

# City of WEST KELOWNA

## Pedestrian and Bicycle Infrastructure Plan

January 15, 2016



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## CITY OF WEST KELOWNA

### Pedestrian and Bicycle Infrastructure Plan

Prepared for: **City of West Kelowna**

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Project No.: **1931.B01**

Date: **January 15, 2016**

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## EXECUTIVE SUMMARY

The City of West Kelowna Pedestrian and Bicycle Infrastructure Plan provides a practical implementation and priority plan for pedestrian and cycling facilities in West Kelowna. The plan was developed to build on the Transportation Master Plan, Recreational Trails Master Plan and the Central Okanagan Regional Active Transportation Master Plan. Pedestrian and bicycling stakeholders were engaged along with adjacent transportation, road, and park authorities including the Westbank First Nation (WFN), the Regional District of Central Okanagan (RDCO), Ministry of Transportation and Infrastructure (MoTI), and the Sustainable Transportation Partnership of Central Okanagan (STPCO) to understand their long range planning and identify opportunities to cooperate on projects.

The infrastructure implementation plan aims to:

- Determine the existing inventory and network gaps from an inventory and stakeholder engagement.
- Bridge gaps in the pedestrian and cycling networks with low-cost short-term (0-10 year) works / solutions until future capital projects can be built;
- Provide long-term planning for desired network connections to link major destinations and regionally significant routes;
- Identify opportunities to partner with adjacent jurisdictions on creating on- and off-road connections;

The pedestrian and cycling networks are based on the adopted City of West Kelowna planning studies, draft Cycling Plan, and the Central Okanagan Regional Active Transportation Plan. Stakeholders such as WFN, RDCO, and MOTI have fed into the process to make up the network. Communications with stakeholders occurred throughout the development of the plan. An open house was held on August 13, 2014 to present the study, pedestrian and bicycle networks, and proposed implementation strategy. Feedback indicated a strong desire to improve pedestrian and cycling facilities within the City.

The pedestrian and bicycle networks are established and refined using the following set of principles:

- The principles of the resulting pedestrian network are:
  - Accommodate a high-level pedestrian environment in urban centres
  - Improve accessibility to major destinations (schools and community centres) and transit
  - Provide neighbourhood-level pedestrian linkages to local shopping (i.e. neighbourhood grocery stores)
  - Connect origins and destinations identified by desire lines

- The principles of the resulting cycling network are:
  - Support eco-tourism, active transportation, and recreational activity in West Kelowna
  - Facilitate connectivity to regional transportation routes
  - Connect origins and destinations identified by desire lines
  - Provide cycling route alternatives to Highway 97
  - Routes with favourable grades (<8% as possible)
  - Waterfront multi-use facilities

Cost estimates were derived for a several facility types as lineal rates. A total of 99 projects were identified through the study. These are in addition to planned projects from the Transportation Master Plan and Recreational Trails Master Plan. These projects are total \$30.0 million and would require a large source of funding to complete within a 20-year time frame. Instead, projects are ranked based on their proximity to major trip generators types. Following this they are prioritized as follows:

1. Funding opportunities
2. Capital plans
3. Continuity / connectivity
4. Safety and Latent demand
5. Boarding and alighting volumes at bus stops

While high ranked projects may seem more ideal to pursue prior to lower ranked projects, it is still more important to provide continuity in the pedestrian and bicycling network, take advantage of opportunities to group with other capital projects (to save on construction, mobilization, and traffic control costs), and complete projects eligible for various grants and other sources of external funding.

The plan prioritizes short-term (10-year) improvements within a 10-minute walking radius of schools to provide at least one-sided sidewalk and upgrade cycling facilities with these improvements. This plan supports an increased budget to the Road Rehabilitation and Pedestrian Improvement Program to \$600,000 per year for the next five years and \$250,000 for the next five years in order to complete the short-term improvements. It is recommended that the City of West Kelowna seek out grants, other funding opportunities, and partnerships to complete additional network links, as possible.

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## 1.0 INTRODUCTION

The Pedestrian and Bicycle Infrastructure Plan has been created to provide a practical implementation and priority plan for pedestrian and cycling facilities in West Kelowna. This document builds on previous planning work completed by the City of West Kelowna in the Transportation Master Plan and Recreational Trails Master Plan in addition to the Central Okanagan Regional Active Transportation Master Plan.

The development of the plan has engaged pedestrian and cycling stakeholders as well as adjacent transportation, road, and park authorities including the Westbank First Nation (WFN), the Regional District of Central Okanagan (RDCO), Ministry of Transportation and Infrastructure (MoTI), and the Sustainable Transportation Partnership of Central Okanagan (STPCO) to understand their long range planning and identify opportunities to cooperate on projects.

The infrastructure implementation plan aims to:

- Determine the existing inventory and network gaps from an inventory and stakeholder engagement.
- Bridge gaps in the pedestrian and cycling networks with low-cost short-term (0-5 year) works / solutions until future capital projects can be built;
- Provide long-term (20-year) planning for desired network connections to link major destinations and regionally significant routes;
- Identify opportunities to partner with adjacent jurisdictions on creating on- and off-road connections;

### 1.1 Context

This document is an implementation plan with the purpose of prioritizing pedestrian and cycling infrastructure projects and identifying the current state of and current plans for the infrastructure. This plan builds off of previous planning documents and only contains element of those plans in order to establish priorities for the next 20 years. As such it does not limit the City's ability to pursue other opportunities or alternative designs that may be realized through land use changes and development. Furthermore, this plan does not negate the previous Council approved planning works that are referenced herein.

## 2.0 TRANSPORTATION PROFILE

The City of West Kelowna is a young and rapidly growing municipality. It is situated on the western shore of Okanagan Lake and totals approximately 12,200 hectares. The City of Kelowna is located across Okanagan Lake and connected by the W.R. Bennett Bridge (Highway 97). The bridge also provides a separated active transportation crossing for pedestrians and cyclists. The District of Peachland is located south of West Kelowna and is connected by Highway 97 with no alternative pedestrian or cycling facilities. The Westbank First Nation (WFN) governs two reserves within the central and northeast boundaries of West Kelowna. Indian Reserves 9 and 10 (Tsinstikeptum) cover 980 hectares.

Pedestrian and cycling travel is challenged by a motor vehicle-centric road design from prior to incorporation, low density sprawl, and topography. On-road pedestrian and cycling infrastructure is limited, lacks connectivity, and major barrier roads such as Highway 97 create a low safety perspective for potential active transportation users. Existing paved shoulder sections are being used by cyclists, but are not designated for cycling. Pedestrians can be found to walk along these shoulders when sidewalks and pathways are not present. This creates conflict between these two user groups as differential speeds between cyclists and pedestrians are much higher for travelling on down grades. Street lighting is deficient on older roads and can further exacerbate the safety of vulnerable road users with motorized traffic along with their personal safety.

Geological features such as Glen Canyon and Mount Boucherie create barriers to connectivity, but also provide opportunities for recreation and eco-tourism. West Kelowna's Wine Trail and Farm Loop provides additional opportunities for eco-tourism. Topography is less varied along the lakefront providing opportunities for multi-use pathways that have scenic views, provide access to parks, and are separated from highway traffic noise and air pollution.

The need for pedestrian and bicycle facilities is to provide space for safe and efficient transportation of these vulnerable road user groups to improve mobility from residential neighbourhoods and access to schools, community centres, parks, urban centres, and neighbourhood commercial.

### 2.1 Data Gathering

A data collection effort was undertaken to assemble the GIS database used to create this plan. Datasets were sourced from the following:

- Transportation Master Plan: Road network classifications
- Recreational Trails Master Plan: West Kelowna and RDCO parks and trails
- Central Okanagan Regional Active Transportation Master Plan: Active transportation corridors

- City of West Kelowna GIS: Property lines, zoning, schools, community centres, civic hall, urban centres, sidewalks
- BC Transit: Bus stop inventory and routes
- RDCO: Administrative boundaries, water bodies, WFN road network and property lines
- WFN: Existing and planned sidewalks
- ICBC: Collision data

## 2.2 Existing Inventory

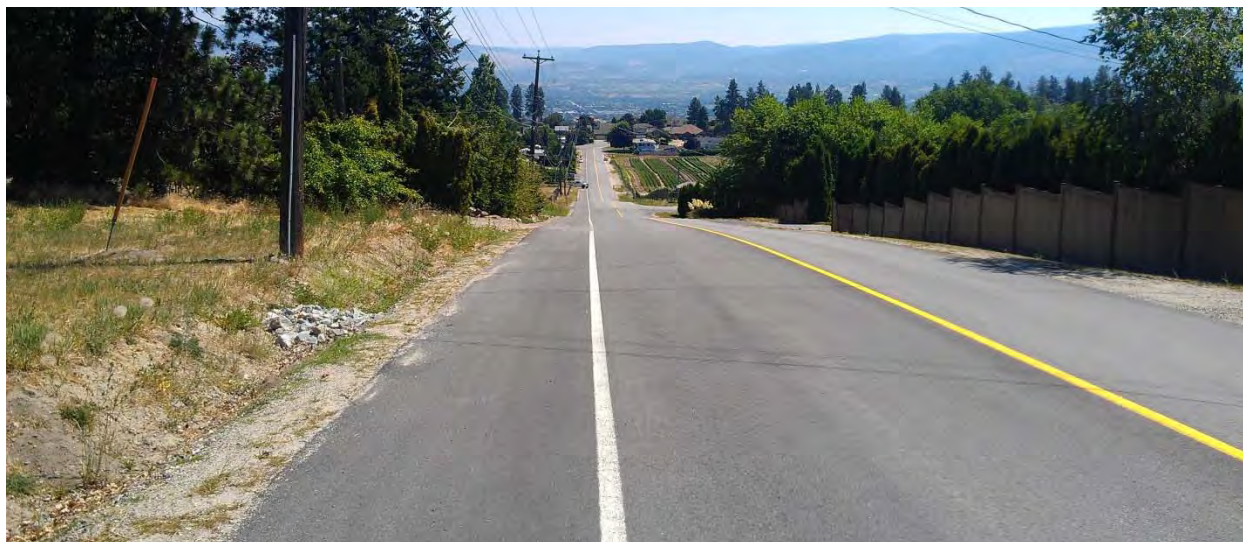
An inventory of pedestrian and cycling facilities was conducted over the course of three weeks in May 2014. Roads and trails throughout the City were traversed by walking and/ or cycling to inventory the type of facility (sidewalk, shoulder, bike lanes, etc.), surface (concrete, asphalt, and gravel), conditions, grades, and deficiencies. From the results of the survey, an overall picture has been generated as to the scope and condition of the City's pedestrian, bicycle, and multi-use facilities. Currently the City has:

- 261 kilometres of roadway
- 65 kilometres of sidewalk and paved pathways
- 6 kilometres of signed bicycle shared-use
- 2 kilometres of bike lanes
- 21 kilometres of major and narrow multi-use trail

### 2.2.1 Pedestrian Facilities Inventory

Facilities for pedestrians include sidewalks, paved pathways, and off-road trails. Sidewalks are spread around the City and are more commonly found in newer developments. The mixture of new and older developments creates gaps in the pedestrian network, this results in few communities or neighbourhood streets being linked together with sidewalk. The majority of the pedestrian facilities are concrete sidewalks while a few are made of asphalt. Overall, the sidewalks are in good condition since they are relatively new construction. Street lighting is also adequate in newer constructed areas, but poor on older facilities including the arterial routes that connect them to the rest of the community. When sidewalks are not present pedestrians are forced to use the shoulders (see **Figure 1**) or walk in the roadway. The majority of off-road trails are wide enough for single-file walking and are suited for seasonal recreational use. They provide convenient links between streets, neighbourhoods, and communities for those that can use them. Given the recreational style of the trails, their use by persons with mobility impairments is limited.

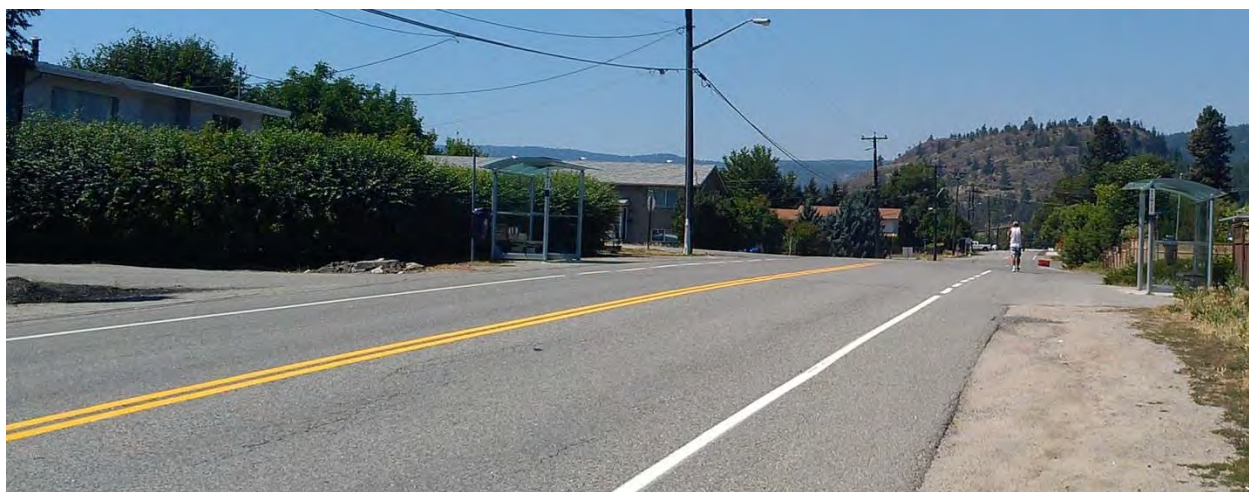
Pedestrians have increased risk when travelling on-street where there are no raised sidewalks or separated pathways. This is further exacerbated during dark hours in older neighbourhoods with insufficient street lighting and sidewalks.



**Figure 1: Rural Roads (Stuart Road) Feature One Paved Shoulder for Non-Vehicular Travel**

## 2.2.2 Bicycle Facilities Inventory

Existing bicycle facilities consist of a few segments of shared-use side-by-side or bicycle lane. The predominant facilities used by cyclists are existing traffic lanes and paved shoulders that are not designated as bicycle routes (as seen in **Figure 2**). Shoulder widths range anywhere from 0.7 to 2.0 meters. The wider of which occurring on one-side of the road in some neighbourhoods such as Webber Road and Glenrosa Road and are intended for both pedestrians and cyclists. There is insufficient space in these shoulders to support both modes. Shoulders have generally been constructed to Ministry standards to accommodate driver error, provide space for vehicles to pullover, and use by cyclists and pedestrians. They are typically provided on one side to limit infrastructure and maintenance costs. Roads that do not have marked shoulders have either gravel shoulders or are too narrow to accommodate travel. In these instance cyclists travel in single file format with traffic.

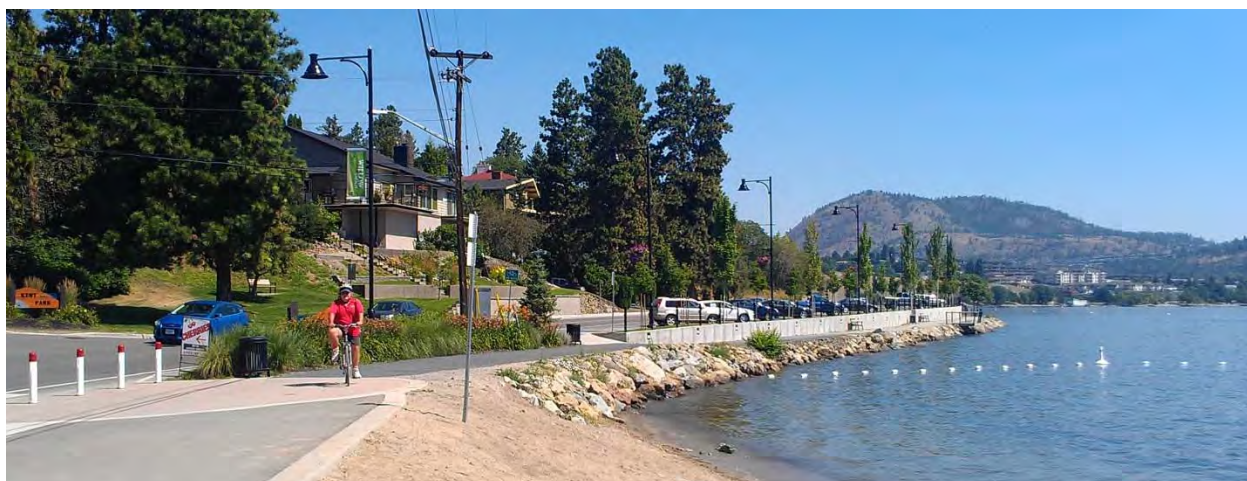


**Figure 2: Shoulders on Ross Road**

Many of the local trails through parks or green corridors are designed for pedestrian use. Park trails are surfaced with gravel and range in width from 0.5 to 1.0 metres; as these trails follow the natural profile of the ground the trail grades can be steep. Many of the trails feature steep sections with stairs and the trails do not indicate whether bicycle use is allowed / prohibited at the trail heads.

### 2.2.3 Multi-Use Facilities Inventory

Multi-use facilities are those that allow for use by both pedestrians and cyclists. They range in width from 3-5 metres for major multi-use facilities and 1-2 metres for narrow multi-use trails. Trails are surfaced with material that provides for comfortable use by all users, typically asphalt for urban and on-road trails and compacted aggregate for rural and off-road facilities. The most prominent multi-use facility in the City is the Gellatly Bay Recreational Corridor, **Figure 3**. This corridor contains multi-use path stretching from Gellatly Road South along the waterfront to Boucherie Road, allowing access to the various parks and facilities along the water. Depending on the location the path is surfaced with pavement or gravel providing easy travel for all users.



**Figure 3: Waterfront Multi-Use Trail**

## 2.3 User Characteristics

To understand the need for the infrastructure, users and their user groups need to be understood. This will help establish facility design requirements and the expected users for each.

### 2.3.1 Pedestrians

Pedestrian type must be understood in planning and designing the pedestrian network. The different types of pedestrians are as follows:

- Adult (able-bodied) – Able-bodied adults can generally meet mobility requirements independent of others and can adapt to a variety of pedestrian facilities. Pedestrian-vehicle safety is generally the primary concern of able-bodied pedestrians.
- Children – Children generally lack familiarity with traffic patterns and motorist behaviour, cannot comprehend signs / traffic signals, are less accurate judging speed and distance, and are often over-confident and trust that others will protect them. Specific consideration must be given to the characteristics of children, particularly in school and park zones.
- Seniors – Many of the characteristics of aging result in reduced mobility, such as reduced physical capability and slower reflexes, loss of vision and/or hearing, and impaired judgement, confidence, and decision-making abilities.
- Disabled – Pedestrians with mobility and visual impairments that limit their ability to travel independently. Pedestrians with mobility impairments may rely on mobility aids such as wheelchairs, crutches, canes, walking, and/or prosthetic limbs to enhance their mobility. Specific design treatments are required to accommodate mobility aids – sufficient width, reasonable grades, smooth surfaces, etc. Audible signals, tactile strips,

and textured surfaces can aid pedestrians with visual impairments at navigating sidewalks and crossing roadways.

Where basic facilities will generally satisfy the needs of able-bodied adults; failure to accommodate for children, seniors, and disabled pedestrians results in reduced quality of life for individuals unable to meet their own mobility needs, results in greater automobile use, and places a burden on the able-bodied population. Developing pedestrian routes that accommodate all pedestrian types addresses this avoidable situation.

### Pedestrian Space Requirement

Pedestrian space requirements describe the physical space needed for specific scenarios and are considered in determining appropriate pedestrian facility dimensions (see **Table 1**).

**Table 1: Pedestrian Space Requirements**

Scenario	Width Required
Unobstructed travel for pedestrian with ambulant disabilities (i.e. crutches)	1.0m
Unobstructed wheelchair travel	1.2m
Wheelchair and stroller pass side-by-side	1.5m
Two wheelchairs pass side-by-side	1.8m

### Walking Speed

Walking speed varies based on pedestrian characteristics (age, gender, fitness level), trip characteristics (purpose, length, route familiarity), route (width, grade, surface, crossing delays) and environmental characteristics (weather).

Traffic signals and controlled pedestrian crossings are generally designed for a pedestrian walking speed of 1.2 m/sec (4.3 km/hr). A study of Canadian jurisdictions concludes that the standard design value of 1.2 m/sec excludes 40% of older adults (older than 65), 90% of older pedestrians with walkers or canes and 10% of the younger adult population (20-64).<sup>1</sup> Lower design values are desirable to accommodate the needs of the older population and disabled.

### Barriers to Walking

Walking is a fundamental activity and something that marks the beginning and end of trips by all other modes. The following are the most commonly cited barriers to walking<sup>2</sup>:

1. Inadequate Facilities (sidewalk gaps, inadequate crossing, disrepair)
2. Inconvenient (longer trip time, physical exertion)

<sup>1</sup> Montufar, J. et al., Pedestrians' Normal Walking Speed and Speed When Crossing a Street, Transportation Research Record 2002, US National Academy of Science, 2008, pg 90-97.

<sup>2</sup> Adapted from New Zealand Transport Agency, Pedestrian Planning and Design Guide, available at: [www.nzta.govt.nz/resources/pedestrian-planning-guide/docs/pedestrian-planning-guide.pdf](http://www.nzta.govt.nz/resources/pedestrian-planning-guide/docs/pedestrian-planning-guide.pdf)

3. Safety Concerns (personal security, vehicle conflicts, poor lighting)
4. Unattractive (poor design, unsightly, traffic noise/exhaust)
5. Weather (limited weather protection as compared to other modes)
6. Physical Ability (mobility issues, steep grades, inaccessible design)
7. Social Perception (pedestrian perceived as too poor to drive, “time is money”)

### 2.3.2 Cyclists

Cyclist skill level is an important determinant of cycling behaviour, route choice, and infrastructure preference. Where a novice cyclist will choose off-road recreational routes and typically operate at low speed, a more experienced cyclist will be comfortable integrating with vehicle traffic and often operate at a higher speed. Understanding the types of cyclists and their tendencies is important in creating a cycling network that provides facility types that facilitate and encourage a broad range of cyclists.

A cyclist classification system has been popularized out of Portland<sup>3</sup>, as follows.

- **Strong + Fearless** (Very low percentage of population) – Cyclists that typically ride anywhere regardless of roadway conditions or weather. These cyclists ride faster than others, prefer direct routes, and will often choose roadways – even if shared with vehicles – over separate bicycle facilities.
- **Enthusied + Confident** (5-10% of population) – Cyclists that are comfortable riding on all types of bicycle facilities but prefer low traffic streets or multi-use trails when available. These cyclists may deviate from a more direct route in favour of a preferred facility type. This group includes all kinds of cyclists – commuters, recreationalists, competitive.
- **Interested but Concerned** (approximately 60% of population) – This group makes up the bulk of the cycling population and represents cyclists who typically only ride on low traffic streets or multi-use trails under favourable conditions and weather. These cyclists perceive traffic and safety as barriers toward increased cycling frequency, and may become “Enthusied & Confident” with encouragement, education and experience.
- **No Way, No How** (approximately 30% of population) – Individuals that are not cyclists and perceive severe safety issues with riding in traffic. Some people in this group may eventually give cycling a second look, but most are not interested.

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<sup>3</sup> Roger Geller, “Four Types of Cyclists”, Portland Office of Transportation, available at [www.portlandoregon.gov/transportation/article/237507](http://www.portlandoregon.gov/transportation/article/237507)

## Cycling Trip Type

Cycling routes and facility types should be developed in consideration of the type of trips that will be accommodated. Trip purpose is related to the characteristics of the route and how well the route connects trip generators (ie. Land use, destinations).

Four commonly accepted cycling trip types are as follows<sup>4</sup>.

1. **Utilitarian** – Moderate or long-distance trips where cyclists seek to reach destinations quickly and efficiently (ie. Commuting)
2. **Neighbourhood** – Shorter trips to access neighbourhood destinations (ie. Shopping, school)
3. **Recreational** – Trips of varying lengths for exercise, enjoyment or sightseeing, with less concern for end destination
4. **Sport** – Typically long-distance trips for competition or training

## Cycling Speed

Cycling speed varies greatly depending on cyclist fitness level, effort exerted, grade, and wind. Generally, cycling speeds on flat terrain with no wind are as follows<sup>5</sup>:

- **Less than 10 km/h** – Speed of most child cyclists; adult cyclists weave from side-to-side to maintain balance, often causing them to put a foot down
- **10 – 20 km/h** – Cruising speed for most cyclists
- **20 – 30 km/h** – Requires sustained effort to maintain speed
- **30 km/h+** - Only very fit cyclists can maintain this speed

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<sup>4</sup> Copeland J, et al., *Developing a Cycling Facility Selection Tool*, Transportation Association of Canada Annual Conference, 2011

<sup>5</sup> Velo Quebec, *Technical Handbook of Bikeway Design*, 2<sup>nd</sup> Ed

### 3.0 EXISTING PLANS AND PROGRAMS

The pedestrian and bicycle networks are established following existing studies and criteria relevant to the goals of this study. This section covers the justification that went into determining the pedestrian and bicycle network in other existing plans (endorsed and not endorsed by Council).

#### 3.1 Capital Program

The draft City of West Kelowna Capital Program identifies planned municipal works for the next 20 years for road, water, storm, and sanitary sewer projects. These are sourced from the Transportation Master Plan, Water Utility Master Plan, Storm Drainage Master Plan, and Sanitary Sewer Utility Plan. It further defines development cost charges that will pay for a portion of the public works. Where works are conducted that are on or below the roadway, opportunities to add pedestrian and cycling facilities will be pursued.

##### 3.1.1 Road Rehabilitation and Pedestrian Improvement Program

The annual Road Rehabilitation and Pedestrian Improvement Program allocates funding to repair and upgrade road infrastructure as well as add new pedestrian infrastructure. Allocated funding varies by year and is summarized in **Table 2**. The Pedestrian and Bicycle Infrastructure Plan will provide a method to prioritize and budget for pedestrian improvements.

**Table 2: Five-Year Summary of Road Rehabilitation & Pedestrian Improvement Program**

Year	Budget	
	Road Rehab	Pedestrian Improvement
2012 Tendered	\$ 1,416,973	\$ 92,180
2013 Tendered	\$ 1,039,922	\$ 250,000
2014 Tendered	\$ 344,543	\$ 48,014
2015 Tendered	\$ 0* (\$600,000 budgeted)	\$ 155,244
2016 Budget	\$650,000	\$600,000

\*Note: The 2015 Road Rehab budget was held for another project which ultimately did not occur. No expenditures occurred in 2015 on road rehabilitation.

#### 3.2 Planning Documents

##### 3.2.1 City of West Kelowna Transportation Master Plan (2014)

The City of West Kelowna Transportation Master Plan was adopted on February 25, 2014. The Plan sets improvements to pedestrian and bicycle infrastructure through road cross-section upgrades. Road cross-sections set width requirements for shared lanes, bike lanes, multi-use pathways, and sidewalks. The plan indicates that the short-term improvements to the pedestrian

and bicycle network should correspond with improvements to the major road network and give priority to transit routes and high pedestrian areas such as Westbank Centre. Transit network improvements would focus on investments in the pedestrian system to provide connectivity from the bus stop to the surrounding network focusing on higher order roads.

The Draft 2011 Transportation Master Plan (not adopted) developed hierarchies for pedestrian and cycling routes. Most cycling routes were derived from the 2008 un-adopted cycling plan (**Section 3.2.4**). The construction of pedestrian facilities was given priorities that focused on school, civic and community centres, and other activity centres. These were to be considered when evaluation of other transportation projects in the area was taking place. Special pedestrian zones were planned to meet the specific objectives of development areas such as Westbank and Boucherie Centre.

