Mill Creek Linear

Mill Creek Linear Park Master Plan - Final

Final Report

Prepared for:

City of Kelowna

Prepared by:

EBA Engineering Consultants Ltd.

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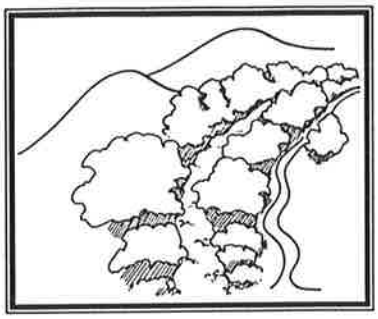

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MILL CREEK LINEAR PARK MASTER PLAN
TABLE OF CONTENTS

APPENDICES

MAPS

FIGURES

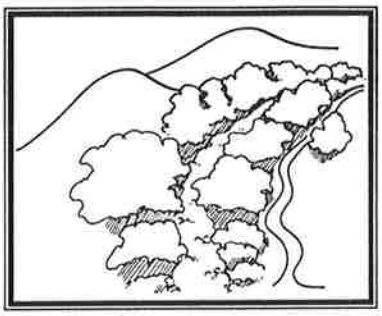
PHOTOS

TABLES

Section 1

INTRODUCTION

This section outlines the background to the Mill Creek Linear Park Plan.



1.1 Project Background

Mill Creek has been identified as a natural feature with environmental, recreational and cultural value to the City of Kelowna. The creek runs through a myriad of land uses, and parallels the primary transportation routes for road and rail in the valley. It winds through the oldest part of Kelowna, and has a history of aboriginal use and early settlement. The City of Kelowna (the **City**) has outlined policies for stream protection and linear park development in the current Official Community Plan **(OCP)** 1994-2013. The OCP states that

> ***'the Linear Parks and Trail System will be managed to conserve its natural features and cultural heritage while offering compatible types of year round recreation, education, and aesthetic opportunities for citizens of Kelowna and visitors (City of Kelowna, 1997).'***

In keeping with the objectives of stream protection and linear park development, the City of Kelowna Parks Division and Planning & Development Services Departments have jointly commissioned the preparation of the Mill Creek Linear Park Master Plan from Okanagan Lake to Bulman Road. The purpose of the document is to establish a vision for the creek corridor, and provide strategies for habitat restoration, activity programming, land acquisition, and management. The plan is based on ecological management principles, providing public access while restoring and preserving the creek corridor's natural functions. The plan is designed to balance the needs of a variety of users while accommodating the variation in stream characteristics and adjacent land uses.

The plan resolves these issues through design guidelines and land use policy.

1.2 Mission Statement

The City of Kelowna has established a fundamental philosophy with regard to establishing linear parks along streams in the city. This philosophy is that a

"continuous open space system, interspersed with recreational activity nodes, can meet the diverse demands for recreation in an urban setting and protect the creek environment".

Linear parks contribute to the quality of life of urban environments. As our city develops, access to natural environments will become increasingly precious, scarce and restricted in some instances. Throughout this process, the importance of balancing public access and recreation with environmental management has been underlined. The objective of the plan has been to balance recreation while promoting environmental objectives of water quality, conservation, restoration, and the protection of biodiversity.

The plan will incorporate the following principles:

- Conservation
- Preservation
- Parkland Acquisition
- Recreation
- Heritage Conservation
- Community Development
- Education

1.3 Objectives

A number of objectives for the Mill Creek Linear Park Master Plan were developed in consultation with the public and interested groups. These are outlined below:

- Define the Mill Creek Corridor
- Establish the Mill Creek Linear Park
- Develop a trail system and corridor management plan.
- Preserve and enhance riparian and habitat areas.
- Balance the needs of all user groups.
- Provide opportunities for interpretation.
- Connect Mill Creek to the Mission Creek Trail system.
- Connect the Mill Creek Linear Park to local and regional parks, bike routes, and staging areas.
- Provide opportunities for recreational, aesthetic, and cultural activities.
- Establish standards for linear park development.

1.4 Access and Ecology

The Mill Creek Linear Park Master Plan is based on the principle that, through careful planning, public access can be provided while restoring and preserving the creek's natural functions. Presently the public has very little access to Mill Creek, and correspondingly, very little knowledge of it. Some citizens of Kelowna may not know that there is a creek running through the center of the city. Many do not know its name. This plan is based on the philosophy that people take care of what they know, and that access and education can provide awareness that leads to an ethic of stewardship.

The plan has been developed based on ecological planning principles developed by the Department of Fisheries and Oceans and the Ministry of Environment, Lands and Parks for public access near aquatic areas (DFO & MELP, 1997). In addition, established principles of greenway design have been incorporated into the Master Plan. These guidelines outline principles for planning, design and management.

Planning principles used in the development of the Linear Park Master Plan include:

- Establish a riparian reserve zone (**RRZ**) around creeks and wetlands to protect the hydrological and biological functions of these areas;
- Establish a riparian management zone (**RMZ**) adjacent the RRZ to provide an opportunity for public access that does not compromise riparian habitat;
- Plan access to reduce and manage impacts by guiding uses away from sensitive areas;
- Provide a hierarchy of trails, paths, and structures based on site sensitivities;
- Encourage interpretative and public stewardship opportunities; and
- Minimize crossing the riparian reserve zone.

1.5 Consultation

The master plan process began in February 1999. This incorporated consultation with the public, community group representatives, landowners, City technical staff, and the Mill Creek Linear Park Master Plan Steering Committee.

Three public open houses were held in total. Each Open House summarized a stage of the process including the Inventory, the Draft Master Plan, and the Final Master Plan. A public committee meeting was held with representatives from neighbourhood associations, and local recreation and naturalist's groups. In addition, four meetings with City staff were conducted, with representation from the Parks Division, Planning Department, Transportation Department and the Environmental Division.

In summary, the consultation process has included:

- Steering Committee Meeting # 1 – February, 1999
- Technical Staff Meeting # 1 - March, 1999
- Public Open House # 1 - March, 1999
- Public Committee Meeting – April, 1999
- Steering Committee Meeting # 2 –May, 1999
- Public Open House # 2 – June, 1999
- Information Booth at Endangered Wildlife Festival – Spring, 1999
- Distribution of Brochures – Spring and Summer, 1999
- Website: http://www.eba.ca/mill_creek_plan
- Technical Staff Meeting # 2 – September, 1999
- Steering Committee Meeting # 3 – October, 1999
- Steering Committee Meeting # 3 – October, 1999
- Public Open House # 3 – November, 1999

1.6 Public Input

The results of the public consultation indicated the following priorities and provided direction to the planning team. An open house exit survey was conduct to gauge plan issues. This survey represents the opinions of only the participants at an open house.

Ranking of Issues:
- #1 - Habitat (Fish, Wildlife, and Vegetation)
- #2 - Recreation (Pathways, Facilities)
- #3 - Water Quality (Runoff, Erosion)

Ranking of Facilities Desired:
- #1 - Fish / Wildlife Enhancement
- #2 - Pocket Parks
- #3 - Picnic Areas / Day Use

Ranking of Uses:
- #1 - Walking
- #2 - Cycling
- #3 - Bird Watching

Ranking of Preferred Destinations:
- #1 - Parkinson Recreation Centre
- #2 - City Park
- #3 – Downtown

The direction received throughout the planning process helped establish planning priorities and provided a structure for decision making. Technical direction from community representatives was provided at the Public Committee Meeting, with recommendations regarding trail and Riparian Reserve Zone **(RRZ)** widths. The planning team combined the information and direction received from consultation with that gathered from published sources and field study. The plan is based on current local, provincial and federal policy with respect to land use and stream corridor management.

1.7 Provincial Review

Comments were solicited from several provincial departments and agencies to ensure that the proposed Linear Park Master Plan was in compliance with existing statutes and regulations. Key contacts were the Ministry of Agriculture and Food, the Land Reserve Commission (formerly the Agricultural Land Commission) and the Ministry of Environment Lands and Parks.

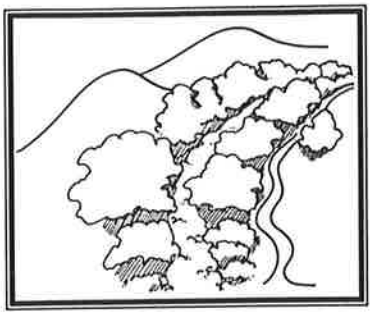
The Agricultural Land Commission **(ALC)** Hand Book March 1997, points out that linear parks that cross lands within the ALR requires approval from the Land Reserve Commission. Page 5-11 of Local Governments and the ALR describes this as:

"In designing linear 'park' routes, care must be exercised to ensure that agriculture is not compromised by the severing of farm units or by inadequate buffering. The planning of linear park routes should make use of topographic breaks and existing vegetation augmented with appropriate fencing, screening and planting to reduce potential for future conflict."

The proposed plan seeks to meet these requirements. Further discussions will help resolve conflicts through the design process.

Section 2

SITE DESCRIPTION



This section identifies the Study Area, and outlines the existing and future land use designations as well as the creek's history and cultural features.

2.1 Study Area

The Study Area includes lands along Mill Creek from Bulman Road to Okanagan Lake. It's southern boundary from Bulman Road to Spall Road is Highway 97, with the northern boundary no closer than 100 metres from the creek. From Spall Road to the waterfront, the northern boundary is Highway 97, and the southern boundary is Springfield Road. Important linkages to Mission Creek, Dilworth Mountain, Chichester Pond, Mount Baldy, Carney Pond, Okanagan University College, Quail Ridge, the Airport, and Mill Creek Regional Park have been identified in the plan.

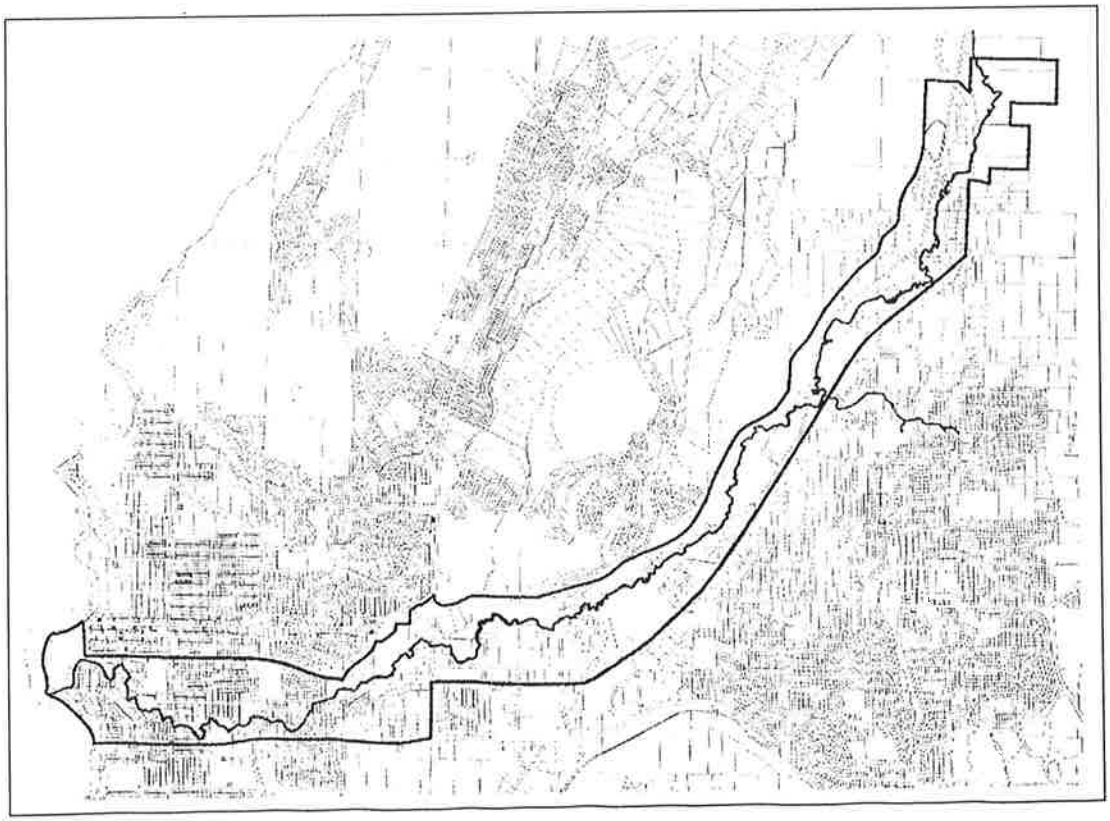


Figure 1 : Study Area

2.2 History and Cultural Features

Mill Creek has had a number of names through its history. These include its aboriginal title Ne'co-quil-tack, which means 'stream of warm water', Millstream, Mill Creek and Kelowna Creek. The creek has a history of use by the Okanagan Lake Band of the Interior Salish people. There are five pre-contact archeological sites within the Study Area. These locations are confidential to protect the integrity of the sites.

The creek has a post-contact history of agriculture, industry and urban development. Brent's Mill is an example of early industry serving agriculture. It was established in 1871 by Frederick Brent and ground flour for local farms throughout the Okanagan Valley. The mill was powered using a system of flumes from Mill Creek that supplied water power. The mill house still stands in its original location, and is built out of hand hewn, squared logs (Central Okanagan Heritage Society,1993).

Two Heritage Conservation Areas, the Marshall Street Heritage Conservation Area and the Abbott Street Heritage Conservation Area, have been established by the City of Kelowna within the Study Area (see Map 9). This designation protects the single and two family nature and heritage character of the area. Therefore, redevelopment to higher densities within these areas is unlikely to occur. Four municipally designated heritage properties are present within the Study Area. These include the:

- 601 Burne Avenue – J.F. Burne House;
- 486 Cadder Avenue – Foster House;
- 1890 Ethel Avenue – DeHart House; and the
- 1988 Bowes Street – DeHart-Bennett House.

Photo 1 : Brent's Mill

2.3 Land Use

There are a great variety of land uses adjacent to Mill Creek, including single and multiple family residential, commercial, industrial, agricultural, institutional, utilities, parks, roadways and the railway. The proposed future land use according to the OCP identifies a transition from single family and duplex residential to multiple family residential along some of the creek properties within the South Central Neighbourhood area of the corridor (Maps 5 and 6).

Two Area Structure Plans (**ASP**) areas occur in the Central Core. Along Spall Road is ASP 7. This has been partially developed to multiple family residential and commercial. The Central Park Golf Course is ASP 8. This is currently being developed into commercial and industrial properties. A dedication has been assigned to the City for a creek protection corridor and park area along the creek through this property.

Properties in the Central Cultivated area between Leathead and McCurdy Roads are typically agricultural within the Agricultural Land Reserve (**ALR**). The future land use for these areas is also agricultural. Future land use is dependant on the outcome of continuing discussions with the Land Reserve Commission (**LRC**) on the McCurdy Road extension.

Within the Urban – Industrial Areas north and south of Sexsmith Road, the area is currently primarily industrial with some agricultural use. The future land use designation provides transition to these properties to industrial use.

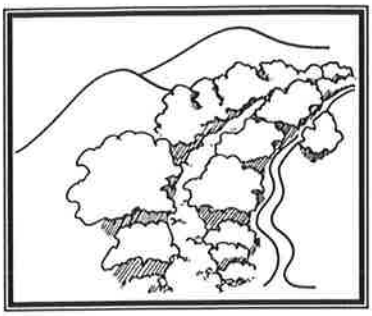
The area around Carney Pond lies within ASP 3 – University South. This plan establishes a number of uses for this area including single and multiple family residential, industrial, park, institutional, and natural open space around Carney Pond with a recommended 30 m setback.

The Northern Cultivated area east of Highway 97 is currently agricultural within the ALR. It remains with its agricultural designation as the proposed future land use.

The proposed linear park crosses distinct natural and man made landscapes as it traverses the distance between the lake and Bulman Road. The proposed Mill Creek Linear Park can provide an important link in the future that is tied to the past. The creek crosses urban and rural, high density to low density and substantially altered to undisturbed environments as it meanders across the valley flood plain.

Section 3

ENVIRONMENTAL CONTEXT



This section identifies the physical and biological context of the Study Area.

3.1 Topography

The Mill Creek watershed is controlled by bedrock ridges and hills with relatively flat slopes on the intervening valley floors. The morphology of the area was formed to a large degree by advancing and retreating ice during the last glacial period. Advancing ice scoured the bedrock surface leaving ridges and hills such as Mount Baldy elongated in the direction of ice movement (north to south). During glacial retreat great thicknesses of sediment were deposited by the meltwater in topographic low points that form the present valley floor. (See Map 1).

The Study Area is predominated by low gradient slopes along the valley floor. It is bound on the west and north sides by a height of land that runs through Okanagan University College (north campus), Mount Baldy and Mount Dilworth. Topographic relief ranges from the level of Okanagan Lake (342 m + / -) to approximately 425 m at Bulman Road. Mount Dilworth (elev. 636 m) is the highest point adjacent the study area.

3.2 Surficial Geology and Soils

The surficial geology and soils of the area have a great influence on the vegetation the site can support and the erosion potential of the stream banks. The surficial geology within the Study Area consists of alluvial fans, deltas, and associated gullies and stream channels, as well as glacial lake sediments (Nasmith, 1962). Melt water drainage and glacial lakes formed the lower reaches of Mill Creek. (See Map 2).

The creek runs through a floodplain in the South Central Zone (see Map 8 for an illustration of zones) reaches of the creek and has layers of sands and silts. The Central Core and Central Cultivated areas south of the railway are within fan deposits consisting of coarse gravel and sand. North of the railway are scattered silt deposits formed by glacial lakes. Above these silt deposits in elevation are glacial till deposits over the bedrock of Dilworth Mountain and Mount Baldy. Glacial lake deposits occur with incised channels occur in the Urban Industrial Area. Floodplain sediments of predominantly silt occur in the Northern Cultivated area north of Edwards Road.

3.3 Hydrology

The Mill Creek watershed drains an area of 223.5 km^2 with 62.9 km^2 within the City of Kelowna boundaries (Dayton and Knight, 1989). The headwaters of the creek are at Postill Lake, approximately 31 km northeast of Kelowna (City of Kelowna, 1998). Smaller lakes such as Hereron Lake, South Lake and Meadow Lake also form the headwaters of the creek. Bulman, Conroy, Vector, and Morrison Creeks join with Mill Creek in the upper watershed. The creek descends through mountainous terrain until reaching the gentle slopes of the valley floor just northeast of the Kelowna Airport. In the lower valley, the creek is joined by Whelan, Scotty and Chichester Creeks (Dayton and Knight, 1989).

Precipitation within the Okanagan Basin averages approximately 554 mm, with the majority falling as snow. Precipitation from June to October averages 237 mm, but most of it evaporates before it can runoff. Approximately 90% of the annual runoff volume occurs during the period from May to June when the snow is melting. Seventy-six percent of the precipitation that falls in the basin is used by the forests and other vegetation, including infiltration to ground water. Twenty-two percent flows into Okanagan Lake of which 43% evaporates (Kelowna Geology Committee, 1995). Maintaining water flows in late summer / early fall is important for Kokanee spawning. The lower Mill Creek watershed has been divided into basins and sub-basins for management purposes (UMA, 1996). (See Map 3).

In order to prevent flooding in the downtown core, the City of Kelowna has installed a diversion channel that carries water from Mill Creek (at the former Central Park Golf Course) to Mission Creek (near the Eco-Centre at Mission Creek Park) during high flows. (See Map 9).

3.4 Water Quality

A wide variety of land uses and activities within the Mill Creek watershed influence its water quality. Water quality is influenced by forestry and recreation activities in the upper watershed, and agricultural, transportation, and urban land uses and activities within the City of Kelowna. Storm water runoff and sedimentation due to the removal of vegetation and erosion contribute to reducing water quality within the watershed.

Storm runoff from roads and highways has been noted as the most significant source of pollutants within Mill Creek (DFO, 1998). Oils, grease, metals (such as lead, zinc and copper), and salts that occur on road surfaces impact the quality of water as they are washed into the stream. The increase of impervious surfaces such as parking lots and buildings reduce the ability of the watershed to filter pollutants, and increase the rates and quantities of urban runoff. Techniques to reduce the impact of urban runoff include biofiltration (i.e. increasing the vegetated buffer adjacent to the stream) and the use of storm water detention ponds.

Water quality can also be impacted by the agricultural and industrial activities adjacent to Mill Creek, and septic tank leakage. The City of Kelowna's Sanitary Sewer / Storm Drain Regulation Bylaw either prohibits or regulates pollutants to allowable limits. The bylaw also establishes regulations for sanitary sewer connection and septic tanks, the use of garburetors and sump pumps. Commercial and industrial operations are required to submit waste reports. Certain types of businesses are required to install grease and oil interceptors (City of Kelowna, 1990).

The following table outlines a series of Best Management Practices **(BMPs)** for stormwater to improve the quality of water draining into creeks.

TABLE 1
SUMMARY OF STORMWATER BEST MANAGEMENT PRACTICES

Best Management Practice (BMP)	Method
Infiltration BMPs	infiltration basins infiltration trenches dry well soak-away pits porous pavements roadside infiltration strips
Vegetative BMPs	grassed swales filter strips artificial wetlands naturalized channel systems
Storage BMPs	dry ponds wet ponds extended detention ponds storage tanks
Water Quality Inlet/Manholes	sediment control temporary cover permanent cover structural
Land Use Alternatives	density bonus zones comprehensive development zones road patterns
Conservation and Enhancement Programs	environmentally sensitive area dedication tree preservation ground water recharge area conservation
Source Control of Pollutants	alter activities enclose activities cover activities
Public Education	seminars catchbasin marking adopt a creek

* Source: UMA, 1996

3.5 Vegetation

The Study Area has been classified into Vegetation Communities to provide the foundation for management recommendations (see Map 4).

What is Riparian Habitat?

The ecological term describing the distinct vegetation found at the edge of streams, lakes and wetlands is called 'riparian habitat'. These areas are characterized by a gradation from wet, saturated soil conditions to drier conditions farther away from the water body. The width of the riparian area depends upon the soil conditions, degree of slope, and the presence of subsurface water. Riparian areas comprise only a small fraction of a total watershed, but because of the diversity of ecological conditions within a small area and the presence of water, they are very rich in terms of species biodiversity and richness. They are often critical habitats for fish, birds and wildlife. It is estimated that approximately 60% of British Columbia's terrestrial vertebrates at risk use riparian areas for all or a portion of their life cycles (Environment Canada).

Values of Riparian Habitat

Riparian habitat provides a number of valuable functions for the benefit of fish and wildlife species and the environment in general. These are described below.

Biomass

The presence of water promotes the growth of vegetation. This provides a great diversity of plant species, shade for animals during summer heat and drought, forage for herbavores, protective cover and shelter.

Ecotones

An 'ecotone' is an edge between one distinct layer of habitat and another. For example, the water's edge and streambank represents an ecotone, and a marsh edge next to a shrub area represents an ecotone. Within a riparian system, ecotones are numerous and in close proximity. A wide diversity of plant species are present in this environment, providing numerous nesting and feeding opportunities for bird and wildlife species.

Wildlife Trees

Wildlife trees are dead or dying standing trees that provide specific habitat opportunities for wildlife. This includes unique nesting, feeding, protective cover, and perching habitat opportunities. Riparian areas are often rich in wildlife trees because of the presence of shorter lived deciduous trees in this environment.

Downed Wood

Fallen trees, stumps, and branches provide a number of functions for wildlife and fish species. When large trees fall into water, they create pools and corners of refuge and low velocity water flow that are important for fish. This is referred to as '*large woody debris*'. When the same trees fall on the stream bank, it is referred to as '*downed wood*'. Downed wood provides important habitat for terrestrial species, such as refuge from predators, shelter and breeding habitat. Amphibians, reptiles, insects, and mammals benefit from the presence of downed wood in an ecosystem. As the wood rots, it slowly restores important nutrients back into the soil.

Canopies

The canopy, or upper layer of the trees, protects the water body and its inhabitants from snow and extreme heat. The shade maintains a lower water temperature in summer. The canopy traps humidity, capturing moisture within the system.

Corridors

The corridors established by riparian areas along streams, lakeshores or wetlands provide a continuous system of thermal and protective cover that is often used by wildlife species for daily or seasonal migration. Fish species use stream corridors for their important spawning migration each year.

Vegetation Communities

The Study Area has been classified into vegetation communities for the purposes of this study (Map 4).

Riparian Deciduous Forest – Mature Forest

This vegetation unit occurs on low lying floodplain areas with soils of well draining sands and a high water table. Mature and regenerating black cottonwoods and a predominance of common horsetail and scouring rush in the understory characterize the unit. Where the banks rise and the moisture regime of the soil becomes less saturated, shrubs such as Nootka Rose and snowberry become prevalent. The unit provides good nesting habitat for birds and cavity dwellers. The only example of this mature black cottonwood forest in the Study Area occurs east of Bulman Road south of the Shadow Ridge Golf Course. This unit is very sensitive to changes in water levels.

Photo 2: Riparian Deciduous Mature Forest

Riparian Deciduous Forest – Mixed Age Forest

The mixed age riparian forest occurs within the floodplain area of the creek throughout the study area, where it has not been encroached upon by agriculture or urban development. The mixed age forest is a younger vegetation community than the mature forest unit.

Common trees are black cottonwood and Pacific Willow, with willow predominating lower in the watershed. Lesser amounts of trembling aspen and water birch are present. A rich and dense shrub layer is present, with red-osier dogwood, mountain alder, Douglas maple, and Wood's and Nootka rose occurring. A variety of herbs are present including miner's lettuce, Northern bedstraw, star flowered Solomon's seal and coral root. The community is vulnerable to invasion by introduced species such as great burdock, Canada thistle, and bluejoint. The community provides food, reproductive, security and thermal cover for a wide variety of birds, mammals, amphibians and reptiles.

Photo 3: Riparian Deciduous Mixed Age Forest

Ponderosa Pine Forest / Grassland

Within the Study Area, the ponderosa pine forest and grassland unit occurs on dry upland slopes that generally have a southern aspect. The unit is characterized by an open tree cover of ponderosa pine with some Interior Douglas-fir occurring. Grasses such as bluebunch wheatgrass and Idaho fescue are predominant. Sporadic shrubs such as Saskatoon berry, squaw current and Oregon-grape are present. A wide variety of herbs and wildflowers are typical of the unit. These include balsamroot, mariposa lily, sagebrush buttercup, blue-eyed Mary, timber milk-vetch, and upland larkspur.

The ponderosa pine forest / grassland provides habitat for a variety of wildlife species including mule deer, coyote, red and white breasted nuthatch, redtailed hawk, bald eagle, and Pacific tree frog. The unit is vulnerable to invasion by weeds such as spotted knapweed, great mullein, sulphur cinquefoil and Dalmatian toadflax.

Photo 4: Ponderosa Pine Grassland

Shrub Carr

This vegetation unit occurs in low areas adjacent the current floodplain. They are often former stream channels and / or marshes that have developed soils that are high in silt and organics. Shrub carrs are often on the edge of marshes and other wetlands, and thus have soils with a high moisture content. Trees species such as black cottonwood do not occur in this unit. The unit is dominated by shrub species such as red-osier dogwood, Nootka rose, black hawthorn, low growing willows, and snowberry.

The unit provides productive nesting and foraging habitat for a variety of bird and wildlife species. Within the Study Area, the unit is present in the Central Cultivated area, and at the base of Dilworth Mountain.

