Highway 17
Wildlife Passage and Regional Trail Crossings

January 2019

Revised Alternatives Report

Prepared by:
Midpeninsula Regional
Open Space District

With:

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Glossary of Terms and Acronyms

AASHTO: American Association of State Highway and Transportation Officials

LRFD: Load and Resistance factor Design

ADA: Americans with Disabilities Act

Caltrans: California Department of Transportation

Catex: Categorical Exemption (CEQA)

CE: Categorical Exclusion (NEPA)

CDFW: California Department of Fish and Wildlife

CE: Categorical Exemption

CEQA: California Environmental Quality Act

CHP: California Highway Patrol

DPR: Draft Project Report

EA: Environmental Assessment

ED: Environmental Documentation

EIR: Environmental Impact Report

EIS: Environmental Impact Statement

FHWA: Federal Highway Administration

GIS: Geographic Information Systems

M: Million

Midpen: Midpeninsula Regional Open Space District

MND: Mitigated Negative Declaration

NA: Not Applicable

NB: Northbound

NEPA: National Environmental Protection Act

OSP: Open Space Preserve

PA&ED: Project Approval/Environmental Documentation

PDT: Caltrans Project Development Team

PID: Project Initiation Document

POST: Peninsula Open Space Trust

PR: Project Report

PS&E: Plans, Specification, and Estimates
PSR: Project Study Report

PSR-PDS: Project Study Report – Project Development Support

PSSR: Project Scope and Summary Report

RRFBs: Rectangular Rapid-Flashing Beacons

ROW: Right-of-way

SB: Southbound

SC County Parks: Santa Clara County Parks and Recreation Department

SC County Roads and Airports Department: Santa Clara County Roads and Airports Department

SCVWD: Santa Clara Valley Water District

SJW: San Jose Water Company

Stage 1 Report: 2016 Preliminary Alternatives Report

SCVP-PID: Small Capital Value Project – Project Initiation Document

TCE: Temporary Construction Easement

1. Executive Summary

This document is the second and final stage of the Highway 17 Wildlife Passage and Regional Trails Crossing Study (the Study); subtitled *Revised Alternatives Report.*

1.1. Project Purpose and Need

The Study is intended to identify options and facilitate decisions on alternative locations and conceptual designs for combined or separate crossing structure(s) for both wildlife and regional trail connections across California State Highway 17 between the Town of Los Gatos and the Bear Creek Road Overcrossing in Santa Clara County. This area is the location of several documented road fatalities of mountain lions, as well as many deer, and countless smaller animals, known as a wildlife crossing "hot spot". It is also a gap in designated regional and national trail systems as well as a focal point for recreational trail and non-vehicular commuter traffic – including hikers, cyclists, dog walkers, and equestrians.

Highway 17 has fragmented thousands of acres of open space in the Santa Cruz Mountains, limiting the ability of wildlife to find food, mates and habitat, and blocking several regional trail connections. The Santa Cruz Mountains are part of the Pacific Coast Range that are generally agreed to extend down the San Francisco Peninsula, roughly from San Francisco south to the Pajaro River near Monterey Bay (Figure 1). Habitat connectivity is important for the health of species like mountain lions and will become even more important with unpredictable future consequences of climate change. Key state plans such as the *California State Wildlife Action Plan* and the *Safeguarding California Plan* (described in Appendix A) emphasize connectivity as a critical goal for wildlife management and climate resilience. Well-placed and appropriately designed crossings will help alleviate wildlife/vehicular collisions, enable wide-ranging animals like mountain lions to disperse, and provide recreational opportunities.

The project purpose and need was defined in coordination with Caltrans District 4, which must review and approve the crossings in the state highway right-of-way:

> Purpose
> The purpose of the proposed project is to improve wildlife passage and regional trail connections in the vicinity of Highway 17 within the study area. Additionally, the project has the following goals:
> - Improve motorist safety by reducing the potential for collisions with wildlife (and recreational users).
> - Maintain healthy wildlife populations through habitat connectivity.
>
> Need
> The University of California, Santa Cruz (UCSC) Mountain Lion Study and Pathways for Wildlife Study have documented numerous road-kill animals on Highway 17 near Lexington Reservoir in Santa Clara County. In addition to the mortality of the wildlife these collisions present a hazard for drivers on this heavily-travelled mountain highway. This underscores the need for improved wildlife passage at this location. Highway 17 presents a barrier for the Bay Area Ridge Trail, Juan Bautista de Anza National Historic Trail, Los Gatos Creek Trail and other future regional multi-use trail connections planned for major public open space and parks, as well for as non-motorized access for local Santa Cruz Mountain residents to the Town of Los Gatos. A separate pedestrian/equestrian/bicycle/non-vehicular commuter crossing would significantly improve recreation and transportation access, and improve safety.

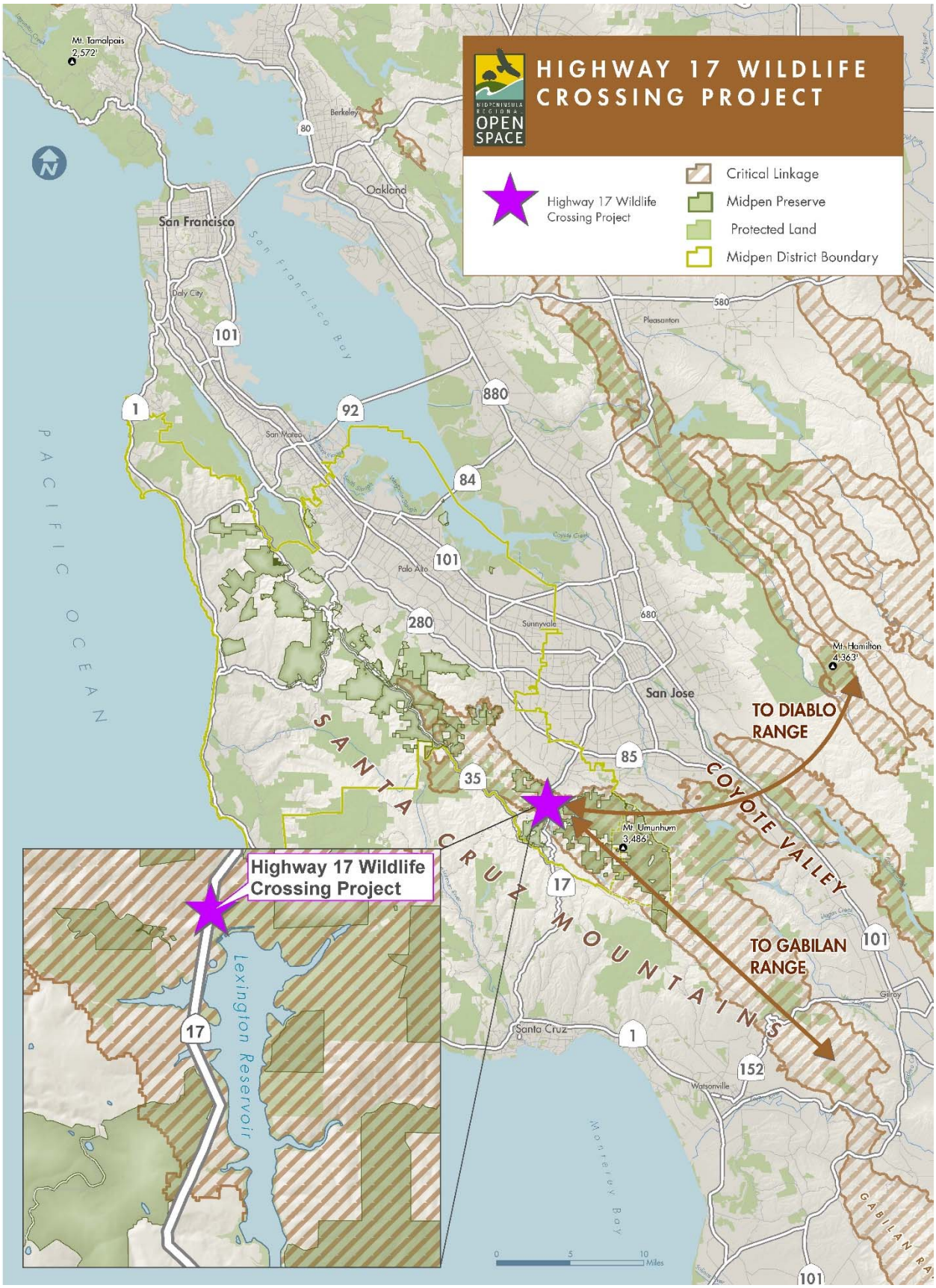
HIGHWAY 17 WILDLIFE CROSSING PROJECT
MIDPENINSULA REGIONAL OPEN SPACE
Highway 17 Wildlife Crossing Project
Critical Linkage
Midpen Preserve
Protected Land
Midpen District Boundary
Mt. Tamalpais 2,572'
Berkeley
Oakland
San Francisco
San Francisco Bay
Daly City
Pleasanton
San Mateo
Palo Alto
Sunnyvale
San Jose
Mt. Hamilton 4,363'
Mt. Umunhum 3,486'
Santa Cruz
Watsonville
Gilroy
Monterey Bay
PACIFIC OCEAN
SANTA CRUZ MOUNTAINS
COYOTE VALLEY
TO DIABLO RANGE
TO GABILAN RANGE
GABILAN RA
Highway 17 Wildlife Crossing Project
Lexington Reservoir
0 5 10 Miles
80
580
101
1
92
880
84
280
680
85
35
17
152

Figure 1: Study Area within Santa Cruz Mountains Region

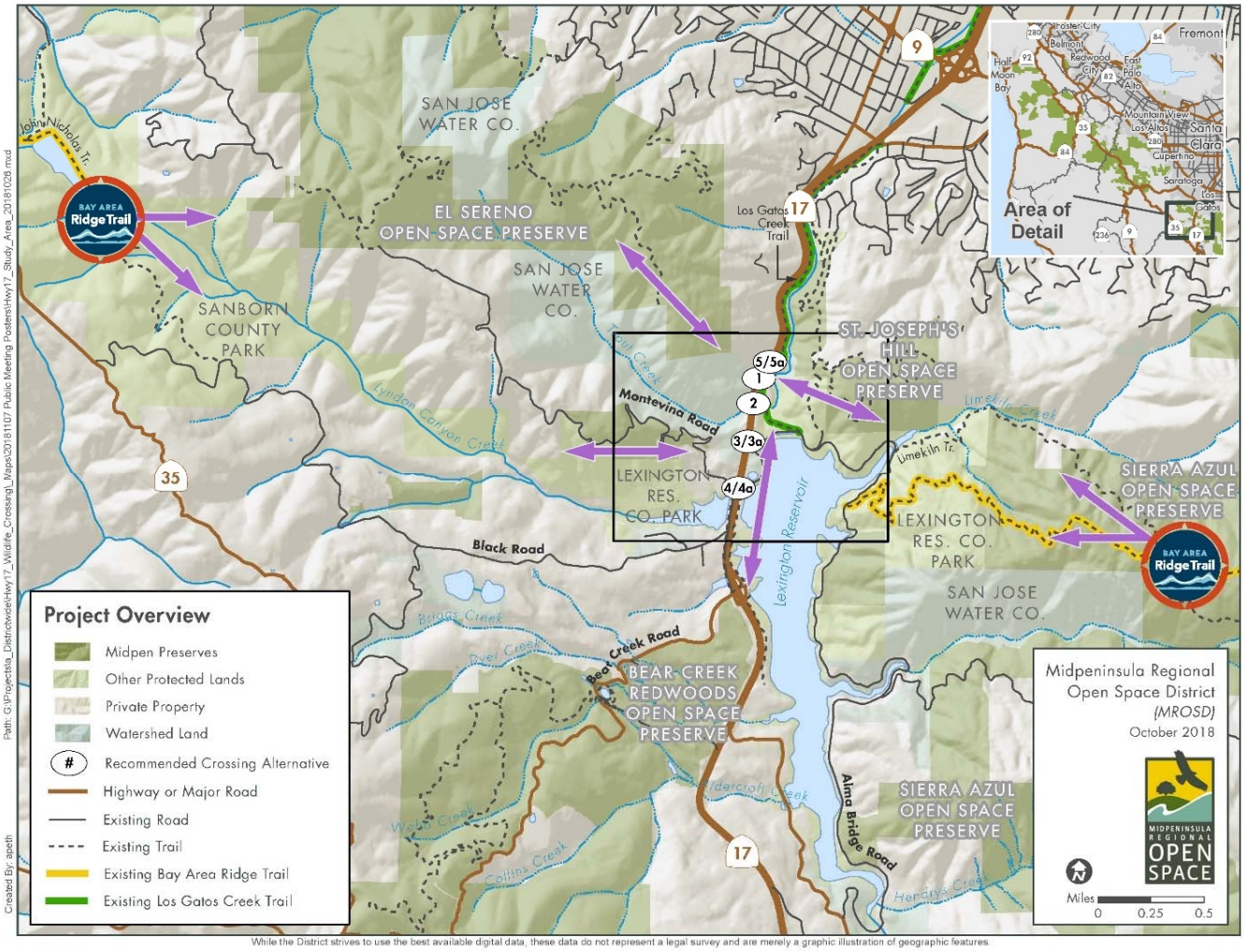

Figure 2: Study Area Overview Map

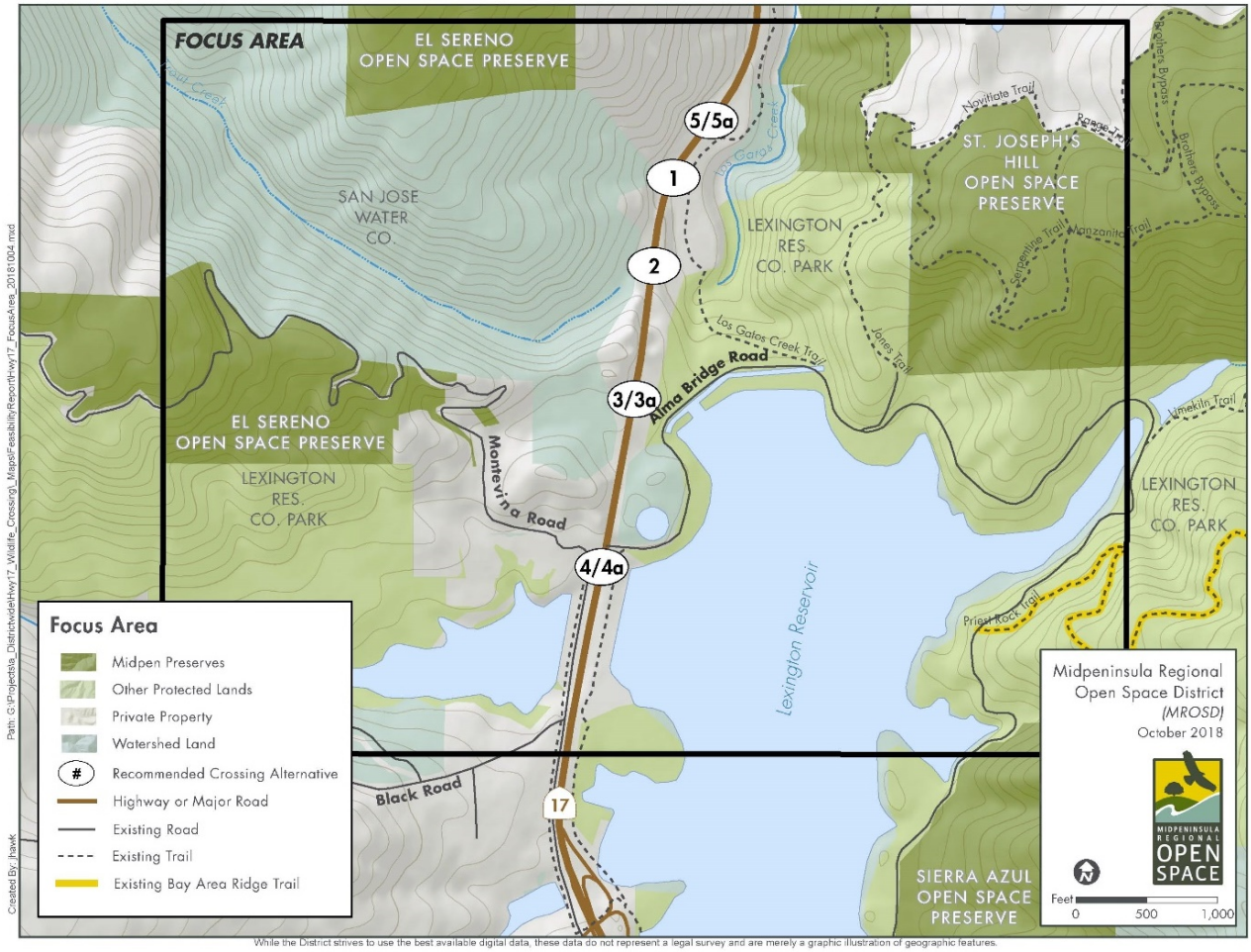

Figure 3: Focused Study Area Map

1.2. Prior Draft Crossing Study

The stage 1 draft Study report, published in 2016 and subtitled *Preliminary Alternatives Report,* identified and evaluated four alternative crossing locations and configurations (Figure 2):

1. A wildlife only undercrossing near the existing Ravine Culvert (Location #1);
2. A wildlife only undercrossing near the existing Trout Creek Culvert (Location #2);
3. A combined wildlife and recreational trail overcrossing just north of the Highway 17 junction with Alma Bridge Road (Location #3); and
4. A combined wildlife and recreational trail undercrossing between Montevina Road and Alma Bridge Road (Location #4).

The 2016 *Preliminary Alternatives Report* made tentative findings that the Trout Creek Undercrossing was the highest ranked wildlife crossing, and that the Montevina Road/Alma Bridge Road Undercrossing was the highest ranked recreational trail crossing based on the evaluation criteria established in the Study.

Based on public, stakeholder, and project partner input and internal study team review, this final draft *Revised Alternatives Report* revises those findings and now recommends that a total of eight (8) alternatives warrant further analysis before preferred alternative(s) can be selected.

1.3. Evaluation Criteria

1.3.1. Design Criteria for Wildlife and Trail Crossings

The crossing alternatives were developed, refined and evaluated based on design criteria for wildlife highway crossings and trail highway crossings detailed in this report. The wildlife and trail crossing design criteria are summarized below and detailed in Appendix A:

Wildlife Crossing Criteria

1. Close proximity to the identified wildlife corridor
2. Appropriate dimensions and design features
3. Provides Habitat connectivity
4. Adequate Line of sight
5. Less human exposure
6. Accommodate Special Status Species

Trail Crossing Criteria

1. Accommodate the full range of potential regional trail users
2. Provide as direct a connection as possible to the existing regional trail alignments
3. Provide a safe and enjoyable trail
4. Provide connection to a feasible trail route
5. Provide emergency and maintenance vehicle access

The trail crossing criteria and potential trail connections have been updated since the 2016 draft report in response to input from the public, stakeholders and internal review.

1.3.2. Other Evaluation Criteria

The criteria below for the general feasibility of the project apply to both wildlife crossings and trail crossings and were also used to review and evaluate the crossing alternatives, as detailed in Appendix A.

