

# Environmental Guidelines



for Planning, Design, Development and Operations

**SURREY PARKS, RECREATION & CULTURE**

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# Introduction

## Background

The City of Surrey recognizes that its residents, businesses and visitors value the natural environment, and has made a commitment to protect and enhance these values through a variety of City bylaws, policies, plans and guidelines. This commitment continues to be realized through the City's leadership role in the management and stewardship of the environment, particularly the active work of the Parks, Recreation and Culture (PRC) Department in the management of the natural environment. As part of its ongoing work in the planning, development, and operation of its park and recreation facilities, the PRC Department has undertaken to prepare environmental guidelines to further contribute to the general health of the local, regional and global natural environment.

Federal and provincial legislation and regulations require that the City perform all municipal operations in a manner that protects its natural environmental resources (Appendix 1. Environmental Legislation relevant to park development). Such measures include careful and sensitive planning and design, and consideration of ground water conservation, wildlife habitat improvements, aquatic habitat/fisheries resources, biodiversity, air quality, water quality, climate, energy consumption, and waste disposal.

Because the Department has not yet defined the direction for the management and protection of the natural environment, the application of natural environment management principles has, up to this point, been inconsistent. Clear and practical guidelines are needed to provide staff with the direction and tools for effective natural environment management and protection, and to hold the Department accountable for park planning, development and operation initiatives and programs. It is for this reason that the *Strategic Planning Annual Plan, Year 2000*, initiated the process leading to the development of the following environmental design guidelines.

These guidelines are intended to enable the Department to fulfill its stated mandate to enhance the "well-being of residents" through the provision of "quality parks" designed to contribute to "the visual environment," "environmental sustainability," and the general "livability" of Surrey (*Official Community Plan 1996*). They are a response to the articulated concern of Surrey's citizens who ranked "protection of the environment" as a priority in the City's 1998 survey (*1998 Update: Report Card on the Master Plan*). The "parks" designation thus includes not just green space, but buildings and facilities in parks areas, and lands and buildings adjacent to parks.

The guidelines are also timely and in compliance with the BC Cabinet's April 1/2001 directives that "all new capital projects are to incorporate green principles in their design and construction" (i), that "all new major projects [are to] incorporate green principles *within* the approved budget," and that "Design Development Reports [are] now [to] include a requirement to include a completed Checklist" (1). Many of the items listed in the Ministry's *Green Building Checklist* have been borrowed in their entirety and incorporated into Surrey's guidelines.

## **Principles of Environmental Design**

The following principles form the foundation for the PRC environmental guidelines:

- Departmental parks, lands and buildings should be designed to enhance quality of life.
- For all stages of Department projects (i.e. planning and design, development, and operation) the best available design, construction and operational practices should be implemented to ensure that negative environmental impacts are minimized.
- The biodiversity of lands under the City’s jurisdiction should be protected, restored and enhanced.
- Wherever possible, natural ecosystems should be preserved, restored and reconnected.
- Environmental guidelines should be manifested as performance objectives for preservation and restoration of the natural environment.

## **Purpose and Scope**

### **Purpose**

The purpose of these environmental guidelines is to formalize the importance that the PRC places on the natural environment values found in the City, and to enable the PRC to proceed with park and recreation facility development and management in a manner that:

- a) protects the existing natural environment,
- b) has the potential of enhancing or rehabilitating the natural environment, and
- c) minimizes impacts on the natural environment.

The guidelines provide general direction for the management and protection of the natural environment when planning and designing, developing and operating the City’s parks, recreation and cultural facilities. They are intended to be used in conjunction with the Department’s current *Standard Construction Documents* and are considered complementary to other environmental-based policies, bylaws and guidelines produced by the City, in particular the Department’s *Parks Natural Areas Strategic Management Plan*.

### **Scope**

These guidelines are intended to constitute a planning, development and operations document that considers natural environment needs across the City, and specifically applies to undertakings of the whole PRC Department—including parklands, civic facilities and buildings. The guidelines are intended to guide and stipulate actions for city staff, design consultants and contractors.

At the staff level, the guidelines are intended to assist PRC staff and their contractors in understanding and applying practical environmental management principles to park projects. Surrey staff will apply these guidelines to the planning, development, renovation and operation phases of the City’s parks and recreation facilities. Staff will also ensure effective liaison among all relevant Department and interdepartmental sections.

It is hoped that these environmental design guidelines will challenge both the PRC staff and consultants to promote the local, regional and global benefits of sound natural environment management and protection in the City of Surrey.

The guidelines are intended to set a new standard and target for PRC-related activities. They are not, however, meant to represent restrictive requirements that all projects must fulfill. Not all recommended practices are appropriate for every project, rather they are offered as points to be strongly considered and applied flexibly during design and construction management. Where competing uses of a park, natural area, or parks facility exist, compatible solutions will be sought.

## **Implementation of Environmental Guidelines**

A number of actions should proceed to ensure the effective implementation of these environmental guidelines, as follows:

1. An *Environmental Guidelines Policy* should be created and adopted by the PRC Commission.
2. These guidelines should be incorporated into the *Parks Construction Specifications and Standards*.
3. These guidelines should be presented and promoted to staff.
4. Copies of the *Environmental Guidelines* document should be distributed throughout the Corporation and to all consultants, contractors and others who have been involved in parks development and construction.
5. Local residents and decision-makers should be educated to have an understanding of natural environment stewardship issues to ensure that conservation initiatives during park development will be supported and embraced by the local community.
6. Partnerships and other cooperative management strategies should be pursued with other municipalities and other levels of government.
7. Best Management Practices for construction and maintenance techniques should be implemented that support these guidelines.
8. Environmental protection clauses should be written into contracts.
9. Staff performance plans should be developed to set out expectations of adherence to the guidelines.
10. An annual PRC report card should be developed, reviewed and updated.

