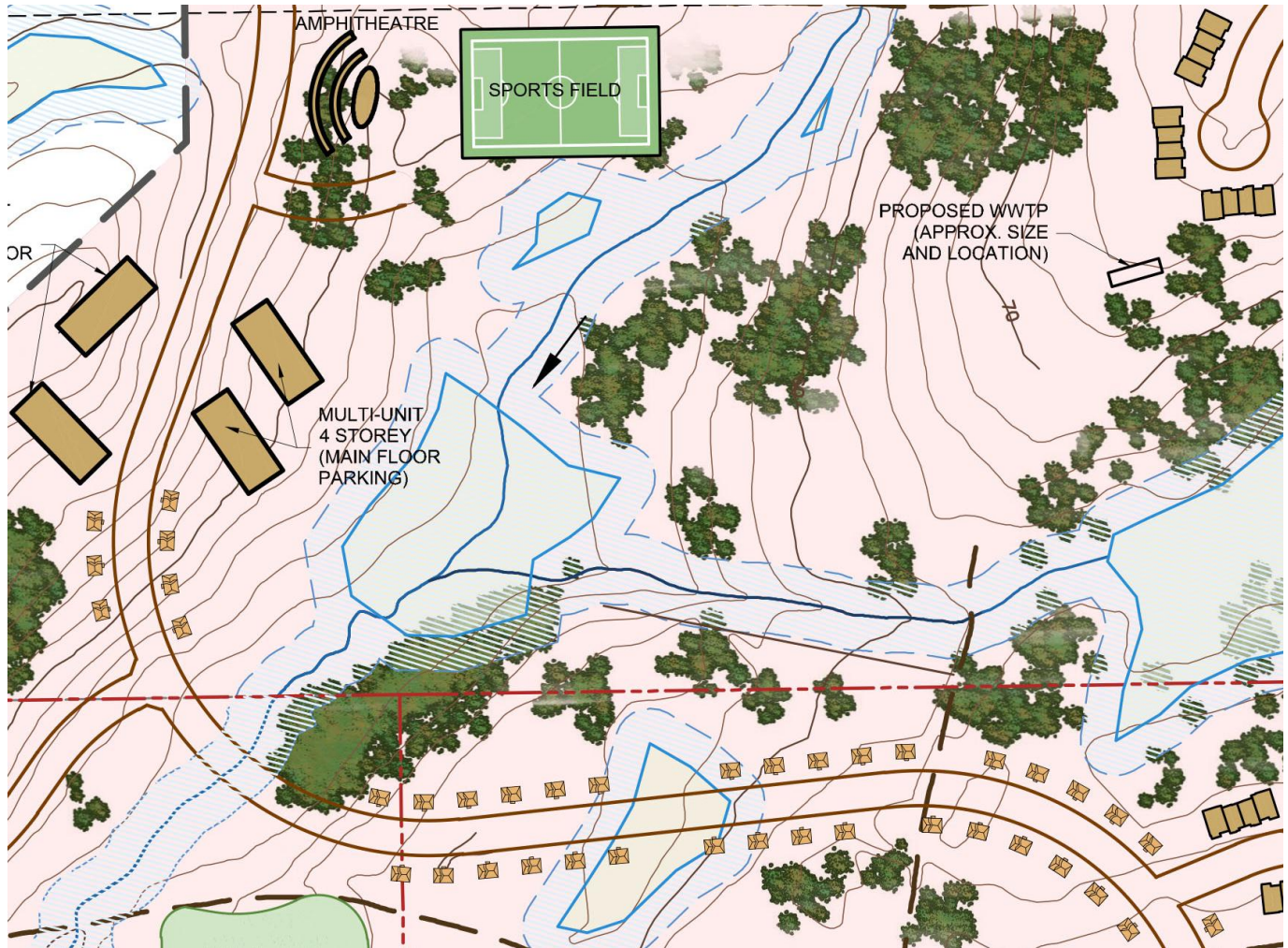


PROJECT NO 141-24579

WINDGATE VILLAGE DEVELOPMENT

MARQUE INVESTMENTS



APPLICATION FOR: EXTENSION OF SERVICE WATER BOUNDARY
AMENDMENTS TO LAND USE BY-LAW
STAGE II: CONCEPTUAL SITE DESIGN PLAN

—
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Date: March 27, 2015
File: 141-24579

Ms. Kate Greene
Operations Manager
Halifax Development Approvals
HALIFAX

Subject: Windgate Village – Extension of Water Service Boundary, Rezoning and Stage 2 Open Space Development (PID 41043597 and 40010514)

Dear Ms. Greene,

On behalf of our client, MARQUE Investments, please accept the attached application for the following requests on above noted properties:

1. a Water Service Boundary extension
2. an amendment to the land use by-law permitting general commercial uses with a gross floor area excess of two thousand (2,000) square feet,
3. a Stage 2 Classic and Hybrid Open Space Design

The Stage 1 Open Space Application for this property was signed off by Mr. Tyson Simms on March 24, 2014 (Case 19059). The Water Service Boundary extension has also been discussed with HALIFAX and Halifax Water previously.

The following supporting documents are enclosed with this letter:

1. Full-Application Form
2. \$2,600 Application and Advertisement Fees
3. Application Report (4 copies)
4. Conceptual Development Plan (10 copies)
5. Stormwater Management Plan (4 copies)
6. Proposed Sewage Treatment System (4 copies)
7. Traffic Impact Study (4 copies)
8. Archaeological Resource Impact Assessment (4 copies)

We look forward to working with you on this project. Please contact us should you require further information.

Yours truly,

WSP Canada Inc.

Original Signed

Kourosh Rad
Urban Planner



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APPENDICES

- Appendix 1 – HALIFAX Correspondence
- Appendix 2 – Conceptual Development Plan
- Appendix 3 – Stormwater Management Plan & Servicing Schematics
- Appendix 4 – Proposed Sewage Treatment Systems
- Appendix 5 – Traffic Impact Study
- Appendix 6 – Archeological Resource Impact Assessment Report

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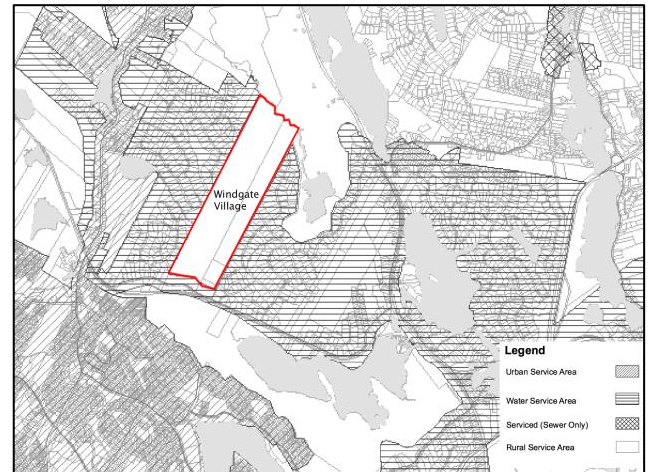
APPLICATION PURPOSES

This report is to serve as the rationale for the following requests:

1.1 REQUEST FOR THE EXTENSION OF WATER SERVICE BOUNDARY

The proposed site of Windgate Village is identified by Schedule "B" of the Subdivision By-law as a Rural Service Area, which indicates that on site services from Halifax Water Commission are not provided. However, the site is surrounded by existing residential developments that are within the Water Service Area boundary (See adjacent map).

We are proposing to extend the Water Service Area boundary to include the Windgate Village site. The proposed development includes a total of 265 residential units in the form of single detached, semi-detached, townhouses and multi-unit dwellings providing a diversity of residential development to meet the needs of most all citizens whether they be young families, empty nesters, retirees or seniors, in other words Age Diversity.



The communities of Sackville, Middle Sackville and Beaver Bank are in need of additional modern infrastructure to accommodate citizens in transition from maturing families to retirement. MARQUE Investments recognizes the importance of including the needs of the greater community in their development, while recognizing and respecting the character of the area and retaining a strong connection to the surrounding landscape and outdoors.

Extending the water service to this community would utilize the existing infrastructures while preserving underground water resources. It further provides the future residents at the site with a reliable source for clean water similar to that provided to all residents in adjacent subdivisions. This will significantly increase affordability and reliability of the residential units in this neighbourhood.

It is our understanding that Halifax Water has been working for the past twenty (20) years, or more, to fill apparent gaps in the Water Service Boundary. For this particular case, extension of the Water Service Boundary will not only benefit development within the site, but more importantly, it will also provide an opportunity to connect the existing infrastructure between the residential neighborhoods that border the site. From our discussions and that of our client with Halifax Water, we understand looping the existing water mains surrounding the site allows for duplication of water service and therefore is highly desired and encouraged by Halifax Water. Furthermore, Extension of the boundary will fill in the idle fabric of the Community and increase efficiency of municipal services such as garbage removal and school busses.

Permitting an expansion to the Water Service Boundary to include these lands is extremely logical and benefits the large surrounding community for the reasons noted. A correspondence letter between the MARQUE, Halifax Water and Ms. Jane Fraser at HALIFAX from April 11 2014 is included in Appendix 1 for your reference.

A Groundwater Level II analysis is typically required as part of the Stage 2 Open Space Application. However, given the above it does not make sense to have to incur substantial costs to complete a ground water analysis when all parties acknowledge the benefits to extend the water service boundary. MARQUE would prefer to direct such typical, but unwarranted costs, to better use such as the amenity spaces provided in the proposed community plan. We would like to proceed with the application for the Stage 2 with a request for water service boundary without a Level 2 groundwater analysis included in the application for the above noted reasons.

1.2 AMENDMENT TO LAND USE BY-LAW TO PERMIT COMMERCIAL USES EXCEEDING TWO THOUSAND (2,000) SQUARE FEET

With the extension of the water service boundary, it is MARQUE's intention to rezone much of this land from industrial to residential. However, a small area of approximately 25 acres is proposed for commercial uses, including a community mall serving nearby residents with essentials that exceeds two thousand (2,000) square feet. These areas are indicated on the concept plan with colour red for Commercial. Currently, this area of the subject properties are within the I-1 (Mixed Industrial) zone and are designated as 'Mixed Use A' in the Municipal Planning Strategy. Although commercial uses are permitted in an I-2 zone, Policy 19.5(a) indicates that such commercial uses shall not exceed two thousand (2,000) square feet.

We are proposing to amend the current land use by-law to permit C-4 uses within a small portion (approximately 25 acres) of the proposed site (See Appendix 2). Policy P-134 of the Municipal Planning Strategy enables this rezoning with conditions set out under Policy P23 and 24.

P134 indicates that general commercial uses with a gross floor area excess of two thousand (2,000) square feet located within a Mixed Use A designation shall be considered by amendment to the land use by-law. Such uses must be in accordance to Policies P-23 or P-24. Policy P-24 indicates that the amendment would permit new commercial uses under the C-4 (Highway Commercial) zone, which includes a maximum of ten thousand (10,000) square feet of gross floor area, provided that provisions of Policy P-24 and P-137 are met.

The following table indicates how the proposed development meets the required provisions for an amendment to the land use by-law.

PROVISIONS:	COMPLIANCE:
<i>P-24(a) - preference for a location adjacent to or in close proximity to other commercial uses;</i>	Proposed use is within 2.5 km of other commercial uses within the Beaver Bank Community.
<i>P-24(b) - the potential for adversely affecting adjacent residential and community facility uses;</i>	Proposed use will compliment adjacent residential and community uses by providing easy access to retail amenities and daycare facilities.
<i>P-24(c) - an evaluation of the impact which the site design and operational characteristics of the</i>	Proposed use will have positive impact on the surrounding community by providing essential

<i>proposed use shall have on the surrounding community;</i>	commercial retail uses that are easy and close for community to access. This is particularly important for the proposed residential community of Windgate and will also benefit adjacent subdivisions.
<i>P-24(d) - that the use has direct access to a collector highway as shown on Map 2 - Transportation;</i>	Proposed use will have a direct access to a collector route (Windgate Drive).
<i>P-24(f) - that no rezoning from a R-1(Single Unit Dwelling) Zone (Policy P-34) or R-6(Rural Residential) Zone (Policy P-13) to a highway commercial zone shall be considered</i>	Does not apply to this site, which is currently zoned I-1 (Mixed Industrial)
<i>P-137(a) - that the proposal is in conformity with the intent of this Plan and with the requirements of all other municipal by-laws and regulations</i>	Municipal Planning Strategy indicates that within the 'Mixed Use A' Designation, commercial and community facility uses serving a local market, as well as continuation of resource activities, are encouraged.
<i>P-137(b) - that the proposal is not premature or inappropriate by reason of:</i> (i) <i>the financial capability of the Municipality to absorb any costs relating to the development;</i> (ii) <i>the adequacy of central or on-site sewerage and water services;</i> (iii) <i>the adequacy or proximity of school, recreation or other community facilities;</i> (iv) <i>the adequacy of road networks leading or adjacent to or within the development; and</i> (v) <i>the potential for damage to or for destruction of designated historic buildings and sites.</i>	(i) we do not anticipate Municipality absorbing any costs relating to the proposed rezoning; (ii) Central water services is requested through the extension of the Water boundary, and on-site septic/wastewater treatment systems will be provided as needed; (iii) Commercial use will be easily accessible from proposed community field and amphitheatre nearby (See Attachment 2); (iv) Proposed development will be fronting an existing collector route (Windgate Drive); (v) See Attachment 6.
<i>P-137(c) - that controls are placed on the proposed development so as to reduce conflict with any adjacent or nearby land uses by reason of:</i> (i) <i>type of use;</i> (ii) <i>height, bulk and lot coverage of any proposed building;</i> (iii) <i>traffic generation, access to and egress from the site, and parking;</i> (iv) <i>open storage;</i> (v) <i>signs; and</i> (vi) <i>any other relevant matter of planning concern.</i>	(i) Commercial use will be easily accessible from proposed apartment uses nearby (See Attachment 2);; (ii) Zone C-4 provides these controls (iii) See Attachment 5; (iv) Zone C-4 provides these controls (v) Zone C-4 provides these controls (vi) Zone C-4 provides these controls

P-137(d) - that the proposed site is suitable in terms of the steepness of grades, soil and geological conditions, locations of watercourses, marshes or bogs and susceptibility to flooding.

See Attachments 3, 4.

1.3 OPEN SPACE STAGE 2 APPLICATION

HALIFAX Open Space Design (OSD) development policies aim to protect and conserve habitat while enabling rural development. The Classic Open Space policy enables homes to be clustered to a maximum gross density of one house per 0.4 ha (1 acre) with 60% of the entire parcel set aside as open space. In the Hybrid Open Space concept, individual lots may be created to a maximum of 1 lot per 1 ha with a minimum preserved area of 80% for each lot. Open space is determined through mapping primary and secondary conservation areas towards the goal of protecting environmentally sensitive areas, habitat corridors and historical features.

This proposal is for a combination of Classic and Hybrid Open Space Development located on 156.7 Ha (387.2 acre) of land in Beaver Bank, Nova Scotia. The Conceptual Development Plan (Appendix 2) exhibits the conceptual lot layout and identifies residential unit sites, potential roadways, trails and parkland. The layout and placement of the infrastructures considered their long-term efficiency and sustainability; these included water, roadways, sewage treatment and stormwater management.

The required studies supporting this application are complete, and they include:

- Open Space Management Plan
- Stormwater Management Plan & Servicing Schematics (Appendix 3)
- Proposed Sewage Treatment System (Appendix 4)
- Traffic Impact Study (Appendix 5)
- Archeological Resource Impact Assessment Report (Appendix 6)

1.4 BACKGROUND

In November 2013 the Stage 1: Preliminary Site Design for Windgate Village was submitted and later signed off by HRM in March 2014. The Stage 1 report identified the open space areas to be preserved and potential areas of development. This process required identifying both primary and secondary conservation areas such as water bodies and wetland areas (including riparian buffers), location of the potential scenic views and slopes greater than 30%. Based on the comments provided by HALIFAX, additional work and refinement of the application has occurred resulting in this Phase 2 report. This refinement has included further detailed analysis of the development site and conceptual design of the project.

1.5 DESIGN PHILOSOPHY

The intent of Open Space Design development is to enable greater flexibility and creativity in the design of the community for a target market looking for a rural lifestyle with easy access to nature and outdoor activities. The central principle of the design approach is to locate homes on the portion of the site where the land is best suited for development while preserving areas such as open space wildlife habitat, water bodies, and wetlands.

Other benefits of Open Space Design developments include:

- Their low impact on the character of surrounding community
- Protection of community water supplies
- Provision of a diversified housing stock, including affordably priced homes
- Protection of archaeological resources

In keeping with this philosophy, our client is proposing a healthy community with a network of trails and park areas that connects the community with nature. The development is also proposes use of shared services such as water and wastewater treatment which provides the foundation for a sustainable community within the boundaries of HALIFAX. This ultimately leads to providing a high quality yet affordable living in a community within a 25 km distance of Halifax. This will enable greater access to a wider range of people who will have the benefit of enjoying the natural environment in which the development sits.

1.6 PROPOSED CLASSIC OPEN SPACE DESIGN DEVELOPMENT

Based on enabling policies S-15 and S-16 of Halifax Regional Plan (2006), we are proposing to develop a 210-unit Classic OSD development. A Classic OSD preserves sensitive areas by clustering smaller lots on a maximum of 40% of the site and preserving 60% of the site as common open space. The proposed Classic OSD will be serviced with wastewater treatment systems and piped water service. Public road access will be located at the southern end of the property off Windgate Drive, at the eastern end of the property off Rivendale Drive and at the western end of the property off Capilano Drive.

In establishing the Classic OSD form of development the intention is to utilize the Condominium Act where a bare land condominium will be established. This property title mechanism will enable the establishment of managing services (e.g. snow removal/driveway maintenance/septic and water management and management of the open space network) within a collective environment.

Continuing towards the north and east on the site will be town houses and clusters of homes leading to the Hybrid Open Space Development adjacent to lands owned by the Ashburn Golf course. As the concept plan illustrates, a series of lots is proposed for this area. This area follows the existing lot layout along Briancrest Road and O'Leary Drive.

1.7 PROPOSED HYBRID OPEN SPACE DESIGN DEVELOPMENT

Based on enabling policies S-15 and S-16 of Halifax Regional Plan (2006), we are proposing to develop 55 individual lots through Hybrid OSD settlement. A Hybrid open space design preserves open space by restricting the area for lawns, pavement and buildings to 20% of the lot while preserving 80% of each individual lot as open spaces. The proposed Hybrid OSD will be serviced with on-site sanitary for each individual lot and piped water service. Public road access will be located at the western end of the property off Terrence Bay Road and at the Southern end of the property off Delmerle Drive.

In establishing this form of development the intention is to implement an on-site basis for managing services (e.g. snow removal/driveway maintenance and septic management). Essentially, each individual lot will have its own on-site septic system with connection to the water service.

1.8 FLEXIBILITY OF OPEN SPACE DESIGN

Given that the Classic OSD is relatively new to the area MARQUE Investments wishes to have the flexibility to change the units permitted within this proposed development and adjust the number of Classic and Hybrid lots. Within the Hybrid OSD concept we also wish to have flexibility to adjust the number of single detached, semi-detached, two houses and multi-units, based on enabling policies and market conditions.

2

SITE DETAILS

Project Name	Windgate Village
Street Address	Windgate Drive, Beaver Bank, NS
Municipality	Halifax Regional Municipality
Site Area	156.7 Ha (387.2 acres)
Legal Description (PID)	PID #: 41043597 and 40010514
Existing Land Use	Vacant Land
HRM Regional Plan Designation	Rural Commuter
MPS Designation	Mixed Use A and Rural Resource
LUB Zone	Mixed Industrial Zone and Mixed Resource Zone

2.1 PLANNING FRAMEWORK

The Halifax Regional Municipality's Regional Plan (2006), the Beaver Bank, Hammonds Plains and Upper Sackville Municipal Planning Strategy and the associated Land Use By-law were reviewed to determine the local planning regime for the site. The following tables outline the applicable policies.

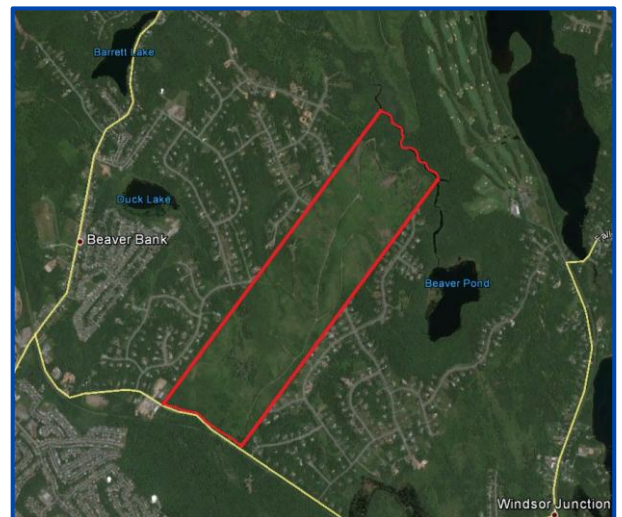
2.1.1 REGIONAL PLANNING STRATEGY

The Regional Plan (2006) is the enabling planning document which permits the creation of Open Space subdivision under policies S-15, S-16, S-17 and T-2. This application therefore focuses its analysis on the requirements of the policies outlined in the Regional Plan.

Designation:	Rural Commuter
Designation Intent:	The Rural Commuter designation is defined as areas within commuting distance from the urban area. The area is intended to focus on low to medium density housing while protecting natural features and to foster traditional development.
Applicable policies:	S-15, S-16, S-17, S-24
Special Designation:	N/A
Settlement & Transportation:	The site is adjacent to a Rural District Growth Centre
Trails & Natural Network:	There is a Water Route crossing adjacent to Windgate Village
Parks & Natural Corridors:	N/A
Significant Habitat & Endangered Species:	Salt Marshes
Cultural Significance:	The site has low to moderate cultural significance
Areas of Elevated Archaeological Potential:	There are areas of archaeological potential within the site boundary, along Windgate Drive and close to Beaver Pond

2.2 SITE LOCATION

The subject properties are located directly North of Windgate Drive in Beaver Bank, NS and approximately 1 km south of Kinsac Lake. The site is 25 km from Downtown Halifax and within the jurisdiction of Halifax Regional Municipality. The site is also within the Beaver Bank, Hammonds Plains and Upper Sackville Plan Area. There is one major road close to the site, Windgate Drive. Other roads surrounding the site are lower volume residential. Proposed access points are connected to four different roads that surround the site: Windgate Drive, Rivindale Drive, O'leary Drive and Capilano Drive. The site is mostly forested with softwood and other type of vegetation. There are currently no major activities taking place within the site.



3

OPEN SPACE ASSESSMENT

As mentioned in the introduction, before the Open space Design Concept could be developed, a Preliminary Site Design summary was completed as Stage 1 of the application process. Using an opportunities and constraints analysis, the primary conservation area was completed and included the following:

- Riparian Buffers and Watercourse setbacks
- Wetland delineation
- Potential Archaeological Sites
- Significant Habitat and endangered Species and
- Slopes greater than 30%
- Mature Forests and Vegetation
- Trails and natural networks and
- Parks and Natural Corridors

Together these collected features identified environmentally sensitive areas and assisted in outlining what areas should be preserved and deemed open space. The remaining area(s) are considered appropriate for development and informed the attached Open Space Design Concept. As the concept (Appendix 2) illustrates the development has been designed to avoid the conservation areas. However, because of the need to obtain road access, there are short lengths of roadway where minor alteration to the wetlands and the riparian buffers may be required. Dialogue regarding these areas will be carried out with the Department of the Environment and upon approval of the Development Agreement a formal application for alteration will be submitted. It should be noted that alteration to a wetland or water requires compensation and it is our client's intention to re-invest the compensation back into wetland restoration within the site.

3.1 SETTLEMENT AND TRANSPORTATION

The proposed development will contribute a greater mass of people to support local services. Future Windgate Village residents will support local amenities within Beaver Bank and surrounding communities including the grocery stores, shops, service stations, dental clinics, restaurants and other commercial services nearby, lending sustainable support to existing and new services. The development will also bring new people to the area who will contribute in different ways to the Beaver Bank Community. Access to sustainable commuting alternatives is recognized as a benefit.

3.2 DWELLING UNITS

Windgate Village is not a traditional suburb with tract homes all in a row; instead it is conceived as a Village unto itself with accommodations to meet the needs of most all citizens whether they be young families, empty nesters, retirees, in other words Age Diversity. The communities of Sackville, Middle Sackville and Beaver Bank are in need of additional and modern infrastructure to accommodate citizens in transition from maturing families to retirement. MARQUE recognizes the importance of including the needs of the greater community in their development, while recognizing and respecting the character of the area and retaining a strong connection to the surrounding landscape and outdoors.

The concept plan emphasizes a development that will eventually have a commercial area along Windgate Drive, providing essential services such as grocery store, medical offices, pharmacy, shops and a day care serving both Windgate Village and surrounding subdivisions. Immediately behind the commercial complex will be multiunit residential buildings designed to accommodate the needs of empty nesters, retirees and senior citizens.

Taking advantage of the landscape near these multiunit residential units will be a Community Amphitheatre designed for outdoor activities such as Canada Day fireworks, children's fair and coasting during the winter. Adjacent to the Amphitheatre will be a Community Soccer Field and other activities for young children and youth. These spaces will be public and open to the greater community residents in order to create a better sense of community in the area.

3.3 OPEN SPACE NETWORK

One of the goals of the open space network is to encourage interaction between the residents of the new development and the existing community. These opportunities of casual interaction enable increased physical activity and reduce social isolation. In addition to the traditional methods such as walking trails MARQUE Investments has included the Community Amphitheater and Soccer Field to promote a healthy lifestyle and social interaction.

With ownership being structured as a Condominium Corporation for the majority of the units, this means residents can enjoy the outdoor amenities and community facilities. Because of the manner in which a bare land condominium is structured our client is unable to offer the private trails and parks to HALIFAX and therefore they must be retained within the ownership of the condominium corporation. In relation to public community facilities we have provided several community parks, including the Amphitheater and Soccer Field, which are connected through a walking trail.

3.4 PRELIMINARY STORMWATER MANAGEMENT PLAN

Based on 1:10,000 provincial mapping, the proposed Windgate Village Open Space Development can be broken down into six (6) watersheds, ranging in size from 5.1 hectares to 55.41 hectares. The watersheds are comprised mainly of woodland and underbrush, containing wetlands and watercourses. The Northern edge of the property is bounded by Mill Brook. Presently, runoff flows overland via sheet flow and shallow concentrated flow to the property boundary or to one of the wetlands or watercourses on site where it drains via channelized flow.

Post-development, stormwater will discharge to open ditches and be directed to the wetlands and watercourses on the site. Appendix 3 includes a Preliminary Stormwater Management Plan, which indicates where stormwater will be directed as well as projected flows. The flows have been calculated based on a 10-year design storm, using Halifax meteorological data. Drainage boundaries and flow patterns have been selected to match pre-development conditions as closely as possible, to minimize the impact of development on the watersheds.

It is anticipated that this type of open space development will provide a more sustainable stormwater solution, with less impact to the environment when compared to a conventional suburban development.

