00	12:15	17:15			
% of class			33.3%	22.2%	6.8%	5.9%	6.1%	11.1%	25.0%	33.3%			4.7%	

15% Percentile :	**64**	KPH
50% Percentile :	**76**	KPH
85% Percentile :	**89**	KPH
95% Percentile :	**97**	KPH

20 KPH Pace Speed:	**65.7-85.7**	KPH
Number in Pace:	**177**	
Percent in Pace:	**64.4**	%
Number of Vehicles >50 KPH:	**270**	
Percent of Vehicles >50 KPH:	**98.2**	%
Mean Speed(average):	**77**	KPH

Report-2.4

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **South** Road :

Dates : 1 **5/1/2019**

Speeds,km/h ------->		11	11 21	21 31	31 41	41 51	51 61	61 71	71 81	81 91	91 101	101 111	111 121	121 131	131 140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**										1					**1**	71.7-91.7	1
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**										1					**1**	71.7-91.7	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**								1							**1**	51.2-71.2	1
4:00	**5:00**								1							**1**	51.2-71.2	
5:00	**5:15**								1							**1**	55.2-75.2	1
5:15	**5:30**									1						**1**	70.9-90.9	1
5:30	**5:45**							2		1						**3**	66.7-86.7	3
5:45	**6:00**							2	2	1						**5**	60.6-80.6	4
5:00	**6:00**							4	3	3						**1**	70.9-90.9	
6:00	**6:15**							1	1	1						**3**	63.7-83.7	3
6:15	**6:30**							2			1					**3**	48.4-68.4	2
6:30	**6:45**							3	1	2	1					**7**	67.3-87.3	5
6:45	**7:00**							2	2	1	2					**7**	53.0-73.0	4
6:00	**7:00**							8	4	4	4					**7**	67.3-87.3	
7:00	**7:15**								4	3						**7**	66.2-86.2	7
7:15	**7:30**						1	4	3	1						**9**	60.3-80.3	8
7:30	**7:45**						1	2	2	4	3					**12**	75.6-95.6	8
7:45	**8:00**						1		1	3						**5**	69.4-89.4	4
7:00	**8:00**						3	6	10	11	3					**12**	75.6-95.6	
8:00	**8:15**							3	4	2						**9**	61.8-81.8	8
8:15	**8:30**							2	6	1						**9**	57.9-77.9	8
8:30	**8:45**						1	1	3		1					**6**	54.6-74.6	4
8:45	**9:00**							4	2							**6**	56.9-76.9	6
8:00	**9:00**						1	10	15	3	1					**9**	61.8-81.8	
9:00	**9:15**						1	2	1							**4**	49.5-69.5	3
9:15	**9:30**								1							**1**	59.5-79.5	1
9:30	**9:45**							3	1							**4**	51.5-71.5	4
9:45	**10:00**						2	2	1							**5**	57.9-77.9	5
9:00	**10:00**						3	7	4							**1**	59.5-79.5	
10:00	**10:15**							1								**1**	50.1-70.1	1
10:15	**10:30**					1		5		1						**7**	49.6-69.6	5
10:30	**10:45**							1	2							**3**	51.4-71.4	3
10:45	**11:00**						1		1	1						**3**	57.5-77.5	2
10:00	**11:00**					1	1	7	3	2						**3**	57.5-77.5	
11:00	**11:15**							1		1						**2**	66.3-86.3	2
11:15	**11:30**						1	2	1							**4**	54.0-74.0	4
11:30	**11:45**						1									**1**	38.4-58.4	1
11:45	**12:00**						1	2	1		1					**5**	59.5-79.5	4
11:00	**12:00**						3	5	2	1	1					**2**	66.3-86.3	

12:00	**12:15**		1	1	1	2				**5**	57.8-77.8	4
12:15	**12:30**					1		1		**2**	73.1-93.1	2
12:30	**12:45**			2	1	1				**4**	52.6-72.6	4
12:45	**13:00**				2		1			**3**	50.1-70.1	2
12:00	**13:00**		1	3	4	4	1	1		**2**	73.1-93.1	
13:00	**13:15**				1					**1**	49.4-69.4	1
13:15	**13:30**				4	1	1			**6**	56.8-76.8	5
13:30	**13:45**				1	2	1			**4**	59.3-79.3	3
13:45	**14:00**											
13:00	**14:00**				6	3	2			**4**	59.3-79.3	
14:00	**14:15**				3					**3**	47.7-67.7	3
14:15	**14:30**				1					**1**	50.4-70.4	1
14:30	**14:45**			1		2				**3**	52.3-72.3	2
14:45	**15:00**			1	1	2	1			**5**	55.5-75.5	3
14:00	**15:00**			2	5	4	1			**5**	55.5-75.5	
15:00	**15:15**			1	2	1		1		**5**	54.9-74.9	4
15:15	**15:30**					1		1	1	**3**	76.2-96.2	2
15:30	**15:45**			1		3	1			**5**	58.6-78.6	4
15:45	**16:00**			1	2	2	1			**6**	57.7-77.7	5
15:00	**16:00**			3	4	7	2	2	1	**3**	76.2-96.2	
16:00	**16:15**				1	2	2			**5**	65.5-85.5	5
16:15	**16:30**			1	2					**3**	48.1-68.1	3
16:30	**16:45**	1	1	1	2	2			1	**8**	58.9-78.9	5
16:45	**17:00**		1		2	3		1		**7**	60.1-80.1	5
16:00	**17:00**	1	2	2	7	7	2	1	1	**5**	65.5-85.5	
17:00	**17:15**			1	1	2	1	1		**6**	53.0-73.0	4
17:15	**17:30**			1	3	4				**8**	58.1-78.1	8
17:30	**17:45**				2					**2**	48.7-68.7	2
17:45	**18:00**				2					**2**	49.2-69.2	2
17:00	**18:00**			2	8	6	1	1		**8**	58.1-78.1	
18:00	**18:15**											
18:15	**18:30**				2	2	1	1		**6**	56.8-76.8	4
18:30	**18:45**				3	1	2			**6**	67.4-87.4	5
18:45	**19:00**					3				**3**	58.0-78.0	3
18:00	**19:00**				5	6	3	1		**6**	67.4-87.4	
19:00	**19:15**				1	1	1			**3**	62.4-82.4	3
19:15	**19:30**							1		**1**	78.5-98.5	1
19:30	**19:45**				1			1		**2**	49.9-69.9	1
19:45	**20:00**				2					**2**	49.3-69.3	2
19:00	**20:00**				4	1	1	2		**1**	78.5-98.5	
20:00	**20:15**			1	1					**2**	43.3-63.3	2
20:15	**20:30**				1	2				**3**	55.5-75.5	3
20:30	**20:45**				3					**3**	50.1-70.1	3
20:45	**21:00**											
20:00	**21:00**			1	5	2				**3**	55.5-75.5	
21:00	**21:15**			1	1					**2**	43.4-63.4	2
21:15	**21:30**					1				**1**	59.9-79.9	1
21:30	**21:45**					1				**1**	51.6-71.6	1
21:45	**22:00**				2					**2**	41.3-61.3	2
21:00	**22:00**			1	3	2				**1**	59.9-79.9	
22:00	**22:15**				1		1			**2**	42.1-62.1	1
22:15	**22:30**											
22:30	**22:45**					1				**1**	57.3-77.3	1
22:45	**23:00**											
22:00	**23:00**				1	1	1			**1**	57.3-77.3	
23:00	**23:15**											
23:15	**23:30**											
23:30	**23:45**											
23:45	**OO:OO**											
23:00	**OO:OO**											
Total		**1**	**4**	**25**	**99**	**85**	**38**	**18**	**2**	**272**		
		0.4%	1.5%	9.2%	36.4%	31.3%	14.0%	6.6%	0.7%			
AM PEAK			**1**	**2**	**5**	**6**	**4**	**3**		**12**		
period			10:15	9:45	10:15	8:15	7:30	7:30		7:30		
% of class			25.0%	8.0%	5.1%	7.1%	10.5%	16.7%			4.4%	
PM PEAK		**1**	**1**	**2**	**4**	**4**	**2**	**1**	**1**	**8**		
period		16:30	12:00	12:30	13:15	17:15	16:00	12:15	15:15	16:30		
% of class		100.0%	25.0%	8.0%	4.0%	4.7%	5.3%	5.6%	50.0%		2.9%	

15% Percentile :	**62**	KPH
50% Percentile :	**72**	KPH
85% Percentile :	**86**	KPH
95% Percentile :	**95**	KPH

20 KPH Pace Speed:	**58.9-78.9**	KPH
Number in Pace:	**189**	
Percent in Pace:	**69.5**	%
Number of Vehicles >50 KPH:	**267**	
Percent of Vehicles >50 KPH:	**98.2**	%
Mean Speed(average):	**73**	KPH

Report-2.5

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **North + South** Road :

Dates : 1 **4/30/2019**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**							1								**1**	56.2-76.2	1
OO:OO	**1:00**							1								**1**	56.2-76.2	
1:00	**1:15**							1								**1**	51.4-71.4	1
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**							1								**1**	51.4-71.4	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**																	
5:00	**5:15**																	
5:15	**5:30**							2		1						**3**	71.2-91.2	3
5:30	**5:45**						2	1	1	1	1					**6**	59.9-79.9	3
5:45	**6:00**							2								**2**	60.9-80.9	2
5:00	**6:00**						2	5	1	2	1					**3**	71.2-91.2	
6:00	**6:15**						1					1				**2**	48.7-68.7	1
6:15	**6:30**					1	2									**3**	50.8-70.8	3
6:30	**6:45**					3			4		1					**8**	81.2-101.2	5
6:45	**7:00**						1									**1**	44.4-64.4	1
6:00	**7:00**					4	4		4		1	1				**8**	81.2-101.2	
7:00	**7:15**					1	2	2	2	1						**8**	60.2-80.2	5
7:15	**7:30**				1	1	1	3	3	1	1					**11**	65.3-85.3	6
7:30	**7:45**					1	2	4	7	1						**15**	69.1-89.1	11
7:45	**8:00**					1	3	3	6							**13**	66.4-86.4	9
7:00	**8:00**				1	4	8	12	18	3	1					**15**	69.1-89.1	
8:00	**8:15**					1	5	6		2						**14**	60.9-80.9	11
8:15	**8:30**					3	1	6	4							**14**	64.3-84.3	10
8:30	**8:45**						3	9	4							**16**	68.5-88.5	14
8:45	**9:00**				1	2	4	1								**8**	49.3-69.3	7
8:00	**9:00**				1	6	13	22	8	2						**16**	68.5-88.5	
9:00	**9:15**				1	1	1	2	3							**8**	65.5-85.5	6
9:15	**9:30**						3	3	1							**7**	56.6-76.6	6
9:30	**9:45**			1			1	2	1							**5**	56.4-76.4	3
9:45	**10:00**					1	2	2	2	1						**8**	61.7-81.7	6
9:00	**10:00**			1	1	2	7	9	7	1						**8**	65.5-85.5	
10:00	**10:15**						1	3	1							**5**	63.2-83.2	5
10:15	**10:30**					1		2								**3**	53.2-73.2	2
10:30	**10:45**						2									**2**	47.8-67.8	2
10:45	**11:00**					1	3	4	1							**9**	55.7-75.7	7
10:00	**11:00**					2	6	9	2							**5**	63.2-83.2	
11:00	**11:15**					1		5								**6**	60.0-80.0	5
11:15	**11:30**			1		1	1	3								**6**	59.8-79.8	4
11:30	**11:45**				1	2	3	2	4							**12**	56.8-76.8	7
11:45	**12:00**						2	2	3	1						**8**	63.8-83.8	6
11:00	**12:00**			1	1	4	6	12	7	1						**8**	63.8-83.8	

12:00	**12:15**						1	6	1				**8**	60.8-80.8	7
12:15	**12:30**			1	1		3	3	2			1	**11**	64.9-84.9	8
12:30	**12:45**						4	2	1	2			**9**	60.1-80.1	6
12:45	**13:00**			1			1	2					**4**	58.3-78.3	3
12:00	**13:00**			2	1		9	13	4	2		1	**11**	64.9-84.9	
13:00	**13:15**				1		1	6	1		1		**10**	56.4-76.4	8
13:15	**13:30**			1			2	3	1				**7**	61.2-81.2	6
13:30	**13:45**				1		4	1	1				**7**	52.3-72.3	6
13:45	**14:00**						1	2	1				**4**	57.1-77.1	3
13:00	**14:00**			1	2		8	12	4		1		**7**	61.2-81.2	
14:00	**14:15**						5	2	3				**10**	61.8-81.8	8
14:15	**14:30**				1		2	1	2				**6**	56.3-76.3	4
14:30	**14:45**				1		2	3	2				**8**	62.7-82.7	7
14:45	**15:00**			1	6		6	4		1			**18**	46.3-66.3	13
14:00	**15:00**			1	8		15	10	7	1			**8**	62.7-82.7	
15:00	**15:15**				1		2		4				**7**	67.4-87.4	6
15:15	**15:30**				2		4	3	5	1			**15**	66.8-86.8	11
15:30	**15:45**				2		4	10	1				**17**	54.8-74.8	14
15:45	**16:00**				1		9	10	3				**23**	56.8-76.8	20
15:00	**16:00**				6		19	23	13	1			**7**	67.4-87.4	
16:00	**16:15**						6	5		1		1	**13**	58.4-78.4	11
16:15	**16:30**			1	2		8	5	5		2		**23**	56.6-76.6	14
16:30	**16:45**						4	13	3	1			**21**	61.7-81.7	18
16:45	**17:00**				5		9	7	1				**22**	54.4-74.4	18
16:00	**17:00**			1	7		27	30	9	2	2	1	**21**	61.7-81.7	
17:00	**17:15**						13	7	5	1			**26**	61.9-81.9	21
17:15	**17:30**				1		6	13	3				**23**	64.3-84.3	22
17:30	**17:45**				2		6	10	5	3			**26**	65.0-85.0	21
17:45	**18:00**				4		9	8	1	1			**23**	56.5-76.5	19
17:00	**18:00**				7		34	38	14	5			**26**	65.0-85.0	
18:00	**18:15**				2		6	4	1				**13**	56.4-76.4	11
18:15	**18:30**	1		1	3		2	1	1				**9**	43.9-63.9	6
18:30	**18:45**				1		4	11	1	1			**18**	63.1-83.1	16
18:45	**19:00**			1			5	5	2				**13**	60.9-80.9	10
18:00	**19:00**	1		2	6		17	21	5	1			**18**	63.1-83.1	
19:00	**19:15**						2	5	2				**9**	61.7-81.7	8
19:15	**19:30**				1		1	3					**5**	51.5-71.5	4
19:30	**19:45**			1	1		2	3					**7**	58.3-78.3	6
19:45	**20:00**						2						**2**	46.6-66.6	2
19:00	**20:00**			1	2		7	11	2				**9**	61.7-81.7	
20:00	**20:15**						4	2	2				**8**	56.3-76.3	6
20:15	**20:30**								1				**1**	66.3-86.3	1
20:30	**20:45**						1			1			**2**	42.2-62.2	1
20:45	**21:00**									1			**1**	72.3-92.3	1
20:00	**21:00**						5	2	3	2			**1**	72.3-92.3	
21:00	**21:15**						2						**2**	51.0-71.0	2
21:15	**21:30**				1		1	2					**4**	58.5-78.5	4
21:30	**21:45**						1	3					**4**	58.3-78.3	4
21:45	**22:00**				1		2						**3**	45.3-65.3	3
21:00	**22:00**				2		6	5					**4**	58.5-78.5	
22:00	**22:15**							1					**1**	57.8-77.8	1
22:15	**22:30**									1			**1**	72.2-92.2	1
22:30	**22:45**				1		1						**2**	44.0-64.0	2
22:45	**23:00**														
22:00	**23:00**				1		1	1		1			**1**	72.2-92.2	
23:00	**23:15**						1						**1**	43.8-63.8	1
23:15	**23:30**						2						**2**	48.7-68.7	2
23:30	**23:45**														
23:45	**OO:OO**														
23:00	**OO:OO**						3						**2**	48.7-68.7	
Total		**1**	**2**	**12**	**64**	**197**	**237**	**108**	**24**	**6**	**3**		**654**		
		0.2%	0.3%	1.8%	9.8%	30.1%	36.2%	16.5%	3.7%	0.9%	0.5%				
AM PEAK			**1**	**1**	**3**	**5**	**9**	**7**	**2**	**1**	**1**		**16**		
period			9:30	7:15	6:30	8:00	8:30	7:30	8:00	5:30	6:00	8:30			
% of class			50.0%	8.3%	4.7%	2.5%	3.8%	6.5%	8.3%	16.7%	33.3%			2.4%	
PM PEAK		**1**		**1**	**6**	**13**	**13**	**5**	**3**	**2**	**1**		**26**		
period		18:15		12:15	14:45	17:00	16:30	15:15	17:30	16:15	12:15	17:00			
% of class		100.0%		8.3%	9.4%	6.6%	5.5%	4.6%	12.5%	33.3%	33.3%			4.0%	

15% Percentile :	**62**	KPH
50% Percentile :	**73**	KPH
85% Percentile :	**85**	KPH
95% Percentile :	**91**	KPH

20 KPH Pace Speed:	**61.9-81.9**	KPH
Number in Pace:	**442**	
Percent in Pace:	**67.6**	%
Number of Vehicles >50 KPH:	**640**	
Percent of Vehicles >50 KPH:	**97.9**	%
Mean Speed(average):	**73**	KPH

Report-2.6

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Direction : **North + South** Road :

Dates : 1 **5/1/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**										1					**1**	71.7-91.7	1
0:30	**0:45**						1									**1**	31.4-51.4	1
0:45	**1:00**																	
OO:OO	**1:00**						1				1					**1**	71.7-91.7	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**																	
2:00	**2:15**						1									**1**	37.3-57.3	1
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**						1									**1**	37.3-57.3	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**																	
4:30	**4:45**																	
4:45	**5:00**								1							**1**	51.2-71.2	1
4:00	**5:00**								1							**1**	51.2-71.2	
5:00	**5:15**								1							**1**	55.2-75.2	1
5:15	**5:30**							1		1						**2**	45.8-65.8	1
5:30	**5:45**							2		1						**3**	66.7-86.7	3
5:45	**6:00**							2	2	1						**5**	60.6-80.6	4
5:00	**6:00**							5	3	3						**3**	66.7-86.7	
6:00	**6:15**							1	1	1						**3**	63.7-83.7	3
6:15	**6:30**							2			2					**4**	48.4-68.4	2
6:30	**6:45**							5	1	2	1					**9**	53.2-73.2	6
6:45	**7:00**				1			3	2	1	2					**9**	53.0-73.0	5
6:00	**7:00**				1			11	4	4	5					**3**	63.7-83.7	
7:00	**7:15**						1		5	4						**10**	66.2-86.2	9
7:15	**7:30**					1	2	4	3	1						**11**	60.3-80.3	8
7:30	**7:45**						1	4	3	4	3					**15**	64.6-84.6	10
7:45	**8:00**						3	3	3	3	1					**13**	52.4-72.4	8
7:00	**8:00**					1	7	11	14	12	4					**10**	66.2-86.2	
8:00	**8:15**						2	5	7	5						**19**	58.2-78.2	14
8:15	**8:30**						3	4	7	1						**15**	57.9-77.9	14
8:30	**8:45**						2	6	5		1					**14**	56.8-76.8	12
8:45	**9:00**						3	6	8	1						**18**	56.9-76.9	16
8:00	**9:00**						10	21	27	7	1					**19**	58.2-78.2	
9:00	**9:15**						1	5	1							**7**	49.5-69.5	6
9:15	**9:30**							2	1	2						**5**	65.7-85.7	4
9:30	**9:45**						1	9	2							**12**	52.7-72.7	12
9:45	**10:00**						2	4	2							**8**	57.9-77.9	8
9:00	**10:00**						4	20	6	2						**5**	65.7-85.7	
10:00	**10:15**					1	2	2								**5**	50.1-70.1	4
10:15	**10:30**					1	2	6	1	1						**11**	51.0-71.0	8
10:30	**10:45**					1		2	2							**5**	51.4-71.4	4
10:45	**11:00**						2	1	2	1						**6**	57.5-77.5	4
10:00	**11:00**					3	6	11	5	2						**6**	57.5-77.5	
11:00	**11:15**						2	2	1	1						**6**	48.4-68.4	4
11:15	**11:30**						1	3	1							**5**	54.0-74.0	5
11:30	**11:45**					1	2	1	2							**6**	53.3-73.3	5
11:45	**12:00**						2	3	2	2	1					**10**	54.0-74.0	6
11:00	**12:00**					1	7	9	6	3	1					**5**	54.0-74.0	

