



# Bridalveil Fall Rehabilitation

## Environmental Assessment





# BRIDALVEIL FALL REHABILITATION ENVIRONMENTAL ASSESSMENT

## TABLE OF CONTENTS

<b>CHAPTER 1: PURPOSE AND NEED .....</b>	<b>1-1</b>
INTRODUCTION .....	1-1
PURPOSE AND NEED FOR THE PROJECT .....	1-1
Purpose .....	1-1
Need .....	1-3
PUBLIC INVOLVEMENT .....	1-3
ISSUES AND CONCERNS ADDRESSED IN THIS DOCUMENT .....	1-3
ISSUES AND CONCERNS BEYOND THE SCOPE OF THIS PROJECT .....	1-5
RELATIONSHIP OF THE PROJECT TO THE MERCED RIVER PLAN .....	1-5
River Segment Classification .....	1-5
Free-flowing Condition and River Resources .....	1-6
River Values .....	1-6
<b>CHAPTER 2: ALTERNATIVES .....</b>	<b>2-1</b>
ALTERNATIVE 1 – THE NO ACTION ALTERNATIVE .....	2-1
Parking Lot and Entrance .....	2-1
Comfort Station .....	2-1
Bridalveil Straight .....	2-1
Trails, Bridges, and Viewing Areas .....	2-2
Accessibility, Interpretation, and Wayfinding .....	2-2
ACTIONS COMMON TO ALTERNATIVES 2 AND 3 .....	2-2
Parking Lot and Parking Entrance .....	2-2
Comfort Station .....	2-5
Bridalveil Straight .....	2-5
Trails, Bridges, and Viewing Areas .....	2-6
Accessibility, Interpretation, and Wayfinding .....	2-7
MITIGATION MEASURES COMMON TO ALL ACTION ALTERNATIVES .....	2-19
ALTERNATIVE 2 – BRIDALVEIL CREEK PEDESTRIAN BRIDGE .....	2-19
Parking Lot and Entrance .....	2-19
Comfort Station .....	2-19
Bridalveil Straight .....	2-19
Trails, Bridges, and Viewing Areas .....	2-20
ALTERNATIVE 3 – EXPANDED VIEWING PLATFORM (PREFERRED ALTERNATIVE) .....	2-20
Parking Lot and Entrance .....	2-20
Comfort Station .....	2-20
Bridalveil Straight .....	2-20
Trails, Bridges, and Viewing Areas .....	2-20
ALTERNATIVES CONSIDERED BUT DISMISSED .....	2-21
SUMMARY OF THE ALTERNATIVES .....	2-22
SUMMARY OF ENVIRONMENTAL CONSEQUENCES .....	2-25
<b>CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES .....</b>	<b>3-1</b>
BACKGROUND .....	3-1
Resource Topics Considered .....	3-1
Resource Topics Dismissed from Further Analysis .....	3-1

GENERAL METHODOLOGY FOR ESTABLISHING IMPACTS.....	3-3
CUMULATIVE IMPACTS .....	3-3
HYDROLOGY, FLOODPLAINS, AND WATER QUALITY .....	3-4
Affected Environment.....	3-4
Environmental Consequences – Methodology.....	3-6
Environmental Consequences of Alternative 1 – No Action Alternative .....	3-7
Environmental Consequences of Alternative 2 .....	3-7
Environmental Consequences of Alternative 3 .....	3-8
WILDLIFE .....	3-9
Affected Environment.....	3-9
Environmental Consequences – Methodology.....	3-11
Environmental Consequences of Alternative 1 – No Action Alternative .....	3-11
Environmental Consequences of Alternative 2 .....	3-12
Environmental Consequences of Alternative 3 .....	3-13
VEGETATION .....	3-14
Affected Environment.....	3-14
Environmental Consequences – Methodology.....	3-16
Environmental Consequences of Alternative 1 – No Action Alternative .....	3-17
Environmental Consequences of Alternative 2 .....	3-17
Environmental Consequences of Alternative 3 .....	3-18
WETLANDS .....	3-19
Affected Environment.....	3-19
Environmental Consequences – Methodology.....	3-21
Environmental Consequences of Alternative 1 – No Action Alternative .....	3-21
Environmental Consequences of Alternative 2 .....	3-21
Environmental Consequences of Alternative 3 .....	3-22
SCENIC RESOURCES .....	3-23
Affected Environment.....	3-23
Environmental Consequences – Methodology.....	3-24
Environmental Consequences of Alternative 1 – No Action Alternative .....	3-25
Environmental Consequences of Alternative 2 .....	3-25
Environmental Consequences of Alternative 3 .....	3-26
SOILS AND GEOLOGY.....	3-27
Affected Environment.....	3-27
Environmental Consequences – Methodology.....	3-28
Environmental Consequences of Alternative 1 – No Action Alternative .....	3-28
Environmental Consequences of Alternative 2 .....	3-28
Environmental Consequences of Alternative 3 .....	3-29
VISITOR EXPERIENCE AND RECREATION.....	3-30
Affected Environment.....	3-30
Environmental Consequences – Methodology.....	3-32
Environmental Consequences of Alternative 1 – No Action Alternative .....	3-32
Environmental Consequences of Alternative 2 .....	3-33
Environmental Consequences of Alternative 3 .....	3-34
PARK OPERATIONS AND FACILITIES .....	3-35
Affected Environment.....	3-35
Environmental Consequences – Methodology.....	3-35
Environmental Consequences of Alternative 1 – No Action Alternative .....	3-35
Environmental Consequences of Alternative 2 .....	3-36
Environmental Consequences of Alternative 3 .....	3-37