3.5 PROPOSED SEWAGE TREATMENT

There are three types of on-site sewage disposal systems being considered for this development. These three types are discussed in detail in Appendix 4 Proposed Sewage Treatment Systems.

3.6 TRAFFIC IMPACT STUDY

Proposed Site Access

Separate site accesses will be provided to the north and south ends of the proposed development. The south end of the site will be accessed via new street connections to Windgate Drive, Rivendale Drive, and Capilano Drive. The north end of the site will be accessed via connections to O'Leary Drive and Briancrest Road.

Background Traffic Volumes

Projected 2025 weekday AM and PM peak hour background volumes were calculated using an annual traffic volume growth rate of 1.0%.

Estimation of Site Generated Trips for the Proposed Development

The proposed development is expected to generate approximately 251 two-way vehicle trips (85 vph entering and 166 vph exiting) during the AM peak hour and 381 two-way vehicle trips (211 vph entering and 170 vph exiting) during the PM peak hour.

Trip Distribution and Assignment

External trips generated by the development have been assigned to study area streets and intersections based on review of the local street network and development surrounding the site as well as local knowledge of the area.

Signal Warrant Analysis

Signal warrant analyses were completed for Windgate Drive intersections at Beaver Bank Road and Windsor Junction Road for projected 2025 background traffic with the addition of trips generated by the proposed development. Traffic signals are not expected to be warranted at the Beaver Bank Road (88 warrant points) or the Windsor Junction Road (21 warrant points) intersections.

Left Turn Lane Warrant

Analysis of left turn lane warrants was completed for eastbound left turns from Windgate Drive into the proposed site access street for projected 2025 volumes with the addition of site generated trips. The analysis indicated that left turn lanes are not expected to be warranted for all scenarios.

Summary - Level of Service Analysis

Intersection performance analysis was completed for Windgate Drive intersections at Beaver Bank Road, Windsor Junction Road, and the proposed site access street. Results indicate that intersection performance at the Windgate Drive - Windsor Junction Road and Windgate Drive - proposed site access street intersections are expected to be satisfactory based on 2025 AM and PM peak hour volumes both without and with site development. At the Beaver Bank Road – Windgate Drive intersection, results indicate that the Windgate Drive (westbound) approach will experience excessive average delay, V/C ratio, and queue lengths – particularly the PM peak hour – both without and with the addition of site generated trips.

Recommendations

Further investigation should be completed to determine a final location for the proposed site access road to Windgate Drive, and to determine whether modifications to the existing road profile are necessary to improve sight distance.

Consideration should be given to the installation of traffic signals at the Beaver Bank Road – Windgate Drive intersection to accommodate existing traffic demand as well as projected traffic demand (both without and with site development). Though traffic signal warrants were not met, installation of signals will improve unacceptably high delays currently experienced on the Windgate Drive approach during AM and PM peak periods.

Conclusion

Site generated trips are not expected to have a significant impact to traffic performance in the Study Area.

3.7 RESOURCE IMPACT ASSESSMENT

As part of Stage 1 Application, some potential areas for archaeological resources were identified. As such, an Archeological Resource Impact Assessment Report was completed for the site and is included in Appendix 6. A summary of the report is as follows:

In November 2014, Davis MacIntyre & Associates Limited was contracted by MARQUE Investments Inc. to conduct an archeological resource impact assessment of the proposed Windgate Village development project. The assessment included a historic background study as well as a field reconnaissance of all areas to be impacted.

A fragment of chalcedony was recovered from a tree throw within the study area. While it is not clear whether the fragment was fractured as a result of lithic tool manufacture, it is obvious that this stone is not native to the study area. The lack of suitable terracing or access to water, coupled with the otherwise culturally sterile appearance of the soil, suggests this object could be an isolated find, and not indicative of the presence of an archeological site. However, exposed soil was limited to a small area, and the tumbled nature of the stone suggests it could have been washed down from slightly higher ground, near an existing logging road to the west. It is also worth considering that in 1911, a grooved stone axe head was recovered from the bed of a stream that runs through the study area, though the exact location of the find is not known. After consulting with the Provincial Curator of Archeology, archeological testing for an area of moderate archeological potential (10 meter intervals) is recommended for an area approximately 50 meters by 50 meters centered on the find site, in order to confirm the presence or absence of archeological resources in the area.

Aside from this chalcedony find, the only area of note is located at the southern end of the study area. This notable location is approximately 40 meters by 40 meters in size and consists of domestic plant varieties and smooth topography, suggesting that a historic residence was located somewhere within this area. Based upon the presence of mixed varieties of fieldstone adjacent to a logging road in this area, it appears likely that the house foundation was removed during road widening. However, this could not be confirmed through either archival records or field reconnaissance, nor could the team establish the age of this occupancy. Historical background research suggests that it does not predate 1865, and that it was not a standing building in 1909.

Archaeological testing at this location, even spaced at 5 meter intervals, could easily miss outbuildings or privy features associated with historic occupation in the absence of surficial evidence of structures, and could likewise yield little or no artificial material if test units are not placed in areas where such material was deposited within this cultural landscape. As such, it is recommended that a qualified archaeologist be present during grubbing or other preliminary ground disturbance activities in order to establish whether or not any archeological resources remain intact, and to determine a suitable method of mitigation if any archaeological material is encountered.

In the event that archaeological resources are encountered elsewhere in the study area, it is required that any ground-disturbing activity be halted immediately and the Coordinator of Special Places (902-424-6475) be contacted immediately regarding a suitable method of mitigation.

4

MAINTENANCE PLAN

Wastewater Treatment Management

For the residential lots located on the Hybrid OSD areas, on-site septic system will be provided.

The units on the Classic OSD area, Wastewater Treatment Systems will be used. The benefit of a condominium funded wastewater treatment system is that allocated condo fees will be collected from each of the development's residents to maintain and service the treatment management system. The advantage compared to single residential ownership is that the condo septic tanks will be pumped on a regular scheduled basis, along with service and maintenance checks of the wastewater treatment system. This combined with education and condo bylaws regarding what can or cannot be put in a septic system will assist in a more efficient and safe treatment system.

Driveways

In the case of individual lots on Hybrid OSD areas, shared driveway will either become a public road or will be maintained through a shared service agreement between individual lot owners. This will further be discussed as we move forward with the project.

For the Classic OSD units, maintenance, repairs and snow clearing of the proposed shared access driveways will be managed by the bare land condominium.

5

OPEN SPACE MANAGEMENT PLAN

Management of Community Parks, Trails and Recreational Facilities

Community parks, trails and recreational facilities will be built as shown on the concept plan as part of the requirements of the DA that will be established. The Condominium Corporation will manage the maintenance and any improvements to these facilities. In addition the Corporation will manage and enforce the protective covenants being prepared for the development. These covenants will address many aspects of the community including protection of the open space.

Non-disturbance Open Space Area

For the Hybrid OSD lots, each individual deed will limit the areas available for development. Like any traditional subdivision, certain design guidelines will have to be followed in order for a building permit to be issued. In those guidelines, the developer will limit the total disturbance area to 20% of the entire lot. The remaining areas will remain preserved open space. Each individual lot owner will be responsible for preserving these areas and will be permitted to remove deadwood and blow downs where required.

In the Classic OSD units, the development will enable the removal of deadwood and blow-down throughout the development where required by the condominium corporation and residents will be permitted to plant new native plants within the open space area. The proposed development has been designed to protect at least 60% of the existing natural features and the diverse wildlife supported by them. There will be no disturbance to this area including wetland or watercourses beyond those outlined as part of the management of this area.

6

CONCLUSIONS

The Windgate Village Development meets the required guidelines for Open Space Design as prescribed by the Halifax Regional Plan (2006). The design of the community protects and preserves over 60% of the existing natural areas for Classic OSD areas and 80% of individual lots for Hybrid OSD areas. The remaining developed area is built in an efficient manner that not only uses less land than a traditional suburb, but also allows residents the choice of interacting with neighbours in their cluster or escaping into the surrounding natural environment.

MARQUE Investments seeks Age Diversity in the development of the lands with accommodations to meet the requirements of families, empty nesters, retirees and seniors citizens and is targeting families and those who enjoy spending time in the outdoors while being close to the amenities of the nearby urban service areas. In addition, this new community will not be a collection of estate homes but rather a diversified housing stock with plans to offer residences at accessible pricing points to young families, retirees and seniors. The development will bring people into the area who will develop relationships with existing residents and contribute to the economic and social fabric of the existing and surrounding communities.

The Windgate Village Development is intended to be high quality development through careful planning, engineering, and engagement with various stakeholders, including the Municipality and the residents of existing Community. The proposed development aims to meet or exceed the HALIFAX's standards for Open Space Design.

Appendix 1

HALIFAX Correspondence



P.O. Box 1749
Halifax, NS
Canada B3J 3A5

April 11, 2014

Mr. Dennis Rogers, President
Marque Investment Ltd
6 Louise Court
Dartmouth, NS B3A 4N6

Dear Mr. Rogers:

Re: Request for Water Service Boundary Extension over the Windgate Village Lands

Thank you for your correspondence of March 31, 2014. I have had my staff review your situation and offer the following comments.

Firstly, the motion of Regional Council that you referenced requested staff to identify areas in Fall River with current ground water quantity or quality issues or on-site sewer issues that may be considered for inclusion within the service boundary. The Windgate Village lands are on the boundary of Beaver Bank and Windsor Junction and are not considered part of the Fall River community.

The intent of the motion is to identify areas in which existing developments are experiencing water or wastewater problems. The Windgate Village lands are undeveloped.

There are provisions to allow for consideration of extending the municipal water district service boundary in both the current Regional Plan where an open space design development is proposed (policy SU-13) and under the proposed Plan where a Classic Conservation Design development is proposed (policy SU-14 of draft 4).

It is my understanding that you have completed a stage I development agreement application pursuant to policy SU-13 of the current plan. You could proceed to submit a stage II development agreement application and an application to extend the Water Service District Boundary (an amendment to the Regional Subdivision By-law) concurrently under current policy provisions.

PLANNING & INFRASTRUCTURE
Director's Office

Tel: (902) 490-7166
E-mail: fraseja@halifax.ca Web Site: www.halifax.ca

My staff has recently had some discussions with Tyson Simms of Planning Applications regarding the approval procedures. As Regional Council has approval authority for Subdivision By-law amendments and the North West Community Council has approval authority for the development agreement application and both require a public hearing, staff may recommend that a joint public hearing be scheduled to hear both matters concurrently.

I trust that this is a satisfactory response to your inquiry. However, if I can be of further assistance, please feel free to contact me.

Yours sincerely,

Original Signed

Jane Fraser, Director
Planning & Infrastructure

cc: Mayor Savage, Halifax Regional Municipality
HRM Regional Councilors'
Austin French, Manager Planning, HRM
Kelly Denty, Manager, Development Approvals, HRM
Tyson Simms, Planner, HRM

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PO Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

e-mailed by CKM- April 10/14

March 24, 2014

To: M. Sooriyakumaran
CKM Engineering Inc.
23 Wilson Drive,
Fall River, NS
B2T 1V9

Re: Case #19059: Application by CKM Engineering Inc., on behalf of Marque Investments Ltd., for a Stage 1 Open Space Design Development on the properties identified as PID #41043597, 40010514 and 41398694, located off Windgate Drive, Beaver Bank.

Dear Mr. Sooriyakumaran:

HRM planning staff has reviewed your Stage 1 Open Space Design Development submission for PID# 41043597, 40010514 and 41398694. This letter serves as a summary of comments received from various departments during the Stage 1 review process and also provides information pertaining to the context of your application, the relevant enabling policy, and the information required to proceed to a full planning application.

The subject properties are located within Polling District 1, which is administered by the North West Community Council (NWCC). As such, this proposal would require the approval of a development agreement by NWCC, subject to the policies of the Regional Plan and the Municipal Planning Strategy (MPS) for Beaver Bank, Hammonds Plains and Upper Sackville.

If you proceed forward with a Stage 2 Application, the materials listed on the application form should be submitted. All plans/drawings shall be submitted in hard copy as well as electronically (PDF), shall be produced at a size of 8.5" by 11", shall be fully legible and shall be able to be photocopied without losing any information from the original.

In this particular location, the development agreement approval process would involve:

- A full evaluation of the application by Planning Applications staff and other agencies;
- A presentation of the proposal to the public at a public information meeting;
- Negotiation of a proposed development agreement;
- First reading of the proposal in front of NWCC;
- A presentation of the proposal at a public hearing at NWCC, after which a decision would be made on the application; and
- A two week appeal period following Council's decision.

It is important to remember that Community Council makes the final decision on these planning applications, which can then be appealed to the Nova Scotia Utility and Review

Board. Please contact me at (902) 490-4843 if you have any questions or require any additional information.

Sincerely,

Original Signed

Tyson Simms
Planner I

Enc. Attachment A – Staff Comments – Stage 1 Review Team Meeting
 Attachment B – Excerpt from Regional Plan
 Attachment C – Review from CBCL Limited regarding Groundwater Assessment

Attachment A: Staff Comments – Stage 1 Review Team Meeting

Re: Case #19059: Application by CKM Engineering Inc., on behalf of Marque Investments Ltd., for a Stage 1 Open Space Design Development on the properties identified as PID #41043597, 40010514 and 41398694, located off Windgate Drive, Beaver Bank.

A meeting with internal staff was held on February 6, 2014 at the Alderney Gate Community and Recreation Services Office in Dartmouth.

Staff:

In Attendance:

Tyson Simms, Planner – Planning Applications
Hugh Morrison, Development Engineer, Development Approvals
Kemp MacDonald, Parkland Planner – Development Approvals
Kevin Warner, Development Officer – Development Approvals

Regrets:

Ruth Thurston, Civic Addressing Technician, Development Approvals
Brian Moriarty, Plans Examiner, Halifax Fire

Level 1 Groundwater Assessment Review:

Willard D'Eon, Engineer – CBCL Limited

Applicant:

M. Sooriyakumaran, CKM Engineering Inc., on behalf of Marque Investments Ltd.

1. Background

Planning Applications has received a request by CKM Engineering Inc. on behalf of Marque Investments Ltd. for a Stage 1 review of a potential open space design subdivision at the property identified as PID #41043597, 40010514 and 41398694 in Beaver Bank. The subject property is currently vacant. The applicant has indicated that the majority of the site is 'developable', with the exception of the areas identified as wetlands, streams, and associated riparian buffers.

2. Proposal

As proposed, the development will include a combination of the classic and hybrid styles of development. As part of the Stage 1 analysis and in accordance with Regional Plan policy, the applicant has identified natural resources and site features which should be retained or protected as part of the proposed development. Details regarding the total number of residential units and the location of development and associated infrastructure will be identified through the Stage 2 Application Process.

3. Comments

This section contains a summary of comments that were made by various internal HRM staff at the meeting held on February 6, 2014, both by those in attendance and through correspondence. The comments are solely preliminary in nature and reflect the level of detail contained in the proposal.

3.1 Tyson Simms, Planner, Planning Applications

The plans provided as part of this Stage 1 Application allow for a preliminary review of the proposal against the policy criteria included in the Regional Plan. As stated on page 2 of your application "*The proposed development will utilize both hybrid open space design development in possible combination with classic open space design development on approximately 143 hectares of land on the northern portion of the property.*" While a combination of the classic and hybrid forms of development may be considered, your Stage 2 application will be subject to review to ensure full compliance with applicable plan policy.

As part of your Stage 1 application and in accordance with plan policy, efforts have been made to identify important natural and cultural features of the subject site. As part of a stage II application, staff would request additional information regarding the area identified for potential development. The information provided identifies a limited number of existing forest stands and notes the presence of views looking towards the Ashburn golf course area. Is the applicant intent on retaining these features as part of the development? This should be discussed as part of a Stage II application.

As the Planning Application Form states, plans submitted for Stage II must be prepared by the appropriate qualified professional. In addition, the Stage II concept plan must include all information required by the Regional Subdivision By-law for concept plans. Please refer to the Guide to Open Space Design Development I HRM for submission requirements. All three of these documents are available at www.halifax.ca.

Unfortunately, due to weather conditions and snow cover, the required Site Visit was not completed as part of the Stage 1 Application review process. If the applicant proceeds with a Stage 2 application, staff advise that a site visit be undertaken as an initial step in the Stage 2 review process.

3.2 Robert Blackmore, Development Technician - HRM Development Approvals

Development Engineering has reviewed the above noted application, including the following plans:

WINDGATE VILLAGE SITE PLAN – PROPERTY LAYOUT WINDGATE VILLAGE TRAFFIC IMPACT STATEMENT

Based on our review we offer the following comments:

- 1) Traffic Impact Statement, dated November, 2013, is acceptable for a stage 1 application. Please note, a Full Traffic Impact Study will be required at the next submission.
- 2) Rivendale Drive, O'Leary Drive, Briancrest Road, Elise-Victoria Drive and Valerie Court

are HRM owned and maintained streets that surround the proposed subdivision. These streets have the possibility to be extended and/or joined. Any proposed streets/extensions must meet HRM Design Guildelines 2013 edition and adhere to the Street By-Law S-300.

- 3) This proposal may be subject to DFO and NSE approval due to Duck Lake Brook traversing the property, existing wetlands and the proximity to Box Mill Brook.
- 4) We reserve the right to make additional comments on subsequent submissions.

3.3 Kemp Macdonald, Parkland Planner – HRM Development Approvals

The applicant has requested HRM enter into a Development Agreement for Stage 1 Open Space Subdivision to permit residential development as a combination classic and hybrid open space design. The 143 ha site is comprised of three parcels and fronts the north side of Windgate Drive between two existing residential subdivisions, Capilano Country Estates to the east and Rivendale Estates to the west, while Box Mill Brook forms the north boundary. These lands are within the service area of HRM Monarch/Rivendale Community Park adjacent the west boundary, HRM Duck Lake Brook Greenway Neighbourhood Park adjacent the east boundary, HRM Capilano Common Community Park, Beaver Bank Monarch Elementary School Community Park, HRM Joan Drive Neighbourhood Park, Harold T. Barrett Junior High School Community Park, and HRM O'Leary Drive Neighbourhood Park. Duck Lake Brook runs across the width of the property and, at its midpoint, through one of seven wetlands on the site that occupy approximately 17 ha. The largest wetland is adjacent Box Mill Brook along the entire north boundary. The property has been logged until recently with several roads for this purpose still evident. No areas of significant habitat, recorded/archaeological sites or trail/natural networks have been identified by the applicant in their Stage 1 Open Space submission. Parkland Planning offers the following comments:

1. The main parkland planning objective with this proposed subdivision is to acquire sufficient lands to complete the pedestrian connection between existing HRM parkland in Capilano Estates and Monarch/Rivendale Subdivisions, secured for this purpose. This corridor will extend from HRM Duck Lake Brook Greenway Neighbourhood Park, along the northeast side of Duck Lake Brook, to HRM Monarch/Rivendale Community Park. This must permit construction of a 1.8 m wide trail with bark mulch shoulders at acceptable grade outside the limits of the Duck Lake Brook 1:10 year flood area with minimum 5 m buffer from any adjacent development and also allow for trail construction around the wetland area adjacent the brook.
2. Additional land dedication within the proposed subdivision adjacent HRM Monarch/Rivendale Community Park should be acquired to allow further development of this asset.
3. Any outstanding park dedication after credit for land acquisition should be directed toward site development of parkland within the subject site.
4. All proposed parkland must meet the HRM Regional Subdivision By-law usable land definition and HRM Parkland Quality of Land Criteria.

If you require any additional information or comments please call me at 490-6974.

3.4 Kevin Warner, Development Officer, Development Approvals

As noted at the review meeting, there is not much to comment on at this stage from a subdivision design point of view. Future subdivision design will need to meet the requirements of the Regional Subdivision Bylaw.

Please note that past development in this vicinity of this property caused some issue with sediment run off into the brooks in the area. Careful review of the erosion and sediment control plans should be of great importance during future review.

3.5 Brian Moriarty, Plans Examiner, Halifax Fire

On behalf of Halifax Regional Fire and Emergency, I have reviewed the application package for Case 19059. At this stage of the application I see no objections to the application made by CKM Engineering (representing Marque Investment Inc.).

HRFE would like to reserve farther comments on the proposed development until the appropriate stage of the application when more design details are provided, such as:

- Road network; access routes, any common/shared driveway or Flag lots.
- Water supply for fire fighting tactics.

3.6 Ruth Thurston, Civic Addressing Technician, HRM Civic Addressing

The following comments are provided regarding the above application,

In accordance with the Civic Addressing By-Law (C-300) adopted by Council February 5, 2002 , civic addressing staff is responsible for the review, acceptance or rejection of all street names. The proposed streets will require names which conform with HRM Street Naming Guidelines. (Schedule A). At the present time street names may be reserved in advanced, the applicant should contact me to discuss potential street names.

Section 3(h) of the HRM Civic Addressing By-law defines a private road as “any street, road or travel way which serves **three or more structures or facilities** and is not owned by Halifax Regional Municipality or the Province of Nova Scotia;” This section would apply to any proposed access driveways serving clusters of development

Section 10 of the HRM Civic Addressing By-law states:

1. “The owner of a private road which intersects a public street or private road shall take the following steps to name, install and maintain a sign at every intersection identifying the private road by name:
 - a) obtain approval from the Civic Addressing Coordinator of the name to be assigned to the private road or request the Civic Addressing Coordinator assign a name;
 - (b) apply for, and use best efforts to obtain permission to install a street name sign from any person or regulatory authority whose permission is required by law to install said sign; and
 - (c) where permission is obtained in accordance with clause (b), install, maintain in good

condition, and replace as necessary, a sign in a manner consistent with any conditions attached to such permission and other lawful requirements, and in accordance with Provincial and Municipal street sign standards.

Where the owner does not wish to undertake the requirements of Clause (c) of subsection (1), the owner may exercise the option to pay the required fees to the Municipality under Administrative Order #15, License, Permits and Processing Fees to have the street name sign manufactured and installed.

Civic Addressing By-law and Guidelines are available on our website at:
www.halifax.ca/civicaddress

Should you have any questions about the contents of this memo please contact me at 490 6066

Attachment B: Excerpt from Regional Plan

Section 3.5.1: Open Space

3.5.1 Open Space Design Developments

Large-scale residential development may be considered through a development agreement if it is in some form of Open Space Design. Open Space Design Development is a creative form of development designed to conserve a connected system of open space. It begins with the identification of primary conservation areas to be protected - such as riparian buffers, wetlands, vernal pools, natural corridors, slopes exceeding 30%, rock outcropping, archeological sites, floodplains, and natural resources. It follows with the identification of secondary conservation areas that should be protected or carefully developed. These include mature forests, slopes between 15% and 30%, scenic views, trails, historic sites and buildings. Building sites are then located on the lands where soils are best suited for development and are then connected through a common road system. Lot lines are then drawn to delineate the extent of private or public ownership of the parcel.

In its classic form, Open Space Design Developments are designed to achieve connectivity in open space by retaining conservation areas under single ownership such as in the form of a condominium corporation or HRM. There are concerns, however, that the small lots required to achieve the classic form of Open Space Design may not be feasible in all areas of HRM without experiencing interference between private wells. There is also a desire by some homeowners to service the dwelling units with individual on site sewage disposal systems and the Nova Scotia Department of Environment and Labour will not allow these systems to be located off-site into the commonly owned lands. It may, therefore, be necessary to allow the entire parcel or portions of the development to be subdivided into large, privately-owned lots. HRM will strive to achieve Open Space Design in these areas by establishing maximum building site disturbance areas and minimizing the extent of road development to avoid impact on the primary and secondary conservation areas. This form of Open Space Design Development may be considered only in the Rural Commuter and Rural Resource Designations.

In areas where there are sufficient soil and water conditions to allow the developer to set aside a significant majority of the parcel as common open space, densities will be increased from one unit per hectare to one unit per 0.4 hectares. This form of Open Space Design Development may be considered in all rural designations, including the Agricultural Designation, as it would leave a substantial amount of the conservation land intact under single ownership. This would minimize the impact of development on larger tracts of land required to maintain a viable commercial farm.

To provide an opportunity for more active use of the common open space, consideration of golf courses as an appropriate use within the classic form of Open Space Design Development shall be given during secondary planning processes. Given the prevalent use of pesticides and irrigation needs of golf courses it may be most appropriate that golf courses only be considered within

centres where municipal water distribution systems are to be provided. Analysis at the secondary planning level will benefit from the findings of watershed studies and community visioning.

S-15

HRM shall permit the development of Open Space Design residential communities, as outlined in this Plan, within the Rural Commuter and Rural Resource designations and within the Harbour designation outside of the Urban Service Area, but not within the portions of the Beaver Bank and Hammonds Plains communities as identified in the Subdivision By-law under Policy S-25 and within the Rural Area Designation under the Eastern Passage/Cow Bay Plan Area. HRM will consider permitting the maximum density of such developments to one unit per hectare of gross site area. In considering approval of such development agreements, HRM shall consider the following:

- a) where the development is to be serviced by groundwater and as determined through a hydrogeological assessment conducted by a qualified professional, that there is an adequate supply of ground water to service the development and that the proposed development will not adversely affect groundwater supply in adjacent developments;
- b) that there is sufficient traffic capacity to service the development;
- c) the types of land uses to be included in the development which may include a mix of residential, associated public or privately-owned community facilities, home-based offices, day cares, small-scale bed and breakfasts, forestry and agricultural uses;
- d) whether soil conditions and other relevant criteria to support on-site sewage disposal systems can be met;
- e) the lot frontages and yards required to minimize the extent of road development, to cluster building sites on the parcel and provide for appropriate fire safety separations;
- f) that the building sites for the residential units, including all structures, driveways and private lawns, do not exceed approximately 20% of the lot area;
- g) approximately 80% of the lot is retained as a non-disturbance area (no alteration of grades, except for the placement of a well or on-site sewage disposal system in the non-disturbance area shall be permitted and provision shall be made for the selective cutting of vegetation to maintain the health of the forest);
- h) that the development is designed to retain the non-disturbance areas and to maintain connectivity with any open space on adjacent parcels;
- i) connectivity of open space is given priority over road connections if the development can be sited on the parcel without jeopardizing safety standards;
- j) trails and natural networks, as generally shown on Map 3 or a future Open Space Functional Plan, are delineated on site and preserved;
- k) parks and natural corridors, as generally shown on Map 4 or a future Open Space Functional Plan, are delineated on site and preserved;
- l) that the proposed roads and building sites do not significantly impact upon any primary conservation area, including riparian buffers, wetlands, 1 in 100 year floodplains, rock

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- outcroppings, slopes in excess of 30%, agricultural soils and archaeological sites;
- m) the proposed road and building sites do not encroach upon or are designed to retain features such as any significant habitat, scenic vistas, historic buildings, pastoral landscapes, military installations, mature forest, stone walls, and other design features that capture elements of rural character;
 - n) that the roads are designed to appropriate standards as per Policy T-2;
 - o) views of the open space elements are maximized throughout the development;
 - p) opportunities to orient development to maximize the capture of solar energy;
 - q) the proposed residential dwellings are a minimum of 800 metres away from any permanent extractive facility;
 - r) the proposed development will not significantly impact any natural resource use and that there is sufficient buffering between any existing resource use and the proposed development to mitigate future community concerns; and
 - s) consideration be given to any other matter relating to the impact of the development upon surrounding uses or upon the general community, as contained in Policy IM-15.

