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**Southgate Business Park  
23T-06503  
Environmental Implementation Report  
2010**

**Prepared for:**

Industrial Equities Guelph Corporation  
c/o LM Real Estate Consulting  
5160 Explorer Road, Unit 17  
Mississauga, ON L4W 4T7

Project No. 636 C

Date: December, 2010



**NATURAL RESOURCE SOLUTIONS INC.**  
Aquatic, Terrestrial and Wetland Biologists

**Southgate Business Park  
23T-06503  
Environmental Implementation Report**

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Report submitted on December 8, 2010



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## TABLE OF CONTENTS

<b>1.0</b>	<b>Introduction.....</b>	<b>6</b>
1.1	Executive Summary .....	6
1.2	Report Overview .....	22
1.3	Study Area.....	24
1.4	Terms of Reference .....	26
1.5	Background .....	26
1.6	Project Phasing .....	27
1.7	Natural Heritage of the Southgate Business Park .....	29
<b>2.0</b>	<b>Fresh Sugar Maple Woodland Assessment.....</b>	<b>31</b>
2.1	Background .....	31
2.2	Woodland Assessment Findings.....	32
2.3	Mitigation Measures.....	34
<b>3.0</b>	<b>Street Tree Planting.....</b>	<b>36</b>
3.1	Planting Guidelines.....	38
3.2	Street Tree Layout.....	39
<b>4.0</b>	<b>Buffer Design and Restoration Plantings .....</b>	<b>40</b>
4.1	Stormwater Management Pond .....	43
4.2	Berms .....	45
4.3	Natural Area Plantings.....	45
4.4	Naturalized Wildlife Corridor .....	46
4.5	Graded Areas .....	47
4.6	Restoration Monitoring.....	48
<b>5.0</b>	<b>Tree Inventory and Preservation Plan.....</b>	<b>49</b>
5.1	Field Work .....	50
5.2	Summary of Findings.....	51
5.3	Tree Protection Plan .....	53
5.4	Tree Conservation and Replacement Plan .....	53
<b>6.0</b>	<b>Pedestrian and Open Space Trail System .....</b>	<b>57</b>
6.1	Off-road Trails.....	58
6.2	Off-road Trail within Natural Area Buffers .....	61
6.2.1	Laneway into Block 1 .....	61
6.2.2	Between Wetland Features .....	61
6.3	Bike Route.....	62
6.4	Naturalized Wildlife Corridor .....	64
6.5	Signage .....	66
6.6	Trail Mitigation Measures.....	71
<b>7.0</b>	<b>Property Demarcation .....</b>	<b>73</b>
<b>8.0</b>	<b>Ecological Connectivity and Wildlife Movement .....</b>	<b>76</b>
8.1	Laneway into Block 1 .....	76
8.2	Street 'A' Wildlife .....	78

8.3	Naturalized Wildlife Corridor .....	78
<b>9.0</b>	<b>Hydrogeology .....</b>	<b>82</b>
9.1	Overview of Hydrogeological Assessment .....	82
9.2	Discussion of Development Conditions .....	87
<b>10.0</b>	<b>Stormwater Management.....</b>	<b>90</b>
10.1	Overview of Stormwater Management .....	90
10.2	Stormwater Management Monitoring Recommendations .....	91
10.2.1	Oil/Grit Separator Monitoring.....	92
10.2.2	Wetland/Wet Pond Monitoring.....	92
<b>11.0</b>	<b>Servicing Overview .....</b>	<b>93</b>
11.1	Area Grading .....	93
11.2	Road Network.....	94
11.3	Sanitary Servicing.....	94
11.4	Water Supply.....	96
11.5	Erosion and Sediment Control .....	97
11.6	Utilities.....	97
<b>12.0</b>	<b>Pre-Construction (Baseline) Monitoring Program .....</b>	<b>98</b>
<b>13.0</b>	<b>Comprehensive Monitoring Program .....</b>	<b>101</b>
13.1	During Construction Monitoring .....	104
13.2	Biological Monitoring.....	105
13.3	Stormwater Management Monitoring .....	105
13.4	Construction Monitoring .....	106
13.4.1	During Construction Sighting Protocols .....	109
13.5	Comprehensive Monitoring Report Structure .....	109
13.5.1	Construction Monitoring Reports .....	111
13.6	Rapid Assessment and Action Protocol .....	111
13.7	Comprehensive Monitoring Program Standard Operating Procedures.....	115
13.7.1	Groundwater .....	115
13.7.2	Vegetation and Soils .....	118
13.7.3	Breeding Birds .....	121
13.7.4	Amphibians .....	123
13.8	Post-Construction Monitoring.....	126
<b>14.0</b>	<b>Site Plan Recommendations .....</b>	<b>127</b>
14.1	Sediment and Erosion Control .....	127
14.2	Dust Suppression .....	127
14.3	Pesticides .....	127
14.4	Salt .....	128
14.5	Tree Retention and Landscape Plantings .....	128
14.6	Lighting.....	129
14.7	Snow Storage .....	129
14.8	Maintenance and Refueling Areas .....	130
<b>15.0</b>	<b>References.....</b>	<b>131</b>



## List of Tables

Table 1. Southgate Business Park EIR Conditions .....	10
Table 2. Recommended Street Tree Species .....	37
Table 3. List of Native and Non-Native Tree Species Inventoried.....	51
Table 4. Tree Inventory Results .....	52
Table 5. Condition of Trees to be Removed (excluding trees within polygons) .....	52
Table 6. Tree Canopy Replacement Plan.....	55
Table 7. Southgate Business Park - Monitoring Components.....	104
Table 8. Monitoring Requirements and Components.....	108

## List of Figures

Figure 1. Study Area and Phase Layout .....	25
Figure 2. Fresh Sugar Maple Woodland Tree Inventory .....	33
Figure 3. Restoration and Planting Plan - Key Plan .....	42
Figure 4. Pedestrian and Open Space Trail System .....	59
Figure 5. Southgate Business Park Trail Corridor and Fencing Plan .....	60
Figure 6. Typical Bikeway Standards .....	63
Figure 7. Typical Naturalized Wildlife Corridor Cross-Section.....	65
Figure 8. Environmental Education Signage.....	67
Figure 9. Stormwater Management Area Signage.....	68
Figure 10. Typical Mid-Block Trail Crossing of Minor Road (Option 1).....	69
Figure 11. Typical Mid-Block Trail Crossing of Minor Road (Option 2).....	70
Figure 12. Property Demarcation Plan.....	75
Figure 13. Trail Corridor and Fencing Details Plan .....	81
Figure 14. Hydrogeological Monitoring Stations .....	84
Figure 15. Pre-Development Recharge Function.....	85
Figure 16. Pre-Development Wetland Sustainability.....	86
Figure 17. Terrestrial and Wetland Monitoring Stations .....	125

## List of Drawings

### IBI Group:

- Drawing 1: Existing Conditions and Removals Plan
- Drawing 2: Erosion and Sediment Control Plan
- Drawing 3: Grading Plan – 1
- Drawing 4: Grading Plan – 2
- Drawing 5: Grading Plan – 3
- Drawing 6: Grading Plan – 4
- Drawing 7: Overall Contributing Sanitary Drainage Areas
- Drawing 8: Southgate Drive Sta. 1+970 to Sta. 2+330
- Drawing 9: Southgate Drive Sta. 2+330 to Sta. 2+690
- Drawing 10: Street A Sta. 3+100 to Sta. 3+200
- Drawing 11: Details and Notes
- Drawing 12: Trail Corridor and Fencing Plan
- Drawing 13: Trail Corridor and Fencing Details and Notes
- Drawing 14: Storm Water Management Details and Notes

## **List of Appendices**

Appendix I	Draft Terms of Reference (May 21, 2009)
Appendix II	Correspondence related to the Southgate Business Park
Appendix III	SBP Temporary Topsoil Stockpile Location Memo
Appendix IV	Migratory Bird Convention Act Fact Sheet
Appendix V	SBP Fresh Sugar Maple Woodland Assessment
Appendix VI	Restoration Planting Plans
Appendix VII	SBP Tree Inventory
Appendix VIII	Pre-Construction Terrestrial and Wetland Monitoring 2006-2010
Appendix IX	Hydrogeological Assessment for the Environmental Implementation Report
Appendix X	Grading, Servicing and Stormwater Management Report
Appendix XI	IBI Group Engineering Drawing Set
Appendix XII	Wildlife Survey and Sighting Response Protocol
Appendix XIII	Site Plan Checklist

## 1.0 Introduction

### 1.1 Executive Summary

The following Environmental Implementation Report has been prepared for the Southgate Business Park (SBP) (23T-06503). As a Condition of Draft Plan Approval, the *“Developer shall prepare an Environmental Implementation Report (EIR) based on a terms of reference approved by the City and Grand River Conservation Authority (GRCA). The Developer and every subsequent owner of any of the subdivision lands shall implement all recommendations of the EIR to the satisfaction of the City and GRCA.”*

The EIR is an integration of comments provided on the 2007 Environmental Impact Study prepared by Natural Resource Solutions Inc. (NRSI) and the Draft Terms of Reference for the EIR that were reviewed and approved by the City of Guelph, Guelph Environmental Advisory Committee (EAC) and the Grand River Conservation Authority (GRCA). Report components have been integrated from a number of sources. The components arise from the following:

- Conditions of Draft Plan Approval (December 22, 2008),
- Comments from City of Guelph Environmental Planner and EAC (December 12, 2007),
- Recommendations from the City of Guelph, Community Design and Development Services (December 22, 2008),
- Recommendations from the Environmental Impact Study (NRSI 2007),
- Recommendations from Harden Environmental Services Ltd. (December 1, 2008),
- GRCA comments (March 13, 2007, May 16, 2008 and June 24, 2009).

Many of these requirements overlap with components of the standard draft plan development and review process. Table 1 provides a list of comments and conditions generated by the above sources through review of the 2007 EIS (NRSI and Draft Terms of Reference for the Southgate Business Park EIR (NRSI 2009) (Appendix I). Correspondence and review comments not included in Table 1, from review agencies

(MNR, GRCA and City of Guelph) that pertain to specific components within the EIR (i.e. trail layout, salamander surveys) are provided in Appendix II.

In 2006, an Environmental Impact Study (EIS) was prepared by NRSI for the Draft Plan of Subdivision for the Southgate Business Park. The EIS provided a characterization of natural features and functions within the area, as well as information and analyses pertaining to hydrogeology, servicing, heritage, etc. A modified Draft Plan of Subdivision, along with an amended EIS was prepared in July 2007 in response to comments received following review of the 2006 EIS (NRSI 2007).

Lot-level detail for the Southgate Business Park is not known at this time, but will be required at the site plan stage. Final project phasing is not known at this time; however, it is anticipated that development activities will begin in Phases 1 and 2. Grading and development of Phase 3 (Block 1) will be driven by market demands.

The schedule of actual on-site work must consider the Migratory Birds Convention Act (MBCA) (Canadian Wildlife Service 1994) construction window. The purpose of the MBCA is to “implement the Convention by protecting and conserving migratory birds – as populations and individual birds – and their nests.” The timing of the peak migratory bird breeding season for the study area is between May 1 and July 31, although this should be held as a general guideline since the Act applies to nesting at any time of the year.

Located within the proposed SBP is a small Fresh Sugar Maple Deciduous Forest. In 2006, a site assessment and tree inventory of the woodland was conducted by NRSI as part of the 2007 EIS to determine woodland character based on the condition of remaining tree species. The EIR summarizes key findings from the woodland assessment, as well as recommendations and mitigation measures.

The EIR proposes a street tree planting plan, including tree species, recommended spacing and approximate numbers.

In the Environmental Impact Study (NRSI 2007), it was recommended that the existing habitat linkages in the northeastern and central portion of the subject property be

maintained and lands within the recommended natural heritage area be restored and detailed in the EIR. Restoration planting plans have been developed for the Business Park, providing a provision of habitat types including early successional meadow habitats, meadow marshes, swamp thickets, shrub thickets, savannah and forests.

As per the Draft Plan of Subdivision and associated Zoning By-Law (Condition 2), a tree inventory and conservation plan is provided. The EIR provides the details of the Tree Conservation Plan for hedgerows and other treed areas, including some of the identified Open Space blocks in the SBP.

To satisfy recommendations within the City of Guelph Trail Master Plan (2005), comments from the City of Guelph Parks Planner and Conditions of Draft Plan Approval (December 22, 2008), a trail layout, including relevant details (i.e. grading, layout, surfacing, signage and mitigation measures), that was developed and refined specifically for the Southgate Business Park is detailed in the EIR.

Fencing treatments, such as chain-link, tree protection and natural barrier fencing associated with the natural heritage features and municipal stormwater management facility are provided in the EIR.

To maintain wildlife movement between the two wetland features associated with the laneway into Block 1, and to encourage movement of wildlife between Open Space Block 8 and Open Space Block 6, wildlife culverts have been designed. To further encourage movement of wildlife, the Draft Plan of Subdivision was revised to include a naturalized wildlife corridor. Restoration planting plans and treatment of the potential off-road trail corridor easement within the naturalized wildlife corridor are detailed within the EIR.

The EIR provides a summary of the Hydrogeological Assessment for the Southgate Business Park (Anderson GeoLogic 2010). The Hydrogeological Assessment report includes a confirmatory assessment of the hydrogeological setting using both historical data and new data collected in 2009/2010, with particular emphasis on the inter-relationship between the shallow groundwater regime and eight identified wetland features.

Findings and recommendations from the Grading, Servicing and Stormwater Management Report prepared by IBI Group (2010) are summarized in the EIR. Based on grading constraints on site (no overland outlet), it is required that all runoff generated up to the Regional Storm (Hurricane Hazel) be retained and infiltrated on-site for all future developing sites. A stormwater management infiltration pond is proposed to retain runoff generated from the right-of-way of the proposed Southgate Drive extension and proposed Street "A". Additional privately owned infiltration facilities will be required to retain and infiltrate surface runoff from the developing sites.

A comprehensive monitoring program is detailed within the EIR. The monitoring program details the pre-construction monitoring that was undertaken within the Business Park from 2006 to 2010, and provides specific monitoring recommendations (frequency, duration and contingency measures) for the during and post-construction phases of the Business Park.

Site Plan recommendations specific to the Southgate Business Park (i.e. sediment and erosion, lighting, snow storage, etc.) are outlined.

**Table 1. Southgate Business Park EIR Conditions**

Source	Condition	EIR Reference
Environmental Advisory Committee (December 12, 2007)	That the Environmental Advisory Committee supports the Environmental Impact Study prepared by Natural Resource Solutions Inc., dated July 2007 related to the Southgate Business Park (23T-06503/ZC0617) subject to the retention of the woodlot at the corner of the proposed Southgate Drive Extension and Street 'A'	Section 2.0  Figure 1. Study Area and Phase Layout
	And that the City prepares a Zoning By-law that restricts land use similar to the restricted zones of the Hanlon Creek Business Park.	The approved Zoning By-law for the SBP includes similar prohibited land uses as the zoning for the Hanlon Creek Business Park
Harden Environmental (December 14, 2007)	Covenants that require the developer to monitor stormwater facilities for ten years to ensure that the water is being infiltrated as designed in both municipal and private systems.	Section 9.0  Appendix IX Hydrogeological Assessment  Appendix X Grading, Servicing and Stormwater Management Report
	Covenants that require sufficient seasonal water level measurements prior to and post development in the wetlands to confirm that water conditions in the wetlands do not change after the development.	Section 9.0 Section 12.0 Section 13.0  Appendix IX Hydrogeological Assessment
	Covenants with the developer to ensure that drainage (from north to south) across Maltby Road does not occur.	Section 9.0  Appendix IX Hydrogeological Assessment
	Covenants that require the developer to monitor the water quality of infiltrated water and if necessary improve water quality control measures.	Section 9.0  Appendix IX Hydrogeological Assessment
Harden Environmental (December 1, 2008)	Monitoring of the SWM facilities (for roads and private blocks) that confirm the infiltration of stormwater within the required 48 hour period.	Section 10.0  Appendix X SBP Grading, Servicing and SWM Report
	Monitoring of surface water crossings beneath Maltby Road to confirm that at two western crossings the flow of water remains from the south to the north.	Section 9.0  Appendix IX Hydrogeological Assessment
	Monitoring of the eastern surface water crossing beneath Maltby Road to confirm that the volume does not increase.	Section 9.0  Appendix IX Hydrogeological Assessment

Source	Condition		EIR Reference
City of Guelph Community Design and Development Services (December 22, 2009) – Condition of Draft Plan Approval	<b>Conditions to be met prior to any grading or site alteration</b>		
	2	The Developer shall complete a <b>tree inventory and conservation plan</b> , satisfactory to the City Engineer in accordance with City of Guelph By-law (1986)-12229 prior to any grading, tree removal or construction on the site.	Section 5.0  Appendix VII Tree Inventory
	8	The Developer shall prepare an overall <b>site drainage and grading plan</b> , satisfactory to the City Engineer, for the entire subdivision. The approved overall grading plan shall be the basis for any site specific grading plan to be submitted prior to the final site plan approval for any blocks within the subdivision.	SBP Site Drainage and Grading Plans
	10	The Developer shall construct, install and maintain <b>erosion and sediment control</b> facilities, satisfactory to the City Engineer, in accordance with a plan that has been submitted to and approved by the City Engineer.	SBP Site Drainage and Grading Plans
	11	The Developer shall provide a qualified <b>environmental inspector</b> , satisfactory to the Director of Community Design and Development Services and the City Engineer, to inspect the site during all phases of development and construction including grading, servicing and building construction. The environmental inspector shall monitor and inspect the erosion and sediment control measures and procedures, and compliance with the Environmental Impact Study. The environmental inspector shall report on their findings to the City as recommended by the Environmental Implementation Report.	Section 13.0  Appendix XIII Site Plan Checklist
	12	The Developer shall submit a <b>Storm Water Management Report and Plan</b> to the satisfaction of the City Engineer. The Report and Plan shall be prepared in accordance with recognized best management practices, Provincial Guidelines, the City's current "Design Principles for Storm Water Management Facilities" and the Storm Water Management Design Report for the Mill Creek Watershed, and address the following: (a) Stormwater Management for Southgate Drive and Street A including runoff from Maltby Road; (b) maintenance and operational requirements for any control and/or conveyance facilities, described in a format to be available for the City of Guelph's Operations Department; and (c) SWM criteria and guidelines to be followed by future Stormwater Management of individual development parcels.	Section 10.0  Appendix X SBP Grading, Servicing and SWM Report



Source	Condition	EIR Reference
City of Guelph Community Design and Development Services (December 22, 2009) – Condition of Draft Plan Approval	13 The Developer shall provide a <b>Detailed Design Report</b> for the proposed sanitary pumping station including the forcemains on Southgate Drive and Maltby Road. The report shall address spill response measures as well as maintenance of the proposed pumping station in accordance with current Ministry of the Environment Regulations and Guidelines to the satisfaction of the City Engineer.	Section 11.0  Appendix X SBP Grading, Servicing and SWM Report
	14 The Developer shall prepare an <b>Environmental Implementation Report</b> (EIR) based on a terms of reference approved by the City and Grand River Conservation Authority (GRCA). The Developer and every subsequent owner of any of the subdivision lands shall implement all recommendations of the EIR to the satisfaction of the City and GRCA. The EIR shall also specifically include:	
	a) Address the comments from the Environmental Planner and EAC (dated Dec. 12, 2007 – see <b>Schedule 9</b> ).	See Referenced Sections Above
	b) Establish recharge targets to be met and the responsibilities of the developer and every subsequent owner of the subdivision lands to demonstrate how the recharge targets will be met through the site plan approval process. The EIR shall establish post-development recharge infiltration rate targets that set target infiltration rates on a block by block basis.	Section 9.0  Appendix IX Hydrogeological Assessment
	c) Address the avoidance of Pesticides and Private Road Salt impact on wetlands and local wells.	Section 14.2 Section 14.3
	d) Establish a comprehensive monitoring program including a monitoring period to the satisfaction of the City and GRCA. The scope of the comprehensive monitoring program shall include monitoring of the adjacent wetlands and private wells of nearby residents living along Maltby Road, provided permission is granted by the home owner. The proposed monitoring program shall include potential mitigation measures and contingency plans.	Section 9.0  Section 13.0  Appendix IX Hydrogeological Assessment
	e) Detail and implement all recommendations expressed in the owner's Mitz Hydrogeological Report (Section 6, page 19 including 5 – (see Schedule 6)	Section 9.0  Appendix IX Hydrogeological Assessment
	f) Participate in the fire safety plan 'Lock Box' program.	Appendix XIII Site Plan Checklist

Source	Condition	EIR Reference
City of Guelph Community Design and Development Services (December 22, 2009) – Condition of Draft Plan Approval	14 g) In addition to Section 4.8 of the Zoning Bylaw entitled Outdoor Lighting, the EIR shall consider lighting provisions that will apply along Maltby Road including Block 1 that would provide residents with added protection from glare and indirect illumination of their properties on Maltby Road and protect the surrounding natural environment.	Section 14.5  Appendix XIII Site Plan Checklist
	h) Include details of the implementation of the Puslinch Township's recommendations contained in the report by Harden Environmental dated December 14, 2007, page 2, including three monitoring strategies outlined by Harden Environmental Services Ltd., in a letter dated December 1, 2008 regarding monitoring of surface water crossings beneath Maltby Road to confirm both the volume and direction of flow and the monitoring of the SWM facilities to confirm that acceptable infiltration is occurring.	Section 9.0  Section 10.0  Section 12.0  Appendix IX Hydrogeological Assessment [See Referenced Sections Above]
	i) Include route plan and sufficient information about the future City developed open space off-road trail to demonstrate that the final dedicated open space blocks contain sufficient land to accommodate a trail designed to City standards outside of the wetland buffers.	Section 6.0  Figure 4. Pedestrian and Open Space Trail Layout  Figure 5. Southgate Business Park Trail Corridor and Fencing Plan
	j) Preparation and implementation of a Pollution Prevention Program including Spill Prevention and Contingency Plans.	Appendix X Grading, Servicing and Stormwater Management Report
	k) Identify key indicator parameters, targets, and establish an environmental monitoring program as part of a Post-Development Adaptive Management Plan.	Section 13.0
	l) A commitment to design the landscaped berm feature along Maltby Road in a comprehensive manner that would include the existing hills and topography along Maltby Road as much as possible to achieve a more natural, rural landscape feature.	Section 4.2  Appendix VI Restoration Planting Plans
	m) The consideration of low impact development (LID) techniques into the final design of the proposed industrial business park.	Appendix X Grading, Servicing and Stormwater Management Report
	n) Detailed design considerations along the private road driveway of Block 1 to protect the safety of wildlife crossing the private road from the adjacent wetlands.	Section 8.1  Figure 13. Trail Corridor and Fencing Details Plan

Source	Condition		EIR Reference
City of Guelph Community Design and Development Services (December 22, 2009) – Condition of Draft Plan Approval	14	o) A commitment to plant the berm and buffer along Maltby Road with only native tree and shrub species that mimic the surrounding naturally-occurring vegetation	Section 4.2 Appendix VI Restoration Planting Plans
		p) Addition of a natural linkage between Woodlot Block 8 and Open Space Block 5 with consideration to the best location, width and design details of the linkage.	Section 4.4 Section 6.4 Section 8.3 Figure 7. Typical Naturalized Wildlife Corridor Cross-Section Appendix VI Restoration Planting Plans
	15	That the developer shall at its expense implement and address all recommendations contained in the latest <b>Environmental Impact Study</b> that has been approved by the City, for the subdivision, and the developer shall address each recommendation to the satisfaction of the GRCA and City.	Section 2.0 Section 4.0 Section 8.0 Section 12.0 Figure 1. Study Area and Phase Layout Figure 2. Fresh Sugar Maple Woodland Tree Inventory and Protection Boundary Figure 3. Restoration & Planting Plan – Key Plan
	16	That any <b>domestic wells located within the lands be properly decommissioned</b> in accordance with current Ministry of the Environment Regulations and Guidelines to the satisfaction of the City Engineer. Any <b>boreholes</b> drilled for hydrogeological or geotechnical investigations must also be properly abandoned.	Section 9.0 Appendix IX Hydrogeological Assessment
	<b>Conditions to be met prior to execution of subdivision agreement</b>		
	21	The Developer shall pay to the City the flat rate charge established by the City per metre of road frontage to be applied to <b>street tree planting</b> within the proposed subdivision.	Section 3.0
	25	The Developer shall phase the subdivision to the satisfaction of the City of Guelph. Such <b>phasing</b> shall conform with the current Development Priorities Plan.	Figure 1. Study Area and Phase Layout

Source	Condition	EIR Reference
City of Guelph Community Design and Development Services (December 22, 2009) – Condition of Draft Plan Approval	28 The Developer shall be responsible for the cost of design and development of the <b>demarcation</b> of all lands conveyed to the City in accordance with the City of Guelph Property Demarcation Policy. This shall include the submission of drawings and the administration of the construction contract up to the end of the warrantee period completed by an Ontario Associated of Landscape Architect (OALA) member for approval to the satisfaction of the Director of Community Design and Development Services. The Developer shall provide the City with <b>cash or letter of credit</b> to cover the City approved estimate for the cost of development of the demarcation for the City lands to the satisfaction of the Director of Community Design and Development Services.	Section 7.0  Figure 12. Property Demarcation
	29 The Developer shall be responsible for the cost of design and implementation of the <b>Open Space Works and Restoration</b> in accordance with the “Environmental Implementation Report” to the satisfaction of the Director of Community Design and Development Services. The Developer shall provide the City with <b>cash or letter of credit</b> to cover the City approved estimate for the cost of the Open Space works and restoration for the City lands to the satisfaction of the Director of Community Design and Development Services.	Section 4.0  Appendix VI Restoration Planting Plans
	30 The Developer shall design and develop the <b>Storm Water Management Facility Landscaping</b> in accordance with the City’s current “Design Principles for Storm Water Management Facilities” to the satisfaction of the Director of Community Design and Development Services and the City Engineer. This shall include the submission of drawings to the administration of the construction contract up to the end of the warrantee period completed by an Ontario Associated on Landscape Architect (OALA) member for approval to the satisfaction of the Director of Community Design and Development Services.	Section 4.0  Appendix VI Restoration Planting Plans
	<b>Conditions to be met prior to registration of the plan</b>	
	35 The Developer agrees to advise all purchasers, within the offer to purchase agreement, that once the City of Guelph Council has adopted a City-wide <b>Community Energy Implementation Plan</b> any site plan applications will need to be prepared by the purchaser in compliance with this <b>Community Energy Implementation Plan</b> City-wide Plan. This Plan will (a) identify high quality energy efficient land uses; (b) establish feasible energy efficiency targets for development and construction; and (c) identify tools/incentives for achieving established targets.	Appendix XIII Site Plan Checklist

Source	Condition	EIR Reference
City of Guelph Community Design and Development Services (December 22, 2009) – Condition of Draft Plan Approval	39 Prior to the registration of any phase of the development, the developer shall install a landscaped <b>buffer strip including a berm</b> on Block 2 and 3 located adjacent to Maltby Road, to the satisfaction of the Director of Community Design and Development Services. The buffer strip required for these blocks shall be a minimum of 14 metres in width and shall consist of a 2 metre high landscaped earth berm measured from the surrounding on-site grade. Landscaping shall include coniferous and deciduous trees planted at 3 metre centre intervals. Landscape material shall be a minimum of 6 centimetre calliper for deciduous trees and 2 metre height for coniferous trees. Where there is existing tree or shrub growth the existing plantings may provide the required buffer strip and landscaping.	Section 4.2  Appendix VI Restoration Planting Plans
	40 The Developer shall <b>deed to the City</b> all lands required by the City for Storm Water Management Facilities, Sewage Pumping Station, Woodlot and Wetlands/Open Space, including Blocks 4 to 10 of the plan. These lands shall be dedicated to the City at the expense of the Developer, in a form that is satisfactory to the City Solicitor and free of all encumbrances. In recognition of the dedication of Blocks 4 to 8 inclusive, the City shall issue a tax receipt for the ecological gift to the City upon receipt of an acceptable appraisal prepared at the owner's sole expense. Furthermore, the Developer shall demarcate and fence (living and/or chain link) the boundaries of any lands conveyed to the City in accordance with the policies of the City.	Figure 1. Study Area and Phase Layout  Figure 12. Property Demarcation  SBP Site Drainage and Grading Plans
	42 That the <b>road allowances</b> included in the draft plan and the road widenings shown as Blocks 11 and 12, be shown and dedicated at the expense of the Developer as public highways and that prior to the registration of any phase of the subdivision, the City shall receive a letter from the O.L.S preparing the plan that certifies that the layout of the roads in the plan conforms to the City's 'Geometric Design Criteria – July 23, 1993" with exception of the road widths which shall comply with the widths shown on the approved draft plan of subdivision.	SBP Site Drainage and Grading Plans

Source	Condition	EIR Reference
City of Guelph Community Design and Development Services (December 22, 2009) – Condition of Draft Plan Approval	43 That all <b>easements, blocks and rights-of-way</b> required within or adjacent to the proposed subdivision be conveyed clear of encumbrance to the satisfaction of the City of Guelph, Guelph Hydro Electric Systems Inc. and other Guelph utilities. Every Transfer Easement shall be accompanied by a Postponement, satisfactory to the City Solicitor, for any mortgage, charge or lease and such Postponement shall be registered on title by the City at the expense of the Developer.	Figure 1. Study Area and Phase Layout  SBP Site Drainage and Grading Plans
	<b>Conditions to be met prior to granting site plan approval</b>	
	49 The owner shall, to support the Community Energy Plan to the satisfaction of the Director of Community Design and Development Services, prior to the issuance of site plan approval, provide the City with evidence that: <ul style="list-style-type: none"> <li>a) The owner shall participate with the City and Guelph Hydro Electric Systems Inc. to explore and demonstrate building energy efficiency options for the development that will further contribute to the peak reduction of electrical power on the subject site.</li> <li>b) The owner shall encourage prospective purchasers to voluntarily display Energy Performance Labels for all main buildings, once the City provides details of the pilot project with NRCan.</li> <li>c) The owner shall participate in a study funded by the City, to review the possibilities for neighbourhood energy integration at or including the subject lands. Site plan approval may be granted if the City has not commenced or funded this study.</li> </ul>	Appendix XIII Site Plan Checklist
	50 The owner shall submit to the City for approval, <b>noise and vibration assessment reports</b> for development on Blocks 1, 2 and 3, in order to confirm that the proposed use, activity and development, together with the proposed zoning restrictions and regulations meet the Ministry of Environment noise and separation distance guidelines, prior to the granting of the site plan approval by the City.	Appendix XIII Site Plan Checklist

Source	Condition	EIR Reference
City of Guelph Community Design and Development Services (December 22, 2009) – Condition of Draft Plan Approval	<b>Agency Conditions</b>	
	64 <b>Prior to any grading or construction</b> on the site and prior to the registration of the plan, the owners or their agents submit the following plans and reports to the satisfaction of the <b>Grand River Conservation Authority</b> : <ul style="list-style-type: none"> <li>a. A detailed Environmental Implementation Report (EIR) in accordance with the recommendations of the Hanlon Creek Subwatershed Study and the South Guelph Secondary Plan. The developer agrees that the GRCA shall have the opportunity to comment on the terms of reference for the EIR.</li> <li>b. A Development, Interference with Wetlands and Alterations to Shorelines and Watercourses permit for all works proposed within the regulated areas on site.</li> <li>c. An erosion and siltation control plan in accordance with the Grand River Conservation Authority Guidelines for sediment and erosion control, indicating the means whereby erosion will be minimized and silt maintained on site throughout all phases of grading and construction.</li> <li>d. Detailed lot grading and drainage plans.</li> </ul>	Plans and reports (a) through (d) will be submitted to the GRCA following review by City of Guelph EAC
Environmental Advisory Committee – EIR Draft Terms of Reference (July 8, 2009)	a)	That a detailed monitoring table be provided
	b)	If possible, additional future salamander monitoring stations be established south of Maltby Road on the adjacent private properties to capture all potential breeding ponds within reasonable proximity to the study area. This work should commence, however, if in the meantime monitoring commences as part of the Maltby Road improvements, the City should assume responsibility.
	c)	That in accordance with Condition 14 i) of the Draft Plan approval, the EIR “include a route plan and sufficient information about the future developed open space off-road trail to demonstrate that the final dedicated open space blocks contain sufficient land to accommodate a trail designed to City standards outside of the wetland buffers.”
		Section 13.0
		Section 12.0
		Appendix I within 2010 Terrestrial and Wetland Monitoring Report (Appendix VIII)
		Preparation for the Maltby Road improvement project commenced in early 2010, therefore, the City of Guelph took responsibility for salamander monitoring needs associated with road improvements. Monitoring that took place is addressed in Section 12.0
		Section 6.0
		Figure 4. Pedestrian and Open Space Trail Layout
		Figure 5. Southgate Business Park Trail Corridor and Fencing Plan

Source	Condition	EIR Reference
Environmental Advisory Committee – EIR Draft Terms of Reference (July 8, 2009)	d) That in accordance with condition 14 p) of the Draft Plan approval, the EIR include specific recommendations and options regarding a “natural linkage between Woodlot Block 8 and Open Space Block 5 with consideration to the best location, width and design details of the linkage”	Section 4.4  Section 6.4  Section 8.3  Figure 7. Typical Naturalized Wildlife Corridor Cross-Section  Appendix VI Restoration Planting Plans
	e) That reference be made to the key findings and recommendations of the Southgate Business Park Fresh Sugar Maple Woodland Assessment prepared by NRSI, dated January 2007, as well as provide recommendations for mitigation measures to address potential impacts to woodlot edge.	Section 2.0  Figure 2. Fresh Sugar Maple Woodland Tree Inventory and Tree Protection Boundary
	f) That the site plan checklist incorporate lot level stormwater management design considerations.	Appendix X Grading, Servicing and Stormwater Management Report
	g) That in accordance with condition 14 m) of the Draft Plan approval the EIR include “the consideration of low impact development (LID) techniques into the final design of the proposed industrial business park”	Appendix X Grading, Servicing and Stormwater Management Report  Appendix XIII Site Plan Checklist
	h) That provisions should be made for open habitats – thickets and meadows in the restoration planting plans.	Section 4.0  Figure 3. Restoration & Planting Plan – Key Plan  Appendix VI Restoration Planting Plans  A provision of habitat types have been included in the restoration areas including early successional meadow habitats, meadow marshes, swamp thickets, shrub thickets, savannah and forests.
	i) That care should be given to the design and mitigation measures associated with the road crossings of Road A and driveway into Block 1.	Section 8.0  Figure 13. Trail Corridor and Fencing Details Plan