12:00	**12:15**			1	1	2	4				**8**	57.8-77.8	7
12:15	**12:30**				1	1	2	1	1		**6**	73.1-93.1	4
12:30	**12:45**			1	2	3	1				**7**	49.4-69.4	6
12:45	**13:00**				1	3	1	2			**7**	50.1-70.1	4
12:00	**13:00**			2	5	9	8	3	1		**6**	73.1-93.1	
13:00	**13:15**					4	2				**6**	60.9-80.9	6
13:15	**13:30**					5	2	1			**8**	56.8-76.8	7
13:30	**13:45**				1	2	4	3			**10**	70.3-90.3	8
13:45	**14:00**					1	2		1		**4**	60.9-80.9	3
13:00	**14:00**				1	12	10	4	1		**10**	70.3-90.3	
14:00	**14:15**				1	6	2				**9**	53.5-73.5	8
14:15	**14:30**				3	2					**5**	50.4-70.4	5
14:30	**14:45**				2	1	7	1			**11**	62.3-82.3	9
14:45	**15:00**				2	2	5	1			**10**	56.1-76.1	7
14:00	**15:00**				8	11	14	2			**11**	62.3-82.3	
15:00	**15:15**				2	3	3	1	1		**10**	54.9-74.9	8
15:15	**15:30**					4	5	2	1	1	**13**	60.1-80.1	9
15:30	**15:45**				2	2	9	2			**15**	58.6-78.6	13
15:45	**16:00**			1	2	6	6	1			**16**	57.7-77.7	14
15:00	**16:00**			1	6	15	23	6	2	1	**13**	60.1-80.1	
16:00	**16:15**					9	7	3			**19**	60.5-80.5	16
16:15	**16:30**				4	9	3	2			**18**	54.8-74.8	15
16:30	**16:45**	1		1	6	12	6	1		1	**28**	58.9-78.9	20
16:45	**17:00**			1	1	10	8		1		**21**	60.1-80.1	18
16:00	**17:00**	1		2	11	40	24	6	1	1	**19**	60.5-80.5	
17:00	**17:15**				1	9	12	1	1		**24**	58.0-78.0	21
17:15	**17:30**				3	12	11	2			**28**	58.2-78.2	24
17:30	**17:45**					4	8	2			**14**	61.1-81.1	13
17:45	**18:00**			1		8	7	1			**17**	59.9-79.9	15
17:00	**18:00**			1	4	33	38	6	1		**14**	61.1-81.1	
18:00	**18:15**				1	4	3	1			**9**	59.9-79.9	7
18:15	**18:30**					5	7	1	1		**14**	57.7-77.7	12
18:30	**18:45**					9	3	3	1		**16**	57.7-77.7	12
18:45	**19:00**				1	1	6	1	1		**10**	64.0-84.0	8
18:00	**19:00**				2	19	19	6	3		**10**	64.0-84.0	
19:00	**19:15**					4	2	1			**7**	62.4-82.4	7
19:15	**19:30**				1	3	2		2	1	**9**	54.9-74.9	6
19:30	**19:45**			1		3	1		1		**6**	56.2-76.2	4
19:45	**20:00**				1	3					**4**	49.3-69.3	4
19:00	**20:00**			1	2	13	5	1	3	1	**7**	62.4-82.4	
20:00	**20:15**				2	1					**3**	43.3-63.3	3
20:15	**20:30**					1	2	1			**4**	62.1-82.1	4
20:30	**20:45**				1	4					**5**	50.1-70.1	5
20:45	**21:00**				1	2					**3**	48.0-68.0	3
20:00	**21:00**				4	8	2	1			**4**	62.1-82.1	
21:00	**21:15**				1	1					**2**	43.4-63.4	2
21:15	**21:30**				2	1	2				**5**	51.2-71.2	4
21:30	**21:45**					1	1				**2**	51.6-71.6	2
21:45	**22:00**					5	1				**6**	53.4-73.4	6
21:00	**22:00**				3	8	4				**6**	53.4-73.4	
22:00	**22:15**					1		1			**2**	42.1-62.1	1
22:15	**22:30**												
22:30	**22:45**				1	2	1				**4**	50.1-70.1	3
22:45	**23:00**												
22:00	**23:00**				1	3	1	1			**4**	50.1-70.1	
23:00	**23:15**												
23:15	**23:30**						1				**1**	60.9-80.9	1
23:30	**23:45**												
23:45	**OO:OO**												
23:00	**OO:OO**						1				**1**	60.9-80.9	
Total		**1**	**1**	**12**	**83**	**259**	**215**	**69**	**24**	**3**	**667**		
		0.1%	0.1%	1.8%	12.4%	38.8%	32.2%	10.3%	3.6%	0.4%			
AM PEAK			**1**	**1**	**3**	**9**	**8**	**5**	**3**		**19**		
period			6:45	7:15	7:45	9:30	8:45	8:00	7:30		8:00		
% of class			100.0%	8.3%	3.6%	3.5%	3.7%	7.2%	12.5%			2.8%	
PM PEAK		**1**		**1**	**6**	**12**	**12**	**3**	**2**	**1**	**28**		
period		16:30		12:00	16:30	16:30	17:00	13:30	19:15	15:15	16:30		
% of class		100.0%		8.3%	7.2%	4.6%	5.6%	4.3%	8.3%	33.3%		4.2%	

15% Percentile :	**61**	KPH
50% Percentile :	**70**	KPH
85% Percentile :	**81**	KPH
95% Percentile :	**90**	KPH

20 KPH Pace Speed:	**58.9-78.9**	KPH
Number in Pace:	**480**	
Percent in Pace:	**72.0**	%
Number of Vehicles >50 KPH:	**654**	
Percent of Vehicles >50 KPH:	**98.1**	%
Mean Speed(average):	**71**	KPH

Report-3.1

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Road :

Dates : **4/30/2019**

Directions ---------->		North Volume	North %	South Volume	South %	East Volume	East %	West Volume	West %	Total Volume	Total %
00:00	0:15										
0:15	0:30										
0:30	0:45										
0:45	1:00			1	0.4%					1	0.2%
00:00	1:00			1	0.4%					1	0.2%
1:00	1:15			1	0.4%					1	0.2%
1:15	1:30										
1:30	1:45										
1:45	2:00										
1:00	2:00			1	0.4%					1	0.2%
2:00	2:15										
2:15	2:30										
2:30	2:45										
2:45	3:00										
2:00	3:00										
3:00	3:15										
3:15	3:30										
3:30	3:45										
3:45	4:00										
3:00	4:00										
4:00	4:15										
4:15	4:30										
4:30	4:45										
4:45	5:00										
4:00	5:00										
5:00	5:15										
5:15	5:30	1	0.3%	2	0.7%					3	0.5%
5:30	5:45	1	0.3%	5	1.8%					6	0.9%
5:45	6:00	1	0.3%	1	0.4%					2	0.3%
5:00	6:00	3	0.8%	8	2.9%					11	1.7%
6:00	6:15			2	0.7%					2	0.3%
6:15	6:30			3	1.1%					3	0.5%
6:30	6:45	3	0.8%	5	1.8%					8	1.2%
6:45	7:00	1	0.3%							1	0.2%
6:00	7:00	4	1.1%	10	3.6%					14	2.1%
7:00	7:15	2	0.5%	6	2.2%					8	1.2%
7:15	7:30	4	1.1%	7	2.5%					11	1.7%
7:30	7:45	5	1.3%	10	3.6%					15	2.3%
7:45	8:00	5	1.3%	8	2.9%					13	2.0%
7:00	8:00	16	4.2%	31	11.3%					47	7.2%
8:00	8:15	7	1.8%	7	2.5%					14	2.1%
8:15	8:30	6	1.6%	8	2.9%					14	2.1%
8:30	8:45	10	2.6%	6	2.2%					16	2.4%
8:45	9:00	6	1.6%	2	0.7%					8	1.2%
8:00	9:00	29	7.7%	23	8.4%					52	8.0%
9:00	9:15	5	1.3%	3	1.1%					8	1.2%
9:15	9:30	4	1.1%	3	1.1%					7	1.1%
9:30	9:45	1	0.3%	4	1.5%					5	0.8%
9:45	10:00	5	1.3%	3	1.1%					8	1.2%
9:00	10:00	15	4.0%	13	4.7%					28	4.3%
10:00	10:15	4	1.1%	1	0.4%					5	0.8%
10:15	10:30	2	0.5%	1	0.4%					3	0.5%
10:30	10:45			2	0.7%					2	0.3%
10:45	11:00	6	1.6%	3	1.1%					9	1.4%
10:00	11:00	12	3.2%	7	2.5%					19	2.9%
11:00	11:15	3	0.8%	3	1.1%					6	0.9%
11:15	11:30	2	0.5%	4	1.5%					6	0.9%
11:30	11:45	6	1.6%	6	2.2%					12	1.8%
11:45	12:00	3	0.8%	5	1.8%					8	1.2%
11:00	12:00	14	3.7%	18	6.5%					32	4.9%

12:00	12:15			8	2.9%			8	1.2%
12:15	12:30	5	1.3%	6	2.2%			11	1.7%
12:30	12:45	2	0.5%	7	2.5%			9	1.4%
12:45	13:00	1	0.3%	3	1.1%			4	0.6%
12:00	13:00	8	2.1%	24	8.7%			32	4.9%
13:00	13:15	6	1.6%	4	1.5%			10	1.5%
13:15	13:30	4	1.1%	3	1.1%			7	1.1%
13:30	13:45	4	1.1%	3	1.1%			7	1.1%
13:45	14:00	3	0.8%	1	0.4%			4	0.6%
13:00	14:00	17	4.5%	11	4.0%			28	4.3%
14:00	14:15	6	1.6%	4	1.5%			10	1.5%
14:15	14:30	4	1.1%	2	0.7%			6	0.9%
14:30	14:45	4	1.1%	4	1.5%			8	1.2%
14:45	15:00	9	2.4%	9	3.3%			18	2.8%
14:00	15:00	23	6.1%	19	6.9%			42	6.4%
15:00	15:15	4	1.1%	3	1.1%			7	1.1%
15:15	15:30	8	2.1%	7	2.5%			15	2.3%
15:30	15:45	14	3.7%	3	1.1%			17	2.6%
15:45	16:00	17	4.5%	6	2.2%			23	3.5%
15:00	16:00	43	11.3%	19	6.9%			62	9.5%
16:00	16:15	9	2.4%	4	1.5%			13	2.0%
16:15	16:30	15	4.0%	8	2.9%			23	3.5%
16:30	16:45	15	4.0%	6	2.2%			21	3.2%
16:45	17:00	17	4.5%	5	1.8%			22	3.4%
16:00	17:00	56	14.8%	23	8.4%			79	12.1%
17:00	17:15	16	4.2%	10	3.6%			26	4.0%
17:15	17:30	10	2.6%	13	4.7%			23	3.5%
17:30	17:45	22	5.8%	4	1.5%			26	4.0%
17:45	18:00	19	5.0%	4	1.5%			23	3.5%
17:00	18:00	67	17.7%	31	11.3%			98	15.0%
18:00	18:15	11	2.9%	2	0.7%			13	2.0%
18:15	18:30	7	1.8%	2	0.7%			9	1.4%
18:30	18:45	12	3.2%	6	2.2%			18	2.8%
18:45	19:00	10	2.6%	3	1.1%			13	2.0%
18:00	19:00	40	10.6%	13	4.7%			53	8.1%
19:00	19:15	5	1.3%	4	1.5%			9	1.4%
19:15	19:30	4	1.1%	1	0.4%			5	0.8%
19:30	19:45	6	1.6%	1	0.4%			7	1.1%
19:45	20:00	1	0.3%	1	0.4%			2	0.3%
19:00	20:00	16	4.2%	7	2.5%			23	3.5%
20:00	20:15	2	0.5%	6	2.2%			8	1.2%
20:15	20:30			1	0.4%			1	0.2%
20:30	20:45	1	0.3%	1	0.4%			2	0.3%
20:45	21:00			1	0.4%			1	0.2%
20:00	21:00	3	0.8%	9	3.3%			12	1.8%
21:00	21:15	1	0.3%	1	0.4%			2	0.3%
21:15	21:30	2	0.5%	2	0.7%			4	0.6%
21:30	21:45	3	0.8%	1	0.4%			4	0.6%
21:45	22:00	1	0.3%	2	0.7%			3	0.5%
21:00	22:00	7	1.8%	6	2.2%			13	2.0%
22:00	22:15	1	0.3%					1	0.2%
22:15	22:30	1	0.3%					1	0.2%
22:30	22:45	1	0.3%	1	0.4%			2	0.3%
22:45	23:00								
22:00	23:00	3	0.8%	1	0.4%			4	0.6%
23:00	23:15	1	0.3%					1	0.2%
23:15	23:30	2	0.5%					2	0.3%
23:30	23:45								
23:45	OO:OO								
23:00	OO:OO	3	0.8%					3	0.5%
Total		379		275				654	100.0%
		58.0%		42.0%				100.0%	
AM PEAK		10		10				16	
period		8:30		7:30				8:30	
% of class			2.6%		3.6%				2.4%
PM PEAK		22		13				26	
period		17:30		17:15				17:00	
% of class			5.8%		4.7%				4.0%

Report-3.2

Location : **CW-21NS** **Guelph St - 500m N of Second Line**

Road :

Dates : **5/1/2019**

Directions ---------->		North Volume	North %	South Volume	South %	East Volume	East %	West Volume	West %	Total Volume	Total %
00:00	0:15										
0:15	0:30			1	0.4%					1	0.1%
0:30	0:45	1	0.3%							1	0.1%
0:45	1:00										
00:00	1:00	1	0.3%	1	0.4%					2	0.3%
1:00	1:15										
1:15	1:30										
1:30	1:45										
1:45	2:00										
1:00	2:00										
2:00	2:15	1	0.3%							1	0.1%
2:15	2:30										
2:30	2:45										
2:45	3:00										
2:00	3:00	1	0.3%							1	0.1%
3:00	3:15										
3:15	3:30										
3:30	3:45										
3:45	4:00										
3:00	4:00										
4:00	4:15										
4:15	4:30										
4:30	4:45										
4:45	5:00			1	0.4%					1	0.1%
4:00	5:00			1	0.4%					1	0.1%
5:00	5:15			1	0.4%					1	0.1%
5:15	5:30	1	0.3%	1	0.4%					2	0.3%
5:30	5:45			3	1.1%					3	0.4%
5:45	6:00			5	1.8%					5	0.7%
5:00	6:00	1	0.3%	10	3.7%					11	1.6%
6:00	6:15			3	1.1%					3	0.4%
6:15	6:30	1	0.3%	3	1.1%					4	0.6%
6:30	6:45	2	0.5%	7	2.6%					9	1.3%
6:45	7:00	2	0.5%	7	2.6%					9	1.3%
6:00	7:00	5	1.3%	20	7.4%					25	3.7%
7:00	7:15	3	0.8%	7	2.6%					10	1.5%
7:15	7:30	2	0.5%	9	3.3%					11	1.6%
7:30	7:45	3	0.8%	12	4.4%					15	2.2%
7:45	8:00	8	2.0%	5	1.8%					13	1.9%
7:00	8:00	16	4.1%	33	12.1%					49	7.3%
8:00	8:15	10	2.5%	9	3.3%					19	2.8%
8:15	8:30	6	1.5%	9	3.3%					15	2.2%
8:30	8:45	8	2.0%	6	2.2%					14	2.1%
8:45	9:00	12	3.0%	6	2.2%					18	2.7%
8:00	9:00	36	9.1%	30	11.0%					66	9.9%
9:00	9:15	3	0.8%	4	1.5%					7	1.0%
9:15	9:30	4	1.0%	1	0.4%					5	0.7%
9:30	9:45	8	2.0%	4	1.5%					12	1.8%
9:45	10:00	3	0.8%	5	1.8%					8	1.2%
9:00	10:00	18	4.6%	14	5.1%					32	4.8%
10:00	10:15	4	1.0%	1	0.4%					5	0.7%
10:15	10:30	4	1.0%	7	2.6%					11	1.6%
10:30	10:45	2	0.5%	3	1.1%					5	0.7%
10:45	11:00	3	0.8%	3	1.1%					6	0.9%
10:00	11:00	13	3.3%	14	5.1%					27	4.0%
11:00	11:15	4	1.0%	2	0.7%					6	0.9%
11:15	11:30	1	0.3%	4	1.5%					5	0.7%
11:30	11:45	5	1.3%	1	0.4%					6	0.9%
11:45	12:00	5	1.3%	5	1.8%					10	1.5%
11:00	12:00	15	3.8%	12	4.4%					27	4.0%

12:00	12:15	3	0.8%	5	1.8%			8	1.2%
12:15	12:30	4	1.0%	2	0.7%			6	0.9%
12:30	12:45	3	0.8%	4	1.5%			7	1.0%
12:45	13:00	4	1.0%	3	1.1%			7	1.0%
12:00	13:00	14	3.5%	14	5.1%			28	4.2%
13:00	13:15	5	1.3%	1	0.4%			6	0.9%
13:15	13:30	2	0.5%	6	2.2%			8	1.2%
13:30	13:45	6	1.5%	4	1.5%			10	1.5%
13:45	14:00	4	1.0%					4	0.6%
13:00	14:00	17	4.3%	11	4.0%			28	4.2%
14:00	14:15	6	1.5%	3	1.1%			9	1.3%
14:15	14:30	4	1.0%	1	0.4%			5	0.7%
14:30	14:45	8	2.0%	3	1.1%			11	1.6%
14:45	15:00	5	1.3%	5	1.8%			10	1.5%
14:00	15:00	23	5.8%	12	4.4%			35	5.2%
15:00	15:15	5	1.3%	5	1.8%			10	1.5%
15:15	15:30	10	2.5%	3	1.1%			13	1.9%
15:30	15:45	10	2.5%	5	1.8%			15	2.2%
15:45	16:00	10	2.5%	6	2.2%			16	2.4%
15:00	16:00	35	8.9%	19	7.0%			54	8.1%
16:00	16:15	14	3.5%	5	1.8%			19	2.8%
16:15	16:30	15	3.8%	3	1.1%			18	2.7%
16:30	16:45	20	5.1%	8	2.9%			28	4.2%
16:45	17:00	14	3.5%	7	2.6%			21	3.1%
16:00	17:00	63	15.9%	23	8.5%			86	12.9%
17:00	17:15	18	4.6%	6	2.2%			24	3.6%
17:15	17:30	20	5.1%	8	2.9%			28	4.2%
17:30	17:45	12	3.0%	2	0.7%			14	2.1%
17:45	18:00	15	3.8%	2	0.7%			17	2.5%
17:00	18:00	65	16.5%	18	6.6%			83	12.4%
18:00	18:15	9	2.3%					9	1.3%
18:15	18:30	8	2.0%	6	2.2%			14	2.1%
18:30	18:45	10	2.5%	6	2.2%			16	2.4%
18:45	19:00	7	1.8%	3	1.1%			10	1.5%
18:00	19:00	34	8.6%	15	5.5%			49	7.3%
19:00	19:15	4	1.0%	3	1.1%			7	1.0%
19:15	19:30	8	2.0%	1	0.4%			9	1.3%
19:30	19:45	4	1.0%	2	0.7%			6	0.9%
19:45	20:00	2	0.5%	2	0.7%			4	0.6%
19:00	20:00	18	4.6%	8	2.9%			26	3.9%
20:00	20:15	1	0.3%	2	0.7%			3	0.4%
20:15	20:30	1	0.3%	3	1.1%			4	0.6%
20:30	20:45	2	0.5%	3	1.1%			5	0.7%
20:45	21:00	3	0.8%					3	0.4%
20:00	21:00	7	1.8%	8	2.9%			15	2.2%
21:00	21:15			2	0.7%			2	0.3%
21:15	21:30	4	1.0%	1	0.4%			5	0.7%
21:30	21:45	1	0.3%	1	0.4%			2	0.3%
21:45	22:00	4	1.0%	2	0.7%			6	0.9%
21:00	22:00	9	2.3%	6	2.2%			15	2.2%
22:00	22:15			2	0.7%			2	0.3%
22:15	22:30								
22:30	22:45	3	0.8%	1	0.4%			4	0.6%
22:45	23:00								
22:00	23:00	3	0.8%	3	1.1%			6	0.9%
23:00	23:15								
23:15	23:30	1	0.3%					1	0.1%
23:30	23:45								
23:45	OO:OO								
23:00	OO:OO	1	0.3%					1	0.1%
Total		395		272				667	100.0%
		59.2%		40.8%				100.0%	
AM PEAK		12		12				19	
period		8:45		7:30				8:00	
% of class			3.0%		4.4%				2.8%
PM PEAK		20		8				28	
period		16:30		16:30				16:30	
% of class			5.1%		2.9%				4.2%