S-16

Further to Policy S-15, within the Rural Commuter, Rural Resource and Agricultural Designations, HRM shall permit an increase in density for Open Space Design Developments up to 1 unit per 4000 square metres, or greater in centres as may be provided for in secondary planning strategies, where approximately 60% or more of the site is retained in single ownership of an individual, land trust, condominium corporation or the Municipality. Notwithstanding Policy E-5, the parkland dedication shall be relaxed to a minimum of 5% for this type of development. In considering approval of such development agreements, HRM shall consider the following:

- a) the criteria specified in Policy S-15, with the exception of items (f) and (g); and
- b) that the common open space cannot be used for any other purpose than for passive recreation, forestry, agriculture or conservation-related use except for a portion of which may be used as a village common for active recreation or the location of community facilities designed to service the development.

IM-15

In considering development agreements or amendments to land use by-laws, in addition to all other criteria as set out in various policies of this Plan, HRM shall consider the following:

- a) that the proposal is not premature or inappropriate by reason of:
 - i. the financial capability of HRM to absorb any costs relating to the development;
 - ii. the adequacy of municipal wastewater facilities, stormwater systems or water distribution systems;
 - iii. the proximity of the proposed development to schools, recreation or other community facilities and the capability of these services to absorb any additional demands;

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- iv. the adequacy of road networks leading to or within the development;
 - v. the potential for damage to or for destruction of designated historic buildings and sites;
- b) that controls are placed on the proposed development so as to reduce conflict with any adjacent or nearby land uses by reason of:
- (i) type of use;
 - (ii) height, bulk and lot coverage of any proposed building;
 - (iii) traffic generation, access to and egress from the site, and parking;
 - (iv) open storage;
 - (v) signs; and
- c) that the proposed development is suitable in terms of the steepness of grades, soil and geological conditions, locations of watercourses, marshes or bogs and susceptibility to flooding.

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February 5, 2014

L. Maddame-Jay, CKM, April 10/14

Mr. Kurt Pyle
Development Approvals
Planning and Infrastructure – Planning Services
7071 Bayers Road, Suite 2005
Halifax, NS B3J 3A5

Dear Mr. Pyle:

RE: *Review of Level I Groundwater Assessment Report
Proposed Windgate Village, Beaver Bank, HRM
HRM Planning Application File No. 19059*

HRM has provided a Level I Groundwater Assessment Report regarding the above noted project. The Report was prepared by Strum Consulting for CKM Engineering Inc, on behalf of Marque Investments Limited.

The Level I Report, dated January 06, 2014, was received on January 27, 2014 and was reviewed by CBCL Limited as per Halifax Regional Municipality's (HRM) *Guidelines for Groundwater Assessment and Reporting (Guidelines)*, dated September 2006.

The following provides our findings, with divergences from the *Guidelines* and/or outstanding issues noted in bold lettering.

UNDERSTANDING OF THE PROPOSED PROJECT

The Level I Report indicates that the proposed project site is located off Windgate Drive in the Community of Beaver Bank. The site covers approximately 143 hectares, and consists of PIDs 40010514 and 41043597 owned by Barrett Lumber Company Ltd., and PID 41398694 owned by Marque Investments Ltd. The Report indicates that the majority of the site is comprised of cleared or regenerating forest with isolated forest stands and wetland habitat present throughout.

A site concept plan is not provided, but the Report indicates that Strum understands that the site is to be developed as hybrid and classic open space design development, used entirely for residential purposes. The report further indicates, however, that each residence is to be individually serviced with potable water from wells, and sanitary services from an on-site septic system. The Report also indicates that a Preliminary Site Design, dated October 29, 2013, and completed by CKM Engineering Inc. has been viewed (not included in Report).

The site is bounded by residential properties to the west and east, by Mill Brook, resource forest and the New Ashburn Golf Course to the north, and by Windgate Drive, the CN Railway, and Department of Natural Resources land to the south. The Report indicates that there are 420 properties located with 500 m of site boundaries. Services provided to the properties include full municipal water and sewer services, municipal water and on-site sewage disposal systems, and on-site water and on-site sewage disposal systems.

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REVIEW OF LEVEL 1 REPORT

Site Visit

The Report indicates that a visit to the site and adjacent properties was completed on December 19, 2013.

Part 2, Section 2.1, Description of Hydrogeology

- The Report identified 56 drilled wells on the 420 adjacent properties located within 500 m of the site boundaries. Additional well logs were found, in the NSE Well Log database, for properties in the vicinity of the site, but civic addresses and/or exact map locations were not provided;
- The Report indicates that 3 pumping test reports for dug wells were available within the study area, and that nine pumping test reports for drilled wells were available within 5 km of the project site;
- General water quality data is provided for groundwater derived from drilled wells in the bedrock in HRM. **The Report indicates that potential parameters of concern include iron, manganese, hardness, colour, turbidity, arsenic, and uranium;**
- The Report indicates no environmental (geotechnical) reports were provided for review as part of this assessment;
- The Report indicates that discussions were held with a well driller, a water quantity contractor, and a representative of NS Natural Resources;
- The Report indicates that the site is underlain by the Halifax Formation of the Meguma Group;
- The site hydrogeology was described. A 3 to 30 m thick unit of silty till overlies slate bedrock of the Halifax Formation. The potential yields and transmissivity of these units was discussed with respect to withdrawals by dug and drilled wells. **The following concepts were not discussed: cones of influence, peak demands, and potential interferences in zones of clustered housing;**
- An overview of surface water data and drainage features in the area of the proposed development, including watersheds, wetlands and surface watercourses, is provided in the Report. A discussion of local drainage patterns suggests that there are flow divides on the site and in the surrounding area. Precipitation data for the area is provided. **Groundwater recharge and discharge areas, and the influence of topography on source water and potential groundwater flow directions were not discussed;**
- The Report indicates that a Stormwater Management Plan has not been developed to date, but is anticipated as development proceeds; and
- The Report discusses a preliminary water budget, and recharge allocation calculations indicate that the site can support 177 lots (**two-acre lots?**). **The assumption of 180 mm for groundwater recharge (R_g) should be confirmed.**

Part 2, Section 2.2, Site Characteristics

- The Report indicates that there are several wet areas on the site, and includes a drawing that indicates the locations of wetlands and watercourses within 500 m of the site. **The Report indicates that residents within the Monarch Estates and Rivendale subdivisions**

had groundwater quantity issues in the past and are now serviced by a combination of drilled wells and municipal water, and that Capilano Estates Subdivision, located to the east of the site, is serviced by municipal water and on-site sewage disposal systems;

- The Report does not discuss the groundwater influence area. The report should indicate whether cumulative interferences and water budget information should be evaluated in the context of existing developments;
- The Report does not discuss the potential for permitted water withdrawal approvals in the area;
- The Report identifies potential sources of contamination within the proposed site and on adjacent properties; and
- Land use on the adjoining properties is discussed in the Report. **Sites with potential environmental issues were identified but are not shown on the Report drawings.**

Part 3, Section 3.1, Report Conclusions

- The potential yields from drilled and dug wells in the area are indicated in the Report Conclusions;
- The Report Conclusions indicate that a rough hydrologic budget suggests that the area can support approximately 177 lots (two-acre). The Report mentions, however, that as the density of homes and wells increases in any area, there is more potential for changes in well yields and water levels in aquifer with time;
- **The Report Conclusions do not discuss expected effects of the groundwater withdrawals associated with the proposed subdivision on any existing water wells and the environment;**
- **The Report Conclusions do not discuss the effects of existing groundwater withdrawals on regional and local water budgets, water levels, and anticipated interferences;**
- The Report Conclusions indicate that some water quality parameters could exceed the Guidelines for Canadian Drinking Water Quality (GCDWQ);
- The Report indicates the parameters expected to exceed the GCDWQ **include iron, manganese, hardness, colour, turbidity, arsenic, and uranium. Treatment processes, with costs, are discussed in the Report.** The Report indicates that the parameters can be treated with commercial treatment systems; and
- Table 7 of the Report provides information on background water quality in bedrock of the Meguma Group.

Part 3, Section 3.2, Report Recommendations

- The Report Recommendations do not address minimum lot sizes, well construction details, well spacing requirements or lot yield and sustainable pumping rate. It is expected, however, that the recommended Level II Investigation will be able to address these concerns based on field data;
- The development (Phasing) of the site is discussed in the Report;
- Water quality and treatment in the Study Area is discussed in the Report; and
- Mitigation measures to address water quality and quantity concerns are discussed in the Report.

The Report Recommendations include the following:

- A test well installation program (minimum of 10 test wells);
- Step drawdown and longer term pump testing;
- Analytical testing; and
- Addressing concerns related to wetlands, Acid Rock Drainage, naturally occurring metals in site soils, and the presence of an abandoned building on the site.

DISCUSSIONS AND RECOMMENDATIONS

The Level I Report generally adheres to the *Guidelines* as established by HRM, and recommends a Level II Groundwater Assessment. The Level I Report, however, indicates that residents within the Monarch Estates and Rivendale subdivisions had groundwater quantity issues in the past and are now serviced by a combination of drilled wells and municipal water, and that Capilano Estates Subdivision, located to the east of the site, is serviced by municipal water and on-site sewage disposal systems.

Notwithstanding the findings of the Level I Report, the fact that the proposed development is surrounded by municipal water services indicates that a detailed investigation into why and how the services were installed is warranted. In particular, discussions could be held with Halifax Water personnel and/or local residents (Rivendale and Monarch) who were involved in the request for water services.

The following issues remain outstanding:

- **The Level I Report should indicate if a detailed water well survey is warranted.** The Well Survey requirements are listed in Appendix A-1 of the Guidelines, and it is noted that the first paragraph should be interpreted as requiring that a "representative" number of existing wells should be surveyed, as determined by the project hydrogeologist; and
- **The Level I Report should indicate if the site qualifies as a sensitive setting under the HRM guidelines (proximity to existing wells and wetland features).** For sites in sensitive settings, work for a Level II Investigation would typically include 72-hour pumping tests.

Yours very truly,

CBCL Limited

Original Signed

Willard D'Eon, MPH. P. Eng.
Environmental Engineer
Phone: (902) 492-6753
E-Mail: wilardd@cbcl.ca

Original Signed

Colin Walker, M.Sc., P. Geo.
Hydrogeologist
Phone: (902) 421-7241 local 2260
E-Mail: colinw@cbcl.ca

Project No. 070808.08

Dennis Rodgers

From: "Soori-G"
Date: December 9, 2013 12:05 PM
To: "Dennis Rodgers"
Subject: Fwd: Meeting to discuss Stage 1 Open Space Application - PID 41043597 & 40010514

Hello Dennis

FYI

Soori

Sent from my iPhone

Begin forwarded message:

From: "Simms, Tyson"
Date: 9 December, 2013 12:01:16 PM AST
To: '
Cc: "Greene, Katherine"
Subject: Meeting to discuss Stage 1 Open Space Application - PID 41043597 & 40010514

Hi Soori:

This message serves as a follow up to our telephone conversation on Friday, December 6th, 2013 regarding your Stage 1 Open Space Subdivision Application for the lands identified as PID# 41043597 and 40010514. As requested, a meeting has been scheduled for **Tuesday, December 10th, 2013 at 10:00 am at Alderney Gate (2nd Floor, HRM Offices), 40 Alderney Drive, Dartmouth.** Following the meeting, planning staff will provide a written summary. As always, please feel free to contact me at 490-5739 if you have any questions or require additional information.

Regards,
Tyson

Tyson Simms, MPlan
Planner – Eastern Region
Development Approvals - Planning Applications
Halifax Regional Municipality
T: 490-5739
F: 490-4346
simmst@halifax.ca

2013-12-09

Dennis Rodgers

From: "Soori"
Date: December 9, 2013 7:27 AM
To:
Cc:
Subject: FW: Windgate Village Lands, PID #: 41043597 & 40010514

Good morning Tyson

Per your request on Friday, we are forwarding emails to and from Andrew Bone, regarding Windgate Village.

Regards
 Soori

From: Bone, Andrew [mailto:bonea@halifax.ca]
Sent: October-07-13 9:37 AM
To: Soori
Subject: RE: Windgate Village Lands, PID #: 41043597 & 40010514

Soori

X You do not need a hydrogeological study if you are going for a water service district, however, should the water service district request not be approved, then you would have to make the decision to do a hydrogeological study or walk away from the proposal.

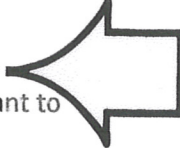
Andrew

HRM planning staff advised we needed this to complete our Phase 1 application. This was done late Dec. / 13.

From: Soori
Sent: October-07-13 8:15 AM
To: Bone, Andrew
Cc:
Subject: Windgate Village Lands, PID #: 41043597 & 40010514

Hello Andrew

Thank you for meeting with Dennis Rodgers and I, on September 12, 2013, to discuss the Windgate Village project. After our meeting we met with Austin French and Maureen Ryan on September 27, 2013 to request that Windgate Village Lands be added to the water service district in the RP+5 process.

RP's letter { Austin indicated that RP+5 is not intended to include any changes to the existing service boundaries. He suggested that we proceed with the application requesting to extend the water service boundary pursuant to provisions in the RP+5. 

As you are aware our client wishes to develop their lands in accordance with the present requirements of the Regional Plan, and we are preparing a Stage 1 submission to proceed with Open Space Design Development. We kindly request the following:

Do we need to include Level 1 Hydrogeological Study in order for your department to consider the submission to be complete; knowing that our client's intent is to apply for the water service district

HRM wanted to see response from NW. Very positive

2013-12-09



July 31, 2014

Mr. M. Sooriyakumaran
CKM Engineering Inc.
23 Wilson Drive
Fall River, NS B2T 1V9

Dear Mr. M. Sooriyakumaran,

Re: Groundwater Assessment Summary
Windgate Village, Beaver Bank, NS

Strum Consulting completed a Level I Groundwater Assessment in January 2014, for CKM Engineering Inc. on behalf of Marque Investments Limited for a proposed residential development located along Windgate Drive in the community of Beaver Bank, NS. The development site is 143 hectares (353 acres) in area, the majority of which is comprised of cleared or regenerating forest with isolated forest stands and wetland habitat present throughout. A summary of the expected groundwater conditions in the vicinity of the development site is provided below. Please refer to the Level I Groundwater Assessment, completed by Strum in January 2014 for full details on the assessment findings.

Groundwater Quantity

The surficial material in the study area consists of 9.1 to 57.9 m (30 to 189.8 ft) thick silty till plain. Three logs for dug wells identified in the study area reported well depths ranging from 4.87 – 5.48 m (15.9 – 17.9 ft) with reported yields between 9.08 – 18.2 Lpm (2.0 – 4.0 gpm). Dug wells may provide sufficient water supply for the proposed development, however water shortages may occur seasonally, especially during extended dry periods. Methods are available which can help to optimize well performance, including deeper well completions (approximately 6 to 9 m or 20 to 30 ft) and large gravel reservoirs where possible. Should dug wells be selected for this development, it is recommended that a cistern back up feed be utilized in conjunction with a dug well.

Bedrock in the vicinity of the proposed development is expected to consist of Meguma Group bedrock (Halifax Formation). Halifax Formation bedrock generally consists of sloped outer shelf slates, greywacke, and minor sandstones. Bedrock of the Halifax Formation has been documented as being susceptible to generating acid rock drainage.

Engineering • Surveying • Environmental

Head Office
Railside, 1355 Bedford Hwy.
Bedford, NS B4A 1C5
t. 902.835.5560 (24/7)
f. 902.835.5574

Antigonish Office
3-A Vincent's Way
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t. 506.850.9314
f. 902.835.5574

Deer Lake Office
101 Nicholasville Road
Deer Lake, NL A8A 1V5
t. 855.770.5560
f. 902.835.5574

www.strum.com info@strum.com

Based on short term driller's estimates for the 53 drilled wells identified in the NSE Well Log Database, the average yield in the study area is approximately 7.7 Lpm (1.7 gpm) and average well depth is approximately 118.2 m (387.7 ft). It is important to note that long term well production rates are typically 25% of the drillers estimates indicating actual longer term yields may be in the 1.9 Lpm (0.4 gpm), or less range.

All 53 wells were drilled through varying surficial materials including clay, gravel, mud, rock, boulders, and overburden ranging from 9.1 m (29.8 ft) to 57.9 m (189.9 ft) in thickness, followed by quartzite, slate, shale, or whinrock. The predominant bedrock types logged in the wells are slate (29 wells), quartzite (5 wells), quartzite/slate (1 well), whinrock (16 wells), and slate/whinrock (2 wells) which corresponds to the Meguma Group bedrock that has been mapped in the study area.

Adjacent Users

A total of 420 adjacent properties are located within 500 m of the proposed site. Rivendale Estates Subdivision and Monarch Estates Subdivision are located to the west and are serviced by a combination of drilled wells, on-site septic, and municipal water and sewer. It has been noted that select residents of the Monarch Estates Subdivision experienced water shortages in drilled wells and have since been provided with municipal water. Capilano Estates Subdivision located to the east of the proposed development is serviced by municipal water and on-site septic systems.

Groundwater Quality

Water quality from wells completed in the Meguma Group is usually soft to moderately hard, with relatively low total dissolved solids, and variable pH. Most parameters meet the Guidelines for Canadian Drinking Water Quality (GCDWQ). The most common water quality issues that may be expected in the area are iron, manganese, and occasionally hardness (aesthetic concerns), and arsenic (health concern).

Most issues are treatable by conventional water treatment systems such as softeners, which are typically used in the area (if required) to remove iron and manganese, or soften water. These systems typically range from \$1,000 - \$2,000, plus annual maintenance costs. In some instances, reverse osmosis (RO) treatment units are installed to remove elevated arsenic. Point of Entry RO systems provide drinking water meeting GCDWQ guidelines at all taps, faucets, and plumbing fixtures in a home at costs ranging from \$4,000 - \$10,000, plus annual maintenance costs. Point of Use RO will produce acceptable drinking water at the selected source such as a dedicated location at the kitchen sink with an associated cost of \$700 - \$2,500, plus annual maintenance.

If you have any questions, please contact us.

Thank you,

Original Signed

A/ Bruce Strum, P.Geo/
President
bstrum@strum.com





◆ SINCE 1926 ◆

November 7, 2013

Mr. Dennis Rodgers
MARQUE Investments Ltd.
6 Louise Court,
Dartmouth, NS
B3A 4N6

Dear Mr. Rodgers:

RE- Barrett lands along Windgate Drive, Beaver Bank

We hereby grant permission to MARQUE Investments Ltd. to make application to the Halifax Regional Municipality to submit the Barrett lands identified as PID's 41043597, 40010514, 41328428 and 41328436 for a Development Agreement and to make application for an extension to the Municipal Water Service Boundary.

Good luck with your development.

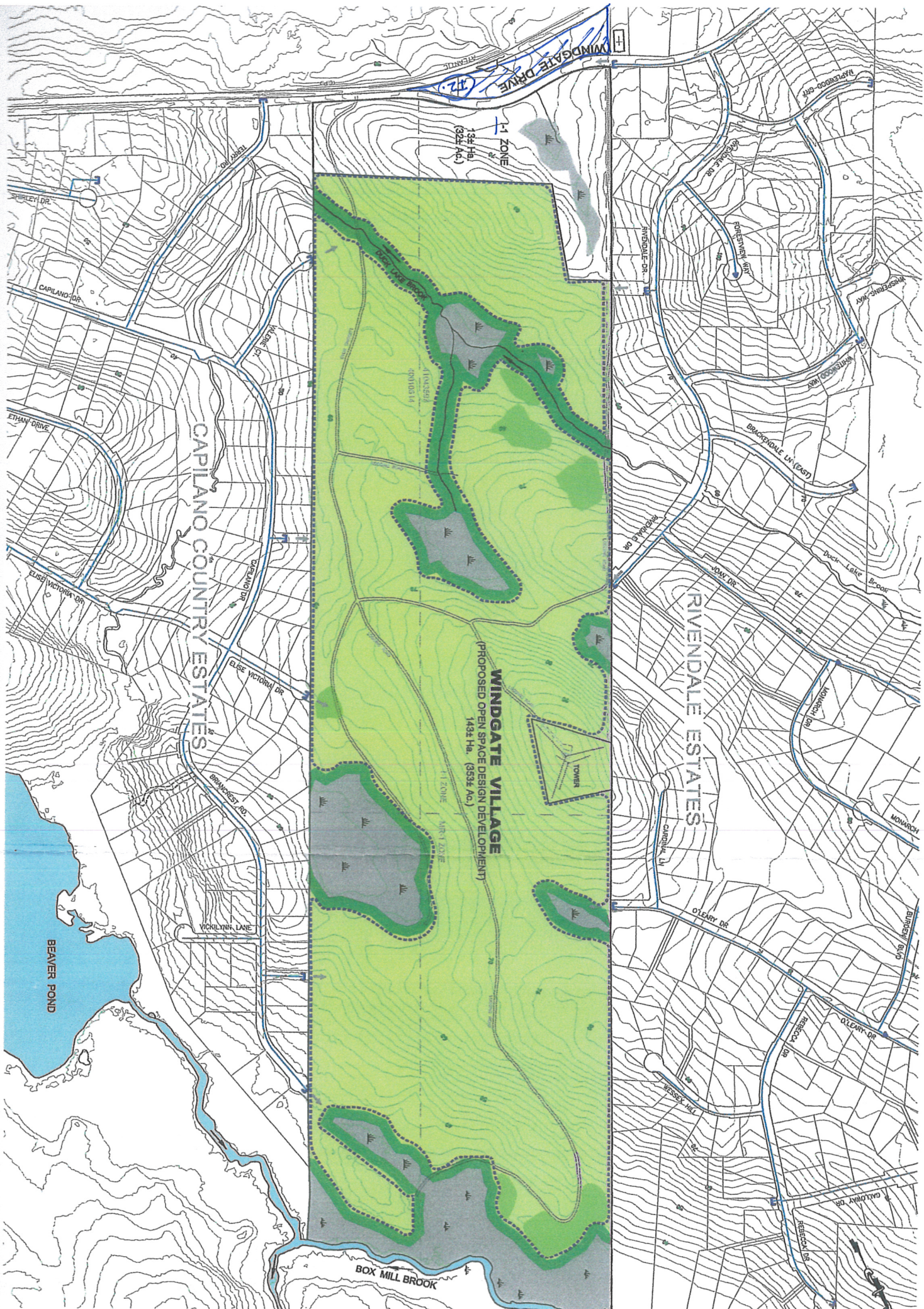
Yours very truly,
Barrett Lumber Co.

Original Signed

David F. Barrett
Secretary

Building Materials | Roof Trusses | Engineered Wood Products

224 Beaver Bank Road, Beaver Bank, Nova Scotia, Canada, B4E 1J7 Tel: (902) 865-2330 Toll Free: 1-800-346-5181 Fax: (902) 865-6198
www.barrettlumber.com



1. Sept 3, 2013 - Dennis, Sorri and Andrew met with HW re the Barrett lands on Windgate Dr. HW was very positive and support the proposed extension. Would likely require a 12" main along Windgate.
2. Sept 27, 2013 met with Austin French and Maureen Ryan also advise of HW's response to our request. Austin stated that RP+5 was not intended to include changes to existing service boundaries. He suggested that we proceed within the application requesting to extend the water service boundary as provided within the current policy.
3. HRM wrote to HW asking if they supported the inclusion of these lands in the water servicer boundary.
4. HW responded with a positive letter shortly after. (fall 2013)

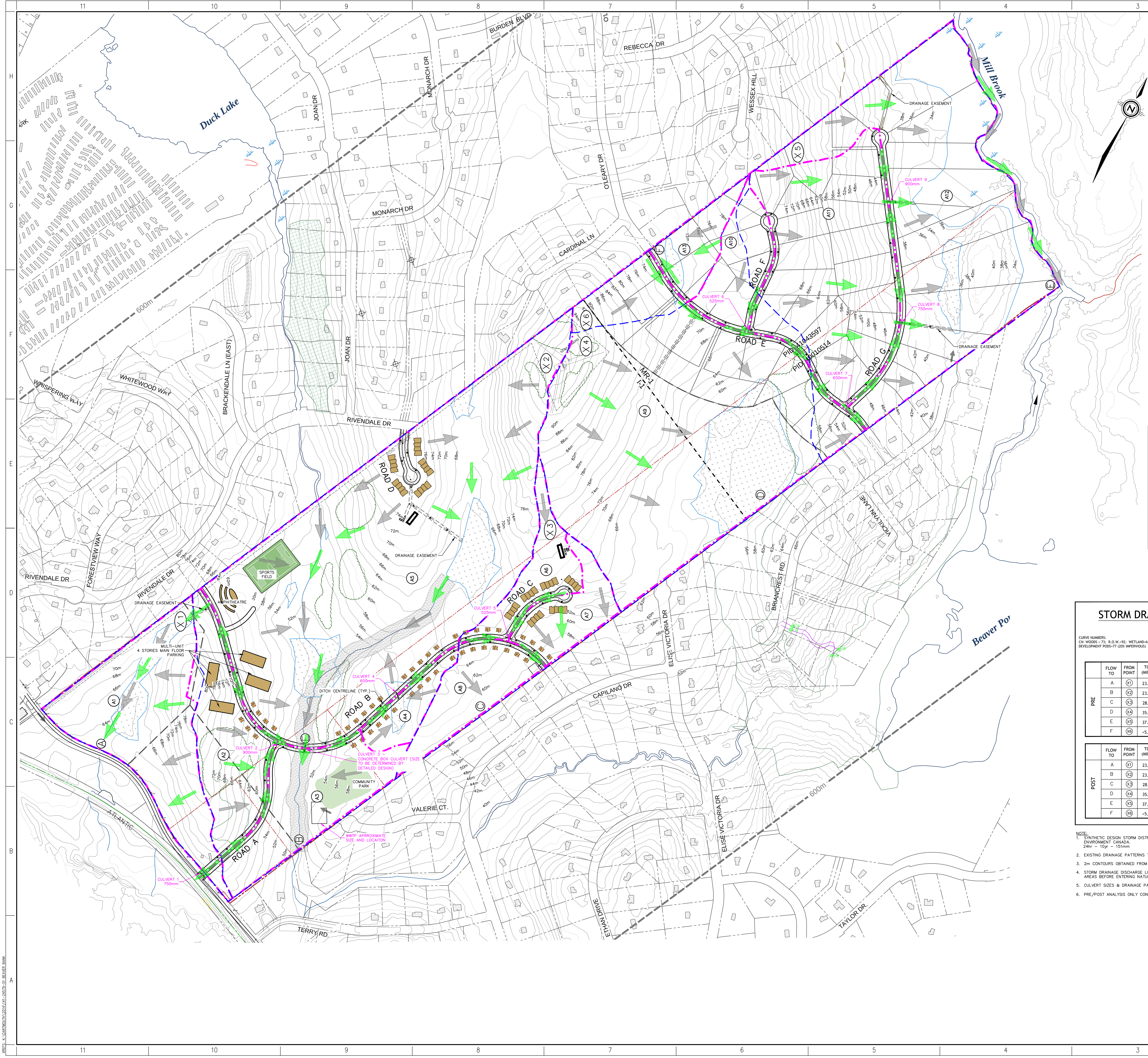


Appendix 2

Conceptual Development Plan

Appendix 3

Stormwater Management Plan & Servicing Schematics



MINOR SYSTEM SUBCATCHMENT AREAS & RATIONAL RUNOFF COEFFICIENTS (10 year)			
SUBCATCHMENT AREAS	RATIONAL 'C' VALUES	SUBCATCHMENT AREAS	RATIONAL 'C' VALUES
A1	11.25% Hq	A6	4.06% Hq
A2	6.56% Hq	A7	33.62% Hq
A3	6.91% Hq	A8	34.40% Hq
A4	1.98% Hq	A9	15.40% Hq
A5	40.24% Hq	A10	23.80% Hq
A6	3.15% Hq	A11	5.08% Hq
A7	3.20% Hq	A12	
A8		A13	

