

### 3 Alternatives Evaluation

This section summarizes and contrasts the trail route alternatives against each other. It includes a matrix format that facilitates comparison. The objective of the evaluation is not to select a preferred alternative, but to highlight the features and relative advantages and disadvantages of each alternative route. The evaluation criteria, and the tentative conclusions, reflect comments from the public and Technical Advisory Committee members during the course of the Study. The conceptual improvements for each route alternative were developed to address these criteria to the extent feasible. The evaluation reflects the performance of the alternatives assuming the recommended and optional improvements are implemented as described in Section 2.

#### Profiles

Profiles (cross-sections following the terrain of the route) were prepared to show the relative slope gradients of the three alternative routes, plus the Casa Buena sub-alternative of the Horse Hill Route (Figure 3-1), and compare them to grades of other bike routes in Marin County (Figure 3-2). The vertical scale is exaggerated to highlight the elevation changes. These profiles show that the Alto Tunnel Route has less than half the elevation gain of the Horse Hill Route, and the Camino Alto/Corte Madera Avenue Route has four times the elevation gain of the Alto Tunnel Route, or twice that of the Horse Hill Route.

The Cal Park Tunnel Route has a similar elevation gain to the Alto Tunnel Route, but steeper approaches. Other Marin County routes have less elevation gain than the Camino Alto/Corte Madera Avenue Route, but have much steeper gradients.