Report-1.1

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **North** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
00:00	**0:15**		1												**1**	0.1%
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
00:00	**1:00**		1												**1**	0.1%
1:00	**1:15**															
1:15	**1:30**		1												**1**	0.1%
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**		1												**1**	0.1%
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**		1												**1**	0.1%
2:45	**3:00**															
2:00	**3:00**		1												**1**	0.1%
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**															
4:15	**4:30**			1											**1**	0.1%
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**			1											**1**	0.1%
5:00	**5:15**		1												**1**	0.1%
5:15	**5:30**															
5:30	**5:45**		3				1								**4**	0.5%
5:45	**6:00**			1											**1**	0.1%
5:00	**6:00**		4	1			1								**6**	0.7%
6:00	**6:15**		3												**3**	0.4%
6:15	**6:30**		1	1											**2**	0.2%
6:30	**6:45**		4						1						**5**	0.6%
6:45	**7:00**		2	2											**4**	0.5%
6:00	**7:00**		10	3					1						**14**	1.7%
7:00	**7:15**		4	1											**5**	0.6%
7:15	**7:30**		4	4											**8**	1.0%
7:30	**7:45**		4	5		2									**11**	1.3%
7:45	**8:00**		6	5											**11**	1.3%
7:00	**8:00**		18	15		2									**35**	4.2%
8:00	**8:15**		5	5											**10**	1.2%
8:15	**8:30**		20	3											**23**	2.7%
8:30	**8:45**		6	4	1										**11**	1.3%
8:45	**9:00**		10	4											**14**	1.7%
8:00	**9:00**		41	16	1										**58**	6.9%
9:00	**9:15**		8	5		1									**14**	1.7%
9:15	**9:30**		5	3											**8**	1.0%
9:30	**9:45**		6	4											**10**	1.2%
9:45	**10:00**		8	4		3									**15**	1.8%
9:00	**10:00**		27	16		4									**47**	5.6%
10:00	**10:15**		7	2											**9**	1.1%
10:15	**10:30**		6	1						1					**8**	1.0%
10:30	**10:45**		4	4											**8**	1.0%
10:45	**11:00**			3											**3**	0.4%
10:00	**11:00**		17	10						1					**28**	3.3%
11:00	**11:15**		7	4											**11**	1.3%
11:15	**11:30**		5	2		1									**8**	1.0%
11:30	**11:45**	1	5	1		1									**8**	1.0%
11:45	**12:00**		3	3											**6**	0.7%
11:00	**12:00**	1	20	10		2									**33**	3.9%

12:00	**12:15**		7	1			1			**9**	1.1%
12:15	**12:30**		7	2						**9**	1.1%
12:30	**12:45**		13	2						**15**	1.8%
12:45	**13:00**		5	2						**7**	0.8%
12:00	**13:00**		32	7			1			**40**	4.8%
13:00	**13:15**		8	1						**9**	1.1%
13:15	**13:30**		3	2						**5**	0.6%
13:30	**13:45**		9	3						**12**	1.4%
13:45	**14:00**		8	4			1			**13**	1.6%
13:00	**14:00**		28	10			1			**39**	4.7%
14:00	**14:15**		6	4						**10**	1.2%
14:15	**14:30**		8	3		1				**12**	1.4%
14:30	**14:45**		11	3						**14**	1.7%
14:45	**15:00**		12			1				**13**	1.6%
14:00	**15:00**		37	10		2				**49**	5.9%
15:00	**15:15**		10	8	1					**19**	2.3%
15:15	**15:30**		9	8	1	1				**19**	2.3%
15:30	**15:45**		11	1						**12**	1.4%
15:45	**16:00**		18	3		2				**23**	2.7%
15:00	**16:00**		48	20	2	3				**73**	8.7%
16:00	**16:15**		18	4						**22**	2.6%
16:15	**16:30**		21	3	1	2				**27**	3.2%
16:30	**16:45**		26	6				1		**33**	3.9%
16:45	**17:00**		24	15		1				**40**	4.8%
16:00	**17:00**		89	28	1	3		1		**122**	14.6%
17:00	**17:15**		27	11		2				**40**	4.8%
17:15	**17:30**	1	22	7						**30**	3.6%
17:30	**17:45**		23	5		1				**29**	3.5%
17:45	**18:00**		25	5		1				**31**	3.7%
17:00	**18:00**	1	97	28		4				**130**	15.5%
18:00	**18:15**		10	6						**16**	1.9%
18:15	**18:30**		16	4		3				**23**	2.7%
18:30	**18:45**		11	6						**17**	2.0%
18:45	**19:00**		6	2		4				**12**	1.4%
18:00	**19:00**		43	18		7				**68**	8.1%
19:00	**19:15**		10	4						**14**	1.7%
19:15	**19:30**			2						**2**	0.2%
19:30	**19:45**		7							**7**	0.8%
19:45	**20:00**		8	5						**13**	1.6%
19:00	**20:00**		25	11						**36**	4.3%
20:00	**20:15**		5	2						**7**	0.8%
20:15	**20:30**		7	1						**8**	1.0%
20:30	**20:45**		6	1						**7**	0.8%
20:45	**21:00**		6	1						**7**	0.8%
20:00	**21:00**		24	5						**29**	3.5%
21:00	**21:15**		2							**2**	0.2%
21:15	**21:30**		3	3						**6**	0.7%
21:30	**21:45**		1							**1**	0.1%
21:45	**22:00**		6			1				**7**	0.8%
21:00	**22:00**		12	3		1				**16**	1.9%
22:00	**22:15**		1							**1**	0.1%
22:15	**22:30**										
22:30	**22:45**		1			1				**2**	0.2%
22:45	**23:00**		2							**2**	0.2%
22:00	**23:00**		4			1				**5**	0.6%
23:00	**23:15**		1							**1**	0.1%
23:15	**23:30**		1							**1**	0.1%
23:30	**23:45**		2							**2**	0.2%
23:45	**OO:OO**					1				**1**	0.1%
23:00	**OO:OO**		4			1				**5**	0.6%
Total		**2**	**583**	**212**	**4**	**30**	**3**	**2**	**1**	**837**	
		0.2%	69.7%	25.3%	0.5%	3.6%	0.4%	0.2%	0.1%		
AM PEAK		**1**	**20**	**5**	**1**	**3**	**1**	**1**	**1**	**23**	
period		11:30	8:15	7:30	8:30	9:45	5:30	6:30	10:15	8:15	
% of class		50.0%	3.4%	2.4%	25.0%	10.0%	33.3%	50.0%	100.0%		2.7%
PM PEAK		**1**	**27**	**15**	**1**	**4**	**1**	**1**		**40**	
period		17:15	17:00	16:45	15:00	18:45	12:00	16:30		16:45	
% of class		50.0%	4.6%	7.1%	25.0%	13.3%	33.3%	50.0%			4.8%

Report-1.2

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **North** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**		1												**1**	0.1%
0:45	**1:00**															
OO:OO	**1:00**		1												**1**	0.1%
1:00	**1:15**		2												**2**	0.3%
1:15	**1:30**					1									**1**	0.1%
1:30	**1:45**															
1:45	**2:00**															
1:00	**2:00**		2			1									**3**	0.4%
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**		1												**1**	0.1%
2:45	**3:00**															
2:00	**3:00**		1												**1**	0.1%
3:00	**3:15**															
3:15	**3:30**															
3:30	**3:45**															
3:45	**4:00**															
3:00	**4:00**															
4:00	**4:15**		1												**1**	0.1%
4:15	**4:30**		1	1											**2**	0.3%
4:30	**4:45**															
4:45	**5:00**															
4:00	**5:00**		2	1											**3**	0.4%
5:00	**5:15**		2												**2**	0.3%
5:15	**5:30**															
5:30	**5:45**		1	1											**2**	0.3%
5:45	**6:00**		1												**1**	0.1%
5:00	**6:00**		4	1											**5**	0.7%
6:00	**6:15**		2	1											**3**	0.4%
6:15	**6:30**		2												**2**	0.3%
6:30	**6:45**		3	2											**5**	0.7%
6:45	**7:00**		2	1											**3**	0.4%
6:00	**7:00**		9	4											**13**	1.8%
7:00	**7:15**		2	3			1								**6**	0.8%
7:15	**7:30**		4	2											**6**	0.8%
7:30	**7:45**		6	2		1			1						**10**	1.4%
7:45	**8:00**		8	5		1									**14**	1.9%
7:00	**8:00**		20	12		2	1		1						**36**	5.0%
8:00	**8:15**		10		1										**11**	1.5%
8:15	**8:30**		13	7											**20**	2.8%
8:30	**8:45**		9	1	1	1									**12**	1.7%
8:45	**9:00**		10	3		1									**14**	1.9%
8:00	**9:00**		42	11	2	2									**57**	7.9%
9:00	**9:15**		3	3											**6**	0.8%
9:15	**9:30**		1	3	1	1									**6**	0.8%
9:30	**9:45**		3	2											**5**	0.7%
9:45	**10:00**		9	2											**11**	1.5%
9:00	**10:00**		16	10	1	1									**28**	3.9%
10:00	**10:15**		4	2		1									**7**	1.0%
10:15	**10:30**		7	1											**8**	1.1%
10:30	**10:45**		1	1		1									**3**	0.4%
10:45	**11:00**		5	1											**6**	0.8%
10:00	**11:00**		17	5		2									**24**	3.3%
11:00	**11:15**		2	1											**3**	0.4%
11:15	**11:30**		2	3											**5**	0.7%
11:30	**11:45**		4	4		1									**9**	1.2%
11:45	**12:00**		5	5											**10**	1.4%
11:00	**12:00**		13	13		1									**27**	3.7%

12:00	**12:15**	4	3					**7**	1.0%
12:15	**12:30**	4	3		1			**8**	1.1%
12:30	**12:45**	7	2					**9**	1.2%
12:45	**13:00**	6	4		2			**12**	1.7%
12:00	**13:00**	21	12		3			**36**	5.0%
13:00	**13:15**	6	2		1			**9**	1.2%
13:15	**13:30**	5	5					**10**	1.4%
13:30	**13:45**	7	1					**8**	1.1%
13:45	**14:00**	6	2		1			**9**	1.2%
13:00	**14:00**	24	10		2			**36**	5.0%
14:00	**14:15**	7	2		1			**10**	1.4%
14:15	**14:30**	6	1					**7**	1.0%
14:30	**14:45**	7	1		1			**9**	1.2%
14:45	**15:00**	13	6					**19**	2.6%
14:00	**15:00**	33	10		2			**45**	6.2%
15:00	**15:15**	7	2					**9**	1.2%
15:15	**15:30**	13	9	1	2			**25**	3.4%
15:30	**15:45**	12	4					**16**	2.2%
15:45	**16:00**	11	2		1			**14**	1.9%
15:00	**16:00**	43	17	1	3			**64**	8.8%
16:00	**16:15**	15	7		2		1	**25**	3.4%
16:15	**16:30**	16	7	1				**24**	3.3%
16:30	**16:45**	25	8		2			**35**	4.8%
16:45	**17:00**	31	3		2			**36**	5.0%
16:00	**17:00**	87	25	1	6		1	**120**	16.5%
17:00	**17:15**	20	6					**26**	3.6%
17:15	**17:30**	30	15					**45**	6.2%
17:30	**17:45**	15	5					**20**	2.8%
17:45	**18:00**	12	6		2			**20**	2.8%
17:00	**18:00**	77	32		2			**111**	15.3%
18:00	**18:15**	9	6					**15**	2.1%
18:15	**18:30**	10	4					**14**	1.9%
18:30	**18:45**	13			2			**15**	2.1%
18:45	**19:00**	8	3				1	**12**	1.7%
18:00	**19:00**	40	13		2		1	**56**	7.7%
19:00	**19:15**	6	2					**8**	1.1%
19:15	**19:30**	9	1					**10**	1.4%
19:30	**19:45**	1						**1**	0.1%
19:45	**20:00**	4	1					**5**	0.7%
19:00	**20:00**	20	4					**24**	3.3%
20:00	**20:15**	4						**4**	0.6%
20:15	**20:30**	2	1					**3**	0.4%
20:30	**20:45**	5						**5**	0.7%
20:45	**21:00**	3	2					**5**	0.7%
20:00	**21:00**	14	3					**17**	2.3%
21:00	**21:15**	1						**1**	0.1%
21:15	**21:30**	1						**1**	0.1%
21:30	**21:45**	1	1					**2**	0.3%
21:45	**22:00**	2	2					**4**	0.6%
21:00	**22:00**	5	3					**8**	1.1%
22:00	**22:15**		1					**1**	0.1%
22:15	**22:30**	1						**1**	0.1%
22:30	**22:45**								
22:45	**23:00**	1						**1**	0.1%
22:00	**23:00**	2	1					**3**	0.4%
23:00	**23:15**	1	1					**2**	0.3%
23:15	**23:30**	2	2					**4**	0.6%
23:30	**23:45**	1						**1**	0.1%
23:45	**OO:OO**	1						**1**	0.1%
23:00	**OO:OO**	5	3					**8**	1.1%
Total		**498**	**190**	**5**	**29**	**1**	**3**	**726**	
		68.6%	26.2%	0.7%	4.0%	0.1%	0.4%		
AM PEAK		**13**	**7**	**1**	**1**	**1**	**1**	**20**	
period		8:15	8:15	8:00	1:15	7:00	7:30	8:15	
% of class		2.6%	3.7%	20.0%	3.4%	100.0%	33.3%		2.8%
PM PEAK		**31**	**15**	**1**	**2**		**1**	**45**	
period		16:45	17:15	15:15	12:45		16:00	17:15	
% of class		6.2%	7.9%	20.0%	6.9%		33.3%		6.2%

Report-1.3

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **South** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**															
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
OO:OO	**1:00**															
1:00	**1:15**		1												**1**	0.1%
1:15	**1:30**															
1:30	**1:45**															
1:45	**2:00**		1												**1**	0.1%
1:00	**2:00**		2												**2**	0.2%
2:00	**2:15**		1												**1**	0.1%
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**		1												**1**	0.1%
2:00	**3:00**		2												**2**	0.2%
3:00	**3:15**			1											**1**	0.1%
3:15	**3:30**															
3:30	**3:45**			1											**1**	0.1%
3:45	**4:00**		1												**1**	0.1%
3:00	**4:00**		1	2											**3**	0.4%
4:00	**4:15**															
4:15	**4:30**		5												**5**	0.6%
4:30	**4:45**		1												**1**	0.1%
4:45	**5:00**		3	1											**4**	0.5%
4:00	**5:00**		9	1											**10**	1.2%
5:00	**5:15**		1												**1**	0.1%
5:15	**5:30**		3	2											**5**	0.6%
5:30	**5:45**		1	2		1									**4**	0.5%
5:45	**6:00**		6	1											**7**	0.9%
5:00	**6:00**		11	5		1									**17**	2.1%
6:00	**6:15**		8	2											**10**	1.2%
6:15	**6:30**		6	3		3									**12**	1.5%
6:30	**6:45**		14	2											**16**	2.0%
6:45	**7:00**		14	5		2									**21**	2.6%
6:00	**7:00**		42	12		5									**59**	7.3%
7:00	**7:15**		6	6	1	1									**14**	1.7%
7:15	**7:30**		18	9											**27**	3.4%
7:30	**7:45**		17	9		2									**28**	3.5%
7:45	**8:00**		11	5											**16**	2.0%
7:00	**8:00**		52	29	1	3									**85**	10.6%
8:00	**8:15**		12	1											**13**	1.6%
8:15	**8:30**		11	2		1			1						**15**	1.9%
8:30	**8:45**		13	4											**17**	2.1%
8:45	**9:00**		9	6	1	2									**18**	2.2%
8:00	**9:00**		45	13	1	3			1						**63**	7.8%
9:00	**9:15**		5	1		3									**9**	1.1%
9:15	**9:30**		6	3											**9**	1.1%
9:30	**9:45**		8	3											**11**	1.4%
9:45	**10:00**		5	3											**8**	1.0%
9:00	**10:00**		24	10		3									**37**	4.6%
10:00	**10:15**		9	7		2									**18**	2.2%
10:15	**10:30**		6	1		2									**9**	1.1%
10:30	**10:45**		10	1											**11**	1.4%
10:45	**11:00**		6	3		1									**10**	1.2%
10:00	**11:00**		31	12		5									**48**	6.0%
11:00	**11:15**		8	4					1						**13**	1.6%
11:15	**11:30**		4	5		2									**11**	1.4%
11:30	**11:45**		6	2		1									**9**	1.1%
11:45	**12:00**		11	5											**16**	2.0%
11:00	**12:00**		29	16		3			1						**49**	6.1%

12:00	**12:15**	11	2					**13**	1.6%
12:15	**12:30**	5	7					**12**	1.5%
12:30	**12:45**	9	2		1			**12**	1.5%
12:45	**13:00**	9	5		1			**15**	1.9%
12:00	**13:00**	34	16		2			**52**	6.5%
13:00	**13:15**	6	2					**8**	1.0%
13:15	**13:30**	8	3			1		**12**	1.5%
13:30	**13:45**	8	10					**18**	2.2%
13:45	**14:00**	6	3					**9**	1.1%
13:00	**14:00**	28	18			1		**47**	5.8%
14:00	**14:15**	4	3					**7**	0.9%
14:15	**14:30**	7	4					**11**	1.4%
14:30	**14:45**	7	1	1	2		1	**12**	1.5%
14:45	**15:00**	7	5		1			**13**	1.6%
14:00	**15:00**	25	13	1	3		1	**43**	5.3%
15:00	**15:15**	13	5					**18**	2.2%
15:15	**15:30**	16	10	1				**27**	3.4%
15:30	**15:45**	14	3	1				**18**	2.2%
15:45	**16:00**	7	1					**8**	1.0%
15:00	**16:00**	50	19	2				**71**	8.8%
16:00	**16:15**	9	6		1	1		**17**	2.1%
16:15	**16:30**	5	5					**10**	1.2%
16:30	**16:45**	12	7		1			**20**	2.5%
16:45	**17:00**	5	5					**10**	1.2%
16:00	**17:00**	31	23		2	1		**57**	7.1%
17:00	**17:15**	9	6					**15**	1.9%
17:15	**17:30**	14	5					**19**	2.4%
17:30	**17:45**	3	7		1			**11**	1.4%
17:45	**18:00**	5	2		1			**8**	1.0%
17:00	**18:00**	31	20		2			**53**	6.6%
18:00	**18:15**	6			1			**7**	0.9%
18:15	**18:30**	7	4		2			**13**	1.6%
18:30	**18:45**	10	2		2			**14**	1.7%
18:45	**19:00**	5	1					**6**	0.7%
18:00	**19:00**	28	7		5			**40**	5.0%
19:00	**19:15**	7	5					**12**	1.5%
19:15	**19:30**	5			1			**6**	0.7%
19:30	**19:45**	4	2					**6**	0.7%
19:45	**20:00**	5	1					**6**	0.7%
19:00	**20:00**	21	8		1			**30**	3.7%
20:00	**20:15**	3	1					**4**	0.5%
20:15	**20:30**	3	1					**4**	0.5%
20:30	**20:45**	3	2					**5**	0.6%
20:45	**21:00**	3	2					**5**	0.6%
20:00	**21:00**	12	6					**18**	2.2%
21:00	**21:15**	4	1					**5**	0.6%
21:15	**21:30**	2			1			**3**	0.4%
21:30	**21:45**								
21:45	**22:00**	2						**2**	0.2%
21:00	**22:00**	8	1		1			**10**	1.2%
22:00	**22:15**	2						**2**	0.2%
22:15	**22:30**	1						**1**	0.1%
22:30	**22:45**	2						**2**	0.2%
22:45	**23:00**	1						**1**	0.1%
22:00	**23:00**	6						**6**	0.7%
23:00	**23:15**		2					**2**	0.2%
23:15	**23:30**				1			**1**	0.1%
23:30	**23:45**								
23:45	**OO:OO**								
23:00	**OO:OO**		2		1			**3**	0.4%
Total		**522**	**233**	**5**	**40**	**2**	**3**	**805**	
		64.8%	28.9%	0.6%	5.0%	0.2%	0.4%		
AM PEAK		**18**	**9**	**1**	**3**		**1**	**28**	
period		7:15	7:15	7:00	6:15		8:15	7:30	
% of class		3.4%	3.9%	20.0%	7.5%		33.3%		3.5%
PM PEAK		**16**	**10**	**1**	**2**	**1**	**1**	**27**	
period		15:15	13:30	14:30	14:30	13:15	14:30	15:15	
% of class		3.1%	4.3%	20.0%	5.0%	50.0%	33.3%		3.4%

