

Lake to Sound Trail

FEASIBILITY STUDY



February 2009

Acknowledgements

King County

City of Renton

City of Tukwila

City of SeaTac

City of Burien

City of Des Moines

Sound Transit

Washington State Department of Transportation

Cascade Bicycle Club

Prepared by **Parametrix**

Introduction - Painting the Picture of the Trail

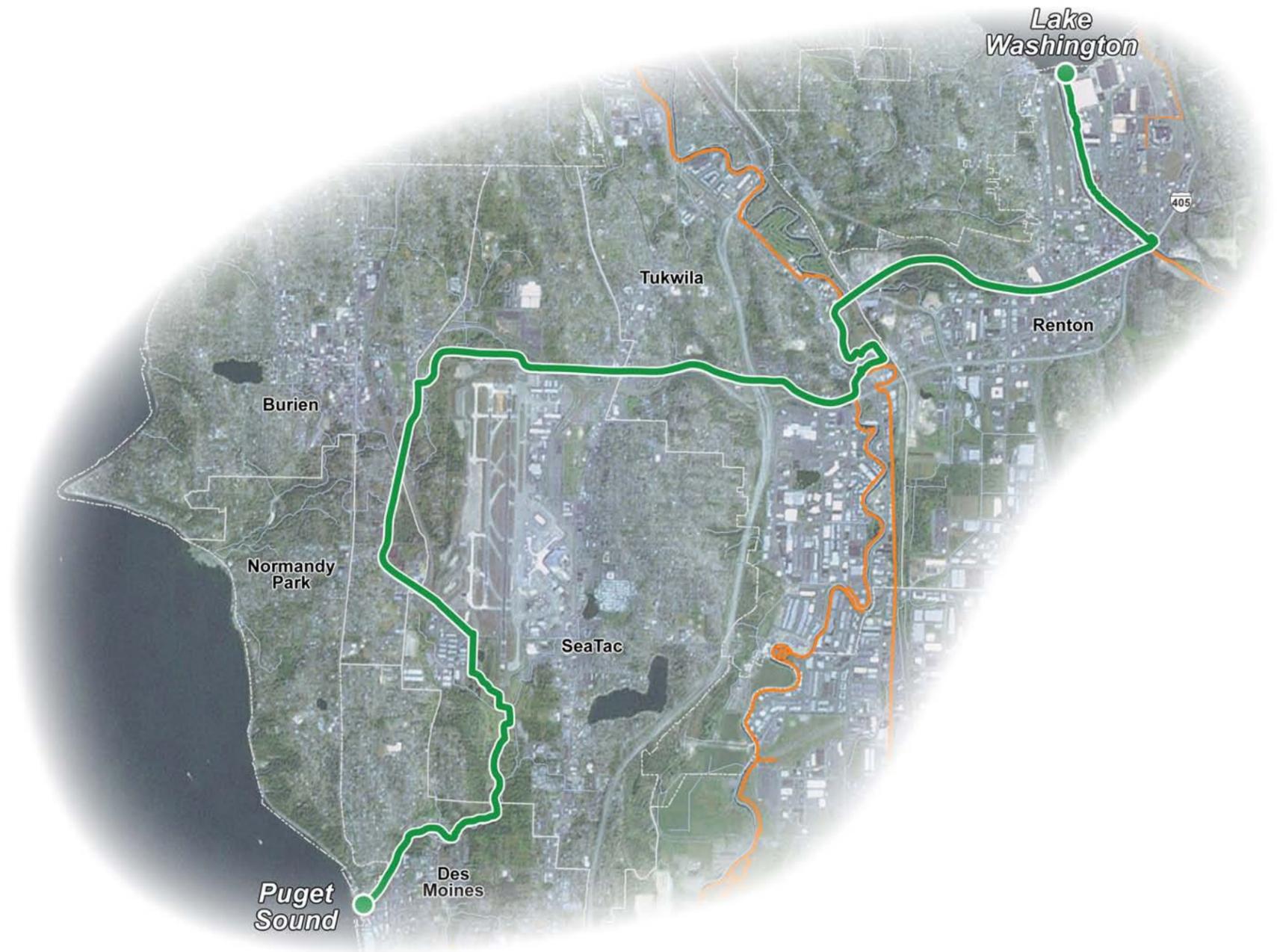
Picture a route that connects the southern end of Lake Washington, where the Cedar River flows into the lake, to Puget Sound, a majestic body of water. This “trail” would connect the cities of Renton, Tukwila, SeaTac, Burien, and Des Moines, as well as the recreational, residential, retail, and employment areas within these cities.

