

1. INTRODUCTION

Mackenzie Green Energy Limited Partnership (MGELP) is proposing to construct and operate the Mackenzie Green Energy Centre (MGEC) in the District of Mackenzie, located approximately 175 km (2 hours) north of Prince George by road. The MGEC will be a biomass energy cogeneration facility designed to generate an average of 59 MW of electricity for delivery to BC Hydro and 272 GJ/h of steam for process and heating applications for sale to the Pope & Talbot pulp mill and, potentially, to the Canfor sawmill. The MGEC will be located within less than 500 m of these mills. The primary fuel for the facility will be wood residue obtained from sawmills in the region. A small proportion of the plant's fuel energy input will be derived from primary clarifier sludge and kraft soap from the Pope & Talbot pulp mill. To a small extent chips produced from forest slash will also be used. Natural gas will be used as backup fuel for steam generation to meet the MGEC's commitments for supply of steam when the wood-fired boiler is shut-down temporarily for repairs and maintenance.

The MGEC is proposed to be built in an area zoned for heavy industry on land extensively disturbed by past development and ongoing use. Existing infrastructure will be used for primary road access, water supply, wastewater treatment, delivery of electric power to the grid, and access to natural gas supply.

Operation of the MGEC will reduce pollutant and greenhouse gas emissions by enabling the shut down of the old wood and natural-gas fired power boiler at the Pope & Talbot pulp mill and, potentially, the switching of the lumber dry kilns at the Canfor sawmill from natural gas to steam heating. Substantial air quality and water quality benefits will also be realized in communities in the region due to a decrease in the amount of wood residue disposed of by incineration in beehive burners or by landfilling.

The MGEC was awarded an Electricity Purchase Agreement (EPA) by BC Hydro under its Fall 2006 Open Call for Power. The EPA between BC Hydro and Mackenzie Green Energy LP took effect on August 29, 2006 and was approved by the BC Utilities Commission on September 21, 2006 (Order E-7-06). Electricity (net output) from the MGEC will be sold to BC Hydro.

Pursuant to the BC Environmental Assessment Act, the Mackenzie Green Energy Limited Partnership (MGELP) is submitting this application to the BC Environmental Assessment Office (EAO) for an Environmental Assessment Certificate (EAC), which would allow it to construct and operate the MGEC. MGELP intends to apply for the required permits to commence construction of the plant immediately upon receipt of an EAC. MGELP expects the federal review of the Application to be harmonized with the provincial review. MGELP anticipates applying for funding for the MGEC under the recently announced federal ecoENERGY Renewable Initiative, or any other future federal incentive programs. Such programs provide incentives and industry support for low-impact renewable electricity generation and heating technologies.

1.1 PROPONENT IDENTIFICATION

The project proponent is Mackenzie Green Energy Limited Partnership (MGELP), a limited partnership between Pristine Power Inc., Balanced Power Inc. and Harbert Power LLC.

Pristine Power Inc. is an independent power producer based in Calgary, Alberta, and specializes in developing conventional and alternative energy projects that are both cost effective and environmentally conscious. Pristine is also involved in the construction, ownership, and operation of its projects. The company's founders have held executive level responsibility for the successful development of 14 independent power projects ranging from 24 to 520 MW in size, with total capacity in excess of 3 GW. These projects were undertaken across Canada, the United States, Mexico, Latin America and Asia.

Pristine is a part-owner of the following power generating facilities:

Name	Capacity (MW)	Ownership (%)	Location	Fuel Type	Tenure
Mackenzie Cogeneration (under development)	60	30	Mackenzie, BC	Biomass	2006
East Windsor Cogeneration (under development)	84	50	Windsor, ON	NG	2006
Savona ERG (under development)	5	50	Savona, BC	Waste Heat	2006
150 Mile House ERG (under development)	5	50	150 Mile House, BC	Waste Heat	2006

Harbert Power, LLC (“Harbert”), a subsidiary of the Harbert Management Corporation, is involved with development, construction, ownership and operation of independent power generating facilities in North America. Harbert Power manages power assets for the Harbert Corporation, an affiliated company, and develops, acquires and manages assets.