### 3.2.2 City of West Kelowna Recreational Trails Master Plan (2013)

The City of West Kelowna Recreational Trails Master Plan sets a variety of goals including establishing “the trail system as a destination for residents and visitors, with natural attractions and varied, year-round recreation opportunities.” The objectives of the plan are as follows:

1. Establish a continuous shoreline trail where possible and as outlined in the Waterfront Plan.
2. Route trails through natural areas wherever possible, avoiding or mitigating negative impacts to Environmentally Sensitive Areas.
3. Provide sidewalks and paths through urban areas.
4. Provide safe routes to schools, neighbourhood centres, parks, and recreation centres.
5. Develop road corridor trails in locations that have potentially high pedestrian and cycling use and/or safety concerns.
6. Link on-road bike lanes and sidewalks with off-road trails.
7. Create connectivity with WFN, Kelowna, and Peachland.
8. Re-establish heritage trail routes.

The implementation plan focuses on a time period of 30 years and assigns priorities to meet current allocated budgets for trail development. The plan recommends that budget allocations be increased where funding becomes available through grants, fundraising, donations, or other means. If additional funding is available later phase priorities should be completed sooner.

### 3.2.3 Central Okanagan Regional Active Transportation Master Plan (2012)

The Central Okanagan Regional Active Transportation Master Plan establishes a vision to connect communities and major destinations. The proposed network provides a primary and secondary system. The primary network focuses on facilitating safe, convenient, and connecting

travel through urban centres, regionally significant destinations and key commercial districts and tourist destinations. The secondary connector system consists of routes that link significant destinations outside urban centres, but are important pedestrian and cycling connections from the primary system. A phasing plan was established, in collaboration with local governments, for a 10, 20, and beyond 20 year horizon. The implementation strategy focuses on developing new pedestrian and cycling infrastructure within local municipalities for safe and convenient travel. It targets short trips and providing good connections to regional transit services. Corridors or segments with little work required are placed at a higher priority for local plans.

### 3.2.4 City of West Kelowna Cycling Plan (2008-Not Adopted by Council)

The objective of the 2008 Cycling Plan was to develop a bicycle network for predominantly commuter use. By comparing the implementation of the City of Kelowna's policy on cycling infrastructure and assessing what was already in place in West Kelowna, a plan for a route network was developed. The plan uses different design levels for facilities depending on who is funding the work and the types of road. The "Second Wave" designs are for projects funded by the City and predominately consist of bike lanes. The "Third Wave" design is more complex and involved. The "Third Wave" network is focused on MoTI projects as their roads tend to be higher volume thus creating the need for the complex design.

The plan places priority on developing the "backbone" routes first then adding in the feeder or arterial routes once it is in place. It identifies three routes as its backbone, Highway 97, Boucherie Road and Westside Road. These networks would tie in heavily with transit stops to provide an alternative to cyclists during poor weather, cycle breakdowns, or sustained, steep grades. Neighbourhood routes would then be connected to the backbone. The plan also focuses on cycling awareness and strategies to develop awareness among motorists that bicycles will be present. Additional goals were to raise awareness of cyclists and increase the cycling mode share to 2% of commute trips.

## 4.0 MAJOR TRIP GENERATORS

Major trip generators in West Kelowna relevant to pedestrian and bicycle travel generate a variety of trip types. **Table 3** illustrates the major trip generators and dominant trip types that were considered in development of the plan. It should also be noted that WFN commercial centres will generate trips from West Kelowna and vice versa. Furthermore, surrounding communities may be considered as major generators as they will generate similar trip types within.

**Table 3: Major Trip Generators and Dominant Trip Types**

Trip Generators	Trip Type			
	Commuter	Commercial	Recreation	Tourism
Transit Exchanges and Stops	Yes	Yes	Some	Some
Schools	Yes	No	Yes	No
Community Centres	No	No	Yes	No
Urban Centres	Yes	Yes	No	Some
Neighbourhood Commercial	Some	Yes	No	No
Parks (DWK and RDCO)	Some	No	Yes	Yes
Heritage Sites	No	No	Some	Yes
Wineries	Some	Yes	Yes	Yes

### Transit Exchanges and Stops

Bus transit exchanges and stops represent key nodes where modes are transitioned to/from transit. They provide regional connectivity to surrounding communities, other major trip generators, and residential dwellings. They are key to commuting and commercial activities and may link some recreational and tourist travel.

### Schools

School District No. 23 operates eleven schools within West Kelowna. These consist of one secondary, two middle, and eight elementary schools (including one French Immersion). The secondary, middle, and French Immersion elementary schools have large catchment areas throughout the City and even the surrounding communities. The remaining eight elementary schools predominantly have smaller catchment areas within the nearby neighbourhoods. In addition, there is a private school, Our Lady of Lourdes Elementary.

### Community Centres

There are six community centres within West Kelowna and are either run by community groups or the City itself. Community Centres attract a wide range of users depending on the type and location. In the case of a seniors activity centre such as the West Kelowna Seniors Centre, **Figure 4**, the priority for active transportation facilities will be on accessibility for users.

Pedestrians with walkers, motorized scooters, or wheelchairs require more room to maneuver than able-bodied pedestrians. This requires sidewalks that are free from obstructions and utilize proper letdowns to ensure a safe and accessible transition from the sidewalk to the street level. Community halls and recreation centres attract users from school age children to seniors. In order to serve this wide scope of users, infrastructure should focus on accessibility, paved or concrete sidewalks, and marked crossings to ensure that each user feels comfortable using active transportation to access community centres.



**Figure 4: West Kelowna Seniors Centre**

### **Urban Centres**

Westbank and Boucherie Centres are the two urban centres for West Kelowna. Westbank Centre contains many small shops and businesses located along Highway 97 as well as some residential areas to the north and south of the highway. The Westbank Centre Transit Exchange is located in a central location on Elliott Road. The area is integral to commuter trips whether they are bound to Westbank Centre or to the transit exchange. The Westbank Centre Revitalization Plan identifies that high density mixed land use in Westbank Centre will be supported by a high quality pedestrian environment that facilitates and supports a continuous, safe, accessible, and attractive network.

While Boucherie Centre does not have a neighbourhood plan, it consists of a mixture of residential, commercial, and retail spaces. Access to Boucherie Centre is largely along Highway 97, East Boundary Road from the south, and Stevens Road from the north; the Boucherie Mountain Transit Exchange is on the south side of the highway on Westgate Road.

Wider concrete or asphalt sidewalks allow for a level of comfort and increased capacity for the large numbers of pedestrians going between shops and businesses. Providing proper signage, lanes, and end-use facilities for bicycles, such as bike racks and repair facilities, promotes their

use as a commuting alternative. As Highway 97 intersects both of these urban centres, it is essential that crossings increase safety and user comfort for north-south connectivity.

### **Neighbourhood Commercial**

A neighborhood commercial area is commercial zoning that lies outside the urban centres. They can be a single corner store or small grouping of retail stores in a neighbourhood. The stores are usually located for convenience such as a general store, day care, hair salon, or pub and generate trips from within the community they are intended to serve. Given the proximity to the customer base these commercial areas are ideal for active transportation. Sidewalks along business frontages enhance pedestrian safety when access a business. Multi-use paths between streets promote walking or cycling by providing “shortcuts” though neighbourhoods. Depending on the types of businesses end-use facilities for bicycles may be required.

### **Parks**

West Kelowna has over 125 parks and recreation facilities ranging from beaches to undeveloped natural areas. There are also six Regional Parks within the City’s boundaries most notably Glen Canyon Regional Park and Kalamoior Regional Park. Currently there are 22 km of multi-use trails and 133 km of nature trails shared between the City of West Kelowna and the Regional District of the Central Okanagan. Parks generate a large draw for recreational users; whether it is along the waterfront or mountain trails, users are seeking out parks for their recreational activities. Active transportation for parks tries to encourage parks users to include their travel to the park as part of their recreation experience. Multi-use pathways between beaches and parks and shortcuts through neighbourhoods promote the use of walking and cycling to parks rather than driving. By linking the various parks and trails with on road facilities that allow users to travel directly from one facility to another, users will find it comfortable and convenient to walk and cycle to the parks.

### **Heritage Sites**

West Kelowna heritage sites can largely be found along the waterfront in the Gellatly area. Sites like the Gellatly Nut Farm, CNR Warf and Gellatly Landing Park are already linked by a multi-use trail through the Gellatly Recreational Corridor. The focus of an active transportation network would be to fill in the remaining links to other major heritage sites like the Westbank Museum. The Westbank Museum (**Figure 5**) is located on the eastern edge of Westbank Centre between Main Street and Dobbin Road. Active transportation would consist of ensuring connectivity with the rest of Westbank Centre by improving sidewalk connections with the museum and onto the Gellatly Road multi-use trail. Connectively to the active transportation network is made even more important as the museum also hosts the West Kelowna Visitor Centre, making it the starting point for many tourists.



**Figure 5: Westbank Museum**

### **Wineries**

Wineries are a major tourist attraction for the Okanagan. There are ten wineries in West Kelowna with others proposed in the future. Tourists using active transportation for wine tours are generally looking for quieter or visually appealing routes, and unlike commuters their trips are not time sensitive. Nine of the ten wineries are located along the designated wine trail, starting in the west and extending along Boucherie Road to the east. Updates have already begun on Boucherie Road with planned upgrades continuing for the next 20 years. This updated Wine Arterial Route will contain wide paved paths, bike lanes, and treed and lit medians. As well as improving local conditions this route will act as a strong active transportation link, crossing much of West Kelowna.

## 5.0 STAKEHOLDER ENGAGEMENT

Formal stakeholder meetings were held with public advocacy groups as well as adjacent road, transportation and park authorities. These meetings helped to determine desire lines of user groups, gaps in the network, jurisdictional issues, opportunities for coordinating efforts, and relevant background information. Formal meetings and follow-up meetings were held throughout May and June 2014.

### 5.1 Public Advocacy Groups

Public advocacy groups provided input on major gaps in the existing pedestrian and / or bicycle network, indicated desirable locations for travel, and provided background information on initiatives with which their groups have been involved. Additional outcomes of the advocacy groups stakeholder engagement identified: (1) the need for route signage and wayfinding for cycling, multi-use, and off-road trails; (2) accessibility needs for mobility impaired pedestrians; and (3) the importance of maintenance for pedestrian and cycling facilities. The public advocacy groups that were engaged include:

- **Kelowna Area Cycling Coalition** – a non-profit organization whose goal is to make cycling a safe and practical alternative mode of transportation through the promotion of cooperation, education and respect among all road users.
- **Gellatly Bay Trails and Parks Society** – a non-profit group that partners with other organizations, local governments and authorities, to plan, design, and construct walking and hiking trails in the community. The group identified the Trail 2000 initiative to connect The W.R. Bennett Bridge to Peachland.
- **Westside Special Needs Advisory Committee** – an advocacy group who campaigns for safe and improved accessibility for disabled persons in the community. They provide information and guidance to local businesses and governments to assess the development of barrier free infrastructure.

### 5.2 Governing Authorities

The governing authorities represent the major transportation influences in West Kelowna. These groups provided background and their plans for development of the pedestrian and bicycle networks. Additional outcomes of the governing authority stakeholder meetings identified: (1) student catchment for schools within the City; (2) need for end-use cycling infrastructure near RapidBus exchanges; (3) RDCO's mandate is to keep parks as natural as possible; and (4) marking routes and enhancing crossings can provide a major benefit at a small cost. The governing authorities that were engaged are identified below along with the information that they provided:

- **Westbank First Nation** – Indian Reserves #9 and #10 are located within West Kelowna boundaries and their own plans and priorities for active transportation as well as their input is critical in establishing continuity between the two networks.
- **Regional District of Central Okanagan** – Responsible for some of the largest parks in West Kelowna where off-road trails are routed including Kalamoior, Glen Canyon, and Rose Valley Regional Parks.
- **Ministry of Transportation and Infrastructure** – Highway 97 creates a barrier through West Kelowna for cross-street pedestrian and cycling travel. Since Highway 97 falls under the jurisdiction of the Ministry of Transportation and Infrastructure, they are sought out for improving crossings for these user groups.
- **Sustainable Transportation Partnership of Central Okanagan** – partnership consists of the Regional District of Central Okanagan and the municipalities governments from Lake Country to Peachland. Together these governments coordinate sustainable transportation projects and programs that reach though the entire region rather than within their individual boundaries. These projects have included RapidBus and the Central Okanagan Regional Active Transportation Plan.
- **School District No. 23** – Operates and manages all of the public schools in the City of West Kelowna from kindergarten to grade 12. They provide insight in to how many students are using active transportation to get to and from school. They also identify the different challenges for each level of school, elementary, middle and secondary, as the transportation needs and distance traveled varies for each.

### 5.3 Public Open House

A public open house was held on August 13, 2014 to present the study, pedestrian and bicycle networks, and proposed implementation strategy. Poster boards provided visual representation of the study overview, pedestrian and bicycle network maps, and approach. Feedback was obtained through an exit survey available at the open house and the City website. There were a total of 37 surveys received. Ninety four percent of the respondents identified the need to improve pedestrian and cycling facilities in the City. Comments received identified the desire to improve waterfront connections and wine route accommodation of pedestrians and cyclists. Half of the comments received were specific to cycling, identifying a strong desire for designated facilities by respondents.

## 6.0 NETWORK ANALYSIS

The network analysis summarizes gaps and barriers in the network identified through the inventory and stakeholder engagement; the results of the collision analysis, and the criteria to establish the pedestrian and cycling network as part of the infrastructure plan.

### 6.1 Network Gaps and Barriers

Network gaps and barriers refer to the site specific and systemic issues in the pedestrian and bicycle networks that impact the connectivity, desired efficiency, and safety of the system. These issues were identified through the field inventory and the stakeholder engagement.

#### 6.1.1 Inventory Gaps and Barriers

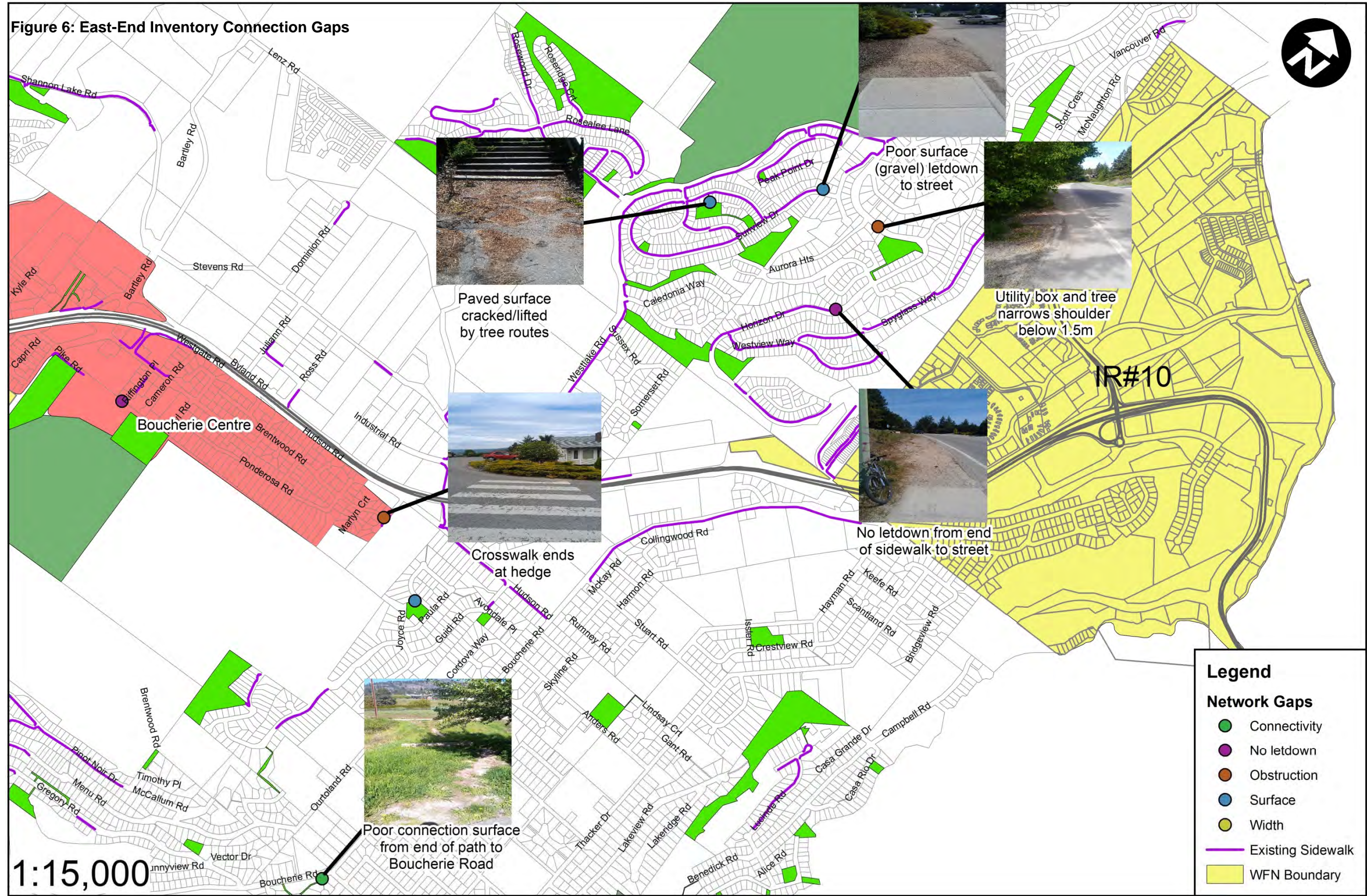
The inventory identified existing sidewalks, bicycle facilities, trails, and shoulders as well as specific gaps in the system. These included obstacles in pathways, missing links in connectivity, sections with substandard width for facilities, and poor surface conditions. The identified locations are shown in **Figure 6**, **Figure 7**, and **Figure 8**. The maps identify the following issues:

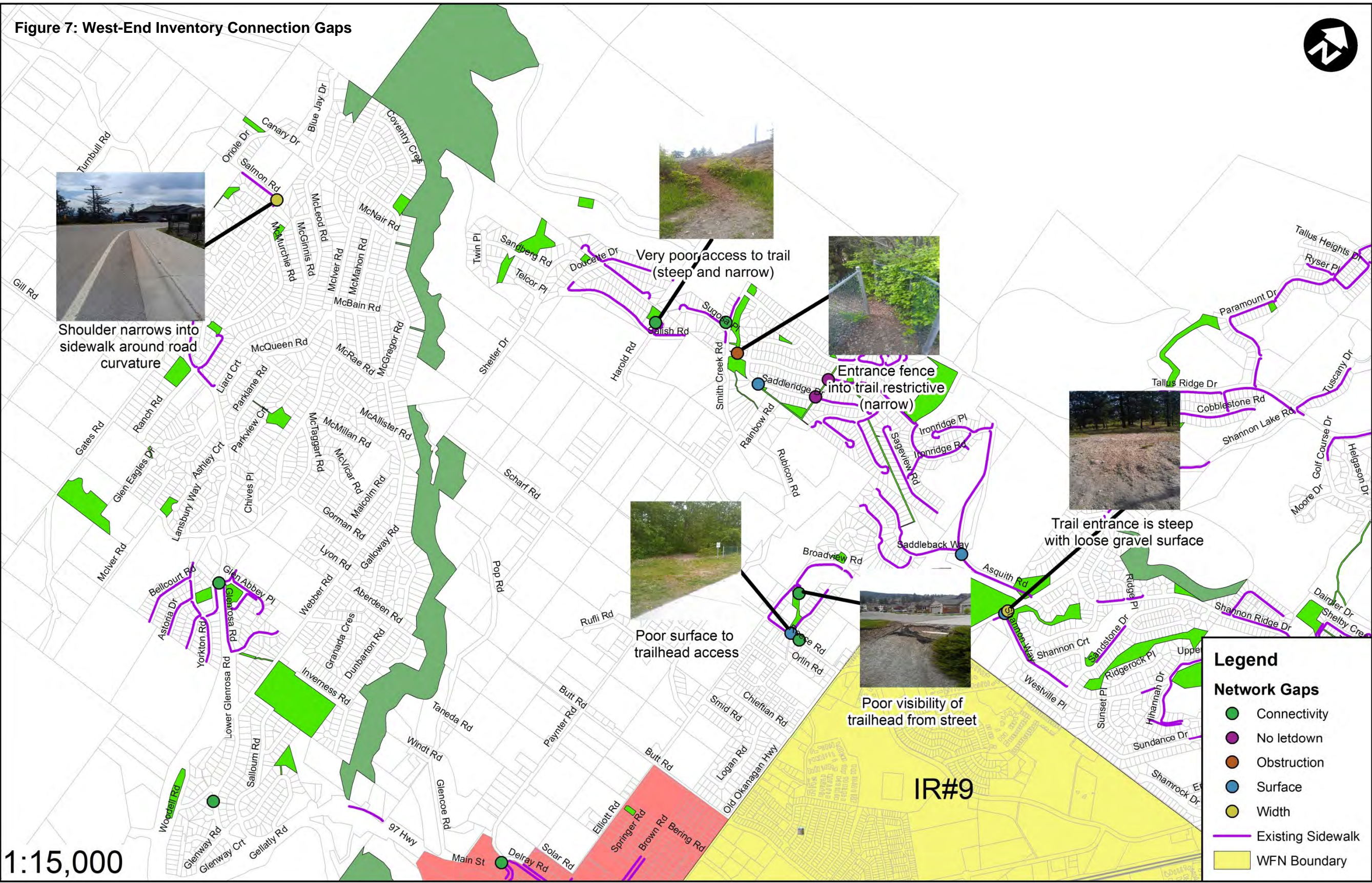
- *Connectivity* – Sidewalks or pathways abruptly end creating a gap in the network.
- *No letdown* – Curb letdowns are missing creating a barrier to pedestrians using mobility devices.
- *Obstruction* – Physical obstructions such as utility poles restricting or blocking pathways.
- *Surface* – Poor surface transitions or conditions at sidewalk / asphalt interfaces or along a given facility.
- *Width* – Narrow sidewalks, pathways, or shoulders.

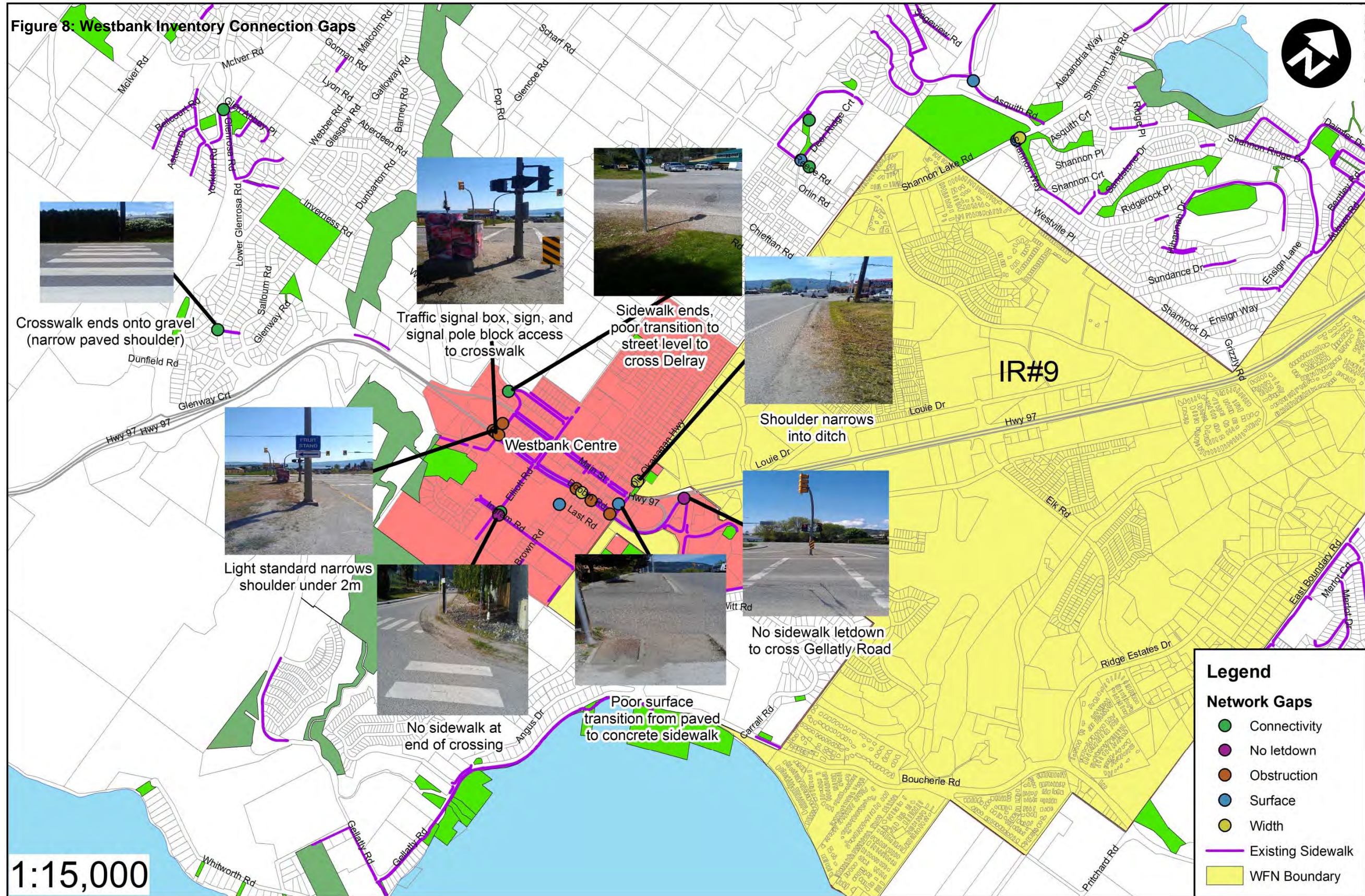
#### 6.1.2 Stakeholder Identified Gaps and Barriers

Network gaps and barriers were attributed by the stakeholder groups to the following:

- Connect segmented sidewalks within West Kelowna and between WFN and West Kelowna roads;
- Need to designate cycling routes;
- Add supporting wayfinding signage for trail heads (from the road), multi-use pathways, and cycling routes;
- Need to improve pedestrian and cycling crossings particularly for roads crossing Highway 97;







## 6.2 Collision Analysis

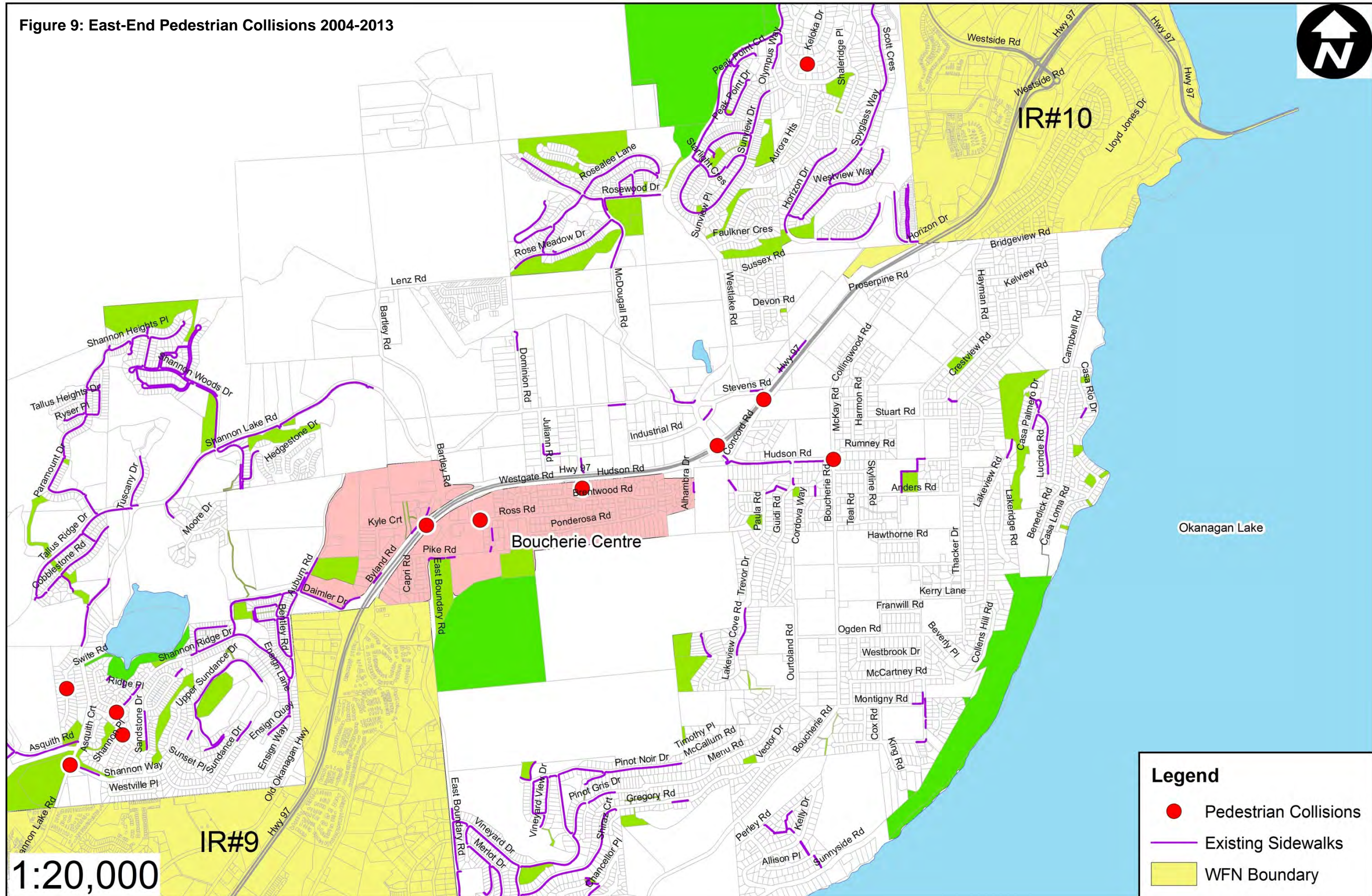
Collision data were provided by ICBC and consist of their claims dataset as well as the RCMP record of collisions. The police dataset is more accurate for injury and fatal collisions, but does not include any information on demographics. Due to the low frequency of reported pedestrian and cyclist collisions, 10-years of collisions involving vulnerable road users were reviewed from 2004 to 2013.

