

Emerald Hills Urban Village

FOUNDATION RESEARCH BULLETIN

Design Centre for
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NATURAL HABITAT

1.0 Why is natural habitat a key theme?

As development paves over natural vegetation, insects, amphibians, birds, and animals are being displaced. Their ability to feed themselves, find shelter, and move throughout the landscape is greatly reduced as habitats are developed into urban landscapes.

Sustainable communities respect and integrate natural systems with human activities, maintaining biodiversity and placing high value on community access to natural systems and parks. Such communities maintain and restore ecosystem functions, and protect natural areas, watersheds and soils which have the potential to shield communities from natural disasters.¹ Effective ecosystem management and restoration can achieve significant energy efficiencies, cost savings, and environmental benefits, as well as provide research and education opportunities and contribute to the local and regional economies.

Preserving biodiversity and natural habitats will ensure the protection of resources including air, water, soil and vegetation; all of which function together to sustain the health of a community.

Biologically diverse natural areas create stable ecological systems which in turn moderate larger systems like temperatures and climate, and provide us with an enduring supply of food, clean water and air. Protecting natural areas and creating compact development will reduce the cost of providing extra road and utilities infrastructure, and will provide additional cost-saving opportunities toward implementing energy-efficient designs at many scales.

Connectivity between habitat areas is key to sustaining them. Trails and greenways can play a key role in enhancing the natural habitat network within the site by increasing the usability of existing open space and natural resources, connecting wildlife habitat, and enhancing opportunities for passive forms of recreation such as walking and cycling for residents.

This research paper will discuss sustainable design strategies for creating and connecting high-value natural habitat areas within the proposed Emerald Hills Urban Village.

2.0 Why is natural habitat important to Emerald Hills Urban Village?

The Edmonton region lies within the "Central Prairie Parkland" subregion. Species in and around this area include foxes, coyotes, skunks and deer, birds, butterflies, dragonflies, and associated wetland species such as reptiles, amphibians and invertebrates.²

¹ IUCN the World Conservation Union.

² Prairie Conservation Forum. March 2006.

Much of Strathcona County lies within the boundaries of the Beaver Hills Moraine, which, in addition to the North Saskatchewan River Valley area, supports a variety of important environmental features and animal species, including important wildlife corridors.³ As such, these natural areas must be protected and should be enhanced by natural habitat connections with neighbouring sites.

While no species or habitat of ecological significance can currently be identified on the Urban Village site, any loss of land to development fragments the overall regional ecosystem and lessens the ability of any species to survive in an urban context. For this reason, environmentally responsible planning and design should maximize the amount of green space and these areas should strive to provide high quality, connected habitat areas which support a diverse variety of native species.

Designing quality natural habitat areas also supports the desire in Strathcona County to provide parks and recreational areas for its residents. From young to old, there is a need for a diverse range and variety of parks and recreational opportunities in both urban and rural areas of the County. It is important when developing parks and recreational areas, to ensure that they complement the surrounding land uses and the environment.”⁴

The strategies in this research bulletin support the environmental management objectives of the Strathcona County Municipal Development Plan, and explore specific design opportunities for integrating the objectives into the foundational planning of the Emerald Hills Urban Village.

3.0 How can EHUV impact on this theme?

Incorporating a variety of natural habitat restoration and conservation strategies into community building from the very beginning can create an interconnected green network which will support the long term diversity of plant and animal species.

A successful long-range planning strategy includes identifying an “ecological infrastructure” for the regional site area, which involves integrating priority habitat areas and linkages to create a “spatial habitat network” that would then inform land use configurations and incorporate habitat within an urbanizing context.⁵

By strategic planning, the Emerald Hills Urban Village has an opportunity to minimize and contain its development footprint from the outset, and create a robust, contextual natural habitat design that can act as a model for future developments in the region.

3.1 What strategies are relevant for EHUV?

Restore, Create and Protect natural habitats and resources



Fig. 1 Wetlands play a key role in sustaining habitat and water management in Strathcona County.

³ Ibid., Section 8.1.

⁴ Strathcona County Draft Municipal Development Plan. August 2006, Section 9.1.

⁵ K.J. Wilkie et al. 2003. p. 195. This paper presents a habitat evaluation tool for this purpose.

“The potential for tree cover in urban areas is generally 60% to 80% depending on land use, so a 40% average recommendation is a very attainable goal” (American Forests)



Overstory
Midstory
Understory

Fig. 2 Native species plant hierarchies provide the richest and most valuable habitat quality.



Fig. 3 Small spaces can provide habitat, such as this design which provides butterfly habitat and stormwater infiltration.

Conserving and improving species’ habitats as functioning ecosystems combines many positive attributes at many scales, including increased habitat value for plants, mammals, birds, fish, reptiles, amphibians and invertebrates, water quality and quantity management, CO₂ and other nutrient, pollutant and toxicant sequestration in the air and ground, property and recreation value, and overall well-being. Ensuring a mix of native plant species in a hierarchical planting arrangement will preserve biodiversity and reduce the need for pesticide use.

Design Criteria:

- Create wetlands within the site with appropriate native plant hierarchy (Fig. 1);
- Ensure all planted areas throughout the site are designed hierarchically (ie. with over-stories (trees), under-stories (shrubs) and groundcover) wherever possible (Fig. 2);
- Provide a variety (Table 1)⁶ of native coniferous and deciduous trees and plants in open spaces and limit non-native species plantings;

Table 1: Plant Types in the Region of Strathcona County

Upland overstory species include willows, aspen, balsam and poplar;

Midstories include saskatoon berries, dogwoods, ribes, and chokecherries;

Understories include plants such as roses and hazelnut.