- Location with fill or cut embankments preferable
- Environmental impact – avoid or minimize impact on natural or cultural resources
- Soils and geology feasible for construction
- Can be designed to meet Caltrans highway and structural design standards
- Minimal impact on existing facilities and operations – highway traffic, water and dam facilities
- Lower relative cost/Feasibility Criteria
- Project Readiness/Funding identified
- Access Permission/Ownership/Right of Way
- Maintenance and Operations
- Public Support

1.4. Response to Public and Stakeholder Input

The 2016 *Preliminary Alternatives Report* was made available to the public and presented at a widely advertised public workshop in Los Gatos on August 2, 2016. Comments received at the meeting and in a subsequent 30-day comment period are summarized. In addition to the many meetings with stakeholder agencies and organizations held during Study Stage 1, several stakeholder meetings and communications occurred during preparation of the Stage 2 report. These are also summarized in Appendix C. This Stage 2 *Revised Alternatives Report* responds to these comments and summarizes additional study and analysis of the four primary alternatives and four additional alternatives that were identified based on comments received. Significant input since the Stage 1 report includes:

- Revised Purpose and Need Statement based on input received from Caltrans.
- Concern from Santa Clara (SC) County Parks Department and SC County Roads and Airports Department about trail traffic that would be added to Alma Bridge Road, a two-lane road encircling the north and east shores of Lexington Reservoir, if a regional trail crossing alternative is selected that will direct recreational users to the roadway. While Alma Bridge Road is heavily used by cyclists despite the existing configuration (narrow, winding, blind corners, and lacking a paved shoulder), significant investment would be needed to provide improved conditions appropriate for a regional trail connection. The narrow segment of Alma Bridge Road between Highway 17 and the intersection with the Los Gatos Creek Trail is particularly expensive and complicated due to the need to build: a) a recreational trail crossing over the existing Lenihan Dam spillway, and b) a cantilevered walkway between Highway 17 and the spillway to add sufficient width for multi-use access. These improvements are likely warranted due to increased recreational trail use in the region, regardless of which recreational trail crossing alternative is ultimately selected. Any additional traffic striping being proposed, signage or trail connection affecting the County right-of-way roadway will need to be maintain by the Open Space Authority by the means of a Maintenance Indemnification Agreement. The County would have no means to maintain these additional items in our right-of-way.
- Additional analysis of the regional trail connection routes was needed to determine feasibility of potential trail connections and conceptual cost estimates to connect trails for each proposed crossing alternative.

- Concerns from San Jose Water Company (SJW) regarding: a) recreational trail proximity to potable water supply and b) worker safety from mountain lions when working at facilities in proximity to proposed wildlife crossings.

1.5. Revised Crossing Alternatives

The concerns listed above, in addition to suggestions from public workshop attendees, resulted in re-evaluation of prior alternatives and expanded evaluation of other alternatives, leading to the selection of four new crossing alternatives, for a total of eight (Figures 2 and 3), to move forward to the Caltrans review process.

1.5.1. Prior Crossing Alternatives

The location and configuration of the four preliminary alternatives (Alternatives 1-4 identified in Section 1.2 and Figure 2) is unchanged, but they have been re-evaluated and design details revised in some cases, based on input and new information. The detailed descriptions, drawings, evaluations and estimates of the updated prior alternatives are contained in Appendix B.

1.5.2. New Crossing Alternatives

This Revised Alternatives Report adds four additional alternatives for a total of eight, including trail-only alternatives at two of the prior locations and a combined wildlife/trail alternative and trail only alternative at one new location:

3a. Recreational trail overcrossing design option (in addition to the prior combined trail and wildlife overcrossing design) at Location #3.
4a. Recreational trail undercrossing design option at Montevina Road (in addition to the prior combined trail and wildlife undercrossing design) at Location #4.
5. A combined wildlife and recreational trail overcrossing, Alternative #5, located north of Ravine Culvert (Alternative #1) near an existing service road – Location #5.
5a. Recreational trail overcrossing as a design option at Location #5.

Summaries and drawings of all the alternatives are contained in Section 3 of this report. The detailed descriptions, drawings, evaluations and estimates of the new alternatives are contained in Appendix B.

Alternatives 1-5a sufficiently met wildlife and/or regional trails criteria to be advanced to Caltrans for review and consideration. These alternatives will be subject to ongoing stakeholder, partner, and public review.

1.5.3. Rejected Alternatives

Four additional crossing alternatives were considered, but not recommended to advance through the Caltrans review process because they: 1) had fatal flaws and/or 2) did not sufficiently meet project criteria and/or 3) would not facilitate passage of target wildlife species (deer and mountain lion) and/or were located outside of the study area:

Rejected Alternative 6:

The Sidehill Viaduct Undercrossing – a new undercrossing located to the north of Alternatives 5/5a that was found to have “fatal flaws” (defined by Caltrans as having: “a non-standard design that cannot be approved, or having operational or safety concerns that are unacceptable”), based on preliminary evaluation.

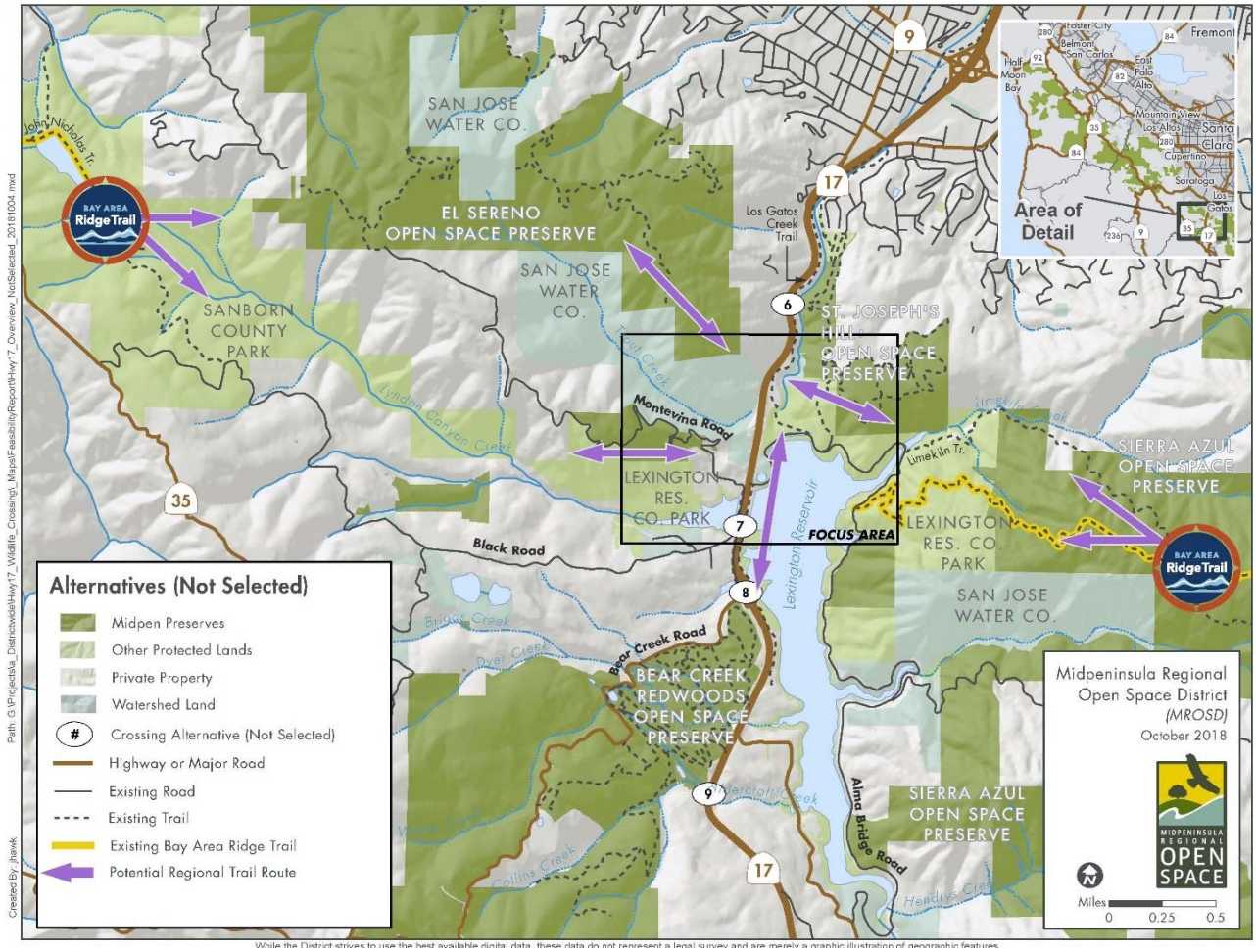

Figure 4: Location of Rejected Alternatives

Rejected Alternative 7:

The existing 10-foot diameter Lexington Culvert located south of Alternatives 4/4a near Black Road could be improved to serve small wildlife; but is too small to serve the needs of larger animal species (mountain lion and deer), which are the primary target species of the Study. The culvert is not suitable for use as a year-round trail crossing or a new undercrossing because it functions as a cross-drain that carries high water flow between the main body of Lexington Reservoir and a western arm of the reservoir.

Rejected Alternative 8:

The existing highway crossing at Bear Creek Road that could be modified to provide limited improvements for recreational users but provides no opportunity for use or improvement as a wildlife crossing.

Rejected Alternative 9:

The existing Aldercroft Culvert located south of the study area. Improvements at this location could benefit small to medium wildlife. The site is located well south of the roadkill hotspot located approximately 2 miles to the north.

These alternatives are located on Figure 4 and discussed in more detail in Appendix B. Due to inherent limitations in addressing the project need at these locations, none of these alternatives were recommended to advance to Caltrans for further review. However, Alternative 7, the Lexington Culvert, and Alternative 8, the Bear Creek Road Overcrossing offer potential wildlife crossing or trail crossing benefits, respectively, through improvements that could be considered as separate stand-alone projects, as detailed in Section 7 of this report.

1.5.4. One versus Two Crossings

Because the wildlife crossing and trail crossing have different objectives, and because the most effective designs for wildlife crossings limit human exposure and activity (disturbance), the analysis for this Report supports two separate wildlife and trail crossing structures. A separate wildlife only crossing structure would optimize performance to provide the most opportunity for unimpaired wildlife passage across the landscape with limited human interaction. This approach is also supported by the California Department of Fish and Wildlife (CDFW). However, if two separate crossings are determined to be infeasible or not supported through the project development process, then one shared crossing would be acceptable, albeit less desirable due to an assumed diminished effectiveness based on data from other projects monitoring wildlife and human use at crossings over long time periods. If shared, a regional trail crossing must be designed to facilitate and encourage wildlife passage, as well as promote trail user comfort and confidence, resulting in a larger, more complex structure.

If dedicated trail access rights cannot be obtained, rather than slowing down the efforts to provide a dedicated wildlife crossing (which does not require trail access rights), regional trail crossing improvements could instead focus on improving the existing Bear Creek Road/Alma Bridge Road Overcrossing. Improvements to the overcrossing and associated regional trail connections (including year-round access to circumnavigate Lexington Reservoir) would provide interim improvements until trail access rights are resolved.

Based on preliminary cost estimates, two separate structures (one for wildlife and one for regional trails) are similar in cost to one shared (wildlife and trails) crossing. However, until the final alternative(s) are analyzed in more detail, and design requirements and associated trail connection improvement costs are refined, it is unknown whether two separate crossings (one for wildlife and one for trails) would result in an overall more cost-effective project than one single combined crossing (shared wildlife and trails). The crossing(s) that best facilitate passage of target wildlife species (deer and mountain lion) and regional trail users (either singularly or in combination) that are also cost effective are the most likely to be well received while also meeting project goals and objectives.

1.6. Additional Project Elements

This Revised Alternatives Report goes into more detail than the Preliminary Alternatives Report about associated components of the wildlife and trail crossings, including:

- A conceptual plan for wildlife fencing for the entire study area (see Section 6 and Appendix D), to reduce wildlife mortality and increase motorist safety in conjunction with any new wildlife crossing structure. The fencing plan includes a “minimum” extent associated with each wildlife crossing alternative and an “ideal” extent to maximize wildlife and motorist protection throughout the corridor, including directing small to medium sized wildlife to existing culvert structures that can accommodate their passage. This component is a substantial element of the project regardless of which wildlife crossing location is selected and may have considerable

visual impacts along Highway 17; however, fencing is necessary and critical to the success of any wildlife crossing constructed, as it guides wildlife to crossings and away from the highway.
- Detail of desirable improvements to the existing Bear Creek Road Overcrossing (see Section 7) and associated connector trails to serve recreational trail users, as this crossing will have an increasingly important role even if a second future trail crossing is developed.
- Recommendations for improvements to accommodate wildlife passage for small to medium animals (fox, bobcat etc.) in the existing Lexington Culvert overflow between the western arm of the reservoir and the main body of the reservoir, especially during periods of high flow (see Section 7).
- Additional considerations for construction access and ongoing maintenance access to each of the crossing structures (site maps in Section 3 and detail in Appendix B).
- Discussion of maintenance and management agreements for future crossing structures (Section 8).
- A summary of potential additional funding sources for construction of the recommended future crossing structures (Appendix E).

1.7. Cost Estimates for Crossing Alternatives

Preliminary total cost estimates were prepared (contained in Appendix B) to implement the new wildlife crossings and new regional trail crossings (either combined or separate), plus the cost of implementing regional trail connections on either side of the crossings.

1.7.1. Caltrans Right of Way (ROW) and Contribution to Project Cost

Trails *per se* are not within the purview of Caltrans for project planning purposes, unless they are partially or completely within Caltrans ROW which is variable in width encompassing either side of the highway throughout the project area. Portions of the project that will be reviewed by Caltrans include: 1) the highway crossing alternatives, 2) regional trail approaches to those crossings that fall within the ROW, 3) other portions of regional trail that falls within the ROW and 4) any wildlife directional fencing that falls within the ROW. This complexity must be factored in to the total project cost, as any proposed structure (including fencing), trail, or approach is thoroughly reviewed and potential issues resolved before final design(s) are vetted and approved by Caltrans. This requires significant investment in personnel cost and time. Working within Caltrans ROW will also require that the project adhere to Caltrans requirements, such as building any new structures to Caltrans design standards and not closing Highway 17 traffic lanes during commute hours during construction.

1.7.2. Crossing Structure Cost Estimates

The 2024-estimated cost of the alternative wildlife and/or trail crossings vary from $12.8 million (lowest cost combined crossing) to $21.3 million (the highest cost wildlife only and trail only crossings). These estimates are based on very preliminary designs for the crossings and do not yet reflect the more detailed geotechnical, utility, environmental, and right-of-way studies that will be identified during the pending Caltrans project review process. The costs include 5% escalation annually to illustrate the potential cost in 2024 – the anticipated year when crossing construction could be initiated.

Table 1: Crossing Cost Estimates

	Crossing Alternatives	Year 2018 Cost Estimates (M)*	Year 2024 Cost Estimates (M)**
1	Ravine Creek Under (wildlife only)	$8.5	$11.4
2	Trout Creek Under (wildlife only)	$8.4	$11.2
3	Southern Over (combined)	$15.3	$20.5
3a	Southern Over (trail only)	$6.6	$8.9
4	Montevina Under (combined)	$9.6	$12.8
4a	Montevina Under (trail only)	$5.4	$7.2
5	Northern Over (combined)	$11.1	$14.9
5a	Northern Over (trail only)	$7.4	$9.9

*In millions of dollars

** Assumes 5% escalation per year

Note: Estimates include cost for planning, design, permitting and construction, but do not include land acquisition or ongoing maintenance and patrol costs.

1.7.3. Cost Estimates for Trail Connections

A separate or combined regional trail crossing requires construction of new trails and/or other improvements to existing trails to connect the crossing to those regional trails and dedicated public lands. Dedicated wildlife-only crossings do not require trail connections, as wildlife move through the landscape regardless of established trails. Both GIS and field analysis concluded that each of the proposed recreational trail alternatives can feasibly be connected to existing trail systems.

The estimated costs for trail connections vary based on a variety of factors, including land ownership, proximity to existing trails, trail steepness, number of stream crossings required, percent cross-slope (land topography), length of trail required, relative ease of construction, and resiliency to withstand heavy use and storm events without requiring excessive maintenance. Separate cost estimates were prepared for minimum new connector trails and full build-out of regional trail connection to a new regional trail crossing (Table 2). Cost estimates provided are for minimum construction needed to connect a given crossing to nearest existing trails. Costs are also provided for full build-out of trails (from 1) Sanborn County Park in the west to Sierra Azul OSP in the east, and from 2) the Town of Los Gatos in the north to Bear Creek Redwoods OSP and the Lexington County Park parking lot south of Bear Creek Road to the south. The full build out cost estimate would not immediately be required to make the minimum initial connections. Full build out of trail connections is a separate planning effort, not part of the scope of this project and therefore running on a slightly slower timeline. Funding and effort will be required to upgrade and maintain existing trails targeted to be part of the full build out of the surrounding regional trail system to handle greater numbers of users.

Table 2: Trail Connection Costs (by Alternative)

Crossing Alternatives:	Year 2024 Minimum Trail Connection Cost ($M)	Year 2030 Full Build Out Trail Connection Cost ($M)
1. Ravine Creek Under (wildlife only)	NA (wildlife only)	NA (wildlife only)
2. Trout Creek Under (wildlife only)	NA (wildlife only)	NA (wildlife only)
3. Southern Over (combined)	$4.5	$23.0-26.5
3a. Southern Over (trail only)	$4.5	$23.0-26.5
4. Montevina Under (combined)	$4.2	$26.5-31.5
4a. Montevina Under (trail only)	$4.2	$26.5-31.5
5. Northern Over (combined)	$1.5	$18.2-21.8
5a. Northern Over (trail only)	$1.5	$18.2-21.8

Note: Estimates do not include cost for planning, design, permitting, land acquisition or ongoing maintenance and patrol costs.

1.7.4. Estimated Total Project Cost

Potential trail connections and calculation of connecting trail costs were evaluated to further refine the proposed project alternatives and determine overall total project costs. The feasibility of connecting a new trail crossing to existing regional trails is vitally important to project partners, stakeholders, and the public. While each of the crossings has an estimated cost, there will also be costs to improve and provide new trail connections to a given crossing. Only when looking at both crossing costs *plus* the minimum trail connection costs required to connect to a given crossing can the true range of costs be determined that are associated with implementing regional trail connectivity across Highway 17. Combining the highway crossing cost with the minimum trail connection costs results in a total estimated cost that varies from $11.4 million to $25 million (2024 dollars) depending on the alternative selected (Table 3).

Table 3: Estimated Total Crossing Cost (using minimum trail connection costs)

Crossing Alternatives:	2024 Crossing Cost ($M)	2024 Minimum Trail Connection Cost ($M)	2024 Total Cost Estimate ($M)
1. Ravine Creek Under (wildlife only)	$11.4	NA	$11.4
2. Trout Creek Under (wildlife only)	$11.2	NA	$11.2
3. Southern Over (combined)	$20.5	$4.5	$25.0
3a. Southern Over (trail only)	$8.9	$4.5	$13.4
4. Montevina Under (combined)	$12.8	$4.2	$17.0
4a. Montevina Under (trail only)	$7.2	$4.2	$11.4
5. Northern Over (combined)	$14.9	$1.5	$16.4
5a. Northern Over (trail only)	$9.9	$1.5	$11.4

1.8. Project Process and Schedule

The project involves a multitude of different project partners, stakeholders, neighboring landowners, public and private interests and funding sources. All of these factors result in a schedule that is continually updated to address different agency approval processes, modified to meet funding application dates, changing to address unanticipated issues, and scheduling of meetings between important project partners, stakeholders, and the public. The process and schedule is summarized in Figure 5 below and described in more detail in Section 9.