# **Environmental Guidelines**

## **General Guidelines & Recommendation**

### **Laws and Standards**

1. PRC planning, development, and maintenance activities should adhere to the spirit of various pieces of federal, provincial, and municipal legislation pertaining to the environment (Appendix 1). Where laws do not adequately protect the environment, Surrey should apply standards that minimize adverse environmental impacts.
2. PRC staff are expected to act with due diligence when undertaking development projects. This entails the effort to:
  - I. be aware of the legal, public and municipal requirements of working in and around water;
  - II. recognize the potential environmental impacts from one's actions;
  - III. obtain the appropriate permits and authorizations from regulatory bodies prior to proceeding with maintenance and construction activities; and
  - IV. conduct one's work activities in a manner that complies with the law.
3. "Due diligence" ensures that one has taken all reasonable steps to prevent any violation and is the primary means of defending oneself when charged with the violation of an environmental law.

### **Communication and Collaboration**

1. The design and development team should be "integrated" and "cross-disciplinary," and should include "all those impacted by the building from the outset of the project" (*Green Building Checklist*, p. 3).
2. PRC staff should be participants at the pre-construction stages of planning and design, working with developers, architects, arborists, biologists or other environmental professionals, builders, and engineers. (The *Green Building Checklist* also recommends the inclusion of "an energy engineer with experience in computer energy simulation," p. 3).
3. A project team approach should be adopted, with a specific PRC staff member assigned to the project, from start to finish, as an overall representative of the various sections of PRC.
4. Environmental clauses should be written into contracts.

### **Design, Development and Operations Goals**

Appropriate design, development and operations techniques and choices should be adopted to protect the natural environment and ecosystems, preserve waterways and wetlands, conserve fish and wildlife, sustain and enhance biodiversity, avoid flood damage, and reduce waste and pollution (*Section E, Official Community Plan 1996*). At all stages of parks' development and management, best management practices should be utilized that protect the natural environment.

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### **Design, Development, Operations Strategies**

1. Landscape ecology planning should be adopted to reduce natural area fragmentation, and to promote corridors, matrixes and linkages (Section F, Official Community Plan 1996; also see *The Fragmented Forest* by Larry D. Harris (1984), *Island Biogeography Theory and the Preservation of Biotic Diversity* by Roger H. MacArthur and Edward O. Wilson (1967), and *Design with Nature* by Ian McHarg).
2. Creative design, development, and operations alternatives should be encouraged for ensuring the balance between natural environment values and safety needs. Where competing uses of a natural area, park or parks facility exist, compatible solutions will be sought.

### **Fiscal Strategies**

1. Cost-effective strategies should be sought, and park development projects must be identified well in advance in annual budgets.
2. Appropriate funding sources should be lobbied for initial investment into energy-efficient projects and retrofits that will recover costs in the short term.

### **Follow-Up**

The design, development, and operations of parks should be monitored and evaluated for natural environment values, energy efficiency, safety, and more efficient management strategies.

### **Education**

1. Initiatives should be undertaken to raise awareness of these guidelines and corresponding performance objectives for those involved in park construction, development, and renovation projects.
2. Opportunities to provide environmental design education and training to staff and residents should be promoted.

## **Parks and Facilities Design Guidelines**

For all new park developments and the renovation of existing facilities, designs must incorporate approaches, techniques, practices and materials that minimize impacts to Surrey's environment, respect the site-specific environmental sensitivity of each location, and aim for reduced (cost-effective) management in the future.

Developing a park is an interactive process. Starting with initial objectives, developers, consultants and Parks staff will work together to determine what to add or modify as constraints and opportunities arise.

Environmental protection and enhancement can be achieved at various stages of park and facility development. Some park developments have the potential to significantly modify the natural environment. Athletic parks, for example, typically take the form of large, flat areas of homogeneous vegetation (i.e. turf) that are generally devoid of trees. These features can significantly alter the environmental values of an area through increased stormwater runoff, and the direct loss or indirect disturbance of natural vegetation, which provides wildlife habitat or other important environmental functions.

City facilities are diverse: they include firehalls, libraries, gymnasiums, sports fields, community centers and community programming for youth, seniors, and families in schools, pools, and arenas. A large number of these facilities exist in parks and land adjacent to parks and are, therefore, subject to these environmental design guidelines. Wherever possible, the features of “green buildings” will be incorporated, including “green” roofs and building materials.

### **Specific Objectives**

In this section each of the following environmental guidelines is explained as an objective. In a separate section, “Recommended Practices,” a set of specific strategies is recommended to meet that objective. These guidelines cover most site requirements that can be anticipated, but are also meant to be supplemented by guidelines set forth in a number of related documents. Wherever possible, these other documents have been cross-referenced. They include the *Standard Construction Documents*, *Engineering Design Standards*, the *Park Natural Areas Strategic Management Plan*, the *Surrey Tree Preservation By-Law*, *Land Development Guidelines (DFO)*, the *Fisheries Act*, the *BC Water Act*, and the *Integrated Pest Management Strategy*. In addition to these sources, there exists a host of other standards and practices that can also be consulted (see guidelines from the DFO, MOE, EPA [US], MWLPA, the US Army Corps of Engineers, the MMCD Construction Standards, LEED, Canadian Green Building Council, GVRD’s Better Building Partnership and the BC Government’s *Green Building Checklist*).

## **A. Site Planning**

*Objective:* Effective site planning requires design integration, problem resolution, incorporation of basic design elements (both aesthetic and functional), collaboration, a thorough inventory, and natural system preservation.

