



CITY OF LANGLEY



NATURE TRAIL NETWORK PLAN

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ACKNOWLEDGMENTS

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1.0 INTRODUCTION

1.1 CONTEXT

The City of Langley has an established network of trails throughout the City. However, some linkages are lacking, there is a lack of design consistency and character, and support facilities could be improved.

The City has recently completed a Master Transportation Plan (MTP) which identifies on-street bicycle and pedestrian networks. Off-street trails are not included in the MTP.

The need for a Nature Trail Network Plan has been identified in order to recognize and accomplish the various opportunities that exist related to trails in the community.

This document provides a classification system and design guidelines for three types of off-road recreational trails and associated infrastructure and staging areas. The network plan is illustrated on the map at the back of the report.

1.2 OBJECTIVES OF THE PLAN

The primary purpose of the Nature Trail Network Plan is to develop a long-term strategy for improving the City's trail system.

The objectives are:

- To expand and connect the trail system,
- To develop an identifiable character or theme for the major trails and a consistent set of design standards for the various levels of trail,
- To improve support facilities for trail users, including trail heads, parking areas, washrooms, and interpretive signage,
- To integrate nature trails with the on-street bicycle and pedestrian network,
- To ensure that the proposed trail system addresses environmental considerations, and
- To recognize heritage resources and provide information about these to trail users.

1.3 PLANNING PROCESS

The process of preparing the Nature Trail Network Plan began in April 2004 and involved the following key steps:

- Meetings with City staff to review objectives, work plan, and to collect relevant information,
- Fieldwork to update trail inventory and analyze opportunities and constraints,
- Preparation of a draft classification system and draft network plan,
- Presentation of the draft network plan to the Parks and Recreation Commission in June 2004,
- Preparation of the draft report,
- Public open house January 20, 2005,
- Presentation to Council,
- Completion of the Nature Trail Network Plan.

1.4 TRAIL PLANNING AND DESIGN CONSIDERATIONS

The process of planning and designing for trails requires consideration of a multitude of social, economic and environmental considerations. The following are some of the considerations that guided the development of the Nature Trail Network Plan:

- **Safety and liability.** User safety is paramount and needs to be addressed through items such as visibility at road crossings and along trails, safety of trail surface for the particular mode, provision of access for emergency vehicles, and separation of incompatible uses where necessary. The issue of liability is related to user safety, and it also extends to liability related to adjacent landowners. For example, it is important that trails do not increase security problems for property owners.
- **User comfort.** Inclusion of special measures to promote user comfort can increase the popularity of the trail system. Examples include: location, programming and design of staging areas; clarity of directional signage; and curb cuts for wheels.
- **Promotion of universal access.** It is an important objective to promote universal access where possible, however in some cases, the terrain may preclude universal access because it would cause too much environmental damage. Where universal access cannot be provided, it is important to ensure that there are alternate routes.
- **Protection of environmentally sensitive lands and ecosystems.** Where options exist, it may be possible to avoid environmentally sensitive areas. Otherwise, the detailed routing and design of the trail can help to protect vegetation and drainage patterns, and mitigate risks such as erosion.
- **Construction and maintenance costs.** Costs for construction and maintenance are important considerations in the development of a trail system. It is important that costs be reasonable, and that they are relative to the type of trail, e.g. high use trails may have higher associated costs.

2.0 TRAIL CLASSIFICATION SYSTEM

2.1 INTRODUCTION

There are three trail types in the classification system, as described in more detail below:

- Multi-use Trail,
- Connector Trail, and
- Recreational Nature Trail.

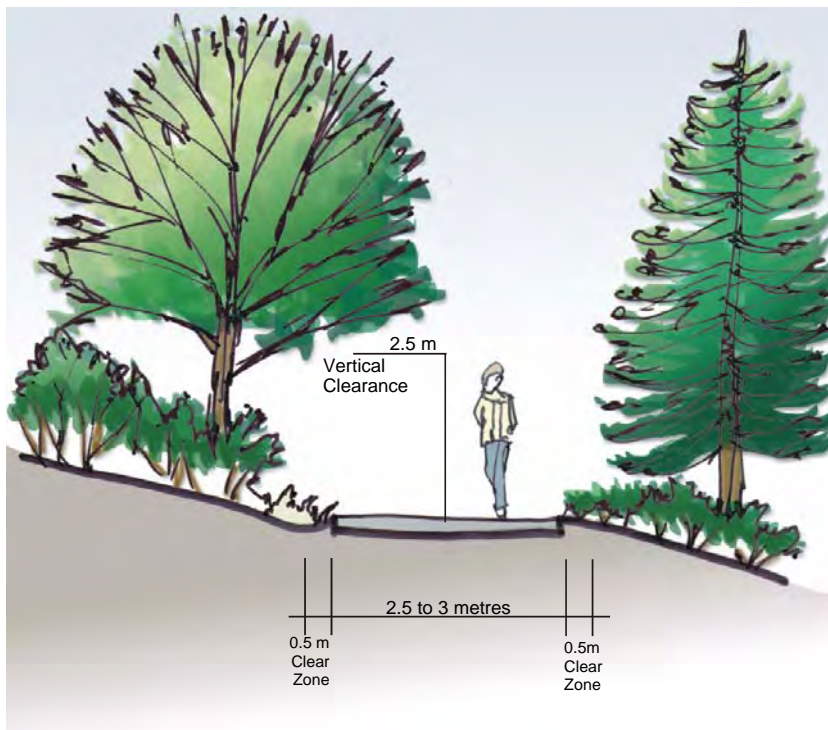
2.2 MULTI-USE TRAIL

Indicators for Use: Major Recreational Routes

Level of Use: High

Type of Use/ Accessibility: Walking, Jogging, Cycling,
General Passage by all ages

Location: Flood plain, Forest, Hydro Corridor, Terrain
maximum 30% slope



DESIGN GUIDELINES

Surface: Typically Paved. Potential alternates of compacted granular material, stabilizer.

Trail Base: Coarse granular material, geotextiles where necessary

Slope: Maximum 10%

Universal Accessibility: Throughout

Residence Buffer: 5 m

Rest Areas: general guideline of maximum 0.5 km between benches or rest areas

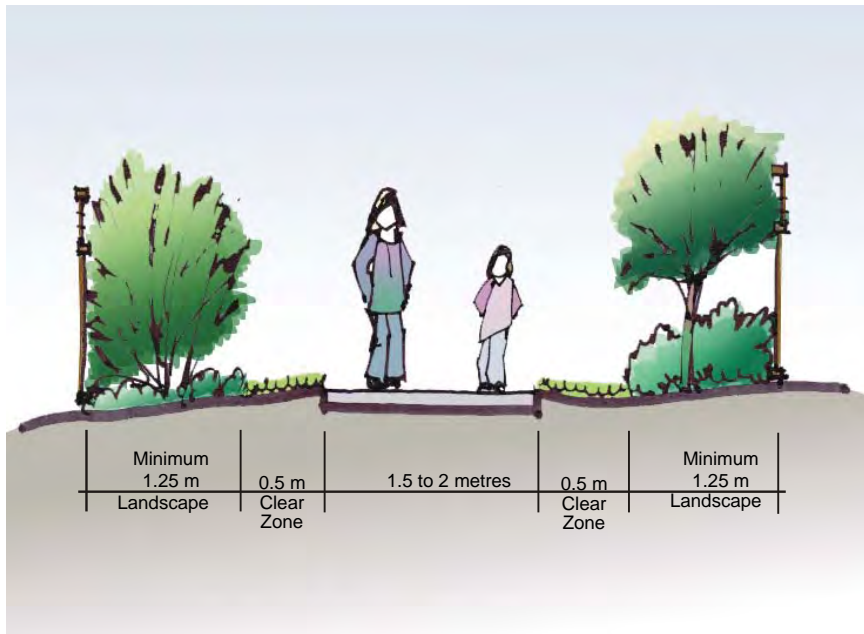
2.3 CONNECTOR TRAIL

Indicators for Use: Connections to Major Trails, Secondary Routes

Level of Use: Moderate

Type of Use/ Accessibility: Walking, Jogging, Cycling, General Passage by all Ages

Location: Perimeter of Trail System, Routes to/from Neighbourhoods



DESIGN GUIDELINES

Surface: Paved, Compacted Granular Material, Stabilizer

Trail Base: Coarse granular material, Geotextiles where necessary

Slope: Maximum 10%

Universal Accessibility: where possible

Residence Buffer: Minimum 2 m, include planting (e.g. trees, shrubs) if buffer either side less than 4 m

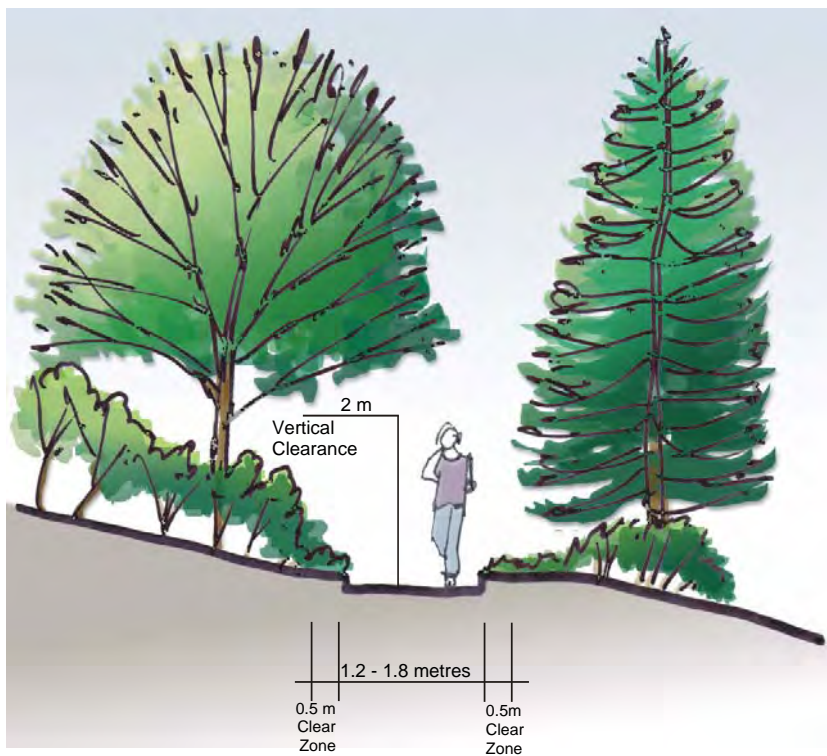
2.4 RECREATIONAL NATURE TRAIL

Indicators for Use: Natural Setting and Lower Use

Level of Use: Low to Moderate

Type of Use/ Accessibility: Walking, Jogging

Location: Natural area



DESIGN GUIDELINES

Trail Base: Granular, None

Surface: Granular, Native Material

Slope: Maximum 15%

Residence Buffer: 3 m

3.0 NATURE TRAIL NETWORK PLAN

3.1 EXISTING TRAILS

The first phase of this project involved refinement of the inventory of existing trails. Map 1 at the back of the report illustrates these trails. Existing parking lots and park washrooms are indicated.