STORM DRAINAGE CRITERIA - SCS METHOD

CURVE NUMBERS:
ON: W0005 - 73; R.O.W.-92; WETLAND-45; ROOFS-98
DEVELOPMENT POS-77 (20% IMPERVIOUS)

FLOW TO	FROM POINT	TC (MIN)	AREAS CONTRIBUTING TO CALCULATE FLOW	AREA (Hectares)	10YR DESIGN EVENT FLOW (L/s)
PRE	A	23.5	A1	11.25±	930
	B	23.3	A2, A3, A4, A5	55.41±	4600
	C	28.1	A6, A7, A8	10.41±	790
	D	35.3	A9	33.62±	2280
	E	37.4	A10, A11, A12	40.84±	2690
	F	<5.0	A13	5.08±	730

FLOW TO	FROM POINT	TC (MIN)	AREAS CONTRIBUTING TO CALCULATE FLOW	AREA (Hectares)	10YR DESIGN EVENT FLOW (L/s)
POST	A	23.5	A1	10.13±	810
	B	23.3	A2, A3, A4, A5	55.99±	4800
	C	28.1	A6, A7, A8	10.46±	870
	D	35.3	A9	34.48±	2340
	E	37.4	A10, A11, A12	43.00±	2830
	F	<5.0	A13	2.55±	360

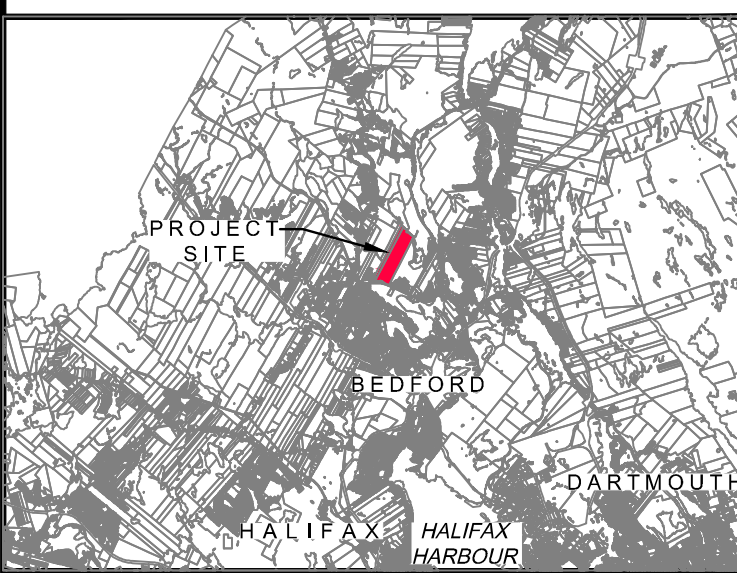
- NOTE:
1. SYNTHETIC DESIGN STORM DISTRIBUTIONS BASED ON HALIFAX RAINFALL DATA, OBTAINED FROM ENVIRONMENT CANADA. 24hr - 10yr = 151mm
 2. EXISTING DRAINAGE PATTERNS TO BE MAINTAINED WHERE POSSIBLE.
 3. 2m CONTOURS OBTAINED FROM NOVA SCOTIA PROVINCIAL MAPPING DATABASE.
 4. STORM DRAINAGE DISCHARGE LOCATIONS TO BE DIRECTED TO DISPERSION APRONS & VEGETATED AREAS BEFORE ENTERING NATURAL DRAINAGE CHANNELS OR WATER BODIES.
 5. CULVERT SIZES & DRAINAGE PATTERNS ARE SUBJECT TO DETAILED DESIGN.
 6. PRE/POST ANALYSIS ONLY CONSIDERS THE SUBJECT LANDS WITHIN WINDGATE VILLAGE.



WSP Canada Inc.
1 Spectacle Lake Drive
Dartmouth, Nova Scotia, Canada B3B 1X7
T 902-835-9955 F 902-835-1645 www.wspgroup.com



KEY PLAN:



DRAINAGE AREA (PRE)	---
DRAINAGE AREA (POST)	---
FLOW ARROW (PRE)	---
FLOW ARROW (POST)	---
FLOW FROM POINT	(X1)
FLOW TO POINT	(A)
DRAINAGE AREA	(A1)

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REVISION:		DATE: (YYYY/MM/DD)	
1		2015/03/26	
0		2015/02/26	
PROJECT NO:		141-24579-01	
DESIGNED BY:		R.A.BARKHOUSE, P.ENG	
DRAWN BY:		M.BALCOMBE, EIT	
CHECKED BY:		R.A.BARKHOUSE, P.ENG	

SCALE: 1:3000 METRIC
60 40 20 0 60 120 180

MARQUE INVESTMENTS LTD.

WINDGATE VILLAGE
OPEN SPACE DEVELOPMENT
BEAVERBANK, NS

PRELIMINARY STORMWATER
MANAGEMENT PLAN

SHEET NUMBER:

1

SHEET #

1 OF 1

ISSUED FOR DEVELOPMENT AGREEMENT

DATE OF: 2015/03/26

REV #

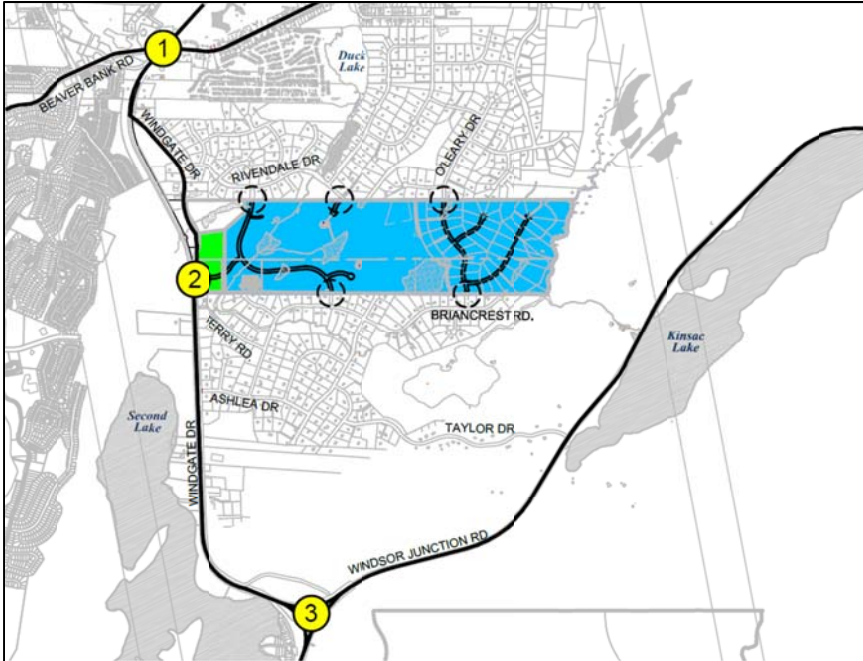
1

Appendix 4

Proposed Sewage Treatment Systems

Appendix 5

Traffic Impact Study



FINAL REPORT



Traffic Impact Study: Proposed “Windgate Village” Mixed Use Development

Beaver Bank, NS

Presented to:
Marque Investments Ltd.

March 2015
Ref# 141-24579

1 Spectacle Lake Drive
Dartmouth, NS
B3B 1X7
Tel: 902-835-9955
Fax: 902-835-1645
www.wspgroup.com

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3.0	Trip Generation, Distribution, and Assignment	10
4.0	Intersection Performance Analysis.....	12
	4.1 Traffic Signal Warrant Analysis	12
	4.2 Turn Lane Warrant Analysis	12
	4.3 Intersection Level of Service Analysis	13
5.0	Summary, Recommendations, and Conclusions	17

Appendix A: **Intersection Turning Movement Counts**
 Traffic Volume Diagrams
 Left Turn Lane Warrants
 Right Turn Lane Warrants
 Traffic Signal Warrant

Appendix B: **Level of Service Analysis**

Prepared by:

Mike Connors, P.Eng.
Greg O'Brien, P.Eng.
Ken O'Brien, P.Eng.

WSP Canada Inc.
1 Spectacle Lake Drive
Dartmouth, NS B3B 1X7
Phone: 902-835-9955
Fax: 902-835-1645
Email: mike.connors@wspgroup.com



1.0 Introduction

Background

Plans are being prepared by Marque Investments Ltd. for the development of “Windgate Village”, a mixed use residential / commercial subdivision in Beaver Bank, NS. The proposed development is located at PID# 41043597, a large undeveloped parcel located between “Capilano Country Estates” and “Rivendale Estates”, two residential subdivisions with frontages along Windgate Drive (See Figure 1).

The proposed development will include a mix of residential and commercial land uses. The south end of the parcel – located adjacent to Windgate Drive – includes commercial developments and a mix of multi-unit, townhouse, and detached single family residential units. The north end of the parcel, which will be accessed via existing residential streets, will comprise detached single family residential units only. It is anticipated that buildout of the development will be completed by 2025.

WSP Canada Inc. has been retained to complete a Traffic Impact Study satisfactory to the Halifax Regional Municipality (HRM).

A Traffic Impact Study Usually Considers Four Questions

A Traffic Impact Study usually consists of determining answers for the following questions:

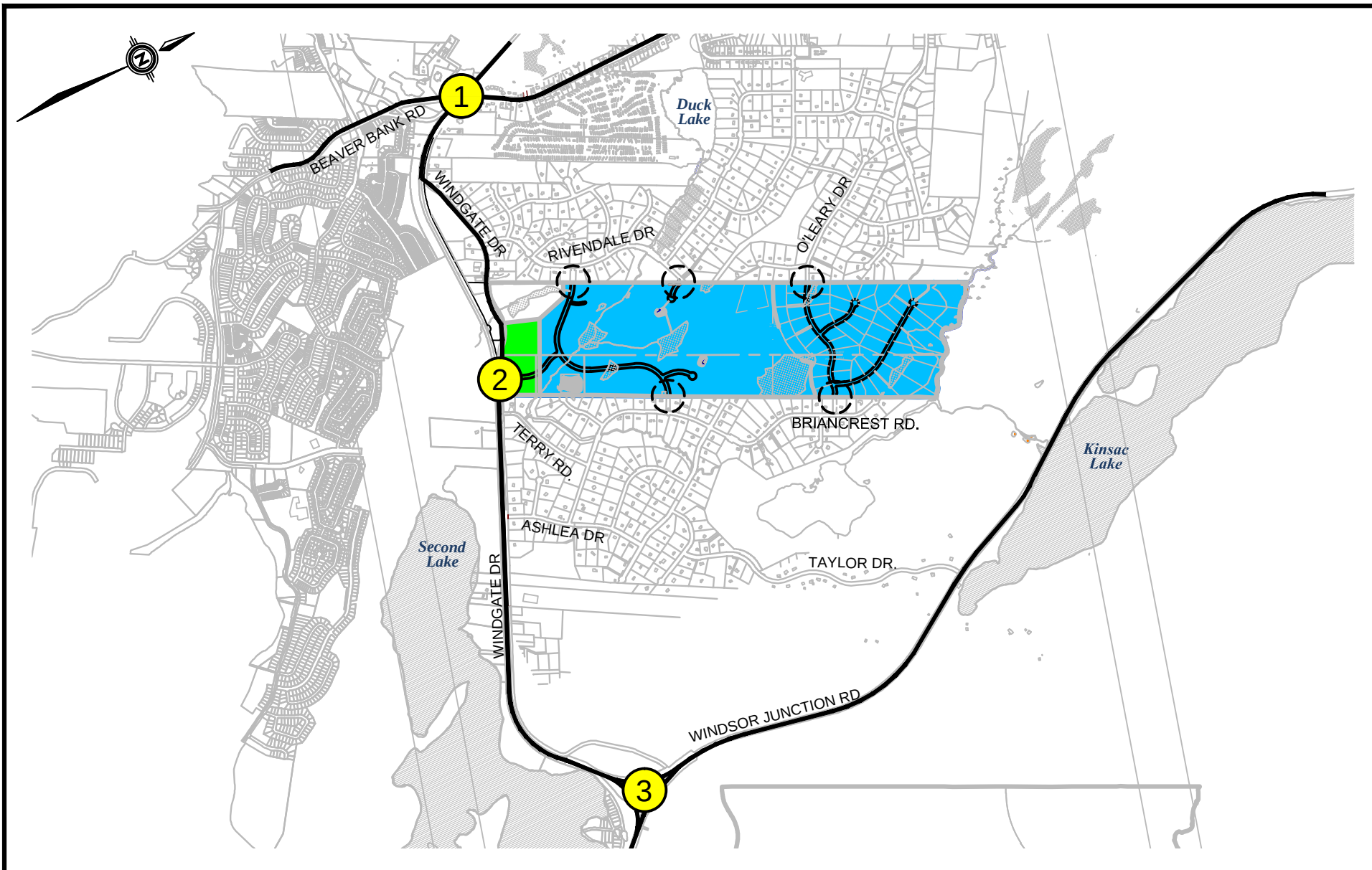
1. **What are the existing traffic situations** on roads adjacent to the study site? How have traffic volumes increased historically?
2. **What traffic changes are expected** at Study Area intersections? How many vehicle trips will be generated by the proposed development during weekday peak hours? How will the traffic be distributed at the exits from the development and to Study Area roads and intersections?
3. **What traffic impacts will occur** on Study Area roads and intersections? How will level of service of roads and intersections be affected?
4. **What road or intersection improvements are required** to mitigate project impacts on Study Area traffic movements?

Study Objectives

The following are the primary objectives of this Study:

1. Develop projected 2025 background weekday AM and PM peak hourly volumes for Study Area roads that do not include trips generated by proposed site development.
2. Estimate the number of weekday AM and PM peak hour trips that will be generated by the proposed development.
3. Distribute and assign site generated trips to Study Area intersections.
4. Add site generated trips to projected 2025 background peak hourly volumes to provide projected volumes that include site generated trips.
5. Evaluate impacts of site generated traffic on the performance and level of service of study intersections.
6. Complete traffic signal warrant analyses, as necessary, for intersections in the vicinity of the proposed development.

7. Complete left-turn lane warrants, as necessary, for intersections on Windgate Drive that access the proposed development.
8. Recommend improvements that may be needed at study intersections to mitigate the impacts of site development.



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TITLE:

FIGURE 1 – STUDY AREA



ACCESS POINTS



RESIDENTIAL DEVELOPMENT



COMMERCIAL DEVELOPMENT

PROJECT NO:

141-24579

DATE: (YYYY/MM/DD)

2015/03/16

SCALE:

1:30,000

1

WINDGATE DR @ BEAVER BANK RD

2

WINDGATE DR @ PROPOSED SITE ACCESS

3

WINDGATE DR @ WINDSOR JUNCTION RD

2.0 Study Area Descriptions

Site Description

The proposed site is an approximately 83 hectare undeveloped parcel located between “Capilano Country Estates” and “Rivendale Estates”, two residential subdivisions between Beaver Bank Road and Windsor Junction Road. The south end of the site will be accessed via a new driveway to Windgate Drive and street connections to Rivendale Drive and Capilano Drive. The north end of the site will be accessed via existing local streets including O’Leary Drive and Briancrest Road. A road connection between the north and south portions of the site is not included in the development concept.

Road and Intersection Descriptions

Windgate Drive is a 2-lane collector road that runs east-west approximately 4.7km between Beaver Bank Road and Windsor Junction Road. In the vicinity of the Study Area, it has gravel shoulders and open ditches; the posted speed limit is 70km/h. Annual average daily traffic volumes on Windgate Drive just west of Rivendale Drive are approximately 3,600 vehicles per day (vpd).



Photo 1: Looking east on Windgate Drive. The proposed development site is to the left of the photo.

Beaver Bank Road is a 2-lane collector road that runs north-south approximately 21km between Lower Sackville and East Uniacke Road. In the vicinity of Windgate Drive, it has curb and gutter with sidewalk on the east side and gravel shoulders and open ditches on the west side. Annual average daily traffic volumes on Beaver Bank Road just north of Windgate Drive are approximately 14,700 vehicles per day (vpd).

The Beaver Bank Road – Windgate Drive intersection is unsignalized, with stop control on Windgate Drive. There is an exclusive left turn lane on the Beaver Bank Road southbound approach; all other approaches are single lane.

Windsor Junction Road is a 2-lane collector road that runs north-south approximately 3.5km between Cobequid Road and Fall River Road. In the vicinity of Windgate Drive it has gravel shoulders and open ditches on both sides. Annual average daily traffic volumes on Windsor Junction Road just south of Windgate Drive are approximately 3,700 vehicles per day (vpd).

**Road and
Intersection
Descriptions
(Continued)**

The Windgate Drive – Windsor Junction Road intersection is unsignalized, with stop control on the Windgate Drive approach. All approaches are single lane.

Rivendale Drive and **O'Leary Drive** are 2-lane paved local residential streets located west of the proposed development. Rivendale Drive provides access from the south end of the site to Windgate Drive, and O'Leary Drive will provide access (via other local streets) between the north end of the development and Beaver Bank Road. **Capilano Drive, Briancrest Road, Terry Road, and Taylor Drive** are 2-lane paved local residential streets located east of the proposed development. **Capilano Drive, Briancrest Road, and Terry Road** will connect the development south to Windgate Drive, while **Taylor Drive** provides a connection northeast toward Fall River. Each street has a posted speed limit of 50km/h.

Public Transportation

Halifax Transit operates Route #400 (formerly Beaver Bank Community Transit) on Beaver Bank Road between Beaver Bank Villa and the Sackville Terminal, where it provides connection to additional routes including the Metrolink service. The route has stops just north of Windgate Drive.

**Proposed Site
Access
(South End of
Development)**

The south end of the site will be accessed via new street connections to Windgate Drive, Rivendale Drive, and Capilano Drive. The proposed connection to Windgate Drive is located approximately 200m west of Terry Road (See Photo 2 and Photo 3).

Stopping sight distances (SSD) – measured from a driver eye height of 1.05 m to a 150 mm object – were observed on the Windgate Drive eastbound and westbound approaches to a location in the vicinity of the proposed access intersection. Observations indicated SSD greater than 150 meters on the eastbound approach, which exceeds the minimum 134m required for an assumed operating speed of 80km/h on a +1% approach grade. On the westbound approach, observations indicated SSD of approximately 96m, which is less than the recommended minimum of 128m for 80km/h operating speed on a +4% approach grade. Further investigation should be completed to determine a final location, and to determine whether modifications to the existing road profile are necessary to improve sight distance.



Photo 2: Looking east (to the left) on Windgate Drive from the proposed site access Intersection.



Photo 3: Looking west (to the right) on Windgate Drive from the proposed site access Intersection

Connections to Rivendale Drive and Capilano Drive will also provide access to the south end of the development. Sight distance (See Photo 4 to Photo 7) on the approaches at both intersections appears adequate.



Photo 4: Looking south (to the left) on Rivendale Drive from the proposed site access Intersection.



Photo 5: Looking north (to the right) on Rivendale Drive from the proposed site access Intersection



Photo 6: Looking north (to the left) on Capilano Drive from the proposed site access Intersection.



Photo 7: Looking south (to the right) on Capilano Drive from the proposed site access Intersection

***Proposed Site Access
(North End of
Development)***

The north end of the site will be accessed via connections to O'Leary Drive and Briancrest Road. O'Leary Drive (Photo 8) will be extended from its existing terminus across the development to connect to Briancrest Road. The proposed O'Leary Drive – Briancrest Road intersection (Photo 9 and Photo 10) will be located approximately 75m north of Vickilynn Lane. Sight distance on both approaches appears adequate.



Photo 8: Looking west on O'Leary Drive from the proposed site access connection.



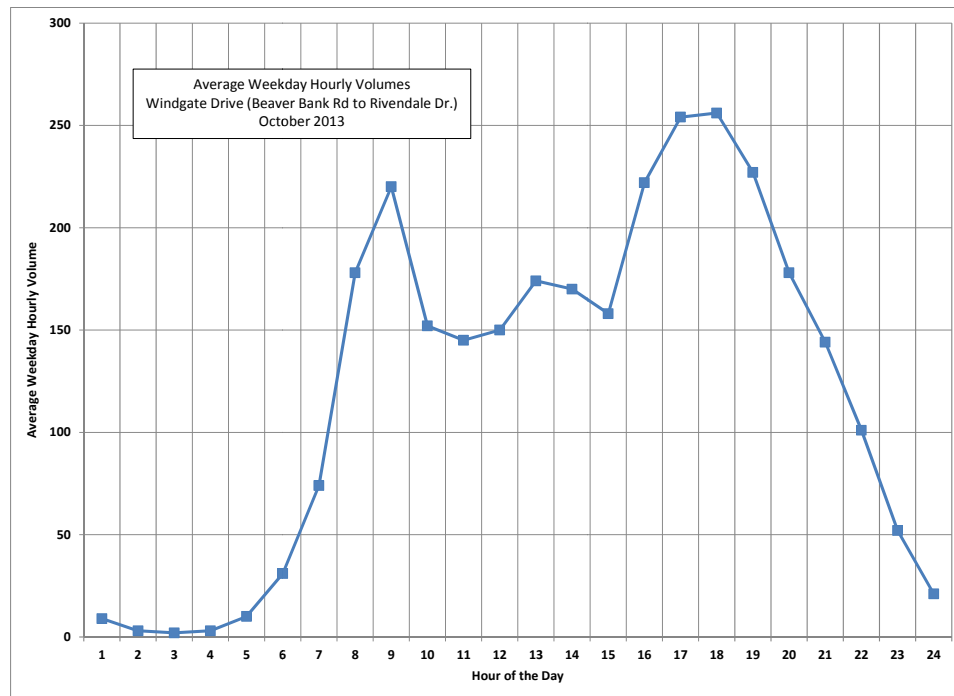
Photo 9: Looking north (to the right) on Rivendale Drive from the proposed site access Intersection



Photo 10: Looking north (to the left) on Capilano Drive from the proposed site access Intersection.

Traffic Volume Data

HRM Traffic & Right-of-Way Services (TROW) obtained a machine traffic count on Windgate Drive between Beaver Bank Road and Rivendale Drive (just west of the proposed development) during October 2013. Counts indicate Windgate Drive two-way AM and PM peak hour volumes of about 220 and 256 vehicles per hour, respectively. The graphical representation of average weekday hourly volumes during a 24 hour day (Figure 2) illustrates the pronounced ‘peaks’ of AM and PM peak hour volumes typical of a road with commuter traffic.



**Figure 2: Average Weekday Hourly Volumes – October 2013:
Windgate Drive (Beaver Bank Road to Rivendale Drive)**

Annual Volume Trends

Historical volume data obtained by HRM between 2011 and 2013 on Windgate Drive (just west of the proposed development) do not indicate a consistent growth trend in volumes. Volumes are in the range of 3,600 vehicles per day. An annual growth rate of 1.0% typical of growth in the Halifax region has been used for the projecting future year traffic volumes for this study.

Manual Traffic Count

Manual traffic counts were obtained during AM and PM peak periods between Wednesday, March 4 and Friday, March 6, 2015 at Windgate Drive intersections at Rivendale Drive and Windsor Junction Road. A count completed by HRM on Friday, August 10, 2012 at the Windgate Drive – Beaver Bank Road intersection was also obtained from HRM TROW. Turning movement counts are tabulated in Tables A-1 to A-3, Appendix A, with peak hour volumes indicated by shaded areas.

Redistribution of Background Volumes

The proposed street connections across the development will provide alternate routing options for existing residents of the area. In some cases, the new east-west connections will shorten the distance required to make certain trips. Overall, it is expected that the potential impact on existing streets and intersections will be minimal, as volumes are relatively low and will likely balance out. Background projections for this Study have incorporated redistribution of volumes based on the presence of the proposed street connections.

Projected 2015 and 2025 Background Volumes

Projected 2025 weekday AM and PM peak hour background volumes, calculated using an annual traffic volume growth rate of 1.0%, are illustrated diagrammatically in Figure A-1 (Boxes A and B), Appendix A.

3.0 Trip Generation, Distribution, and Assignment

Description of Proposed Development

The proposed residential development will include a mix of residential and commercial land uses. The south end of the parcel – located adjacent to Windgate Drive – includes commercial developments, a mix of multi-unit and single family residential units, and a sports field / community park. The north end of the parcel, which will be accessed via existing residential streets, will comprise single family residential units only. Proposed land uses are summarized in Table 3-1.

Table 3-1: Summary of Proposed Developments

Development Area	Access	Proposed Land Uses
1	Windgate Drive Rivendale Drive Capilano Drive	Residential: - 46 Detached Single Family Units - 44 Townhouse Units - 120 Apartment Units Commercial: - 60,000 SF Specialty Retail
2	O'Leary Drive Briancrest Road	Residential: - 55 Detached Single Family Units

The proposed commercial parcel includes approximately 11.5 acres of developable land. The Beaver Bank, Hammonds Plains and Upper Sackville LUB for a C-4 (Highway Commercial Zone) includes the following general limitations for development:

- Minimum lot area – 30,000 SF
- Minimum lot frontage – 100 feet
- Maximum gross floor area on a lot – 10,000 SF

Considering the size and configuration of the commercial parcel, it is estimated that the site will support approximately six lots which will allow construction of up to 60,000 square feet of commercial buildings. Since expected land uses are not known at this time, trip generation estimates have been prepared for a Specialty Retail land use.

Estimation of Total Site Generated Trips

The number of trips that will be generated by the proposed development has been estimated using rates published in *Trip Generation, 9th Edition* (Washington, 2012). Trip generation estimates, which are summarized in Table 3-2, indicate that the proposed development is expected to generate approximately 251 two-way vehicle trips (85 vph entering and 166 vph exiting) during the AM peak hour and 381 two-way vehicle trips (211 vph entering and 170 vph exiting) during the PM peak hour.