There were a total of 54 pedestrian collisions over the 10-year period. They consisted of one (1) fatal, 51 injury, and two (2) property damage only. There were 42% of collisions occurring in dark or low light conditions. This highlights deficient lighting in the roadway for pedestrians during the darker winter months. The locations of the collisions are shown in **Figure 9** and **Figure 10** (there are 15 collisions that are not georeferenced and therefore do not appear on the figures). Approximately 31% of the collisions occur along Highway 97 (including Main Street and Dobbin Road). Westbank Centre has a concentration of 41% of the pedestrian collisions. Westbank Centre has been an area of higher pedestrian activity with limited facilities and connections between them. There are recurring collisions at Brown Road / Main Street (4), Brown Road / Dobbin Road (2), and Elliott Road / Dobbin Road (2).

The cyclist collision dataset identifies 30 collisions (all injury) over the 10-year period and no recurring collisions on City of West Kelowna roads / intersections. The collision locations are shown in **Figure 11** and **Figure 12** (there are nine collisions in the dataset that are not georeferenced and therefore do not appear on the figures). About 30% of the cyclist collisions occurred on Highway 97 (including Main Street and Dobbin Road). One third of the incident locations occurred in Westbank Centre.

Since there are no recurring collisions on City of West Kelowna roads and limited data in the collision database, mitigation cannot be applied. However, improvements are needed for safety at Highway intersection crossings. In the summer of 2014, pedestrian countdown signals were added to Highway 97 intersections throughout West Kelowna. New sidewalk and bicycle facilities will be prioritized for safety by focusing on segments that will get the most use. By improving these facilities, safety is improved for the most users. The proximity of links to major trip generators will be used to identify where the most trips are anticipated to occur and where there is latent demand.

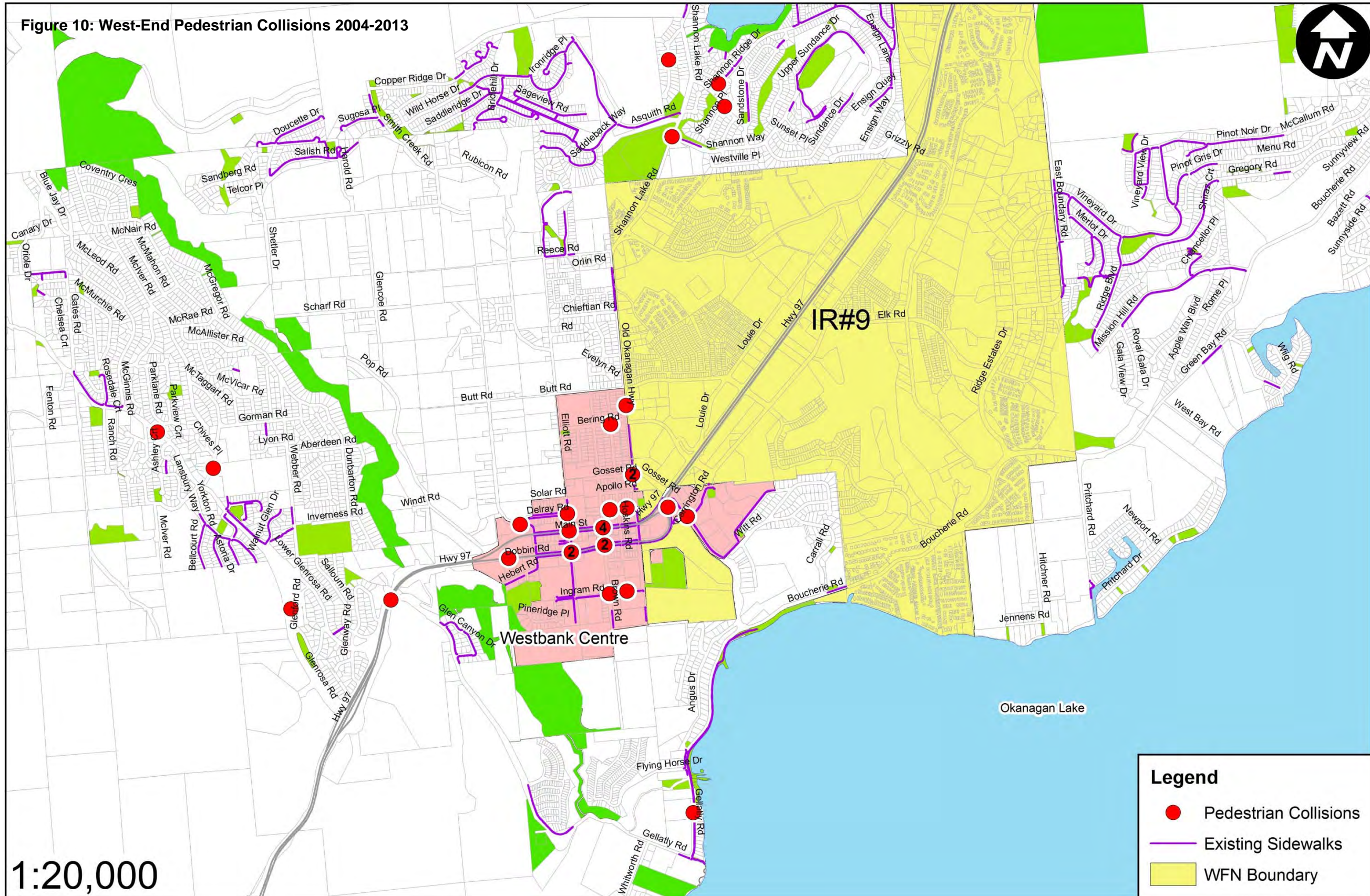
Figure 9: East-End Pedestrian Collisions 2004-2013



**Legend**

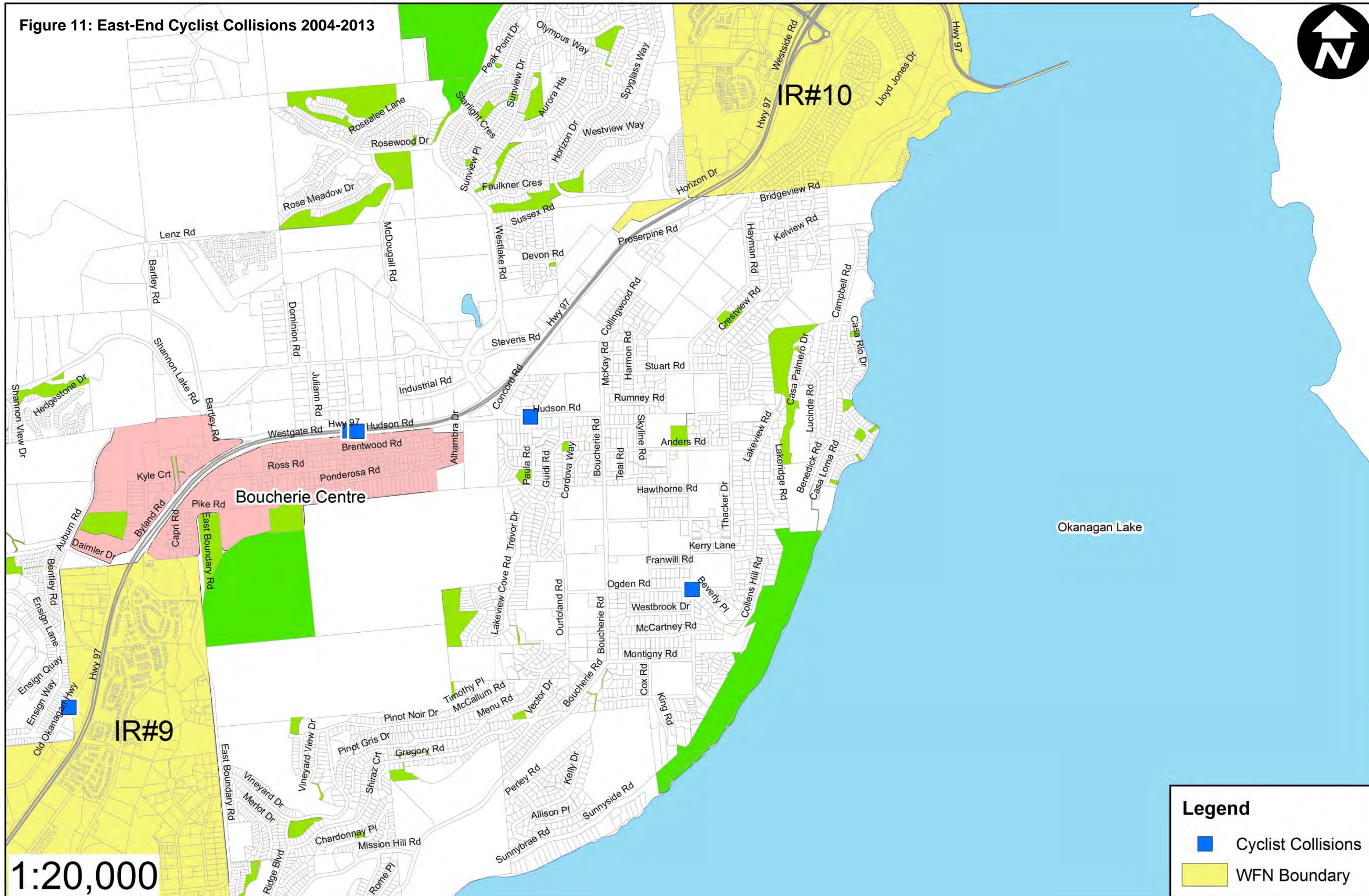
- Pedestrian Collisions
- Existing Sidewalks
- WFN Boundary

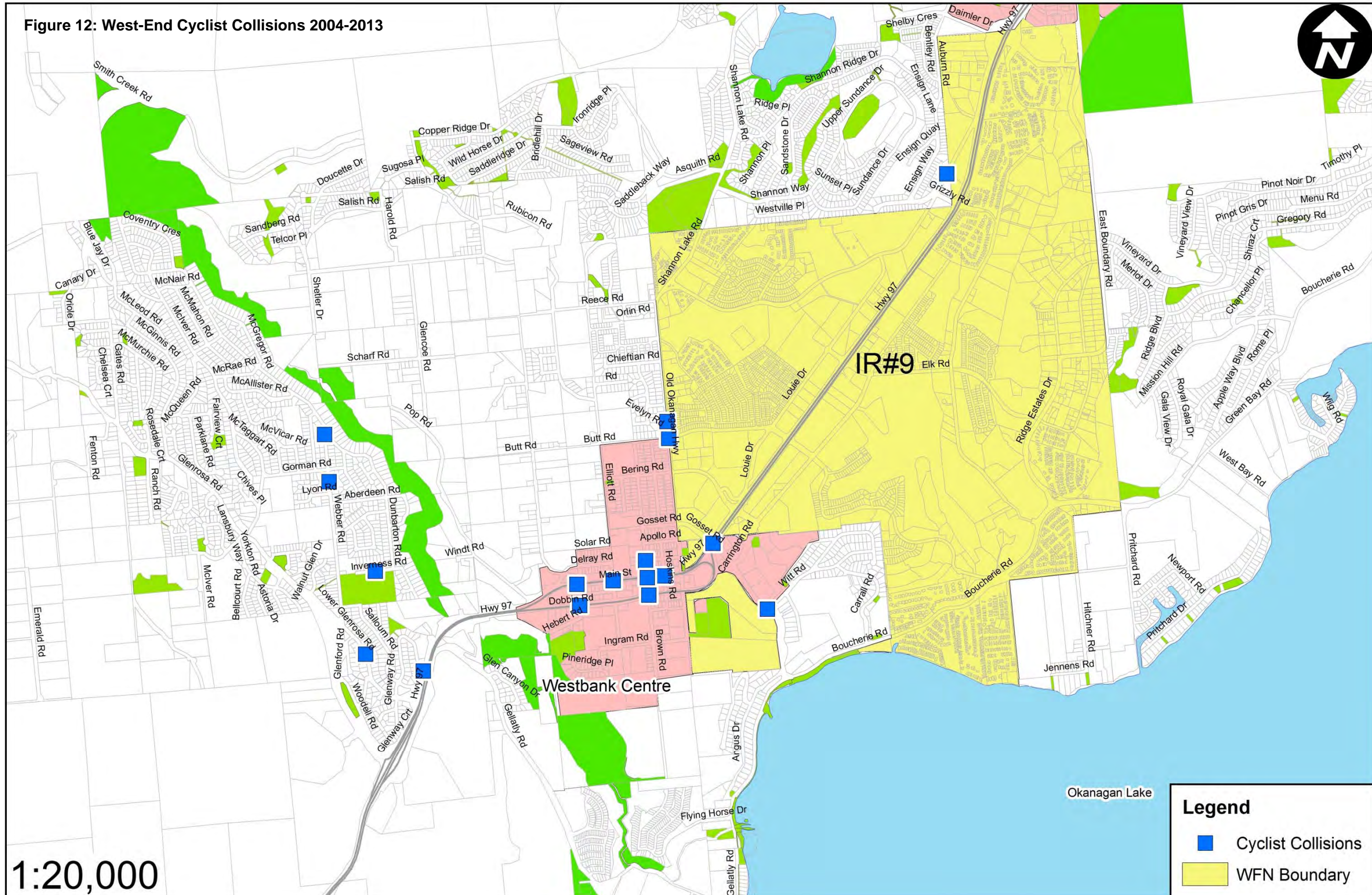
Figure 10: West-End Pedestrian Collisions 2004-2013



**Legend**

- Pedestrian Collisions
- Existing Sidewalks
- WFN Boundary





### 6.3 Network Establishment

The pedestrian and cycling networks are based on the adopted City of West Kelowna planning studies, draft Cycling Plan, and the Central Okanagan Regional Active Transportation Plan. Stakeholders such as WFN, RDCO, and MOTI have fed into the process to make up the network.

The principles of the resulting pedestrian network are:

1. Accommodate a high-level pedestrian environment in urban centres
2. Improve accessibility to major destinations (schools and community centres) and transit
3. Provide neighbourhood-level pedestrian linkages to local shopping (i.e. neighbourhood grocery stores)
4. Connect origins and destinations identified by desire lines

The principles of the resulting cycling network are:

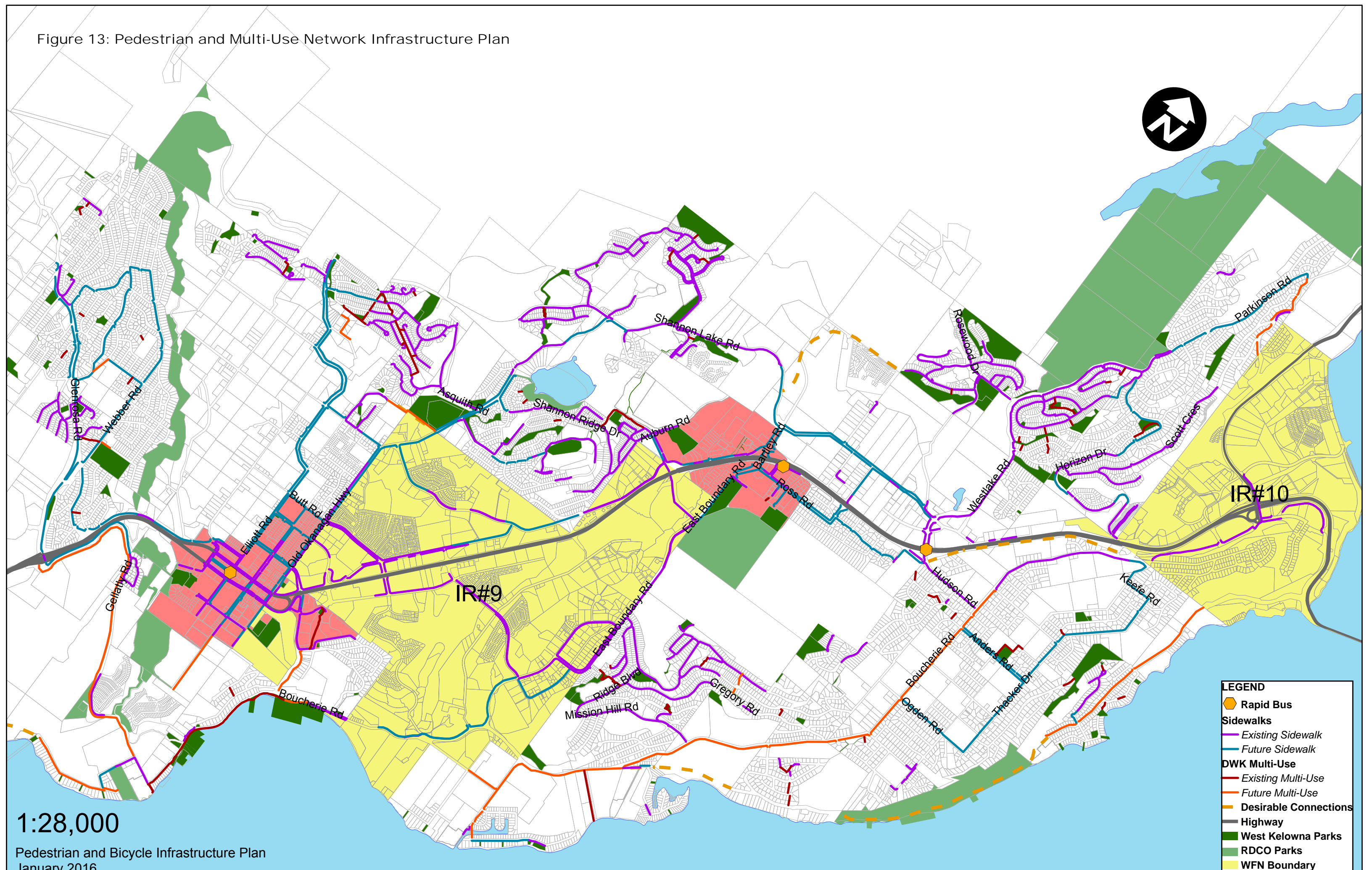
1. Support eco-tourism, active transportation, and recreational activity in West Kelowna
2. Facilitate connectivity to regional transportation routes
3. Connect origins and destinations identified by desire lines
4. Provide cycling route alternatives to Highway 97
5. Routes with favourable grades (<8% as possible)
6. Waterfront multi-use facilities

The pedestrian and bicycle networks are shown in **Figure 13** and **Figure 14**, respectively. The pedestrian network infrastructure map identifies existing pedestrian infrastructure and planned future infrastructure. The bicycle network infrastructure map identifies planned bicycle facility types for West Kelowna.

### 6.4 Desirable Connections

Desirable connections are those requiring additional work for land acquisition or partnerships with owners. The following section describes the desirable connections and their approximate lengths. These connections are shown on the pedestrian and bicycle networks and highlighted on **Figure 15**.

Figure 13: Pedestrian and Multi-Use Network Infrastructure Plan

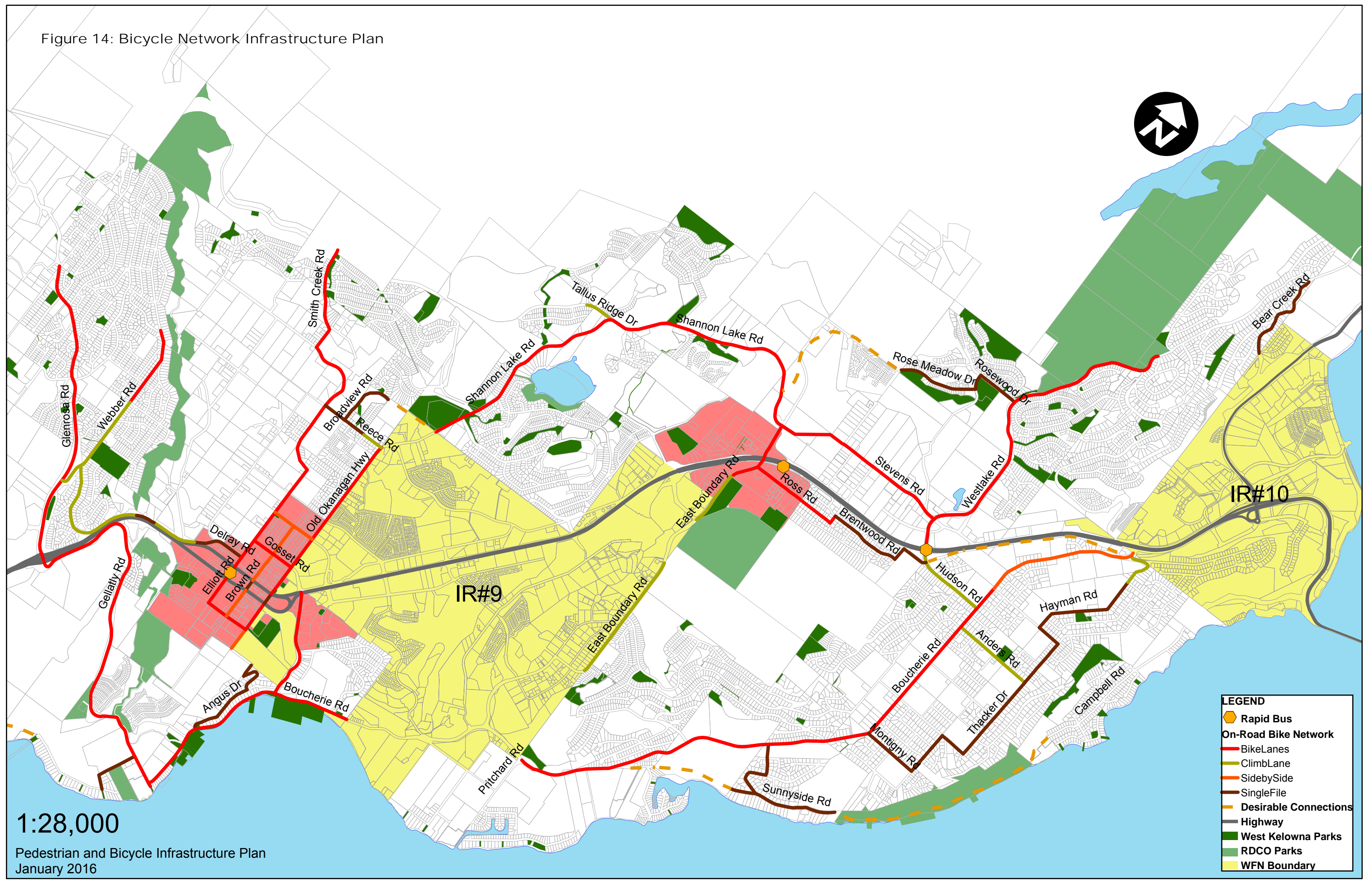


**LEGEND**











- Rapid Bus
- Sidewalks**
- Existing Sidewalk
- Future Sidewalk
- DWK Multi-Use**
- Existing Multi-Use
- Future Multi-Use
- Desirable Connections
- Highway
- West Kelowna Parks
- RDCO Parks
- WFN Boundary

1:28,000  
 Pedestrian and Bicycle Infrastructure Plan  
 January 2016

Figure 14: Bicycle Network Infrastructure Plan



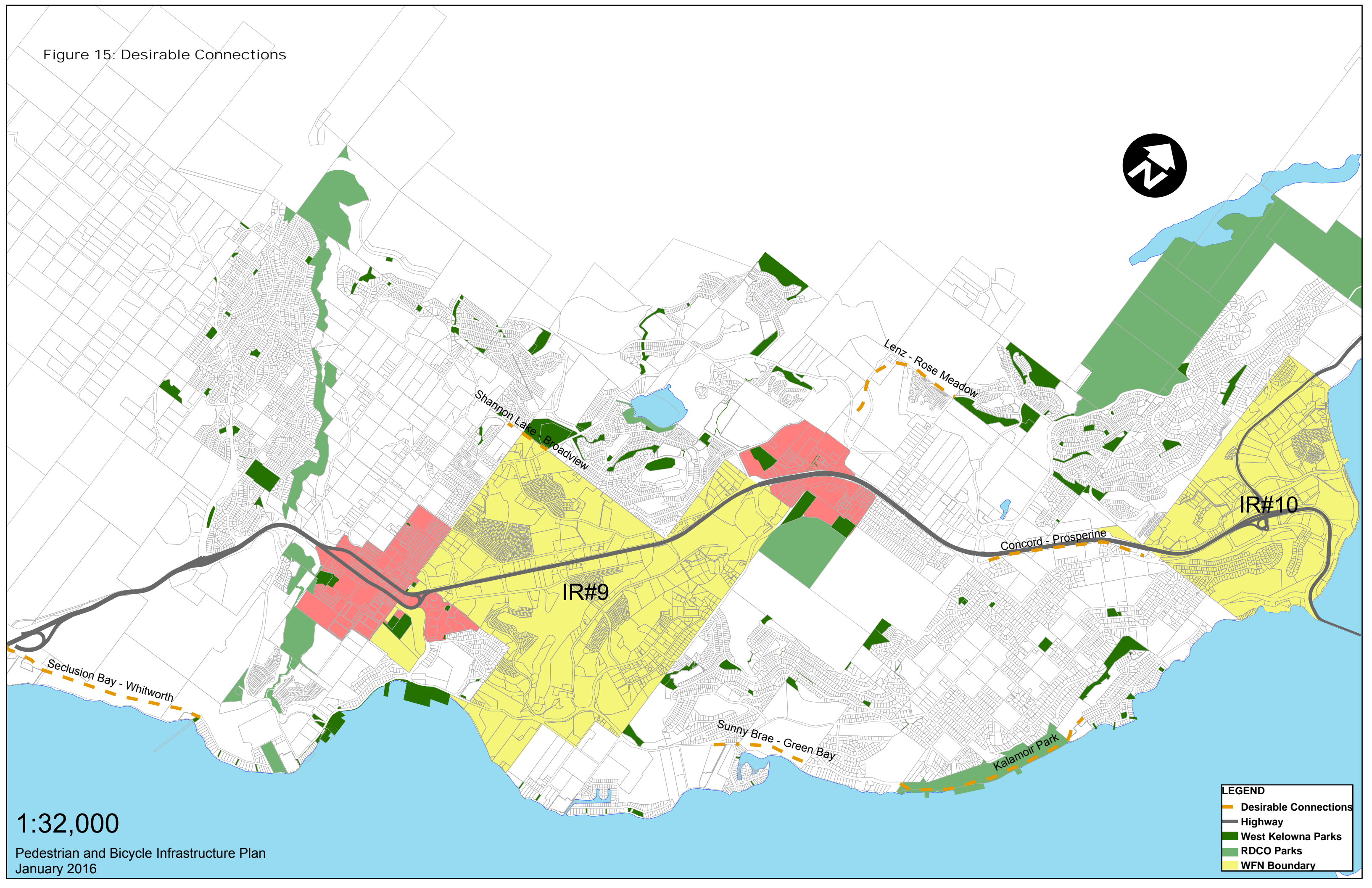
**LEGEND**

-  Rapid Bus
- On-Road Bike Network**
-  BikeLanes
-  ClimbLane
-  SidebySide
-  SingleFile
-  Desirable Connections
-  Highway
-  West Kelowna Parks
-  RDCO Parks
-  WFN Boundary

1:28,000

Pedestrian and Bicycle Infrastructure Plan  
January 2016

Figure 15: Desirable Connections



1:32,000

Pedestrian and Bicycle Infrastructure Plan  
January 2016

**LEGEND**

- Desirable Connections
- Highway
- West Kelowna Parks
- RDCO Parks
- WFN Boundary

### 6.4.1 Kalamoir Park

Kalamoir Park is under the jurisdiction of the RDCO. It contains many different trails over its 27.6 hectares. One of these trails is the Waterfront Trail along the lake shore. This relatively flat trail consists of gravel surface approximately 1m wide, **Figure 16**. Kalamoir Park ties in with the desirable trail network along Okanagan Lake running from the William R. Bennett Bridge to Whitworth Road. The Waterfront trail already has connections on Benedick Road in the East and Sunnyside Road in the West; there is also a paved vehicle access to Collins Hill Road. This is an important link not only for recreational users but for people looking to avoid the Highway on their commute to Kelowna.



