

4 Cost Estimates

This section provides planning-level cost estimates for the alternative route improvement concepts, including planning, design, construction, and other anticipated implementation costs, as well as maintenance costs.

Construction Costs

Costs for the Alto Tunnel rehabilitation and the drainage improvements associated with the tunnel portals were estimated separately in the respective technical studies, and are summarized here.

Like the improvement concepts themselves, the cost estimates required assumptions about the methods of construction and associated requirements. The estimate and assumptions reflect the experience of the consultant team with other similar projects.

The individual segment estimates (Table 4-2 and Appendix L) include cost “placeholders” for each stage of project implementation, based on factors of the construction cost, including:

- Survey, technical studies (such as geotechnical or hazardous waste investigations) and design (including preliminary and final plans, cost estimates, and specifications/bid forms) – 15%
- Environmental analysis and documentation and related permits – 10%
- Project administration during planning, design and construction – 10%
- Construction overhead (costs the contract typically includes over and above the individual work items, such as mobilization and general conditions) – 10%

A contingency for the level of accuracy of the estimate is included at 20% of all items, except for the Alto Tunnel, which has contingencies on some items at 20% or 40% depending on certainty of requirements, as well as an estimate accuracy allowance of 20% (see Appendix B, Tunnel Feasibility Study for more information).

Specific cost allowances are added to the standard cost factors for tasks or items that are unique to some segments.

If small improvement projects are undertaken separately, the costs may potentially increase significantly from the design, administration and construction cost factors in the estimates. In any case, actual costs for the projects can only be determined following development of more complete and detailed base information and definition of the specific improvements for design, environmental review and permitting, and construction.

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Table 4-1: Route Improvements Planning-Level Estimates

A Horse Hill Route				
Length - Segment 4A option (Meadowsweet):		15,570 feet/2.9 miles		
Length - Segment 4B option (Casa Buena):		15,330 feet/2.9 miles		
Total estimated cost:			Path widening & route improvements <u>without</u> sunken path option	Path widening & route improvements <u>with</u> sunken path option
<u>Without</u> E. Blithedale bike/ped O/U Crossing	Using Segment 4A		\$4,370,000	\$9,047,000
	Using Segment 4B		\$5,515,000	\$10,192,000
<u>With</u> E. Blithedale bike/ped O/U Crossing	Using Segment 4A		\$7,778,000	\$12,455,000
	Using Segment 4B		\$8,923,000	\$13,600,000
B Alto Tunnel Route				
<i>(route is longer than A because it includes segment 10, Sandra Marker Trail)</i>				
Length: 16,620 feet/3.1 miles				
Total estimated cost:			Low Range	High Range
<u>Without</u> E. Blithedale bike/ped O/U Crossing			\$45,985,000	\$55,910,000
<u>With</u> E. Blithedale bike/ped O/U Crossing			\$49,393,000	\$59,318,000
C Camino Alto/Corte Madera Avenue Route				
<i>(route is longer than A because it includes segment 10, Sandra Marker Trail)</i>				
Length: 19,430 feet/3.7 miles				
Total estimated cost:			Adding bike and/or climbing lanes <u>without</u> sidewalk extension to Overhill Rd.	Adding bike and/or climbing lanes <u>with</u> sidewalk extension to Overhill Rd.
<u>Without</u> E. Blithedale bike/ped O/U Crossing			\$4,645,000	\$5,466,000
<u>With</u> E. Blithedale bike/ped O/U Crossing			\$8,053,000	\$8,874,000

Note: Costs include these items and assumptions:

- Construction overhead (e.g. mobilization and general conditions) – 10% of construction cost.
- Survey and technical studies – 15% of construction cost.
- Environmental analysis and documentation and related permits – 10% of construction cost.
- Project administration during planning, design and construction – 10% of construction cost.
- Contingency for level of estimate accuracy – 20% of all items.
- Specific cost allowances for tasks or items unique to some segments.

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Table 4-2: Segment Improvements Planning-Level Estimates

(see Figure 1-2 for segment locations)