School parking lots that are close to the trail system are indicated in a different colour. Typically school parking lots are closed when school is not in session. Schools in the City do not have public washrooms accessible from the outside.

3.2 BROAD TRAIL NETWORK

The next phase of this project involved development of a trail network plan at a broad level. The reasons for conceiving of the trail network plan at this level are as follows:

- It enables optional trail routes to be evaluated in a broad sense before addressing details,
- It provides a clear overview of the system that is easily understood,
- It provides a basis for “theming”, if the trail names and information provided to the public are based on physical and cultural features.

The following are the broad level trails, along with a brief description and the potential interpretive information for each trail (see Map 2 at back of report). The trail names can be changed if more appropriate names are identified in the future.



Brydon Access – This is a proposed road-side pathway along 53 Ave., linking the Brydon Lagoon Access, West Boundary Trail, and neighbourhoods. A portion of the trail can run through Brydon Park. Interpretive opportunities along this trail may be limited.



Lagoon Access – This is a short section of existing gravel trail along power lines adjacent to Baldi Creek. Interpretive information can focus on the fate of urban creeks through developed areas where riparian setbacks are limited.



Brydon Lagoon – This is the existing loop trail around the rehabilitated sewage lagoon. Interpretive information can focus on the history of the site and the wildlife viewing opportunities.



Nicomekl Trail – This is the primary east-west trail through the centre of the City. An attractive trail through the Nicomekl floodplain, much of the trail already exists. Interpretive information can focus on the history of the route (Smuggler Trail), the Nicomekl River, wildlife information, and the role of the floodplain.



West Boundary – This route follows the boundary with Surrey, meandering onto both sides of the city boundary. Interpretive information can focus on the ways that municipalities can work together to provide recreational opportunities.



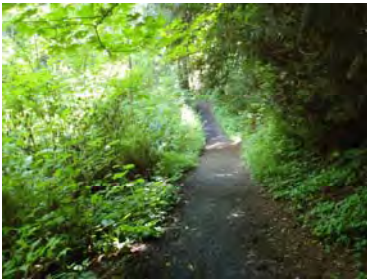
Hydro Trail – This route is currently composed of service roads and trails along the major hydro line that runs east-west in the south of the City. Interpretive information can focus on how this line fits within the regional power grid and the opportunities for trails along utility corridors.



Southeast Connector – This route through Uplands Elementary School and Linda Carlson Park provides a link to the Hydro Trail for neighbourhoods in the southeast sector. The route does not have high interpretive potential.



Muckle Creek – This trail generally follows Muckle Creek. There is no continuous route along Muckle Creek, and even in the future, the trail will need to be separate from the creek in some sections. Interpretive information can focus on the treatment of the creek through Sendall Gardens and Muckle Creek.



Pleasantdale Creek – This route uses existing trails along Pleasantdale Creek, however the trail is not publicized or marked clearly. The south portion is particularly attractive. Interpretive information can focus on any history associated with this creek and riparian vegetation.



Langley Creek – This trail follows a short portion of Langley Creek. Only this portion of the creek is currently and potentially accessible to the public. Interpretive information can focus on this small creek that carries the City's name.



City Park Connector – Since north-south trails through City Park already exist, this route provides another opportunity for a north-south link in the south of the City. Interpretive information can focus on the history of City Park.



Downtown Connector – This route provides a link between the City’s downtown streets and the Nicomekl Trail, since these are not well connected at present. There is an opportunity for historic interpretive information to be located along this route.



North Connector – This route that passes through Langley Central Park and Dumais Park provides the best opportunity for a trail link to the north portion of the City. Interpretive information can focus on the characteristics of this newly developed area adjacent to the large industrial area.



Logan Creek Loop – The Logan Creek loop provides a north terminus to the trail system, and provides recreational opportunities for residents of the new developments, students and staff at Kwantlen University College, and workers in the industrial area. Logan Creek is the only creek in the north portion of the City with any significant riparian area along it. Interpretive information can focus on the challenges of protecting urban creeks through these types of land uses.



Opportunities for nature trails in the northwest portion of the City were explored. Due to the heavy security considerations for industrial uses and safety concerns along railway lines, no opportunities were found. Should the railway or railway spur lines ever be decommissioned in the future, new opportunities could arise along these corridors.

3.2 DETAILED TRAIL NETWORK

A detailed nature trail network plan indicates the specific location and the classification of trail segments (see Map 3 at back of report). Additional information on each trail segment is located in Appendix A. The database describes for each trail segment:

- Location type, e.g. riparian, floodplain, roadside, park, hydro corridor
- Existing condition of trail or lack of trail (as many as apply)
- Type of vegetation, e.g., urban landscape, meadow, scrub, forest, wetland
- Slope of terrain – high (over 30%), moderate (10 – 30%), low (under 30%)
- Environmental sensitivity – high (watercourses, floodplain), moderate (meadow, shrub/scrub, combination of forest and urban landscape), or low (urban landscape)
- Special features – cultural or environmental
- Opportunities
- Constraints
- Recommendations for trail system development

The trail network plan also indicates proposed locations for parking lots, washrooms, major and minor trail heads, signs, viewpoints and rest areas. These have been located in order to have an appropriate distribution of these facilities. The locations for viewpoints and rest areas are conceptual. They will require siting in the field to take best advantage of views and other considerations.

Some signs and rest areas are shown in the vicinity of existing features of this type. During implementation, the City will need to determine whether the existing rest areas are to be retained, replaced or gradually phased out. It is recommended that all signs be replaced with the new system for consistency.

The trail network plan illustrates two other types of routes that will interrelate with nature trails. These include:

- Heritage Route – a proposed walking trail that takes in a number of heritage sites. The Nicomekl Trail will form part of this route.
- Bicycle Network – a system of on-road bicycle trails proposed within the City's Master Transportation Plan.

In developing the trail network plan, one segment was controversial; Nicomekl 2. In this area, many options were explored including: trail with boardwalk through the centre or south of the wetland, trail around the north of the wetland behind backyards on 199 St. and 52 Ave., trail under 200 St. Bridge and up west side of 200 St. linking either up to 52 Ave. or up west side of 200 St. to 53 Ave. The primary concern is the environmental sensitivity of the floodplain pond and wetlands. Although a trail through this area would have high public value because it would avoid roads, and offer exceptional wildlife viewing and educational opportunities, the concern was that trail use by the public and dogs would disturb and displace wildlife.

In order to resolve this issue, an environmental overview was conducted by a biologist¹. This study recommended against any route passing under the 200 Street bridge for the following reasons:

- Grassland habitats in the floodplain are important living areas for Townsend's Vole, an important prey for raptors such as Red-tailed Hawk, Northern Harrier and Great Blue Heron.
- The natural open wetland (lagoon) south of 53rd Avenue and west of 199th Street is utilized by a high number and diversity of waterbirds in winter. Species observed during one day in winter include: Green-winged Teal, Mallard, Canada Goose, American Wigeon, Common Merganser, Great Blue Heron, Ring-billed Gull, Glaucous-winged Gull, and Long-billed Dowitcher. Birds are susceptible to disturbance since they flushed when approached within 60 m
- A Great Blue Heron rookery is apparently established in deciduous forest south of the Nicomekl River.
- The 200th Street Bridge over the Nicomekl River permits secure wildlife movement opportunities below the transportation corridor. Several recent tracks of Coyote and Raccoon were observed under the bridge.
- The diversity of wetland, riparian shrub, woodland, and grassland habitats attract a high diversity of bird species. Birds seen on the one day in winter in addition to the waterbirds indicated above include: Red-tailed Hawk, Northwestern Crow, Song Sparrow, House Sparrow, House Finch, Spotted Towhee, Marsh Wren, Black-capped Chickadee, and Pine Siskin.
- Beaver appear to be very active in the area.
- The Conservation Data Centre has old records (1954) of two blue-listed plant species – Mountain Sneezewood (*Helenium autumnae* var. *grandiflorum*) and Western St. John's Wort (*Hypericum scouleri* ssp. *nortoniae*) – in the area around the natural lagoon. These species have likely not been searched for in recent years, and therefore still have the potential to occur in the area.

As a result of the above findings, the decision was made to route the trail up 200 St, avoiding the floodplain in this area.

¹ Gebauer and Associates Ltd. – text available from City

4.0 DESIGN GUIDELINES

4.1 SITING OF TRAILS

Trails need to be sited in the field to be responsive to a variety of specific conditions. The following are some basic guidelines for siting of new trails:

- Protect important existing vegetation by siting trails around such features.
- Provide focal views of scenic and cultural features.
- Avoid long straight segments. Provide enough meander to make the trail interesting, but avoid excessive weaving.
- Consider boardwalks in very specialized locations where a nature-viewing opportunity can be provided without undue damage to environmental resources.
- Locate riparian crossings at the narrowest point of the creek or gully if possible.
- Construct riparian crossings as close as possible to a right angle with the creek.
- Keep bridge abutments as small as possible and screen with planted riparian vegetation.
- As soon as possible after construction, restore disturbed areas with growing medium if possible, and use seed/sod and/or native riparian plants for stabilization.
- Protect as much riparian vegetation as possible and obtain necessary permits for riparian crossings and boardwalks from the City and appropriate senior government agencies.