**Figure 16: Waterfront Trail in Kalamoir Park**

### 6.4.2 Seclusion Bay Road / Whitworth Road

This 1800m connection links seclusion bay road with Whitworth Road or onto Gellatly Regional Heritage Park on Gellatly Road. This would provide for an off-road connection between West Kelowna and Peachland. Currently the only active transportation connection to Peachland is along Highway 97. This not only poses significant grade problems when climbing from the waterfront (approximately 160m) but it exposes vulnerable pedestrians and cyclists to the high traffic volumes of the highway. This connection provides for an off-road, multi-use trail along Goats Peak that significantly reduces grades and continues the waterfront trail onto Peachland, the goal of Trails 2000.

### 6.4.3 Sunnybrae Road / Green Bay Road

Connecting Sunnybrae Road and Green Bay Road would cut out the considerable climb incurred from Sunnyside Road to Boucherie Road. This 700m connection would create an off-road, multi-use trail that would enhance the waterfront trail and provide a safe, useable link to Kalamoir Park. Currently users wishing to continue along the waterfront must climb

approximately 40m up Sunnyside Road and use Boucherie Road to by-pass this section. The desirability of an active transportation link is greatly increased when grades are minimized or eliminated. This connection eliminates having to climb the grades along Sunnyside Road and Boucherie Road as well as provides further separation of vehicles and active transportation users.

#### 6.4.4 Lenz Road / Rose Meadow Road

Linking neighbourhoods by facilities dedicated to active transportation promotes walking and cycling by removing barriers such as narrow roads and long travel times. Connecting Lenz Road with Rose Meadow Road is one of these desired neighbourhood links. At 540m this connection would link Rose Valley with Shannon Lake and Boucherie Center through Lenz Road and Bartley Road. Currently users must use McDougall Road or Westlake Road in order to access Boucherie Centre and destinations beyond. Both of these roads carry significant amounts of traffic traveling to and from the Rose Valley neighbourhoods as well as heavy, continuous grades. Creating an active transportation link between Lenz Rd and Rose Meadow Road provides a desirable alternative to these roads for pedestrians and cyclists.

#### 6.4.5 Shannon Lake Road / Broadview Road

A connection between Shannon Lake Road and Broadview Road provides a neighbourhood link between Shannon Lake and Smith Creek. The proximity of Kinsmen Park and local neighbourhood businesses makes this a desirable link for residents in Smith Creek, as well as a desired connection for the Westside Farm Loop. Currently users must use Asquith Road or Reece Road. This 540m link would cut out heavy grades on Asquith Road and allow users to avoid a narrow section of Shannon Lake Road to the south of Kinsman Park. This connection is part of the Recreational Trails Master Plan.

#### 6.4.6 Concord Road / Proserpine Road

The RapidBus Expansion and the desire to provide active transportation facilities that are separated from the highway make the connection between Concord Road and Proserpine Road desirable. This 1000m link would parallel Highway 97 from Concord Road to Proserpine Road and onto Boucherie Road. Recent upgrades to Boucherie Road and the new RapidBus Station at Westlake Road creates a desire to increase and improve access to this area. Currently users must use the Highway or Hudson Road and Boucherie Road, a route that contains long, steady grades. Separating pedestrians and cyclists from fast moving highway traffic allows for greater user comfort and safety.

## 7.0 FACILITY TYPES AND CROSSINGS

### 7.1 Pedestrian Facility Types

Pedestrian facility types consist of sidewalks, paved pathways, trails, and multi-use facilities. Typical cross-sections in the Works and Services Bylaw No. 0120 set the criteria for widths, surface treatments depending on the road classification (for on-road facilities) or trail type (for off-road facilities).

#### 7.1.1 Pedestrian Facilities and Street Lighting

As mentioned in **Section 2.3.1** on pedestrian Barriers to Walking, two the most common barriers to walking are inadequate facilities and safety concerns (personal security, vehicle conflicts, and poor street lighting). Adequate levels of lighting are important for pedestrian visibility to other road users and the personal security of individual pedestrians.

Pedestrian facilities should be separated from the roadway to reduce the risk of vehicle-pedestrian conflicts. This may be achieved by locating a boulevard space between the sidewalk and roadway, or ensuring barrier curb (as opposed to rolling/mountable curb) is used at the roadway edge to limit vehicles rolling onto or parking on sidewalks.

Street lighting is limited in many of West Kelowna's older neighbourhoods and is important for personal safety. The Crime Prevention Through Environmental Design (CPTED) Guidelines identify that high pedestrian traffic areas should provide pedestrian-scale street lighting. These key areas are in the vicinity of transit exchanges, schools, commercial zones, and community centres. These land uses are expected to have high pedestrian traffic during low light / dark conditions in the winter months. While schools may predominantly operate during daylight hours, after school activities can extend into evenings resulting in pedestrian travel. It is commonly noted during the winter months that many pedestrians travel in dark clothing.

While sidewalks and separated pathways provide a greater degree of protection to pedestrians than walking on shoulders, street illumination is still important for intersections and crosswalks to ensure visibility of pedestrians in crossing and at either extent. In cases where added pedestrian facilities are not raised or separated from the roadway, illumination should be enhanced to ensure adequate visibility of pedestrians on the roadway.

On-road bicycle facilities are less of a concern for additional lighting as they are required to have lighted lamps on the front and back and a rear reflector by the BC Motor Vehicle Act. They are also generally more integrated with vehicular traffic and benefit from conventional street lighting.

## 7.2 Bicycle Facility Types

Bicycle facility types that have been selected for West Kelowna are noted below. Facilities that were identified are considered practical to tie-in with existing facilities.



### Multi-Use Pathway

Physically separated from roads and provide sufficient width and supporting facilities to be used by cyclists, pedestrians, and other non-motorized users. Refer to Recreational Trails Master Plan for more details.

Width: 3.0 to 5.0m width desirable



### Bike Lane

Designated exclusively for bicycle travel. Most appropriate on arterial and collector routes. Width dependent on traffic volume and grade.

Width: 1.8m preferred. Should be no less than 1.5m and no more than 2.0m. A “buffered” lane may be considered if more space is available. Buffers of 0.5m may also be placed adjacent to parked cars to allow for additional separation for opening and closing doors.

Signs: Reserved Bicycle Lane sign (RB-91)

Marking: Bicycle Symbol, Diamond Symbol

### Climbing Lane

Intended for roads with steep grades with a bike lane to accommodate uphill cyclists and shared use (side-by-side preferred) for downhill cyclists that keep pace with vehicle traffic. Climbing lanes may be installed on roads at least 8% grade.

Width: Bike lane should be at least 2.0m to accommodate cyclist sway

Signs / Markings: Same as “Bike Lane” and “Shared Use” facilities



**Shared Use, side-by-side**

Designed for vehicles and cyclists to travel side-by-side. Shared lanes have not been widely applied because they do not provide a sense of safety in novice cyclists.

Width: Minimum 4.3m, maximum 4.8m

Signs: Bicycle Route Marker sign (IB-23), Share the Road sign (WC-19) optional

Markings: Shared Use Lane symbol (“sharrow”) centred 1.0m from curb or parked vehicles



**Shared Use, single file**

Intended for cyclists to occupy the centre of the lane, used where insufficient space for side-by-side travel and roads 50 km/h or less with short block lengths.

Width: Less than 4.0m

Signs: Bicycle Route Marker sign (IB-23), Shared Use Lane Single File sign (WC-20) optional

Markings: Shared Use Lane symbol (“sharrow”) placed in the centre of the lane

**7.3 Bikeway Traffic Control Devices**

**Pavement Markings**



**Bike Lane**

Bike lanes are demarcated with the bicycle and diamond symbols. Markings are placed 10m downstream from an intersection and spaced a minimum of 200m apart between intersections.



**Shared Use Lane**

Shared use facilities (side-by-side, single file) are demarcated with the shared use lane (“sharrow”) marking placed on the pavement surface in the intended area of bicycle travel. Markings are placed 10m downstream from an intersection and at maximum intervals of 75m.

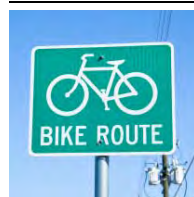
## Signage



**Shared Pathway** RB-23 Shared Pathway signs indicate that both cyclists and pedestrians are permitted to use the path.



**Reserved Bicycle Lane** RB-90, RB-91 Reserved Bicycle Lane signs indicate that a lane is reserved for bicycles. Signs are mounted above (RB-90) or adjacent (RB-91) a bike lane, and placed downstream from intersections (maximum 15m from the end of the curb radius) and subsequent signs at 200m intervals. A Reserved Lane Ends sign (RB-92) is installed to indicate where a bike lane ends.



**Bicycle Route Marker** IB-23 Bicycle Route Marker signs identify on- and off-road routes that form part a bicycle network. Signs are placed 20-30m in advance of and following intersections and other decision points. This sign may be combined with Arrow Tab signs and is unnecessary where Reserved Bicycle Lane signs (RB-90, RB-91) are used.



**Share the Road** WC-19 Share the Road signs warn motorists that they are to provide adequate driving space for cyclists on the road. May be used on a shared use facility or to indicate road configuration changes such as discontinuation of a bike lane. Must include "Share the Road" tab and should include shared use lane markings when used on a shared use facility.



**Shared Use Lane Single File** WC-20 Shared Use Lane Single File signs warn motorists and cyclists that cyclists are allowed full use of the lane ahead and that the lane is too narrow for side-by-side travel. Must include "Single File" tab and shared use lane markings to indicate the intended cyclists positioning in the lane.

Based on Transportation Association of Canada, Bikeway Traffic Control Guidelines for Canada, 2<sup>nd</sup> Edition, February 2012

## 7.4 Pedestrian Crossings

Due to the increased risk for pedestrians and cyclists, active transportation infrastructure should be designed to reduce the number of crossings. By utilizing and continuing existing infrastructure along the same side of the road the number of required crossings can be reduced. For the locations where crossing are warranted, a properly marked crossing should be utilized to improve the visibility, comfort and safety for pedestrians. The following is a list of locations where the upgrade of existing or installation of new crossings may be warranted. More specific crossing drawings are shown for select locations in **Appendix A**. It should be noted that Highway 97 is in the jurisdiction of the Ministry of Transportation and Infrastructure and improvements to highway intersections would be supported by the City when their roads intersect, but are ultimately Ministry projects.

### Boucherie Road / Anders Road and Boucherie Road / Hudson Road

Boucherie Road is part of the Wine Trail therefore and the arterial cross-section will locate a multi-use pathway on the lakeside (eastside) with some sidewalks opposing to connect streets and transit stops. There is a marked pedestrian school crossing and school zone signage on Boucherie Road and Anders Road from the now closed Lakeview Heights Elementary School (shown in **Figure 17** and **Figure 18**). Anders Road still serves pedestrian travel for the Lakeview Community Centre and the Lakeview Heights Shopping Plaza that may warrant a pedestrian crosswalk.



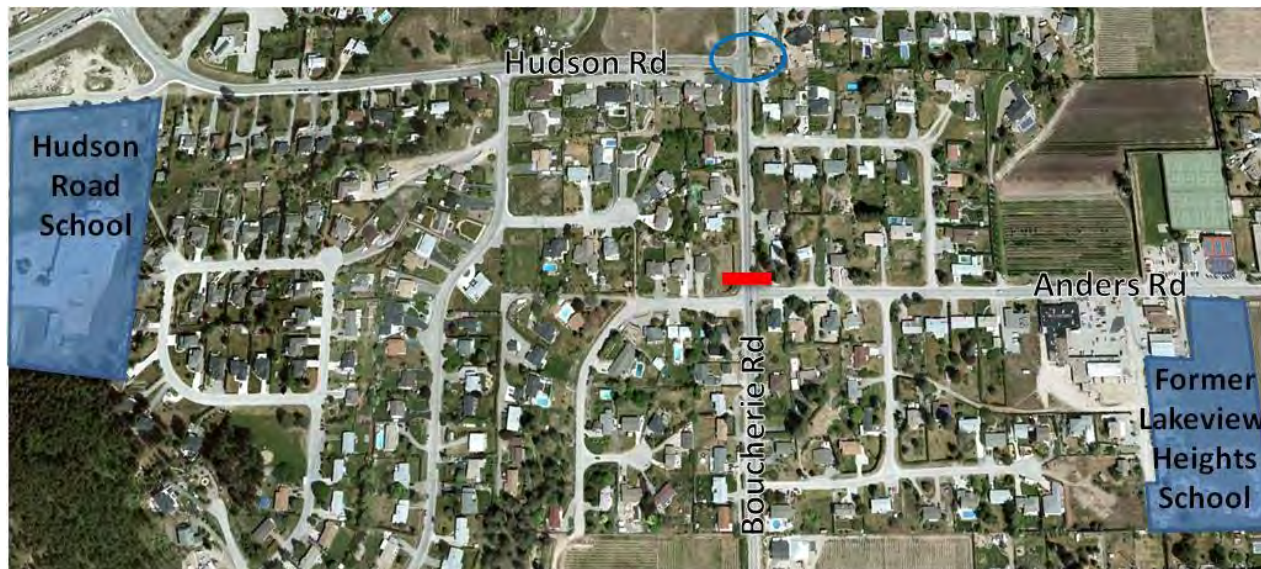
**Figure 17: School Crosswalk at Boucherie Road and Anders Road**



**Figure 18: School Zone Sign Approaching School Crossing at Anders Road**

The Hudson Road Elementary is accessed from Hudson Road north of Anders Road. **Figure 19** shows the existing school crossing for the Lakeview Heights Elementary approximately 200 metres south of Hudson Road at the intersection of Boucherie Road and Anders Road. The school crossing may be better suited at the Hudson Road crossing to provide a crossing for

students from homes east of Boucherie Road. Crossings warrants should be reviewed for Boucherie Road at Anders Road and Hudson Road when school is in session. Future capital improvements for Boucherie Road should re-evaluate the most suitable locations for crossings.



**Figure 19: Boucherie Road and Hudson Road Existing Crossing 200m South (Red)**

#### **Boucherie Road / Mission Hill Road**

Due to its connection with Mission Hill Winery and the location of adjacent transit stops a pedestrian crossing may be required at the intersection of Mission Hill Road and Boucherie Road.

#### **Boucherie Road and Gellatly Road**

The multi-use pathway and bike lanes along Gellatly Road North will see an increase of pedestrian and cycling traffic to and from the waterfront. This will provide a high capacity link between Westbank Centre and the waterfront. As Boucherie Road and Gellatly Road are both arterials the need for a crossing at the base of Gellatly Road may be warranted. This crossing will provide access to the multi-use path along the waterfront as well as the future Wine Route facilities along Boucherie Road. There are no current crossing facilities at this location.

#### **Gellatly Road / Whitworth Road**

The sidewalk along this section of the pedestrian network will move from the westside to the eastside of Gellatly Road. This crossover combined with the users coming to and from the Whitworth Road facilities (Nut Farm and Waterfront) may provide enough demand to warrant a crossing at this location.

### Shannon Lake Road / Tallus Ridge Drive

A roundabout is currently being designed for Shannon Lake Road / Tallus Ridge Drive that will have sidewalks on all four quadrants and tie-in to existing sidewalk to the south of the intersection.

### Shannon Lake Road / Swite Road

Swite Road is the main access and parking area for the Shannon Lake Regional Park. A crosswalk over Shannon Lake Road may benefit the access to the park from the West sidewalk. Pedestrians using the east sidewalk will need to cross at this location in order to continue to Tallus Ridge Drive and beyond. Currently there are no crossing facilities.

### Westbank Centre

Westbank Centre contains four main North-South road crossings of Highway 97, Hebert Road, Elliott Road, Brown Road, and Old Okanagan Highway. These four crossings are situated along desire lines between the residential areas in the north and the shopping and recreational areas to the south and as such each should carry sufficient pedestrian crossing infrastructure. Currently each intersection has a signalized crossing on each of the legs with letdowns into each crosswalk. To provide better comfort and shorter crossing distance, there are pavement markings and curb extensions for each crossing.



**Figure 20: Obstructions at the Corner of Hebert Road and Dobbin Road Creating Accessibility Barriers**

#### 7.4.1 Intersections with Provincial Highways

The following identifies intersections with Highway 97 that are under the jurisdiction of the Ministry of Transportation and Infrastructure. Improvements are suggested to enhance safety, mobility, and accessibility of pedestrians and cyclists crossing these facilities.

### Highway 97 Interchange / Glenrosa Road / Gellatly Road South

The Glenrosa community is accessed through a single, central location at the base of Glenrosa Road. The majority of traffic entering or exiting the community does so through Highway 97; with the remaining traffic using the nearby Lower Glenrosa Road. Pedestrians and cyclists use the Glenrosa Road overpass as a means of crossing Highway 97. This crossing provides the main access to and from the Glenrosa neighbourhood for pedestrians and cyclists traveling to and from the waterfront. Currently there are painted shoulders on each side of the overpass and a single sidewalk on the eastside, **Figure 21**. The Gellatly Road and Northbound On/Off ramp signalized intersection provides pedestrian crossing signals, however the intersection of Glenrosa Road and the Southbound On/Off ramp is stop controlled in the southbound direction (Highway 97) and provides marked crosswalks to cross the off-ramp and Glenrosa Road. Loop sensors imbedded in the pavement can detect the presence of a vehicle through magnetic fields. They may not be sensitive enough for bicycles or unable to detect aluminum and composite bicycle frames. Bicycle push buttons can aid Due to the high volume of traffic, including a significant amount industrial traffic accessing Gorman Brothers Plant, the need for a carefully designed and visible crossing is critical for reducing conflict points and improving pedestrian and cyclist safety. Conceptual designs for the crossing are shown in **Appendix A**



**Figure 21: Gellatly/Glenrosa interchange showing existing crossings in red**

### Highway 97 / Bartley Road

Given its central location in the Boucherie Centre and proximity to the new Boucherie Mountain Transit Exchange, Mt. Boucherie Secondary School, and Civic Centre this crossing will see significant use by pedestrian and cyclists. Currently there is only one signalized crosswalk in the east leg of the intersection to cross Highway 97, **Figure 22**, and no dedicated facilities for bicycles. To add further complexity the close proximity of three intersections (Bartley Road / Stevens Road, Bartley Road / Byland Road, and Bartley Road / Ross Road) creates numerous conflict points for pedestrians and cyclists. Conceptual designs for the crossing are shown in **Appendix A**

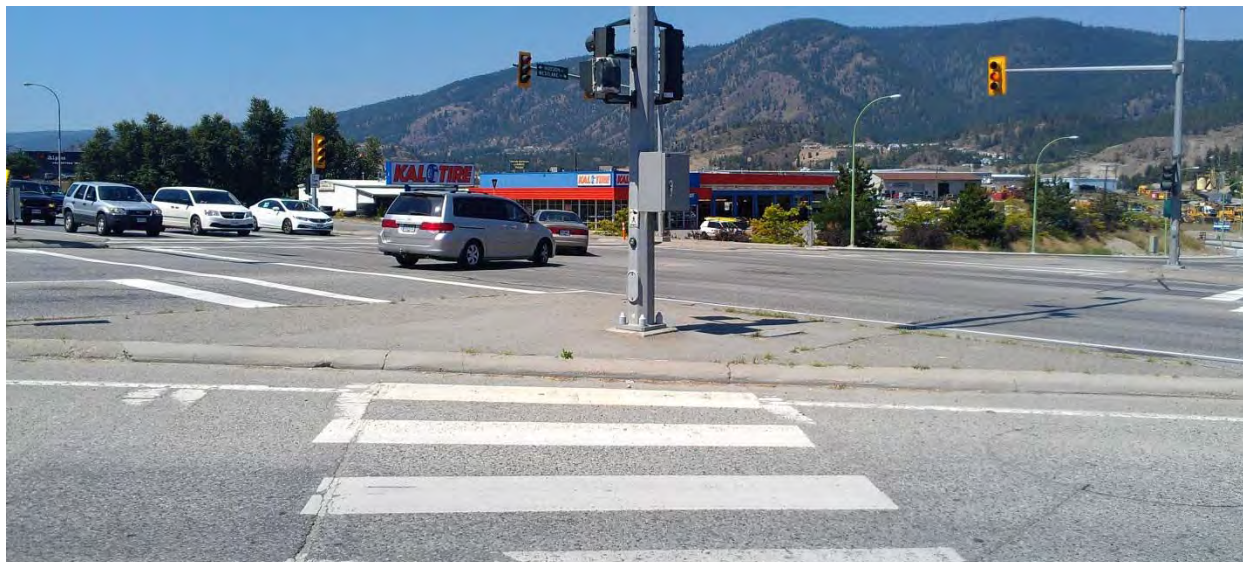


**Figure 22: Bartley Road Crossing Highway 97, Existing Crossings in Red**

### Highway 97 / Westlake Road

The intersection of Westlake Road and Highway 97 will be an increasingly important crossing for pedestrians and cyclists. Bike lanes from Westlake Road, Hudson Road, and Stevens Road converge on this one crossing. Besides linking the communities of Lakeview Heights and Rose Valley this crossing will see active use by students travelling to and from Mt Boucherie Secondary. Currently there is one signalized crosswalk on the west leg of the intersection and

two more on the north and south legs crossing Westlake Road and Hudson Road respectively. Letdowns do not exist, but plans are underway to add them (see **Figure 23**). The current plans for the bike lanes are to move them to the pedestrian crossing. This does not satisfy the needs of the cyclists and the design should at least facilitate cyclist through movements crossing Highway 97.



**Figure 23: Hudson Road / West Lake Road Crossing with Highway 97: Marked Pedestrian Crosswalk Does Not Feature Letdowns**

### **Highway 97 / Gellatly Road / Gosset Road**

The north end of Gellatly Road is the upmost access point for on-road access from Westbank Centre to the waterfront by both pedestrians and cyclists. Safe crossing of Highway 97 to Gosset Road and onto Westbank Centre is key for the connectivity of this route. Considerations for pedestrians and cyclists should be taken into account for facilities that are accessible and provide user comfort across the busy highway. The existing infrastructure consists of one signalized crossing of Highway 97 in the east leg of the intersection and a signalized crossing of the north and south leg. Conceptual designs for the crossing are shown in **Appendix A**.

## 8.0 END-USE FACILITIES

End-use facilities refer to bicycle parking and complementary facilities that enhance the cycling experience and encourage new cyclists by ensuring cyclist needs are accommodated at the end destination. End-use facilities address some of the most commonly cited barriers to cycling – fear of bike theft/vandalism and need to shower and change at the workplace.

End-use facilities are generally considered in two categories – bike parking and complementary facilities. Each is described in subsequent sections in detail.

### 8.1 Bike Parking

Bicycle parking includes both long-term (referred to as “Class I”) and short-term (“Class II”) parking. Each satisfies differing needs depending on trip duration, level of security/comfort, and desired weather protection. See **Table 4**.

**Table 4: Characteristics of Short- and Long-Term Bicycle Parking<sup>6</sup>**

Criteria	Short-Term	Long-Term
Duration	Less than two hours	More than two hours
Fixture Types	Bike racks	Lockers or racks in a secured area
Weather Protection	Unsheltered or sheltered	Sheltered or enclosed
Security	Personal locking devices and passive surveillance	Unsupervised – Individual secured (locker) or group secured (bike room) Supervised – valet bike parking, video/CCTV
Land Uses	Multi-family residential, retail, parks, recreation and community facilities	Multi-family residential, employment places, schools

The City recently adopted new bicycle parking requirements in the March 2014 Zoning Bylaw update. Requirements have been established for Class I (long-term) and Class II (short-term) bike parking for a range of land uses – apartment/townhouse, retail commercial, office,

<sup>6</sup> Association of Pedestrian and Bicycle Professionals (APBP), Bicycle Parking Guidelines, 2nd Ed., 2010

industrial, community/assembly, and educational and medical facilities. More information on bike parking requirements is available in Zoning Bylaw No. 0154, Section 4.9<sup>7</sup>.

### 8.1.1 Short-Term Bike Parking

Short-term bike parking is typically utilized as part of shopping, appointments, leisure/social, or recreational trips and is intended for stays of two hours or less. Short-term bike parking can be accommodated informally on fences, trees, street lights and benches, but a properly designed and placed bike rack, **Figure 24** and **Figure 25**, provides for more orderly bike placement to avoid damage to bicycles and prevent obstructing pedestrian and vehicle spaces.

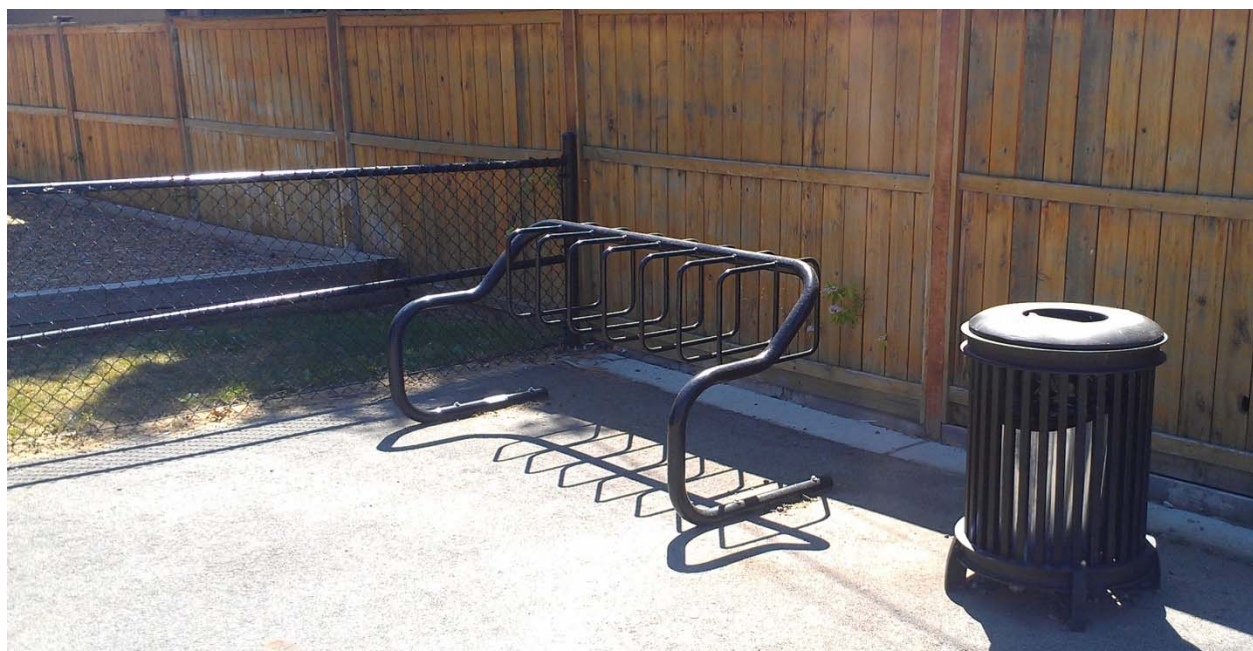
#### Preferred Bike Rack

The City should identify a preferred bike rack supplier and model to be used for all future bike rack installations. The chosen rack may be part of a coordinated street furniture program. This will create consistency throughout West Kelowna and ensure appropriate racks are used. Typical costs are \$500-\$1,000 per rack, depending on the size and design.