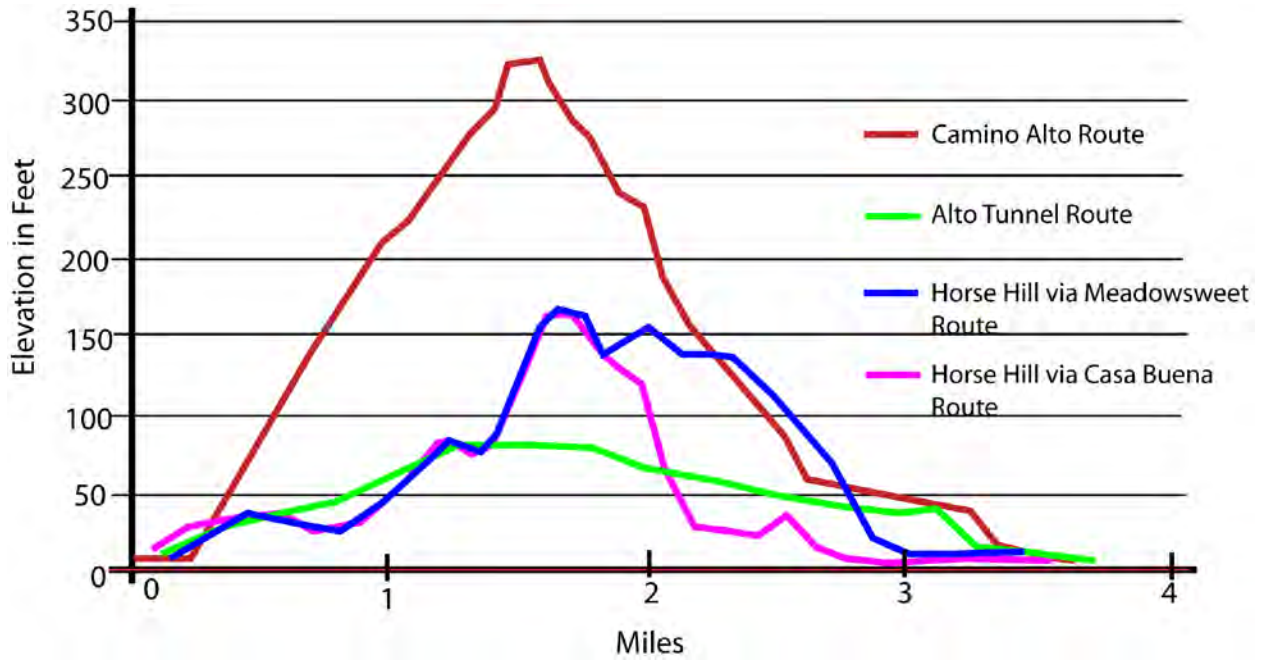


Figure 3-1: Profiles of Study Routes

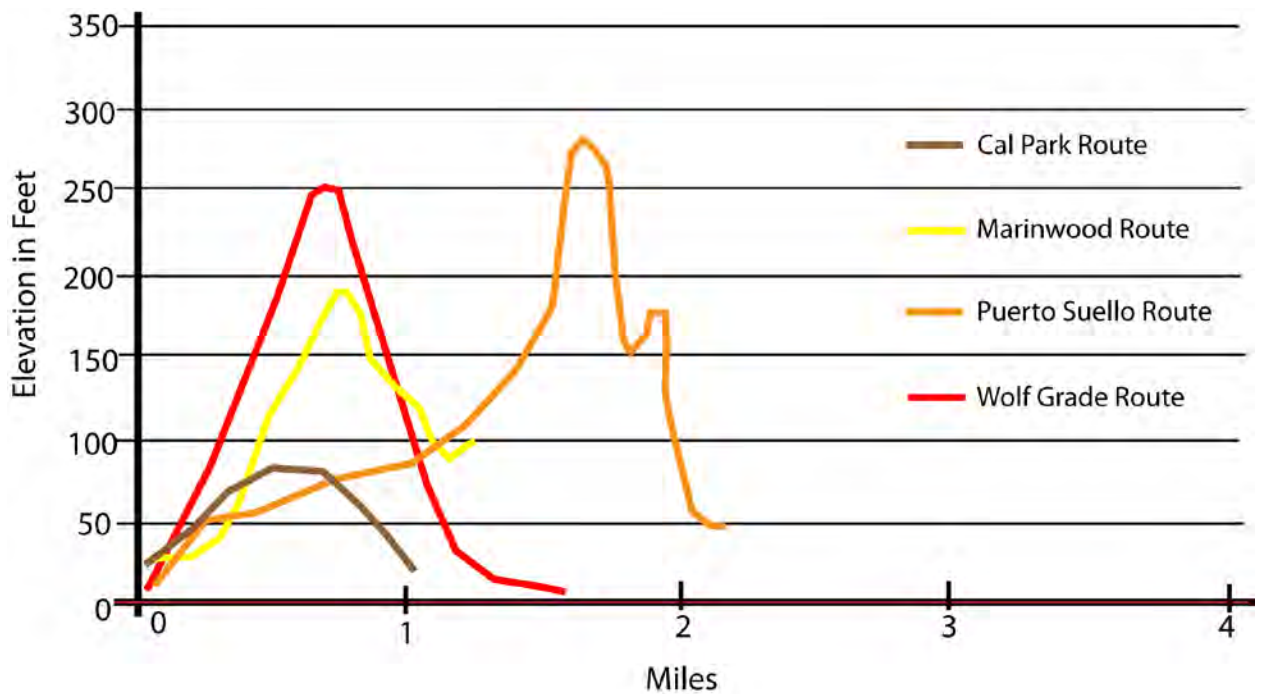


Figure 3-2: Profiles of Other Marin County Routes

### Evaluation Criteria

Based on input during the first stage of the Study, the evaluation criteria were refined to consist of the following (not listed in particular order):

- **Emergency Access and Safety**

Ability to meet the requirements of local emergency agencies to respond to fire, police or medical emergencies on the route and provide the safety and security features identified.

- **Bikeway and Community Connections**

Direct and convenient access to other routes and destinations, paths or bikeways, schools, parks, commercial or employment areas.

- **Functionality/Efficiency**

Function for the intended and likely user groups, based on adopted local, state or federal design criteria, and ability to address potential conflicts between user groups.

- Bicyclists
- Pedestrians
- Persons with disabilities

- **Mode Shift/Use Levels**

The relative increase in travel by bicyclists and pedestrians compared to current conditions, as estimated in the Use Counts and Projections, Appendix H.

- **Roadway Crossings and Intersections**

Need for road crossings by bicyclists and pedestrians and ability to configure the intersections for safe and efficient crossing.

- **Right-of-Way Availability/Issues**

Requirements to secure additional right-of-way and/or agreements from other parties to complete the path improvements.

- **Possible Environmental Issues**

Possible issues related to geologic stability, storm drainage, biological or cultural resources, aesthetics, noise, water quality, or other factors typically addressed during the CEQA or NEPA process.

- **Adjacent Property Issues**

Issues related to path construction or users on adjacent properties and conceptual feasibility to address these issues.