Since Harbert began its power business in 1986, the company has managed the investment of approximately \$270 million of equity and raised approximately \$1.4 billion of debt in the commercial bank and capital markets to help finance power projects in Canada. Harbert currently is involved in the management of 17 power generating facilities with an aggregate capacity of approximately 2,000 MW.

Harbert is a part-owner of the following power generating facilities:

Name	Capacity (MW)	Ownership (%)	Location	Fuel Type	Tenure
Mackenzie (under development)	60	50	Mackenzie, BC	Biomass	2006
Pinelawn	80	90	Babylon, NY	NG/FO	2005
Freeport	50	90	Freeport, NY	NG/FO	2004
Fluvanna	885	30	Fluvanna, VA	NG	2004
GWF Energy (3)					
-Tracy	180	40	Tracy, CA	NG	2003
-Henrietta	90	40	Lemoore, CA	NG	2002
-Hanford	90	40	Hanford, CA	NG	2001
Soda Lake	14	50	Fallon, NV	GEO	1998
Kalaeloa	209	50	Oahu, HI	FO	1997
Lockport	200	24	Lockport, NY	NG/FO	1997
GWF Power (7)					
-Hanford	23	50	Hanford, CA	Pet Coke	1991
-Site I	19	50	Pittsburg, CA	Pet Coke	1991
-Site II	19	50	Loveridge, CA	Pet Coke	1990
-Site III	19	50	Antioch, CA	Pet Coke	1990
-Site IV	19	50	Antioch, CA	Pet Coke	1990
-Site V	19	50	Nichols, CA	Pet Coke	1990

Name	Capacity (MW)	Ownership (%)	Location	Fuel Type	Tenure
Bridgewater	17	40	Bridgewater, NH	Biomass	1986

In addition to the “Bridgewater” facility listed above, Harbert has experience with two other biomass facilities:

- Tracy: a 20 MW facility located in Tracy, CA. Role: developer, contractor, owner, and operator.
- Lyonsdale: a 19 MW facility located in Lyonsdale, NY. Role: owner and operator.

Balanced Power Inc. is an independent power producer based in Vancouver, BC, and specializes in developing efficient and reliable cogeneration facilities. They have pioneered creative energy saving systems that help protect the environment and improve the management of natural resources. The following projects have been completed:

- Power Boiler Emission Upgrade, Williams Lake;
- Dryer Upgrade, Tolko Industries, Kelowna;
- Powerhouse Startup, Neucel, Port Alice;
- Cogeneration Plant, BC-confidential;
- Boiler Upgrade, Tembec, Smooth Rock Falls; and,
- Emergency Boiler Repair, Tech-Cominco, Trail.

Mackenzie Green Energy LP maintains offices at:

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1.2 BACKGROUND

Consultation with local First Nations, government agencies, the public and other interested parties in regard to the MGEC began in mid-2005 in anticipation of the BC Hydro 2006 Call for Power. For the purpose of this Application, the period from mid-2005 to submission of the Application is considered the pre-Application period. The formal pre-Application consultation program for the MGEC began in February 2006 and continued through to submission of the Application,

Consultation undertaken from 2005 to submission of the Application focussed on discussions with government officials, Treaty 8 First Nations with an interest in the project, and the public and stakeholder groups.

The history of formal procedural decisions by the Environmental Assessment Office with respect to the MGEC is as follows:

- March 9 2006: Section 10 order was issued stating the MGEC requires an environmental assessment certificate to proceed with construction and operation of the project.
- May 26 2006: A draft terms of reference was accepted by the Environmental Assessment Office for the MGEC.
- June 19 2006: Section 11 order was issued prescribing the scope, procedures and methods to be used to conduct the environmental assessment for the MGEC.
- January 31 2007: Approved Application Terms of Reference was issued by the Environmental Assessment Office.