Horse Hill Route			
	Length - Segment 4A option (Meadowsweet):	15,570 feet/2.9 miles	
	Length - Segment 4B option (Casa Buena):	15,330 feet/2.9 miles	
		Without Sunken Path Option	
Total estimated cost:	Without E. Blithedale Bike/Ped O/U Crossing	\$4,369,778	Using Segment 4A
		\$5,514,939	Using Segment 4B
	With E. Blithedale Bike/Ped O/U Crossing	\$7,777,778	Using Segment 4A
		\$8,922,939	Using Segment 4B
Segment 11A			
	E. Blithedale Avenue crossing improvements from northern end of Mill Valley Sausalito Path at Lomita Avenue.		
	Length:	100 feet/0.02 miles	
	Total Cost:	\$84,067	
E. Blithedale Bike/Ped O/U Crossing Option (add): \$3,408,000			
Segment 1			
	Functions as part of Alto Tunnel & Horse Hill route. From the northern end of Mill Valley-Sausalito Path to Vasco Court.		
	Length:	3,700 feet/0.7 miles	
	Total Cost:	\$926,325	
Segment 2A			
	From bike path at Edna Maguire Elementary School along Lomita Road to Greenfield Court.		
	Length:	1,550 feet/0.3 miles	
	Total Cost:	\$90,440	
Segment 2B			
	From Greenfield Court along Lomita Road to Horse Hill bike path.		
	Length:	1,830 feet/0.35 miles	
	Total Cost:	\$486,332	
Segment 3			
	Existing Class I bike path running from end of Lomita Drive parallel to Highway 101 to Meadowsweet Drive.		
	Length:	2,040 feet/0.4 miles	
	Total Cost:	\$2,301,606	

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Horse Hill Route (Continued)

Segment 4A South	From the northern end of the Horse Hill path along Meadowsweet Drive to Conow Street.			
Length:	4,270 feet/0.8 miles			
Total Cost:	\$41,116			
Segment 4A North	Meadowsweet Drive from Conow Street to Sanford Street			
Length:	1,640 feet/0.3 miles			
Total Cost:	\$5,692			
Segment 4B South	(Alternative to Segment 4a South above): Casa Buena Drive from northern end of Horse Hill path to Conow Street			
Length:	3,780 feet/0.7 miles			
Total Cost:	\$1,160,816			
Segment 4B North	(Alternative to Segment 4a North above): Casa Buena Drive from Conow Street to Sanford Street			
Length:	1,890 feet/0.4 miles			
Total Cost:	\$31,153			
Segment 5	Intersection - Sanford Street from Meadowsweet Drive to Tamalpais Drive			
Length:	60 feet/0.01 miles			
<i>Construction Items: to be scoped and estimated as part of Highway 101 Greenbrae/Twin Cities Corridor Improvements Study</i>				
Segment 6	From Tamalpais Drive to Wornum Way along Madera Boulevard and Tamal Vista Boulevard to the study end point.			
Length:	3,630 feet/0.7 miles			
<i>Construction Items: to be scoped and estimated as part of Highway 101 Greenbrae/Twin Cities Corridor Improvements Study</i>				

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Alto Tunnel Route					
Length:	16,620 feet/3.1 miles				
	Total estimated cost:				
	<u>Without</u> E. Blithedale Bike/Ped Bridge	\$45,985,000	Low	\$55,910,000	High
	<u>With</u> E. Blithedale Bike/Ped Bridge	\$49,393,000	Low	\$59,318,000	High
Segment 11A	E. Blithedale Avenue crossing improvements from northern end of Mill Valley Sausalito Path at Lomita Avenue.				
Length:	100 feet/0.02 miles				
Total Cost:	\$84,067				
E. Blithedale Bike/Ped O/U Crossing Option (add):	\$3,408,000				
Segment 1	Functions as part of Alto Tunnel & Horse Hill route. From the northern end of Mill Valley-Sausalito Path to Vasco Court.				
Length:	3,700 feet/0.7 miles				
Total Cost:	\$926,325				
Segment 7	Old railroad bed running from Vasco Court to Alto Tunnel.				
Length:	1,280 feet/0.2 miles				
Total Cost:	\$1,411,809				
Segment 8	Alto Tunnel and Portals				
Length:	2,250 feet/0.4 miles				
Total Cost:		Low \$40,626,000		High \$50,551,000	
Segment 9A	From northern end of Alto Tunnel to Montecito Avenue and beginning of existing path near Tamalpais Drive.				
Length:	2,310 feet/0.4 miles				
Total Cost:	\$2,555,968				
Segment 9B	Along RR row from Montecito Avenue and beginning of existing path near Tamalpais Drive to the south side of Redwood Avenue.				
Length:	690 feet/0.1 miles				
Total Cost:	\$215,697				
Segment 10	Connection along Montecito Drive north of Redwood Avenue to the existing Sandra Marker Trail, and along the existing Sandra Marker Trail				
Length:	6,638 feet/1.3 miles				
Total Cost:	\$164,197				