CULTURAL RESOURCES .....	3-37
Built Environment (Historic Structures and Landscapes) .....	3-37
Archeological Resources .....	3-44
Ethnographic Resources.....	3-45
<b>CHAPTER 4: CONSULTATION AND COORDINATION.....</b>	<b>4-1</b>
INTERNAL AND PUBLIC SCOPING .....	4-1
NHPA SECTION 106 CONSULTATION .....	4-1
AGENCY CONSULTATION.....	4-1
Consultation with Federal Agencies .....	4-1
Consultation with State Agencies .....	4-2
<b>CHAPTER 5: GLOSSARY AND ACRONYMS .....</b>	<b>5-1</b>
GLOSSARY OF TERMS.....	5-1
ACRONYMS .....	5-3
<b>CHAPTER 6: REFERENCES .....</b>	<b>6-1</b>

### List of Figures

Figure 1-1	Regional Location Map.....	1-2
Figure 2-1	Existing Conditions – Alternative 1 (No Action).....	2-3
Figure 2-2	Alternative 2.....	2-9
Figure 2-3	Alternative 3.....	2-10
Figure 2-4	Bridalveil Straight Alternative 2.....	2-11
Figure 2-5	Bridalveil Straight Alternative 3.....	2-12
Figure 2-6	Parking Lot and Trail Entrance Alternative 2 .....	2-13
Figure 2-7	Parking Lot and Trail Entrance Alternative 3 .....	2-14
Figure 2-8	Overlooks Alternative 2 .....	2-15
Figure 2-9	Overlooks Alternative 3 .....	2-16
Figure 2-10	Illustration of Proposed Comfort Stations .....	2-17
Figure 2-11	Elevated Pathway .....	2-18
Figure 3-1	Hydrogeomorphic Units within the Project Area .....	3-5
Figure 3-2	Vegetation within the Project Area .....	3-15
Figure 3-3	Wetlands within the Project Area .....	3-20
Figure 3-4	Bridalveil Fall Rehabilitation Project Area of Potential Effects.....	3-38

### List of Tables

Table 1-1	Public Issues, Comments, and Concerns .....	1-3
Table 2-1	Alternatives Considered but Dismissed .....	2-21
Table 2-2	Summary of Actions Common to Alternatives 2 and 3 .....	2-22
Table 2-3	Summary of Actions that vary Among the Action Alternatives.....	2-24
Table 2-4	Summary Comparison of Impacts for the No Action and Action Alternatives.....	2-25

### Appendices

Appendix A. Draft Wild and Scenic Rivers Act Section 7 Determination
Appendix B. Mitigation Measures
Appendix C. Cumulative Actions
Appendix D. Draft Floodplain Statement of Findings
Appendix E. Special Status Wildlife Species Potentially Occurring in Yosemite Valley
Appendix F. Draft National Historic Preservation Act Section 106 Assessment of Effects

This page intentionally left blank.