Site planning should strive to achieve a harmony of form, material, finish, and use in design, so that a park is both functional and pleasing to the eye. A well-conceived project is therefore dependent on “a design process of integration in which a new landscape is created. Components and site are consciously related and interrelated to yield the best that each can offer in dynamic interaction” (Simonds, p. 126)

Effective planning also anticipates and aims to resolve conflicts: it involves “a thought process that proposes to anticipate problems of land usage and provide a physical solution that ensures that the problems never occur” (Molnar and Rutledge, p. viii).

## **B. Environmental Assessment**

*Objective:* For all new park developments, an environmental assessment should be completed to identify and inventory unique and/or sensitive habitats that may be affected by the proposed works.

During park planning activities, Surrey Parks, Recreation and Culture Department will conduct an assessment of physical (e.g. topography) and biological (e.g. flora and fauna) characteristics to identify site-specific environmental sensitivities of the proposed park location. Potential impacts of development will be predicted, and, where necessary, mitigation measures will be incorporated into design and construction standards to avoid or minimize negative effects.

## **C. Buildings**

*Objective:* Buildings should be located and designed to minimize impact to the environment. “Green design” practices should be adopted to ensure that the environmental impact of the design, construction and operation of a facility is minimized, and that, at the same time, the needs of users are met.

Overall, this means achieving high economic performance, in terms of both initial costs and longevity. It “also means that facilities will:

- be more resource efficient,
- require less energy to operate,
- make better use of materials and consume less water.

In addition, these facilities will:

- improve the comfort of building occupants,
- generate cost savings, and
- foster the growth of a strategic industry in the province.” (*Green Buildings Checklist*, p. 1)

## **D. Materials and Construction Methods**

*Objective:* Whenever possible, environmentally friendly materials will be identified and used. Materials should also be recycled through renovation or salvage, and they should be used efficiently through both design strategies and resource efficient choices.

## **E. Vegetation Management**

*Objective:* Vegetation should be protected, enhanced, and restored wherever possible.

In addition to recommended practices (Section III), see *Standard Construction Documents* for guidelines on root protection, use of herbicides, tree protection along water courses, vegetation protection in xeriscape landscaping, and plant selection in xeriscape landscaping. Also consult *The Vegetation Management Strategy* for operational issues and guidelines.



## **F. Tree Management**

*Objective:* Trees should be protected, nurtured, and restored.

Mature tree preservation and management should occur minimally in accordance with the City of Surrey’s *Tree Preservation By-Law* (No. 11565), but normally should adhere to the more rigorous standards set by the PRC Department. The by-law stipulates specific tree management practices that address both human and environmental concerns, and empowers City staff to intervene where contractors are engaged in activities not in accordance with the by-law.



Trees provide a wealth of values related to the biophysical and social components of the environment. These include soil stabilization, air purification, climate regulation (shading and wind protection), noise attenuation, wildlife habitat and the enhancement of visual aesthetics. (See the *Tree Management Strategy* for operational guidelines.)

## **G. Fauna Management**

*Objective:* Responsible creative strategies should be employed to recoup and restore conditions conducive to the health of fauna. Whenever possible, steps should be taken to reintroduce natural fauna to a developed site.

Throughout the City of Surrey there are a variety of park sites that provide important habitat and/or ecological values that contribute to the current level of biodiversity in the City (these range from athletic parks to large forest blocks and remnant hedgerows).



In accordance with the Department *Fauna Management Strategy*, the PRC Department is mandated to protect, enhance and restore a range of habitats for fish, birds, wildlife, and other fauna. The *Fauna Strategy* sets out a number of recommendations for park planning, trail planning, footbridges, boardwalks and viewing, clearing riparian vegetation, and construction. These recommendations should be adopted to protect fauna functions and values.

## **H. Stream Crossings and Preservation of Water Courses**

*Objective:* Watercourse crossings must be designated, constructed and managed in a manner that minimizes potential negative environmental effects.

These crossings include pedestrian-only and controlled vehicular access, and hold significant environmental values that are potentially threatened where people and their pets have access to Surrey Parks. The documents “Preservation of Water Courses,” *Standard Construction Documents* and the British Columbia *Water Act*, justify many constructed crossings by stating that it is an offence to divert or use water, or alter a stream, without approval/license.



## **I. Stormwater Management**

*Objective:* Storm water runoff from parks and park facilities must be managed to prevent any negative effects from changes in water quantity and quality. Engineering Drainage staff should review any proposed changes.

The development of parks and park facilities has the potential to impact natural drainage systems. Vegetation removal and construction of impervious surfaces increases storm water runoff through decreased infiltration and increased surface flow. The combination of these two factors can result in reduced water quality through flooding and damage to stream channels, reduction of groundwater discharges to streams, increased rates of erosion, larger sediment loading, and increases in waterborne pollutants. (During the dry season, on the other hand, vegetated areas retain moisture, preventing drought and cooling temperatures.)

## **J. Soil Management and Erosion Control**

*Objective:* Environmentally friendly erosion control techniques should be adopted to restore soil stability, enrich topsoil quality, and minimize sediment release.

Loss of bank stability, loss of nutrient-rich topsoil, and release of sediment to watercourses are potential results of erosion.

## **K. Siltation Control**

*Objective:* Sediment-laden runoff must be minimized to prevent direct and indirect effects on fish and other aquatic organisms.

The Fisheries Act prevents the input of deleterious substances that can degrade water quality. When site conditions make the complete control of erosion difficult, and where sediment has the potential to be transported to a water body, appropriate sediment control structures must be implemented.



## **L. Trail Development**

*Objective:* Trails should be designed to maximize user safety and enjoyment, minimize or reverse environmental damage, and reduce long-term costs.