4.2 MATERIALS AND COLOURS

One of the ways to introduce consistency and identity to the trail system is to use a consistent set of materials and colours for all structures and details. The following are some guidelines:

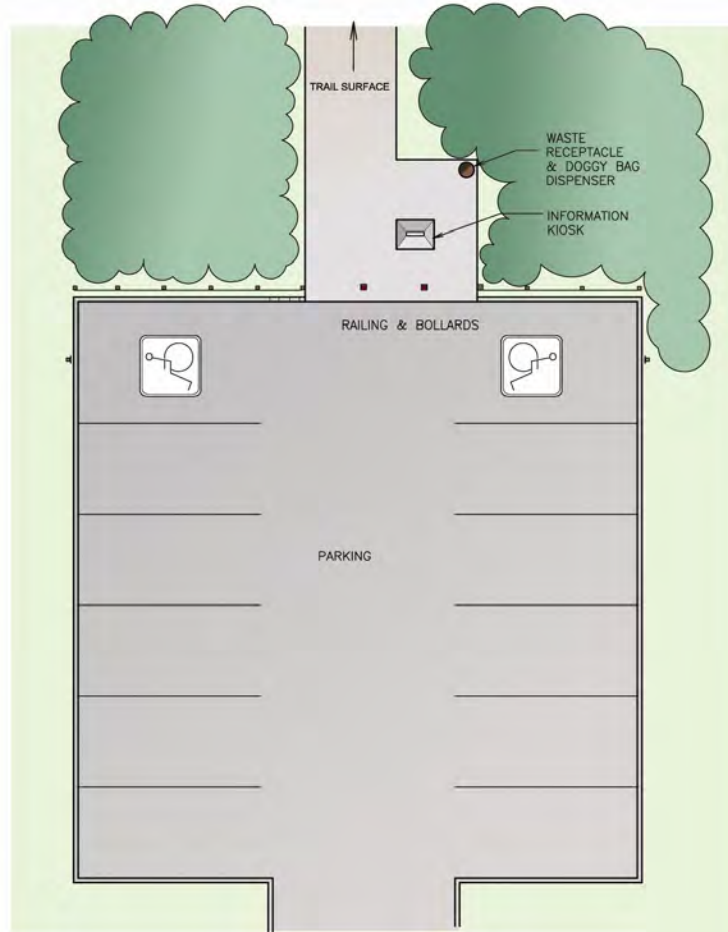
- Select a palette of materials to be used throughout the system, e.g. round or squared timbers.
- Select one primary colour for all metal, matching with the City colours. In this report, burgundy has been used as the colour for illustrative purposes.
- For structures that are not to be replaced in the short term, e.g. existing benches, add some metal trim with the selected colour so that these will blend with the new structures.
- Select finishes that are resistant to vandalism and graffiti to the degree possible. Consider finishes that facilitate the removal of graffiti.

4.3 TRAIL HEADS

Trail heads are the major access points to trails. They typically occur at roads, or parking lots within parks. The Trail Network Plan (Map 3) identifies the locations of proposed trail heads. Consistency in the design of trail heads can help to establish an identity for the City's trail system and help in way-finding.

There are two primary levels of trail heads (see sketches and guidelines below). These are examples only, as trail head designs will vary based on site-specific conditions such as soils, slopes, views, vegetation, interpretive opportunities, and adjacent land uses and features.

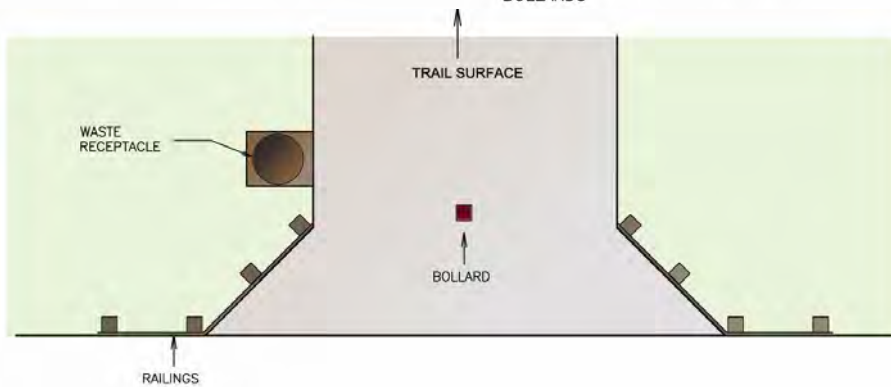
Minor trail heads typically include minimal facilities such as 3 bollards, trail identifier sign, waste receptacle, doggy bag dispenser, and sometimes a railing. Major trail heads typically have parking, sign kiosk, waste receptacle, doggy bag dispenser, and railing or continuous bollards. Additional facilities may include a larger area of the trail surface material, bench(es) washroom building, and drinking fountain.



Major Trail Head



Minor Trail Head



Enhanced Minor Trail Head

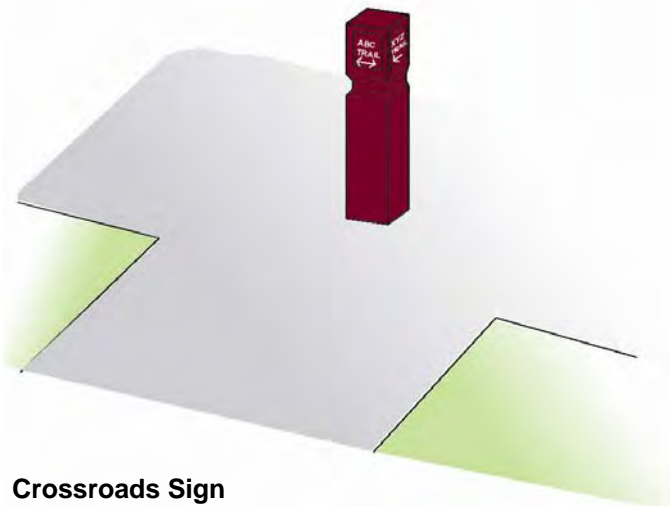
4.4 SIGNS

Four types of signs are proposed for the nature trail network:

- **Trail identifier** signs occur at trail heads and provide the name of the trail on a small plate mounted on a post (bollard or extended railing post).
- **Crossroads** signs occur where two or more trails connect, and provide trail names on small plates mounted on two or more sides of a post (bollard or extended railing post).
- **Kiosk** signs occur at major trail heads, and provide a trail system map with “you are here” noted. These are mounted on kiosk panels.
- **Interpretive** signs provide information about the surroundings, e.g. cultural history, vegetation, fish and wildlife, landmarks. These are mounted on kiosk panels or onto railings.

DESIGN GUIDELINES:

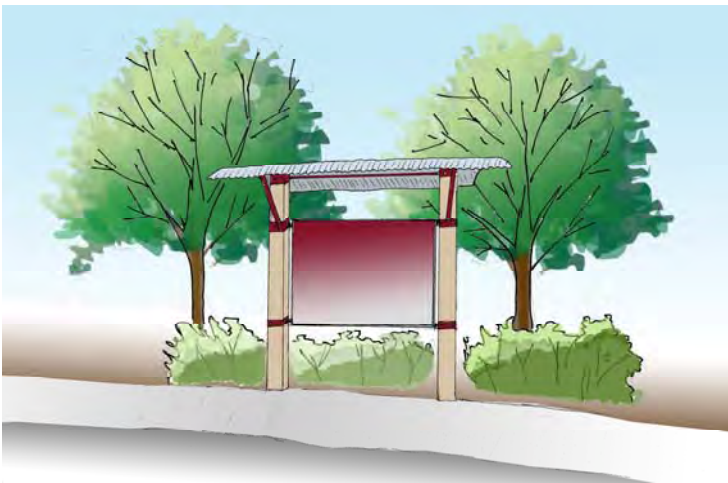
- Locate interpretive signs at points of interests, e.g. attractive viewpoints, cultural sites, environmentally sensitive areas.
- Mount signs on bollards or railings where possible to minimize number of posts and structures.
- Use kiosks at major trail heads and high use areas. Minimize the use of wood on the kiosk. The sample illustrated has wood posts, metal supports and sign panel, and galvanized metal roof (cut portion of pipe).
- Consider the use of a painted symbol on sidewalks that form part of the trail system.



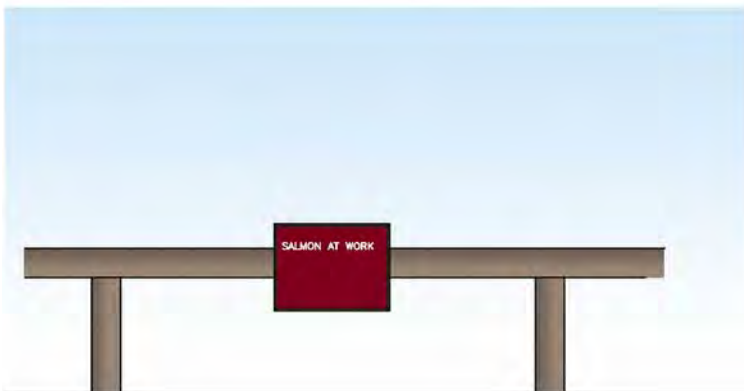
Crossroads Sign



Kiosk Sign



Kiosk Shelter

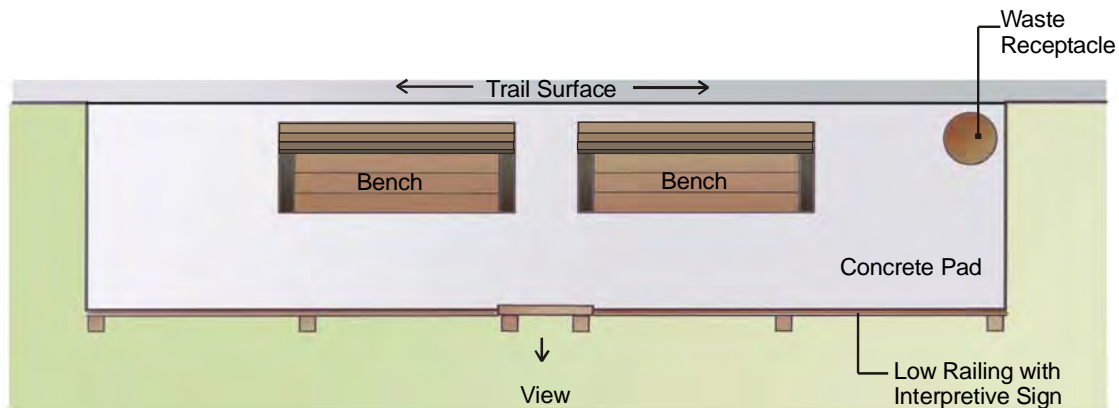


Interpretive Sign on Railing

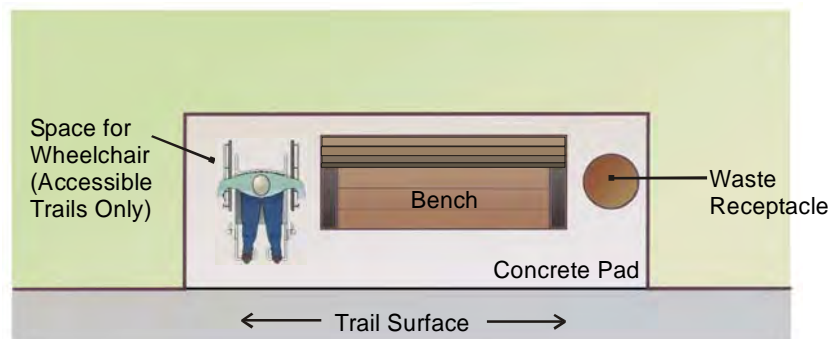
4.5 VIEWPOINTS AND REST AREAS

Viewpoints and rest areas are locations along trails that provide opportunities for sitting, socializing, resting, and viewing. The purpose of a basic rest area may be simply to provide the opportunity to sit down and rest. More elaborate viewpoints may also provide opportunities for viewing scenery, viewing wildlife, or learning about either of those.