# CHAPTER 1: PURPOSE AND NEED

## INTRODUCTION

The National Park Service (NPS) proposes to improve visitor facilities and services at Bridalveil Fall in Yosemite Valley, California. This environmental assessment (EA) identifies and evaluates three alternatives for the rehabilitation of the Bridalveil Fall area (Figure 1-1). This document is intended to meet the environmental analysis and public review requirements of section 102(2) (C) of the National Environmental Policy Act (NEPA). The park coordinated the requirements of Section 106 of the National Historic Preservation Act (NHPA) with the NEPA process. The project tiers off the *Merced Wild and Scenic River Comprehensive Management Plan Environmental Impact Statement and Record of Decision (Merced River Plan)* (NPS 2014).



BRIDALVEIL FALL

## PURPOSE AND NEED FOR THE PROJECT

### Purpose

Plunging 617 feet, Bridalveil Fall is the first grand waterfall that most visitors encounter upon entering Yosemite Valley. Visitors can park and walk a short distance to reach the base of the iconic waterfall. The purpose of the Bridalveil Fall Rehabilitation Project is to rehabilitate visitor facilities at the base of Bridalveil Fall and surrounding area.

The project would:

- Improve visitor services at Bridalveil Fall, including restroom facilities (*Merced River Plan* pg. 8-74).
- Protect natural and cultural resources in the area.
- Reduce crowding on the trails and the viewing platform (*Merced River Plan* pg. 8-74).
- Improve safety and congestion in and around the parking lot and along Southside Drive.
- Improve interpretation and wayfinding.
- Improve accessibility for visitors (*Merced River Plan* pg. 8-74).
- Correct long-standing maintenance issues and address deferred maintenance.
- Remove selected trees to open scenic views of the fall (*Merced River Plan* pg. 8-73 and Appendix H).



Figure 1-1. Regional Location Map



## Need

Bridalveil Fall typically flows throughout the year, promoting year-round visitation and high volumes of visitor use during spring and summer flows. Visitors to the Bridalveil Fall area encounter low-functioning vault toilets with long lines, congestion in and around the parking lot, busy trails, a crowded viewing platform, a lack of accessible path of travel to a viewing platform, and unclear wayfinding. The project considers a range of options to address these issues including replacement of the four inadequate vault toilets at the parking area with flush toilets and creating an accessible loop trail to reduce crowding.

## PUBLIC INVOLVEMENT

Yosemite National Park conducted a 30-day public scoping period for the Bridalveil Fall Rehabilitation Project from April 26, 2017 through May 26, 2017. The NPS provided information to the public in the form of an electronic newsletter; press release; NPS Planning, Environment, and Public Comment (PEPC) website; media interviews; and a public open house. During the public scoping period, the park received 22 correspondences, generating 77 individual substantive comments. All comments, substantive or non-substantive, received during the scoping period were duly considered and are now part of the decision file for this project. A comment is considered substantive if it raises specific issues or concerns regarding the project or the study process, but not if it merely expresses support for or opposition to the project or a particular alternative.

## ISSUES AND CONCERNS ADDRESSED IN THIS DOCUMENT

Table 1-1 lists the issues and concerns identified during the public scoping process.

**Table 1-1. Public Issues, Comments, and Concerns**

Topic	Comment or Concern
Visitor Facilities	Most commenters requested that the NPS update and improve the existing restrooms, while one group considered whether restrooms are necessary at the site.
	The NPS should expand the trail system around the exterior of the parking lot to separate vehicle and pedestrian traffic.
	The NPS should ensure that trails are accessible to all.
	The NPS should add interpretive signage to the area.
	The NPS should minimize interpretive and wayfinding signage and consider electronic alternatives.
	The NPS should include more roadway signage to help direct traffic and alleviate congestion.
	The NPS should include more signage to improve pedestrian wayfinding.
	The NPS should provide upgraded trash receptacles.
Park Management	The NPS should improve roadway safety and address traffic congestion in the area.
	The NPS should make safety improvements to trails in the area.