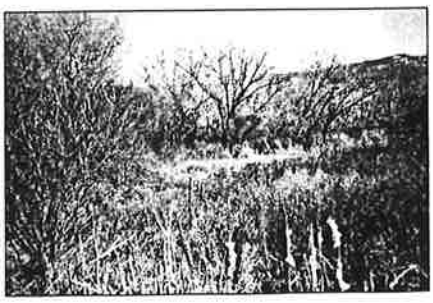


Photo 5: Shrub Carr

Shallow Open Water

Shallow open water occurs where a wetland has a minimum of 75% of open water, and no more than 2 m of standing water at the height of summer. Shallow open water often occurs in conjunction with a marsh edge. Within the Study Area, this unit occurs at Carney Pond, and another smaller pond in the Northern Agricultural area. The unit provides good feeding and rearing habitat for waterfowl.

Photo 6: Shallow Open Water

Marsh

A marsh is a mineral wetland unit that sees seasonal flooding. It is characterized by emergent vegetation such as cattails, rushes and sedges. It often occurs adjacent the active floodplain, in depressions and former channels. The unit is characterized by organic soils of well-decomposed peat.

The unit provides good nesting, feeding and security cover for waterfowl and other birds such as yellow-headed and red-winged blackbird. A number of marshes are present within the study area. Within the Study Area, the marsh wetland unit occurs at the edge of Carney Pond, and between the creek and the base of Dilworth Mountain northwest of Cary Road.

Photo 7: Marsh

Wet Meadow

Wet meadows are areas of grasses and herbaceous communities where the water table is high and becomes saturated for part of the year. Within the Study Area, this community is maintained through agricultural practices and vegetation removal. It occurs in locations in the Central and Northern Cultivated areas. If undisturbed, the unit provides good nesting habitat for waterfowl.

Agricultural

Agricultural land varies in its species composition depending on the use of the land. Within the study area, agricultural uses include turf farming, hay cultivation, and cattle production.

Photo 8: Agricultural Vegetation Community

Managed Landscape

The managed landscape is typical of parks and schools along the Mill Creek corridor. Often the creek is 'caged' by concrete or rock walls in these areas. Views are generally maintained in these landscapes. Typically there is a combination of turf, shrubs and trees that are used in urban landscaping applications. Typical grass species include Kentucky bluegrass, red fescue, and perennial rye. Tree and shrub species include a mix of introduced and native species. Generally, however, introduced species are predominant.

This unit is common for parks and schools. Often the turf is mowed and the riparian shrubs are removed to the edge of the creek. However, the City of Kelowna has been replacing the managed landscape with indigenous riparian shrubs and trees along the corridor. Examples of projects include Parkinson Recreation Centre, Millbridge Park and the Cambridge site (former Central Park GC).

Photo 9: Managed Landscape

Cleared Landscape

Cleared landscape was identified where the property was recently cleared, and essentially no vegetation was present on site and the time of mapping.

Hard Surfaced Landscape

Hard surfaced landscape is typical of parking lots and paved areas. While there may be trees and shrubs planted at the border, the majority of the surface is impervious.

Residential Landscape

This unit is common on residential properties in the South Central area. It is similar to the managed landscape unit, but the expanses of turf are generally smaller in the residential landscape. A variety of trees and shrubs are present, with the majority of shrubs being introduced. Often the riparian shrubs and trees are removed from beside the creek.

Whereas the City of Kelowna has jurisdiction of the management decisions within City parks, this tool is not available for existing residential properties along the creek. Instead, the Environmental Division has a program of promoting stewardship among property owners adjacent the creek. Owners are encouraged to plant native riparian shrubs adjacent the creek.

3.6 Wildlife

The diversity of vegetation communities produces a rich variety of habitat types for wildlife. From cattail marshes to dry, rocky outcrops, the range of ecosystems provides habitat for a large number of species. The presence of water, within the creek or in wetlands, adds an important element essential for wildlife. Many birds, mammals, amphibians and reptile species occur in the Mill Creek corridor. Table 2 outlines species that commonly occur in the corridor. Table 3 indicates species at risk within British Columbia that may occur in the corridor. Species at risk in BC are considered red when they are either endangered, extirpated (no longer in a region they once were in) or extinct. Blue listed species are those that are considered threatened.

TABLE 2
WILDLIFE SPECIES WITHIN THE MILL CREEK CORRIDOR

	COMMON NAME	SCIENTIFIC NAME
BIRDS:	American robin	*Turdus migratorius*
	Black-billed magpie	*Pica pica*
	European starling	*Sturnus vulgaris*
	Barn swallow	*Hirundo rustica*
	Tree swallow	*Tachycineta bicolor*
	Black-capped chickadee	*Parus atricapillus*
	Mourning dove	*Zenaida macroura*
	Northern shrike	*Lanius excubitor*
	California quail	*Callipepla california*
	Killdeer	*Charadrius vociferus*
	Northern oriole	*Icterus glabula*
	Mallard	*Anas platyrhynchos*
	Winter wren	*Troglodytes trogodytes*
	Northern flicker	*Colaptes auratus*
	Crow	*Carvous brachyrhynchos*
	Brown-headed cowbird	*Molothrus ater*
	Cedar waxwing	*Bombycilla cedrorum*
	Redwinged blackbird	*Agelaius phoeniceus*
MAMMALS:	Badger	*Taxidea taxus*
	Mule deer	*Odocoileus hemionus*
	Red squirrel	*Tamiasciurus hudsonicus*
	Columbian ground squirrel	*Speermophilus columbianus*
	Coyote	*Canis latrans*
	Yellow-bellied marmot	*Marmota flaviventris*
	Muskrat	*Ondatra zibethica*
	Beaver	*Castor canadensis*
	Snowshoe hare	*Lepus americanus*
REPTILES:	Common garter snake	*Thamnophis sirtalis*

TABLE 3
RED AND BLUE LISTED SPECIES

SPECIES	SPECIES
RED LISTED: night snake ferruginous hawk peregrine falcon ssp. *anatum* white-headed woodpecker yellow-breasted chat brewer's sparrow ssp. *breweri* grasshopper sparrow pallid bat northern bog lemming ssp. *artemisiae*	BLUE-LISTED: Great Basin spadefoot toad painted turtle rubber boa western yellow-bellied racer gopher snake ssp. *deserticola* western rattlesnake turkey vulture bald eagle Swainson's hawk gyrfalcon sandhill crane lesser golden-plover American avocet long-billed curlew short-billed dowitcher red-necked phalarope flammulated owl western screech owl short-eared owl black-chinned hummingbird Lewis' woodpecker grey flycatcher canyon wren palm warbler lark sparrow bobolink spotted bat western small-footed myotis fringed myotis Townsend's big-eared bat Nuttall's cottontail Great Basin pocket mouse badger

3.7 Fisheries

Mill Creek is considered to be an important spawning stream for rainbow trout, brook trout and Kokanee. It has been estimated that 1% of the total stream rainbow trout spawners for Okanagan Lake spawn in Mill Creek. The protection of salmonid (e.g., Kokanee, rainbow trout, and brook trout) spawning and rearing habitat has been determined to be a priority for this creek. Kokanee are Blue listed in the province of British Columbia (DFO, 1998)

Urban development has been identified as a high constraint to fisheries within this system. The ranking of its importance within the Okanagan Basin, as a fish stream is declining due to impacts to water quality from storm water discharges (DFO, 1998). Urban development, water works, and agricultural activities have altered the stream morphology. This includes channel straightening, bank protection, riparian vegetation clearing, and 'caging' the creek by rock and concrete walls. These works, and the deterioration of water quality, largely due to storm water outfall, have significantly reduced the quality of fish habitat in Mill Creek.

Fish Species

Mill Creek and its tributaries support a number of fish species including Kokanee, rainbow trout, brook trout, prickly sculpin, burbot, redside shiner, northern squawfish, longnose dace, largescale sucker, and carp (a species introduced from Europe). These species occupy the creek in both seasonal and spatial patterns. For example, brook trout are found in the upper reaches and move to their spawning grounds in the fall, while Kokanee only enter the stream to spawn in the fall at riffles (broken water) near the lower to middle reaches of the stream. Kokanee fry migrate to Okanagan Lake, where they mature over a four-year cycle.

Fish Requirements

Interactions of each fish species with the stream system is complex and interactive with all aspects of the watershed. Fish depend on aquatic systems that are directly influenced by the neighbouring riparian ecosystem as well as water from high in the watershed. Fish need the following attributes to be present in their environment.

Cover

Fish need the presence of protective cover. Overhanging banks and large woody debris such as logs and stumps provides this cover within the stream channel. This large woody debris also creates pools where water slows. The pools provide good feeding and rearing habitat. Cover is also supplied by overhanging vegetation, directly by limiting visibility and indirectly by supplying shade.

Food

Most fish eat aquatic and / or airborne insects. The riparian vegetation above the creek provides insects dropping into the channel. This is an important source of food for fish. Riparian plants also provide nutrients for aquatic plants and organisms, which are in turn eaten by fish.

Water Quantity

Many fish species are susceptible to changes in water quantity. Extreme water flows can destroy spawning beds. Flows that are too low can leave fish vulnerable to predators or reduce access to upstream spawning areas. Riparian areas and adjacent wetlands act as a sponge, absorbing water and releasing it in times of drought.

Water quantity in Mill Creek is threatened by water licensees. For example, flow is presently regulated by a dam on Posthill Lake on upper Mill Creek.

Water Quality

Most fish require clear, clean water that has a high level of dissolved oxygen in order to stay healthy. In addition, the water temperature should stay stable. Riparian vegetation provides shade to moderate water temperature, and filters pollutants and sediment before they get to the stream channel. Riffles act to oxygenate and cool the water, and pools provide depositional areas that allow sediments to settle out of suspension.

Access

Salmonids, such as Kokanee, brook trout, and rainbow trout, return to the area of the stream where they were born to spawn. It is important, therefore, that stream channel modifications such as culverts provide clear access for fish. The riparian area helps maintain water flows during the year, which also helps maintain access for fish to upstream spawning beds.

Substrate

Salmonids require clean, unsilted gravel in which to spawn. Riparian vegetation helps maintain clean spawning beds by providing root systems that reduce erosion, which in turn reduces the deposition of silt in the stream. Gravel is transported from the upper reaches of the stream system and collects in areas that are referred to as riffles. Sequences of riffles and pools are extremely important to healthy fish habitat.

Fish Habitat of Mill Creek

There are few places on Mill Creek within the Study Area that have not been either directly or indirectly impacted by development activities. However, there still exists fair quality fish habitat along much of the length of the stream.

Much of the stream from Bulman Road westward is composed of run or glide habitat. That is, the flow is rarely broken by riffles or pools. Glide habitat is typified by even depths and flow speed (velocity) and does not provide much cover for fish (both broken surfaces and deep water provide cover from terrestrial predators). The lack of habitat complexity in Mill Creek within the Study Area is attributed to habitat alteration and the stream's low gradient profile. Historical records indicate that Mill Creek travelled through a system of wetlands from possibly Orchard Park Mall to Okanagan Lake before agriculture and urban development commenced (I. Walker, pers. comm., 2000).

Recommendations for restoration, enhancement, and preservation of fish habitat are presented within Table 4. Preservation and restoration of the riparian reserve zone (**RRZ**) will fall under the guidelines established by the **OCP**. Eventually large organic debris will begin to re-incorporate itself into the stream. Specific stream restoration plans should incorporate placement of large organic objects into the stream channel. Riffle/pool sequences should also be created whenever opportunities occur. Opportunities to incorporate in-stream structures should be identified at the time of Development Permit application.

3.8 Visual Quality

A number of viewscape types are present within the Mill Creek Corridor. These are internal views, adjacent views, view openings, and views of contrasting landscapes. Each of these are described and illustrated below.

Internal views are those provided along the riparian corridor. The creek and vegetation provides an enclosed visual and acoustic space separated from the city.

Photo 10: Internal View

Adjacent views are those that are available along the corridor. These include the adjacent mountains, views to the south slopes, Mount Baldy, and Dilworth Mountain.

Photo 11: Adjacent View

Photo 12: View Openings

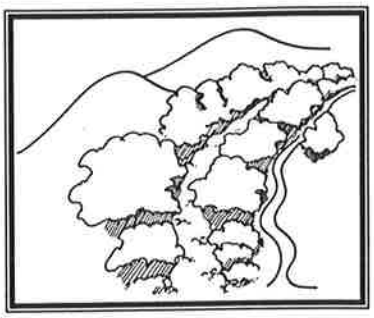
View openings are available in the Mill Creek Corridor when the enclosed viewscapes along the riparian corridor open up to wetlands and grasslands.

Variety and diversity in viewscapes occur along the corridor when two distinct vegetation communities contrast. This occurs along the base of Dilworth Mountain and at the lakeshore.

Photo 13: Diversity in Viewscapes

Section 4

LANDSCAPE ASSESSMENT



This section analyses the Study Area and outlines the park management zones.

4.1 Site Analysis

The Mill Creek Corridor runs through the heart of Kelowna, it parallels Highway 97 and the Kelowna Pacific Railway through much of its length. A number of municipal parks occur along the creek, including City Park at the waterfront and the Parkinson Recreation Centre. Millbridge Park and Pacific Court Park are neighbourhood parks that occur in the South Central Neighbourhood along the creek. The creek intersects with major existing and proposed roads, and existing and proposed bike routes (Map 7). Mill Creek is closest to Mission Creek in the 'hourglass' between Dilworth Mountain and the East Kelowna escarpment. This is near Banks and Baron Roads. This area has been identified as a potential greenway to connect the linear paths along the two creeks.

The creek flows through five significant areas that each have a unique character, with respect to creek morphology and adjacent land use. The zones are the South Central Neighbourhood, Central Core, Central Cultivated, Industrial, and Northern Cultivated. These zones are outlined in the next section.

4.2 Park Management Zones

The study area has been divided into 5 distinct management zones, based on creek morphology, adjacent land use, and anticipated future patterns of use (Map 8).

The 5 zones are:

- South Central Neighbourhood
- Central Core
- Central Cultivated
- Industrial
- Northern Cultivated

South Central Neighbourhood

Creek condition	largely "caged" by rock walls
Geography	alluvial floodplain
Current Land Use	single/ multi-family residential
Proposed Land Use	increased residential density
Transportation	established bike routes foreshore route linkages
Water Quality Issues	urban storm water runoff
Habitat Opportunities	Mill Bridge Park Replanting riparian corridor Parkinson Recreation Centre
Key Nodes	City Park Downtown Core Millbridge Park Parkinson Recreation Centre
User Groups	Local residents, local cyclists, dog walkers, tourists, schools

Central Core

Creek condition	*varies - healthy to degraded*
Geography	Dilworth Mt. / Mission Creek "hourglass"
Current Land Use	mixed commercial & industrial
Proposed Land Use	mixed commercial & industrial with increased residential
Transportation	existing / planned highways existing / planned bike routes
Water Quality Issues	erosion / urban storm water runoff
Habitat Opportunities	wetland conservation in-stream fish habitat enhancement (Cambridge Development) riparian restoration
Key Nodes	Parkinson Recreation Centre Cambridge Development (Central Park GC) Dilworth Mountain
User Groups	workers, commuting cyclists, residents, dog walkers

Central Cultivated

Creek condition	From healthy to degraded
Geography	Mt. Baldy / alluvial floodplain
Current Land Use	agricultural
Proposed Land Use	agricultural
Transportation	Highway 97 railway no established bike routes
Water Quality Issues	agricultural/urban storm water runoff and erosion
Habitat Opportunities	riparian planting in-stream structure wetland conservation
Key Nodes	Mt. Baldy
User Groups	commuting cyclists, nature viewing, dog walking

Industrial

Creek condition	*channelized / riparian varies*
Geography	ravine height varies, 0 - 7m
Current Land Use	industrial and agricultural
Proposed Land Use	industrial and residential
Transportation	existing / planned highways railway planned bike routes
Water Quality Issues	erosion / runoff / dumping
Habitat Opportunities	Carney Pond creek clean up riparian restoration
Key Nodes	Okanagan University College Sexsmith Road Carney Pond
User Groups	workers, nature viewers, residents, dog walkers, cyclists

Northern Cultivated

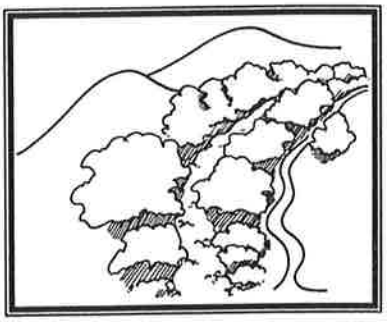
Creek condition	*from healthy to denuded*
Geography	floodplain
Current Land Use	agricultural
Proposed Land Use	agricultural
Transportation	Highway 97 local roads no planned bike routes
Water Quality Issues	agricultural runoff and erosion
Habitat Opportunities	riparian planting in-stream structure wetland conservation
Key Nodes	Mill Creek Regional Park
User Groups	recreational cyclists, nature viewing, dog walking, local residents

The identification of the above zones provides base material upon which the Master Plan has been prepared. The transportation and use patterns within each zone that has been used to prepare the corridor design.

Section 5

MASTER PLAN

This section outlines the design principles and standards for Riparian Management Area design and habitat restoration.



5.1 Design Principles

The design of the Mill Creek Corridor is founded the principles of stream protection and recreation opportunities. This includes providing a Riparian Reserve Zone (**RRZ**) for riparian and creek protection as outlined in the Official Community Plan. The zone may be crossed, but such crossings should be minimized and planned to limit disturbance. A zone to the outside edge, away from the creek, is the Riparian Management Zone. This zone will accommodate public access. The zones are described in detail below.

Riparian Management Area (RMA): This is a specified setback area that is comprised of the Riparian Reserve Zone, the Riparian Management Zone, or both. The width of these areas is determined by attributes of the stream and adjacent terrestrial ecosystems.

Riparian Reserve Zone (RRZ): This is the land adjacent to the normal high water level in a stream, river, lake or pond and extending to the portion of land that is directly influenced by the presence of adjacent ponds or channels. Riparian areas typically exemplify a rich and diverse vegetative mosaic reflecting the influence of available surface water.

Riparian Management Zone (RMZ): This is a specified setback area of a stream located outside of the Riparian Reserve Zone, or if there is no riparian zone, it is that area located adjacent to a stream. The Riparian Management Zone is established to conserve and maintain the productivity of aquatic and riparian ecosystems where specified or approved development is permitted (no less than 50% native vegetation retention).

5.2 Master Plan Program

The program has been developed in accordance with the park zones (Map 8). Opportunities and constraints vary within each zone, and the program for each has been designed with these in mind. Several opportunities occur throughout the corridor. For example, restoration opportunities are available throughout. Particular opportunities along the creek are noted in Table 4. In addition, on-leash dog walking is recommended throughout the park and equestrian use would be permitted in less urban areas (Northern Cultivated).

South Central Neighbourhood

The creek is the most physically constrained within the South Central Neighbourhood. It meanders through residential properties, and is often 'caged' by rock or concrete walls within this zone. It is anticipated that the pathway in this area will be used for local residents and visitors, providing an enjoyable walking experience and a contrast to the urban environment. Recreational cycling is recommended in this area, with commuting cyclists utilizing the bike routes nearby. This represents the best spawning area along the creek, and opportunities for viewpoints and interpretation are recommended. Neighbourhood parks are recommended along this length of creek, to help provide parks for the projected 3,000 multiple family units within the downtown core in the next 20 years.

An interim path is recommended within the South Central Neighbourhood, to provide continuity to the route while parcels along the creek remain inaccessible (Map 9). The interim path will follow existing and proposed sidewalks as outlined in the illustrations of Pathway Type B (Fig. 2) and Pathway Type C (Fig. 3). A summary of where path types occur along the corridor is found in Table 4.

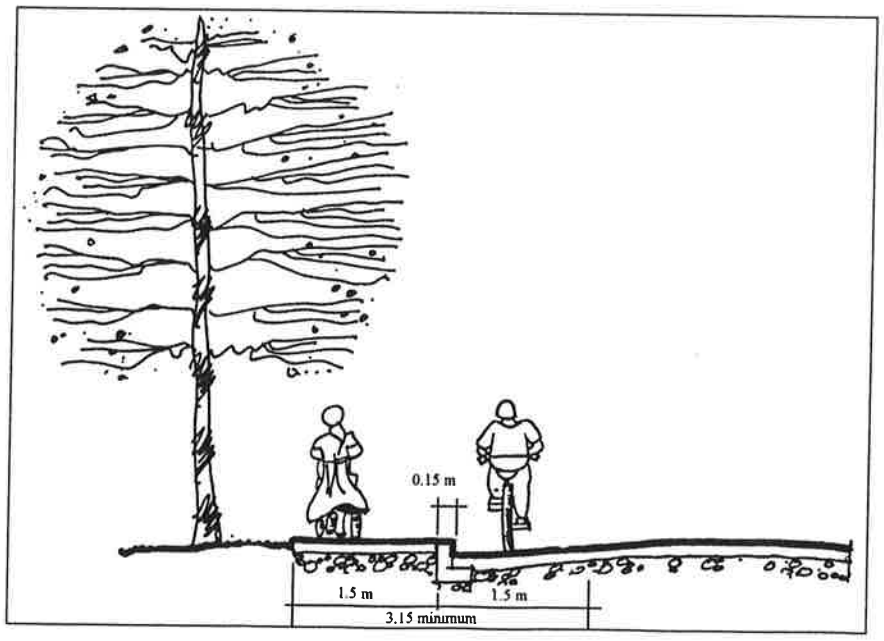


Figure 2: Pathway Type B – Sidewalk with Cycle Lanes on Roadway (RED Line Map 9)

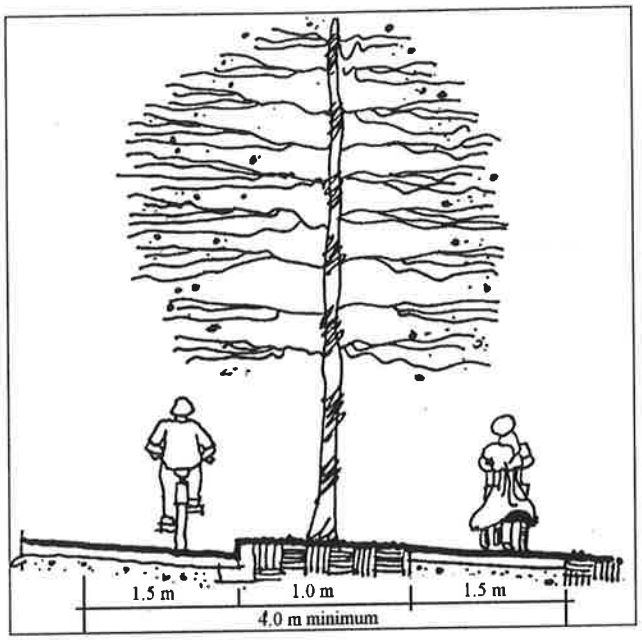


Figure 3: Pathway Type C – Sidewalk with Boulevard (RED Line Map 9)

For the long term path in the South Central Neighbourhood, a shared crushed stone multi-use path (Fig. 4) is recommended. The crushed surface will serve to slow cyclist speed and promote the infiltration of water in this zone where impervious surfaces are predominant.

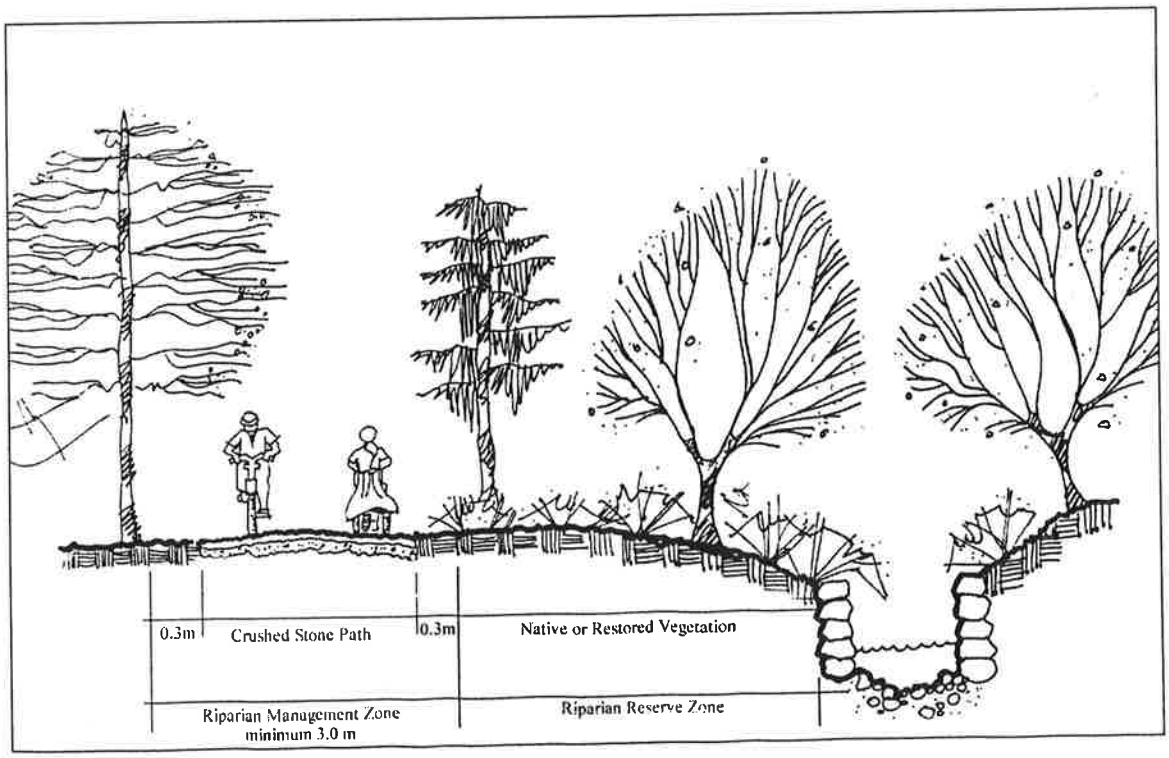


Figure 4: Pathway Type E – Crush Stone Path (GREEN Line Map 9)

In some locations in the South Central Neighbourhood, a multi- use pathway (Fig. 5) is recommended along the existing road. A barrier is recommended to fully separate cycling and pedestrian traffic from vehicular traffic. This occurs along Brookside Avenue (see Map 9).