Source	Condition	EIR Reference
Environmental Advisory Committee – EIR Draft Terms of Reference (July 8, 2009)	j) That the location of the existing and proposed groundwater monitoring wells as well as monitoring method (i.e. continuous datalogger vs. manual measurements) and frequency should be provided.	Section 9.0 Section 13.0 Appendix IX Hydrogeological Assessment
	k) That in accordance with condition 14 d) of the Draft Plan approval, the EIR include “monitoring of the adjacent private wells of nearby residents living along Maltby Road, provided permissions is granted by the homeowner.” If permission can be obtained from the well owner, pre-construction groundwater elevation and water quality data should be obtained from the private wells.	Section 9.0 Section 13.0 Appendix IX Hydrogeological Assessment
	l) That the “Stormwater Management and Servicing Report(s)” section as it relates to the Block 9 SWM facility should be removed from the “Site Plan Checklist”. A new “Municipal Services and Utilities” section should be discussed and illustrate the water distribution, wastewater conveyance, the wastewater pumping station, SWM facility, utilities and roadway systems in the context of potential impacts to natural systems.	Appendix X Grading, Servicing and Stormwater Management Report
	m) That in accordance with condition 14 b) of the Draft Plan approval, the EIR “establish recharge targets to be met and the responsibilities of the developer and every subsequent owner of the subdivision lands to demonstrate how the recharge targets will be met through the site plan approval process. The EIR shall establish post-development recharge infiltration rate targets that set target infiltration rates on a block-by-block basis.”	Section 9.0 Appendix IX Hydrogeological Assessment
	n) That is accordance with condition 5 of the Draft Plan approval, the EIR include a description of how “regular dust suppression will be accomplished during the construction phase of the subdivision.”	Section 14.2
	o) That the “feasibility of reduced or staged development block grading be evaluated in the EIR.”	Section 1.6

Source	Condition	EIR Reference
Grand River Conservation Authority (June 24, 2009)	We agree that buffer restoration will help increase ecological connectivity and wildlife movement throughout the site. We anticipate that buffer prescriptions will vary for wetland and woodlands. For example, there will be a need to restore or enhance wetland buffer functions such as groundwater recharge and discharge, nutrient and sediment removal, as well as provide suitable upland habitat for wetland-dependent wildlife. The buffer prescription for the central woodland will likely be based on the need to augment the overall size of this area for area-sensitive birds. Accordingly, buffer objectives and plans should be area-specific. Plantings should include a list of appropriate ground, shrub and tree layer species native to the local area. It is also assumed that the buffer restoration area will comprise and extend beyond the specified 1m and 5m no touch setback area for woodlands and wetlands, respectively.	<p>Section 4.0</p> <p>Figure 3. Restoration &amp; Planting Plan – Key Plan</p> <p>Appendix VI Restoration Planting Plans</p>
	It is recommended that the Marsh Monitoring Program, as described by Bird Studies Canada and Canadian Wildlife Service, be employed on this site in order to allow for a more systematic survey and, potentially, a long-term assessment of marsh communities on this site. It is also recommended that MMP vegetation survey methodology also be followed. Generally, vegetation surveys or inventories within wetland communities should be conducted during the wet growing season, which typically includes the months of May, June and possibly July, in order to ensure that hydrophytes are well represented. Monitoring frequency and duration should be specified in the EIR.	<p>Section 13.2</p> <p>Appendix VIII Pre-Construction Terrestrial and Wetland Monitoring 2006-2010</p>

## 1.2 Report Overview

The EIR is divided into sections as follows:

- **Section 1** includes a detailed description of the historic background of the EIR, as well as a summary of the natural heritage components of the study area.
- **Section 2** provides an overview of the Fresh Sugar Maple Woodland (Block 8), including background information and inventory findings. Mitigation measures for the woodland are also provided.
- **Section 3** provides a recommended street tree planting plan as per the City planting requirements and planting guidelines.
- **Section 4** discusses buffer designs and restoration planting plans for the stormwater management pond, naturalized wildlife corridor easement, berms and buffers. Restoration plans for the study area are appended to this report. This section also includes details on planting requirements and restoration monitoring.
- **Section 5** includes details on field work and findings from the tree inventory conducted throughout the study area. Section 5.0 also outlines tree conservation and replacement.
- **Section 6** presents the pedestrian and open space trail corridor proposed for implementation by the City of Guelph throughout the study area.
- **Section 7** outlines the City of Guelph Property Demarcation Policy (2006) and how it pertains to the business park. Fencing requirements are discussed and a detailed fencing plan is appended to this report.
- **Section 8** discusses ecological connectivity and wildlife movement throughout the study area. Enhancement opportunities and wildlife movement culverts are discussed.
- **Section 9** provides a summary of the Hydrogeological Assessment Report prepared by Anderson GeoLogic Limited (2010) which outlines the on-going detailed monitoring of groundwater levels, updated characterization of the hydrogeological conditions within the study area, and how various hydrogeology-related approval conditions are addressed.
- **Section 10** provides an overview of stormwater management recommendations and requirements as outlined in the 2010 Southgate Business Park Grading, Servicing and Stormwater Management Report prepared by IBI Group

- **Section 11** provides details regarding the servicing features (watermains and sanitary sewers) within the proposed development based on the 2010 Grading, Servicing and Stormwater Management Report prepared by IBI Group.
- **Section 12** details the pre-construction (baseline) monitoring program that was undertaken within the study area
- **Section 13** provides a detailed Comprehensive Monitoring Program, arising from the Conditions of Draft Plan approval and the EIR Terms of Reference. The monitoring program assesses the performance of stormwater management facilities to ensure post-development recharge and runoff targets are met. Additional monitoring that arose from the conditions of Draft Plan approval, such as monitoring of the adjacent wetlands and private wells of nearby residents living along Maltby Road, tree preservation plans, buffer and woodlot restoration, pedestrian and open space trail system are also discussed.
- **Section 14** provides a list of site plan recommendations, such as sediment and erosion control, dust suppression and snow storage based on the proposed development.

The EIR is prepared as part of a package for submission and review, and although excerpts from these companion documents are included in the EIR, the reader is referred to these associated appended documents for further details:

- Hydrogeological Assessment For the Environmental Implementation Report (Anderson GeoLogic Limited, November 2010),
- Southgate Business Park Grading, Servicing and Stormwater Management Report (IBI Group, November 2010)
- Southgate Business Park 23T-06503 Pre-Construction Terrestrial and Wetland Monitoring 2006-2010 (NRSI October 2010)
- Southgate Business Park 2010 Jefferson Salamander Monitoring Program Implementation and Results (NRSI June 2010)

### 1.3 Study Area

The study area is approximately 87.3ha in area. The subject property is located in the south end of the City of Guelph and is bounded by Crawley Road on the west, Maltby Road to the south, and to the north by existing industrial development and the southerly limit of Southgate Drive. The eastern boundary stretches through agricultural land, to the east of the white pine coniferous plantation shown on Figure 1. The study area is mainly comprised of abandoned and cultivated fields, hedgerows, plantations, small woodlots, wetlands and cultural thickets. The surrounding landscape consists primarily of old and cultivated fields, wooded areas, rural residential and an industrial park.

The Southgate Business Park (SBP) – Draft Plan of Subdivision is proposed for lands within the City of Guelph. The lands are shown in the City's Official Plan (OP) on Schedule 1 as 'Industrial', 'Core Greenlands' and 'Non-Core Greenlands' and on Schedule 2 as 'Provincially Significant Wetland' and 'Other Natural Heritage Features'. The properties are currently zoned as 'UR-Urban Reserve', 'P.1-Park' and 'WL-Wetland' as well as 'Lands Adjacent to a Provincially Significant Wetland' and 'Land with Local Significant Wetland, Significant Woodlot, Natural Corridor, or Linkage'.

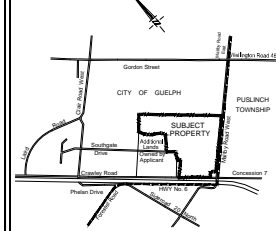
Lands within the study area encompass the Hanlon Creek Subwatershed and the Mill Creek Subwatershed. Portions of the Provincially Significant Hanlon Creek Wetland Complex are found on the subject property.

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DRAFT PLAN OF SUBDIVISION  
SOUTHGATE BUSINESS PARK  
23T-06503

2020: REVISED BY JACB  
PROJECT No.: 2004  
SCALE: 1:500  
DRAWN BY: S.J.S.

KEY MAP



NOT TO SCALE

LEGAL DESCRIPTION

Part of Lots 14 & 15  
Concession 7  
(Former Township of Puslinch)  
City of Guelph

LAND USE SCHEDULE

DESCRIPTION	SUBJECT	AREA (hectares)
INDUSTRIAL	BLOCKS 1A	10.50
OPEN SPACE	BLOCKS 4A	35.58
STORM WATER MANAGEMENT	BLOCK 9	0.75
LANDSCAPED PARKING LOT/DRIVE	BLOCK 10	5.47
ROAD/WEENING	BLOCKS 11, 12	0.87
RESERVES	BLOCKS 13-16	6.00
TOTAL		59.17

NOTES

1. LEGAL PROFESSIONAL OPINION: THIS PLAN IS AN INFORMATIONAL ONLY. IT DOES NOT CONSTITUTE A GUARANTEE OF ANY KIND. THE USER OF THIS PLAN SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AUTHORITIES.
2. LOCATIONS AND DIMENSIONS ARE INDICATED AND ARE REFERENCED TO THE BOUNDARY LINE. METRIC DIMENSIONS ARE GIVEN.

ADDITIONAL INFORMATION

OWNER'S CERTIFICATE OF THE PLANNING ACT  
INFORMATION REQUIRED BY CLASSED AS A CLASS 1.1 AND 1.2 ARE AS SHOWN ON DRAFT PLAN.  
NATURAL WATER  
NATURAL HERITAGE FEATURES

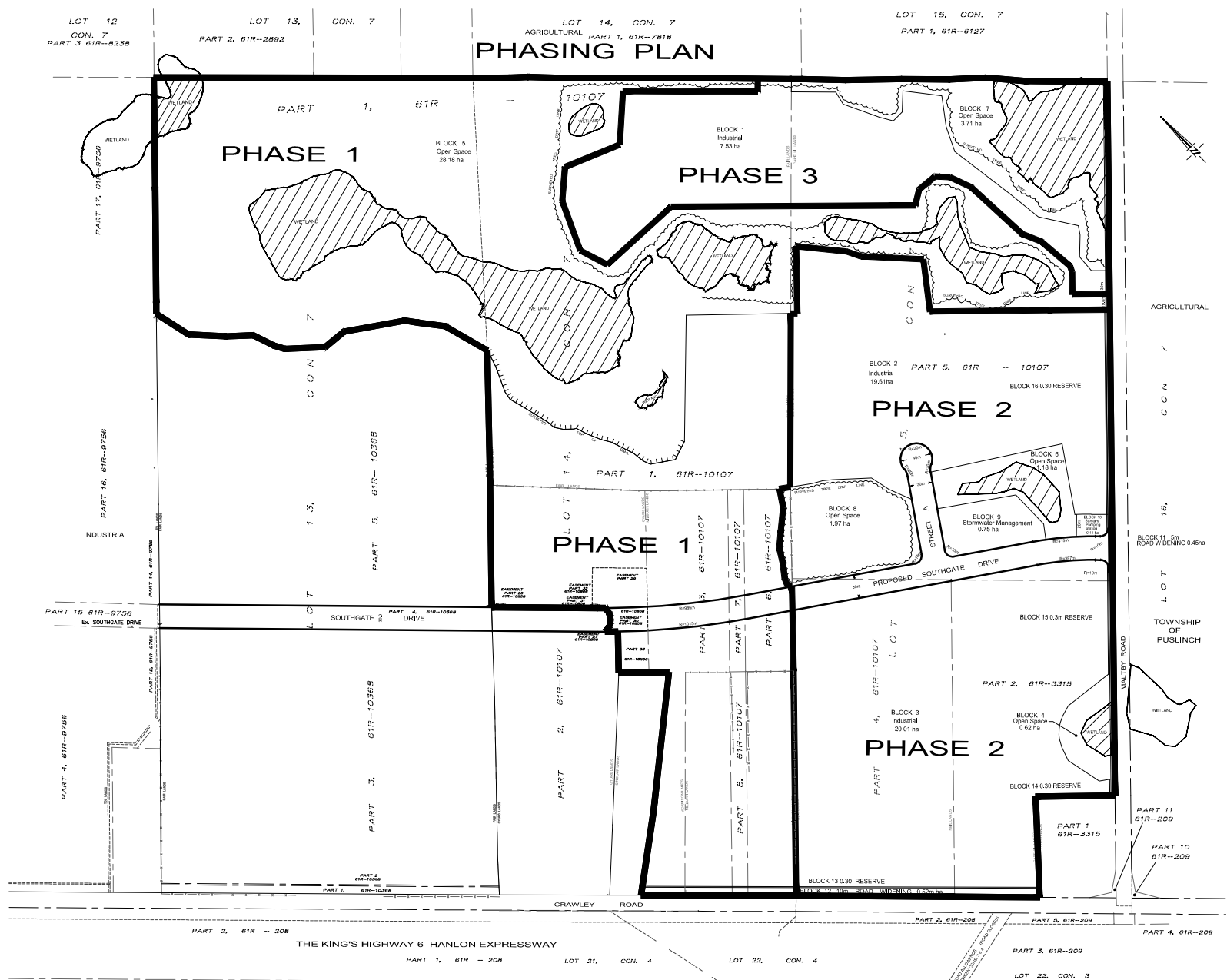
OWNER'S CERTIFICATE

BY THE CLASSED AS A CLASS 1.1 AND 1.2 TO REPEAL AND SUBMIT THE DRAFT PLAN  
TO THE CITY OF GUELPH FOR APPROVAL.  
*[Signature]* *[Signature]*  
Mark G. Guelph, President  
Industrial Equities Guelph Corporation  
DATE

SURVEYOR'S CERTIFICATE

THE PLAN IS A DRAFT PLAN OF SUBDIVISION. IT IS NOT TO BE USED FOR ANY OTHER PURPOSE.  
DATE: DECEMBER 4, 2006  
*[Signature]*  
JEFF BURMAN, C.L.S.  
Land Surveyor (Ontario)

PHASING PLAN



#### 1.4 Terms of Reference

Terms of Reference for the EIR were prepared and presented to the GRCA and the City of Guelph Environmental Advisory Committee (EAC). The Guelph District Ministry of Natural Resources (MNR) was also provided with the Terms of Reference for the EIR in relation to the proposed work program related to potential Jefferson Salamander habitat.

#### 1.5 Background

In 1998, the Southgate Business Park subject property was studied for the City of Guelph by LGL Limited as part of the 'South Guelph Secondary Plan Area – Scoped EIS'.

In 2006, an environmental impact study (EIS) was prepared by NRSI for the Draft Plan of Subdivision for the Southgate Business Park. The EIS provided a characterization of natural features and functions within the area, as well as information and analyses pertaining to hydrogeology, servicing, heritage, etc. The EIS included a conceptual layout for the business park, including primary road network and block boundaries, and assessed the potential impacts of the undertaking. The EIS was reviewed by staff of the City of Guelph, Guelph Environmental Advisory Committee (EAC) and the GRCA.

A modified Draft Plan of Subdivision, along with an amended EIS was prepared in July 2007 in response to comments received following review of the 2006 EIS (NRSI 2007). Following review of the 2007 EIS, conditions of Proposed Official Plan Amendment, Draft Plan of Subdivision and associated Zoning By-Law Amendment were set out by the City of Guelph Community Design and Development Services in December 2009. Condition #14 of the Proposed Official Plan Amendment requires that the Developer prepare an Environmental Implementation Report (EIR) based on a Terms of Reference approved by the City and GRCA.

The topography in the subdivision is sloped to gently undulating, resulting in a need for grading to create usable flat industrial land. To accommodate surplus topsoil (approximately 170,000 m<sup>3</sup>) from development lands to the north, one temporary topsoil location was proposed on Phase 1 lands. NRSI was asked to undertake an analysis of

the proposed location of the topsoil area as shown on a Temporary Stockpile Location plan prepared by Planning and Engineering Initiatives Ltd. (now IBI) dated May 7, 2007. The analysis was based on a meeting on May 1, 2007 between staff of the City of Guelph and members of the Southgate Business Park consulting team, as well as follow-up discussions between staff of NRSI (Tara Brenton) and Carrie Musselman, the Environmental Planner at the City of Guelph in 2007. Refer to Appendix III for a complete discussion of impact analysis and mitigation measures based on the proposed location as well as the Environmental Impact Study prepared for the Draft Plan of Subdivision for the Southgate Business Park (Phase 1, 2 and 3) and first-hand knowledge of the subject property.

## 1.6 Project Phasing

The consent applications for the development of the SBP existing development, which are located north of the subject lands for this EIR, were approved in 2006 and construction commenced in April 2007 with grubbing and installation of silt fence. This portion of the Business Park was originally referred to as Phase 1, with the remaining lands in the Business Park described as Phases 2 to 4. An EIS was not required for the development of the existing development lands. The LGL 1998 Scoped EIS was prepared prior to the zoning of the existing development lands. However, the City required watermain looping, temporary emergency access and hydro service for the existing development lands to be provided south of the northern developed lands and extending into the lands which are the subject of this EIR.

Since the Draft Plan for the lands under this EIR treats these lands as a separate development from the northern lands, the phasing in this area is referred to as Phases 1, 2 (previously Phases 2 and 3) and Phase 3 (previously Phase 4). The Southgate Business Park Phase 1 and 2 lands are situated south of the existing development lands, and Phase 3 is situated southeast of Phase 1 (see Figure 1). This new phase numbering will be used throughout this EIR. The 2007 EIS (NRSI) characterized natural features for lands within Phases 1, 2 and 3 (but at that time referred to them by their older phase numbers).



Lot-level detail for the Southgate Business Park is not known at this time, but will be required at the site plan stage. Final project phasing is not known at this time; however, it is anticipated that development activities will begin in Phases 1 and 2 (see Figure 1). Grading and development of Phase 3 (Block 1) will be driven by market demands.

The schedule of actual on-site work must consider the Migratory Birds Convention Act (MBCA) (Canadian Wildlife Service 1994) construction window. Construction activities can only be conducted in accordance with the Migratory Birds Convention Act (MBCA). The purpose of the MBCA is to “implement the Convention by protecting and conserving migratory birds – as populations and individual birds – and their nests.” Every developer/consultant/contractor, etc. is legally obligated to carry out due diligence to protect migratory birds from harm during all construction projects. To mitigate potential impacts to migratory birds during construction, the Canadian Wildlife Service (CWS) recommends that construction contract documents identify importance of migratory bird protection. During pre-construction meetings, it is recommended that meeting agendas “*contain a standard item on the protection of wildlife and their habitats. Procedures in the contract documents pertaining to wildlife protection and mitigation should be clearly communicated to front-line workers on the project.*” During construction, “*if there is evidence that migratory birds are actively inhabiting an area that may be affected by construction (i.e. fallow field, hedgerows) all work in the immediate vicinity should STOP immediately. The site supervisor should contact the appropriate authorities for advice (CWS, MNR) and assistance. Until permission is granted to the owner, consultant or site supervisor to proceed with construction, construction activities will remain suspended.*” (CWS Factsheet – Appendix IV).

The timing of the peak migratory bird breeding season for the study area is between May 1 and July 31, although this should be held as a general guideline. Birds are known to nest prior to and after these dates, depending on site conditions and other factors. In the event construction activities are anticipated to commence during the peak breeding season in potential breeding habitat, pending discussion and approval by the CWS, nest surveys may be conducted by trained biologists within small habitat areas just prior to construction activity.

## 1.7 Natural Heritage of the Southgate Business Park

The following overview of the natural heritage components of the Southgate Business Park is excerpted from the 2007 EIS (NRSI 2007). This section is intended to provide an overview of the natural features and functions within the SBP and to provide an ecological context for the components of the EIR. For additional detail, the reader is referred to the complete EIS.

Terrestrial corridor systems (i.e. hedgerows and forests) provide linkages necessary for wildlife movement. As stated in the Hanlon Creek Watershed Plan (Marshall and LGL 1993), the primary function of linkage habitats is to connect two or more significant areas. These areas can provide habitat that is suitable for wildlife movement and plant propagation, while allowing genetic exchange, re-colonization and the ability to move in response to seasonal and long-term environmental changes (Marshall and LGL 1993).

The combination of scrub, old field, hedgerows, deciduous forests and pine plantation associated with the northeastern portion of the property, provide habitat for a wildlife corridor between the Hanlon Creek Subwatershed and Mill Creek Subwatershed. The movement of white-tailed deer and other small mammals through this area has been documented in previous studies and is supported by evidence found in the study area during 2006 to 2010 surveys.

Both the Hanlon Creek Watershed Plan and the Mill Creek Subwatershed Plan identified linkage enhancement opportunities between the two watersheds through the central and northeastern fringe of the study area (LGL 1998). These linkages encompass the kettle wetlands and associated upland deciduous forest, abandoned field/thicket habitats, and coniferous plantation. The large wetland complexes north of Maltby Road are connected to a large deciduous/mixed swamp to the south (LGL 1998). A terrestrial linkage system exists along the northeastern border of the property and extends to the north and south of Maltby Road. This area is comprised of a number of provincially significant wetlands surrounded by communities such as sugar maple deciduous forest, white pine coniferous plantation, meadow marsh, cultural thicket/savannah and mixed hemlock forest.

The Hanlon Creek Watershed Plan (1993) identified a number of areas with potential protection measures that would result in a linked system of natural areas of the Hanlon Creek, Torrance Creek and Speed River watershed, as well as the Galt Creek Swamp complex and the Arkell Bog. The recommendations of the Watershed Plan were reviewed for guidance, and site specific analyses were completed to provide a greater level of detail to guide land use decisions. The identification of enhancement and protection measures (such as setbacks) was iterative, taking into account not only the characteristics of the natural features, but also the nature of the proposed undertaking.

## 2.0 Fresh Sugar Maple Woodland Assessment

A small Fresh Sugar Maple Deciduous Forest (FOD5-1) is located within the proposed SBP. The woodland is situated within Open Space Block 8 (Draft Plan of Subdivision 23T-06503 March 2008) approximately 250m northwest of Maltby Road (see Figure 2). The woodland is approximately 1.7ha and is currently surrounded by agricultural fields. Lands in close proximity to the woodland are comprised of abandoned and cultivated fields, hedgerows, red pine plantation, and a small red-osier dogwood mineral thicket swamp.

### 2.1 Background

While under prior ownership, the small woodland community was heavily logged in the winter of 2005/6. In 2006, a site assessment and tree inventory of the woodland was conducted by NRSI as part of the 2007 EIS to determine woodland character based on the condition of the remaining vegetation. For detailed information pertaining to the woodland, the reader is referred to the Fresh Sugar Maple Woodland Assessment (NRSI 2007) included in this EIR in Appendix V.

The 2007 EIS prepared by NRSI was approved by City of Guelph EAC on December 12, 2007, based on the following condition:

*“That the Environmental Advisory Committee supports the Environmental Impact Study prepared by Natural Resource Solutions Inc., dated July 2007 related to the Southgate Business Park (23T-06503/ZC0617) subject to the retention of the woodlot at the corner of the proposed Southgate Drive extension and Street ‘A’.”*

Following review of the 2007 EIS (NRSI 2007) and discussions pertaining to the Fresh Sugar Maple Woodland, it was determined that these lands would be dedicated to the City of Guelph as part of the 2% parkland dedication. The City noted that the woodland would be under public ownership and that the City would be responsible for managing and protecting the trees. Protection will be provided to the maple woodland by ensuring that no development activities occur within the recommended boundary. The City requests that the developer erect paige-wire fence on posts around the entire block and provide signage to identify ownership and significance of the trees (City of Guelph 2008).

Hazard trees within the Sugar Maple Woodland are identified on Figure 2, tree protection fencing details are shown on Figure 12 and education signage is shown on Figure 8. Hazard trees identified on Figure 2 should be inspected by a qualified City staff person or designated arborist to determine the need for hazard tree management (pruning, removal, etc.). The Sugar Maple Woodland is designated as “Significant Woodland” within the City of Guelph’s Official Plan, Draft Schedule 4C: Natural Heritage Strategy (City of Guelph April 2010).

Through review of the EIR Terms of Reference (NRSI 2009), City of Guelph EAC requested that reference be made within the EIR to key findings and recommendations based on the Fresh Sugar Maple Woodland Assessment (NRSI 2007). Specifically, the EAC Condition states *“that reference be made to the key findings and recommendations of the Southgate Business Park Fresh Sugar Maple Woodland Assessment, prepared by NRSI, dated January 2007, as well as provide recommendations for mitigation measures to address potential impacts to the woodlot edge.”*

Key findings from the woodland assessment, as well as recommendations and mitigation measures are outlined below.

## 2.2 Woodland Assessment Findings

The logging operation targeted saw logs only and left large quantities of slash or coarse woody debris. During the time of the assessment, the woodland community was mainly comprised of pockets of sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*) and basswood (*Tilia americana*) around the perimeter and in the corners. Sugar maple, white ash, basswood and bitternut hickory (*Carya cordiformis*), among other species were scattered throughout.





### Southgate Business Park Fresh Sugar Maple Woodland Tree Inventory

High Hazard

Medium Hazard

Low Hazard

Tree Polygon

Other Tree

Proposed Grading

Existing Contour

Flagged Features

Tree Protection Fencing

Living Fence

Map Key

Map Key

NO.	BY	DATE	DESCRIPTION

SCALE: 1:750 (11x17)  
Universal Transverse Mercator  
NAD83 - Zone 17

PROJECT: NRSI-636  
DATE: December 2010

DISCLAIMER: Map produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Base layers from IBI Group received December 1st, 2010 (1743E-Phase II.dwg).

Figure 2

Fresh Sugar Maple Woodland  
Tree Inventory

NRSI\_0636\_CAD\_SouthgateWoodlot\_wGrading\_2010\_12\_03\_GCS

Of the 239 trees inventoried in the woodland, 140 (59%) were observed to have a low hazard rating. Forty trees (17%) were considered to have a high hazard rating. Based on the findings obtained, the small woodland was separated into three compartments:

1. The north and northeast edges of the woodland are situated on gently rolling topography. Area characterized by clusters of healthy trees, especially along the northern edge. A number of large, mature sugar maples and basswoods, with dbh ranging from 37-75cm and an average crown radius of 8.6m, were found around the perimeter of this area, with very few hazard trees present.
2. The central portion of the woodland is situated on a knoll. As a result of logging and strong winds, this area is predominantly open, with a few scattered trees.
3. The south and southeast edges of the woodland are similar in composition to that of the northern section. This area is predominantly comprised of smaller sized tree species, such as sugar maple and white ash. A number of large, healthy tree species are scattered throughout this area as well.

### 2.3 Mitigation Measures

The following recommendations were provided by NRSI in the Fresh Sugar Maple Woodland Assessment (2007). Some of the 2007 recommendations (i.e. sediment and erosion control plans) are detailed as part of the EIR, while others remain as recommendations for the City of Guelph. The following mitigation measures are to be implemented by the Developer prior to development activities to ensure that any potential impacts to the maple woodland are minimized:

- Sediment and erosion control measures must be installed prior to, and maintained during construction (Engineering Drawing 2 and Drawing 12).
- Heavy duty paige-wire tree protection fencing and associated tree protection signage be installed around the perimeter of woodland as outlined on Engineering Drawing 2, Drawing 12 and Figure 12 Property Demarcation. Fencing to be maintained prior to and during construction.
- In order to maximize the retention of trees and other areas of vegetation, the following recommendations are provided:



- trees and other areas of vegetation to be retained must be identified and delineated with tree protection fencing located beyond the dripline of trees, to ensure that vehicle movement or material storage does not disrupt vegetation (especially root zones),
  - erect signage to identify ownership and significance of trees, and
  - any limbs or roots to be retained which are damaged during construction must be pruned using appropriate arboricultural techniques.
- Maintenance of machinery during construction must occur at a designated location away from the maple woodland and its associated buffer.
  - Any areas of bare soil that arise must be graded and re-vegetated as soon as possible to avoid gulying and erosion (native seed mix must be applied to cleared/graded areas within 30 days).
  - No storage of equipment, materials or fill is to occur within the maple woodland or its associated buffer.
  - During the installation of the construction limit fencing, any hazard trees must be identified by a Certified Arborist and removed as warranted.
  - Developer to install signage on the fencing of woodland to identify Fresh Sugar Maple Woodland as a tree retention area (Figure 4).
  - Install naturalized plantings around boundary of woodland as outlined in Restoration Planting Plans L-5 and L-17 to provide natural barrier from proposed future off-road trail and adjacent development lands.

In addition, it is recommended that the following management guidelines be implemented by the City of Guelph:

- Identified hazard trees should be inspected by a qualified City staff person or designated arborist to determine the need for hazard tree management (pruning, removal, etc.).
- If deemed necessary, City to prepare and implement an invasive species removal program (especially for common buckthorn and garlic mustard).
- Ensure that tree protection fencing and signage is maintained post construction.



### 3.0 Street Tree Planting

A proposed street tree planting plan, providing tree species, recommended spacing and approximate numbers, is requested by City staff at the EIR stage. The following criteria, as set out by City staff, were followed to develop a viable street tree planting plan:

- implementation of native, non-invasive tree species that complement the surrounding natural features,
- no ash species, due to the risk of introducing the emerald ash borer (*Agrilus planipennis*),
- salt and drought tolerant tree species,
- avoid use of fruiting trees, such as crabapple (*Malus spp.*) along sidewalks,
- trees should be 4m off-set from lamp posts (this level of detail will be provided at the Site Plan stage), and
- special attention to location and height of trees in proximity to utilities.

Street trees will be planted at least 10-12m on-centre to provide adequate room for growth and ≥60mm caliper trees be planted to ensure survivability in more harsh street conditions. Tree species should be alternated to eliminate homogeneity along each street. A setback of at least 1.5m from driveways is recommended as well as 9.1m x 9.1m sight line triangle on road corners/intersections (City of Hamilton 2007). Various tree species have been chosen to complement the surrounding landscape and increase species diversity, in turn, increasing resistance to various blights/diseases, etc. Table 2 summarizes tree species that are recommended for street tree planting within the Southgate Business Park.

Species have been reviewed and approved by City staff and were chosen based on their size, salt/drought tolerance, native status, spring/summer and fall foliage.

**Table 2. Recommended Street Tree Species**

Common Name	Scientific Name	Avg. Height at maturity (m)	Avg. DBH at maturity (cm)	Foliage	Comments
Bur Oak	<i>Quercus macrocarpa</i>	15	60	Foliage is green in spring and summer and becomes yellow green in autumn.	<ul style="list-style-type: none"> <li>• Moderately shade tolerant.</li> <li>• Tolerant to urban conditions.</li> <li>• Tolerates poor soil conditions and wide pH ranges.</li> </ul>
Common Hackberry	<i>Celtis occidentalis</i>	12-25	30-60	Foliage is dark green in spring and summer and yellow-green in autumn.	<ul style="list-style-type: none"> <li>• Grows on a variety of soils, very adaptable.</li> <li>• Moderately shade tolerant.</li> <li>• Used in landscaping as substitute for elm species as it withstands city conditions well.</li> <li>• Fast growing.</li> <li>• Host species for hackberry butterfly and tawny emperor butterfly.</li> </ul>
Black Cherry	<i>Prunus serotina</i>	22	60	Foliage is dark green and lustrous above, paler below in spring and summer. Leaves are yellow to orange in autumn. Fragrant white flowers that bloom in May.	<ul style="list-style-type: none"> <li>• Grows well on a variety of soils.</li> <li>• Highly tolerant of salt and drought conditions.</li> <li>• Seeds and leaves important food source for songbirds, mammals, moths and butterfly larvae.</li> </ul>
Red Maple	<i>Acer rubrum</i>	13-25	60	Foliage light green in spring and summer and bright red in autumn.	<ul style="list-style-type: none"> <li>• Excellent street tree.</li> <li>• Thrives on a great variety of soils and sites.</li> <li>• Moderately shade tolerant.</li> </ul>

Common Name	Scientific Name	Avg. Height at maturity (m)	Avg. DBH at maturity (cm)	Foliage	Comments
Red Oak	<i>Quercus rubra</i>	20-27	30-90	Dull green and smooth above and yellowish-green below in spring and summer. Russet to dark red in autumn.	<ul style="list-style-type: none"> <li>• Tolerant of air pollution.</li> <li>• Transplants relatively easily because of absence of significant taproot.</li> </ul>
Downy Serviceberry	<i>Amelanchier arborea</i>	5-12	Multi-stemmed shrub or small tree (up to 20cm)	White flowers in early spring with green foliage. Fall colour is variable, from apricot-orange to dull, deep red.	<ul style="list-style-type: none"> <li>• Adapts to high light, urban situations and restricted root space.</li> </ul>

**Source:**

City of Hamilton. 2007. Street Tree Planting Program.

<http://www.myhamilton.ca/myhamilton/CityandGovernment/CityDepartments/PublicWorks/Parks/Forestry/StreetTreePlantingProgram/tree-library.htm>

Farrar, J.L. Trees in Canada. Markham, Ontario: Fitzhenry & Whiteside Limited, 1995.

### 3.1 Planting Guidelines

The following planting guidelines should be adhered to during the installation of street trees:

- receiving hole should be at least 1.5 times wider than root ball,
- top of root ball should be approximately 1 inch above the adjacent grade,
- receiving hole should be back-filled with topsoil native to the site,
- all caliper trees are to be double staked with 50x50mm timber stakes and rubber tree ties. The stakes are to be driven into the ground beyond the wire basket (root zone),
- tree stakes are to be removed after end of warranty period (2 years) to ensure that the tree is not “choked” by the collar,
- shredded pine bark mulch or an approved other is to be spread around the base of all trees to a depth of 75mm, and a minimum radius of 300mm beyond the mulch free ring, and
- trees are to be mulched from near, but not up to, the trunk and to the edge of the canopy dripline. No sod should be planted within the canopy or mulched area at the base of trees.