**Figure 24: Brown Road Westbank Centre Bike Parking**

<sup>7</sup> Available at - <http://www.districtofwestkelowna.ca/241/Zoning-Bylaw-Number-0154>



**Figure 25: Bike Rack at Marina Park**

### **Bike Rack Funding**

The City should create a bike parking funding program that makes monies available to private land owners or businesses interested in providing bike racks at their site. The program should involve an application process that clarifies the types of eligible recipients and funds should be provided as a 50-50 match with private investment. The City should develop a bike rack design(s) that are arranged through a supplier.

### **Kelowna Bike Rack Program**

The City of Kelowna's "Bike Rack Program" offers a subsidy of up to 50% of the cost to purchase and install bike racks at eligible businesses. More information on Kelowna's program at – [www.kelowna.ca/CM/Page4166.aspx](http://www.kelowna.ca/CM/Page4166.aspx)

### **Development Regulations**

As noted, the City recently adopted bicycle parking requirements as part of the Zoning Bylaw. The Class II (short-term) rates are considered appropriate and will ensure that future development includes adequate short-term bike parking. Although not required, the City should encourage developers to use the City's preferred bike rack for their Class II provision.

### 8.1.2 Long-Term Bike Parking

Long-term bike parking is intended for trips of two hours or longer and typically utilized by residents of multi-family residential units without a private garage, employees with a fixed place of employment (office, retail, industrial sites), and school and post-secondary sites. These facilities reduce the fear of bicycle theft or vandalism and provide opportunities for multi-modal trips (“trip chaining”) when provided at transit facilities.

#### **Bike Parking at Transit Exchanges**

The City will work toward improving cycling routes to/from major transit facilities through this Pedestrian and Bicycle Master Plan as a means to expand the transit catchment area and encourage multi-modal trips. To further enhance transit and cycling integration, long-term bicycle parking should be provided at Major Transit Exchanges<sup>8</sup> (Westbank Centre, Boucherie Mountain) and RapidBus Stations (Westside Rd, Westlake Rd, Butt Rd). Fully enclosed bike lockers should be provided with internal electrical outlets to allow for electric bicycle charging, as well as covered bike racks for cyclists without access to bike lockers (shown in **Figure 26**). Priority should be providing bike parking at major exchanges (Westbank Centre, Boucherie Mountain) and expanding to RapidBus Stations and high-usage bus stops where demand is demonstrated and funding is available.



**Figure 26: Bike Locker from Kelowna (left) and Sheltered Bike Rack in Esquimalt (right)**

As the City does not currently have the resources to administer a bicycle locker program, they should establish budget to provide covered bike racks at West Kelowna facilities. These

<sup>8</sup> More information on the Kelowna RapidBus project and related facilities planned for West Kelowna available at - [www.kelownarapidbus.ca](http://www.kelownarapidbus.ca)

facilities would include, but are not limited to, the public library, arenas, the Johnson Bentley Memorial Aquatic Centre, beaches, major parks, community centres, transit exchanges, and civic buildings. Businesses should also be encouraged to purchase bicycle racks. For the longer-term, the City should develop a bike locker program to implement bike lockers at public facilities.

Bike lockers should be administered by the City. This will entail a new function for City staff, either as part of the recreation and culture or transportation duties, which will require processing rental applications/fees, conducting regular monitoring and arranging maintenance, and promoting the service. Bike lockers should be rented at rates that encourage usage and not necessarily recover costs. Recommended rates are \$10/month or \$80/year. A refundable security deposit may be collected to cover costs for lost keys.

The City may also consider establishing a Sustainable Transportation Coordinator (or TDM Coordinator) function within the Development Services or Engineering and Public Works department with more direct responsibility for locker rentals and other sustainable transportation initiatives.

### **Development Regulations**

As noted, the City recently adopted bicycle parking requirements as part of the Zoning Bylaw. The Class I (long-term) rates are considered appropriate and will ensure that future development includes adequate long-term bike parking.

The City should consider developing more detailed design standards for Class I bike parking to ensure facilities are designed appropriately. This could be more detailed criteria in Zoning or a long-term bike parking design checklist that is distributed to prospective developers.

### **Bicycle Parking Design**

The following documents offer more information on bike parking layout and design:

Association of Pedestrian + Bicycle Professionals, Bicycle Parking Guidelines  
[http://c.ymcdn.com/sites/www.apbp.org/resource/resmgr/publications/bicycle\\_parking\\_guidelines.pdf](http://c.ymcdn.com/sites/www.apbp.org/resource/resmgr/publications/bicycle_parking_guidelines.pdf)

Transport Canada, Bicycle End-of-Trip Facilities  
[www.fcm.ca/Documents/tools/GMF/Transport\\_Canada/BikeEndofTrip\\_EN.pdf](http://www.fcm.ca/Documents/tools/GMF/Transport_Canada/BikeEndofTrip_EN.pdf)

City of Victoria, Bicycle Parking Guidelines  
[www.victoria.ca/EN/main/departments/engineering/parking/bicycle.html](http://www.victoria.ca/EN/main/departments/engineering/parking/bicycle.html)

Capital Bike + Walk Society, Bicycles at Rest  
[www.bicycleparkingonline.org](http://www.bicycleparkingonline.org)

## 8.2 Complementary Facilities

Complementary facilities provide further support to cyclists by ensuring they have appropriate shower/change facilities and access to equipment in case of repairs.

### 8.2.1 Development Regulations

The Zoning Bylaw provides for vehicle parking supply reductions in multi-family residential, mixed-use and commercial sites in Westbank Centre where cycling end-point facilities are provided. This provides incentive for future developments to provide for cyclist access to shower and sink facilities.

The City may consider adding a requirement for change rooms and locker facilities in future to support requirements for showers and sinks.

### 8.2.2 Repair Stations

Bicycle repair stations (referred to as “bike kitchens”) provide the necessary equipment to tune-up and make basic repairs to a bicycle. **Figure 27** shows a “bike kitchen” recently installed in Saanich, BC that includes a bike stand, air pump, tire levers, and wrenches / screwdrivers / hex keys. The City should provide bike kitchens in locations where cyclists may benefit, including in Westbank Centre, at major transit facilities, and along major cycling corridors.

It is recommended that two bike kitchens are installed on a trial basis. The District of Saanich recently installed a bike kitchen at cost of approximately \$2,000 (purchase and install)<sup>9</sup>.

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<sup>9</sup> Saanich installed a stand and pump from “Bike Fixtation” that has been successful. This supplier is recommended for West Kelowna. More information on Fixtation website - [www.bikefixtation.com](http://www.bikefixtation.com)



**Figure 27: Recently Installed “Bike Kitchen” in Saanich, BC**

*Photo Credit: District of Saanich*

### **City Program**

The City should develop a program to retrofit existing public places with bike racks and provide other end facilities such as the bike kitchen. A 5-year commitment of \$10,000 per year is recommended to start and program would be re-visited in 2020. Target locations for bike parking should include Westbank Centre, waterfront, key transit stops, civic sites, parks and trailheads, and schools.

### **8.3 Bicycle Stairway**

A bicycle stairway refers to a staircase with an inclined (wheeling) channel adjacent to facilitate walking a bicycle up or down the staircase. They are ideally located at end-point facilities in urban areas, major transit facilities, and at staircases on multi-use routes. They may be designed as a concrete channel adjacent to a concrete staircase or a metal “trough” installed on an existing staircase.

Accessibility requirements for handrails may be negatively impacted by bicycle channels by increasing the separation between pedestrians and handrails or removing them altogether. The channel should be designed to reduce the impact to handrails by using a U-shaped channel to allow for the bicycle to be held at an angle. This will reduce catching of the handlebars and

pedals against the hand railing while maintaining a narrower separation of the steps from the hand railing.

**Figure 28** shows a stairway with a bicycle wheeling channel. This design removes one hand railing and uses a flat channel which can be traversed downhill by a cyclist and can also be slippery for a cyclist pushing their bicycle uphill. Wheeling channels need to be regularly maintained to remove debris.



**Figure 28: Stairway with Bicycle Wheeling Channel in Victoria West**

Since the majority of people walk to the left of their bicycle, if only one channel is provided it should be located on the right side of an ascending stair case. Alternative routes are preferable since stairs are not accessible to cyclists. Stairway ramps should be used as a last resort. A design of the bicycle stairway is provided in **Appendix B**.

## 9.0 COST ESTIMATES

The Pedestrian and Bicycle Infrastructure Plan identifies 98 segments for pedestrian and/or bicycle infrastructure improvements. It should be noted that these projects are additional to the arterial road projects in the DCC program and Transportation Master Plan as well as the projects in the Recreational Trails Master Plan. The majority of the proposed pedestrian and bicycle segments are along roadways and a portion of them are off-road. Cost estimates were created for general projects with lineal (per metre) pricings with a 20% contingency and 15% to engineering. Costs include removals, installation of civil works (sidewalks, curb-and-gutter, asphalt, paint markings, signage, retaining walls, and lighting), and relocations of utility poles. Underground utilities are not included in the estimates. Additionally, specific pricings were determined for one-off projects that are context specific and required additional planning. **Table 5** summarizes the lineal cost estimates.

**Table 5: Summary of Lineal Infrastructure Cost Estimates**

DESCRIPTION	RATE
<b>Sidewalks</b>	
Add two-sided sidewalk (2.0m), curb-and-gutter, two-sided bike lanes + street lights	\$2,210/m
Add one-side sidewalk, curb-and-gutter, two-sided bike lane + street lights	\$1,430/m
Add one-side sidewalk, curb-and-gutter + street lights	\$1,220/m
Add one-side sidewalk, curb-and-gutter + two-sided bike lane	\$1,020/m
Add one-side sidewalk + curb-and-gutter	\$810/m
Extend one-side sidewalk and replace curb-and-gutter (for urban cross-sections)	\$500/m
<b>Paved Pathways</b>	
Add one-side paved pathway, two-sided bike lane + street lights	\$940/m
Add one-side paved pathway + street lights	\$840/m
Add one-side paved pathway + two-sided bike lanes	\$530/m
Add one-side paved pathway	\$440/m
<b>Multi-Use Pathways and Bike Markings / Signage</b>	
Add multi-use pathway + street lighting	\$1,280/m
Pave multi-use pathway over right-of-way (off-road) + lighting	\$690/m
Add bike signage and pavement markings	\$10/m

Notes: Source roads have rural cross-sections (no curb-and-gutter) unless otherwise noted  
 All sidewalks are to be 1.5m wide unless otherwise noted  
 Includes a contingency of 20% and engineering design of 15%  
 Does not include costs for underground utilities or property acquisition

## 10.0 IMPLEMENTATION PLAN

### 10.1 Prioritization

Prioritization of the pedestrian and cycling network links is paramount to establishing the implementation plan. The following hierarchy is applied to the network segments:

1. Funding opportunities
2. Capital plans
3. Continuity / connectivity
4. Safety and Latent demand
5. Boarding and alighting volumes at bus stops

Funding opportunities such as grants are not guaranteed, but should be taken advantage of as they are available. The priority would go to the implementation plan projects; however, circumstances may occur that would not apply to those projects. In such cases, priority projects should be sought. See **Section 10.4** for more details on funding opportunities.

The main purpose of this plan is to group pedestrian and bicycle infrastructure projects with other capital works. This will take advantage of already planned disturbances to the roadway and mobilization, traffic control, and administrative costs.

Continuity and connectivity refer to the pedestrian and bicycle facility networks. These are incorporated into prioritization ratings to identify sidewalk and bicycle links that would improve the connectivity of the network. Existing deficient letdowns occur at the end of discontinuous sidewalk facilities and will be improved with new sidewalk projects.

Safety is incorporated into the prioritization weightings by focusing on the proximity of facilities to the trip generators that create the greatest demand for walking and cycling. Facilities near these locations will have the highest number of users and the greatest need for safe and accessible facilities. These trip generators include the transit exchanges, schools, community centres, neighbourhood commercial, major parks and heritage sites, major bus stops, and facilities on the winery or farm route links. These facilities also have the highest latent demand. Once facilities are built, they will attract more users to make walking and cycling trips thereby meeting latent demand. Without boarding and alighting volumes at the bus stops, latent demand is assessed from facilities that will generate active transportation trips. Facilities that generate trips or are most likely to be utilized through active transportation have been broken down and given a particular weight. The amount of weight given to a facility depends on its desirability or need for active transportation facilities. **Table 6** shows the weights applied to each trip generator. Two radii are applied around each project, 400m for a 5-minute walk and 800m for a 10-minute walk. Higher scores are given to projects that fall within the 400m radius and lower scores for those that are between 400m and 800m. Some facilities (Farms, Wineries, and Major

Bus Stops) only apply to a project if they lay directly on the same network link as the project. Major bus stops refer to timing points in the transit routes.

**Table 6: Prioritization Weightings**

TRIP GENERATOR	5-MINUTE WALK	10-MINUTE WALK
Transit Exchange	10	6
Elementary School	9	6
Middle/Secondary School	8	5
Community Centres	7	4
Neighbourhood Commercial	7	5
Major Parks & Heritage Sites	7	4
Network Link Weights		
Connects Links	5	
Extend Link	2	
Major Bus Stop on Link	4	
Winery or Farm Route on Link	2	

The scores are summed up and put into a ranking. All projects are ranked, but some can also be tied to other capital plans to provide an opportunity to cover some of the costs for mobilization and removals. **Appendix C** provides a complete list of the projects with weighted rankings.

## 10.2 Prioritization of Pedestrian and Bicycle Facilities Near Schools

Pedestrian and cycling facilities near schools are a priority for the City of West Kelowna. In September 2015, Council increased funding for pedestrian infrastructure near schools. This method focuses on providing at least on-sided sidewalk near schools to improve pedestrian and bicycle infrastructure within a 10-minute walking radius. The segments are prioritized over the weighted rankings into: (1) short-term priority projects within 10-minute walking radius of schools (see **Figure 29**); (2) all projects within 10-minute walking radius of school (see **Figure 30**). The prioritized segments are listed in **Appendix C** and summarized in **Table 7**.

There are a total of 99 pedestrian and bicycle infrastructure projects totalling 39.5 km of facilities and \$30.0 million. The short-term priority projects within a 10-minute walking radius of schools account for 26 projects, 6.5 km of facilities, and a cost just over \$4.0 million. The remaining projects within a 10-minute walking radius of schools account for 31 projects (includes short-term projects), 10.7 km of facilities, and total \$11.8 million. There are 42 remaining projects totalling a length of 22.3 km for a cost of \$14.2 million.

Figure 29

# SHORT TERM PRIORITY PEDESTRIAN IMPROVEMENTS WITHIN 10 MIN WALKING RADIUS OF SCHOOLS



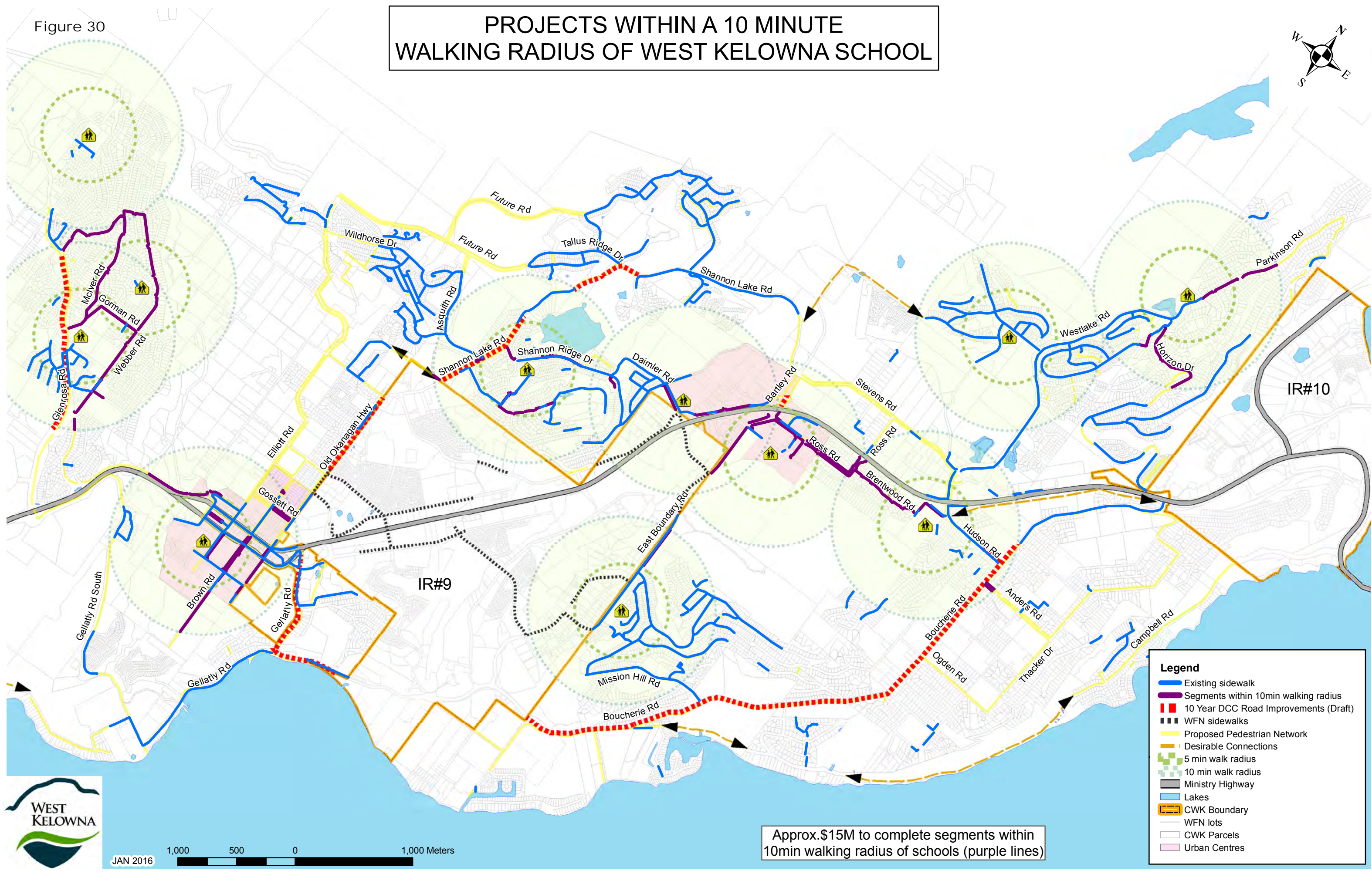
**Legend**

- Existing sidewalk
- Short Term Priority Segments (10min walking)
- 10 Year DCC Road Improvements (Draft)
- WFN sidewalks
- Desirable Connections
- 5 min walk radius
- 10 min walk radius
- Ministry Highway
- Lakes
- CWK Boundary
- WFN lots
- CWK Parcels
- Urban Centres



Figure 30

# PROJECTS WITHIN A 10 MINUTE WALKING RADIUS OF WEST KELOWNA SCHOOL



**Legend**

- Existing sidewalk
- Segments within 10min walking radius
- - - 10 Year DCC Road Improvements (Draft)
- - - WFN sidewalks
- Proposed Pedestrian Network
- Desirable Connections
- 5 min walk radius
- 10 min walk radius
- Ministry Highway
- Lakes
- CWK Boundary
- WFN lots
- CWK Parcels
- Urban Centres

Approx. \$15M to complete segments within 10min walking radius of schools (purple lines)



JAN 2016 1,000 500 0 1,000 Meters

**Table 7: Prioritized Pedestrian and Bicycle Projects**

DESCRIPTION OF PROJECTS	NUMBER OF PROJECTS	TOTAL LENGTH (KM)	TOTAL COST
Short-Term within 10-Min Walking Radius of Schools	26	6.5	\$4,004,000
Remaining within 10-Min Walking Radius of Schools	31	10.7	\$11,814,000
All Other Projects	42	22.3	\$14,172,800
<b>Total</b>	<b>99</b>	<b>39.5</b>	<b>\$29,990,800</b>

Prioritizing the short-term priority projects within 10-minute walking radius of schools will better facilitate safe and efficient active transportation near schools. Following active transportation improvements near schools, it would be beneficial to evaluate whether vehicular trips to/from nearby schools are reduced.

### 10.3 Easy to Implement Projects

Many of the cycling facilities can be created on existing infrastructure with little additional cost to sign and mark the routes. **Table 8** shows a list of low budget and easy to implement projects. Bike lane projects have sufficient existing space to accommodate the lanes. The projects total \$55,400. Projects are also noted on the total project lists in **Appendix C**.

**Table 8: Easy to Implement Low Budget Projects**

PROJECT	Length (m)	Cost
Stuart Rd from Thacker to Hayman Rd Single File Signage and Pavement Markings	219	\$2,200
Thacker Dr from Montigny Rd to Stuart Rd Single File Signage and Pavement Markings	2812	\$28,100
Montigny Rd from Boucherie Rd to Thacker Dr Single File Signage and Pavement Markings	504	\$5,000
Hayman Rd from Stuart Rd to Keefe Rd Single File Signage and Pavement Markings	956	\$9,600
Cindy Rd from Trail Head to Harding Rd Single File Signage and Pavement Markings	118	\$1,200
Harding Rd from Cindy Rd to Angus Dr Single File Signage and Pavement Markings	320	\$3,200
Angus Dr from Harding Rd to Gellatly Rd Single File Signage and Pavement Markings	605	\$6,100

Note: Projects on Montigny Rd, Stuart Rd, Thacker Dr, and Hayman Rd are part of the same corridor.  
Projects on Cindy Rd, Harding Rd, and Angus Dr are part of the same corridor

## 10.4 Funding Opportunities

There are a variety of approaches that West Kelowna may take to fund future development of active transportation infrastructure beyond establishing capital budgets, including acquiring property or money through land development, individual donations, and funds through Provincial or Federal grant programs. Funding opportunities do not provide priority within this plan directly since they are not guaranteed; however, opportunities should be pursued as possible.

### 10.4.1 Land Acquisition

The City may seek easements or statutory rights-of-way where desired community trail connections exist on private property. Statutory rights-of-way may be pursued independent of subdivision and the land owner always retains the right of refusal on all negotiations.

### 10.4.2 Cash In-Lieu

The Local Government Act (LGA) is the enabling legislation allowing the community to undertake long-range planning and regulate land development. The LGA includes a number of opportunities for the community to leverage funds for active transportation infrastructure through land development. The community should consider the following approaches.

Section 938 permits the City to require the provision of sidewalks located and constructed in accordance with standards established in a Bylaw.

Section 933 permits the community to impose development cost charges (DCCs) to assist in paying the capital costs of infrastructure needed to service the development for which the charge is being imposed.

Section 906 allows the community to establish a Bylaw permitting a land developer to offer money to the community in-lieu of off-street parking spaces required in the Zoning Bylaw. Monies received are put into a reserve fund and used to develop public off-street parking or transportation infrastructure that supports walking, bicycling, public transit or other alternative forms of transportation.

### 10.4.3 Individual Donation

It is common-place for residents or organizations to donate property and/or funds toward community infrastructure. There are a number of ways the City may facilitate this process by making it simpler and more attractive to potential donors

- The City may establish an active transportation or trails endowment fund to instill confidence in potential donors that their contributions will be used for the intended use.

- The City may issue official donation receipts for the appraised fair market value of donated property or facilities, which the donor may use as a Federal or Provincial tax credit.
- The City may promote the donation process so potential donors are clear on the process and aware of the benefits.
- Donors may be recognized in the media to honor donors and develop a sense of pride around community development.

#### 10.4.4 Grant Programs

There are a variety of Provincial and Federal infrastructure grant programs that the community may pursue as a source of funding for active transportation infrastructure. Available grant programs change over time and the community should remain active in seeking out new Provincial or Federal funding initiatives that may be used for to develop active transportation facilities. The following is a sampling of the grant programs currently available.

- Bike BC is a \$31-million program for cycling infrastructure which municipalities will benefit from new, safe and high-quality cycling trails, bike lanes, bike lockers and more. For more information visit <http://www.th.gov.bc.ca/BikeBC/index.html>.
  - The Cycling Infrastructure Partnerships Program (CIPP) is a Provincial cost-share program for the construction of new cycling infrastructure. The City is eligible to receive a grant up to \$100,000.
- The Canadian Gas Tax Fund provides support toward infrastructure that contributes to cleaner air and reduced greenhouse gas emissions. This fund is allocated on a per-capita basis; over the next 10 years BC will receive \$1.3 billion. Eligible projects include local roads and bridges, highways, sport and recreation. For more information visit <http://www.infrastructure.gc.ca/plan/gtf-fte-eng.html>.
- Green Municipal Fund offers funding and knowledge to municipal governments and their partners for municipal environmental projects. Eligible projects include improvements to active transportation infrastructure around transit nodes, such as sidewalks, pedestrian crossings, pedestrian links from park and ride, bike paths and bike crossings, and end-of-trip facilities. Funding is provided for up to 80% of eligible project costs. In 2014-2015 there is \$40 million in loans and \$5 million in grants available. For more information visit <http://www.fcm.ca/home/programs/green-municipal-fund.htm>.

- The Community Works Fund is delivered twice annually to all local governments outside of the Greater Vancouver Regional District. Funding can be invested towards capital projects that improve public transit, local roads, bridges and tunnels, and active transportation. From 2005-2014, the City received \$4.3 million from this fund. For more information see <http://www.ubcm.ca/EN/main/funding/gas-tax-fund/community-works-fund.html>.

## 10.5 Capital Plans

Improvements to the pedestrian and cycling network are already identified in the City of West Kelowna's Transportation Master Plan and Recreational Trails Master Plan. The Water Utility Master Plan, Master Drainage Plan, and Sanitary Sewer Utility Master Plan identify opportunities for road works where additional pedestrian and cycling facilities can be added when removals to the existing roadway take place.

### 10.5.1 Road Network

The Transportation Master Plan and Draft DCC Capital Program identify improvements to the arterial roadways in West Kelowna over a 20-year period. Sidewalks / pathways and bike lanes will be included. The 20-year capital program on-road active transportation facility types, lengths, and costs are summarized in **Table 9**. With the capital program, the City is funding on-road active transportation improvements at an average of \$850,000 per year on pedestrian facilities and \$250,000 per on bicycle lanes. The arterial road DCC projects and arterial cross-sections are provided in **Appendix D**.

