

## **SECTION THREE**

### **Theory and Design Principles**

## **Social Issues and Aesthetics**

The Halifax Urban Greenway is more than just a means to preserve the natural landscape above the railway corridor and more than an Active Transportation route within the HRM. The development of this Greenway is an opportunity to create a unique natural trail experience within an urban setting. Members of the local community and visitors to the HRM should see the Greenway as an enjoyable recreational experience and an opportunity to escape the stresses and restrictions of urban life. Using thoughtful design theory and principles in the planning and design of the Greenway, the multi-use and footpath trails have the potential to provide a pleasurable and interesting experience for its users, beyond functional purpose.

This section examines the design principles and theories relevant to the trail design within the project area. I begin by examining the general concepts associated with enjoyment of parks and trails. I then examine the specific design techniques that may be used to create these desirable features.

Throughout this discussion, I refer to contemporary landscape design texts, articles and manuals oriented towards urban park and greenway design. I will also refer to the writings and theories of Frederick Law Olmsted, as he is generally accepted as one of the founding thinkers in North American landscape architecture and the founder of the greenway parks and trails at the community scale (Fabos, 1995, p.7).

### **General Concepts**

#### **Nature in an Urban Landscape**

In an 1870 article, entitled “Public Parks and the Enlargement of Towns”, Frederick Law Olmsted states, “we want a ground to which people may easily go after their day’s work is done, and where they may stroll for an hour seeing, hearing, and feeling nothing of the bustle and jar of the streets, where they shall, in effect, find the city put far away from them” (p. 80). People escape to natural parks and recreational trails in order to experience nature without leaving the city. Research shows that one of the dominant reasons people enjoy paths and trails, is the fact that they provide “intimate

contact with nature”. When designing this type of space, it is important to emphasize a separation between the park and the immediate urban environment, as well as allowing for an intimacy to develop between the user and the surrounding natural environment (Kaplan et al., 1998, p.89).

### **Understanding, Exploration, Enjoyment and Restoration**

In the text, *With People in Mind: Design and Management of Everyday Nature* (Kaplan, Kaplan & Ryan, 1998), the authors outline three relevant concepts that should be taken into consideration when designing landscapes such as the Urban Greenway. The first is to ensure that the users have an understanding of the landscape. People have a natural desire to make sense of their surroundings and their current situation. When we are conscious of where we are located and understand our surroundings, we feel with a sense of security and appreciation for the landscape (Kaplan et al., p. 10).

The second concept is to ensure that the landscape provides the users with a sense of exploration. A sense of exploration may be the act discovering new elements of the physical environment, or it may come from contemplation, wondering or imagining brought on by the surrounding environment (Kaplan et al., p. 153).

The third concept is to design environments that generate restful and enjoyable experiences. Most of us suffer from stress, worries and fatigue that arise from our daily lives and activities. Natural landscapes have been proven to be effective restorative environments for relieving stress and helping us to clear our minds. When designing landscapes in natural settings, it is important to create enjoyable environments that allow users to escape both physically and mentally from everyday life (Kaplan et al., pp. 67-68). A successful landscape design will generate a sense of understanding and exploration as well as provide restorative and enjoyable experience for its users.

### **Types of Recreation**

When we initially envision Greenway activity, we typically picture active users such as inline skaters, cyclists and walkers. In order for this landscape to reach its full potential however, it should allow for an enjoyable experience for both active users as well as passive and reflective users.

Olmsted states that all recreational activities can be divided into two categories. He refers to the first category of recreation as ‘exertive recreation’. This group includes activities involving physical and mental exertion, such as games, sports, and anything involving active movement. In the case of the Greenway, ‘exertive recreation’ will include activities such as jogging or cycling along the trail. The second type of recreation is far more passive than the first, and is classified as ‘receptive recreation’. Olmsted states that this type of recreation “cause[s] us to receive pleasure without conscious exertion” (Olmsted, 1870, p. 73). In the case of the Greenway, ‘receptive recreation’ would include taking in an attractive view or observing an element in nature. A recreational landscape such as this should accommodate both ‘exertive’ and ‘receptive’ recreational activities.

## **Design Principles and Techniques**

Several design techniques can be employed to incorporate these concepts in the design. The remainder of this section examines the design guidelines and principles that may be used to create this type of landscape.

### **Curved Pathways**

One of the best ways to encourage exploration within a landscape is to create a sense of mystery. A landscape becomes more intriguing with the possibility of finding something new and exciting as one progresses through it. In order to create mystery and draw a user into a space, we can suggest that they are near or approaching new and interesting scenes and experiences (Kaplan et al, 1998, p. 16).

The classic method of creating mystery in a landscape is the winding pathway. As one travels along a path that continually bends and turns, an expectation of something new just around the bend is created. Vegetation can be used with a curved path to partially block views or reveal elements of what lies ahead (Kaplan et al, 1998, p. 43). Providing only a small amount of information of what lies just ahead or beyond the line of sight creates a highly pleasurable environment.