Report-1.4

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **South** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**					1									**1**	0.1%
0:15	**0:30**		1												**1**	0.1%
0:30	**0:45**															
0:45	**1:00**		1												**1**	0.1%
OO:OO	**1:00**		2			1									**3**	0.4%
1:00	**1:15**															
1:15	**1:30**															
1:30	**1:45**		1												**1**	0.1%
1:45	**2:00**															
1:00	**2:00**		1												**1**	0.1%
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**															
2:45	**3:00**															
2:00	**3:00**															
3:00	**3:15**		1	1											**2**	0.3%
3:15	**3:30**		1												**1**	0.1%
3:30	**3:45**			1											**1**	0.1%
3:45	**4:00**															
3:00	**4:00**		2	2											**4**	0.5%
4:00	**4:15**		3												**3**	0.4%
4:15	**4:30**		2	2											**4**	0.5%
4:30	**4:45**		3												**3**	0.4%
4:45	**5:00**		3	1											**4**	0.5%
4:00	**5:00**		11	3											**14**	1.9%
5:00	**5:15**		1	1											**2**	0.3%
5:15	**5:30**		2	2		1									**5**	0.7%
5:30	**5:45**		6	2											**8**	1.1%
5:45	**6:00**		4			1									**5**	0.7%
5:00	**6:00**		13	5		2									**20**	2.7%
6:00	**6:15**		4	2											**6**	0.8%
6:15	**6:30**		7	3											**10**	1.4%
6:30	**6:45**		13	3		1									**17**	2.3%
6:45	**7:00**		11	2		1									**14**	1.9%
6:00	**7:00**		35	10		2									**47**	6.4%
7:00	**7:15**		11	6		1	1								**19**	2.6%
7:15	**7:30**		8	7		1									**16**	2.2%
7:30	**7:45**		14	5		1									**20**	2.7%
7:45	**8:00**		16	3											**19**	2.6%
7:00	**8:00**		49	21		3	1								**74**	10.1%
8:00	**8:15**		10	2		2									**14**	1.9%
8:15	**8:30**		13	4		1									**18**	2.5%
8:30	**8:45**		12	5											**17**	2.3%
8:45	**9:00**		20	6		1									**27**	3.7%
8:00	**9:00**		55	17		4									**76**	10.4%
9:00	**9:15**		7	1											**8**	1.1%
9:15	**9:30**		7	4		1									**12**	1.6%
9:30	**9:45**		4	3											**7**	1.0%
9:45	**10:00**		3	1					2						**6**	0.8%
9:00	**10:00**		21	9		1			2						**33**	4.5%
10:00	**10:15**		2			1									**3**	0.4%
10:15	**10:30**		7	3											**10**	1.4%
10:30	**10:45**		5	3											**8**	1.1%
10:45	**11:00**		7	1											**8**	1.1%
10:00	**11:00**		21	7		1									**29**	4.0%
11:00	**11:15**		6	2											**8**	1.1%
11:15	**11:30**		7	2		1									**10**	1.4%
11:30	**11:45**		8	1											**9**	1.2%
11:45	**12:00**		7	3											**10**	1.4%
11:00	**12:00**		28	8		1									**37**	5.1%

12:00	**12:15**	1	3						**4**	0.5%
12:15	**12:30**	10	4						**14**	1.9%
12:30	**12:45**	12	5					1	**18**	2.5%
12:45	**13:00**	6							**6**	0.8%
12:00	**13:00**	29	12					1	**42**	5.8%
13:00	**13:15**	12			1				**13**	1.8%
13:15	**13:30**	7	1						**8**	1.1%
13:30	**13:45**	6	5		1				**12**	1.6%
13:45	**14:00**	4	3		1				**8**	1.1%
13:00	**14:00**	29	9		3				**41**	5.6%
14:00	**14:15**	4	4						**8**	1.1%
14:15	**14:30**	6	3		1				**10**	1.4%
14:30	**14:45**	9	1		1			1	**12**	1.6%
14:45	**15:00**	7	3		1				**11**	1.5%
14:00	**15:00**	26	11		3			1	**41**	5.6%
15:00	**15:15**	5	2				1		**8**	1.1%
15:15	**15:30**	30	10		1				**41**	5.6%
15:30	**15:45**	18	5	1					**24**	3.3%
15:45	**16:00**	12	2						**14**	1.9%
15:00	**16:00**	65	19	1	1		1		**87**	11.9%
16:00	**16:15**	8	5						**13**	1.8%
16:15	**16:30**	8	4						**12**	1.6%
16:30	**16:45**	8	3		1				**12**	1.6%
16:45	**17:00**	9	2				1		**12**	1.6%
16:00	**17:00**	33	14		1		1		**49**	6.7%
17:00	**17:15**	13	5						**18**	2.5%
17:15	**17:30**	6	3		1				**10**	1.4%
17:30	**17:45**	5	2						**7**	1.0%
17:45	**18:00**	2	3						**5**	0.7%
17:00	**18:00**	26	13		1				**40**	5.5%
18:00	**18:15**	6	2						**8**	1.1%
18:15	**18:30**	4							**4**	0.5%
18:30	**18:45**	5	3						**8**	1.1%
18:45	**19:00**	6	1				1		**8**	1.1%
18:00	**19:00**	21	6				1		**28**	3.8%
19:00	**19:15**	5	3						**8**	1.1%
19:15	**19:30**	3	2		1				**6**	0.8%
19:30	**19:45**	6	1						**7**	1.0%
19:45	**20:00**	3		1					**4**	0.5%
19:00	**20:00**	17	6	1	1				**25**	3.4%
20:00	**20:15**	4			2				**6**	0.8%
20:15	**20:30**	3	4						**7**	1.0%
20:30	**20:45**	4	1						**5**	0.7%
20:45	**21:00**	4							**4**	0.5%
20:00	**21:00**	15	5		2				**22**	3.0%
21:00	**21:15**	1	1						**2**	0.3%
21:15	**21:30**	5							**5**	0.7%
21:30	**21:45**	2							**2**	0.3%
21:45	**22:00**									
21:00	**22:00**	8	1						**9**	1.2%
22:00	**22:15**									
22:15	**22:30**	2							**2**	0.3%
22:30	**22:45**	2	1						**3**	0.4%
22:45	**23:00**									
22:00	**23:00**	4	1						**5**	0.7%
23:00	**23:15**									
23:15	**23:30**	1							**1**	0.1%
23:30	**23:45**		1						**1**	0.1%
23:45	**OO:OO**		1						**1**	0.1%
23:00	**OO:OO**	1	2						**3**	0.4%
Total		**512**	**181**	**2**	**27**	**1**	**5**	**2**	**730**	
		70.1%	24.8%	0.3%	3.7%	0.1%	0.7%	0.3%		
AM PEAK		**20**	**7**		**2**	**1**	**2**		**27**	
period		8:45	7:15		8:00	7:00	9:45		8:45	
% of class		3.9%	3.9%		7.4%	100.0%	40.0%			3.7%
PM PEAK		**30**	**10**	**1**	**2**		**1**	**1**	**41**	
period		15:15	15:15	15:30	20:00		15:00	12:30	15:15	
% of class		5.9%	5.5%	50.0%	7.4%		20.0%	50.0%		5.6%

Report-1.5

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **North + South** Road :

Dates : **4/30/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**		1												**1**	0.1%
0:15	**0:30**															
0:30	**0:45**															
0:45	**1:00**															
OO:OO	**1:00**		1												**1**	0.1%
1:00	**1:15**		1												**1**	0.1%
1:15	**1:30**		1												**1**	0.1%
1:30	**1:45**															
1:45	**2:00**		1												**1**	0.1%
1:00	**2:00**		3												**3**	0.2%
2:00	**2:15**		1												**1**	0.1%
2:15	**2:30**															
2:30	**2:45**		1												**1**	0.1%
2:45	**3:00**		1												**1**	0.1%
2:00	**3:00**		3												**3**	0.2%
3:00	**3:15**			1											**1**	0.1%
3:15	**3:30**															
3:30	**3:45**			1											**1**	0.1%
3:45	**4:00**		1												**1**	0.1%
3:00	**4:00**		1	2											**3**	0.2%
4:00	**4:15**															
4:15	**4:30**		5	1											**6**	0.4%
4:30	**4:45**		1												**1**	0.1%
4:45	**5:00**		3	1											**4**	0.2%
4:00	**5:00**		9	2											**11**	0.7%
5:00	**5:15**		2												**2**	0.1%
5:15	**5:30**		3	2											**5**	0.3%
5:30	**5:45**		4	2		1	1								**8**	0.5%
5:45	**6:00**		6	2											**8**	0.5%
5:00	**6:00**		15	6		1	1								**23**	1.4%
6:00	**6:15**		11	2											**13**	0.8%
6:15	**6:30**		7	4		3									**14**	0.9%
6:30	**6:45**		18	2					1						**21**	1.3%
6:45	**7:00**		16	7		2									**25**	1.5%
6:00	**7:00**		52	15		5			1						**73**	4.4%
7:00	**7:15**		10	7	1	1									**19**	1.2%
7:15	**7:30**		22	13											**35**	2.1%
7:30	**7:45**		21	14		4									**39**	2.4%
7:45	**8:00**		17	10											**27**	1.6%
7:00	**8:00**		70	44	1	5									**120**	7.3%
8:00	**8:15**		17	6											**23**	1.4%
8:15	**8:30**		31	5		1			1						**38**	2.3%
8:30	**8:45**		19	8	1										**28**	1.7%
8:45	**9:00**		19	10	1	2									**32**	1.9%
8:00	**9:00**		86	29	2	3			1						**121**	7.4%
9:00	**9:15**		13	6		4									**23**	1.4%
9:15	**9:30**		11	6											**17**	1.0%
9:30	**9:45**		14	7											**21**	1.3%
9:45	**10:00**		13	7		3									**23**	1.4%
9:00	**10:00**		51	26		7									**84**	5.1%
10:00	**10:15**		16	9		2									**27**	1.6%
10:15	**10:30**		12	2		2				1					**17**	1.0%
10:30	**10:45**		14	5											**19**	1.2%
10:45	**11:00**		6	6		1									**13**	0.8%
10:00	**11:00**		48	22		5				1					**76**	4.6%
11:00	**11:15**		15	8					1						**24**	1.5%
11:15	**11:30**		9	7		3									**19**	1.2%
11:30	**11:45**	1	11	3		2									**17**	1.0%
11:45	**12:00**		14	8											**22**	1.3%
11:00	**12:00**	1	49	26		5			1						**82**	5.0%

12:00	**12:15**		18	3			1			**22**	1.3%
12:15	**12:30**		12	9						**21**	1.3%
12:30	**12:45**		22	4		1				**27**	1.6%
12:45	**13:00**		14	7		1				**22**	1.3%
12:00	**13:00**		66	23		2	1			**92**	5.6%
13:00	**13:15**		14	3						**17**	1.0%
13:15	**13:30**		11	5			1			**17**	1.0%
13:30	**13:45**		17	13						**30**	1.8%
13:45	**14:00**		14	7			1			**22**	1.3%
13:00	**14:00**		56	28			2			**86**	5.2%
14:00	**14:15**		10	7						**17**	1.0%
14:15	**14:30**		15	7		1				**23**	1.4%
14:30	**14:45**		18	4	1	2		1		**26**	1.6%
14:45	**15:00**		19	5		2				**26**	1.6%
14:00	**15:00**		62	23	1	5		1		**92**	5.6%
15:00	**15:15**		23	13	1					**37**	2.3%
15:15	**15:30**		25	18	2	1				**46**	2.8%
15:30	**15:45**		25	4	1					**30**	1.8%
15:45	**16:00**		25	4		2				**31**	1.9%
15:00	**16:00**		98	39	4	3				**144**	8.8%
16:00	**16:15**		27	10		1	1			**39**	2.4%
16:15	**16:30**		26	8	1	2				**37**	2.3%
16:30	**16:45**		38	13		1		1		**53**	3.2%
16:45	**17:00**		29	20		1				**50**	3.0%
16:00	**17:00**		120	51	1	5	1	1		**179**	10.9%
17:00	**17:15**		36	17		2				**55**	3.3%
17:15	**17:30**	1	36	12						**49**	3.0%
17:30	**17:45**		26	12		2				**40**	2.4%
17:45	**18:00**		30	7		2				**39**	2.4%
17:00	**18:00**	1	128	48		6				**183**	11.1%
18:00	**18:15**		16	6		1				**23**	1.4%
18:15	**18:30**		23	8		5				**36**	2.2%
18:30	**18:45**		21	8		2				**31**	1.9%
18:45	**19:00**		11	3		4				**18**	1.1%
18:00	**19:00**		71	25		12				**108**	6.6%
19:00	**19:15**		17	9						**26**	1.6%
19:15	**19:30**		5	2		1				**8**	0.5%
19:30	**19:45**		11	2						**13**	0.8%
19:45	**20:00**		13	6						**19**	1.2%
19:00	**20:00**		46	19		1				**66**	4.0%
20:00	**20:15**		8	3						**11**	0.7%
20:15	**20:30**		10	2						**12**	0.7%
20:30	**20:45**		9	3						**12**	0.7%
20:45	**21:00**		9	3						**12**	0.7%
20:00	**21:00**		36	11						**47**	2.9%
21:00	**21:15**		6	1						**7**	0.4%
21:15	**21:30**		5	3		1				**9**	0.5%
21:30	**21:45**		1							**1**	0.1%
21:45	**22:00**		8			1				**9**	0.5%
21:00	**22:00**		20	4		2				**26**	1.6%
22:00	**22:15**		3							**3**	0.2%
22:15	**22:30**		1							**1**	0.1%
22:30	**22:45**		3			1				**4**	0.2%
22:45	**23:00**		3							**3**	0.2%
22:00	**23:00**		10			1				**11**	0.7%
23:00	**23:15**		1	2						**3**	0.2%
23:15	**23:30**		1			1				**2**	0.1%
23:30	**23:45**		2							**2**	0.1%
23:45	**OO:OO**					1				**1**	0.1%
23:00	**OO:OO**		4	2		2				**8**	0.5%
Total		**2**	**1105**	**445**	**9**	**70**	**5**	**5**	**1**	**1642**	
		0.1%	67.3%	27.1%	0.5%	4.3%	0.3%	0.3%	0.1%		
AM PEAK		**1**	**31**	**14**	**1**	**4**	**1**	**1**	**1**	**39**	
period		11:30	8:15	7:30	7:00	7:30	5:30	6:30	10:15	7:30	
% of class		50.0%	2.8%	3.1%	11.1%	5.7%	20.0%	20.0%	100.0%		2.4%
PM PEAK		**1**	**38**	**20**	**2**	**5**	**1**	**1**		**55**	
period		17:15	16:30	16:45	15:15	18:15	12:00	14:30		17:00	
% of class		50.0%	3.4%	4.5%	22.2%	7.1%	20.0%	20.0%			3.3%

Report-1.6

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **North + South** Road :

Dates : **5/1/2019**

Classes ---------->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
OO:OO	**0:15**					1									**1**	0.1%
0:15	**0:30**		1												**1**	0.1%
0:30	**0:45**		1												**1**	0.1%
0:45	**1:00**		1												**1**	0.1%
OO:OO	**1:00**		3			1									**4**	0.3%
1:00	**1:15**		2												**2**	0.1%
1:15	**1:30**					1									**1**	0.1%
1:30	**1:45**		1												**1**	0.1%
1:45	**2:00**															
1:00	**2:00**		3			1									**4**	0.3%
2:00	**2:15**															
2:15	**2:30**															
2:30	**2:45**		1												**1**	0.1%
2:45	**3:00**															
2:00	**3:00**		1												**1**	0.1%
3:00	**3:15**		1	1											**2**	0.1%
3:15	**3:30**		1												**1**	0.1%
3:30	**3:45**			1											**1**	0.1%
3:45	**4:00**															
3:00	**4:00**		2	2											**4**	0.3%
4:00	**4:15**		4												**4**	0.3%
4:15	**4:30**		3	3											**6**	0.4%
4:30	**4:45**		3												**3**	0.2%
4:45	**5:00**		3	1											**4**	0.3%
4:00	**5:00**		13	4											**17**	1.2%
5:00	**5:15**		3	1											**4**	0.3%
5:15	**5:30**		2	2		1									**5**	0.3%
5:30	**5:45**		7	3											**10**	0.7%
5:45	**6:00**		5			1									**6**	0.4%
5:00	**6:00**		17	6		2									**25**	1.7%
6:00	**6:15**		6	3											**9**	0.6%
6:15	**6:30**		9	3											**12**	0.8%
6:30	**6:45**		16	5		1									**22**	1.5%
6:45	**7:00**		13	3		1									**17**	1.2%
6:00	**7:00**		44	14		2									**60**	4.1%
7:00	**7:15**		13	9		1	2								**25**	1.7%
7:15	**7:30**		12	9		1									**22**	1.5%
7:30	**7:45**		20	7		2			1						**30**	2.1%
7:45	**8:00**		24	8		1									**33**	2.3%
7:00	**8:00**		69	33		5	2		1						**110**	7.6%
8:00	**8:15**		20	2	1	2									**25**	1.7%
8:15	**8:30**		26	11		1									**38**	2.6%
8:30	**8:45**		21	6	1	1									**29**	2.0%
8:45	**9:00**		30	9		2									**41**	2.8%
8:00	**9:00**		97	28	2	6									**133**	9.1%
9:00	**9:15**		10	4											**14**	1.0%
9:15	**9:30**		8	7	1	2									**18**	1.2%
9:30	**9:45**		7	5											**12**	0.8%
9:45	**10:00**		12	3					2						**17**	1.2%
9:00	**10:00**		37	19	1	2			2						**61**	4.2%
10:00	**10:15**		6	2		2									**10**	0.7%
10:15	**10:30**		14	4											**18**	1.2%
10:30	**10:45**		6	4		1									**11**	0.8%
10:45	**11:00**		12	2											**14**	1.0%
10:00	**11:00**		38	12		3									**53**	3.6%
11:00	**11:15**		8	3											**11**	0.8%
11:15	**11:30**		9	5		1									**15**	1.0%
11:30	**11:45**		12	5		1									**18**	1.2%
11:45	**12:00**		12	8											**20**	1.4%
11:00	**12:00**		41	21		2									**64**	4.4%

