



Environmental Management Areas Strategy

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Environmental Management Areas Strategy

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1. Environmental Management Areas Strategy

The beautiful Okanagan valley setting of Vernon is characterized by forested hillsides to the south and east and arid, semi-desert hillsides to the north and west. Lakes, rivers and ponds dominate the landscape and provide easily accessible recreational opportunities. These unique characteristics contribute to the attractiveness of Vernon as a place to live and vacation. Vernon's hillsides, natural features and unique ecosystems are valuable scenic and recreational resources, and contribute environmental services which enhance the high quality of life enjoyed by residents and visitors alike.

Unlike many other cities, which are working to reclaim and reinstate ecosystems and natural features, Vernon has the unique and enviable opportunity to grow into a beautiful, balanced and sustainable city. There are many challenges in this process, but these challenges can be achieved. The City has opportunities to learn from the choices made by cities around us with similar challenges, so we can build on the experience of others. As a result, the City of Vernon is poised to move forward and rise to the challenges ahead. The protection of the natural beauty of the city's setting, Vernon's most valuable asset, will ensure Vernon remains a highly livable, attractive and memorable place.

Environmental management is not just about ecosystem protection, although this is a central component of the Environmental Management Areas (EMA) Strategy. Many features of a livable and well designed city can both enhance and impact the land on which a city is built. During the development of OCP 2008, and reiterated during the 2013 review process for the OCP, public input emphasized the importance of environmental protection and management, reinforcing the significance of the Guiding Principles which direct the OCP and its implementation.

Environmental management priorities identified as significant for this area include air and water quality, the protection of natural areas and wildlife habitat, encouragement for the development of alternative energy and community greenhouse gas emissions reduction. Of these, all but alternative energy and community greenhouse gas emissions (GHG) reduction are addressed in the EMA Strategy. Alternative energy and community GHG emissions reduction are addressed in the Energy and Sustainability sections of the OCP. Of the nine Guiding Principles, two in particular guided the development of this strategy: to protect and preserve green spaces and sensitive areas; and to create a culture of sustainability. Under these directives, as identified by Vernon residents and endorsed by Council, the EMA strategy has been developed.

The EMA Strategy strives to provide an effective, transparent and biophysically appropriate strategy to provide guidance in land use decision making in the City of Vernon. This comprehensive goal of the EMA Strategy is intended to apply across all development districts, and is not restricted in its applicability to any specific development district or habitat area of concern.

The objectives of the EMA Strategy are:

1. To balance the demands of natural areas protection and development opportunities through application of SEI mapping to identify moderate and high sensitivity ecosystems through consistently applied processes throughout Vernon;
2. To protect sensitive ecosystem areas through the use of comprehensive environmental permitting requirements and environmental management guidelines.
3. To identify conservation, protection and enhancement areas in both greenfield and infill development areas;
4. To protect open spaces, environmentally sensitive areas and access to natural amenities which support and facilitate the high quality of life found in Vernon;
5. To support the reduction, prevention and mitigation of pollution and its sources in the air, water and soils of Vernon.

The EMA Strategy identifies key critical ecosystems and natural features essential to the quality of life and attractiveness of Vernon. This strategy provides guidelines aimed at the protection, maintenance and

enhancement of the beauty of the area that provides the natural physical foundation for Vernon while acknowledging the need to accommodate growth.

Sensitive ecosystems, significant natural features, recreation, municipal infrastructure, housing, accessibility, employment and the provision of environmental services for residents and visitors are all interconnected. To ensure that Vernon’s livability continues to grow with the community, the connections between the environment in which the city has been built, and the services provided to all who enjoy Vernon, are supported. Through ridgeline protection and steep slope management, viewscales are protected, recreational opportunities are maintained, water quality and availability are protected, and agricultural lands and wildlife habitat areas are protected. These connections are intrinsic to the quality of life in Vernon, and through the protection and enhancement of significant natural features and ecosystems, a high quality of life will continue to grow with the community.

The Development Districts are identified in the OCP Land Use Plan, and act as an overlay to work in coordination with other zoning and development guidelines and procedures. The EMA strategy has been developed to provide clear direction of the treatment of existing natural area features, significant habitats and protected areas on a development district basis. This approach is intended to simplify the process of identifying the areas which contain sensitive ecosystems and natural features, and to clarify expectations for environmental impact assessments, habitat assessments and land use requirements to be conducted as part of the development permit process for each development district.

Environmentally Sensitive Areas are defined by the presence of key natural features. The following table provides a general outline of the natural features and sensitive ecosystems identified as requiring consideration in each Development District (DD 1-3).

Key Natural Features	DD 1	DD 2	DD 3
Creek, Stream, River	X	X	X
Fish Habitat	X	X	X
Wildlife and Bird Habitat	X	X	X
Heritage Trees	X	X	X
Migratory Bird Habitat	X	X	X
Lakeshore		X	X
Wetland, Pond		X	X
Ravines		X	X
Threatened or Endangered Species Habitat		X	X
Steep Slopes		X	X
Sensitive and Significant Ecosystems		X	X
Ridgelines			X
Hill Tops			X

Table 1: Natural Features and Sensitive Ecosystem Types by Development District

2. Environmental Development Permit Areas and the Local Government Act

Section.919.1(a) of the *Local Government Act* allows municipalities to designate Development Permit Areas for the protection of the natural environment, its ecosystems and biological diversity. The EMA Strategy sets out guidelines and management strategies to achieve these goals in accordance with the Development Permit Areas as set out in the OCP. These DP areas have been established to follow the three distinct areas (City Centre, Neighbourhood and Agricultural and Hillside Development Districts)which are identified in the land use plan.

To streamline the permitting process, and to provide clear and consistent implementation of the EMA Strategy, environmental permitting will be undertaken as part of the development application process, to varying degrees of intensity by DP area. Instead of requiring separate Riparian Development Permits and Environmental Development Permits, site appropriate environmental requirements have been built into a single streamlined, development application process.

To ensure that environmental requirements do not impede development permit application processing, the intensity of assessment has been established by land use alternation type, as appropriate, based on the Sensitive Ecosystem Inventory mapping. To ensure that the level of analysis requested at the time of application is consistent, but reflects the site specific considerations for each property, environmental requirements are to be undertaken at a scale appropriate to the development permit in question (increased intensity of analysis for subdivision than rezoning) and to the fullest extent possible, be based on the natural features and history of disturbance specific to the site in question.

3. Development District Approach to Conservation and Ecosystem Service Protection Issues

Sensitive Ecosystem Inventory (SEI) mapping data from the three SEI projects (Bella Vista – Goose Lake Range, Vernon Commonage, and Coldstream – Vernon) were provided to the City of Vernon, as coordinated by the Allen Brooks Nature Centre. These SEI projects were undertaken under the direction and with the funding of the following organizations: the Okanagan Indian Band, the Ministries of Environment and Sustainable Resource Management, the City of Vernon, Greater Vernon Services Commission, the Allen Brooks Nature Centre, Okanagan University College, FORECON Consulting Service and the Real Estate Foundation.

The SEI map provided in Appendix 1, *EMA Strategy Map*, identifies ecosystem areas of low, moderate and high sensitivity, and the EMA maps show how the Development Districts correspond with the existing development pattern, slope conditions and sensitive ecosystem areas. These maps have been compared to other biophysical inventories, zoning and land use maps of Vernon to determine appropriate EMA areas and corresponding strategies. Analysis of the background information and ecological data, including the SEI data and sensitivity polygon maps, the development history of the city, and the management challenges facing the City of Vernon, resulted in the identification of three Development Districts which cover all land use areas in the city of Vernon.

Each Development District is characterized by a different proportion of identified low, moderate and high sensitivity ecosystem polygons, with the proportions reflecting different levels of significance for conservation and protection emphasis, and each having increasing implications for development. High sensitivity polygons (red polygons) require development permit applications, and restricts development or increase environmental management demands based on site specific inventories and SEI inventories.

Moderate sensitivity polygons (yellow polygons) influence development to a lesser degree, responding to property specific conditions and the presence or absence of key natural and habitat features. Land use alterations, changes to permitted uses and citing of all proposed land uses are required to undertake conservation, protection and mitigation planning as part of development permit application materials.

Low sensitivity polygons (green polygons) require the lowest level of conservation and protection planning, but may require property specific environmental assessment work to be undertaken as part of the development process based on site specific conditions, such as the presence of a creek or wetland on or adjacent to the property.

While protection of critical areas is important to quality of life in Vernon, allowing reasonable use of land is also important. Maintaining the livability of Vernon requires balancing the protection of sensitive and significant areas with the provision of development opportunities. The Environmental Management Areas Strategy is designed to ensure these sensitive and significant ecosystem and natural features are protected and enhanced while continuing to provide reasonable potential for development when taking into account the entire property.

Each Development District has its own unique challenges, while sharing a number of overlapping key natural features and sensitive ecosystems. Regardless of which Development District a development is proposed, EMA considerations and permitting requirements will be triggered by the presence or proximity of one or more key natural features, as outlined in Appendix 6, *Environmental Management Areas Strategy Implementation Guidelines*. To continue to ensure ongoing environmental resilience and overall quality of life, the precautionary principle will be used in the absence of complete site condition information accompanying a development application, limiting development and land use activities until the uncertainty is sufficiently resolved.

