

Final Approval Package – Summary Environmental Report

Cape Roger Curtis Subdivision Bowen Island, BC



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- Appendix 2 CRC Joint Ventures – Overview Environmental Inventory – Cape Roger Curtis, Bowen Island, BC (January 2005), which includes biophysical reports for Burke and Huszar Creeks
- Appendix 3 Cape Roger Curtis Development – Detailed Vegetation Assessment of Coastal Bluffs (August 2005)
- Appendix 4 Cape Roger Curtis Wildfire Management Plan (July 2006)
- Appendix 5 Preliminary Field Reconnaissance (PFR) of the Proposed Cape Roger Curtis Development on Bowen Island (December 2006)
- Appendix 6 Cape Roger Curtis – Site Assessment to Identify Significant Site Features (June 2007)
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As requested by the Cape on Bowen Community Development Ltd. (CBCDL) on March 17, 2009, Pottinger Gaherty Environmental Consultants Ltd. (PGL) is pleased to provide you with our summary report on environmental issues for the Cape Roger Curtis Subdivision project.

1.0 BACKGROUND

This report addresses a number of comments raised by the Bowen Island Municipality (BIM) in their July 7, 2006 Preliminary Layout Review letter (PLR letter), and provides information required for the Development Permit application, along with information on other environmental issues related to the proposed development, including:

- A review of the degree to which the CBCDL proposal meets the BIM Cape Roger Curtis Development Permit Area Guidelines for environmental protection outlined in Sections 7.1 and 7.2 of Land Use Bylaw (LUB) 57.
- Confirmation that boundaries of covenanted creek riparian areas satisfy the Riparian Areas Regulation (RAR);
- A discussion of potentially impacted stream and riparian areas;
- Results of an overview field reconnaissance of proposed building locations;
- Results of detailed vegetation surveys; and
- A discussion of potential mitigation and habitat enhancement plans.

This report also includes copies of a number of documents requested by BIM in their PLR letter, along with other relevant reports, including:

- May 2009 Environmental Construction Management Plan – Cape Roger Curtis Lands, Bowen Island, BC (Appendix 1);
- January 2005 CRC Joint Ventures – Overview Environmental Inventory – Cape Roger Curtis, Bowen Island, BC, which includes biophysical reports for Burke and Huszar Creeks (Appendix 2);
- August 2005 Cape Roger Curtis Development – Detailed Vegetation Assessment of Coastal Bluffs (Appendix 3);
- July 2006 Cape Roger Curtis Wildfire Management Plan (Appendix 4);
- December 2006 Preliminary Field Reconnaissance (PFR) of the Proposed Cape Roger Curtis Development on Bowen Island (Appendix 5);
- June 2007 Cape Roger Curtis – Site Assessment to Identify Significant Site Features (Appendix 6);
- June 2007 Cape Roger Curtis Western Screech-owl Survey (Appendix 7);
- August 2007 Cape Roger Curtis Amphibian, Reptile and Butterfly Survey (Appendix 8); and
- August 2007 Property Adjacent to the Cape Roger Curtis Development – Vegetation Assessment and Ecological Classification (Appendix 9).

2.0 DEVELOPMENT PERMIT APPLICATION

This section is provided to support the Development Permit (DP) Application by The Cape on Bowen Community Development Ltd. (CBCDL) at its Cape Roger Curtis (CRC) property. We have reviewed the degree to which the CBCDL proposal meets the Bowen Island Municipality (BIM) Cape Roger Curtis Development Permit Area Guidelines for environmental protection outlined in Sections 7.1 and 7.2 of Land Use Bylaw (LUB) 57. This section contains a summary of the Cape Roger Curtis DP Area Guidelines relevant to the proposed project, along with an Environmental Construction Management Plan (ECMP) (Appendix 1), references to previous PGL

reports (Appendices 2–9), and a May 2009 report from Webster Engineering Ltd. (Webster) (Appendix 10) that address these guidelines. Please note that figures associated with the May 2009 Webster report are being provided separately by Webster.