**Table 9: 20-Year Capital Program On-Road Active Transportation Facilities**

FACILITY TYPE	TOTAL LENGTH	TOTAL COST
Sidewalks*	12.4 km	\$ 14,070,000
Asphalt Pathways*	6.3 km	\$ 1,580,000
Multi-Use Pathways	5.1 km	\$ 1,170,000
Bike Lanes	25.9 km	\$ 4,870,000
<b>Total Active Transportation</b>	<b>49.7 km</b>	<b>\$ 21,690,000</b>

\* Includes supporting pedestrian infrastructure (street lighting and hand rails)  
Sourced from Draft DCC Capital Program

### 10.5.2 Trail Network

The City of West Kelowna Recreational Trails Master Plan identifies 151.5 km of on- and off-road trail projects. The capital plan identifies 18 projects over a 20-year period in 10-year horizons totalling \$956,000. These projects are in addition to the on-road projects identified in the Transportation Master Plan. Five projects have been identified along with the pedestrian and

bicycle infrastructure plan that will support improved connectivity and access for these modes. **Table 10** identifies the five projects, their segment lengths, cost, and implementation horizon from the Recreational Trails Master Plan. It summarizes important trail segments that are not part of the Transportation Master Plan that will benefit the pedestrian and cycling network.

**Table 10: Recreational Trail Connection Capital Plans**

PROJECT	LENGTH	COST	YEAR
1-A: George Court Trail from Nut Farm to Whitworth Rd Major Multi-Use Trail	138m	\$ 94,000	1-10
1-C: Reece Rd-Shannon Lake Rd Connector Narrow Multi-Use Trail via Broadview Rd	512m	\$107,000	1-10
2-A: Whitworth Rd Trail from George Ct to Pebble Beach Major Multi-Use Trail	784m	\$421,000	11-20
2-D: Bear Creek Rd Trail from Horizon Trail to Parkinson Rd Major Multi-Use Trail	809m	\$84,000	11-20

Note: Project scopes, costs, and implementation years from Recreational Trails Master Plan

### 10.5.3 Water Utility

The Water Utility Master Plan identifies 50 capital improvement projects to the City's drinking water infrastructure over a 20-year period costing \$151,044,500 (including growth related projects which represent \$73,210,000). Upgrades of watermains located under the surface of the roads provide for the opportunity to install new pedestrian and bicycle facilities. As the road surface will have to be lifted to access the watermains, new sidewalk and bike lanes can be installed as warranted during the resurfacing of the road. By combining the construction of this new infrastructure with the watermain upgrades the costs can be less than a stand-alone project as the equipment and materials can be shared between the two projects. **Table 11** identifies the amount of pedestrian and bicycle infrastructure projects that can be constructed in conjunction with the works effecting roadways in the Water Utility Master Plan. It should be noted that many of these projects are planned over the next five years and the pedestrian infrastructure has a substantial added cost.

**Table 11: Draft Capital Water Utility Projects Overlapping with Pedestrian/Bike Projects**

PROJECT	LENGTH	COST	SCOPE
<b>TD-4: West Kelowna Estates Transmission Main: \$2,470,000</b>			<b>2016</b>
.1 Parkinson Rd from Pettman Rd to Westlake Rd Southside Asphalt Pathway and Street Lighting	1061m	\$897,700	In Project Area
.2 Horizon Dr from Aurora Ht to Shaleridge P Westside Sidewalk and Street Lighting	265m	\$329,800	In Project Area
.3 Horizon Dr from Aurora Ht to Olympus Way Westside Sidewalk and Street Lighting	335m	\$415,200	Optional

PROJECT	LENGTH	COST	SCOPE
.4 Horizon Dr from Shaleridge Pl to Covington Cres Westside Sidewalk and Street Lighting	314m	\$389,600	Optional
.5 Horizon Dr from Existing Sidewalk to Covington Cres Westside Sidewalk and Street Lighting	200m	\$250,500	Optional
.6 Westlake Rd from Existing Sidewalk to Parkinson Rd Southside Asphalt Pathway and Street Lighting	332m	\$285,400	Optional
<b>D-1: Webber Road Watermain Upgrades: \$ 420,000</b>			<b>2017</b>
.1 Webber Rd from Malcolm Rd to McAllister Rd Westside Asphalt Pathway, Bike Lanes (from Malcolm to McAllister), and Street Lighting	156m	\$154,600	In Project Area
.2 Webber Rd from McAllister Rd to McRae Rd Westside Asphalt Pathway, Bike Lanes (from Malcolm to McAllister), and Street Lighting	257m	\$222,400	In Project Area
.3 Webber Rd from Malcolm Rd to Gorman Rd Westside Asphalt Pathway, Bike Lanes, and Street Lighting	330m	\$318,200	Optional
<b>D-3: Old Okanagan/Butt Rd Watermain Upgrades: \$850,000</b>			<b>2017</b>
.1 Butt Rd from Old Okanagan Hwy to Elliott Rd Southside Sidewalk and Street Lighting	347m	\$429,800	In Project Area
.2 Gosset Rd from Brendalee Rd to Old Okanagan Hwy Southside Sidewalk and Street Lighting	92m	\$81,000	In Project Area
.3 Gosset Rd from Brendalee Rd to Brown Rd Southside Sidewalk and Street Lighting	93m	\$81,800	Optional
.4 Gosset Rd from Brown Rd to Old Okanagan Hwy Two-side Sidewalk, Bike Lanes, and Street Lighting	185m	\$434,400	Alternate to .2 and .3
<b>D-6: McIver Rd and Gorman Rd Watermain Upgrades: \$300,000</b>			<b>2017</b>
.1 McIver Rd from Glenrosa Rd to Closed Rd Southside Asphalt Pathway and Street Lighting	240m	\$208,100	In Project Area
.2 Closed Rd from McIver Rd and Gorman Rd Asphalt Multi-Use Pathway and Lighting	191m	\$138,300	Optional

Note: Sidewalks include curb and gutter  
Costs do not include underground utilities or land acquisition

#### 10.5.4 Storm Drainage

There were no projects identified in the Storm Drainage Master Plan and the DCC Capital Program that would provide opportunities for additional pedestrian and bicycle infrastructure within the 20-year time frame.

### 10.5.5 Sanitary Sewer Utility

The Sanitary Sewer Utility Master Plan identifies thirteen capital improvement projects for the City’s sewer system over the next 20 years totalling \$10,820,000. As the sanitary sewer mains run under the surface of the roads it sees much of the same overlap as in the Water Utility Master Plan. While improvement work is being carried out on the sewer system under the road surface, new pedestrian and bicycle facilities can be constructed when the road is put back together. The cost for this new infrastructure is once again economized when compared with a stand-alone project due to the construction already taking place. **Table 12** lists the amount of pedestrian and cycling projects that share an overlap with the Sanitary Sewer Utility Master Plan as well as the extra cost associated with their construction.

**Table 12: Capital Sanitary Sewer Projects Overlapping with Pedestrian/Cycling Projects**

PROJECT	LENGTH	COST	SCOPE
<b>Gorman Rd Upgrade 250 to 300mm: \$58,000</b>			<b>2017</b>
.1 Gorman Rd from Closed Rd to Webber Rd Southside Asphalt Pathway	364m	\$166,700	In Project Area
<b>Upsizing of West Kelowna Trunk: \$ 240,000</b>			<b>11-20 Years</b>
.1 East Boundary Rd from Pike Rd to WFN Boundary Eastside Sidewalk, Climbing Lane and Street Lighting	489m	\$603,100	In Project Area
.2 Bartley Rd from Pike Rd to Ross Rd Eastside Sidewalk and Street Lighting	220m	\$274,900	Optional
.3 Ross Rd from Hewl Rd to Brentwood Rd Two-side Sidewalk, Bike Lanes, and Street Lighting	400m	\$994,000	Optional

Note: Sidewalks include curb and gutter  
Costs do not include underground utilities or land acquisition

### 10.6 Partnerships

There are instances where works being completed by adjacent jurisdictions can create partnerships for pedestrian and sidewalk infrastructure. These partnerships can save on mobilization and traffic control costs.

Westbank First Nation (WFN) is a key partner for completing infrastructure that connects and crosses through the two jurisdictions. The City of West Kelowna should coordinate with WFN on West Kelowna’s planned works for Old Okanagan Highway and Shannon Lake Road arterial links. Arterial upgrades for Boucherie Road should also be coordinated with WFN for connecting near Pritchard Drive. This link will be key to completing the Waterfront Trail. Arterial road projects are summarized in the **10.5 Capital Plans** section.

WFN has upgraded Old Okanagan Highway from Daimler Road to Shamrock Drive with a northside sidewalk, curb-and-gutter, street lighting, and widened shoulders. WFN plans to

complete the Old Okanagan Highway section with the same upgrades from their boundary near Grizzly Road to Louie Drive after 2015. The City of West Kelowna should partner with WFN to complete their section of Old Okanagan Hwy between the WFN boundary from Grizzly Road to Shamrock Drive to match the cross-section and complete the sidewalk connection. Campbell Rd from the bridge to Kalamoir Park will be an important connection to better facilitate in the longer term. A multi-use pathway is desirable, but lower priority. The projects are summarized in **Table 13**.

**Table 13: WFN Partnership Opportunities**

PROJECT	PARTNER	LENGTH	COST	YEAR
Old Okanagan Hwy from WFN to Shamrock Dr Northside sidewalk, street lighting, and shoulders	WFN	201m	\$ 294,400	0-5
Campbell Rd from WFN to Benedick Rd Narrow Multi-Use Pathway	WFN	1794m	\$1,567,300	11-20

Note: Sidewalks include curb and gutter  
Costs do not include underground utilities or land acquisition

The Waterfront Trail connections will require additional partners to complete key desirable links in the route. The long-term goal is to connect the W.R. Bennett Bridge to Peachland along the Waterfront in West Kelowna and WFN IR 9 and 10. Kalamoir Park facilitates a portion of this link and is under the jurisdiction of the RDCO. The RDCO has secured park lands in the Goat's Peak area with the intent of providing a connection from Whitworth Road to Seclusion Bay Road.

## 10.7 Financial Implications

The Pedestrian and Bicycle Infrastructure Plan identifies 94 capital projects (aside from the arterial road projects in the Transportation Master Plan and the Recreational Trails Master Plan) costing \$30,153,600. Over the next 20 years, this would require approximately \$1.5 million per year to complete indicating that some of the projects will not be completed within the next 20 years.

The Road Rehabilitation and Pedestrian Improvement Program is budgeting budgeted \$140,704 per year for pedestrian facilities in the past. Effective in 2016, this has been updated to \$600,000 for five years followed by \$250,000 for the following five years. This equates to \$4,250,000 over 10 years. This can accommodate the 26 short-term priority projects within 10-minute walking radius of schools (estimated at \$4.0 million) within the first 10 years.

The City should annually evaluate the project list for opportunities to secure grants, partner with neighbouring jurisdictions, planned developments, and other planned capital projects.

## 11.0 SUPPORTING POLICIES

The City of West Kelowna has some policies in place for maintenance of roads and sidewalks / walkways as well as pavement markings.

### 11.1 Review of Existing Policies

#### **Sidewalk, Walkway, and Stairway Snow Clearing Policy**

The City's policy on snow clearing of sidewalks, walkways, and stairways is to address the hazard of snow accumulation to pedestrians. The procedure identifies priorities for clearing as follows:

- Priority 1: Sidewalks/Walkways/Stairways surrounding City owned property and businesses, fronting bus routes, schools, medical institutions, and on major arterial routes that have no residences or businesses abutting them.
- Priority 2: Selected City sidewalks/walkways.
- Priority 3: Selected sidewalks fronting residences.

The Parks, Recreation and Culture department maintains a list of walkways which are closed for the season and those that remain open in an unmaintained state.

The City may provide an in-kind service to attempt to clear all sidewalks within 24-72 hours after a storm where there is snowfall of five centimetres or more. Sidewalks are cleared using sidewalk plowing and are not plowed to bare concrete. The occurrence of a second storm will reset the service objective of clearing sidewalks within 24-72 hours. The residences or businesses will be responsible to ensure all ice has been removed from their frontage.

#### **Pedestrian Infrastructure Inspection and Maintenance Policy**

This policy provides the Operations Department with an assessment tool for the condition of the pedestrian infrastructure (public sidewalks, walkways, and stairways) within the municipality in order to identify, repair, and/or mitigate any defects or hazards and to establish priorities for repairs according to the resources available.

The procedures identify inspection protocol for Type A (commercial, school, and institutional frontages) and Type B (residential, light commercial, and industrial). Type A sidewalks/walkways are inspected once annually after the last frost. Type B are inspected on a rotating annual basis in the spring or fall. Defects and hazards are identified as:

- Major – requiring immediate repair / not serviceable
- Moderate – placed on list of repairs / serviceable
- Minor – documented and monitored for next inspection / no effect on service

## **Pavement Markings**

Pavement markings delineate the travel path on the roadway and identify the shoulder. In terms of the pedestrian and bicycle facilities they indicate crosswalks, bike lanes, and sharrows. The City's practice on pavement markings is to remark line paintings annually and symbols / traverse markings are planned for every four years. There is however, no existing policy in place.

### **11.2 Policy Recommendations**

A low service of maintenance of the facilities can lead to users avoiding travel or using the roadway and exposing themselves to conflict with motor vehicle traffic. In areas of higher traffic volumes or speeds, it is recommended that bike lanes be provided, however, maintenance policies will need to prioritize clearing of dedicated facilities and routes.

Line paintings for bicycle lanes should be repainted annually. This would be consistent with the City of West Kelowna's current practices for line painting. Pavement markings for sharrows, bike lane markings, and pedestrian crossings should be updated every 3-5 years depending on wear.

Bike lanes require a larger degree of maintenance than shared use cycling facilities. Debris and snow accumulation can render the lanes inoperable forcing cyclists into the motorized traffic lanes.

## **12.0 RECOMMENDATIONS**

Boulevard Transportation recommends that the City of West Kelowna:

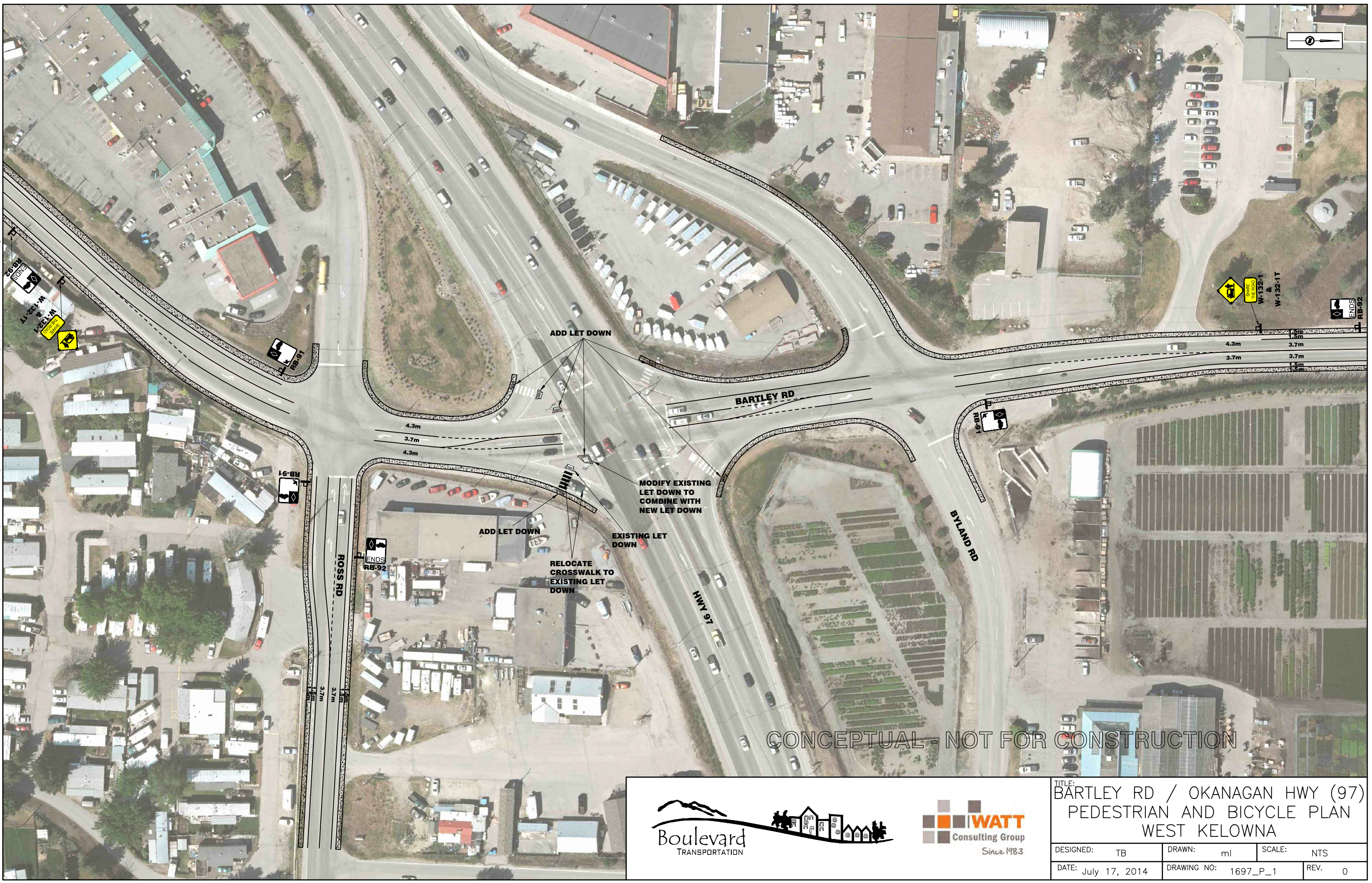
- Adopt the Pedestrian and Bicycle Infrastructure Plan;
- Evaluate student travel following improvements near schools to assess if vehicular trips to/from school are reduced;
- Combine additional works for pedestrian and bicycle facilities with utility capital works occurring under the roadway and consider the optional works as funding permits;
- Coordinate with WFN to complete identified pedestrian connections and capital plans for shared corridors;
- Implement bicycle end-use facilities;
- Develop and maintain partnerships to complete the Waterfront Trail;
- Pursue funding grants for pedestrian and bicycle infrastructure projects; and
- Adjust and update policies to prioritize maintenance of bicycle facilities.

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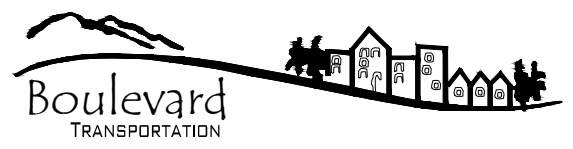
**APPENDIX A: MOTI IMPROVEMENT CONCEPT DRAWINGS**

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 PLOT DATE: 7/17/2014 12:42 PM  
 PLOTTED BY: Michael Lee

These Design Documents are prepared solely for the use by the party with whom the Design Professional has entered into a contract, and there are no representations of any kind made by the Design Professional to any party with whom the Design Professional has not entered into contract.



CONCEPTUAL - NOT FOR CONSTRUCTION




TITLE: BARTLEY RD / OKANAGAN HWY (97)  
 PEDESTRIAN AND BICYCLE PLAN  
 WEST KELOWNA


DESIGNED: TB	DRAWN: ml	SCALE: NTS
DATE: July 17, 2014	DRAWING NO: 1697_P_1	REV. 0

PROJECT: V:\Project Files\1697 - West Kelowna Pedestrian and Bicycle Plan\Drawings\Glenrosa Overpass Oct 9, 2014.dwg  
 PLOT DATE: 10/9/2014 12:13 PM  
 PLOTTED BY: Michael Lee





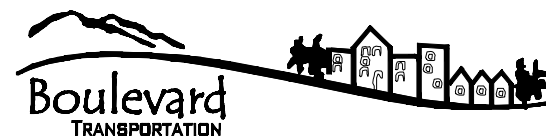
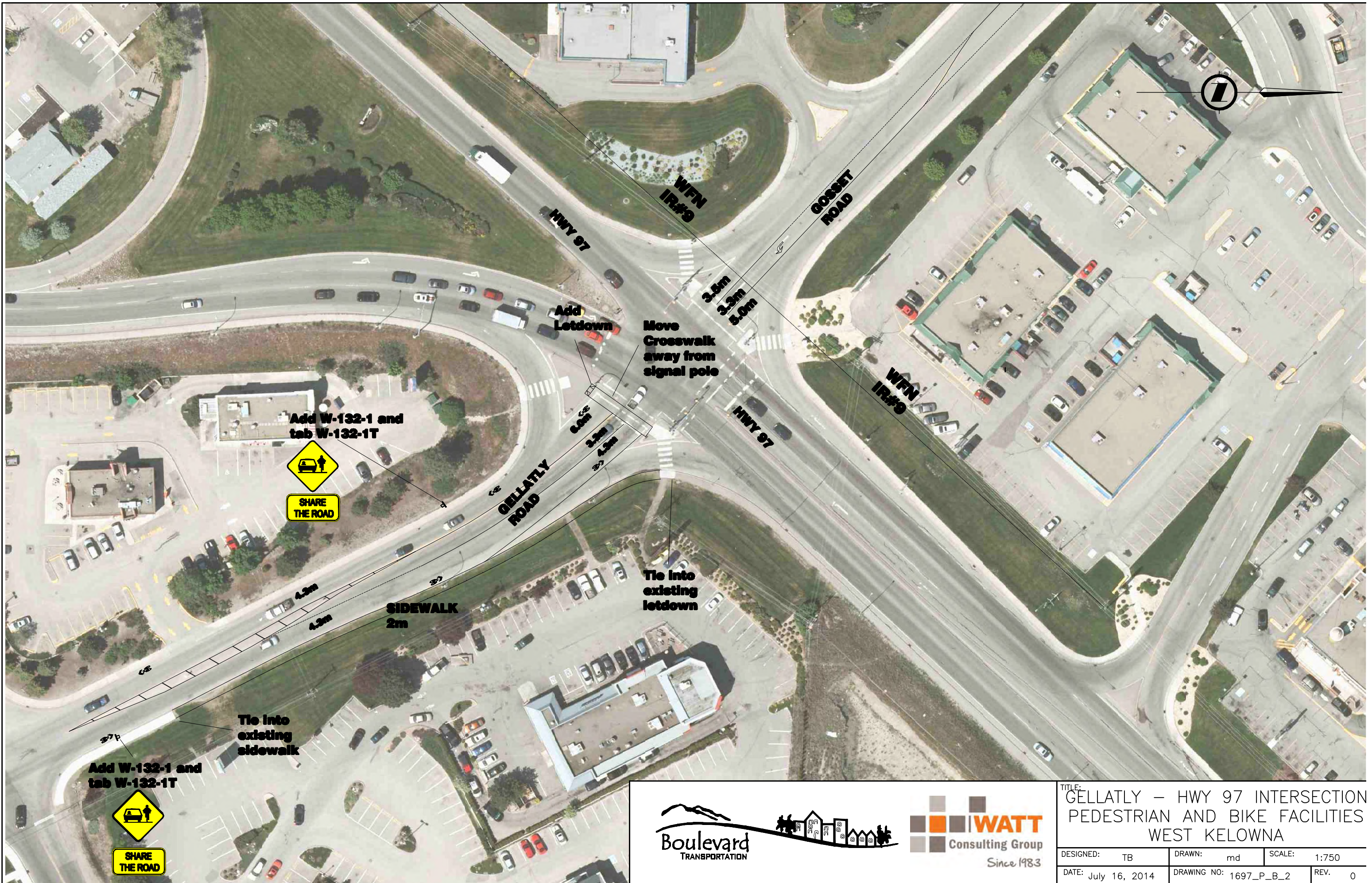
Boulevard  
TRANSPORTATION



WATT  
Consulting Group  
Since 1983

TITLE: GLENROSA-GELLATLY OVERPASS PEDESTRIAN AND BIKE FACILITIES WEST KELOWNA		
DESIGNED: TB	DRAWN: md	SCALE: 1:1000
DATE: Oct 9, 2014	DRAWING NO: 1697_P_B_1	REV. 0

no representations of any kind made by the Design Professional to any party with whom the Design Professional has not entered into contract.



TITLE:  
 GELLATLY - HWY 97 INTERSECTION  
 PEDESTRIAN AND BIKE FACILITIES  
 WEST KELOWNA

DESIGNED: TB	DRAWN: md	SCALE: 1:750
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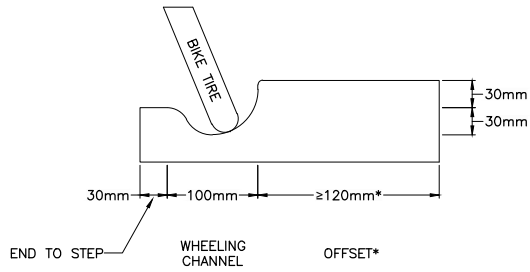
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## APPENDIX B: BICYCLE STAIRWAY DESIGN

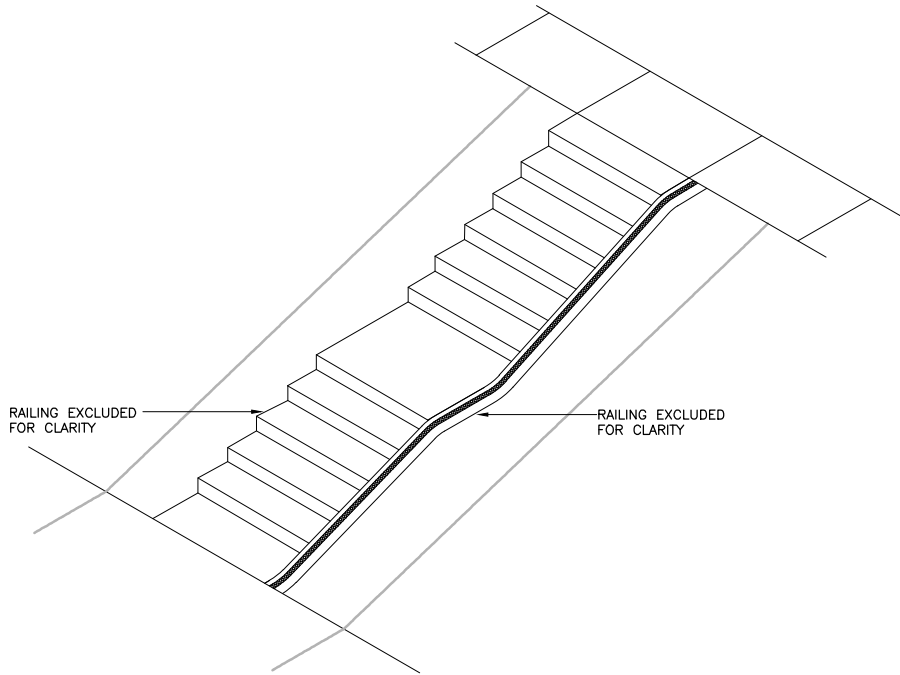
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 PLOT DATE: 3/23/2015 10:57 AM  
 PLOTTED BY: Michael Lee

# STANDARD DETAIL DRAWINGS

NOT TO SCALE



\*ADJUST DISTANCE TO AVOID CONFLICT BETWEEN BICYCLE HANDLE BARS AND STAIRWAY HANDRAIL



BICYCLE STAIRWAY

Drawing Number  
XXX

LEGEND:

TITLE: BICYCLE STAIRWAY  
 PEDESTRIAN AND BICYCLE PLAN  
 DISTRICT OF WEST KELOWNA

DATE: MAR 23, 2015

FILE NO: 1697



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## APPENDIX C: CAPITAL PROJECTS