The sketches provide examples of a typical viewpoint and a typical rest area. The design of viewpoints and rest areas will vary based on site-specific conditions such as soils, slope, views, vegetation, interpretive opportunities, and adjacent land uses and features.



Viewpoint



Rest Area

LOCATION CRITERIA:

- Locate rest areas a maximum of 500 m apart
- Locate major rest areas at natural viewpoints, major use areas, primary trail heads, or other nodes based on site-specific opportunities

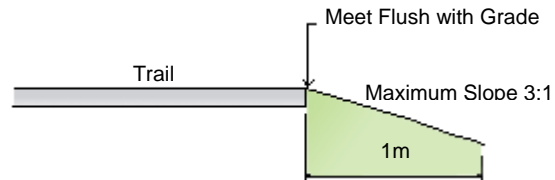
4.6 TRAIL ACCESSIBILITY

The Multi-use and Connector Trails are to be designed for universal accessibility. Accessibility issues should be considered in the design and maintenance of Recreational Nature Trails where feasible.

Typical Maximum Slopes:

- 5% for long distances
- maximum 8% for 10 metres, if slope required over greater distance, provide landing minimum every 10 metres

Slopes near Path: ensure that the path surface meets flush with the surrounding grade immediately adjacent to the trail, maximum slope within 1 m of trail maximum 3:1 where possible (may not be possible on trails along steep terrain)

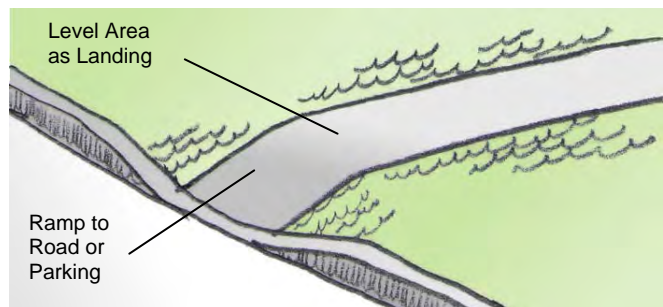


Surfacing: ensure uniform consistent surface (well compacted for aggregate trails) without puddles or depressions and free of obstructions

Drainage Grates: none within trail surface

Trail Heads and Parking: at trail heads of universally accessible trails, provide designated handicap parking stall(s) per relevant city bylaws

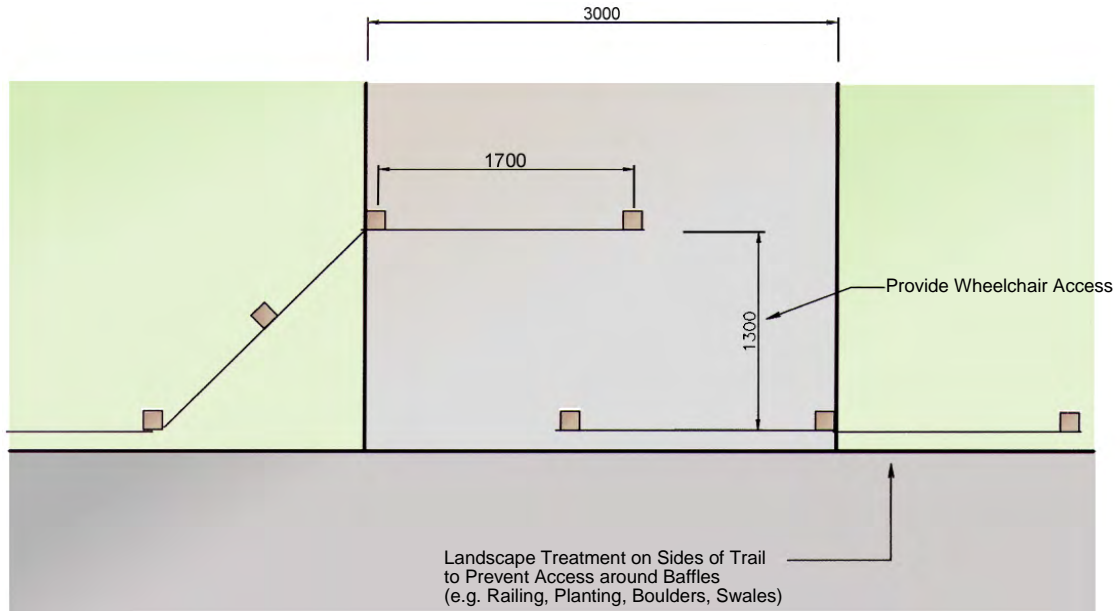
Curb Cuts: provide curb cuts where path crosses roads and from parking to trail



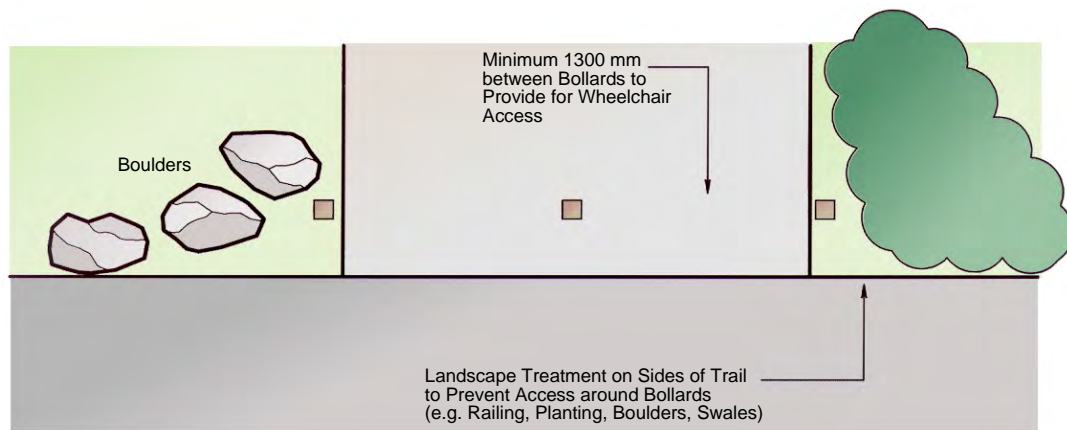
Curb Cut

Washrooms: at major trail heads of universally accessible trails, it is desirable to provide permanent or portable washrooms with wheelchair-accessible stall(s)

Bollards, Baffles and other Barriers: ensure that spaces between bollards, baffles and other barriers are sufficient to allow passage by wheelchairs on universally accessible trails



Baffle



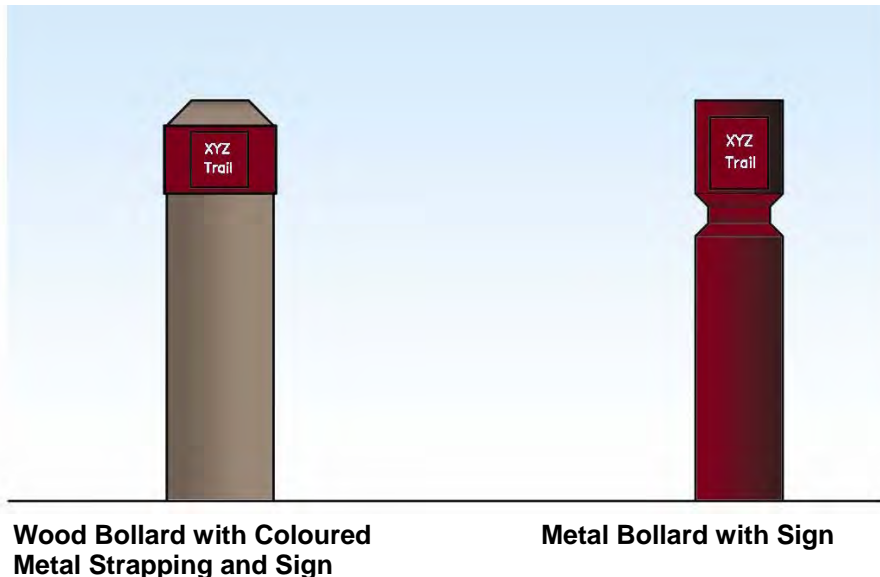
Bollards

4.7 BARRIERS AND FENCES

Bollards, baffles and railings are required at trail heads to prevent vehicles from encroaching onto the trail. The minimal treatment for minor trail heads is 3 bollards, with the centre one removable to allow for service vehicle or equipment access. The next level up would add a low railing to the sides of each trail, either where more protection is required or where there is a need to make the trail head more visible. Baffles may be used instead of bollards on trails where bicycles are not permitted. Within the City, this will only be the case on Recreational Nature Trails.