LUB 57 (Section 7) Guidelines addressed in our ECMP (Appendix 1) include:

- Section 7.1 (4) and Section 7.2 (2): Refer to ECMP Sections 2.1, 2.4, 2.6, 3.1, 3.2, 3.5. Additional information on disturbances to watercourses and their riparian zones is provided in Sections 3.0 and 4.0 below.
- Section 7.1 (5a) and Section 7.2 (3a): Refer to ECMP Sections 3.1, 3.2 and 3.9. Additional information is provided in Sections 3.0, 4.0, 5.0, 6.0, and 7.0 below, Appendices 2, 3, 6, 7, 8, 9 and 10.
- Section 7.1 (5b) and Section 7.2 (3b): Refer to ECMP Sections 3.4 to 3.7, 3.9, 3.10, 3.11 and 4.1. Additional information is provided in Sections 4.0, 5.0, 6.0 and 8.0 below, and Appendix 10.
- Section 7.1 (5c) and Section 7.2 (3c): Refer to ECMP Section 3.1.
- Section 7.1 (5d) and Section 7.2 (3d): Refer to ECMP Section 3.5 and Section 4.0 below. There will be minimal clearing and alteration of grades in riparian leave areas. These activities will take place only at stream crossings and in one area near Burke Creek where the road construction will impact the riparian zone.
- Section 7.1 (5f) and Section 7.2 (3f): Refer to ECMP Section 3.9 and the Webster Sediment and Erosion Control Plan (Appendix 10).
- Section 7.1 (5g) and Section 7.2 (3g): Stormwater detention for the site will meet the minimum requirements of Schedule “D” of the Land Development Guidelines. Additional information is provided in Appendix 10.
- Section 7.1 (5h) and Section 7.2 (3h): Stormwater outflows to the stream or leave areas will have water quality and erosion control features included in accordance with Schedule “D” of the Land Development Guidelines. Refer to ECMP Section 3.9 and Appendix 10.
- Section 7.2 (3p): Stormwater management for the site will meet the requirements of Schedule “D” of the Land Development Guidelines. Information is provided in Appendix 10.
- Section 7.1 (5j) and Section 7.2 (3j): Refer to ECMP Section 3.1 and Section 4.0 below.
- Section 7.1 (5k) and Section 7.2 (3k): Refer to ECMP Section 3.1 (PGL will send required notifications to the Ministry of Environment for stream crossings and works in and about a stream. These notifications will contain work schedules that comply with appropriate instream works windows).
- Section 7.1 (5l) and Section 7.2 (3l): Refer to ECMP Section 3.10 and Sections 4.0 and 8.0 below. A formal vegetation management plan is not required because leave areas are to be protected by covenants. Potential impacts to riparian areas during construction will be minor, and those areas will be revegetated with native plant species immediately upon completion of the work.
- Section 7.1 (5m) and Section 7.2 (3m): Refer to ECMP Sections 3.9 and 3.10. Potential impacts to riparian areas will be minor, and those areas will be revegetated with native plant species immediately upon completion of the work.
- Section 7.1 (5o) and Section 7.2 (3o): Refer to ECMP Section 2.7.
- Section 7.1 (6) and Section 7.2 (4): Bridges will be provided across all watercourses. Refer to Appendix 10.
- Section 7.1 (9) and Section 7.2 (7): Refer to ECMP Sections 3.1, 3.5 and 3.9.