- **Cost**

The relative cost of implementation of the alternatives – including studies, planning, final design permitting, acquisition, and construction. The evaluation will also consider the relative certainty of the estimated cost based on available information.

- **Cost per Projected User**

The cost of improvements divided by the projected number of users – the latter number being an estimate based on national trends and current use of nearby bicycle and pedestrian facilities.

- **Permitting Requirements**

Potentially required permits from State and Federal agencies, the likelihood of obtaining permits, and the impact on cost and schedule

- **Consistency with Local Plans**

Consistency of the alternative alignments with previously-adopted County or city plans and policies.

- **Maintenance and operation requirements**

The relative requirements and feasibility of maintaining and managing the facility, including ability of the responsible party(ies).

### Input Regarding Criteria

Comments during public participation recommended the use of criteria from the 2008 *Marin County Unincorporated Bicycle and Pedestrian Master Plan* to evaluate the feasibility of use of the Alto Tunnel. These criteria are taken in turn from a 2001 the Rails-to-Trails Conservancy study, *Tunnels on Trails*, a survey of 78 tunnels in use as bikeways on 36 trails in the United States. As stated in the *Master Plan*:

According to this report and based on criteria specific to Marin County, the feasibility of reusing any of the tunnels is dependent on several factors, including:

1. The willingness of local jurisdiction(s) to become project sponsor(s) and take on the cost and responsibility of building and operating the facility
2. The political acceptability to local neighborhoods of these renewed corridors provided by re-opened tunnels
3. The lack of reasonable, less costly alternatives
4. The expectation that they will significantly increase bicycling and walking
5. Geological, drainage, or other physical factors posed by the reopening of tunnels
6. Ability of project sponsoring agencies to resolve legal issues with affected property owners
7. Cost of re-construction and available funding
8. The ability to address safety and security issues

Factors 1 and 2 above are input and decision processes that will follow the completion of this technical study. Factor 6 cannot be determined until the process recommended in the study to address right-of-way issues is completed, but the issue is framed in the analysis and evaluation. The other factors are all included in the evaluation criteria.

In December 2000 the Mill Valley City Council passed resolution 00-36, supporting a tunnel feasibility study and recommending 11 specific issues to be addressed:

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1. The manner in which the tunnel construction, operations and maintenance costs will be financed, along with identification of possible funding, and a cost/benefit analysis be prepared utilizing these cost figures.
2. The extent to which the tunnel and the approaches thereto can be constructed and maintained so as to be non-invasive to privacy and safety of the neighboring residents during both construction and operation.
3. Analysis of the tunnel structure including seismic safety of the tunnel and adjoining properties;
4. Analysis of the likely ongoing costs of maintenance, lighting and security and the impact of these costs on the city;
5. The extent to which construction of the tunnel is likely to delay or diminish completion of the specific local and regional projects benefiting the City and surrounding areas, as listed in the Marin County Bicycle and Pedestrian Master Plan;
6. Evaluation of the adequacy of the current multi use path in Bayfront Park for the expected increased volume of bike riders, and users of the park;
7. Evaluation of the effect of the tunnel on the existing and anticipated traffic congestion problems in Marin County in general and the city in particular;
8. Whether reestablishment of the Alto Tunnel might result in its use in connection with train service in southern Marin County (which would be counter-productive to bicycle and pedestrian use) and;
9. Evaluation of whether alternatives to the tunnel, including the improvement of the existing route on Camino Alto, the path adjacent to U.S. highway101, and other possible north/south routes, may contribute sufficient improvement to bicycle/pedestrian travel and traffic flow without the addition to the tunnel.
10. Proposed schedule for design, funding, construction and opening.
11. Identification of the environmental impacts of the proposed tunnel on the surrounding areas, including the need for any possible easement or property acquisition.

The current study addresses the above issues at a general level consistent with a preliminary engineering study, except for the following issues:

Issue 1 – How the tunnel improvements will be financed is not specifically resolved in the study, although it does identify potential funding sources. It provides cost/benefit considerations.

Issue 5 – Regarding the impact of the project on competing projects. This depends on funding opportunities.

Issue 8 – Potential use of the re-opened tunnel for train service is also beyond the scope of the current study to address.