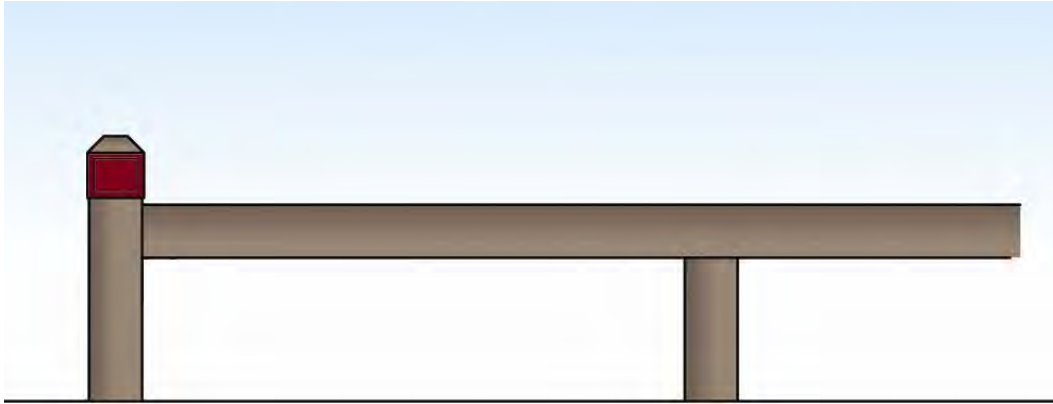
Two optional approaches are provided for bollards and baffles. One of these should be selected and used throughout the nature trail network. The options are:

- square wood timbers with reveal and metal strapping around top (to match City burgundy), or
- square metal tubing in City burgundy with reveal near top.



The existing detail for **low railings** (6 by 6 square timbers with 6 by 6 across the top) is recommended to be retained. This railing functions as a barrier, and can be used to identify a property line between public and private realm, or a particular use (e.g. no dogs allowed, environmentally sensitive area, top of slope at a viewpoint, edge of parking area) where restricting access is not a major issue and aesthetic quality is of some concern. The end post on railings can be extended upwards to accommodate trail identifier signs.

For taller railings (e.g., bridge railings) either wood or a combination of wood and burgundy metal is recommended.



Typical Railing with Trail Identifier Sign

A **tall fence** may be required along environmentally sensitive areas that have the most sensitive resources, where any access by humans could negatively affect the resources. The purpose of the fence is to serve as a barrier. Black vinyl-coated galvanized chain link fence is proposed to blend with the surroundings. The purpose of galvanizing is durability. The use of this fence should be limited to only the most critical environmental resources and where there are major safety or access issues.



Vinyl-coated Chain Link Fence

Privacy fences occur where private residential land is close to a trail. Guidelines for these fences, which are usually privately built, include:

- Maximum 1.5 m (5 feet) high
- Provide planting on the trail side of the fence where possible
- Include permeable or semi-permeable features in the fence, e.g. lattice at top, alternating panels
- Provide variation along long stretches of fence, e.g. stepping top of fence, notches to accommodate planting.



Wood Privacy Fence

4.8 TREE PROTECTION

Trees are important resources that add aesthetic and environmental value to the areas surrounding the trail system. Care should be taken to protect trees wherever possible in the planning, design, construction and maintenance of the trail system. The following are guidelines for each phase of work:

PLANNING AND DESIGN GUIDELINES

- Route trails around the drip line of existing significant trees where possible.
- In densely forested areas, route trails through major gaps between trees where possible.
- Stake and adjust trail alignment on site with City prior to finalizing the alignment in order to avoid trees.
- A report by a certified arborist is required for trails proposed within the drip line of significant trees and/or where there is a risk to life or property.
- Trim hazard trees to create snags for wildlife instead of removing the entire tree where possible and appropriate.

CONSTRUCTION GUIDELINES

- Where trails pass close to trees, take measures to protect the tree as outlined in the arborist's report, e.g. protective fencing, clean cuts on any roots that must be cut, minimize use of heavy equipment, hand digging, restricting material storage or any other form of compaction over tree roots.
- Minimize excavation in areas with dense trees, especially for trails that are not to be paved. Instead consider the use of geotextile with granular material placed above existing grade, boardwalks, or decking over drain rock.
- For paved trails, remove all roots below the path surface in preparing the subgrade. If there are tree roots likely to extend under the path, use a commercial root barrier to prevent this only where required.
- Avoid cuts to tree bark by construction equipment.
- Consider windthrow hazard if clearing clumps of trees, especially in densely forested areas.
- Do not change the drainage pattern around existing trees unless approved by the City arborist or landscape architect.
- Do not use trees for signage.

4.9 LANDSCAPE

The landscape treatment adjacent to trails will depend on the trail type as well as the surrounding area. The following are general guidelines for the landscape in different types of areas.

LANDSCAPE GUIDELINES FOR ALL TRAIL TYPES

- All landscape installation and maintenance practices should conform with the BCSLA/BCNTA Landscape Standard.
- Plant no trees or shrubs within the vertical clearance zone indicated on the trail guideline sheets.
- Avoid planting masses of tall shrubs near the trail where they will impede visibility along the trail.
- Native plants are preferred over exotic species, particularly in natural or naturalizing areas.
- Minimize changes to the existing or natural drainage pattern. Do not add or remove excess amounts of water.
- Ensure that adequate silt control measures and other best management practices are used during construction.

PARK LANDSCAPE GUIDELINES

- Integrate the trail and related landscape with the park design.
- Plant large trees at least 2 m from the edge of the Multi-use Trail, and at least 1.5m from the edge of other trails, unless the trail is passing through an urban plaza, in which case trees could be planted with tree grates or in planters.



NATURAL AREA LANDSCAPE GUIDELINES

- No new planting will generally be required in natural areas. If planting is required for restoration or screening, use only native species. Protection of existing vegetation and brushing within the clear zone will be the primary management methods.
- Minimize disturbance to the soil surface and existing vegetation adjacent to trails.
- Where areas adjacent to trails are disturbed, restore growing medium (with imported material if necessary) and revegetate with grass and/or native plants as appropriate.
- Use bioengineering for erosion control along steep slopes where erosion is a risk or has occurred.



UTILITY CORRIDORS

- In utility corridors, comply with the specific limitations of the utility regarding planting.
- Along hydro corridors, refer to Planting Near Power Lines by B.C. Hydro (or any updated brochures). B.C. Hydro requires that plants within 5 m of power lines have a maximum mature height of 6 m. Beyond this zone and up to 20 m from the power line, the maximum mature height of trees should be 12 m.

RESIDENTIAL AREAS

- Where trails are close to residential property, provide adequate screening with plant material for privacy and to enhance the quality of the trail, but avoid tall dense thickets to address safety and security.
- Reduce the visual impact of hard edges such as fences, retaining walls or extensive paved areas with tree and shrub planting.

4.10 SAFETY

The safety aspects of the trail system are of the utmost importance. Many of the guidelines contained in other sections of this document are intended to promote safety. The following are some specific guidelines related to design, construction and maintenance practices that support safety.

- At-grade trail crossings of arterial roads should only be located at intersections with traffic signals.
- Pathway design, public education and signage should all be used as methods to control speed.
- Pathways next to steep slopes should have vegetation and/or a railing between the trail surface and the slope, depending on the proximity and steepness of the grade.
- Adopt “rules of the road” for use of the trail system and post these at major trail heads. Rules will include: speed, keep right, “wheels yield to heels”, cyclists sound warning.
- Post the modes of transport permitted on each type of trail.
- Request a review of the design and management of the entire trail system from the RCMP, focusing on CPTED (Crime Prevention through Environmental Design) principles.

5.0 IMPLEMENTATION

5.1 COOPERATION

Implementation of the trail system will require cooperation with a number of different agencies and land owners. The following partnerships have been initiated and will need to be continued during the implementation stage.

- Work with Kwantlen University College on the implementation of the Logan Creek Trail.
- Work with existing and future private land owners in the Logan Creek area on the implementation of the trail.
- Work with B.C. Hydro on design improvements and the addition of support facilities along the Hydro Trail.
- Work with City of Surrey on the implementation of the West Boundary Trail.
- Collaborate with those within the City responsible for the Heritage Route and bicycle trail system.
- Work with the School District to explore the potential for opening school parking lots near the trail network so they can serve as trail staging areas.
- Initiate conversations with B.C. Rail regarding potential use of railway corridors for trails in the future.
- Work with specific owners to obtain trail access through closed rights-of-way on cul-de-sacs.

5.2 CAPITAL COST ESTIMATES

Capital cost estimates have been prepared for construction and upgrading of trails, as well as construction of related infrastructure (see following page). These are Class C cost estimates based on typical costs in the fall of 2004. Units costs are as follows:

Item	Unit Cost
New Trail – Multi-Use Trail	\$90/lineal metre
New Trail – Connector Trail	\$60/lineal metre
New Trail – Recreational Nature Trail	\$45/lineal metre
Updated Trail– Multi-Use Trail	\$45/lineal metre
Updated Trail– Connector Trail	\$30/lineal metre
Major Trail Head	\$30,000 each
Minor Trail Head	\$8,000 each
New Parking	\$10,000 each
New Washrooms	\$100,000 each
Crossroads Sign	\$1,000 each
Viewpoint	\$7,000 each
Rest Area	\$4,000 each
Interpretive Sign	\$1,000 each