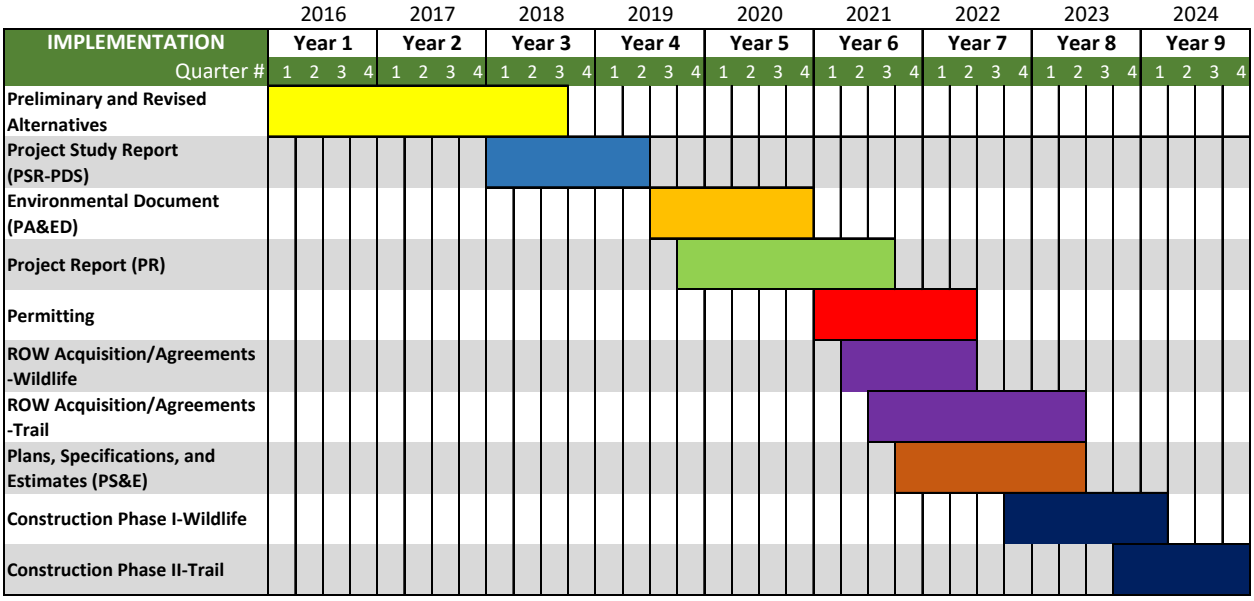

Figure 5: Estimated Implementation Timeline

The project entails several phases of study, planning, design and permitting before it can move into construction. Permission is required from Caltrans District 4, which is responsible for highways in the Bay Area, for structure(s) to cross this busy state highway. Permission is also required from other adjacent property owners for access to construct the crossing(s), to improve access routes for wildlife and trail users, and for ongoing access for maintenance and monitoring. These property owners may include Santa Clara Valley Water District, Santa Clara County Parks Department, Santa Clara County Roads and Airports Department, San Jose Water Company, and other private landowners depending on the location of the crossing structure(s) selected and route of connecting trails to the crossing.

1.8.1. Stakeholder and Public Participation Process

The Feasibility Study phase will identify, evaluate and refine options for combined or separate crossing structure(s) for both wildlife and regional trail connections. It is intended to eliminate options with obvious infeasibility or fatal flaws, and to facilitate public, stakeholder, and partner comment on the overall concepts and alternatives.

Midpen began coordinated efforts prior to the Study inception with Caltrans District 4. Efforts included discussions with: Caltrans District 5 through the Mitigation and Wildlife Connectivity Specialist, Valley Transportation Authority (VTA – the overall Transportation Management Agency in Santa Clara County), and with adjacent land and facility owners. Meetings were also held with operators who may be affected by or involved in the potential crossings including: Santa Clara County Parks, Santa Clara County Roads, Santa Clara Valley Water District (SCVWD), San Jose Water Company (SJW), and the Town of Los Gatos. Specific meetings and outreach are detailed in Appendix C.

The Feasibility Study was conducted to thoroughly respond to the input from these meetings in the identification and analysis of alternatives, with the goal that conceptual crossing designs will be fully coordinated with the transportation systems; water storage, treatment and delivery systems; and the related habitat protection and recreation lands and efforts.

Additional public input on the Revised Alternatives Report will be sought at a public workshop in Los Gatos on November 7, 2018, and a parallel online public survey about crossing preferences and concerns.

1.8.2. Caltrans Review and Approval Process

The formal Caltrans review process overlaps the Feasibility Study process, including negotiating a cooperative agreement between Caltrans and Midpen (contained in Appendix F) for the highway crossing project, and beginning preparation of a project scoping study in Caltrans' required format and content. Known as a PSR-PDS (Project Study Report – Project Development Support) document, this report will contain information from the Feasibility Study and other documentation required by Caltrans to complete the process to determine the extent of technical and environmental studies to be completed in the next phase, the PA&ED (Project Approval/Environmental Documentation). This phase will result in selection of preferred alternative(s) for the potential separate wildlife and trail crossings or a combined wildlife and trail crossing, and ultimately approval from Caltrans.

Upon completion of the PA&ED phase, the Design phase (Plans, Specifications and Estimates- PS&E) provides the detailed design of the crossing structure(s), initial trail connections and other elements such as wildlife fencing, and preparation of contract documents.

The final phase is putting the project out for public bidding, signing a contract with the selected contractor, and construction of the project, which may be done in phases.

2. Introduction

2.1. Project Background

The Midpeninsula Regional Open Space District (Midpen or the District) is an independent special district formed by the voters in 1972 in portions of San Mateo and Santa Clara Counties, allocating a small share of property taxes toward the formation of a regional greenbelt system on the San Francisco Peninsula. The system owned and managed by Midpen is currently comprised of over 60,000 acres of land in 26 open space preserves (OSPs) protected for stewardship and public enjoyment. The District's mission is: "To acquire and preserve a regional greenbelt of open space land in perpetuity; protect and restore the natural environment; and provide opportunities for ecologically sensitive public enjoyment and education."[1]

Thousands of acres of open space habitat have been permanently protected by Midpen and other agencies and organizations in the Santa Cruz Mountains on either side of Highway 17. These lands comprise a critical habitat corridor with expected long-term benefits for wildlife movement, climate change resiliency, and preservation of a healthy genetic structure for wildlife populations within the Santa Cruz Mountains. They also provide many miles of publicly-accessible recreational trails, including the regional Bay Area Ridge Trail and the national Juan Bautista de Anza Historic Trail. Highway 17 presents a significant barrier to both wildlife and trail connectivity that limits the function of this important wildlife corridor and access to and completion of regional trail systems.

Midpen began funding studies examining wildlife use in this area in 2008 based on the importance of this habitat corridor and the significant number of collisions between large wildlife and motor vehicles that occur on Highway 17 between the Town of Los Gatos and Lexington Reservoir. These studies have documented that nine mountain lions have been killed by vehicles on Highway 17 in Santa Clara County in the last nine years, of which five were killed in the current study area. During the same period there were four successful Highway 17 crossings by two collared mountain lions near Lexington dam, based on tracking by the UCSC Puma Project. Additionally, data collected between 2000 and 2016 indicated that there were a total of 82 other wildlife species killed by vehicle collisions in the study area, including many small to medium mammals, and an additional 51 deer, indicating that a significant motorist safety issue also exists in this section of Highway 17. [2] Further discussion of the studies supporting this project can be found in Chapters 2.4 and 6 of this report.

Midpen works with local, regional and national trail groups and partners with other agencies and organizations to implement trail connections in the Lexington area – particularly the Bay Area Ridge Trail. The Bay Area Ridge Trail Council (the Council) is a private non-profit organization founded in 1987 with a mission to create a continuous 550+-mile trail for hikers, mountain bicyclists, and equestrians along the ridgelines overlooking San Francisco Bay. The Council works in close partnership with agencies and local government, parks, land trusts, and other stakeholders and volunteers to plan, acquire, design, build, care for, and promote the Bay Area Ridge Trail. The gap in the Ridge Trail between Sanborn County Park to the west of Highway 17, and Sierra Azul OSP to the east, is one of the most challenging and significant in the Bay Area. This route is also anticipated to be designated as part of the Juan Bautista de Anza National Historic Trail, a National Parks-administered facility which will ultimately

[1] Basic Policy, Midpeninsula Regional Open Space District, adopted March 10, 1999.
[2] Highway 17 Wildlife Connectivity Project: Lexington Study Area, Pathways for Wildlife, February 2016.

extend from Mexico to San Francisco on a route as close as possible to that taken by the Spanish explorer for which the trail is named.

Highway 17 is also a barrier to other non-motorized recreation and transportation connections between areas of Lexington County Park and the popular Los Gatos Creek Trail on the east side of Highway 17 and other park and open space areas on the west side of Highway 17. These areas include Bear Creek Redwoods and El Sereno OSPs, and roads and neighborhoods in the Lexington Basin and the Santa Cruz Mountains beyond.

Midpen is committed to developing a wildlife crossing and a separate or combined regional multi-use trail crossing of Highway 17 near Lexington Reservoir, as identified in its Open Space Vision Plan as one of the top 25 priorities. In 2014 voters approved a $300 million bond measure to fund land conservation, stewardship and public access projects, including these two high priorities. Midpen commissioned this Feasibility Study (the Study) to explore and evaluate crossing alternatives, determine compatibility of recreational and wildlife usage, identify the preferred crossing alternative(s) and clarify their features, implementation steps, schedule, conceptual design and costs. This includes an effective wildlife crossing and a separate or potentially combined crossing for trail users, including the Bay Area Ridge Trail (the Ridge Trail), the Juan Bautista de Anza National Historic Trail and local trail and non-motorized transportation connections.

The primary objective for the wildlife crossing is to address wildlife mortality from vehicle collisions for mountain lions and deer on Highway 17 between Los Gatos and Lexington Hills as well as to study and plan for possible use by special status species occurring within the area, and any other wildlife that might benefit from this crossing.

The primary objective of the trail crossing is to accommodate the full range of potential Ridge Trail users – hikers, mountain bikers, equestrians, and dog owners[3] on a safe and enjoyable route, with as direct a connection as possible to the Ridge Trail alignments connecting to open space and parklands on either side of Highway 17. The secondary objective is to accommodate the widest possible range of other non-motorized access, including road bicyclists, people using wheelchairs and other mobility devices, and others who would need or prefer a paved trail connection.

2.2. Purpose and Need

Revised Purpose and Need Statement based on input received from Caltrans:

> Purpose
> The purpose of the proposed project is to improve wildlife passage and regional trail connections in the vicinity of Highway 17 within the study area. Additionally, the project has the following goals;
> - Improve motorist safety by reducing the potential for collisions with wildlife (and recreational users).
> - Maintain healthy wildlife populations through habitat connectivity.

[3] The Bay Area Ridge Trail Council defers to the public land manager regarding dog access on the Ridge Trail that traverses public lands, so this access depends on specific policies and decisions of land owners and managers regarding dog access.

Need

The UCSC Mountain Lion Study and Pathways for Wildlife Study have documented numerous road-kill animals on Highway 17 near Lexington Reservoir. In addition to the mortality of the wildlife, these collisions present a hazard for drivers on this heavily-travelled mountain highway. This underscores the need for improved wildlife passage at this location. Highway 17 presents a barrier for the Bay Area Ridge Trail, Juan Bautista de Anza National Historic Trail, Los Gatos Creek Trail and other future regional multi-use trail connections planned for major public open space and parks, as well for as non-motorized access for local Santa Cruz Mountain residents to the Town of Los Gatos. A separate pedestrian/equestrian/bicycle/non-vehicular commuter crossing would significantly improve recreation and transportation access, and improve safety.

3. Alternatives Evaluated

This section contains a summary of the eight new crossing alternatives that were evaluated at five different sites and recommended to move forward into the Caltrans review process, as well as a sixth site/ninth crossing alternative that was investigated but not recommended for further consideration. Appendix B, Crossing Alternatives Evaluation, contains the full detail of the site context and conceptual design features of each new wildlife and/or trail crossing alternative, descriptions of each factor considered in the evaluation, the evaluation table, and a detailed preliminary cost estimate for each alternative.

Though the report evaluates and compares alternatives, attempting to promote preferred wildlife and/or trail crossing alternative(s) this early in the planning process would be premature. Instead, multiple alternatives have been identified that could accommodate the target species of wildlife (deer and mountain lion), and accommodate multiple types of regional trail users. Additional information uncovered during the Caltrans PSR-PDS process may identify fatal flaws, cost estimates may change, and additional partner, public, and stakeholder information will be presented that may shift preference for one alternative over another, perhaps multiple times. Only at the completion of the PSR-PDS process, during preparation of the environmental document will a preferred wildlife alternative be identified and presented to Midpeninsula Regional Open Space District's (Midpen) Board of Directors for consideration.

3.1.1. Alternative 1 –Wildlife Undercrossing at Ravine Culvert

Site Conditions

Ravine culvert is located approximately at post mile 5.1 (Figure 6), about 500 feet north of the Trout Creek Culvert. There is a relatively small area of roughly level terrain west of Highway 17 north of the inlet; otherwise steep slopes descend on every side. Currently, there is not a safe location to pull off the highway near the existing inlet. The Ravine culvert collects runoff from an unnamed small creek (on USGS 7.5' topographic quadrangle maps); the inlet is at the western toe of the Highway 17 embankment. The outlet of the culvert is presumably in Los Gatos Creek – 372' to the east per the as-built plans; the outlet could not be found during field investigations for the crossing study. In any case the prospective new crossing would need to avoid interfering with the existing culvert. It would be located south of the existing culvert and would feature an opening on the east side just to the south of a retaining wall along the Los Gatos Creek Trail.

The opening to the undercrossing would be near the top of a steep embankment that slopes down to a paved access road that functions as the Los Gatos Creek Trail. There is an existing large diameter water line located below the surface of the road beyond the prospective opening. A ramp and unpaved road into the undercrossing would be needed for construction and maintenance access. This would also improve access for small animals, and would be necessary for any trail/non-motorized access and maintenance/inspection access.

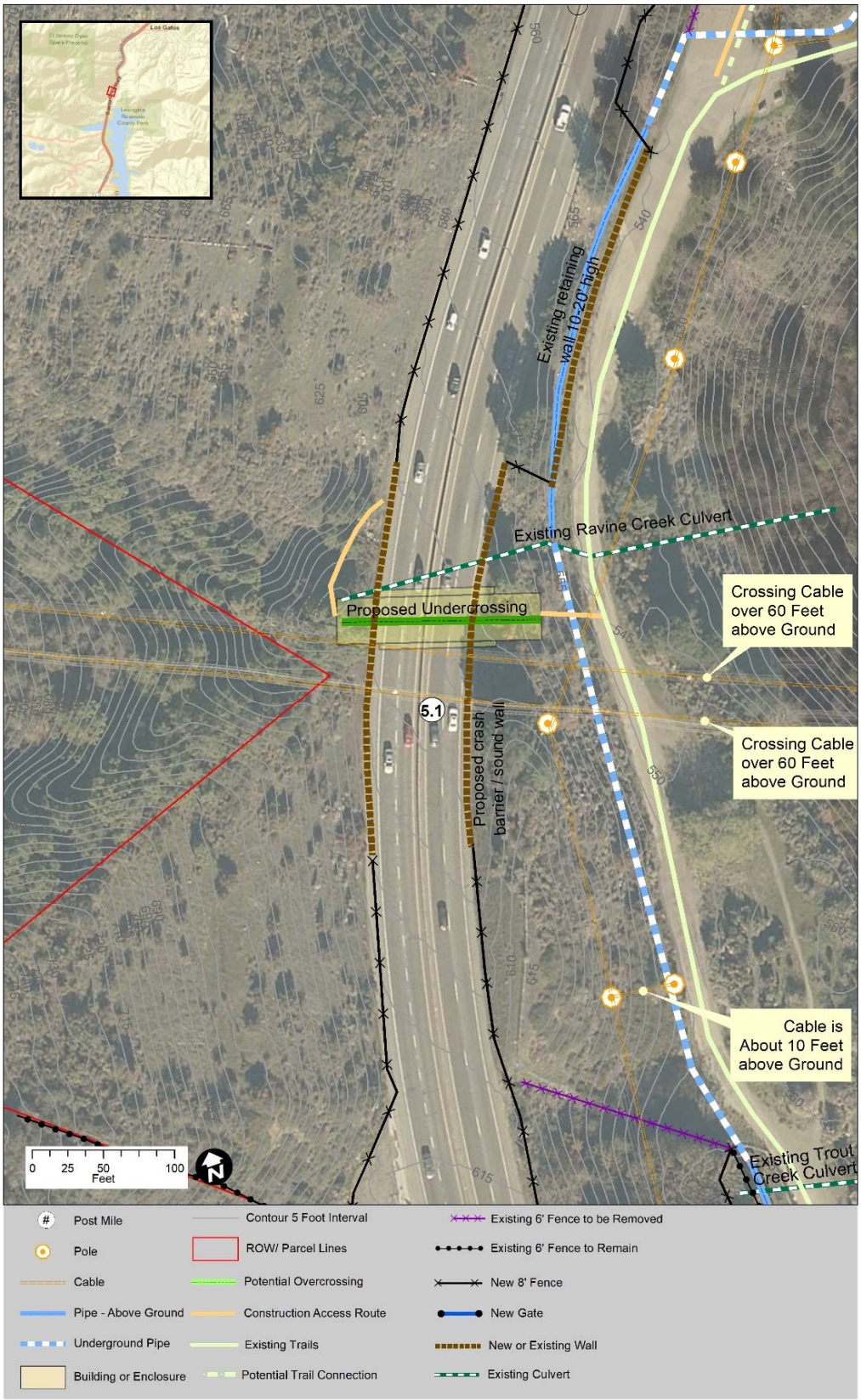

Figure 6: Site Area – Alt. 1, Ravine Wildlife Undercrossing

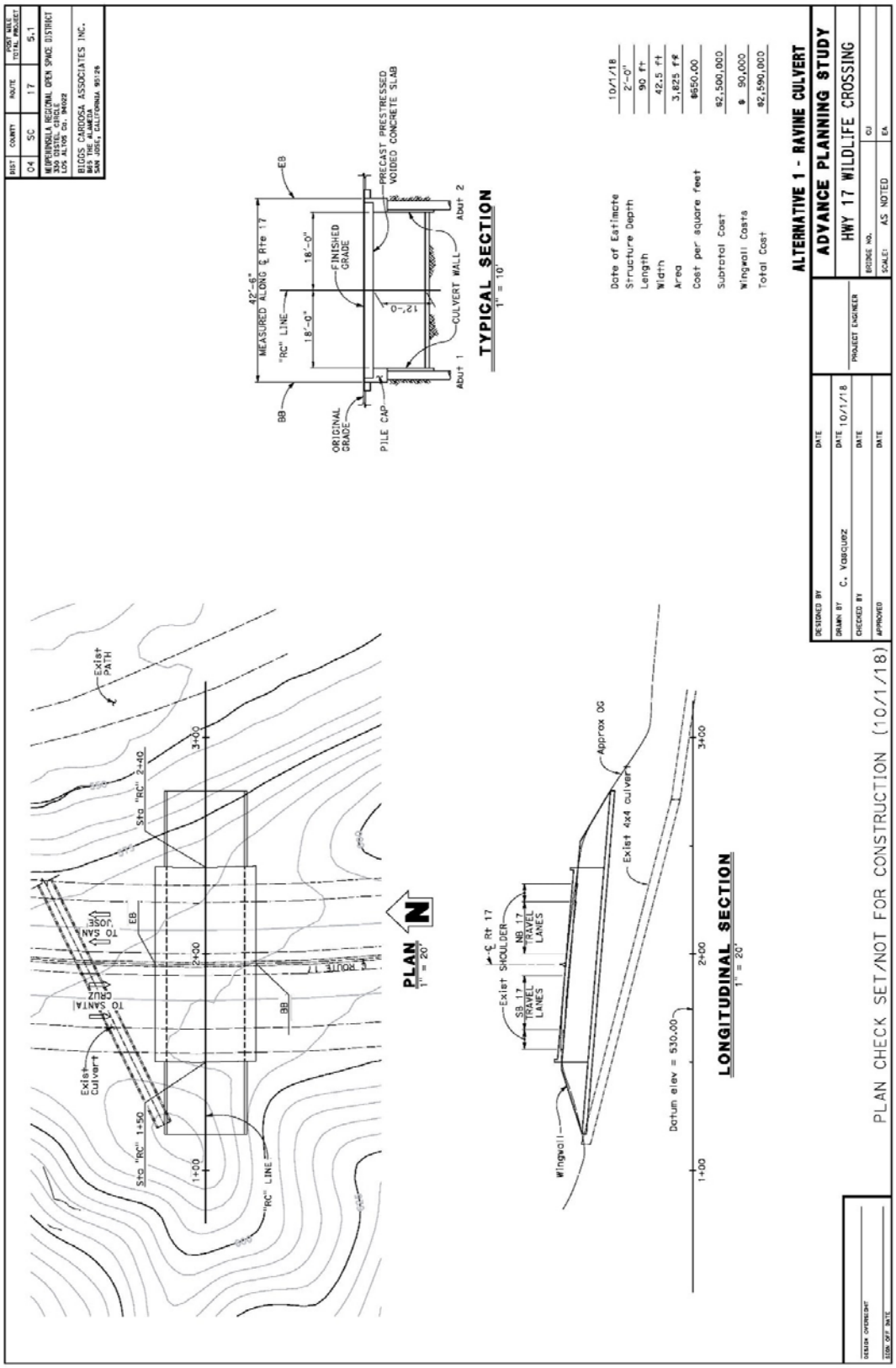

Figure 7: Conceptual Engineered Plan – Alt. 1, Ravine Wildlife Undercrossing

Figure 8: Photo-Rendering of Ravine Wildlife Undercrossing, before & after

3.1.2. Alternative 2 –Wildlife Undercrossing at Trout Creek

Site Conditions

Trout Creek is a major tributary of Los Gatos Creek. As with the Ravine Culvert crossing location, the land above abuts El Sereno OSP, creating a substantial habitat corridor in the canyon and along the ridge. Further to the west the continuous habitat is interrupted by Montevina Road plus a series of rural residences.