Riparian corridors and water bodies in the City of Surrey provide an important ecological function in sustaining fish and wildlife populations in the City. These areas are also the “backbone” of the City’s greenway trail network. Recreational trails and other forms of public access in greenways demand careful planning, design and management when environmental values are high and when encroachment could be potentially damaging. Trails should not be planned within riparian leave strips, particularly where salmon-bearing streams are present.



The “Trail Classification System” and trail development guidelines as articulated in the *Access and Recreation Management Strategy* should be used for all trail development. These guidelines cover sensitive habitat strategies (e.g. assessment of biophysical conditions of a site, establishment of buffer areas), access concentration, trail widths, structures, signage, health and safety, trail materials, watercourse impacts, and user needs (e.g. cycling access for transportation). Designers and developers should also adhere to the guidelines in the *Trail Standards* documents.

## **M. Water Conservation**

*Objective:* Wherever possible, methods should be adopted to reduce the use of water, recycle greywater, and conserve potable water. Water is a finite resource that should be conserved at all costs.

## **N. Water Conservation**

*Objective:* Wherever possible, energy efficiencies should be implemented through alternative methods, multiple use methods and reduced consumption. Conservation of energy will contribute to a cleaner air shed and reduce pollution.



## **O. Indoor Environmental Quality**

*Objective:* Design to minimize the release of air pollutants and to provide daylighting and views.

## **P. Pest Control**

*Objective:* Pests should be suppressed to acceptable levels in economic and environmentally sound ways that are amenable to community values. “Integrated pest management” principles will be used in the design and construction of new landscapes and recreational areas.

In addition to recommended practices, see specific instructions in the *Integrated Pest Management Policy* and the “Chemical Control of Pests” section in *Standard Construction Documents*.



## **Q. Waste Disposal and Cleaning**

*Objective:* Waste disposal methods should not introduce waste into the environment that contributes to pollution, and waste disposal activities should occur by permit only.

PRC staff must adopt methods of waste disposal that are in compliance with Section 3 of the *Waste Management Act*: the Act prohibits the introduction of waste into the environment in such a manner or quantity as to cause pollution, or in the course of conducting an industry, trade or business, unless it is done in accordance with the permit, approval, order or regulation made pursuant to the Act. Permits to introduce waste into the environment may be granted under Section 8 of the Act.

## **R. Public Participation and Process**

*Objective:* During the design and development process, opportunities should be incorporated for public education on environmental issues.

The importance of community outreach cannot be overemphasized. Education and understanding of stewardship issues by local residents and decision-makers will ensure that conservation initiatives during park development will be supported and embraced by the local community. Voluntary conservation practices by landowners on their own properties will also assist in meeting park development goals.

# Recommended Practices

## A. Site Planning

1. Planning should incorporate the principle of integration. Site planning should consider the environment, public needs, functionality, and aesthetics in addition to maintenance and budget.
2. Planning should anticipate and aim to resolve conflicts. A well-conceived plan involves both meeting the requirements of an intended program for a plot of land and fitting this program within designated property areas. Successful planning must consider the full range of problems and possibilities of a site. It is especially important to anticipate and plan for resolution of any potential conflicts and frictions that may be implicated in a site's future.
3. Planning should incorporate the basic principles of design:
  - a) Aesthetic elements: points, lines, planes, forms, motion, colour, texture, sound, fragrance, and organization (unity, harmony, interest, simplicity, emphasis-dominance, balance, scale and proportion, and sequence of experiences).
  - b) Functional elements: size, quantity, orientation, operating needs, budgets, site resources, products and use of appropriate structural materials and plan materials, durability, energy conservation, attention to details, visibility, accessibility, circulation, and safety.
4. Planning should be a collaborative process, involving staff, consultants, and community. A project approach should be adopted whereby a single PRC representative will be assigned as a participant and advisor from start to finish. Parks staff should provide early, specific feedback to plans submitted by land development engineers and other contractors and consultants; such consultation and communication should be ongoing and interactive.
5. Planning should proceed at three levels or stages:
  - a) pre-planning: the concept and vision
  - b) planning for construction activities (sediment control, scheduling of activities, etc.)
  - c) planning for post-construction activities (provisions for maintenance, monitoring and management)
6. A thorough site and inventory analysis should be a critical first step.

As much as possible, the existing natural systems should be preserved. This means considering and preventing or mitigating changes to drainage, groundwater (e.g. infiltration, evaporation), topography and landforms, flora, fauna, soils, light, macro and microclimate, natural cycles of growth, decay and regeneration, and views.

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## B. Environmental Assessment

1. Compile existing site-specific background information.
2. Where necessary, supplement existing information with data collected during field surveys.
3. Predict potential impacts and their significance.
4. Mitigate potential impacts through project planning and design, construction scheduling, selection of materials/equipment, and the application of best management practices during construction.
5. Investigate whether the site has existing contamination issues subject to the Provincial Waste Management Act. Develop strategies for remediation of any contaminants.
6. Develop maintenance guidelines for works at the new facility that may impact the receiving environment. This includes guidelines for runoff from such activities as power washing, paint removal, cleaning or sidewalks/parking lots, and disposal of waste salt after winter de-icing.

## C. Buildings

1. Utilize site selection guidelines detailed in the “Sustainable Sites” Section of the GVRD *Green Building Strategies for Municipal Buildings*. (LEED™ Principles).
2. Avoid constructing buildings on environmentally sensitive areas like wetlands and endangered species habitats.
3. Build on previously disturbed sites (*Brownfield*), wherever possible; avoid building on *Greenfield* sites.
4. Locate buildings to minimize impact on landscape and existing wildlife corridors.
5. Cluster buildings to reduce site coverage.