12:00	**12:15**	5	6						**11**	0.8%
12:15	**12:30**	14	7		1				**22**	1.5%
12:30	**12:45**	19	7					1	**27**	1.9%
12:45	**13:00**	12	4		2				**18**	1.2%
12:00	**13:00**	50	24		3			1	**78**	5.4%
13:00	**13:15**	18	2		2				**22**	1.5%
13:15	**13:30**	12	6						**18**	1.2%
13:30	**13:45**	13	6		1				**20**	1.4%
13:45	**14:00**	10	5		2				**17**	1.2%
13:00	**14:00**	53	19		5				**77**	5.3%
14:00	**14:15**	11	6		1				**18**	1.2%
14:15	**14:30**	12	4		1				**17**	1.2%
14:30	**14:45**	16	2		2			1	**21**	1.4%
14:45	**15:00**	20	9		1				**30**	2.1%
14:00	**15:00**	59	21		5			1	**86**	5.9%
15:00	**15:15**	12	4				1		**17**	1.2%
15:15	**15:30**	43	19	1	3				**66**	4.5%
15:30	**15:45**	30	9	1					**40**	2.7%
15:45	**16:00**	23	4		1				**28**	1.9%
15:00	**16:00**	108	36	2	4		1		**151**	10.4%
16:00	**16:15**	23	12		2		1		**38**	2.6%
16:15	**16:30**	24	11	1					**36**	2.5%
16:30	**16:45**	33	11		3				**47**	3.2%
16:45	**17:00**	40	5		2		1		**48**	3.3%
16:00	**17:00**	120	39	1	7		2		**169**	11.6%
17:00	**17:15**	33	11						**44**	3.0%
17:15	**17:30**	36	18		1				**55**	3.8%
17:30	**17:45**	20	7						**27**	1.9%
17:45	**18:00**	14	9		2				**25**	1.7%
17:00	**18:00**	103	45		3				**151**	10.4%
18:00	**18:15**	15	8						**23**	1.6%
18:15	**18:30**	14	4						**18**	1.2%
18:30	**18:45**	18	3		2				**23**	1.6%
18:45	**19:00**	14	4				2		**20**	1.4%
18:00	**19:00**	61	19		2		2		**84**	5.8%
19:00	**19:15**	11	5						**16**	1.1%
19:15	**19:30**	12	3		1				**16**	1.1%
19:30	**19:45**	7	1						**8**	0.5%
19:45	**20:00**	7	1	1					**9**	0.6%
19:00	**20:00**	37	10	1	1				**49**	3.4%
20:00	**20:15**	8			2				**10**	0.7%
20:15	**20:30**	5	5						**10**	0.7%
20:30	**20:45**	9	1						**10**	0.7%
20:45	**21:00**	7	2						**9**	0.6%
20:00	**21:00**	29	8		2				**39**	2.7%
21:00	**21:15**	2	1						**3**	0.2%
21:15	**21:30**	6							**6**	0.4%
21:30	**21:45**	3	1						**4**	0.3%
21:45	**22:00**	2	2						**4**	0.3%
21:00	**22:00**	13	4						**17**	1.2%
22:00	**22:15**		1						**1**	0.1%
22:15	**22:30**	3							**3**	0.2%
22:30	**22:45**	2	1						**3**	0.2%
22:45	**23:00**	1							**1**	0.1%
22:00	**23:00**	6	2						**8**	0.5%
23:00	**23:15**	1	1						**2**	0.1%
23:15	**23:30**	3	2						**5**	0.3%
23:30	**23:45**	1	1						**2**	0.1%
23:45	**OO:OO**	1	1						**2**	0.1%
23:00	**OO:OO**	6	5						**11**	0.8%
Total		**1010**	**371**	**7**	**56**	**2**	**8**	**2**	**1456**	
		69.4%	25.5%	0.5%	3.8%	0.1%	0.5%	0.1%		
AM PEAK		**30**	**11**	**1**	**2**	**2**	**2**		**41**	
period		8:45	8:15	8:00	7:30	7:00	9:45		8:45	
% of class		3.0%	3.0%	14.3%	3.6%	100.0%	25.0%			2.8%
PM PEAK		**43**	**19**	**1**	**3**		**2**	**1**	**66**	
period		15:15	15:15	15:15	15:15		18:45	12:30	15:15	
% of class		4.3%	5.1%	14.3%	5.4%		25.0%	50.0%		4.5%

Report-2.1

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **North** Road :

Dates : 1 **4/30/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	**Total**	**Pace Speed**	**Number in Pace**
OO:OO	**0:15**							1								**1**	45.7-65.7	1
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**							1								**1**	45.7-65.7	
1:00	**1:15**																	
1:15	**1:30**						1									**1**	38.7-58.7	1
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**						1									**1**	38.7-58.7	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**							1								**1**	50.7-70.7	1
2:45	**3:00**																	
2:00	**3:00**							1								**1**	50.7-70.7	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**																	
4:15	**4:30**							1								**1**	43.5-63.5	1
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**							1								**1**	43.5-63.5	
5:00	**5:15**								1							**1**	58.2-78.2	1
5:15	**5:30**																	
5:30	**5:45**					1	2	1								**4**	48.2-68.2	4
5:45	**6:00**							1								**1**	45.0-65.0	1
5:00	**6:00**					1	2	2	1							**1**	58.2-78.2	
6:00	**6:15**					1	1	1								**3**	48.6-68.6	3
6:15	**6:30**						1	1								**2**	47.1-67.1	2
6:30	**6:45**							2	1	2						**5**	61.5-81.5	5
6:45	**7:00**						1	2	1							**4**	51.6-71.6	4
6:00	**7:00**					1	3	6	2	2						**5**	61.5-81.5	
7:00	**7:15**				1			2	2							**5**	52.2-72.2	4
7:15	**7:30**				1		2	3	1	1						**8**	47.5-67.5	5
7:30	**7:45**						5	3	3							**11**	54.2-74.2	11
7:45	**8:00**					1	3	2	5							**11**	54.4-74.4	9
7:00	**8:00**				2	1	10	10	11	1						**11**	54.4-74.4	
8:00	**8:15**						6	2	2							**10**	49.0-69.0	8
8:15	**8:30**				1		9	10	3							**23**	53.5-73.5	22
8:30	**8:45**						6	4	1							**11**	51.5-71.5	11
8:45	**9:00**					2	2	6	4							**14**	56.3-76.3	11
8:00	**9:00**				1	2	23	22	10							**14**	56.3-76.3	
9:00	**9:15**					1	3	6	4							**14**	55.7-75.7	10
9:15	**9:30**						3	5								**8**	50.9-70.9	8
9:30	**9:45**					1	3	3	3							**10**	55.7-75.7	8
9:45	**10:00**						3	5	6	1						**15**	58.0-78.0	11
9:00	**10:00**					2	12	19	13	1						**15**	58.0-78.0	
10:00	**10:15**					1	4	4								**9**	48.3-68.3	9
10:15	**10:30**					1	2	2	3							**8**	55.2-75.2	5
10:30	**10:45**						1	3	3	1						**8**	56.6-76.6	7
10:45	**11:00**						1	1	1							**3**	59.2-79.2	3
10:00	**11:00**					2	8	10	7	1						**3**	59.2-79.2	
11:00	**11:15**				1		5	5								**11**	50.5-70.5	10
11:15	**11:30**						3	5								**8**	50.5-70.5	8
11:30	**11:45**		2		2		2	2								**8**	15.0-35.0	4
11:45	**12:00**			1			1	2	2							**6**	52.6-72.6	5
11:00	**12:00**		2	1	3		11	14	2							**6**	52.6-72.6	

12:00	**12:15**				1	3	2	2	1			**9**	51.8-71.8	7
12:15	**12:30**				1	4	3	1				**9**	53.3-73.3	8
12:30	**12:45**					7	4	3		1		**15**	45.6-65.6	11
12:45	**13:00**					1	1	5				**7**	58.6-78.6	6
12:00	**13:00**				2	15	10	11	1	1		**7**	58.6-78.6	
13:00	**13:15**					5	4					**9**	49.3-69.3	9
13:15	**13:30**					4	1					**5**	49.2-69.2	5
13:30	**13:45**				1	3	7	1				**12**	51.5-71.5	11
13:45	**14:00**				1	3	4	4	1			**13**	55.6-75.6	11
13:00	**14:00**				2	15	16	5	1			**13**	55.6-75.6	
14:00	**14:15**				3	3	4					**10**	43.0-63.0	8
14:15	**14:30**					3	5	4				**12**	56.8-76.8	10
14:30	**14:45**				2	5	4	3				**14**	45.1-65.1	11
14:45	**15:00**			1	4	2	6					**13**	45.2-65.2	12
14:00	**15:00**			1	9	13	19	7				**12**	56.8-76.8	
15:00	**15:15**			1	3	9	4	2				**19**	45.8-65.8	14
15:15	**15:30**				2	6	8	1	2			**19**	45.8-65.8	14
15:30	**15:45**				1	3	4	4				**12**	57.4-77.4	9
15:45	**16:00**				4	10	3	5		1		**23**	42.6-62.6	15
15:00	**16:00**			1	10	28	19	12	2	1		**12**	57.4-77.4	
16:00	**16:15**				1	7	7	6	1			**22**	56.1-76.1	17
16:15	**16:30**				2	7	15	3				**27**	49.9-69.9	23
16:30	**16:45**				3	4	13	9	3	1		**33**	55.8-75.8	23
16:45	**17:00**					7	16	16	1			**40**	60.5-80.5	34
16:00	**17:00**				6	25	51	34	5	1		**40**	60.5-80.5	
17:00	**17:15**			1	1	5	17	15	1			**40**	60.6-80.6	32
17:15	**17:30**				1	11	10	5	3			**30**	47.7-67.7	21
17:30	**17:45**				1	8	18	1	1			**29**	50.8-70.8	26
17:45	**18:00**					1	12	17	1			**31**	60.8-80.8	29
17:00	**18:00**			1	3	25	57	38	6			**31**	60.8-80.8	
18:00	**18:15**					4	9	3				**16**	58.1-78.1	15
18:15	**18:30**			1		3	8	7	4			**23**	62.4-82.4	16
18:30	**18:45**					1	5	6	4		1	**17**	65.5-85.5	12
18:45	**19:00**				1		6	4	1			**12**	62.0-82.0	11
18:00	**19:00**			1	1	8	28	20	9		1	**17**	65.5-85.5	
19:00	**19:15**			1		3	4	4	1		1	**14**	54.4-74.4	10
19:15	**19:30**							2				**2**	56.2-76.2	2
19:30	**19:45**						5	1	1			**7**	61.7-81.7	7
19:45	**20:00**				1	3	4	4	1			**13**	52.3-72.3	8
19:00	**20:00**			1	1	6	13	11	3		1	**7**	61.7-81.7	
20:00	**20:15**						5	2				**7**	55.5-75.5	7
20:15	**20:30**				1	2	2	3				**8**	54.7-74.7	7
20:30	**20:45**				1		1	5				**7**	59.2-79.2	6
20:45	**21:00**					3	3	1				**7**	47.5-67.5	6
20:00	**21:00**				2	5	11	11				**7**	59.2-79.2	
21:00	**21:15**					2						**2**	40.2-60.2	2
21:15	**21:30**				1	2	1	2				**6**	46.1-66.1	4
21:30	**21:45**							1				**1**	53.9-73.9	1
21:45	**22:00**				3	3			1			**7**	40.6-60.6	6
21:00	**22:00**				4	7	1	3	1			**1**	53.9-73.9	
22:00	**22:15**						1					**1**	41.2-61.2	1
22:15	**22:30**													
22:30	**22:45**				1	1						**2**	38.5-58.5	2
22:45	**23:00**					1	1					**2**	45.8-65.8	2
22:00	**23:00**				1	2	2					**2**	45.8-65.8	
23:00	**23:15**					1						**1**	37.1-57.1	1
23:15	**23:30**							1				**1**	54.1-74.1	1
23:30	**23:45**					2						**2**	38.0-58.0	2
23:45	**OO:OO**					1						**1**	39.9-59.9	1
23:00	**OO:OO**					4		1				**1**	54.1-74.1	
Total		**2**	**1**	**11**	**50**	**223**	**313**	**199**	**33**	**3**	**2**	**837**		
		0.2%	0.1%	1.3%	6.0%	26.6%	37.4%	23.8%	3.9%	0.4%	0.2%			
AM PEAK		**2**	**1**	**2**	**2**	**9**	**10**	**6**	**2**			**23**		
period		11:30	11:45	11:30	8:45	8:15	8:15	9:45	6:30			8:15		
% of class		100.0%	100.0%	18.2%	4.0%	4.0%	3.2%	3.0%	6.1%				2.7%	
PM PEAK				**1**	**4**	**11**	**18**	**17**	**4**	**1**	**1**	**40**		
period				14:45	14:45	17:15	17:30	17:45	18:15	12:30	18:30	16:45		
% of class				9.1%	8.0%	4.9%	5.8%	8.5%	12.1%	33.3%	50.0%		4.8%	

15% Percentile :	**54**	KPH
50% Percentile :	**65**	KPH
85% Percentile :	**77**	KPH
95% Percentile :	**81**	KPH

20 KPH Pace Speed:	**56.7-76.7**	KPH
Number in Pace:	**590**	
Percent in Pace:	**70.5**	%
Number of Vehicles >50 KPH:	**778**	
Percent of Vehicles >50 KPH:	**93.0**	%
Mean Speed(average):	**65**	KPH

Report-2.2

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **North** Road :

Dates : 1 **5/1/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**						1									**1**	40.8-60.8	1
0:45	**1:00**																	
OO:OO	**1:00**						1									**1**	40.8-60.8	
1:00	**1:15**							1	1							**2**	51.8-71.8	2
1:15	**1:30**								1							**1**	54.7-74.7	1
1:30	**1:45**																	
1:45	**2:00**																	
1:00	**2:00**							1	2							**1**	54.7-74.7	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**							1								**1**	47.3-67.3	1
2:45	**3:00**																	
2:00	**3:00**							1								**1**	47.3-67.3	
3:00	**3:15**																	
3:15	**3:30**																	
3:30	**3:45**																	
3:45	**4:00**																	
3:00	**4:00**																	
4:00	**4:15**								1							**1**	55.2-75.2	1
4:15	**4:30**							1	1							**2**	57.7-77.7	2
4:30	**4:45**																	
4:45	**5:00**																	
4:00	**5:00**							1	2							**2**	57.7-77.7	
5:00	**5:15**								2							**2**	60.4-80.4	2
5:15	**5:30**																	
5:30	**5:45**						1	1								**2**	46.2-66.2	2
5:45	**6:00**						1									**1**	38.4-58.4	1
5:00	**6:00**						2	1	2							**2**	60.4-80.4	
6:00	**6:15**						1	1		1						**3**	42.9-62.9	2
6:15	**6:30**							1	1							**2**	51.6-71.6	2
6:30	**6:45**							3	1	1						**5**	62.0-82.0	5
6:45	**7:00**						1	1	1							**3**	43.9-63.9	2
6:00	**7:00**						2	6	3	2						**5**	62.0-82.0	
7:00	**7:15**						1	3	1	1						**6**	53.0-73.0	5
7:15	**7:30**							2	3	1						**6**	64.1-84.1	6
7:30	**7:45**					1	2	4	3							**10**	57.7-77.7	9
7:45	**8:00**					1	4	7	2							**14**	48.8-68.8	12
7:00	**8:00**					2	7	16	9	2						**6**	64.1-84.1	
8:00	**8:15**						1	7	2	1						**11**	51.5-71.5	10
8:15	**8:30**			1			6	11	2							**20**	54.0-74.0	19
8:30	**8:45**						8	3	1							**12**	47.1-67.1	11
8:45	**9:00**						6	8								**14**	49.2-69.2	14
8:00	**9:00**			1			21	29	5	1						**20**	54.0-74.0	
9:00	**9:15**					1		4		1						**6**	49.0-69.0	5
9:15	**9:30**						2	3		1						**6**	47.7-67.7	5
9:30	**9:45**					1	1	2	1							**5**	49.2-69.2	4
9:45	**10:00**					3	3	4		1						**11**	48.3-68.3	8
9:00	**10:00**					5	6	13	1	3						**5**	49.2-69.2	
10:00	**10:15**					2	2	2		1						**7**	41.2-61.2	5
10:15	**10:30**					1	3	3	1							**8**	53.3-73.3	7
10:30	**10:45**						3									**3**	40.4-60.4	3
10:45	**11:00**						4	1	1							**6**	50.9-70.9	5
10:00	**11:00**					3	12	6	2	1						**8**	53.3-73.3	
11:00	**11:15**						1		1	1						**3**	69.4-89.4	2
11:15	**11:30**						1	3	1							**5**	56.4-76.4	5
11:30	**11:45**					3	2	3	1							**9**	43.1-63.1	6
11:45	**12:00**						4	4	2							**10**	50.4-70.4	8
11:00	**12:00**					3	8	10	5	1						**3**	69.4-89.4	

12:00	**12:15**					3	3	1			**7**	49.8-69.8	6
12:15	**12:30**				1	3	2	2			**8**	54.7-74.7	6
12:30	**12:45**					4	1	3	1		**9**	54.7-74.7	6
12:45	**13:00**				3	4	4			1	**12**	47.2-67.2	9
12:00	**13:00**				4	14	10	6	1	1	**8**	54.7-74.7	
13:00	**13:15**					2	7				**9**	48.9-68.9	9
13:15	**13:30**					3	3	3		1	**10**	54.5-74.5	7
13:30	**13:45**					2	3	3			**8**	52.7-72.7	6
13:45	**14:00**					3	5	1			**9**	49.6-69.6	8
13:00	**14:00**					10	18	7		1	**10**	54.5-74.5	
14:00	**14:15**				1		5	4			**10**	58.6-78.6	9
14:15	**14:30**				2	2		2	1		**7**	34.5-54.5	4
14:30	**14:45**	1				3	1	3	1		**9**	56.6-76.6	5
14:45	**15:00**				4	3	9	2	1		**19**	56.0-76.0	13
14:00	**15:00**	1			7	8	15	11	3		**10**	58.6-78.6	
15:00	**15:15**					3	3	2	1		**9**	54.6-74.6	7
15:15	**15:30**				4	9	9	3			**25**	49.3-69.3	21
15:30	**15:45**			1		5	4	5	1		**16**	53.4-73.4	10
15:45	**16:00**				3	4	3	1	2	1	**14**	46.1-66.1	8
15:00	**16:00**			1	7	21	19	11	4	1	**9**	54.6-74.6	
16:00	**16:15**				1	2	18	2	2		**25**	57.9-77.9	22
16:15	**16:30**					18	3	3			**24**	44.8-64.8	21
16:30	**16:45**					13	11	8	3		**35**	53.1-73.1	27
16:45	**17:00**				2	12	10	10	2		**36**	57.4-77.4	28
16:00	**17:00**				3	45	42	23	7		**25**	57.9-77.9	
17:00	**17:15**			1		5	7	11	2		**26**	57.3-77.3	19
17:15	**17:30**					7	27	7	4		**45**	56.0-76.0	38
17:30	**17:45**			1		2	8	9			**20**	53.2-73.2	17
17:45	**18:00**					6	8	6			**20**	55.5-75.5	16
17:00	**18:00**			2		20	50	33	6		**26**	57.3-77.3	
18:00	**18:15**				1	1	4	6	3		**15**	62.1-82.1	13
18:15	**18:30**			1	1	1	4	4	3		**14**	62.9-82.9	10
18:30	**18:45**					1	7	6	1		**15**	59.1-79.1	13
18:45	**19:00**					1	5	2	3	1	**12**	61.2-81.2	8
18:00	**19:00**			1	2	4	20	18	10	1	**14**	62.9-82.9	
19:00	**19:15**	1				1	1	5			**8**	58.8-78.8	6
19:15	**19:30**				1	1	3	4	1		**10**	56.9-76.9	7
19:30	**19:45**							1			**1**	54.8-74.8	1
19:45	**20:00**					2	1	2			**5**	55.9-75.9	4
19:00	**20:00**	1			1	4	5	12	1		**8**	58.8-78.8	
20:00	**20:15**					2	1		1		**4**	47.5-67.5	3
20:15	**20:30**				1			2			**3**	59.7-79.7	2
20:30	**20:45**					1	3	1			**5**	49.8-69.8	4
20:45	**21:00**				1	2	1	1			**5**	42.6-62.6	4
20:00	**21:00**				2	5	5	4	1		**3**	59.7-79.7	
21:00	**21:15**						1				**1**	41.1-61.1	1
21:15	**21:30**					1					**1**	40.7-60.7	1
21:30	**21:45**							1	1		**2**	62.9-82.9	2
21:45	**22:00**				1		1		1	1	**4**	41.6-61.6	2
21:00	**22:00**				1	1	2	1	2	1	**2**	62.9-82.9	
22:00	**22:15**						1				**1**	48.2-68.2	1
22:15	**22:30**					1					**1**	33.0-53.0	1
22:30	**22:45**												
22:45	**23:00**						1				**1**	43.3-63.3	1
22:00	**23:00**					1	2				**1**	48.2-68.2	
23:00	**23:15**					2					**2**	38.8-58.8	2
23:15	**23:30**						2		2		**4**	63.2-83.2	4
23:30	**23:45**						1				**1**	46.8-66.8	1
23:45	**OO:OO**						1				**1**	45.8-65.8	1
23:00	**OO:OO**					2	4		2		**4**	63.2-83.2	
Total		**3**	**4**	**40**	**194**	**276**	**157**	**47**	**5**		**726**		
		0.4%	0.6%	5.5%	26.7%	38.0%	21.6%	6.5%	0.7%				
AM PEAK		**1**		**3**	**8**	**11**	**3**	**1**			**20**		
period		8:15		9:45	8:30	8:15	7:15	6:00		8:15			
% of class		33.3%		7.5%	4.1%	4.0%	1.9%	2.1%				2.8%	
PM PEAK		**1**	**1**	**4**	**18**	**27**	**11**	**4**	**1**		**45**		
period		14:30	15:30	14:45	16:15	17:15	17:00	17:15	12:45	17:15			
% of class		33.3%	25.0%	10.0%	9.3%	9.8%	7.0%	8.5%	20.0%			6.2%	