The existing culvert is in a deep gully with a fill embankment for the adjacent highway descending above it. There is a large level area and access road north of the culvert that accesses a service road into the watershed that is fenced and gated. Illegal dumping has been a problem at this site. SJW has water facilities near the existing culvert. The potential undercrossing opening on the west side would be south of and above the inlet of the existing culvert, exiting into the creek along a steep, rocky, wooded slope to the south of the creek.

On the east side the opening to the undercrossing would be near the top of a steep embankment that slopes down to a paved access road that is gated just north of this point, beyond which it functions as the Los Gatos Creek Trail. There is an existing large diameter water line located along the edge of the roads below the prospective opening. This water line would need protection for construction access and for ongoing service access to the undercrossing structure. A ramp and unpaved road into the undercrossing would also improve access for small animals, and would be necessary for any trail/non-motorized access.

The entire footprint area for the undercrossing is in Caltrans ROW, although connection to it for construction and ongoing access would involve lands and facilities of SJW and SCVWD and approvals or agreements with those agencies.

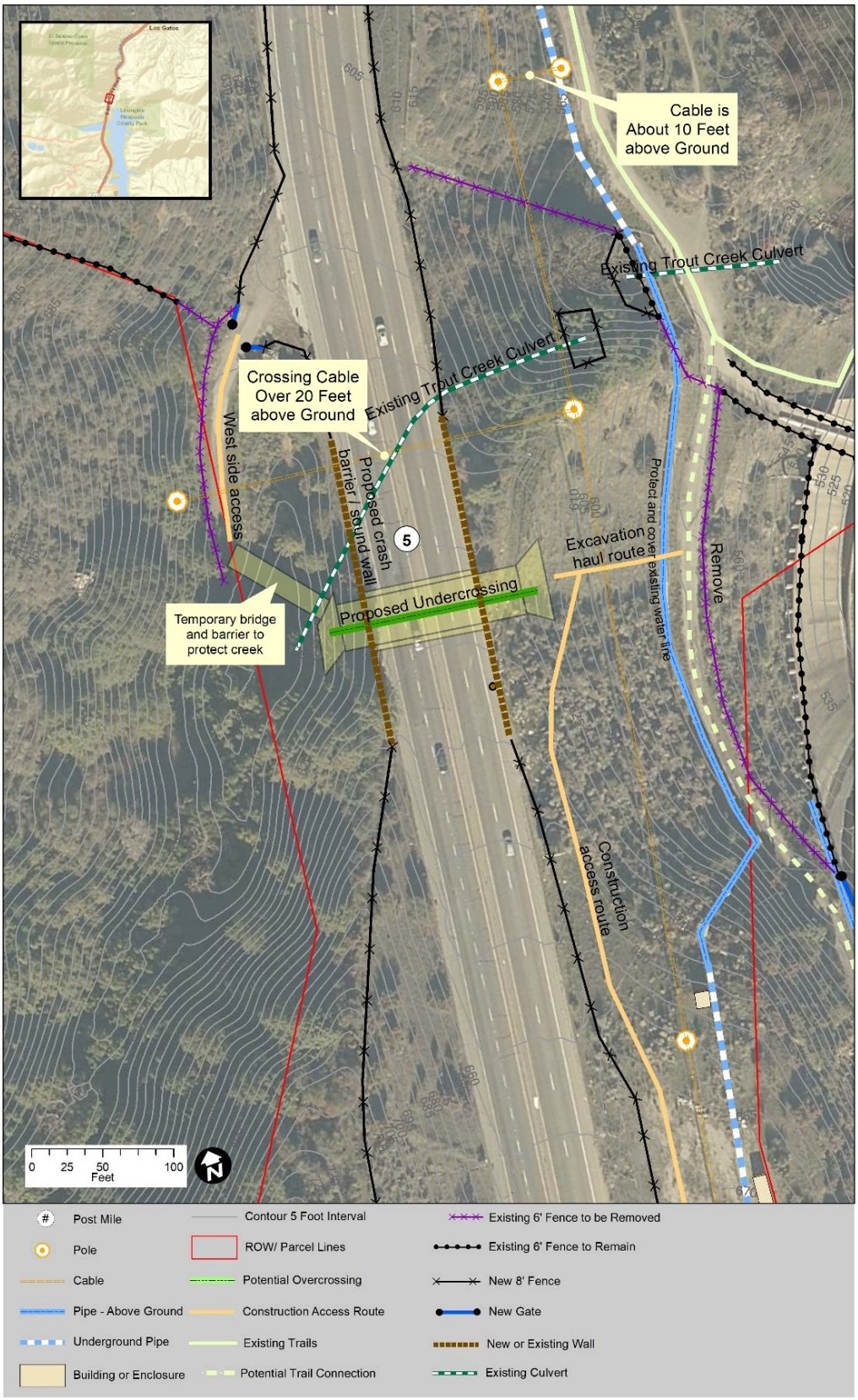

Figure 9: Site Area - Alt. 2, Trout Creek Wildlife Undercrossing

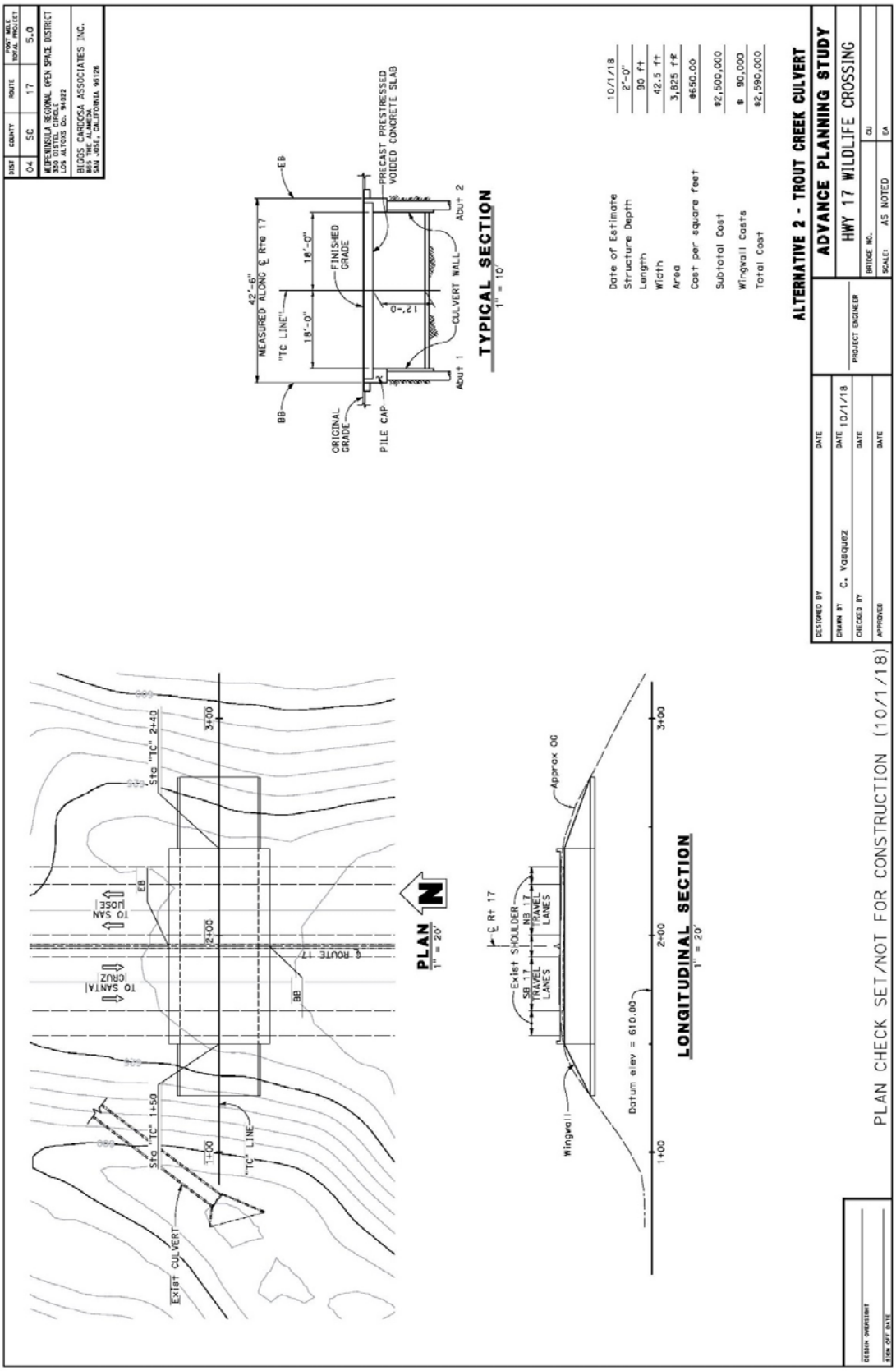

Figure 10: Conceptual Engineered Plan – Alt. 2, Trout Creek Wildlife Undercrossing

Figure 11: Photo-Rendering of Trout Creek Wildlife Undercrossing, before & after

3.1.3. Alternative 3 (Southern Overcrossing) – Combined Trail/Wildlife Overcrossing, or 3a – Trail-Only Overcrossing

Two options were developed and evaluated at this location because two separate crossings may be warranted to provide wildlife an opportunity to cross the highway uninterrupted by recreational trail users and vice-versa. A narrower recreational trail bridge would be a less expensive option to provide recreational trail users with their own dedicated crossing if wildlife were provided a dedicated wildlife crossing elsewhere in the vicinity. The combined trail/wildlife crossing configuration option was retained in case some wildlife only crossing options prove to be infeasible in subsequent more detailed studies.

Site Conditions

The team considered a new wildlife overcrossing at a location approximately 5000 feet south of the existing Trout Creek culvert. This is the only location in the Study Area where there are cut slopes and hills on both sides of the highway. The terrain immediately to the west of the shoulder along Highway 17 at this location is a steep cut slope, but there is a level "bench" area located two thirds of the way up the slope providing an obvious end point for the overcrossing. On the east side of Highway 17 there is a smaller hill with a wider landing area, however it is approximately 25 feet lower than the west landing elevation. The entire footprint area for the overcrossing is in Caltrans ROW, although connection to it for construction and ongoing access would involve lands and facilities of SJW and SCVWD and approvals or agreements with those agencies.

Access to the eastern landing point would be from Alma Bridge Road and a large relatively level area that has been used for construction staging in the past. There is a steep oak-studded knoll south of this area that is accessible by a set of steep railroad tie steps. There are cell towers and utility enclosures on this knoll, as well as an electric/utility line that parallels the highway about 20 to 24 feet back from the edge of the embankment.

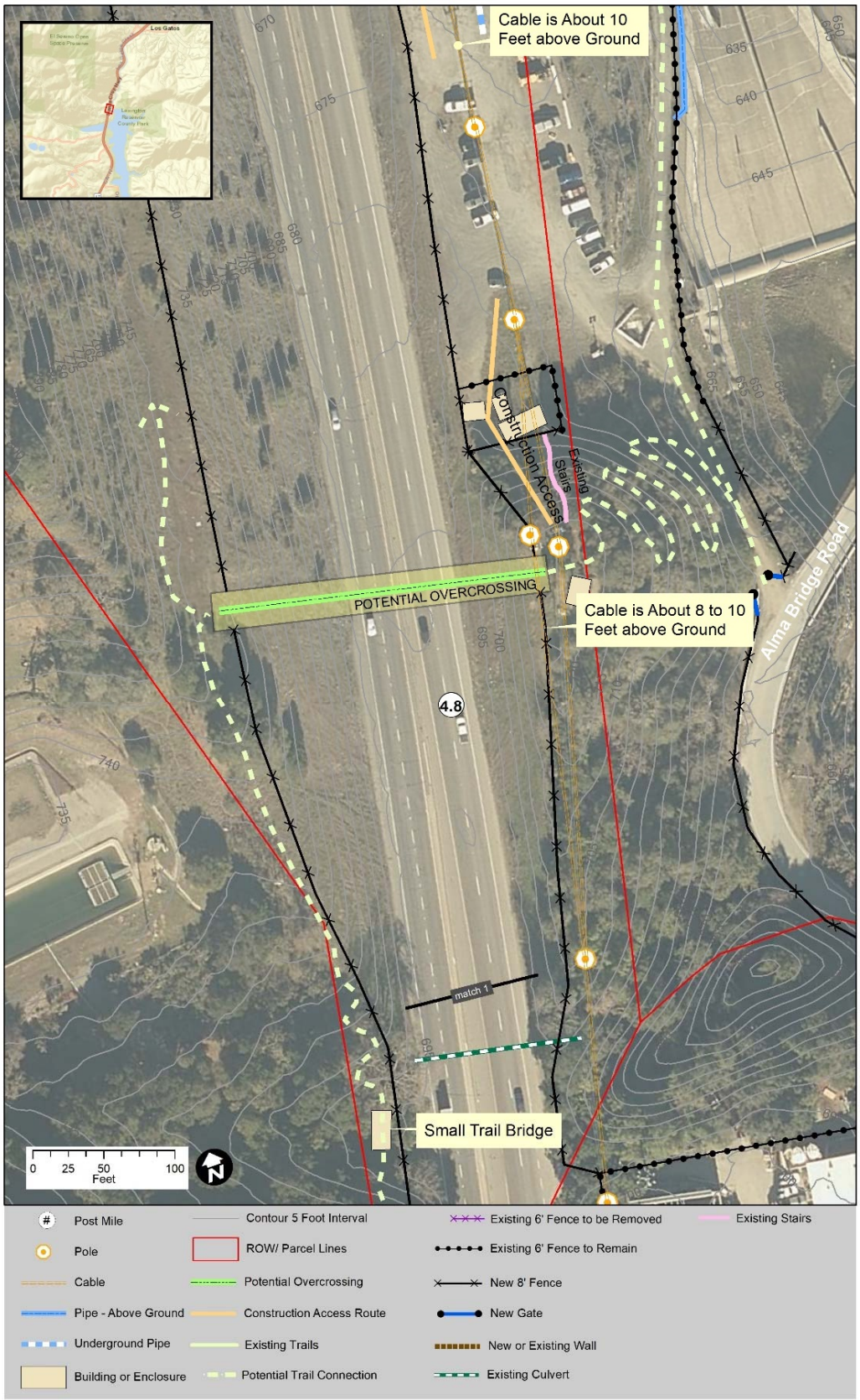

Figure 12: Site Area - Alt. 3, Southern Trail/Wildlife Overcrossing and Alt. 3a, Southern Trail Only Overcrossing

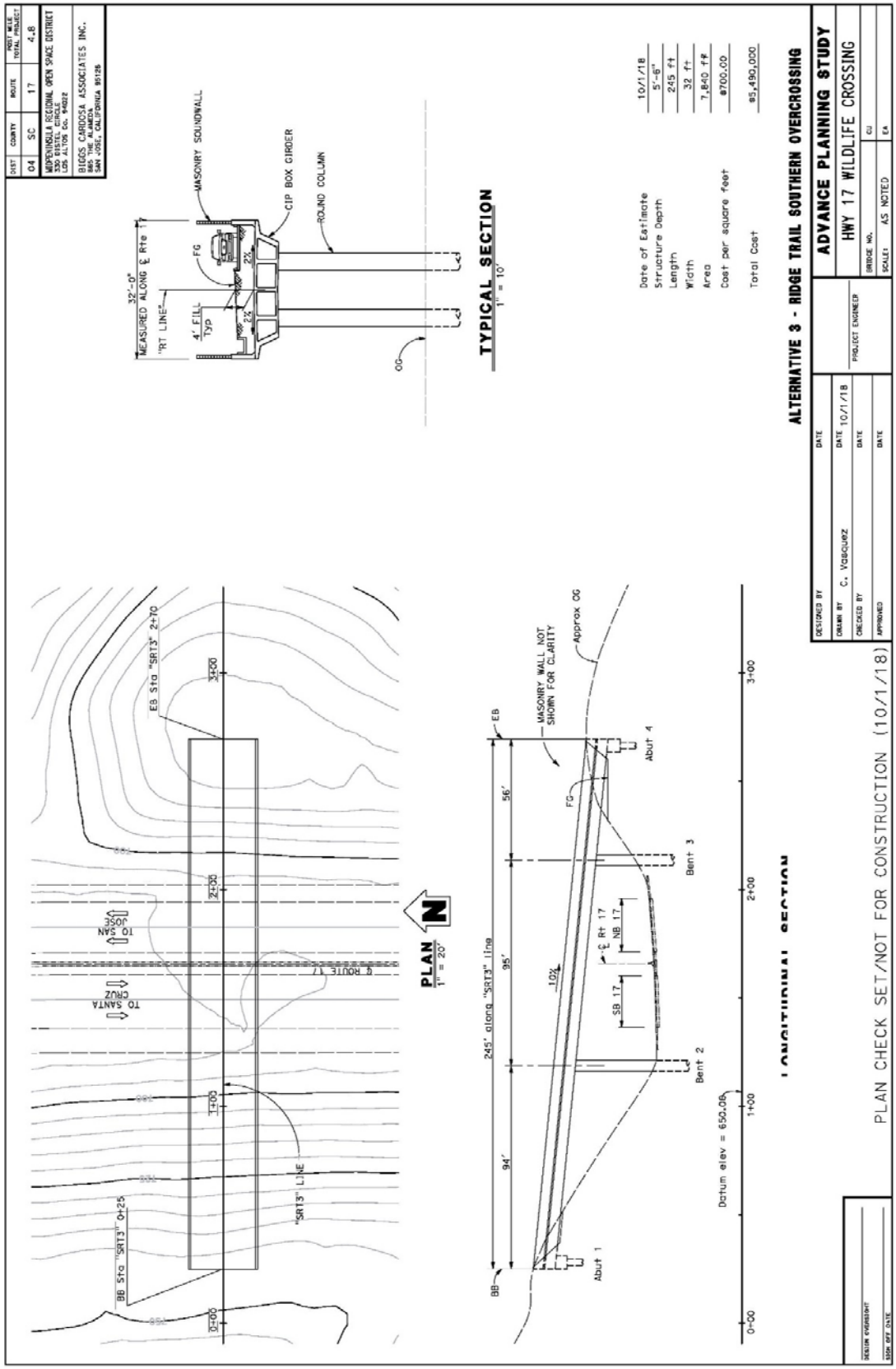

Figure 13: Conceptual Engineered Plan – Alt. 3, Southern Trail/Wildlife Overcrossing