A comprehensive environmental and socioeconomic assessment has been completed to identify and assess the potential effects from development of the Mackenzie Green Energy Centre and to develop measures to effectively manage both positive and negative effects. This Application presents the results of the assessment and responds to the specified requirements of the Approved Application Terms of Reference (ATOR) (dated January 31, 2007) issued by the Environmental Assessment Office (<http://www.eao.gov.bc.ca>). The ATOR incorporate input from numerous and varied consultation activities with First Nations, government agencies, stakeholder groups and the public.

This Application documents past and planned consultation activities; describes the design, construction, operation and decommissioning of the MGEC; presents baseline studies and the results from detailed assessments of the project's potential environmental, socioeconomic and cumulative effects; assesses potential effects specific to First Nations; and describes plans to enhance or mitigate potential effects and to monitor residual effects of the project. The organization and general content of each section of the Application is presented below:

- Section 1 The project proponent and an overview of the project and the regulatory framework.
- Section 2 An overview of completed and planned consultation activities with First Nations, government agencies, stakeholder groups and the public, and the information gathered for use in the Application.

Section 3	A description of the location of the project, preliminary designs of the proposed facilities, operation and maintenance activities, construction plans, schedule, and project construction and operating costs.
Section 4	A description of the scope of the assessment in terms of issues, geographic scope and time frames for the assessment.
Section 5	Assessment of the potential environmental effects of the project, based on valued ecosystem components.
Section 6	Assessment of the likely project-specific effects on First Nations.
Section 7	Assessment of potential socioeconomic effects of the project, including the key indicators of employment and income, population, business opportunities, transportation, emergency services, public health, and utility services.
Section 8	Assessment of the potential cumulative effects of the project, considering effects that would be due to the MGEC in combination with residual past, present or foreseeable future projects.
Section 9	Component environmental management plans.
Section 10	Summary of commitments by MGELP to enhance, mitigate and monitor residual effects.
Section 11	Summary and conclusions.
Section 12	References.
Addendum	Approved Application Terms of Reference.
Appendices	Information supporting the discussion in the main report.

1.3 PROJECT OVERVIEW

The MGEC will operate as a base load facility and cogenerate an average net output of 59 MW of electrical power and 272 GJ/hr of steam from biomass fuels. For the expected annual electrical and thermal loads, the MGEC will deliver 480 GWh of electricity and 2,226 TJ of thermal energy annually. The electricity delivered by the MGEC will meet the annual electrical needs of approximately 50,000 households over its 30 year lifetime.

The plant will provide medium-pressure steam to the adjacent Pope & Talbot pulp mill and, potentially, low-pressure steam to the Canfor sawmill, thereby reducing their consumption of natural gas. Pope & Talbot will shut-down its old wood and natural gas-fired power boiler, which will no longer be needed to generate steam once the MGEC is in operation. Should the Canfor sawmill decide to purchase steam from the MGEC, its natural gas-fired lumber dry kilns would be converted to steam heating.

The MGEC will be fuelled predominantly by wood residue from regional sawmill operations and to a small extent from chipping of forest residues remaining after logging that would otherwise be burned *in situ*. A small percentage of the energy input to the MGEC will be from biomass derived fuels supplied by the Pope & Talbot pulp mill, with an average of about 2% from kraft soap, a by-product of the pulping process, and 1% from primary clarifier sludge, which is composed largely of wood fibre. Kraft soap is now shipped to Prince George and used as fuel, while the primary clarifier sludge is being landfilled.

The site selected for the MGEC is comprised of two adjacent parcels of land covering 43.1 hectares. The properties are currently independently owned by Mackenzie Pulp Land Ltd. and BCR Properties Ltd and will be purchased by MGELP. The MGEC site has been

extensively disturbed by past developments and logging activities and on-going use of part of the site to service the needs of the Pope & Talbot pulp mill. The portion of the site owned by Mackenzie Pulp Land Ltd. is zoned by the District of Mackenzie for heavy industrial use (M3 zone), including electric power generation. The portion of the site owned by BCR Properties Ltd. is being rezoned from its existing Agriculture and Resource zone to Heavy Industrial zone independently of the MGEC project. The nearest residentially zoned land is 2 kilometres east of the proposed site.