4. Environmental Development District 1 – City Centre District

Development District 1 (MA1) is an area of significance for downtown revitalization and urban redevelopment where there are few significant environmental challenges. The Sensitive Ecosystem Inventory (SEI) mapping undertaken in 2012 as part of the Biodiversity Conservation Strategy project, coordinated by the Okanagan Collaborative Conservation Program did not identify any high sensitivity ecosystems within the area of MA1. The absence of highly sensitive ecosystem areas in the City Centre reflects both the history of development in this DP area and the extent to which the landscape has been altered over time. This does not mean that there are no environmental challenges to be managed in this area the challenges are those of reclamation, enhancement and environmental quality improvements.

Environmental challenges identified in DD1 include stormwater management and water quality mitigation, xeriscaping and landscaping choices, creek reclamation and enhancement, heritage and street tree protection, and the enhancement of urban green spaces throughout the downtown area.

The goal and objectives for DD1 reflect the challenges and opportunities of specific relevance in this development district.

Goal To identify opportunities to protect and enhance environmentally significant features and to encourage the rehabilitation of previously impacted natural areas.

Key Issues Environmental management issues in DD1 are limited to riparian area protection, enhancement and reclamation; stormwater management; landscaping and tree protection; and the creation and maintenance of parks and green space.

Sensitive Areas to be Protected
There are no SEI identified high sensitivity ecosystem areas identified in DD1.

Development District 1 Challenges, Objectives and Proposed Implementation

Challenge	Objective	Implementation
Improve green spaces and habitat in DD1	Encourage use of drought tolerant native landscaping	Promote the use of native, drought tolerant plants in City landscaping, public streets and outdoor open spaces
		Encourage the use of native, drought tolerant species and xeriscaping in public spaces created through development
	Protect trees and enhance tree canopy cover	Encourage retention of trees outside of development footprint immediately prior to and during development and redevelopment
		Promote planting of native tree species to provide shade, rainwater and snowmelt retention and infiltration within the DD1
		Encourage protection and planting of trees to attain the Tree Canopy Cover goal of 5% in the City Centre.
	Encourage development of community garden and public recreation spaces	Promote the creation of community gardens

Challenge	Objective	Implementation
		Encourage public/private green space creation during redevelopment
Ecosystem enhancement	Enhance, daylight, protect and conserve riparian areas	Ensure redevelopment includes riparian area enhancement and native species planting to enhance previously impacted watercourses within or immediately adjacent to property boundaries (i.e. streams, creeks, wetlands or lakes which form part of the property boundary of a given property)
		Encourage conservation covenant use to protect riparian buffers
		Promote creation of public trails adjacent to riparian buffer areas to provide continuous trail system connections
	Ensure stormwater management and water quality protection in Vernon and BX Creeks	Promote stormwater quality protection through storm drain marking program
		Promote awareness of relationship between stormwater, rainfall and snowmelt to lakes, ponds and wetlands throughout Vernon
		Promote onsite recharge and infiltration through to maintain hydrologic conditions and protect water quality and quantities draining into Vernon and BX Creeks
		Ensure new development and redevelopment address stormwater quality, quantity, reuse and infiltration
	Conserve and improve avian habitat	Promote tree planting activities throughout DD1 to ensure multi species avian habitat resilience

5. Environmental Development District 2 - Neighbourhood District

Environmental Management Area 2 (DD2) includes many of the established neighbourhoods and developed areas of Vernon. This area is significant for its neighbourhood enhancement and community development opportunities, while containing a limited number of environmental challenges.

The SEI study identified riparian areas as sensitive ecosystems of concern in DD2. In this area, riparian areas include creeks, streams, lake shore habitats and wetlands. This does not mean that there are no other environmental challenges to be managed in this area. Challenges identified specifically to this area are those of reclamation, enhancement and environmental quality improvements.

The goal and objectives for DD2 reflect the challenges and opportunities of specific relevance in this development district. The goals and objectives of DD1 also apply to DD2, as appropriate.

Goal To identify opportunities to protect, conserve and enhance environmentally significant features and to encourage environmental stewardship and awareness throughout established Vernon neighbourhoods.

Key Issues Environmental management issues identified in DD2 consist of wildlife habitat and corridor conservation; gully protection; lake shore and wetland enhancement and protection; moderate sensitivity ecosystem management; moderate slope protection; and management of the interface between residential, agricultural and park lands.

In addition, all of the environmental management issues identified for DD1 require management and careful consideration in DD2. These shared management issues include riparian area protection, enhancement and reclamation; stormwater management; landscaping and tree protection; and the creation and maintenance of parks and green space.

Sensitive Areas to be Protected

SEI identified sensitive ecosystems in DD2 include remnant grass land areas, neighbourhoods tree canopy and riparian areas, consisting of streams, creeks, wetlands, and lakeshore areas, as well as all associated wildlife habitats and potential wildlife corridor areas.

Development District 2 Challenges, Objectives and Proposed Implementation

Challenge	Objective	Implementation
Ecosystem enhancement and protection	Conserve and protect avian habitat	Promote tree planting activities throughout the Neighbourhood District to ensure multi species avian habitat resilience
	Conserve and protect wildlife habitat and corridors	Promote awareness of wildlife habitat within the city
		Encourage local property owners to include native plants in their gardens
		Promote awareness of wildlife needs for water access and sites of likely wildlife corridors in neighbourhoods
	Protect sensitive ecosystems including moderate sensitivity SEI	Identify sensitive ecosystems within the Neighbourhood District

Challenge	Objective	Implementation
	areas	
		Promote increased awareness of the significance of sensitive ecosystems and habitats within the Neighbourhood District
Aquatic habitat protection and enhancement	Ensure stormwater management and water quality protection into Okanagan Lake and Vernon and BX Creeks	Promote the retention of hydrologic conditions onsite to maintain predevelopment conditions Promote stormwater quality protection through storm drain marking program
		Promote awareness of relationship between stormwater, rainfall and snowmelt to lakes, ponds and wetlands throughout Vernon.
		Ensure new development addresses stormwater quantity, quality, reuse and infiltration.
	Promote creek, pond and wetland protection and habitat enhancement	Ensure redevelopment includes riparian area enhancement and native species planting to enhance previously impacted watercourses within property boundaries
		Encourage community stewardship initiatives and support programs which raise community awareness of riparian area protection
		Encourage daylighting and recovery of channelized and piped sections of Vernon and BX Creeks
	Promote lakeshore protection and enhancement	Promote awareness of lakeshore habitat sensitivities and methods for protecting the lakeshore
		Ensure that shoreline habitat mapping is used in dock siting and RAR assessments for lakeshore properties
		Ensure maximum appropriate setback distances from the High Water Mark to the edge of development and enhancement of altered shoreline areas
Conserve and enhance previously disturbed and impacted areas	Remediation and enhancement	Promote the use of native, drought tolerant plants in landscaping and gardens throughout the Neighbourhood District.
		Promote the use of native, drought tolerant species and xeriscaping in green and public spaces created through development
	Protect trees and enhance urban canopy cover	Encourage retention of trees outside of development footprint immediately prior to and during development and redevelopment
		Promote planting of native tree species to provide shade and rainwater and snowmelt retention and infiltration within the Neighbourhood District
		Encourage protection and planting of trees.

6. Environmental Development District 3 – Hillside Residential and Agricultural District

Development District 3 (DD3) is the largest development district in Vernon, with the most diverse landscapes, the greatest biodiversity, most expansive viewsapes and the largest unfragmented areas of greenfield lands. As a result, DD3 has the greatest number of environmental management opportunities and challenges.

DD3 contains all of the remaining agricultural, forested, hillside, wildlife habitat and greenfield lands within Vernon. The Sensitive Ecosystem Inventory (SEI) identified moderate and high sensitivity areas throughout DD3, which, in combination with infrastructure expansion costs, hillside development challenges and seasonal residential resort use patterns, increase both the requirement for excellence in responding to the environmental challenges and the provision of profound opportunities for unique, innovative solutions which could become characteristic of development and sensitive ecosystem protection throughout this area.

The goal and objectives for DD3 reflect the challenges and opportunities of specific relevance in this development district. The goals and objectives of DD1 and DD2 also apply to DD3 as appropriate.

Goal To protect and conserve sensitive ecosystem areas and environmentally significant features and to encourage the rehabilitation of previously impacted natural areas.

Key Issues Environmental management issues have been identified as unique to this area, necessitating site specific management adaptations to be created in response to specific site conditions and proposed land use. Those environmental management issues identified specifically for this area include steep slope management; ridgeline and hilltop protection; grassland and rangeland management and protection; invasive species management; protection of biodiversity; maintenance of ecosystem function; forest land and fire protection; ALR – residential interface areas management; reclaimed water use; moderate and high sensitivity ecosystem protection and management; and hazard land exclusions from use.