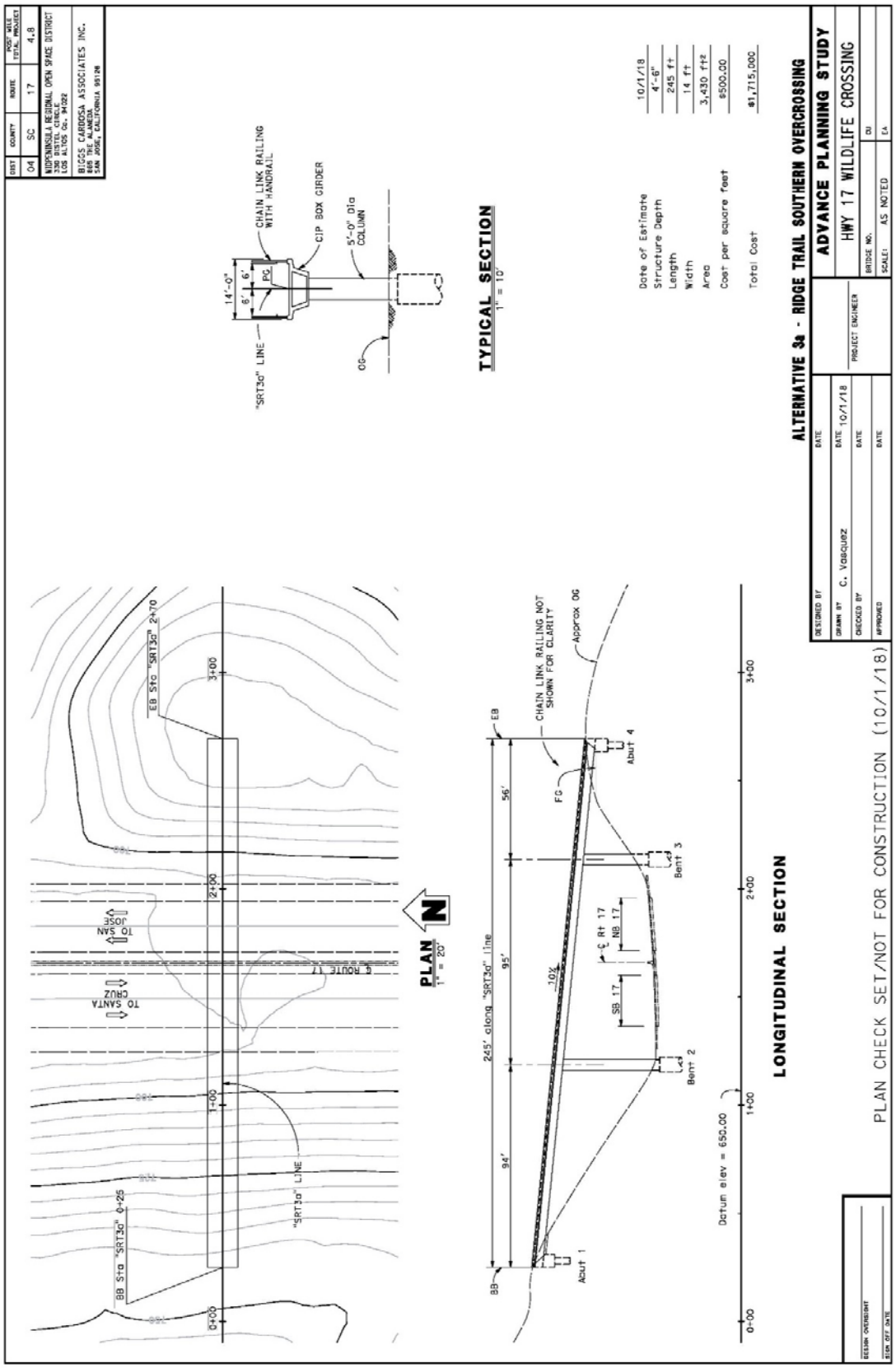

Figure 14: Conceptual Engineered Plan – Alt. 3a, Southern Trail Only Overcrossing

Figure 15: Photo-Rendering of Southern Trail/Wildlife Combined Overcrossing, before & after

Figure 16: Photo Rendering of Southern Overcrossing Trail Approach from Northeast

Figure 17: Photo Rendering of Southern Trail Only Overcrossing

3.1.4. Alternative 4 (Montevina Road) – Combined Trail/Wildlife Undercrossing, or 4a –Trail Only Undercrossing

Two options were developed and evaluated at this location because two separate crossings may be warranted to provide wildlife an opportunity to cross uninterrupted by recreational trail users and vice-versa. A narrower recreational trail undercrossing would be a less expensive option to provide recreational trail users with their own dedicated crossing if wildlife were provided a dedicated wildlife crossing elsewhere in the vicinity. The combined trail/wildlife undercrossing configuration option was retained in case wildlife only crossing options prove to be infeasible in subsequent more detailed studies.

Site Conditions

Approximately 500 feet to the south of where Montevina Road and Alma Bridge Road respectively turn west and east away from the highway, the highway transitions southward from being located in a bedrock cut to being constructed atop a fill embankment. An undercrossing could potentially be built to connect from Montevina Road on the west to the existing trail on the east, and a connection could be made along the trail north to Alma Bridge Road. There is approximately 12 to 15 feet of elevation difference between the surface of the highway and the adjacent road or trail beyond the embankments. Of particular note: when the Bear Creek Road overcrossing was designed and permitted in the 1990s one of the mitigation conditions was that a pedestrian crossing at Montevina/Alma Bridge Roads should ultimately be constructed.

The west side features an approximately 2:1 sloped embankment about 25 feet wide between Montevina Road and the highway, while the east side features a slightly steeper and taller embankment adjacent to an unpaved road/trail that is used as a trail connection along the shore of Lexington Reservoir.

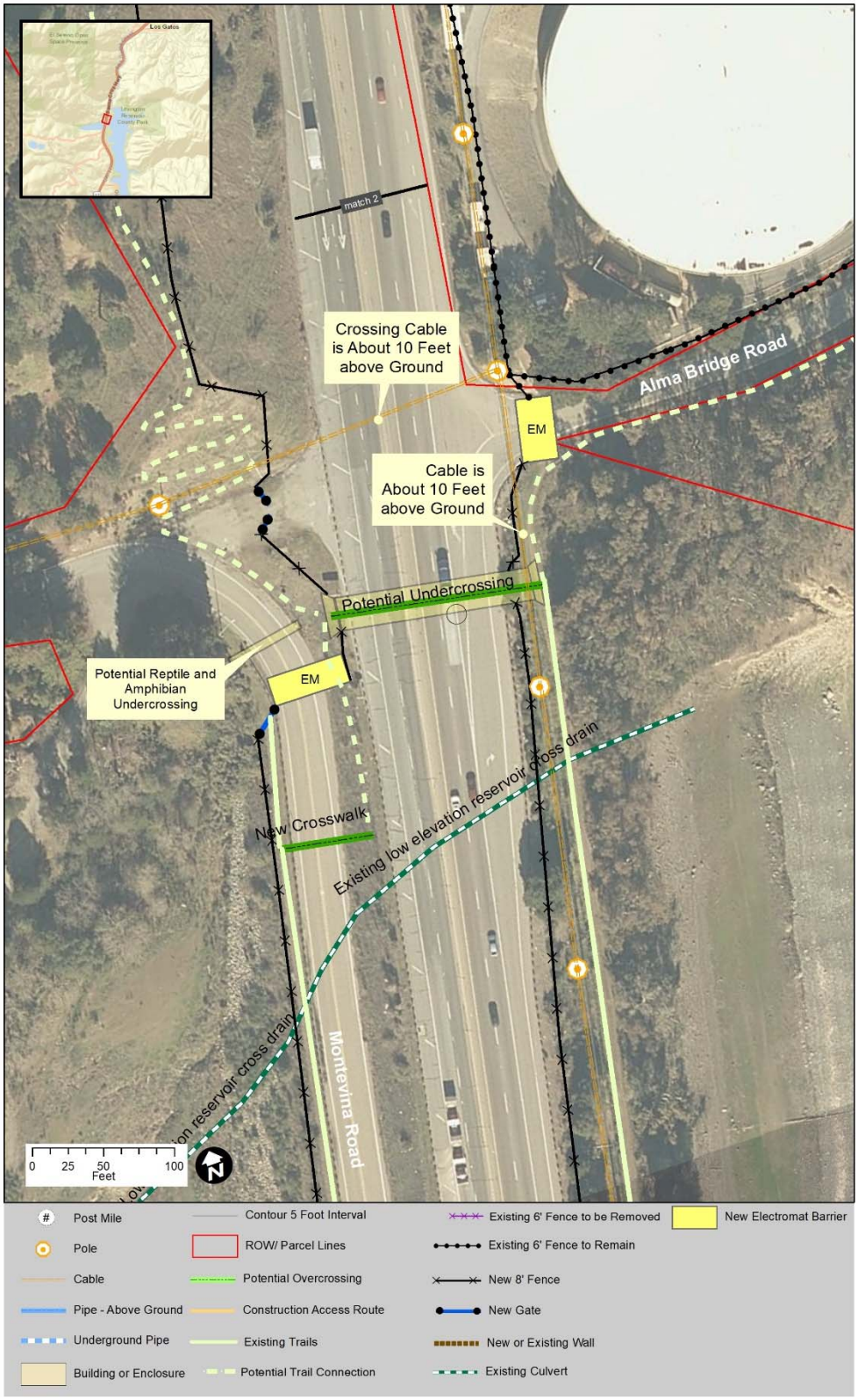

Figure 18: Site Area – Alt. 4, Montevina Trail/Wildlife Undercrossing and Alt 4a, Montevina Trail Only Undercrossing

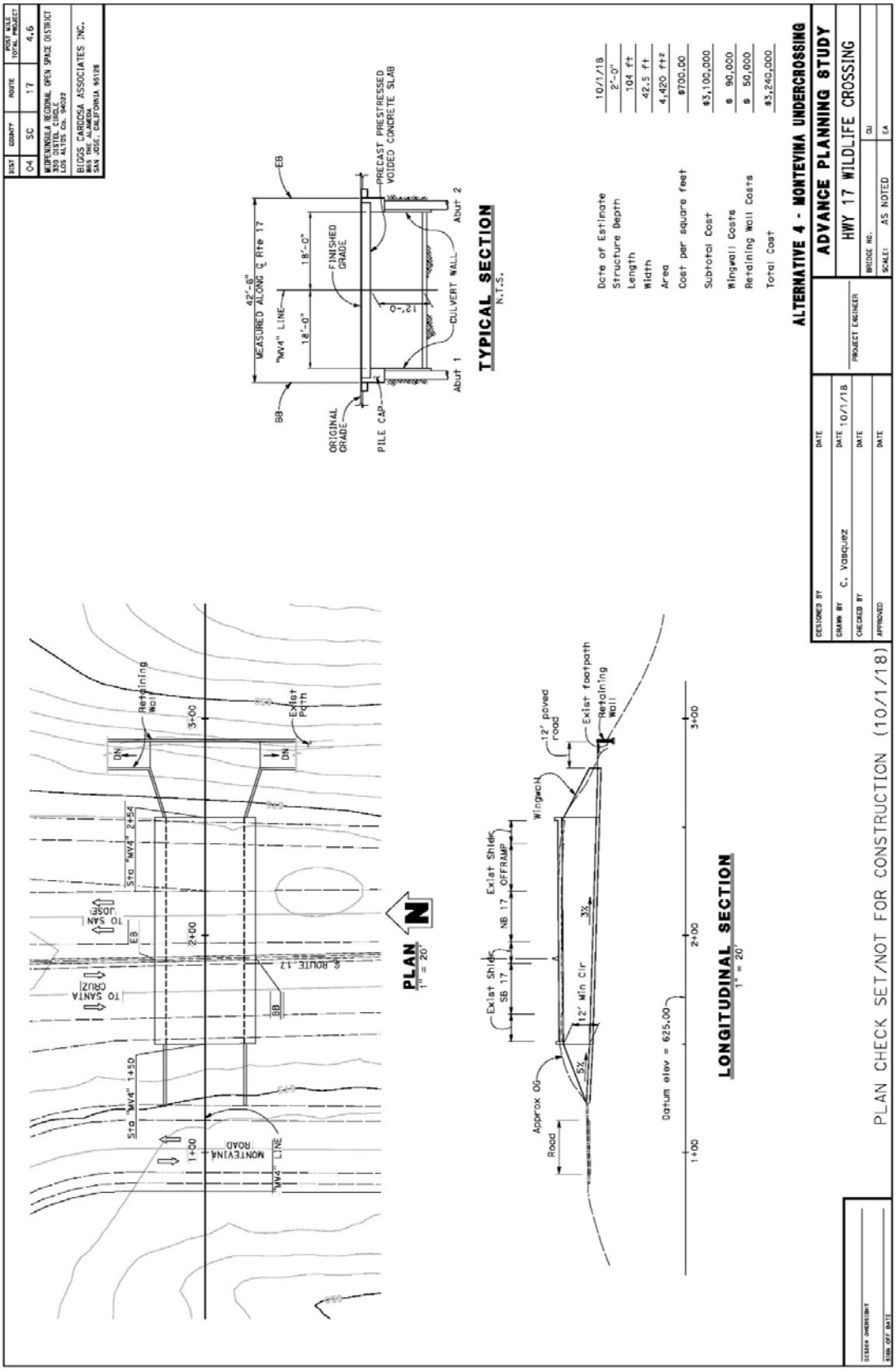

Figure 19: Conceptual Engineered Plan - Alt. 4, Montevina Trail/Wildlife Combined Undercrossing

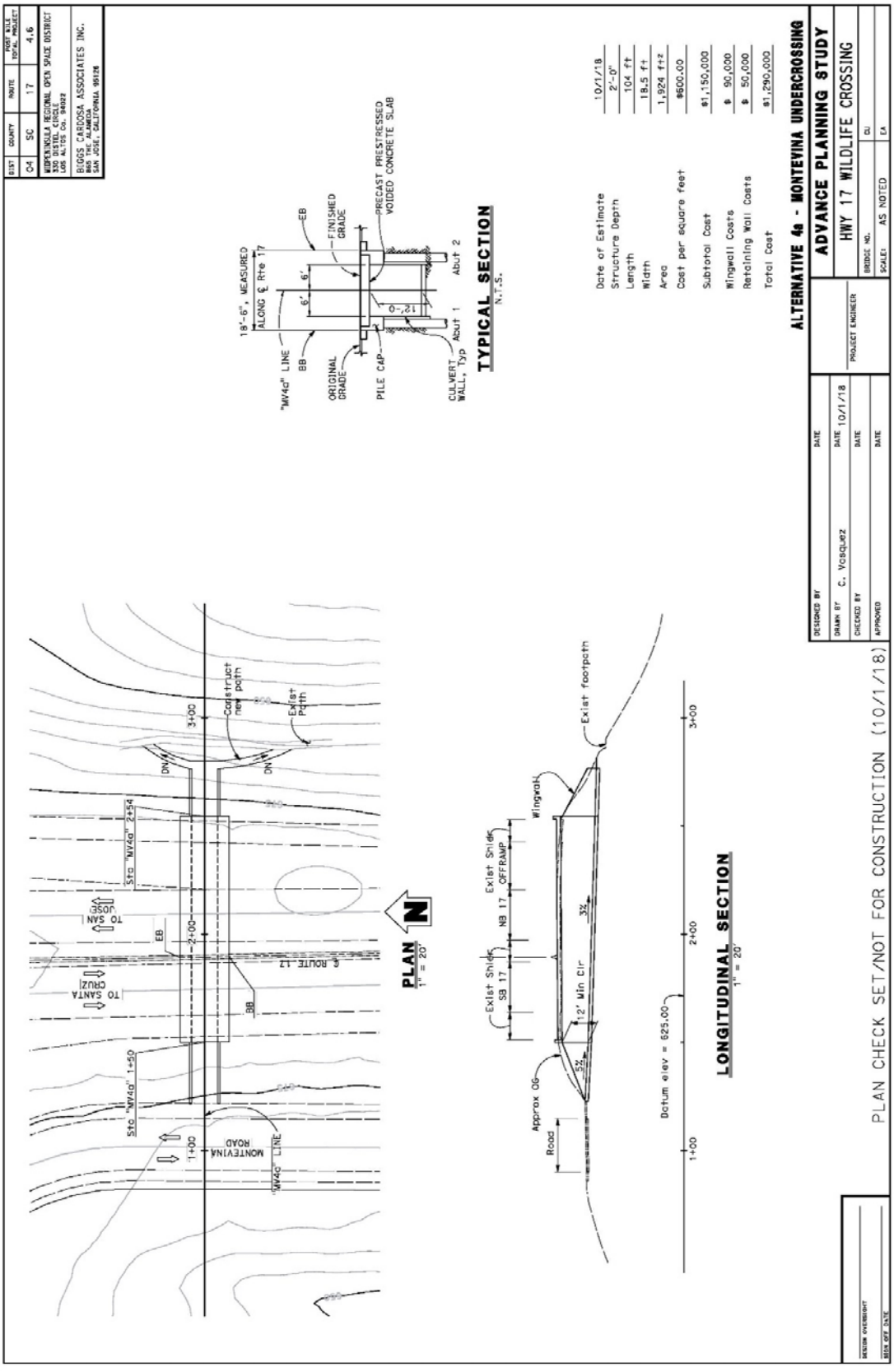

Figure 20: Conceptual Engineered Plan - Alt. 4a, Montevina Trail Only Undercrossing

Figure 21: Photo Rendering of Alternative 4 Montevina Wildlife/Trail Combined Undercrossing, before and after

Figure 22: Photo Rendering of Montevina Wildlife/Trail Combined Undercrossing, East Side

Figure 23: Photo Rendering of Montevina Trail Only Undercrossing

3.1.5. Alternative 5 (Northern Overcrossing) – Combined Trail/Wildlife Overcrossing, or 5a – Trail-Only Overcrossing

Alternatives 5 and 5a are located at the merge of an existing service road that provides access onto northbound (NB) Highway 17 from the Los Gatos Creek Trail at approximately post mile 5.25 (Figure 24). It is currently gated and fenced and primarily used as a turnout by California Highway Patrol (CHP). This area warranted further investigation based on public comment received at the August 2, 2016 meeting. Following field review a potential overcrossing site was confirmed at this location. Two versions of a northern overcrossing were evaluated: Alternative 5- a combined wildlife and trail crossing, and Alternative 5a- a recreation only trail bridge. The combined crossing would have a greater width and a portion of soil surface to support vegetation to encourage use by wildlife. Each version would include an elevated ramp structure located along the existing service access road. A design objective was to maintain sufficient space that the access road onto the highway would be preserved.