Examples of curved pathways that create a sense of wonder and exploration are evident in Calvert Vaux and Frederick Law Olmsted’s design of Central Park in New



**Figure 11**

York City (Figure 11). One of the features that continually draws people into Central Park and away from the grid-iron street pattern of Manhattan, are the gracefully curved pathways that wind between the trees and disappear behind edges of vegetation (Rybczynski, 2003). These curved pathways create mystery and intrigue about what lies ahead.

While the main purpose of a curved path is to create a sense of mystery, it is important that these curves are not arbitrarily introduced to the landscape. A bend in a trail should follow the natural contours of the land or should steer the user towards interesting points in the landscape (Kaplan et al., 1998, p. 91). A

trail that loosely follows the natural landscape will create a contrast between the natural park space and the geometric, linear order of the streets and sidewalks in the nearby urban environment. This contrast will emphasize the fact that the user is traveling through a natural area, bringing them in touch with nature and making them feel further removed from the city (Molnar & Rutledge, 1992, p. 3).

### **Depth and Seclusion**

To create the feeling of being removed from the city and closer to nature, there needs to be a distinct separation between the park and the urban environment. This separation does not require an extensive forest. Olmsted points out that we only require “depth of wood enough about it not only for comfort in hot weather, but to completely shut out the city from our landscapes” (Olmsted, 1870, p.80). A small natural environment in an urban setting can be manipulated to appear larger and more secluded from the surrounding urban landscape than it really is. This can be done by creating the impression of depth and extent in a landscape. A sense of depth creates the illusion that one is farther removed from the city than one really is.

The impression of depth can be created by layers within the landscape. Naturally wooded sites, lacking dense underbrush and foliage make the layers of trees visible to the

user and produce a sense of depth. Distant landmarks and borrowed views also give depth and extent to a landscape, making the site seem larger than it truly is (Kaplan et al., 1998, p.46). When sites are very small or narrow and closely border an urban landscape, it is important to define a strong separation between the two spaces. Defining a clear separation can be done through developing a sense of enclosure around the park space. A



**Figure 12**

vertical separation is the easiest way to create a sense of enclosure and separation. A vegetated buffer, consisting of a few trees with large canopies creates a sufficient sense of removal from the surrounding environment. A vegetated buffer creates physical depth as well as blocking out noise from adjacent streets (Kaplan et al., 1998, p. 73).

### **Views and Vistas**

Views and vistas add a valuable element to any landscape. Sites that offer opportunity for views of the distant landscape (natural or urban) should include this borrowed view in the site design. Views of the landscape beyond the immediate site provide context for the site. Users are able to orient themselves in the larger landscape and improve their understanding and appreciation of where they are located (Yahner, Korostoff, Johnson, Battaglia & Jones, 1995, p. 308). Views and vistas also encourage further exploration of the landscape. They often provide an exciting perspective for what lies ahead, and persuade users to explore and travel further (Kaplan et al., 1998, p. 99-100).

In addition to giving a site context and encouraging users to explore, distant views also stimulate mental contemplation and engage our imaginations. They provide a different perspective of the land and the world than we typically experience, and this causes our minds to wander beyond our usual realm of thoughts. In Olmsted's discussion about the importance of borrowed views, he states that "it is not desirable to have such a scene constantly before one. If within control, it should be held only where it can be

enjoyed under circumstances favourable to sympathetic contemplation” (Olmsted, 1866, p. 276). In order for views to inspire mental reflection, it is best if they are incorporated into the landscape at limited points rather than being continuously put before a viewer.

According to Kaplan et al. (1998), in order for a view to be worth incorporating into a design, it must have an initial focus that captures the viewer’s attention and then a coherent set of regions that naturally guide the viewer’s eye across the landscape (p. 103). Olmsted states, “the general quality of a distant scene should be natural and tranquil; in the detail, however, there had better be something of human interest” (Olmsted, 1866, p. 277). A design should not be based around a view simply because it is distant. The view must have aesthetic value and interesting characteristics that draw the viewer in.

### **Points of Interest**

A trail is far more than simply a route to get from point A to B. A trail should encourage exploration of the space, allow users to experience borrowed views, and provide opportunities to develop an understanding of the surrounding landscape. It should be an enjoyable experience for the user that ignites both ‘exertive’ and ‘receptive’ recreation. In order to achieve this, points of interest that encourage people to stop along the way should be included in the design of the trail route.