15% Percentile :	**54**	KPH
50% Percentile :	**65**	KPH
85% Percentile :	**77**	KPH
95% Percentile :	**84**	KPH

20 KPH Pace Speed:	**55.5-75.5**	KPH
Number in Pace:	**506**	
Percent in Pace:	**69.7**	%
Number of Vehicles >50 KPH:	**683**	
Percent of Vehicles >50 KPH:	**94.1**	%
Mean Speed(average):	**66**	KPH

Report-2.3

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **South** Road :

Dates : 1 **4/30/2019**

Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**																	
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**																	
1:00	**1:15**								1							**1**	52.8-72.8	1
1:15	**1:30**																	
1:30	**1:45**																	
1:45	**2:00**									1						**1**	66.6-86.6	1
1:00	**2:00**								1	1						**1**	66.6-86.6	
2:00	**2:15**						1									**1**	36.6-56.6	1
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**							1								**1**	49.2-69.2	1
2:00	**3:00**						1	1								**1**	49.2-69.2	
3:00	**3:15**								1							**1**	54.4-74.4	1
3:15	**3:30**																	
3:30	**3:45**								1							**1**	55.9-75.9	1
3:45	**4:00**							1								**1**	49.9-69.9	1
3:00	**4:00**							1	2							**1**	55.9-75.9	
4:00	**4:15**																	
4:15	**4:30**					1	1	2				1				**5**	49.1-69.1	4
4:30	**4:45**								1							**1**	57.0-77.0	1
4:45	**5:00**							1	3							**4**	58.8-78.8	4
4:00	**5:00**					1	1	3	4			1				**4**	58.8-78.8	
5:00	**5:15**						1									**1**	38.9-58.9	1
5:15	**5:30**						1	2		2						**5**	68.3-88.3	4
5:30	**5:45**							1	2			1				**4**	60.6-80.6	3
5:45	**6:00**								5	2						**7**	65.2-85.2	7
5:00	**6:00**						2	3	7	4		1				**5**	68.3-88.3	
6:00	**6:15**						1	6	3							**10**	58.4-78.4	10
6:15	**6:30**							1	10		1					**12**	59.5-79.5	11
6:30	**6:45**						4	4	4	4						**16**	54.0-74.0	10
6:45	**7:00**						4	4	11	1	1					**21**	58.7-78.7	18
6:00	**7:00**						9	15	28	5	2					**12**	59.5-79.5	
7:00	**7:15**							8	6							**14**	58.8-78.8	14
7:15	**7:30**						2	7	17	1						**27**	58.8-78.8	25
7:30	**7:45**						4	17	7							**28**	55.7-75.7	25
7:45	**8:00**					1	2	9	4							**16**	53.1-73.1	14
7:00	**8:00**					1	8	41	34	1						**14**	58.8-78.8	
8:00	**8:15**							5	7	1						**13**	59.9-79.9	12
8:15	**8:30**				1		3	8	3							**15**	56.4-76.4	14
8:30	**8:45**					1	7	6	2	1						**17**	49.3-69.3	13
8:45	**9:00**						6	7	5							**18**	55.2-75.2	15
8:00	**9:00**				1	1	16	26	17	2						**13**	59.9-79.9	
9:00	**9:15**						1	4	4							**9**	60.9-80.9	8
9:15	**9:30**						3	4	2							**9**	53.1-73.1	8
9:30	**9:45**						4	2	4	1						**11**	51.3-71.3	10
9:45	**10:00**						2	5	1							**8**	54.8-74.8	8
9:00	**10:00**						10	15	11	1						**9**	60.9-80.9	
10:00	**10:15**						1	12	5							**18**	57.9-77.9	18
10:15	**10:30**					1	1	4	3							**9**	51.9-71.9	7
10:30	**10:45**						2	4	5							**11**	54.4-74.4	9
10:45	**11:00**						4	4	2							**10**	52.4-72.4	9
10:00	**11:00**					1	8	24	15							**18**	57.9-77.9	
11:00	**11:15**		1				2	7	3							**13**	57.1-77.1	12
11:15	**11:30**					1	2	6	2							**11**	53.8-73.8	10
11:30	**11:45**				2	1	2	2	1	1						**9**	47.4-67.4	5
11:45	**12:00**					1	5	7	1	1	1					**16**	54.2-74.2	13
11:00	**12:00**		1		2	3	11	22	7	2	1					**13**	57.1-77.1	

12:00	**12:15**				1	3	8		1			**13**	48.8-68.8	11
12:15	**12:30**				1	3	6	2				**12**	49.0-69.0	9
12:30	**12:45**					5	3	2	2			**12**	53.1-73.1	10
12:45	**13:00**				2	7	2	3	1			**15**	45.4-65.4	11
12:00	**13:00**				4	18	19	7	4			**12**	53.1-73.1	
13:00	**13:15**					1	5	1	1			**8**	51.9-71.9	7
13:15	**13:30**				1	4	6	1				**12**	52.5-72.5	11
13:30	**13:45**				3	5	8		2			**18**	46.4-66.4	13
13:45	**14:00**					3	2	3		1		**9**	54.8-74.8	7
13:00	**14:00**				4	13	21	5	3	1		**9**	54.8-74.8	
14:00	**14:15**		1			3	2	1				**7**	53.7-73.7	6
14:15	**14:30**				2	2	7					**11**	50.7-70.7	11
14:30	**14:45**				1	6	5					**12**	48.1-68.1	12
14:45	**15:00**		2			4	3	4				**13**	53.7-73.7	10
14:00	**15:00**		3		3	15	17	5				**7**	53.7-73.7	
15:00	**15:15**					11	5	2				**18**	49.5-69.5	16
15:15	**15:30**		1		3	14	6	3				**27**	47.9-67.9	21
15:30	**15:45**	1			1	8	6	2				**18**	47.0-67.0	14
15:45	**16:00**				1	4	2	1				**8**	43.7-63.7	7
15:00	**16:00**	1	1		5	37	19	8				**18**	49.5-69.5	
16:00	**16:15**					5	8	2	1	1		**17**	55.2-75.2	14
16:15	**16:30**				1	2	5	2				**10**	55.6-75.6	9
16:30	**16:45**					5	9	5	1			**20**	54.2-74.2	17
16:45	**17:00**					1	5	1	2	1		**10**	51.1-71.1	7
16:00	**17:00**				1	13	27	10	4	2		**10**	55.6-75.6	
17:00	**17:15**						8	6		1		**15**	55.1-75.1	14
17:15	**17:30**					3	7	7	1	1		**19**	56.4-76.4	15
17:30	**17:45**						4	5	1	1		**11**	59.2-79.2	9
17:45	**18:00**					1	2	5				**8**	56.5-76.5	8
17:00	**18:00**					4	21	23	2	3		**11**	59.2-79.2	
18:00	**18:15**					2	3	2				**7**	52.5-72.5	6
18:15	**18:30**				2	5	3	1	1	1		**13**	43.6-63.6	9
18:30	**18:45**				1	1	9	2	1			**14**	57.9-77.9	12
18:45	**19:00**					2	1	2		1		**6**	54.0-74.0	5
18:00	**19:00**				3	10	16	7	2	2		**14**	57.9-77.9	
19:00	**19:15**					1	7	3	1			**12**	58.6-78.6	10
19:15	**19:30**				3	1	2					**6**	38.4-58.4	4
19:30	**19:45**						4	2				**6**	56.0-76.0	6
19:45	**20:00**				1	1	1	3				**6**	53.7-73.7	4
19:00	**20:00**				4	3	14	8	1			**12**	58.6-78.6	
20:00	**20:15**					1		2	1			**4**	54.1-74.1	3
20:15	**20:30**					2	1	1				**4**	53.7-73.7	4
20:30	**20:45**				1		1	2	1			**5**	64.9-84.9	4
20:45	**21:00**					3	1		1			**5**	50.4-70.4	4
20:00	**21:00**				1	6	3	5	3			**5**	64.9-84.9	
21:00	**21:15**					1	1	3				**5**	57.2-77.2	4
21:15	**21:30**						2	1				**3**	53.2-73.2	3
21:30	**21:45**													
21:45	**22:00**						2					**2**	45.5-65.5	2
21:00	**22:00**					1	5	4				**5**	57.2-77.2	
22:00	**22:15**					1	1					**2**	50.7-70.7	2
22:15	**22:30**							1				**1**	53.4-73.4	1
22:30	**22:45**					1	1					**2**	48.7-68.7	2
22:45	**23:00**					1						**1**	33.0-53.0	1
22:00	**23:00**					3	2	1				**1**	53.4-73.4	
23:00	**23:15**				1			1				**2**	24.7-44.7	1
23:15	**23:30**				1							**1**	29.3-49.3	1
23:30	**23:45**													
23:45	**OO:OO**													
23:00	**OO:OO**				2			1				**1**	29.3-49.3	
Total		**2**	**7**	**34**	**189**	**315**	**210**	**35**	**11**	**2**		**805**		
		0.2%	0.9%	4.2%	23.5%	39.1%	26.1%	4.3%	1.4%	0.2%				
AM PEAK		**1**	**2**	**1**	**7**	**17**	**17**	**4**	**1**	**1**		**28**		
period		11:00	11:30	4:15	8:30	7:30	7:15	6:30	6:15	4:15		7:30		
% of class		50.0%	28.6%	2.9%	3.7%	5.4%	8.1%	11.4%	9.1%	50.0%			3.5%	
PM PEAK		**1**	**2**	**3**	**14**	**9**	**7**	**2**	**1**			**27**		
period		15:30	14:45	13:30	15:15	16:30	17:15	12:30	13:45			15:15		
% of class		50.0%	28.6%	8.8%	7.4%	2.9%	3.3%	5.7%	9.1%				3.4%	

15% Percentile :	**55**	KPH
50% Percentile :	**66**	KPH
85% Percentile :	**78**	KPH
95% Percentile :	**83**	KPH

20 KPH Pace Speed:	**56.0-76.0**	KPH
Number in Pace:	**597**	
Percent in Pace:	**74.2**	%
Number of Vehicles >50 KPH:	**765**	
Percent of Vehicles >50 KPH:	**95.0**	%
Mean Speed(average):	**67**	KPH

Report-2.4

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **South** Road :

Dates : 1 **5/1/2019**

Speeds,km/h ------->		11	11 21	21 31	31 41	41 51	51 61	61 71	71 81	81 91	91 101	101 111	111 121	121 131	131 140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**							1								**1**	43.8-63.8	1
0:15	**0:30**								1							**1**	57.1-77.1	1
0:30	**0:45**																	
0:45	**1:00**					1										**1**	29.8-49.8	1
OO:OO	**1:00**					1		1	1							**1**	57.1-77.1	
1:00	**1:15**																	
1:15	**1:30**																	
1:30	**1:45**						1									**1**	39.8-59.8	1
1:45	**2:00**																	
1:00	**2:00**						1									**1**	39.8-59.8	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**																	
2:45	**3:00**																	
2:00	**3:00**																	
3:00	**3:15**							1	1							**2**	57.7-77.7	2
3:15	**3:30**							1								**1**	43.7-63.7	1
3:30	**3:45**							1								**1**	50.0-70.0	1
3:45	**4:00**																	
3:00	**4:00**							3	1							**2**	57.7-77.7	
4:00	**4:15**							2	1							**3**	59.6-79.6	3
4:15	**4:30**					1	1	1	1							**4**	43.9-63.9	3
4:30	**4:45**						1			1	1					**3**	81.0-101.0	2
4:45	**5:00**							1	3							**4**	57.2-77.2	4
4:00	**5:00**					1	2	4	5	1	1					**3**	31.0-101.0	
5:00	**5:15**							2								**2**	49.9-69.9	2
5:15	**5:30**						1	2		1	1					**5**	50.5-70.5	3
5:30	**5:45**					1		2	2	3						**8**	66.2-86.2	7
5:45	**6:00**								5							**5**	60.1-80.1	5
5:00	**6:00**					1	1	6	7	4	1					**8**	66.2-86.2	
6:00	**6:15**							3	2	1						**6**	61.6-81.6	6
6:15	**6:30**							5	4	1						**10**	61.6-81.6	10
6:30	**6:45**							13	3	1						**17**	56.0-76.0	16
6:45	**7:00**							8	5	1						**14**	61.8-81.8	14
6:00	**7:00**							29	14	4						**14**	61.8-81.8	
7:00	**7:15**						3	8	4	4						**19**	51.5-71.5	13
7:15	**7:30**						1	9	5	1						**16**	57.3-77.3	14
7:30	**7:45**					1	2	10	5	2						**20**	63.0-83.0	17
7:45	**8:00**						2	8	9							**19**	55.1-75.1	18
7:00	**8:00**					1	8	35	23	7						**20**	63.0-83.0	
8:00	**8:15**					2		9	3							**14**	56.2-76.2	12
8:15	**8:30**						5	10	3							**18**	53.4-73.4	17
8:30	**8:45**					1	4	7	3	2						**17**	53.3-73.3	14
8:45	**9:00**				1	1	13	7	5							**27**	53.9-73.9	25
8:00	**9:00**				1	4	22	33	14	2						**14**	56.2-76.2	
9:00	**9:15**						3	2	3							**8**	51.3-71.3	6
9:15	**9:30**						3	6	3							**12**	48.8-68.8	9
9:30	**9:45**				1	1	1	1	3							**7**	56.6-76.6	4
9:45	**10:00**					1	1	4								**6**	46.5-66.5	5
9:00	**10:00**				1	2	8	13	9							**7**	56.6-76.6	
10:00	**10:15**						2		1							**3**	53.3-73.3	3
10:15	**10:30**					2	2	3	3							**10**	55.9-75.9	8
10:30	**10:45**					1		7								**8**	48.7-68.7	7
10:45	**11:00**		1				2	2	2	1						**8**	54.8-74.8	6
10:00	**11:00**		1			3	6	12	6	1						**10**	55.9-75.9	
11:00	**11:15**					1	1	6								**8**	49.9-69.9	8
11:15	**11:30**						5	4	1							**10**	51.8-71.8	10
11:30	**11:45**						2	6	1							**9**	56.3-76.3	9
11:45	**12:00**						3	4	3							**10**	53.6-73.6	8
11:00	**12:00**					1	11	20	5							**9**	56.3-76.3	

12:00	**12:15**						1	2		1		**4**	51.0-71.0	3
12:15	**12:30**						4	7	1	2		**14**	48.4-68.4	11
12:30	**12:45**						9	7	2			**18**	53.3-73.3	17
12:45	**13:00**						3	1	1	1		**6**	52.2-72.2	5
12:00	**13:00**						17	17	4	4		**18**	53.3-73.3	
13:00	**13:15**						3	7	2	1		**13**	54.5-74.5	11
13:15	**13:30**						2	5	1			**8**	48.5-68.5	7
13:30	**13:45**						3	4	5			**12**	54.0-74.0	11
13:45	**14:00**						4	3	1			**8**	44.6-64.6	7
13:00	**14:00**						12	19	9	1		**13**	54.5-74.5	
14:00	**14:15**						2	4	2			**8**	52.3-72.3	7
14:15	**14:30**						2	3	5			**10**	60.9-80.9	8
14:30	**14:45**					2	3	7				**12**	48.4-68.4	10
14:45	**15:00**				1	2	1	7				**11**	48.7-68.7	10
14:00	**15:00**				1	4	8	21	7			**10**	60.9-80.9	
15:00	**15:15**				1		2	5				**8**	50.7-70.7	7
15:15	**15:30**				2	7	17	11	4			**41**	48.6-68.6	30
15:30	**15:45**					2	8	11	2		1	**24**	51.9-71.9	21
15:45	**16:00**					3	2	7	1		1	**14**	46.4-66.4	11
15:00	**16:00**				3	12	29	34	7		2	**24**	51.9-71.9	
16:00	**16:15**						4	6	2	1		**13**	53.9-73.9	11
16:15	**16:30**					1	2	6	2	1		**12**	54.4-74.4	10
16:30	**16:45**						5	3	2	2		**12**	49.7-69.7	8
16:45	**17:00**						2	6	2	2		**12**	51.9-71.9	9
16:00	**17:00**					1	13	21	8	6		**12**	54.4-74.4	
17:00	**17:15**		2				3	9	3	1		**18**	55.6-75.6	15
17:15	**17:30**						2	5	3			**10**	51.4-71.4	8
17:30	**17:45**							4	1	2		**7**	62.9-82.9	7
17:45	**18:00**							4		1		**5**	61.7-81.7	5
17:00	**18:00**		2				5	22	7	4		**7**	62.9-82.9	
18:00	**18:15**							5	3			**8**	60.0-80.0	8
18:15	**18:30**							1	3			**4**	58.4-78.4	4
18:30	**18:45**						1	2	3	2		**8**	61.4-81.4	6
18:45	**19:00**						1	6	1			**8**	49.8-69.8	7
18:00	**19:00**						2	14	10	2		**8**	61.4-81.4	
19:00	**19:15**				2			4	1	1		**8**	60.5-80.5	5
19:15	**19:30**						1	3	2			**6**	54.4-74.4	5
19:30	**19:45**					1	2	3		1		**7**	49.8-69.8	5
19:45	**20:00**						4					**4**	37.0-57.0	4
19:00	**20:00**				2	1	7	10	3	2		**8**	60.5-80.5	
20:00	**20:15**						3	2	1			**6**	52.6-72.6	6
20:15	**20:30**						2	4	1			**7**	46.1-66.1	6
20:30	**20:45**					1	1	3				**5**	49.3-69.3	5
20:45	**21:00**						1	2		1		**4**	46.3-66.3	3
20:00	**21:00**					1	7	11	2	1		**6**	52.6-72.6	
21:00	**21:15**							1	1			**2**	56.6-76.6	2
21:15	**21:30**						1	3	1			**5**	51.2-71.2	5
21:30	**21:45**					1			1			**2**	27.1-47.1	1
21:45	**22:00**													
21:00	**22:00**					1	1	4	3			**2**	56.6-76.6	
22:00	**22:15**													
22:15	**22:30**							1	1			**2**	52.5-72.5	2
22:30	**22:45**							1	2			**3**	60.3-80.3	3
22:45	**23:00**													
22:00	**23:00**							2	3			**3**	60.3-80.3	
23:00	**23:15**													
23:15	**23:30**							1				**1**	50.1-70.1	1
23:30	**23:45**									1		**1**	64.9-84.9	1
23:45	**OO:OO**							1				**1**	48.2-68.2	1
23:00	**OO:OO**							2		1		**1**	64.9-84.9	
Total		**1**	**2**	**8**	**34**	**160**	**333**	**148**	**40**	**4**		**730**		
		0.1%	0.3%	1.1%	4.7%	21.9%	45.6%	20.3%	5.5%	0.5%				
AM PEAK		**1**		**1**	**2**	**13**	**13**	**9**	**4**	**1**		**27**		
period		10:45		8:45	8:00	8:45	6:30	7:45	7:00	4:30		8:45		
% of class		100.0%		12.5%	5.9%	8.1%	3.9%	6.1%	10.0%	25.0%			3.7%	
PM PEAK			**2**	**2**	**7**	**17**	**11**	**5**	**2**	**1**		**41**		
period			17:00	15:15	15:15	15:15	15:15	13:30	12:15	15:30		15:15		
% of class			100.0%	25.0%	20.6%	10.6%	3.3%	3.4%	5.0%	25.0%			5.6%	