**Table C-1: Short-Term Priority Projects within 10-Minute Radius of West Kelowna Schools**

Project	Description	Length (m)	Cost	Rank	Capital Program /Status
Ross Rd from Hewl Rd to Brentwood Rd	Northside sidewalk curb/gutter, bike lane, and street lighting	400	\$415,000	1	Sanitary Sewer
Bartley Rd from Pike Rd to Ross Rd	Eastside sidewalk curb/gutter and lighting	220	\$274,900	4	Sanitary Sewer
Ross Rd from Cameron Rd to Hewl Rd	Northside sidewalk curb/gutter and street lighting	133	\$142,700	8	None
Closed Rd from Mclver Rd to Gorman Rd	Pave Multi-Use Pathway 5m wide with lighting	191	\$138,300	12	Water Utility
Gorman Rd from Closed to Webber Rd	Southside asphalt pathway	364	\$166,700	14	Sanitary Sewer
Brentwood Rd from Ponderosa Rd to Alhambra Dr	Southside asphalt pathway and street lighting	208	\$181,200	18	None
Brentwood Rd from Ponderosa Rd to Alhambra Dr	Single File Signage	208	\$2,100	22	None
Mclver Rd from Glenrosa Rd to Closed Rd	Southside asphalt pathway and street lighting	240	\$208,100	24	Water Utility
Horizon Dr from Aurora Ht to Olympus Way	Westside sidewalk curb/ gutter and street lighting	335	\$415,200	26	Water Utility
Rosewood Dr from Westlake Rd to McDougall Rd	Single File Signage	381	\$3,800	27	None
Ross Rd from Brentwood Rd to Hwy 97	Westside Sidewalk curb/gutter	100	\$87,500	28	None
Webber Rd from Malcolm Rd to Gorman Rd	Westside asphalt pathway, bike lanes, and street lighting	330	\$318,200	31	Water Utility
McDougall Rd from Rosewood Dr to Rose Meadow Dr	Single File Signage	135	\$1,400	33	None
Brentwood Rd from Ross Rd to Ponderosa Rd	Single File Signage	391	\$3,900	37	None
Brentwood Rd from Ross Rd to Ponderosa Rd	Southside asphalt pathway and street lighting	391	\$334,900	38	None
Westlake Rd from Horizon Rd to Keloka Way	Bike Lane on both sides	205	\$2,100	39	None
Marathon Dr from Existing S/W to Olympus Way	Northside sidewalk curb/gutter and street lighting	60	\$79,700	42	None
Olympus Way from Marathon Dr to Existing S/W	Westside sidewalk curb/gutter and street lighting	107	\$137,000	43	None
Cindy Rd from Trail Head to Harding Rd	Single File Signage	118	\$1,200	44	Easy to Implement
Rose Meadow Dr from McDougall Rd to End of street	Single File Signage	698	\$7,000	45	None
Westlake Rd from Existing S/W to Parkinson Rd	Southside asphalt pathway and street lighting	332	\$285,400	51	None
Alhambra Dr from Existing S/W to Hudson Rd	Westside asphalt pathway and street lighting	99	\$89,700	58	None
Webber Rd from Malcolm Rd to McAllister Rd	Westside asphalt pathway, bike lanes, and street lighting	156	\$154,600	63	Water Utility
Webber Rd from McAllister Rd to McRae Rd	Westside asphalt pathway and street lighting	257	\$222,400	64	None
Alhambra Dr from Brentwood Rd to Hudson Rd	Single File Signage	122	\$1,200	65	None
Horizon Dr from Aurora Ht to Shalerridge Pl	Westside sidewalk and street lighting	265	\$329,800	82	Water Utility
<b>TOTAL</b>		<b>6,446</b>	<b>\$4,004,000</b>		

**Table C-2: Remaining Projects within 10-Minute Walking Radius of West Kelowna Schools**

Project	Description	Length (m)	Cost	Rank	Capital Program /Status
Ross Rd from Hewl Rd to Brentwood Rd	Southside sidewalk curb/gutter, bike lane, and lighting	400	\$579,000	2	Sanitary Sewer Utility
Webber Rd from Gorman Rd to Lower Glenrosa Rd	Westside asphalt pathway, bike lanes, and lighting	943	\$894,400	3	None
Old Okanagan Hwy from Ingram Rd to Dobbin Rd	Eastside sidewalk curb/gutter and bike lanes and lighting	232	\$338,800	5	None
Old Okanagan Hwy from Ingram Rd to Existing S/W	Westside sidewalk curb/gutter and lighting	86	\$111,400	6	None
Ross Rd from Bartley Rd to Cameron Rd	Southside sidewalk curb/gutter and Bike lanes and lighting	300	\$688,500	7	None
Ross Rd from Cameron Rd to Hewl Rd	Southside sidewalk curb/gutter, bike lanes, and lighting	133	\$197,200	9	None
Brown Rd from Main St to Ingram Rd	Brown Rd Streetscape Phase 2	390	\$1,400,000	10	None
Byland Rd from Existing S/W to Existing S/W	Northside sidewalk curb/gutter and street lighting	406	\$501,800	11	None
Elliott Rd from Ingram Rd to Dobbin Rd	Eastside sidewalk curb/gutter and Bike lanes and lighting	263	\$383,100	13	None
Gossett Rd from Brown Rd to Old Okanagan Hwy 2-side	Sidewalk curb/gutter and bike lanes	185	\$434,400	15	Water Utility
Hewl Road from Ross Rd to Cul-de-Sac	Westside sidewalk curb/ gutter	175	\$148,300	16	None
Delray Rd from Elliott Rd to Paynter Rd	Single File Signage	294	\$2,900	17	None
East Boundary Rd from Pike Rd to Daimler Rd	Eastside sidewalk curb/gutter and lighting	489	\$603,100	19	Sanitary Sewer Utility
Brown Rd from Existing S/W to Glen Canyon Access	Eastside Narrow Multi-Use Trail	593	\$522,400	23	None
Shannon Way Hihannah Dr to Woodstock Dr	Extend Sidewalk on southside	379	\$196,000	25	None
Ross Rd from Brentwood Rd to Hwy 97	Eastside Sidewalk curb/gutter	100	\$87,500	29	None
Shannon Ridge Dr s/w from Shannon Pl to Shannon Lake	Extend northside sidewalk and adjust lighting setback	129	\$71,000	30	None
Mclver Rd from Closed Rd to McBain Rd	Eastside asphalt pathway and lighting	940	\$796,100	32	None
Lower Glenrosa Rd from Existing S/W to Paynter Rd	Northside asphalt pathway and street lighting	540	\$460,100	40	None
Lower Glenrosa Rd from Powers Creek OP to Glencoe Rd	Southside climb lane and northside single file signage	403	\$221,600	41	None
Lower Glenrosa Rd from Glencoe Rd to Paynter Rd	Single File Signage	169	\$1,700	48	None
Concord Bike Lane from Concord Rd to Proserpine Lane	Multi-Use Pathway	1000	\$296,500	49	None
Webber Rd from McRae Rd to McBain Rd	Westside asphalt pathway and street lighting	262	\$226,600	50	None
Brown Rd from Bering Rd to Existing	Brown Rd Streetscape Phase 3	200	\$700,000	55	None
McGinnis Rd from Glenrosa Rd to McQueen Rd	Eastside asphalt pathway and lighting	189	\$165,300	56	None
Daimler Dr from Old Okanagan Hwy to Auburn Rd	Daimler Road CNB Phase 3 Improvements	245	\$350,000	66	None
Webber Rd from Glenrosa Rd to Lower Glenrosa Rd	Westside asphalt pathway, bike lanes, and street lighting	191	\$187,500	69	None

Project	Description	Length (m)	Cost	Rank	Capital Program /Status
McQueen Rd from McGinnis Rd to McIver Rd	Southside asphalt pathway and lighting	464	\$396,300	77	None
Horizon Dr from Shaleridge Pl to Covington Cres	Westside sidewalk curb/ gutter and street lighting	314	\$389,600	83	Water Utility
Churchill Rd from Herbert Rd to Existing S/W	Both side Sidewalk curb/gutter and street lighting	130	\$312,800	91	None
McBain Rd from McIver Rd to Webber Rd	Southside asphalt pathway and lighting	171	\$150,100	92	None
<b>TOTAL</b>		<b>10,715</b>	<b>\$11,814,000</b>		

**Table C-3: Remaining Pedestrian and Bicycle Infrastructure Projects**

Project	Description	Length (m)	Cost	Rank	Capital Program /Status
Ingram Rd from Old Okanagan Hwy to Elliott Rd	Both sides Bike Lane	403	\$4,000	20	None
Anders Rd from Boucherie Rd to Thacker Dr	Urbanize with bike lanes curb/gutter and sidewalk	730	\$1,400,000	21	None
Off-Road MU from Webber Rd to Inverness Rd	Off-Road Narrow Multi-Use Trail	87	\$66,500	34	None
Thacker Dr from Montigny Rd to Stuart Rd	Single File Signage	2812	\$28,100	35	Easy to Implement
Thacker Dr from Ogden Rd to Keef Rd	Westside asphalt pathway and street lighting	2397	\$2,020,000	36	None
Whitworth Rd from Existing S/W to George Ct	Eastside sidewalk curb/gutter and lighting	270	\$335,900	46	None
Horizon Dr from Existing S/W to Existing S/W	Northside sidewalk curb/gutter and street lighting	202	\$252,900	47	None
Whitworth Dr from Gellatly Rd to George Ct	Single File Signage	486	\$4,900	52	None
Reece Rd from Existing S/W to Old Okanagan Hwy	Northside climb lane southside single file signage	202	\$295,900	53	None
Angus Dr from Harding Rd to Gellatly Rd	Single File Signage	605	\$6,100	54	Easy to Implement
Ross Rd from Stevens Rd to Existing S/W	Eastside sidewalk curb/gutter and street lighting	291	\$361,500	57	None
Hayman Rd from Keefe Rd to Boucherie Rd	Eastside asphalt pathway Westside Climb lane and lighting	379	\$364,300	59	None
Hudson Rd from Alhambra Dr to Westlake Rd	Southside asphalt pathway and street lighting	178	\$156,000	60	None
Stuart Rd from Thacker to Hayman Rd	Single File Signage	219	\$2,200	61	Easy to Implement
Bering Rd from Old Okanagan Hwy to Elliott Rd	Widen for side-by-side add s/w, lighting	405	\$586,200	62	None
Hayman Rd from Stuart Rd to Keefe Rd	Single File Signage	956	\$9,600	67	Easy to Implement
Hudson Rd from Alhambra Dr to Westlake Rd	Single File Signage	235	\$2,400	68	None
Benedick Rd from Kalamoir Park to Campbell Rd	Northside Narrow Multi-Use Trail	303	\$270,100	70	None
Campbell Rd from Benedick Rd to WFN	Northside Narrow Multi-Use Trail	1794	\$1,567,300	71	WFN Partnership
Horizon Dr from Existing S/W to Existing S/W	Southside sidewalk curb/gutter street lighting and crosswalk	210	\$262,700	72	None
Lower Glenrosa Rd from Glenview Rd to Powers Crk OP	Northside climb lane southside bike lanes	796	\$756,200	73	None
Lucinde Rd from Existing S/W to Benedick Rd	Westside sidewalk curb/gutter and lighting	137	\$173,600	74	None
Ogden Rd from Boucherie Rd to Thacker Dr	Northside asphalt pathway and street lighting	455	\$388,700	75	None
Parkinson Rd from Pettman Rd to Westlake Rd	Southside asphalt pathway and street lighting	1061	\$897,700	76	Water Utility
Pritchard Dr North from Boucherie Rd to Pritchard Dr	Eastside Narrow Multi-Use Trail	724	\$636,400	78	None
Wild Horse Dr sidewalk extension to Smith Creek Rd	Extend northside sidewalk and adjust lighting setback	460	\$236,500	79	None
Bering Rd from Brown to Old Okanagan Hwy	Southside sidewalk curb/gutter and street lighting	139	\$176,100	80	None

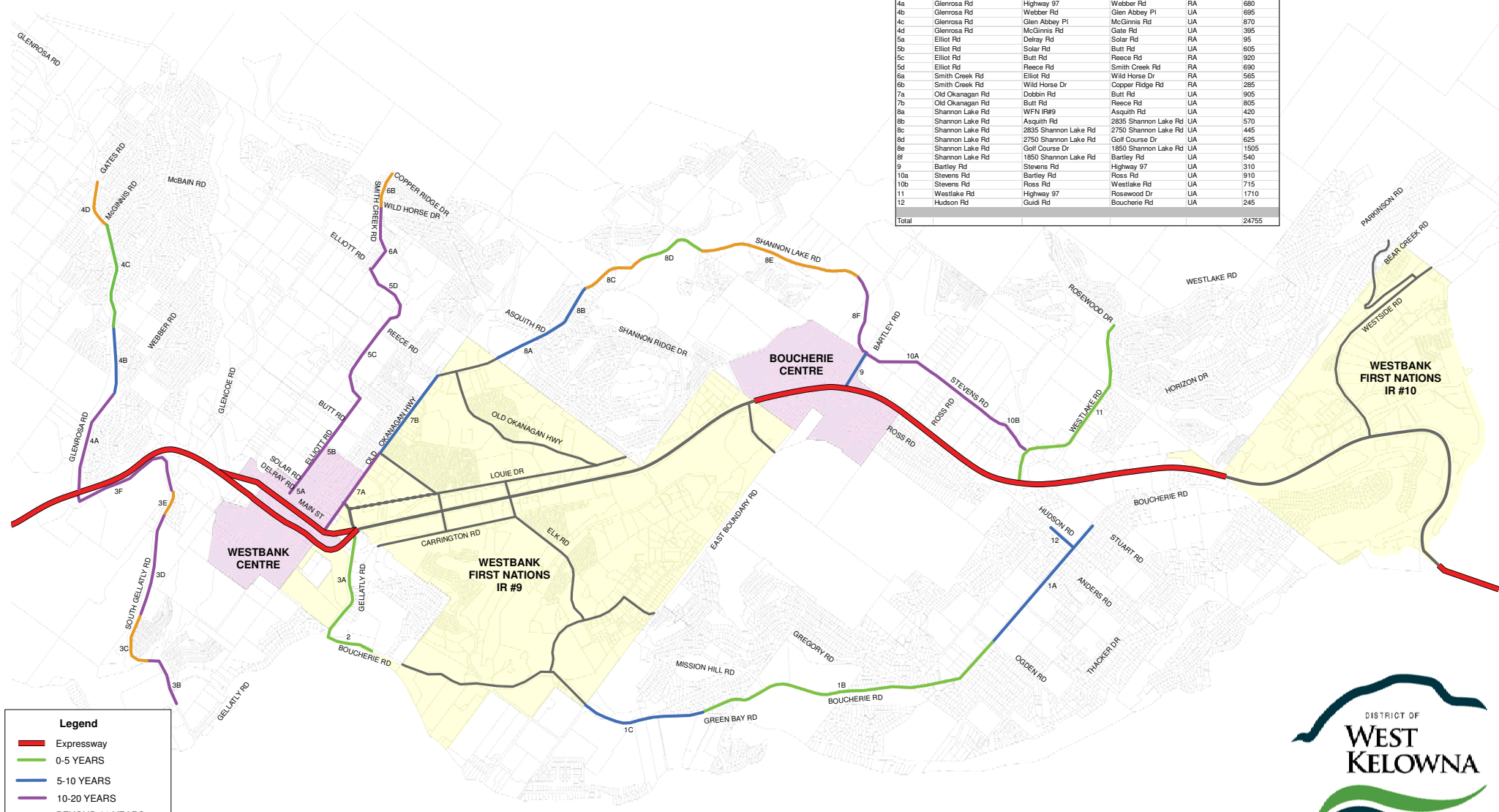
Project	Description	Length (m)	Cost	Rank	Capital Program /Status
Bering Rd from Elliott Rd to Brown Rd	Both side sidewalk curb/gutter and street lighting	338	\$772,500	81	None
Lower Glenrosa Rd Powers Creek overpass	Single File Signage	167	\$1,700	84	None
Sunnyside Rd from Kalamoir Park to Boucherie Rd	Single File Signage	1382	\$13,800	85	None
Butt Rd from Old Okanagan Hwy to Elliott Rd	Southside sidewalk curb/gutter and street lighting	347	\$429,800	86	Water Utility
Harding Rd from Cindy Rd to Angus Dr	Single File Signage	320	\$3,200	87	Easy to Implement
Lower Glenrosa Rd from Webber Rd to Glenview Rd	Single File Signage	384	\$369,000	88	None
Reece Rd from Elliott Rd to Broadview Rd	Northside sidewalk curb/gutter and street lighting	211	\$263,900	89	None
Keefe Rd from Hayman Rd to Thacker Dr	Southside asphalt pathway and street lighting	225	\$195,500	90	None
Reece Rd from Elliott Rd to Orlin Rd	Single File Signage	505	\$5,100	93	None
Old Boucherie Rd from WFN to Pritchard Rd	Northside Narrow Multi-Use Trail	293	\$261,400	94	None
Old Okanagan Hwy from WFN to Shamrock Dr	Northside sidewalk curb/gutter and street lighting	201	\$294,400	95	WFN Partnership
Green Bay Rd From Existing S/W to End of Road	Northside asphalt pathway	82	\$42,600	96	None
Montigny Rd from Boucherie Rd to Thacker Dr	Single File Signage	504	\$5,000	97	Easy to Implement
Horizon Dr from Existing S/W to Covington Cres	Westside sidewalk and street lighting	200	\$250,500	98	Water Utility
Tallus Ridge Dr from Shannon Lk Rd to Mountain Hollow	Northside climb lane southside single file signage	257	\$2,600	99	None
<b>TOTAL</b>		<b>22,352</b>	<b>\$14,172,800</b>		

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## APPENDIX D: DRAFT ROAD DCC ARTERIAL PROJECTS AND CROSS-SECTIONS



Project Number	Roadway Segment	From	To	Road Classification	Roadway Length (m)
1a	Boucherie Rd	Stuart Rd	Ogden Rd	WR-A	1275
1b	Boucherie Rd	Ogden Rd	Green Bay Rd	WR-A	2760
1c	Boucherie Rd	Green Bay Rd	WFN IR#9	WR-A	865
2	Boucherie Rd	3716 Carrall Rd	Gellatly Rd	WR-A	400
3a	Gellatly Rd	Highway 97	Boucherie Rd	UA	785
3b	Gellatly Rd South	Whitworth Ave	4251 Gellatly Rd South	WR-A	495
3c	Gellatly Rd South	4251 Gellatly Rd South	4035 Gellatly Rd South	WR-A	490
3d	Gellatly Rd South	4035 Gellatly Rd South	Glen Canyon Dr	WR-A	810
3e	Gellatly Rd South	Glen Canyon Dr	Glen Canyon Dr	WR-A	285
3f	Gellatly Rd South	Glen Canyon Dr	Highway 97	WR-A	1100
4a	Glenrosa Rd	Highway 97	Webber Rd	RA	680
4b	Glenrosa Rd	Webber Rd	Glen Abbey Pl	UA	695
4c	Glenrosa Rd	Glen Abbey Pl	McGinnis Rd	UA	870
4d	Glenrosa Rd	Gate Rd	Gate Rd	UA	395
5a	Elliot Rd	Delray Rd	Solar Rd	RA	95
5b	Elliot Rd	Solar Rd	Butt Rd	UA	605
5c	Elliot Rd	Butt Rd	Reece Rd	RA	920
5d	Elliot Rd	Reece Rd	Smith Creek Rd	RA	690
6a	Smith Creek Rd	Elliot Rd	Wild Horse Dr	RA	565
6b	Smith Creek Rd	Wild Horse Dr	Copper Ridge Rd	RA	285
7a	Old Okanagan Rd	Dobbin Rd	Butt Rd	UA	905
7b	Old Okanagan Rd	Butt Rd	Reece Rd	UA	805
8a	Shannon Lake Rd	WFN IR#9	Asquith Rd	UA	420
8b	Shannon Lake Rd	Asquith Rd	2835 Shannon Lake Rd	UA	570
8c	Shannon Lake Rd	2835 Shannon Lake Rd	2750 Shannon Lake Rd	UA	445
8d	Shannon Lake Rd	2750 Shannon Lake Rd	Golf Course Dr	UA	625
8e	Shannon Lake Rd	Golf Course Dr	1850 Shannon Lake Rd	UA	1505
8f	Shannon Lake Rd	1850 Shannon Lake Rd	Bartley Rd	UA	540
9	Bartley Rd	Stevens Rd	Highway 97	UA	310
10a	Stevens Rd	Bartley Rd	Ross Rd	UA	910
10b	Stevens Rd	Ross Rd	Westlake Rd	UA	715
11	Westlake Rd	Highway 97	Rosewood Dr	UA	1710
12	Hudson Rd	Guidi Rd	Boucherie Rd	UA	245
Total					24755



**Legend**

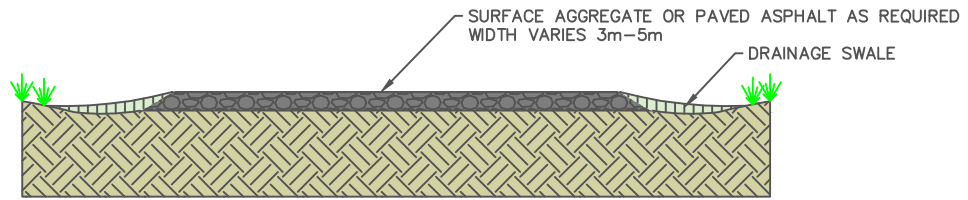
- Expressway
- 0-5 YEARS
- 5-10 YEARS
- 10-20 YEARS
- BEYOND 20 YEARS
- Urban Centres
- WFN Indian Reserves
- WFN Road Coverage