In addition to the environmental management issues identified specifically for DD3, those issues identified in DD1 and DD2 will also require consideration, with management strategies adapted to the site conditions present on proposed development sites. All identified environmental management issues are outlined, with reference to relevant regulations, bylaws, policies and guidelines in Appendix 5, *EMA Issues and Related Regulatory Implications*.

Sensitive Areas to be Protected

The SEI identified sensitive ecosystem areas in DD3 which include riparian areas of all types, grassland and rangeland ecosystems, forested ecosystems, and sparsely vegetated ecosystems. In addition to those areas identified by SEI analysis, DD3 contains natural features of interest including ridgelines, hilltops, rock outcrops and steep slopes.

Development District 3 Challenges, Objectives and Proposed Implementation

Challenge	Objective	Implementation
Sensitive Ecosystem Protection	Greenfield ecosystem mapping and environmental assessment	Ensure verification of SEI polygon rankings and site conditions through ground truthing and mapping at an appropriate scale (Appendix 6).

Challenge	Objective	Implementation
		Encourage awareness of significance of identified ecosystem and habitat sensitivities
		Promote voluntary conservation and protection of sensitive and critical ecosystems and habitats
		Promote awareness and education of grassland, rangeland and forest ecosystems as appropriate for site conditions
		Ensure that areas set aside for conservation, protection and enhancement are supported through interpretive signage and ecosystem information including tools for living in and around sensitive habitats and ecosystems.
	Conserve and protect wildlife habitat and corridors	Ensure new development protects habitat for sensitive and protected species identified during environmental assessment process
		Ensure new development provides habitat connectivity through the creation of wildlife corridors
		Ensure wildlife habitat areas are not sited so as to create conflicts between wildlife and residents
Forest Ecosystem Conservation	Forest stand protection	Encourage the conservation of forest stands outside of development footprints in collaboration with fire interface regulations
		Promote the protection of forest habitats through the maintenance of canopy cover, multi-story stands and maintenance of understory plants and debris
		Ensure forest habitat connectivity
Riparian Areas Protection	Creek, pond and wetland protection and habitat enhancement	Ensure development includes riparian area enhancement and native species planting to enhance conserve predevelopment riparian habitat function.
		Ensure riparian buffers are established and protected through the development phase and long term use of the development.
	Lakeshore protection and enhancement	Promote awareness of lakeshore habitat sensitivities and methods for protecting the lakeshore
		Ensure that shoreline habitat mapping is used in dock siting and RAR assessments for lakeshore properties
		Ensure maximum appropriate setback distances from the High Water Mark to the edge of development and enhancement of altered shoreline areas
Greenfield Development Impact Mitigation	Develop appropriate stormwater, drainage and groundwater	Ensure onsite stormwater, groundwater and snow storage management plans are created to maintain predevelopment site hydrology for new development and

Challenge	Objective	Implementation
	onsite management plans	redevelopment
		Promote the use of pervious surfaces, infiltration measures and protection of landscape level drainage patterns.
		Promote awareness of relationship between stormwater, rainfall and snowmelt to lakes, ponds and wetlands.
		Promote the maintenance of landscape level hydrology through limited irrigation use and drought resistant landscaping.
	Remediation and Enhancement	Promote the use of native, drought tolerant plants in landscaping, residential yards and shared green spaces
		Encourage the protection of conservation and natural areas through the use of native, drought tolerant species and site appropriate xeriscaping.
		Encourage retention of trees outside of development footprint immediately prior to and during development and redevelopment
		Promote planting of native tree species to provide shade and runoff retention and infiltration within new developments
	Protect wildlife habitats and corridors	Promote awareness of wildlife habitat and corridors
		Encourage local property owners to include native plants in their gardens
		Promote awareness of wildlife needs for water access and sites of likely wildlife corridors in resorts, estates and neighbourhoods
		Promote awareness of conservation and protected areas within and adjacent to resort, estate and neighbourhood properties
		Promote stewardship and environmental awareness among new residents in greenfield developments
		Establish wildlife corridor areas, without interference or interaction with human settlement or activity as appropriate, in all new subdivisions and neighbourhood plans



7. Environmentally Sensitive Areas and Natural Features

Environmentally sensitive areas (ESAs), critical ecosystems and natural features have been identified as those areas which are at greatest risk for significant and difficult to reverse impacts to ecosystem functioning, habitat and ecosystem services,¹ removal or disruption of habitat and corridors, or are at risk of not being adequately compensated or mitigated. These areas include ridgelines, hilltops, ravines, riparian areas and rangelands/grasslands.

ESAs and functional ecosystems are fundamental to Vernon's high quality of life. Some natural features are critical to protect as they act to prevent potential hazards to public health and safety (such as erosion control through vegetated ground cover), some due to the environmental services they provide, such as drinking water quality protection as a result of stormwater infiltration and in soil filtration, and others because of the sensitive habitats and significant areas they contain, such as rattlesnake hibernacula.

Areas with critical sensitive habitats and ecosystems require management to protect species at risk, rare and sensitive ecosystems, water quality and availability, air quality, soil retention and the unique beauty of the Vernon area. All of these attributes contribute to quality of life for current Vernon residents and are essential for the ongoing sustainability of the region. Although there are many areas which may not be considered sensitive natural areas, these areas all contribute important ecosystem services and should be managed with equivalent care to ensure that ecological functions, biodiversity and area livability are not jeopardized over time.

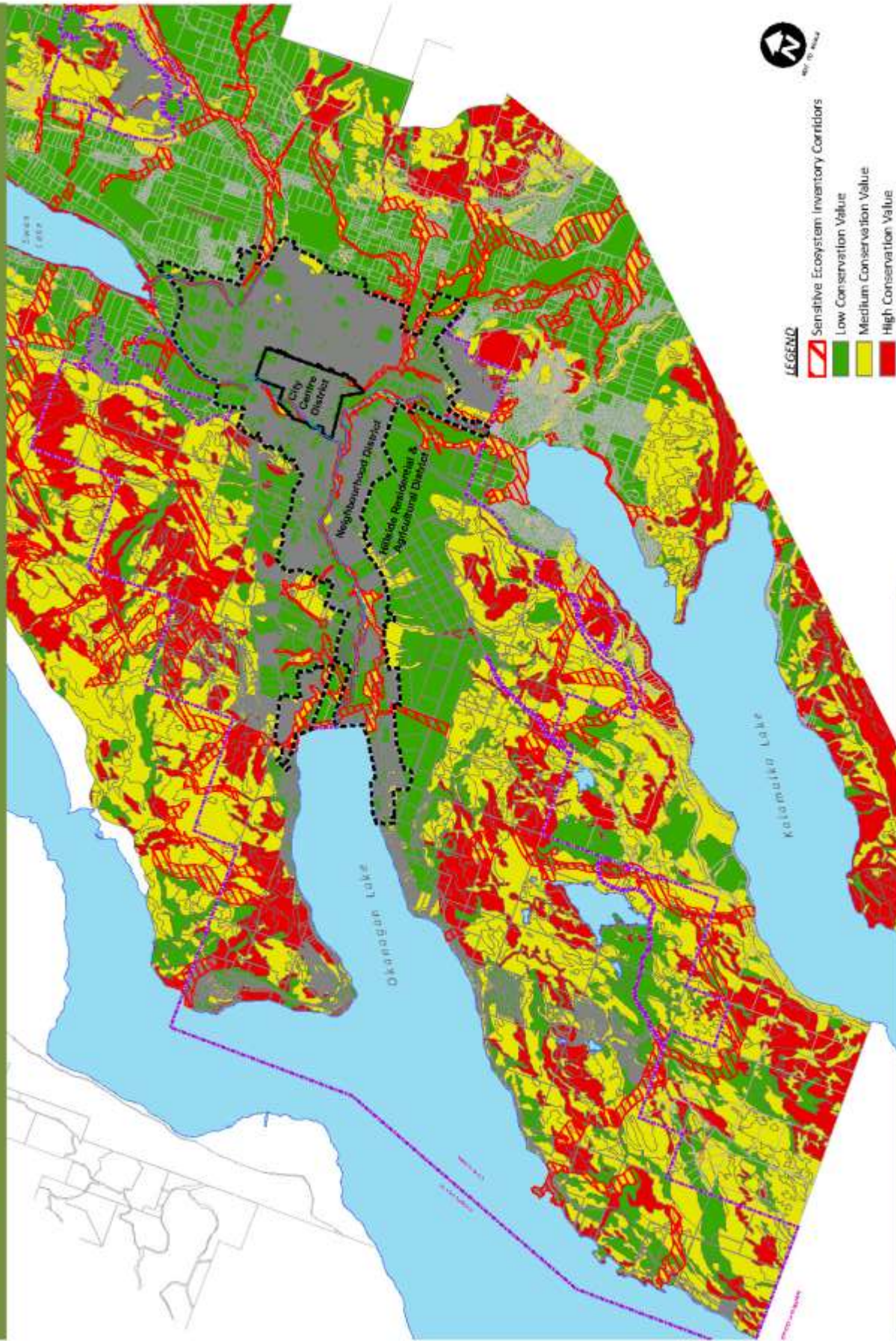
The EMA Strategy will evolve to ensure that policies, programs and best management practices implemented by the City continue to adapt and change in response to changing environmental conditions as well as changing pressures and the priorities of the community.