While one is traveling along the trail, the immediate landscape is seen as a background to the recreation. However, when one is enticed to stop along the trail, the immediate landscape becomes the point of focus. A trail that is connected by points of interest allows the entire landscape to become far more interesting. Points of interest that encourage trail users to stop include: interpretation points of the surrounding landscape, look-off areas of distant views, historical and natural heritage features, as well as benches and general resting points along the trail . A successful trail design is one that ties points of interest together into one fluent experience for the user (Kaplan et al., 1998, p. 97-98).

## **Ecological Principles**

In a 1995 article in *Landscape and Urban Planning*, Yahner et al. state that “the design and management of public open space and greenways provide opportunities for the protection of existing natural resources, the creation of new habitats, and restoration of regionally rare ecological communities” (p.306). The design and management of the Halifax Urban Greenway is an opportunity to protect, conserve and improve the ecological health of this landscape.

Members of the Halifax Urban Greenway Association are fearful that the development of the four meter wide multi-use trail will severely damage this natural landscape. However, the current ecological condition of the project site shows evidence of continual disturbance and human abuse. If the area continues to be used and treated as it is now, it will further the natural degradation of the site. If designed properly, this Greenway will improve and protect the ecological values of the land.

This section discusses the theory and principles that may be applied in the design of the Greenway to allow enjoyable recreational activity and nature conservation to co-exist on the project site. The majority of design recommendations considered in this section are taken from David Cole’s chapter entitled ‘Minimizing Conflict between Recreation and Nature Conservation’ in the *Ecology of Greenways* (1993).

### **Environmental Impact**

The level of impact a recreational trail has on the natural environment is a function of the environmental characteristics of the site and the design of the trail. To reduce the negative impact a trail has on the natural environment, the design must address both the characteristics of the site and the physical design of the trail itself (Cole, 1993, p.110). It is preferable to place a trail in an area that can best sustain the abuse caused by the trail.

Soil and vegetation are likely to be affected by the implementation of the Greenway multi-use trail and footpaths. The negative impact of the trail will be caused predominantly by human trampling.

The health of the soil and vegetation are interrelated. As people continuously step on a path, it causes the soil underneath to compact. Soil compaction diminishes the soil's ability to absorb water, increasing the water runoff of the trail site and speeding up the process of soil erosion. The depletion of the soil in turn influences the health of the vegetation on the site. As the soil erodes the plants are no longer able to sustain themselves on the site. As the vegetation disappears, the amount of organic matter in the soil decreases, further affecting the health of the soil (Cole, 1993, pp. 107-108). The impact that a trail has within a natural environment is tied to this relationship between soil and vegetation.

Some plant species are more resistant to the effects of trampling than others. Studies have generally shown that mature trees and grasses are usually fairly resistant to the effects of trampling. Mosses and shrubs vary from resistant to sensitive and lichens and tree seedlings have a very low resistance to trampling (Cole, 1993, p.112). Species that are resistant to trampling and soil compaction can be seen growing adjacent to the current footpaths on the project site.

### **Spatial Configuration**

The spatial design and distribution has a significant impact on the ecological impacts of the trail. It has been shown that the impact of a recreational trail is spatially confined to the area immediately adjacent to the trail. In *Ecology of Greenways* (1993) David Cole states, "a few yards from totally denuded and eroded trails or vista points, soils and vegetation may be completely unaffected by recreational use" (p.108). Because the environmental impacts of a trail usually occur within a limited area, the spatial configuration of the landscape and trail can be designed to limit the amount of land that is adversely affected by the trail development.

The best way to minimize environmental impact in a recreational landscape is to design it in such a way that it leaves patches of undisturbed land separate from the recreational areas. The recreation area should be condensed as much as possible, and the rest of the site should be left undisturbed. This will create patches of obvious disturbance on some areas and leave other areas on the site relatively untouched (Cole, 1993, p.112).

When determining the locations on the site that should be designated for trail development versus those areas that should remain untouched, we must look to the current use and condition of the site. The areas that are already used and disturbed should be included in the recreational trail, and the areas that are currently in a more natural, undisturbed state should provide guidance as to where to leave the natural patches. The environmental impact of trail development in previously undisturbed areas is far greater than development in areas that have already adapted to the affects of human recreational disturbance (Cole, 1993, p.111). In the case of the project site, the current paths define areas of disturbance. The multi-use trail or footpath routes should be based on these currently disturbed locations. The broken tree trunk in Figure 13 demonstrates the ecological disturbance that currently exists along the paths of the project site.



**Figure 13**

In order to maintain definition between the areas for recreation and the areas for conservation, the boundaries and the areas should be strictly defined. It should be obvious to trail users which areas they are allowed to use and which areas should not be trampled. One way to do this is to ensure that the trail width is capable of supporting the appropriate activity. Users will be less likely to stray from the path if the surface material and the width of the trail are able to support the appropriate types of use and traffic levels. Physical boundaries between the trail and the natural areas may also help to keep people on the path. The boundary may be man-made structures such as a small fence or it may be a vegetated buffer, such as dense underbrush or hedging that deters people from disrupting the natural areas (Cole, 1993, p.116).