## D. Materials and Construction Methods

1. Utilize materials selection guidelines detailed in the “Materials and Resources” Section of the *GVRD Green Building Strategies for Municipal Buildings* (LEED™ Principles).
2. Plan and use construction techniques that will minimize the import and export of materials at the site.
3. For new construction, utilize and salvage materials that are already on-site, such as topsoil, and small trees for replanting.
4. Design small park structures to allow for eventual disassembly. Select building systems that can be deconstructed at the end of the useful life of the building.



5. Use the following design strategies: value engineering, advanced framing techniques, and multiple-use materials.
6. Share materials among sites, and recycle materials.
7. Balance the use of natural materials against their vulnerability to vandalism to reduce maintenance.
8. Use anti-graffiti products that can be power-washed (instead of repainted).
9. Use permeable pavements for large pavement expanses.
10. Choose preferred materials: cedar, non-pressure treated woods, native plants, real stone (instead of concrete), masonry. (See also “Tree and Shrub Preservation,” *Standard Construction Documents*.)
11. Avoid materials such as limestone and cedar chips that produce environmentally hazardous leachates.
12. Do not use rare or endangered wood species such as ebony, rosewood, teak, and honduras mahogany which can contribute to de-forestation of tropical rainforests.
13. For ice-rinks, choose non-toxic paints and other non-toxic ice products.
14. Stop work upon the discovery of spray or trowel-applied asbestos, and follow recommended procedures. (See “General Instructions,” *Standard Construction Documents*.)
15. Plan maintenance activities such that no contaminated waters enter into the onsite storm drainage systems. This includes wash downs from cleaning, power washing, vehicle cleaning, sediment, pool water disposal, etc.
16. In pools, utilize systems that will reduce chlorine usage such as ozone systems.
17. To ensure long structure life, provide flexible floor plans and structural design that can be easily adapted to many uses.

## **E. Vegetation Management**

1. Retain concentrated natural vegetation areas and, where possible, reconnect those isolated remnant stands that have been broken up.
2. Avoid monoculture plantings of entire areas; instead, use planting combinations that occur in natural ecosystems. (Exceptions are single streets and plazas.)
3. Use native plants that are both indigenous and historically ecologically matched to the site. Use the Biogeoclimatic Ecosystem classification principles where possible.
4. Use water-wise plant selections, and employ mulches.
5. Create new managed meadows and restore old field habitat.

6. Reduce turf grass expanses except in horticultural zones and active park areas.
7. Utilize preferred options to replace grass, such as the use of mixed wildflowers indigenous to the site.
8. Retain coarse woody debris: leave large logs on-site, in long lengths; chip native materials back onto the site.
9. Utilize balconies, trellises, and rooftop gardens to maximize green space.
10. Monitor new plantings to ensure survival.
11. Apply IPM principles for vegetation control.
12. Remove invasive species to protect existing native vegetation.

## **F. Tree Management**

1. Discourage single tree planting.
2. Maintain a site's existing large trees wherever possible.
3. Ensure PRC staff are familiar with both the *City of Surrey Tree Preservation By-Law*, and the stronger provisions stipulated in the *Standard Construction Documents*, "Tree Protection in Parks."
4. Check for the viability of a tree and any possible hazard; then determine whether it should be saved.
5. Retain or minimize the removal of mature trees. Tree preservation must be given top priority in circumstances when individual specimens are considered to be of unique character or historical significance or are rare species. "Significant" or "protected" trees, designated in the *City's Tree Preservation Bylaw* must only be removed when absolutely necessary.
6. Protect trees to be retained using barriers (e.g. fencing, flagging, vegetation) established at or outside the drip-line. (See guidelines in *Standard Construction Documents*.)
7. During any excavation, for any work that is to be carried out within 4 metres of the drip-line of any tree to be retained, proceed by hand or in a manner that will not damage the trunk, branches, or roots.
8. Retain or create suitable "wildlife" trees.
9. Install root wads and large woody debris adjacent to water courses for erosion control and for vegetating to the top of banks/fisheries setback line. Be mindful of the *Wildlife Act*, Section 35, which stipulates it is unlawful to destroy birds, their eggs, and their nests.
10. Minimize grade and drainage changes.

11. Select trees that are long-lived and that require less water, little or no pesticides, and only minimal amounts of fertilizer.
12. In natural areas, match native trees to the ecology of the site.
13. Use Biogeoclimatic Ecosystem classification principles where possible.
14. Develop standards for tree canopy cover appropriate to different applications (e.g. active sports, facilities, community and neighbourhood parks, streetscapes, parking lots).
15. Re-use small native trees in the planting of parks.
16. Avoid exposure of large forest trees to human traffic; leave significant buffer areas.
17. Involve certified arborists or Registered Professional Foresters in tree hazard assessment and wildlife tree creation.
18. Plan and construct tree barriers responsibly.
19. Expand the drip-line standard to be consistent with Surrey's tree preservation specifications: "For every 2.5 cm of trunk diameter, a protection zone diameter of 30 cm plus the trunk diameter is required."
20. Construct boardwalks over wetlands and marshy areas to protect tree roots.
21. Do not disturb nests as outlined in the B.C. Wildlife Act; consider tree removals outside of mating season.

## **G. Fauna Management**

1. To protect species at risk and sensitive habitat, planning should aim to balance development and protection of biodiversity.
2. Design strategies should include recommendations for the acquisition of lands supporting sensitive habitat, redesigning a site if necessary, and the relocation of park features (and even fauna where necessary--see Appendix 2 for a description of the relocation of a red-tailed hawk's nest during the development of Bolivar Park).
3. Plant selections should be made to enhance and attract local fauna.