**Table 1-1. Public Issues, Comments, and Concerns**

Topic	Comment or Concern
Natural Resources	The NPS should protect natural resources in the park.
	The NPS should reduce wildlife vehicular deaths.
Cultural Resources	The NPS should consult with tribes and agency interests regarding historic properties and monitor impacts to cultural resources.
	The NPS should protect views from and toward historic structures, sites, and areas.
	The NPS should provide a place of quiet reflection to honor the cultural significance of the area.
Scenic Resources	The NPS should protect the natural beauty of the area.
	The NPS should clear vistas to improve views.
Air Quality	The NPS should promote the shuttle system to reduce carbon dioxide emissions.
Visitor Experience	The NPS should improve interpretive displays.
	The NPS should address congestion and crowding on the viewing platform and trails.
Transportation	The NPS should enhance the shuttle system.
	The NPS should reduce vehicle congestion and traffic.
	The NPS should limit parking.
	The NPS should increase parking due to high demand.
	The NPS should improve traffic circulation to reduce congestion.
Other	The NPS should identify the funding source and the total cost for the project.



## ISSUES AND CONCERNS BEYOND THE SCOPE OF THIS PROJECT

The planning team considered the following issue to be beyond the scope of this project:

- Yosemite Valley lacks a bicycle circulation plan that would provide defined pathways to Bridalveil Fall.

The park considers this issue outside the scope and purpose and need for the project because it would require extensive planning, design, and compliance throughout Yosemite Valley outside the geographic extent of the project. Bicycle circulation in Yosemite Valley requires analysis from a Valley-wide perspective. Because the scale required for appropriate bicycle planning far exceeds the scale of the proposed action, this comment has been determined to be beyond the scope of this analysis. In addition, funding for compliance and implementation of a bicycle circulation plan is not available to add to the project at this time.

## RELATIONSHIP OF THE PROJECT TO THE MERCED RIVER PLAN

All of the Bridalveil Fall Rehabilitation project area is within the Merced River Wild and Scenic River corridor with the exception of the viewing platform. The *Merced River Plan* provides specific direction for the Bridalveil Fall Rehabilitation Project as follows:

- Reduce crowding at Bridalveil Fall by redesigning or improving trails, parking areas, and the viewing platform below the fall.
- Extend the viewing area trail to a loop, if possible.
- Improve accessibility and restrooms.
- Expand the Yosemite Valley shuttle service to Bridalveil with a 60-minute interval between buses (summer only).

Land management within the corridor must also be consistent with the *Merced River Plan*, as described below.

### River Segment Classification

The Wild and Scenic Rivers Act directs agencies to classify and administer rivers based on the type and intensity of development existing at the time of their designation. The classification of a river segment provides a general framework for the type and intensity of land management activities that may take place in the future. The Bridalveil Fall project area is in Segment 2B: West Valley, classified as Scenic. Scenic rivers are those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads<sup>1</sup>.

“Scenic” river segments retain their overall natural character but may have structures or a concentration of structures in short reaches of the total area. The *Merced River Plan* describes Segment 2B: West Valley as free of impoundments with exceptional water quality, a largely primitive and undeveloped shoreline, with some picnic areas, parking lots, and restrooms (*Merced River Plan* pg. 3-4 and Table 3-1).

---

<sup>1</sup> 47 Fed. Reg. 39457-58.

## Free-flowing Condition and River Resources

Section 7 of the Wild and Scenic Rivers Act requires managing agencies to apply a rigorous and consistent process to protect the free-flowing condition and the river resources within the bed and banks of a designated river. Projects carried out on tributaries to the Merced River, such as Bridalveil Creek, must not have the potential to affect the free-flow of the river, or affect scenic, recreational, fish, or wildlife values. The NPS evaluated actions on Bridalveil Creek to ensure they do not invade the area or unreasonable diminish these values using the process described in the *Merced River Plan* (see Appendix A for Wild and Scenic Rivers Act Section 7 Determination).

## River Values

The NPS must manage the Merced River corridor to protect and enhance the values that led to its inclusion in the Wild and Scenic Rivers System. River values, as defined in the *Merced River Plan*, are the river's (1) free-flowing condition, (2) water quality, and (3) outstandingly remarkable values (ORVs). The *Merced River Plan* identifies the ORVs in the Bridalveil Fall project area (Segment 2B: West Valley pgs. 5-3 to 5-4, Table 5-1) as:

**Biological.** The meadows and riparian communities of Yosemite Valley comprise one of the largest mid-elevation meadow-riparian complexes in the Sierra Nevada.

**Geological/Hydrological.** The Merced River from Happy Isles to the west end of Yosemite Valley provides an outstanding example of a rare, mid-elevation alluvial river.