### 3.2 Street Tree Layout

Within Phases 1 and 2 of the proposed development, there is approximately 570m of road (Southgate Extension and Street 'A'). Based on this layout, there should be approximately 48 to 57 trees planted 10-12m on-centre along the major roadways within Phases 1 and 2. The laneway into Block 1 (Phase 3) is not a street and does not require street trees to be located along it. Restoration plantings have been proposed along either side of the laneway into Block 1 within the buffer areas, as shown in Appendix VI – Restoration Planting Plans.

#### **4.0 Buffer Design and Restoration Plantings**

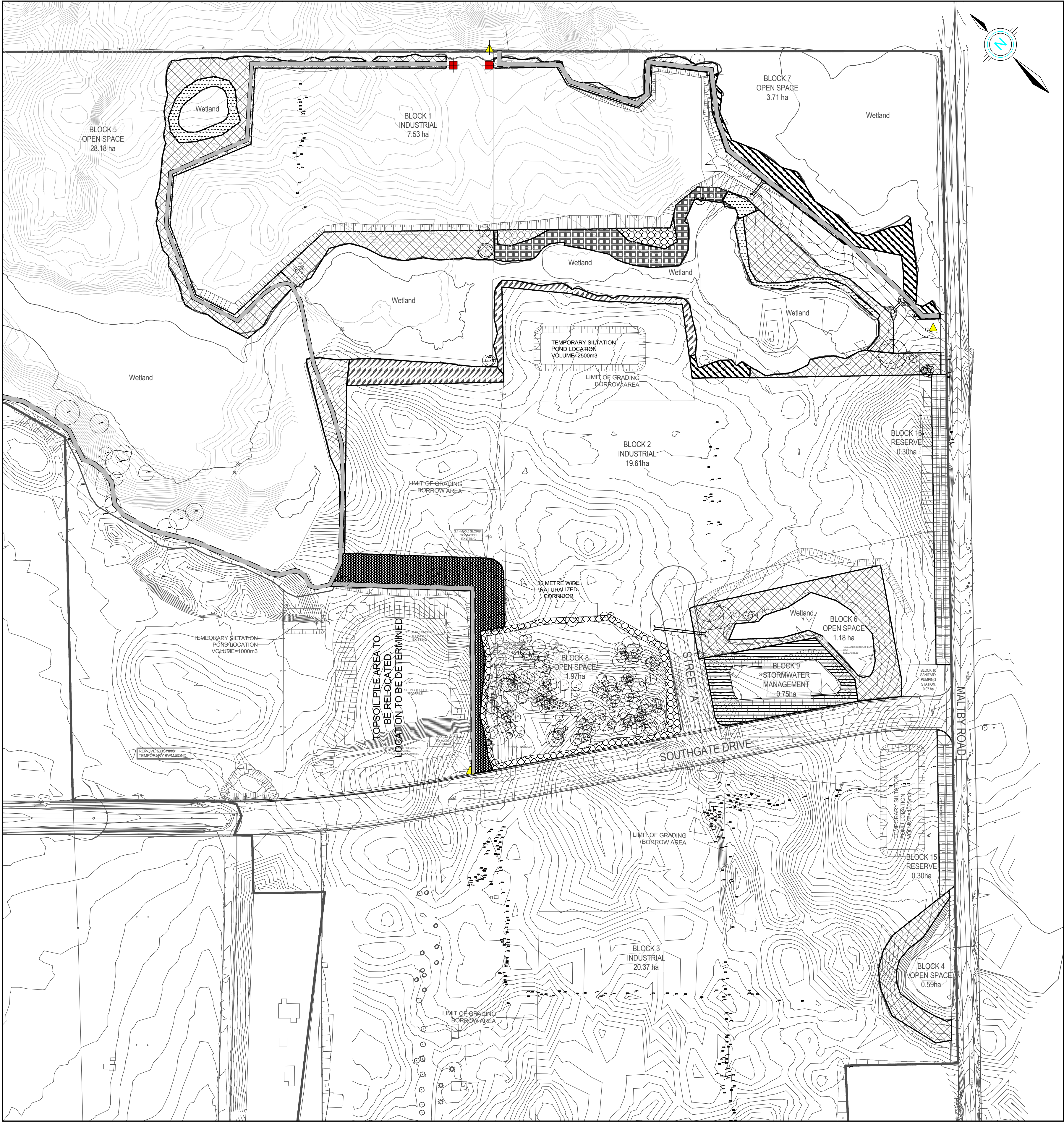
In the EIS (NRSI 2007), it was recommended that the existing habitat linkages in the northeastern and central portion of the subject property be maintained and that restoration of the lands within the recommended natural heritage area be detailed in the EIR. The intent of these recommendations was that the wetland complex that runs along the central portion of the subject property was to be 'bulked' up through the installation of appropriate native plant material in the buffers. Similarly, the northeastern boundary of the property was recommended for enhancement to improve wildlife habitat and linkage functions.

A provision of habitat types have been included in the restoration areas including early successional meadow habitats, meadow marshes, swamp thickets, shrub thickets, savannah and forests. These habitat types have been selected and located in areas to complement existing natural features and to provide a range of structural habitats comprised of different species to support a diverse wildlife community. A guiding principle in the selection of plant species is that only common species that are tolerant of a range of conditions be used. Further, the restoration plantings and seeding are intended to create a framework community which will be augmented in terms of species diversity and structure through the natural process of succession. Trying to create a highly diverse plant community in the buffers using landscape stock is not as desirable as allowing for natural introductions of new species from nearby seed sources. This ensures that the end product supports the greatest extent of local genotypes. Overall, the restoration/buffer planting areas (excluding street trees) will comprise approximately 6.61ha of land and provide a number of enhancement opportunities, such as:

- Enhancement of existing habitat linkages through re-vegetation of existing habitat breaks, widening the existing core natural area and providing restoration plantings that correspond to the existing native vegetation.
- Provision of buffers and setbacks to enhance wetland and terrestrial habitats. Natural succession and plantings are used to create native vegetation zones around some of the retained wetland and woodland areas.
- Bulking up of natural features (i.e. wetland and woodland areas)
- Provision of early successional habitats such as meadows for species that require open areas (grassland birds, butterflies, etc.).

Based on the existing characteristics of the natural features and the proposed plan of development, a series of enhancement planting themes have been established throughout the Business Park. Figure 3 provides a 'Key Plan' for restoration proposed throughout the subject property. The goal behind the restoration planting plans included in this report (see Appendix VI) is to create naturalized buffer and enhancement areas with the use of hardy, native species indigenous to the Guelph/Wellington County area.





**LEGEND**

**Swamp (.23 ha)**

**Naturalized Wildlife Corridor Easement (.62 ha)**

**Savannah (.44 ha)**

**Meadow (.43 ha)**

**Meadow Marsh (.39 ha)**

**Upland Forest (3.07 ha)**

**Shrub Thicket Understorey (.07 ha)**

**Shrub Thicket (.44 ha)**

**Berm Plantings (.55 ha)**

**Storm Water Management Pond (.49 ha)**

**Proposed Trail**

**Trees to be Retained**

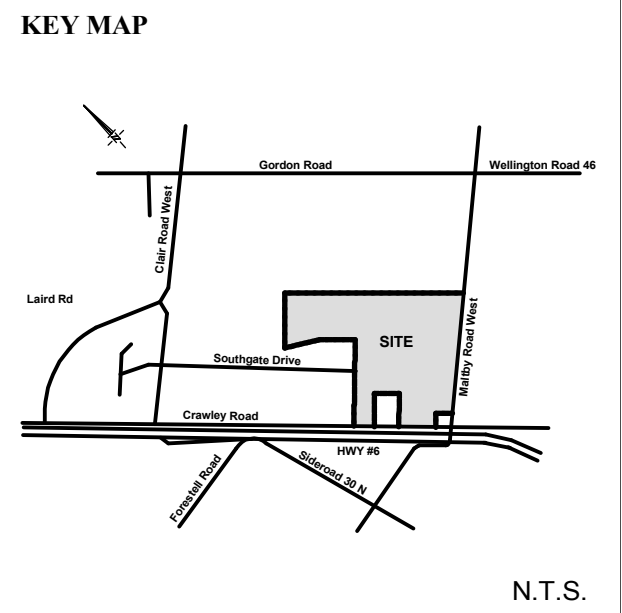
**Proposed Culvert**

**Environmental Education Sign**

**Stormwater Management Area Signage (provided by City of Guelph)**

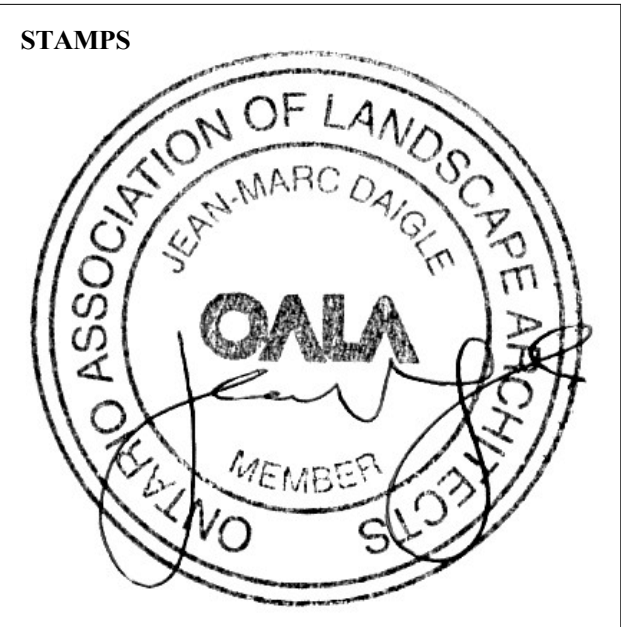
**Road Crossing Sign (provided by City of Guelph)**

- GENERAL NOTES**
- These drawings and specifications are prepared by the designer on the basis of information obtained from one site inspections, and data supplied by the owner.
  - Contractor shall report any error or omissions to GENUS LOCI ECOLOGICAL LANDSCAPES INC. prior to commencement of construction.
  - Contractor shall verify all information and dimensions prior to proceeding with construction. Dimensions always take precedent over scale measurements. Do not scale drawings.
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**LANDSCAPE DESIGN BY:**

REVISIONS	
DATE	COMMENT



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**PROJECT**  
**SOUTHGATE BUSINESS PARK**  
Malby Road & Hanlon Expressway  
Guelph, ON

**TITLE**

**KEY PLAN**

<b>DATE</b>	Dec. 2, 2010
<b>SCALE</b>	NTS
<b>DRAWING</b>	<b>L1</b> OF <b>18</b>



#### 4.1 Stormwater Management Pond

Two types of stormwater management ponds may be required for each development lot. A constructed wetland may be used (instead of oil/grit separator units) to provide stormwater quality control to treat surface runoff before it is directed to infiltration facilities. Once runoff has been treated, it must be directed to an infiltration pond, which will be a dry basin designed to contain and infiltrate runoff to depth. Planting plans will be required for each type of facility.

A planting plan is required for all on-site stormwater management ponds based on the Condition of Draft Plan Approval – Condition 30, that states that;

*“The Developer shall design and develop the Storm Water Management Facility Landscaping in accordance with the City’s current “Design Principles for Storm Water Management Facilities” to the satisfaction of the Director of Community Design and Development Services and the City Engineer. This shall include the submission of drawings to the administration of the construction contract up to the end of the warrantee period completed by an Ontario Associated on Landscape Architect (OALA) member for approval to the satisfaction of the Director of Community Design and Development Services.”*

The planting plan for each stormwater management pond is to be prepared by an OALA member and must adhere to the Design Principles for Storm Water Management (City of Guelph 1996). Additionally the design should incorporate components from the Ministry of the Environment (MOE) Stormwater Management Planning and Design Manual (MOE 2003). For example, a wetland facility can be divided into three planting zones that are reflective of water levels: shallow water, floodline fringe, and upland. Through the designation of these zones, a wider array of appropriate native plant diversity can be prescribed. Dry infiltration facilities will not require aquatic plantings since they will be maintained as dry facilities.

The Municipal stormwater management pond for the Southgate Drive extension will be a dry infiltration basin. Since stormwater quality control is provided using oil/grit separator units, the pond will not include a permanent pool. The planting plan for the Municipal SWM pond was prepared by an OALA member, adheres to the Design Principles for Storm Water Management (City of Guelph 1996) and incorporates components from the MOE Stormwater Management Planning and Design Manual (MOE 2003).



The planting details for the Municipal stormwater management pond are included in Drawing L3, Appendix VI.

All species prescribed in the Municipal SWM Pond planting plan are native and not regionally rare in Wellington County (Riley 1989). Also, as requested by City staff, specific species have been avoided including all species of ash (*Fraxinus spp.*) in recognition of the continuing spread of emerald ash borer (EAB). Many of the species used are also recommended for use in stormwater facilities by different sources ranging from the MOE Guidelines, the Toronto Region Conservation Authority (2004), to various native plant growers.

Below is an overview of some of the considerations that determined plant placements, selections and densities.

The shrub beds have been designed for the Upland Meadow planting zone. Within this zone, according to the City of Guelph guidelines, the required shrub planting density is 1 shrub per 4 square metres (which is equal to 2.0m on-centre) based on a maximum of 5:1 slopes. This plan proposes shrub beds be planted at densities ranging from 1.2 m – 1.8m on-centre.

While the Guidelines make no mention of herbaceous plantings or seeding, specific seed mixes have been created for the two different zones; Floodline Fringe and Upland Meadow. In order to provide the greatest long-term potential cover of a diverse mix of appropriate native species, the plans call for the seed mixes to be applied using a terraseed application to eliminate the need for expensive topsoil or mulch. Topsoil from on-site grading activities will be located along the berms and areas around the stormwater management pond. Woody plantings, shrubs and trees will be located in areas containing topsoil.

Finally, in recognition of the high quality natural areas that are being retained in the SBP, the planting plans have prescribed seed only for some areas in order to allow for natural re-vegetation of woody species. This will ensure that much of the long-term vegetation will be of local seed stock, and be distributed in a natural, as opposed to a contrived matrix.

## 4.2 Berms

A landscaped berm, 2m in height and 14m in width is included along Maltby Road based on the following Conditions of Draft Plan Approval:

### Condition 14

*“A commitment to design the landscaped berm feature along Maltby Road in a comprehensive manner that would include the existing hills and topography along Maltby Road as much as possible to achieve a more natural, rural landscape feature.”*

*“A commitment to plant the berm and buffer along Maltby Road with only native tree and shrub species that mimic the surrounding naturally-occurring vegetation.”*

### Condition 39

*“Prior to the registration of any phase of the development, the developer shall install a landscaped **buffer strip including a berm** on Block 2 and 3 located adjacent to Maltby Road, to the satisfaction of the Director of Community Design and Development Services. The buffer strip required for these blocks shall be a minimum of 14 metres in width and shall consist of a 2 metre high landscaped earth berm measured from the surrounding on-site grade. Landscaping shall include coniferous and deciduous trees planted at 3 metre centre intervals. Landscape material shall be a minimum of 6 centimetre calliper for deciduous trees and 2 metre height for coniferous trees. Where there is existing tree or shrub growth the existing plantings may provide the required buffer strip and landscaping.”*

The berm located along Maltby Road will be planted with a mix of upland deciduous and coniferous trees and seeded with native meadow forbs and graminoids. The planting plan has been designed to enhance the aesthetic appeal of the berm while providing a visual barrier. Details of the plantings for the landscape berm are found on Drawing L16, Appendix VI.

## 4.3 Natural Area Plantings

Restoration planting plans have been developed for the natural area buffers throughout the Business Park based on recommendations outlined in the 2007 EIS (NRSI), as well as the following;

### Environmental Advisory Committee (July 8, 2009)

*“That provisions should be made for open habitats – thickets and meadows in the restoration planting plans.”*

*“We agree that buffer restoration will help increase ecological connectivity and wildlife movement throughout the site. We anticipate that buffer prescriptions will vary for wetland and woodlands. For example, there will be a need to restore or enhance wetland buffer functions such as groundwater recharge and discharge, nutrient and sediment removal, as well as provide suitable upland habitat for wetland-dependent wildlife. The buffer prescription for the central woodland will likely be based on the need to augment the overall size of this area for area-sensitive birds. Accordingly, buffer objectives and plans should be area-specific. Plantings should include a list of appropriate ground, shrub and tree layer species native to the local area. It is also assumed that the buffer restoration area will comprise and extend beyond the specified 1m and 5m no touch setback area for woodlands and wetlands, respectively.”*

The Regeneration Zones captured in the Restoration Planting Plans propose to create a variety of different habitats that will result in long term species diverse communities of different structural compositions that will provide a range of wildlife habitats. Specifically the plans include early successional meadows, meadow marshes, shrub thickets, swamp thickets, savannahs and forests. All of the species selected for the establishment of these respective communities are both native and common to Wellington County (Riley 1989). Further, these species have low to average site fidelities as scored by their co-efficient of conservatism. In short, this means that these species are tolerant of a range of site conditions and are likely to establish well in various locations throughout the site. By comparison, species with high co-efficients of conservatism have very specific habitat requirements that are often poorly understood and hard to predict. Such species are much less likely to establish under different micro-site conditions across a large site. It is the intent of the Restoration Planting Plans to create a healthy foundation of common native species that will be diversified through succession and the introduction of local native seeds by wind or carried by animals. The details of the different ecological treatments of the buffer areas (Regeneration Zones) are found on Drawings L2, L4 – L15 and L17, Appendix VI.

#### 4.4 Naturalized Wildlife Corridor

Conditions of Draft Plan Approval (2008) requested the *“addition of a natural linkage between Woodlot Block 8 and Open Space Block 5 with consideration to the best location, width and design details of the linkage.”* To satisfy this condition, two 30m wide naturalized corridor options have been proposed; Option A and Option B (see Figure 4).

For the purposes of this report, design details, such as grading, tree retention/removal, potential off-road trail layout and restoration planting plans for Option A have been prepared; however, design details will be provided for Option B if it is determined to be the most appropriate based on the ultimate development layout. As shown on Figure 4, Option A will connect the northeast corner of Woodlot Block 8 to the southwest corner of Open Space Block 5. Option B would provide connection from the northeast corner of Woodlot Block 8 to western wetland edge of Open Space Block 5. For either corridor option, as determined through discussions between City staff, NRSI and the Developer, a potential off-road trail corridor will be accommodated on an easement along the northern edge of the naturalized wildlife corridor.

Both Option A and Option B naturalized wildlife corridors have been situated to coincide with existing hedgerows to protect existing trees, as well as provide more vegetation cover in the short-term than if it was created in an existing agricultural area. The location of Option A corresponds approximately to recommended naturalized corridor shown on the City's Natural Heritage System mapping. The corridor is to be further enhanced with a mix of upland tree and shrub species, as well as herbaceous seed mix. The corridor will be 30m in width and include a 3.6m wide trail corridor (2.4m wide trail surface with 0.6m clearance zones on either side). Setback from the edge of the trail is a dense planting of low-growing (<1.2 m tall at maturity) shrubs that will discourage intrusion into the wildlife corridor and creation of ad-hoc trails. Further setback from 'natural barrier' planting will be the meadow regeneration plantings associated with the Fresh Sugar Maple Woodland (Block 8). Planting details for the Option A Natural Wildlife Corridor are found on Drawing L5, Appendix VI.

#### 4.5 Graded Areas

In order to avoid unnecessary sediment, erosion and dust control issues, all disturbed areas are to be seeded within 30 days of being disturbed, graded and/or cleared with a nurse crop of annual oats (i.e. *Avena sativa*) applied at a rate recommended by the supplier.

To prevent wash-outs, it is recommended that a Terraseed application containing the recommended seed mixture be applied at a minimum depth of 25mm. The Terraseed

depth will be increased depending on the degree of slope, as recommended by the Terraseeding contractor.

#### 4.6 Restoration Monitoring

A two year warranty is recommended for all proposed planting material throughout the subject property (shrubs, trees, herbaceous and grasses). All plants shall be inspected by an appropriate inspector at the end of the guarantee period. Plants which, at that time, are not in healthy vigorous growing condition, to the inspector's approval, shall be replaced at no extra charge. At the two year warranty period inspection, for areas where seed mixes have been applied, seed applications must have a minimum of 70% cover by native plants and 70% of species from seed mix for approval of seed application.

Once on-site works commence and restoration plantings have been installed, a monitoring plan will be discussed and agreed upon by the City of Guelph at the Site Plan stage. The habitat restoration monitoring will:

- evaluate restoration effectiveness (i.e. planting areas showing a trend toward natural regeneration),
- document use of restoration areas by wildlife species, such as songbirds and small mammals,
- monitor impacts of beaver activity on plantings, and
- implement subsequent restoration activities/monitoring (i.e. additional plantings, non-native species removal and additional protective covenants) in response to observed changes in planted areas.

## 5.0 Tree Inventory and Preservation Plan

As per the Draft Plan of Subdivision and associated Zoning By-Law (Condition 2), a tree inventory and conservation plan was requested. It was stated that *“the Developer shall complete a tree inventory and conservation plan, satisfactory to the City Engineer in accordance with City of Guelph By-law (1986)-12229 prior to any grading, tree removal or construction on the site.”* (December 22, 2008). The City of Guelph’s Official Plan Amendment Number 42: Natural Heritage System (July 2010) also requires that a *Vegetation Compensation Plan* be required for the replacement of all healthy indigenous trees measuring over 10cm dbh. As a result of the OP Amendment Number 42, the tree inventory focused on assessing isolated and hedgerows trees. A tally was also made of plantation trees within the proposed development, and overall health and hazard rating were also documented.

Section 6.1.9 of Official Plan Amendment Number 42 (City of Guelph 2010) is as follows:

1. *The detailed requirements for a Vegetation Compensation Plan will be developed by the City through the Urban Forest Management Plan. The requirements, once developed, will be applied to determine appropriate vegetation compensation for the loss of trees through development and site alteration.*
2. *The Vegetation Compensation Plan shall identify, to the satisfaction of the City, where the replacement vegetation will be planted. Where replanting is not feasible on the subject property, the planting may be directed off-site to lands identified in consultation with the City, within the Natural Heritage System and may include:*
  - i) *Established buffers,*
  - ii) *Significant Valleylands,*
  - iii) *Significant Landforms,*
  - iv) *Ecological Linkages, or*
  - v) *Restoration Areas.*
3. *All replacement vegetation should be indigenous species and compatible with the site conditions within which they are proposed. In some cases, re-vegetation may consist of a combination of trees, shrubs and herbaceous species, or may consist exclusively of native herbaceous species and grasses where the restoration objective is to establish a meadow habitat.*

4. *The vegetation compensation plantings do not replace the normal landscape planting requirements as part of the approval of the development or site plan application.*
5. *A Vegetation Compensation Plan is required to be implemented through on site or off site plantings as cash in lieu equal to the value of the replacement vegetation required by the City.*

The EIR provides the details of the Tree Conservation Plan for hedgerows and other treed areas, including some of the identified Open Space blocks in the SBP (see Appendix VII). The GIS-based tree data and mapping have been used in conjunction with CAD design plans generated by the engineering team (layout of features, grading, etc.), to identify tree retention and removal. The preliminary grading plans have been used to identify the trees that will require removal due to cut and fill. The layout of features such as roadways (extension of Southgate Drive, development of Street 'A'), block development and the stormwater management facility was also used to assess tree retention. Where possible, trees recommended for retention (i.e. along the proposed naturalized wildlife corridor) and measures to protect them have been identified. Refer to Section 5.4 for details regarding the recommended compensation plan.

## 5.1 Field Work

Comprehensive tree inventories were completed by NRSI certified arborists and GIS technicians during the months of December 2006, November 2007, October 2008 and July 2010. Individual trees and hedgerow trees within the proposed development footprint, with a 10cm or greater diameter at breast height (dbh), were included in the inventory. Tree species, dbh, canopy radius, health and hazard rating were recorded for each tree. In some instances, where species composition within an area (i.e. plantation) was quite homogenous, a summary of trees including approximate number and size ranges within that area (polygon) was provided rather than individual location. Each individual tree and polygon was given a number and their location was taken for mapping purposes using a GPS Trimble Unit. The location of each tree and polygon is shown in Appendix VII.

## 5.2 Summary of Findings

In total, 1043 individual trees consisting of 44 species were surveyed in hedgerows and as isolated trees throughout the subject lands, which does not include the trees within the polygons (i.e. plantations) (Table 3). Of these, 74.2% are native species, 25.8% are non-native. Table 3 lists the tree species from the SBP and whether they are native or non-native.

Tree removal and retention was based on the grading plans for the SBP, dated November 25, 2010.

In total, 72.3% of the trees are anticipated to be removed, of which 65.9% are native and 34.1% are non-native (i.e. 497 native trees are to be removed). 27.7% of the trees will be retained, of which 95.8% are native and 4.2% are non-native. Table 4 shows the results of the tree inventory.

**Table 3. List of Native and Non-Native Tree Species Inventoried**

American Beech	native	Norway Spruce	non-native
Amur maple	non-native	Pear	non-native
Austrian Pine	non-native	Red Ash	native
Balsam Poplar	native	Red Maple	native
Basswood	native	Red Pine	native
Bitternut Hickory	native	Scots Pine	non-native
Black Cherry	native	Silver Maple	native
Black Locust	non-native	Slippery Elm	native
Black Oak	native	Sugar Maple	native
Black Walnut	native	Sweet Cherry	non-native
Blue Beech	native	Tamarack	native
Canada Plum	native	Trembling Aspen	native
Choke Cherry	native	Tulip Tree	native
Colorado Spruce	non-native	Weeping Willow	non-native
Common Apple	non-native	White Ash	native
Cottonwood	native	White Birch	native
Hawthorn	native	White Cedar	native
Ironwood	native	White Elm	native
Manitoba Maple	non-native	White Fir	non-native
Mountain Ash	non-native	White Mulberry	non-native
Mulberry	non-native	White Pine	native
Norway Maple	non-native	White Spruce	native



**Table 4. Tree Inventory Results**

Inventory Total	Total	%
Native trees	774	74.2
Non-native trees	269	25.8
Total Species	44	
Approx. Trees in Polygons	7101	
Surveyed Trees	1043	
<b>Total Trees</b>	<b>8144</b>	
<b>To Remove</b>		
Native trees	497	47.7
Non-native trees	257	24.6
<b>Total Trees to be Removed</b>	<b>754</b>	<b>72.3</b>
<b>To Retain</b>		
Native trees	295	26.6
Non-native trees	17	1.2
<b>Total Trees to be Retained</b>	<b>289</b>	<b>27.7</b>

The condition of the individually surveyed trees that will be removed is shown in Table 5. The condition of the trees within the polygons is not included as they were not individually surveyed. A majority of the trees are in good condition (69.3%), with 30.5% being in fair to very poor condition. The condition of the native and non-native trees that will be removed is very similar.

**Table 5. Condition of Trees to be Removed (excluding trees within polygons)**

	<b>Native</b>	<b>% Native</b>	<b>Non-Native</b>	<b>% Non-Native</b>	<b>Total</b>	<b>% Total</b>
Excellent	2	0.4	0	0.0	1	0.1
Good	343	69.0	179	69.6	522	69.3
Fair	102	20.5	61	23.7	163	21.6
Poor	34	6.8	17	6.6	51	6.8
Very Poor	16	3.2	0	0.0	16	2.1

Five polygons were surveyed. The number of trees within each polygon was approximated during tree surveys. Based on this approximation, there are 7100 trees within these polygons, all of which are being removed. The polygons are comprised of a coniferous plantation and a mixed stand of deciduous and coniferous trees. The trees within the polygons are a mix of native and non-native species. The plantation is approximately 3.7ha in area and is dominated by red pine (*Pinus resinosa*) averaging approximately 20cm dbh, with white pine (*Pinus strobus*), white spruce (*Picea glauca*),

tamarack (*Larix laricina*) and other species (15 to 20cm dbh). The plantation is densely planted and currently overstocked, resulting in a crowded canopy. It is estimated that approximately 5300 trees are found within the plantation. Refer to Appendix VII for additional information on each polygon. .

### 5.3 Tree Protection Plan

In addition to sediment and erosion control fencing (i.e. silt fence), tree protection fencing in the form of heavy-duty paige-wire will be installed beyond the dripline of trees to be retained. Signage indicating the purpose of protection fencing will be attached to the paige-wire fencing every 100-150m.

Tree protection fencing locations correspond to the placement of sediment and erosion control paige-wire fencing throughout the SBP. Fencing locations are shown on Drawing 12 Trail Corridor and Fencing Plan and Figure 12 Property Demarcation.

### 5.4 Tree Conservation and Replacement Plan

As part of the Draft Plan of Subdivision, trees and vegetation within Open Space Blocks 4, 5, 6, 7, and 8 are being preserved as part of the Draft Plan of Subdivision (see Figure 1). The Open Space Blocks, which are comprised of approximately 35.6ha of wetlands, deciduous and coniferous woodlands, thickets, savannah and meadow, have been dedicated to the City of Guelph. Removal of trees and vegetation within the remaining areas of the subject property will occur from the proposed draft plan and associated site servicing and grading.

The number of native trees that are to be removed is 497. Of these, 345 are in good or excellent condition. In total, 754 trees are proposed for removal within Phases 1, 2 and 3 due to construction (non-plantation trees). Approximately 7101 trees will be removed that are located within the identified polygons (i.e. plantations and mixed stand of trees). The strategy for compensation of the loss of trees is to implement a re-vegetation program within the subject property which will provide additional native wildlife habitat, active restoration and enhancement plans (woodlot and wetland buffers, stormwater management ponds and roadside berms) (see Section 4.0 and Figure 3 Restoration Key

Plan). Table 6 lists restoration locations as identified on the Restoration Planting Plans (Appendix VI) within the subject property and projected canopy replacement areas for each planting zone 0, 5, 15, and 25 years after planting. The following assumptions were used to determine the area of new tree and shrub canopy:

- a) Tree types are dominated with large tree species, e.g. oaks (red, bur, white), maples (sugar, red, silver), and basswood.
- b) Various stock sizes will be planted with the following estimated crown diameters:
  - 2 gallon containers – 0.4m crown diameter
  - 40mm wire basket (WB) – 2m crown diameter
  - 60mm wire basket – 3m crown diameter
  - 200cm wire basket (red cedar) – 1.2m crown diameter
- c) Crown diameter growth is 40cm per year for the first 15 years, and 20cm per year from years 16 to 25.
- d) Canopy of the existing tree cover remained constant.
- e) Number of trees, by caliper size, planted on the subject property is:
  - i. 2 gal. – 1040
  - ii. 40mm WB – 562
  - iii. 60mm WB – 115 (includes street trees)
  - iv. 200cm WB – 120
- f) Tree canopy area of the retained trees is 2.5ha (excludes canopy cover within Open Space Block 4, 5, 6 and 7).

**Table 6. Tree Canopy Replacement Plan**

Regeneration Zone	Area (ha)	Trees to be Planted	Future Canopy Area (ha) Years After Planting			
			0	5	15	25
1 Upland Forest	0.2920	98	0.0139	0.0781	0.3913	0.6402
2 Stormwater Management Pond	0.4850	118	0.0174	0.0962	0.4762	0.7774
3 Upland Forest	0.8010	226	0.0225	0.1561	0.8493	1.4089
4 Naturalized Wildlife Corridor Easement	0.6200	119	0.0166	0.0940	0.4733	0.7751
5 Savannah	0.2310	49	0.0037	0.0313	0.1788	0.2988
6 Shrub Thicket	0.2620	35	0.0065	0.0319	0.1488	0.2402
7 Shrub Thicket	0.1790	15	0.0041	0.0172	0.0718	0.1132
8 Shrub Thicket Understorey	0.0720	38	0.0047	0.0285	0.1476	0.2430
9 Upland Forest	0.2250	86	0.0104	0.0646	0.3350	0.5513
10 Swamp and Upland Forest	0.5000	192	0.0214	0.1375	0.7317	1.2097
11 Upland Forest	0.4170	143	0.0178	0.1073	0.5559	0.9150
12 Upland Forest and Swamp Thicket	0.9540	333	0.0349	0.2327	1.2558	2.0813
13 Upland Forest	0.1200	48	0.0040	0.0317	0.1774	0.2956
14 Shrub Thicket Understorey	0.3960	155	0.0176	0.1122	0.5935	0.9802
15 Berm Plantings	0.5500	125	0.0486	0.1678	0.6418	0.9966
16&17 Meadow and Meadow Marsh	0.5080	0	0.0000	0.0000	0.0000	0.0000
Street Trees		57	0.0403	0.1119	0.3626	0.5417
<b>Total</b>	<b>6.6120</b>	<b>1837</b>	<b>0.2845</b>	<b>1.4990</b>	<b>7.3908</b>	<b>12.0680</b>
Existing Tree Canopy	8.7500					
Tree Canopy to be Retained	2.5241					
Tree Canopy to be Removed	6.2258					
Total Future Canopy			2.8086	4.0231	9.9149	14.5921
Net Difference			-5.9413	-4.7268	1.1649	5.8421

Based on buffer planting plans, it is projected that there will be approximately 1,823 trees and 3,101 shrubs planted throughout the subject property. Therefore, installation of the projected tree and shrub plantings will provide a replacement ratio of approximately 6:1 (>2:1 with tree species only). In addition to buffer plantings, each development parcel will be required to have landscape plantings covering 10% of the area. The composition of landscape plantings (i.e. grass, trees and shrubs) will be determined by each individual landowner.

Street tree planting and other landscape plantings within the individual lots will be additional; however, it is anticipated that there will be approximately 48-57 street trees based on 10-12m on centre spacing along major roadways within the Business Park.

Based on the assumptions made above, the canopy cover from the buffer plantings and street trees will surpass the existing canopy cover in less than 15 years. This area does not include ultimate canopy cover of planted shrub species. Restoration plantings throughout the business park will cover approximately 6.61ha of land (excluding street trees). The restoration plantings are comprised of a variety of native trees, shrubs, and seed mixes to create a provision of habitat types (i.e. meadow, savannah, shrub thicket etc.).