Site Conditions

This site features an elongated north-south bench in the overall eastward-descending slopes that drop to Los Gatos Creek below. The western end of the overcrossing would meet steep southern-facing slopes that descend to the shoulder of Highway 17. These steep slopes have been heavily modified by cuts made for the highway and a former residential structure and associated access driveway.

The service road is located within Caltrans right-of-way, but it is unclear if other entities have easement rights over the existing service road (SCVWD, SJW etc.). This information will be confirmed and clarified during Caltrans review of the project.

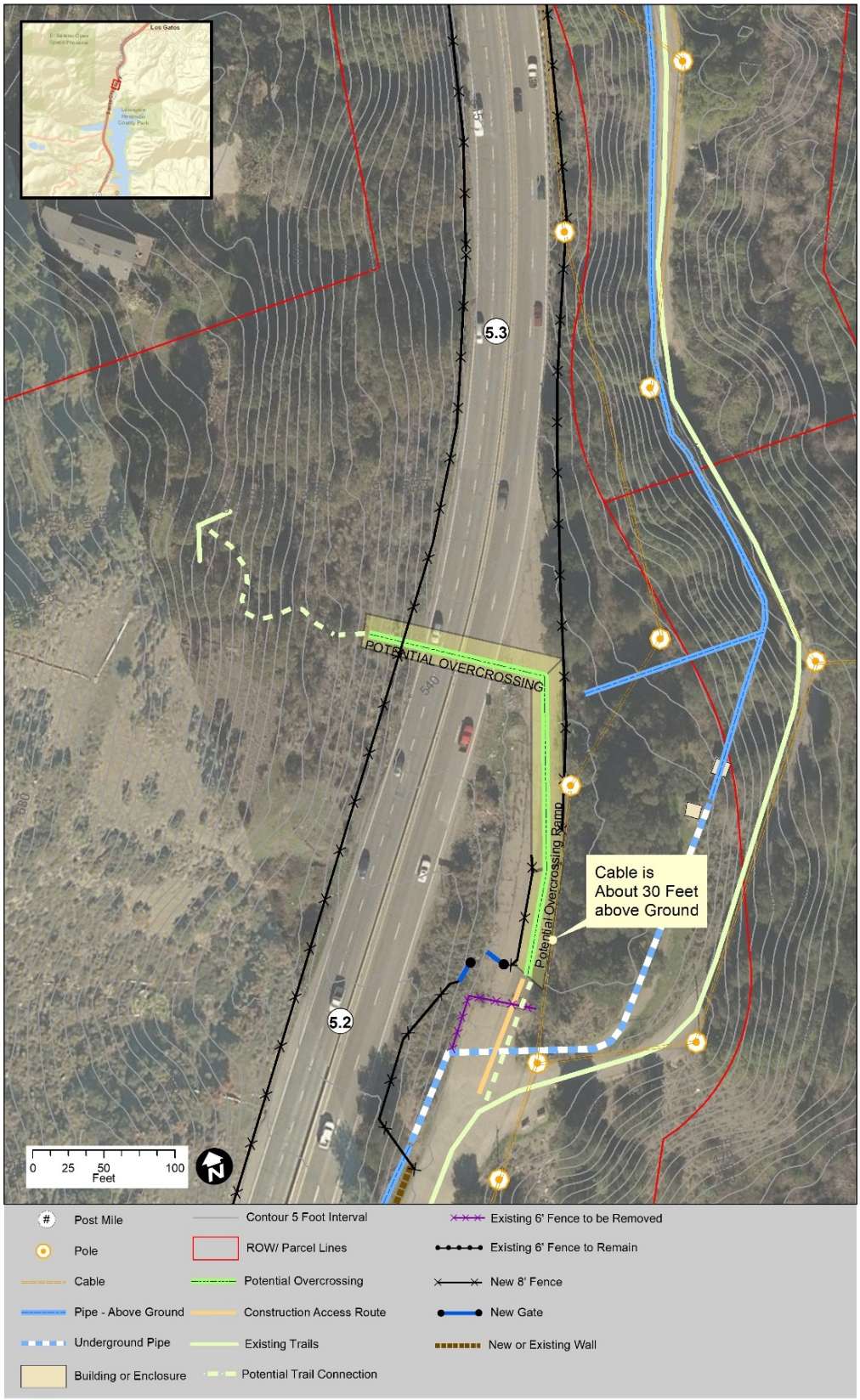

Figure 24: Site Area - Alt. 5, Northern Trail/Wildlife Overcrossing and Alt. 5a, Northern Trail Only Overcrossing

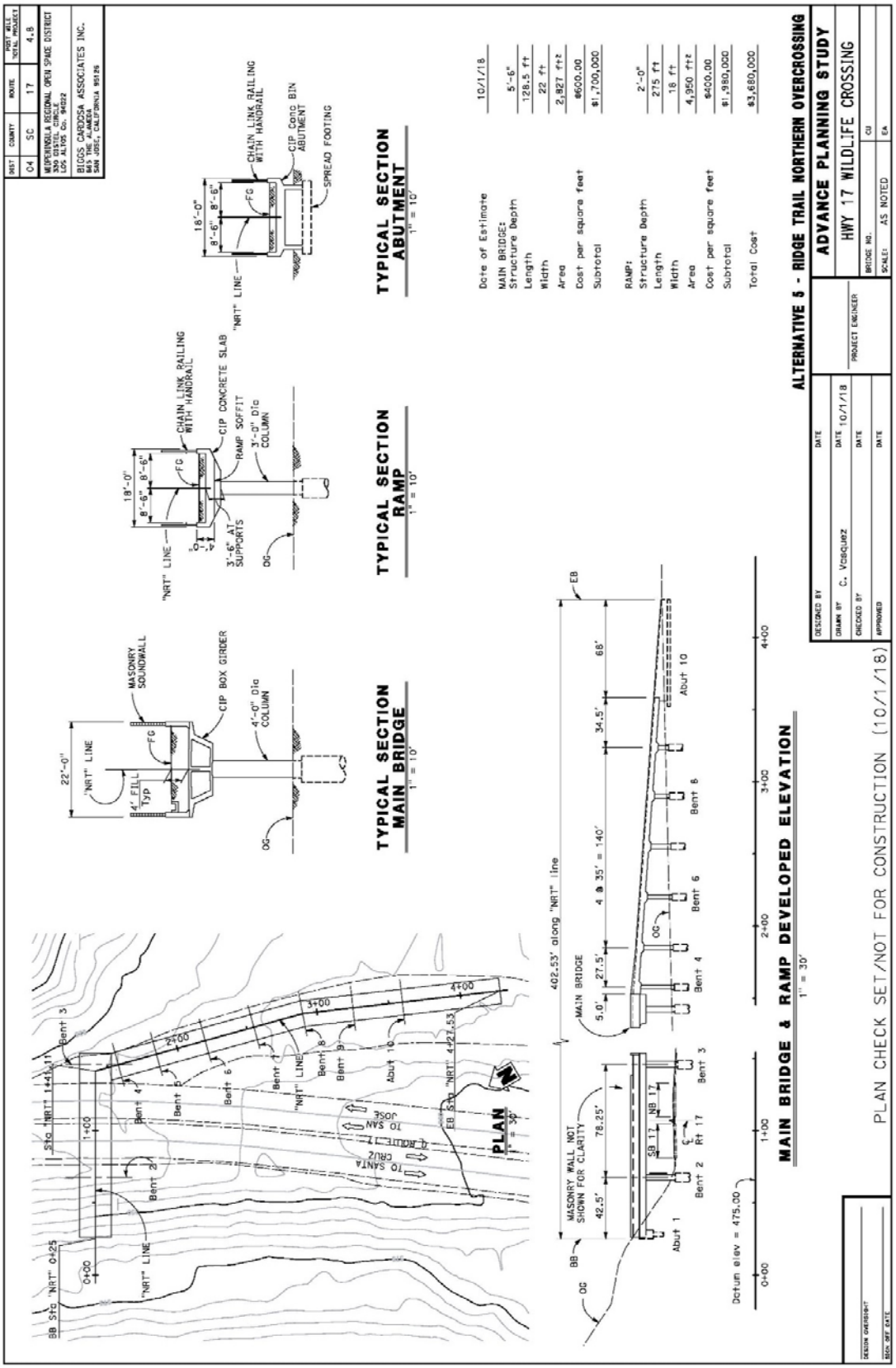

Figure 25: Conceptual Engineered Plan - Alt. 5, Northern Trail/Wildlife Overcrossing

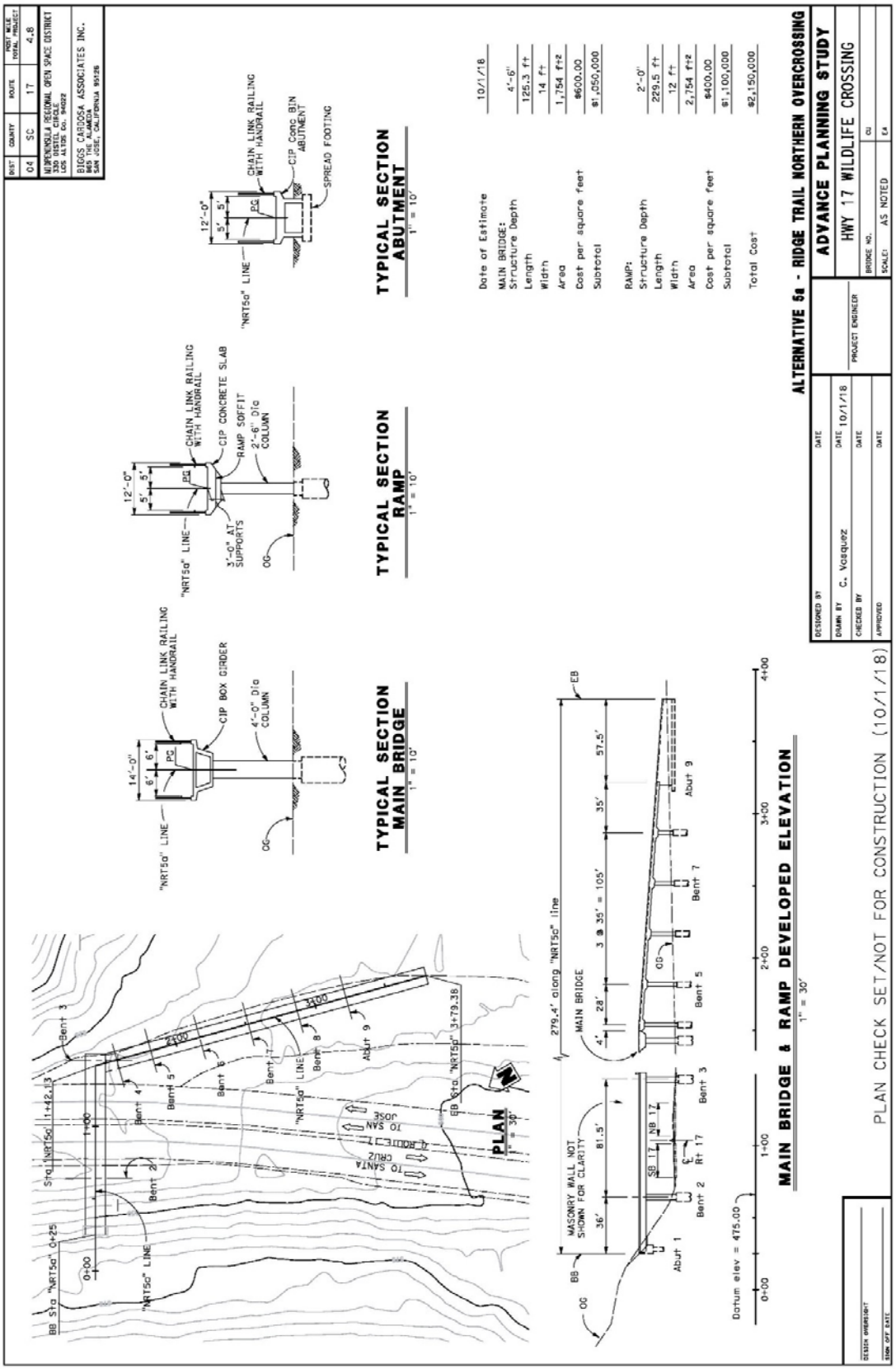

Figure 26: Conceptual Engineered Plan - Alt. 5a, Northern Trail Only Overcrossing

Figure 27: Photo Rendering of Northern Wildlife/Trail Combined Overcrossing, before and after

Figure 28: Photo Rendering of Northern Trail Only Overcrossing

3.1.6. Alternative 6. Sidehill Viaduct Undercrossing (Eliminated- No Longer an Alternative)

At the August 2, 2016 public workshop, a member of the public pointed out the potential to cross under an existing sidehill viaduct located north of the Alternative 5 site. On October 14, 2016, Midpen staff made a field visit to the viaduct site and evaluated its feasibility against the criteria used for the other alternatives and noted extreme construction access and design constraints. At a meeting with Caltrans District 4 staff on February 10, 2017, Bridge Engineering staff said they would be very resistant to the idea of tunneling under the existing structure in this manner due to potential impacts on its supports. SJW expressed concern about construction and modification in this area limiting access to critical water infrastructure and that some form of casing would likely be required if the water pipe needed to be buried. These factors add both complexity and cost at this location and for these reasons Alternative 6 was eliminated as a feasible alternative.

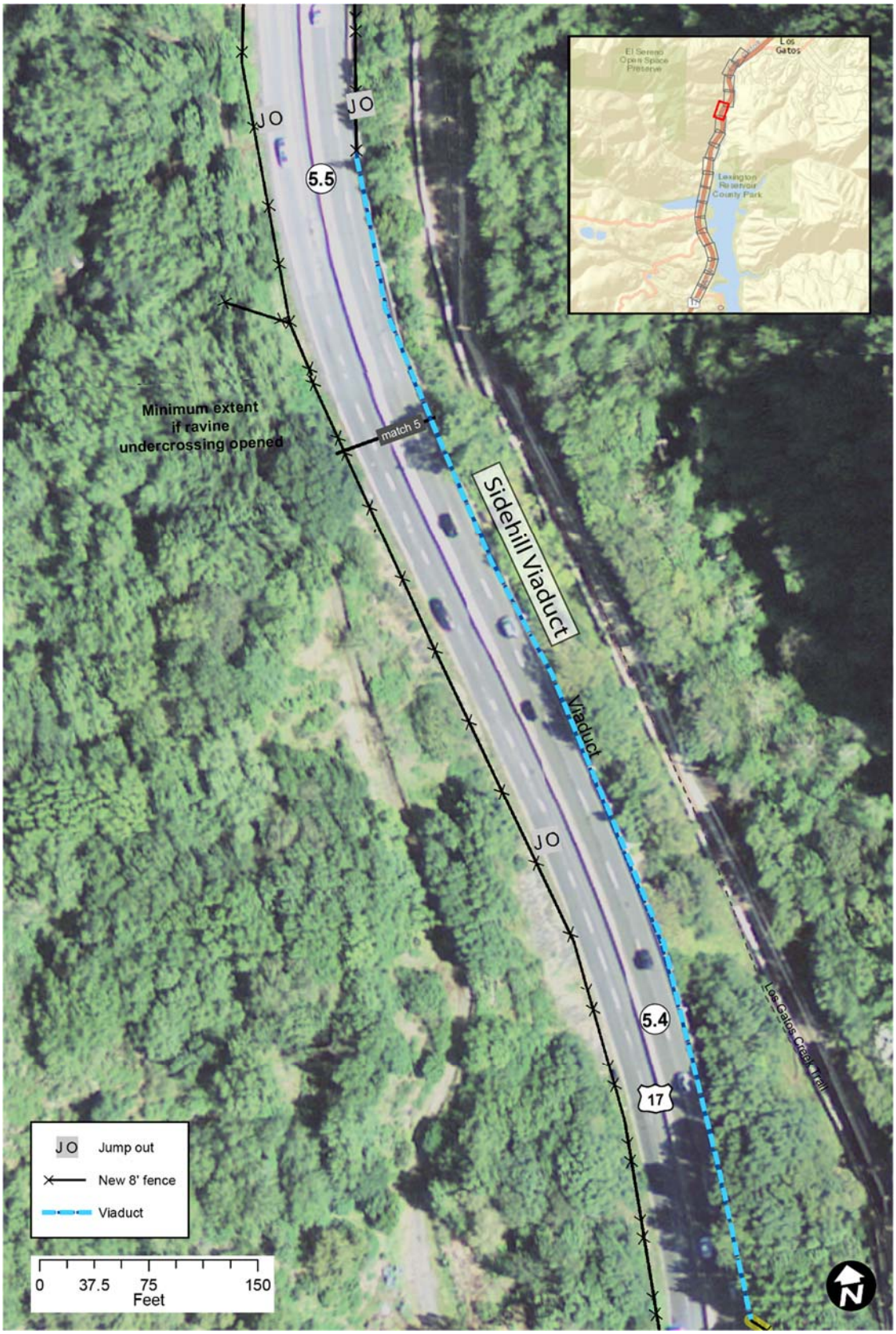

Figure 29: Overview of Eliminated Alternative 6- Sidehill Viaduct

4. Evaluation Findings

Table 4 shows the overall evaluation results. These are not intended to select alternatives, but to facilitate comparison on different performance factors. Alternatives 1, the Ravine Wildlife Undercrossing and 2, the Trout Creek Wildlife Undercrossing, are generally tied for highest wildlife crossing performance, but Trout Creek rates better for constructability factors due to space limitations and geologic constraints at Ravine Creek, while Ravine has less potential conflict with existing facilities.

Conversely, Alternative 3 (Southern Overcrossing) and Alternative 5 (Northern Overcrossing) have low value as a wildlife crossing, and Alternative 4 (Montevina Undercrossing) is compromised for that purpose; however it stands out as the highest-ranking trail crossing based on constructability versus the two combined overcrossings. Alternatives 5 (Combined Northern Overcrossing) ranks second in terms of regional trail criteria performance because it would afford a direct ADA-compliant connection and access for service vehicles, but ranks lower for constructability than Alternative 4.

The projected 2024 costs for completing the wildlife crossing and trail crossing with associated minimum trail connections (see Table 3) range from roughly $17 million for the Montevina Wildlife/Trail Undercrossing to $23 million for the Ravine Wildlife Undercrossing plus the Northern Trail Only Overcrossing. The actual cost depends on the combination of alternatives selected, and on more precise estimates and actual costs based on final designs, environmental, access and permitting requirements, and construction costs. These numbers will be further refined as Midpen continues to work with Caltrans to select a preferred alternative.