Starting at the southern end of Lake Washington in Renton, the trail follows the existing Cedar River Trail south along the banks of the Cedar River into Cedar River Park. The trail meanders by the Renton Municipal Airport, with its long and proud heritage of serving planes inspired by Boeing’s top designers, and skirts the northern edge of the downtown district of Renton. The trail offers excellent views of and access to the Cedar River. At the Cedar River Park, one can continue along the river to the City of Seattle’s Cedar River Watershed or turn west to follow the Lake to Sound Trail.

Continuing west into downtown Renton, the trail connects through Tomkin Park to the old Renton train station, which served the Spirit of Washington dinner train. At this point, the trail follows the railroad tracks, which provide sweeping regional views of Renton and eventually plunge into the forested canopy of the Black River Riparian Forest. This park is a wildlife refuge with a diverse and treasured ecosystem, offering trail users wonderful separation from the urban landscape while still making the important connections among employment, retail, and residential areas.

Emerging from the Black River Riparian Forest, the trail connects under the Sounder Commuter rail line into the largest park in the city of Tukwila, Fort Dent Park, and connects to the Green River and Interurban trails. Traveling south along the Green River Trail, it ducks under Interurban Avenue S and heads into Tukwila Park, the City’s oldest park with its large firs and a variety of rhododendrons.

Traveling west, Southcenter Boulevard provides a gentle but steady climb to the Sound Transit link light rail station as the land rises up and connects into the city of SeaTac. The trail wraps around the northern edge of the Seattle-Tacoma (Sea-Tac) International Airport and connects to Des Moines Memorial Drive, which is a living memorial to those who gave their lives in the course of World War I. The trail continues south lined with American elm trees into the city of Burien and escapes the built-up areas as it settles into a green ribbon winding south along the SR 509 extension right of way. As the SR 509 extension heads east to connect to I-5, the trail turns south to connect into the city of Des Moines and the Des Moines Creek Trail. Hugging the side of a ravine, the trail follows the bubbling creek as it makes its way to the Des Moines Beach Park to arrive at our destination, Puget Sound.



The Lake to Sound Trail will be a legacy for our future generations. By connecting the trails in our region we are creating pathways for pedestrians and cyclists to enjoy access to our downtown, neighborhoods and parks, and to explore the natural beauty along the shores of our rivers.

—Renton City Councilmember Randy Corman

Project Goals – What would make a successful Lake to Sound Trail?

This study was commissioned to examine the feasibility, timeline, and routing for constructing a multi-purpose trail or similar facility from Lake Washington to Puget Sound through Renton, Tukwila, SeaTac, Des Moines, and Burien. To guide the process, the project team evaluated a range of alternative routes to meet several goals for the trail:

1. Develop a safe, continuous regional trail connecting Lake Washington from Renton to Puget Sound in Burien.
2. Provide access to the trail for local communities.
3. Evaluate opportunities to proceed with the development of selected sections of the trail by applying for upcoming federal transportation funding.
4. Provide economic and health benefits to communities along the trail.

Benefits of the Lake to Sound Trail

The majority of the feasibility study focuses on determining a preferred alignment for a Lake to Sound Trail corridor. Characteristics such as cost and constraints were identified based upon field observations, consultation with local jurisdictions, and review of existing studies and analyses.

Before addressing the feasibility of developing a regional trail, an overview of benefits of a trail is appropriate as a reminder of the potential positive outcomes from achieving the trail vision. The Lake to Sound Trail would benefit people in local communities by providing an alternative to driving from one place to another, encouraging physical activity, helping children get safely to and from school, connecting to other trails and facilities, and creating a new community resource that has the potential to bring people together.

What is a regional trail?

A regional trail is a shared-use (multi-use), regionally significant, off-road path that provides recreational opportunities and enhances regional mobility and travel. These facilities meet regional trail development guidelines for size, grade, and other characteristics and are suitable for nonmotorized uses such as bicycling, hiking, jogging, roller-blading, roller-skating, and other similar activities.

In urban areas, regional trails may use streets as an interim solution, where providing separated, off-road paths is not possible. User safety and convenience are paramount for both off-road and on-road trails. Providing opportunities for travel by all age groups, user types, and skill levels is essential to these facilities.

King County currently is responsible for over 175 miles of regional trails throughout the county. These trails are either paved or soft-surfaced (gravel). However, they all share common features of providing a safe and enjoyable experience for a variety of trail uses and levels.