The critical ecosystems and natural features related to the Vernon SEI polygons displayed on the EMA Strategy Map (Appendix 1) are described and discussed in Appendix 3, *Methods used to derive Conservation Values based on Sensitive Ecosystems Inventories*.

¹ Ecosystem services are the benefits people obtain from ecological systems such as fresh water, timber, water flow regulation, pollination, recreation and protection from natural hazards. Millennium Ecosystem Assessment, World Resources Institute, Washington, DC.

Appendix 1

Environmental Management Areas Strategy Map



LEGEND

- Sensitive Ecosystem Inventory Corridors
- Low Conservation Value
- Medium Conservation Value
- High Conservation Value

NOTE
 This drawing has been prepared by the City of Vernon's Geographic Information System. Data provided in this system is derived from a variety of sources with varying levels of accuracy. The City of Vernon disclaims all responsibility for the accuracy or completeness of the information contained herein.

Last Update: July 23, 2013
 Produced by: The City of Vernon GIS

Appendix 2

Sensitive Ecosystems Identified through SEI Mapping

Sensitive ecosystems identified through the SEI mapping process are considered to be ecologically significant due to their rarity and fragility, as well as the diversity of species, including many rare and endangered species, which are supported by these ecosystems. Sensitive ecosystems identified in the Vernon area through SEI mapping include old forests, broadleaf woodland, and coniferous woodland ecosystems; grassland ecosystems; riparian and wetland ecosystems; and sparsely vegetated ecosystems.

Significant ecosystems are those which are considered to not be as sensitive as sensitive ecosystems, but which provide important ecosystem services and habitats which support the proper functioning of the sensitive ecosystems. Significant ecosystems identified through SEI mapping include mature forests and disturbed grassland ecosystems.

Old Forest Ecosystems: These areas are dominated by large, old trees. Logging, fire exclusion and development have impacted these systems. In the Vernon area few old forest ecosystems remain. Old forests provide significant habitat for many species of owls, deer and woodpeckers.

Broadleaf Woodland Ecosystems: These areas are dominated by trembling aspen. These systems tend to be shrubby, and include broad, moist basins in grassland areas. Broadleaf woodland ecosystems provide habitat for many species.

Coniferous Woodland Ecosystems: These ecosystems are similar to old forests, but have less uniform canopy structure and may consist of sparse, clustered tree cover. These ecosystems have been impacted by invasive species encroachment, growth of other tree species in canopy gaps, and development.

Mature Forest Ecosystems: These ecosystems tend to be composed of mature trees which buffer old or newly reestablishing forest systems. Mature forests provide habitat for many species and can grow into old forest ecosystems over time.

Grassland Ecosystems: These ecosystems are dominated by bunchgrasses, and forb species. These systems have been impacted by agricultural practices, development, invasive species encroachment, alteration of area hydrology, or other forms of land alteration. Grassland ecosystems provide essential habitat to a wide range of species, many of which are protected.

Disturbed Grassland Ecosystem: These ecosystems develop following the disturbance of grassland ecosystems, and no longer consist of climax species typical of undisturbed grasslands. These systems differ from grassland ecosystems due to the presence of noxious weed species (10 – 50%). Many of the species who inhabit grassland ecosystems can also find habitat in disturbed grassland ecosystems, and many rare, endangered and protected species are found in these areas.

Sparsely Vegetated Ecosystems: These ecosystems are dominated by exposed bedrock and rocks, with limited areas of vegetative growth. Due to the limited area of vegetative growth, as well as the presence of shallow, coarse soils the vegetation tends to be composed of rare species, highly sensitive to disturbance. These ecosystems provide habitat for highly sensitive species.

Riparian Ecosystems: Ecosystems identified by the proximity of streams, gullies with ephemeral or permanent creek flow, fringes of lakes and ponds, as well as sites with significant seepage. These systems provide habitat for a wide range of species and provide hydrologic ecosystem services including water quality improvements including temperature control, pollutant filtration, rainfall water retention and delayed release, and the prevention of stream bank erosion.

Wetlands: These ecosystems are dominated by aquatic vegetation and the presence of slow flowing surface waters, and permanently saturated soils. These systems are rare in the Okanagan, and are sensitive to disturbance and hydrologic alteration. Wetlands provide habitat for a range of species, including amphibians, fish, insects, birds, mammals, and aquatic plants. Wetlands also provide water quality improvement, water retention and gradual rainfall release into receiving waters, supporting downstream creeks, ponds and lakes.

Appendix 3

Methods used to derive Conservation Values based on Sensitive Ecosystems Inventories

Sensitive Ecosystem Ranking – Modified for Vernon Draft OCP (July 2013)²

The Sensitive Ecosystem Rankings (SER) for the City of Vernon have been modified to reflect new and expanded disturbances, derived from 2010 aerial imagery. The rankings simplify the Conservation Value mapping, grouping the data into three classes (Haney & Iverson, 2009)³:

- SER1 = High conservation value (7 to 10). Locally and provincially significant ecosystems that provide habitat of critical importance to rare wildlife species. This class consists of habitat with native vegetation and are minimally impacted by human activity.
- SER2 = Medium conservation value (3 to 6.9). Areas of moderate ecological importance based on ecosystem rarity and sensitivity and/or value to rare wildlife. In some cases, non-sensitive ecosystems may have medium conservation values because of their importance to wildlife. For example, agricultural areas may provide foraging habitat or, depending on location, connectivity corridors. The lower class limit recognizes the value of habitats such as disturbed grasslands, old fields and other green spaces. While these ecosystems have been altered, they have value to animals such as small mammals and their predators, including snakes, raptors and badger.
- SER3 = Low conservation value (0 to 2.9). These areas are assumed to have little or no inherent ecological value or importance as wildlife habitat. This class consists primarily of residential, urban, and industrial land uses.

A revised conservation rankings dataset (developed for a regional scale biodiversity conservation strategy in 2012) was integrated into the SER dataset to vet the rankings and resolve any discrepancies. For example, because the conservation rankings dataset included a riparian analysis, SER polygons falling within riparian areas were upgraded to the SER1 class. Conversely, lower ranked polygons in the 2012 conservation rankings dataset were used to moderate some SER polygons where it was obvious (in air photos) that natural ecosystem conditions have been degraded (i.e., impacted by human disturbance).

The modified SER classes provide a means of ranking the relative ecological value of each polygon, serving as a flagging tool for planners. There are scale and temporal limitations associated with the data, and the printed resolution of this map, that should be considered when interpreting the results. A site visit is strongly recommended prior to finalizing any land use decisions.

² A second revision to this map will occur in Fall 2013, based on air photos from the summer of 2013.

³ Haney, A., & Iverson, K. (2009, March). *Conservation Analysis and Updated Ecosystem Mapping for the Central Okanagan Valley*. Retrieved July 2013, from EcoCat: The Ecological Reports Catalogue.

<http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=16043>

Appendix 4

Impacts of Concern

The following discussion of impacts of concern was chosen for inclusion as it was developed as part of the Sensitive Ecosystems Inventory: Bella Vista –Goose Lake Range report which was reviewed by the Okanagan Indian Band, the Ministries of Environment and Sustainable Resource Management, the City of Vernon, Greater Vernon Services Commission, the Allen Brooks Nature Centre, Okanagan University College and FORECON Consulting Service. These reports and associated maps provided the foundation for the EMA Strategy in OCP 2008, and while the maps have been updated to reflect changes in land use in Vernon, the following discussion remains pertinent.

All activities result in impacts to the landscape. Some activities improve or mitigate previous impacts while others create new impacts. This discussion is included to provide a general overview of the types of impacts commonly created as a result of building and development, recreational uses and all other anthropogenic activities. The following discussion has been modified slightly to reflect the applicability of these impacts beyond the Bella Vista-Goose Lake Range.

Impacts of Concern

Human settlement pressures represent the greatest threat to sensitive ecosystems in the study area. Large-scale landscape concerns, which affect all ecosystems, include landscape fragmentation, disruption of natural disturbance regimes, edge effects and invasive species introductions.

Landscape fragmentation

Fragmentation of the landscape often affects the functioning of ecosystems by disrupting connections between different ecosystems (e.g. between uplands and wetlands, resulting in changing water movement and water table levels). In addition, disconnected islands of natural ecosystems often cannot provide the necessary habitat values for wildlife species, which may require a number of different ecosystems for breeding, wintering, and foraging. A network of corridors that connect habitats will help to maintain habitat access, gene dispersal, and the potential distribution for wildlife species.

Habitat fragmentation

Habitat fragmentation occurs when pieces of intact habitat are separated by sub-optimal habitat and is related to increased mortality of many wildlife species due to a wide range of causes such as road mortality, increased predator success along the edges of the habitat, decreased hiding areas deep within the habitat, and many other causes noted in the ecological literature. Increased mortality due to habitat fragmentation can be enough to send a sensitive species into decline.