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Camino Alto/Corte Madera Avenue Route			
Length:	19,430 feet/3.7 miles		
	Total estimated cost:	Without Sidewalk Extension to Overhill Rd.	With Sidewalk Extension to Overhill Rd.
	Without E. Blithedale Bike/Ped O/U Crossing	\$4,644,473	\$5,465,647
	With E. Blithedale Bike/Ped O/U Crossing	\$8,052,473	\$8,873,647
Segment 11	Short connection along E. Blithedale Avenue from northern end of Mill Valley Sausalito Oath to El Camino Alto.		
Length:	570 feet/0.1 miles		
Total Cost:	\$84,067		
E. Blithedale Bike/Ped O/U Crossing Option (add):	\$3,408,000		
Segment 12A	Along Camino Alto from E. Blithedale Avenue to Overhill Road.		
Length:	3,430 feet/0.7 miles		
Total Cost:	\$1,393,898		
Segment 12B	Along Camino Alto Road from Overhill Road to Mill Valley/Corte Madera city limit.		
Length:	3,850 feet/0.7 miles		
Total Cost:	\$1,365,172		
Segment 13A	From Mill Valley/Corte Madera city limit to Open Space boundary and start of pedestrian path		
Length:	2,570 feet/0.5 miles		
Total Cost:	\$760,575		
Segment 13B	From Open Space boundary and start of pedestrian path to Redwood Avenue, and along Redwood Avenue to Tamalpais Drive		
Length:	2,710 feet/0.5 miles		
Total Cost:	\$876,563		

Operation and Maintenance Costs

Requirements for management, maintenance, and operation of the alternative routes are an important consideration for future decisions about what improvements to undertake. A well-designed program of maintenance and operation can encourage the use of the facilities and deter problems such as vandalism and littering. Such a program requires a realistic level of funding

Depending on the type of improvements, different levels of funding are necessary to address items such as pavement stabilization, landscape maintenance, facility upkeep, sign replacement, fencing, mowing, litter removal, painting, and pest control. Maintenance-related design objectives for any new facilities include:

- Provide an adequate pavement structural section to support maintenance vehicles on the paths of the Horse Hill route and the paths leading to the Alto Tunnel as well as the bike lanes of the Camino Alto/Corte Madera Ave route;
- Provide vandal-proof lighting for the Tunnel and features of the other routes such as the guard rail on the Camino Alto/Corte Madera Avenue Route, that minimize maintenance needs;
- Provide adequate fencing and other access control to the path routes to minimize trespassing.
- Provide adequate informational, traffic control, regulatory, and wayfinding signage.

Meeting these objectives and providing a thorough ongoing maintenance program will benefit the basic physical, aesthetic, and biological qualities of the route, and result in many other benefits in as listed below:

- A high standard of maintenance is an effective way of helping advertise and promote the facility as a local and regional transportation and recreational resource;
- The psychological effects of good maintenance can be a deterrent to vandalism, litter, and encroachments;
- Good maintenance is necessary to preserve positive public relations between the adjacent land owners and between public agencies;
- Good maintenance can help make enforcement of regulations on the route more efficient. Local clubs, interest groups, and neighbors will take pride in the facility and will be more apt to assist in its protection;
- A proactive maintenance policy will help improve safety;
- Regular, routine maintenance on a year-round basis will prolong the life of the facility.

Maintenance Cost

Maintenance costs for the bicycle and pedestrian connection between Mill Valley and Corte Madera will depend on the facility type. Maintenance costs are most expensive for separate bike paths and tunnels followed by on-street bicycle lanes and then the least expensive facilities to maintain are on-street bicycle routes. Whereas tunnels and off-street paths require separate maintenance schedules, maintenance of on-street bikeways occur with normal roadway maintenance programs with extra

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emphasis on keeping the bike lanes and roadway shoulders clear of debris and keeping vegetation overgrowth from blocking visibility or creeping into the roadway.

The typical maintenance costs and assumptions for 1 mile of bikeway and sidewalk per year are as follows:

Bike Path:	\$10,578	Lighting, where included; removal of trash and vegetation overgrowth, sweeping, graffiti removal.
Bike Lanes:	\$2,000	Repainting lane stripes and stencils, sign replacement as needed
Bike Routes/Sharrows:	\$1,000	Sign and shared use stencil replacement as needed
Sidewalk	\$5,000	Minor repairs of cracks and settlement. Sidewalk maintenance is typically the responsibility of the adjacent property owner, and some public maintenance is often involved. Many of these facilities are adjacent to public land.

Other improvements related to the above basic bicycle and pedestrian facilities will require maintenance:

Retaining walls - New retaining walls will require maintenance of associated drains, graffiti removal, and potentially repair of cracks. An annual allowance of \$1.00 per square foot of new wall is assumed.

Drainage systems – new storm drainage systems will require inspections and maintenance, especially before and after storms to clear debris. An annual allowance of \$1.00 per lineal foot of new drain is assumed.