For regional trails within the urban growth area, King County prefers a trail with a minimum width of 12 feet of pavement and 2-foot shoulders on both sides, separated from motorized facilities such as roads. However, in densely developed urban areas, opportunities to develop such a corridor may be limited. New trail alignments are often limited to circumstances where linear corridors already exist, such as the following:

- Linear utility corridors, such as those associated with transmission lines or pipelines, can often accommodate a trail. However, undeveloped utility corridors weren't identified within the Lake to Sound Trail study area, based on a review of aerial photographs and parcels maps.
- Railroad corridors are attractive for trail use when they are constructed at grade, because they are built with a horizontal and vertical geometry that lends itself to trails. Rail corridors also often have fewer crossings and intersections than other types of corridors. However, for trail use rail companies must be agreeable to such an arrangement or have abandoned the corridor. If rail use remains along with a new trail, there must be adequate right of way to accommodate the negotiated separation between the tracks and the trail. One rail corridor has been identified within the Lake to Sound Trail study area.
- Road rights of way may accommodate a variety of nonmotorized schemes that may include off-road two-way sidepaths located adjacent to the roadway, bike lanes and sidewalks on both sides of the road, wider paved shoulders (preferably on both sides), or shared uses with motor vehicles. The choice of facility type depends on the amount of right of way available, the number of driveways and roads crossed, and other safety factors. Numerous road corridors could become part of the Lake to Sound Trail alignment, although on-road segments would not meet regional trail development guidelines and, strictly speaking, would not be considered regional trails.



The Lake to Sound Trail will provide excellent opportunities to connect to existing trails like the Green River Trail shown above.

How were alternatives for the Lake to Sound Trail identified?

The idea of developing trails through these municipalities is not new. We reviewed planning documents prepared by each of the jurisdictions and met with many of them to understand the perspectives and insights of each. Several overarching principles guided our efforts:

- Where available, the preferred alternative would be a regional trail—a two-way, paved, multi-use path separated as much as possible from roadway traffic and conflicts such as driveways. Where property ownership and cost could substantially delay development of a trail segment (10 years or more), however, we offered shorter-term (i.e., interim) non-regional trail alternatives for consideration.
- The objective for shorter-term trail alternatives was to minimize the level of investment and potential known conflicts. Routes were selected that generally required less property conflicts, have a lower cost to construct, and would leave behind an inherent value to the nonmotorized network with the eventual construction of the preferred alignment.
- Preference was given to alignments where nonmotorized investments have already been made or are being made. In these areas, we typically proposed to maintain the same type of facility as is currently in place or being developed. By doing so, we help to minimize the cost impact and political backlash of rebuilding or redesigning an ‘improved’ area. In some instances, however, these investments may not meet the County’s guidelines for a regional trail at this time.
- We attempted to provide more continuity and consistency for trail users by minimizing the number of times a facility type is switched along a given segment. For example, we sought to minimize switching between off-road and on-road facilities.

In general, recommendations for potential alignments and facility types considered guidelines such as the King County Regional Trail System Development Guidelines, the Guide for the Development of Bicycle Facilities (AASHTO 1999), the Guide for the Planning, Design, and Operation of Pedestrian Facilities (AASHTO 2004) the Washington State Department of Transportation (WSDOT) Design Manual, and best professional judgment based on what we’ve seen work in other locations.

Feasibility Summary

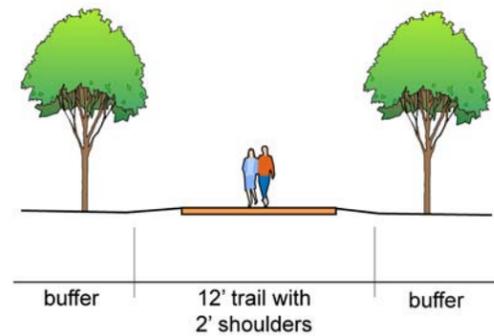
Is it feasible to build a trail from Lake Washington to Puget Sound, connecting through Renton to Burien? Yes. However, there are some significant challenges to address and differences in the readiness of segments to be constructed. As we identified and evaluated alignments and layouts, we considered the six criteria described below. Where constraints could potentially be addressed through the future design phase, we identified some of the options.