Table 4: Evaluation Summary Matrix

	1. Ravine Wildlife Undercrossing	2. Trout Creek Wildlife Undercrossing	3. Southern Wildlife/Trail Overcrossing	3a. Southern Trail-Only Overcrossing	4. Montevina Wildlife/Trail Undercrossing	4a. Montevina Trail-Only Undercrossing	5. Northern Trail/Wildlife Overcrossing	5a. Northern Trail-Only Overcrossing	Key Differentiators
Functionality for Wildlife									
1. Proximity to wildlife corridor	High	High	Medium	Medium	Medium	Medium	High	High	More northerly alts are in identified corridor
2. Appropriate dimensions and design features	High	High	Medium	Low	Medium	Low	Low	Low	OC not preferred by mt. lions; #4 UC too close to roads
3. Habitat connectivity	High	High	Low	Low	Low	Low	Medium	Medium	More disturbed area, roads and facilities around southern alts
4. Line of sight	High	High	Medium	Medium	High	High	Low	Low	Undercrossings have better through visibility from adj. habitat
5. Less human exposure	Medium	Medium	Low	Low	Low	Low	Medium	Medium	Increasing level of facilities and activity to the south
6. Species of special status	Medium	Medium	Low	Low	Medium	Medium	Low	Low	Potential access for semi-aquatic species at # 1, 2 and 4
Functionality for Regional Trail Use									
1. Accommodate the full range of potential regional trail users	Low	Low	Medium	Medium	High	High	Medium	Medium	#1 - 3a and 5/5a have no potential to connect to public road on west
2. **Provide direct connection to regional trail alignments**	Low	Low	Medium	Medium	Medium	Medium	High	High	#1 and 2 constrained; all close to connecting routes but 5/5a closest
3. **Provide a safe and enjoyable trail**	Low	Low	Medium	Medium	Medium	Medium	High	High	#1 and 2 have little opportunity to connect; 3 and 5 better; 4 best
4. Provide connection to a feasible trail route	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	Feasible route ided, but access rights need resolution for all trail alts.
5. Emergency and maintenance vehicle access	Low	Low	Low	Low	Medium	Medium	Low	Low	#4/4a is only location that could connect through to public roads
Constructability/Cost									
1. Location with fill or cut embankments	Medium	High	Medium	Medium	Medium	Medium	Low	Low	Only #2 Trout Creek appears to have ample depth/ht of embankment
2. Environmental impact	Medium	Medium	Medium	Medium	Medium	Medium	High	High	#1, 2 incl. riparian habitat; 3/3a oak woodlands; 4/4a close to reservoir
3. Soils and geology feasible for construction	Medium	High	High	High	High	High	Medium	Medium	#1 and 5/5a have landslide potential; others relatively unconstrained
4. Can be designed to meet standards	High	High	Medium	Medium	High	High	High	High	#3/3a challenged to meet ADA standards due to slopes
5. Feasible construction staging and traffic impact	Medium	Medium	Medium	Medium	High	High	Medium	Medium	#1, 3/3a and 5/5a have significant constraints for access on west side
6. Minimal impact on existing facilities and operations	High	Medium	Low	Low	High	High	Medium	Medium	Only #1 and 4/4a are located away from water and dam facilities
7. Lower relative cost (low cost = high score)	Medium	Medium	Low	Medium	High	High	Medium	Medium	OC will cost more than an UC; alt #4/4a is least constrained/costly
Future Decision Factors (Pending)									
1. Project readiness/funding identified									
2. Access permission/ ownership/right-of -way									
3. Maintenance and operation arrangements									
4. Public, stakeholder and partner support									

5. Regional Trail Connectivity Analysis

Identifying feasible regional trail crossings and connecting trails to the crossings is a high priority for Midpen and regional partners. It is not only the potential highway crossing locations, but also their continuing routes and connections that must be feasible in order to compare crossing alternatives. A proposed recreational trail crossing alternative is only feasible if it can connect to existing and future regional trails (see Figure 2 for approximate connection points). Implementation of a new regional trail crossing and connecting routes will connect approximately 40 miles of east-west regional trails (Bay Area Ridge Trail and Juan Bautista de Anza National Historic Trail). A new crossing would also improve 14 miles of existing north-south connection trails to connect to a broader span of approximately: a) 19 miles of multi-use trail, b) 24 miles of bicycling and hiking trail, c) 15 miles of hiking and equestrian trail, and d) three miles of hiking only trail (Los Gatos Creek Trail, existing highway frontage trails, future trail system planned for Bear Creek Redwoods OSP, and the Guadalupe River Trail in San Jose). It is an understatement to say these gaps are challenging due to the highway itself, surrounding terrain, existing utilities, facilities, and diversity of ownership/jurisdictions.

In order to recommend recreational trail crossing alternatives to advance to the Caltrans process, Midpen assessed land ownership and estimated trail steepness, side slopes, potential trail length, number of times a trail would potentially cross a stream, and cost estimates to construct and maintain new and existing trail connections to each of the crossing alternatives. In addition, Midpen would need to evaluate and consider designation of the Ridge Trail through El Sereno OSP, which is intended to connect to the recreational trail crossing alternatives.

Although Midpen believes feasible trail connections are possible to each of the Recreational Trail Crossing Alternatives, each one is associated with a unique and considerable set of known complexities. (Table 5). The true cost to implementing a highway crossing is the sum of the combined cost to construct a given crossing, plus the associated cost to build trails that connect to that crossing). Tables 1-3 in the executive summary above.

Table 5: Trail Connection Complexities Associated with Each Recreational Trail Crossing Alternative

Recreational Trail Crossing Alternative #:	Anticipated connecting trail complexities and requirements:
3. and 3a. Southern Overcrossing	• Use of existing cut benches above the highway and a new pedestrian bridge to connect the two benches • New shorter west side trail connection • Negotiations with adjacent landowners • Trail improvements at or near the existing Lenihan dam spillway (access road) • Trail improvements at or near to Alma Bridge Road east of the existing Los Gatos Creek Trail to connect to Sierra Azul OSP • New crosswalk at the existing Bear Creek Road interchange on existing Montevina Road frontage trail to connect to Bear Creek Redwoods OSP
4. and 4a. Montevina and Alma Bridge Road Undercrossing	• Use of existing cut benches above the highway and a new pedestrian bridge to connect the two benches • A new longer west side trail connection • Negotiations with adjacent landowners • Trail improvements on Alma Bridge Road near the Lenihan dam spillway (potentially new bridge, crossing and/or cantilevered trail) • Paving existing trail east of Highway 17 between Alma Bridge Road and the dirt parking area south of the Bear Creek Road interchange to provide year-round cycling connectivity • Trail improvements at or near to Alma Bridge Road east of the existing Los Gatos Creek trail to connect to Sierra Azul OSP
5. and 5a. Northern Overcrossing	• A new longer west side trail connection • Negotiation with adjacent landowners • Trail improvements at or near Alma Bridge Road east of the existing Los Gatos Creek trail to connect to Sierra Azul OSP • Trail improvements on Alma Bridge Road near the Lenihan dam spillway (new bridge, crossing, and/or cantilevered trail) • Paving existing trail east of Highway 17 between Alma Bridge Road and the dirt parking area south of the Bear Creek Road interchange to provide year-round cycling connectivity • Trail improvements at or near Alma Bridge Road east of the existing Los Gatos Creek trail to connect to Sierra Azul OSP

6. Wildlife Fencing

A very important component of the project is fence installation along the highway to direct wildlife away from traffic and towards the proposed wildlife crossing(s), regardless of the alternative(s) selected. Other successful wildlife crossing projects that employ comprehensive directional fencing encompassing long sections of road has been shown to be highly effective to meet these two primary objectives. Roadkill data collected by Pathways for Wildlife included in the 2016 Preliminary Alternatives Report shows where animals have been hit while attempting to cross; this data will help determine the best directional fence placement to reduce future wildlife-vehicle collisions at these locations. The data shows that the "hotspot"- an area where wildlife are consistently hit by cars- stretches along the highway from the Los Gatos town limits south to the Alma Helitack Station centered around Trout Creek Canyon for a distance of approximately 2.4 miles (1.2 miles to either side of Trout Creek). The total number of wildlife-vehicle collisions within the study area between 2000 and 2017 was 266, with 153 hit within the hotspot including 101 deer. Fencing would ideally stretch this entire distance; however, based on the recommended wildlife crossing option that is selected, a shorter section of fencing may initially be required and monitored for success. Long-term effectiveness monitoring would dictate initial fencing installation success and if additional fencing is warranted in the future. An example of wildlife fencing directing wildlife (primarily deer) to a crossing on Highway 89 north of Truckee, California can be seen in Photos 1 - 3.

Photo 1: Example of directional fencing associated with a wildlife crossing on Highway 89 in Northern California

Photo 2: Directional fencing leading to a culvert on Highway 89 in Northern California

Photo 3: Directional fencing placed at the tree line on Highway 89 in Northern California

Similar black-colored directional fencing was installed in 2017 by Midpen in Sierra Azul OSP for the Mount Umunhum Summit, which proved to be non-intrusive from an aesthetic and visual standpoint, and does not block the view beyond.

Appendix D presents a conceptual plan for fencing the corridor, including a "minimum" fencing extent for success of each alternative, including a much longer "ideal" extent throughout the study corridor from the edges of downtown Los Gatos to south of the Alma Helitack Station (2.4 miles). The plan was crafted in response to the recent Pathways for Wildlife roadkill data for the study area and the connecting roads and trails. This plan was developed with input from Wildlife Biologist Dr. Tony Clevenger, Pathways for Wildlife Biologist Tanya Diamond and Wildlife Researcher Ahiga Snyder, and Midpen Senior Natural Resources Specialist Julie Andersen.[4] The concepts reflect consideration of the guidelines for fencing design summarized in a survey of techniques used by wildlife managers. [5]

Table 6: Table of Wildlife Fencing Quantities and Costs

Alt	Crossing	Min Fencing West Side (mile)	Min Fencing East Side (mile)	Total (mile)	Estimated Total Cost in 2016	Estimated Total Cost in 2024
1	Ravine Creek (wildlife)	0.8	0.9	1.7	$1,020,004	$1,580,186
2	Trout Creek (wildlife)	0.8	0.9	1.7	$927,053	$1,436,173
3	Southern (combined)	0.6	1.4	2.0	$1,188,216	$1,840,425
3a	Southern (trail only)	NA	NA	NA	NA	NA
4	Montevina (combined)	1.3	1.4	2.7	$1,752,312	$2,714,062
4a	Montevina (trail only)	NA	NA	NA	NA	NA
5	Northern (combined)	0.8	0.9	1.7	$1,020,004	$1,580,186
5a	Northern (trail only)	NA	NA	NA	NA	NA
Full Corridor (Los Gatos to Aldercroft)		2.7	2.7	5.4	$3,379,452	$5,237,003

7. Standalone Projects to Improve Existing Crossings

Three existing crossings were identified that could be improved or modified to serve small wildlife (but not larger animal species such as mountain lion and deer) or to provide limited improvements for recreational users. Although none of these alternatives were advanced to Caltrans, each could be considered a standalone project of value to regional wildlife or recreational trail connectivity. Additional work such as identification of a project proponent, right of way needs, and outside agency approvals are needed. The three crossings include:

- Lexington Culvert
- Aldercroft Culvert
- Bear Creek Road Overcrossing

[4] Based on a field trip October 31, 2016 and subsequent telephone communications

[5] *Construction Guidelines for Wildlife Fencing and Associated Escape and lateral Access Control Measures*. Kociolek, Allen, McGowen; Western Transportation Institute – Montana State University; Cramer and Venner, April 2015

7.1. Lexington Culvert Improvements

The ten- foot diameter Lexington Culvert was eliminated as a wildlife crossing or trail crossing alternative because it is too small to adequately serve deer, mountain lions and does not provide adequate separation of trail users and requires equestrians to dismount. Santa Clara Valley Water District also stated that it is an overflow between two arms of Lexington Reservoir that carries significant flows when the reservoir and/or creeks are full and due to the flooding potential during storm events should not be designated as a primary recreational trail crossing.

Wildlife camera monitoring by Pathways for Wildlife has shown that in low water conditions the culvert is used by small- to medium-sized wildlife. It is also occasionally used by humans. While human use is not encouraged, crossing by small wildlife could be facilitated by the following measures (Figures 30 and 31):

Lexington Culvert Improvement Options

- Clear out silt that presently covers the bottom of the culvert, and continue to maintain this condition
- Install a drainage ditch from the eastern outlet of the culvert towards the main body of the reservoir to allow the culvert to drain rather than retain standing water.
- Build a catwalk in the form of a platform on the interior side of the culvert approximately three feet wide that can be used by animals even when there is water flowing through the culvert below that height. Initial drainage capacity volume lost due to this construction would be offset by the removal of the accumulated silt and ongoing maintenance.
- Increase visibility by pruning dense vegetation to thin vegetation from the entrances of the culvert. When Pathways for Wildlife cleared vegetation from the entrances to make them more visible to their wildlife cameras, they found that wildlife use increased. Counterintuitively, some vegetated cover should be retained to encourage use by more wildlife. The specific balance would be determined at the design stage, and ongoing maintenance would be required to maintain an appropriate level of visibility while providing some cover. Having more visibility may also deter the apparent use of the culvert as a human hangout or a homeless encampment.
- Install directional fencing at the culvert, including provisions for small animals including herpetofauna (amphibians and reptiles), and install exclusion fencing along the frontage roads and the highway to reduce potential for small animals to be struck by vehicles and to guide them to a safer crossing location.
- Consult with wildlife experts to ensure the correct amount and type of vegetative cover or other design features are incorporated to encourage use by small and/or cover seeking wildlife.

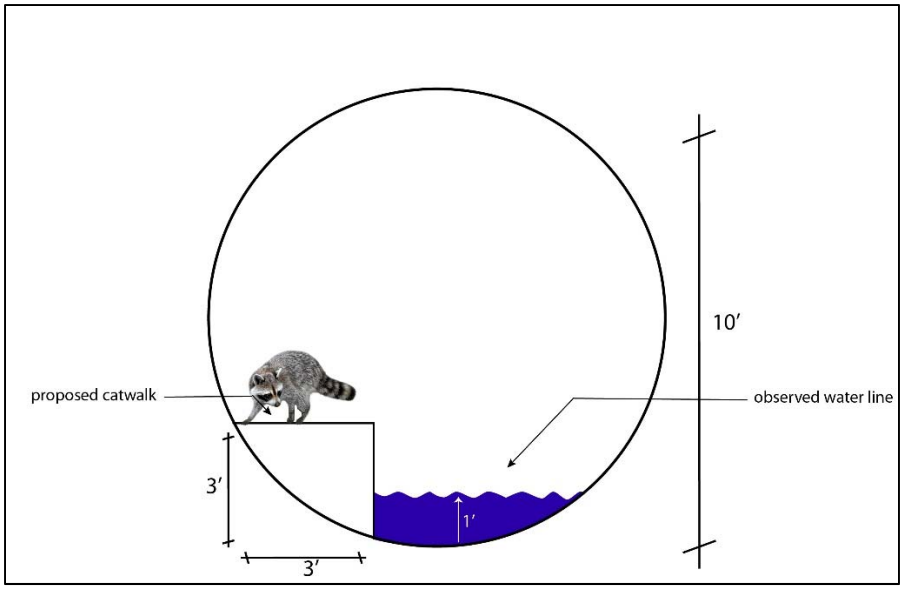

Figure 30: Illustration of catwalk

Figure 31: Example of raised catwalk inside culvert – Roscoe Steel and Culvert Co. and University of Montana's "Critter Crossing"

7.2. Aldercroft Culvert Improvements

The existing Aldercroft Culvert is an arched concrete culvert that is 11 feet one inch high and 11 feet seven inches wide, and greater than 100 feet long. No animals were observed traveling through the culvert during camera monitoring from April 2016 to December 2016. Deer were observed investigating the culvert, but would then walk away. However, given the dimensions, during low flows, it could support passage of small (rodent-sized), medium (raccoon-sized), and possibly larger wildlife such as deer if ponded water on the eastern end were bridged or reduced by removing sediment and/or reworking the channel. Aldercroft Culvert is located well south of the roadkill hotspot which is centered at Trout Creek Canyon, about two road miles to the north.

Photo 4: Aldercroft Culvert, Looking West During Wet Conditions

7.3. Bear Creek Road/Alma Bridge Road Overcrossing, Frontage Road Trails, and Los Gatos Creek Trail Improvements

When the Bear Creek Overcrossing was first built, project features including the existing east side recreational trail alongside Highway 17 adjacent to Lexington Reservoir and the west side frontage road recreational trail along Montevina Road were included to facilitate a future recreational trail crossing of Highway 17 at Montevina/Alma Bridge Road to the north. This study identifies three locations and six alternatives to provide this important regional trail connection: Alternatives 3/3a, 4/4a 5/5a.

The Bear Creek Road Overcrossing was determined to be unsuitable as a wildlife crossing because there is too much pavement and vehicle traffic to attract or accommodate wildlife. If a new regional trail overcrossing were to be built to the north, the Bear Creek Road overcrossing remains an important crossing for hikers, equestrians, and cyclists between Lexington County Park and Bear Creek Redwoods OSP. Improvements are recommended to both the structure itself and north-south connector trails to improve regional trail connectivity. This crossing will become increasingly important after the scheduled opening of Bear Creek Redwoods OSP to the public in 2019. If north-south trail connections from the Los Gatos Creek Trail can be improved, recreational trail users will be able to travel from Los Gatos to Highway 35 through Bear Creek Redwoods OSP.

The Bear Creek Road Overcrossing connects to on and off ramps for Highway 17 in both the NB and SB directions. On the overcrossing there is an eight-foot sidewalk with a 44 inch high concrete barrier topped by a six-foot high mesh screen. There are two 12-foot vehicular lanes eastbound and one 12-foot travel lane headed west, and four-foot striped shoulders on each side (Figure 32, Photo 3). The intersection on the western side of the crossing is a four-way stop with Bear Creek Road on the west. Montevina Road to the north, and the Highway 17 SB on and off ramp on the south. There is a crosswalk across Montevina Road, the west side of which is obstructed by a guardrail (Figure 32- Photo 1). On the eastern side of the overcrossing Bear Creek Road terminates into a three-way intersection with the Highway 17 NB on/off ramp to the north and Old Santa Cruz Highway to the south (Figure 32- Photo 4). There are stop signs on both the Old Santa Cruz Highway and the Highway 17 NB off-ramp approaches to this intersection, but the two eastbound lanes on the overcrossing do not stop or yield, and the left

turn onto the NB Highway 17 ramp is a sweeping wide-radius turn. There is limited visibility or protection for the existing crosswalk across the off-ramp connecting the sidewalk on the overcrossing to the trail around Lexington Reservoir the east (Figure 32- Photo 2).

To increase regional trail connectivity to this crossing will require improving and formalizing the existing north-south trails located on either side of and parallel to Highway 17 between Alma Bridge Road and Bear Creek Road. After completion of the Bear Creek Road Overcrossing, portions of the western frontage road were transferred to the County of Santa Clara Roads and Airports Department, but formal easements for these trails are needed within the Caltrans right-of-way on both sides of the highway.

SC County Parks and the SCVWD have a Master Partnership Agreement for recreational uses that the County manages and operates within SCVWD owned lands surrounding Lexington Reservoir. Any impact from this project to the terms of that partnership agreement would need to be negotiated with those entities. Paving of the eastern connector trail from Alma Bridge Road to the pullout located south of the Bear Creek Road Overcrossing would provide much needed trail improvements and is supported by both the managing entity (Santa Clara County Parks) and recreational trail users, especially cyclists. The frontage road pullout is currently used as a parking area by recreational trail users. However during the wet winter months the dirt section of trail leading from this parking area becomes muddy and difficult to navigate which results in cyclists instead using Highway 17 alongside motor vehicles. Paving would provide a year-round road cycling route around Lexington Reservoir separate from Highway 17 vehicular traffic.