### **Education and Interpretation**

The behaviour of trail users plays a significant role in determining the ecological health of a site. A disproportionate amount of environmental disturbance from recreational trails in natural areas comes from people abusing the landscape either out of

malicious intent or ignorance (Cole, 1993, p.11). If the users of the trail do not have an understanding or respect for the landscape, their actions may cause ecological harm to the natural areas, regardless of how the trail is designed. Examples of this type of human disturbance include the cutting or damage of trees, those who stray from the trail and trample environmentally sensitive areas or dog walkers who allow their pets to explore freely off-leash. There is already evidence of this type of disturbance on the project site, and it has influenced the shape of the natural environment.

Interpretive and educational points along the trail are the most effective way of deterring people from disrupting the natural environment. Informing people about the ecological functions and the unique qualities of the natural landscape teaches people to respect for the landscape. This type of interpretation is often successful in deterring problems of ecologically disruptive behaviour (Forsyth and Musacchio, 2005, p. 37). An example on the project site might be drawing people's attention to the beauty and importance of pink lady's-slipper orchids and showing them what they should do around the flowers in the wild to ensure that they are not disturbed. In Forsyth and Musacchio's manual *Designing Small Parks*, they state that "public education about ecological systems is the key to building public awareness and acceptance of what constitutes a healthy landscape" (2005, p. 37).

## **SECTION FOUR**

### **Analysis: opportunities and constraints**

Each of the inventory features (Appendix C) represents areas that influence the trail development by either creating opportunities for the trail or the trail route.

Constraints are areas that are considered environmentally valuable or sensitive, areas that are culturally and historically valuable and areas that conflict with future development of the SMU campus. In order to design the trails to meet the objectives of this project, the trail routes should avoid these areas of constraint. The opportunities are areas that are suitable for trail development because they are already environmentally disturbed or they offer unique opportunities for the trail experience.

In some cases, landscape features may be considered both opportunities and constraints. The trail should avoid the exact location of these sensitive areas; however they are also valuable features that add an interesting experience in the trail design. The trail should be designed around these areas in such way that it protects these elements while allowing the trail users to observe them from the trail.

The following tables outline the opportunities and constraints and explains why each feature is classified as it is. The locations of the opportunities and constraints are shown on the Analysis Map (Appendix C).

**OPPORTUNITIES**

<b>Current footpaths</b>	Environmental opportunity	The trail routes should follow the current footpaths when possible because these areas are the most heavily disturbed by human trampling and influence.
<b>Slope &lt; 5%</b>	Environmental opportunity	Areas that naturally meet the gradient requirements for the multi-use trails, and will not require any alterations to the land.
<b>Potential viewing points</b>	Trail experience opportunity	Areas located on the edge of the cut that may be used for views of the railroad corridor and the distant landscape. Accessible from the current footpaths, are on level ground, clear of most vegetation, and offer attractive viewing points while maintaining a safe distance from the edge.

## BOTH OPPORTUNITIES AND CONSTRAINTS

<b>Wall remnants</b>	Cultural/historical constraint	Culturally and historically sensitive areas that should be protected from the trail development.
	Trail experience opportunity	Also provide an interesting feature in the trail experience because of their cultural and historical value.
<b>Orchid sites</b>	Environmental constraint	Highly valuable and sensitive environmental areas. If the orchids are damaged or removed, they will be lost from this landscape.
	Trail experience opportunity	Also an opportunity to incorporate the orchids into a trail experience. Users of the greenway should be able to appreciate these natural treasures without disrupting the orchid habitat.

## CONSTRAINTS

<b>Mature trees</b>	Environmental constraint	Important features in the landscape that significantly influence the character of the landscape and will take many decades to replace if lost (see 'Mature Trees' in Section 2 for explanation on why this feature is not also an opportunity).
<b>Slope &gt; 5%</b>	Environmental constraint	Areas with steep slopes can not be avoided in many places. The first priority of the trail route will be to avoid the steep slopes, the second option will be to traverse the slope to meet the gradient requirements, and the least favourable (but may be necessary in some cases) will be to cut-and-fill to force the landscape to meet the gradient standards.
<b>SMU future development</b>	Property ownership constraint	As the largest landowner on the project site, it is necessary that the trail be in agreement with what SMU intends to do with the land. The area designated for a future building should be left available for future development.

The Analysis Map compiles these opportunities and constraints to show which areas are suitable or unsuitable for trail development. The green areas on the map

represent areas that are suitable for development, the blue areas are features that should be protected but included in the trail experience, and the red areas represent locations that are not suitable or difficult to develop. The majority of this map is coloured red, demonstrating that trail development on the site is a difficult task that requires proper planning and design to ensure that the natural environment is minimally effected.