**Cultural.** Yosemite Valley American Indian ethnographic resources include a linked landscape of traditional-use plant populations as well as the ongoing traditional cultural practices that reflect the intricate continuing relationship between indigenous peoples of the Yosemite region and the Merced River in Yosemite Valley.

The Yosemite Valley Archeological District is an unusually rich and linked landscape that contains dense concentrations of resources that represent thousands of years of human settlement.

The Yosemite Valley Historic District represents a linked landscape of river-related or river-dependent, rare, unique or exemplary contributing resources that bear witness to the historical significance of the river system.

**Scenic.** Visitors to Yosemite Valley experience views of some of the world's most iconic scenery, with the river and meadows forming a placid foreground to towering cliffs and waterfalls.

**Recreational.** Visitors to Yosemite Valley enjoy a wide variety of river-related recreational activities in the Valley's extraordinary setting along the Merced River.

The *Merced River Plan* describes the process for protecting and enhancing each ORV. Each ORV has specific indicators, standards, and trigger points. The *Merced River Plan* identifies two ORVs in the Bridalveil Fall project area with management concerns that require action:

- Scenic ORV – For scenic segments like Segment 2B: West Valley, actions must retain the existing character of the landscape and changes in the landscape should be minimal. Management activities may be noticeable, but they should not attract attention. Any changes must repeat or maintain basic elements of form, line, color, and texture found in predominant natural features and characteristics of the broader landscape (*Merced River Plan* pg. 5-113).
- Recreational ORV –The *Merced River Plan* specifies that the acceptable visitor density at the platform is 20 square feet per person (*Merced River Plan* pg. 5-134, Table 5-47). The *Merced River Plan* commits to redesigning access and parking at Bridalveil Fall to improve visitor access and provide less crowded conditions (*Merced River Plan* pgs. 5-138-139).

## **CHAPTER 2: ALTERNATIVES**

This chapter describes the three alternatives associated with the Bridalveil Fall Rehabilitation Project. Alternative 1 (No Action) represents a continuation of current management practices and provides a frame of reference for the action alternatives, Alternative 2 and Alternative 3 (Preferred Alternative). This chapter also lists the actions common to Alternatives 2 and 3, describes the actions considered but dismissed from detailed analysis, and identifies the agency's environmentally preferable alternative. This chapter concludes with a summary of the alternatives and a summarized comparison of the environmental consequences of each alternative.

### **ALTERNATIVE 1 – THE NO ACTION ALTERNATIVE**

NEPA regulations require analysis of a “No Action” alternative in all NEPA documents. Under the No Action Alternative, Yosemite National Park would not rehabilitate or repair visitor facilities or services below Bridalveil Fall with the exception of emergency repairs and routine and periodic maintenance activities. There would be no improvements to visitor experience, scenic vistas, visitor safety, or congestion; the park would not meet accessibility standards; and the park would not correct long-standing maintenance issues. Maintenance and repair needs would likely increase with continued visitation and aging infrastructure. Figure 2-1 depicts the existing conditions at Bridalveil Fall.

#### **Parking Lot and Entrance**

The existing parking lot for Bridalveil Fall is accessible from Wawona Road by a single combined entrance/exit road. The park would reconfigure the existing parking lot footprint to add 20-24 parking spaces for a total of about 80 spaces (including four accessible spaces). The lot is located outside of the rockfall hazard line. Portions of the parking lot flood during periods of high water flows.

#### **Comfort Station**

The existing comfort station at the southeast side of the parking lot consists of four vault toilets. The vault toilets are located in a heavily shaded area, which leads to inefficient ventilation and ongoing maintenance problems. In addition, the number of toilets is insufficient to accommodate the large number of visitors.

#### **Bridalveil Straight**

Bridalveil Straight is a segment of Southside Drive in Yosemite Valley at the point where drivers first see dramatic views of El Capitan to the north and Bridalveil Fall to the south (Figure 2-1). There is roadside parking available on both sides of the road and two lanes of one-way traffic. The area is congested during peak visitation periods and visitors often walk on the pavement directly adjacent to moving vehicles. Vehicles pulling out of parking spaces must avoid pedestrians as well as other vehicles.