Table 3-2 - Trip Generation Estimates for Proposed Development

Land Use	Units ²	Trip Generation Rates ¹				Trips Generated			
		AM Peak		PM Peak		AM Peak		PM Peak	
		In	Out	In	Out	In	Out	In	Out
Trip Generation Estimates for Area 1 (Southern Portion)									
Single Family Residential (ITE Land Use Code 210) ³	90	0.19	0.56	0.63	0.37	17	50	57	33
Apartment (ITE Land Use Code 222)	120	0.10	0.41	0.40	0.22	12	49	48	26
Specialty Retail ⁴ (ITE Land Use Code 826)	60	0.76	0.60	1.19	1.52	46	36	71	91
Trip Generation Estimates for Area 1						75	135	176	150
Trip Generation Estimates for Area 2 (Northern Portion)									
Single Family Residential (ITE Land Use Code 210) ³	55	0.19	0.56	0.63	0.37	10	31	35	20
Total Trip Generation Estimates for Proposed Development						85	166	211	170
Notes: 1. Trip generation rates are 'vehicles per hour per unit' for Single Family Residential (Land Use Code 210), published in <i>Trip Generation, 9th Edition</i> , Institute of Transportation Engineers, 2012. 2. Residential units are dwellings. KGLA is 'Gross Leasable Area x 1000 square feet'. 3. The Single Family Residential (Land Use Code 210) has been used to estimate trip generation for tow nhouse units. 4. The Speciality Retail (Land Use 826) rate for 'Peak Hour of Adjacent Street Traffic, One Hour Betw een 4 and 6 PM' has been used. Since there is no published rate for the AM peak hour of adjacent street for this Land Use, and since AM peak hour trips to Speciality Retail are generally low , AM trip rates have been assumed to be 50% of the PM rate with reversal of the directional split.									

Trip Distribution and Assignment

Based on review of the local street network and development surrounding the site as well as local knowledge of the area, external trips generated by the proposed development have been distributed as summarized in Table 3-3. Assigned site generated trips at Study Area intersections are shown diagrammatically in Figure A-2 (Boxes A and B), Appendix A.

Table 3-3: Trip Distribution Summary

Development Area	Direction	
1 (South)	East – Windgate Drive	45%
	East – Taylor Drive	10%
	West – Windgate Drive	45%
2 (North)	East – Windgate Drive	35%
	East – Taylor Drive	20%
	West – Windgate Drive	10%
	West – O'Leary Drive	35%

Projected 2025 Volumes that Include Site Generated Trips

Site generated trips have been added to the projected 2025 background volumes (Figure A-1, Boxes A and B) to provide projected 2025 volumes that include site generated trips which are illustrated diagrammatically in Figure A-3 (Boxes A and B), Appendix A.

4.0 Intersection Performance Analysis

4.1 Traffic Signal Warrant Analysis

Traffic Signal Warrant Principles

A signal warrant analysis is completed to determine if the installation of traffic signals at an intersection will provide a positive impact on total intersection operation. That is, the benefits in time saved and improved safety that will accrue to vehicles entering from a side street will exceed the impact that signals will have in time lost and potential additional collisions for vehicles approaching the intersection on the main street.

The Canadian Traffic Signal Warrant Matrix Analysis (Transportation Association of Canada (TAC), 2005) considers 100 warrant points as an indication that traffic signals will provide a positive impact. Signal warrant analysis uses vehicular and pedestrian volumes, and intersection, roadway and study area characteristics to calculate a warrant point value.

Traffic Signal Warrant Analysis

Signal warrant analyses were completed for Windgate Drive intersections at Beaver Bank Road and Windsor Junction Road for projected 2025 background traffic with the addition of trips generated by the proposed development. Results, which are summarized in Table 4-1, indicate that traffic signals are not expected to be warranted at either intersection both without and with site development.

Table 4-1: TAC Traffic Signal Warrant Points by Development Scenario

Development Scenario	Intersection	
	Windgate Drive @ Beaver Bank Road	Windgate Drive @ Windsor Junction Road
2025 Background <u>without</u> Site Development	63 Points (Signals not warranted) [Table A-4]	(Signals not warranted)
2025 Background <u>with</u> Site Development	88 Points (Signals not warranted) [Table A-5]	21 Points (Signals not warranted) [Table A-6]

4.2 Turn Lane Warrant Analysis

Left Turn Lane Warrant Analysis

Left turn movements on a two lane street may cause both operational and safety problems. Operational problems result as a vehicle stopped waiting for an opportunity to turn across 'heavy' opposing traffic causes a queue of stopped vehicles to form. Safety problems result from rear end collisions when a stopped left turning vehicle is struck by an advancing vehicle, or from head-on or right angle collisions when a left turning vehicle is struck by an opposing vehicle.

The Geometric Design Standards for Ontario Highways Manual contains nomographs for left turn lane analysis for two lane streets. The analysis method, which is normally used by WSP Atlantic to

evaluate need for left turn lanes, uses a series of nomographs that consider speed, advancing volumes, left turns as a percentage of advancing volumes, and opposing volumes. A point, based on 'opposing' and 'advancing' volumes, plotted to the right of the 'warrant line' of the appropriate '% left turns' and 'approach speed' nomograph, indicates that a left turn lane is warranted for the conditions used in the analysis. Similarly, a point that is plotted to the left of the warrant line indicates that a left turn lane is not warranted.

Analysis of left turn lane warrants was completed (Figure A-4, Appendix A) for eastbound left turns from Windgate Drive into the new site access intersection for projected 2025 volumes with the addition of site generated trips. The analysis indicated that left turn lanes are not expected to be warranted based on weekday AM and PM peak hour traffic volumes.

4.3 Intersection Level of Service Analysis

Intersection Level of Service Analysis

The level or quality of performance of an intersection in terms of traffic movement is determined by a level of service (LOS) analysis. LOS for intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and increased travel time.

Level of Service (LOS) Criteria

LOS criteria (Table 4-2) are stated in terms of average control delay per vehicle which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Table 4-2 - Level of Service (LOS) Criteria for Intersections

LOS	LOS Description	Two Way Stop Controlled (TWSC) Intersections Control Delay (Seconds per Vehicle)
A	Very low delay; most vehicles do not stop (Excellent)	Less than 10.0
B	Higher delay; most vehicles stop (Very Good)	Between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)	Between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)	Between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay	Between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	Greater than 50.0

***Intersection Level of
Service Analysis***

Synchro 8.0 software has been used for performance evaluation of Study Area intersections on Beaver Bank Road for 2025 AM and PM peak hour volumes without and with site development.

Level of service (LOS) analysis results are included in Appendix B and are summarized in Tables 4-3 to 4-5.

***Summary Level of
Service Analysis***

Windgate Drive @ Beaver Bank Road (Table 4-3) – With the exception of the Windgate Drive westbound approach, overall intersection performance is good. Results indicate that the Windgate Drive approach will experience excessive average delay, V/C ratio, and queue lengths – particularly the PM peak hour – both without and with the addition of site generated trips. It is noted that analysis of unsignalized intersections using Synchro software does have limitations that result in it reporting unreasonably poor levels of performance as a movement approaches capacity. For this reason, it is expected that the results indicated for the PM peak hour (both without and with development) are not representative of actual conditions.

Windgate Drive @ Windsor Junction Road (Table 4-4) – Intersection performance is expected to be satisfactory both without and with the addition of site generated trips. All movements operate within HRM acceptable limits.

Windgate Drive @ Proposed Site Access (Table 4-5) – Intersection performance is expected to be satisfactory; all movements operate within HRM acceptable limits.

Table 4-3 - LOS for Beaver Bank Road @ Windgate Drive

LOS Criteria	Control Delay (sec/veh), LOS, v/c Ratio, and 95th% Queue (m) by Intersection Movement				Overall Intersection	
	WB-LR	NB-TR	SB-L	SB-T	Delay	LOS
Weekday AM Peak Hour - Projected 2025 Volumes without Site Development (Page B-1)						
Delay	39.2	0.0	8.0	0.0	3.6	A
v/c	0.52	0.18	0.04	0.49		
Queue	20.2	0	0.9	0		
Weekday AM Peak Hour - Projected 2025 Volumes with Site Development (Page B-5)						
Delay	77.8	0.0	8.1	0.0	10.7	B
v/c	0.87	0.2	0.05	0.49		
Queue	51.7	0	1.2	0		
Weekday PM Peak Hour - Projected 2025 Volumes without Site Development (Page B-3)						
Delay	288.8	0.0	11.6	0.0	26.8	D
v/c	1.41	0.71	0.06	0.28		
Queue	89.7	0.0	1.4	0.0		
Weekday PM Peak Hour - Projected 2025 Volumes with Site Development (Page B-8)						
Delay	747.2	0.0	12.5	0.0	92.8	F
v/c	2.45	0.76	0.11	0.28		
Queue	175.9	0	2.8	0		

Table 4-4 - LOS for Windsor Junction Road @ Windgate Drive

LOS Criteria	Control Delay (sec/veh), LOS, v/c Ratio, and 95th% Queue (m) by Intersection Movement			Overall Intersection	
	EB-LR	NB-LT	SB-TR	Delay	LOS
Weekday AM Peak Hour - Projected 2025 Volumes without Site Development (Page B-2)					
Delay	12.1	3.1	0.0	7.3	A
v/c	0.38	0.03	0.09		
Queue	13.7	0.6	0.0		
Weekday AM Peak Hour - Projected 2025 Volumes with Site Development (Page B-6)					
Delay	14.1	3.7	0.0	8.6	A
v/c	0.5	0.04	0.11		
Queue	21.3	0.8	0		
Weekday PM Peak Hour - Projected 2025 Volumes without Site Development (Page B-4)					
Delay	13.3	4.6	0.0	5.3	A
v/c	0.24	0.10	0.10		
Queue	7.0	2.4	0		
Weekday PM Peak Hour - Projected 2025 Volumes with Site Development (Page B-9)					
Delay	17.8	5.1	0.0	7.2	A
v/c	0.44	0.12	0.14		
Queue	16.7	3.2	0		

Table 4-5 - LOS for Windgate Drive @ Proposed Site Access Street

LOS Criteria	Control Delay (sec/veh), LOS, v/c Ratio, and 95th% Queue (m) by Intersection Movement			Overall Intersection	
	EB-LT	WB-TR	SB-LR	Delay	LOS
Weekday AM Peak Hour - Projected 2025 Volumes with Site Development (Page B-7)					
Delay	1.1	0.0	10.4	3.0	A
v/c	0.02	0.07	0.13		
Queue	0.5	0.0	3.5		
Weekday PM Peak Hour - Projected 2025 Volumes with Site Development (Page B-10)					
Delay	2.8	0	12.2	3.4	A
v/c	0.06	0.15	0.18		
Queue	1.3	0	12.2		

5.0 Summary, Recommendations, and Conclusions

Description of the Proposed Development

1. Plans are being prepared by Marque Investments Ltd. for the development of “Windgate Village”, a mixed use residential / commercial subdivision in Beaver Bank, NS. The proposed development will include a mix of residential and commercial land uses. The south end of the parcel – located adjacent to Windgate Drive – includes commercial developments and a mix of multi-unit, townhouse, and detached single family residential units. The north end of the parcel, which will be accessed via existing residential streets, will comprise detached single family residential units only. It is anticipated that buildout of the development will be completed by 2025.

Proposed Site Access

2. Separate site accesses will be provided to the north and south ends of the proposed development. The south end of the site will be accessed via new street connections to Windgate Drive, Rivendale Drive, and Capilano Drive. The north end of the site will be accessed via connections to O’Leary Drive and Briancrest Road.

Description of Study Area Roads

3. **Windgate Drive** is a 2-lane collector road that runs east-west approximately 4.7km between Beaver Bank Road and Windsor Junction Road. In the vicinity of the Study Area, it has gravel shoulders and open ditches; the posted speed limit is 70km/h.

Beaver Bank Road is a 2-lane collector road that runs north-south approximately 21km between Lower Sackville and East Uniacke Road.

Windsor Junction Road is a 2-lane collector road that runs north-south approximately 3.5km between Cobequid Road and Fall River Road.

Rivendale Drive and **O’Leary Drive** are 2-lane paved local residential streets located west of the proposed development. Rivendale Drive provides access from the south end of the site to Windgate Drive, and O’Leary Drive will provide access (via other local streets) between the north end of the development and Beaver Bank Road. **Capilano Drive, Briancrest Road, Terry Road, and Taylor Drive** are 2-lane paved local residential streets located east of the proposed development. **Capilano Drive, Briancrest Road, and Terry Road** will connect the development south to Windgate Drive, while **Taylor Drive** provides a connection northeast toward Fall River.

Background Traffic Volumes

4. Projected 2025 weekday AM and PM peak hour background volumes were calculated using an annual traffic volume growth rate of 1.0%.

<i>Estimation of Site Generated Trips for the Proposed Development</i>	5. The proposed development is expected to generate approximately 251 two-way vehicle trips (85 vph entering and 166 vph exiting) during the AM peak hour and 381 two-way vehicle trips (211 vph entering and 170 vph exiting) during the PM peak hour.
<i>Trip Distribution and Assignment</i>	6. External trips generated by the development have been assigned to study area streets and intersections based on review of the local street network and development surrounding the site as well as local knowledge of the area.
<i>Signal Warrant Analysis</i>	7. Signal warrant analyses were completed for Windgate Drive intersections at Beaver Bank Road and Windsor Junction Road for projected 2025 background traffic with the addition of trips generated by the proposed development. Traffic signals are not expected to be warranted at the Beaver Bank Road (88 warrant points) or the Windsor Junction Road (21 warrant points) intersections.
<i>Left Turn Lane Warrant</i>	8. Analysis of left turn lane warrants was completed for eastbound left turns from Windgate Drive into the proposed site access street for projected 2025 volumes with the addition of site generated trips. The analysis indicated that left turn lanes are <u>not</u> expected to be warranted for all scenarios.
<i>Summary - Level of Service Analysis</i>	9. Intersection performance analysis was completed for Windgate Drive intersections at Beaver Bank Road, Windsor Junction Road, and the proposed site access street. Results indicate that intersection performance at the Windgate Drive - Windsor Junction Road and Windgate Drive - proposed site access street intersections are expected to be satisfactory based on 2025 AM and PM peak hour volumes both without and with site development. At the Beaver Bank Road – Windgate Drive intersection, results indicate that the Windgate Drive (westbound) approach will experience excessive average delay, V/C ratio, and queue lengths - particularly the PM peak hour – both without and with the addition of site generated trips.
<i>Recommendations</i>	10. Further investigation should be completed to determine a final location for the proposed site access road to Windgate Drive, and to determine whether modifications to the existing road profile are necessary to improve sight distance. 11. Consideration should be given to the installation of traffic signals at the Beaver Bank Road – Windgate Drive intersection to accommodate existing traffic demand as well as projected traffic demand (both without and with site development). Though traffic signal warrants were not met, installation of signals will improve unacceptably high delays currently experienced on the Windgate Drive approach during AM and PM peak periods.
<i>Conclusions</i>	12. Site generated trips are not expected to have a significant impact to traffic performance in the Study Area.

Appendix A

**Intersection Turning Movement
Counts**

Traffic Volume Diagrams

Traffic Signal Warrants

Table A-1 Windgate Drive @ Rivendale Drive Beaver Bank, NS Wednesday, March 4, 2015									
AM Peak Period Volume Data									
Time		Windgate Drive Westbound Approach		Rivendale Drive Southbound Approach		Windgate Drive Eastbound Approach		Total Vehicles	
		E	F	G	I	J	K		
07:00	07:15	11	0	6	3	1	12	33	
07:15	07:30	11	0	8	5	0	14	38	
07:30	07:45	21	3	14	11	2	28	79	
07:45	08:00	12	2	14	5	1	41	75	
08:00	08:15	6	1	8	8	2	29	54	
08:15	08:30	21	2	3	8	2	25	61	
08:30	08:45	12	2	9	3	4	28	58	
08:45	09:00	15	2	12	3	1	25	58	
AM Peak Hour		60	8	39	32	7	123	269	
PM Peak Period Volume Data									
Time		Windgate Drive Westbound Approach		Rivendale Drive Southbound Approach		Windgate Drive Eastbound Approach		Total Vehicles	
		E	F	G	I	J	K		
15:30	15:45	23	5	3	3	10	30	74	
15:45	16:00	28	7	3	2	8	20	68	
16:00	16:15	37	8	4	5	3	21	78	
16:15	16:30	24	5	4	1	7	24	65	
16:30	16:45	21	3	4	4	5	33	70	
16:45	17:00	15	5	3	0	11	29	63	
17:00	17:15	19	7	2	2	5	24	59	
17:15	17:30	29	8	4	5	12	24	82	
PM Peak Hour		112	25	14	11	28	95	285	

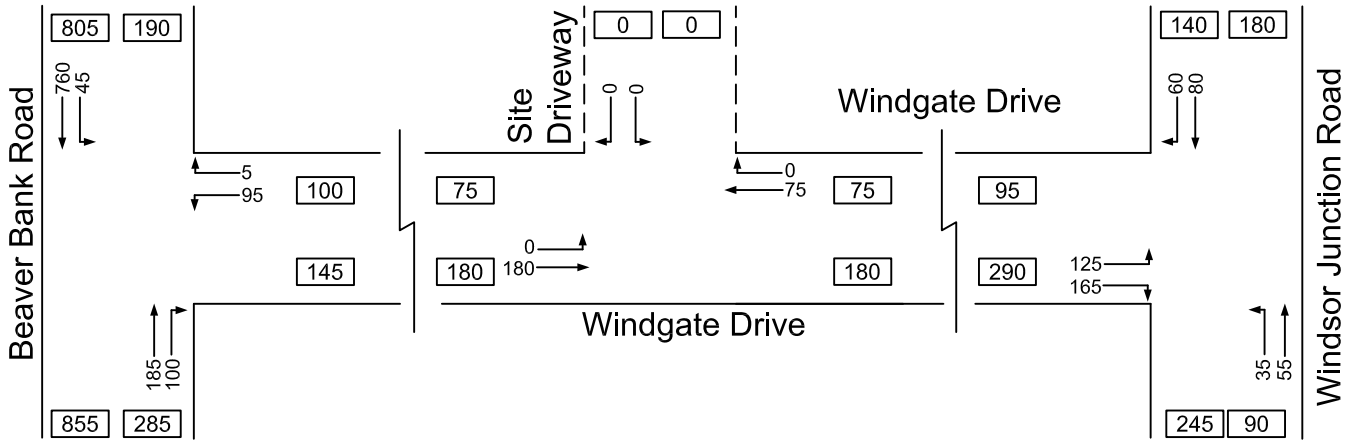
Table A-2 Windgate Drive @ Windsor Junction Road Beaver Bank, NS Thursday, March 5 (AM Peak) and Friday, March 6 (PM Peak), 2015								
AM Peak Period Volume Data								
Time		Windsor Junction Road Northbound Approach		Windsor Junction Road Southbound Approach		Windgate Drive Eastbound Approach		Total Vehicles
		A	B	H	I	J	L	
07:00	07:15	4	18	16	2	17	26	83
07:15	07:30	8	8	11	8	21	31	87
07:30	07:45	4	8	23	17	30	43	125
07:45	08:00	9	15	20	11	28	44	127
08:00	08:15	12	16	15	17	30	28	118
08:15	08:30	7	9	17	4	17	23	77
08:30	08:45	6	10	14	7	17	17	71
08:45	09:00	9	14	19	11	32	18	103
AM Peak Hour		33	47	69	53	109	146	457
PM Peak Period Volume Data								
Time		Windsor Junction Road Northbound Approach		Windsor Junction Road Southbound Approach		Windgate Drive Eastbound Approach		Total Vehicles
		A	B	H	I	J	L	
15:30	15:45	9	14	20	8	8	10	69
15:45	16:00	15	14	17	15	16	11	88
16:00	16:15	10	16	14	21	21	15	97
16:15	16:30	22	19	12	19	15	18	105
16:30	16:45	29	19	14	22	18	8	110
16:45	17:00	27	29	17	21	15	12	121
17:00	17:15	21	24	14	19	17	15	110
17:15	17:30	35	25	17	17	22	7	123
PM Peak Hour		112	97	62	79	72	42	464

Table A-3 Beaver Bank Road @ Windgate Drive* Beaver Bank, NS Friday, August 10, 2012				Beaver Bank Road HG Windgate Drive F D B C				
AM Peak Period Volume Data								
Time		Beaver Bank Road Northbound Approach		Windgate Drive Westbound Approach		Beaver Bank Road Southbound Approach		Total Vehicles
		B	C	D	F	G	H	
07:00	07:15	38	20	22	3	10	175	268
07:15	07:30	45	22	18	2	13	175	275
07:30	07:45	34	22	20	1	6	162	245
07:45	08:00	53	24	26	2	11	180	296
08:00	08:15	59	18	12	4	8	148	249
08:15	08:30	67	15	16	6	5	134	243
08:30	08:45	70	16	13	6	10	137	252
08:45	09:00	68	22	19	12	7	139	267
AM Peak Hour		170	88	86	8	40	692	1084
Noon Peak Period Volume Data								
Time		Beaver Bank Road Northbound Approach		Windgate Drive Westbound Approach		Beaver Bank Road Southbound Approach		Total Vehicles
		B	C	D	F	G	H	
11:00	11:15	80	12	14	5	5	71	187
11:15	11:30	83	14	19	2	5	71	194
11:30	11:45	82	21	19	1	5	83	211
11:45	12:00	81	21	19	7	3	80	211
12:00	12:15	84	16	16	4	5	94	219
12:15	12:30	83	27	23	4	5	93	235
12:30	12:45	78	31	16	10	5	87	227
12:45	13:00	75	20	15	3	5	93	211
Noon Peak Hour		326	68	71	15	18	305	803
PM Peak Period Volume Data								
Time		Beaver Bank Road Northbound Approach		Windgate Drive Westbound Approach		Beaver Bank Road Southbound Approach		Total Vehicles
		B	C	D	F	G	H	
15:30	15:45	163	39	27	6	14	99	348
15:45	16:00	180	37	32	7	7	88	351
16:00	16:15	199	37	25	14	8	90	373
16:15	16:30	233	26	20	12	10	77	378
16:30	16:45	264	46	32	19	7	122	490
16:45	17:00	218	36	24	19	5	109	411
17:00	17:15	181	31	29	14	6	116	377
17:15	17:30	156	25	26	11	6	119	343
PM Peak Hour		896	139	105	64	28	424	1656

*Count obtained from HALIFAX Traffic & ROW Services.

A

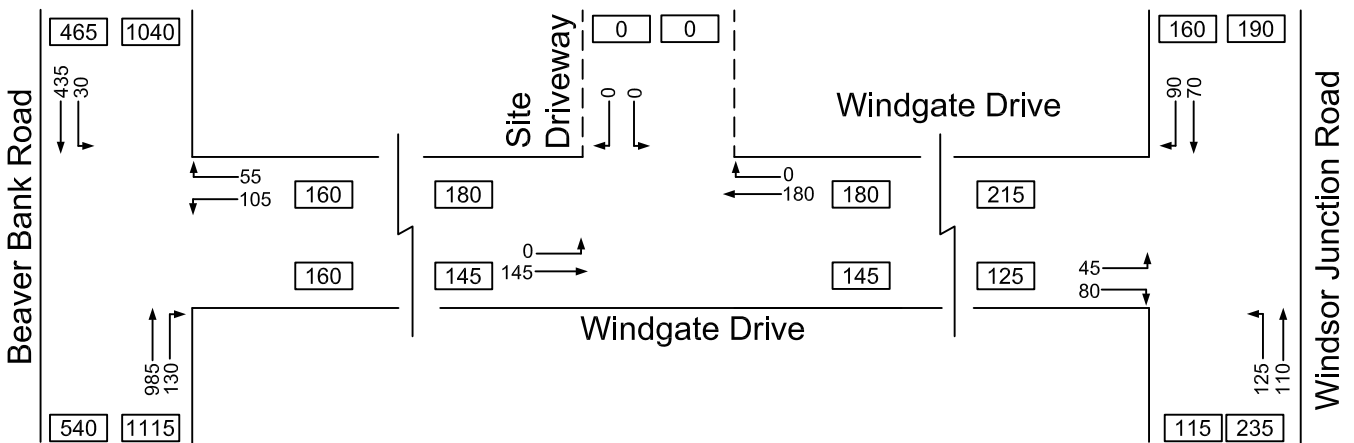
AM Peak Hour



NOT TO SCALE

B

PM Peak Hour



NOT TO SCALE



Traffic Impact Study -
Proposed 'Windgate Village' Mixed Use Development
Beaver Bank, NS

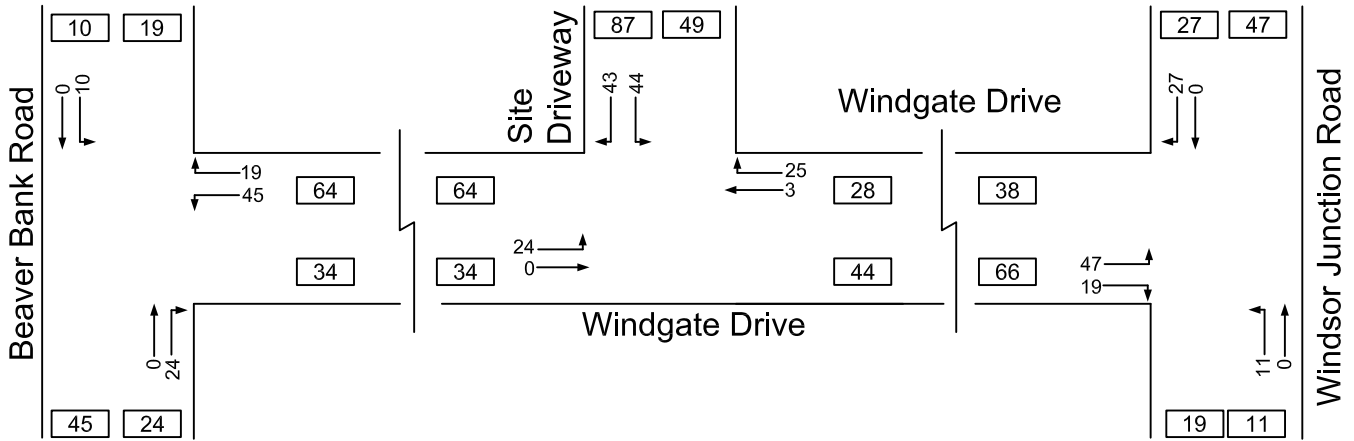
2025 Weekday AM and PM Peak Hour Background Traffic
Without Site Development