## 6.0 Pedestrian and Open Space Trail System

A Trail Master Plan was prepared by the City of Guelph in 2005. The goal of the Guelph Trail Master Plan was to *“develop a cohesive city wide trail system that will connect people and places through a network that is off-road wherever possible and supported by on-road links where necessary.”* The Trail Master Plan (2005) indicated a desired off-road trail connection north of Maltby Road along the large wetland complex (northeastern portion of the study area) to the South End Community Park and a lateral connection to Southgate Drive.

In accordance with Conditions of Draft Plan Approval, Condition 14 (i), the EIR shall *“include route plan and sufficient information about the future City developed open space and off-road trail to demonstrate that the final dedicated open space blocks contain sufficient land to accommodate a trail designed to City standards outside of the wetland buffers.”* The pedestrian and open space trail system was also developed in response to comments received from City of Guelph Park Planner.

To satisfy recommendations within the City of Guelph Trail Master Plan (2005), comments from City of Guelph Parks Planner and Conditions of Draft Plan Approval (December 22, 2008), a trail layout was developed and refined specifically for the Southgate Business Park through discussions between the study team and City staff (see Figure 4).

On October 7, 2010, NRSI and City staff conducted a site visit to review site conditions and determine the most appropriate alignment for the trail corridor. The alignment shown on Figures 4 and 5 represent the most appropriate location agreed upon by the City.

The following discussion on the off-road trail corridor and bike route through the Southgate Business Park provides recommended routing based on discussions between the City of Guelph, NRSI and the Developer, as well as design consideration. Ultimately, the City of Guelph will be responsible for preparing, finalizing and implementing detailed trail plans.

## 6.1 Off-road Trails

As per the City of Guelph Trail Master Plan (2005), the main north-south off-road trail corridor (primary trail) from the South End Community Park to Maltby Road will have a minimum 3.0m wide surface, plus 0.6m on either side which will be clear of obstructions (4.2m wide trail corridor). The east-west lateral trail corridors off of the main trail corridor (secondary trail) will have a minimum 2.4m wide surface, plus 0.6m on either side clear of obstructions (3.6m wide trail corridor). To minimize the impact of off-road trails on natural features, it is recommended that the surface material for the primary and secondary trails be stone dust with an aggregate base (to be refined on a site by site basis by the City of Guelph during trail design and implementation stage). Where longitudinal slopes are >5%, the trail is to be treated with an asphalt surface. It is recommended that the off-road trail corridor associated with development blocks be constructed as part of the Grading and Drainage Plans to ensure the least amount of environmental impact. The City of Guelph will be responsible for final layout, surfacing and implementation of the off-road trail running north-south within the larger Open Space Block (Block 5) connecting to the South End Community Park.



Figure 4

Southgate Business Park

Pedestrian and Open Space Trail System



NATURAL RESOURCE SOLUTIONS INC.

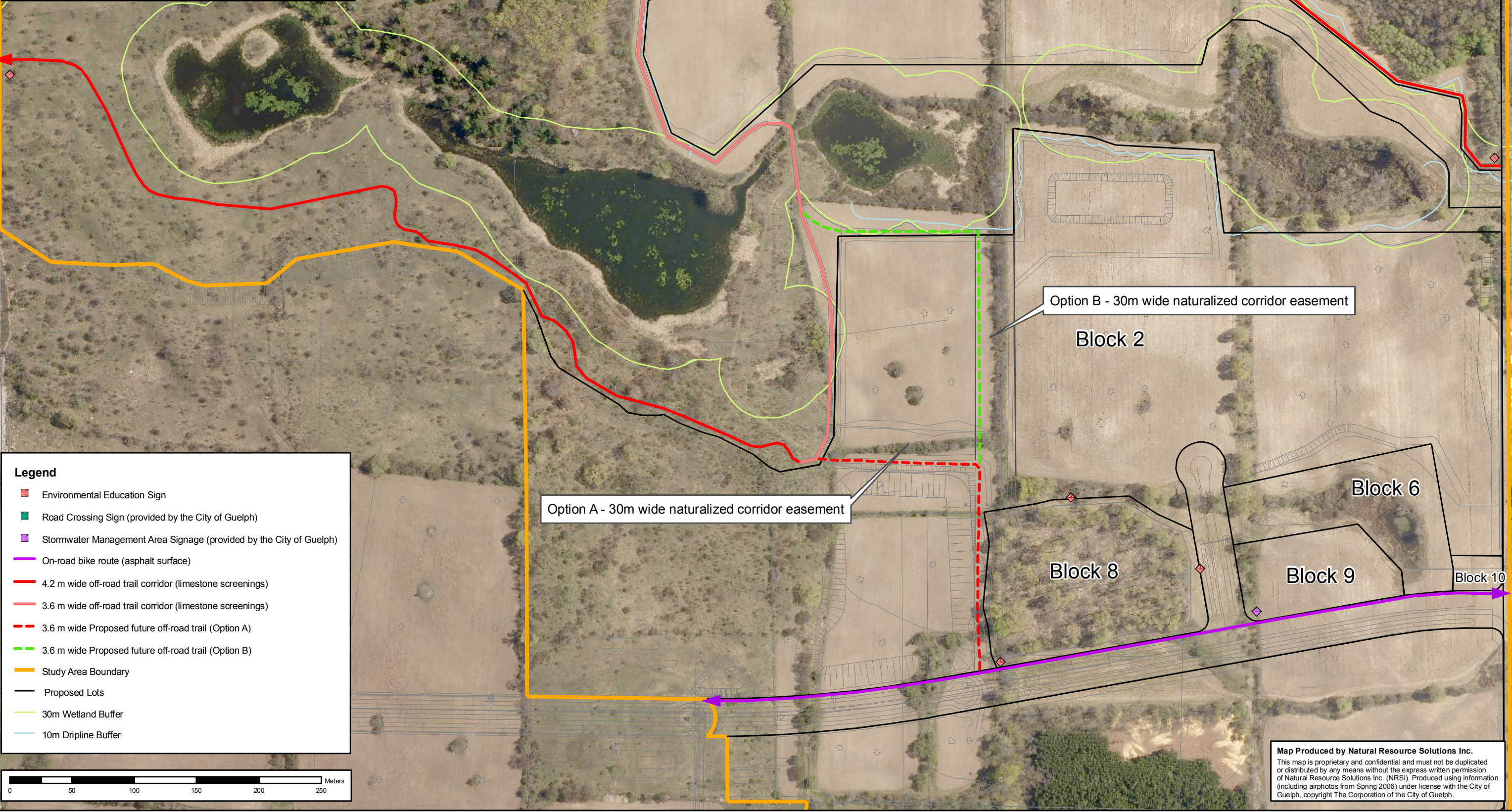
Aquatic, Terrestrial and Wetland Biologists

December 6, 2010


Project: NRSI-0636C


Scale: 1:3,000 (11 x 17")


UTM Zone 17 NAD83





Legend


 Environmental Education Sign


 Road Crossing Sign (provided by the City of Guelph)


 Stormwater Management Area Signage (provided by the City of Guelph)


 On-road bike route (asphalt surface)


 4.2 m wide off-road trail corridor (limestone screenings)


 3.6 m wide off-road trail corridor (limestone screenings)


 3.6 m wide Proposed future off-road trail (Option A)

 3.6 m wide Proposed future off-road trail (Option B)

 Study Area Boundary

 Proposed Lots

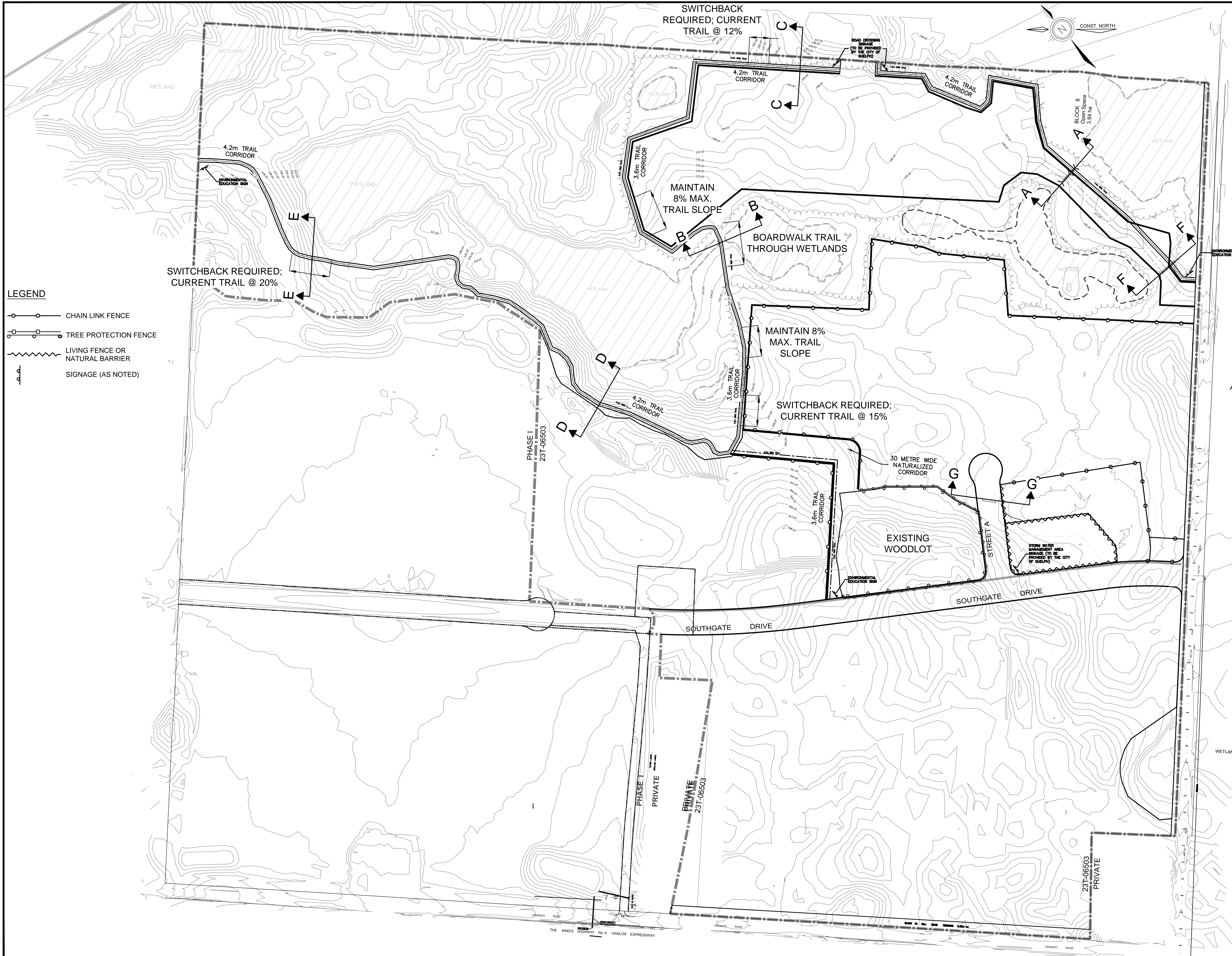
 30m Wetland Buffer

 10m Dripline Buffer

Map Produced by Natural Resource Solutions Inc.

This map is proprietary and confidential and must not be duplicated or distributed by any means without the express written permission of Natural Resource Solutions Inc. (NRSI). Produced using information (including airphotos from Spring 2006) under license with the City of Guelph, copyright The Corporation of the City of Guelph.





**LEGEND**

- CHAIN LINK FENCE
- TREE PROTECTION FENCE
- LIVING FENCE OR NATURAL BARRIER
- SIGNAGE (AS NOTED)

KEY PLAN Scale: NOT TO SCALE

**NOTES:**

1. ALL WORK TO BE DONE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF GUELPH, AND ONTARIO PROVINCIAL STANDARDS, EXCEPT WHERE NOTED.

2. THE CONTRACTOR SHALL NOTIFY THE CITY OF GUELPH AND THE ENGINEER AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.

BENCHMARK - BM42 (NEW 1981) ELEV. = 332.685

Benchmark plate set 01.01.20 on Nly end on conc. base of directory sign for "Horton Industrial Park" On S. Ely side of Laird Road near Horton Ely. Plate is 0.80m above ground. Elevation: City datum 92.03 Geodetic 1091.49 Geodetic Metric 332.685

THE POSITION OF POLES, LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	DATE	DESCRIPTION	BY:	CHKD.
6				
5				
4				
3				
2				
1				

CORPORATION OF THE CITY OF GUELPH

ENGINEERING DEPARTMENT

**IBI GROUP** 379 QUEEN STREET SOUTH  
KITCHENER, ONTARIO  
N2G 1W6  
(519) 745-9455  
www.ibigroup.com

**SOUTHGATE BUSINESS PARK**

TRAIL CORRIDOR AND FENCING PLAN

29 NOV 2006  
J. R. PERKS  
PROFESSIONAL ENGINEER  
PROVINCE OF ONTARIO

29 NOV 2006  
J. R. PERKS  
PROFESSIONAL ENGINEER  
PROVINCE OF ONTARIO

SCALE: HOR: 1:2000

DATE DRAWN: NOVEMBER 25, 2010

DESIGN BY: E. CERI

CHECKED BY: J. PERKS

CITY CONTRACT No. XX

CITY REFERENCE No. XX

SHEET 12

CITY FILE NO.

## 6.2 Off-road Trail within Natural Area Buffers

According to Condition 14 of Draft Plan Approval (2008), lands dedicated to the City for the off-road trail are to be outside of wetland buffers. Through assessment of on-site conditions (site visit October 7, 2010) and discussions between team members and City staff, it was determined that encroachment of the trail corridor into the wetland buffers in select locations was appropriate. These are described below.

### 6.2.1 Laneway into Block 1

The off-road trail corridor is located along the eastern edge of Block 1 to minimize encroachment into natural area buffers (Figure 5). To provide appropriate separation between the trail corridor and laneway into Block 1, the trail corridor is situated along the development limit line; therefore, a small portion of the trail corridor is within the 30m wetland buffer. As these lands are currently comprised of active agricultural field, and the future trail corridor will be separated from the existing natural area by dense restoration plantings, little to no impacts to the natural area are anticipated.

### 6.2.2 Between Wetland Features

To provide connection to lands along the west side of the property, the off-road trail is situated between two wetland features (Figure 5). Although within the 30m wetland buffer, the off-road trail is recommended within this location as it corresponds to an existing agricultural laneway.

From Section 6.1.5.3.3 in the City of Guelph Official Plan Amendment No 42 (adopted by City of Guelph Council in July 2010);

“5. Notwithstanding the General Permitted Uses of Section 6, trails within *Significant Wetlands* are subject to the following additional limitations. The formalization of existing ad hoc trails through formal trails and walkways may be permitted within *Significant Wetlands* and their *established buffers* where:

- i) they are considered *essential* to the City's trail system or integral to the scientific, educational or passive recreational use of the property;
- ii) no reasonable alternative *location* exists;
- iii) the environmental impacts of the proposed trails have been assessed and mitigated through design that minimize impacts to the natural heritage features and ecological functions; and
- iv) where appropriate, they consist primarily of boardwalks and viewing

platforms and are accompanied with educational signs.”

The existing agricultural laneway is approximately 5m in width and is situated along an elevated area that runs between the two wetland features. During the site visit on October 7, 2010, City staff reviewed and approved this area in terms of trail suitability. However, to ensure that trail implementation does not expand upon the existing footprint or lead to potential impacts on adjacent wetland features, it is recommended that the final trail design be reviewed by the GRCA prior to implementation by the City.

During the site visit the following off-road trail treatment options were discussed:

- 1) install culvert beneath berm to encourage flow between wetland features (hydrogeological assessments indicate that appropriate water balance will be maintained within each wetland if culvert implemented),
- 2) increase height of existing berm and provide narrow trail along top of berm,
- 3) implement small bridge or boardwalk at existing grade to ensure pedestrian use kept outside of wetland feature

Figure 13, Section B-B provides cross-section detail assuming a boardwalk within this area; however, ultimate trail treatment and final design are to be determined by the City of Guelph.

### 6.3 Bike Route

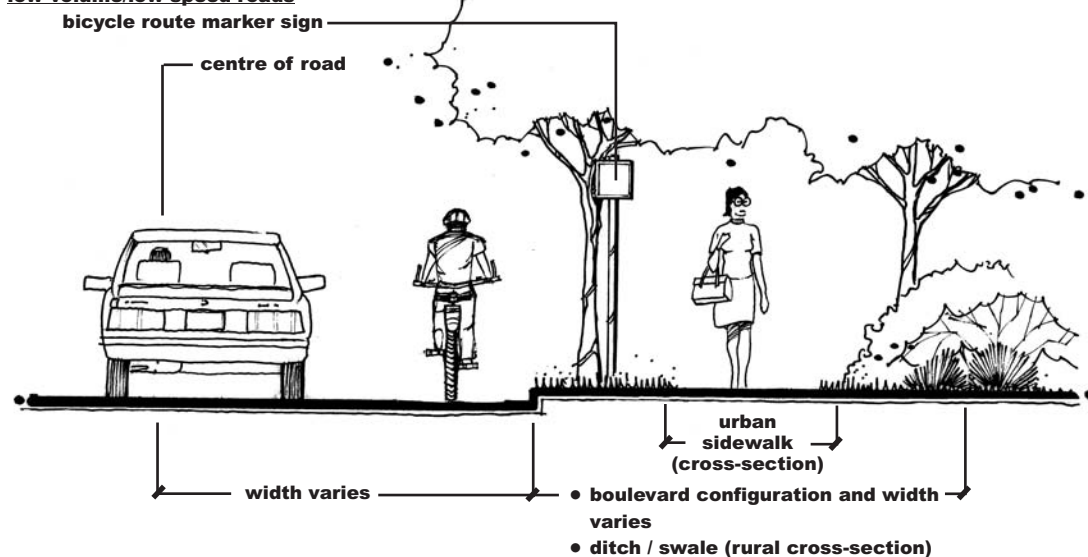
As requested by the City of Guelph (December 22, 2008), an on-road bike route is recommended along the east side of Southgate Drive. The on-road bike route will be a shared lane running along the east side of Southgate Drive, providing connection from Maltby Road to development lands in the north, as well as a connection to the off-road trail within the open space blocks. Typical on-road bike route cross section detail, as provided by the City of Guelph Trail Master Plan (2005) is shown on Figure 6.



## Typical On-Road Signed Routes

### typical location

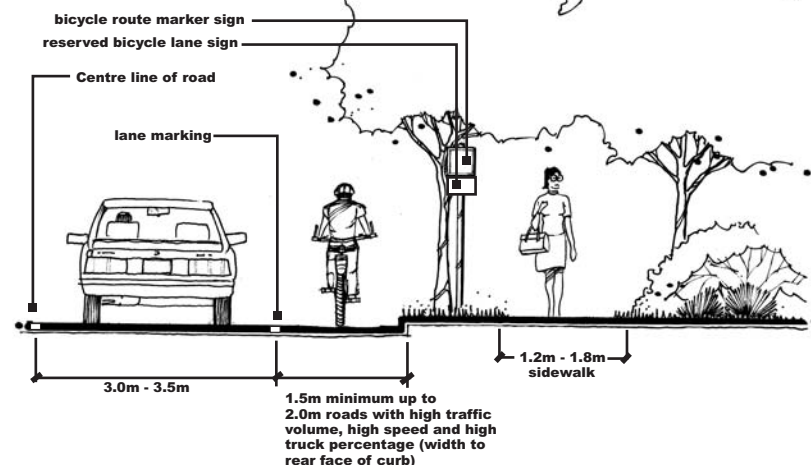
- urban residential
- rural (low traffic volumes)
- synonymous with Bike Route as defined in the Official Plan, only for low volume/low speed roads



## Typical Bike Lane

### typical location

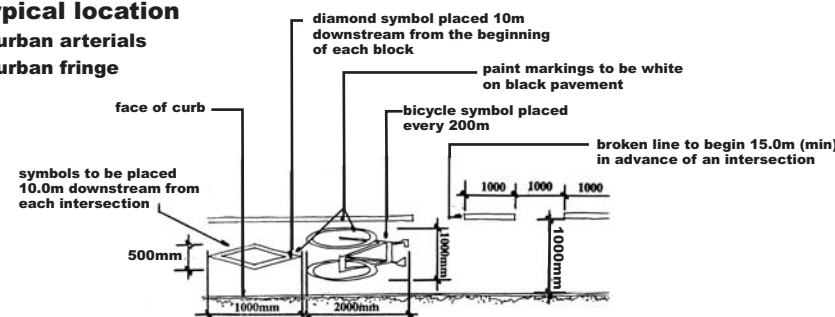
- urban arterials
- urban fringe



## Typical Bike Lane Marking

### typical location

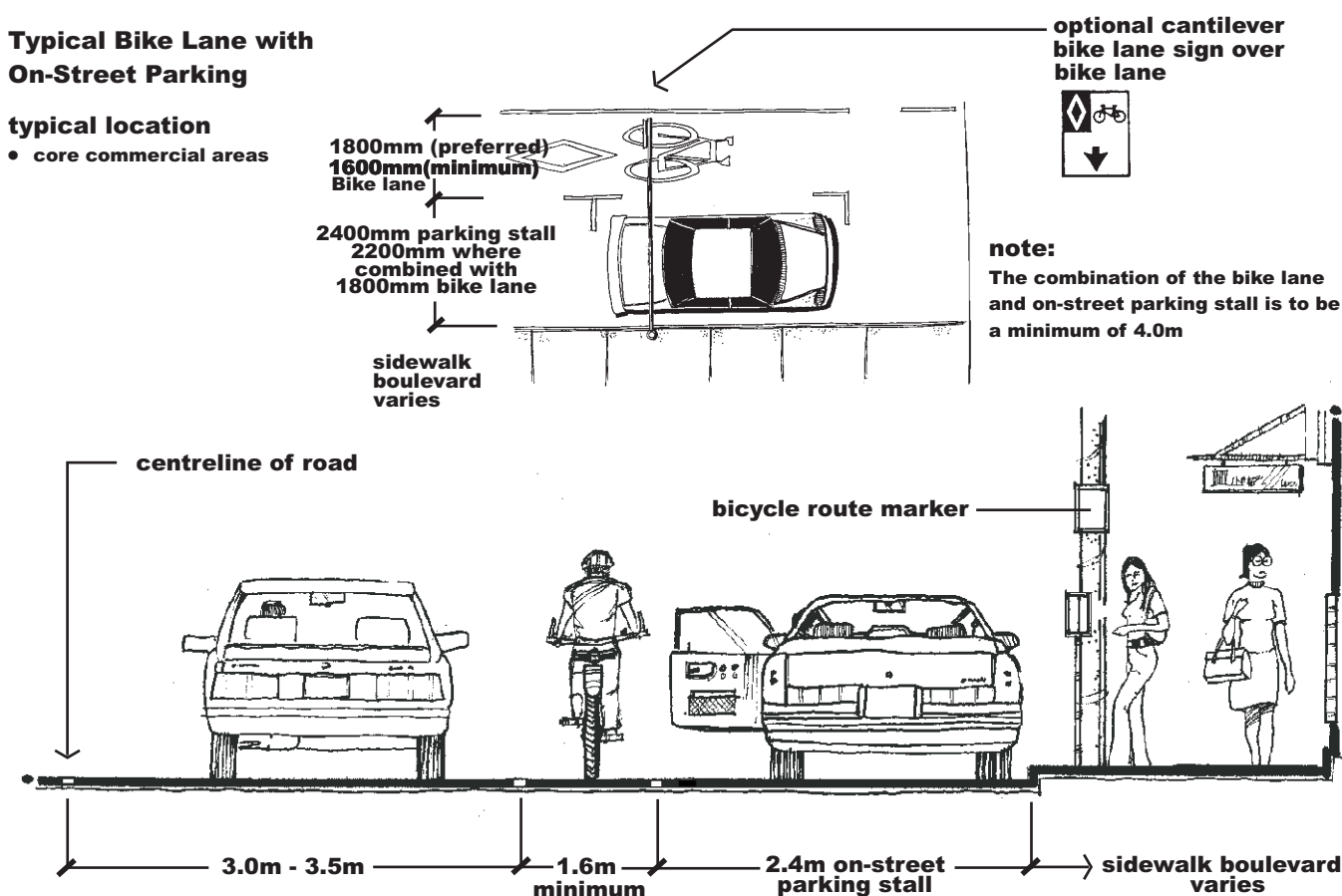
- urban arterials
- urban fringe



## Typical Bike Lane with On-Street Parking

### typical location

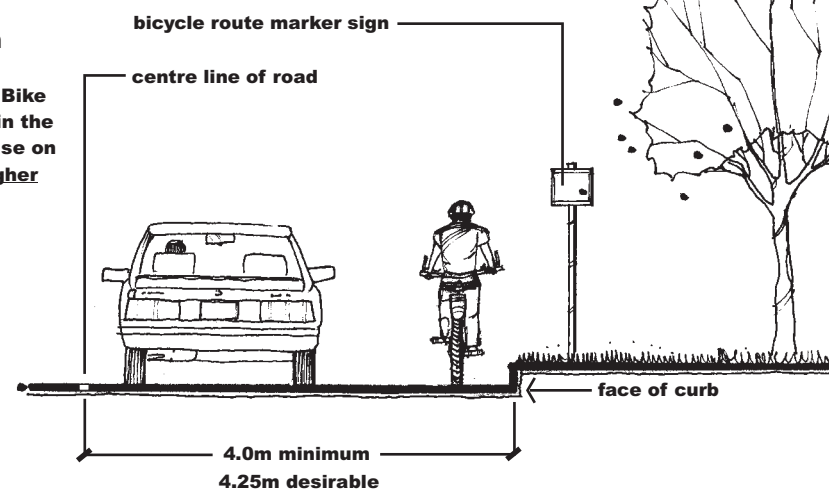
- core commercial areas



## Typical Wide Shared-Use Lane

### typical location

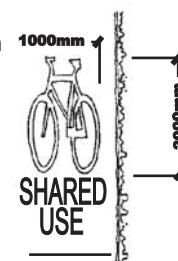
- urban collector
- synonymous with Bike Route as defined in the Official Plan, for use on higher volume, higher speed roads



## Optional Wide Shared Lane Marking

### typical location

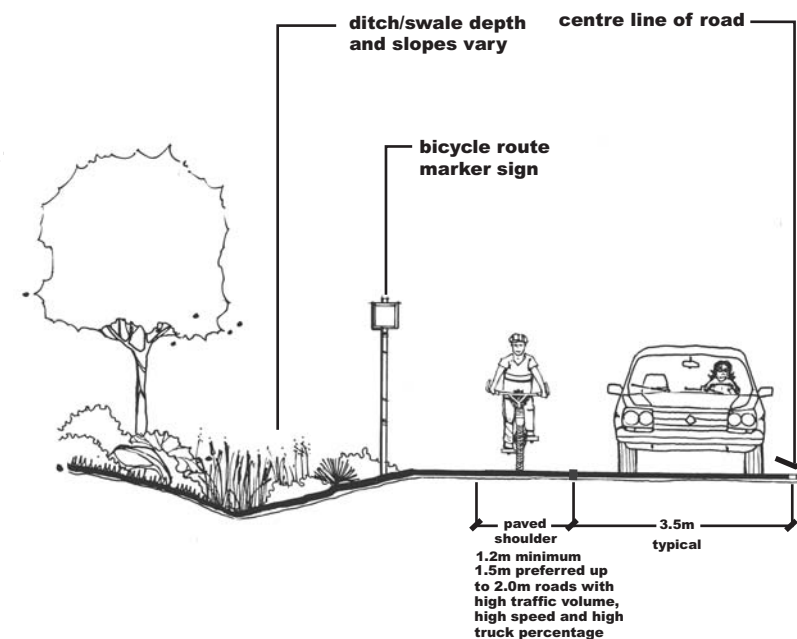
- urban collector



## Typical Paved Shoulder

### typical location

- rural, moderate to high traffic volumes & speed



NOT TO SCALE

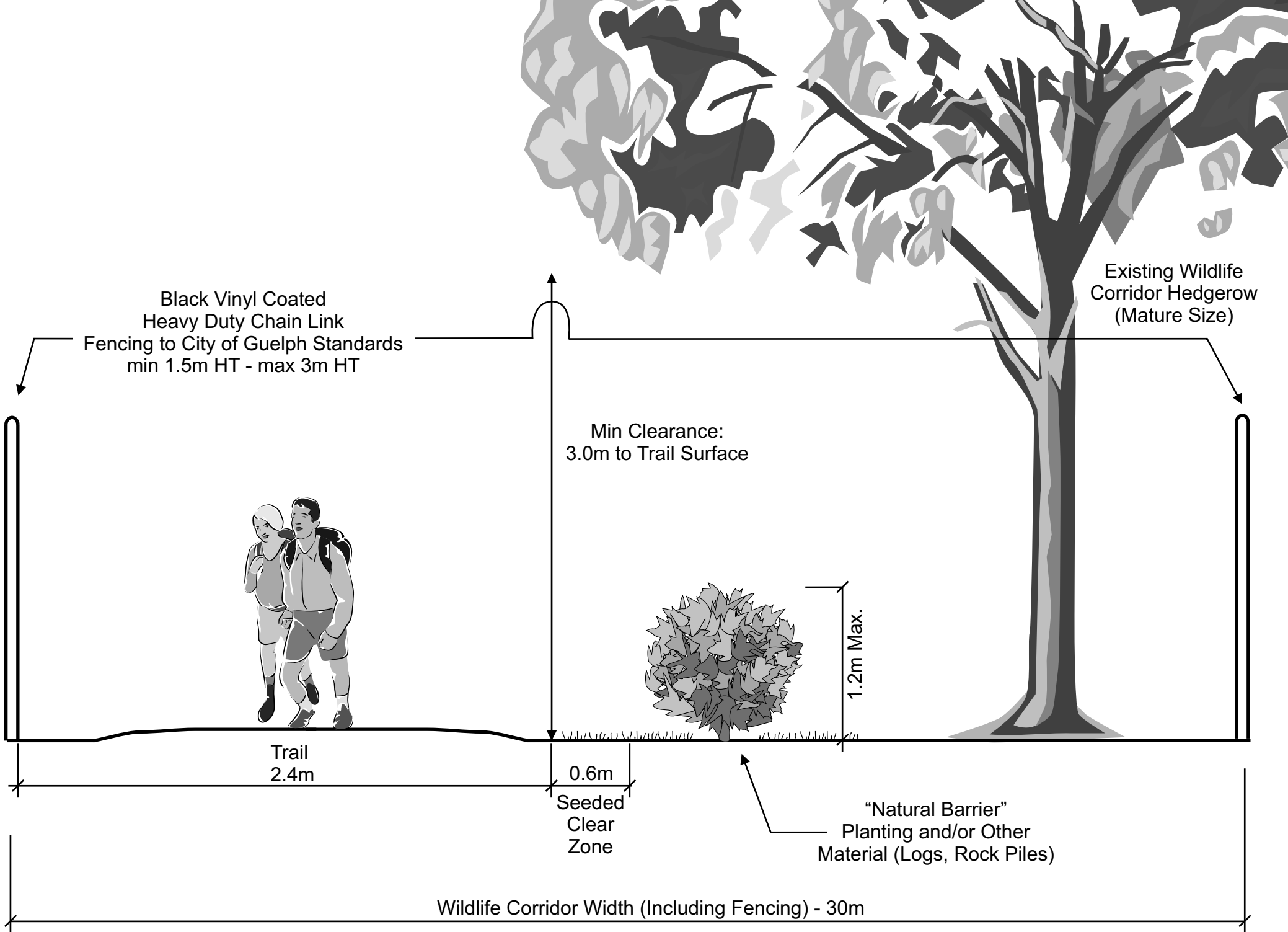
#### 6.4 Naturalized Wildlife Corridor

The Guelph Trail Master Plan (2006) outlines desired opportunities for off-road trail connections. Within the Southgate Business Park, a desired connection is identified providing connection from the main north-south off-road trail to Southgate Drive.

Condition 14 of Draft Plan Approval (2008) requested the “*addition of a natural linkage between Woodlot Block 8 and Open Space Block 5 with consideration to the best location, width and design details of the linkage.*” To satisfy this condition, a naturalized wildlife corridor has been recommended (see Figures 4 and 5). It was determined through discussions between City staff, NRSI and the Developer that an off-road trail corridor easement be accommodated along the northern edge of the naturalized wildlife corridor. Refer to Sections 4.4 and 8.3 for further discussions on the wildlife corridor.

To maximize connectivity within the corridor, it is recommended that the potential off-road trail corridor:

- be situated along the northern edge of the corridor
- be no greater than 3.6m in width,
- have a surface treatment of stone dust with an aggregate base (to be refined by the City of Guelph during trail design and implementation stage),
- be separated from development blocks to the north by a chain link fence,
- separated from remaining portion of naturalized corridor by a ‘natural barrier’ or ‘living fence’ (see Figure 12 and Engineering Drawing 2 and 12),
- natural barrier as per City of Guelph comments, is to be comprised of “*materials suitable to the habitat of the species served by the corridor along the length of the trail (e.g. dense native shrub or herbaceous plantings, logs, large rocks, etc.)*” (see Figure 7)



## 6.5 Signage

The success and maintenance of a public trail system that is associated with natural features is largely reliant upon public education. The lack of a formal trail network can lead to encroachment on natural features, dumping and formation of ad-hoc trails.

However, with the use of a public trail system, stormwater management and environmental education signage at trail access points, stormwater facilities, and site boundaries, along with dense restoration plantings, the impact of a trail network and development activities on the surrounding natural features can be greatly reduced.

Figure 8 provides an example of environmental education signage that is recommended at trail heads and along site boundaries to inform land users within the business park as to significance of natural features. The environmental education signage is the proposed sign for both the developer and future City environmental education signage.

Figure 9 provides an example of the stormwater management area signage that is recommended for the municipally owned SWM facility in Block 9, as well as future SWM facilities established throughout the business park.

Trail signage, which will be posted at trail entrance points, and associated wording, will be provided by the City of Guelph. Final construction materials, wording and layout for the above mentioned signs are to be approved by the City of Guelph prior to installation.

Trail traffic signs as shown on Figure 10 and 11 (Figures 5-14 and 5-15 in the City of Guelph Trail Master Plan 2005) are required where the off-road trail system crosses a road. Figure 4 provides a recommended location for a trail traffic sign. This location corresponds to a potential low-traffic road that may be implemented in the future to provide access to lands along the east side of the subject property (Block 1). Wording, layout and location of trail traffic signs is to be determined by the City of Guelph.