Guidelines not addressed in our ECMP or other PGL reports are discussed below:

- Section 7.1 (1): Where possible, construction has been avoided on slopes over 25 degrees (approximately 46%). Please refer to Appendix 10.
- Section 7.1 (3) and Section 7.2 (1): All natural watercourses will be dedicated at the time of registration of a subdivision plan. Please refer to Appendix 10.
- Section 7.1 (2): There are no septic fields proposed on slopes over 12 or 30%. Please refer to Appendix 10.
- Section 7.1 (5e) and Section 7.2 (3e): Restricted access to, or fencing of, environmentally sensitive areas (ESA) will be dealt with by covenanting these areas, and fencing the ESA at the southerly end of Lot 21.
- Section 7.1 (5i) and Section 7.2 (3i): Storm drain inlets will not be located within this DP area.
- Section 7.1 (5n) and Section 7.2 (3n): Bonding or other acceptable security will be provided for up to 100% of the value of the erosion control and environmental management works. Please refer to Appendix 10.
- Section 7.1 (7) and Section 7.2 (5): All access road banks will be regraded to a point significantly less than 10m in vertical height. Please refer to Appendix 10.
- Section 7.1 (8) and Section 7.2 (6): Cut and fill for access road construction will be balanced. Please refer to Appendix 10.
- Section 7.1 (10): Providing telephone and power services underground for a subdivision of this size could have significant negative impacts to existing site vegetation; therefore, we recommend overhead telephone and power services. Additional information is provided in Appendix 10.
- Section 7.2 (8): There are no watercourse siting variances required for this project.

It is our opinion that proposed plans for the CBCDL project at CRC meet the objectives of the Cape Roger Curtis Development Permit Area Guidelines.

3.0 CREEK RIPARIAN AREAS

During the month of March 2009, Bennett Surveyors Ltd. (Bennett) conducted detailed high water mark (HWM) surveys of both Burke and Huszar Creeks. PGL used the Bennett data to calculate average channel width based on the HWM for both watercourses. PGL also conducted site visits along each watercourse to verify the calculated average channel widths. Given average channel widths of Burke and Huszar Creeks of 2.2m and 4.7m, respectively, it is our opinion that the covenanted riparian setbacks or, in RAR terminology, the Streamside Protection and Enhancement Areas (SPEAs) provided for each watercourse exceed the requirements under the RAR. Using calculated/field verified channels widths, RAR SPEAs would be 10m (RAR minimum) and 14.1m for Burke and Huszar Creeks, respectively. Actual (covenanted) riparian setbacks (or SPEAs) provided by the developer for Burke and Huszar Creeks are 15m.

4.0 POTENTIALLY IMPACTED STREAM AND RIPARIAN AREAS

Along with a representative from Webster Engineering (Webster), PGL examined the potential impacts of proposed road crossings on instream and riparian habitats of Burke and Huszar Creeks. Our observations included:

- There is minimal understorey riparian vegetation at all stream crossing locations;

- Crossing locations have been selected to avoid meander bends, braided streams, alluvial fans, active floodplains, or any other areas that are inherently unstable and may result in the erosion and scouring of the bridge structure during high flows;
- Bridge abutments will not encroach on the natural channel width at any stream crossing (i.e., there will be no instream footprint/impact); and
- Stream crossing locations were selected in areas that reduced or minimized cut/fill activities.

Please note that bridges have been designed with only one travel lane plus a walkway to minimize their total footprint, and only the vegetation required to accommodate the footprint of the crossing and access to the construction site will be removed. Every effort will be made to minimize the number of trees to be impacted at each stream crossing.

Information on the extent of potential impacts and potential for mitigation/compensation obtained during these surveys, along with information obtained from monitoring and site inspection during construction, will be used to develop vegetation enhancement plans for these areas to ensure that there is no net loss of aquatic or riparian habitat. In addition, open, well-vegetated breeding ponds (permanent and ephemeral) will be created adjacent to both creeks for red-legged frogs (as per recommendations from the wildlife biologist in Appendix 8).

5.0 PROPOSED BUILDING LOCATIONS

PGL conducted a field reconnaissance of proposed building locations at the site (Appendix 11). The purpose of these visits was to ensure that building locations did not impact environmentally sensitive areas (ESAs) of the site. As a result of this field reconnaissance, we can confirm that proposed building locations are outside all ESA boundaries.