The MGEC site is approximately 5 km from the town of Mackenzie beside the Pope & Talbot pulp mill and 500 m from the Canfor sawmill, providing excellent access to existing infrastructure and for piping of steam to the mills and the return of condensate to the MGEC. The location of the proposed MGEC site, information on local terrain and landforms, and the proximity of the site to the town of Mackenzie, water bodies, and road and rail access infrastructure are illustrated in Figure 1.3-1. Figure 3.2-1 in Section 3 presents a 2005 aerial photograph of the proposed MGEC site and the surrounding area, including existing land development and transportation infrastructure.

The proposed MGEC site is within the boundaries of the Treaty 8 First Nations lands. Although each of the Treaty 8 First Nations has its own reserves and communities, all Treaty members have equal rights to use the lands within the bounds of Treaty 8 and, as such, all have an equal interest in the project area. The Treaty 8 First Nations who have expressed an interest in the MGEC project are the McLeod Lake Indian Band, the West Moberly First Nations, the Sauteau First Nations, and the Fort Nelson First Nation.

The MGEC will generate electricity and steam using a modern high-pressure stoker boiler, a steam cycle and a condensing steam turbine-generator. An efficient electrostatic precipitator will be installed to reduce the concentration of particulate matter in the stack gas to the lowest permitted level of comparable wood-fired power boilers in British Columbia. Good combustion practices and an advanced computerized boiler control system will be utilized to minimize emissions of other pollutants. The main components of the proposed facility are:

- A wood residue-fired boiler with supplemental natural gas-firing capability;
- A steam turbine generator capable of producing up to 82 MW (gross) of electricity;
- Natural gas-fired auxiliary boilers for backup steam supply;
- Steam and condensate pipelines to provide steam to local mills and return condensate to the MGEC for re-use in the boiler;
- Wood residue and primary clarifier sludge unloading equipment, storage area, and reclamation, conveying, and feeding equipment;
- Kraft soap storage, handling and feeding equipment;
- Particulate matter emission control equipment;
- Stacks for discharge of flue gases to the atmosphere;
- A cooling tower;
- An onsite electrical substation and switch gear, and a short power transmission line to connect to the BC Hydro power transmission line;
- A short natural gas feeder pipeline and a metering and regulation station to provide fuel needed for plant startups, in case of upsets in wood firing, and for the auxiliary boilers;

- Water supply and an associated pipeline from Pope & Talbot Inc. under its existing water license;
- Wastewater effluent discharge to the advanced effluent treatment system at the Pope & Talbot's Mackenzie Pulp Operations mill;
- Sanitary sewer discharge to Pope & Talbot's sanitary waste treatment system;
- An onsite landfill for disposal of wood ash for the 30-year service lifetime of the MGEC;
- A building to house the power boiler, auxiliary boilers, steam turbine and ancillary equipment; and
- Primary and secondary truck and vehicle access to the MGEC site from existing industrial roads.

Wood residue will be delivered in trucks from suppliers in Mackenzie, Chetwynd, Bear Lake, and Fort St. James. Other wood residue from chipping forest residues (tree tops, limbs and non-merchantable timber) will be brought to the plant from locations that will vary with logging activities. Fuel deliveries are likely to be contracted to independent trucking firms. Trucks will use existing mill roads for fuel deliveries originating in Mackenzie, and will use Highways 97 and 39 for fuel deliveries originating from Bear Lake and Chetwynd. Forestry roads will be used for fuel deliveries coming from Fort St James. A total of approximately 89 trucks per day will deliver wood residue to the plant.

The costs and employment numbers for construction and operation of the MGEC will be:

Costs:

- Construction cost: \$200-\$225 million.
- Annual operating cost: \$15-\$20 million (includes fuel supply and transportation).