Disruption of Natural Disturbance Regime

The exclusion and suppression of natural fire has changed grassland and forest ecosystems in the study area. Ecosystems and species of the Okanagan Valley have evolved with natural fire as a major factor in ecosystem and habitat distribution. Frequent surface fires maintained open forests with largely grassy and shrubby understories. Fires likely limited the amount of sagebrush in grassland ecosystems. Fire exclusion has resulted in dense forests ingrown with Douglas-fir and ponderosa pine, and encroachment of these trees onto grasslands. Fire exclusion has affected both ecosystem processes and wildlife habitat values.

Invasive Species

Both the deliberate and accidental introduction of invasive non-native plant species has significantly altered the species composition of some ecosystems in the study area. The northern and lower slope portions of the study area are the areas that have been most altered by invasive plants. Some invasive animal species such as European starlings have altered wildlife populations by displacing native cavity nesting birds.

Invasive plant species reduce diversity by displacing native plant species, and reducing vegetation diversity and soil stabilization. Invasion of non-native plants can also result in loss of forage for domestic animals, domestic livestock and wildlife. Recreation vehicles such as all terrain vehicles (ATVs), bicycles, and people can all spread weeds. Many weeds have seeds that can survive in the soil for decades; consequently, weed control must always be considered to be a long-term process.

Grasslands, old forests, coniferous woodlands, and sparsely vegetated ecosystems are vulnerable to invasion by cheatgrass (*Bromus tectorum*) and other annual bromes (*Bromus* spp.), diffuse knapweed (*Centaurea diffusa*), or sulphur cinquefoil (*Potentilla recta*). Disturbed grasslands are very vulnerable to takeover by invasive plant species if they are disturbed further. Riparian ecosystems and broadleaf

woodlands are vulnerable to invasion by common hound's-tongue (*Cynoglossum officinale*) and common burdock (*Arctium minus*). Wetland ecosystems can be completely altered if purple loosestrife (*Lythrum salicaria*) becomes established.

Edge effects

Fragmentation of ecosystems combined with adjacent development contributes to the creation of 'edges' where there is an abrupt rather than natural, gradual change from one ecosystem type to another. This edge effect can alter the habitat value of the original ecosystem by creating changes in microclimate elements such as air temperature, light level, and humidity. Direct biological effects result when specific species cannot tolerate human activity nearby, or they are exposed to predation by other species. Increased non-native species invasion and competition for habitat are examples of indirect biological edge effects.

Direct Impacts

Direct impacts to ecosystems are those which occur on site, and which have the most immediate and visible effects. Vegetation removal or damage, and soil removal or compaction are examples of immediate and visible effects. Ditching, diking, draining and filling of wetlands and riparian areas are visible effects which also result in long-term indirect effects on water movement and water levels. Disturbances to wildlife species, particularly during the breeding season can directly impact their survival. Although it may seem like large rural lots have the potential to retain many natural values, many owners choose to remove native vegetation and natural features, and intensely graze domestic animals (e.g., horses). Fragmentation associated with these lots also leaves them more vulnerable to weed invasion. All of these possible changes reduce the ecological integrity and natural values of these areas.

Indirect Impacts

Activities that occur adjacent to or at some distance from the ecosystem result in indirect impacts. Hydrological changes due to roads, buildings, deforestation, removal of vegetation, invasive plant species, increased impervious road surfaces, soil compaction and agricultural practices can all result in reduced groundwater infiltration and summer soil moisture, increased annual runoff, disrupted drainage patterns, and reduced soil moisture holding capacity. These hydrological changes can change the water quality and function, structure, and wildlife habitat values of adjacent wetlands and riparian areas.

Water pollution from both point and non-point sources contributes to reduced water quality, potential outbreaks of water-borne disease, and impacts to wildlife populations through the loss of habitat and disruption of the food chain. The use of pesticides associated with agriculture and landscaping has also caused degradation of natural ecosystems and wildlife habitat.

The presence of humans and their pets, even on private property can cause disturbances to wildlife. Recreational activities involving all terrain vehicles (ATVs), dirt bikes, off-road vehicles, and mountain bikes, create soil disturbances that allow rapid invasion and spread of invasive plant species. They can also disturb wildlife, and cause soil erosion and damage to plants.

The Importance of Wildlife Corridors

Isolated populations can become locally extinct or decline for a variety of reasons including inbreeding, random impacts to the population or lack of food, habitat or mates. Therefore, after defining core areas for protection and putting buffers around them, it is important to define connective wildlife corridors between them. Less obvious species, such as plants or invertebrates also need connectivity to be able to adapt to changing local conditions and for genetic exchange between populations.

Adapted from Sensitive Ecosystems Inventory: Bella Vista – Goose Lake Range 2002 Volume 1: Methods, Ecological Descriptions, Results and Management Recommendations. Kristi Iverson, Iverson & MacKenzie Biological Consulting Ltd.

Appendix 5

EMA Issues and Related Regulatory Implications

Development District 1: Issues, Sensitive Ecosystems Identified and Related Existing Bylaws, Regulations, Policies and Guidelines.

Management Issue	Action	Existing Bylaws, Regulations, Policies and Guidelines
Stormwater	Management Mitigation	Stormwater Management Policies and Design Manual Drainage Systems Management
Landscaping	Irrigation Plant Choice Pesticide Use	Landscape Standards Landscape Maintenance Landscape Restoration City Boulevards
Creeks	Daylighting Habitat Enhancement	Riparian Areas Regulation Fish Protection Act Creek Channels: Maintenance of Trees and Creek Banks Work in or About a Stream
Heritage and Street Trees		Tree Removal Public Lands Bylaw Tree Protection Bylaw

Development District 2: Issues, Sensitive Ecosystems Identified and Related Existing Bylaws, Regulations, Policies and Guidelines.

Management Issue	Action	Existing Bylaws, Regulations, Policies and Guidelines
Stormwater	Management Mitigation Retention Treatment	Stormwater Management Policies and Design Manual Drainage Systems Management Snow and Ice Control Bylaw
Landscaping	Irrigation Plant Choice Pesticide Use	Landscape Standards Landscape Materials Selection Guide Landscape Maintenance Landscape Restoration City Boulevard
Creeks	Protection Habitat Enhancement Protection	Riparian Areas Regulation Fish Protection Act Creek Channels: Maintenance of Trees and Creek Banks Work in or About a Stream Water Act
Wildlife Corridors	Protection Creation	Species at Risk Act Migratory Bird Convention Act Canada Wildlife Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act
Tree Protection	Urban forest management Heritage tree conservation	Tree removal Public Lands Bylaw Tree Protection Bylaw Migratory Bird Convention Act
Wetland	Protection Enhancement	Riparian Areas Regulation Fisheries Act CEAA/ Navigable Waters Protection Act
Lakeshore	Protection, Enhancement	Riparian Areas Regulation Fish Protection Act Water Act Navigable Waters Protection Act CEAA
Reclaimed Water Use		Reclaimed Water Use Bylaw
Moderate Sensitivity Ecosystem	Conservation	Species at Risk Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act

Development District 3: Issues, Sensitive Ecosystems Identified and Related Existing Bylaws, Regulations, Policies and Guidelines.

Management Issue	Action	Existing Bylaws, Regulations, Policies and Guidelines
Stormwater	Management Mitigation Retention Treatment	Stormwater Management Policies and Design Manual Drainage Systems Management Services Beyond City Boundaries Snow and Ice Control Bylaw
Landscaping	Irrigation Plant Choice Pesticide Use	Landscape Standards Landscape Maintenance Landscape Restoration City Boulevard
Creek	Protection Enhancement	Riparian Areas Regulation Fish Protection Act Creek Channels: Maintenance of Trees and Creek Banks Work in or About a Stream
Lakeshore	Protection Enhancement	Riparian Areas Regulation Fish Protection Act
Steep Slope	Management	Steep Hillside Development Permit Guidelines
Ridgeline Hilltop	Protection	Species at Risk Act Canada Wildlife Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act Biodiversity Strategy
Wildlife Habitat Corridors Ravines	Protection Management	Species at Risk Act Canada Wildlife Act Migratory Bird Convention Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act Biodiversity Strategy
Grassland Rangeland	Management Conservation	Canada Wildlife Act Species at Risk Act Wildlife Act Biodiversity Strategy
Forest Systems	Management Conservation	Forest and Range Practices Act
Reclaimed water use in domestic, landscaping irrigation		Reclaimed Water Use Bylaw
High, Moderate, Low Sensitivity Ecosystem Protection		Species at Risk Act Canada Wildlife Act Migratory Bird Convention Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act Biodiversity Strategy
Tree Protection		Tree Removal Public Lands Bylaw Tree Protection Bylaw Migratory Bird Convention Act Wildlife Act
ALR Protection		Agricultural Land Reserve Use, Subdivision and Procedure Regulation

Appendix 6

Environmental Management Areas Strategy Implementation Guidelines

Environmental Management Areas Strategy Implementation

The EMA Strategy is intended to address issues of conflict between the priorities of development, community sustainability and ecosystem protection in Vernon. Based on the foundation of Sensitive Ecosystem Inventory mapping, implementation of the EMA Strategy looks to balance these interests by including clear guidelines, policies and bylaws in the development process to protect and conserve the natural features and significant habitats which contribute to the quality of living in Vernon.