Figure A-1

March 2015

A

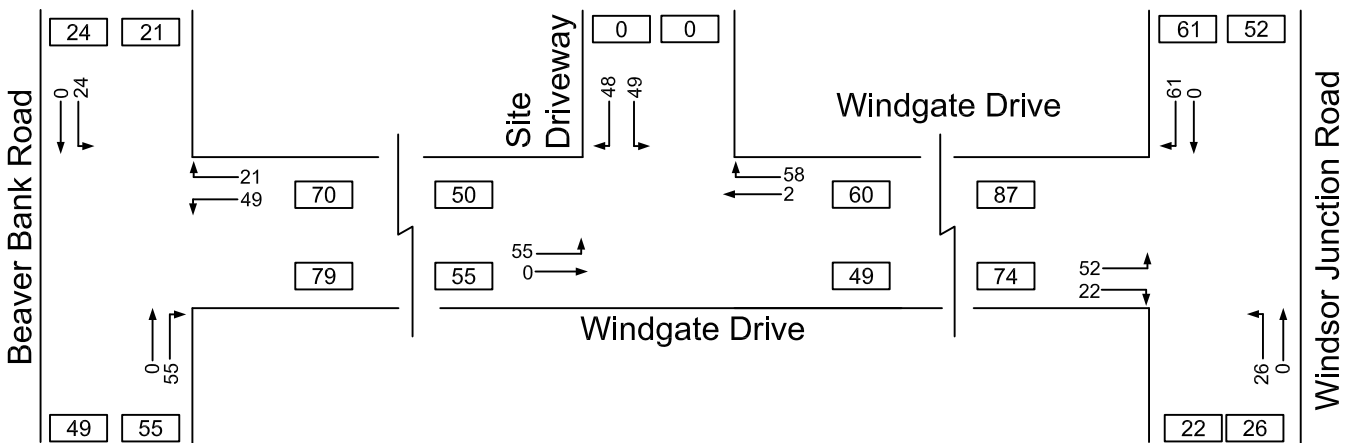
AM Peak Hour



NOT TO SCALE

B

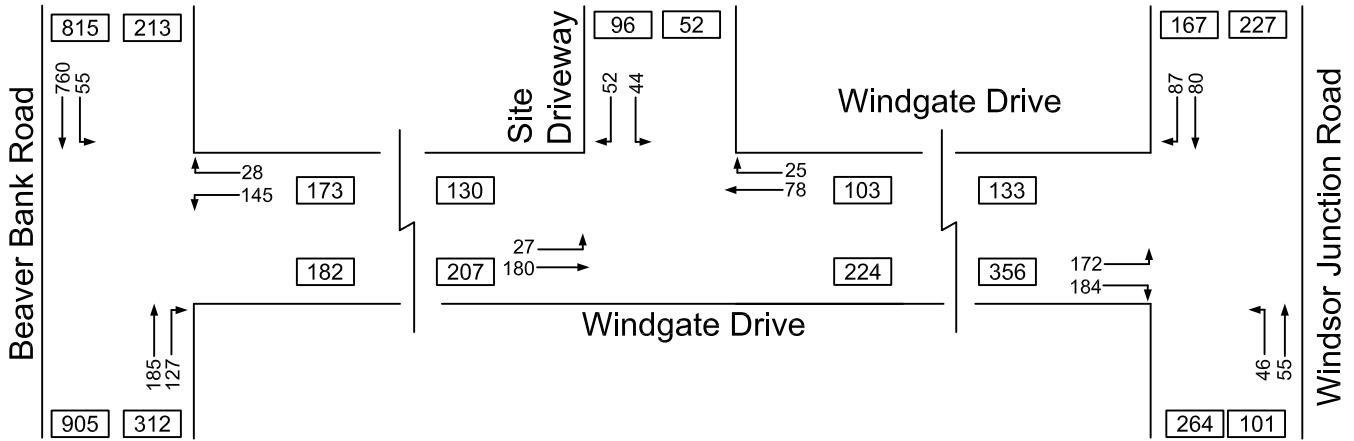
PM Peak Hour



NOT TO SCALE

A

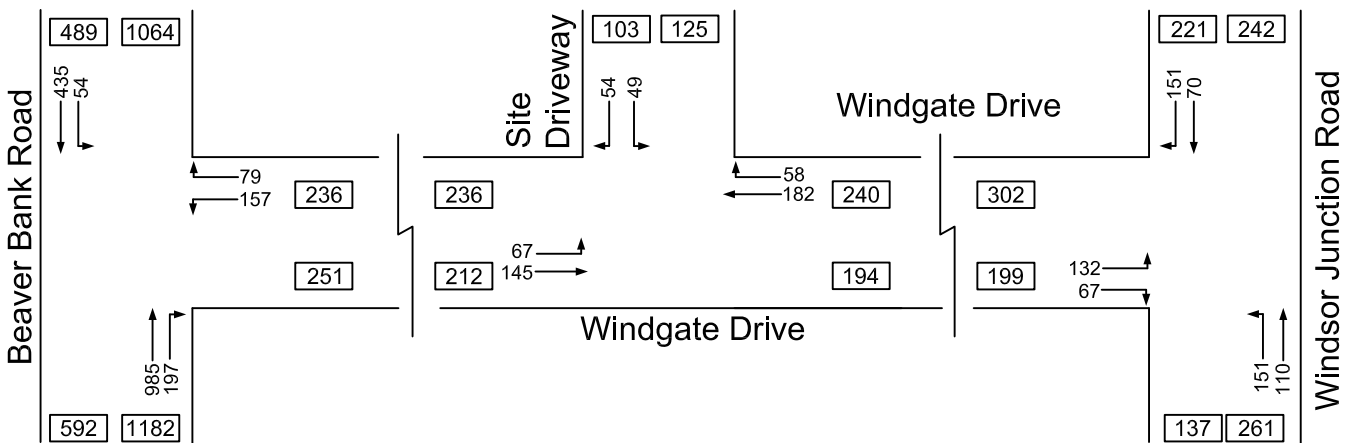
AM Peak Hour



NOT TO SCALE

B

PM Peak Hour



NOT TO SCALE



Traffic Impact Study -
Proposed 'Windgate Village' Mixed Use Development
Beaver Bank, NS

Figure A-3

Projected 2025 AM and PM Peak Hour Background Traffic
With Added Site Generated Trips and Diverted Trips

March 2015

2005 Canadian Traffic Signal Warrant Matrix Analysis

Table A-4: Beaver Bank Road @ Windgate Drive
Projected 2025 Background Traffic Volumes without Site Development

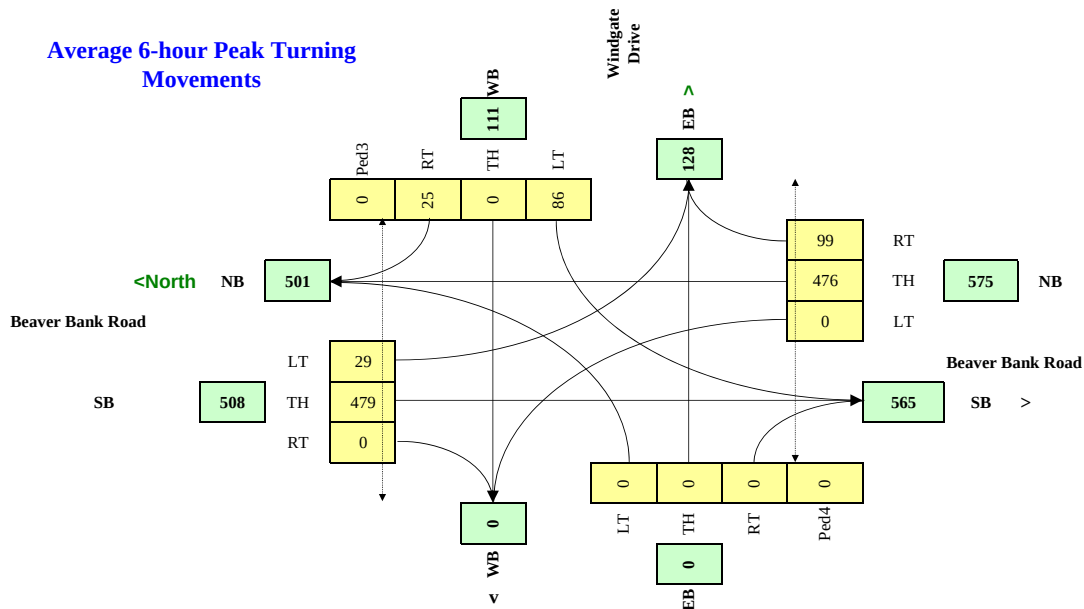
Main Street (name)	Beaver Bank Road			Direction (EW or NS)		NS	Date:	March 2015	
Side Street (name)	Windgate Drive			Direction (EW or NS)		EW	City:	Halifax NS	
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes	
Beaver Bank Road	NB				1			1	
Beaver Bank Road	SB		1				1,000	1	
Windgate Drive	WB			1					
	EB								

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Beaver Bank Road	NS	50	2.0%	n	0.0
Windgate Drive	EW	50	2.0%	n	

	Ped1	Ped2	Ped3	Ped4
	NS	NS	EW	EW
	W Side	E Side	N Side	S side
7:00 - 8:00	0	0	0	0
8:00 - 9:00	0	0	0	0
11:30 - 12:30	0	0	0	0
12:30 - 13:30	0	0	0	0
15:30 - 16:30	0	0	0	0
16:30 - 17:30	0	0	0	0
Total (6-hour peak)	0	0	0	0
Average (6-hour peak)	0	0	0	0

Demographics		
Elementary School	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population (#)		300,000
Central Business District	(y/n)	n

Traffic Input	NB			SB			WB			EB		
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT
7:00 - 8:00	0	185	100	45	760	0	95	0	5	0	0	0
8:00 - 9:00	0	140	75	35	570	0	70	0	5	0	0	0
11:30 - 12:30	0	360	75	20	335	0	80	0	15	0	0	0
12:30 - 13:30	0	350	105	20	405	0	75	0	25	0	0	0
15:30 - 16:30	0	985	130	30	435	0	105	0	55	0	0	0
16:30 - 17:30	0	835	110	25	370	0	90	0	45	0	0	0
Total (6-hour peak)	0	2,855	595	175	2,875	0	515	0	150	0	0	0
Average (6-hour peak)	0	476	99	29	479	0	86	0	25	0	0	0



$$W = [C_{bt}(X_{v-v}) / K_1 + (F(X_{v-p}) L) / K_2] \times C_i$$

W = 63 63 0
 Veh Ped
NOT Warranted

2005 Canadian Traffic Signal Warrant Matrix Analysis

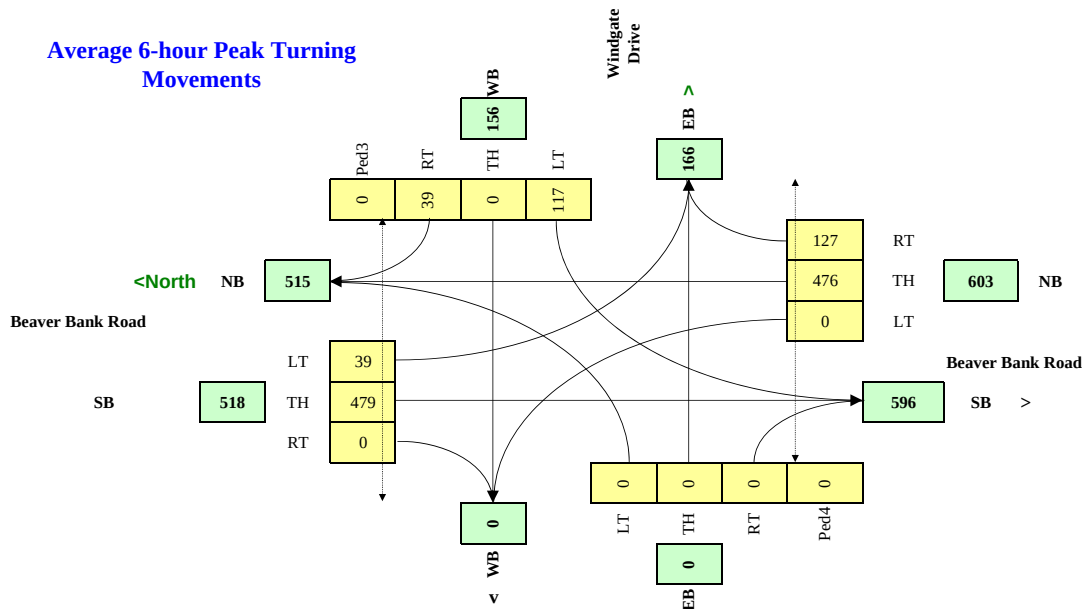
Table A-5: Beaver Bank Road @ Windgate Drive
Projected 2025 Background Traffic Volumes with Site Development

Main Street (name)	Beaver Bank Road		Direction (EW or NS)		NS		Date:	March 2015	
Side Street (name)	Windgate Drive		Direction (EW or NS)		EW		City:	Halifax NS	
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes	
Beaver Bank Road	NB				1			1	
Beaver Bank Road	SB		1				1,000	1	
Windgate Drive	WB			1					
	EB								
Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)				
Beaver Bank Road	NS	50	2.0%	n	0.0				
Windgate Drive	EW	50	2.0%	n					

	Ped1	Ped2	Ped3	Ped4
	NS	NS	EW	EW
	W Side	E Side	N Side	S side
7:00 - 8:00	0	0	0	0
8:00 - 9:00	0	0	0	0
11:30 - 12:30	0	0	0	0
12:30 - 13:30	0	0	0	0
15:30 - 16:30	0	0	0	0
16:30 - 17:30	0	0	0	0
Total (6-hour peak)	0	0	0	0
Average (6-hour peak)	0	0	0	0

Demographics		
Elementary School	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population (#)		300,000
Central Business District	(y/n)	n

Traffic Input	NB			SB			WB			EB		
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT
7:00 - 8:00	0	185	125	55	760	0	145	0	30	0	0	0
8:00 - 9:00	0	140	95	40	570	0	110	0	20	0	0	0
11:30 - 12:30	0	360	75	20	335	0	80	0	15	0	0	0
12:30 - 13:30	0	350	105	20	405	0	75	0	25	0	0	0
15:30 - 16:30	0	985	195	55	435	0	155	0	80	0	0	0
16:30 - 17:30	0	835	165	45	370	0	135	0	65	0	0	0
Total (6-hour peak)	0	2,855	760	235	2,875	0	700	0	235	0	0	0
Average (6-hour peak)	0	476	127	39	479	0	117	0	39	0	0	0



$$W = [C_{bt}(X_{v-v}) / K_1 + (F(X_{v-p}) L) / K_2] \times C_i$$

W = 88 88 0
Veh Ped
NOT Warranted

2005 Canadian Traffic Signal Warrant Matrix Analysis

Table A-6: Windsor Junction Road @ Windgate Drive
Projected 2025 Background Traffic Volumes with Site Development

Main Street (name)	Windsor Junction Road		Direction (EW or NS)		NS		Date:		March 2015	
Side Street (name)	Windgate Drive		Direction (EW or NS)		EW		City:		Halifax NS	
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes		
Windsor Junction Road	NB		1					1		
Windsor Junction Road	SB				1		1,000	1		
Windgate Drive	WB									
	EB			1						

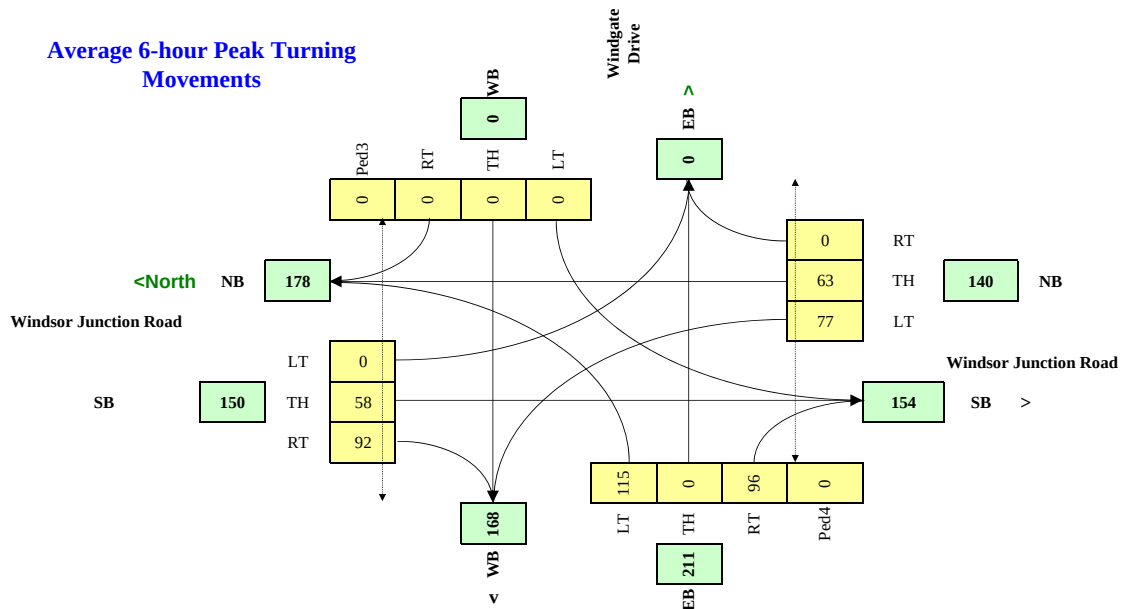
Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Windsor Junction Road	NS	50	2.0%	n	0.0
Windgate Drive	EW	50	2.0%	n	

	Ped1	Ped2	Ped3	Ped4
	NS	NS	EW	EW
	W Side	E Side	N Side	S side
7:00 - 8:00	0	0	0	0
8:00 - 9:00	0	0	0	0
11:30 - 12:30	0	0	0	0
12:30 - 13:30	0	0	0	0
15:30 - 16:30	0	0	0	0
16:30 - 17:30	0	0	0	0
Total (6-hour peak)	0	0	0	0
Average (6-hour peak)	0	0	0	0

Demographics		
Elementary School	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population (#)		300,000
Central Business District	(y/n)	n

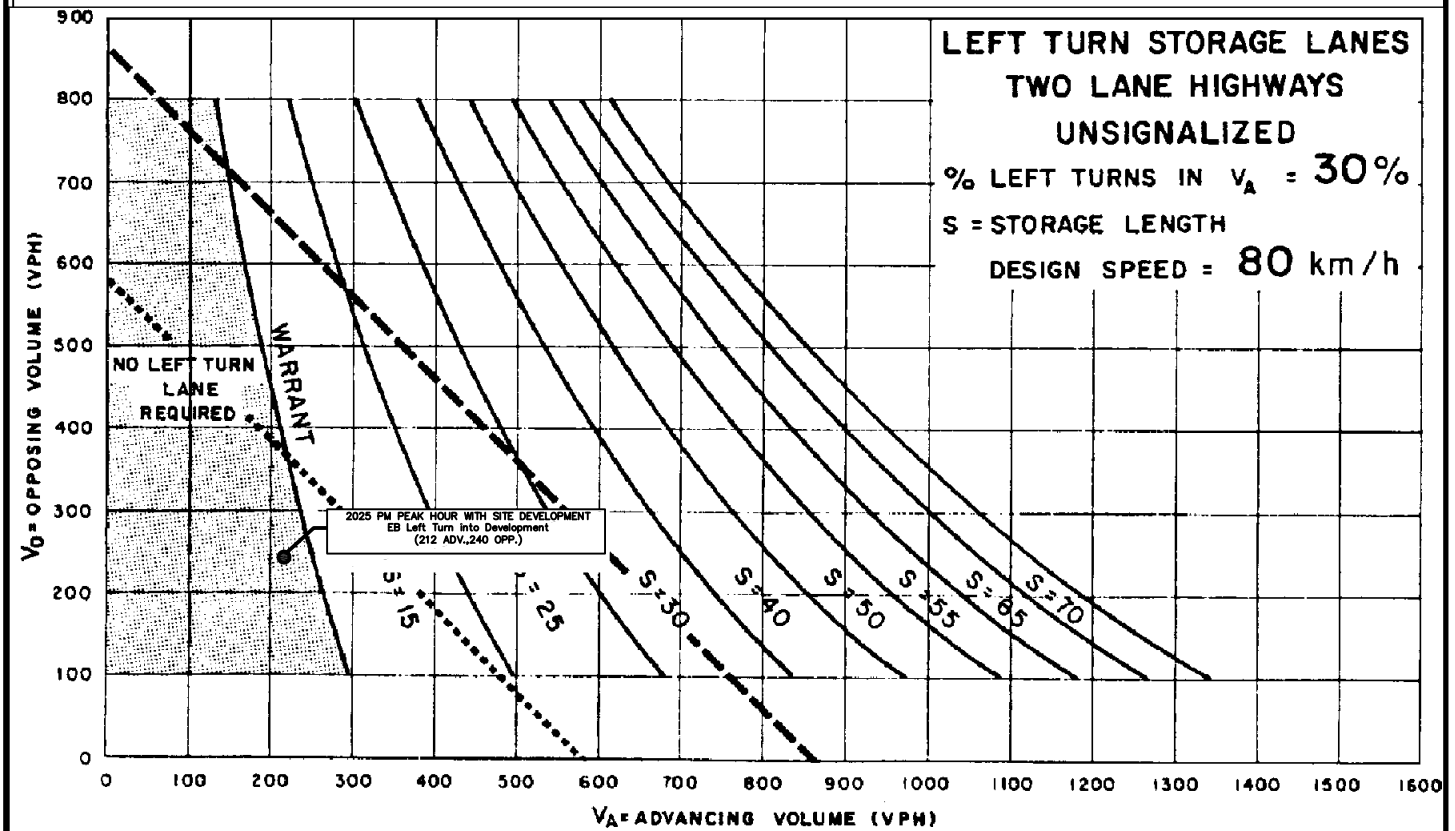
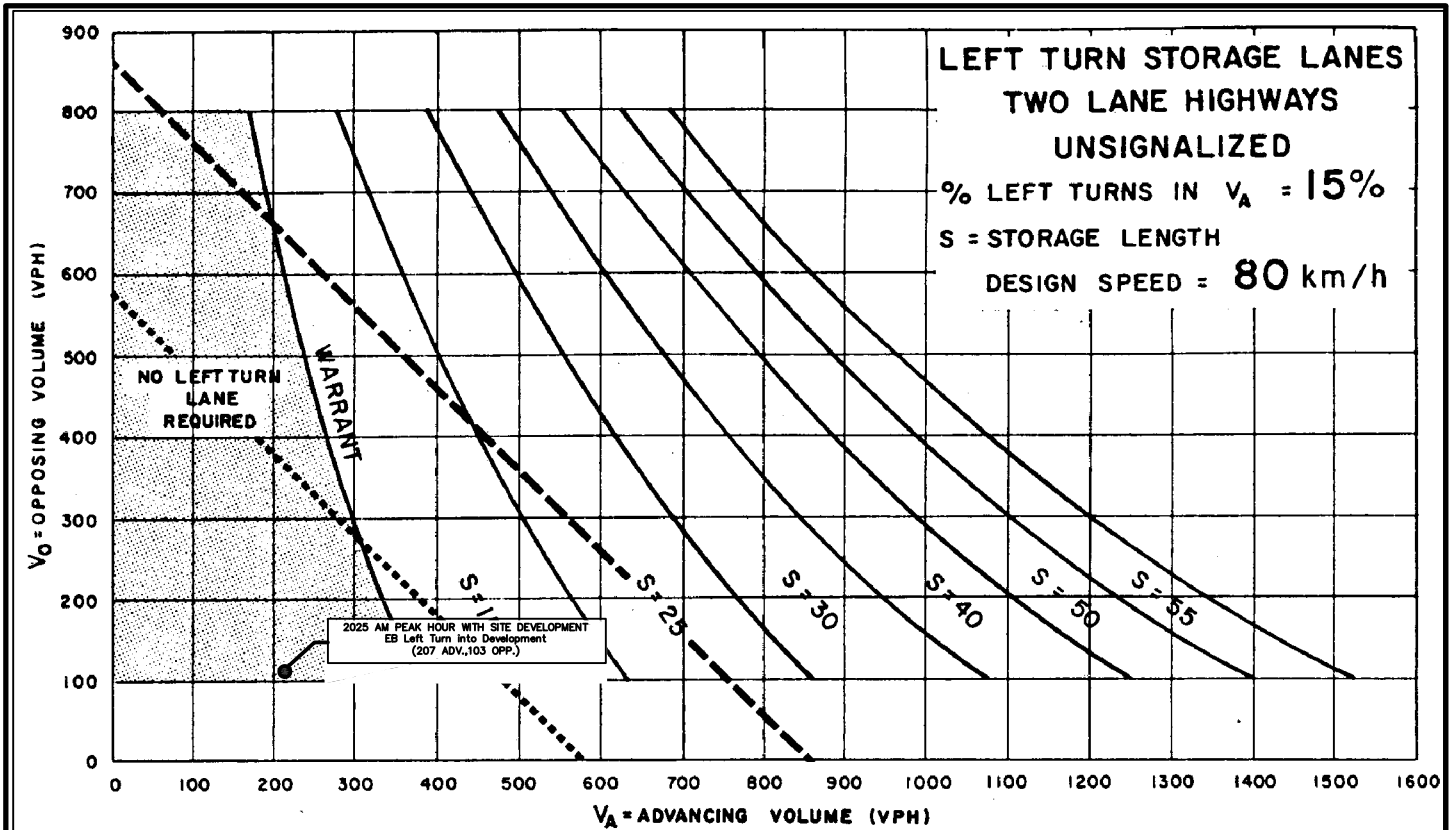
Traffic Input	NB			SB			WB			EB		
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT
7:00 - 8:00	45	55	0	0	80	85	0	0	0	170	0	185
8:00 - 9:00	35	40	0	0	60	65	0	0	0	130	0	140
11:30 - 12:30	50	40	0	0	40	60	0	0	0	75	0	65
12:30 - 13:30	50	40	0	0	40	60	0	0	0	75	0	65
15:30 - 16:30	150	110	0	0	70	150	0	0	0	130	0	65
16:30 - 17:30	130	95	0	0	60	130	0	0	0	110	0	55
Total (6-hour peak)	460	380	0	0	350	550	0	0	0	690	0	575
Average (6-hour peak)	77	63	0	0	58	92	0	0	0	115	0	96

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v-v}) / K_1 + (F(X_{v-p})L) / K_2] \times C_i$$

W = 21 21 0
Veh Ped
NOT Warranted



Appendix B

Intersection Performance Analysis

1: Beaver Bank Road & Windgate Drive

2025 AM Peak Hour without Site Development

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	95	5	185	100	45	760
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	5	201	109	49	826
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1179	255			310	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1179	255			310	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	49	99			96	
cM capacity (veh/h)	202	783			1251	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	109	310	49	826		
Volume Left	103	0	49	0		
Volume Right	5	109	0	0		
cSH	210	1700	1251	1700		
Volume to Capacity	0.52	0.18	0.04	0.49		
Queue Length 95th (m)	20.2	0.0	0.9	0.0		
Control Delay (s)	39.2	0.0	8.0	0.0		
Lane LOS	E		A			
Approach Delay (s)	39.2	0.0	0.4			
Approach LOS	E					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			52.2%		ICU Level of Service	A
Analysis Period (min)			15			

Appendix B - Intersection Performance Analysis
2: Windsor Junction Road & Windgate Drive

Page B-2
2025 AM Peak Hour without Site Development

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	125	165	35	55	80	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	136	179	38	60	87	65
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	255	120	152			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	255	120	152			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	81	97			
cM capacity (veh/h)	714	932	1429			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	315	98	152			
Volume Left	136	38	0			
Volume Right	179	0	65			
cSH	823	1429	1700			
Volume to Capacity	0.38	0.03	0.09			
Queue Length 95th (m)	13.7	0.6	0.0			
Control Delay (s)	12.1	3.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.1	3.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			7.3			
Intersection Capacity Utilization			39.8%	ICU Level of Service		A
Analysis Period (min)			15			

1: Beaver Bank Road & Windgate Drive

2025 PM Peak Hour without Site Development

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	105	55	985	130	30	435
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	60	1071	141	33	473
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1679	1141			1212	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1679	1141			1212	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	76			94	
cM capacity (veh/h)	98	244			576	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	174	1212	33	473		
Volume Left	114	0	33	0		
Volume Right	60	141	0	0		
cSH	124	1700	576	1700		
Volume to Capacity	1.41	0.71	0.06	0.28		
Queue Length 95th (m)	89.7	0.0	1.4	0.0		
Control Delay (s)	288.8	0.0	11.6	0.0		
Lane LOS	F		B			
Approach Delay (s)	288.8	0.0	0.8			
Approach LOS	F					
Intersection Summary						
Average Delay			26.8			
Intersection Capacity Utilization			75.6%	ICU Level of Service		D
Analysis Period (min)			15			