## **Stream Crossings and Preservation of Watercourses**

1. Assess the environmental sensitivity of potential crossing locations to select the most environmentally benign location.
2. Wherever possible, situate crossing locations in areas of low environmental sensitivity.
3. Liaise with the Engineering Drainage and Environment Section. City staff do a first review of instream applications to determine whether simple notification to the province

- or a full Fisheries and Oceans Canada approval is required. They will assist in the facilitation of the approval process with the outside agencies.
4. Where possible, construct crossings that span (i.e. bridge) the watercourse to minimize negative environmental effects.
  5. When instream work is required, apply standard procedures for environmental protection (including the acquisition of environmental permits and approvals). These standard procedures must address vegetation management, construction timing, erosion and sediment control, work site “housekeeping” practices, and site restoration activities.
  6. Select appropriate crossing structures which reflect the environmental sensitivity of the crossing (e.g. boardwalks).
  7. Plan for only prefabricated concrete to be used in streams.
  8. Secure necessary permits and approvals for work in or about a watercourse, and work within the designated “fisheries window.” (See the City’s Stream Classification mapping to determine fisheries value of the stream).
  9. Select appropriate materials and equipment for construction (e.g. preserved or prefabricated materials).
  10. Use materials that minimize or eliminate invasive maintenance practices (e.g. powder-coated metal products).

## **I. Stormwater Management**

1. Before undertaking stormwater detention facility design or modifications, seek advice from Engineering Drainage staff who can also provide free or low-cost advice on problem areas, piping, etc.
2. Manage the water quality of stormwater runoff by:
  - a) minimizing potential sources with controls such as oil/water separators (e.g. for parking lot runoff)
  - b) encouraging infiltration and filtration using “bioswales,” French drains and “bioponds” or constructed wetlands
  - c) incorporating vegetated areas.
3. Design roads and parking lots without curbs or with curb cuts or openings to allow stormwater to infiltrate into soils through edge swales and biofiltration systems.
4. Incorporate design considerations that minimize the use of impervious surfaces and maximize infiltration and filtration principles (e.g. for roads, parking, courtyards and pathways).
  - a) consider the use of alternative materials such as “porous pavers.”
  - b) promote the infiltration of groundwater wherever possible.
  - c) review possible impacts to neighboring properties in advance.
5. Where necessary, provide stormwater detention to minimize flooding and potential damage to receiving water bodies.

6. Review applicable stormwater management strategies such as those criteria contained in the City of Surrey *Engineering Drainage Design Standards, Land Development Guidelines* (DFO, MoELP, 1993) and publications such as the *Washington State Stormwater Management Manual*.

## J. Soil Management and Erosion Control

1. Use site-specific erosion strategies throughout construction activities, and ensure ongoing inspection and adherence to these strategies.
2. Minimize excavation and soil disturbance of natural landscapes.
3. Provide siltation control on all exposed soil areas.
4. Save, protect and reuse all topsoil removed during construction.
5. Stabilize or cover all bare soil areas by the time construction is completed. (See “Xeriscape,” *Standard Construction Documents* for specific guidelines on vegetating, mulching, and erosion control fabrics.)
6. Give priority to the use of vegetation (i.e. existing vegetation and revegetation techniques.)
7. Schedule site preparation and construction/maintenance activities during the low-precipitation months of the year.
8. Stage construction and maintenance activities to minimize areas of disturbance and to allow revegetated areas to establish prior to the end of the growing season.
9. Stop work during periods of heavy rainfall. (“Heavy rainfall” is defined by Environment Canada standards as over 50mm predicted in a storm.)
10. Revegetate disturbed areas as soon as possible following construction and maintenance.
11. Where necessary, use additional erosion control measures such as hydroseed, biodegradable erosion control blankets, and impermeable covers to enhance soil stabilization.

## K. Siltation Control

1. Select sediment control structures to suit the site-specific conditions of the work area, the volume of water to be managed, and the potential quantity of sediment to be removed.
2. Ensure all sediment control structures function properly by scheduling regular inspections and maintenance.
3. Install structures according to standard techniques and specifications endorsed by the BC Ministry of Water, Land and Air Protection.

4. Refer to the *Land Development Guideline* for effective sediment control options and their water quality discharge standards.
5. As necessary, consult with Surrey Engineering Department staff within the Drainage and Environment Section for assistance.

## **L. Trail Development**

See the “Trail Classification System” and trail development guidelines as articulated in the *Access and Recreation Management Strategy*. Designers and developers should also adhere to the guidelines in *Trail Standards* documents.

## **M. Water Conservation**

1. Utilize water efficiency guidelines detailed in the Water Efficiency Section of the GVRD *Green Building Strategies for Municipal Buildings* (LEED™ Principles).
2. Use water for multiple purposes (e.g. fountains and pools).
3. Use water-wise plant selections.
4. Use low-flow taps.
5. Use one of the following strategies:
  - a) waterless toilets or urinals, or
  - b) composting toilets, or
  - c) local biological wastewater treatment facilities
6. Reduce dependence on irrigation through passive irrigation designs (e.g. connected silos). (For specific techniques, see “Xeriscape,” *Standard Construction Documents*.)
7. Capture and store rainwater for indoor and outdoor uses.
8. Share facilities (e.g. plan washrooms adjacent to leisure areas to prevent duplication of services).
9. Recycle water and wastewater (e.g. install rain barrels on parks structures, for roofs use permeable hard-surfaced areas with run-off storage and run-off cleansing built into the surface).
10. Install wastewater piping with a generous pitch to account for smaller water flows.
11. Incorporate a greywater treatment system that reuses water in toilets or irrigation.
12. Restrict water features that use potable water except when they perform another function such as cooling.