- Return 50 cm of topsoil (min. 30 cm) to public and private land;
- Plant a variety of canopy street trees on all streets to attain a 40% minimum overall site canopy coverage⁷;
- Provide residential units with optional gardening spaces (which could be in common spaces or attached to unit);
- Design edible landscapes with native plants;
- Provide residents access to value-added natural areas, within a 5-minute walk⁸ (1 km radius) of all homes;
- Design permeable surfaces to absorb 1 inch/day of rainwater⁹ to preserve watershed health¹⁰.

⁶ Locke Girvan, Strathcona County, phone conversation, October 2006.

⁷ American Forests. <http://www.amcanforests.org>

⁸ Condon, P. and J. Teed. 1998. Ch. 2: Traditional pattern with an ecological underlay.

⁹ Condon, P. and J. Proft. 2001.

¹⁰ See Foundation Research Bulletin #3: Water.

Connect natural habitats

Natural habitat connectivity is important for conserving ecosystems and species biodiversity. Animals and amphibians must be able to move across their habitat area to meet seasonal needs and sustain their population. Movements occur across a range of scales- both local and regional- for different species, and it is important to determine the species potentially affected by proposed development in order to design appropriately scaled corridors and associated habitat areas to facilitate their movement.

Design Criteria:

- Connect isolated habitat patches to maximize their effective size (Table 1).¹¹
- Connect greenway trails, creeks (eg. Old Man Creek) and riparian corridors with parks and wetlands for recreation, water management and animal habitat and migration (Fig. 4);
- Connect greenspaces throughout the community and to adjacent neighbourhoods (eg. to Sherwood Park Natural Area, and Fig. 5);
- Provide “value-added” greenspace for residents within walking or biking access;
- Align natural corridors to the location of community based amenities;
- Connect pedestrian paths and trails and create appropriately scaled plant layers on either side.



Fig. 4 Land-bridges, such as this one near Banff, connect animal habitats as well as trails.



Fig. 5 Greenways can connect the community. Value-added attributes include native plant layers and walking and cycling amenities.

Key Attribute	Optimal Condition
Length	In general, shorter is better. Ideally, based on focal species' maximum inter-node distance.
Width	In general, wider is better. Ideally based on focal species' requirements.
Shape	Rectangular and straight. No sharp bends.
Composition	Diversity of habitat types. Ideally, a minimum of three habitat types.
Structure	Abundance of habitat. Ideally, 40% of linkage is comprised of habitat.
Barriers	Breaks in a continuous corridor. Ideally, minimum number of barriers (roads and residential development).
Network Connectivity	The degree to which all habitat nodes are connected. A minimum of two linkages for each habitat node.

¹¹ K.J. Wilkie et al. 2003. p. 194.

Densify to reduce the need for land development

Higher density development preserves land, water and air resources. Densifying means that developments require less land, buildings and costly infrastructure (such as utilities, schools, hospitals, daycare, police and fire services). This protects watersheds, open space, wetlands, and wildlife corridors. Preserving land and natural areas through densification maintains rural character, minimizes light pollution and preserves valuable natural resources and habitat areas.



Fig. 6 Decreasing building footprints reduces the need for extra infrastructure and preserves natural habitat and resources.



Fig. 7 City Farmer's organic community garden in Vancouver lets people grow their own food, and such gardens can be educational forums for children, especially when gardens are included in schoolyards, play spaces and community centres.

Design Criteria -

- Condense land use by decreasing building footprints and sharing infrastructure and resources at building and neighbourhood scales (Fig. 6);
- Densify to a minimum of 30 uph (12 upa), which is the minimum necessary for effective district heating to conserve energy resources¹²;
- Utilize creative designs to integrate and share infrastructure and services at neighbourhood scale (e.g. swales for stormwater management);
- Create community gardens for local food production (Fig.7);
- Design and build multi-use buildings and facilities rather than new ones;
- Reduce parking space footprints (eg. no surface lots- use underground and on-street options);

4.0 What policies and/or programs will add value?¹³

- Create partnerships between the Municipality and Developer with government bodies, NGOs and local community groups and members to determine rare and threatened habitats, plants and animal species.
- Work with partners to creation a Biodiversity Action Plan to consider parcel, site, neighbourhood, and regional plans and initiatives.
- Educate residents (young and old), and community leaders about preserving and creating value-added planted areas and identifying and preventing the spread of invasive plants.
- Create community and educational events around invasive species removal.
- Develop a community Ecoteam (see Tools of Change: Proven Methods for Promoting Health, Safety and Environmental Citizenship: www.toolsofchange.com). This website, an initiative of Natural Resources

¹² Miller, Nicole M. 2006. p. 46.

¹³ One Planet Living. 2006. p.31



Fig. 8 Green canopy along a residential street.

Canada, offers specific tools, case studies, and a planning guide for changing people's behavior into taking action and adopt habits that promote health and/or are more environmentally-friendly.

- Develop a bird-watching or other species-related club which encourages people to interact with natural environments and promotes stewardship.

5.0 What other resources are available?

Foundation Research Bulletins:

- #1: Land, for more on densification.
- #3: Water, for more on infiltration strategies and technologies.
- #4: Carbon, for more on conserving natural resources.
- #11: Equity, for more on residents' access to natural areas.

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Contact Us

Design Centre for Sustainability

University of British Columbia, 394-2357 Main Mall, V6T 1Z4

t. 604-822-5148, f. 604-822-2184

www.designcentreforsustainability.org