# HANLON CREEK AND MILL CREEK WATERSHED

The natural features associated with the Southgate Business Park include provincially significant wetlands, upland woodlands and meadow habitats. These habitats provide water quality and storage, biodiversity, native seed sources, and habitat for birds, mammals, amphibians, reptiles and insect species.

## **PLEASE HELP PRESERVE THIS HABITAT BY OBSERVING THE FOLLOWING GUIDELINES WHICH ARE ENFORCED UNDER CITY BY-LAWS:**

- No mowing, littering or dumping of household or industrial waste
- No motorized vehicles
- Stay on designated trails
- Leash and clean up after your pet
- Do not remove native plant material or wildlife
- Do not introduce any plant material or animals
- Keep this area clear of trash or noxious weeds

For more information regarding the protection of natural features in Guelph, please contact The City of Guelph's Planning, Engineering and Environmental Services Department at (519) 837-5616 or read the City's Environmental handbook "Enviroguide" available online at [www.Guelph.ca](http://www.Guelph.ca)





# **SOUTHGATE BUSINESS PARK STORMWATER MANAGEMENT FACILITY CITY OF GUELPH**

This facility has been designed to function as an infiltration pond. It stores and treats stormwater, then gradually releases it to the local groundwater source and adjacent Hanlon Creek and Mill Creek watersheds. Naturalization of this stormwater management pond will provide protection of the adjacent natural features from human impact and provide important wildlife habitat.

## **NATURAL FEATURES**

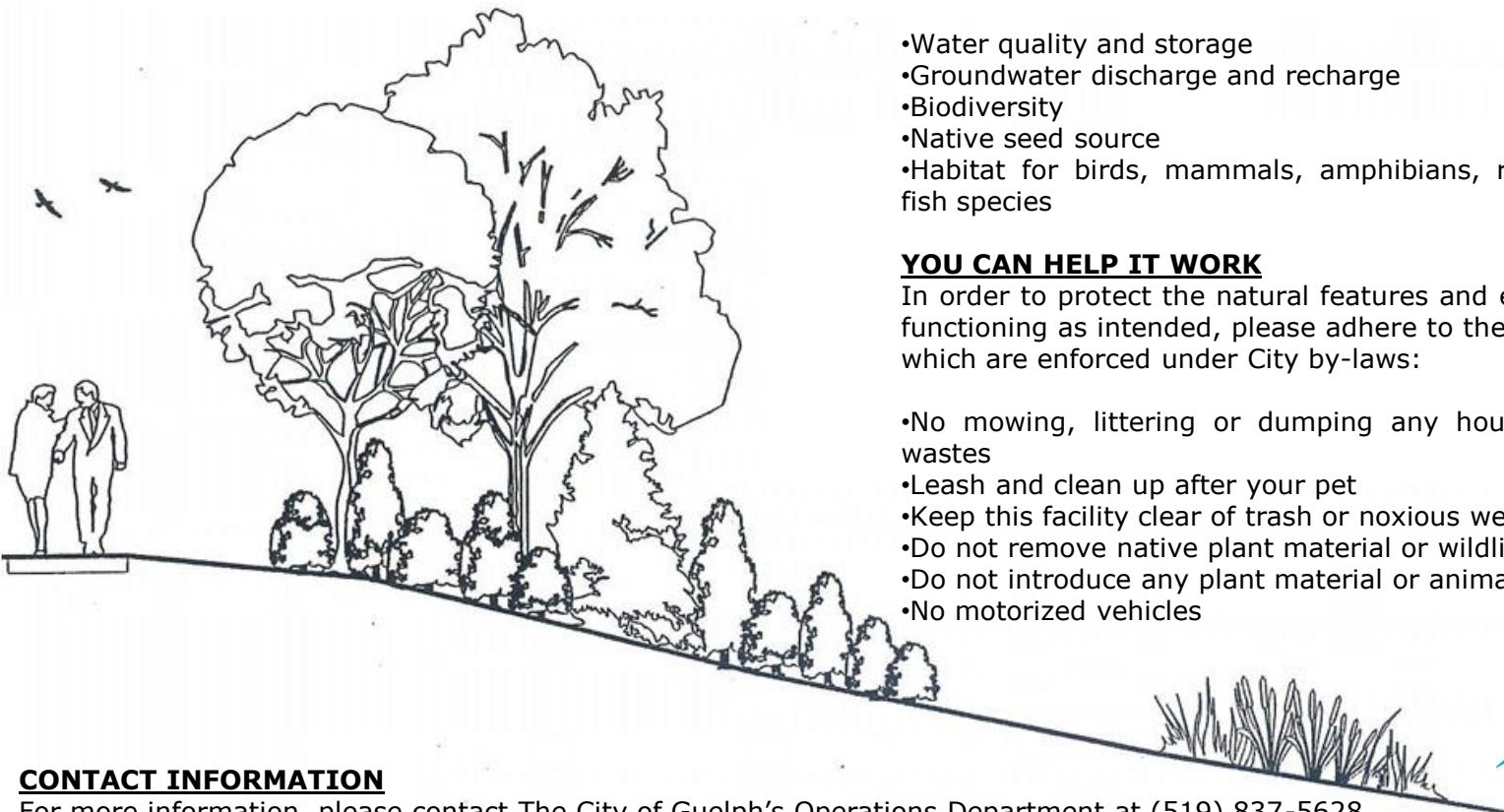
The natural features associated with the Southgate Business Park include provincially significant wetlands, upland woodlands and meadow habitats. These habitats provide the following important ecological functions:

- Water quality and storage
- Groundwater discharge and recharge
- Biodiversity
- Native seed source
- Habitat for birds, mammals, amphibians, reptiles, insects and fish species

## **YOU CAN HELP IT WORK**

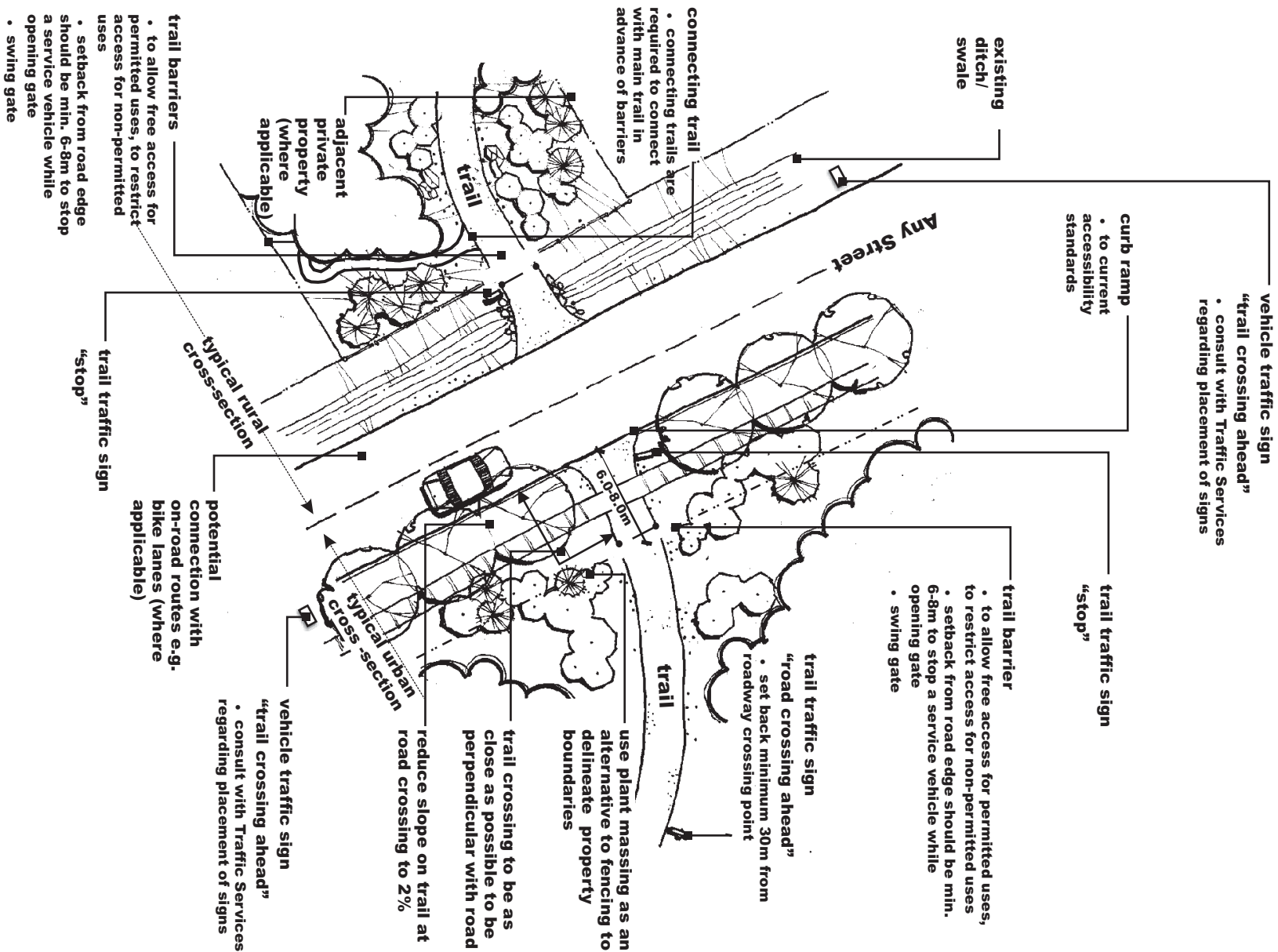
In order to protect the natural features and ensure this facility is functioning as intended, please adhere to the following guidelines which are enforced under City by-laws:

- No mowing, littering or dumping any household or industrial wastes
- Leash and clean up after your pet
- Keep this facility clear of trash or noxious weeds
- Do not remove native plant material or wildlife
- Do not introduce any plant material or animals
- No motorized vehicles



## **CONTACT INFORMATION**

For more information, please contact The City of Guelph's Operations Department at (519) 837-5628.



**Fig. 5-14** Typical Mid-Block Trail Crossing of Minor Road (Option 1)

FILE: G3285/Report/Figures/Figure 5-14.CDR



Stantec



Marshall  
Macklin  
Monaghan

CROSSING DESIGNER FIRM • GUYTON VOYLES • PLANNING

City  
of  
Guelph



NOT TO SCALE

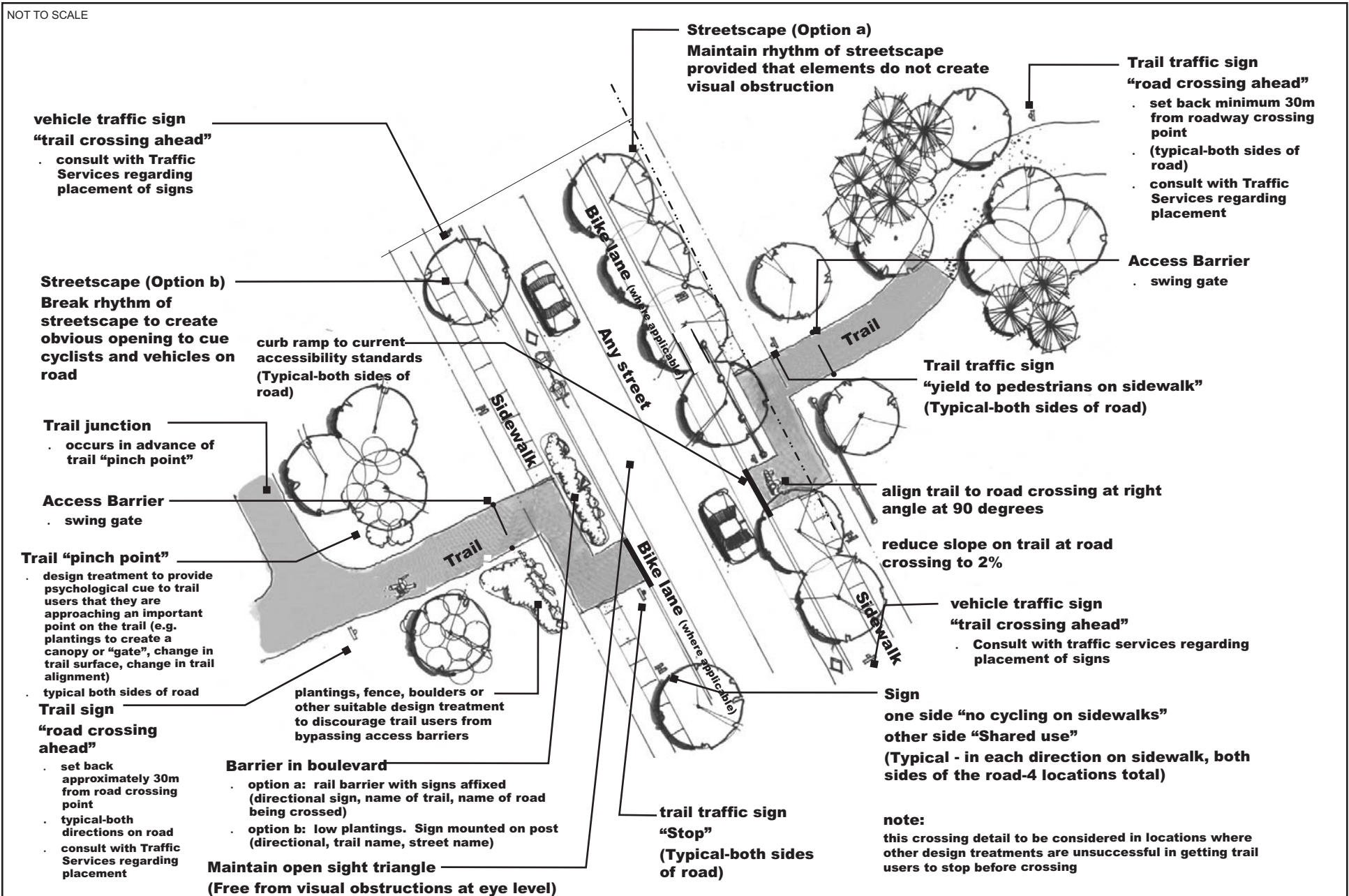


Fig. 5-15 Typical Mid-Block Trail Crossing of Minor Road (Option 2)

FILE: G3285/Report/Figures/Figure 5-15.CDR



Stantec



City of Guelph



## 6.6 Trail Mitigation Measures

The following recommendations are provided to ensure that any potential impacts from trail construction are minimized:

- Sediment and erosion control measures must be installed prior to, and maintained during construction. Areas of bare soil must be re-vegetated within 30 days of being cleared to prevent erosion of soils.
- In areas where off-road trails are located in proximity to wetlands, minor grading must be used to direct surface runoff away from the wetland.
- Existing areas of natural vegetation are to be retained wherever possible. In order to maximize the retention of trees and other areas of vegetation, the following recommendations are provided:
  - Trees and other areas of vegetation to be retained must be identified and delineated with temporary fencing located beyond the dripline of trees, to ensure that trail construction equipment or material storage does not disrupt vegetation (especially tree root zones)
  - Any limbs or roots of trees to be retained which are damaged during construction must be pruned using appropriate arboricultural techniques
- Maintenance of machinery during trail construction must occur at a designated location away from the wetland or other natural features on-site. Details for fencing with proposed development lands are provided on Erosion and Sediment Control Plan Drawing 2, Trail Corridor and Fencing Plan Drawing 12 and Figure 12 – Property Demarcation.
- If construction schedules allow, restoration and buffer plantings of native woody and herbaceous species along woodlot, wetland and thicket edges should be installed in conjunction with trail construction to provide protection to natural features from erosion, as well as unauthorized entry. If trail construction does not correlate with restoration and buffer plantings, temporary silt fence should be installed along off-road trail corridor to ensure trail construction and associated grading does not impact restoration plantings and natural features on-site. For the section of trail that is recommended along the existing agricultural laneway between the two large wetland communities, the 'no touch' zone does not apply. As this section of trail is situated between two provincially significant wetland

features, the City of Guelph will need to correspond with the GRCA prior to the City's trail construction activities to determine best practices for trail treatment.

## 7.0 Property Demarcation

Fencing along various natural heritage features within the study area is recommended as per the City of Guelph Property Demarcation Policy which was approved by City Council on July 2 and 15, 1996. The policy states that the Recreation and Parks Department will cooperate with the demarcation of common property lines between existing public City parks and private property as per the City of Guelph Property Demarcation Policy. To form the basis of future construction plans within the Southgate Business Park Condition of Draft Plan Approval, the *“Developer shall be responsible for the cost of design and development of the demarcation of all lands conveyed to the City in accordance with the City of Guelph Property Demarcation Policy. This shall include the submission of drawings and the administration of the construction contract up to the end of the warrantee period completed by an Ontario Associated of Landscape Architect (OALA) member for approval to the satisfaction of the Director of Community Design and Development Services.”*

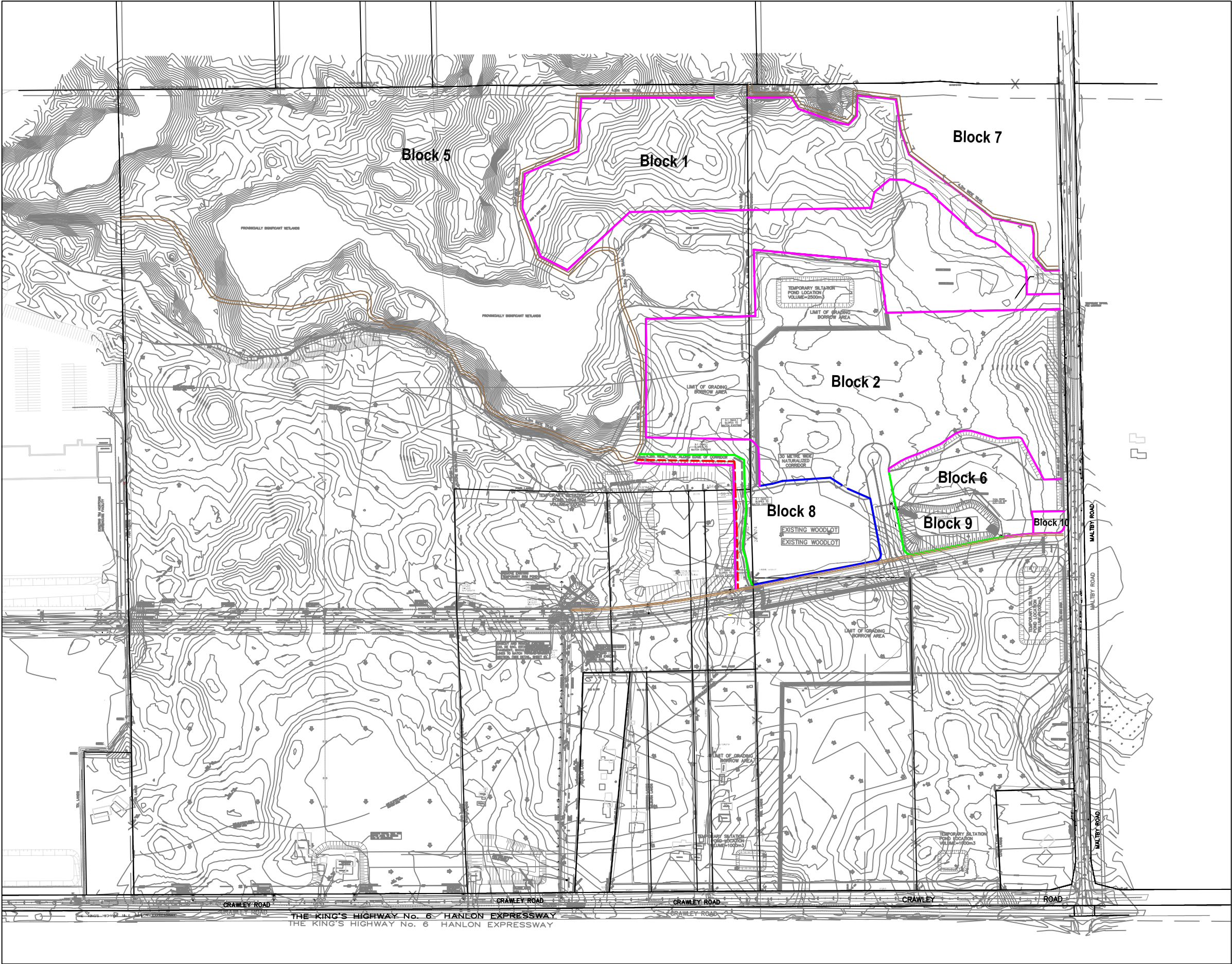
In the Southgate Business Park, chain link fences and/or buffer plantings are proposed along rear lot edges, between off-road trails and development blocks, around the stormwater management facility and around other natural features (i.e. naturalized wildlife corridor) that may be impacted by construction or human use. Within the Design Principles for Stormwater Management Facilities (City of Guelph 1996), fencing around stormwater management facilities is discouraged; therefore, demarcation will be achieved by way of a ‘living fence’ (naturalized plantings)(see Figure 12). Refer to detailed Restoration Planting Plan for recommended plantings (Appendix VI). The SWM facility in Block 9 will be municipally owned and managed, therefore, the City reserves the right to chain link fence natural heritage features if the living fence is not protecting the natural heritage features to the satisfaction of the City (City of Guelph 1996). As per the City of Guelph Property Demarcation Policy (1996), chain link fencing within the Business Park will be black vinyl chain link, 5 feet (1.5m) in height with 2 inch (50mm) fabric, galvanized posts and galvanized rails.

A ‘living fence’ or buffer planting means a *“primarily native, low maintenance, non-invasive plant material that will successfully co-exist with other plants. It is imperative that the plant material not result in a monoculture or threaten the existing ecosystem.”*

(City of Guelph 1996) To encourage movement of wildlife species along the naturalized corridor from Open Space Block 8 and Open Space Block 5 and between Block 8 and Open Space Block 6/SWM Management Block 9, it is recommended that a 'living fence' be implemented. In the locations where wildlife culverts have been recommended (Street A and laneway into Block 1), naturalized plantings should be implemented rather than chain link fence to ensure maintenance of wildlife movement.

Property demarcation markers (PDM) are to be installed throughout the business park to indicate the relative position of a boundary and serve as a public notice indicator of the use/restriction of publicly owned lands. The PDM is generally a 4 inch (10cm) square plastic marker, 6 feet (1.8m) long, installed vertically 3 feet (0.9m) into the ground. It should be placed generally every 100 feet (30m) or 3 lots, whichever is less (City of Guelph 1996). Property demarcation markers can be ordered and purchased from the City of Guelph Operations Department (contact: 519-837-5628). Figure 12 shows the recommended property demarcation plan; however, the reader is referred to Erosion and Sediment Control Plan Drawing 2 and Trail Corridor and Fencing Plan Drawing 12 for detailed property demarcation plans. Restoration planting plans, which are included in Appendix VI, show buffer plantings throughout the business park that provide a 'living fence' for sensitive wildlife movement areas.





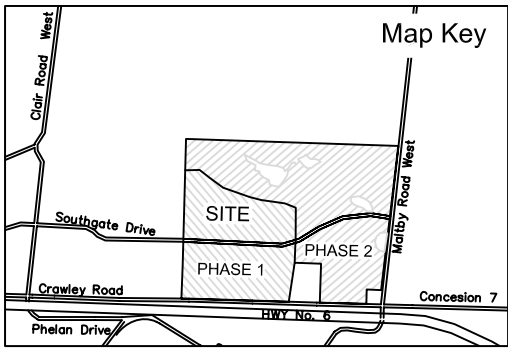
# Southgate Business Park

23T-06503

Environmental Implementation Report



- Chainlink Fence (black vinyl with galvanized posts and rails)
- Living Fence or Natural Barrier
- Tree Protection Fence (heavy-duty paige wire fence)
- Trail Corridor
- Proposed Future Trail
- Property Boundary
- Existing Contour



NO.	BY	DATE	DESCRIPTION
SCALE: 1:5000 (11x17)			PROJECT: NRSI-636
Universal Transverse Mercator			DATE: December 2010
NAD83 - Zone 17			

DISCLAIMER: Map produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or December 1, 2010 (1743E-Phase II.dwg).

Figure 12

Property Demarcation



## 8.0 Ecological Connectivity and Wildlife Movement

The 2007 Southgate Business Park EIS (NRSI) identified that terrestrial corridor systems (i.e. hedgerows and forests) provide linkages necessary for wildlife movement. As stated in the Hanlon Creek Watershed Plan (1993), the primary function of linkage habitats is to connect two or more significant areas. These areas can provide habitat that is suitable for wildlife movement and plant propagation, while allowing genetic exchange, re-colonization and the ability to move in response to seasonal and long-term environmental changes (Marshall and LGL 1993).

Both the Hanlon Creek Watershed Plan and the Mill Creek Subwatershed Plan identified linkage enhancement opportunities between the two watersheds through the central and northeastern fringe of the study area (LGL 1998). These linkages encompass the wetlands and associated upland deciduous forest, abandoned field/thicket habitats, and coniferous plantation. The large wetland complexes north of Maltby Road are connected to a large deciduous/mixed swamp to the south (LGL 1998). A terrestrial linkage system exists along the northeastern border of the property and extends to the north and south of Maltby Road. This area is comprised of a number of Provincially Significant Wetlands (PSW) surrounded by communities such as sugar maple deciduous forest, white pine coniferous plantation, meadow marsh, cultural thicket/savannah and mixed hemlock forest. The 2007 EIS identified linkage areas throughout the study area.

### 8.1 Laneway into Block 1

Stemming from review of the 2007 EIS (NRSI), the following Condition of Draft Plan Approval was developed; that the EIR provide *“detailed design considerations along the private road driveway into Block 1 to protect the safety of wildlife crossing the private road from the adjacent wetlands.”*

In spring 2010, NRSI conducted wildlife movement surveys with the use of silt fencing and pitfall traps to obtain useful information on movement within Block 1, with a focus on herpetofauna and small mammal species. Refer to Appendix I – 2010 Jefferson Salamander Monitoring Program Implementation & Results (NRSI 2010 B) within the Terrestrial and Wetland Monitoring Report 2006-2010 prepared by NRSI (Appendix VIII) for detailed wildlife movement survey findings. To maintain wildlife movement between

the two wetland features associated with the laneway into Block 1, two wildlife culverts have been recommended. The location of culverts and their design have been determined based on movement concentration areas, as well as species observed.

Although few studies have been conducted to monitor the success of wildlife tunnels, especially within southern Ontario climate, literature suggests that concrete box culverts function the best (Jackson and Griffin 2000). Culverts should be the shortest length possible to maximize openness or 'see-throughness'.

Literature recommends that culverts be as large (diameter) as possible in order to maximize air circulation, allow more light into the tunnel and encourage use of tunnels by more species (small to medium sized mammals). The minimum size should be 2'x2' (0.61x0.61m) (Jackson 2003); the Ministry of Transportation (2006) recommends tunnel diameters of 3.3-4.9' (1 to 1.5m) minimum. Culvert substrate should be natural to provide familiar scents, with a sandy loam recommended to hold the moisture (MTO 2006). Care should be taken to ensure that the tunnels do not become flooded.

To encourage movement of wildlife toward culverts, diversion wing walls should be constructed on either side of the tunnel opening either vertical or at an angle of 45° (Ministry of Transportation 2006). The diversion wall is to be at least 18" (46cm) high and smooth to prevent herpetofauna from climbing the wall (Aresco 2005). The entryway to the culvert is to be vegetated with low cover for refuge, with rocks, stumps or logs within the culvert for this purpose as well.

Based on the above recommendations and existing conditions, to accommodate movement of herpetofauna and small mammal species across the laneway into Block 1, two concrete box culverts, 1800mm x 900mm (1.8mx0.9m) are included (see Figure 5 for Plan view showing culvert locations). Wildlife will be directed into the box culverts by way of grading, along with concrete headwalls. To reduce the potential for wildlife to climb and/or jump over the barriers, concrete headwalls a minimum of 50-60cm in height will be implemented along either side of culvert openings. Where surrounding features/development limits allow, the concrete headwalls are to be 30m in length. The bottom of each box culvert will be covered in 2-3 inches of native substrate, which will consist of a mix of small to medium sized stones with sandy, loamy soil. Cross-section

detail for the box culverts along the laneway into Block 1 are shown on Figure 13 (Box Culvert Crossing Section A-A and Box Culvert Crossing Section F-F). Refer to Restoration Planting Plans in Appendix VI for detailed planting plans associated with these areas.

## 8.2 Street 'A' Wildlife

City of Guelph EAC (2007) *“questioned what could be done to mitigate the preservation of wildlife on Road 'A'. The possibility of using dry culverts, landscaping blocks and vegetation were discussed.”*

To encourage movement of wildlife between the sugar maple woodland (Block 8) the small PSW (Block 6), one box culvert, 1800mm x 900mm (1.8mx0.9m) in size, is included across Street 'A'. Similar to the box culverts along laneway into Block 1 (Section A-A and F-F), wildlife will be directed into the box culverts by way of grading, along with concrete headwalls. To reduce the potential for wildlife to climb and/or jump over the barriers, concrete headwalls a minimum of 50-60cm in height will be implemented along either side of culvert openings. Due to the Street 'A' cul-du-sac bulb, 30m of concrete headwall cannot be accommodated; however, headwall length will be maximized where feasible. As there will likely be seasonal run-off from the sugar maple woodland due to the difference in grades to reduce the potential for wash-outs within the culvert, the native substrate is 2-3 inches deep consisting of large stones in combination with small, native substrate. Cross-section detail for the Street 'A' box culvert is shown on Figure 13 (Box Culvert Crossing Section G-G). Existing grades along the sugar maple woodland edge range from 337.10 to 337.85, where final grades at culvert openings north and south of Street 'A' are proposed to be 335.50. Refer to Drawing 3 – Grading Plan for elevation details.

## 8.3 Naturalized Wildlife Corridor

As discussed above in Section 4.4 and 6.4, in response to Conditions of Draft Plan Approval (2008), two naturalized wildlife corridor options have been proposed; Option A and Option B (see Figure 4) connecting Woodlot Block 8 and Open Space Block 5. For the purposes of this report, design details, such as grading, tree retention/removal,

potential off-road trail layout and restoration planting plans for Option A have been prepared. Design details will be provided for Option B if it is determined to be the most appropriate based on the ultimate development layout.

During the MNR's review of the 2010 SBP salamander monitoring program, it was requested that the wildlife movement study results inform how the Condition be met (i.e. location, width) (K. Pickett 2010, *pers. comm.*). Amphibian species were observed moving from the main wetland complex to agricultural lands west; however, only 15 individuals were captured travelling in this direction, indicating less amphibian movement in this area than other areas within the Business Park. Refer to Appendix I – 2010 Jefferson Salamander Monitoring Program Implementation & Results (NRSI 2010 B) within the Terrestrial and Wetland Monitoring Report 2006-2010 prepared by NRSI (Appendix VIII) for complete analysis of wildlife movement documented during spring 2010 salamander monitoring. As discussed in Section 8.1 and 8.2 above, installation of wildlife culverts have been included where concentrations of wildlife were observed moving.

The general location of Option A was based on recommendations within the South Guelph Secondary Plan Area Scoped Environmental Impact Study prepared by LGL Limited (1998), the City of Guelph Official Plan Natural Heritage System – Draft Schedule 4 and finalized to correspond to the northern edge of existing sugar maple woodland and the existing hedgerow feature.

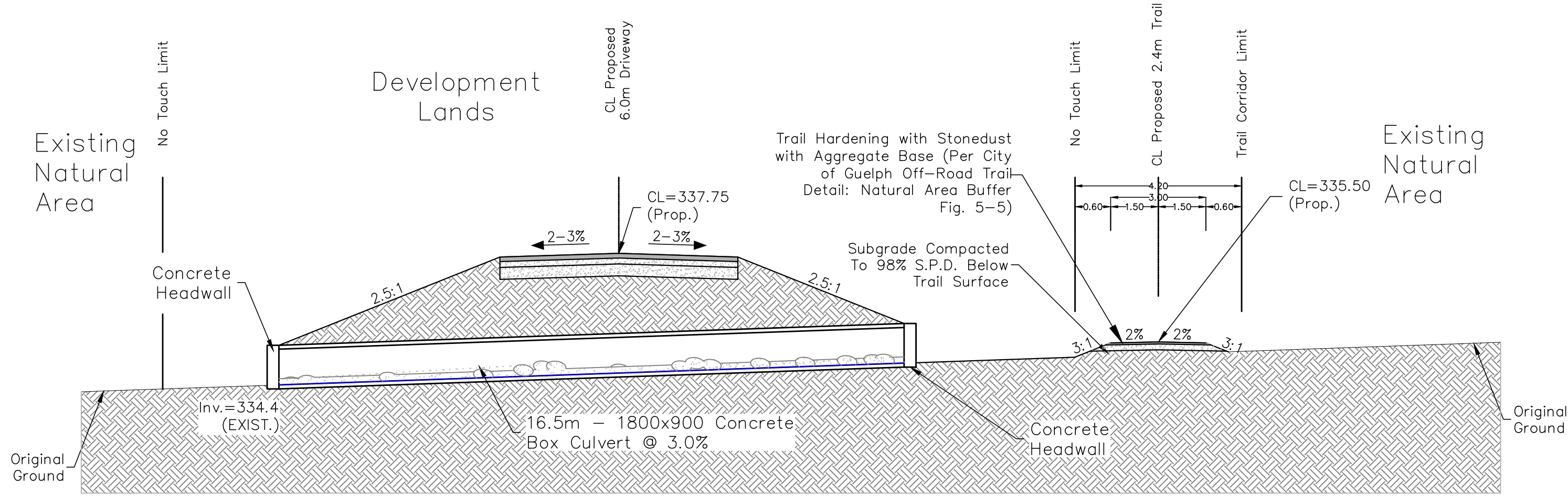
Option B would provide connection from the northeast corner of Woodlot Block 8 to western wetland edge of Open Space Block 5.