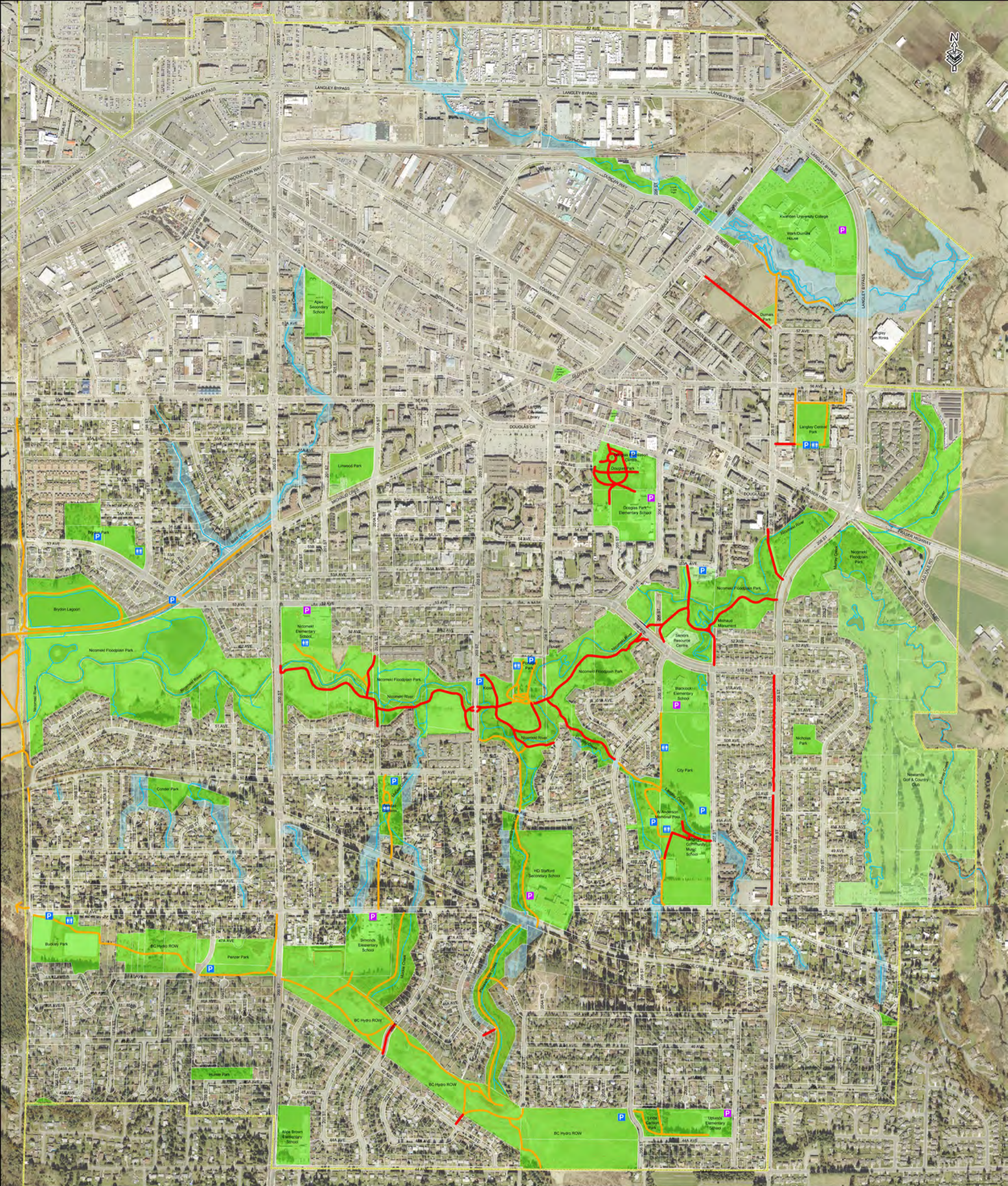
Trail Segment	Existing Trail	New Trail		Updated Trail		Trail Total	Major Trail Head		Minor Trail Head		New Parking		New		Crossroads Sign		Viewpoint		Rest Area		Interpretive Sign	
	Length	Length	Cost	Length	Cost		#	Cost	#	Cost	#	Cost	#	Cost	#	Cost	#	Cost	#	Cost	#	Cost
Brydon Access	0.0	630.5	37,832.77			630.5					0.00		0.00	1	1,000.00							
Brydon Lagoon	854.8					854.8					0.00		0.00			1	7,000.00					
City Park Connector 1	60.7	242.4	21,812.75	245.7	11,057.31	548.8			2	16,000.00		0.00		0.00	1	1,000.00						
City Park Connector 2	230.7			425.2	19,132.08	655.9	1	30,000.00	3	24,000.00		0.00		0.00								
City Park Connector 3	0.0	455.6	41,000.22			455.6			1	8,000.00		0.00		0.00								
Downtown Connector	940.6	666.5	\$59,988.73			1607.1			10	\$80,000.00	1	\$10,000.00									1	\$2,000.00
Hydro 1	0.0			599.4	\$26,973.51	599.4			2	\$16,000.00								1	\$4,000.00			
Hydro 2	0.0	15.6	\$1,405.51	441.6	\$19,870.54	457.2	1	\$30,000.00	3	\$24,000.00	1	\$10,000.00										
Hydro 3	102.6	348.5	\$31,365.82	511.2	\$23,001.91	962.2			2	\$16,000.00				1	\$1,000.00				1	\$4,000.00		
Hydro 4	36.5	73.0	\$6,569.67	824.0	\$37,079.51	933.5			2	\$16,000.00				1	\$1,000.00	1	\$7,000.00					
Hydro 5	0.0	917.3	\$82,561.01	16.5	\$744.35	933.9	1	\$30,000.00	2	\$16,000.00			1	\$100,000.00					1	\$4,000.00		
Lagoon Access	1016.5	18.0	\$1,082.80	358.7	\$10,760.93	1393.2			1	\$8,000.00				1	\$1,000.00							
Langley Creek	309.5	17.7	\$1,590.99	161.6	\$7,272.52	488.7			2	\$16,000.00											1	\$2,000.00
Logan Creek	0.0	44.0	\$1,977.86			44.0																
Logan Creek 1	387.3	211.8	\$9,531.57			599.1			1	\$8,000.00	1	\$10,000.00			2	\$2,000.00					1	\$2,000.00
Logan Creek 2	0.0	606.5	\$27,294.39			606.5			2	\$16,000.00												
Logan Creek 3	0.0	487.4	\$21,932.65			487.4			3	\$24,000.00												
Logan Creek 4	0.0	487.4	\$21,932.65			487.4			1	\$8,000.00					1	\$1,000.00						
Muckle Creek 1	60.7	165.8	\$14,920.96	432.9	\$19,479.44	659.4			2	\$16,000.00											1	\$2,000.00
Muckle Creek 2	0.0	184.3	\$16,584.24	811.5	\$36,518.81	995.8			7	\$56,000.00											1	\$2,000.00
Nicomekl 1	0.0			522.2	\$23,498.53	522.2									1	\$1,000.00						
Nicomekl 2	0.0	1068.8	\$96,192.43			1068.8	1	\$30,000.00	1	\$8,000.00	1	\$10,000.00			1	\$1,000.00	1	\$7,000.00				
Nicomekl 3	1016.2	108.6	\$9,771.83	326.1	\$14,675.74	1450.9			3	\$24,000.00					1	\$1,000.00			2	\$8,000.00		
Nicomekl 4	1018.1	29.5	\$2,657.69	573.7	\$25,816.45	1621.3	1	\$30,000.00	2	\$16,000.00					3	\$3,000.00			1	\$4,000.00	1	\$2,000.00
Nicomekl 5	684.5	713.1	\$64,179.97			1397.6	1	\$30,000.00	4	\$32,000.00	1	\$10,000.00			2	\$2,000.00	1	\$7,000.00				
Nicomekl 6	0.0	840.4	\$75,637.97			840.4			3	\$24,000.00												
North Connector	499.7	852.8	\$76,748.83	767.0	\$34,516.66	2119.5			9	\$72,000.00					1	\$1,000.00			1	\$4,000.00	1	\$2,000.00
Pleasantdale Creek 1	161.4	94.5	\$8,508.42	736.9	\$33,162.21	992.9			6	\$48,000.00												
Pleasantdale Creek 2	39.5	56.4	\$5,080.48	976.2	\$43,930.77	1072.2			3	\$24,000.00											1	\$2,000.00
Southeast Connector	0.0	260.1	\$15,604.55	372.9	\$11,185.74	632.9			5	\$40,000.00												
West Boundary 1	0.0	131.5	\$11,837.95	758.3	\$34,123.95	889.8			1	\$8,000.00					1	\$1,000.00						
West Boundary 2	0.0	172.7	\$15,545.97	850.2	\$38,259.29	1022.9			1	\$8,000.00					1	\$1,000.00					1	\$2,000.00
West Boundary 3	0.0	378.5	\$34,069.25	41.9	\$1,883.67	420.4			3	\$24,000.00												
Total Cost / Item	7419.0	10279.4	\$815,219.92	10753.7	\$472,943.92	28452.2	6	\$180,000.00	87	\$696,000.00	5	\$50,000.00	1	\$100,000.00	19	\$19,000.00	4	\$28,000.00	7	\$28,000.00	9	\$18,000.00