Maintenance of the Alto Tunnel route will be more expensive than the typical bike path maintenance cost due to special activities and costs associated with maintaining the tunnel. It will require opening and closing of safety barriers, upkeep of lights and fences, and vandalism abatement in addition to the cost of insurance. The current estimated annual operation and maintenance cost for the Cal Park Tunnel multi-use path is \$150,000.³ The Cal Park Tunnel, at 1,100 lineal feet is half the length of the Alto Tunnel. The Alto Tunnel operation maintenance cost is assumed to be on the order of 1.5 times the cost of the Cal Park Tunnel.

Based on these requirements and examples, Table 4-3 presents estimated annual maintenance costs for the three project alternatives and various options. These maintenance costs do not include the long-term repair and replacement costs for the facilities, which will be factors of the original construction cost.

³ Ed Hulme, Superintendent, County of Marin Parks and Open Space, personal communication.

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Table 4-3 – Maintenance Costs Estimates for the Three Project Alternatives

Alternative	Facility Type	Length in Feet	Length in Miles	Cost per Mile	Subtotal Cost
Horse Hill Route	Multi-Use/Bike Paths (see note 1)	2,240	0.4	\$10,578	\$4,488
	Bike Lanes (see note 2)	0	0	\$2,000	\$0
	Bike Routes/Sharrows (see note 3)	8,990	1.7	\$1,000	\$1,703
	Sidewalks/Pedestrian Paths (see note 4)	3,080	0.6	\$5,000	\$2,917
		Unit	Quantity	Unit Cost	
	New Retaining Walls	Square feet	6,600	\$1.00	\$6,600
	New Drainage Systems	Lineal Feet	400	\$1.00	\$400
	Total Cost				\$16,107
		Unit	Quantity	Unit Cost	
"Sunken Path" Option - add:	New Retaining Walls	Square feet	14,000	\$1.00	\$14,000
	New Drainage Systems	Lineal Feet	2,000	\$1.00	\$2,000
	Total Cost (add)				\$16,000
Alternative	Facility Type	Length in Feet	Length in Miles	Cost per Mile	Subtotal Cost
Alto Tunnel Route	Multi-Use/Bike Paths (see note 1)	7,980	1.5	\$10,578	\$15,987
	Alto Tunnel (see note 5)	2,250	0.4	N.A.	\$275,000
	Bike Lanes	0	0	\$2,000	\$0
	Bike Routes/Sharrows	0	0	\$1,000	\$0
	Sidewalks/Pedestrian Paths (see note 4)	14,618	2.8	\$5,000	\$13,843
		Unit	Quantity	Unit Cost	
	New Retaining Walls	Square feet	1,000	\$1.00	\$1,000
	New Drainage Systems	Lineal Feet	2,290	\$1.00	\$2,290
	Total Cost				\$308,120
Alternative	Facility Type	Length in Feet	Length in Miles	Cost per Mile	Subtotal Cost
Camino Alto/ Corte Madera Ave Route	Multi-Use/Bike Paths (see note 1)	0	0	\$10,578	\$0
	Bike Lanes	11,560	2.2	\$2,000	\$4,379
	Bike Routes/Sharrows	1,000	0.2	\$1,000	\$189
	Sidewalks/Pedestrian Paths (see note 4)	1,970	0.4	\$5,000	\$1,866
		Unit	Quantity	Unit Cost	
	New Retaining Walls	Square feet	26,900	\$1.00	\$26,900
	New Drainage Systems	Lineal Feet	0	\$1.00	\$0
	Total Cost				\$33,334
Alternative	Facility Type	Length in Feet	Length in Miles	Cost per Mile	Subtotal Cost
Sidewalk Extension to Overlook Road Option (add)	Sidewalks/Pedestrian Paths (see note 4)	2,760	0.5	\$5,000	\$2,614
		Unit	Quantity	Unit Cost	
	New Retaining Walls	Square feet	4,000	\$1.00	\$4,000
	Total Cost (add)				\$6,614
Alternative	Facility Type	Length in Feet	Length in Miles	Cost per Mile	Subtotal Cost
E. Blithdale Crossing and Connection Improvements	Multi-Use/Bike Paths (bridge or UC)	800	0.2	\$10,578	\$1,603
	Bike Lanes	0	0.0	\$2,000	\$0
	Bike Routes/Sharrows	570	0.1	\$1,000	\$108
		Unit	Quantity	Unit Cost	
(could apply to any of the routes)	New Bridge or UC Structure (same factor as Retaining Walls) - assume 800' x 20'	Square feet	16,000	\$1.00	\$16,000
	Total Cost				\$17,711

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