Employment:

- Construction 322 person-years; and a peak number of workers of 260.
- Operation 28 full-time and apprentice positions.

At the end of the expected 30-year service life of the MGEC, MGELP will salvage equipment and return the MGEC site to a condition suitable for continued industrial use. The cost to dismantle equipment and return the site to this condition is estimated to be \$2.5 million in current dollars.

The local area will benefit from direct, indirect and induced construction and operations employment and expenditures. It is estimated that up to 20% of the peak construction workforce (about 50 workers) and 10-15 of the 28 operations positions could be sourced from the local area. During construction, the local area will realize benefits from the expenditure of wages by local workers as well as by workers coming to the area for their terms of employment. During operations, annual employment income (wages and benefits) of between \$.9 million and \$1.6 million will accrue to local employees.

The District of Mackenzie, along with the remainder of B.C. will benefit from the approximately \$2 million in provincial sales tax and \$200,000 in other fees paid to government during construction and the approximately \$400,000 in provincial sales tax and \$20,000 in other fees to government paid annually during operations. In addition, annual property taxes paid to the District of Mackenzie are anticipated to be approximately \$500,000 based on a current estimate.

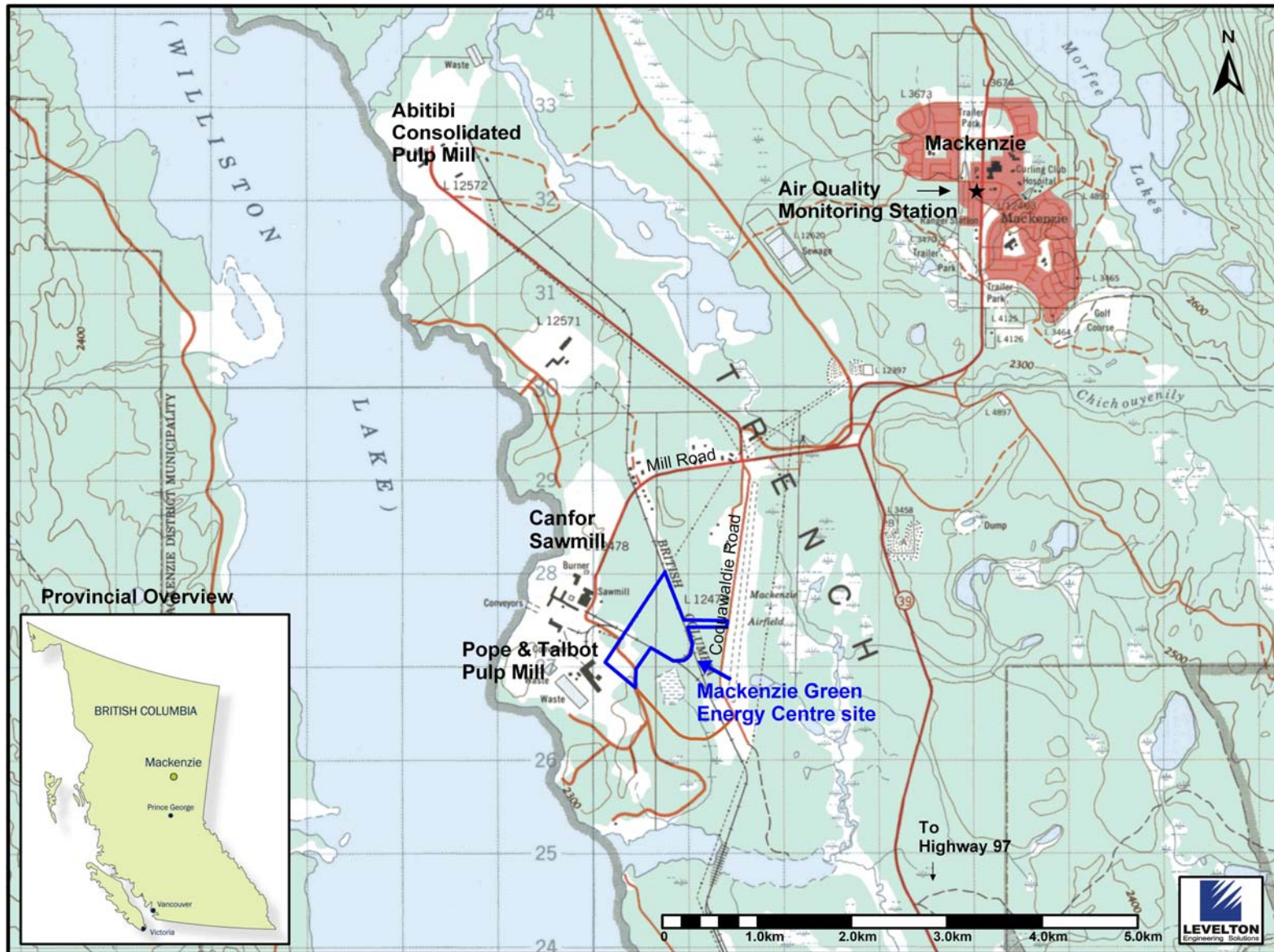


Figure 1.3-1 General Location Map Showing the MGEC Site and Surrounding Development and Landforms

Perhaps the most notable effect on the local economy will be the fact that the provision of low cost energy to the mills from the MGEC will contribute to their overall competitiveness which will bring longer term economic stability to the region.

Site construction work is expected to start in the summer of 2007. Equipment and materials should start arriving at site in January 2008 and construction of buildings and above ground structures and equipment should also start at that time. The construction schedule is set primarily by the lead times for the power boiler and the steam turbine generator. Plant commissioning activities should commence during the summer of 2009 with performance testing to occur in the fall 2009. The MGEC is scheduled to start commercial service in December 2009.

1.4 REGULATORY FRAMEWORK