Appendix B - Intersection Performance Analysis
2: Windsor Junction Road & Windgate Drive

Page B-4
2025 PM Peak Hour without Site Development

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	80	45	125	110	70	90
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	49	136	120	76	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	516	125	174			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	516	125	174			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	95	90			
cM capacity (veh/h)	469	926	1403			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	136	255	174			
Volume Left	87	136	0			
Volume Right	49	0	98			
cSH	570	1403	1700			
Volume to Capacity	0.24	0.10	0.10			
Queue Length 95th (m)	7.0	2.4	0.0			
Control Delay (s)	13.3	4.6	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.3	4.6	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			5.3			
Intersection Capacity Utilization			39.1%	ICU Level of Service		A
Analysis Period (min)			15			

1: Beaver Bank Road & Windgate Drive

2025 AM Peak Hour with Site Development

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	145	28	185	127	55	760
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	30	201	138	60	826
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1216	270			339	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1216	270			339	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	17	96			95	
cM capacity (veh/h)	190	769			1220	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	188	339	60	826		
Volume Left	158	0	60	0		
Volume Right	30	138	0	0		
cSH	217	1700	1220	1700		
Volume to Capacity	0.87	0.20	0.05	0.49		
Queue Length 95th (m)	51.7	0.0	1.2	0.0		
Control Delay (s)	77.8	0.0	8.1	0.0		
Lane LOS	F		A			
Approach Delay (s)	77.8	0.0	0.5			
Approach LOS	F					
Intersection Summary						
Average Delay			10.7			
Intersection Capacity Utilization			56.4%		ICU Level of Service	B
Analysis Period (min)			15			

Appendix B - Intersection Performance Analysis
2: Windsor Junction Road & Windgate Drive

Page B-6
2025 AM Peak Hour with Site Development

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	172	184	46	55	80	87
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	187	200	50	60	87	95
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	294	134	182			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	294	134	182			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	72	78	96			
cM capacity (veh/h)	672	915	1394			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	387	110	182			
Volume Left	187	50	0			
Volume Right	200	0	95			
cSH	779	1394	1700			
Volume to Capacity	0.50	0.04	0.11			
Queue Length 95th (m)	21.3	0.8	0.0			
Control Delay (s)	14.1	3.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.1	3.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			8.6			
Intersection Capacity Utilization			45.8%	ICU Level of Service		A
Analysis Period (min)			15			

10: Windgate Drive & Proposed Site Access

2025 AM Peak Hour with Site Development

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	27	180	78	25	44	52
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	196	85	27	48	57
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	112				353	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				353	98
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				92	94
cM capacity (veh/h)	1478				632	958
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	225	112	104			
Volume Left	29	0	48			
Volume Right	0	27	57			
cSH	1478	1700	775			
Volume to Capacity	0.02	0.07	0.13			
Queue Length 95th (m)	0.5	0.0	3.5			
Control Delay (s)	1.1	0.0	10.4			
Lane LOS	A		B			
Approach Delay (s)	1.1	0.0	10.4			
Approach LOS			B			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			29.9%	ICU Level of Service		A
Analysis Period (min)			15			

1: Beaver Bank Road & Windgate Drive

2025 PM Peak Hour with Site Development

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	157	79	985	197	54	435
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	171	86	1071	214	59	473
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1768	1178			1285	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1768	1178			1285	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	63			89	
cM capacity (veh/h)	82	232			540	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	257	1285	59	473		
Volume Left	171	0	59	0		
Volume Right	86	214	0	0		
cSH	105	1700	540	1700		
Volume to Capacity	2.45	0.76	0.11	0.28		
Queue Length 95th (m)	175.9	0.0	2.8	0.0		
Control Delay (s)	747.2	0.0	12.5	0.0		
Lane LOS	F		B			
Approach Delay (s)	747.2	0.0	1.4			
Approach LOS	F					
Intersection Summary						
Average Delay			92.8			
Intersection Capacity Utilization			84.0%	ICU Level of Service		E
Analysis Period (min)			15			

Appendix B - Intersection Performance Analysis
2: Windsor Junction Road & Windgate Drive

Page B-9
2025 PM Peak Hour with Site Development

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	132	67	151	110	70	151
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	143	73	164	120	76	164
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	606	158	240			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	606	158	240			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	92	88			
cM capacity (veh/h)	403	887	1326			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	216	284	240			
Volume Left	143	164	0			
Volume Right	73	0	164			
cSH	494	1326	1700			
Volume to Capacity	0.44	0.12	0.14			
Queue Length 95th (m)	16.7	3.2	0.0			
Control Delay (s)	17.8	5.1	0.0			
Lane LOS	C	A				
Approach Delay (s)	17.8	5.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			48.5%	ICU Level of Service		A
Analysis Period (min)			15			

10: Windgate Drive & Proposed Site Access

2025 PM Peak Hour with Site Development

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	67	145	182	58	49	54
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	73	158	198	63	53	59
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	261				533	229
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261				533	229
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				89	93
cM capacity (veh/h)	1304				479	810
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	230	261	112			
Volume Left	73	0	53			
Volume Right	0	63	59			
cSH	1304	1700	610			
Volume to Capacity	0.06	0.15	0.18			
Queue Length 95th (m)	1.3	0.0	5.1			
Control Delay (s)	2.8	0.0	12.2			
Lane LOS	A		B			
Approach Delay (s)	2.8	0.0	12.2			
Approach LOS			B			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			40.5%	ICU Level of Service		A
Analysis Period (min)			15			

Appendix 6

Archeological Resource Impact Assessment Report



Windgate Village:

**Archaeological Resource Impact Assessment
Heritage Research Permit A2014NS111**

**WINDGATE VILLAGE:
ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT**

**Heritage Research Permit A2014NS111
Category C**

**Davis MacIntyre & Associates Limited
Project No.: 14-036.1MAR**

**Principal Investigator: Laura de Boer
Report Compiled by: Laura de Boer**

Submitted to:

**Marque Investments Inc.
Real Estate Investment & Land Development
6 Louise Court
Dartmouth, NS
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-and-

**Coordinator, Special Places
Communities, Culture and Heritage
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Cover: A grassy portion of the study area, looking northeast.

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EXECUTIVE SUMMARY

In November 2014, Davis MacIntyre & Associates Limited was contracted by Marque Investments Inc. to conduct an archaeological resource impact assessment of the proposed Windgate Village development project. The assessment included a historic background study as well as a field reconnaissance of all areas to be impacted.

A fragment of chalcedony was recovered from a tree throw within the study area. While it is not clear whether the fragment was fractured as a result of lithic tool manufacture, it is obvious that this stone is not native to the study area. The lack of suitable terracing or access to water, coupled with the otherwise culturally sterile appearance of the soil, suggests this object could be an isolated find, and not indicative of the presence of an archaeological site. However, exposed soil was limited to a small area, and the tumbled nature of the stone suggests it could have washed down from slightly higher ground, near an existing logging road to the west. It is also worth considering that in 1911, a grooved stone axe head was recovered from the bed of a stream that runs through the study area, though the exact location of the find is not known. After consulting with the Provincial Curator of Archaeology, archaeological testing for an area of moderate archaeological potential (10 metre intervals) is recommended for an area approximately 50 metres by 50 metres centred on the find site, in order to confirm the presence or absence of archaeological resources in this area.

Aside from this chalcedony find, the only area of note is located at the southern end of the study area. This notable location is approximately 40 metres by 40 metres in size and consists of domestic plant varieties and smooth topography, suggesting that a historic residence was located somewhere within this area. Based upon the presence of mixed varieties of fieldstone adjacent to a logging road in this area, it appears likely that the house foundation was removed during road widening. However, this could not be confirmed through either archival records or field reconnaissance, nor could the team establish the age of this occupancy. Historical background research suggests that it does not predate 1865, and that it was not a standing building in 1909.

Archaeological testing at this location, even spaced at 5 metre intervals, could easily miss outbuildings or privy features associated with historic occupation in the absence of surficial evidence of structures, and could likewise yield little or no artifactual material if test units are not placed in areas where such material was deposited within this cultural landscape. As such, it is recommended that a qualified archaeologist be present during grubbing or other preliminary ground disturbance activities in order to establish whether or not any archaeological resources remain intact, and to determine a suitable method of mitigation if any archaeological material is encountered.

In the event that archaeological resources are encountered elsewhere in the study area, it is required that any ground-disturbing activity be halted immediately and the

Coordinator of Special Places (902-424-6475) be contacted immediately regarding a suitable method of mitigation.

1.0 INTRODUCTION

In November 2014, Davis MacIntyre & Associates Limited was contracted by Marque Investments Inc. to conduct an archaeological resource impact assessment of the proposed Windgate Village development project. The assessment included a historic background study as well as a field reconnaissance of all areas to be impacted.

This assessment was conducted under Category C (Archaeological Resource Impact Assessment) Heritage Research Permit A2014NS111 issued by the Department of Communities, Culture and Heritage. This report conforms to the standards required by the Culture and Heritage Development Division under the Special Places Protection Act (*R.S., c. 438, s. 1*).

2.0 STUDY AREA

Marque Investments Inc. is proposing to develop a 350-acre property on Windgate Drive between the Capilano Estates and Rivendale Subdivisions near Beaverbank and Windsor Junction, Halifax County (Figure 2.0-1). The development is through the HRM Open Space Design Development policy, which is designed to locate houses on the portion of the property that is best suited for development, while retaining the remainder of the property as open space. The exact location and extent of ground disturbance or impact has not yet been determined, and as such, this assessment will be applied to the entire property.

The project is located within the Headwater Lakes Natural Theme Region, Beaverbank sub-Unit (#436a)(Figure 2.0-2). Greywacke and slate underlies this region in parallel east-west bands, forming a topography of low ridges and shallow valleys. Overlaying the bedrock is predominantly red and sandy Lawrencetown Till, changing to quartzite till west of Beaverbank Lake, where Lawrencetown Till drumlins are also found. Large areas of rock are exposed in some locations. Soils include medium-textured red Wolfville loams for the most part, with some Halifax soil and Danesville sandy loam, which are well-drained and imperfectly drained respectively.

Water in this region has little order, forming lakes, bogs, and interconnecting streams in irregular patterns including the Waverley chain of lakes that span a third of the province's width and are now part of the historic Shubenacadie Canal.

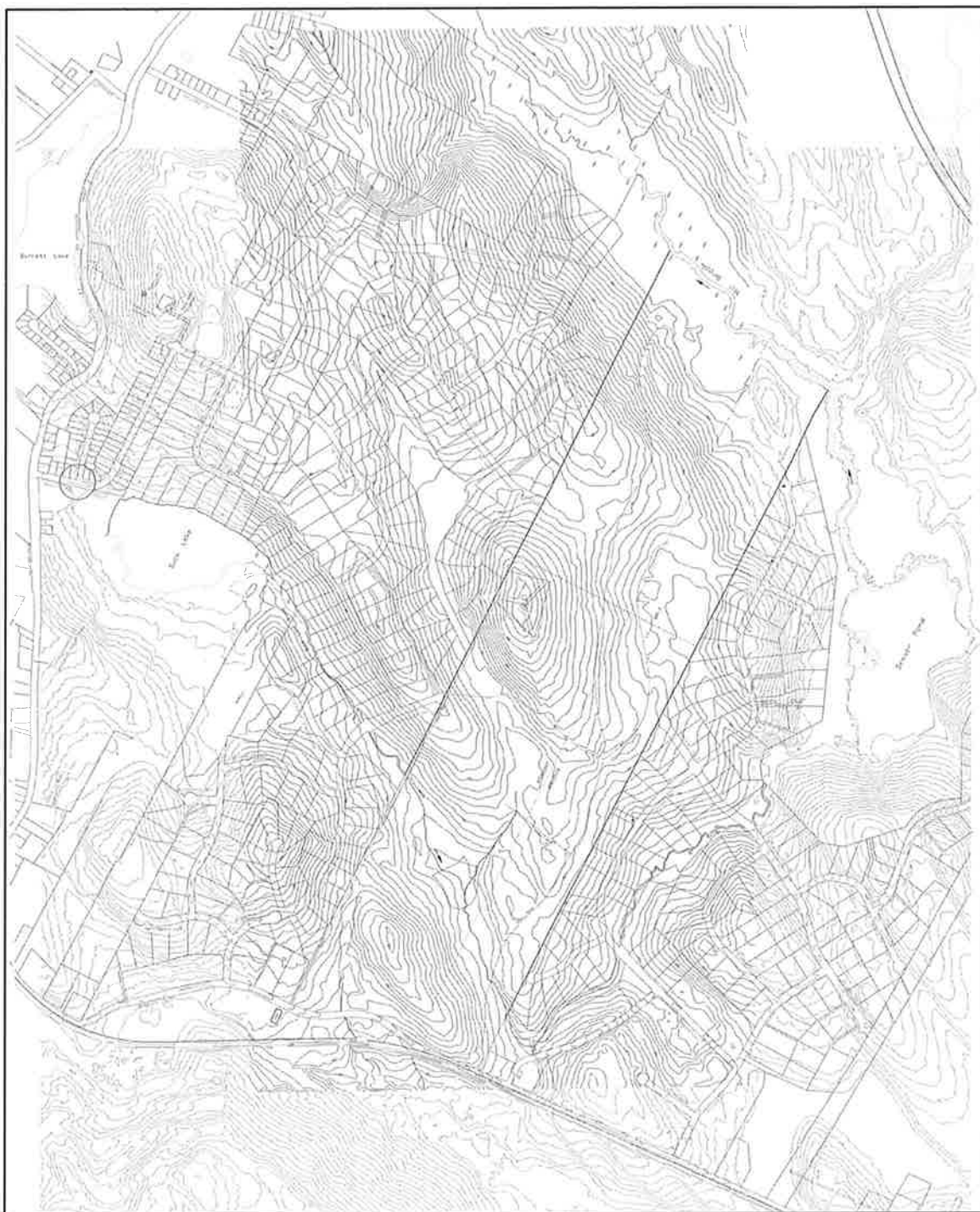


Figure 2.0-1: A line drawing provided by Marque Investments shows the undeveloped study area located between two modern subdivisions.

Trees characterizing the region include Red Spruce and Eastern Hemlock, along with White Pine, Balsam Fir, Red Maple, and Yellow Birch. Shallow soil in previously burnt areas attracts the growth of shade-intolerant birch and aspen.¹

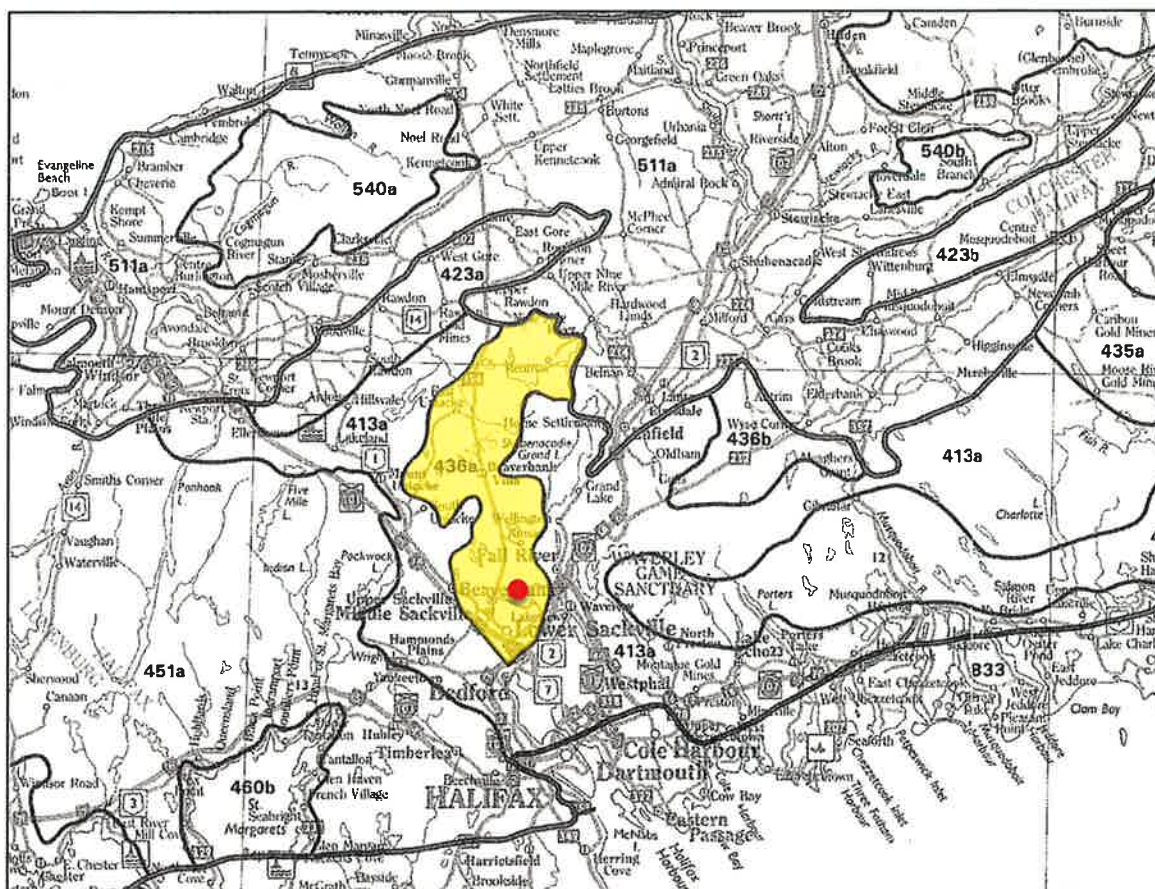


Figure 2.0-2: Detail of a map of the natural theme regions of Nova Scotia, showing the Headwater Lakes region, Beaverbank sub-Unit (#436a, highlighted).² The study area is shown in red.

3.0 METHODOLOGY

A historic background study was conducted by Davis MacIntyre & Associates Limited in November 2014. Historical maps and manuscripts and published literature were consulted at the Nova Scotia Archives as well as online. The Maritime Archaeological Resource Inventory, a database of known archaeological resources in the Maritime region, was searched to understand prior archaeological research and known

¹ Davis and Browne 1996:76.

² After Davis and Browne 1996.

archaeological resources neighbouring the study area. Finally, a field reconnaissance was conducted in order to further evaluate the potential for archaeological resources.

3.1 Maritime Archaeological Resource Inventory

The Maritime Archaeological Resource Inventory, a database of known archaeological sites in the Maritime Provinces, was consulted in November 2014.

An isolated archaeological find is known within or in very close proximity to the study area (BeCw-01). The find was a grooved stone axe head most likely dating to the Late Archaic period. In 1911, the artifact was recovered from the bed of a brook running between Duck Pond and Beaver Pond, which flows directly through the study area. The axe is part of the Nova Scotia Museum's archaeological collection.

Aside from the Bedford Barrens petroglyphs located approximately 7km south of the study area (BeCw-02), most of the registered archaeological sites relating to First Nations activity in proximity to the study area are found approximately 5km to the east, along the Shubenacadie waterway. Historic sites are also known in that area.

Approximately 5km east-northeast of the study area, a historic residence and associated features are known just off Highway 1 (BeCw-04). Known as the D. Hamilton site, it represents a pre-confederation (1867) homestead.

3.2 Historical Background

3.2.1 The Precontact Period

The history of human occupation in Nova Scotia has been traced back approximately 11,000 years ago, to the Palaeo-Indian period or Sa'qewe'k L'nu'k (11,000 – 9,000 years BP). The only significant archaeological evidence of Palaeo-Indian settlement in the province exists at Debert/Belmont in Colchester County.

The Sagiwe'k Lnu'k period was followed by the Mu Awsami Kejikawe'k L'nu'k (Archaic period) (9,000 – 2,500 years BP), which included several traditions of subsistence strategy. The Maritime Archaic people exploited mainly marine resources while the Shield Archaic concentrated on interior resources such as caribou and salmon. The Laurentian Archaic is generally considered to be a more diverse hunting and gathering population.

The Archaic period was succeeded by the Woodland/Ceramic period or Kejikawek L'nu'k (2,500 – 500 years BP). Much of the Archaic way of subsistence remained although it was during this period that the first exploitation of marine molluscs is seen in the

archaeological record. It was also during this time that ceramic technology was first introduced.

The Woodland period ended with the arrival of Europeans and the beginning of recorded history. The initial phase of contact between First Nations people and Europeans, known as the Protohistoric period, was met with various alliances particularly between the Mi'kmaq and French.

The Mi'kmaq inhabited the territory known as Mi'kma'ki or Megumaage, which included all of Nova Scotia including Cape Breton, Prince Edward Island, New Brunswick (north of the Saint John River), the Gaspé region of Quebec, part of Maine and southwestern Newfoundland.

The area roughly encompassing Halifax, Lunenburg, Kings, Hants and Colchester Counties was known as *Sipekni'katik* or "wild potato area".³ For centuries, the Mi'kmaq had encampments along the shores of the Bedford Basin, Dartmouth, Eastern Passage, and McNab's Island in the district known as *Eskikewa'kik* or "skin dressers territory". First Nations occupation is particularly notable along what would become the Shubenacadie Canal system, as well as around the Bedford Barrens and on the St. Margaret's Bay watershed. Kinsac Lake is thought to be a Mi'kmaw name.⁴

³ Confederacy of Mainland Mi'kmaq 2007:11

⁴ Smiley 1968:8.

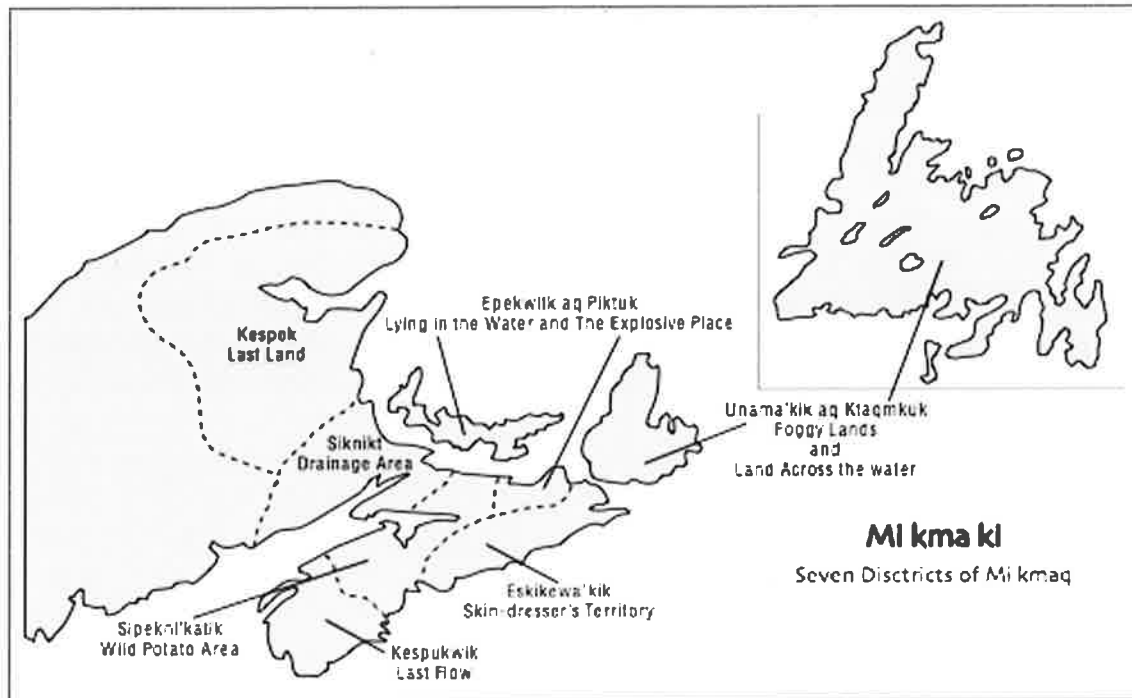


Figure 3.2-1: Map of the Mi'kmaq districts.⁵

3.2.2 European Settlement

The study area is located in the community of Windsor Junction, and is closely adjacent to the community of Beaver Bank. Windsor Junction was named for the joining rail lines from Windsor, Truro, and Halifax and Dartmouth. The settlement was part of a large grant of land made to Joseph Scott in 1765.⁶

It is thought that the community name of Beaver Bank originates from the presence of a large beaver dam in the area, although consulted historical sources did not indicate the exact origin of the name.⁷ The community is also spelled as Beavervbank, a 1950's alteration made by an RCAF secretary at a local radar base to make typing faster.⁸

Notable European settlers in Beaver Bank's early years include John Barnstead, who lived on a rented farm in 1811, and William Nicholson, who received a 550 acre grant in 1813 and had built two houses by 1824 with 20 acres under cultivation. Five members of the Fultz family were collectively granted 1350 acres of land near the Halifax-Hants county border in July of 1816. There were a total of ten families forming the settlement at Beaver Bank by 1827.⁹

⁵ Confederacy of Mainland Mi'kmaq 2007:11

⁶ Fergusson 1967: 740.

⁷ Fergusson 1967:47.

⁸ Jones 1985.

⁹ Fergusson 1967: 47.

Beaver Bank's first sawmill was located on or near the site of Barrett Lumber Co.'s plant near the railway line on the present Beaver Bank Road, using vertical saws operated by a water wheel. A second mill was operated on the site by Benjamin Dean sometime before Barrett Lumber established themselves on the site, driven by water power and using rotary saws, which suggests it was in operation sometime after 1870. Several other sawmills operated in the community historically, but by the 1960s only Barrett Lumber was in operation.¹⁰

The rail line from Halifax to Windsor Junction was completed in 1857, though it did not connect to Windsor and Truro until the following year, opening officially on June 3rd, 1858. By 1882, the community had a large station house that was two storeys in height and included accommodations for the Station Agent and his family. Another line between Windsor Junction and Dartmouth was completed in 1896, and the Halifax to Windsor Junction line was made into a double track in 1905.¹¹

Settlement in this area was somewhat sparse until the introduction of the railway and the creation of a major rail junction here, with a significant influx of "auld sod Irish and German" settlers around 1867.¹² Historic settlement appears to have predominantly taken place around Kinsac Lake and Third Lake, east of the study area.

The nearby Windgate Farm, now defunct but previously operated as a horse training and boarding facility, was part of a property purchased by the Keough (or Kehoe) family in 1860 from George and Joanne Weston, remaining in the Keough family for at least 100 years.¹³ Another prominent house and family in the vicinity was the Lee Homestead, built in the late 1800's and bought by the Ashburn Golf Course, north of the study area, before being demolished sometime after 1983.¹⁴

The abundance of rocks in this area is so prevalent that one undated anecdote exists about the elderly Mrs. Heisian, who at one point was seen carrying wood up a ladder to the top of a large boulder to create a huge pile, which she then set alight. When the rock beneath the fire was sufficiently heated, she and the local children threw buckets of water on the rock until it was "cracked asunder" and could be more easily dealt with.¹⁵

Living in close proximity to the rail junction, residents of the area were known to be accustomed to the thundering noise, the sound of an engine's whistle, and the "rattling progress" of the trains, while visitors were often made a "nervous wreck" by the same

¹⁰ Smiley 1968:7.