15% Percentile :	**55**	KPH
50% Percentile :	**66**	KPH
85% Percentile :	**77**	KPH
95% Percentile :	**83**	KPH

20 KPH Pace Speed:	**54.6-74.6**	KPH
Number in Pace:	**543**	
Percent in Pace:	**74.4**	%
Number of Vehicles >50 KPH:	**688**	
Percent of Vehicles >50 KPH:	**94.2**	%
Mean Speed(average):	**66**	KPH

Report-2.5

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **North + South** Road :

Dates : 1 **4/30/2019**

Speeds,km/h -------->		11	11 21	21 31	31 41	41 51	51 61	61 71	71 81	81 91	91 101	101 111	111 121	121 131	131 140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**							1								**1**	45.7-65.7	1
0:15	**0:30**																	
0:30	**0:45**																	
0:45	**1:00**																	
OO:OO	**1:00**							1								**1**	45.7-65.7	
1:00	**1:15**								1							**1**	52.8-72.8	1
1:15	**1:30**						1									**1**	38.7-58.7	1
1:30	**1:45**																	
1:45	**2:00**									1						**1**	66.6-86.6	1
1:00	**2:00**						1		1	1						**1**	66.6-86.6	
2:00	**2:15**						1									**1**	36.6-56.6	1
2:15	**2:30**																	
2:30	**2:45**							1								**1**	50.7-70.7	1
2:45	**3:00**							1								**1**	49.2-69.2	1
2:00	**3:00**						1	2								**1**	50.7-70.7	
3:00	**3:15**								1							**1**	54.4-74.4	1
3:15	**3:30**																	
3:30	**3:45**								1							**1**	55.9-75.9	1
3:45	**4:00**							1								**1**	49.9-69.9	1
3:00	**4:00**							1	2							**1**	55.9-75.9	
4:00	**4:15**																	
4:15	**4:30**					1	1	3				1				**6**	49.1-69.1	5
4:30	**4:45**								1							**1**	57.0-77.0	1
4:45	**5:00**							1	3							**4**	58.8-78.8	4
4:00	**5:00**					1	1	4	4			1				**4**	58.8-78.8	
5:00	**5:15**						1		1							**2**	58.2-78.2	2
5:15	**5:30**						1	2		2						**5**	68.3-88.3	4
5:30	**5:45**					1	2	2	2			1				**8**	48.2-68.2	5
5:45	**6:00**							1	5	2						**8**	62.5-82.5	7
5:00	**6:00**					1	4	5	8	4		1				**5**	68.3-88.3	
6:00	**6:15**					1	2	7	3							**13**	54.2-74.2	11
6:15	**6:30**						1	2	10		1					**14**	59.5-79.5	12
6:30	**6:45**						4	6	5	6						**21**	61.5-81.5	15
6:45	**7:00**						5	6	12	1	1					**25**	58.7-78.7	21
6:00	**7:00**					1	12	21	30	7	2					**21**	61.5-81.5	
7:00	**7:15**				1			10	8							**19**	58.8-78.8	18
7:15	**7:30**				1		4	10	18	2						**35**	56.6-76.6	29
7:30	**7:45**						9	20	10							**39**	55.7-75.7	35
7:45	**8:00**					2	5	11	9							**27**	54.4-74.4	23
7:00	**8:00**				2	2	18	51	45	2						**19**	58.8-78.8	
8:00	**8:15**						6	7	9	1						**23**	58.1-78.1	18
8:15	**8:30**				2		12	18	6							**38**	56.4-76.4	34
8:30	**8:45**					1	13	10	3	1						**28**	52.9-72.9	24
8:45	**9:00**					2	8	13	9							**32**	56.3-76.3	26
8:00	**9:00**				2	3	39	48	27	2						**23**	58.1-78.1	
9:00	**9:15**					1	4	10	8							**23**	60.9-80.9	18
9:15	**9:30**						6	9	2							**17**	50.9-70.9	15
9:30	**9:45**					1	7	5	7	1						**21**	51.3-71.3	16
9:45	**10:00**						5	10	7	1						**23**	58.0-78.0	19
9:00	**10:00**					2	22	34	24	2						**23**	60.9-80.9	
10:00	**10:15**					1	5	16	5							**27**	56.0-76.0	23
10:15	**10:30**					2	3	6	6							**17**	59.9-79.9	12
10:30	**10:45**						3	7	8	1						**19**	54.6-74.6	15
10:45	**11:00**						5	5	3							**13**	52.4-72.4	11
10:00	**11:00**					3	16	34	22	1						**17**	59.9-79.9	
11:00	**11:15**		1		1		7	12	3							**24**	53.0-73.0	20
11:15	**11:30**					1	5	11	2							**19**	53.8-73.8	18
11:30	**11:45**		2		4	1	4	4	1	1						**17**	48.0-68.0	8
11:45	**12:00**			1		1	6	9	3	1	1					**22**	52.6-72.6	17
11:00	**12:00**		3	1	5	3	22	36	9	2	1					**19**	53.8-73.8	

12:00	**12:15**				2	6	10	2	2			**22**	51.8-71.8	18
12:15	**12:30**				2	7	9	3				**21**	53.3-73.3	17
12:30	**12:45**					12	7	5	2	1		**27**	53.1-73.1	21
12:45	**13:00**				2	8	3	8	1			**22**	45.4-65.4	13
12:00	**13:00**				6	33	29	18	5	1		**21**	53.3-73.3	
13:00	**13:15**					6	9	1	1			**17**	51.9-71.9	16
13:15	**13:30**				1	8	7	1				**17**	50.4-70.4	15
13:30	**13:45**				4	8	15	1	2			**30**	51.5-71.5	24
13:45	**14:00**				1	6	6	7	1	1		**22**	55.4-75.4	17
13:00	**14:00**				6	28	37	10	4	1		**22**	55.4-75.4	
14:00	**14:15**			1	3	6	6	1				**17**	50.7-70.7	12
14:15	**14:30**				2	5	12	4				**23**	50.7-70.7	19
14:30	**14:45**				3	11	9	3				**26**	48.1-68.1	23
14:45	**15:00**			3	4	6	9	4				**26**	45.2-65.2	17
14:00	**15:00**			4	12	28	36	12				**17**	50.7-70.7	
15:00	**15:15**			1	3	20	9	4				**37**	49.9-69.9	29
15:15	**15:30**			1	5	20	14	4	2			**46**	50.7-70.7	35
15:30	**15:45**	1			2	11	10	6				**30**	47.0-67.0	22
15:45	**16:00**				5	14	5	6		1		**31**	43.7-63.7	22
15:00	**16:00**	1		2	15	65	38	20	2	1		**46**	50.7-70.7	
16:00	**16:15**				1	12	15	8	2	1		**39**	55.2-75.2	30
16:15	**16:30**				3	9	20	5				**37**	55.6-75.6	31
16:30	**16:45**				3	9	22	14	4	1		**53**	57.6-77.6	40
16:45	**17:00**					8	21	17	3	1		**50**	54.1-74.1	40
16:00	**17:00**				7	38	78	44	9	3		**53**	57.6-77.6	
17:00	**17:15**			1	1	5	25	21	1	1		**55**	60.6-80.6	46
17:15	**17:30**				1	14	17	12	4	1		**49**	56.4-76.4	35
17:30	**17:45**				1	8	22	6	2	1		**40**	52.0-72.0	31
17:45	**18:00**					2	14	22	1			**39**	59.9-79.9	36
17:00	**18:00**			1	3	29	78	61	8	3		**55**	60.6-80.6	
18:00	**18:15**					6	12	5				**23**	58.1-78.1	21
18:15	**18:30**			1	2	8	11	8	5	1		**36**	51.4-71.4	22
18:30	**18:45**				1	2	14	8	5		1	**31**	58.9-78.9	23
18:45	**19:00**				1	2	7	6	1	1		**18**	57.0-77.0	15
18:00	**19:00**			1	4	18	44	27	11	2	1	**31**	58.9-78.9	
19:00	**19:15**			1		4	11	7	2		1	**26**	55.9-75.9	19
19:15	**19:30**				3	1	2	2				**8**	56.2-76.2	5
19:30	**19:45**						9	3	1			**13**	61.7-81.7	13
19:45	**20:00**				2	4	5	7	1			**19**	53.7-73.7	12
19:00	**20:00**			1	5	9	27	19	4		1	**13**	61.7-81.7	
20:00	**20:15**					1	5	4	1			**11**	55.5-75.5	10
20:15	**20:30**				1	4	3	4				**12**	54.7-74.7	11
20:30	**20:45**				2		2	7	1			**12**	64.9-84.9	10
20:45	**21:00**					6	4	1	1			**12**	50.4-70.4	10
20:00	**21:00**				3	11	14	16	3			**12**	64.9-84.9	
21:00	**21:15**					3	1	3				**7**	57.2-77.2	6
21:15	**21:30**				1	2	3	3				**9**	53.8-73.8	7
21:30	**21:45**							1				**1**	53.9-73.9	1
21:45	**22:00**				3	3	2		1			**9**	41.7-61.7	7
21:00	**22:00**				4	8	6	7	1			**7**	57.2-77.2	
22:00	**22:15**					1	2					**3**	50.7-70.7	3
22:15	**22:30**							1				**1**	53.4-73.4	1
22:30	**22:45**				1	2	1					**4**	48.7-68.7	4
22:45	**23:00**					2	1					**3**	45.8-65.8	3
22:00	**23:00**				1	5	4	1				**1**	53.4-73.4	
23:00	**23:15**				1	1		1				**3**	37.1-57.1	2
23:15	**23:30**				1			1				**2**	29.3-49.3	1
23:30	**23:45**					2						**2**	38.0-58.0	2
23:45	**OO:OO**					1						**1**	39.9-59.9	1
23:00	**OO:OO**				2	4		2				**1**	39.9-59.9	
Total		**4**	**1**	**18**	**84**	**412**	**628**	**409**	**68**	**14**	**4**	**1642**		
		0.2%	0.1%	1.1%	5.1%	25.1%	38.2%	24.9%	4.1%	0.9%	0.2%			
AM PEAK		**2**	**1**	**4**	**2**	**13**	**20**	**18**	**6**	**1**	**1**	**39**		
period		11:30	11:45	11:30	7:45	8:30	7:30	7:15	6:30	6:15	4:15	7:30		
% of class		50.0%	100.0%	22.2%	2.4%	3.2%	3.2%	4.4%	8.8%	7.1%	25.0%		2.4%	
PM PEAK		**1**		**3**	**5**	**20**	**25**	**22**	**5**	**1**	**1**	**55**		
period		15:30		14:45	15:15	15:00	17:00	17:45	18:15	12:30	18:30	17:00		
% of class		25.0%		16.7%	6.0%	4.9%	4.0%	5.4%	7.4%	7.1%	25.0%		3.3%	

15% Percentile :	**54**	KPH
50% Percentile :	**66**	KPH
85% Percentile :	**77**	KPH
95% Percentile :	**82**	KPH

20 KPH Pace Speed:	**56.7-76.7**	KPH
Number in Pace:	**1185**	
Percent in Pace:	**72.2**	%
Number of Vehicles >50 KPH:	**1543**	
Percent of Vehicles >50 KPH:	**94.0**	%
Mean Speed(average):	**66**	KPH

Report-2.6

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Direction : **North + South** Road :

Dates : 1 **5/1/2019**

		11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------->		11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number in Pace
OO:OO	**0:15**							1								**1**	43.8-63.8	1
0:15	**0:30**								1							**1**	57.1-77.1	1
0:30	**0:45**						1									**1**	40.8-60.8	1
0:45	**1:00**					1										**1**	29.8-49.8	1
OO:OO	**1:00**					1	1	1	1							**1**	57.1-77.1	
1:00	**1:15**							1	1							**2**	51.8-71.8	2
1:15	**1:30**								1							**1**	54.7-74.7	1
1:30	**1:45**						1									**1**	39.8-59.8	1
1:45	**2:00**																	
1:00	**2:00**						1	1	2							**1**	54.7-74.7	
2:00	**2:15**																	
2:15	**2:30**																	
2:30	**2:45**							1								**1**	47.3-67.3	1
2:45	**3:00**																	
2:00	**3:00**							1								**1**	47.3-67.3	
3:00	**3:15**							1	1							**2**	57.7-77.7	2
3:15	**3:30**							1								**1**	43.7-63.7	1
3:30	**3:45**							1								**1**	50.0-70.0	1
3:45	**4:00**																	
3:00	**4:00**							3	1							**2**	57.7-77.7	
4:00	**4:15**							2	2							**4**	59.6-79.6	4
4:15	**4:30**					1	1	2	2							**6**	57.7-77.7	5
4:30	**4:45**						1			1	1					**3**	81.0-101.0	2
4:45	**5:00**							1	3							**4**	57.2-77.2	4
4:00	**5:00**					1	2	5	7	1	1					**3**	81.0-101.0	
5:00	**5:15**							2	2							**4**	60.4-80.4	4
5:15	**5:30**						1	2		1	1					**5**	50.5-70.5	3
5:30	**5:45**					1	1	3	2	3						**10**	66.2-86.2	7
5:45	**6:00**						1		5							**6**	56.3-76.3	5
5:00	**6:00**					1	3	7	9	4	1					**10**	66.2-86.2	
6:00	**6:15**						1	4	2	2						**9**	54.6-74.6	7
6:15	**6:30**							6	5	1						**12**	61.6-81.6	12
6:30	**6:45**							16	4	2						**22**	56.0-76.0	20
6:45	**7:00**						1	9	6	1						**17**	61.8-81.8	16
6:00	**7:00**						2	35	17	6						**17**	61.8-81.8	
7:00	**7:15**						4	11	5	5						**25**	53.8-73.8	18
7:15	**7:30**						1	11	8	2						**22**	60.0-80.0	19
7:30	**7:45**					2	4	14	8	2						**30**	57.7-77.7	25
7:45	**8:00**					1	6	15	11							**33**	55.1-75.1	29
7:00	**8:00**					3	15	51	32	9						**22**	60.0-80.0	
8:00	**8:15**					2	1	16	5	1						**25**	61.4-81.4	22
8:15	**8:30**			1			11	21	5							**38**	54.0-74.0	36
8:30	**8:45**					1	12	10	4	2						**29**	53.3-73.3	24
8:45	**9:00**				1	1	19	15	5							**41**	53.9-73.9	39
8:00	**9:00**			1	1	4	43	62	19	3						**25**	61.4-81.4	
9:00	**9:15**					1	3	6	3	1						**14**	49.2-69.2	10
9:15	**9:30**						5	9	3	1						**18**	48.8-68.8	14
9:30	**9:45**				1	2	2	3	4							**12**	54.7-74.7	7
9:45	**10:00**					4	4	8		1						**17**	48.3-68.3	13
9:00	**10:00**				1	7	14	26	10	3						**12**	54.7-74.7	
10:00	**10:15**					2	4	2	1	1						**10**	41.2-61.2	7
10:15	**10:30**					3	5	6	4							**18**	55.9-75.9	15
10:30	**10:45**					1	3	7								**11**	48.7-68.7	10
10:45	**11:00**		1				6	3	3	1						**14**	54.8-74.8	11
10:00	**11:00**		1			6	18	18	8	2						**18**	55.9-75.9	
11:00	**11:15**					1	2	6	1	1						**11**	49.9-69.9	9
11:15	**11:30**						6	7	2							**15**	51.8-71.8	14
11:30	**11:45**					3	4	9	2							**18**	56.3-76.3	15
11:45	**12:00**						7	8	5							**20**	56.9-76.9	16
11:00	**12:00**					4	19	30	10	1						**20**	56.9-76.9	

12:00	**12:15**					4	5	1	1		**11**	51.0-71.0	9
12:15	**12:30**				1	7	9	3	2		**22**	48.4-68.4	16
12:30	**12:45**					13	8	5	1		**27**	54.7-74.7	22
12:45	**13:00**				3	7	5	1	1	1	**18**	50.5-70.5	13
12:00	**13:00**				4	31	27	10	5	1	**27**	54.7-74.7	
13:00	**13:15**					5	14	2	1		**22**	54.5-74.5	20
13:15	**13:30**					5	8	4		1	**18**	54.6-74.6	14
13:30	**13:45**					5	7	8			**20**	55.4-75.4	17
13:45	**14:00**					7	8	2			**17**	49.6-69.6	15
13:00	**14:00**					22	37	16	1	1	**20**	55.4-75.4	
14:00	**14:15**				1	2	9	6			**18**	59.2-79.2	16
14:15	**14:30**				2	4	3	7	1		**17**	62.2-82.2	11
14:30	**14:45**		1		2	6	8	3	1		**21**	56.6-76.6	15
14:45	**15:00**			1	6	4	16	2	1		**30**	48.7-68.7	21
14:00	**15:00**		1	1	11	16	36	18	3		**17**	62.2-82.2	
15:00	**15:15**			1		5	8	2	1		**17**	54.6-74.6	14
15:15	**15:30**			2	11	26	20	7			**66**	49.3-69.3	51
15:30	**15:45**			1	2	13	15	7	1	1	**40**	53.4-73.4	31
15:45	**16:00**				6	6	10	2	2	2	**28**	46.4-66.4	19
15:00	**16:00**			4	19	50	53	18	4	3	**17**	54.6-74.6	
16:00	**16:15**				1	6	24	4	3		**38**	57.9-77.9	33
16:15	**16:30**				1	20	9	5	1		**36**	52.1-72.1	30
16:30	**16:45**					18	14	10	5		**47**	53.1-73.1	35
16:45	**17:00**				2	14	16	12	4		**48**	53.5-73.5	36
16:00	**17:00**				4	58	63	31	13		**38**	57.9-77.9	
17:00	**17:15**		2	1		8	16	14	3		**44**	57.3-77.3	34
17:15	**17:30**					9	32	10	4		**55**	56.0-76.0	46
17:30	**17:45**			1		2	12	10	2		**27**	61.9-81.9	23
17:45	**18:00**					6	12	6	1		**25**	55.5-75.5	20
17:00	**18:00**		2	2		25	72	40	10		**27**	61.9-81.9	
18:00	**18:15**				1	1	9	9	3		**23**	62.1-82.1	21
18:15	**18:30**			1	1	1	5	7	3		**18**	62.9-82.9	14
18:30	**18:45**					2	9	9	3		**23**	61.4-81.4	19
18:45	**19:00**					2	11	3	3	1	**20**	61.2-81.2	15
18:00	**19:00**			1	2	6	34	28	12	1	**18**	62.9-82.9	
19:00	**19:15**		1	2		1	5	6	1		**16**	60.5-80.5	11
19:15	**19:30**				1	2	6	6	1		**16**	58.5-78.5	12
19:30	**19:45**				1	2	3	1	1		**8**	54.8-74.8	6
19:45	**20:00**					6	1	2			**9**	48.5-68.5	7
19:00	**20:00**		1	2	2	11	15	15	3		**16**	60.5-80.5	
20:00	**20:15**					5	3	1	1		**10**	52.6-72.6	9
20:15	**20:30**				1	2	4	3			**10**	46.1-66.1	7
20:30	**20:45**				1	2	6	1			**10**	49.8-69.8	9
20:45	**21:00**				1	3	3	1	1		**9**	46.3-66.3	7
20:00	**21:00**				3	12	16	6	2		**10**	52.6-72.6	
21:00	**21:15**						2	1			**3**	56.6-76.6	3
21:15	**21:30**					2	3	1			**6**	51.2-71.2	6
21:30	**21:45**				1			2	1		**4**	62.9-82.9	3
21:45	**22:00**				1		1		1	1	**4**	41.6-61.6	2
21:00	**22:00**				2	2	6	4	2	1	**4**	62.9-82.9	
22:00	**22:15**						1				**1**	48.2-68.2	1
22:15	**22:30**					1	1	1			**3**	52.5-72.5	3
22:30	**22:45**						1	2			**3**	60.3-80.3	3
22:45	**23:00**						1				**1**	43.3-63.3	1
22:00	**23:00**					1	4	3			**3**	60.3-80.3	
23:00	**23:15**					2					**2**	38.8-58.8	2
23:15	**23:30**						3		2		**5**	63.2-83.2	5
23:30	**23:45**						1		1		**2**	64.9-84.9	2
23:45	**OO:OO**						2				**2**	48.2-68.2	2
23:00	**OO:OO**					2	6		3		**2**	64.9-84.9	
Total		**1**	**5**	**12**	**74**	**354**	**609**	**305**	**87**	**9**	**1456**		
		0.1%	0.3%	0.8%	5.1%	24.3%	41.8%	20.9%	6.0%	0.6%			
AM PEAK		**1**	**1**	**1**	**4**	**19**	**21**	**11**	**5**	**1**	**41**		
period		10:45	8:15	8:45	9:45	8:45	8:15	7:45	7:00	4:30	8:45		
% of class		100.0%	20.0%	8.3%	5.4%	5.4%	3.4%	3.6%	5.7%	11.1%		2.8%	
PM PEAK			**2**	**2**	**11**	**26**	**32**	**14**	**5**	**2**	**66**		
period			17:00	15:15	15:15	15:15	17:15	17:00	16:30	15:45	15:15		
% of class			40.0%	16.7%	14.9%	7.3%	5.3%	4.6%	5.7%	22.2%		4.5%	