Los Gatos Creek Trail potential improvements – the 1.8-mile stretch of trail that leads north from Lexington Reservoir could be improved with paving or other compacted materials to improve the surface. The existing surface is rough cut gravel and somewhat steep in places. This improvement would greatly benefit both recreational and commuting cyclists.

Figure 32: Bear Creek Road Overcrossing Existing Conditions

The following measures could improve safety and comfort for hikers, cyclists and equestrians using this crossing (Figure 33). This would be especially desirable when the trail connection to the adjacent Bear Creek Redwoods OSP is established, and when a regional trail crossing of Highway 17 is established to the north.

- Create a gap in the guardrail at the corner of Bear Creek Road and Montevina to allow access for crossing.
- Add an International or "ladder style" crosswalk at Bear Creek Road with associated signs warning motorists of the crossing.
- Replace the existing crosswalk striping on Montevina Road and the Highway 17 NB on-ramp International or "ladder style" crosswalks and crossing signage.
- Move the existing crosswalk at the Highway 17 NB on-ramp further south, to be seen more easily by drivers approaching from the crossing to the west.
- Adding a stop sign at the east end of the overcrossing would further protect pedestrians crossing the NB on/off ramp.
- Consider installation of user-activated rectangular rapid-flashing beacons (RRFBs) to warn of crossing use, especially at the NB on/off ramp if a stop sign is not installed on the east end of the overcrossing.

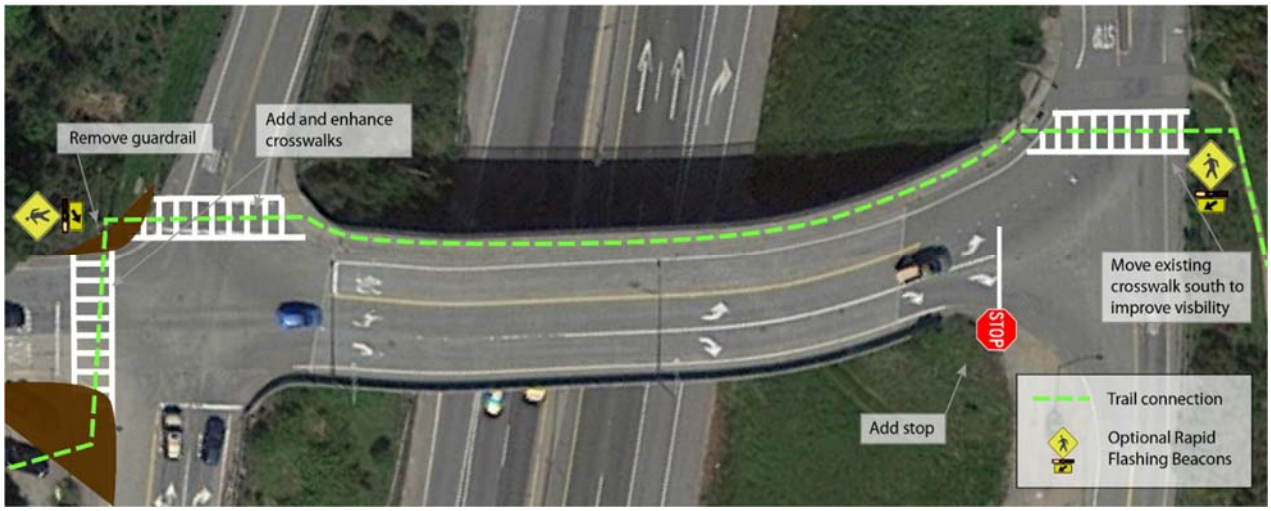

Figure 33: Potential Trail Crossing Improvements to the Bear Creek Road Overcrossing

Improvements detailed above to the structure itself, formalization of easements for north-south connector trails to the crossing, and paving the east side connector trail would greatly benefit the ability to provide and maintain regional recreational and commuter trail connections.

8. Construction Access, Monitoring, and Maintenance

The configuration of access for construction, inspections, monitoring, maintenance, and management of the new crossings is an important consideration for cost and feasibility. Along with design of the improvements, resolving the details of operation, management, and maintenance of the crossing(s) and connections will be necessary to secure approval of the project. Midpen will enter into an Operation and Management Agreement (OMA) with affected agency partners for public improvements and access deemed necessary and beneficial to all parties. Scope will include but will not be limited to: construction, management, operation, repair, patrol, and enforcement of said improvements and public access. Existing interagency agreements, such as Master Partnership and Joint Use Agreements, will be considered to provide a cohesive system of management and prevent duplication of services and among agency partners. Necessary permit authority will be obtained for any construction occurring on or potentially impacting partner agency properties, facilities, or use.

This section describes the considerations and anticipated approaches. The crossing alternative descriptions and evaluations address the site-specific conditions for construction access and staging and ongoing access for wildlife, trail users, and ongoing monitoring and maintenance.

8.1. Construction Access

Access and space for construction of the crossings can be a greater challenge than the ongoing access by wildlife and/or trail users. The Study Area features rugged terrain, and many facilities/utilities in addition to the busy highway. In addition to construction access, space will also be needed for storage and staging of equipment and materials. Minimizing impacts to Highway 17 traffic, especially during commute hours, is of utmost importance during construction. This is likely to mean that construction with the potential to impact traffic may need to take place at night. The safety of construction operations in terms of vehicles pulling off and onto the highway will also need to be carefully resolved, as will the issue of slope stability where work is being done adjacent to the highway.

Addressing potential utility conflicts is also a key part of detailed evaluation of alternatives and design. The alternatives descriptions include site maps that show known major utilities, but these will need to be surveyed, mapped, confirmed and studied in more detail in subsequent phases.

8.2. Monitoring

Monitoring of new crossing(s) and associated trail connections for a variety of factors is anticipated to be performed by a variety of entities. Structural monitoring to ensure roadway safety may be Caltrans responsibility similar to monitoring required of other highway infrastructure (such as the planned Highway 101 pedestrian overcrossing at Clark Avenue in East Palo Alto, California).

Monitoring for unauthorized use is anticipated to fall to agencies that have a patrol function- Midpen and Santa Clara County Parks for recreational trail users and California Highway Patrol for abandoned vehicles or other highway safety concerns.

Monitoring for use by target species (and recreational trail users groups) may be done using wildlife cameras, trail counters, and roadkill surveys. Ensuring successful use of the crossing(s) and associated wildlife fencing is imperative to determining overall project success. Wildlife monitoring is usually fairly intense initially and then less frequent once a baseline has been established. Wildlife monitoring is often completed using video and still (motion activated) cameras to detect passage of wildlife in conjunction with roadkill surveys. Camera data and roadkill data prior to project implementation can be compared

with post construction monitoring to determine the percent reduction in roadkill as well as the numbers and types of species using the crossings, or any adaptive management modifications needed to improve the effectiveness of the crossings and associated wildlife directional fencing. More in depth monitoring may also be warranted to answer specific research questions. Wildlife monitoring is anticipated to be implemented by one or more partner agency biologists and/or through the use of consultant biologists.

8.3. Maintenance Agreement

One or more maintenance agreement(s) will need to be prepared by Midpen and partners and approved by Caltrans as a requirement to secure an encroachment permit from Caltrans to build the crossing structures. Maintenance agreements spell out which entities are responsible to inspect and maintain specific portions of a project. For example, the County of Santa Clara Roads and Airports Department has asked that any additional striping, signage, or trail connections affecting the County road right-of-way will need to be maintained by Midpen through a Maintenance Indemnification Agreement. As another example, inspection and maintenance of directional fencing is anticipated to be a collaborative effort between landowners whose property the fencing crosses and Caltrans, who has a vested interest in keeping wildlife off the roadway. These landowners and agencies would need to work together to inspect and maintain directional fencing. They may potentially choose to rotate responsibility, be responsible for only the portion on their own property, or retain an outside party such as the California Conservation Corps, or outside contractor to inspect and maintain the fencing. A maintenance agreement will spell out these types of roles, responsibilities, and details associated with maintaining new infrastructure. Once a preferred alternative is selected maintenance, monitoring, and management discussions could begin.

As maintenance agreement/s are developed, there is the potential for overlap with the Master Partnership Agreement between SC County Parks and the SCVWD for the County's operations and maintenance of recreational trails and other uses within SCVWD properties surrounding Lexington Reservoir. Any impacts from this project to the terms of that partnership agreement would need to be negotiated with those entities.

8.4. Anticipated Tasks and Responsibilities

Table 7 outlines potential tasks likely to be necessary to maintain and operate new wildlife and trail crossing(s). This table reflects preliminary discussions with project stakeholders and indicates potential responsible and supporting parties, but it is only a starting point for resolving these details. Caltrans will typically take responsibility for new highway infrastructure features (superstructures spanning travel lanes), while others may take responsibility for the ancillary facilities and functions (such as vegetation clearing at culvert entrances, vegetation maintenance, trail maintenance, etc.).

Table 7 Conceptual Maintenance, Monitoring, and Management Plan

Task	Responsible Party	Supporting Parties
Structural elements: includes crossing(s) and associated features such as crash barriers and sound walls – monitoring, maintenance and repair	Caltrans	Midpen, Santa Clara County Parks – (monitoring)
Unauthorized use, vandalism, etc. – monitoring and response, including trail use info	Midpen	Santa Clara County Parks, California Highway Patrol
Wildlife Fencing and related features – monitoring, maintenance and repair	Collaborative efforts between Santa Clara County Parks, Midpen, Caltrans, and other organizations or entities such as California Conservation Corps	
Drainage (features on/in the crossing) – monitoring, maintenance and repair	Caltrans	Midpen/Santa Clara County Parks, SCVWD
Signs – public information, guidance and regulation – monitoring, maintenance and repair	Midpen	Santa Clara County Parks
Wildlife use and movement – monitoring and adaptive management of directional fencing and crossing features	Midpen	Consulting Biologists
General public information, education, and interagency coordination	Midpen, POST	Santa Clara County Parks, SCVWD
Regional trail connections to new recreational trail crossing (may include some overlap with Master Lease Agreement for recreational trail use adjacent to Lexington Reservoir).	Collaborative efforts between Midpen, Santa Clara County Parks, SCVWD* and other organizations or entities such as Bay Area Ridge Trail	

*SCVWD approval will be obtained for any construction occurring on or potentially impacting SCVWD properties, facilities, or use. SCVWD will not be responsible for the operation or maintenance of potential trail connections on their property that result from the recreational crossing.

9. Project Implementation and Next Steps

9.1. Caltrans Project Development Process and Project Approval Stages

All projects on the State Highway System are under the purview of the California Department of Transportation, or Caltrans. Because this project interacts with Highway 17, which is a designated State Highway, Midpen is required to submit the project to Caltrans through the project development process. Generally, Caltrans projects and projects within Caltrans right-of-way that are considered "complex" follow the project development process and must complete the following required documentation/stages:

Project Initiation – The outcome of the project initiation process is a project initiation document (PID) that establishes a well-defined purpose-and need statement and proposed project scope tied to a reliable cost estimate and schedule. All projects are required to have an initiation document that provides the "next phase" decision makers with a broad understanding of the transportation deficiency and the proposed project's objective to address this deficiency.

There are four types of PIDs/processes:

Project Study Report (PSR)

Project Scope and Summary Report (PSSR)

Small Capital Value Projects (SCVP)

Project Study Report/Project Development Support (PSR-PDS)

The PSR-PDS provides scope approval of projects brought to Caltrans that are-funded-by-others. The PSR-PDS does not provide conceptual approval. The PSR-PDS is prepared by the project sponsor with direction from the Caltrans project development team (PDT), the PDT:

- Defines the purpose-and-need for the project,
- Gets input from stakeholders,
- Systematically collects and analyzes existing information,
- Identifies alternatives,
- Develops a plan of action to deliver the project, and
- Estimates the project cost and schedule.

The PSR-PDS template allows the programming of support costs and capital costs separately. The PSR-PDS allows Caltrans and local agencies to:

1. Program only the support costs if the project life-cycle is longer than the State programming period.

2. Maximize the use of finite PID resources by beginning detailed environmental studies and engineering studies without performing preliminary studies.

3. Proceed with engineering and environmental studies and evaluate the merits and feasibility of alternatives before a preferred alternative is selected for programming right-of-way and construction costs.

4. Accurately plan resources needed to complete the environmental document - project approval process.

5. To advance the programming of next phase elements of future State projects, if there are adequate funds in the State Highway Account.

In a sense the PSR-PDS process creates a "game plan" for the next phase of the Caltrans Process (Project Approval and Environmental Documents). Caltrans has indicated that the PSR-PDS is the appropriate PID process for the Highway 17 wildlife and regional trails crossing project. The Feasibility Study and this Report will directly support the preparation of the PSR-PDS. At the completion of the PSR-PDS, the project team can proceed to the Project Approval & Environmental Documentation phase.

Cooperative Agreement – Project Initiation Documents are approved by Caltrans District Directors. PIDs for projects that are funded by others, as is the case of the Highway 17 project, require executed Cooperative Agreements covering the work and responsibilities to be done and by whom in each phase of the project. A Cooperative Agreement has been signed by Caltrans District 4 and Midpen for the PSR-PDS phase of the project (contained in Appendix F).

Project Development Team (PDT) – The PDT is the team that acts as the "steering committee" for the project for all phases – from feasibility studies through to completion. The PDT and project sponsor work together to:

- Defines the purpose-and-need for the project
- Get input from stakeholders
- Systematically collects and analyzes existing information
- Identify alternatives
- Develop a plan of action to deliver the project
- Estimates the project cost and schedule.

Draft Project Report (DPR)/Project Report (PR) – When a PSR-PDS is used to initiate the project, a project report (PR) will be used to program the remaining support, right-of-way, and construction costs. Projects that require consideration of multiple alternatives must submit a DPR, which expands and enhances the PID with preliminary engineering analysis that contains more detailed information about the project's background, purpose and need, alternatives, engineering issues and environmental investigations. (Projects not requiring evaluation of alternatives need only submit a Project Report rather than a Draft Project Report. These are most often projects with no foreseeable environmental impacts, which is not the case for the Highway 17 project).

Project Approval/Environmental Documentation (PA&ED) – Draft Environmental Document(s) and DPR are circulated for public comment. The least environmentally damaging practicable alternative that satisfies the project's purpose and need must be identified when Draft Environmental Document(s) are prepared.

Environmental Documents/Studies (CEQA, NEPA) – The project and alternatives must undergo the environmental studies and documentation required by the State of California (CEQA – California Environmental Quality Act). This investigation is concurrent with the formation of the DPR. For projects receiving or hoping to receive federal support or having issues associated with federal jurisdiction must also submit documentation complying with NEPA (National Environmental Protection Act). Environmental Studies vary based on the scope and impact of the project, environmental documentation may include (in order of intensity of investigation):

Categorical Exemption (CatEx)/Categorical Exclusion (CE)

Mitigated Negative Declaration (MND)/Environmental Assessment (EA)

Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) – The Highway 17 project could require a mitigated Negative Declaration, Environmental Assessment, or a more comprehensive full EIR/EIS. As a precursor to the draft environmental document and DPR process, sponsors must review the project alternatives and consider the environmental impacts and necessary mitigation; the extent of these impacts and mitigation needs will play a role in determining the preferred alternative. Projects must be able to comply with a number of environmental laws, and this compliance is documented within the environmental document.

Final Project Approval – After it has analyzed and responded appropriately to the public comments, the PDT selects the preferred alternative. At this point the ED is completed and attached to the final PR, which should also document the selection of the preferred alternative and discuss changes in the project as a result of public comment. The PR and ED that is approved by the District Director or delegated authority with an attached approved ED project often must also be approved by the Federal Highway Administration (FHWA) unless there are existing agreements. A one-month waiting period is allowed after final project approval of the document to provide an opportunity for objections by other federal agencies or legal action by project opponents. If the project contains no federal funds or federal action, final approval of the project is by Caltrans.

9.2. Timeline for Implementation

With adequate funding and project support, a likely timeline for construction of the Highway 17 project is six years from start of the PSR-PDS (currently underway) (Figure 5).

Feasibility Study – Three Years (nearly complete): The Feasibility Study phase identified, evaluated and refined options for combined or separate crossing structure(s) for both wildlife and regional trail connections. It is intended to eliminate options with obvious infeasibility or fatal flaws, and to facilitate public and stakeholder comment on the overall concepts and alternatives. This phase included early coordination with Caltrans District 4 and other project partners and stakeholders, and the negotiation of a formal Cooperative Agreement with Caltrans District 4 regarding the project review and approval process.

Project Study Report/Project Development Support (PSR-PDS) – 12 months: This stage includes creation of a detailed scope of the required physical work, concept plans for alternatives, a budget, and a delivery schedule. During this time the “Purpose and Need” of the project is also refined.

Environmental Documentation (ED) – 18 months: During this time, all necessary CEQA and NEPA studies are conducted. At this stage the alternatives, including a no-build alternative, are further developed and formally studied to find the alternative that fulfills the Purpose and Need will minimize environmental impact/damage. Studies performed as part of the environmental phase may include: a visual impact analysis, air quality and noise impact studies, water quality studies, hazardous waste investigations, hydraulic/floodplain studies, paleontology and biological studies and assessments, wetlands studies, archeological surveys, and cultural/historical studies. Additional opportunities for public review and comment on project alternatives is an important component of this phase. The CEQA/NEPA lead agency must prepare written responses to public comments received.

Project Report (PR - Draft and Final) – Two years: This stage may overlap with the environmental documentation stage and involves a consideration of the alternatives.

Permitting – 18 months: This stage may overlap with the PR and environmental documentation stages and involves securing the required permits from various agencies. Examples of other agencies might be local water authorities, US Fish and Wildlife, California Department of Fish and Wildlife, etc.

ROW Certification – Three years: The process of establishing and securing rights of way is a long process that may overlap with PA/ED, and the Preliminary Specifications and Estimates. This process ensures that there is physical room and rights to build the project. Agreements and rights to be secured as part of ROW certification may include:

- ROW Acquisition/Agreements
- Utility Clearance
- Partnership Agreements including relinquishment and maintenance agreements

Plans, Specifications and Estimates (PS&E) – Two years: This stage involves detailed design and preparation of contract documents to be bid. Details determined include a range of activities including detailed engineering, staging, landscaping, etc.

Construction – Two years: This stage includes issuing a request for bids, selecting and awarding a construction contract, and the actual building timeline.

9.3. Project Phasing

The wildlife and regional trails crossing project is currently combined for the design, environmental, and Caltrans review process, but thereafter construction may be phased, based on available funding and project support.

The actual schedule may depend on factors such as staff availability and review time, weather and funding/partnership opportunities.

9.4. Funding Opportunities

As discussed in the 2016 *Preliminary Alternatives Report*, Midpen has allocated approximately $14 million from the recent voter-approved funding measure for the wildlife and regional trails crossing projects and associated property acquisition. The estimated cost of the project may exceed this amount, depending on the alternatives implemented, and the actual cost for property acquisitions and right of ways, design, environmental review, permitting, and construction based on findings during the process and future economic conditions. There will be significant ongoing costs for monitoring, management, and maintenance of the structures themselves and the additional costs associated with implementing full build out of regional trails connecting the recreational trail crossing.

Midpen is seeking, and will continue to seek, community support, financial backing, and partnership participation on the projects, including potential grant funding and permitting streamlining. If Midpen investment in the projects can be supplemented with other significant participation, many other projects and priorities in the Open Space Vision Plan could benefit.

Appendix E describes various sources of funding available to plan and construct bicycle and pedestrian facilities. It includes sections covering federal, state, regional, and local sources of funding, as well as some non-traditional funding sources that have been used by local agencies to fund bicycle or alternate transportation projects.