**Total Cost
\$2,407,163.84**

APPENDIX A: TRAIL DATABASE

Trail Identifier:	Trail Location Type	Existing Trail (or not)	Vegetation	Slope	Overall Environ. Sensitivity	Special Features	Opportunities	Constraints	Recommendations
Brydon Access	Roadside, Hydro Corridor	Sidewalk, No trail or walk, Narrow gravel	Urban Landscape	Low	Low		Quiet street with sidewalks both sides and wide grass median on 53 Ave, Parking lot and washrooms at Brydon Park, Existing trail along power line	Residents not accustomed to being on a trail route	Establish walkway through Brydon Park with connection to washrooms, Mark sidewalk routes, Consult with neighbours
Brydon Lagoon	Riparian	Narrow gravel	Pond	Low	High	Wildlife Sanctuary	Quiet scenic loop, Popular trail, Has interpretive signs	Concerns by some neighbours	Establish signs that are consistent with new system
City Park Connector 1	Park/School	Narrow paved, Wide gravel	Urban Landscape	Low	Low		Pleasant existing trail behind sports fields with hedges and trees	Portion adjacent to Blacklock Elem School not that attractive - sidewalk with retaining wall and fence, Route needs to cross 51B Ave	Mark crossing at 51B Ave, Improve sidewalk and adjacent landscape at Blacklock Elem School
City Park Connector 2	Park/School	Narrow gravel, Wide paved	Urban Landscape	Low	Low	Music School	Attractive park, Has parking lot and picnic shelters	Multiple paths through the park could be confusing, Route crosses parking lot, Multiple trail surfaces	Establish consistent treatment of main route with signs, Use special paving or markings where path crosses parking lot
City Park Connector 3	Roadside	No trail or walk	Urban Landscape	Low	Low		48 Ave has partly open ditches and wide shoulders, Sidewalk adjacent to school could serve as trail route (no windows)	School District may oppose trail through school site, No sidewalk in front of school along Grade Cres	Establish walkway along 48 Ave, Explore potential for route through school site (option H), If acceptable establish clear walkways and signs throughout, Otherwise establish sidewalk along road (option I)
Downtown Connector	Park/School, Roadside	Narrow paved	Urban Landscape	Low	Low	Downtown Buildings	Attractive features in Douglas Park, Wide sidewalk and boulevard with trees along 206 St, Parking lot at Recreation Centre	Route could be confusing with so many paths, Two street crossings required	Establish most appropriate route through park and downtown, Use consistent treatment and signs to mark route, Provide crossing of 206 St and 53A Ave at south end, Explore option of sharing parking with Family Services
Hydro 1	Hydro Corridor, Park/School	Narrow gravel	Meadow with Shrubs & Trees	Moderate	Moderate		Parking and washrooms at Buckley Park, Quiet location, Windy interesting trail	Trail at Buckley Park does not extend to West Boundary	Extend trail through Buckley Park to West Boundary trail
Hydro 2	Hydro Corridor	Narrow gravel	Urban Landscape	Moderate	Low		Parking lot at Penzer Park, Trail exists	Trail crosses parking lot, Trail is a bit steep at west end, Unsafe to cross 200 St at east end	Realign trail at west end to reduce slope and to pass outside parking lot, Extend route to 48 Ave to cross 200 St improving sidewalks and marking route as required
Hydro 3	Hydro Corridor	Wide gravel, Narrow paved	Meadow with Shrubs & Trees	Moderate	Moderate		Excellent views	Sterile character of main trail due to its width, Unsafe to cross 200 St at west end	Explore potential for parking lot at end of 202 St (either end), If so, reroute trails around parking lot as required, Reduce width of gravel road or pave trail within it and allow gravel portion to revegetate
Hydro 4	Hydro Corridor	Wide gravel	Shrub/Scrub	Moderate	Moderate		Good connections to other trails	Sterile character of main trail due to its width, Variety of fences close to trail along north boundary	Reduce width of gravel road or pave trail within it and allow gravel portion to revegetate, Screen fences with shrubs, Consider moving trail farther south away from fences
Hydro 5	Hydro Corridor	No trail or walk	Urban Landscape	Low	Low	Dog off-leash park	Lots of open space, Parking lot	No trail through, Dog use, Parking lot unattractive	Add walkway through dog park along north side, Improve materials and add landscape around parking lot
Lagoon Access	Riparian, Hydro Corridor	Wide gravel, No trail along Baldi Creek	Urban Landscape, Creek	Low	Moderate		Existing trail along power line, potential opportunity for trail along west fork of Baldi Creek in future when redevelopment occurs	Lots at end of 198A St. exist - may be difficult to obtain trail access.	Upgrade and sign trail along powerline, explore opportunity for Baldi Creek trail route
Langley Creek	Riparian	Narrow gravel, Narrow paved	Meadow with Shrubs & Trees	Low	High		Pleasant meandering trail, Bridge over creek	Not a major route now, some confusing links, No signs	Upgrade and sign trail to multi-use standard
Logan Creek 1	Riparian	No trail or walk, Narrow gravel	Meadow with Shrubs & Trees, Wetland	Low	High		Natural area surrounding by intense development, Creek is attractive, Potential to provide a trail in portion of City that has none	Existing trail is on private land, No trail in some portions, Requires crossing of Glover Rd	Work with multi-family development to recognize or relocate existing portion of trail, Develop trail on remainder of route, Establish marked crossing of Glover Road
Logan Creek 2	Riparian	No trail or walk	Meadow with Shrubs & Trees, Wetland	Low	High	Kwantlen University College	Natural area surrounding by intense development, Creek is attractive, Potential to provide a trail in portion of City that has none, Education/interpretive opportunity for college	No trail now, College land - college could have concerns, Need to go to Duncan Way to cross Glover Rd	Work with college to establish trail
Logan Creek 3	Riparian	No trail or walk	Meadow with Shrubs & Trees, Wetland	Low	High		Natural area surrounding by intense development, Creek is attractive, Potential to provide a trail in portion of City that has none, City owns land	No trail now, Adjacent to industrial area - could be concerns, 206 and 206A accesses interrupt route	Establish trail, Consult with industry, Establish paths across 206 and 206A Streets
Logan Creek 4	Riparian	No trail or walk	Meadow with Shrubs & Trees, Wetland	Low	High		Natural area surrounding by intense development, Creek is attractive, Potential to provide a trail in portion of City that has none, City owns land, Adjacent to Duncan Way	No trail now, 206 and 206A accesses interrupt route	Establish trail, Establish paths across 206 and 206A Streets
Muckle Creek 1	Riparian	Narrow gravel, Narrow paved	Mixed Forest, Pond, Urban Landscape	Moderate	High	Sendall Gardens	Attractive forest and garden features in Sendall Gardens, 201A St is an adequate connection - quiet street with sidewalks	Portions of existing trail near Grade Cres are steep, Trail system in Sendall Gardens is confusing, Preferred route would be up Muckle Creek behind multi-family (option G)	Establish major route through Sendall Gardens with no steps if possible, Explore potential for trail along Muckle Creek behind multi-family development, Mark routes and crossing of 50 Ave

Trail Identifier:	Trail Location Type	Existing Trail (or not)	Vegetation	Slope	Overall Environ. Sensitivity	Special Features	Opportunities	Constraints	Recommendations
Muckle Creek 2	Riparian	Narrow gravel	Mixed Forest	Moderate	High		Attractive forest, Links to Simonds Elem school, Potential use of parking lot at school, Pleasant connecting trail between houses at north end (with forest vegetation)	Trail not well defined so there is significant trampling over a wide area of forest floor, No sign at south end of trail, No crossings of 48 Ave or Grade Cres	Add surfacing of trail through forest to better define it, Establish crossings at 48 Ave and Grade Cres, Explore option of sharing school parking, Provide signs to mark route
Nicomekl 1	Riparian, Floodplain	Wide gravel	Meadow with Shrubs & Trees	Low	High		Quiet scenic area, Connects to trails in Surrey, Small parking lot	Double power lines	Expand parking lot
Nicomekl 2	Riparian, Floodplain	No trail or walk	Pond	Low	High		Quiet scenic area, Beautiful views, Wildlife viewing opportunities	No trail connection exists, High environmental sensitivity - high bird use, mammal use of passage under 200 St. Bridge, e.g., coyote, raccoon. Neighbours concerned about a route too close to homes, Access right-of-way blocked off 52 Ave	Wide range of options considered from route entirely on main roads (unpleasant and less safe for pedestrians) to route through centre of wetland (too much environmental impact). Council prefers route under 200 St bridge, along 199 St and 52 Ave. - requires opening right-of-way. Alternative is route behind backyards on terrace. In both cases, provide shrub screening on south side of 200 St bridge underside for mammal cover, add viewpoint over wetland. For any trail west of 200 St., install wood railing with wire mesh on floodplain side of trail to minimize dogs in floodplain, and post strong signs about impacts of dogs on wildlife.
Nicomekl 3	Riparian, Floodplain	Narrow paved	Meadow with Shrubs & Trees	Low	High		Attractive area, Underpass at 203 St, Has some benches	No crossing at 200 St	Establish proper crossing at 200 St under north side of existing bridge - high priority since this is the most important trail in the City
Nicomekl 4	Riparian, Floodplain	Narrow gravel, Wide paved	Meadow with Shrubs & Trees	Low	High	Michaud House	Attractive area, Parking and interpretive kiosk at 203 St, Parking and washrooms at Portage Park, Has some benches, Underpass at 51B Ave	Portion of primary route is not paved, but secondary loop is	Pave entire main path
Nicomekl 5	Riparian, Floodplain	Narrow gravel, Wide paved	Meadow with Shrubs & Trees	Low	High		Attractive area, Suspension bridge, Potential locations for parking and viewing deck	Connections lacking at Seniors Resource Centre and along 208 St	Conduct detailed site design to locate connector to Seniors Resource Centre and multi-use path near 208 St, Locate parking lot along closed road R-O-W, Establish viewing deck at small pond, Explore potential for use of parking at Family Services
Nicomekl 6	Riparian, Floodplain	No trail or walk	Meadow with Shrubs & Trees	Low	High		Attractive open area bordering agricultural land to east	Residents not accustomed to being on a trail route, Terrain requires detailed site review	Establish trail, Consult with neighbours
North Connector	Park/School, Roadside	Narrow gravel, Narrow paved	Urban Landscape	Low	Low	Rotary Centennial Park	Langley Central Park portion is attractive, 208 St is a quiet attractive road with sidewalks and median	Requires crossing Fraser Highway and going around or through shopping centre, Access off 56 Ave is partly through a parking lot, Walkway north of 208 St is not on City land	Establish and clearly mark route, Establish walkway around or through parking lot at 56 Ave, Establish agreement for use of walkway north of 208 St
Pleasantdale Creek 1	Riparian	Narrow gravel	Mixed Forest	Moderate	High		Pleasant forest area	Trampled forest floor in large area around path in some places especially near HD Stafford Sec School, No safe crossing of Grade Cres or 49 Ave, confusing at north end	Improve entry to trail and portion of trail near school - remove concrete barrier, widen and define trail with surfacing, may need rail barriers to define restoration areas, Establish clear crossings of Grade Cres and 49 Ave, Clarify route at north end and simplify to one major trail
Pleasantdale Creek 2	Riparian	Narrow gravel	Mixed Forest	Moderate	High		Most attractive existing forest trail in City, Beautiful forest, Creek sound, Some large trees, Trail well defined	Some steep sections (access to 204 St, south end), Some areas of mud/seepage, Trail not well marked	Install culverts and/or raise surface of trail as required in seepage areas, Regrade portion of steep bowl at south end (in hydro corridor) and rebuild trail to be less steep
Southeast Connector	Park/School	No trail or walk, Narrow gravel	Mixed Forest, Urban Landscape	Low	Moderate		Attractive trail through forest, Sidewalk on 44A Ave, Wide paved path at east end (between 207A and 208 St)	No connection across 206 St to Linda Carlson Park, Elem school may not want trail through site	Route trail as shown, Open fences at 206 St, Treed City lot for sale across from school has greenway potential - small picnic area, parking, or just to add character to trail
West Boundary 1	Hydro Corridor	No trail or walk, Narrow gravel	Shrub/Scrub with Trees	Low	Low		Existing trail along small power line,	Power line portion of route may be in Surrey - also may be road in future, Trail doesn't extend all the way to Brydon Lagoon	Establish trail along entire west boundary in collaboration with Surrey
West Boundary 2	Riparian, Floodplain	Narrow gravel	Meadow with Shrubs & Trees	Low	High		Very scenic and quiet, Trail exists almost throughout including bridge over the Nicomekl River	Small portion of trail is a dirt track, Small portion of route is on sidewalk, Most of trail is in Surrey	Build appropriate connection where trail is a dirt track, Work with Surrey to formalize route
West Boundary 3	Park/School, Roadside	No trail or walk, Narrow paved	Mixed Forest, Urban Landscape	Low	Moderate		Very quiet road along portion of route with continuous forest on west side (Surrey Park), Various trail accesses into Surrey Park	Portion of route is along a road, Could be all or partly in Surrey, Neighbours could have concern about formalizing this route	Work with Surrey and neighbours to establish route (likely best on west side of road)