The objectives of the EMA Strategy are:

1. To balance the demands of natural areas protection and development opportunities through application of SEI mapping to identify moderate and high sensitivity ecosystems through consistently applied processes throughout Vernon;
2. To protect sensitive ecosystem areas through the use of comprehensive environmental permitting requirements and environmental management guidelines.
3. To identify conservation, protection and enhancement areas in both greenfield and infill development areas;
4. To protect open spaces, environmentally sensitive areas and access to natural amenities which support and facilitate the high quality of life found in Vernon;
5. To support the reduction, prevention and mitigation of pollution and its sources in the air, water and soils of Vernon.

Guidelines for all Environmental Development Districts

The following guidelines are intended to apply to all EMA Districts and to be implemented in response to specific site conditions, sensitivity and value of ecosystems potentially impacted, and to the intensity of development or alteration of the landscape proposed at the time of permit application.

1. A habitat or ecosystem assessment is to be prepared by qualified professionals (grassland, aquatic or forest ecosystem specialists as needed) as deemed necessary for properties found in DD 2 and DD3, to address site conditions and identified sensitive ecosystems and habitats on a property by property basis.
2. Habitat/Ecosystem assessments are to be done *prior* to the initiation of site clearing, infrastructure installation and construction initiation on greenfield sites
3. Habitat/Ecosystem assessments are to be done prior to demolition or other site preparation disturbance activities on properties which have been previously developed and also contain active habitat or sensitive ecosystems.
4. Land clearing, disturbance, construction or ongoing human impacts within and immediately adjacent to high sensitivity ecosystems and significant natural features is discouraged.
5. Buffers, conservation areas, setbacks and covenants to provide a commitment to conservation and protection of high sensitivity ecosystems and identified key natural features as determined by environmental assessment are to be implemented.
6. Functional habitats, corridors and connections which ensure that habitat islands are not created in greenfield development are to be maintained. This includes the protection and conservation of viable corridors to connect ecosystems and habitats to necessary landscape features including access to water, appropriate food sources and habitat niches.
7. Protection and expansion of urban forest areas as appropriate are promoted to help to reach established Tree Canopy Cover goals for DPAs1 and 2, and to ensure that tree cover is not removed in excess of that warranted by development activity in DPA 3..
8. Protection of water quality for recreational, drinking water and aquatic habitat including those waters of regional lakes, creeks, streams, ponds and wetlands.
9. Promote the use of native plants in landscaping and the control of invasive species within City green spaces.
10. Erosion and sediment control measures are to be implemented throughout the city.

11. Nesting sites, hibernacula, breeding areas and other critical habitats are to be protected so that ongoing reproductive habitat is available to ensure the viability of protected and endangered species living in the Vernon area.

Environmental Permitting

Environmental permitting is undertaken as part of the development permit process, to varying degrees of intensity by district. To ensure that environmental requirements do not impede development permit application processing, environmental requirements will be separated by application type, as appropriate, based on natural features onsite and the stage of development currently underway, as illustrated on the EMA Map and represented by the sensitivity polygon colours (Green - Previously Disturbed; Yellow - Moderate Disturbance and Moderate Sensitivity; Red - No Previous Disturbance, High Sensitivity).

For example, at the point of subdivision, environmental requirements consist of habitat or ecosystem assessment, survey, preparation of site maps and the identification of significant features which may require protection.

The proposed environmental requirements for use in City of Vernon permitting are outlined as follows.

Professional Standards

Reports are to be prepared by, signed and sealed by an appropriate Professional Registered in British Columbia and working within their area of expertise (e.g. Registered Professional Biologist, Registered Professional Forester, Professional Geologist) and signed off within the document or by a covering letter bound into the document. The person(s) and corporation(s) who prepared the report must be identified.

Habitat Assessments are generally completed at the Neighbourhood Plan and Rezoning or Subdivision stage (if not already completed). A habitat assessment provides a description and assessment of natural features and characteristics in order to determine site conditions and identify sensitive ecosystems and habitats. Assessment must take current and historic land uses into consideration. The Environmental Management Areas Strategy and Sensitive Ecosystem Inventory (SEI) mapping should be used as baseline information for the assessment. The intensity/scale of the assessment is to be determined by the location of the subject property and development permit sought (see Assessment and Mapping Scales section).

Environmental Impact Assessments (EIA), together with an Environmental Management Plan, are generally completed at the Rezoning, Subdivision and Development Permit stage. An EIA provides a similar description and assessment as described in the Habitat Assessment definition above, but on a more detailed scale (see appropriate scales based on development district and permit type in this document) , with the addition of the proposed development, potential impacts and any proposed mitigation and compensation measures. An EIA must include a determination of lot layout, infrastructure siting, roads and lot accesses, percentage of impervious coverage, and building pads as appropriate to the permit application in question.

The report must reflect the site conditions prior to disturbance and the anticipated site conditions post development.

The report must conform to all municipal and regional bylaws, federal and provincial legislation, regulations and standards. These regulations may include but are not limited to the Riparian Areas Regulation, Fish Protection Act, Migratory Birds Act, Canadian Environmental Assessment Act, Fisheries Act, Species at Risk Act, and Navigable Water Protection Act.

Location of Project and Mapping

The proponent should commit to providing the following in the application:

1. Legal site description including plan number, lot number, district lot, zoning and agricultural land reserve status. For large parcels, UTM coordinates of the site location where specific works will occur may be required.
2. Location map at appropriate scale (minimum 1:2,500 and maximum 1:15,000) indicating the regional setting. This information should be overlaid on the most current cadastral map.
3. Site map at appropriate scale (minimum 1:250 and maximum 1:5,000, dependent on Development District and permit type, as shown in the Assessment and Mapping Scales section) indicating the layout of project components and activities. This information should be overlaid on the most current cadastral map outlining all surrounding property boundaries and uses. Map legends should show clear descriptions of all symbols used as per provincial standards.
4. Site profiles and cross sections in sufficient number to demonstrate conformance with the objectives and goals of the Hillside Guidelines, terrain conditions prior to disturbance and intended conditions post development. When development is occurring on or near slopes that are greater than 30%, a topographic survey may be required. The survey is to show natural slope contours (at appropriate contour intervals of 1 to 5 meters) and the proposed post development contours.
5. Maps should be presented in an applicable size and scope to show the proposed development and requirements as per the Hillside Guidelines.
6. Site plans/sketches/colour photographs indicating project location, site features and activities identified in relation to easily identifiable landmarks such as those found on accompanying maps.
7. Show on map the proximity to designated environmentally sensitive areas such as those previously identified in City of Vernon documents (Official Community Plan or otherwise). This includes aquatic, terrestrial and hillside areas, watercourses (including high water mark or top of bank) and updated sensitive ecosystem inventory locations. Known occurrences of sensitive or important species should also be identified.
8. Where available, particularly for larger projects digital copies of supporting information presented should be provided in a format compatible with the ESRI platform (shapefiles) in NAD83 UTM Zone 11.
9. All image and data sources will be appropriately referenced and clearly indicate the date when this information was developed to certify that the most up-to-date information available was used in completing the relevant assessments. The professional and the applicant must be prepared to work within a comprehensive design process where the development proposal adapts to the findings of the EIA and requirements from all applicable approving agencies.

Assessment and Mapping Scales

Development District 1 – City Centre District

Rezoning	1:250
Subdivision	1:250
Development Permit	1:250

Development District 2 – Neighbourhood District

Rezoning	1:1,500
Subdivision	1:750
Development Permit	1:250

Development District 3 – Hillside Residential and Agricultural District

Neighbourhood Plans	1:5,000
Rezoning	1:2,500
Subdivision	1:750-1,000
Development Permit	1:250

Securities

If development conditions include mitigation, compensation, maintenance and/or monitoring plans, the applicant shall post a security deposit in an amount **determined by the qualified professional**, proportional to the proposed works and deemed acceptable by the City of Vernon. The security needs to be based on the full costs of industry standard complete works and shall be sufficient to guarantee that all required mitigation measures will be completed, monitored and furthermore continue to function properly as prescribed. Securities will be requested prior to final approval of the development proposal.

A 10% hold back will be required after construction to guarantee the performance/proper functioning of the works. The role of the holdback is to protect against design defects and/or failures in workmanship, and to guarantee that the works constructed under the permit will be regularly and adequately maintained and monitored throughout the maintenance period. Thus, the maintenance bond guarantees that any faulty work of the developer or contractor will be corrected or defective materials will be replaced.

- Security Deposit Amount
 - The security shall be in the amount of 125% of the estimated cost of the prescribed works (including monitoring). Conditions for reducing or returning the security are as follows: 90% returned after installation and inspection for substantial completion, and 10% returned after 1 year during which the landscaping or site restoration has been successfully established.
 - The security shall be in the form of a cash security deposit or certified cheque (for amount less than \$2000.00) or an irrevocable letter of credit guaranteed by an acceptable financial institution with terms and conditions acceptable to the City of Vernon attorney. A sample letter of credit is available at www.vernon.ca
- Duration
 - The duration of maintenance/monitoring obligations shall be established by the City of Vernon, based on the recommendations of the qualified professional and based upon the nature of the

proposed works, maintenance or monitoring and the likelihood and expense of correcting works or maintenance failures with respect to design and ecological function.