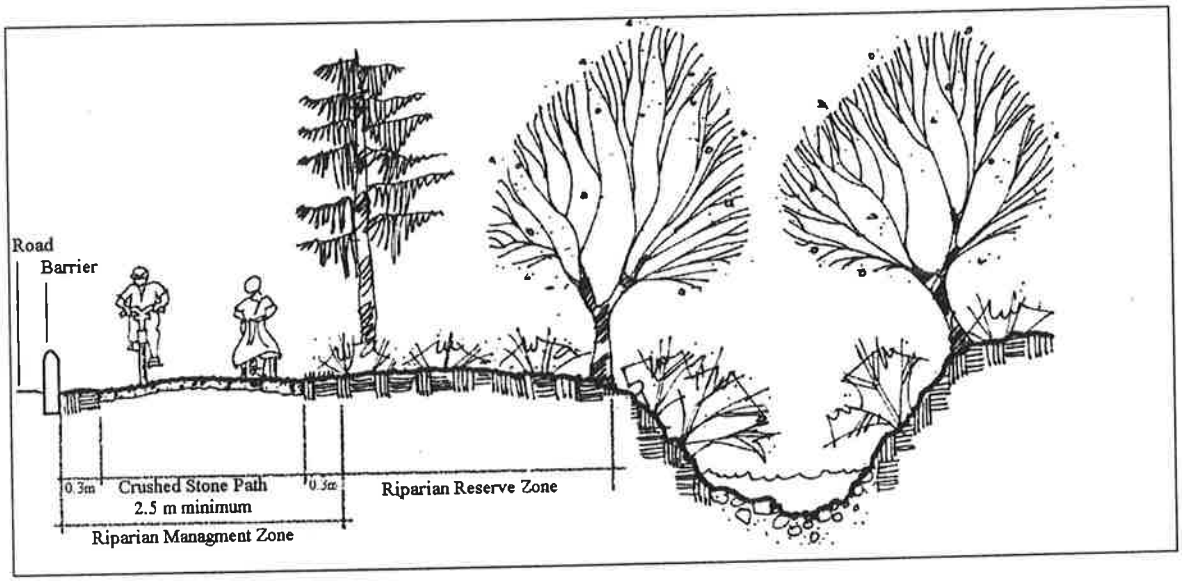


Figure 5: Pathway Type D – Shared Multi-Use Path Adjacent Roadway (YELLOW Map 9)

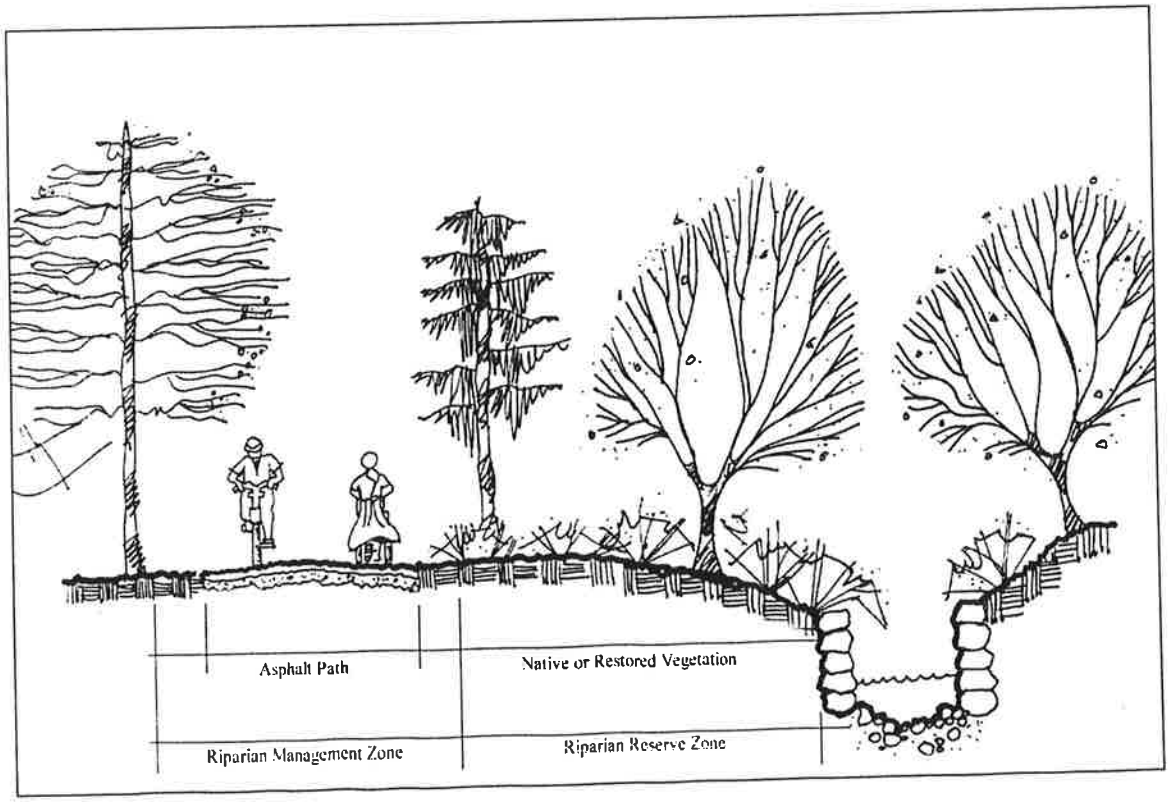


Figure 6: Pathway Type A – Asphalt Path (BLUE Line Map 9)

Central Core

The Central Core is characterized by a variety of uses and large parcel sizes relative to the South Central zone. City road right-of-way is present along much of the creek from the Parkinson Recreation Centre to the former Central Park Golf Course site, making the development of this portion of the corridor likely within the next 5 years. Few alternatives exist presently for commuting cyclists through this 'hourglass' portion of the corridor, with Highway 97 being the closest continuous route. Due to the larger parcel sizes along this corridor, it is recommended that a split path be established in this zone, with cyclists and in-line skaters on an asphalt path and pedestrians on a crushed path. A vegetated buffer will separate these paths.

Numerous opportunities exist within this zone for restoration and interpretation. The removal of the walls along the Parkinson Recreation Centre is recommended, as well as the provision of viewing platforms and interpretative signs along the creek. Planting riparian vegetation is recommended in denuded areas.

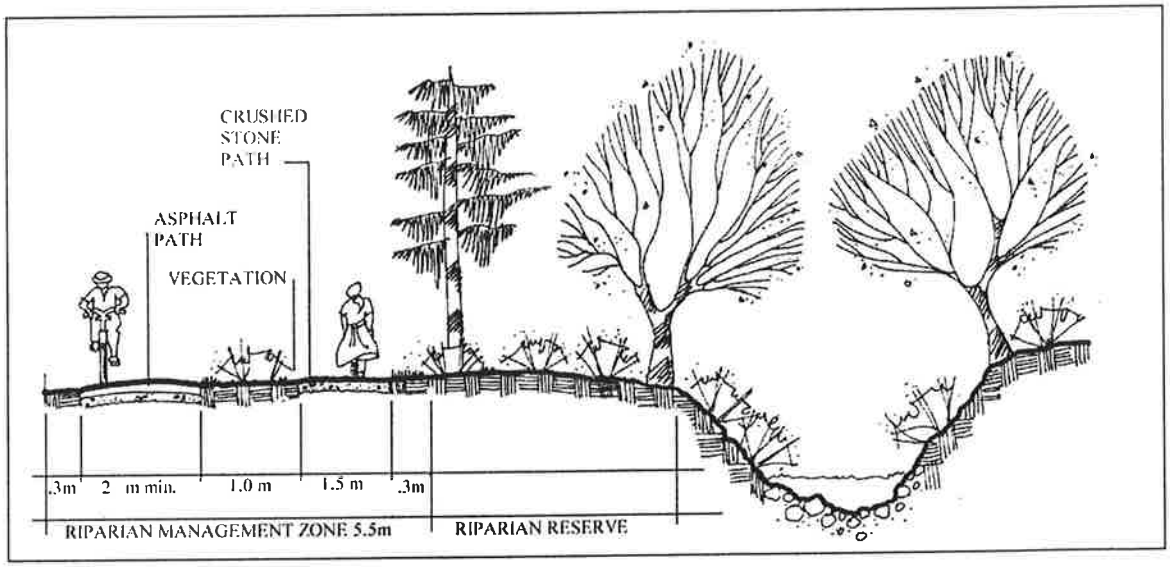


Figure 7: Pathway Type F – Separated Path (PURPLE Line Map 9)

Central Cultivated

The Central Cultivated area is dominated by agricultural uses. Very little road right-of-way is currently available along the creek. This part of the corridor lies within Phase Three, estimated to be established from 10 to 20 years from now. Few alternatives exist in this area for commuting cyclists. The majority of this zone has is within a floodplain area, except for the length north of Scandia which has a ravine enclosing a shrub carr vegetation community adjacent to the creek. A separated pathway is recommended in this zone, to accommodate commuting cyclists as well as recreational cyclists, pedestrians, and nature viewers.

Ecologically this area has good connections to upland habitats along Dilworth Mountain and Mount Baldy. Vegetated draws provide an important corridor for mammals such as mule deer, coyote, mice and voles. The draws provide protective cover and protection from summer heat. The shrub carr provides good nesting habitat for a variety of birds. As much of this area is within the Agricultural Land Reserve, it is recommended that the trail be located along the bottom edge of the ravine, with agricultural fencing at the top of the ravine to separate the uses. A viewing blind should also be considered in this area.

Restoration considerations in the Central Cultivated Zone include riparian planting and noxious weed removal. In-stream structures should be considered, especially in the southern end of this zone.

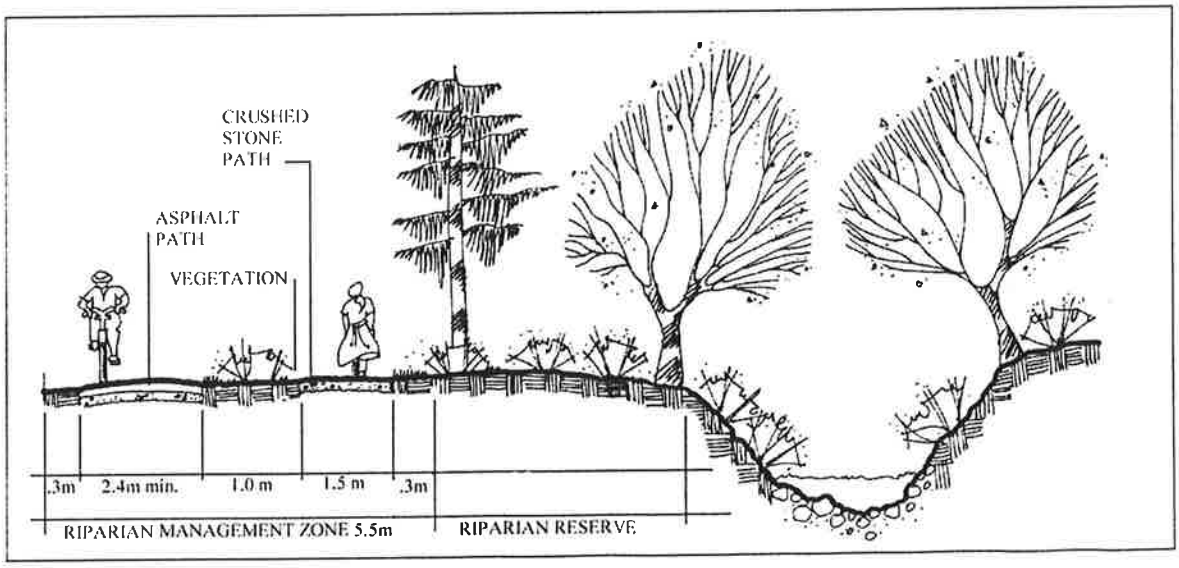


Figure 7: Pathway Type F – Separated Path (PURPLE Line Map 9)

Industrial

Within the Industrial zone, the creek lies within a steep ravine that varies in height up to approximately eight metres. Current land use is primarily industrial with some agricultural properties. Future land uses indicates industrial through the majority of the area with the residential University South ASP. A significant amount of road right-of-way along the creek currently exists both north and south of Sexsmith Rd. An access road is proposed from Sexsmith Road south to parallel Highway 97. A City visitor's center is proposed in this area.

The expansion of Hollywood Rd. to Okanagan University College will provide a commuting cyclist route in the long term. A staging area is proposed where this expansion crosses the creek. A dyke with gravel surfacing currently exists in the length of creek along Adams Rd. It is reasonable to suggest that this portion of the trail is possible in Phase One (next 5 yrs). Workers and residents in the area will likely use this portion of the creek. It will provide a pleasant way to walk to work and a spot to have lunch. A transit stop is recommended close to the path intersection at Sexsmith Rd. A crushed stone surface multi-use path is suggested in this area. Restoration works include riparian planting, noxious weed removal and refuse removal.

Carney Pond lies within this zone and provides an opportunity for nature viewers. A 30 m Riparian Reserve Zone is recommended for Carney pond by the *University South Area Structure Plan* (Protech et. al, 1996). A 0.8 ha neighbourhood park is recommended also recommended in the document. It is recommended that the location of the neighbourhood park be moved to the north side of the Carney Pond Riparian Reserve Zone, to be combined with a Staging Area for the linear park.

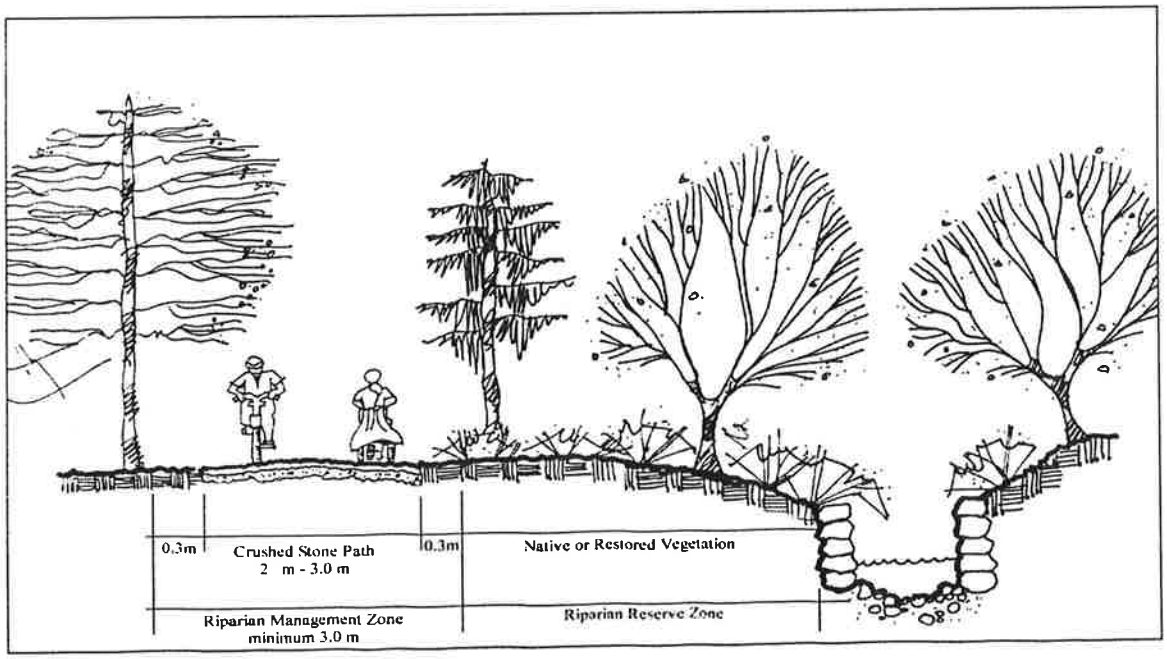


Figure 4: Pathway Type E – Crush Stone Path (GREEN Line)

Northern Cultivated

Agricultural land use and a floodplain without a ravine edge characterize the Northern Cultivated zone. As it is east of Highway 97, a high commuting cycling demand is not expected. Rather, recreational cycling, walking, and nature viewing are the anticipated park uses along this length of the corridor. The area provides a link to the Mill Creek Regional Park north of the Kelowna International Airport. Many recreational cyclists and equestrians frequent the area currently, travelling along Bulman and Old Vernon Road.

A crushed stone multi-use path is recommended in this area. Restoration works include continuing the program of fencing (adjoining ALR lands) and riparian planting along denuded areas, and noxious weed removal.

As previously mentioned in Section 1.7, trails in this management zone will require continued discussions and review by the Land Reserve Commission (**LRC**) to ensure that trail segments that cross ALR lands are designed and located to the commissions satisfaction.

Master Plan Corridor Summary Table

A summary of the trail types along the corridor is found in Table 4.

Also refer to:

- Map 8, Park Management Zones
- Map 9, Master Plan
- Map 10, Phasing Plan

for additional information when reviewing the table.

Table 4 Master Plan Summary

Abbreviations

SW	sidewalk	DON	donation
FP	footpath	COV	Section 219 Covenant
MUP	multi-use path	ACC	access agreement
BL	bike lane	RRZ	riparian reserve zone
BP	bike path	RMZ	riparian management zone
E	existing	PUR	purchase
N	new	DCC	Development Cost Charge
N/A	not applicable	FND	funding
DP	Development Permit	SWD	stewardship group
DED	dedication	SNP	Sidewalk Network Plan
PRC	Parkinson Recreation Centre	TRP	Transportation Plan
ROW	Right of Way	DPR	Development Permit Requirements
P	Detention Pond	MOTH	Ministry of Transportation & Highways
RP	Riparian Planting	NW	Noxious Weed Removal
LWD	Large Woody Debris	RW	Railway Crossing
PIP	Partners in Parks	SS	Stream Stewardship

Trail Types:
A - Hard Surface *(Pg. 33)*
B - Sidewalk /w Cycle Lane on Roadway *(pg. 31)*
C - Sidewalk /w Boulevard (Pg. 32)
D - Shared Multi-Use Path Adjacent to Road *(Pg. 33)*
E - Crushed Stone *(pg. 32)*
F - Separated Path - Asphalt/Crushed *(Pg. 34)*

Phasing Plan

1	0-2 Years
2	2-5 Years
3	5-10 Years
4	10-20 Years
5	20 + Years

☐ Potential Acquisition Property

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
City Park to Water St. (along Lake, Abbott, & Riverside Ave.)	I	B	3.15	E	700	trail head signs 2 crosswalks	City	Crosswalks required at Riverside, & Water St.	Road ROW	Road ROW	1	N/A *PUR: DON*
								Note: Consider acquiring property at south end of Riverside Ave. to link Lake to path- purchase, dedicate and resale)				
City Park to Abbott Abbott St. (north side of creek)	L	A	3	N	500	footpath signs crosswalk 2 multi-use footbridges 1 bollard	City	Maintain access via underpass w/ new bridge Restoration works 1999 Install in conjunction w/ bridge construction Crosswalk required at Abbott Street	Road ROW	Park Road ROW	Subject to bridge construcxti	TRP

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
Abbot St. to Water St. (along north side of creek)	L	A	3	N	200	trail head footpath signs 1 bollard	50% City 50% Private	100m of ROW required (3 properties) Remaining available as City Road ROW Two properties are currently in the DP stage Pedestrians only. Install a trail head at the east side of Abbott Street.	Commercial MFR	Commercial	2	DED; COV; ACC - private; DP
Water St. to Pandosy St. (along Boyce St.)	L	C	4	E	100	1 crosswalk signs trees	City	Route to be along Boyce St. Crosswalk required at Water St. & Boyce St. Pedestrians only.	Road ROW	Road ROW	1	PIP
Pandosy St. to Elliot St. (along Sutherland Ave. and Richter St.)	I	B	3.15	E	900	signs	City	Pedestrians travel along existing sidewalks along Pandosy, Sutherland and Richter. Bikes should follow identified bike routes in the area.	Road ROW	Road ROW	1	
Boyce St. to Buckland Ave. (along Pandosy)	L	C	4	N	200	sidewalk trees signs	City	Improve sidewalk Crosswalk required at Buckland Ave. & Pandosy St.	Road ROW	Road ROW	2	
Buckland Ave. to Sutherland Ave. (along Marshall St.)	L	B	1.5	E/N	200 E 100 N	1 sidewalk 1 footbridge 1 trail head	City Roads	Pedestrians only, cyclists to follow bike routes. Install 100 m of sidewalk on Marshall St. Install a footbridge from Marshall St. to road ROW Install a trail head on Sutherland Ave. by foot bridge.	Road ROW	Road ROW	2	PIP; SWD; DON
Buckland Ave. to Sutherland Ave. (along west side of creek)	L	E	3	N	400	footpath signs 1 crosswalk	90% Private 10% City	Crosswalk required at Sutherland Ave. Pedestrians only, cyclists to follow bike routes.	MFR	MFR	4	DED; COV ACC - private
NE Corner of Pandosy St. & Sutherland Ave.								*Recommend the acquisiton of the property at the northeast corner of Pandosy and Sutherland for a for an urban plaza.*			*1 - 3*	*DCC; PUR;* PIP
Sutherland Ave. to Elliot Ave. (along north side of creek)	L	E B	3 1.5	N N	400 30	footpath signs 1 crosswalk 1 sidewalk 2 bollards	90% City 10% Private	Crosswalk required at Elliot Ave. and Richter St. 30m ROW link (2 properties) required for block City Road ROW varies from 5 to 20m 30m of sidewalk required from creek to Richter Street along Elliot Ave.	80% MFR 20% SFR	100% MFR	2	DED
Along Sutherland Ave. (north side of Creek)								*Consider the purchase , dedicate & resale option to acquire dedication for last 2 remaining properties on the north side of Mill Creek.*			*1-3*	*PUR*

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
Along Elliot Ave. (south side of creek)								*Consider acquiring properties south of creek along Elliot Ave. for a neighbourhood park (6 SFR; 4 to east preferred).*			*2-3*	*PIP; DCC; PUR*
Richter St. to Ethel St. (along Burne Ave.)	I	B	3.15	N	400	1 sidewalk signs 2 crosswalks	City	2 crosswalks required. Sidewalk required along Burne Ave. Sidewalks exist along Richter St.& Ethel St. Pedestrians only, cyclists to follow bike routes.	Road ROW	Road ROW	1	PIP
Richter St. to Ethel St. (along north & crossing to south side of creek)	L	E	3	N	400	footpath 1 trail head 2 footbridges	90% Private 10% City	Install a footbridge from St. Joseph's school to park trail on south side of the creek, and one crossing form north to south side of creek.	95% RU6 5% MFR	95% MFR 5% RU6	4	DED; PIP
Ethel Street to Gordon Avenue (along Springfield)	I	B	3.15	E	650	Signs	City	Signs required	Road ROW	Road ROW	1	N/A
Ethel St. to Millbridge Park (along south side of creek)	L	E	3	N	300	footpath 1 trail head 1 crosswalk 1 bollard	City	Install path / restoration work in conjunction w/ current development proposal south of creek. Tie into Millbridge Park path south of creek. Millbridge Parks restoration works 1999. Crosswalk required at Gordon to Riverside Ave. RP;LWD proposed (Wildstone, 1996).	Road ROW Park	Road ROW Park	2	FND; PIP
Gordon Dr. to Wilkinson St. along Brookside Ave.)	L	C D	4 2.5	N N	100 300	1 sidewalk 1MUP signs 1 trail head	City	Apply to Transportation Division to allow a portion of Road ROW for restoration, and a multi-use pathway, (cyclists permitted).	95% Road 5% MFR	95% Road 5% MFR	1	PIP; FND
Properties south and east of Pacific Ct. Park						*1 footbridge*	*Private*	***Consider acquiring one or more of the properties south and east of Pacific Court Park to open it up to the trail and expand the neighbourhood park Install a footbridge across creek to connect.***				*DCC; DON PUR*
Wilkinson St. to Sutherland Ave. (along Lindahl St.)	I	C	4	N	300	1 sidewalk signs	City		Road ROW	Road ROW	1	

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
Lindahl St. to Harvey Ave. (along Sutherland and Burtch Rd.)	L	B	3.15	E N	200 250	signs bike lane intersection	City	Install new bike lane along Sutherland Ave. RP;LWD recommended (Wildstone, 1998) Signs to guide pedestrians up Burtch Rd. to cross at Harvey Ave. Improve intersection for pedestrians & cyclists at Burtch Road & Harvey Avenue.	Road ROW	Road ROW	1	Cycling Master FND
Corner of Harvey Ave and Sutherland Ave.						restoration	City	RP; LWD; NW recommended for City Road ROW at Harvey Ave. and Sutherland. Encourage meander with riffle/pool sequence into south side of stream.	Road ROW	Road ROW	2	FND; SWD
Sutherland Ave. to Lawrence Ave. (along Burtch Ave).	L	B	3.15	E	300	signs crosswalk	City	Crosswalk required at Lawrence and Burtch Ave. Tie into Parkinson Recreation Centre at Lawrence Ave.	Road ROW	Road ROW	1	SNP
Harvey Ave. to PRC (along Harvey Ave.)	L	C	4	N	150	1 sidewalk 1 bike lane signs boulevard	MOTH	Install and improve sidewalk and bike lane on north side of Harvey Ave. from the PRC to the corner of Harvey Ave. and Burtch Rd. for pedestrian safety.	Road ROW	Road ROW	4	MOTH upgrade
Lawrence Ave. (through to PRC)	L	F A	3	N	200 200	path bollard lights signs	City	RP;LWD recommended (Wildstone, 1998) P recommended (UMA, 1996) Rock wall removal (MCSP, 1998) Encourage riffle/ pool sequence. Path to go along north side of creek.	Park	Park	1	PIP; FND
PRC	L	A	3	N	500	footpath signs 2 bollards	City	Connect paths to existing and proposed paths within PRC.	Park	Park	2	PIP
PRC to Spall Rd.	L	F	4	N	200	MUP signs 1 bollard	City	Install path to proposed pedestrian underpass under Spall Rd. (Note: until underpass is built, link the path to the sidewalk on the west side of Spall Rd.)	Road ROW	Road ROW	1	FND; PIP; TRP
Spall Rd. to Hardy St. (along Spall Rd. & Enterprise Way)	I	B	3.15	E N	300 150	signs 1 sidewalk	City	100 m SW existing along Spall Rd. 200 m SW existing along Enterprise Way 150 m SW required along Hardy St. P recommended (Wildstone, 1998) Enterprise is an existing bike route.	Road ROW	Road ROW	1	SNP

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
Spall Rd. to Hardy St. (along north side of creek)	L	F	5.5	N	450	footpath bike path 1 crosswalk trail head	City BC Gas Telus	Underpass is proposed for Spall Rd. Crosswalk required at Hardy St. P recommended @ W. Star (UMA, 1996).	Utility / Road ROW	Utility/ Road ROW	4	TRP; ACC - BC Gas ACC - Telus
Hardy St. to Dilworth Dr. (through City property)	L	F	5.5	N	800	footpath bike path 2 bollards	City	Potential realingment of 100m (min.) stream channel to accommodate proposed NEC (ECL, 1998) 2 bollards required at Hardy St. BC Gas line present. RP recommended (Wildstone, 1998). Coordinate path location w/ Brent's Mill plans. 2 P (UMA, 1996); 1 @ W. Star, 1 @ park property. RP;SS;LF recommended (Wildstone, 1998).	Industrial / Agricultural	Park / Open Space / Industrial	1	ACC - BC Gas PIP; FND
Leckie Pl. to Dilworth Dr.(along Dilworth Dr.)	L	B	3.15	E	150	signs 1 crosswalk	City Roads	Crosswalk required at Leckie Pl. and Dilworth Rd.	Road ROW	Road ROW	1	PIP
Dilworth Dr. to Cambridge Site (along north side of creek)	L	F	5.5	N	250	footpath bike lane signs 1 trail head 1 bollard	City BC Gas	RP;SS;NW recommended (Wildstone, 1998). East end of path follows BC Gas ROW.	Agricultural	Park / Open Space	1	PIP ACC - BC Gas
Cambridge Site (along south of creek)	L	F E	5.5 1.6	N N	650 200	path signs 1 trail head interpretation 3 platforms 1 bollard foot bridge	City Roads	Install trail head at Banks Rd. Boulevard link. SS;RP,P, LWD recommended (Wildstone, 1998) Pond being installed by developer. SS;RP,LWD for east section work 1999, 2000. NW work by E Team (1999). 15m Stream Corridor Protection Dedication; plus 15m No Disturb Section 219 Covenant. Replace one existing foot bridge. Install 1m wide crushed path loop north of creek.	Road ROW	Road ROW	1	PIP:FND
Highway 97 at Cambridge Site	L	C	4	N	200	sidewalk boulevard		Install sidewalk, boulevard w/ trees, to connect with existing sidewalk at hotel site.	Agricultural	Plan # 8	2	DPR
Cambridge Site (Hunter Rd. to Powick Rd.)	L	B	3.15	N	600	sidewalks x 2 bike lanes x 2	Private	Sidewalks and bike lanes connect Hunter Rd. to Powick Rd. through the Cambridge site along Leathead Rd.	Agricultural	Industrial	2	DED