MGELP is applying to the EAO for an Environmental Assessment Certificate, which would allow it to construct and operate the MGEC. MGELP will apply for permits, approvals and licenses from agencies to build and operate the MGEC immediately upon receipt of an Environmental Assessment Certificate.

The key federal, provincial and local governments requirements identified during the preparation of this Application through the review of environmental regulations and legislation and consultation with government agencies are:

Federal

- Greenhouse gas emission reporting;
- Effects to fish and fish habitat (no permit is anticipated to be required).
- Effects on migratory birds.

Provincial

- Emissions and effects on air quality (requirement for provincial air permit);
- Greenhouse gas emissions (no specific regulation);
- Wastewater and effects on receiving water quality (requirement for a change to Pope & Talbot's provincial effluent permit to include effluent from the MGEC);
- Wood ash disposal in a landfill (requirement for provincial refuse disposal permit or registration under the Province's proposed Code of Practice);
- Wood residue storage and effects on groundwater;
- Contaminated Sites Regulation (disposal of contaminated soils to be removed from the site);
- Archaeology, Culture and Heritage (disturbance to soils during construction – no provincial permit is anticipated to be required);
- First Nations and public consultation.

- Various permits and licenses will be required for construction and operation of equipment, the main ones being:
 - Electrical Permit – This will be required prior to the start of construction. Permitting is required by the BC Safety Authority under the Safety Standards Act, Electrical Safety Regulation.
 - Certification/registration of the pressure equipment and an installation permit from the BC Safety Authority under the Safety Standards Act, Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation.
 - Power Plant Operator Certificate.

Regional District of Fraser-Fort George

- Waste management during construction and operation, including planning to reduce, reuse and recycle and the offsite disposal of residual wastes. (Permit for waste disposal and conformance with waste management plan).

District of Mackenzie

- Building Permit.
- Secondary access road tie-in to Coquawaldie Road;
- Construction and operating noise (compliance with noise bylaw);
- Land use and conformance with zoning (zoning bylaw and Official Community Plan).