¹¹ The Friendly Group Seniors History Club 1989:122.

¹² Arnold 1968:18.

¹³ Norton 1997: 62, 64.

¹⁴ Wyatt 1997: 66.

¹⁵ Arnold 1968: 18.

Before 1900, there were no houses found north of McGuire's Crossing, where a significant forest fire had razed the area and left it inhospitable in appearance for years afterwards.¹⁷ Unfortunately, it is not clear from local sources where McGuire's Crossing was located within the community. Electricity was brought to the Windsor Junction community in 1926.¹⁸

The map is a detailed topographic representation of a rural area in Ontario, Canada. It features a yellow-shaded rectangular area, which is the focus of the project. The map includes various geographical features such as lakes (Wilson L., Little L., Feely L., Duck Pond, Beaver Pond, Second Lake), hills (Mardon Hill), and roads. A yellow rectangle highlights a specific area, likely the site of the proposed development. The map also shows property boundaries, lot numbers, and names of landowners or residents.

¹⁶ Arnold 1968: 17.
¹⁷ Arnold 1968: 18.
¹⁸ The Friendly Group Seniors History Club 1989:36.
¹⁹ Department of Lands and Forests 1952.
 Davis MacIntyre & Associates Limited

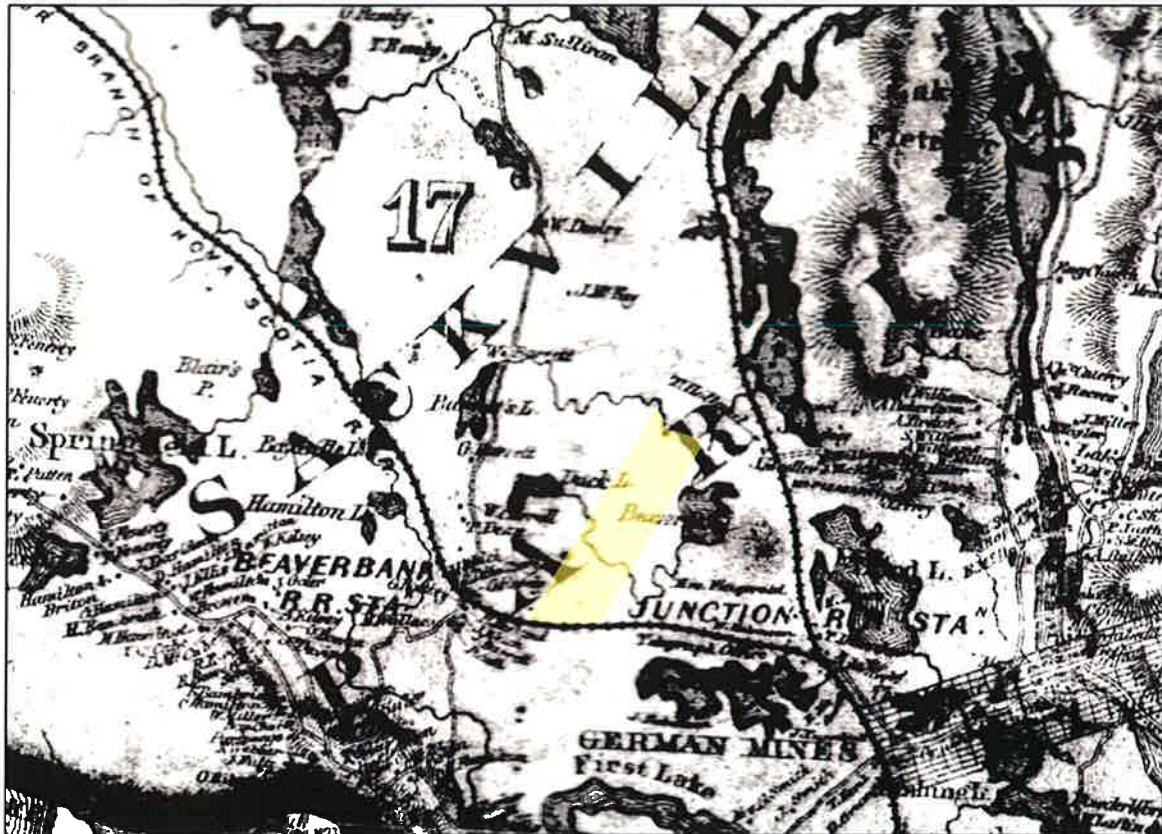


Figure 3.2-3: The Ambrose Church map of Halifax County, showing the approximate study area in yellow.²⁰ Note that Windgate Drive (previously the Windsor Junction Cross Road) has not yet been built.

Aerial photographs from the 1930s onwards were reviewed, but unfortunately none were sufficiently clear to distinguish houses or other buildings from large trees along Windgate Drive. The Geological Survey of Canada map series, compiled by Hugh Fletcher and Eugene Faribault, is generally accepted to be highly accurate, and as such it appears most likely that no buildings were standing on the property in 1909.

²⁰ Church 1865.

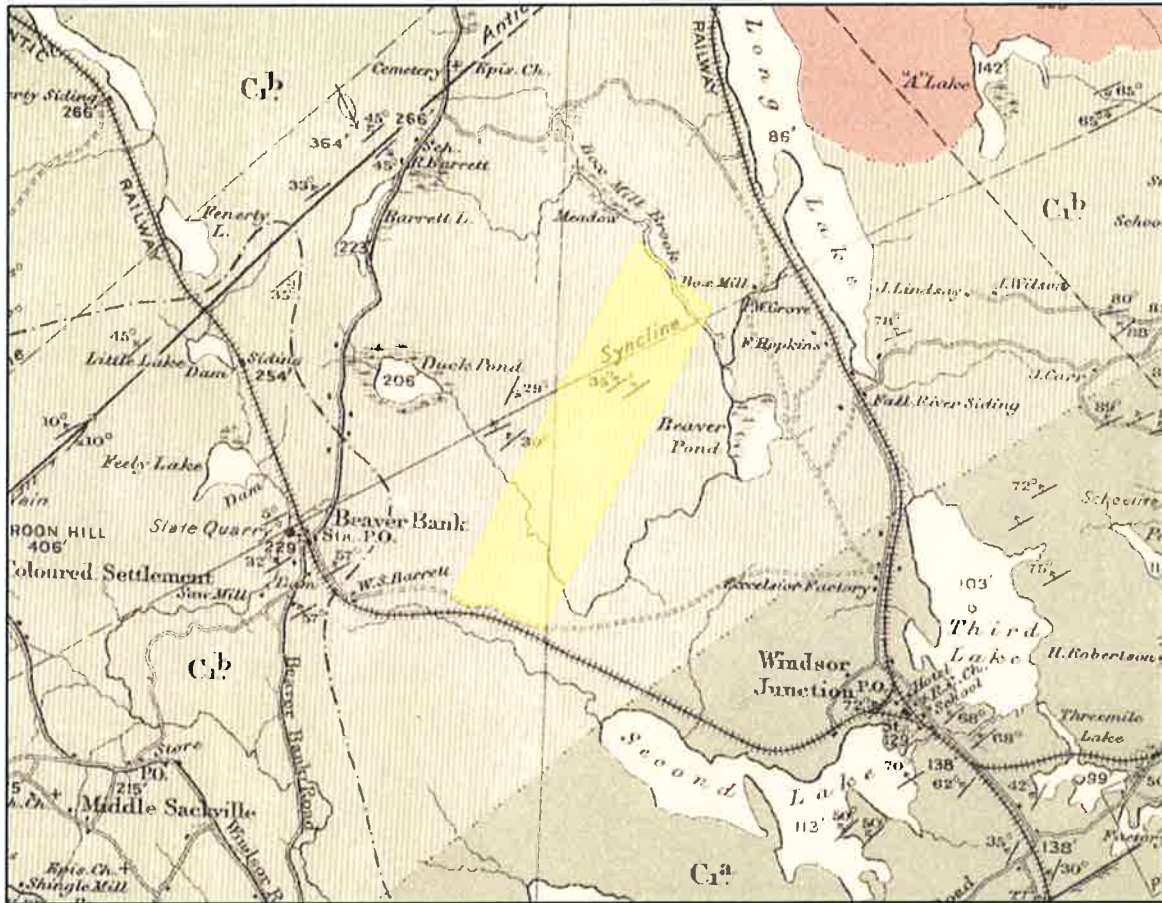


Figure 3.2-4: Detail of a Geological Survey of Canada map from 1909, showing the approximate outline of the study area in yellow.²¹ Note that Windgate Drive now runs along the rail tracks, but in 1909 is shown as travelling almost due east to the Excelsior Factory north of Windsor Junction.

3.3 Field Reconnaissance

A field reconnaissance was conducted in late November 2014 by two archaeological teams to speed the process of the survey. The reconnaissance was aided by hand-held GPS units, and in the absence of evidence of historic cultural activity in much of the study area the team made note of terrain, plant life, recent logging, and forest regrowth of two decades or more. The team made use of the logging roads and ATV trails that criss-cross the entirety of the study area, frequently detouring off the trails and into the forest or the open and recently harvested areas to ensure sufficient coverage of the terrain. Notable findings are shown on Figure 3.3-1.

²¹ Senécal 1909.

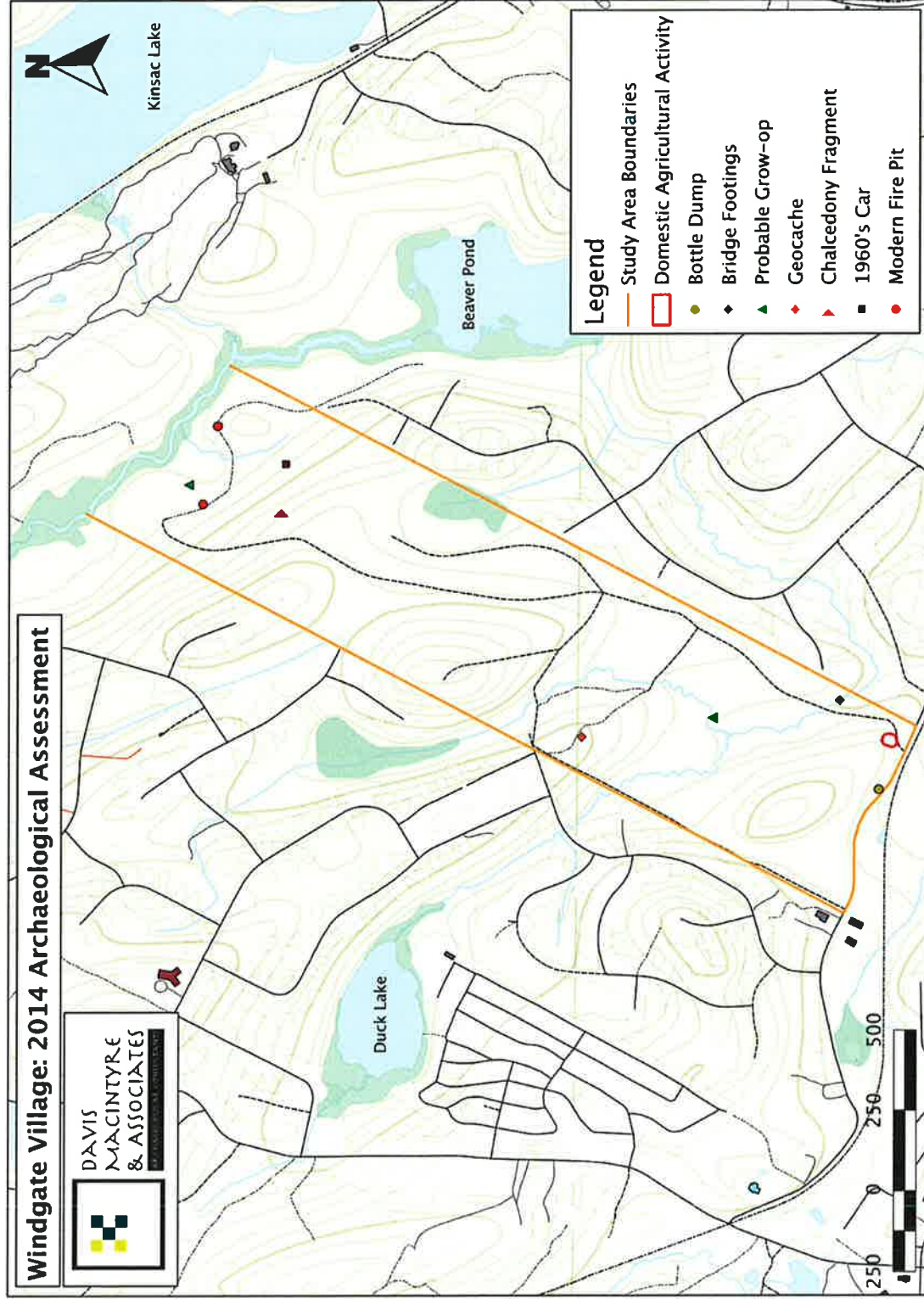


Figure 3.3-1: A map showing reconnaissance findings within the study area.

The front or south end of the study area along Windgate Drive was dominated by several decades' worth of secondary forest growth, with large swaths of poorly drained areas forming wet spruce swamps. Most of the secondary growth is spruce and tamarack, with some birch and maple on better-drained slopes and uplands. Blackberry or raspberry bushes are found in abundance as well, usually in relation to hardwood rather than conifer regrowth. A small cache of glass bottles from the mid-twentieth century, including an amber glass Javex bottle and a twist-top Minard's Liniment bottle (Plate 1), were observed less than 10 metres from the side of Windgate Drive, most likely dumped by a passing car.

Near the study area's southeastern corner, a section of vegetation was notably domestic, including grape vines, apple and other fruit trees, blackberry or raspberry canes, and rose bushes (Plate 2). Upon noting these domestic varieties of plants, the team continued the survey with the expectation of finding a house foundation or other historic features in close proximity. The vegetation was found immediately north of a curving, gated entrance road that once hosted a gatehouse for Barrett Lumber.²² A shed with shelving and a counter still stands approximately 30 metres to the east of the notable vegetation (Plate 3), as well as a blown-open safe (Plate 4) and recently dumped domestic garbage.

It appears likely, however, that the foundation was removed sometime in the last few decades by heavy equipment in order to create a wider section of access road for parking and storage (Plate 5). A mixture of stone types not noted elsewhere in the study area was observed on the south side of this road, strongly suggesting that they originated from the foundation (Plate 6). No mortar or concrete was observed, suggesting this was a dry-laid stone foundation. An area of disturbed soil approximately 4 metres by 4 metres was observed approximately 20 metres south of this location and still within the area of domestic vegetation, reportedly the result of a recent soil test.²³ No artifactual material or cultural soil was visible.

Surrounding this area of historic and modern activity, the terrain quickly returns to its relatively untouched appearance of secondary regrowth with an undulating or hummocky forest floor. Like the area closer to the road, tamarack and spruce grow in the wetter areas, while a mixture of young spruce and birch saplings is found elsewhere, with occasional stands of maple saplings on the crests of some hills.

Farther north, the study area continues to be dominated by secondary regrowth after heavy logging, becoming more recent farther north (Plate 7). Two notable streams are present in the southern half of the study area, one (Duck Lake Brook) entering in the northwest from Duck Pond or Duck Lake and crossing the property towards Beaver Pond (Plate 8), while a second drains a wetland near the middle of the study area and meets

²² Dennis Rodgers, personal communication 25 November 2014.

²³ Dennis Rodgers, personal communication 25 November 2014.

Duck Lake Brook in a broad wetland before the combined watercourses drain to the southeast, heading towards Beaver Pond (Plate 9).

Sections of both watercourses were followed and examined above and below the confluence. Above the confluence, both watercourses are approximately a metre to 1.5 metres in width and of variable depth and speed as they flow through either wetlands or better-drained sloping terrain. Below the confluence, the watercourse has washed out a logging road in recent years, and forms a deep steady brook flowing out of the study area.

Along this deep and steady section, the team observed what appears to be the footings for an iron or steel suspension bridge (Plate 10). While the southern bank of the watercourse is notably level and firm between the existing logging road and these footings, it is not clear why no overgrown roadway or approaches have survived on either side of the brook. Barrett Lumber has owned the study area for much of the twentieth century,²⁴ and so it appears most likely that this feature represents an earlier logging road bridge prior to the substantial construction of the modern logging road. Currently, there is a proposed construction setback from the brook of at least 20 metres.²⁵

Near Capilano Drive and Elise Victoria Drive, logging appears to have taken place in winter months, as the stumps have been cut high off the ground as if deep snow were present.

Nearer to the northeast corner of the property, tree falls and other soil disturbances show that the topsoil in this area is extremely thin (less than 5cm), with culturally sterile soil dotted with boulders found immediately below the forest's root mat (Plate 11). At one tree fall location, a tumbled piece of fractured chalcedony was found and collected (Plate 12). It is unclear whether this piece was fractured during deliberate lithic manufacture, but what is clear is that no other stone even resembling chalcedony was observed anywhere else in the study area, though milky quartz cobbles were occasionally noted. Chalcedony is not native to this region, and to the best of the reconnaissance team's knowledge the nearest natural source is near Cape Split, over 80 kilometers to the northwest.

In an effort to determine whether this chalcedony fragment was an isolated find, the tree fall and exposed soil beneath it was closely examined, and soil still held in the root ball was scraped away with trowels (Plate 13). Some of the soil near the surface was slightly blackened due to natural organic decay, while the remainder was a consistently sterile orange soil. The tree fall is located on a steady slope rising towards a logging road,

²⁴ Dennis Rodgers, personal communication 25 November 2014.

²⁵ Dennis Rodgers, personal communication 25 November 2014.

with no terracing and no navigable water except Box Mill Brook, approximately 380 metres to the north.

In contrast to the recently harvested areas re-growing in saplings, some areas just north of the property's mid-section were covered in a shoulder-high flowering grass that had browned and dried after the growing season (Plate 14). Like the areas of spruce and birch saplings, these grassy areas represent regrowth after logging, though it appears that this cutting has been more recent. In several locations, the open nature of the regrowth coupled with the rolling hills of the study area allowed the team to see both the east and west boundaries, over 600 metres apart, at the same time.

Approximately 350 metres from the study area's northern boundary, the team noted an abandoned car most likely from the early 1960's (Plate 15), as well as a hubcap nearby (Plate 16).

Finally, the northern boundary of the study area is formed by Box Mill Brook, which flows slowly between Barrett Lake and Beaver Pond (Plate 17). While the brook is more than large enough to be navigable, the banks of this brook are consistently low and wet across the entire length of the study area for over 10 metres from the shore, with an additional 10 to 20 metres of wet forest beyond this (Plates 18 and 19). Higher and drier ground beyond this has been logged in recent years in the northeast end of the study area.

In the northwest the forest is more mature (30 to 40 years at least), dotted with bedrock outcroppings forming small islands of barren ground with caribou moss and rhodora. This mature forest is found on either side of a hairpin turn on the main logging road, and is also the site of dumped old cars, refrigerators, and other late twentieth century debris. Two modern fire pits were encountered at this end of the study area, along the existing logging road (Plate 20).

At two separate locations, the team encountered abandoned raised gardening beds constructed from particle board, accompanied by plastic pots, water bottles and jugs, watering cans, and even an empty bottle of wolf urine used to repel a wide range of animals. Both locations are almost certainly the results of small marijuana grow-operations. The first, located in the more mature forest at the northwest corner of the property, appears to have been abandoned several years ago (Plate 21). The second was located near the middle of the property's southern half, at the northwest tip of a section of mature spruce forest overlooking the wetland surrounding part of Duck Lake Brook. This operation appeared slightly more recent, and small holes in the soil of the raised beds were still visible where plants had been removed, along with the dried stalks of a few potted plants that had died or been harvested.

Other modern cultural activity was evidenced in the chance find of a geocache approximately 150m southeast of the termination of Parkside Lane and Rivendale Drive.

The geocache, hidden beneath a metal camping cook pot, appears to be one of eleven caches on or near the study area property,²⁶ though most have been camouflaged into the forest and were not observed by the team.

4.0 RESOURCE INVENTORY

Most of the cultural activity observed in the study area appears to have taken place in the latter half of the twentieth century, and is not considered to be of archaeological significance. Two locations may be host to archaeological resources of some significance, but despite examination of exposed soils, it is not clear whether archaeological sites remain intact at the site of the chalcedony fragment find or the area of historic domestic activity near Windgate Drive.

It is not clear whether the chalcedony fragment was fractured as a result of lithic tool manufacture, but it is obvious that this stone is not native to the study area. The lack of suitable terracing or access to water, coupled with the otherwise culturally sterile appearance of the soil, suggests this object could be an isolated find, and not indicative of the presence of an archaeological site. However, exposed soil was limited to a small area, and the tumbled nature of the stone suggests it could have washed down from slightly higher ground, near an existing logging road to the west.

Table 1: Features of interest noted during reconnaissance.

Feature	Coordinates (UTM NAD83)	Archaeological Significance
Bottle Dump	20 T 446722 4960017	Low
Historic Domestic Vegetation	20 T 446879 4959982	Unknown
Bridge Footings	20 T 446999 4960139	Low
Chalcedony Fragment	20 T 447597 4961871	Unknown
1960's Car	20 T 447739 4961857	Low
Fire Pit 1	20 T 447614 4962111	Low
Fire Pit 2	20 T 447858 4962065	Low
Grow-Op 1	20 T 447674 4962155	Low
Grow-Op 2	20 T 446946 4960535	Low
Geocache	20 T 446887 4960941	Low

5.0 RECOMMENDATIONS AND CONCLUSIONS

After consulting with the Provincial Curator of Archaeology, archaeological testing for an area of moderate archaeological potential (10 metre intervals) is recommended for an

²⁶ <http://www.geocaching.com>, accessed 28 November 2014.

area approximately 50 metres by 50 metres centred on the chalcedony fragment find site, in order to confirm the presence or absence of archaeological resources in this area. It is our understanding that this portion of the study area is not scheduled for development for approximately five years. Archaeological testing should take place before any ground disturbance occurs in this area – this includes grubbing, road construction, or any other activity that churns up or disturbs the soil in this area.

Aside from this chalcedony find, the only area of note is located at the southern end of the study area. This notable location is approximately 40 metres by 40 metres in size and consists of domestic plant varieties and smooth topography, suggesting that a historic residence was located somewhere within this area. Based upon the presence of mixed varieties of fieldstone adjacent to a logging road in this area, it appears likely that the house foundation was removed during road widening. However, this could not be confirmed through either archival records or field reconnaissance, nor could the team establish the age of this occupancy. Historical background research suggests that it does not predate 1865, before Windgate Drive appears on mapping, and that it was not a standing building in 1909, as it does not appear on the geological survey map series.

Archaeological testing at this location, even spaced at 5 metre intervals, could easily miss outbuildings or privy features associated with historic occupation in the absence of surficial evidence of structures, and could likewise yield little or no artifactual material if test units are not placed in areas where such material was deposited within this cultural landscape. As such, it is recommended that a qualified archaeologist be present during grubbing or other preliminary ground disturbance activities in order to establish whether or not any archaeological resources remain intact, and to determine a suitable method of mitigation if any archaeological material is encountered.

In the event that archaeological resources are encountered elsewhere in the study area, it is required that any ground-disturbing activity be halted immediately and the Coordinator of Special Places (902-424-6475) be contacted immediately regarding a suitable method of mitigation.

6.0 REFERENCES CITED

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PLATES



Plate 1: *A cluster of bottles from the mid-twentieth century was encountered near Windgate Drive.*



Plate 2: *Apple trees, grape vines, rosebushes, and blackberry or raspberry canes are present at this location near Windgate Drive. Note an unidentified fruit tree, possibly pear, at the upper left. Looking north.*

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Windgate Village



Plate 3: An abandoned shed near Windgate Drive, looking southwest.



Plate 4: A blown-open safe near the abandoned shed, looking south towards Windgate Drive (visible through the trees at the upper left).

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Windgate Village



Plate 5: Courtney Glen and Steve Davis examine exposed soil at the edge of the logging road bordering the domestic vegetation. Looking southwest.



Plate 6: A mixture of different types of field stone piled at the edge of a logging road may be what remains of a historic house foundation. Looking northeast.



Plate 7: Spruce saplings, and birch saplings in better-drained areas, characterize much of the study area's southern half. Looking southwest.



Plate 8: The wetland and Beaver Lake Brook below the confluence, viewed from the washed-out road looking west.



Plate 9: The smaller brook draining a nearby wetland, looking south or downstream towards the confluence with Duck Lake Brook.



Plate 10: The two probable bridge footings on the southern side of Duck Lake Brook. Only one footing was visible on the northern side due to the growth of dense spruce saplings.



Plate 11: Steve Davis examines a tree throw showing exposed boulders under very thin topsoil.



Plate 12: A fragment of chalcedony recovered from beneath a tree fall.

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Plate 13: Laura de Boer and Courtney Glen scrape through soil caught in the root ball of a fallen tree. The chalcedony fragment was found in the foreground on soil exposed by the fall.



Plate 14: A very tall species of flowering grass has grown up in one of the more recently logged sections of the study area. Looking east, with the edge of the study area visible in the distance.



Plate 15: An abandoned car, most likely an early 1960's car, in the northern end of the study area.



Plate 16: A hubcap found near the abandoned car.



Plate 17: Box Mill Brook, looking northwest.



Plate 18: A low, wet area near Box Mill Brook, with tree stumps showing the area was harvested in the last 5 years or so. Looking northwest.

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Plate 19: An unharvested area of low, wet ground near Box Mill Brook, showing the dense and scrubby nature of the vegetation. Looking south.



Plate 20: A modern fire pit along a logging road at the north end of the study area, looking northeast.



Plate 21: Two of the three particleboard planters forming part of the abandoned grow-op identified in the northern end of the study area. Looking north.



Plate 22: A long particleboard planter at the southern abandoned grow-op, looking west.

APPENDIX A: HERITAGE RESEARCH PERMIT



Heritage Research Permit (Archaeology)

Special Places Protection Act 1989

(Original becomes Permit when approved by
Communities, Culture and Heritage)

Office Use Only
Permit Number:

A264NS101

Grayed out fields will be made publically available. Please choose your project name accordingly

Surname

First Name

Project Name **Windgate Village**

Name of Organization **Davis MacIntyre & Associates Limited**

Representing (if applicable)

Permit Start Date **17 Novmber 2014**

Permit End Date **31 December 2014**

General Location: Beaverbank, HRM between Capilano Estates and Rivendale Subdivision

Specific Location: (cite Borden numbers and UTM designations where appropriate and as described separately in accordance with the attached Project Description. Please refer to the appropriate Archaeological Heritage Research Permit Guidelines for the appropriate Project Description format)

20 T 447147.56 m E 4960877.11 m N (approx. center of study area)

Permit Category:

Please choose one

☐ Category A – Archaeological Reconnaissance

☐ Category B – Archaeological Research

☒ Category C – Archaeological Resource Impact Assessment

☒ I certify that I am familiar with the provisions of the *Special Places Protection Act* of Nova Scotia and that I have read, understand and will abide by the terms and conditions listed in the Heritage Research Permit Guidelines for the above noted category.

Signature of applicant

for Aura de Boer

Date

05 November 2014

Approved by
Executive Director

Date

10-14