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
Cambridge Site (to and along Leathead Rd. extension)	I E	B arterial ROW 3	N N	900 100	sidewalks x 2 bike lanes x 2 signage 2 crosswalks 1 bollard	Private BC Gas	Install 2m path along Show Creek to Leathead Rd. Install a bollard at Show Creek path. Works will be part of Leathead Rd. extension. Leathead Rd. extension crosses BC Gas line.	50% Indust. 50% Agricult.	Plan # 8	3	TRP; PIP
Cambridge Site (from creek to Leathead Rd. ext.)	L	E	4	N	200	path trees 1 bollard	Private	Install a multi-use path and trees to connect creek and the Banks Rd. extension sidewalks.	Commercial	Plan # 8	2	DON; PIP
Cambridge Site (from Leathead Rd. extension to Hwy 97)	L	C	4 (x 2 sides)	N	250	sidewalks x 2 bike lanes x 2 boulevards x 2	Private	Install sidewalk, treed boulevard, and bike lanes on both sides of Banks Rd. extension to make green corridor to Mission Creek.	Commercial	Plan # 8	2	DPR; SNP TRP
Cambridge Site to Leathead Rd. (along south side of creek)	L	F	5.5	N	400	path signs 1 bollard crossing	20% Road 80% Private	Assess area for unconfirmed wetlands within 30m creek corridor (based on field study). P;SS;RP recommended (Wildstone, 1998). 3 P recommended (UMA, 1996). Crossing required at Hwy. 33 extension.	50% Indust. 50% Agric.	Industrial	4	DED; FND COV
Leathead Rd. to McCurdy Rd. Ext. (along south side of creek)	L	F	5.5	N	700	foot path bike path 1 trail head bollard signs RW crossing 1 crosswalk	Private KP Rail	Assess area for unconfirmed wetlands within identified in the WSHM (USL, 1998). NW;SS;RP;RR recommended (Wildstone, 1998) P recommended (UMA, 1996) RW crossing is required. Crossing at McCurdy Road intersection is required. Potential wildlife corridor to upland through draws.	Agricultural	Application in progress, proposed Industrial	4	DED; FND; COV ACC - KP Rail
NEC & McCurdy Rd. to Highway 97 (along McCurdy Road)	L	B	3.15	N	400	sidewalks x 2 bike lanes x2	Private	Sidewalks & bike lanes along McCurdy Rd. extension should be used to connect trail south of McCurdy with options north, along Highway 97 & Railway ROW.	Agricultural	Road ROW	4	TRP
McCurdy Road to Fenwick Rd. (along RW ROW)	L	E	4	N	550	trailhead path fence agriculture sign	KP Rail	Negotiations for an access agreement required with Kelowna Pacific Railway. Optional trail head at Fenwick Road. Fencing along railway required.	Railway ROW	Railway ROW	4	ACC-KP Rail

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
McCurdy Rd. to north of Scandia along Hwy 97	L	B	3.15	N	600	sidewalk 1 crosswalk agriculture sign bike lane	MOTH	Install sidewalk and bike lane along Hwy 97 from McCurdy Rd. to north of Scandia. Install a crosswalk at Fenwick Rd.	ROW	ROW	4	ACC-MoTH
McCurdy Rd. Ext. to Fenwick Rd. (along south side of creek)	L	None	N/A	N/A			80% Private 20% Roads	Unconfirmed wetlands identified, WHSM (USL, 1998). Potential wildlife habitat connection to uplands. Access required via private road at Fenwick Rd. RP;SS recommended (Wildstone, 1998). Riparian Management Areea through ALR north of McCurdy Road to be determined.	80% Agricult. 20% ROW	80% Agricult. 20% ROW	5	N/A
Fenwick Rd. to Willow Park Rd. crossing (via RW ROW & crossing to south side of creek)	L	F	5.5	N	900	path 1 bollard signs fence 2 foot bridges 2 agriculture signs	70% Private 20% Roads 10% KP Rail	P recommended (UMA, 1996). Require an access agreement w/ KP Rail for a 100m length of Railway line, and fence. Require 2 foot bridges, 1 north of Scandia & 1 north of L&D Petch property. SS;P;RR recommended (Wildstone, 1998). Unconfirmed wetlands identified, WHSM (USL, 1998).	20% Comm. 20% ROW 60% Agricult.	20% Comm. 20% ROW 60% Agricult.	4	DED; PIP; FDN; ACC - KP Rail
Willow Park Rd. crossing to Hollywood Rd. Ext. (along north side of creek)	L	F	5.5	N	450	foot path bike path 1 trail head 1 bollard signs	Private	Plan for future intersection at Hollywood Rd. Extension. Trail head proposed at Hollywood Rd. Avoid marsh west of Willow Park Road (nesting habitat for waterfowl).	Agricultural	Industrial	4	DED; PIP; FND ACC-KP Rail
Hollywood Rd. Extension to proposed access road (along north side of creek)	L	E	4	N	600 100	foot path signs 1 bollard 2 foot bridges 1 crosswalk	90% Roads 10% Private	Recommended conservation area between 2nd foot bridge and Sexsmith Rd. (fence). SS;RP;RR recommended (Wildstone, 1998). Install a foot bridge and path to connect to proposed Information Centre. Install foot bridge to meet proposed access road. Pedestrians only, cyclists to follow local bike routes. Crosswalk required across Hollywood Rd. Extention.	90% ROW 10% Ind.	90% ROW 10% Ind.	4	PIP; FND; SWD
Proposed access road to Sexsmith Rd. (along both sides of creek).	L	N/A	N/A	N/A	N/A	fence	Private	Recommended conservation area (fence). P recommended (UMA, 1996).	Agricultural	Industrial	N/A	DED; FND; SWD

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
Proposed access road to Sexsmith Rd.	L	C	4	N	200	sidewalk trees boulevards 1 crosswalk	Private	Install sidewalk and treed boulevard. Pedestrians only, cyclists to follow local bike routes. Install cross walk at Sexsmith Road.	50% Agric. 50% Resid.	Industrial	4	DED; TRP; DPR
Sexsmith Rd. to Alcan Rd. (along east side of the creek)	L	E	4	E	700	1 trail head signs 3 benches bus stop 1 crosswalk	98% Roads 2% Private	Bus stop recommended at Sexsmith trail head. Improve access to trail from Sexsmith Rd. Install crosswalk at Adams and Alcan Rd. Install benches. RR;SS;RP;NW recommended (Wildstone, 1998). Improve existing path.	98% ROW 2% Industrial	98% ROW 2% Industrial	3	DED; DPR; PIP
Alcan Rd. to Edwards Rd.	L	B	3.15	N	300	sidewalk 1 crosswalk	City Roads	Install a sidewalk along Adams and Edwards Roads from Alcan Rd. to Hwy 97. Continue RP;NW; RR along creek. Connect sidewalk to light at Hwy 97 & Edwards Rd. Install a crosswalk at Edwards & Adams Roads.	Road ROW	Road ROW	5	PIP
North Route A												
Edwards Road to Carney Pond (Option One)	L	B	3.15	N	400	sidewalk signs	City Roads KP Rail	Cross RW at existing crossing for Lougheed Rd. Pedestrians only, cyclists to follow local bike routes.	Road ROW	Road ROW	5	ACC - KP Rail; PIP
Edwards Road to Carney Pond (Option Two)	L	B E	3.15 4	N N	250 400	sidewalk footpath 2 bollards signs	City Roads Private	Install sidewalk along Lougheed Rd. and connect to a footpath through to Carney Pond. Requires a RW crossing.	30% Road 20% Indust. 50% Agric.	30% Road 20% Indust. SFR (ASP 3)	5	DED; DPR; ACC - KP Rail; PUR

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
Carney Pond to College (along Hollywood Rd. Ext.)	L	C E	4 4	N N	950 600	sidewalk boulevard trees signs bike lanes x 2 Staging Area 2 Interpretive platforms 2 bollards footpath	Private	Establish a 30 m Reserve Zone (no disturbance area) around Carney Pond (US-ASP, 1996). Recommend locating the 0.8 ha park (US-ASP, 1996) adjacent the Carney Pond Reserve Zone to function as a Staging Area / Neighbourhood Park. Install sidewalk, bike lane and signs in conjunction with the Hollywood Road Extension. Install the interpretive footpath outside, and at the edge of, the 30 m. Reserve Zone. Install 2 viewing platforms along the path. Carney Pond is rated a High Sensitivity Wetland (USL, 1998, and is identified in the Natural Feature Inventory (RCA, 1991).	Agricultural	SFR (ASP 3)	5	DED; DPR; FND; SWD

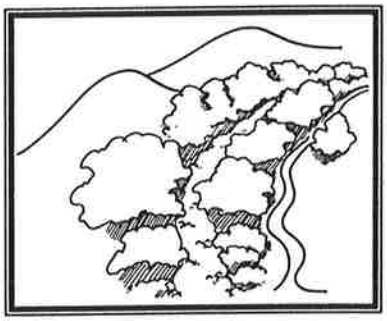
North Route B

Edwards Rd. & Hwy 97 to Hereron Rd. (along west side of creek)	L	E	4	N	500	Multi-use path Trail head 1 crosswalk	Private	Install a shared multi-use path. SS;RP;NW recommended (Wildstone, 1998). Crosswalk required at Hereron Rd.	50% Indust. 50% Agricult.	75% Indust. 25% Park & Open space	5	DED; FND; COV; SWD
Hereron Rd. to Bulman Rd.	L	E	4	N	1000	Multi-use path 2 Agriculture signs trail head	Private	The WHMS (USL, 1998) had identified 2 wetlands of Moderate Rating; #102a and #102b. Drainage ditches with some wetland characteristics have also been identified here. A mature cottonwood / horsetail flood plain is along the creek at the west side of Bulman Rd. This flood plain is unique in ecological qualities within the study area and is recommended for conservation. Install foot path & bike lane along Bulman Rd. Install 2 agriculture signs, one at Hereron Rd. & one at the trail head near Shadow Ridge Golf course.	ROW	ROW	5	FND; SWD

Trail Segment	Long Term (L) or Interim (I)	Trail Type	RMZ Width Minimum (m)	New (N) or Existing (E)	Length (m)	Works Required	Land Ownership / ROWs	Remarks	Current General Zoning	Future Land Use (OCP 1995)	Phase	Options to Acquire / Implement
East West Link												
Bulman Rd. / College Way Connection	L	C	4	N	500	sidewalk bike lanes x 2 signs	private	Install this connection when roadways Bulman Rd. and College Way are connected. Consider equestrian access across this link.	Agricultural	Road. ROW	5	PIP

Section 6

DESIGN AND RESTORATION STANDARDS



This section outlines the standards for Riparian Management Area design and habitat restoration.

6.1 Design Standards

Design standards used in the development of the Master Plan include:

- the riparian management area, and the riparian reserve zone within it, should be clearly defined and protected prior to and during construction;
- access points should be concentrated and well defined designed to encourage foot traffic;
- cyclists and pedestrian traffic should be separated where possible;
- where cyclists and pedestrian traffic occur together, surfacing, trail widths, and signage will promote awareness and safety;
- barriers should be established to discourage inappropriate access;
- site lines and lighting should be designed to promote security along the trail, while reducing conflicts with neighbouring properties;
- structures in sensitive habitats should be designed to minimize impacts;
- signage should be used at strategic locations to provide interpretative information, linear park maps and trail rules; and
- erosion control methods should be incorporated during construction.

The following section outlines details for trail design, signage, and lighting standards.

Trail Design

1. Trail surfaces should be free of toxic materials.
2. Bark mulch is not recommended for trails as it produces a leachate that is harmful to water quality.
3. A positive cross slope should be maintained on all trails. The cross slope should drain away from the creek.
4. Trails should be designed to avoid significant existing trees and shrub groupings.

5. Trail locations should be established so that hazard areas such as ravine edges are avoided.
6. Edging should be used adjacent crushed stone trails to prevent trail widening over time.

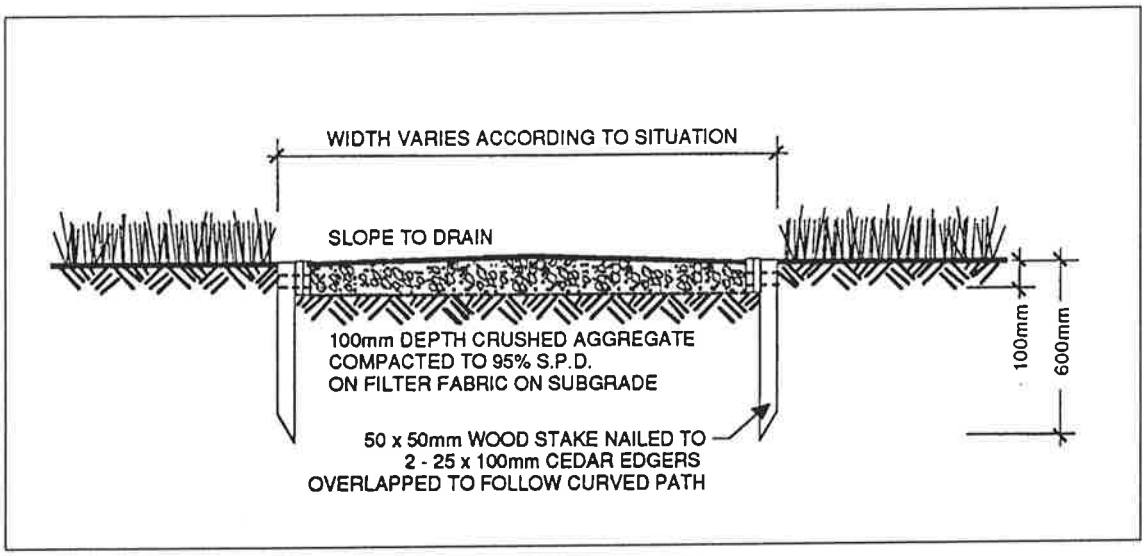


Figure 7: Crush Stone path (Source: DFO, 1997)

Signage

Signage and clearly defined pathways will manage access away from environmentally sensitive areas, provide direction for route, and establish an identity for the trail. A second major class of signs in the linear park will be interpretive to educate and foster stewardship principles.

A contest is recommended to establish a logo for the linear park. Schools and the public at large should be invited to participate.

Figure 8: Signage

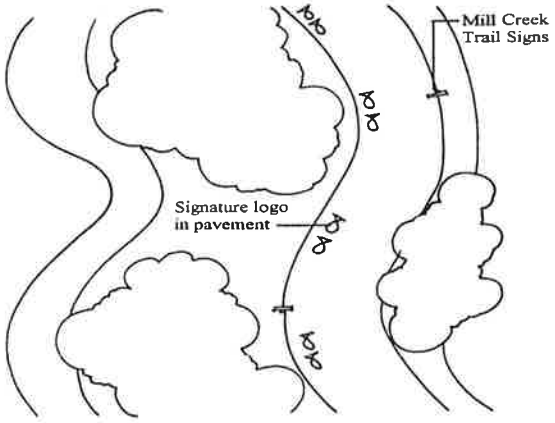


Figure 8a: Signature Stamp

6.2 Habitat Restoration Standards

The following habitat restoration standards have been developed based on established standards published by provincial and federal agencies (DFO, 1997), the City of Kelowna (Environmental Division, 1997), and the experience of EBA staff in local projects.
For each project, a comprehensive restoration plan should be prepared. This should include, at the minimum, the following:

- Silt, Sediment, and Erosion Control Plan;
- Access Management Plan;
- Environmental Monitoring Program;
- In-stream Works Specifications (if applicable);
- Planting Plan and Schedule; and a
- Maintenance Program.

Note: A Section 9 Permit is required from the Ministry of the Environment, Lands and Parks for all works in and about a stream.

Planting Specifications

The following planting specifications are recommended for planting shrubs and trees in the RMA. Table 4 outlines plant species that are recommended for riparian areas within the City of Kelowna, and the Mill Creek Corridor in particular.

- Prepare the soil to a depth of 30 cm.
- Add organic material to the original mineral soil to promote the retention of moisture.
- Planting during the fall (September to October 15th), or spring (April 15th to June 15th) is recommended.
- Regular watering is recommended until the plant material is established (usually two growing seasons).
- A minimum of 80% survival should be ensured for the first three years.
- Protection of new plantings is recommended (e.g. mouse guards, livestock fencing, and /or snow fencing to protect plants from being browsed or trampled).
- Tree and Shrub species should be of guaranteed nursery stock.
- Botanical names should be used for purchase.
- Plant a maximum of 10% coniferous species (e.g. Interior Douglas-fir and ponderosa pine) in the Riparian Reserve Zone to add species diversity.

TABLE 5
PLANT SPECIES FOR RIPARIAN AREAS

Latin Name	Common Names
Trees	
Acer douglasii var. glabrum	Douglas Maple
Betula occidentalis	Water Birch
Betula papyrifera	Western White Birch
Cratageus douglasii	Black Hawthorn
Pinus ponderosan *	Ponderosa Pine
Populus tremuloides	Trembling Aspen
Populus trichocarpa	Black Cottonwood
Pseudotsaga menziesii *	Interior Douglas-Fir
Prunus emarginata	Bitter Cherry
Prunus pensylvanica	Pin cherry
Prunus virginiana	Choke Cherry
Salix lasiandra	Pacific Willow
Salix scouleriana	Scouler's Willow
Sorbus sitchensis	Mountain Ash
Thujia plicata	Western Red Cedar
Shrubs	
Alnus crispa	Sitka Alder
Amelanchier alnifolia *	Saskatoon Berry
Cornus stolonifera	Red-Osier Dogwood
Holodiscus discolor	Oceanspray
Mahonia aquifolium	Oregon-grape
Physocarpus capitatus	Pacific ninebark
Physocarpus malvaceus	Mallow Ninebark
Philadelphus lewisii	Mock Orange
Potentilla fruticosa	Shrubby Cinquefoil
Rosa acicularis	Prickly Rose
Rosa nutkana	Nootka Rose
Rosa woodsii	Wood's Rose
Rubus idaeus	Red Raspberry
Rubus parviflorus	Thimbleberry
Rubus spectabilis	Salmonberry
Sambucus cerulea	Blue Elderberry
Sambucus racemosa	Red Elderberry
Salix brachycarpa	Short-Fruited Willow
Salix discolor	Pussy Willow
Salix exigua	Coyote Willow
Symphoricarpus albus	Snowberry
Wetland Plants	
Carex rostrata	Beaked Sedge
Juncus balticus	Salt Rush
Potemogeton pectinatus	Pond Weed
Scirpus lacustris	Great Bulrush
Scirpus microcarpus	Small-flowered Bulrush
Scirpus validus	Soft-stemmed Bulrush
Typha latifolia	Cattail

* Upland species that should be placed on the upper edge of the riparian zone and on dry microsites.

6.3 Construction Standards

The following construction standards have been developed based on established guidelines and are recommended for works within the Mill Creek Stream Protection Corridor.

1. All works in and about a stream should be completed in accordance with the *Land Development Guidelines for the Protection of Aquatic Habitat* (Chilibeck, 1992). The Fisheries Act (RBC, 1992) prohibits the deposition of deleterious substances, including sediment, into a fish bearing creek. The guidelines illustrate methods of erosion control, including the use of silt fences, hay bales, check dams, and detention ponds.
2. City of Kelowna Parks Division Staff will review and approve all planting plans and plant material selections proposed for use in the linear park and of adjoining properties.
3. City of Kelowna Environmental Division Staff and the Ministry of Environment should approve environmental monitoring programs for projects in and adjacent to the creek.
4. All works within the RMA (e.g. trail and viewpoint construction) should take care to minimize the removal of vegetation.
5. All works within the RMA (e.g. trail and viewpoint construction) should take care to minimize the disturbance of soil.
6. Temporary fencing should be erected to protect the RMZ in accordance with the Stream Protection Corridor Development Permit Guidelines (City of Kelowna, 2000).
7. Minimize construction impacts through the use of small vehicles and equipment, under-inflated rubber tired vehicles, construction platforms.
8. Prefabricated construction for viewpoints, bridges, interpretative signs, and other structures should be used wherever possible to reduce construction impacts.
9. Within the riparian reserve zone, use manual methods for maintenance such as danger tree removal, weeding and litter pick up.

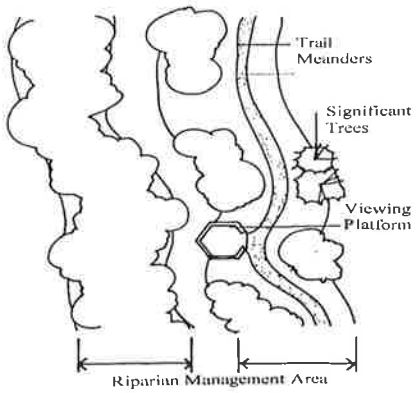
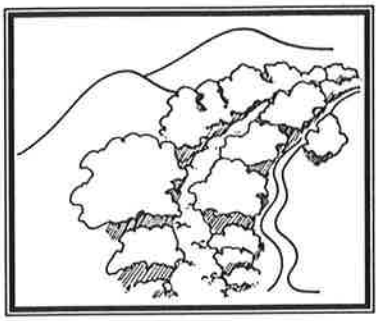


Figure 8b: Viewing Platform

Section 7

ACCESS MANAGEMENT AND DESIGN STANDARDS



This section outlines the design principles and standards for access management and trail design.

7.1 Access Management

The considerations of public access, protection of the Riparian Reserve Zones **(RRZ),** wetlands, and security are connected. This section outlines an access management strategy that integrates public access and safety considerations with the protection of the natural environment. The strategy focuses on the value of public surveillance to develop an attitude of stewardship and stream protection. The following section outlines design strategies and elements to reduce damage to the riparian area while promoting user safety.

Viewing platforms, Towers and Bridges

Viewing platforms provide an effective way to bring people into the RRZ in a thoughtful and managed way. Towers are effective in wetland areas and provide a good perspective for bird and wildlife watching. Bridges allow the RRZ to be crossed. The following guidelines are recommended for viewing platforms and bridges.

- Viewpoints may be designed within the RRZ. These should include railings that discourage visitors from departing from the platform and access path.
- Towers may be used in sensitive areas, these are particularly valuable near wetlands for bird viewing.
- Boardwalks should be used through wetlands and damp riparian areas.
- Decks, platforms and bridges need to be constructed in accordance with provincial floodplain requirements. Bridges must have enough freeboard to pass debris and high water.
- Bridge and platform footings should be placed outside the wetted perimeter of the creek or wetland in the Study Area.