### Evaluation Matrix

The evaluation in Table 3-1 is a summary of very complex issues and conclusions based on the opinion of the technical study team. The evaluation summarizes relative performance of each alternative against each criterion in subjective terms of Excellent, Good, Fair, or Poor. In some cases there are mixed results, or clarifications of the conclusion.

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**Table 3-1: Route Alternatives Evaluation Matrix**

Route Alternatives Performance			
Criteria	Horse Hill Route	Alto Tunnel Route	Camino Alto/Corte Madera Ave Route
<b>Emergency Access and Response</b>	<b>Good</b> , except along the Horse Hill Path. Concepts to widen path would improve access.	<b>Fair</b> . Tunnel would present access challenges for emergency personnel, partially mitigated by safety improvement concepts. Tunnel would provide a new emergency egress route between communities.	<b>Excellent</b> . All portions are along public roads.
<b>User/Public Safety – separation from traffic</b>	<b>Good</b> . Separated from traffic or on low volume roads, but Sanford and Madera Street intersection is challenging.	<b>Good</b> . Entirely separated from roads if Montecito pathway improvements are implemented, but mixing user types in tunnel is a concern, as is sense of personal safety.	<b>Fair</b> . All portions are along busy, winding, narrow public roads, but widening will significantly improve safety from current.
<b>Bikeway and Community Connections</b>	<b>Good</b> . A less direct route from central Mill Valley to central Corte Madera, but connects directly to Town Center shopping area and to improvements planned in the Highway 101 Twin Cities Corridor Study by TAM.	<b>Excellent</b> . A direct, virtually flat link between the two most popular pathways in the County, and between central MV and CM.	<b>Fair</b> . Links central MV and CM, but a longer, winding route.
<b>Functionality/ Efficiency – Bicycles</b>	<b>Fair</b> . Involves two steep hills of 10% and 8% slope. A longer and less direct route. Exposure to freeway traffic noise, view and nighttime glare. May be partially addressed by improvements.	<b>Good</b> . Flat and relatively straight. Potential conflict with other users in the tunnel, aesthetic and safety concerns may deter some users.	<b>Fair</b> . Involves climbing a steep hill and mixing with cars on a winding road. Even with climbing lanes or bike lanes some bicyclists would feel uncomfortable on this route. But scenic and challenging for avid bicyclists.

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<b>Route Alternatives Performance</b>			
<b>Criteria</b>	<b>Horse Hill Route</b>	<b>Alto Tunnel Route</b>	<b>Camino Alto/Corte Madera Ave Route</b>
<p><b>Functionality/ Efficiency –</b></p> <p><b>Pedestrians/ Persons with disabilities</b></p>	<p><b>Poor/Fair.</b> Southern and northern portions have sidewalks or path and low gradients. Horse Hill Path and part of Casa Buena have steep grade. Southern Meadowsweet and Casa Buena lack sidewalk or path, and use patterns and adjacent land uses and resources do not support adding pedestrian improvements.</p>	<p><b>Good.</b> Excellent relative to gradient and surface, but potential conflicts with bikes in tunnel and concerns about personal comfort and perceived safety in the tunnel pertain.</p>	<p><b>Poor.</b> A steep route exposed to heavy traffic with discontinuous sidewalks and path. Extension of sidewalk on Camino Alto north to Overhill and improvements to Corte Madera Avenue path would improve access on those portions, but not through access. Use patterns and adjacent land uses and resources do not support adding pedestrian improvements.</p>
<p><b>Mode Shift/Use Levels</b></p>	<p><b>Fair.</b> An estimated 10% increase in use due to limited ability to improve existing route conditions, and current relatively low popularity.</p>	<p><b>Excellent.</b> Estimated use and vehicle miles travelled savings of up to approximately eight times the projected level for Horse Hill Route, and three times the level for Camino Alto/Corte Madera Ave. Route, based on capturing 80% of users of adjacent existing paths.</p>	<p><b>Good.</b> An estimated 25% increase in use, primarily by bicyclists, on this already popular route, due to potential significant improvement in safety and conflict with vehicles.</p>
<p><b>Roadway Crossings and Intersections</b></p>	<p><b>Fair.</b> Most of route avoids major crossings, but conflicts at freeway on-ramp on Casa Buena, and complex intersection at Sanford Street.</p>	<p><b>Excellent.</b> Crossings at E. Blithedale and Redwood Avenue comparable to other 2 routes; only other crossing is Vasco Court.</p>	<p><b>Fair.</b> Crossing at and connection from E. Blithedale and at Redwood Ave. could be improved, no other major road crossing issues, but many intersecting roads .</p>