- The security deposit shall remain in effect until the City of Vernon has been notified, in writing, by a qualified professional that the standards have been met and substantial completion of the works has been satisfied. Once substantial completion of the works have been certified, the City of Vernon will withhold 10% for one year to ensure that the required mitigation has been fully implemented and demonstrated to function (ecologically or as designed). The maintenance bond may be held for longer periods if, throughout the initial 1-year period, the persistent failure of the works is documented.

Environmental Impact Assessment

The qualified professional personnel will include, at minimum, a Registered Professional Biologist other accredited professional (applicable to the proposed development or property land use) in the Province of British Columbia with experience with the ecosystems and species of the North Okanagan, standard development practices, environmental assessments and current best management practices.

In cases where subject properties have been recently annexed into the city, a preliminary site survey based on the North Okanagan Biodiversity Conservation Strategy Map is to be used as a reference.

Environmental Impact Assessments (EIA) should be performed generally in accordance with the B.C. Environmental Assessment Act (2002). The policy, legislation, bylaw or regulatory framework (e.g. Environmental Management Areas Strategy) that triggered the preparation of the EIA must be clearly described within the introductory section of the EIA. The regulatory/policy framework and site specific issues will determine the scope of the EIA.

Habitat or biological assessments completed to satisfy legal requirements of other levels of government (e.g. Provincial Water Act instream works) may be included within an EIA, but the separate approval process should be identified.

There may be situations where the property has both requirements for an EIA as well as a Riparian Areas Regulation (RAR) assessment. In this case the EIA likely will have broader issues to address than are required by the RAR assessment. The RAR assessment forms may be provided as an appendix to the EIA but are still required to be submitted to the City and filed online with the province. The entire EIA should not be filed as part of the RAR assessment. The RAR assessment forms will need to be able to stand on their own under the legislated filing process and refer to the City permitting process.

Inventory Phase

Inventory Phase or pre-planning phase is based on existing biological and physical conditions, or such conditions prior to any preparatory site disturbances. If the works have been started without an EIA, the applicant will be required to stop all works and to attempt to identify what was on the site prior to disturbance.

Pre-existing and available information for the site, such as on the BC Species and Ecosystem Explorer website, will be assessed, presented and referenced, however the assessment should not be limited to this scope if critical species and habitats are identified during the on-site survey and assessment.

A complete biophysical inventory and map of the site referring to adjacent lands will be prepared including:

- Sensitive ecosystems (using a common method such as Sensitive Ecosystem Inventory, Terrestrial Ecosystem Mapping) based on the most recent products available and ground truthing.
- Protected areas
- Habitat including corridors of endangered, threatened, special concern and federally, provincially or regionally rare or significant species and plant communities for all life stages
- Corridors to accommodate known movement of species
- Other existing ecological areas, functions or habitat features

- Landforms, soil type, site stability, geological and topographical features and contours –this may be highlighted for further assessment by a geotechnical professional
- Detailed contour maps are required for sites with slopes greater than 30%, as per the Hillside Guidelines
- Surface and ground water features including swales, wetlands, draws, springs discharge or recharge areas, floodplains, top of bank, high water mark
- Land use history including existing structures, paved and unpaved roads

The inventory should clearly identify levels of confidence and gaps in the existing information and state the best ways to fill these information gaps. To reach the desired level of information to conduct the EIA, information gaps may be filled by additional field work and/or from local information sought from other interested parties including current and past owners, neighbours, and other local groups to make up for the typical short time-frame and limited fieldwork undertaken to complete EIAs.

The inventory should include a list of species found or expected to be found on or adjacent to the site. The provincial and federal ranking of species should be included. A similar table should be provided for any relevant ecosystems or plant communities.

The inventory may be used as a baseline for a covenant, more information may be requested if the inventory does not sufficiently detail the features to be protected by the covenant.

Environmentally Sensitive Areas (ESAs)

A fundamental task within the Inventory Phase is the stratification of communities occurring within the study area based on their environmental sensitivity. This is a key element in the planning process as it identifies area constraints and opportunities (avoidance/conservation, mitigation, and restoration) thus encouraging a more integrated and sustainable development plan. The following three-class rating system has been adopted by the City of Vernon, as part of the Environmental Management Areas Strategy (Method) and Official Community Plan, and shall be applied to all ESA evaluations.

High Sensitivity – High sensitivity polygons (red polygons) would require highly detailed development permit applications, and would restrict development or increase environmental management demands based on site specific inventories and SEI inventories.

Moderate Sensitivity – Moderate sensitivity polygons (yellow polygons) would limit development to a lesser degree, responding to property specific conditions and the presence or absence of key natural and habitat features, but also requiring conservation, protection and mitigation planning as part of development permit application materials.

Low Sensitivity - Low sensitivity polygons (green polygons) would require the lowest level of conservation and protection planning, but would require property specific environmental information to contribute to the environmental management strategies developed as part of the development process.

Sensitive Ecosystem Inventory work (which is the foundation of the SER maps) was carried out at a 1:20,000 scale. All information derived from these maps is to be used as the foundation for all assessment work, with the end product reflecting site conditions at the time of application and at the required scale.

ESA Criteria

A complex of factors may contribute to an area's environmental sensitivity rating. Although the SEI Methodology with SER (EMA) mapping have been used as the baseline, principle components will be

required in order to evaluate communities/polygons. At a minimum, communities/polygons will be stratified and evaluated in terms of habitat/ecosystem rarity, wildlife habitat suitability, rare and endangered species' occurrence potential, functional condition (i.e., ecological connectivity, level of disturbance, seral stage, structural stage etc.), and fragility.

Stratifying ESAs will be completed from a primarily objective approach relying on existing information and a professional understanding about the functional requisites for respective wildlife, communities, and ecosystems. The specific criteria/rating system developed and used in the evaluation will be appended to the EIA report. Where ESA evaluations require a more subjective approach, a clearly articulated discussion/rationale will be provided (in the report). This discussion must describe the rationale used to determine biological value and the methodology used to rank ecological sensitivity such that the rankings and weightings will be reproducible and are transparent.

The components to be considered include the following. Not all will be relevant at each site and other factors than these may require consideration as well.

- Ecosystem mapping
- Seral and Structural stage
- Rarity in the region, province, country
- Landscape context including contiguity to other ESAs (buffering function), area vital to health of ecosystems beyond is boundaries (water catchment, storage/recharge zone)
- Distinct/unusual landforms or viewscapes
- Habitat ratings/suitability for provincially and federally listed or significant species (Regional)
- Presence of critical and important habitat features (e.g. breeding/spawning areas, hibernacula, migration stop over, connectivity corridors, reported sightings of uncommon species, ungulate winter range) and known local species
- Species diversity/habitat complexity
- Ecosystems at risk in the Okanagan include riparian (including subsurface flow and recharge areas), wetlands, grasslands, rock outcrops, talus and cliffs, old growth, and low elevation forests
- Vulnerability to anthropogenic disturbance (e.g. soil disturbance, including adjacency to developments/roads, pets, invasive plants)
- Current condition (biological integrity) function, structure, stability and probability of restoration to a functional level or ecological capability
- Rarity and/or historical loss

Residences or critical habitats are to be identified and buffered as a discrete site within a lower sensitivity ecosystem area.

Impact Assessment and Mitigation Phase

Development Proposal Description

This phase should take the information from the site inventory and examine it in context of the proposed development.

- Describe the existing site conditions (or pre-existing if works were initiated without approval), development proposal, reasons for work and alternatives, phasing, and timing and required development applications
- Provide a site plan, if appropriate to the application, superimposed on both an air photo and on SER/EMA map of the subject property
- Describe the current and proposed provincial, Official Community Plan and zoning designations, policies and permitted uses affecting the subject property
- Outline other relevant provincial, municipal and agency policies, existing studies and issues (e.g. servicing, stormwater management, open space dedication) related to the sensitive

ecosystems, and provide an opinion as to the conformity of the proposal to these policies and guidelines

- Describe the agreed list of scoped issues from consultation with staff

Impact Assessment

Prepare an assessment of the potential impacts of the development proposal on natural features and functions.

- Provide an explanation of methods used to determine impacts
- Citing scientific literature, evaluate the significance of impacts by considering: magnitude, geographic extent, sequencing, timing, duration, frequency, reversibility, and likelihood of occurrence
- Outline the short and long term as well as direct and secondary impacts
- Evaluate if the potential impacts can be prevented, mitigated or compensated and identify opportunities for alternative layout or design. Avoidance is the first objective
- Consider the ability for the site to be used outside of features and buffers
- Consider the type of development and the sensitivity of the site
- Landscape fragmentation, connectivity, distribution
- Identify buffers and setbacks using BMPs or, if not possible, provide an alternative

Outline the design and prescriptions to best protect habitat and/or compensate for permanent habitat loss or degradation associated with or adjacent to the proposed development.