15% Percentile :	**55**	KPH
50% Percentile :	**66**	KPH
85% Percentile :	**77**	KPH
95% Percentile :	**84**	KPH

20 KPH Pace Speed:	**54.8-74.8**	KPH
Number in Pace:	**1045**	
Percent in Pace:	**71.8**	%
Number of Vehicles >50 KPH:	**1371**	
Percent of Vehicles >50 KPH:	**94.2**	%
Mean Speed(average):	**66**	KPH

Report-3.1

Location : **CW-66NS** **Scotland St - 240m S of McQueen Blvd**

Road :

Dates : **4/30/2019**

Directions ---------->		North Volume	North %	South Volume	South %	East Volume	East %	West Volume	West %	Total Volume	Total %
00:00	0:15	1	0.1%							1	0.1%
0:15	0:30										
0:30	0:45										
0:45	1:00										
00:00	1:00	1	0.1%							1	0.1%
1:00	1:15			1	0.1%					1	0.1%
1:15	1:30	1	0.1%							1	0.1%
1:30	1:45										
1:45	2:00			1	0.1%					1	0.1%
1:00	2:00	1	0.1%	2	0.2%					3	0.2%
2:00	2:15			1	0.1%					1	0.1%
2:15	2:30										
2:30	2:45	1	0.1%							1	0.1%
2:45	3:00			1	0.1%					1	0.1%
2:00	3:00	1	0.1%	2	0.2%					3	0.2%
3:00	3:15			1	0.1%					1	0.1%
3:15	3:30										
3:30	3:45			1	0.1%					1	0.1%
3:45	4:00			1	0.1%					1	0.1%
3:00	4:00			3	0.4%					3	0.2%
4:00	4:15										
4:15	4:30	1	0.1%	5	0.6%					6	0.4%
4:30	4:45			1	0.1%					1	0.1%
4:45	5:00			4	0.5%					4	0.2%
4:00	5:00	1	0.1%	10	1.2%					11	0.7%
5:00	5:15	1	0.1%	1	0.1%					2	0.1%
5:15	5:30			5	0.6%					5	0.3%
5:30	5:45	4	0.5%	4	0.5%					8	0.5%
5:45	6:00	1	0.1%	7	0.9%					8	0.5%
5:00	6:00	6	0.7%	17	2.1%					23	1.4%
6:00	6:15	3	0.4%	10	1.2%					13	0.8%
6:15	6:30	2	0.2%	12	1.5%					14	0.9%
6:30	6:45	5	0.6%	16	2.0%					21	1.3%
6:45	7:00	4	0.5%	21	2.6%					25	1.5%
6:00	7:00	14	1.7%	59	7.3%					73	4.4%
7:00	7:15	5	0.6%	14	1.7%					19	1.2%
7:15	7:30	8	1.0%	27	3.4%					35	2.1%
7:30	7:45	11	1.3%	28	3.5%					39	2.4%
7:45	8:00	11	1.3%	16	2.0%					27	1.6%
7:00	8:00	35	4.2%	85	10.6%					120	7.3%
8:00	8:15	10	1.2%	13	1.6%					23	1.4%
8:15	8:30	23	2.7%	15	1.9%					38	2.3%
8:30	8:45	11	1.3%	17	2.1%					28	1.7%
8:45	9:00	14	1.7%	18	2.2%					32	1.9%
8:00	9:00	58	6.9%	63	7.8%					121	7.4%
9:00	9:15	14	1.7%	9	1.1%					23	1.4%
9:15	9:30	8	1.0%	9	1.1%					17	1.0%
9:30	9:45	10	1.2%	11	1.4%					21	1.3%
9:45	10:00	15	1.8%	8	1.0%					23	1.4%
9:00	10:00	47	5.6%	37	4.6%					84	5.1%
10:00	10:15	9	1.1%	18	2.2%					27	1.6%
10:15	10:30	8	1.0%	9	1.1%					17	1.0%
10:30	10:45	8	1.0%	11	1.4%					19	1.2%
10:45	11:00	3	0.4%	10	1.2%					13	0.8%
10:00	11:00	28	3.3%	48	6.0%					76	4.6%
11:00	11:15	11	1.3%	13	1.6%					24	1.5%
11:15	11:30	8	1.0%	11	1.4%					19	1.2%
11:30	11:45	8	1.0%	9	1.1%					17	1.0%
11:45	12:00	6	0.7%	16	2.0%					22	1.3%
11:00	12:00	33	3.9%	49	6.1%					82	5.0%

12:00	12:15	9	1.1%	13	1.6%			22	1.3%
12:15	12:30	9	1.1%	12	1.5%			21	1.3%
12:30	12:45	15	1.8%	12	1.5%			27	1.6%
12:45	13:00	7	0.8%	15	1.9%			22	1.3%
12:00	13:00	40	4.8%	52	6.5%			92	5.6%
13:00	13:15	9	1.1%	8	1.0%			17	1.0%
13:15	13:30	5	0.6%	12	1.5%			17	1.0%
13:30	13:45	12	1.4%	18	2.2%			30	1.8%
13:45	14:00	13	1.6%	9	1.1%			22	1.3%
13:00	14:00	39	4.7%	47	5.8%			86	5.2%
14:00	14:15	10	1.2%	7	0.9%			17	1.0%
14:15	14:30	12	1.4%	11	1.4%			23	1.4%
14:30	14:45	14	1.7%	12	1.5%			26	1.6%
14:45	15:00	13	1.6%	13	1.6%			26	1.6%
14:00	15:00	49	5.9%	43	5.3%			92	5.6%
15:00	15:15	19	2.3%	18	2.2%			37	2.3%
15:15	15:30	19	2.3%	27	3.4%			46	2.8%
15:30	15:45	12	1.4%	18	2.2%			30	1.8%
15:45	16:00	23	2.7%	8	1.0%			31	1.9%
15:00	16:00	73	8.7%	71	8.8%			144	8.8%
16:00	16:15	22	2.6%	17	2.1%			39	2.4%
16:15	16:30	27	3.2%	10	1.2%			37	2.3%
16:30	16:45	33	3.9%	20	2.5%			53	3.2%
16:45	17:00	40	4.8%	10	1.2%			50	3.0%
16:00	17:00	122	14.6%	57	7.1%			179	10.9%
17:00	17:15	40	4.8%	15	1.9%			55	3.3%
17:15	17:30	30	3.6%	19	2.4%			49	3.0%
17:30	17:45	29	3.5%	11	1.4%			40	2.4%
17:45	18:00	31	3.7%	8	1.0%			39	2.4%
17:00	18:00	130	15.5%	53	6.6%			183	11.1%
18:00	18:15	16	1.9%	7	0.9%			23	1.4%
18:15	18:30	23	2.7%	13	1.6%			36	2.2%
18:30	18:45	17	2.0%	14	1.7%			31	1.9%
18:45	19:00	12	1.4%	6	0.7%			18	1.1%
18:00	19:00	68	8.1%	40	5.0%			108	6.6%
19:00	19:15	14	1.7%	12	1.5%			26	1.6%
19:15	19:30	2	0.2%	6	0.7%			8	0.5%
19:30	19:45	7	0.8%	6	0.7%			13	0.8%
19:45	20:00	13	1.6%	6	0.7%			19	1.2%
19:00	20:00	36	4.3%	30	3.7%			66	4.0%
20:00	20:15	7	0.8%	4	0.5%			11	0.7%
20:15	20:30	8	1.0%	4	0.5%			12	0.7%
20:30	20:45	7	0.8%	5	0.6%			12	0.7%
20:45	21:00	7	0.8%	5	0.6%			12	0.7%
20:00	21:00	29	3.5%	18	2.2%			47	2.9%
21:00	21:15	2	0.2%	5	0.6%			7	0.4%
21:15	21:30	6	0.7%	3	0.4%			9	0.5%
21:30	21:45	1	0.1%					1	0.1%
21:45	22:00	7	0.8%	2	0.2%			9	0.5%
21:00	22:00	16	1.9%	10	1.2%			26	1.6%
22:00	22:15	1	0.1%	2	0.2%			3	0.2%
22:15	22:30			1	0.1%			1	0.1%
22:30	22:45	2	0.2%	2	0.2%			4	0.2%
22:45	23:00	2	0.2%	1	0.1%			3	0.2%
22:00	23:00	5	0.6%	6	0.7%			11	0.7%
23:00	23:15	1	0.1%	2	0.2%			3	0.2%
23:15	23:30	1	0.1%	1	0.1%			2	0.1%
23:30	23:45	2	0.2%					2	0.1%
23:45	OO:OO	1	0.1%					1	0.1%
23:00	OO:OO	5	0.6%	3	0.4%			8	0.5%
Total		837		805				1642	100.0%
		51.0%		49.0%				100.0%	
AM PEAK		23		28				39	
period		8:15		7:30				7:30	
% of class			2.7%		3.5%				2.4%
PM PEAK		40		27				55	
period		16:45		15:15				17:00	
% of class			4.8%		3.4%				3.3%

Report-3.2		Location :		CW-66NS		Scotland St - 240m S of McQueen Blvd					
						Road :					
		Dates :		5/1/2019							
		North		South		East		West		Total	
Directions	---------->	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
00:00	0:15			1	0.1%					1	0.1%
0:15	0:30			1	0.1%					1	0.1%
0:30	0:45	1	0.1%							1	0.1%
0:45	1:00			1	0.1%					1	0.1%
00:00	1:00	1	0.1%	3	0.4%					4	0.3%
1:00	1:15	2	0.3%							2	0.1%
1:15	1:30	1	0.1%							1	0.1%
1:30	1:45			1	0.1%					1	0.1%
1:45	2:00										
1:00	2:00	3	0.4%	1	0.1%					4	0.3%
2:00	2:15										
2:15	2:30										
2:30	2:45	1	0.1%							1	0.1%
2:45	3:00										
2:00	3:00	1	0.1%							1	0.1%
3:00	3:15			2	0.3%					2	0.1%
3:15	3:30			1	0.1%					1	0.1%
3:30	3:45			1	0.1%					1	0.1%
3:45	4:00										
3:00	4:00			4	0.5%					4	0.3%
4:00	4:15	1	0.1%	3	0.4%					4	0.3%
4:15	4:30	2	0.3%	4	0.5%					6	0.4%
4:30	4:45			3	0.4%					3	0.2%
4:45	5:00			4	0.5%					4	0.3%
4:00	5:00	3	0.4%	14	1.9%					17	1.2%
5:00	5:15	2	0.3%	2	0.3%					4	0.3%
5:15	5:30			5	0.7%					5	0.3%
5:30	5:45	2	0.3%	8	1.1%					10	0.7%
5:45	6:00	1	0.1%	5	0.7%					6	0.4%
5:00	6:00	5	0.7%	20	2.7%					25	1.7%
6:00	6:15	3	0.4%	6	0.8%					9	0.6%
6:15	6:30	2	0.3%	10	1.4%					12	0.8%
6:30	6:45	5	0.7%	17	2.3%					22	1.5%
6:45	7:00	3	0.4%	14	1.9%					17	1.2%
6:00	7:00	13	1.8%	47	6.4%					60	4.1%
7:00	7:15	6	0.8%	19	2.6%					25	1.7%
7:15	7:30	6	0.8%	16	2.2%					22	1.5%
7:30	7:45	10	1.4%	20	2.7%					30	2.1%
7:45	8:00	14	1.9%	19	2.6%					33	2.3%
7:00	8:00	36	5.0%	74	10.1%					110	7.6%
8:00	8:15	11	1.5%	14	1.9%					25	1.7%
8:15	8:30	20	2.8%	18	2.5%					38	2.6%
8:30	8:45	12	1.7%	17	2.3%					29	2.0%
8:45	9:00	14	1.9%	27	3.7%					41	2.8%
8:00	9:00	57	7.9%	76	10.4%					133	9.1%
9:00	9:15	6	0.8%	8	1.1%					14	1.0%
9:15	9:30	6	0.8%	12	1.6%					18	1.2%
9:30	9:45	5	0.7%	7	1.0%					12	0.8%
9:45	10:00	11	1.5%	6	0.8%					17	1.2%
9:00	10:00	28	3.9%	33	4.5%					61	4.2%
10:00	10:15	7	1.0%	3	0.4%					10	0.7%
10:15	10:30	8	1.1%	10	1.4%					18	1.2%
10:30	10:45	3	0.4%	8	1.1%					11	0.8%
10:45	11:00	6	0.8%	8	1.1%					14	1.0%
10:00	11:00	24	3.3%	29	4.0%					53	3.6%
11:00	11:15	3	0.4%	8	1.1%					11	0.8%
11:15	11:30	5	0.7%	10	1.4%					15	1.0%
11:30	11:45	9	1.2%	9	1.2%					18	1.2%
11:45	12:00	10	1.4%	10	1.4%					20	1.4%
11:00	12:00	27	3.7%	37	5.1%					64	4.4%

12:00	12:15	7	1.0%	4	0.5%			11	0.8%
12:15	12:30	8	1.1%	14	1.9%			22	1.5%
12:30	12:45	9	1.2%	18	2.5%			27	1.9%
12:45	13:00	12	1.7%	6	0.8%			18	1.2%
12:00	13:00	36	5.0%	42	5.8%			78	5.4%
13:00	13:15	9	1.2%	13	1.8%			22	1.5%
13:15	13:30	10	1.4%	8	1.1%			18	1.2%
13:30	13:45	8	1.1%	12	1.6%			20	1.4%
13:45	14:00	9	1.2%	8	1.1%			17	1.2%
13:00	14:00	36	5.0%	41	5.6%			77	5.3%
14:00	14:15	10	1.4%	8	1.1%			18	1.2%
14:15	14:30	7	1.0%	10	1.4%			17	1.2%
14:30	14:45	9	1.2%	12	1.6%			21	1.4%
14:45	15:00	19	2.6%	11	1.5%			30	2.1%
14:00	15:00	45	6.2%	41	5.6%			86	5.9%
15:00	15:15	9	1.2%	8	1.1%			17	1.2%
15:15	15:30	25	3.4%	41	5.6%			66	4.5%
15:30	15:45	16	2.2%	24	3.3%			40	2.7%
15:45	16:00	14	1.9%	14	1.9%			28	1.9%
15:00	16:00	64	8.8%	87	11.9%			151	10.4%
16:00	16:15	25	3.4%	13	1.8%			38	2.6%
16:15	16:30	24	3.3%	12	1.6%			36	2.5%
16:30	16:45	35	4.8%	12	1.6%			47	3.2%
16:45	17:00	36	5.0%	12	1.6%			48	3.3%
16:00	17:00	120	16.5%	49	6.7%			169	11.6%
17:00	17:15	26	3.6%	18	2.5%			44	3.0%
17:15	17:30	45	6.2%	10	1.4%			55	3.8%
17:30	17:45	20	2.8%	7	1.0%			27	1.9%
17:45	18:00	20	2.8%	5	0.7%			25	1.7%
17:00	18:00	111	15.3%	40	5.5%			151	10.4%
18:00	18:15	15	2.1%	8	1.1%			23	1.6%
18:15	18:30	14	1.9%	4	0.5%			18	1.2%
18:30	18:45	15	2.1%	8	1.1%			23	1.6%
18:45	19:00	12	1.7%	8	1.1%			20	1.4%
18:00	19:00	56	7.7%	28	3.8%			84	5.8%
19:00	19:15	8	1.1%	8	1.1%			16	1.1%
19:15	19:30	10	1.4%	6	0.8%			16	1.1%
19:30	19:45	1	0.1%	7	1.0%			8	0.5%
19:45	20:00	5	0.7%	4	0.5%			9	0.6%
19:00	20:00	24	3.3%	25	3.4%			49	3.4%
20:00	20:15	4	0.6%	6	0.8%			10	0.7%
20:15	20:30	3	0.4%	7	1.0%			10	0.7%
20:30	20:45	5	0.7%	5	0.7%			10	0.7%
20:45	21:00	5	0.7%	4	0.5%			9	0.6%
20:00	21:00	17	2.3%	22	3.0%			39	2.7%
21:00	21:15	1	0.1%	2	0.3%			3	0.2%
21:15	21:30	1	0.1%	5	0.7%			6	0.4%
21:30	21:45	2	0.3%	2	0.3%			4	0.3%
21:45	22:00	4	0.6%					4	0.3%
21:00	22:00	8	1.1%	9	1.2%			17	1.2%
22:00	22:15	1	0.1%					1	0.1%
22:15	22:30	1	0.1%	2	0.3%			3	0.2%
22:30	22:45			3	0.4%			3	0.2%
22:45	23:00	1	0.1%					1	0.1%
22:00	23:00	3	0.4%	5	0.7%			8	0.5%
23:00	23:15	2	0.3%					2	0.1%
23:15	23:30	4	0.6%	1	0.1%			5	0.3%
23:30	23:45	1	0.1%	1	0.1%			2	0.1%
23:45	OO:OO	1	0.1%	1	0.1%			2	0.1%
23:00	OO:OO	8	1.1%	3	0.4%			11	0.8%
Total		726		730				1456	100.0%
		49.9%		50.1%				100.0%	
AM PEAK		20		27				41	
period		8:15		8:45				8:45	
% of class			2.8%		3.7%				2.8%
PM PEAK		45		41				66	
period		17:15		15:15				15:15	
% of class			6.2%		5.6%				4.5%