Scale 1:14,000

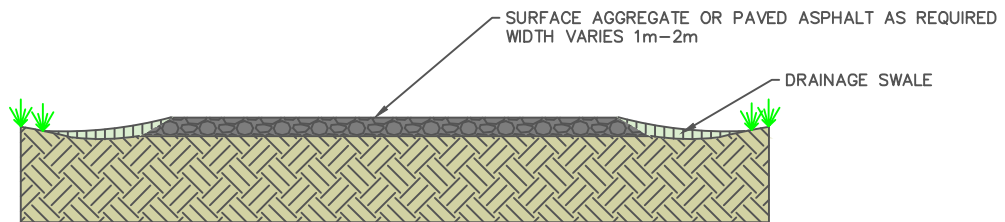


**5-10 Year Arterial Road DCC Study**  
 District of West Kelowna  
 December 2013

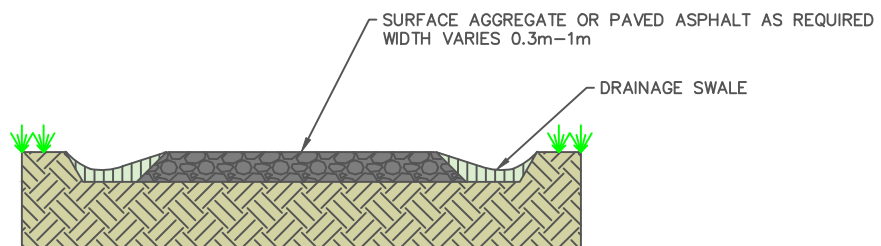
# MULTI USE PATHWAY SECTIONS



MAJOR MULTI USE TRAIL



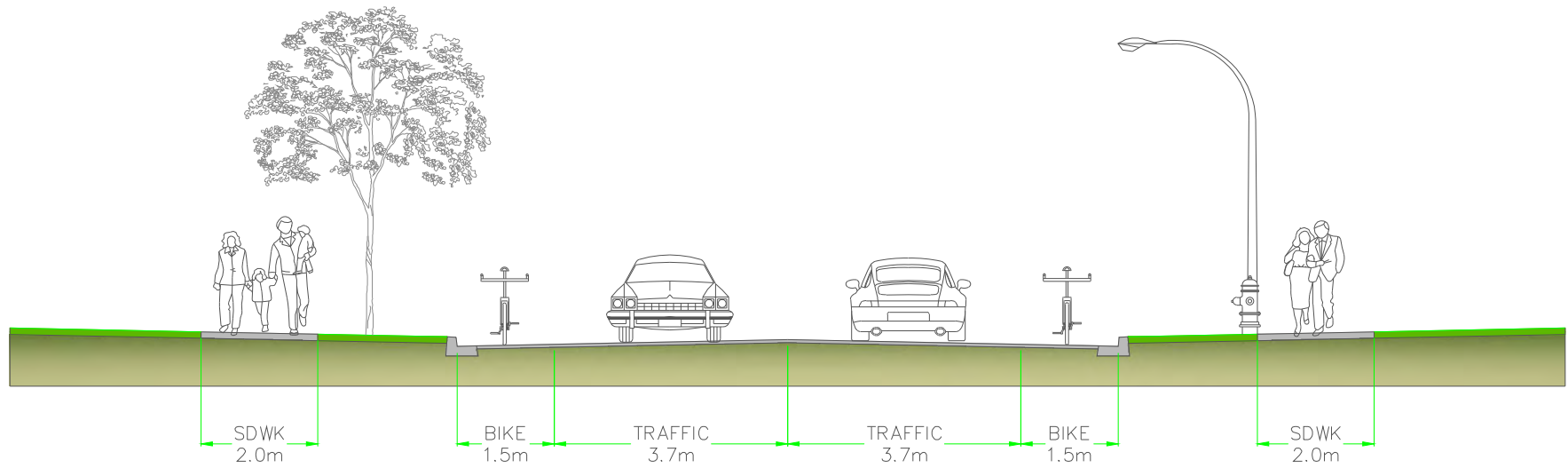
NARROW MULTI USE TRAIL



NATURE TRAIL



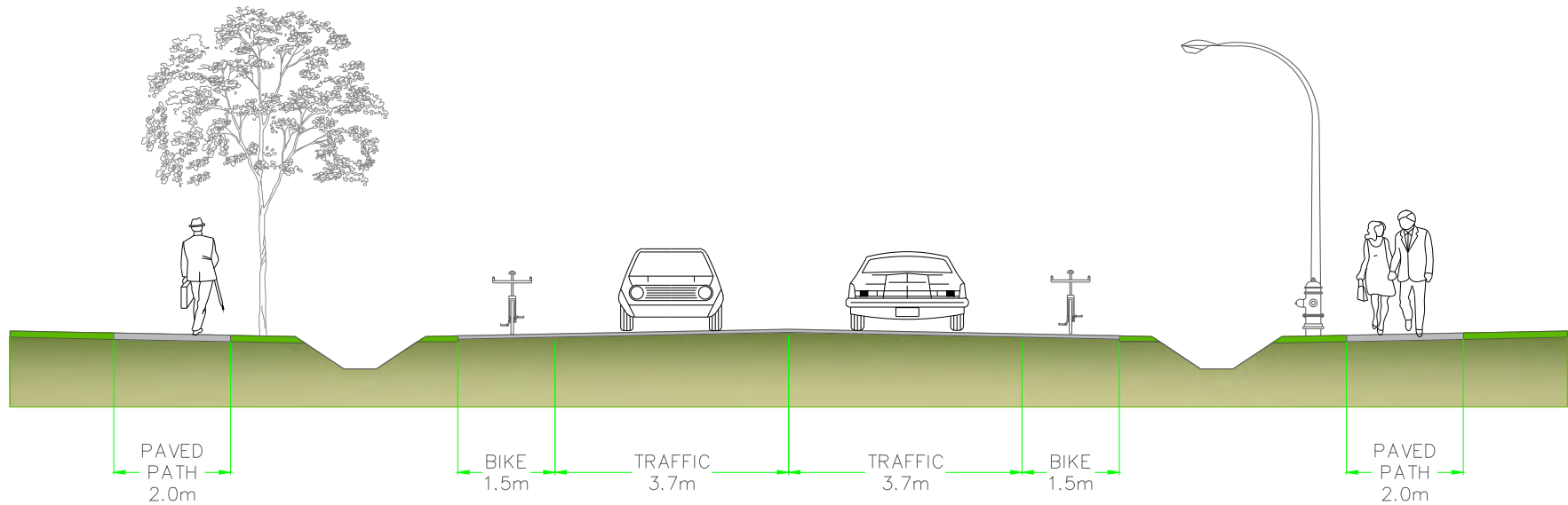
# URBAN ARTERIAL ROAD - 24.0m ROW



\*Refer to Bylaw No.0120 for details



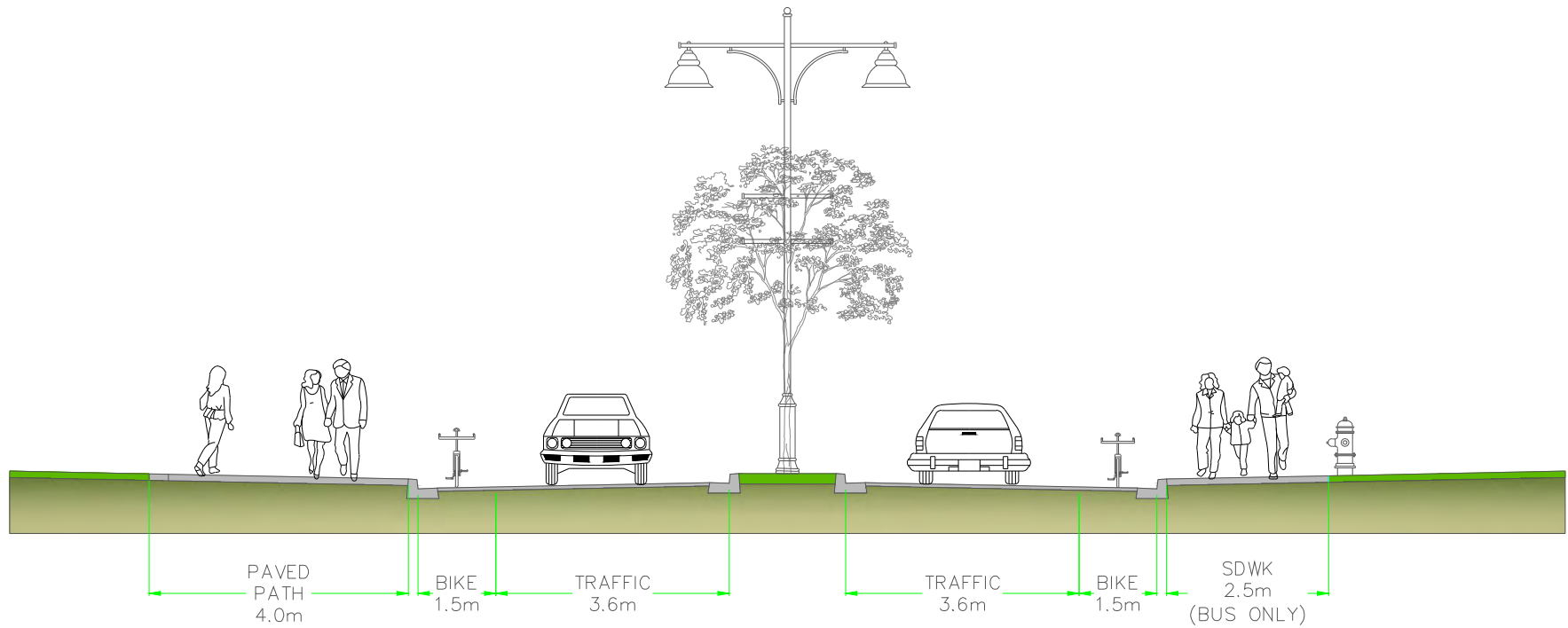
# RURAL ARTERIAL ROAD - 24.0m ROW



\*Refer to Bylaw No.0120 for details



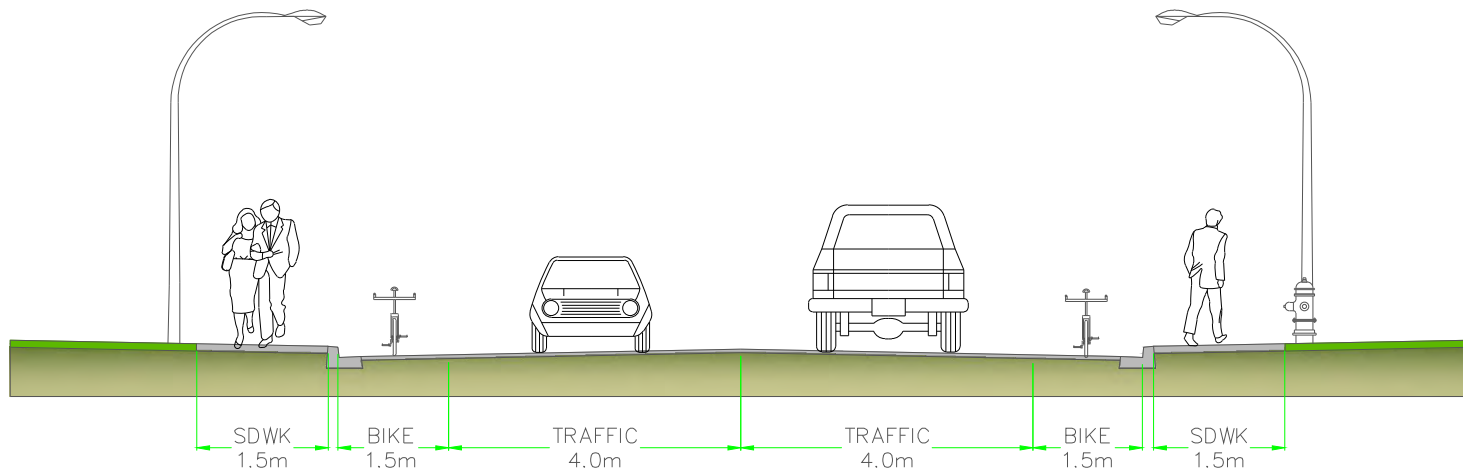
# WINE ROUTE ARTERIAL ROAD - 24.0m ROW



\*Refer to Bylaw No.0120 for details



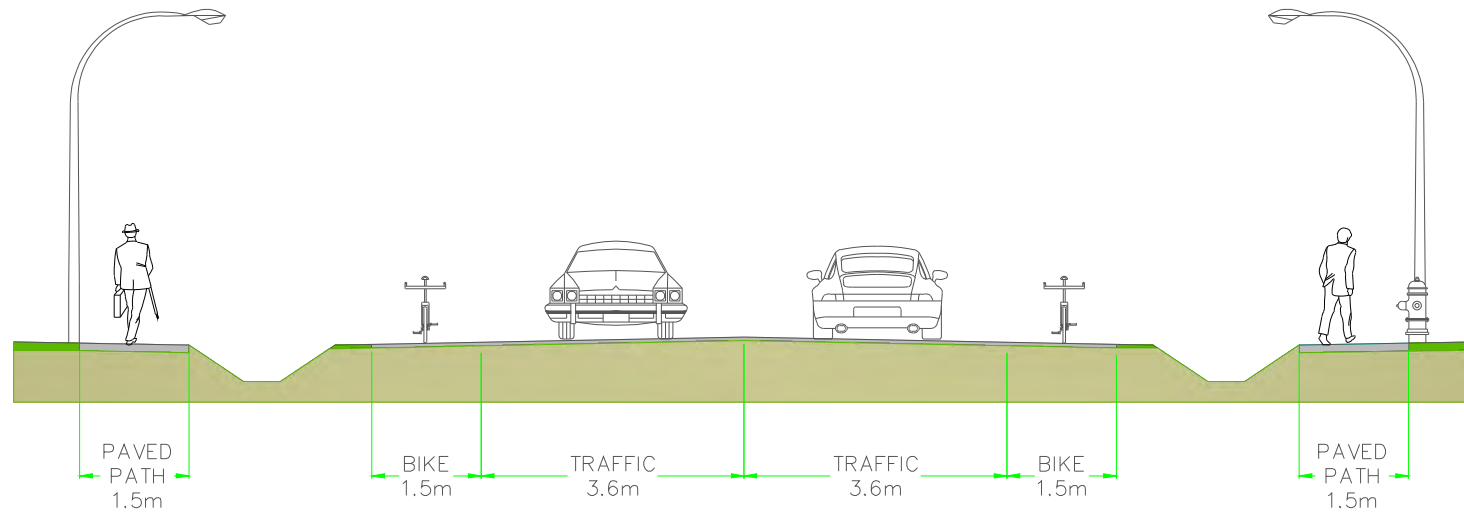
# URBAN COLLECTOR ROAD - 20.0m ROW



\*Refer to Bylaw No.0120 for details



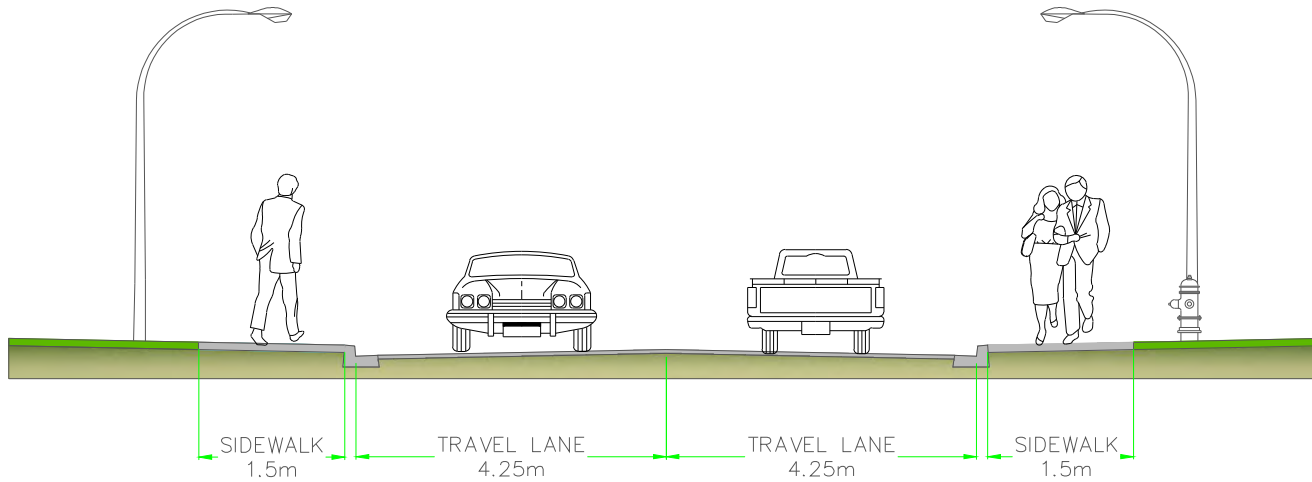
# RURAL COLLECTOR ROAD - 20.0m ROW



\*Refer to Bylaw No.0120 for details



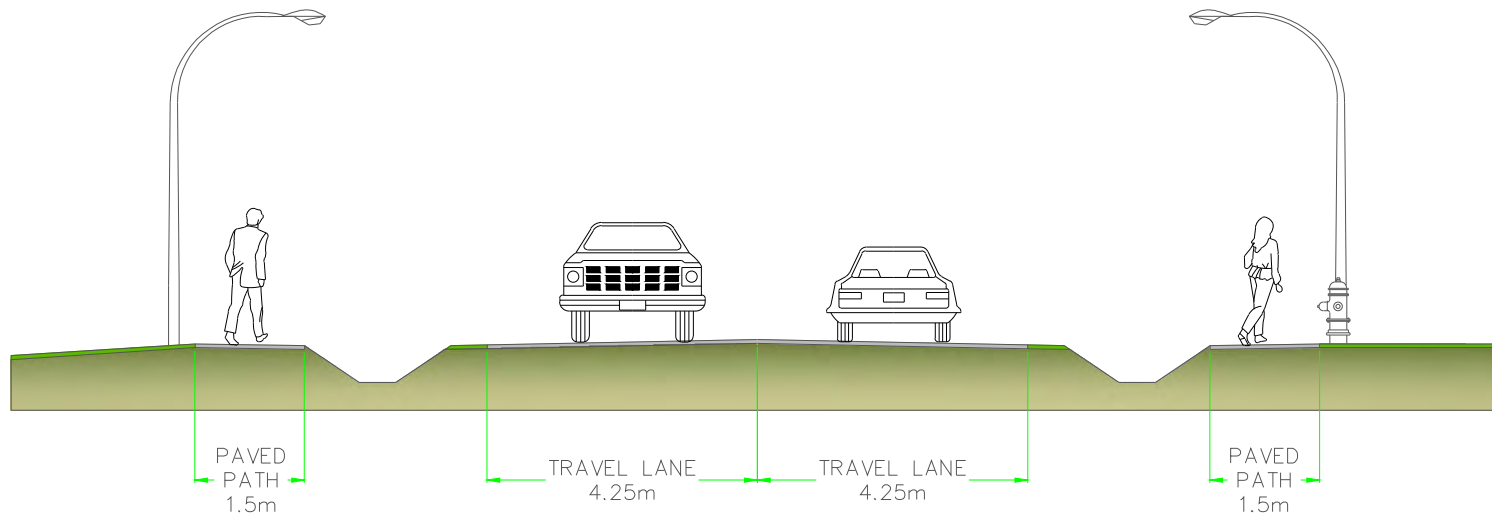
# URBAN MINOR COLLECTOR ROAD - 18.0m ROW



\*Refer to Bylaw No.0120 for details



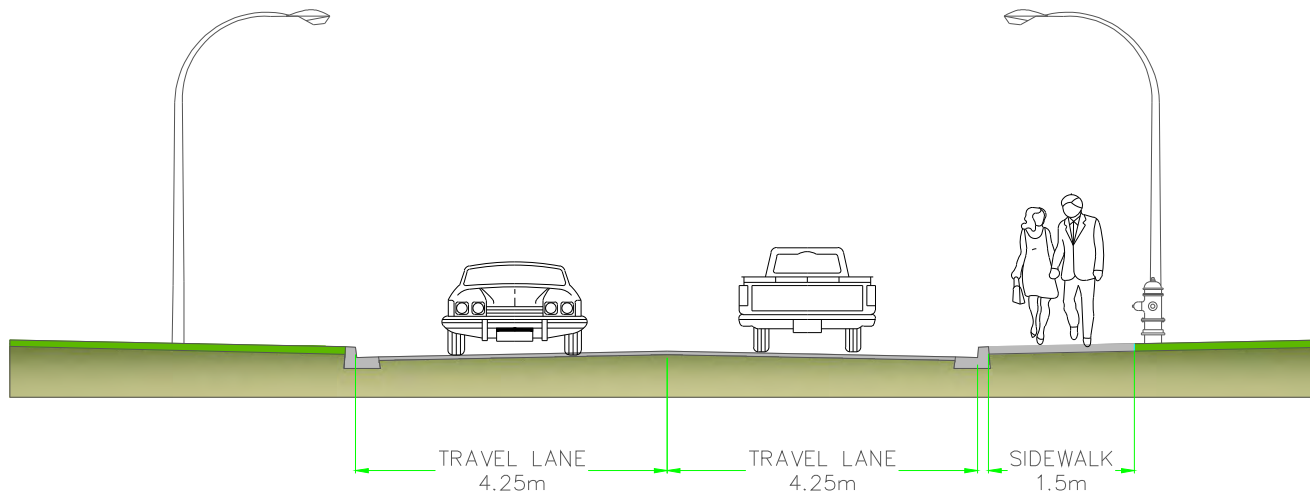
# RURAL MINOR COLLECTOR ROAD - 18.0m ROW



\*Refer to Bylaw No.0120 for details



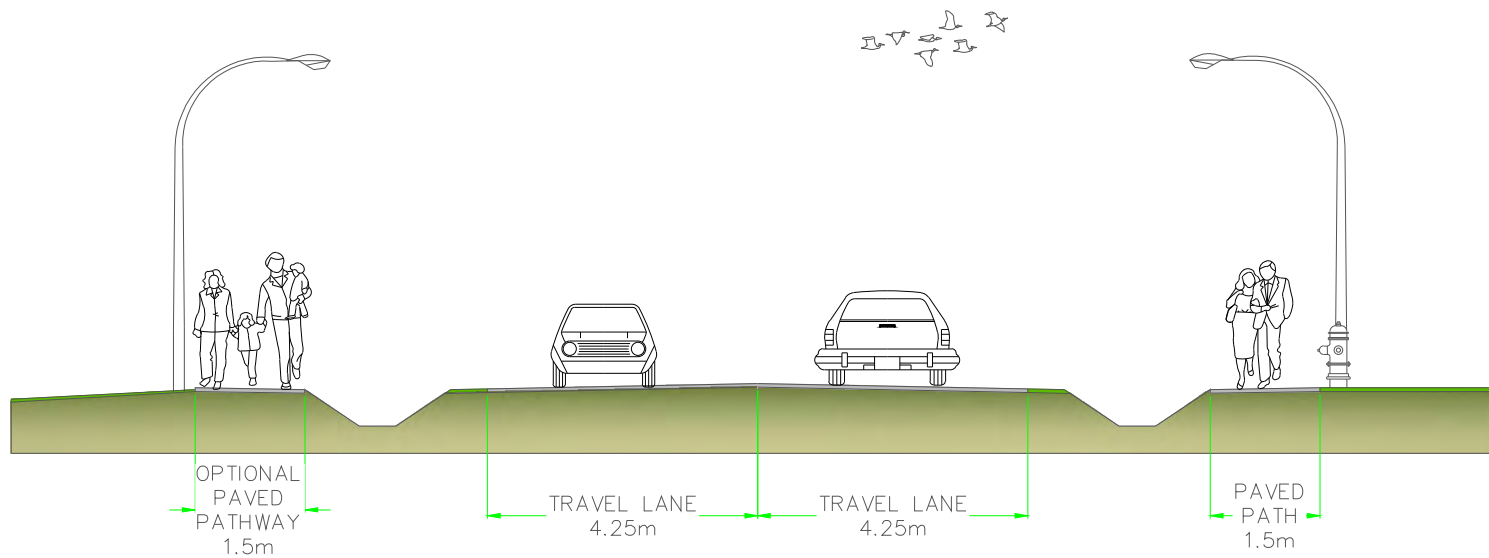
# URBAN LOCAL ROAD - 18.0m ROW



\*Refer to Bylaw No.0120 for details



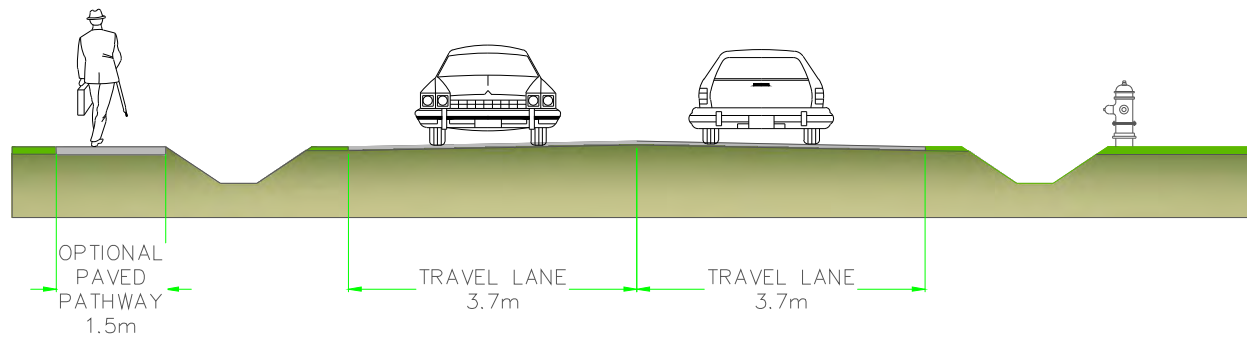
# RURAL LOCAL ROAD - 18.0m ROW



\*Refer to Bylaw No.0120 for details



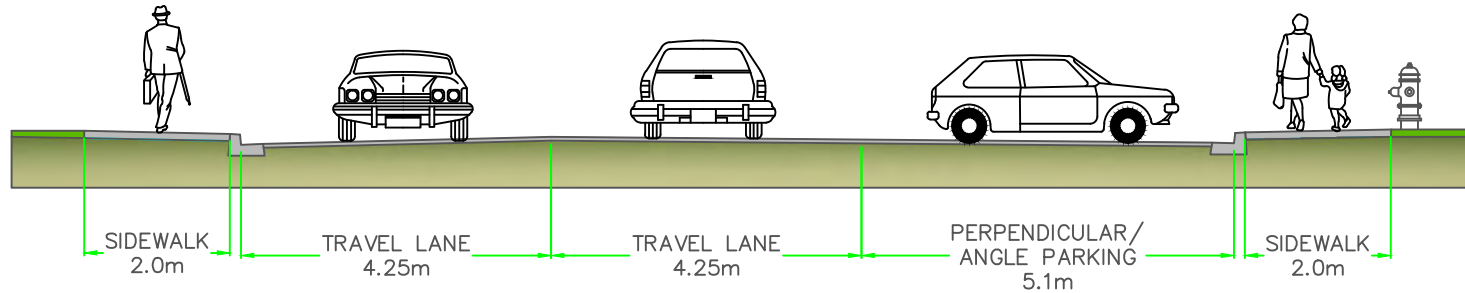
## RURAL RESERVE LOCAL ROAD - 18.0m ROW



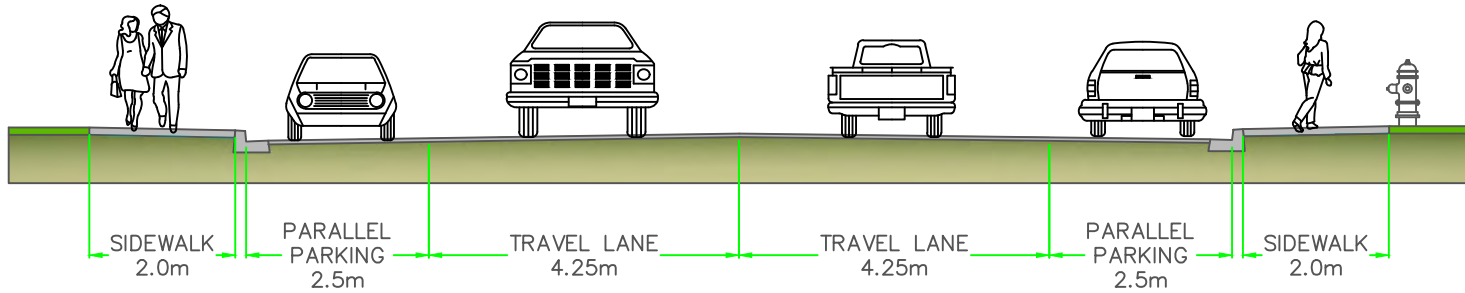
\*Refer to Bylaw No.0120 for details



# URBAN CENTRE ROAD - 20.0m ROW



PARKING ON ONE SIDE OF THE ROAD

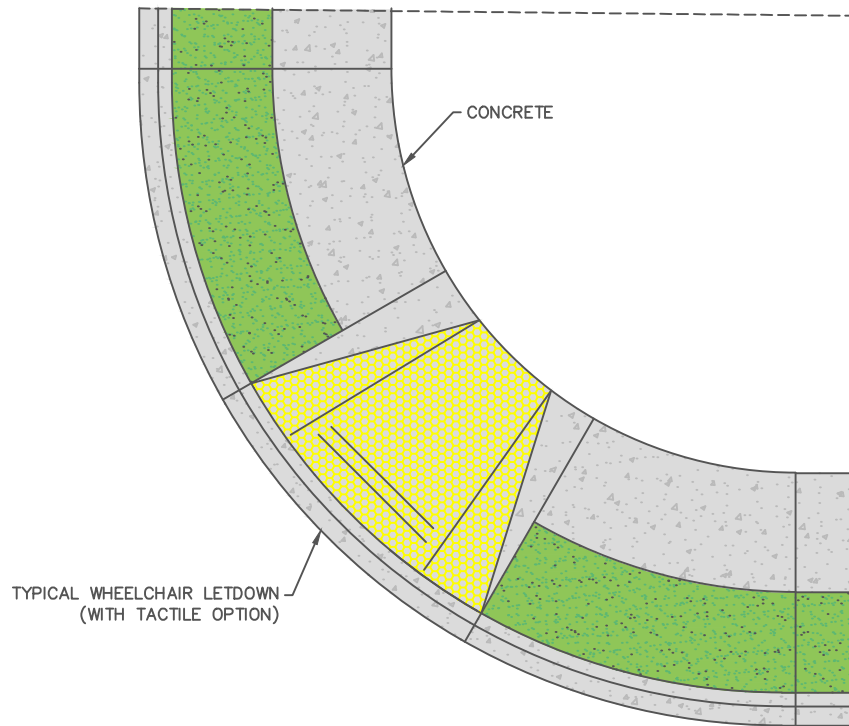
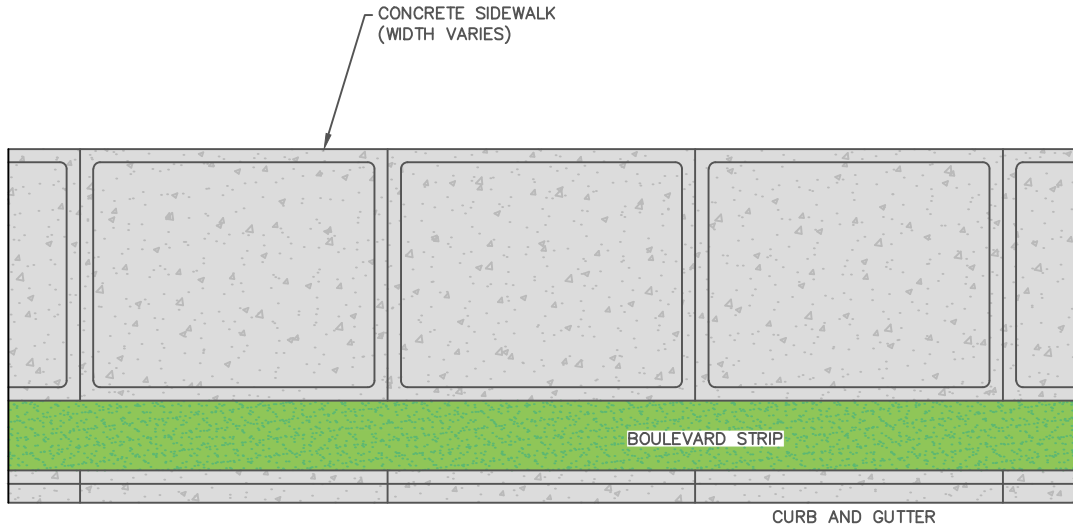


PARKING ON BOTH SIDES OF THE ROAD

\*Refer to Bylaw No.0120 for details

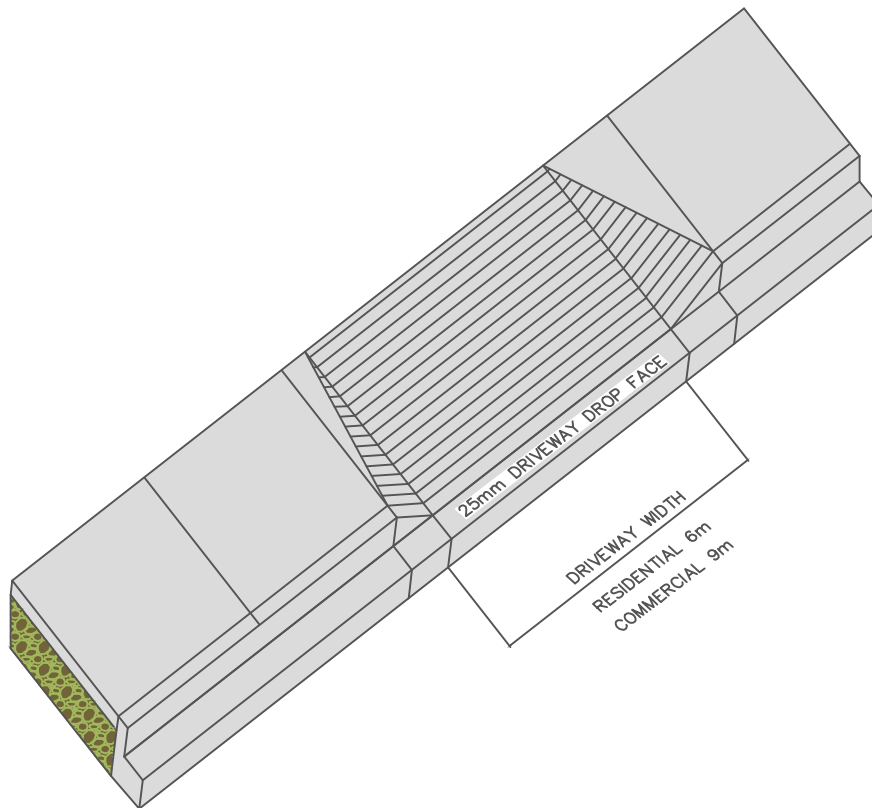


# TYPICAL SIDEWALK (WITH BOULEVARD STRIP)



\*Refer to Bylaw No.0120 for details

## DRIVEWAY CROSSINGS FOR BARRIER CURBS



\*Refer to Bylaw No.0120 for details