Complex properties or large development assessments may also be supported with the expertise of additional professionals including:

- A land use plan by a professional land use planner
- A hydrogeological assessment of drainage patterns, downstream effects and proposed water supply, wastewater and stormwater management facilities by a professional engineer
- A geotechnical stability assessment and recommendations if sloping terrain of 30% or more
- A vegetation management plan including invasive species
- Erosion and sedimentation control plan

Consider surrounding lands, watercourses and subsurface drainage, and their uses and impacts in a cumulative impact analysis. This means both the effects of the surroundings on the proposed development and vice versa. This should include consideration of travel corridors to surrounding habitats. In most cases on very small parcels, individual environmental impacts may be small, and therefore difficult to measure and/or assess, or seem negligible in total impact. However, cumulative impacts of the same nature on adjacent lands, or all similarly-zoned land, or all land with similar future generalized use, may be large or even extreme. The City of Vernon can provide consultants with GIS files of zoning, Official Community Plans, parcels and development permit areas (at cost) that will allow for Cumulative Impact Assessments in a GIS framework. SEI and TEM information is available through the province's Ecocat website.

Mitigation and Compensation

If impact cannot be avoided, mitigation and/or compensation may be considered. Describe all feasible mitigative measures and their anticipated effectiveness in maintaining the health, form and function and reducing or eliminating potential impacts on natural heritage features and functions.

Summarize residual impacts that cannot be mitigated and develop a plan for compensation and restoration.

Recommend a monitoring and reporting plan for prevention, mitigation and compensation activities for the period before construction, during construction and after construction, where appropriate.

- Provide measurable parameters that will help establish whether the development has caused impacts, or that mitigation was actually achieved and successful
- Identify who is accountable for potential impacts that might occur, and who would be responsible for unintended but foreseeable impacts
- Identify who (e.g. agencies, departments, developers and/or personnel) will be responsible for monitoring potential impacts, and propose a monitoring schedule including identifying the expertise of personnel required to perform the monitoring. Provide recommendations for future assessments. In most cases, the developer will be responsible for hiring a monitor
- All mitigative, restoration, and compensative prescriptions will include clearly articulated performance standards that are based on the best available science and that reflect the structural and functional objectives of projects.

A. Definitions

For the purpose of applying Development Permits to all Development Districts, the following definitions shall apply:

1. **HIGH WATER MARK** is the visible high water mark of a stream where the presence and action of the water are so common and usual and so long continued in all ordinary years, as to mark on the soil of the bed of the stream a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes the active floodplain. The High Water Mark for Okanagan Lake is set at 343m above sea level (asl), unless otherwise assessed by a qualified environmental professional (QEP) using their professional opinion to satisfy the definition above.
2. **DEVELOPMENT means any of the following:**
 - (i) removal, alteration, disruption or destruction of vegetation;
 - (ii) disturbance of soils;
 - (iii) construction or erection of buildings and structures;
 - (iv) creation of nonstructural impervious or semi-impervious surfaces;
 - (v) flood protection works;
 - (vi) construction of roads, trails, docks, wharves and bridges;
 - (vii) provision and maintenance of sewer and water services;
 - (viii) development of drainage systems;
 - (ix) development of utility corridors; and
 - (x) subdivision as defined in section 872 of the *Local Government Act*.

QUALIFIED ENVIRONMENTAL PROFESSIONAL means an applied scientist or technologist, acting alone or together with another qualified environmental professional, if:

the individual is registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association;

the individual's area of expertise is recognized in the assessment methods set out in the Schedule to the Riparian Areas Regulation as one that is acceptable for the purpose of providing all or part of an assessment report in respect of that development proposal; and the individual is acting within that individual's areas of expertise

3. RIPARIAN ASSESSMENT AREA means:

(i) the 30 metre strip on both sides of the stream, measured from the high water mark;

(ii) for a ravine less than 60 metres wide, a strip on both sides of the stream measured from the high water mark to a point that is 30 metres beyond the top of the ravine bank; and

(iii) for a ravine 60 metres wide or greater, a strip on both sides of the stream measured from the high water mark to a point that is 10 metres beyond the top of the ravine bank.

STREAM means all watercourses including ponds, lakes, rivers, creeks and brooks as well as ditches, springs and wetlands that are connected by surface flow to such watercourses.

B. Permitting Requirements within Riparian Assessment Areas (RAAs), All Development Districts – DD 1, DD 2, DD 3

1. Prior to undertaking any activities defined by the Riparian Areas Regulation (RAR) as development within 30m of a stream as defined by the Riparian Areas Regulation, a property owner or appointed agent shall apply to the City of Vernon for a Development Permit and the application shall meet the following guidelines:
 - a. A Qualified Environmental Professional (QEP) will be retained at the expense of the applicant, for the purpose of preparing a report on the riparian area, pursuant to Schedule "A" of the RAR. The report will be submitted to the provincial RAR Notification System and the City of Vernon.
 - b. The Qualified Environmental Professional (QEP) must submit evidence acceptable to the City of Vernon confirming their qualifications (as an applied scientist or technologist registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act) and that he or she is qualified to carry out the assessment as per Section 4(2)(a) of the RAR.
 - c. Development which affects the SPEA will adhere to a "no net loss" principle. All City of Vernon infrastructure and private development proposals will adhere to the following priority sequence of management objectives:
 - (i) Avoid impacts to SPEA through appropriate project siting and design;
 - (ii) Mitigate minor or temporary impacts by minimizing disturbance and repairing or restoring damaged riparian habitat to a natural state;
 - (iii) Compensate with native plantings at a ratio of 3:1 by area disturbed when encroachment into the SPEA is proposed and supported by a QEP in accordance with the RAR; and
 - (iv) Where disturbance cannot be mitigated onsite, offsite environmental improvements shall occur. Such offsite compensation is not an acceptable alternative where effective on-site mitigation is achievable.
 - d. Where a QEP cannot complete a report on the riparian area, pursuant to Schedule "A" of the RAR, because harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area may occur, the development cannot proceed without subsequent authorization by Fisheries and Oceans

Canada (DFO). Such authorization must be provided to the City of Vernon in writing prior to development permit issuance.

- e. Where the QEP report describes an area as suitable for development as per Section 4 of the RAR, the Development Permit shall allow the development in strict compliance with the report and the remainder of the EMA Strategy's Implementation Guidelines. Monitoring and regular reporting by professionals retained by the applicant may be required, as specified in the QEP's assessment report and the Development Permit.
- f. Reduced SPEAs must not result in any portion of the SPEA boundary being less than 15 meters from the high water mark of Okanagan Lake.
- g. For land fronting Okanagan Lake, provision may be made in the Development Permit for access to the lake within the SPEA and above the HWM. A plan must be prepared that indicates how sediment, erosion and construction control measures will protect the riparian area.
- h. If the nature of a proposed project in a Riparian Assessment Area changes, a QEP will be required to re-assess the proposal with respect to the SPEA.
- i. Where storm water outfalls are proposed within a property's SPEA, the RAR Assessment report shall include the outfall's design drawings, approved by DFO and the appropriate provincial ministry where necessary, and require that the post-development report address proper installation.

C. Exemptions

Applications for the following shall be exempt from the Permitting Requirements by District, above:

1. Renovations, repairs and maintenance to existing buildings and structures that are determined to be legally non-conforming under section 911 of the Local Government Act;
2. Reconstruction of a building or structure damaged beyond seventy-five per cent of its value, as described by Section 911(8) of the Local Government Act, provided it remains on its existing foundation;
3. Reconstruction of buildings that are legally non-conforming as to siting after damage regardless of the extent (%) of damage, under Section 911(10) of the Local Government Act, as long as there is no further contravention (that is, as long as the building remains within the same envelope both horizontally and vertically);
4. Farming operations as defined in the Farm Practices Protection Act;
5. Minor interior and exterior renovations to existing buildings, where no additional floor space is added;
6. Developments that have been approved but not constructed prior to the adoption of this bylaw, provided the approved development has not changed;
7. Mining activities, hydroelectric facilities and forest management;
8. Public works and services: The construction, repair and maintenance of works by the City or its authorized agents and contractors are exempt from the formal development approval process, but only when the works are completed in accordance with the assessments and recommendation of a qualified environmental professional (QEP) in accordance with the Riparian Areas Regulation; and

9. Emergency Procedures: Actions and activities performed to prevent, control, or reduce flooding, erosion or other immediate threats to life or property including:
 - a. Emergency flood or erosion protection works;
 - b. Clearing of an obstruction from a bridge, culvert or drainage channel;
 - c. Repairs to bridges or safety fences.

D. Performance Bonding

1. The City may require an applicant to submit to the City a cost estimate, prepared by a qualified professional and accepted by the City, of the total cost of rehabilitating and/or restoring the riparian area.
2. The applicant will provide adequate financial security, as determined by the City, prior to the issuance of approvals of any building or site disturbance.
3. The value of a financial security will be based upon the estimated cost of:
 - (a) Rehabilitating and/or restoring a riparian area;
 - (b) Rehabilitating and/or restoring a riparian area in the event that a riparian area is damaged as a consequence of a contravention of a condition contained in the development permit;
 - (c) Repairing damage caused by construction or site disturbance. (Bylaw 5367)