The Option A corridor is 30m in width, which will allow for retention of approximately 32 trees >10cm dbh. The corridor has been designed to have maximum 3:1 slopes on either side, which will accommodate tree retention and the City of Guelph's potential 3.6m wide off-road trail corridor. In addition to existing trees, the naturalized wildlife corridor easement will be enhanced with native restoration plantings as detailed in Section 4.4 and Restoration Planting Plans (Appendix VI). As the linkage will be separated from proposed development lands by chainlink fencing and separated from the potential off-road trail by a natural barrier (i.e. dense shrub plantings - see

Restoration Planting Plans for design detail), a number of mobile wildlife species (i.e. small to large mammals, amphibians and birds) will be accommodated by the linkage.

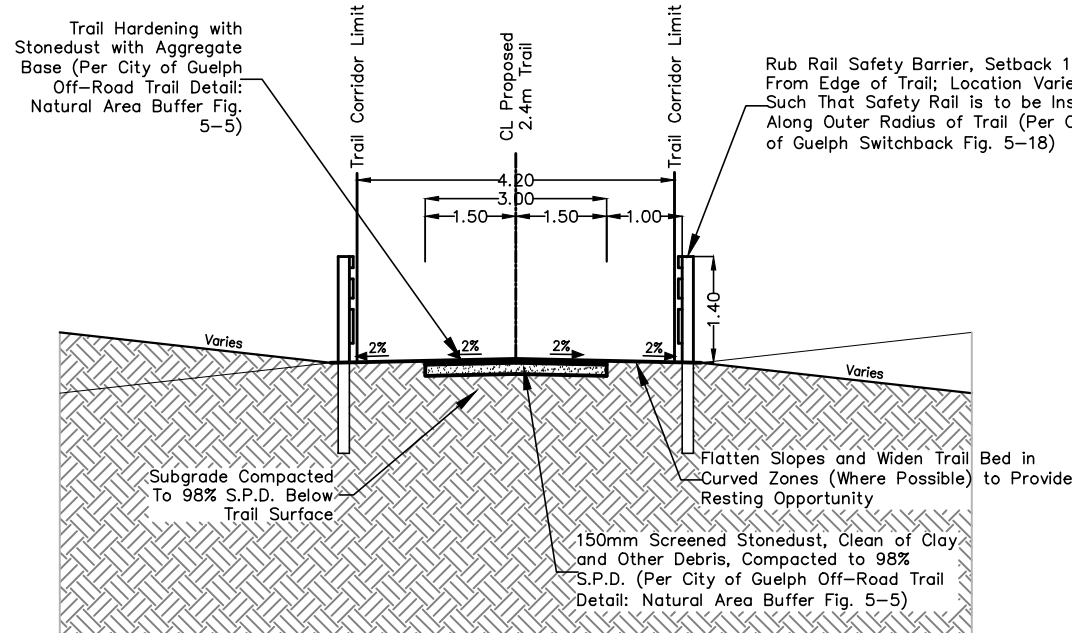


FILE NAME: 1743E-NRS1 Trail Details.dwg, LAYOUT NAME: 13-Trail Box Culvert Crossing, DATE: Nov 25, 2010-4:49pm



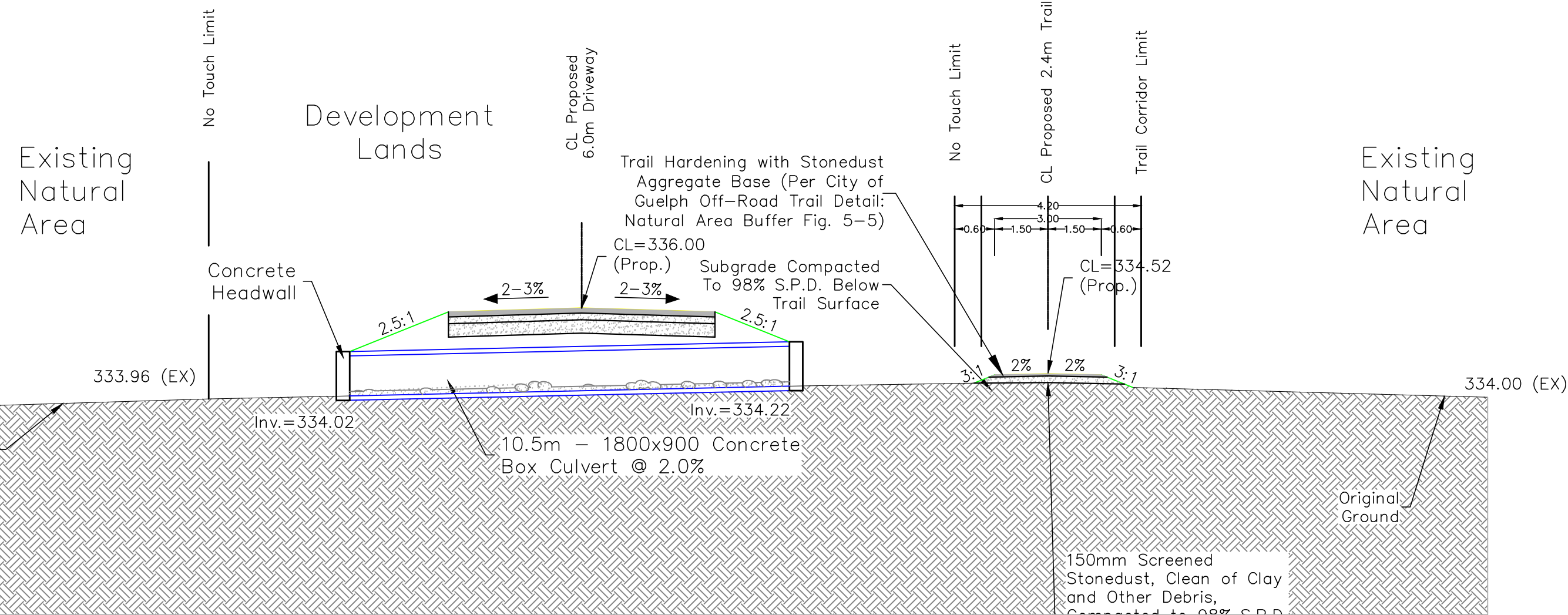
NOTE: Trail to Slope to ensure drainage and avoid blocking drainage on either side.

## SECTION A-A BOX CULVERT CROSSING N.T.S.



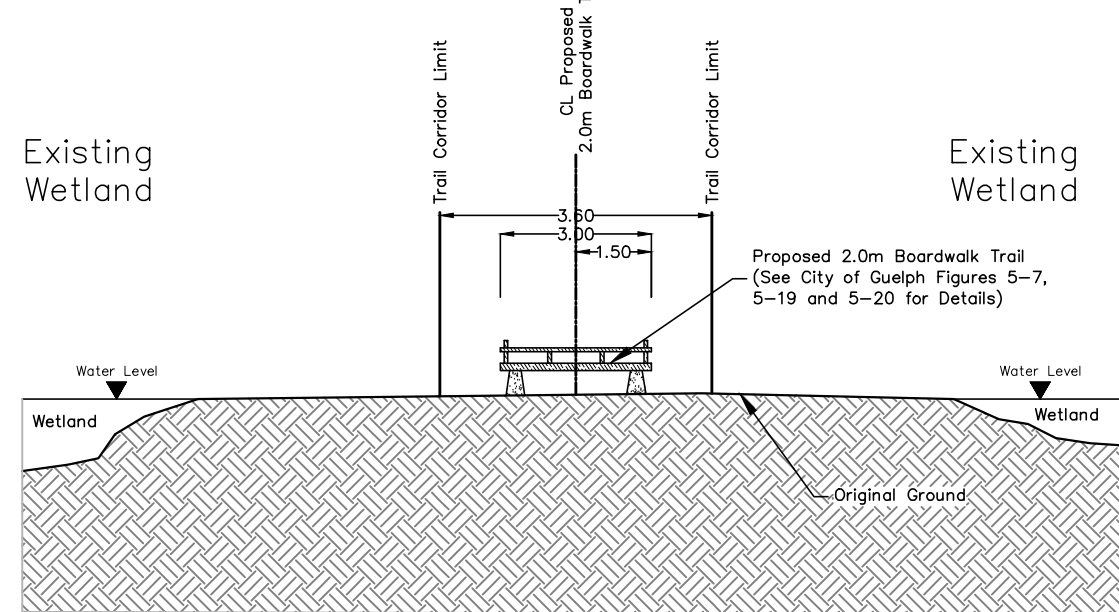
NOTE: Trail to Slope to ensure drainage and avoid blocking drainage on either side.

## SECTION E-E 4.2m TRAIL CORRIDOR (TYPICAL FOR TRAIL SWITCHBACKS) N.T.S.



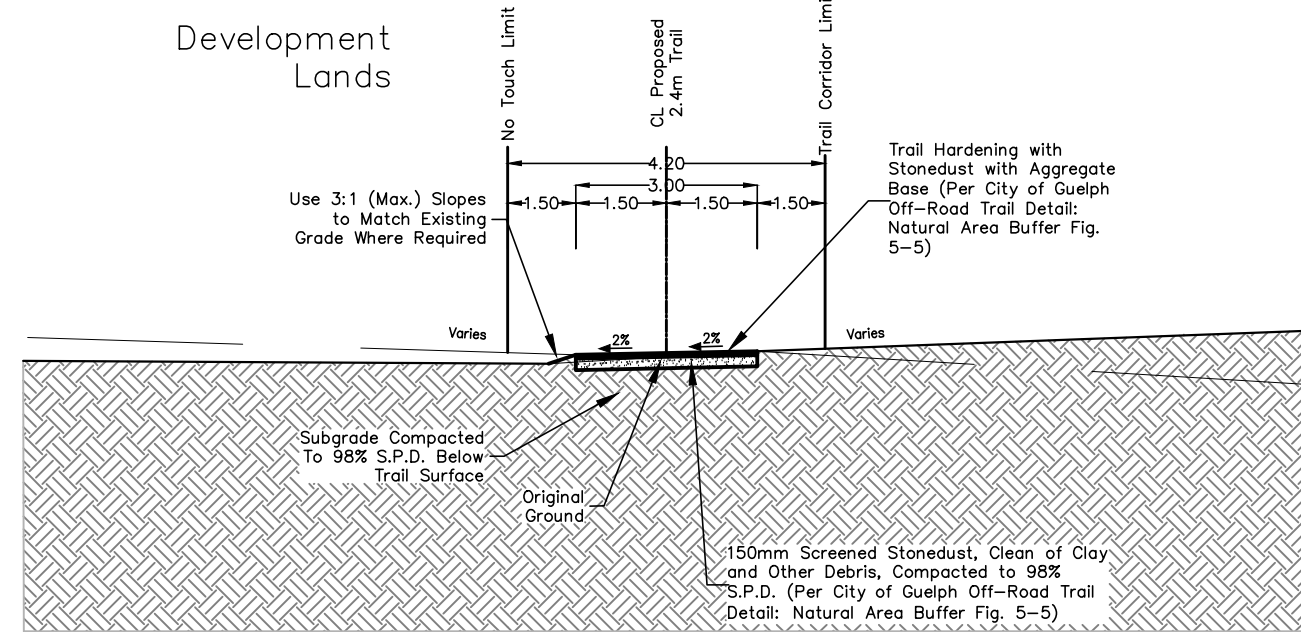
NOTE: Trail to Slope to ensure drainage and avoid blocking drainage on either side.

## SECTION F-F BOX CULVERT CROSSING N.T.S.



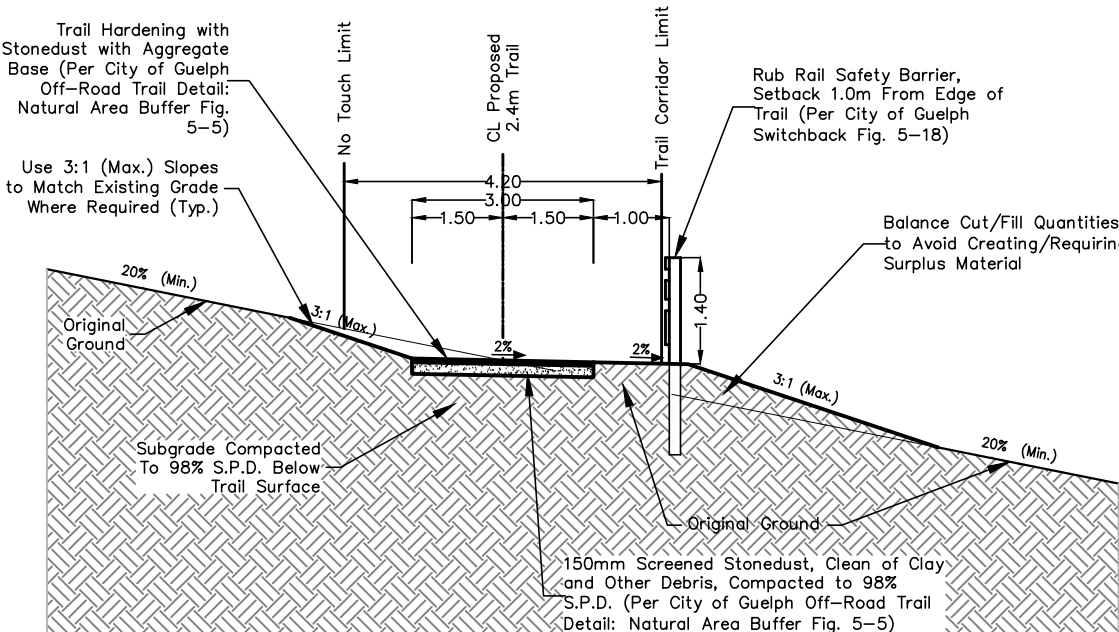
NOTE: Trail to Slope to ensure drainage and avoid blocking drainage on either side.

## SECTION B-B 3.6m TRAIL CORRIDOR (TYPICAL FOR WETLAND CROSSINGS) N.T.S.



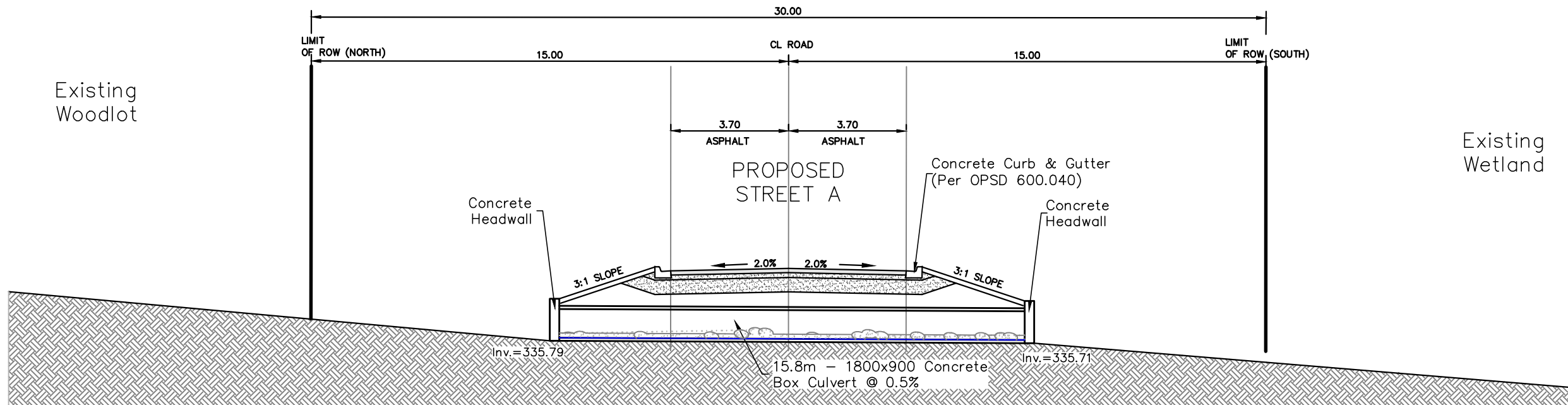
NOTE: Trail to Slope to ensure drainage and avoid blocking drainage on either side.

## SECTION C-C 4.2m TRAIL CORRIDOR (TYPICAL FOR TRAILS ON FLAT GROUND) N.T.S.

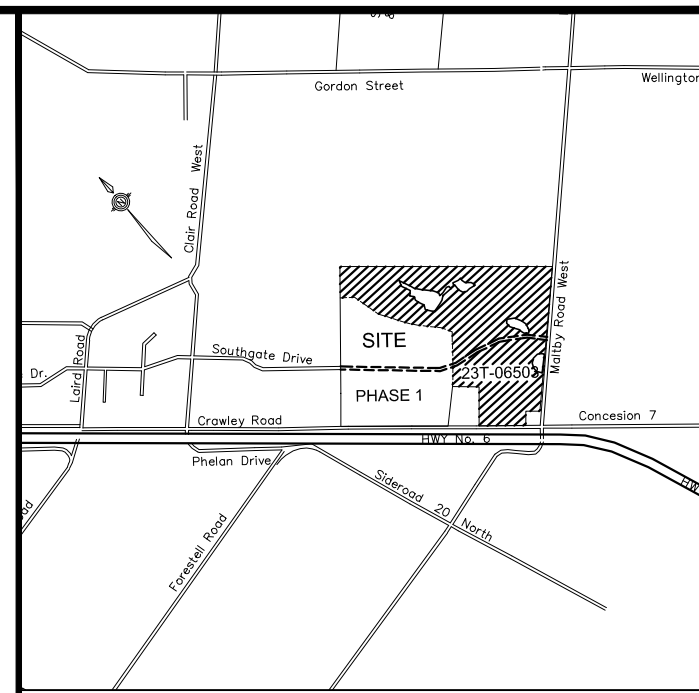


NOTE: Trail to Slope to ensure drainage and avoid blocking drainage on either side.

## SECTION D-D 4.2m TRAIL CORRIDOR (TYPICAL FOR TRAILS ALONGSIDE STEEP SLOPE) N.T.S.



## SECTION G-G BOX CULVERT CROSSING N.T.S.



- NOTES:**
- ALL WORK TO BE DONE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF GUELPH, AND ONTARIO PROVINCIAL STANDARDS, EXCEPT WHERE NOTED.
  - THE CONTRACTOR SHALL NOTIFY THE CITY OF GUELPH AND THE ENGINEER AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
  - ALL CONCRETE TO BE 32MPa IN 28 DAYS WITH 6 ±1% AIR ENTRAINMENT UNLESS OTHERWISE STATED.
  - SANITARY SEWER SYSTEM**
    - PVC PIPE OR 30 ASTM D3034-BACK FILLED WITH APPROVED MATERIAL (SEE SP-10) OR EQUIVALENT PER OPSD 802.010
    - CLASS "B" BEDDING PER OPSD 802.030
    - MINIMUM PIPE COVER 2.80m
    - MANHOLES - OPSD 701.010-BACKFIELD WITH GRANULAR "B" (100% SP-10)
    - ALL STUBS TO HAVE 2X4 MARKER PAINTED GREEN
    - SERVICE CONNECTIONS PER SD-118
  - WATERMAIN SYSTEM**
    - WATERMAIN CONSTRUCTION IS TO ADHERE TO CITY OF GUELPH PART "B" STANDARD CONTRACT SPECIFICATIONS SS-200 FOR WATERMAIN SPECIFICATIONS FOR CONSTRUCTION
    - CLASS 150 PVC PIPE PER OPSD 802.010
    - MINIMUM PIPE COVER 2.0m
    - MIN. VERTICAL CLEARANCE BETWEEN WATERMAIN AND OTHER SERVICES = 0.5m
    - MIN. HORIZ. CLEARANCE BETWEEN WATERMAIN AND OTHER SERVICES = 2.5m
    - HYDRANTS ON WATERMANS LESS THAN 300mm, 2-45mm NOZZLES, 150mm MECHANICAL JOINT INLET PER OPSD 1103.010
    - WATER VALVE LOCATED ON PROPERTY LINE PER C. OF G. SD-548
    - ALL STUBS TO HAVE 2X4 MARKER PAINTED BLUE
    - ALL THRUST BLOCKS PER SD-27 AND OPSD 1003.010, 1013.010
    - THRUST BLOCKS AND/OR RESTRAINTS SHALL BE AS PER SS-200
  - ROADWORKS/SWM POND/EMERGENCY ACCESS**
    - WATERMAIN CONSTRUCTION AT CUL-DE-SAC AS PER C. OF G. SD-88A
    - ROAD CROSS SECTION PER CITY OF GUELPH SD-50
    - COMPACT AND PROOF ROLL SUBBASE FOR APPROVAL BY ENGINEER PRIOR TO PAVEMENT CONSTRUCTION.
    - PAVEMENT CONSTRUCTION-SEE DETAILS
    - CURB AND GUTTER PER OPSD 600.040
    - CURB RADI AT INTERSECTIONS = 9.0m TO FACE OF CURB (MIN.)
    - DRIVEWAY ACCESS AS PER SD-47, C. OF GUELPH SITE PLAN GUIDELINES
    - DEAD END BARRICADE & SIGN AS PER C. OF G. SD-32
    - BOULEVARD LANDSCAPED WITH 125mm TOPSOIL AND No.1 NURSERY SOD

BENCHMARK - BM42 (NEW 1981) ELEV. = 332.685  
Benchmark plate set 81.01.20 on Niy and on conc. base of directory sign for "Horton Industrial Park" On S. Ely side of Laird Road near Horton Expy. Plate is 0.80m above ground. Elevation: City datum 92.03  
Geodetic 1091.49 Geodetic Metric 332.685

THE POSITION OF POLES, LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

6			
5			
4			
3			
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No.	DATE	DESCRIPTION	BY:	CHKD.
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### ISSUES/REVISIONS

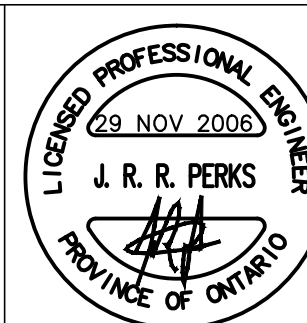
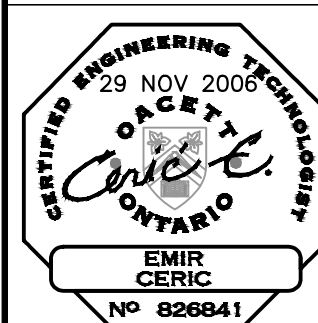


### ENGINEERING DEPARTMENT



379 QUEEN STREET SOUTH  
KITCHENER, ONTARIO  
N2G 1W6  
(519) 745-9455  
www.ibigroup.com

## SOUTHGATE BUSINESS PARK TRAIL CORRIDOR AND FENCING DETAILS PLAN



SCALE: HOR: 1:2000	CONSULTANT DRAWING No. KE-1743
DATE DRAWN: NOVEMBER 25, 2010	CITY CONTRACT No. XX
DESIGN BY: E. CERI	CHECKED BY: J. PERKS
CITY REFERENCE No. XX	SHEET 13

CITY FILE NO.



## 9.0 Hydrogeology

### 9.1 Overview of Hydrogeological Assessment

The hydrogeological assessment for the Southgate Business Park was prepared in support of the EIR and Stormwater Management (SWM) Design for the Business Park. The reader is referred to Appendix IX - Hydrogeological Assessment for the Environmental Implementation Report (Anderson GeoLogic Limited 2010).

The Hydrogeological Assessment report includes a confirmatory assessment of the hydrogeological setting using both historical data and new data collected in 2009/2010, with particular emphasis on the inter-relationship between the shallow groundwater regime and eight identified wetland features, A to H (see Figure 14). Important aspects of the hydrogeological setting have been confirmed, including:

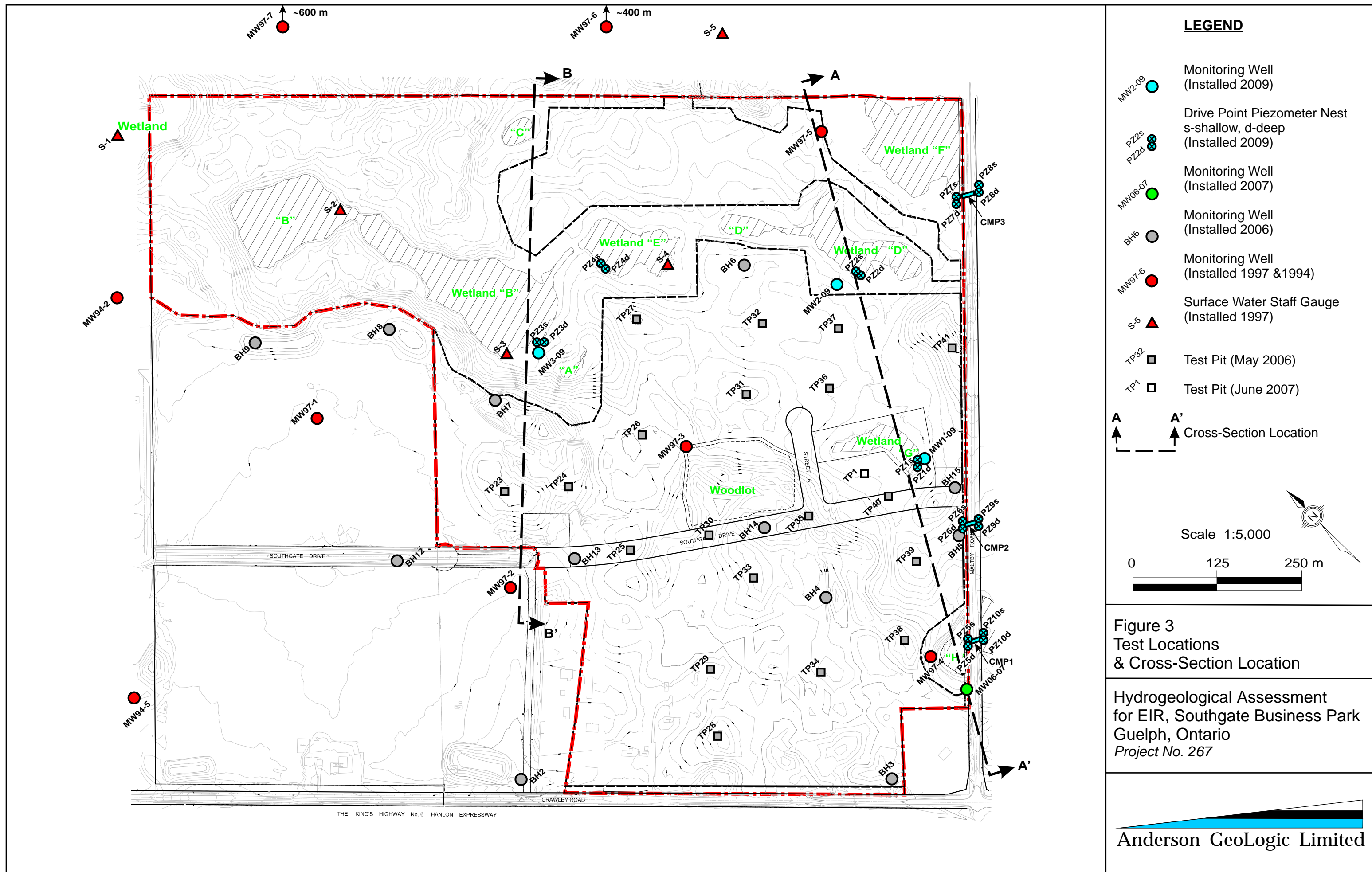
- The seasonally 'high' and 'low' water table configurations are typically about 2 metres apart, yet exhibit similar patterns irrespective of the height,
- The groundwater flow direction is from the northeast to southwest across the property, with some modest seasonal discharge of groundwater apparent along part of the northeast side of the main wetland corridor (i.e. Wetlands B and E), but with the majority of groundwater flow moving off-site toward regional discharge features (in particular, Mill Creek and Irish Creek), and
- Notwithstanding the function that groundwater discharge has at Wetlands B and E, surface water runoff and direct precipitation also play a substantial role in sustaining these two wetlands, and the remaining wetlands on the property (A, C, D, F, G and H) are sustained strictly by surface water runoff and precipitation.

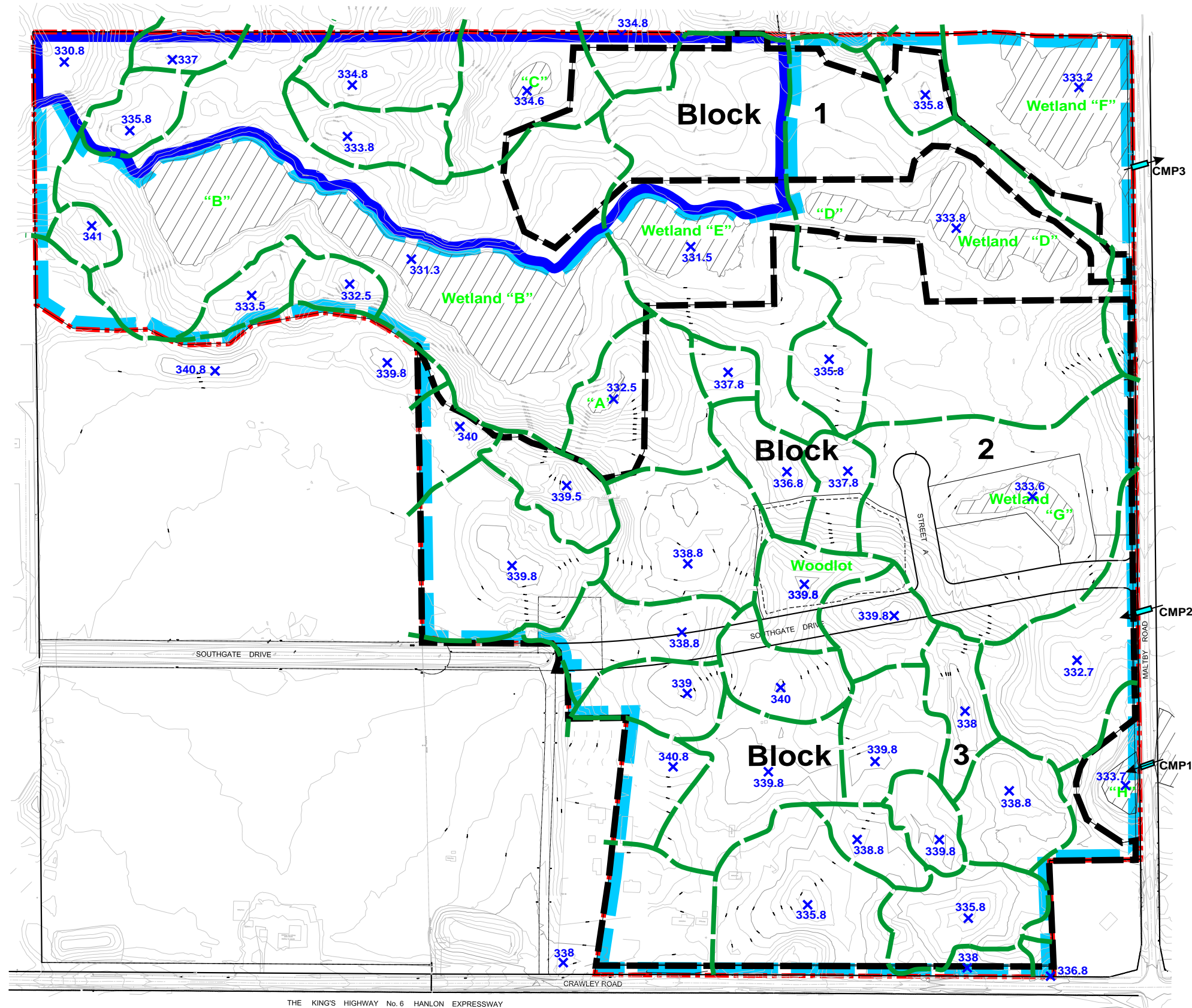
Figures 15 and 16 in the Hydrogeological Assessment (Appendix IX) provide illustrative summaries of the functions that groundwater recharge has at various parts of the property and also what combination of groundwater, surface water and precipitation sustain each of the eight wetlands.

The Hydrogeological Assessment has also included a detailed water-balance and groundwater recharge evaluation to support an effective strategy for post-development







stormwater management, one that maintains groundwater and surface water contributions to important groundwater and surface water receptors. The strategy includes identification of the specific responsibilities and targets that future property owners will have to meet for stormwater management. In addition, recommendations for the groundwater component of a comprehensive monitoring program have been provided, including: groundwater and wetland water levels, groundwater quality at stormwater infiltration facilities, and private well water levels and quality (as detailed in Section 13.0 and Appendix IX Hydrogeological Assessment).







## LEGEND

-  Existing Culvert (CMP) & Inferred Flow Direction
-  Development Blocks
-  Pre-Development Surface Water Catchment Area
-  Recharge Focus Point & Approximate Elevation (mASL)
-  Area with a Recharge Function to the Regional Water Table only
-  Area with a Recharge Function to both a Local Wetland and the Regional Water Table

Scale 1:5,000



Figure 7  
Pre-Development  
Recharge Functions

Hydrogeological Assessment  
for EIR, Southgate Business Park  
Guelph, Ontario  
Project No. 267

Anderson GeoLogic Limited





## 9.2 Discussion of Development Conditions

The following is a discussion of various hydrogeology-related conditions required for implementation as part of the development approval, as detailed in Section 6.1 of the Hydrogeological Assessment for EIR (Anderson GeoLogic 2010) (Appendix IX). The particular conditions are listed in Table 1.

### A. Condition of Draft Plan Approval 14b) – Establish Recharge Targets

“An overall recharge target of 0.3 m/yr for the entire property has been established in Section 5.2 of the Hydrogeological Assessment. Except in the portion of Development Block 1 that affects Wetlands B and E, the precise location(s) of where post-development SWM recharge facilities are located is not critical to the maintenance of the regional groundwater flow system, since there is already a broad distribution of ‘natural’ recharge points (i.e. the wetlands) across the width of the property perpendicular to the groundwater flow direction. The number of SWM facilities and the responsibility for recharge quantities on an individual property basis is addressed in Section 5.2 of the Hydrogeological Assessment”

### B. Condition of Draft Plan Approval 14d) – Establish a Comprehensive Monitoring Program

“The details of the groundwater component of the comprehensive monitoring program are described in Section 6.2 of the Hydrogeological Assessment and Section 13.0 of the EIR. This program outlines recommended post-development monitoring and builds on pre-development baseline monitoring data, including: a) the seasonal groundwater and surface water / wetland water level data from 2009/2010, collected using both data loggers and manual measurements, and which supplemented historical water level data collected in 1994, 1997 and 2006, b) the shallow groundwater quality data from 2009, and c) groundwater quality samples and water levels at available private wells located along Maltby Road and elsewhere within approximately 250 m of the development property that will be completed during the late fall of 2010 (i.e. when groundwater levels are typically at seasonal ‘lows’).”