City of Langley

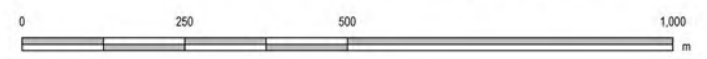
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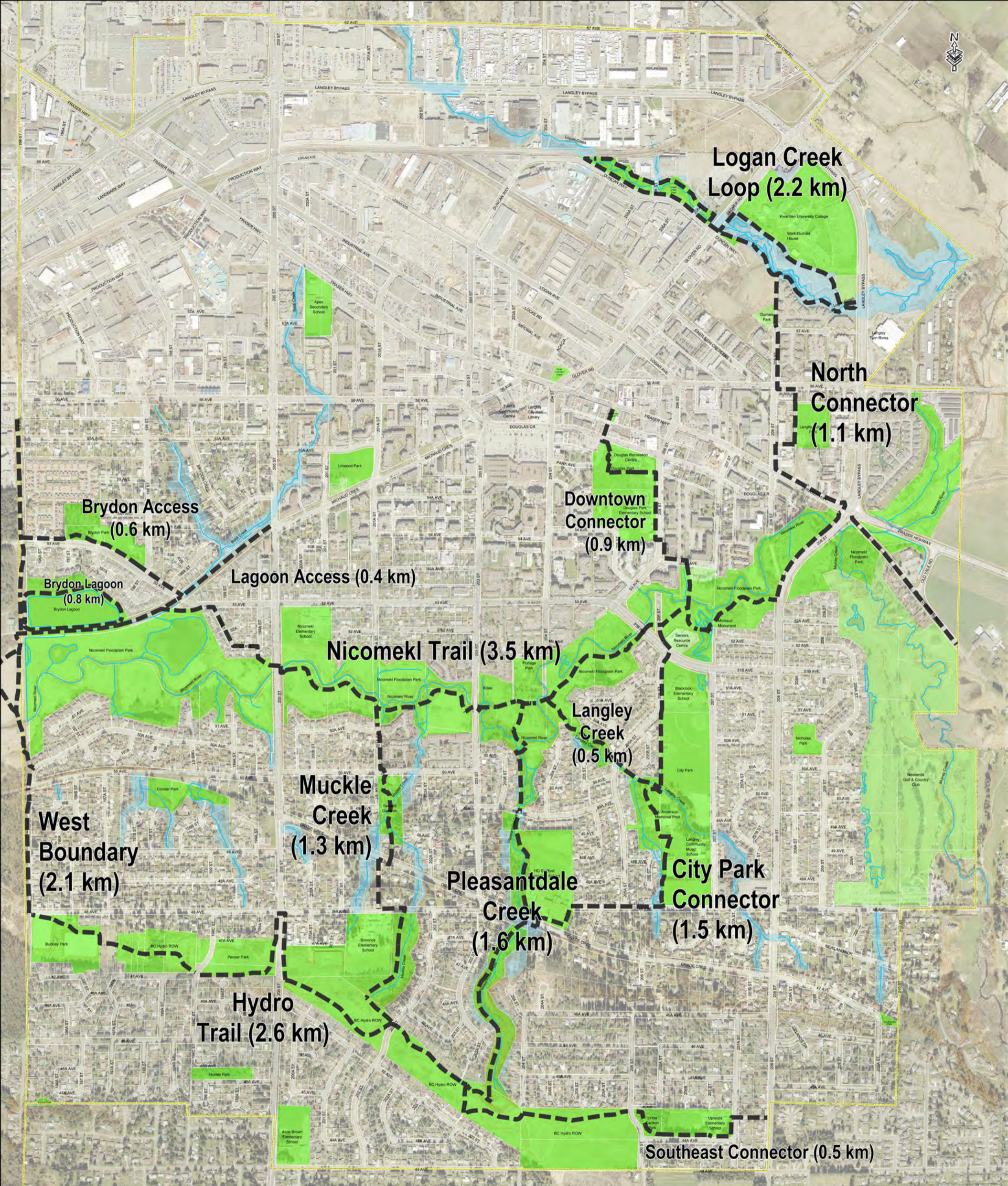
- Unpaved Trails
- Paved Trails
- Existing Facilities**
- Parking
- School Parking
- Washrooms
- Municipal Boundary
- Ravine / Riparian Areas
- Parks, Schools & Colleges
- Other Public & Private Open Space

Map 1: Existing Trails Nature Trail Network Plan

CATHERINE BERRIS ASSOCIATES INC.
 • Land Use • Environmental Planning
 • Landscape Architecture

Plot Date: March 11, 2005





City of Langley

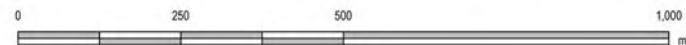
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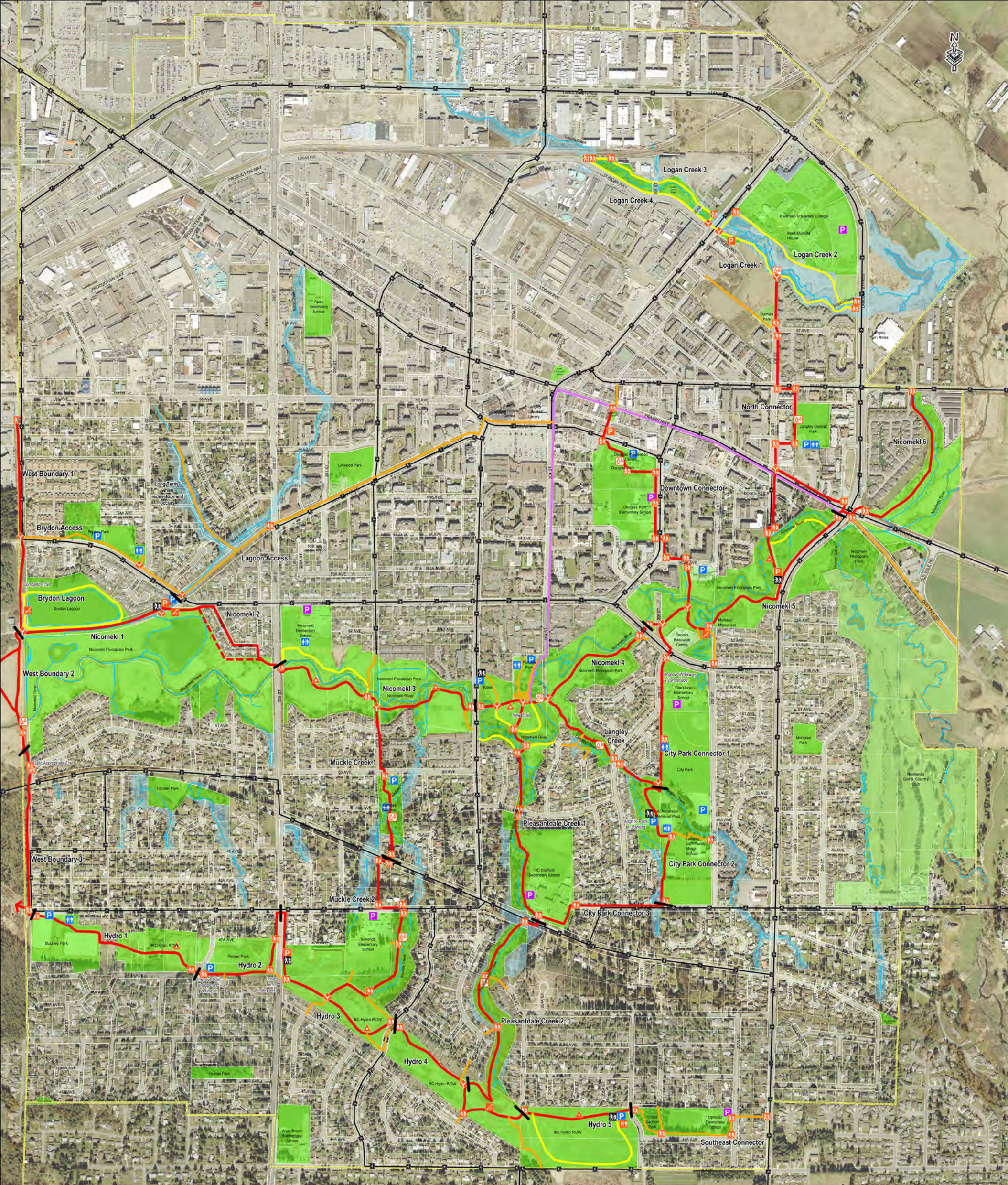
-  City Trails
-  Municipal Boundary
-  Ravine / Riparian Areas
-  Parks, Schools & Colleges
-  Other Public & Private Open Space

Map2: Broad Trail Network Nature Trail Network Plan

CATHERINE BERRIS ASSOCIATES INC.
• Land Use + Environmental Planning
• Landscape Architecture

Plot Date: March 11, 2005





City of Langley

Legend

- | | | | | |
|---------------------------|--|---------------------|--|-----------------------------------|
| Trail Network Plan | | Existing Washrooms | | Municipal Boundary |
| | | Potential Washrooms | | Bike Network |
| | | Major Trail Head | | Ravine / Riparian Areas |
| | | Minor Trail Head | | Parks, Schools & Colleges |
| | | Crossroads Sign | | Other Public & Private Open Space |
| Facilities | | Viewpoint | | Interpretive Sign |
| | | Rest Area | | |
| | | | | |
| | | | | |

Map 3: Trail Network Plan

Nature Trail Network Plan

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 • Land Use + Environmental Planning
 • Landscape Architecture

Plot Date: March 11, 2005