13. Install water meters to allow measurement of potable water consumption.

## **N. Energy Conservation**

1. Utilize energy efficiency guidelines detailed in the “Energy and Atmosphere” Section of the GVRD *Green Building Strategies for Municipal Buildings* (LEED™ Principles).
2. Use alternative energy sources and methods. (See “Xeriscape,” *Standard Construction Documents*).
3. Design buildings to use at least 25% less energy than the MNECB (preferably 50% less) and apply for the CBIP and other federal financial incentive programs.
4. Build to use the least area that suits the needs of the project and that requires the least energy to maintain. Be space efficient, and combine uses.
5. Design an energy-efficient envelope: appropriate insulation, tight construction and high-performance, low-e windows (when this reduces lifecycle costs).
6. Control solar heat gain and glare by selecting glazing with appropriate ratio of visible light transmittance to solar heat gain coefficient.
7. Use trees and plantings to reduce summer solar gain, to channel summer breezes, and to block winter winds (deciduous trees let winter sun through and shade summer sun).
8. Use light coloured roofs or green roofs to heat absorption.
9. Use light coloured site surfaces (walkways, courtyards, etc.) or provide green space to reduce heat absorption.
10. Install high-efficiency heating and cooling equipment.
11. Install high-efficiency lamps and fixtures (e.g. compact fluorescents with T-8 lamps).
12. Install high-efficiency appliances.
13. Explore the feasibility of heat recovery equipment.
14. Use demand control ventilation. This is most appropriate for spaces with large but intermittent or short duration occupancy loads.
15. Use motion- or CO<sub>2</sub>-detecting occupancy sensors for lights and HVAC systems. This is most appropriate for spaces with intermittent or short duration occupancy loads.
16. Plan for independent building commissioning for optimum performance of all systems.
17. Maximize use of natural ventilation and passive energy to meet heating and cooling needs, especially during shoulder seasons.
18. Use solar water pre-heating, photovoltaic panels, wind power, geothermal heat exchange, local micro-hydro, fuel cells, or other benign energy sources.

19. Build infill and mixed-use development.
20. Locate buildings to have access to public transit, bike routes, and pedestrian routes.
21. Design safe, attractive, pedestrian and bike-friendly access within the site (e.g. covered, well-lit walkways, separate bikeways).
22. Build shower and changing facilities for cyclists and joggers.
23. Give carpool cars preferred parking.
24. Minimize other car parking spaces.
25. Maximize bicycle parking spaces.
26. Use locally produced materials.
27. Retrofit pools for efficiency of energy use (e.g. switch to salt-electronator instead of chlorinated water).
28. Use linking systems between ice-rinks and pools to facilitate reciprocity between adding heat to pools and removing heat from rinks.
29. Use direct digital control (DDC) to program energy use (e.g. through the use of compressors in arenas).

## **O. Indoor Environmental Quality**

1. Utilize indoor environmental quality guidelines detailed in the “Energy and Atmosphere” Section of the GVRD *Green Building Strategies for Municipal Buildings* (LEED™ Principles).
2. Reduce gas and particulate emissions through careful selection of construction materials:
  - a) Select indoor finish materials that are “Ecologo” or “Zero VOC” certified (or equivalent).
  - b) Avoid any material that will off-gas pollutants such as formaldehyde, VOCs, CFCs or HCFCs.
  - c) Avoid ozone-depleting chemicals in mechanical equipment, including CFCs and HCFCs.
  - d) Avoid fibrous floor, wall, and ceiling finishes on any surfaces that are exposed to inhabited spaces, supply or return air.
  - e) Use propane (instead of gas) powered zambonis.
  - f) Use non-toxic paints and other ice products for ice-rinks.
  - g) Use electric (instead of gas) powered ice hedgers for rinks.
3. Locate air intakes distant from sources of outdoor pollution.
4. Avoid materials and design details that act as sinks (traps, sponges) for pollutants.



5. Ensure that ventilation systems are pollution-free by:
6. Protecting ventilation systems and ductwork from pollution contamination during construction, and/or
7. Cleaning and verifying supply and return air duct systems and ventilation equipment before occupancy.
8. Design envelope details to minimize moisture entry, and allow passive drying to deal with any water that may enter to insure against mold and mildew.
9. Avoid ceiling plenums that expose the supply or return airstreams to artificial mineral or glass fibres.
10. Specify supply air filters at a minimum of 40% efficient according to ASHRAE Dust Spot Method.
11. Use vented windows to promote cross-air currents (e.g. in washrooms and field buildings).
12. Perform ventilation air effectiveness studies for typical spaces with high or prolonged occupancy.
13. Install CO<sub>2</sub> monitoring devices to monitor air quality standards.
14. Require ventilation air effectiveness studies for typical spaces with high or prolonged occupancy.
15. Require independent commissioning of HVAC systems and equipment.
16. Provide adequate drainage of condensation and moisture from HVAC equipment, preventing contact with supply or return airstreams.
17. Design details or systems to ensure that radon cannot enter a building, where radon and soil gasses are a potential indoor air pollutant.
18. Ensure that daylighting is the primary light source in spaces that are used in the day.
19. Provide high quality daylighting and visual comfort by controlling glare, and providing even daylight distribution.
20. Provide visual access for occupants to the outdoors through eye-level glazing.

## **P. Pest Control**

1. Use a combination of methods to suppress pests, including the use of the least toxic pesticides that are effective against the target pests.
2. Use an ecological approach: it is not desirable to eliminate the pests; it is only necessary to keep pest numbers down to non-damaging levels.