### C. Condition of Draft Plan Approval 14e) – Detail/Implement Recommendations from Mitz Hydrogeological Report

“The five Mitz recommendations (in italics) are addressed below:

- 1) *Development must incorporate measures to ensure that groundwater recharge is maintained and that local groundwater flow directions are not influenced by anthropogenic features such as utility trenches, trench backfill, and foundation walls.* “Recharge will be maintained in accordance with the targets set in the Hydrogeological Assessment. It is not anticipated that local groundwater flow directions will be influenced by development since the water table is well below any anthropogenic features.”
- 2) *Stormwater management structures must be designed to match as closely as possible the existing recharge patterns at the site, both for the site as a whole and to the extent possible, within each major SWM development block.*

"Matching recharge patterns has been concluded in the Hydrogeological Assessment report to not be critical (refer to Item 'A' above). Rather, matching runoff quantities to each individual wetland has been determined to be of greater importance in sustaining wetlands. Nevertheless, overall target recharge rates are to be maintained on each development lot."

- 3) *Consideration should be given to restricted or alternate deicing salt application techniques or even an outright ban on deicing salts with the exception of pedestrian walkways.* "Deicing salts is addressed in the EIR under site plan considerations."
- 4) *It is recommended that each industry locating in the Southgate Business Park incorporate all appropriate best management practices in the transport, handling, containment, use, and disposal of all wastes/chemicals used within their facility.* "Disposal of wastes/chemicals is addressed in the EIR under site plan considerations."
- 5) *The monitoring wells installed by Gartner Lee Limited are ideal for long term monitoring. These wells should be located (not all were found during the current study), geo-referenced, rehabilitated, and preserved for their long term monitoring value.* "Two of the four 1997 Gartner Lee wells on the subject property, MW97-3 and MW97-5, were used during the 2009/2010 monitoring program and it is anticipated that both can be preserved for future use. Wells MW97-1 and MW97-4 could not be located and are presumed to have been destroyed. The other Gartner Lee wells are not located on the development property."

D. Condition of Draft Plan Approval 14h) Puslinch/Harden Recommendations

The seven Puslinch/Harden recommendations (in italics) are addressed below.

- 1) *Monitoring of the SWM facilities (for roads and private blocks) that confirm the infiltration of stormwater within the required 48 hour period.* "Monitoring of the SWM facilities for 48-hour infiltration is addressed in the Stormwater Management Report and EIR."
- 2) *Monitoring of surface water crossings beneath Maltby Road to confirm that at two western crossings the flow of water remains from the south to the north.* "The two western culvert crossings (CMP1 and CMP2) have been monitored during the 2009-2010 monitoring program using shallow piezometers to confirm the seasonal understanding of flow direction through the culverts. The data included in the Hydrogeological Assessment (Appendix A and Figures 2, 4 and 5) confirms that flow is consistently from south to north. The proposed grading and stormwater management approach for the development (see Section 5.2 of the Hydrogeological Assessment and SWM report) ensures that no excess stormwater runoff will be directed to CMP1 and CMP2. As a result, the flow direction at these crossings will remain from south to north and no post-development monitoring is required."
- 3) *Monitoring of the eastern surface water crossing beneath Maltby Road to confirm that the volume does not increase.* "The eastern culvert crossing (CMP3) has been monitored during the 2009-2010 monitoring program using shallow piezometers to confirm the seasonal understanding of flow direction. The data included in the Hydrogeological Assessment (Appendix A and Figures 2, 4 and 5) confirms that flow is consistently from north to south. The proposed grading and stormwater management approach for the development (see Section 5.2 of the Hydrogeological Assessment and SWM report) ensures that no excess

stormwater runoff will be directed to Wetland F. As a result, the flow volume and direction at this crossing will not change and no post-development monitoring is required.”

- 4) *Covenants that require the developer to monitor stormwater facilities for ten years to ensure that the water is being infiltrated as designed in both municipal and private systems.* “Harden’s concern is that the design infiltration may be reduced during post-development because of soil compaction and pond siltation. The infiltration ponds will be constructed with granular soils (native or imported), which are not subject to compaction. Silt soils are subject to compaction, however, the risk of siltation occurring is greatest during the construction period before grass and asphalt surfaces are completed. Pond siltation is not anticipated afterwards given the inclusion of an oil-grit separator at each pond. Nevertheless, routine inspection and maintenance (including silt removal) of both the pond and the separator will be required under the Certificate of Approval for as long as the facility exists.”
- 5) *Covenants that require sufficient seasonal water level measurements prior to and post development in the wetlands to confirm that water conditions in the wetlands do not change after the development.* “See Item B above in respect to the Comprehensive Monitoring Program. Seasonal water level monitoring in the wetlands was initiated in 2009 and will continue using the available piezometer / data loggers established at Wetlands B, E, D, F and G for a period of two years after 75% of development construction.”
- 6) *Covenants with the developer to ensure that drainage (from north to south) across Maltby Road does not occur.* “See discussion in Items D.2 and D.3 above.”
- 7) *Covenants that require the developer to monitor the water quality of infiltrated water and if necessary improve water quality control measures.* “The groundwater component of the comprehensive monitoring program (Section 6.2 of the Hydrogeological Assessment) includes provisions for monitoring groundwater quality downgradient from each SWM pond and a contingency plan to improve water quality. This monitoring will be carried out pursuant to the Certificates of Approval for each SWM pond.”

## 10.0 Stormwater Management

### 10.1 Overview of Stormwater Management

The following description of the stormwater management for the SBP is based on the November 2010 report entitled “Grading, Servicing and Stormwater Management Report” prepared by IBI Group (2010) (Appendix X). Detailed site drainage and grading plans, and sediment and erosion control plans are included in Appendix X and included in the engineering drawing set.

The groundwater table lies relatively deep beneath the property, owing to the extensive presence of well-drained permeable granular deposits both at surface and at depth. The Geotechnical Investigation prepared by Peto MacCallum Ltd. (July 25, 2006) indicated that the soils on the property (silty gravels, gravel sand-silt mixtures) have an infiltration rate of 60 mm/hr which is suitable for stormwater infiltration.

Based on grading constraints on site (no overland outlet), it is required that all runoff generated up to the Regional Storm (Hurricane Hazel) be retained and infiltrated on-site for all future developing sites. The area is characterized by closed drainage, with surface runoff discharging to low-lying depressions and wetlands throughout the site, with no runoff flowing off-site. A stormwater management infiltration pond is proposed to retain runoff generated from the right-of-way of the proposed Southgate Drive extension and proposed Street “A”. Additional privately owned infiltration facilities will be required to retain and infiltrate surface runoff from the developing sites.

A detailed water balance assessment for the subject property has been completed in the Hydrogeological Assessment for the Environmental Implementation Report (Anderson GeoLogic Ltd. 2010) (Appendix IX). The strategy for stormwater management will include the following components, as recommended in the water balance analysis completed in the Hydrogeological Assessment:

- The overall average groundwater recharge target should be a minimum of 300 mm/year (0.3 m/yr) in order to maintain the regional groundwater flow system.
- The precise location(s) of where post-development SWM recharge facilities are located is not critical to the maintenance of the regional flow system, since there

is already a broad distribution of 'natural' recharge points (wetlands) across the width of the property perpendicular to the groundwater flow direction.

- Wetlands B and E are sustained, in part, by up-gradient groundwater recharge from the northeast, some of which occurs in Development Block 1. This recharge should be maintained, both in respect to quantity and proportion contributing to Wetland B and E.
- All eight wetlands (A through H) are sustained to varying degrees by local surface water runoff within the individual wetland catchments. These runoff quantities should be maintained, as ultimately this surface water is important both for the wetlands themselves and for regional groundwater recharge.

Each developing site must therefore provide the appropriate quantity and distribution of infiltration and surface runoff to meet the above strategy. Each site must also provide stormwater quality control to an Enhanced Protection Level as per MOE guidelines prior to any infiltration or discharge of surface runoff. This can be achieved by using constructed wetland/wet pond facilities, or by using devices such as OGS units. The municipal road areas will be treated using OGS units, the surface runoff from Southgate Drive will sustain the required surface water flow to Wetland 'G'. A Monitoring Program (typically for a minimum of two years) will be required for effluent chemistry for stormwater quality features, and for groundwater chemistry. The design of stormwater management facilities and subsequent monitoring is to address the recommendations from the Grading, Servicing and Stormwater Management Report (IBI 2010) (Appendix X).

## 10.2 Stormwater Management Monitoring Recommendations

Typically, a minimum of two years of monitoring is required for effluent chemistry for water quality features, and for groundwater chemistry as outlined below. After the two-year period, the results of the stormwater management monitoring program will be reviewed by monitoring consultant to determine if further monitoring is required. If the stormwater management facilities are functioning as per the design, no additional monitoring will be required. Specific Monitoring requirements are to be confirmed with the City and MOE at the Site Plan stage.



### 10.2.1 Oil/Grit Separator Monitoring

A grab sample is required at OGS units three to four times per year. Sampling will be contingent of sufficient rainfall to generate flows from the OGS units. Samples will be monitored for the following parameters:

- 3 to 4 samples per year per unit
  - Oil & Grease
  - pH
  - Total Suspended Solids

### 10.2.2 Wetland/Wet Pond Monitoring

If any of the proposed sites include a wet facility, a grab sample is required at the outlet of the wetland or wet pond three to four times per year. Samples will be monitored for the following parameters:

- 3 to 4 samples per year per unit
  - Oil & Grease
  - pH
  - Total Suspended Solids

A report should be submitted to the City and MOE for review after the end of each monitoring season, which will summarize all data collected and provide analysis/interpretation of the results and recommendations for changes (if any) for the following year's monitoring. All sampling, analysis, and reporting will be completed based on current MOE regulations and requirements.

## 11.0 Servicing Overview

For detailed information pertaining to servicing within the Southgate Business Park, the reader is referred to the Southgate Business Park Grading, Servicing and Stormwater Management Report prepared by IBI (November 2010) (Appendix X).

### 11.1 Area Grading

Lands within the SBP are to be developed for industrial use with typically large building footprints requiring flat parking/storage areas. Therefore, the grading design will need to flatten the existing topography. Given the extent of grading required within the development blocks, a majority of vegetation within these blocks will need to be removed, with exception of a) vegetation designated for retention within the Draft Plan of Subdivision and b) vegetation associated with the naturalized wildlife corridor easement connecting Open Space Block 8 and Open Space Block 5.

Development lands adjacent to Southgate Drive will generally slope away from the road (i.e. east and west), mimicking direction of existing conditions. Proposed slopes within the development lands will generally be flat with minimal slope as required by Industrial land. Southgate Drive will continue from its existing southern terminus and rise in elevation for a distance of approximately 260m. At this point (Sta 1+710) Southgate Drive will fall continuously to Maltby Road.

Grading has been designed to create an approximate overall cut/fill earth balance. The limits of the various land parcels/blocks are currently not known and will be determined by market demands. To achieve the cut/fill balance, it will likely be necessary to grade beyond the limits of the specific parcels/blocks. Accordingly, the grading limits will be dictated by the extent of the developed areas.

While some topsoil may be reused on-site in landscaped areas and berms along Maltby Road, there will be a surplus of topsoil as a large percentage of the developed area will be comprised of buildings or hard surfaces where topsoil placement will not be suitable. As such, as lands are graded and developed, a majority of the topsoil will eventually need to be hauled from the site and used off-site. Temporary stockpiling of topsoil may

occur within the subject property depending on availability of site to accept the topsoil. Until removal is warranted, the existing topsoil pile, as shown on Engineering Drawing 1 Existing Conditions and Removals Plan will be utilized as the on-site stockpile location.

## 11.2 Road Network

Southgate Drive will be extended southerly from its present terminus to Maltby Road. A second street, Street 'A', is proposed to be extended easterly from Southgate Drive, at a point approximately 140m north of Maltby Road. Street 'A' will end in a cul-du-sac, providing access to future development lands within this area (see Figure 1).

The cross-section of all roads within the business park will be a 26m right-of-way. This is a reduction from the existing sections of Southgate Drive to the north, which is 30m. The decreased width of 4m has been taken from the boulevard areas. The typical road cross-section is shown on Engineering Drawing 10. The vertical and horizontal profiles of these roads follow City of Guelph standards for industrial roads.

As traffic from Southgate Drive will use Maltby Road to access the Hanlon Expressway, Maltby Road will ultimately need to be upgraded to an industrial standard, west of Southgate Drive. These upgrades are currently under construction by the City of Guelph.

Block 1 (Phase 3) will be a private development block with access to Maltby Road. A private driveway, approximately 6m in width with an asphalt surface, will provide access from this site to Maltby Road.

## 11.3 Sanitary Servicing

The proposed extension of Southgate Drive is contained within the City of Guelph sanitary servicing boundary as documented on the City of Guelph's "South Guelph Lands Preliminary Sanitary Servicing Concept" dated May 14, 1999. A 450mm diameter sanitary sewer is present along the existing Southgate Drive and has been capped for future extension at the northern limit of the subject property. The existing sewer has been sized to incorporate the flows of the subject industrial lands.

Gravity sewers will be extended along the centerline of Southgate Drive and Street 'A'. A sanitary sewer drainage divide on Southgate Drive occurs at approximately Sta. 2-170. Refer to Engineering Drawing 6 for the proposed sanitary catchment areas. Sewage north of the drainage divide will drain northerly via gravity to the existing sanitary sewer.

Sewage south of the divide, including flows from Street 'A', will have two alternative drainage solutions:

1. Municipal SPS: The sewage would drain southerly via gravity to a proposed sanitary pumping station (SPS) to be located on the northeast corner of Southgate Drive and Maltby Road. Flows collected by the SPS will be pumped northerly via forcemain along Southgate Drive and outlet to the northerly draining gravity sewer at approximate Sta. 2+170.
2. Private Pumping: The character of the development on Southgate Drive is large industrial blocks. Accordingly there could be very few individual properties outletting to the municipal sanitary system. Further, depending on the type of development, there could be very little demand on the sanitary system (e.g., if the users are warehousing, etc.). If indeed there are few users and/or little demand, a full scale municipal SPS may not be economically feasible, both to construct or to maintain in the long term. Instead, private pumping systems may be much more practical. In this alternative, each user would have their own pumping facility, pumping to a common municipal forcemain on Southgate Drive which would outlet to the northern gravity sewer. This type of system has been implemented in other municipalities with success (reference: [http://www.eone.com/sewer\\_systems/intro](http://www.eone.com/sewer_systems/intro))

With respect to Block 1 (Phase 3), there are also two alternative servicing alternatives:

1. Trenchless Service to Street 'A': This alternative would extend a sanitary service from Street 'A' or Southgate Drive, via an easement through Block 2, beneath a narrow section (50m wide) of the environmental lands (via trenchless methods) and into Block 1. Refer to Engineering Drawing 6 for approximate location of the environmental crossing. The sewer would be installed trenchlessly through the

environmental buffer at a depth below vegetation, and as a result, will have little impact on the environmental lands.

2. Via Maltby Road: This alternative would extend a sewer southerly along the Block 1 driveway to Maltby Road, westerly on Maltby Road to Southgate Drive, and into the proposed SPS as described above. It is noted that this sewer in sections would be at a significant depth of over 8m within Maltby Road allowance.

In review of the two sanitary servicing alternatives for Block 1, the preferred method would be the Trenchless service alternative. This alternative reduces the overall length of sewer required, avoids reconstruction of the newly constructed Maltby Road, and avoids a deep section of sewer.

Once development plans for Blocks 1, 2 and 3 are further advanced, the various alternatives can be further reviewed. At this time, details of the servicing scheme will need to be reviewed by the City and GRCA to ensure no impacts. The proposed sanitary sewer, forcemain and possible SPS will be designed as per the City of Guelph's Urban Design Standards (1995).

#### 11.4 Water Supply

The proposed development is contained within the City of Guelph water servicing boundary as documented in the "Southgate Guelph Lands Preliminary Water Distribution Concept" dated May 14, 1999. A 400mm diameter watermain is present on the existing section of Southgate Drive and a 300mm diameter watermain exists on Crawley Road. Both watermains terminate at the northern limit of the subject property. The two watermains have an existing looping via a 300mm watermain located in an easement at the southern limit of Phase 1. In 2010, the City of Guelph installed a 400mm watermain along Maltby Road, from Gordon Street to where the Southgate Drive extension will join Maltby Road; therefore, potable water will enter Block 1 along the proposed laneway.

These watermains will provide potable water and fire protection to the SBP and will be designed as per the City of Guelph's Urban Design Guidelines (1995).

### 11.5 Erosion and Sediment Control

During area grading, erosion and sediment control measures will be implemented to ensure sediment does not escape the subdivision or impact adjacent environmental lands. Erosion and sediment control measures will take the form of silt fences and sediment control ponds, strategically positioned within the subdivision, at low points receiving overland flows.

During site development, additional controls will be required. These measures will be reviewed as part of the Site Plan approval.

An environmental monitoring program will be developed as part of the Site Plan approval process to ensure that sediment and erosion control measures are installed, maintained and functioning as intended.

### 11.6 Utilities

The various utilities (i.e. Hydro, Gas, Cable and Telephone) have existing facilities surrounding the Business Park. Servicing of the development by the various utilities will be provided by the extension of these facilities. It is anticipated that each of these utilities will, as required, identify their specific requirements through the standard application circulation and review process.



## **12.0 Pre-Construction (Baseline) Monitoring Program**

The discussion of monitoring at the Southgate Business Park is divided into Section 12 and 13. Section 12 describes the pre-construction or baseline monitoring that has occurred to date and refers the reader to appended monitoring reports. Section 13 describes the consolidated comprehensive monitoring program for the Southgate Business Park.

The pre-construction (baseline) monitoring program associated with the Southgate Business Park is an integration of a series of monitoring requirements arising from the Conditions of Draft Plan Approval (December 22, 2008), recommendations from Harden Environmental Services Ltd. (December 1, 2008), recommendations made in the EIS (NRSI 2007) and review comments from agencies.

Pre-construction biological monitoring addressed the following monitoring components:

- 1) monitoring of baseline (pre-construction) groundwater levels. Grading plans have been reviewed and developed to ensure that predevelopment drainage patterns are not altered causing changes in surface water and groundwater flows to the south across Maltby Road to Puslinch Township.
- 2) monitoring of baseline (pre-construction) conditions in the on-site wetlands (vegetation, groundwater levels)
- 3) monitoring to demonstrate how the recharge targets and runoff targets will be met through the site plan approval process and,
- 4) monitoring of wildlife movement throughout the Business Park, with a focus on amphibian movement associated with the proposed laneway into Block 1.

Hydrogeological pre-construction monitoring results for monitoring components 1-3 as outlined above are described in the November 2010 Hydrogeological Assessment prepared by Anderson GeoLogic (Appendix IX). A summary of the 2010 study is included in Section 9.0. Pre-construction groundwater monitoring was conducted in 2009 and 2010 with historical data collected in 1994, 1997 and 2006.

Detail on pre-construction (baseline) terrestrial and wetland monitoring for component 2 is dealt with in Appendix VIII - Southgate Business Park Pre-Construction Terrestrial and

Wetland Monitoring 2006 - 2010 (NRSI 2010). Component 4 monitoring detail is provided in Appendix I – 2010 Jefferson Salamander Monitoring Program Implementation & Results (NRSI 2010 B) within the Terrestrial and Wetland Monitoring Report 2006-2010 prepared by NRSI (Appendix VIII).

Terrestrial and wetland monitoring within the Southgate Business Park was established as a result of recommendations from the Hanlon Creek State of the Watershed Report (PEIL 2004) and over time, has expanded to address concerns and recommendations made by review agencies and groups. The following areas were monitored throughout the study period (2006 – 2010), and are documented in the Southgate Business Park Pre-Construction Terrestrial and Wetland Monitoring Report (NRSI 2010 A) (Appendix VIII):

- Vegetation and Soil Surveys (2008)
- Breeding Bird Surveys (2006, 2008)
- Amphibians Call Surveys (2006, 2008, 2009)
- Salamander Surveys (2009, 2010)

In 2009, a Draft Recovery Strategy, as well as proposed Habitat Regulations were prepared by the Jefferson Salamander Recover Team for Jefferson salamander (*Ambystoma jeffersonianum*), a species known to occur within the study area. The Ontario Recovery Strategy Series (Jefferson Salamander Recovery Team 2010) for Jefferson salamander was finalized in February 2010. To assess presence/absence of Jefferson salamander within the Business Park based on guidelines set out in the Ontario Recovery Strategy Series (MNR 2010), salamander monitoring was conducted by NRSI in 2009. Although no Jefferson salamanders were observed within the subject property during 2009 surveys, a comprehensive monitoring program was undertaken by NRSI in 2010. Monitoring in 2010 was in response to comments received from the Ministry of Natural Resources, Guelph District (November 2009). The City of Guelph Environmental Advisory Committee (EAC) (July 2009) requested that *“if possible, additional future salamander monitoring stations be established south of Maltby Road on the adjacent private properties to capture all potential breeding ponds within reasonable proximity to the study area. This work should commence, however, if in the meantime, monitoring commences as part of the Maltby Road improvements, the City should assume responsibility.”* Preparation for the Maltby Road improvement project

commenced in early 2010, therefore, the City of Guelph took responsibility for monitoring needs associated with road improvements. The City of Guelph requested NRSI conduct wildlife movement studies (as recommended by MNR, Guelph District staff) along Maltby Road, with the specific purpose of determining where amphibian species and reptile movement locations were concentrated in order to refine the understanding of culvert locations.

Results from the 2009 and 2010 salamander monitoring programs conducted within Southgate Business Park were reviewed by the MNR, Guelph District and it was determined through this review that further salamander surveys are not warranted (see Appendix II for MNR correspondence).

The monitoring regime for terrestrial and wetland components followed in 2006, 2008 and 2009, is consistent with the Hanlon Creek State of the Watershed Report (PEIL 2004). The objective of the monitoring is to track changes that may occur to the terrestrial and wetland ecology within the new industrial lands as a result of construction and the stormwater management plan.

### 13.0 Comprehensive Monitoring Program

As noted in Section 12.0, the monitoring program associated with the Southgate Business Park is an integration of a series of monitoring requirements arising from the Conditions of Draft Plan Approval (December 22, 2008), recommendations from Harden Environmental Services Ltd. (December 1, 2008), recommendations made in the EIS (NRSI 2007), review comments from agencies. The Comprehensive Monitoring Program is also associated with the need to monitor the effectiveness of measures arising from the detailed studies and EIR as part of the design, mitigation and restoration features in the Business Park.

The following Comprehensive Monitoring Program has been patterned after the approved Hanlon Creek Business Park Consolidated Monitoring Program (NRSI 2010c) and for the purposes of this report, has been developed in response to the following conditions/comments:

Condition of Draft Plan Approval 14d

*“Establish a comprehensive monitoring program including a monitoring period to the satisfaction of the City and GRCA. The scope of the comprehensive monitoring program shall include monitoring of the adjacent wetlands and private wells of nearby residents living along Maltby Road, provided permission is granted by the home owner. The proposed monitoring program shall include potential mitigation measures and contingency plans.”*

Condition of Draft Plan Approval 14k

*“Identify key indicator parameters, targets and establish an environmental monitoring program as part of a Post-Development Adaptive Management Plan.”*

Grand River Conservation Authority (June 24, 2009)

*“It is recommended that the Marsh Monitoring Program, as described by Bird Studies Canada and Canadian Wildlife Service, be employed on this site in order to allow for a more systematic survey and, potentially, a long-term assessment of marsh communities on this site. It is also recommended that MMP vegetation survey methodology also be followed. Generally, vegetation surveys or inventories within wetland communities should be conducted during the wet growing season, which typically includes the months of May, June and possibly July, in order to ensure that hydrophytes are well represented. Monitoring frequency and duration should be specified in the EIR.”*

EAC – Comments of Draft Terms of Reference (July 8, 2009)

*“That a detailed monitoring table be provided.”*

A total of 6 discrete monitoring requirements have been identified. They are:

1. **Monitoring of during and post-construction groundwater levels:** During and post construction monitoring of groundwater levels to ensure that predevelopment drainage patterns are not altered causing changes in surface water and groundwater flows to the south across Maltby Road to Puslinch Township as a result of development.
2. **Monitoring of during and post-construction conditions in the on-site wetlands (vegetation, groundwater levels):** During construction biological monitoring within on-site wetlands (vegetation and soils, breeding birds, amphibian and water levels) to document and react to any significant fluctuations as a result of development activities.
3. **Performance of Municipal Stormwater Management System:** Post construction monitoring of performance of municipally managed SWM Pond to ensure it is functioning in accordance to its design. This monitoring will be completed for a minimum of two years following construction of the pond.
4. **Performance of Private Pond Stormwater Management Systems:** Lot owners will be responsible for monitoring their own individual stormwater management facilities to ensure they are functioning as per the final design. A minimum of two years following construction of the pond will be required.
5. **Permit Conditions and EIR Recommendations:** Monitoring arising as conditions from permit applications/review as well as impact predictions specifically arising from recommendations within this report. Permit-related monitoring may include monitoring requirements set forth in the Certificate of Approval (CofA) from the Ontario Ministry of the Environment for the stormwater management facility.
6. **Success and Naturalization of Restoration Areas:** Monitoring of success and naturalization processes of restoration areas within buffers, the

stormwater management area and planted berm, arising from agency comments and restoration planting warranty.

7. **Wildlife Movement:** Monitoring of wildlife movement throughout the business park, with focus on movement within wildlife culverts once they are implemented.
8. **Construction Monitoring:** Monitoring arising from Conditions of Draft Plan Approval #11, which states that an environmental inspector is to carry out the construction monitoring during grading, servicing, and building construction.

Pre-construction monitoring occurred over a number of years to establish baseline conditions. These activities are described in Section 12. Many of the terrestrial monitoring activities have been in effect annually from 2006 to 2010, while hydrogeological monitoring activities commenced in 2009 and have continued into 2010.

The following monitoring discussion is divided into two phases, during construction and post-construction. Since the timing of construction in the Business Park is driven by the rate at which lands are sold and built, the construction period may extend over many years. Therefore, it is anticipated that there will be considerable overlap between during and post construction.

As identified in Section 12.0, monitoring components 1 and 2 commenced as pre-construction monitoring. It is recommended that monitoring for components 1 through 4 continue through construction until two years after 75% build out of each of Phases 1, 2, and 3. If two years after 75% build out of Phase 1 and/or 2 is reached prior to commencement of works within Phase 3, then aspects of the monitoring program specific to Phases 1 and/or 2 may cease. Under this approach, there will be post-construction monitoring relative to the separate parcels as they are built, but there will not be a full business park post-construction monitoring period.

Details of this monitoring, including triggers, contingency measures and cessation are detailed below. Other monitoring activities will occur only during construction while others will occur post-construction (see Table 7).



**Table 7. Southgate Business Park - Monitoring Components**

	Pre-Construction	During Construction	Post-Construction
Performance of SWM Systems		√	√
Groundwater and Wetlands	√	√	
Permit Conditions and EIR Recommendations		√	√
Success and Naturalization of Restoration Areas			√
Wildlife Movement	√		√
Construction Monitoring		√	

### 13.1 During Construction Monitoring

The following during-construction monitoring programs are required for the Southgate Business Park based on components 4 and 5 above. As discussed under pre-construction monitoring (Section 12.0), the hydrogeological and terrestrial and wetland monitoring programs will continue through the during construction period. In response to GRCA comments on the EIR Terms of Reference (T. Zammit 2009, *pers. comm.*), components of the terrestrial and wetland monitoring program will be adjusted to implement the Marsh Monitoring Program (MMP) for bird and vegetation surveys.

Breeding bird surveys will continue to follow OBBA methodology; however, they will also incorporate the MMP. As outlined in Section 13.7 Standard Operating Procedures, the MMP includes a 15 minute survey at each station; beginning with a 5 minute silent listening period, followed by 5 minute call broadcast period to elicit calls of secretive marsh birds, and ending with another 5 minute survey period (Bird Studies Canada 2008). Monitoring stations will not change; however, implementation of the MMP will allow for a systematic survey and allow for a long-term assessment of marsh communities within the subject property.

To satisfy comments from the City of Guelph EAC (July 2009) and GRCA (June 2009), an outline of during and post construction monitoring programs for the Southgate Business Park, including monitoring frequency and duration is provided in the sections below.

## 13.2 Biological Monitoring

The biological monitoring components are indicated as follows, with the years of pre-construction monitoring indicated in parentheses.

- Groundwater (2009 and 2010) [Note there is also some historical data available from 1994, 1997 and 2006]
- Vegetation and Soils (2008)
- Breeding Birds (2006, 2008)
- Amphibians (2006, 2008 and 2009)
- Salamanders (2009 and 2010)

Monitoring of biological features (groundwater, vegetation and soils, breeding birds and amphibians) is to be conducted by the Developer. The duration of the responsibility to monitor is recommended to be when 75% of each of Phases 1, 2 and 3 have been built, plus an additional 2 years. If two years after 75% build out of Phase 1 and/or 2 is reached prior to commencement of works within Phase 3, then aspects of the monitoring program specific to Phase 1 and/or 2 may cease. The monitoring program applies to this commitment by the Developer. Once the developer's responsibilities are fulfilled, it is typically the municipality that assumes responsibility for any continued monitoring.

To assist with the determination of what future/ongoing monitoring may be required after this timeframe has elapsed, the Comprehensive Monitoring Program includes an annual review of future monitoring needs, which includes possible modification of approach or cessation of components.

Standard Operating Procedures for the components of the biological monitoring are provided in 13.7. Each monitoring discipline is responsible for recommending changes in the frequency, intensity and duration of monitoring as the need arises. Such recommendations are to be included in the annual reporting.

## 13.3 Stormwater Management Monitoring

As detailed in Section 11.0, an adaptive management approach should be adopted to ensure that the stormwater management approach is working and has minimal impacts on wetland conditions and groundwater conditions. A Monitoring Program (typically for a

minimum of two years) will be required for effluent chemistry for stormwater quality features, and for groundwater chemistry. Monitoring recommendations are detailed in the Grading, Servicing and Stormwater Management Report (IBI 2010), as well as Section 11.0.

Post construction monitoring for both the Municipal stormwater pond and individual Site Plan stormwater ponds is to be carried out until two years after 75% of the development area is built (Phase 1, 2 and 3). If two years after 75% build out of Phase 1 and/or 2 is reached prior to commencement of works within Phase 3, then aspects of the monitoring program specific to Phase 1 and/or 2 may cease.

#### 13.4 Construction Monitoring

Construction monitoring is the responsibility of the proponent and is tied to the specific undertaking. Generally, construction monitoring must occur to ensure compliance with the conditions of various permits. In the specific case of the SBP, the need for construction monitoring also stems from Condition of Draft Plan Approval # 11 (December 2008). The condition states that an environmental inspector is to carry out construction monitoring during grading, servicing, and building construction. Condition 11 is stated as follows:

*The Developer shall provide a qualified **environmental inspector**, satisfactory to the Director of Community Design and Development Services and the City Engineer, to inspect the site during all phases of development and construction including grading, servicing and building construction. The environmental inspector shall monitor and inspect the erosion and sediment control measures and procedures, and compliance with the Environmental Impact Study. The environmental inspector shall report on their findings to the City as recommended by the Environmental Implementation Report.*

Due to the site-specific requirements and dynamic nature of construction monitoring, standard operating procedures for construction monitoring are not provided in the monitoring plan. However, guidance can be obtained from commonly cited documents on the subject. At the time of developing this monitoring program, the *Erosion and Sediment Control Guidelines for Urban Construction* prepared by the Greater Toronto Area Conservation Authorities (2006) is a commonly cited document in the Greater Toronto Area of Ontario.

At this time, construction monitoring will be required during the grading of Phases 1, 2 and 3, construction of Southgate Drive and installation of services; however, once lots are sold, construction monitoring will become the responsibility of each individual lot owner.

The following additional activities will occur during construction:

- Sediment and erosion control measures will be installed prior to, and maintained during construction. Areas of bare soil will be re-vegetated with a recommended seed mix within 30 days of being cleared to prevent erosion of soils.
- Trees and other areas of vegetation to be retained will be identified and delineated with temporary fencing located beyond the dripline of trees, to ensure that vehicle movement or material storage does not disrupt vegetation (especially root zones).
- Any limbs or roots to be retained which are damaged during construction will be pruned using appropriate arboricultural techniques.
- Maintenance of machinery during construction will occur at a designated location away from the natural areas on-site. Details are provided on the Erosion and Sediment Control Plans (Appendix XI).
- No storage of equipment, materials or fill will occur within the natural areas or buffers.
- During the installation of the construction limit fencing, any hazard trees will be identified and removed as warranted.

The relationships between the monitoring requirements and components are outlined below in Table 8.

**Table 8. Monitoring Requirements and Components**

	Biological Monitoring					Construction Monitoring	
	Groundwater	Vegetation & Soils	Breeding Birds	Amphibians	Salamanders	Construction Inspections	Performance of Plantings
1. Performance of Stormwater Management Systems	√						
2. Groundwater and Wetlands for the SBP	√	√		√	√		
3. Permit Conditions and EIR Recommendations	√	√			√	√	
4. Success and Naturalization of Restoration Areas		√	√	√	√		√
5. Wildlife Movement		√	√	√	√		
6. Construction Monitoring	To be conducted during grading, servicing and building construction, concerning all natural features within the site.						

#### 13.4.1 During Construction Sighting Protocols

To address the possibility of encountering Species at Risk (SAR) during construction of the Business Park, it is recommended that construction crews be provided with a sighting protocol. The sighting protocol is specific to SAR species that are known to occur within the vicinity of the study area, such as northern ribbonsnake (*Thamnophis sauritus septentrionalis*), common snapping turtle (*Chelydra serpentina serpentina*), western chorus frog (*Pseudacris triseriata*), eastern milksnake (*Lampropeltis t. triangulum*) and Jefferson salamander (*Ambystoma jeffersonianum*), as well as common wildlife species during construction of the business park, it is recommended that construction crews be provided with a sighting protocol.