1. **Continuous route and right of way** with a common trail treatment increases the ability of users to follow the trail. It also reduces the likelihood of conflict, such as wrong-way cycling when a sidepath configuration switches to bike lanes and sidewalks (i.e., bicyclists do not cross the street to ride in the direction of traffic). However, natural and man-made barriers often constrain the continuous route and right of way. To a certain extent, these constraints can be addressed through the design process, though sometimes at substantial cost. For example, to create a safer, controlled interaction, bridges could carry users over obstacles such as roadways and rivers, boardwalks could navigate wet areas, and tunnels could cross under railroad tracks.
2. **Safety** is paramount. Trail facilities either on-road or off-road should provide an environment with reduced chance of confusion and conflicts among all users. Difficult and narrow sections should be avoided. Separation from vehicular use should be maximized. However, where the trail facility must interact with other uses, the consistent use of applicable design standards and guidelines would improve safety in many situations.
3. **Environmental considerations** include potential effects on the transportation system, drainage, the natural environment in undeveloped areas, and adjacent properties where the trail would require widening of an existing right of way. Sometimes these effects are a tradeoff for creating a safer, more enjoyable trail. Many of the impacts can be minimized through design or mitigated. During the trail design phase, these tradeoffs can be evaluated in more detail and mitigation developed where needed.
4. **Grades** that are steep present a challenge—sometimes a source of excitement—for younger and less experienced riders and can be an obstacle to some trail users. Where very steep grades are present, the preference is to find an alternative route that provides a gentler transition. Design features could include switch-backs, level areas after a section of climbing, stairs, even elevators, all dependent on the type of facility and users to be accommodated.
5. **Structures** for the purposes of this study included bridges to be utilized or constructed as part of the trail and buildings or support structures that could be affected. Generally, a consideration that trail designers encounter when addressing structures is the potential cost escalation of modifying or creating a structure versus safety and convenience (i.e., relocate column or create pinch-point or narrowing of the facility, grade separated or at-grade crossing).
6. **Cost-benefit** involves weighing the cost of the solution to the overall benefit that it could provide to all users, including motorized users and adjacent property owners. Often, a solution is available for just about any situation, but it might cost a lot of money to do it. In recommending layouts for the trail, a higher level of cost was often accepted if the outcome was a safer, more enjoyable trail with better separation from adjacent uses.

What would this regional trail look like?

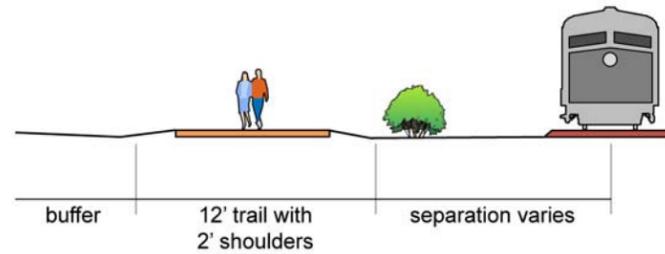
We have identified five layouts that could apply to the various alternative alignments, described in detail by map section. The five layouts may be characterized as off-road or on-road and are as follows: 1) two-way multi-use trail, 2) rail with trail, 3) sidepaths, 4) bike lanes and sidewalks, and 5) shared-use roadway.

Off-road facilities:



Two-way multi-use trail

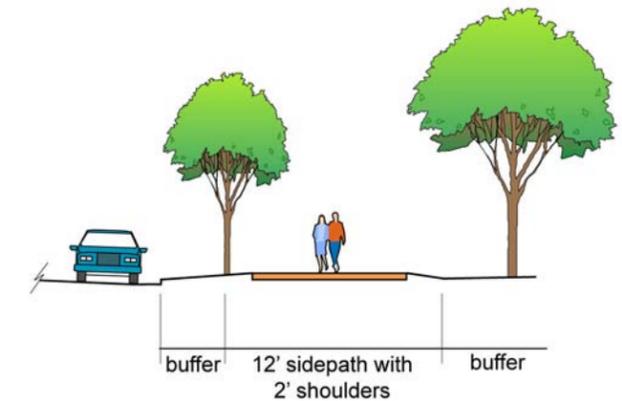
The preferred two-way multi-use trail would consist of a 12-foot-wide paved section, bounded by 2-foot-wide soft shoulders and 1-foot-wide clear zones on both sides. This section would be consistent with regional trail guidelines.



Rail with trail

The preferred trail layout in a railroad right of way would include a generous separation between the trail and the rail line and a safety barrier between the rail and the trail. The width and configuration of the trail would be the same as a two-way multi-use trail. This section would likely be consistent with regional trail guidelines, although some special design features might need to be incorporated to accommodate both trail and rail.