6.0 DETAILED VEGETATION SURVEYS

The objective of the original 2005 vegetation ecology assessment (Appendix 2) was to produce a broad-level description of the existing plant communities and classify these areas to site series according to the Biogeoclimatic Ecosystem Classification System of BC (BEC), and provincial Land Management Handbook. Further to the initial assessment, the site was revisited in the summer of 2005 to conduct a more detailed sensitive vegetation survey of the coastal bluffs (site series CWHxm1/02), and to identify and locate additional plant species of conservation concern (i.e., rare and endangered). The locations of rocky mountain junipers (*Juniperus scopulorum*) and additional veteran trees were also identified (Appendix 3). The site was again revisited in the late spring of 2007 to use a Global Positioning System (GPS) to further locate significant site features (Appendix 6).

The 2005 detailed vegetation assessment of coastal bluff areas collected the following information:

- A comprehensive plant species list;
- Identification of any rare and endangered plant species;
- Identification of any unique plant communities;
- Assessment the extent of human disturbance in these areas; and
- Assessment the extent of invasive non-native species growing in these areas.

The 2007 significant site feature inventory identified and located:

- Evidence of historic fires;
- Recreation and historic disturbance sites;
- Significant plants and plant communities (i.e., moderate to high quality CWHxm1/02); and
- Trees of significance.

The majority of the ESAs to be covenanted at the CRC site contain pockets of listed plant communities of varying quality growing on rocky outcrops identified in Appendix 6. These communities are classified in the BEC system as the Eastern Very Dry Maritime Variant of the Coastal Western Hemlock (CWHxm1) site series 02.

As a result of field surveys carried out in the fall of 2004, summer of 2005, and spring of 2007, rare/listed plant communities have been identified. Although there are currently no legal requirements for the protection of listed plant communities, the Diamond Head reports suggest protecting these communities where possible. PGL has worked closely with the project planners and engineers to provide that protection by covenanting all ESAs (including the majority of the moderate to high quality coastal bluff areas) as “no build” zones. In fact, roads and building sites have been moved out of all proposed ESAs with the exception of one case involving Road A (Appendix 11). Two cases (Byways 5 and 6) involving public rights-of-way (ROWs) were re-examined to ensure they were positioned outside proposed ESAs (Appendix 11).

In May 2009, PGL carried out further detailed vegetation surveys at the proposed Road A location and the two proposed public access ROW locations (Byways 5 and 6), which are located in or adjacent to ESAs identified in Appendix 6. The purpose of these surveys was to determine:

- The quality of the CWHxm1/02 plant communities in the proposed road and access ROW locations;
- Whether or not the CWHxm1/02 plant communities would be impacted by the proposed development; and
- The potential for further mitigation through design modifications.

The results of our May 2009 surveys include:

Road A

- The positioning of Road A is restricted in this location by geotechnical constraints (i.e., steep slopes), and appears to be positioned on a high terrace, which leads into a saddle between two high points of land.
- The original ESA extends downslope to the west; however, the plant community quickly transitions from CWHxm1/02 to CWHxm1/03(01) beyond the terrace (i.e., as a result of our May 2009 survey, the ESA is noted to end at the edge of the terrace/extent of CWHxm1/02).
- The road construction will result in the loss of this outer portion of the ESA (moderate to high quality CWHxm1); however, it is anticipated that roughly 75% of the ESA will remain intact.
- An additional moderate to high quality CWHxm1/02 plant community was located on the west side of the saddle, on top of a knoll southwest of the existing ESA. This area has been identified as an additional ESA, will be protected, and will not be impacted by the road construction.

- A temporary fence should be erected around the protected ESAs before construction begins to restrict access and prevent the storage of construction materials (stockpiles, machines, etc.) in these areas.
- Due to the sensitivity of these communities, full-time environmental monitoring should be implemented during road construction to ensure that the disturbance footprint is minimized and CWHxm1/02 plant communities are protected wherever possible.