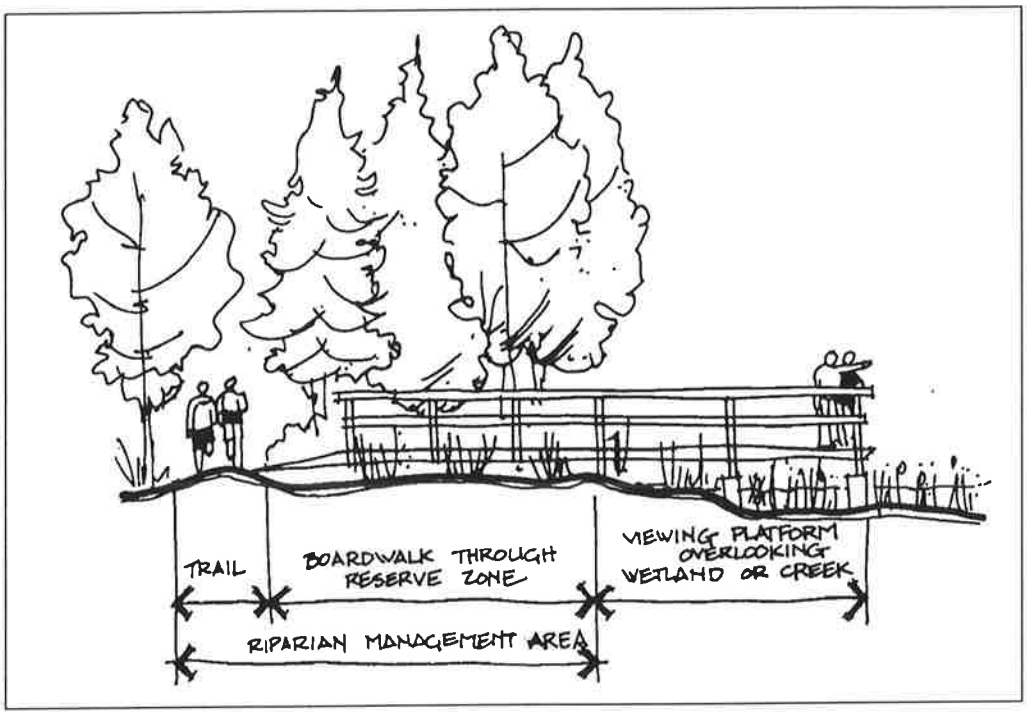


Figure 9: Viewing Platform

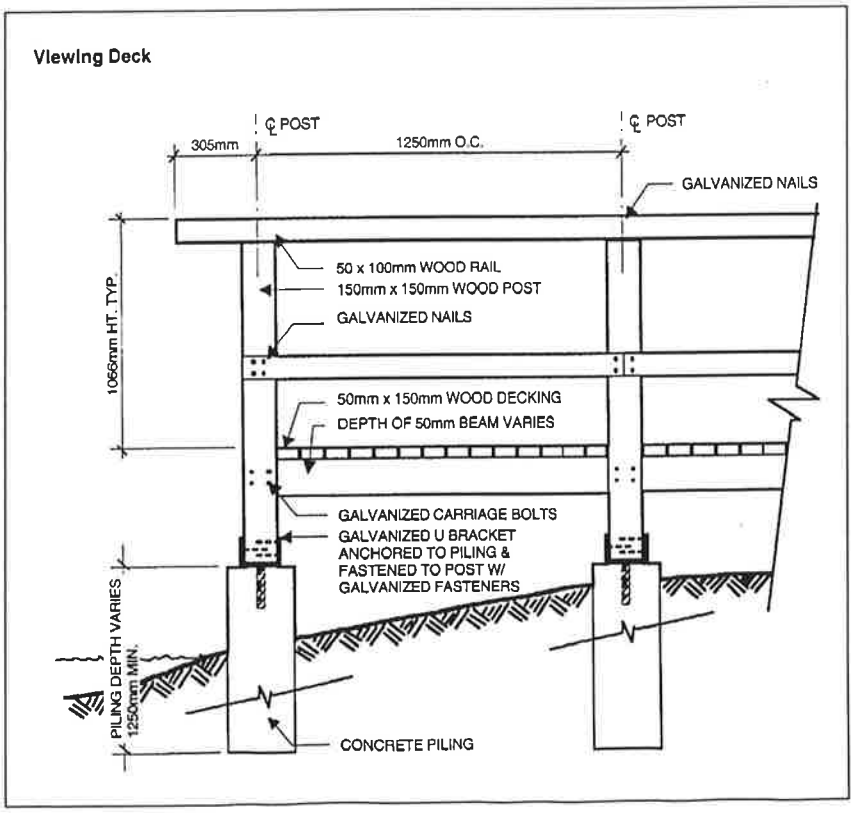


Figure 10: Viewing Deck Detail (Source: DFO, 1997)

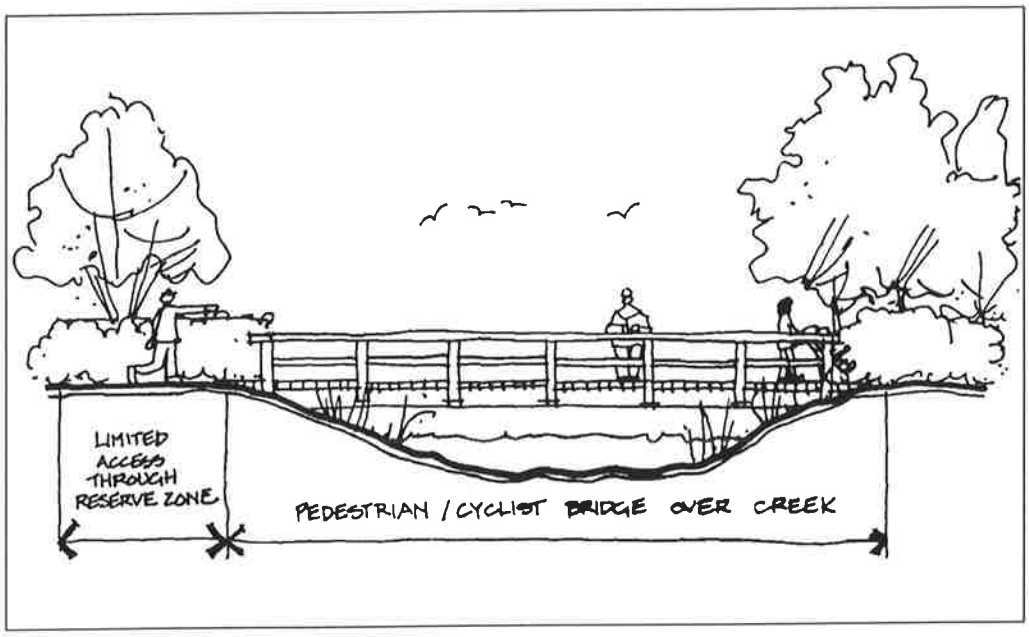


Figure 11: Pedestrian / Cyclist Bridge

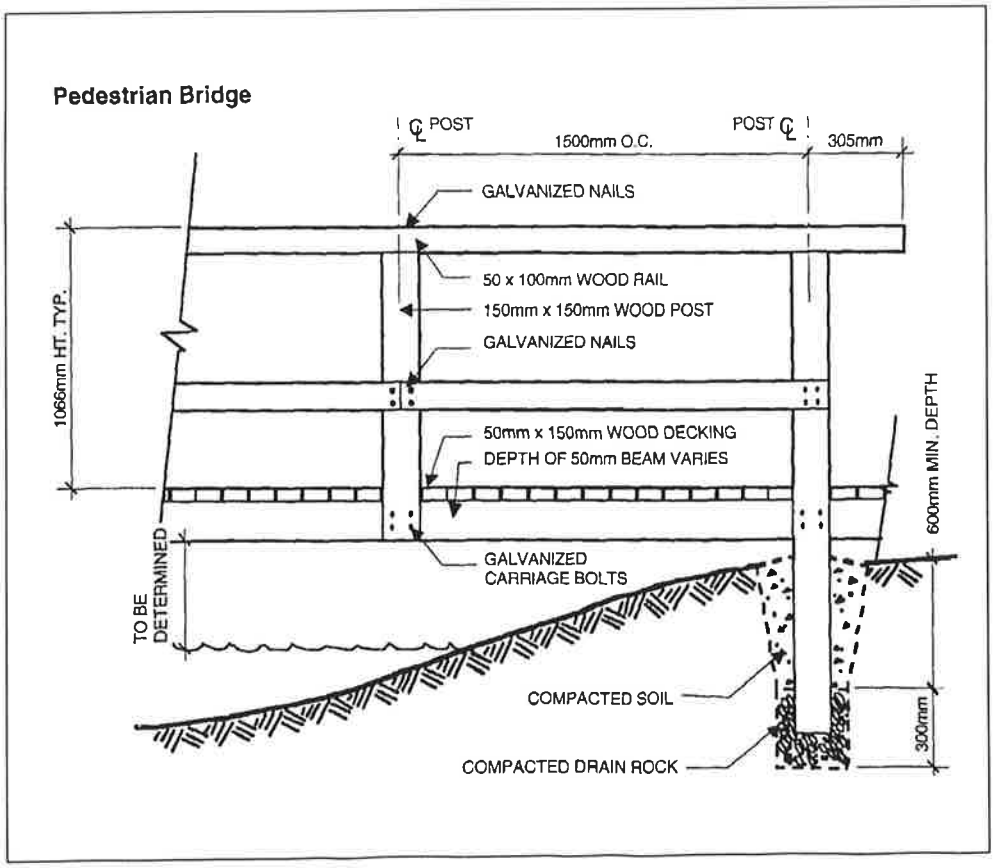


Figure 12: Bridge Detail (Source: DFO, 1997)

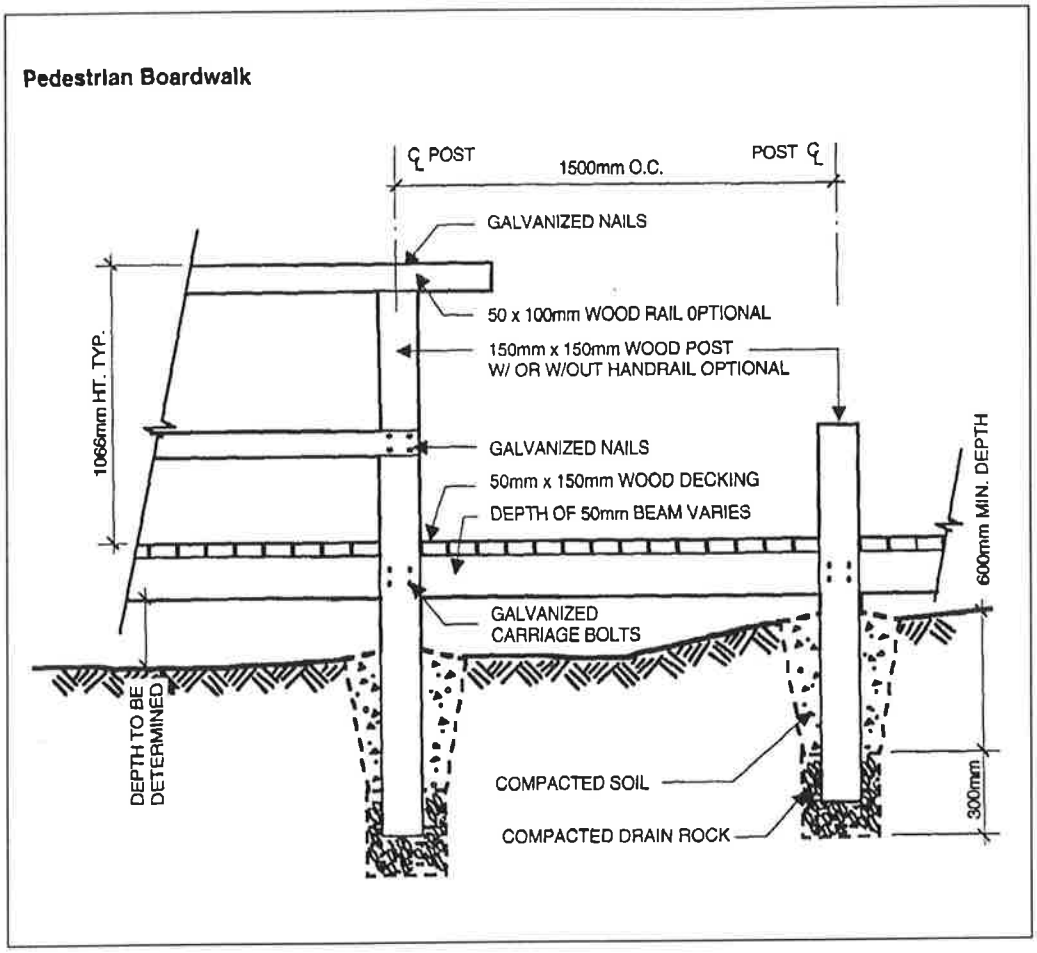


Figure 13: Pedestrian Boardwalk (Source: DFO, 1997)

Trail Access Barriers

Removable bollards should be used to prevent unauthorized vehicular access. Maintenance vehicles will be able to access the main trails. Permanent timber posts may be used for secondary trails where vehicular access is not required.

Hard Barriers - Fencing

Fencing is generally not recommended between the RRZ and the RMZ. However, there are some applications where guardrails may be appropriate to guide traffic onto a bridge, viewing platform, or away from a ravine.

Adjacent property owners along the corridor for security concerns and to discourage trespassing may desire fencing. Guidelines and examples are outlined below.

- Transparent or semi-transparent fencing should be encouraged for property owners adjacent the creek corridor (e.g. split rail , chain link, etc.)
- Barriers are appropriate where existing public utilities are within the corridor.
- Where fencing is adjacent the RMA, gates should be established at planned access points only in order to concentrate and direct traffic onto pathways.
- Gates in fences adjacent private property should occur at planned access points only, and should be between 600 and 750 mm wide, to restrict the passage of wheelbarrows that may be used for dumping.

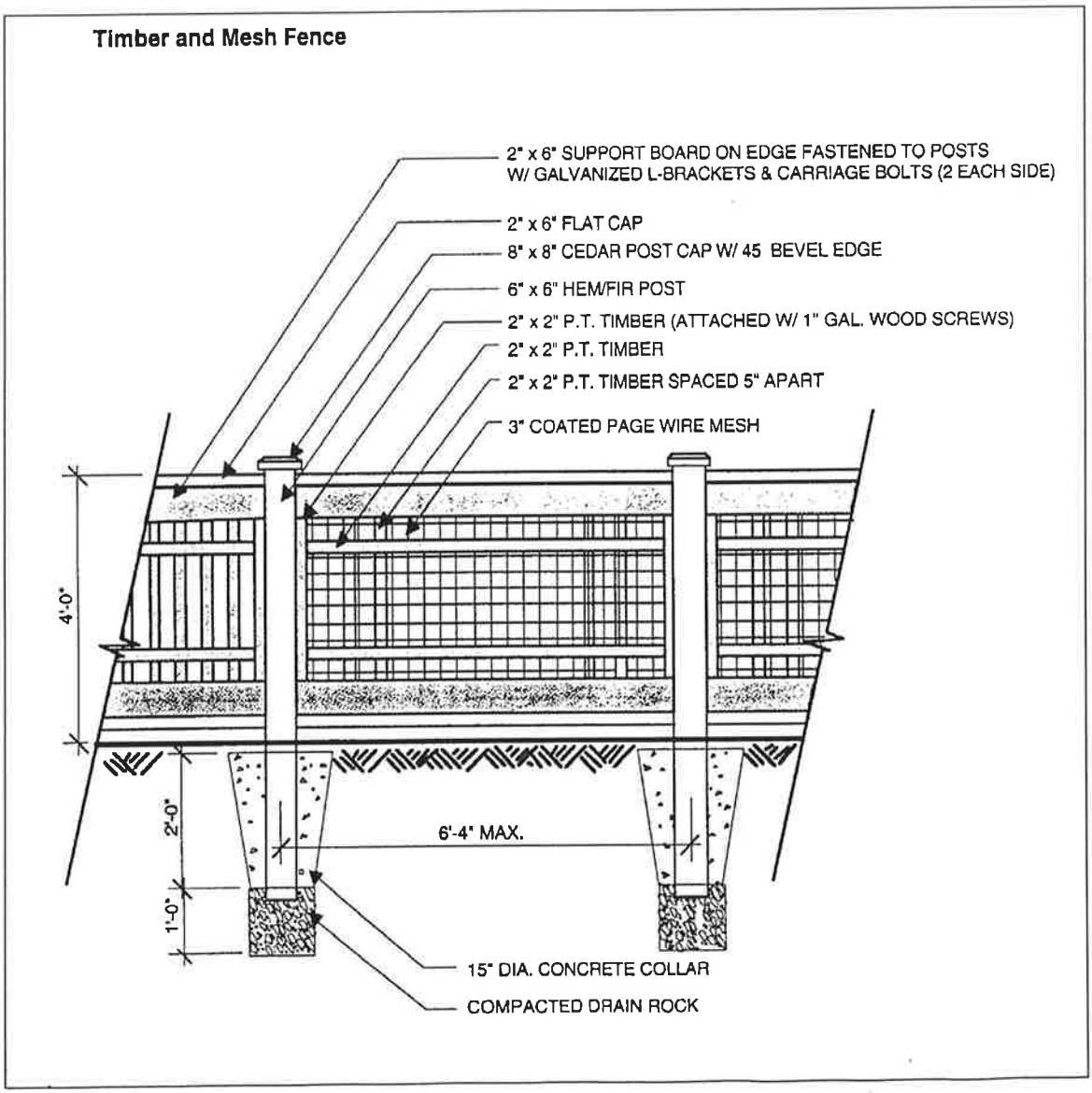


Figure 14: Timber and Mesh Fence (DFO, 1997)

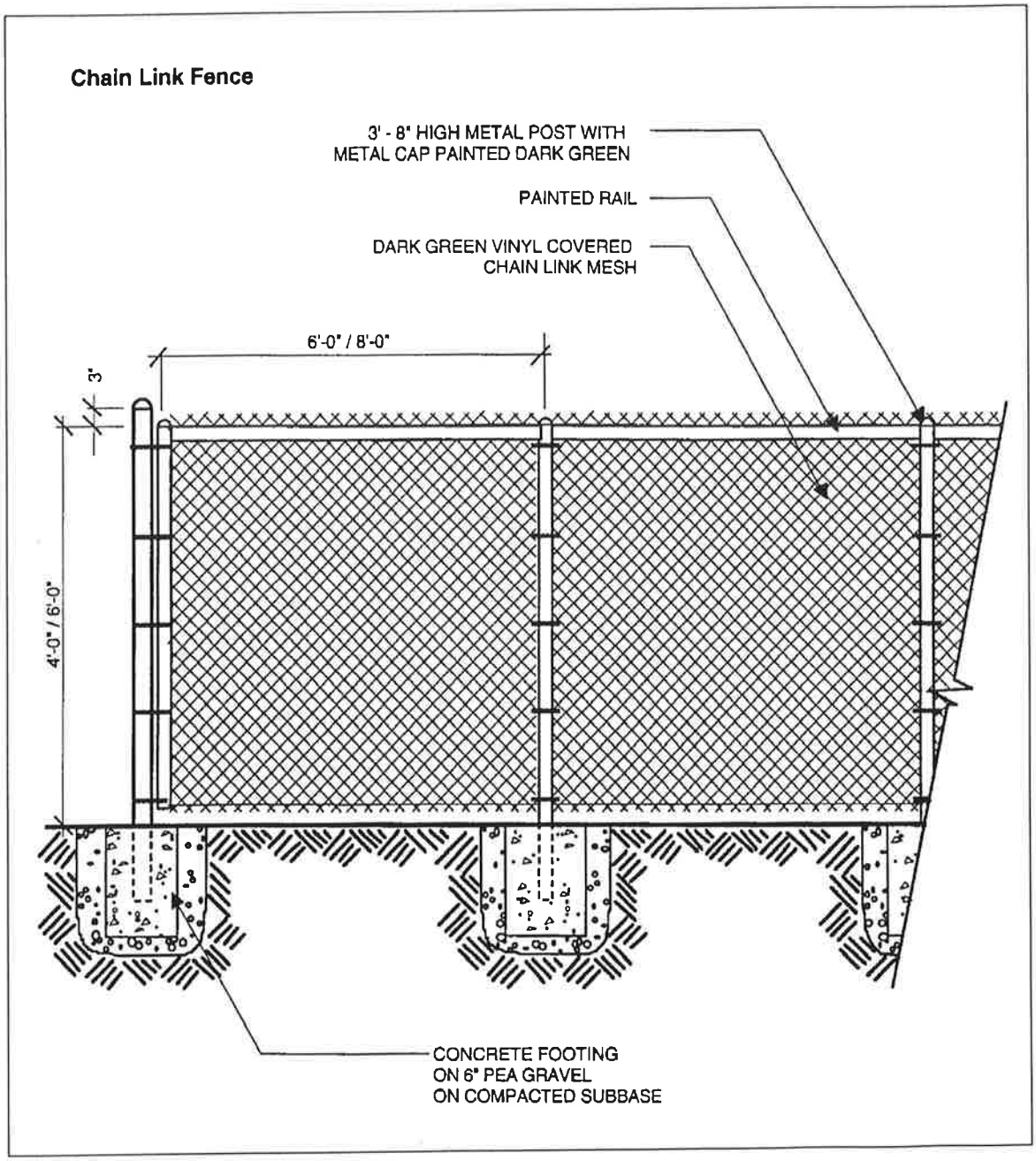


Figure 15: Chain Link Fence (Source: DFO, 1997)

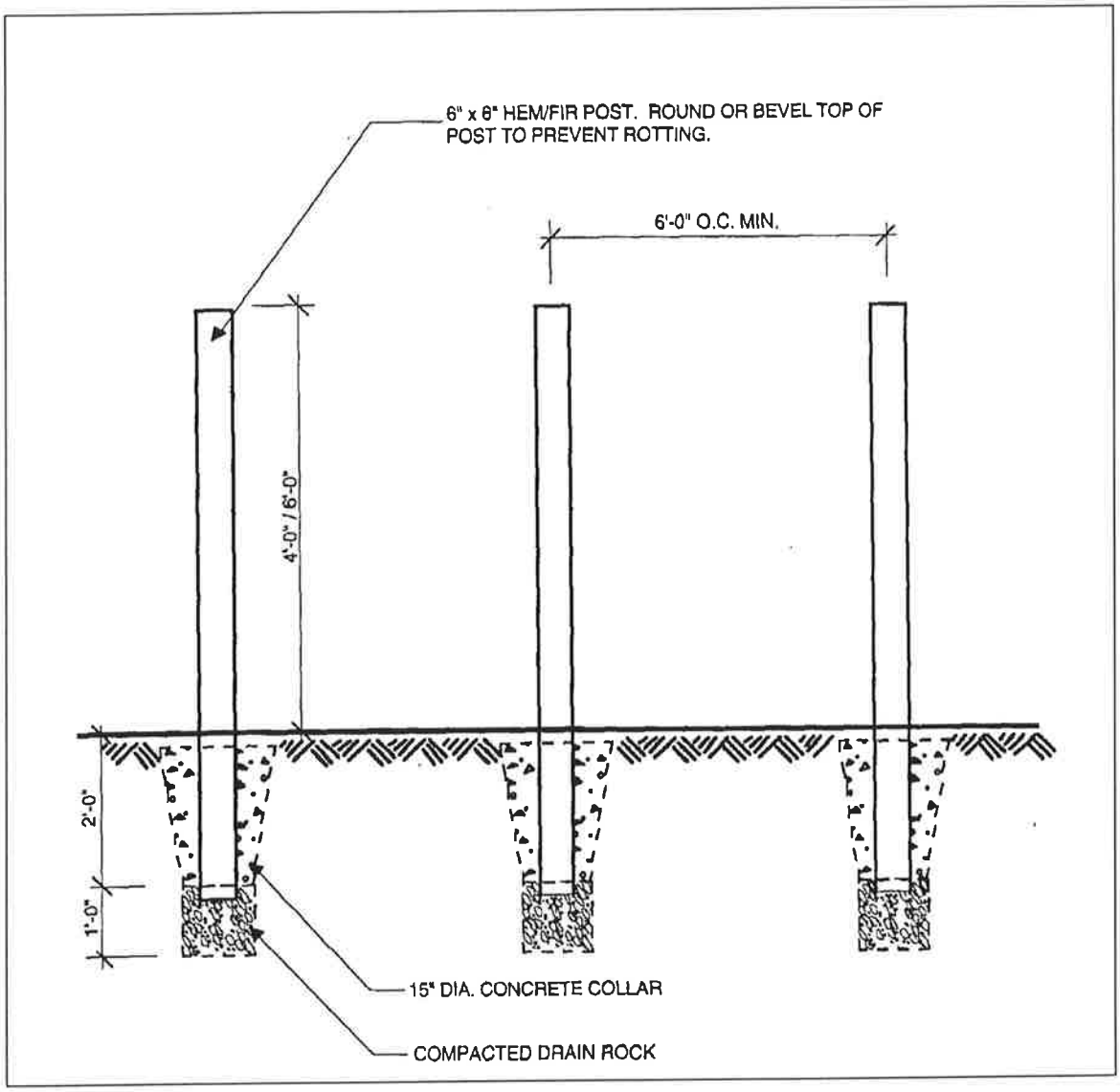


Figure 16: Timber Post Barrier (Source: DFO, 1997)

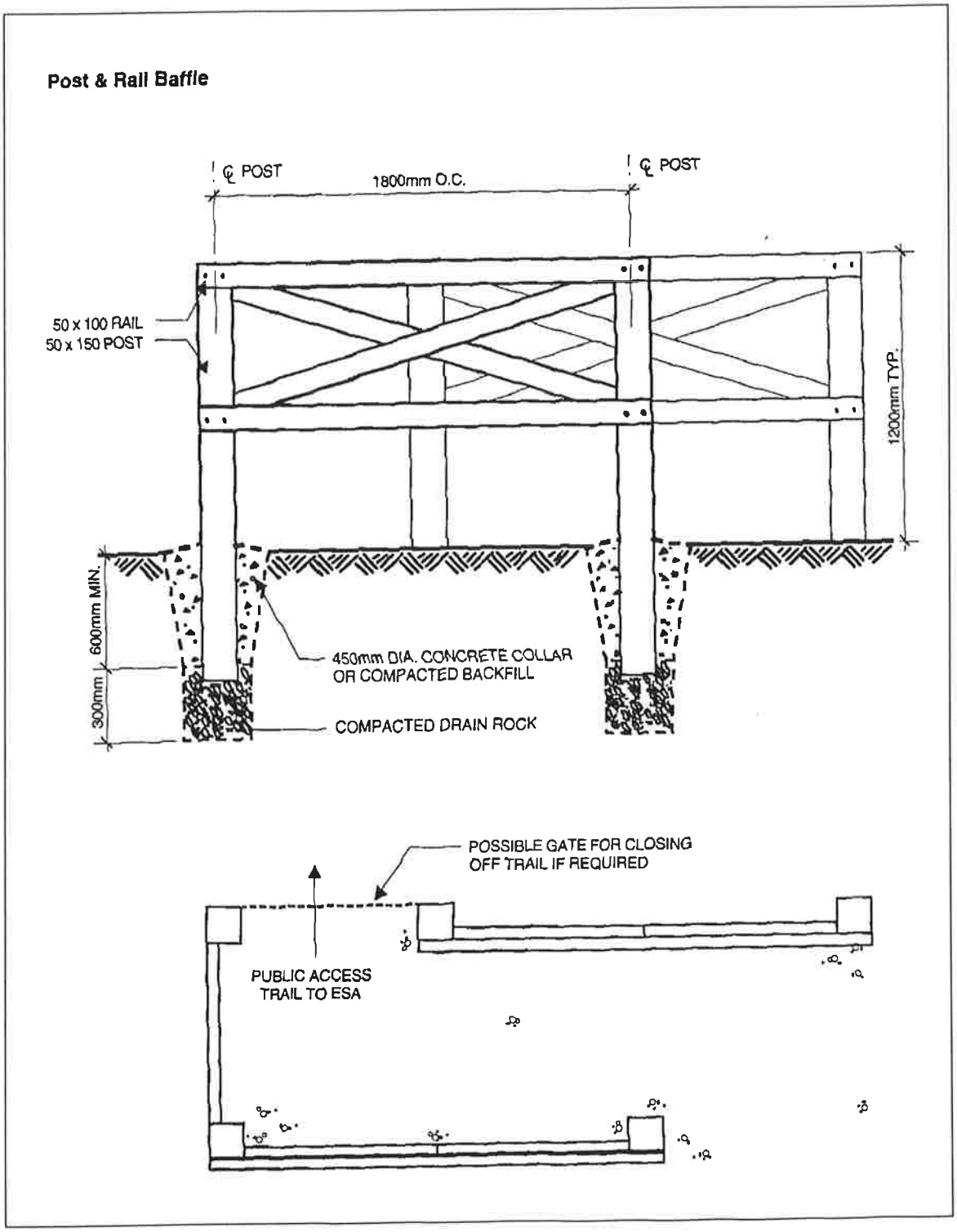


Figure 17: Post and Rail Baffle (Source: DFO, 1997)

Live Barriers – Planting

The installation of a live barrier using native plants can be effective in discouraging trampling in the RRZ. Planting armoured species such as roses, hawthorn and Oregon-grape increases the effectiveness of the barrier. Live barriers also provide shade, protective cover and food for fish and wildlife species. Recommendations for live barriers include:

- Plant the barrier to a width greater than 1.0 m wide.
- Use a combination of different species to improve the chances of success.
- Indigenous riparian species should be used (see Table 5).