3. Apply Integrated Pest Management principles (using a combination of techniques to suppress pests):
  - a) plan and manage ecosystems to prevent organisms from becoming pests
  - b) identify potential pest problems
  - c) use injury thresholds (hazard levels) in making treatment decisions
  - d) reduce pest populations to acceptable levels, using strategies that may include a combination of biological, physical, mechanical, and chemical controls
  - e) evaluate treatment effectiveness
3. Minimize risk to human health and the environment in both the application and storage of pesticides.
4. Consider community values in establishing pest control maintenance standards for City lands.
5. Include long-term benefits when determining cost-effectiveness.
6. Employ prevention techniques that address human-induced pest problems.

## **Q. Waste Disposal and Cleaning**

1. Provide on-site containers for collection of waste materials and debris. Containers should be sealed to contain any potential leachate material.
2. Do not dump excavated fill, waste material, or debris in watercourses.
3. Immediately report any accidental discharges of toxins into the storm systems to the Engineering Department and provincial emergency program.
4. Clean up after any accidental spills or leaks of deleterious substances from equipment, vehicles and machinery.
5. Provide a central location convenient to occupants and loading bays to collect and store recyclables and compostables.
6. Create convenient storage and sorting facilities in use areas (e.g. under the sink, alongside the garbage) for recyclables and compostables.
7. Provide composting facilities on site, and locate them away from buildings and structures to reduce access by rodents.
8. Reuse construction and demolition waste. Use the GVRD's Project Waste Management Master Specification (or equivalent) to ensure that:
  - a) construction and demolition waste is minimized
  - b) as much construction and demolition waste as possible is recycled, reused or salvaged
  - c) the contractor follows a formal Waste Management Plan (WMP) that specifies each material proposed to be salvaged, reused or recycled
  - d) a demo permit has been obtained from the Buildings Department

## **R. Public Participation and Process**

1. Include design elements that are geared for educating people (e.g. signage in dog parks, signage announcing design changes during and after development).
2. Adopt a public process that is inclusive and that can lead to better designs.
3. Provide time and opportunities to educate the public about environmental sensitivity (see *Natural Areas Management Plan* for species).

# Appendices

## Appendix 1. Environmental legislation relevant to park development.

Title	Responsible Agency	General Description
FEDERAL LEGISLATION		
Fisheries Act	Department of Fisheries and Oceans	Approval for activities that impact fish and fish habitat including discharges of deleterious substances. Requirements for the provision of fishways, canals, fishscreens or guards and the flow of water.
Policy for the Management of Fish Habitat	Department of Fisheries and Oceans	Fisheries Act approvals may include the Policy's Guiding Principle of "no net loss of productive capacity of habitat" achieved through habitat compensation.
Wildlife Act	Environment Canada (Canadian Wildlife Service)	Permission for activities affecting wildlife and wildlife habitat in designated wildlife areas.
Migratory Birds Convention Act	Environment Canada	Empowers the federal government to manage migratory bird populations. Prohibits the deposition of oil, grease and other deleterious substances into waters frequented by migratory birds.
Navigable Waters Protection Act	Department of Transport	Approvals for works that are placed in, on, over, under, through or across a navigable water.
Pest Control Products Act	Health Canada	Specifies requirements for labeling of pesticide product containers and general storage requirements. There is a national registration system for pesticides.
PROVINCIAL LEGISLATION		
Fish Protection Act	BC MoELP * (Planning and Assessment)	Approval for activities that affect flow, fish habitat and riparian areas. Requirements for the maintenance of flows, the establishment of setbacks, and the designation and protection of sensitive streams.
Wildlife Act	BC MoELP	Among other issues, requires the identification and protection of nest sites of herons and certain raptor species.
Water Act	BC MoELP (Water Management Division)	Approval for short term use, storage and diversion of water. Approval of alterations and work in and about a stream.
Waste Management Act	BC MoELP (Environmental Protection Division)	Permits required for the discharge or emission of effluent, waste or contaminants into air, land or water. Restrictions regarding solid and toxic wastes.
Pesticides Control Act	BC MoELP	Regulates the use and sale of pesticides in BC. Use is controlled through use of licensed applicators, permits, certificates and approved pesticide management plans.
B.C. Parks Act	BC MoELP	Gives MoELP the mandate to establish and maintain parks in B.C. Responsibilities of MoELP under this Act include the property, rights, interests of the Crown on or in park and recreation areas, the natural resources within those areas,

Title	Responsible Agency	General Description
		and the presentation, development, use and maintenance of parks. Regulations may be established to govern the human use of these areas as well as for the administration, protection and development of the land.
Ecological Reserves Act	BC MoELP	Sites are chosen to protect ecologically significant examples of ecosystems, wildlife habitat, and special features for the purposes of conservation, scientific study and research. Level of access depends on the purpose of the reserve.
<b>MUNICIPAL LEGISLATION</b>		
Local Government Act	City of Surrey	Official Community Plans which regulate the alteration of the local environment through the Zoning and Development Permit, Tree Protection, Soil Removal, and Drainage By-law
Surrey Waterways Protection By-law, No. 2659	City of Surrey	A by-law to prohibit the fouling, obstructing or impeding the flow of any stream, creek, waterway, watercourse, waterworks, ditch, drain or sewer within the City.
Surrey Tree Preservation By-law No. 12880	City of Surrey	A By-law to regulate and prohibit the cutting and removal of trees, the setting of fees and issuance of permits for the same, and the requiring of Replacement Trees and of security for their provision and maintenance.

\*BC MoELP = BC Ministry of Environment, Lands and Parks

\*\* (not an all-encompassing list)

## **Appendix 2. Project Summary of Red-Tailed Hawk Relocation.**

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