Byway 5 ESA

- Based on contours and ground-truthing, Byway 5 appears to be positioned outside of the CWHxm1/02 plant community ESA located here.
- A temporary fence should be erected around the protected ESAs before construction begins to restrict access and prevent the storage of construction materials (stockpiles, machines, etc.) in these areas.
- During construction in this area, full-time environmental monitoring should be implemented to ensure that the disturbance footprint does not extend into the ESA.

Byway 6 ESA

- Based on contours and ground-truthing, Byway 6 appears to be positioned outside of the CWHxm1/02 plant community ESA located here.
- A temporary fence should be erected around the protected ESAs before construction begins to restrict access and prevent the storage of construction materials (stockpiles, machines, etc.) in these areas.
- During construction in this area, full-time environmental monitoring should be implemented to ensure that the disturbance footprint does not extend into the ESA.

Additional ESA

- An additional ESA has been established south of Byway 6 on Lot 21 adjacent to the existing 30m shoreline setback zone.
- The additional ESA was established to protect the botanically diverse and regionally significant seepage ecosystem identified in previous studies (Site 11, Seepage Area – Appendix 3).
- The diversity of this ecosystem is dependent upon vernal seepage from upland sources. The design of Byway 6 (permeable road base and stormwater management practices) will ensure that it does not impact these vernal seepages.
- A permanent fence and educational signage should be erected around the perimeter of this seepage ecosystem to deter people from entering.
- During construction in this area, full-time environmental monitoring should be implemented to ensure that the disturbance footprint does not extend into the ESA.

7.0 WILDLIFE

A field survey carried out on December 16 and 17, 2004 provided an initial overview evaluation of the wildlife values of the project site (Appendix 2). Survey methodology entailed systematically walking as much of the area as could be covered during the two days, and sampling the habitat polygons previously mapped by the vegetation ecologists. Subsequent to the 2005 Overview Report, a western screech-owl survey was conducted in May, 2007 (Appendix 7), and surveys of amphibians, reptiles, and butterflies were conducted in May and July 2007 (Appendix 8).

Western Screech-owl surveys conducted according to Resource Information Standards Committee (RISC) standards in May 2007 resulted in no observations of these raptors (Appendix 7); however, two Barred Owls were detected in the upper Huszar Creek/Fairy Fen area. Barred Owls are known predators of Western Screech-owls and their presence may discourage Western Screech-owls from the CRC area.

Although numerous ephemeral and both permanent watercourses were inspected during the two amphibian surveys (Appendix 8), the blue-listed red-legged frog was only located along Burke Creek. Although no red-legged frogs were located along Huszar Creek, it does contain moderate to low quality habitat, with several sections of high quality habitat. The lack of amphibian observations along Huszar Creek is likely due to deficient breeding sites and poor cover in most of the adjacent forest. Proposed riparian buffers on both Burke and Huszar Creeks will ensure continued use of CRC by red-legged frogs. Enhancement of red-legged frog habitat is discussed in Section 4.0 above.

8.0 MITIGATION/COMPENSATION PLANS

As discussed in Section 4.0, PGL will develop vegetation and wildlife enhancement plans as required for potentially impacted aquatic, riparian and other environmentally sensitive areas.

Mitigation measures to be undertaken during works in or adjacent to environmentally sensitive areas include:

- Having an EM onsite to ensure that all best management practices (BMPs) are adhered to during all phases of construction at the Cape Roger Curtis site;
- Installing effective sediment and erosion control measures before starting construction;
- Minimizing machinery crossings of watercourses;
- Preventing deleterious substances such as uncured concrete, grout, paint, sediment and preservatives from entering watercourses;
- Stabilizing any waste soils or organic matter removed from the work site to prevent them from entering the watercourses. This could include covering stockpiles with biodegradable mats or tarps or planting stockpiles with grass or shrubs; and
- Vegetating all disturbed soils in a timely manner to prevent erosion.