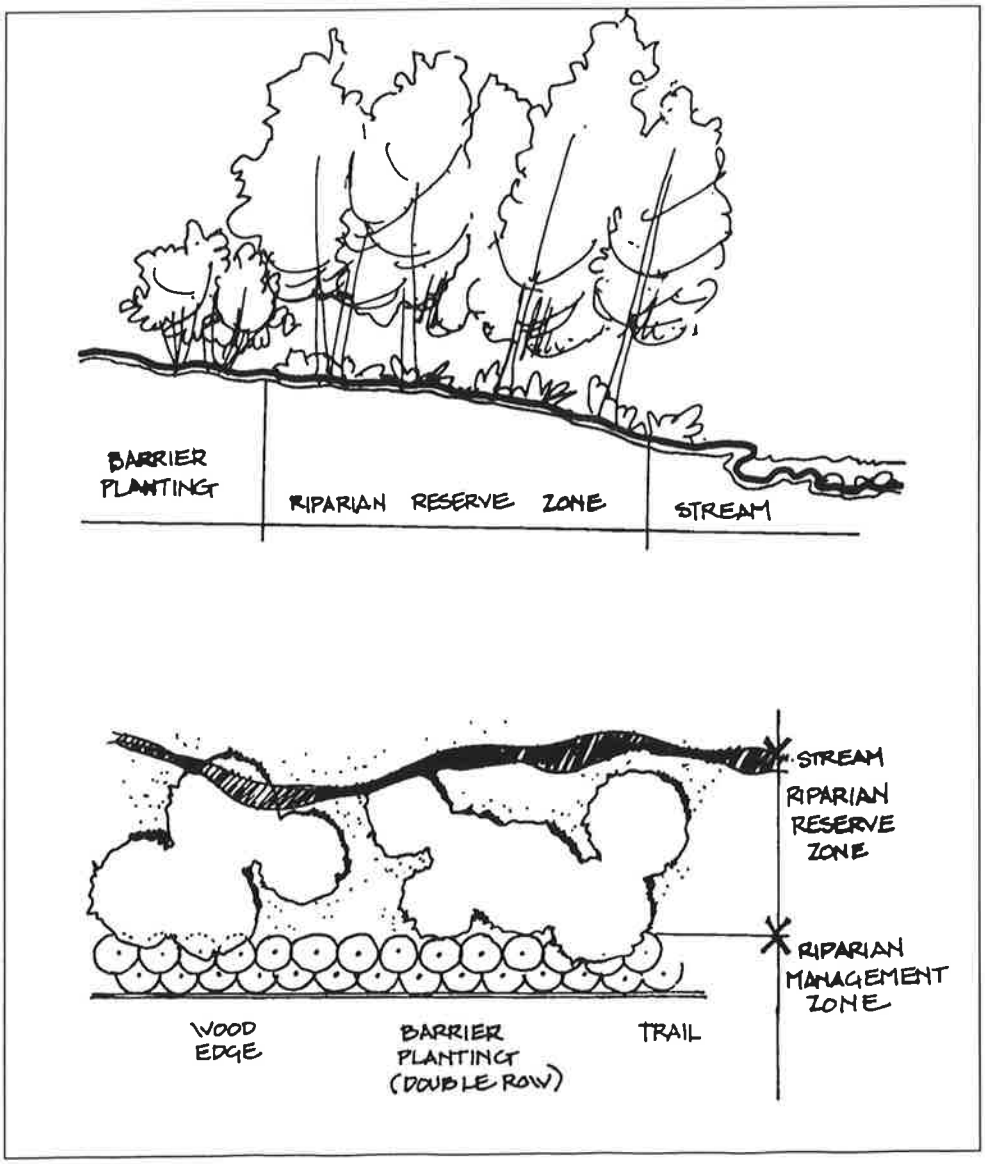


Figure 18: Live Barrier Planting

Terrain Barriers

Terrain barriers include channels, berms, or retaining walls. The establishment of a backwater channel can provide additional fish habitat as well as discourage traffic. This may be feasible where there is sufficient width within the RMA and physical parameters permit. Berms may be used to discourage access. These are most effective when combined with a live barrier. Retaining walls are also an option to reduce access. A secure railing must be installed along the retaining wall if the drop is greater than 600mm. An engineer must design and approve the retaining wall if the wall is greater than 1.2 m in height.

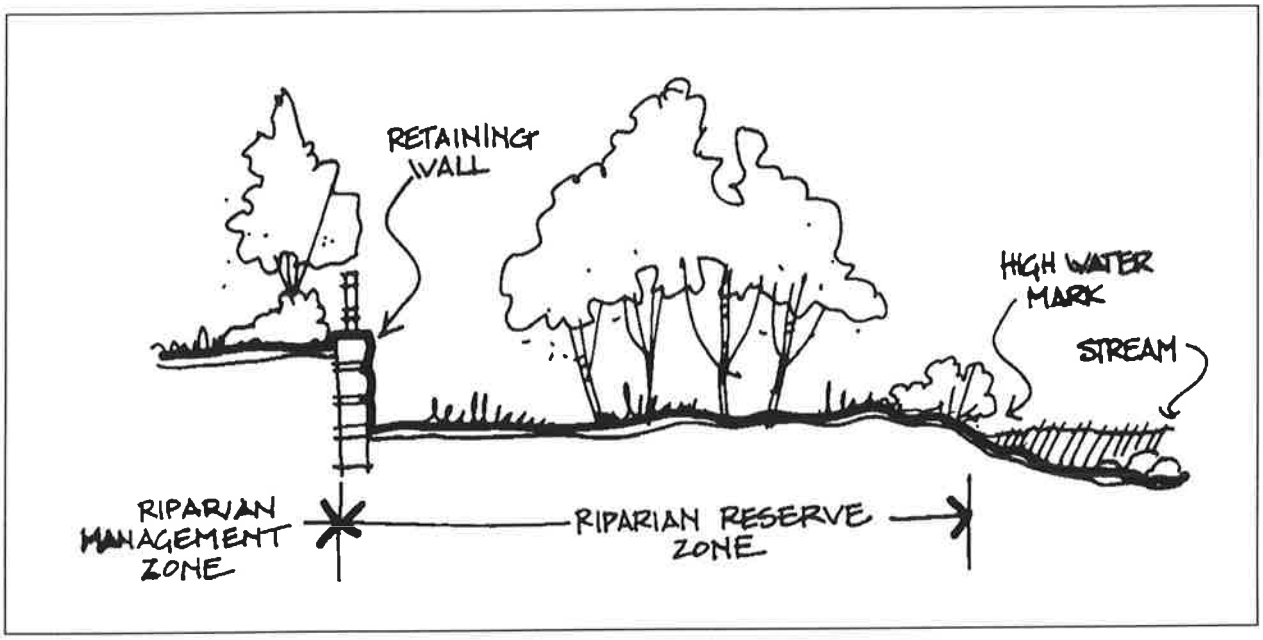


Figure 19: Retaining Wall Barrier

Fencing for Agriculture

Fencing is often required for protecting the RMA from the impacts of agriculture. Livestock fencing is required to prevent farm animals from entering the stream. Fences adjacent to cultivated areas helps establish an area for riparian planting and regeneration.

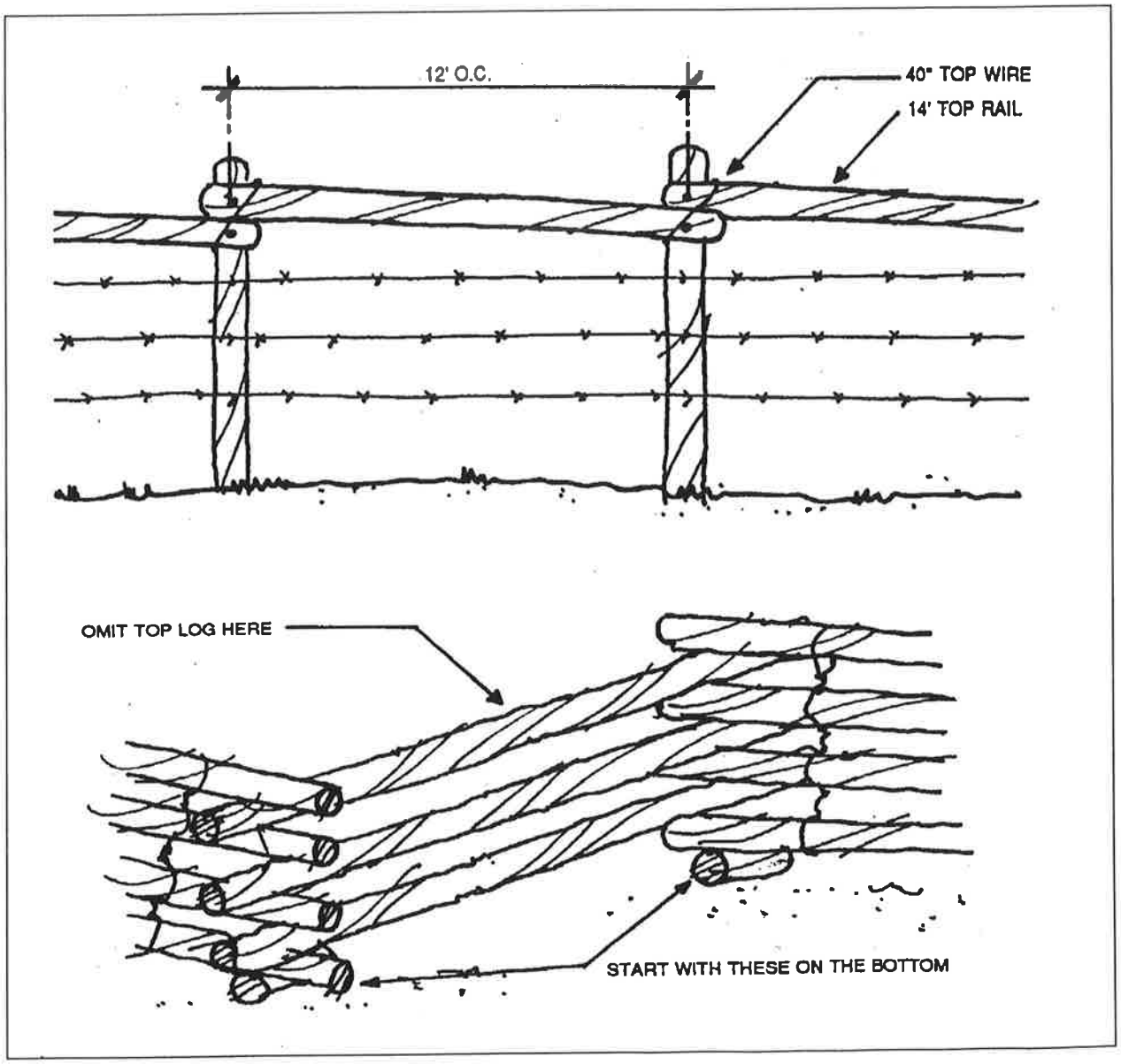


Figure 20: Livestock Fencing

Alternatives to Barriers

The need for barriers can be reduced through addressing the concerns of use in alternative ways. For example, the issues of littering and trampling can be managed by:

- Trash receptacles should be placed at regular intervals and at trail heads and view platforms.
- Implement a regularly scheduled trash collection program.
- Incorporate densely planted vegetation to discourage access into the riparian management zone.
- Implement monitoring and community stewardship programs (e.g. Adopt-a Stream).
- Implement an enforcement program (e.g. rangers to enforce trail rules).
- An education program using interpretive signage is important to promote respect for and understanding park rules and ecosystem management.

Sight Lines

Security is improved through the provision of sight lines. Providing sight lines through to streets and buildings is important in designing spaces for security. The following guidelines are recommended with respect to sight lines.

- Sight lines should be maintained through to local streets and access points.
- Neighbourhood parks and staging areas should maintain sight lines through to local streets.
- Transparent and semi-opaque fences and plantings should be encouraged for adjacent properties.
- Plantings in the riparian management zone should accommodate sight lines.

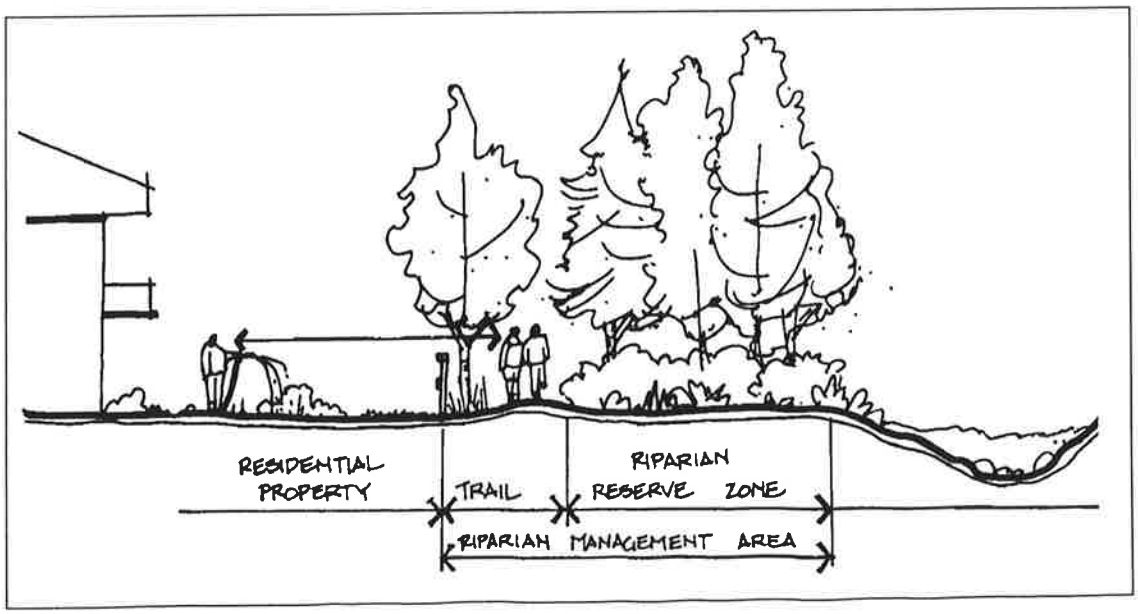


Figure 21: Sight Lines

Lighting

Lighting increases the sense of security of a public space and encourages use in the evening. The resulting increased use correspondingly increases surveillance that improves security. Lighting should be installed in the South Central Neighbourhood and Central Core park zones. The following guidelines are recommended to ensure that the lighting complements the adjacent land uses.

- Lighting should be incorporated into the trail system within the South Central and Central Core areas. As the trail develops, consideration to providing lighting in the other park zones should be given.
- Where single or multiple family residential development is adjacent either side of the creek corridor, bollard lighting is recommended.
- Where commercial, industrial, agricultural, or non-residential institutional properties are on both sides of the creek, post lighting may be used.

Signage

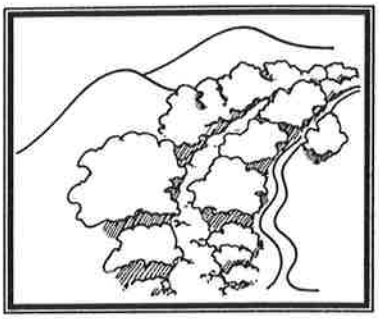
Signage contributes to the security of the park as well as interpretation. Posting park rules, hours of operation and security monitoring program helps improve security.

- Safety: Hazard conditions such as swift currents, seasonally high waters, and ravine edges should be posted.
- Interpretative: stewardship and education:
    - fisheries habitat requirements;
    - fish life cycles;
    - the importance of the riparian edge;
    - watershed issues;
    - local wildlife species;
    - identify vegetation species and wildlife trees; and
    - red and blue listed species of the area.
    - Park rules and maps should be posted.

- Directional

Section 8

PARK OPERATION AND MANAGEMENT



This section outlines the principles and guidelines for park maintenance and operation.

8.1 Management Principle

The management guidelines are based on the principle of preserving and protecting the natural environment while creating a linear park and providing a safe and pleasant recreational experience along the corridor.

8.2 Dog Control

The following dog control guidelines have been developed in accordance with the City of Kelowna Dog Control Bylaw No. 5880-88 and the guiding management principles for the Mill Creek Corridor.

In order to ensure the objective of protecting the riparian vegetation and water quality, and reduce user conflicts with respect to dogs, the following management guidelines are recommended.

1. Mill Creek Linear Park should be an on-leash area for dogs.
2. Dog waste pick up is mandatory, in accordance with Bylaw No. 5880-88.
3. Dog waste receptacles, along side trash containers, should be located at trail heads and staging areas along the trail.
4. Signage at each trailhead and staging area should clearly state regulations to ensure users are informed.
5. Education signage should be available at trailheads and staging area outlining the responsibilities of dog owners within public parks, and fine for non-compliance (up to $500).
6. The park should be included in the *Parks for Paws* Site Monitor program, enabling volunteers to participate in regular monitoring and clean-up of a portion of the linear park.

8.3 Cycling

In order to manage responsible cycling within the Mill Creek corridor, it will be important to implement a program of education in conjunction with physical impediments to encourage cyclists to stay on the designated trails. To this end, the following guidelines are recommended.

1. Cyclists will be encouraged along the designated trails but off-trail riding in the Riparian Reserve Zone **(RRZ)** will be prohibited.
2. Recreational cycling will be encouraged throughout the length of the park. Where the cycling path is shared with pedestrians, a crushed rock surface will be used. This will serve to slow cycling traffic in these areas.
3. Commuting cycling traffic will be accommodated in the Urban - Central Core and the Central Cultivated zones. A path that separates pedestrians from cyclists is recommended in these zones.
4. Signage should educate cyclists and pedestrians regarding the importance of staying on the trail to avoid damaging riparian vegetation and contributing to erosion.
5. Steps should include an allowance for a bike run along one side.
6. Guard rails should be installed at the edges of environmentally sensitive or hazardous areas, such as wetlands and ravine edges.

8.4 In-line Skating

Due to the physical constraints and anticipated use patterns along the creek, in-line skating is recommended only in areas where the cycling and pedestrian paths are separated or unless path is wide enough to accommodate all users. This occurs in the Urban – Central Core and the Central Cultivated zones.

8.5 Maintenance

The following maintenance guidelines are designed to protect the long-term ecological health of the stream corridor, while ensuring the safety of park users.

1. Fallen trees and large woody debris should be left in place providing that they do not pose a significant erosion concern, or, it poses a barrier or hazard to pedestrians or cyclists.
2. Noxious weeds should be controlled by hand. Gas powered weed control devices may be used where they do not threaten indigenous plants.
3. Garbage bins should be placed at trailheads and points that are easily accessed by maintenance vehicles.
4. Trail maintenance should not damage indigenous shrubs or impact the channel.
5. Heavy equipment should be prohibited in the RRZ excepting emergency situations.

6. Hand tool use should be used in the RRZ.
7. Vegetation removal in the RRZ should be restricted to the removal of noxious weeds and dangerous trees and branches.

8.6 Interpretation

The incorporation of an interpretation program along the stream corridor is an integral part of promoting the conservation and stewardship of the area. The following guidelines are recommended with respect to interpretation.

1. Provide interpretative signage along the creek corridor regarding natural history and park rules.
2. Integrate the Mill Creek Corridor into existing local interpretative programs such as Science Opportunities for Kids and other community initiatives.
3. Develop a brochure for a self-guided tour of the corridor, including trail routes and points of interest, including heritage sites.
4. Encourage the use of the linear park as an outdoor class room.

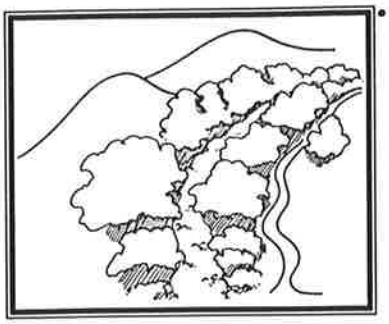
8.7 Security

Security is a concern among property owners adjacent Mill Creek. In addition, it will be important to incorporate security guidelines into management policies for the users of the park. The following guidelines have been developed based on these considerations.

1. Design the path to allow for surveillance, providing clear sight lines to adjacent properties.
2. Provide appropriate level of lighting along the path in the South Central Zone, and the Urban Industrial Zone.
3. Incorporate the park into local Neighbourhood Watch programs.
4. Encourage a program of volunteer wardens to monitor security in the park.
5. Provide signage at trailheads and staging areas indicating the presence of security and park hours.
6. Provide removable bollards at trailheads to deter vehicles along the path.

Section 9

IMPLEMENTATION PLAN



This section outlines the phasing, access, and acquisition plan for the linear park.

9.1 Phasing Plan

A phasing plan has been developed that divided the project into five phases (Map 10). The phases are discussed with respect to each park zone below. The phases include:

Phase One	- 0 to 2 years
Phase Two	- 2 to 5 years
Phase Three	- 5 to 10 years
Phase Four	- 10 to 20 years
Phase Five	- greater than 20 years

South Central Neighbourhood

The majority of the South Central Neighbourhood is within Phase One. Through a series of interim and long term connections, a route should be established within five years. Several sections of the long term path adjacent to the creek are anticipated to be in Phase Two and Phase Three (Map 10).

Central Core

Approximately 80% of the Central Core park zone is within Phase One. The length from the Parkinson Recreation Centre to the former Central Park Golf Course is within Phase One. Approximately 90% of this length is within municipal park or a dedicated road right-of-way along the creek, facilitating the completion of the trail in this area. The final link to Leathead Road in this park zone is largely dependant upon the completion of the Enterprise Road extension, and will proceed in conjunction with this effort.

Central Cultivated

The Central Cultivated park zone is largely within the Agricultural Land Reserve **(ALR)**. This zone lies within Phase Three.

Northern Industrial

The Northern Industrial park zone has lengths in three phases. The length along the existing dyke from Sexmith Road to Adams Road is largely within city road right-of-way presently. This is proposed for Phase One. The length from the Hollywood Road extension to Sexsmith Road is proposed for Phase Three. A proposed cycle route along the Hollywood Road extension is proposed for Phase Four.

The path splits at Edwards Road. The eastern route connects to Carney Pond and Okanagan University College, the second route crosses Highway 97 and lies within the Northern Cultivated park zone.

Northern Cultivated

The second route past Edwards Road crosses Highway 97 and follows the creek to Bulman Road, connecting to rural roads that lead to Mill Creek Regional Park. Both of these routes are proposed for Phase Four, more than 20 years in the future.

9.2 Acquisition

The acquisition plan has been developed based on available tools and mechanisms for the protection of environmentally sensitive areas and the acquisition of public route of access. The tools are available through legislation, stewardship, and community initiatives.

Dedication

Dedication is a tool available for creek protection and public route of access. Dedication of a public route of access along a watercourse is done at the time of subdivision or zoning, as part of a servicing agreement. The dedicated land is legally identified as a road right-of-way. The dedication is referred to as the Riparian Management Area for management purposes. It is measured from the top of bank, normal high water mark, or top of ravine bank in accordance with the Official Community Plan and the Ministry Enviornment, Lands and Parks (**MELP**) *Land Development Guidelines for the Protection of Aquatic Habitat* (Chilibeck, 1992).

Currently **MELP** has proposed a series of Streamside Protection Policy Directives (**SPPDs**), under Section 12 of the *Fish Protection Act*, which are currently in the discussion stage (**MELP**, 2000). The directives set new guidelines for **RMA**s. Consideration to the proposed directives has been incorporated into this document.

Donation

Donation represents an option for land acquisition through the Mill Creek corridor. The donation may be done through the Partners in Parks program (see below.) The donor may choose to donate the land to the Central Okanagan Parks and Wildlife Trust and receive a tax credit (see below.)

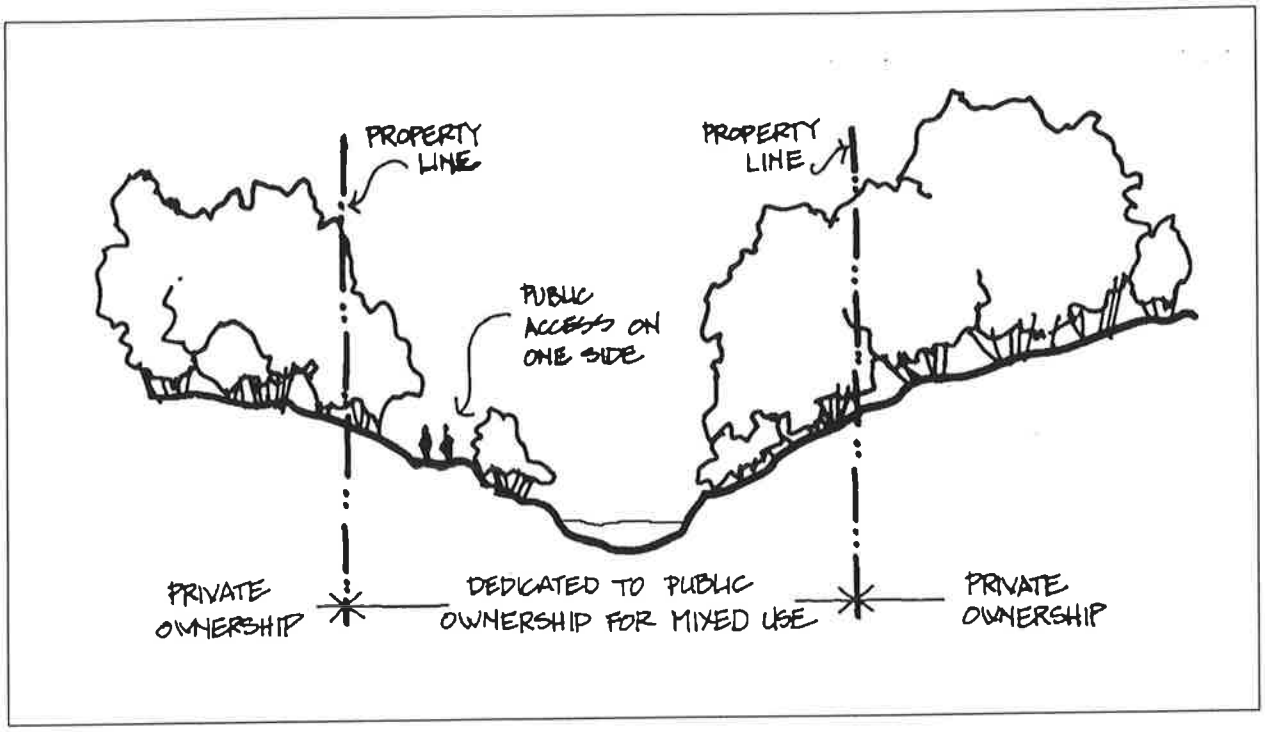


Figure 22: Dedication for Conservation and Public Route of Access

Land Trusts

Through the contribution of an environmentally sensitive property to a land trust, such as the Central Okanagan Parks and Wildlife Trust (the Trust) a donor is entitled to a tax receipt that may be credited against income. The Trust will issue a tax receipt equal to the value of the donated land, easements and covenants. Receipts are also issued for cash and other gifts (Central Okanagan Parks and Wildlife Trust). The receipt may be used as a credit against income taxes, from between 45% to 54% depending on the income level of the donor.

Conservation Covenants

Section 219 of the Land Title Act enables a covenant to be issued on a property for a specific use. In the case of a conservation covenant, the objective is to protect, maintain or restore the natural state of the land. A conservation covenant may also include a public route of access. The terms of the covenant may vary and are determined by the management objective. For example, a covenant for the RMA of Mill Creek may prohibit structures, establish a public route of access, and provide vegetation retention guidelines.

In order for conservation covenants to be effective, monitoring is required. Reliance on voluntary compliance has had a poor success rate. A recent study revealed that when voluntary compliance was the only enforcement mechanism, a non-compliance rate of 75% was the result (DFO, 1997).