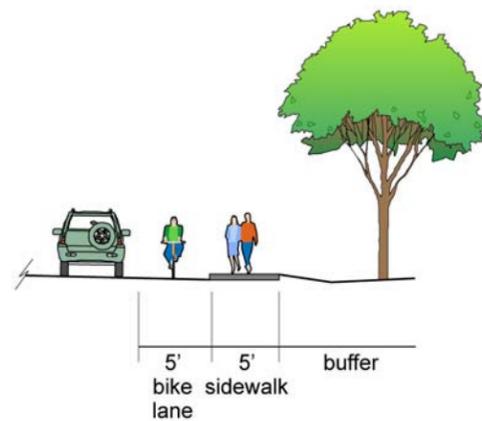
In locations with limited right of way or limiting adjacent uses inside the corridor, the trail must be located relatively close to the tracks. The minimum separation between a trail and tracks has yet to be identified. If the separation distance from the rail tracks to the trail is less than desirable, safety enhancements, such as a barrier fence, could be installed.



Sidepaths

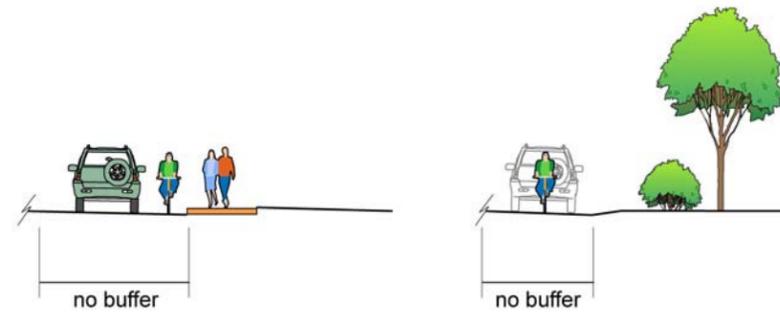
Sidepaths are off-road paths within road corridors. Where there are limited driveway crossings, or adjacent roadway speeds and volumes are higher, a sidepath layout would be proposed. A sidepath would be a two-way multi-use trail immediately adjacent to the street. The preferred configuration would be a 12-foot-wide paved path with at least 3 to 6 feet from the edge of the pavement to any obstructions (e.g., fences or signs) or adjacent uses (e.g., curb). The 3 to 6 feet includes a shoulder and clear zone. A preferred sidepath section would likely meet the regional trail guidelines, although some special features (e.g., a barrier) might need to be incorporated to reduce potential conflicts with motor vehicles.

On-road facilities:



Bike lanes and sidewalks

Bike lanes and sidewalks along a roadway provide a cost-effective and safe solution for bicycle and pedestrian users, although they do not technically meet the design criteria of a regional trail. Improvements are typically symmetrical to the existing roadway, avoiding or minimizing the need to shift or reconfigure travel lanes. Often, the roadway surface does not occupy the entire right of way, providing space for expansion. Some of the improvements (e.g., sidewalks) may already be in place on an intermittent basis. This layout may be preferred where frequent, multiple driveway crossings occur and adjacent roadway speed and vehicle volumes are low.



Shared-use roadways

The lowest level of trail accommodation that could be proposed would be a shared-use roadway, which is only recommended on low-volume roadways. This on-road approach essentially uses the street as the trail and would not technically meet the design criteria of a regional trail. These facilities are designated with bike route signage and may include “share the road” striping or “sharrow”-type markings placed in travel lanes.



Pictured above is a “sharrow” roadway marking to alert road users that bicyclists and autos share the roadway.

The proposed trail route is diverse and includes some complex considerations for construction. This section examines the trail route from Lake Washington to Puget Sound in more detail.

Feasibility Analysis by Trail Segment

As a decision-making tool, this feasibility analysis evaluated trail segments that begin and end at logical breakpoints along the route. The segments are also aligned with logical locations that might be the basis for phasing the construction of the Lake to Sound Trail. Optional trail alignments are also provided where viable alternative alignments are present, and where construction of the preferred alignment could reach considerable challenge or opposition. In some cases, the alternative (i.e., interim) route could be constructed first. In other places, the alternative route could become the long-term solution.

Segment Cost Estimates

The planning level cost estimates included in the segment descriptions indicate the characteristics of the improvements as well as the extent. Cost estimates provided are preliminary and for planning purposes only. They should not be relied upon for budget preparation or contracting because they do not include all project costs (e.g., design, permitting, right of way acquisition, mitigation, and owner administration). Instead, they represent a comparative analysis between segments. Cost estimates were developed based on the preferred alignment's recommended base improvements using the WSDOT Planning Level Cost Estimate software and a representative cost-per-mile value from trail projects with similar characteristics.

Reliable cost estimates would require ground survey of the proposed alignments and some engineering design of the trail facility, including more detailed geotechnical evaluation and design for specific retaining wall solutions. Evaluation of existing bridges was visual only and did not include structural analysis or design.

Shown below are the delineations for each of the map segments discussed on the following pages.