Prior to the on-set of any construction activities, all staff involved in on-site activities are to be provided with a sighting protocol document, along with detailed fact sheets specific to SAR that may be encountered within the business park. The information package will include representative photos, habitat descriptions, size characteristics and other important identifying features. The project biologist or environmental inspector will be responsible for familiarizing all on-site staff with these identifying characteristics, as well as the proper protocol to follow should a suspected SAR be encountered. The Sighting Protocol and associated fact sheets are included in Appendix XII. It should be noted that these documents will need to be updated just prior to any on-site construction activity to ensure accurate species are represented.

#### 13.5 Comprehensive Monitoring Report Structure

To date, preconstruction monitoring has been reported in individual reports covering each professional discipline. These reports are appended to this report and include terrestrial and wetland monitoring (Appendix VIII), salamander monitoring (Appendix I within Terrestrial and Wetland Monitoring 2006 – 2010 (Appendix VIII)) and hydrogeological monitoring (Appendix IX).

Future reporting will consist of annual Comprehensive Monitoring Reports, Construction Monitoring Reports and a Rapid Assessment and Action Protocol (RAAP) for responding to threshold exceedances or other observations of concern. The first Comprehensive

Monitoring Report is to be produced for the 2011 monitoring year, and construction monitoring will occur in conjunction with construction activities. The RAAP will be in place for the commencement of construction which is anticipated to commence in 2011.

An annual comprehensive monitoring reporting process will facilitate effective monitoring by integrating all of the monitoring data and addressing all trends and effects that are identified. Integration will provide each monitoring discipline with the opportunity to make use of the findings of the other disciplines and provide accessible documentation for stakeholders. Trends and effects can be addressed in a manner that recognizes the needs for input from multiple disciplines. The reporting process will culminate in the production of an annual Consolidate Monitoring Report, which includes 8 specific components:

1. A **Summary of Findings** of each monitoring discipline provides the reader with a synopsis of all the information and highlights any substantive changes in the methodologies.
2. **Individual Reports** from the past year for each discipline are appended to provide the reader with opportunity for more detailed review, to facilitate referencing in the main body of the report, and to file all monitoring information together by year.
3. **Construction Inspection Reports** are appended to ensure they are filed with other monitoring data, and to facilitate referencing as needed in the main body of the report.
4. **Reporting on Effects** from the past year stemming from exceedances or observations of concern (if any) is appended and summarized.
5. **Trends and Effects** (either positive or negative) are identified and addressed in detail. All known causes related to each trend or effect are included in the discussion. The discussion is based on all applicable annual monitoring data, and can also make use of construction inspection reports and/or effects reporting.
6. **Recommended Actions** are provided to deal with negative trends or effects. These actions need not include detailed plans of corrective measures because this could delay the production of reporting. Rather, they initiate action to deal with negative trends, and/or reiterate ongoing or planned



actions stemming from the RAAP. They should also indicate the severity of the issue and provide a timeframe for action.

7. **Corrective Measures** that have taken place in the previous year are documented. The associated discussion clearly indicates whether the recommendation has been implemented and the situation corrected. As part of this documentation, a table or chart is included that provides a rudimentary history of recommendations and actions to show what issues remain outstanding, and to provide the reader with a history of recurring issues.
8. **A review of future monitoring needs** will summarize recommendations from the individual reports, and provide any clarification required to ensure continued coordination of the monitoring disciplines.

This reporting process is the responsibility of the Developer for the duration of the responsibility to monitor (when 75% of Phases 1, 2 and 3 have been built, plus an additional 2 years).

#### 13.5.1 Construction Monitoring Reports

Whenever construction activity is ongoing, environmental inspections are to occur as per Condition of Draft Plan Approval # 11. The condition specifies that the environmental inspector shall report on their findings to the City. The details of site inspections and reporting frequency will be site-specific and determined as part of the permits, or as deemed appropriate by the environmental inspector/monitor.

#### 13.6 Rapid Assessment and Action Protocol

The construction inspection/monitoring is conducted on a project-specific basis and is typically based on rapid response to any environmental issues that arise as a result of the construction. On the other hand, the biological monitoring is conducted throughout the Business Park, but may only be reported on at the end of the annual period. As such, there is the need to identify a protocol to quickly address environmental issues that become evident through the course of the annual monitoring. This protocol is provided to facilitate rapid response to events when specific thresholds are exceeded or when other unexpected environmental issues arise.

Thresholds for the long-term biological monitoring (groundwater, vegetation and soils, breeding birds and amphibians) need not be dealt with in the RAAP timeframe, as these results are more appropriately dealt with in the annual reporting. However, the RAAP may be used for any monitoring components should a monitoring team member have a concern about the results that they think should be addressed promptly. No specific groundwater thresholds are recommended and the groundwater results are generally reported annually, but unexpected changes in the results are treated as an observation of concern that is subject to the RAAP.

Monitoring staff, the contractor or the general public may also have observations of concern that warrant immediate attention.

The central component of the RAAP is the designation of 4 persons representing the City of Guelph, GRCA, Monitoring Team and Land Owner. These designated persons are responsible for overseeing the RAAP. This group must be confirmed on a yearly basis or when otherwise warranted in the event of a staff change, for example.

The Monitoring Team constitutes the collective consulting firms who are acting on behalf of the Developer to perform the various monitoring disciplines. The Monitoring Team members are responsible for reviewing their data for threshold exceedances or other observations of concern. If a member of the Monitoring Team identifies either of these, they must initiate the RAAP by contacting one of the Designated Persons. This must be done immediately so the threshold exceedances or observations of concern can be addressed within 2 days of acquiring the information. Threshold exceedances and examples of observations of concern are provided with the Standard Operating Procedures in 13.7.

Construction monitoring is included as a monitoring discipline within the Monitoring Team. However, it must be recognized that observations of concern in this case have a somewhat different meaning for construction monitoring. Observations of concern for construction monitoring represent concerns that are not addressed promptly and effectively. Administration of construction mitigation measures is a dynamic process in which there is frequent discussion and reporting. It is a routine occurrence for the construction inspector to make recommendations to the contractor or contract

administrator for improvements to mitigation measures such as erosion and sediment controls. If corrective measures are employed promptly and effectively, it is not necessary to consider this process to be an observation of concern. If corrective measures are not carried out to the satisfaction of the construction inspector and the issue cannot be resolved, the RAAP represents a broader level of response to the concern. If initiated, the RAAP is not intended to replace the regular reporting by the construction monitor. Rather, it is carried out in addition to the regular reporting.

The RAAP should be carried out as follows:

1. The monitoring team member who discovers the exceedance or observation of concern must contact one of the Designated Persons immediately. In the case where a third party identifies a possible issue, the issue should be reported to one of the Designated Persons.
2. The Designated Persons must meet and investigate the cause of the exceedance and the potential impacts within 48 hours of notification by the Monitoring Team member. This meeting need not be limited to the Designated Persons.
3. The Designated Persons must provide notification of the exceedance and proposed corrective actions including the timeline for implementation to the City and GRCA within three business days.
4. A minimum of 1 report per concern must be prepared for each calendar year in which activities related to the concern occur. The report(s) document the nature of each problem and how it is being addressed. The format could be meeting minutes, a letter or memo report, or a formal report. Regardless of the number or type of reports, the last report must indicate how the problem was resolved.
5. Threshold exceedances and observations of concern must be documented in the Consolidated Monitoring Report for the year in which they occur. As part of this, any RAAP reporting that occurs pursuant to item 4 of the RAAP must be appended to and summarized in the Consolidated Monitoring Report for the year in which the RAAP reporting occurred.

The RAAP is the responsibility of the Developer for the duration of the responsibility to monitor. This is defined as the time when 75% of Phases 1, 2 and 3 of the Business Park have been built, plus an additional 2 years.

## 13.7 Comprehensive Monitoring Program Standard Operating Procedures

### 13.7.1 Groundwater

GROUNDWATER
<p><b>Purpose:</b></p> <p>Groundwater monitoring for the SBP is undertaken for several reasons:</p> <ol style="list-style-type: none"><li>1. To establish a baseline of seasonal groundwater levels and surface water levels in wetlands across the development property, with particular emphasis on establishing the high and low water levels.</li><li>2. To establish a baseline of shallow groundwater quality across the development property, in particular the concentrations of common groundwater contaminants such as salt, nutrients, and metals.</li><li>3. To establish a baseline of water levels and water quality in neighbouring private wells used for supply.</li><li>4. To detect effects on groundwater and wetland water levels that is attributable to the SBP development.</li><li>5. To address conditions specified in agency permits and/or recommendations arising out of the EIR review process.</li></ol>
<p><b>Methods:</b></p> <p>A comprehensive groundwater level program was initiated in 2009 and has continued into 2010 using both data loggers and manual measurements. The established program includes monitoring of the groundwater levels in selected monitoring wells and mini-piezometers and monitoring the surface water levels at the piezometers located in wetlands.</p> <p>Manual water levels are measured using an electronic water level meter. Measurements are made of the depth to groundwater from the top of the monitoring well or mini-piezometer casing and recorded with an accuracy of 1.0 cm. Water elevations are calculated from the elevation of the top of monitoring well or mini-piezometer casing. and these elevations are recorded in the monitoring database.</p> <p>Groundwater levels are also recorded in selected monitoring wells and mini-piezometers utilizing electronic data loggers. Groundwater elevations are calculated from the depth measured below top of casing and corrected for barometric pressure influences, and calibrated relative to manual measurements. By utilizing this technology, the trends in groundwater level changes can be detected with improved accuracy. These groundwater elevation data are recorded in the monitoring database following each occasion when the data is downloaded from the data loggers.</p> <p>Static groundwater levels in neighbouring private wells (i.e., when the well is not in use) are measured manually using an electronic water level meter with an accuracy of 1.0 cm.</p> <p>Groundwater quality samples are collected from selected monitoring wells using the Waterra<sup>®</sup> plastic tubing and foot-valve sampling systems. These systems are to be</p>

## **GROUNDWATER**

dedicated to each of the selected wells and are to remain installed for subsequent monitoring. Groundwater samples from private wells are collected directly from household taps. Samples are contained in sample bottles provided by an accredited laboratory and chain-of-custody protocols, quality assurance and quality control methods are established in consultation with the laboratory. Samples are analyzed for general chemical water quality parameters which typically include common anions, metals and nutrients.

### **Locations and Frequency:**

Water level monitoring is to continue at five available monitoring wells (MW1-09, MW2-09, MW3-09, MW97-3, MW97-5) and five available piezometers (PZ1, PZ2, PZ3, PZ4 and PZ7) that have already been fitted with data loggers. Data is to be downloaded from the loggers on an annual basis, at which time confirmatory manual levels are also to be taken. This monitoring is to continue for 2 years after 75% of the development has been constructed.

The five available on-site monitoring wells (MW1-09, MW2-09, MW3-09, MW97-3, MW97-5) were sampled for general water quality once in November 2009 for baseline purposes. No additional monitoring of these wells is recommended. Nevertheless, these baseline data are available for comparison to future water quality data at SWM facilities.

Additional shallow water table wells will be required as conditions of the Certificates of Approval for individual SWM facilities to monitor shallow groundwater quality. It is recommended that these wells be sampled first for baseline purposes on one occasion prior to the commissioning of the adjacent SWM facility and then twice annually for a period of 2 years after facility commissioning. It is recommended samples be analyzed for general water quality parameters including metals, anions, total dissolved solids, hardness, alkalinity, oil and grease, and dissolved organic carbon. The sampling parameters, locations and frequencies should also be specified in the individual approval conditions and would be the responsibility of the individual property owners to fulfill.

All available private wells located along Maltby Road and elsewhere within approximately 250 m of the development property are to be monitored for water level and sampled for water quality once during the late fall of 2010 when groundwater levels are typically at seasonal 'lows'. This is for baseline purposes. No additional monitoring of these wells is required. Nevertheless, these baseline data are available for comparison to future possible water quality data at private wells.

Refer to Figure 14 for Groundwater Monitoring Stations.

### **Thresholds and Observations of Concern:**

A specific quantitative threshold is not used. However, unexpected changes in groundwater and/or wetland surface water elevations or groundwater quality require certain contingency measures. Groundwater elevations that increase above previously observed seasonal high levels or decline below previously observed seasonal low levels, without an obvious relationship to climatic conditions, will be identified as observations of

## GROUNDWATER

concern. Similarly, groundwater quality that differs from baseline ranges in parameters, and/or indicates an upward trend, will be identified as observations of concern.

### **Contingency Measures:**

In response to any unexpected changes, the frequency of monitoring, sampling, and reporting is to be evaluated and revised where appropriate. Possible cause and effect relationships will be identified and recommendations to further evaluate these relationships will be made.

For example, in the case of declining groundwater levels observed at a monitoring location, it would be recommended that the local lot-level stormwater management systems be assessed in terms of groundwater recharge performance criteria and targets. If the stormwater management system is determined to be the cause, possible modifications would be identified and recommended.

### **Reporting:**

On an annual basis, until 2 years after 75% of the development is constructed, the water level monitoring data is to be presented and analyzed in a report prepared by a qualified professional engineer or geoscientist. The report is to include recommendations related to the monitoring program, including any proposed modifications to the monitoring locations and frequency and any proposed contingency measures.

It is recommended that the 2011 annual water-level monitoring report also include a presentation and assessment of the baseline private well monitoring data. This report should include any recommendations for follow-up monitoring and/or contingencies that may be appropriate, although none are anticipated at this time.

Reporting and contingency requirements in respect to the SWM groundwater quality monitoring will be specified in the Certificates of Approval for individual SWM facilities.



### 13.7.2 Vegetation and Soils

VEGETATION and SOILS
<p><b>Purpose:</b></p> <p>Vegetation and soils are being monitored in order to i) provide baseline information on interactions and track changes that may occur to the terrestrial and wetland ecology within the new industrial lands as a result of construction and the stormwater management facilities and ii) detect any effects on the groundwater and wetlands on the SBP property that are attributable to the SBP.</p>
<p><b>Methods:</b></p> <p><u>Vegetation</u></p> <p>The vegetation monitoring occurs at 10m x 10m permanent plots. At each of the 9 vegetation plots, herbaceous plants, shrubs, and trees are recorded.</p> <p>The following information is recorded for each vegetation group:</p> <p><i>Herbaceous Species:</i></p> <p>Five subplots are randomly chosen within each permanent plot. Randomly generated bearings and distances are used, and are taken from the southwest corner of each plot. The same bearings and distances are used in each of the 9 plots. Comparison of year to year data is made more meaningful by using the same approximate subplot locations in all years of monitoring. Each herbaceous subplot is 1m<sup>2</sup>. All of the plant species observed within each subplot are recorded; including their number and percent cover (the number of individuals of dense growing species like sedges, grasses and moss was not recorded). In addition, all herbaceous species observed within the 10 x 10m plots are recorded, along with their relative abundance within the plot (i.e. D – Dominant, A – Abundant, O – Occasional, R – Rare).</p> <p><i>Shrubs:</i></p> <p>All shrub species within each 10m x 10m permanent plot are recorded, as well as their approximate percent cover.</p> <p><i>Trees:</i></p> <p>Tree species within each 10m x 10m permanent plot are recorded. In 2006 and 2007, all trees having a DBH ≥10cm were tagged using an aluminum tag nailed into the tree at breast height (approximately 1.37m above ground). Tags are added to any trees that have become &gt;10cm DBH since monitoring was initiated in 2006 and 2007. The information on the tags includes the plot number followed by the tree number.</p> <p>For each tree &gt;10cm DBH, the following information is recorded: species, physical condition and diameter at breast height (dbh). The overall health of each tree is recorded (ranging from excellent to very poor) based on visible indicators of decline. If the tree is dead (a snag), no other information is recorded. A densiometer is used to estimate canopy cover in each of the vegetation plots. Within each plot, canopy cover readings are taken while facing north, south, east</p>

## VEGETATION and SOILS

and west to provide an average estimate.

### Soils

A central location within each 10m x 10m permanent plot is randomly selected and a dutch auger is used to obtain a soil column approximately 1.20m in length. If the auger encounters till or the soil is otherwise impenetrable, soil columns may be less than 1.20m in length.

Information is recorded for each soil sample according to the *Field Manual for Describing Soils in Ontario* (Ontario Centre for Soil Resource Evaluation 1993), and includes:

- depth and texture of both the organic and mineral soil horizons;
- the effective texture of the mineral layer; and
- the presence and depth of mottles, gley, bedrock, water table and carbonates.

The moisture regime is determined from the pore pattern and depth of the mineral soil material, the topographic position of the site and characteristics of the soil profile such as mottling or gley which indicates impeded drainage (Ontario Centre for Soil Resource Evaluation 1993).

### **Location:**

A total of 9 permanent plots were established and monitored in the 2008 pre-construction year. Plots were selected by means of stratified random sampling. This sampling technique involved use of vegetation community mapping to guide sample selection (ELC mapping was completed as part of the original EIS) (NRSI 2007). A range of vegetation plot types and locations were chosen.

To satisfy comments stemming from the 2007 EIS, the permanent 10m x 10m plots focus primarily on wetlands features within the study area. The southwest corner of each plot is marked with a 6m high metal t-post with the top painted bright orange. Flagging tape is also used in the vicinity to make the location more obvious.

Plots are surveyed during each year of monitoring for vegetation and soils (Figure 17).

### **Frequency:**

Monitoring occurs with the following frequency:

Vegetation: 1 occasion/year

Soils: 1 occasion every second year

### **Thresholds and Observations of Concern:**

The results for all metrics will be evaluated and compared to previous years data from the same plot, as well as to other plots monitored the same year. If any anomalies are seen, these will be addressed. Specifically, the following vegetation parameters will be considered thresholds:

- A change in herbaceous cover by more than 25%.
- A change in species diversity by more than 25%.
- A change in canopy cover by more than 25%.

## VEGETATION and SOILS

### Contingency Measures:

Specific contingency measures are not recommended as automatic responses to the thresholds or observations of concern. The complexity of interactions between factors that may contribute to a shift in flora or significant change in soil moisture regime makes it difficult to ensure that a specific contingency measure will be the appropriate response.

The following list of examples is provided to help initiate thinking and discussion about possible responses to specific problems that result in thresholds/observation of concern being exceeded.

#### Water levels/Quality

- Analyze water quality sampling and determine source.
- Refer to Section 1.1 Groundwater for the contingency measures associated with groundwater thresholds.

#### Decrease in vegetation/shift in species composition

- Initiate restoration efforts to enhance number of native wetland species.
- Provide educational material to neighbouring properties outlining importance of natural features and their protection.
- Provide additional signage regarding trail closures, etc.
- Refer to Section 1.1 Groundwater for the contingency measures associated with groundwater thresholds.

### Reporting:

The vegetation, soil, breeding bird, and amphibian data is to be analyzed and discussed in one annual terrestrial and wetland monitoring report.

### 13.7.3 Breeding Birds

BREEDING BIRDS
<p><b>Purpose:</b></p> <p>Breeding birds are being monitored in order to provide baseline information on interactions and track changes that may occur to the terrestrial and wetland ecology within the new industrial lands as a result of construction and stormwater management facilities.</p>
<p><b>Methods:</b></p> <p><u>Breeding Birds</u></p> <p>In 2006 and 2008, breeding bird point counts were performed according to the standard Ontario Breeding Bird Atlas protocol (OBBA 2001). According to this protocol, each of the 9 stations (10m x 10m permanent plots) is visited between dawn and 10:00am on 2 occasions during the breeding bird season (June/July). Ten minute point counts are conducted at each of the stations. Bird species, breeding evidence, activity and the number of birds encountered are recorded.</p> <p>In response to GRCA comments on the EIR Draft Terms of Reference (May 21, 2009), breeding bird point counts will continue to follow the OBBA protocol; however, they will also incorporate the Marsh Monitoring Program (MMP). The MMP includes a 15 minute survey at each station, beginning with a 5 minute silent listening period, followed by 5 minute call broadcast period to elicit calls of secretive marsh birds, and ending with another 5 minute survey period. Implementation of the MMP will allow for a systematic survey and allow for long-term assessment of marsh communities.</p>
<p><b>Location:</b></p> <p>In the 2006 pre-construction year, a total of 10 plots within a range of habitat types were monitored. Following comments received on the 2007 EIS (NRSI), point count locations were revised to correspond to the 9 permanent monitoring plots within wetland habitats (Figure 17).</p>
<p><b>Frequency:</b></p> <p>Monitoring occurs each year with the following frequency:</p> <p style="padding-left: 40px;">Breeding birds: 2 occasions</p>
<p><b>Timing:</b></p> <p>Monitoring occurs at specific times of the year as follows:</p> <p style="padding-left: 40px;">Breeding birds: June/July</p>
<p><b>Thresholds and Observations of Concern:</b></p> <p>A threshold of 25% change in species diversity will be considered to represent a potential concern. The results of all metrics will be evaluated and compared to previous years data from the same plot, as well as to other plots monitored the same year. If any</p>

## BREEDING BIRDS

anomalies are seen, these will be addressed.

### **Contingency Measures:**

Specific contingency measures are not recommended as automatic responses to the thresholds or observations of concern. The complexity of interactions between factors that may contribute to a decline in fauna species makes it impossible to ensure that a specific contingency measure will be the appropriate response.

The following list of examples is provided to help initiate thinking and discussion about possible responses to specific problems that result in thresholds/observation of concern being exceeded.

#### Decline in bird species

- Assess success of naturalization/restoration plantings. If plantings are not establishing, increase buffer/natural area plantings.
- Assess status of restoration plantings (e.g. if shrub and tree species are beginning to proliferate in open meadow areas, return naturalized area to intended habitat type).
- Increase buffer plantings or alter if necessary.
- Provide educational material to neighbouring properties outlining importance of natural features, wildlife and their protection.
- Provide additional signage regarding trail closures, etc.

### **Reporting:**

The vegetation, soil, breeding bird, and amphibian data is to be analyzed and discussed in one annual terrestrial and wetland monitoring report.

#### 13.7.4 Amphibians

AMPHIBIANS
<p><b>Purpose:</b></p> <p>Amphibians are being monitored in order to i) provide baseline information on interactions and track changes that may occur to the terrestrial and wetland ecology within the new industrial lands as a result of construction and stormwater management facilities and ii) detect any effects on the groundwater and wetlands on the SBP property that are attributable to the SBP.</p>
<p><b>Methods:</b></p> <p><u>Amphibians</u></p> <p>Evening amphibian surveys are conducted using the Marsh Monitoring Program (Bird Studies Canada 2003, Weeber and Vallianatos 2000). Monitoring focuses on calling anurans during 3 minute call counts. Call intensity and an estimated number of amphibian individuals are recorded following the Marsh Monitoring Program protocol. Immediately after the three-minute monitoring period, time, air and water temperature, pH, wind speed, and cloud cover are recorded for each station.</p>
<p><b>Location:</b></p> <p>In the 2006 pre-construction year, a total of 6 stations were monitored. In the 2008 pre-construction year, additional stations were added to correspond to the 9 permanent monitoring plots (Figure 17).</p>
<p><b>Frequency:</b></p> <p>Monitoring occurs each year with the following frequency:</p> <p>Amphibians: 3 occasions</p>
<p><b>Timing:</b></p> <p>Monitoring occurs at specific times of the year as follows:</p> <p>Amphibians: late April through early June</p>
<p><b>Thresholds and Observations of Concern:</b></p> <p>A change in species diversity of 25% or more will be considered a threshold that may constitute a concern, as will be a significant change in species abundance, measured by a difference in two call codes. The results for all metrics will be evaluated and compared to previous years data from the same plot, as well as to other plots monitored the same year. If any anomalies are seen, these will be addressed.</p>
<p><b>Contingency Measures:</b></p> <p>Specific contingency measures are not recommended as automatic responses to the thresholds or observations of concern. The complexity of interactions between factors that may contribute to a decline in fauna species makes it difficult to ensure that a specific contingency measure will be the appropriate response.</p>

## AMPHIBIANS

The following list of examples is provided to help initiate thinking and discussion about possible responses to specific problems that result in thresholds/observation of concern being exceeded.

### Hydroperiod changes in pond

- Review wetland configuration to see where changes could be made.
- Potentially increase depth of wetland.

### Decline in amphibian species

- Wetland creation where feasible.
- Enhancement plantings to improve wetland condition.
- Additional monitoring – broaden range of parameters (i.e. water quality).
- Increase buffer plantings or alter if necessary.
- Provide educational material to neighbouring properties outlining importance of natural features, wildlife and their protection.
- Provide additional signage regarding trail closures, etc.

### **Reporting:**

The vegetation, soil, breeding bird, and amphibian data is to be analyzed and discussed in one annual terrestrial and wetland monitoring report.



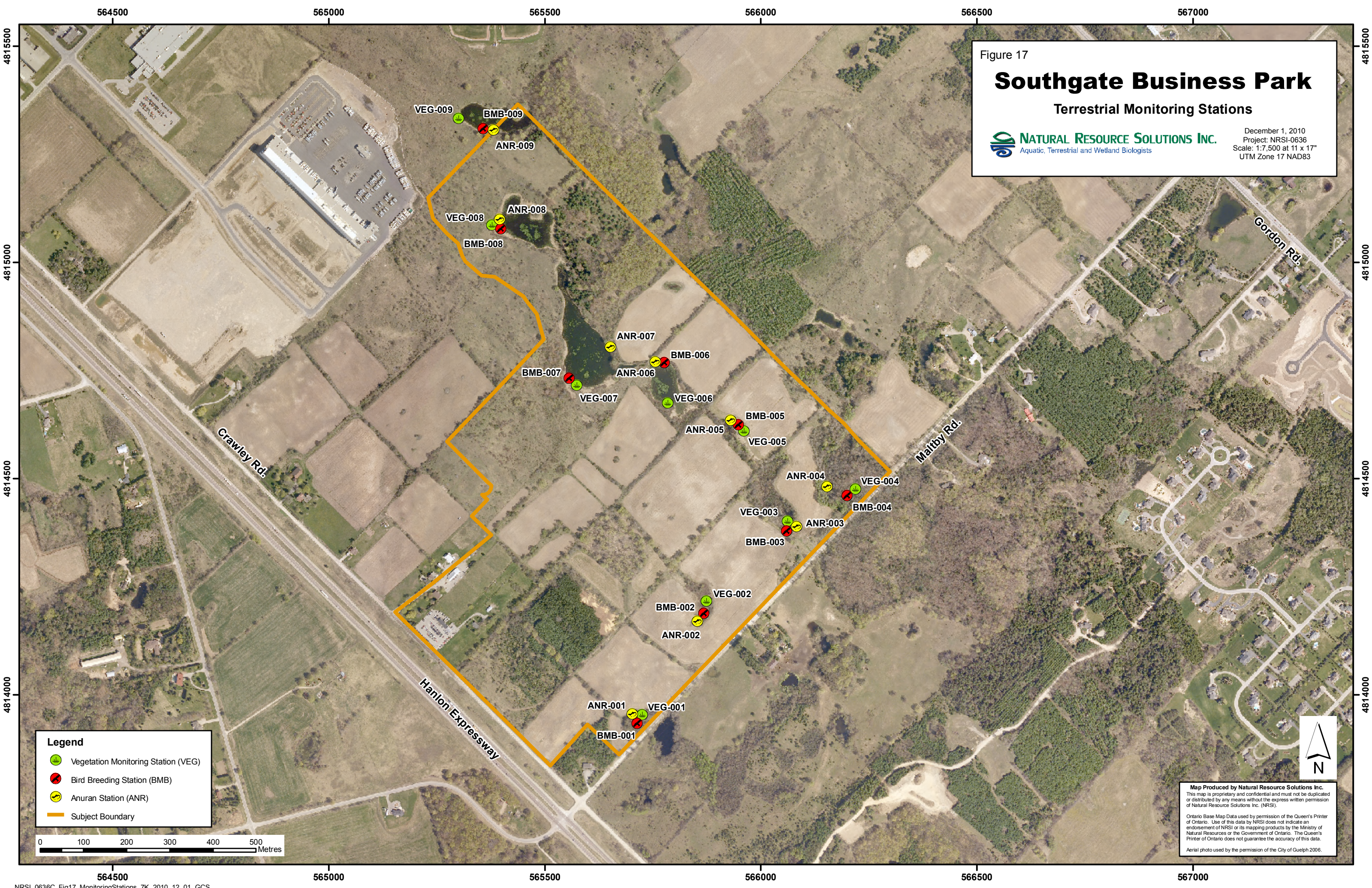


Figure 17





# Southgate Business Park

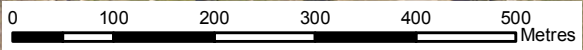
Terrestrial Monitoring Stations

 **NATURAL RESOURCE SOLUTIONS INC.**  
Aquatic, Terrestrial and Wetland Biologists

December 1, 2010  
Project: NRSI-0636  
Scale: 1:7,500 at 11 x 17"  
UTM Zone 17 NAD83

**Legend**

-  Vegetation Monitoring Station (VEG)
-  Bird Breeding Station (BMB)
-  Anuran Station (ANR)
-  Subject Boundary



Map Produced by Natural Resource Solutions Inc.  
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Aerial photo used by the permission of the City of Guelph 2006.



### 13.8 Post-Construction Monitoring

It is anticipated that a post-construction monitoring program will not be required as the hydrogeological, terrestrial and wetland monitoring will continue until two years after 75% build out of Phases 1, 2 and 3. If two years after 75% build out of Phases 1 and/or 2 is reached prior to commencement of works within Phase 3, then aspects of the monitoring program specific to Phase 1 and/or 2 may cease.

## 14.0 Site Plan Recommendations

A checklist of Site Plan recommendations is outlined below and provided in Appendix XIII that corresponds to the City of Guelph Site Plan Approval Procedures and Guidelines (City of Guelph 2008).

### 14.1 Sediment and Erosion Control

The following recommendations are provided to ensure that any potential impacts due to construction are minimized:

- Sediment and erosion control plans are required for all site works and must be installed prior to and maintained during construction.
- Maintenance of machinery during construction must occur at a designated location outside of natural features on-site and their associated buffers.
- No storage of equipment, materials or fill is to occur within the natural areas or their associated buffers.

### 14.2 Dust Suppression

The Developer shall submit to the City a report indicating how *“regular dust suppression will be accomplished during the construction phase of the subdivision”* (Condition of Draft Plan Approval – Condition 5).

Dust suppression control plans are required for all site works. Areas of bare soil will be moistened with water during all construction activities to ensure that the amount of dust within the study area is reduced. Topsoil stockpile locations will be identified and placed in areas of lesser wind exposure and away from natural features and their associated buffers.

### 14.3 Pesticides

The Provincial Cosmetic Pesticides Ban Act (2008) and the City of Guelph Pesticide By-Law Number 18308 (2007) must be adhered to at the Site Plan stage.

#### 14.4 Salt

It is recommended that grades on driveways and walkway areas be kept relatively flat where possible to reduce the need for salt use. The use of salt should be discouraged in favour of other products, such as sand. As there are a number of sensitive wetland features within the Business Park, when possible, sand should be applied to areas that require deicing.

As outlined in the Grading, Servicing and Stormwater Management Report (IBI 2010), conventional stormwater quality control measures will not remove salt from runoff, therefore, it is recommended that the use of salt be minimized to as great an extent as possible.

Once development occurs within the Business Park, if the City determines that the use of salt on internal and external roadways is necessary, management practices must be adopted, such as pre-wetting and anti-icing techniques, employee training on best practices and salt chemistry, as well as the identification of priority areas to ensure natural features are not impacted (Environment Canada 2004).

#### 14.5 Tree Retention and Landscape Plantings

Trees on development blocks have been assessed and recommendations as per removal/retention are provided in Section 5.0. Native plant species have been recommended for all areas of restoration within the study area and species chosen are consistent with the surrounding natural features. These plans are to be implemented at the earliest possible point in the site plan process. It is recommended that a landscape guide be provided to developers to ensure plantings are installed appropriately.

Lot-level landscape plans are to be prepared as part of the site plan process. These plans are to include:

- native vegetation species,
- efforts to be made to obtain locally sourced seed, tree and shrub stock for naturalized plantings,
- local availability of planting stock will be determined at the site plan stage.

## 14.6 Lighting

Detailed lighting designs will be provided at the Site Plan stage. At the site plan stage, lighting provisions will be implemented that provide residents along Maltby Road and surrounding natural environment with added protection from glare and indirect illumination from development properties. Lighting designs should include directional lighting for all areas of road and developments that are within 30 metres of the natural heritage features or adjacent to existing residential dwellings to eliminate lightwash. Each developer of lands adjacent to Highway 6 shall submit to the Ministry of Transportation for their review and approval, an illumination plan, prepared by a qualified consultant, indicating the intended treatment of the site lighting glare.

## 14.7 Snow Storage

Over the course of a winter and multiple plowing sessions, snow can build up along roadways. In order to avoid large snow banks in areas with limited space, designated snow storage areas must be identified. As snow can be contaminated with items such as salts, oil, grease, litter and debris, designated snow storage areas away from sensitive natural features and buffers/setbacks are essential for best management practices.

Snow storage areas must be located at least 30m from wetland features and 10m from woodlot areas. Specific snow storage areas will be designated at the site plan stage taking into account the natural features and functions described in the EIS and EIR. In addition, the following principles will be adhered to when areas are chosen and functioning:

- Locate and operate snow disposal areas to minimize impacts to the natural environment
- Clearly delineate the actual snow disposal areas in a manner that is clearly identifiable under adverse winter conditions to ensure that the snow is placed in the proper location
- Manage the meltwater discharge to comply with the City of Guelph water quality regulations and protect surface and groundwater resources

- Collect and dispose of on-site litter, debris and sediment from meltwater that settles in area in accordance with the City of Guelph waste management legislation
  - Control emissions (drainage, noise, dust, litter and fumes) to prevent off-site environmental impacts
  - The snow handling, storage and disposal design must be practical and must not impose undue maintenance requirements.
- (Transportation Association of Canada 2003)

#### 14.8 Maintenance and Refueling Areas

Maintenance and refueling areas must be located away from the natural features on-site (a minimum of 30m from wetland areas and 10m from woodlot edge). Site specific locations will be designated at the site plan stage. Storage locations for equipment, materials and fill should be located away from natural areas and buffers. In the event that maintenance and refueling areas are located in proximity to natural features (i.e. 30m), minor grading must be used to direct surface runoff away from the natural feature. This generally consists of the slope of the course leading to a very shallow swale created by a low ridge of topsoil.

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