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<b>Route Alternatives Performance</b>			
<b>Criteria</b>	<b>Horse Hill Route</b>	<b>Alto Tunnel Route</b>	<b>Camino Alto/Corte Madera Ave Route</b>
<b>Right-of-Way Availability/ Issues</b>	<b>Good.</b> Requires Caltrans permission, permit to make improvements on Horse Hill path.	<b>Poor.</b> Parts of the route in a variety of ownerships. Requires significant study and negotiation process to resolve.	<b>Fair.</b> Involves changes to private improvements in the R.O.W., as noted under Adjacent Property Issues. Limited available ROW for improvements requires careful design
<b>Environmental Issues</b>	<b>Good.</b> Changes to grassland and scrub if Horse Hill Path widened, Meadowsweet connection implemented. Potential cultural resources and hazardous materials (along Highway 101) constraints. Construction noise and activity.	<b>Poor.</b> Removal of native trees and vegetation along the right of way near tunnel portals, construction in wet area habitat, potential soil contamination along rail route. Geologic and hydrologic considerations. Construction noise and activity, and safety and community impacts to be assessed. Potential cultural resources constraints.	<b>Fair.</b> Changes to adjacent hillsides by path widening – removal of trees, shrubs, grassland adjacent to open space, visual changes with retaining walls. Potential cultural resources and regulatory waters constraints. Construction noise and activity.
<b>Adjacent Property Issues</b>	<b>Fair.</b> Major bike route passing Maguire Elementary School campus a concern. May be concerns about impact on freeway.	<b>Poor.</b> Improvements and introduction of up to 1,850,000 annual users is a significant change to the character of the neighborhoods to the south and north of the tunnel portal. Construction noise and activity will affect.	<b>Good/Fair.</b> Construction noise and activity will affect, but no lasting impact on adjacent properties on southern 3/4 of route. Localized changes in neighborhoods along Corte Madera Avenue, loss of some parking.
<b>Cost</b>	<b>Good/Fair.</b> \$4.4 - \$5.5 million Route 4A or 4B Sunken Path Option \$9 - \$10.2 million E. Blithedale Separated Crossing: <u>add</u> \$3.4 - \$4 million	<b>Poor.</b> \$46 - \$56 million E. Blithedale Separated Crossing: <u>add</u> \$3.4 - \$4 million	<b>Good.</b> \$4.6 million With sidewalk extension to Overlook Road: \$5.5 million E. Blithedale Separated Crossing: <u>add</u> \$3.4 - \$4 million

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<b>Route Alternatives Performance</b>			
<b>Criteria</b>	<b>Horse Hill Route</b>	<b>Alto Tunnel Route</b>	<b>Camino Alto/Corte Madera Ave Route</b>
<b>Permitting and Agreement Requirements</b>	<b>Fair.</b> Requires Caltrans permission, permit to make improvements on Horse Hill path.	<b>Poor.</b> Requires delineation of potential wetlands, permits from state and federal environmental agencies, agreement between County and two cities.	<b>Fair.</b> Requires delineation of potential wetlands/drainages and/or permits from state and federal environmental agencies. Otherwise requires only approval of Mill Valley and Corte Madera.
<b>Consistency with Local Plans</b>	<b>Undetermined.</b> Listed as an option in Co. Unincorporated Area Bike and Ped. Master Plan, but not in City plans. Lomita portion is in unincorporated area. Part is an adopted County bike route.	<b>Good.</b> Incorporated in adopted bicycle plans. Adopted plans direct current study.	<b>Good.</b> Consistent with County, Mill Valley, and Corte Madera adopted bicycle and pedestrian plans.
<b>Maintenance and Operation Requirements</b>	<b>Good/Fair.</b> Basic improvements primarily additions and modifications to existing facilities, but Sunken Path option brings added maintenance (drainage; retaining walls long-term maintenance responsibility).	<b>Poor.</b> Tunnel and connecting pathways, drainage facilities, and tunnel safety and emergency features would be a large operation and maintenance responsibility.	<b>Fair.</b> Primarily additions and modifications to existing road and drainage facilities, but extensive retaining walls would be a long-term maintenance responsibility.