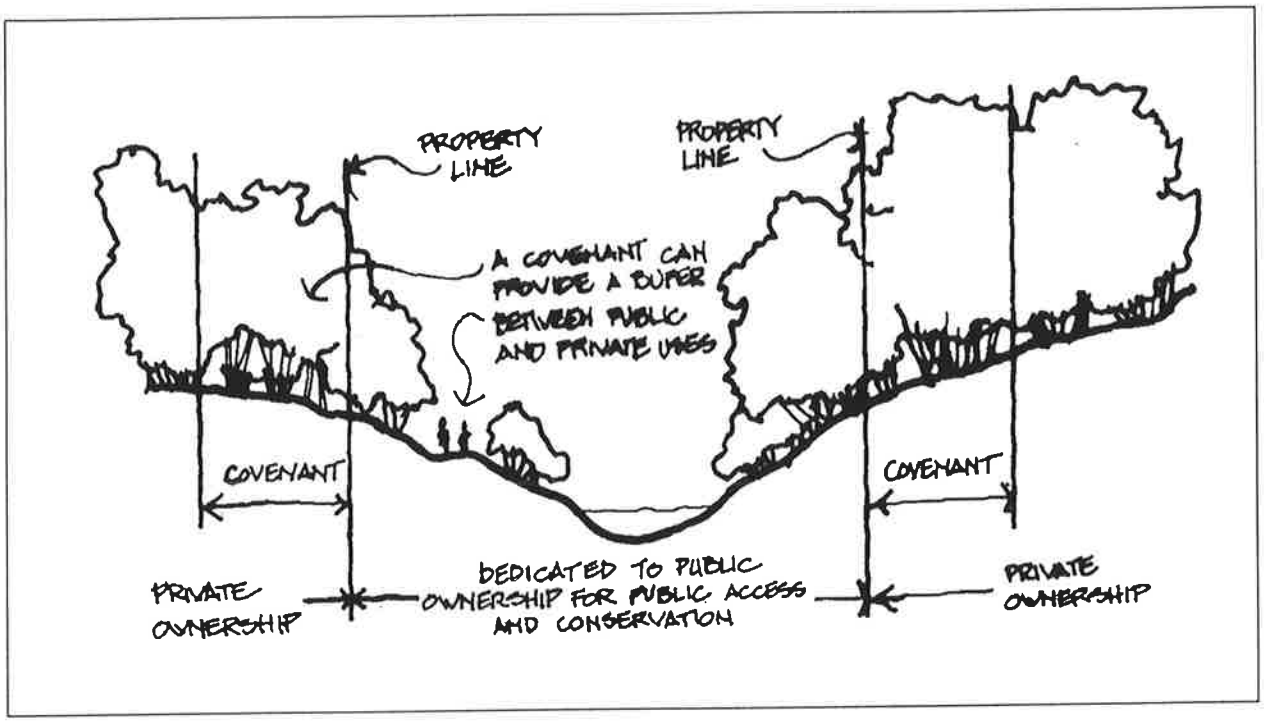


Figure 23: Combination of a Conservation Covenant and Dedication

Purchase, Dedicate and Resale

In some cases, the option of purchase, dedicate and resale is an option for the City's consideration. In this case, the City would purchase a property or series of properties adjacent the creek, dedicate the RMA, and then resell the property. This is an effective tool in cases where a property is required to establish a strategic linkage.

Access Agreements with Utility Companies

Access agreements with utility companies such as BC Gas and the Kelowna Pacific Railway will need to be negotiated for crossings and certain lengths of the alignment.

Development Cost Charges

The City of Kelowna's Bylaw No. 7728 outlines a schedule of Development Cost Charges (**DCCs**) to allow for the accommodation of increased infrastructure required of new development. There is provision in this regulation for the purchase of neighbourhood, community and city parks within the bylaw. The use of these funds along the corridor would be appropriate where neighbourhood, community and city parks are planned adjacent the corridor, but not appropriate for linear park purchase or development. These funds may also fund bike lanes and sidewalks where designated in the Transportation Plan.

Purchase

The City may use purchase of a property as an option for acquisition. Purchase of properties should correspond with the overall park acquisition plan for Kelowna, including objectives for neighbourhood, community, city and district parks.

Density Bonuses

The provision of a density bonus is a tool available to the municipality whereby increased density is agreed upon in exchange for additional land being made available for the Riparian Management Area.

Long Term Lease

The establishment of a long term leases for the RMA is an option for the municipality where the property owner does not wish to relinquish the land.

9.3 Implementation

Development Permit Areas

Section 879 of the Local Government Act (RSBC, 1997), a municipality may designate Development Permit Areas in their Official Community Plan for a number of purposes, including the protection of the natural environment and the avoidance of hazardous areas (RSBC, 1997). In accordance with Section 920 of the Municipal Act, the Development Permit (**DP**) may require that:

- natural features be preserved;
- specific areas remain free of development;
- watercourses be dedicated;
- landscape elements be incorporated such as trail and lighting installation; and
- works be undertaken to restore and / or enhance fish habitat or riparian areas.

The entire length of Mill Creek within the City of Kelowna lies within a Development Permit Area. The Development Permit process may include guidelines for referral to senior agencies such as MELP.

Section 925 of the Local Government Act allows local governments to require a security deposit from owners as a condition of a DP to ensure that the works outlined for restoration, enhancement, and / or landscaping are completed.

Sanitary Sewer / Storm Drainage By-law

The City of Kelowna's Bylaw No. 6618-99 restricts and regulates the deposition of hazardous substances into the storm and sanitary sewer system.

Property Tax Credits

Section 343.1 of the Local Government (RSBC, 1997) enables a municipal council to provide, by bylaw, property tax exemptions for riparian land that is managed for conservation provided that the land is held in a conservation covenant and is managed in accordance with the requirements of that covenant.

Partners In Parks

Partners In Parks is a program that provides an opportunity for individuals, businesses, community groups and organizations to participating in developing and maintaining the parks in Kelowna. The opportunities to participate take all forms, and include:

- donation of funds to purchase landscape elements (e.g. buy-a-metre of trail);
- volunteer time for replanting or noxious weed removal;
- adopt-a-stream; and
- volunteer time for security patrols.

Partnering opportunities also exist with utility companies, provincial agencies and institutions. Utility companies often have environmental management and restoration programs, and may have corresponding environmental goals.

Funding Sources

Habitat Conservation Trust Fund

The Habitat Conservation Trust Fund is a funding organization that receives its monies from surcharges on hunting and angling licences, donations, and compensation dollars from corporations. Its mandate is to provide monies for the acquisition and enhancement of fish and wildlife habitat. Potential projects for funding include:

- acquisition of environmentally sensitive habitat;
- enhancing spawning and rearing habitat;
- improving waterways for fish passage; and
- providing public viewing locations for the observation of fish and wildlife without the disruption of habitat.

Public Conservation Assistance Fund

The Public Conservation Assistance Fund is a provincial organization that provides grants for community habitat enhancement projects up to a maximum of $2,500. The community group must provide equal or greater than the grant amount to the project, with volunteer labour and materials be valid contributions. Example projects include:

- enhancing spawning habitat;
- building bird houses; and
- planting native vegetation.

Interim Routes

A key implementation strategy is the use of existing sidewalks and local streets as interim connecting lengths. This is a particularly useful tool, especially where alternate routes exist and a right-of way along the creek has not been acquired. The installation of directional signage is important in these areas.

It is proposed that pathways should not be installed unless it is possible to complete a length of pathway from one public space to another. This will avoid creating a trail with a 'dead end', and the security and maintenance issues that are associated with this situation.

Existing City Property

The use of existing property is a key implementation strategy as well as the extension of current pathways and the development of new paths in locations like Parkinson Recreation Centre and the city property at Dilworth Drive. The riparian program of the Environmental Division within the City also represents the implementation of creek restoration within city owned properties.

In some areas, modifying the current road right-of-way is recommended. For example, the provision of a multi-use trail is recommended along Brookside Avenue. This will reduce the asphalt surface in this area (Map 9).

Future Planning Initiatives

It is recommended that the objectives and recommendations within this report be incorporated into future planning initiatives along the corridor such as Area Structure Plans, updates to the Road Network Plan, the Cycling Master Plan, and the Pedestrian Master Plan.

9.4 Cost Estimate

A cost estimate for the trail works and improvements outlined in the Master Plan. This does not include costs for acquiring neighbourhood parks, or costs for in-stream restoration works. Refer to the Cost Estimate on the following page for a detailed breakdown of costs. A summary for each trail zone follows.

South Central Neighbourhood	$ 231,762.00
Central Core	$ 360,925.00
Central Cultivated	$ 89,375.00
Industrial	$ 154,850.00
North Route A to College	$ 98,825.00
North Route B to Bulman Rd. – Northern Cultivate	$ 31,300.00
East West Link	$ 40,175.00
Miscellaneous Items (e.g. Staging Areas, Restoration, etc.)	$1,465,800.00
Total	**$2,472,962.00**

PLEASE NOTE: that this cost estimate does not include any necessary in stream restoration or the cost to produce comprehensive construction plans required for development approval.

Cost Estimate - Mill Creek Linear Park Master Plan

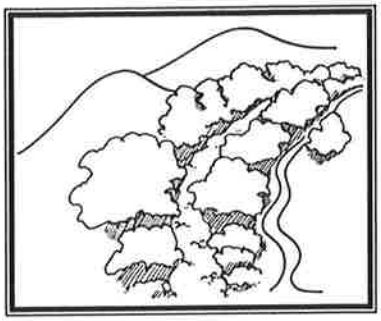
Improvement	Quantity	Unit	$ / unit	Subtotal	
Phase One (0 to 2 yrs)					
Path Type A	200	linear metre (lm)	$40.00	$8,000.00	
Path Type B	800	linear metre	$50.00	$40,000.00	
Path Type C	400	linear metre	$55.00	$22,000.00	
Path Type C Boulevard Trees	25	each (ea)	$225.00	$5,625.00	
Path Type D	300	linear metre	$25.00	$7,500.00	
Path Type E	200	linear metre	$22.50	$4,500.00	
Path Type F	2100	linear metre	$48.00	$100,800.00	
Direction Signs	40	each	$100.00	$4,000.00	
Trail Head Signage	4	each	$500.00	$2,000.00	
Dog Waste Bag Dispensers	4	each	$225.00	$900.00	
Trash Cans	4	each	$600.00	$2,400.00	
Benches	12	each	$2,000.00	$24,000.00	
Crosswalks	7	each	$500.00	$3,500.00	
Bollards	5	each	$500.00	$2,500.00	
Footbridges	1	each	$30,000.00	$30,000.00	
Subtotal - Phase One				***$257,725.00***	
Phase Two (2 to 5 yrs)					
Path Type A	1200	linear metre	$40.00	$48,000.00	
Path Type B	93	linear metre	$50.00	$4,650.00	
Path Type C	670	linear metre	$55.00	$36,850.00	
Path Type C Boulevard Trees	35	each	$225.00	$7,875.00	
Path Type E	900	linear metre	$22.50	$20,250.00	
Direction Signs	30	each	$100.00	$3,000.00	
Trail Head Signage	3	each	$500.00	$1,500.00	
Dog Waste Bag Dispensers	3	each	$225.00	$675.00	
Trash Cans	3	each	$600.00	$1,800.00	
Benches	12	each	$2,000.00	$24,000.00	
Crosswalks	4	each	$500.00	$2,000.00	
Bollards	8	each	$500.00	$4,000.00	
Footbridges	3	each	$30,000.00	$90,000.00	
Subtotal - Phase Two				***$244,600.00***	
Phase Three (5 to 10 yrs)					
Path Type B	900	linear metre	$50.00	$45,000.00	*Leathead extension*
Path Type E	100	linear metre	$22.50	$2,250.00	
Direction Signs	4	each	$100.00	$400.00	
Crosswalks	2	each	$500.00	$1,000.00	
Bollards	1	each	$500.00	$500.00	
Trash Cans	2	each	$600.00	$1,200.00	
Benches	4	each	$2,000.00	$8,000.00	
Subtotal - Phase Three				***$58,350.00***	

Improvement	Quantity	Unit	$ / unit	Subtotal	
Phase Four (10 to 20 yrs)					
Path Type B	1000	linear metre	$50.00	$50,000.00	*McCurdy ext/hwy*
Path Type C	350	linear metre	$55.00	$19,250.00	
Path Type C Boulevard Trees	20	each	$225.00	$4,500.00	
Path Type E	2050	linear metre	$22.50	$46,125.00	
Path Type F	2900	linear metre	$48.00	$139,200.00	
Direction Signs	16	each	$100.00	$1,600.00	
Trail Head Signage	5	each	$500.00	$2,500.00	
Dog Waste Bag Dispensers	5	each	$225.00	$1,125.00	
Trash Cans	5	each	$600.00	$3,000.00	
Benches	12	each	$2,000.00	$24,000.00	
Crosswalks	6	each	$500.00	$3,000.00	
Bollards	4	each	$500.00	$2,000.00	
Footbridges	4	each	$30,000.00	$120,000.00	
Agriculture / Railway Fence	1550	linear metre	$32.50	$50,375.00	
Agriculture Signs	4	each	$200.00	$800.00	
Phase Four				***$467,475.00***	
Phase Five (20 + yrs)					
Path Type B	950	linear metre	$50.00	$47,500.00	*Hollywood extension.*
Path Type C	950	linear metre	$55.00	$52,250.00	
Path Type C Boulevard Trees	50	each	$225.00	$11,250.00	
Path Type E	2500	linear metre	$22.50	$56,250.00	
Direction Signs	15	each	$100.00	$1,500.00	
Trail Head Signage	2	each	$500.00	$1,000.00	
Dog Waste Bag Dispensers	2	each	$225.00	$450.00	
Trash Cans	2	each	$600.00	$1,200.00	
Benches	6	each	$2,000.00	$12,000.00	
Subtotal - North Route A				***$183,400.00***	
Phase Five (East West Link at Bulman Rd)					
Path Type C	500	linear metre	$55.00	$27,500.00	
Path Type C Boulevard Trees	25	each	$225.00	$5,625.00	
Direction Signs	4	each	$100.00	$400.00	
Trail Head Signage	2	each	$500.00	$1,000.00	
Dog Waste Bag Dispensers	2	each	$225.00	$450.00	
Benches	2	each	$2,000.00	$4,000.00	
Trash Cans	2	each	$600.00	$1,200.00	
Subtotal - East West Link				***$40,175.00***	
Miscellaneous Items					
Phase One - Light Standards [1]	62	each	$2,200.00	$136,400.00	
Phase Two - Light Standards [1]	52	each	$2,200.00	$114,400.00	
Staging Areas	3	each	$250,000.00	$750,000.00	
Interpretative Displays	6	each	$15,000.00	$90,000.00	
Restoration Planting [2]	37500	square metre (sm)	$10.00	$375,000.00	
Subtotal - Miscellaneous				***$1,465,800.00***	
Total				***$2,472,962.00***	

[1] Light standards have been designated for Path Types A, E and F within the South Central Neighbourhood and the Central Core

[2] Assumed an average 7.5 m width for restoration planting

APPENDIX



- **Glossary**
- **References**

GLOSSARY AND ABBREVIATIONS

Aquatic Habitat: Areas associated with water which provide food and shelter and other elements critical to completion of an organism's life cycle. Aquatic habitats include streams, wetlands, marshes, bogs and riparian areas, as well as large water bodies.

Barrier: A structure installed to protect an environmentally sensitive area. A barrier can be hard (i.e. fence); live (i.e. vegetation); a combination of hard and live; or a terrain feature (i.e. berm). A barrier can be physical (obstructing passage) or psychological (deterring access).

Bikelane: portion of a roadway or shoulder which is designated by stripping, signage and/or pavement marking for the preferential or exclusive use of cyclists, or to be shared exclusively by cyclists and parked automobiles (IMC, 1995).

Bikepath: A pathway physically separated from the travel portion of a roadway by an open space buffer or barrier, and either shared with pedestrians or designated for the exclusive use of cyclists (IMC, 1995).

Bikeroute: A roadway which is suitable for shared bicycle use, and which may be designated as such by signage and/or mapping (IMC, 1995).

Boulevard: A portion of the roadway right-of-way located outside the travel lanes and shoulders (IMC, 1995).

Dangerous or hazardous Tree or Limb: A tree or limb identified by a qualified person as being, or likely to become in the immediate future, a danger to people or property (Bylaw No. 8041, 1997).

Deleterious Substance: Substance harmful to fish or fish habitat (Canada Fisheries Act, sec. 36.3).

Development or Development Activity: Means any activity carried out in the process of preparing a site, erecting structures or providing services for human use, and includes:

- X the cutting or removal of trees
- X clearing or disturbance of vegetation
- X grading, removal, deposit, or moving of soil or other similar material
- X construction of a new structure or expansion of an existing structure
- X paving, landscaping
- X installation of drainage or underground services (City of Kelowna, 1997)

Development Permit Area: An identified area that is designated on an OCP map, as allowed by Section 879 of The Municipal Act (RSBC, 1996). Development in these areas requires a permit before the land is altered. Typically, development must meet special requirements due to the unique nature of the site.

Drip Line: A line on the ground around the stem of a tree directly beneath the ends of the outermost twigs and branches of a tree (City of Kelowna, 1997).

Ecosystem: The terms used for the sum total of vegetation, animals and the physical environment in which they interact. Ecosystem is derived from the Greek term *oikos*, which means home.

Environmentally Sensitive Area (ESA): An area requiring special management attention to protect fish and wildlife resources and other implicit natural systems or processes. ESAs have also been broadly defined to include other scenic, historic or cultural values.

Fish: Fish are defined as: shellfish, crustaceans, marine animals, the eggs, spawn, spat and juvenile stages of fish, shellfish, crustaceans, and marine animals. (Canada Fisheries Act, sec. 31.5).

Fish Habitat: Spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes. (Canada Fisheries Act, sec. 31.5).

Fishery Operating Window: The time periods of reduced risk for important commercial, sport, and resident fish species, based on life histories. The fishery operating window is the time of year during which there are no fish eggs or alevins present in the substrates of the local rivers. This is the preferred period for instream work or development. Prior to commencement of any instream work and with sufficient lead time, proponents should contact MELP for information regarding species timing windows.

Floodplains: Relatively flat, low-lying areas adjacent to watercourses. Floodplains are formed of fluvial sediments and are periodically flooded and modified when streams flow over the tops of banks. Steam channels under natural conditions meander within unconfined floodplains, alternately creating and isolating habitats.

Groundwater: Water that infiltrates through the ground surface and accumulates in underground water bodies in porous rock or gravels.

Headwater: The area in the upper reaches of a watershed typified by unconfined surface water flows. Hydrologic processes such as those that occur in headwaters affect the entire downstream structure of the watercourse.

Hydrology: The study of the occurrences, circulation and distribution of the waters of the earth. Local hydrologic regimes and processes need to be taken into account inwater and land use planning. These processes include precipitation, interception, run-off, infiltration, percolation, storage, evaporation, and transpiration.

Impervious: The inability of a material (usually substance used inroad, parking lot and driveway surfacing such as asphaltic concrete) to permit the relatively rapid passage of water through into the ground.

Land Disturbance: Includes, but are not limited to, buildings, parking lots, tree removal, soil removal or filling, retaining walls, patios, lawns, and agricultural practices (Bylaw No. 7600).

Marsh: A mineral wetland that is permanently or seasonally inundated up to a depth of two metres by standing or slow moving water. The waters are nutrient rich and the substrate is usually mineral soil. Marshes are characterized by communities of emergent rushes, grasses and reeds, and submerged or floating aquatic plants in areas of open water.

Mitigation: Actions taken during the planning, design, construction and operation of works and undertakings to alleviate potential adverse effects on the productive capacity of fish habitats. *(DFO Policy for the Management of Fish Habitat, 1986).*

Natural Boundary: The visible high watermark of any stream or other body of water representing the water level reached during annual freshet, 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 body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself (City of Kelowna, 1997).

Natural Environment or Natural State: The condition that existed before the change in and about the Stream Protection Corridor or Natural Environment/Hazardous Condition area began (City of Kelowna, 1997).

No Net Loss: A working principle which strives to balance unavoidable habitat losses through avoidance, mitigation and habitat replacement on a project-by-project basis so that further reductions to Canada's fisheries resources due to habitat loss or damage may be prevented. *(DFO Policy for the Management of Fish Habitat, 1986).*

Protected Tree: As referred to in the Tree Protection Bylaw No. 8041. Means any tree with a diameter of 150 mm or more measured 1 m above grade which is:

a) located within a designated stream corridor Leave Strip within a Natural Environment/Hazardous Condition Development Permit Area as identified in Kelowna Official Community Plan (1994-2013) Bylaw No. 7600, (1997);
b) located on a slope with a grade equal to or greater than 30% and which is within a Natural Environment/Hazardous Condition Development Permit Area as identified in Kelowna Official Community Plan (1994-2013) Bylaw No. 7600, (1997).

Public Route of Access: A specified area of land on both sides of a stream which, in addition to the purposes of the Stream Protection Corridor, provides an opportunity for existing or future public access (City of Kelowna, 1997).

Recreational Cycling: Cycling activity intended primarily for exercise, leisure and/or exploration (IMC, 1995).

Right-Of-Way: A publicly-owned transportation corridor generally permitted for use by the public for motorised vehicular, cycling and pedestrian travel, and including the roadway surface, sidewalks, boulevards and curbs and gutters, (urban), or shoulders, ditches and side slopes (rural) (IMC, 1995).

Riparian Area: The land adjacent to the normal high water level in a stream, river, lake or pond and extending to the portion of land that is directly influenced by the presence of adjacent ponded or channelled water. Riparian areas typically exemplify a rich and diverse vegetative mosaic reflecting the influence of available surface water.

RMA: Riparian Management Area.

Riparian Management Area: A specified setback area that is comprised of the Riparian Reserve Zone, or the Riparian Management Zone, or both. The width of these areas is determined by attributes of the stream and adjacent terrestrial ecosystems.

Riparian Management Zone: A specified setback areas of a stream located outside of the Riparian Reserve Zone, or if there is no riparian zone, it is that area located adjacent to a stream. The Riparian Management Zone is established to conserve and maintain the productivity of aquatic and riparian ecosystems where specified or approved development is permitted (no less than 50% native vegetation retention).

RRZ: Riparian Reserve Zone.

Riparian Reserve Zone: A specified setback area established on both sides of a stream that is comprised of the protected natural feature and its riparian (buffer) area. The riparian reserve zone is to remain in a largely undisturbed state, and is established to conserve and maintain the productivity of aquatic and riparian ecosystems (greater than 90% native vegetation retention).

Riparian Vegetation: The streamside vegetation located on or near the bank of a stream or watercourse. The plants must be tolerant of water and occasional flooding.

ROW: Right-of-way.

Runoff: That portion of rain fall or snow melt which flows off the surface.

Rural Roads: Roads where there are no curbs, gutters or storm/combination sewers (IMC, 1995).

Sedimentation: Deposition of material carried in water; usually the result of a reduction in water velocity below the point at which it can transport the material.

Sidewalk: A portion of a roadway right-of-way intended for the exclusive use of pedestrians. They are bi-directional, located on either or both sides of the roadway, and usually elevated from the road surface and protected from drainage and vehicular traffic by a raised curb (IMC, 1995).

Spawn (noun): Eggs of fish or invertebrates.

Spawn (verb): To produce or deposit eggs - usually used in reference to aquatic organisms such as fish, crustaceans and oysters. Eggs of fish or invertebrates.

Stream: Any natural watercourse or source of water supply, whether usually containing water or not, groundwater, and a lake, river creek, spring, ravine, swamp and gulch (Bylaw No. 7600, 1997).

Stream Protection Corridor: A specified setback requirement on both sides of a stream within which buildings, structures, driveways and parking areas shall not be developed. The Stream Protection Corridor includes the leave strip and may or may not include provision for a Public Route of Access (Bylaw No. 7600, 1997).

Structure: Is defined as anything constructed, placed or erected on land (City of Kelowna, 1997).

Stormwater Detention: The collection and containment of run-off from impervious surfaces. Detention is intended to maintain, as closely as possible, the natural predevelopment flow pattern and water quality of development sites in the watershed. Increases in impervious surfaces reduce detention and retention, causing significantly higher peak flows and reduced base flows in streams.

Top of Bank: The point at which the bank shows a significant or abrupt change in slope. In flat landscapes it could be the normal high water mark, but more typically, it is the top of the slope leading down to the water.

Tree: A self-supporting woody plant that is a species of coniferous or deciduous genus which normally grows to a height of five (5) metres or greater, notwithstanding its current size (Bylaw No. 8041).

Utilitarian Cycling: Cycling activity intended primarily for work, school, shopping or social related purposes (IMC, 1995).

Urban Roads: Roads where curbs, gutters and storm/combination sewers are located on at least ones side of the roadway surface (IMC, 1995).

Water Quality: The chemical, physical and biological characteristics of water.

Watershed: The total region defined by height of land draining into a given waterway, lake or reservoir; a drainage basin.

Wetlands: Areas of permanent or temporary standing water, characterized by the absence of channel flow and the presence of vegetation which is distinct from that in neighbouring, freely drained areas. The most common types of wetlands are swamps, marshes and bogs, fens and shallow water.

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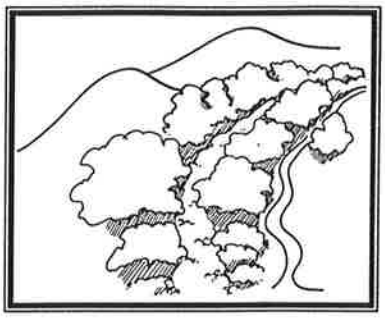
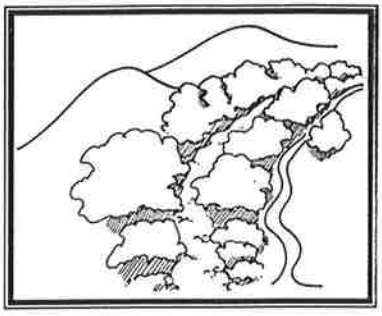
APPENDIX A



- **Planning Framework**

PLANNING FRAMEWORK



This section outlines the planning and legislative framework within which the Mill Creek Linear Park Master Plan was developed.

Planning Context

The City of Kelowna has a number of planning documents that outline policy for creek corridors in general and for Mill Creek in particular. The following planning documents have provided the framework in which the Mill Creek Linear Park Master Plan was developed.

Strategic Plan

The *Kelowna Strategic Plan* was developed in 1992 to establish goals to guide community growth and development. The plan addresses environmental, social, economic and governmental aspects of the City and provides the fundamental principles upon which the Official Community Plan is based. These goals include the protection of significant natural areas, the improvement of access to urban and natural areas of the community, and the provision of transportation options within the City.

Official Community Plan

The City of Kelowna's Official Community Plan (**OCP**) identifies Mill Creek as part of the linear park system. It has outlined policies for a public route of access along the creek, and stream protection corridor requirements. To establish a public route of access, the City seeks dedications at the time of rezoning, development permit or subdivision of properties abutting a creek.

Sector Plan

The Sector Plan provides a planning framework that incorporates the policies of the OCP for an area of the city that presents an integrated planning area. It addresses population, land use, servicing requirements, transportation, and the environment, and provides direction for the Neighbourhood Structure Plans. The plan must adhere to the intent of all higher level plans. One Sector Plan, the Highway 97 Sector Plan, overlaps the Study Area. The plan notes the importance of a linear park along Mill Creek and its tributary Gopher Creek to Chichester Pond.

It outlines the need for connections to Carney Pond, Okanagan University College Campus, and Quail Ridge Development.

Neighbourhood Structure Plan

Neighbourhood Structure Plans (**NSP**) incorporate the policies set out in the OCP for a specific neighbourhood. They address land use, servicing and transportation issues. One NSP, the South Central Structure Plan, impacts the study area. The NSP identifies the maintenance of heritage building and heritage tree resources and the development of the Mill Creek Corridor as objectives within the area.

Area Structure Plan

An Area Structure Plan (**ASP**) may be required by Council for an area in order to address issues regarding the natural environment, proposed land use, transportation networks, and facilities requirements including parks. One ASP impacts lands within the Study Area. This is the *University South Area Structure Plan* (Geddes Holdings Ltd. and G.M. Holzhey Ltd.). It outlines a potential transportation network, a setback for Carney Pond, and park requirements for the University South area.

Zoning Bylaw

The intent of the zoning bylaw is to establish policies that ensure orderly development within the City and avoid land use conflicts. The bylaw divides the city into zones based on land use and provides policy for the form, siting, height and density of the buildings within each zone. The OCP provides a framework to guide existing and future zoning within the City.

Tree Protection Bylaws

City of Kelowna Bylaws No. 8041 and No. 8042 regulate the removal and replacement of trees within municipal parks and environmentally sensitive and hazardous areas. These bylaws provide protection to trees within these areas, requires permits for their removal, and establishes requirements for replacement trees.

Parks Regulation Bylaw

The City of Kelowna's Bylaw No. 6819-91 establishes guidelines for activities within municipal parks. Activities such as fire creation, dumping trash, discharging firearms and selling merchandise are prohibited by this bylaw. The bylaw also establishes hours of use and dog control.

Natural Features Inventory

The *Kelowna Natural Features Inventory* was prepared for the City in 1991. The intent of the study was to provide an information base of natural features where urban development had potential to impact the environment. Mill Creek is listed within the inventory as a natural feature that requires protection and management. Recommendations for the protection of watercourses and trail guidelines are outlined in the document.

Recreation Master Plan

The *Recreation Facility and Parkland Development Master Plan* was developed for the City in 1993. The study assessed the present and future demand for recreation opportunities in the community. The plan also established priorities for facilities and parkland over a 20 year time horizon. The need to develop linear parks is outlined in this plan.

Highway 97 / Springfield Town Centre Charrette

The Official Community plan has identified four Urban Town Centres within the City. The town centre strategy is designed to reduce the trend of urban sprall and improve the quality and livability within the community. In the fall of 1998, a design workshop (or 'charrette') was conducted for the Highway 97 / Springfield Town Centre area. Planning professionals and community members came together with the task of creating a vision that met the planning challenges within the area. The Highway 97 / Springfield Town Centre is bound by Mill Creek on the north and Mission Creek on the south. The vision of providing a green multi-use corridor between the two creeks was a common theme in the various design solutions.

Legislation

The following section outlines pertinent federal and provincial legislation.

Fisheries Act

The *Fisheries Act* (RSC, 1985) *Chapter F-14*, is federal legislation that prohibits the destruction or harmful alteration of fish habitat, where that is defined as 'spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes'. The Department of Fisheries and Oceans **(DFO)**, in conjunction with the Ministry of Environment, Lands and Parks **(MELP)**, has published the *Land Development Guidelines for the Protection of Aquatic Habitat* (Chilibeck, 1992). This publication has become the standard for development guidelines for the protection of fish streams. It includes standards for erosion control, stream setbacks, work windows for in-stream work, and culvert specifications. Within the Central Okanagan, MELP personnel administer fisheries Act policies on behalf of DFO.

Navigable Waters Protection Act

The *Navigable Waters Protection Act* (1985) is federal legislation that protects waters from unlawful obstructions and structures that may interfere with navigation.

Wildlife Act

The *Wildlife Act* (RSBC, 1996), is provincial legislation that protects and prohibits the damage of birds, eggs, occupied bird nests and raptors nests whether they are occupied or not. It may impose fines for damaging or destroying raptors and their nests.

Migratory Birds Convention Act

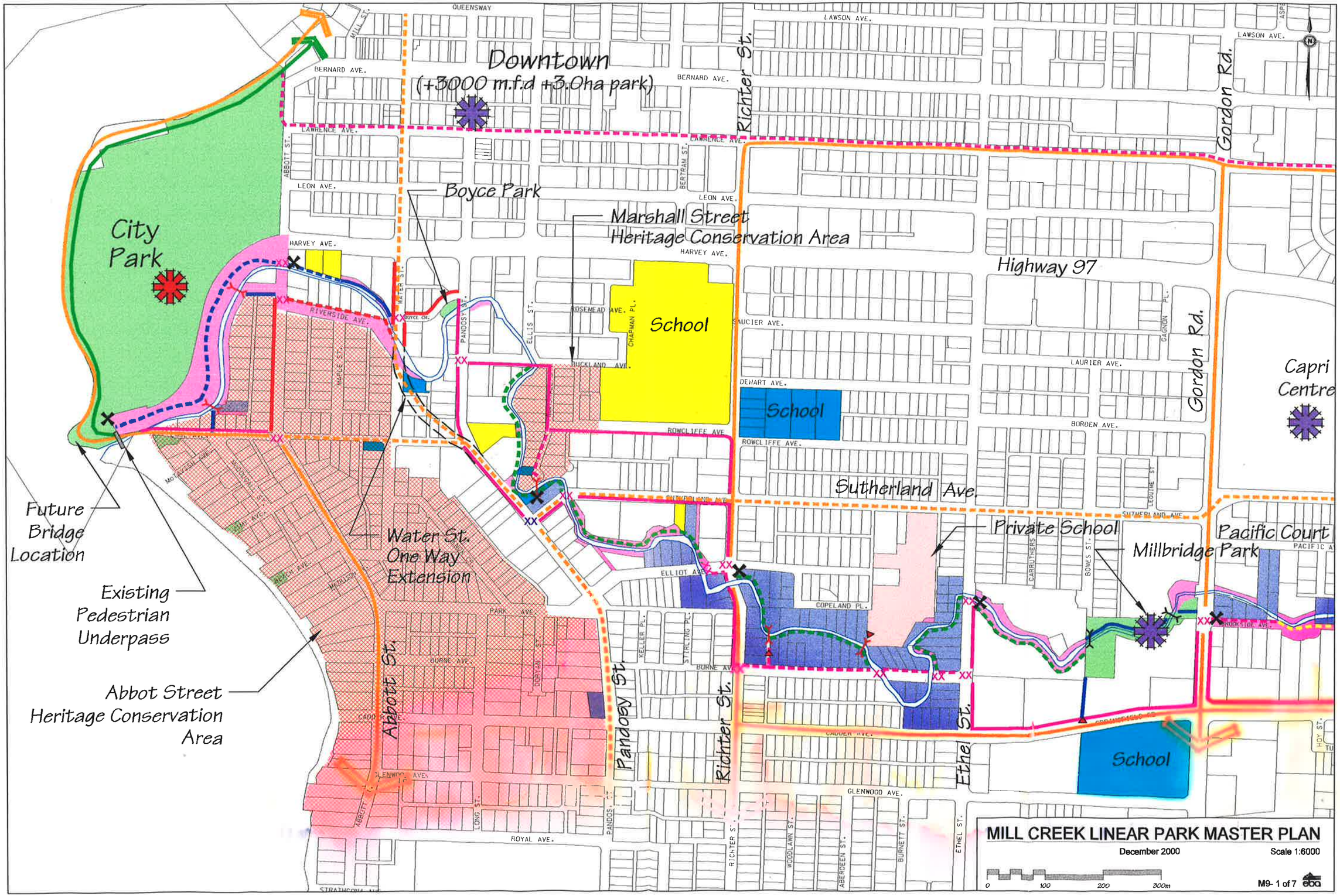
The *Migratory Birds Convention Act* (1994) is federal legislation that regulates and prohibits the killing, capture, and possession of migratory birds and their nests. Fines may be imposed if the tenants of the Act are contravened.

MILL CREEK LINEAR PARK MASTER PLAN

MASTER PLAN LEGEND

- Path A - Existing Asphalt Path
- Path A - Proposed Asphalt Path
- Path B - Existing Sidewalk
- Path B - Proposed Sidewalk
- Path C - Existing Sidewalk with Boulevard
- Path C - Proposed Sidewalk with Boulevard
- Path D - Proposed Path Along Roadway
- Path E - Proposed Crush Stone Path
- Existing Greenway
- Path F - Proposed Separated Path
- Proposed Roadway
- Earth Trail
- Proposed Underpass / Overpass
- Existing Bike Route
- Proposed Bike Route
- Municipal Park
- Ponderosa Pine Parkland / Grasslands
- Shrub Carr
- Shallow Open Water
- Marsh
- Wet Meadow

- Known Future Development Sites
- Existing Road R.O.W
- City Property
- Urban Transition Properties
- Heritage Properties
- Existing Crosswalk
- Existing Traffic Light
- Proposed Crosswalk
- Proposed Traffic Light
- Existing Railway Crossing
- Proposed Railway Crossing
- Existing Foot Bridge
- Proposed Foot Bridge
- Access Point
- Staging Area
- Point of Interest
- Creek
- Agricultural Signage


Downtown
(+3000 m.f.d +3.0ha park)
City Park
Boyce Park
Marshall Street
Heritage Conservation Area
Highway 97
Gordon Rd.
Richter St.
School
Capri Centre
Future Bridge Location
Existing Pedestrian Underpass
Abbot Street Heritage Conservation Area
Water St. One Way Extension
Sutherland Ave.
Private School
Millbridge Park
Pacific Court
Abbott St.
Pandosy St.
Richter St.
Ethel St.
QUEENSWAY
BERNARD AVE.
LAWRENCE AVE.
LEON AVE.
HARVEY AVE.
RIVERSIDE AVE.
ROWCLIFFE AVE.
ELLIOT AVE.
COPELAND PL.
PARK AVE.
BURNE AVE.
GLENWOOD AVE.
ROYAL AVE.
LAURIER AVE.
BORDEN AVE.
DEHART AVE.
SUTHERLAND AVE.
MILL ST.
ABBOTT ST.
BERTRAM ST.
WATER ST.
PANDOSY ST.
ELLIS ST.
ROSEMEAD AVE.
CHAPMAN PL.
BUCKLAND AVE.
GAGNON PL.
MAPLE ST.
WILLOW ST.
MCKINLEY PL.
MCKINLEY AVE.
BEACH AVE.
MELVILLE ST.
KELLER PL.
STERLING PL.
LOCKHART ST.
CADDER AVE.
LONG ST.
PANDOSY CT.
WOODLAWN ST.
ABERDEEN ST.
BURNETT ST.
CARRUTHERS
BOWES ST.
LEGTHE ST.
PACIFIC AVE.
BROOKSIDE AVE.
HOY ST.
STRATHCONA AVE.
MILL CREEK LINEAR PARK MASTER PLAN
December 2000
Scale 1:6000
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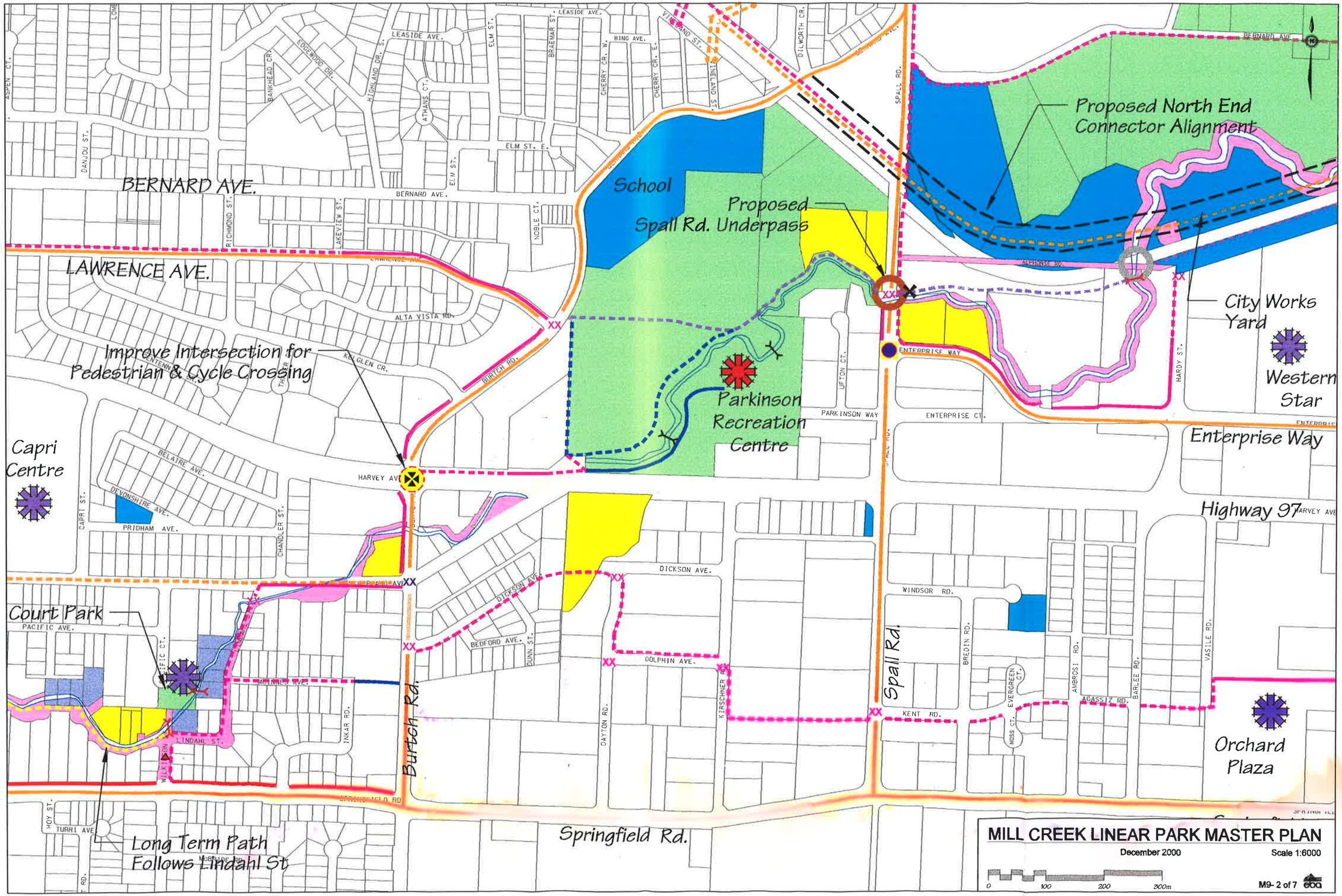
M9- 1 of 7
eda

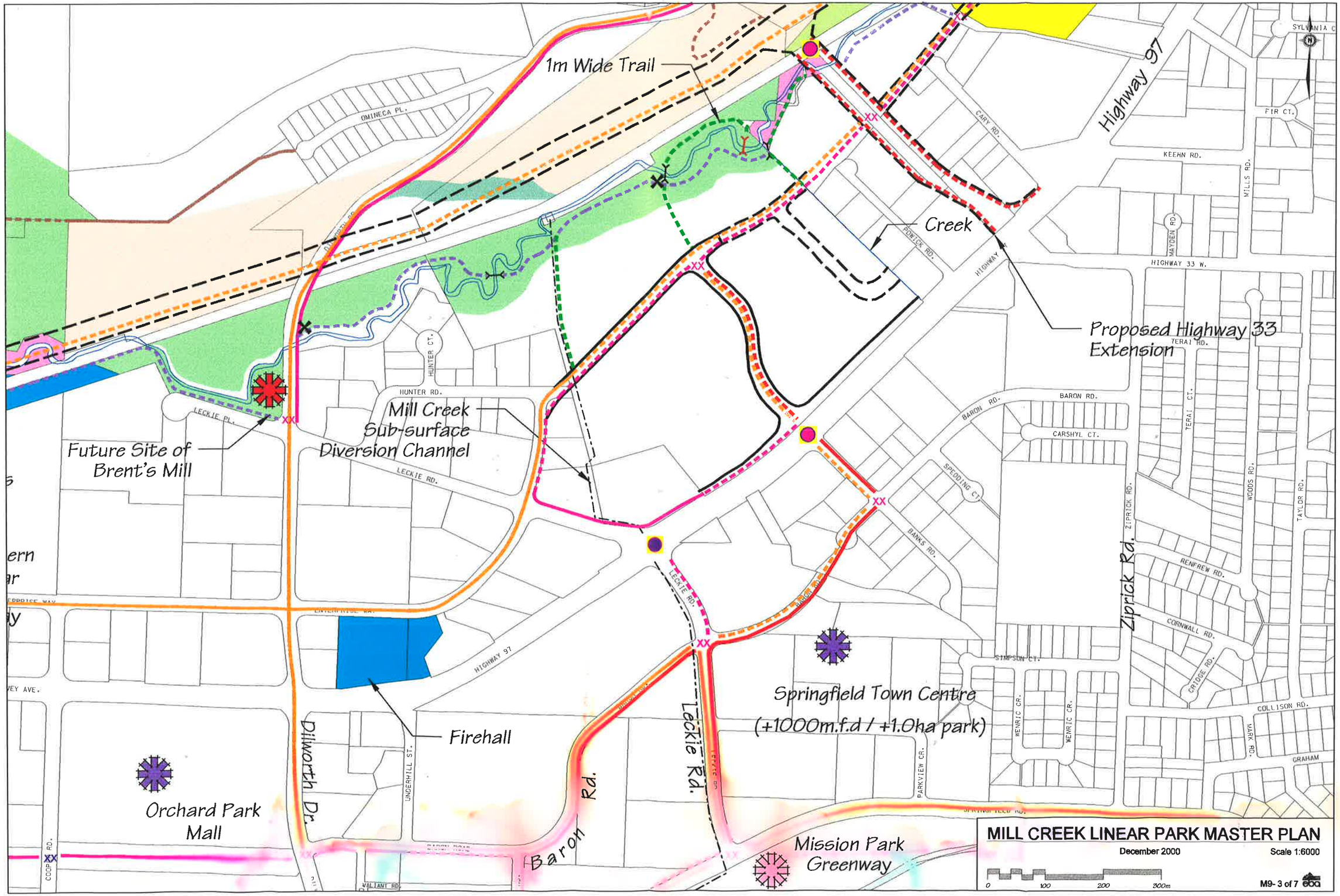


MILL CREEK LINEAR PARK MASTER PLAN

December 2000 — Scale 1:6000

0 100 200 300m

M9- 2 of 7

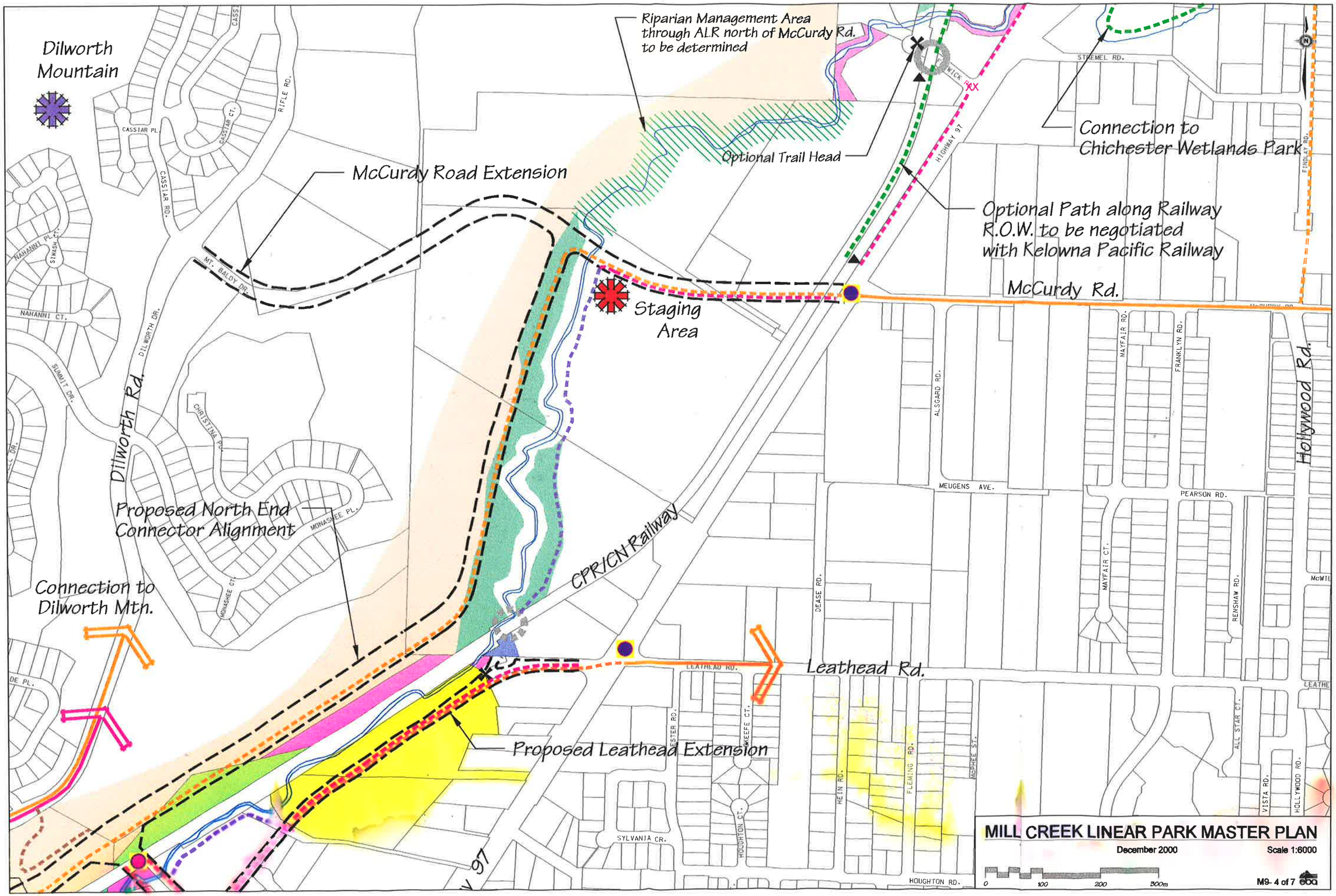


MILL CREEK LINEAR PARK MASTER PLAN

December 2000 — Scale 1:6000

0 100 200 300m

M9- 3 of 7 eda


Dilworth Mountain
Riparian Management Area through ALR north of McCurdy Rd. to be determined
McCurdy Road Extension
Optional Trail Head
Connection to Chichester Wetlands Park
Optional Path along Railway R.O.W. to be negotiated with Kelowna Pacific Railway
McCurdy Rd.
Staging Area
Dilworth Rd.
Proposed North End Connector Alignment
Connection to Dilworth Mtn.
CPR/CN Railway
Proposed Leathead Extension
Leathead Rd.
RIFLE RD.
CASSIAR PL
CASSIAR CT.
CASSIAR RD.
NAHANNI PL.
SIMESH
NAHANNI CT.
MT. BALDY DR.
DILWORTH DR.
SUMMIT DR.
CHRISTINA PL.
MONASHEE PL.
MONASHEE CT.
STREMEL RD.
WICK RD.
HIGHWAY 97
FINDLAY RD.
ALSGARD RD.
MAYFAIR RD.
FRANKLYN RD.
Hollywood Rd.
MEUGENS AVE.
PEARSON RD.
MAYFAIR CT.
REWSHAW RD.
McWILLIAMS RD.
DEASE RD.
LEATHEAD RD.
LESTER RD.
MCPHEE CT.
HEIN RD.
FLEMING RD.
MCPHEE ST.
ALL STAR CT.
VISTA RD.
HOLLYWOOD RD.
SYLVANIA CR.
HOUGHTON CT.
HOUGHTON RD.
MILL CREEK LINEAR PARK MASTER PLAN
December 2000
Scale 1:6000
0 100 200 300m
M9- 4 of 7
eba

Proposed Access Road.

Proposed Information Centre/ Tree Fruit Centre

Potential Linear Park within ALR & Restoration Opportunity

Proposed Pedestrian Linkage to Chichester Wetlands Park

Optional Path along Railway R.O.W. to be negotiated with Kelowna Pacific Railway

Riparian Management Area through ALR north of McCurdy Rd. to be determined

Optional Trail Head

Connection to Chichester Wetlands Park

Optional Path along Railway R.O.W. to be negotiated with Kelowna Pacific Railway

Chichester Wetlands Park

GRANVILLE RD.

MONFORD RD.

POTOM AVE.

WILLOW PARK RD.

HIGHWAY 97

FINDLAY RD.

STAFFORD RD.

KILLARNY RD.

Rutland Rd.

RAINS RD.

ALIN CT.

KRIESE RD.

FITZPATRICK RD.

FINNS RD.

STREMEL RD.

WICK RD.

HILLABY AVE

CHICHESTER CT.

CLARK CT.

HILLABY CT.

MAPLE RD.

IRENE RD.

WALLACE RD.

ORTT PL

ORTT RD.

ALDON RD.

SUMAC RD. W.

SUMAC RD. E.

RUTLAND RD. N.

SAXBORN CT.

ELL CT.

FELIX RD.

ALTA DENA RD

DOVER RD.

MILL CREEK LINEAR PARK MASTER PLAN

December 2000

Scale 1:6000

0 100 200 300m

M9- 5 of 7

eda

Map 9

MASTER PLAN

- Path A - Existing Asphalt Path
- Path A - Proposed Asphalt Path
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- Shrub Carr
- Shallow Open Water
- Marsh
- Wet Meadow

- Known Future
- Existing Road
- City Property
- Urban Transiti
- Heritage Prope
- xx Existing Cross
- Existing Traffic
- xx Proposed Cros
- Proposed Traf
- Existing Railwa
- Proposed Railw
- Existing Foot E
- Proposed Foot
- Access Point
- Staging Area
- Point of Interes
- Creek
- Trail Head
- Agricultural Si

Civic Core

Downtown
(+3000 m.fd +3.0ha park)

City Park

Boyce Park

Marshall Street Heritage Conservation Area

School

School

School

School

Richter St.

Gordon Rd.

Highway 97

BERNARD AVE.

LAWRENCE AVE.

Improve Intersection for Pedestrian & Cycle Crossing

Capri Centre

Sutherland Ave.

Private School

Millbridge Park

Pacific Court Park

Burtch Rd.

Springfield Rd.

Long Term Path Follows Lindahl St.

Future Bridge Location

Existing Pedestrian Underpass

Water St. One Way Extension

Abbott Street Heritage Conservation Area

Abbott St.

Ellis St.

Rathlody St.

CPR/CN Railway

Connection to Brandts Creek

School

Proposed Small Rd. Underpass

Parkinson Recreation Centre

PLAN

University College

Quail Ridge Tr

To Airport

Connect Trail to Proposed G.E.I.D. Trail

University South Area Structure Plan Future Residential Area (1.8ha Park Space)

Carney Pond

Proposed Hollywood Road Extension

Sexsmith Rd.

CPR/CN Railway

Proposed Access R

Proposed Information Ce Tree Fruit Centre

Potential Linear Park within ALR & Restoration Opportunity

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Mount Baldy

Optional Path along Railway R.O.W. to be negotiated with Kelowna Pacific Railway

Riparian Management Area through ALR north of McCurdy Rd. to be determined

Chichester Wetlands Park

Dilworth Mountain

Optional Trail Head

Connection to Chichester Wetlands Park

McCurdy Road Extension

Optional Path along Railway R.O.W. to be negotiated with Kelowna Pacific Railway

McCurdy Rd.

Staging Area

Dilworth Rd.

Proposed North End Connector Alignment

Connection to Dilworth Mtn.

Holywood Rd.

CPR/CN Railway

Leathead Rd.

Proposed Leathead Extension

1m Wide Trail

Highway 97

Creek

Highway 33

Proposed Highway 33 Extension

Mill Creek Sub-surface Diversion Channel

Future Site of Brent's Mill

Works

Western Star

Way

Springfield Town Centre (±1000m².d / +1.0ha park)

Firehall

Orchard Park Mall

Dilworth Dr.

Baron Rd.

Leckie Rd.

Ziprick Rd.

Mission Park Greenway