There is no dedicated area for commercial tour bus parking. Buses may park on both sides of Southside Drive. Commercial tour buses parked on the north side of Southside Drive must open their doors into the traffic lane, creating potential safety hazards. There is a park shuttle bus stop on the south side of the road.

### **Trails, Bridges, and Viewing Areas**

The Bridalveil Fall Trail follows the alignment of a carriage road built by the United States (U.S.) Cavalry, which managed Yosemite National Park from 1890–1914. The trail extends from the Bridalveil Fall parking area to Southside Drive, a distance of approximately 0.4 mile. The majority of the trail is paved with asphalt; however, the portion of the trail from Bridge Number 3 to Southside Drive is dirt, lined with stones. This trail includes three bridges that span the braided streams of Bridalveil Creek. In addition, a paved trail leads from the Bridalveil Fall trail to the paved viewing platform (roughly 400 square feet) below Bridalveil Fall.

The section of the trail from Bridalveil Straight to the east bridge (Bridge 3) is unpaved; the rest of the trail is paved (Figure 2-1).

### **Accessibility, Interpretation, and Wayfinding**

Currently, the majority of trails at Bridalveil Fall are not compliant with accessibility standards due to steep grades. The trail from Bridalveil Straight to the viewing platform is not accessible because it is unpaved and has non-compliant steps that lead up to Bridge 3.

### **ACTIONS COMMON TO ALTERNATIVES 2 AND 3**

The following actions are an integral part of all of the action alternatives. Figures 2-2 through 2-9 illustrate the project components for each of the alternatives. Numbers inserted into the text (in parentheses) correspond to the callouts on maps in Figures 2-2 through 2-9. Tables 2-2 and 2-3 summarize project components for each alternative.

### **Parking Lot and Parking Entrance**

Both action alternatives would designate a right-hand turning lane and a left-hand turning lane from Wawona Road into the parking lot (4). The northbound right-hand turning lane would function as a de-acceleration lane for cars coming down the grade on Wawona Road. This de-acceleration lane would also provide space for queueing cars as they enter the lot.

The park would reconfigure the existing parking lot footprint to add 20-24 parking spaces for a total of about 80 spaces (including four accessible spaces) (1). In addition, there would be space added for service vehicle parking near the accessible spaces. The existing footprint of the parking lot would not increase. The lot would be repaved and restriped to improve parking efficiency. The intent of this plan is to retain the current parking capacity in west Yosemite Valley (as prescribed in the *Merced River Plan*). Parking added to the Bridalveil Parking Lot (3) as it is reorganized in the same footprint will be balanced by removing parking along Bridalveil Straight.

The northeast end of the parking lot would be raised a maximum of 18 inches to be above high water levels and damaged culverts and headwalls would be reconstructed (1). A formal trail would be added in the center island for pedestrians to safely move from the north to the south side of the parking lot (5). Additional amenities would include bear boxes, animal-proof trash and recycling receptacles or an additional animal-proof dumpster.





Figure 2-1. Existing Conditions – Alternative 1 (No Action)



This page intentionally left blank.

## **Comfort Station**

Under Alternatives 2 and 3, the existing comfort station with four vault toilets at the parking lot would be replaced with a new 40-foot 8-inch by 25-foot 6-inch building with flush toilets (14 stalls) (12) (Figure 2-10). The new comfort station would be located in the same general area as the current comfort station. New infrastructure for the flush toilets (including new sewer, electrical lines, transformer, well pump, control panel, water tank, and sewer lift station) would be installed (13). Electrical and sewer for the flush toilets would be connected to the main lines at Northside Drive near Pohono Bridge. This would require approximately 1 mile of trenching or directional drilling in Wawona Road/Southside Drive up to Pohono Bridge, where the lines would cross as part of the bridge. A transformer would be added at Pohono Bridge. If trenching were used to install electrical and sewer, the ground disturbance from trenching would be approximately 3 feet wide and 4 feet deep. If directional drilling were used, the ground disturbance would only occur where the borer enters the ground at specific intervals along the route, and the lines would be approximately 3 to 4 feet deep. The sewer borehole would be about 8 inches in diameter. The borehole for power would be smaller. Electrical and sewer lines would be placed within the existing road footprint and bridge deck.

A new gathering, viewing, and orientation plaza would be added near the restrooms. The plaza would include benches and orientation signage and would be hardened with an accessibility acceptable surface (2).

## **Bridalveil Straight**

Both action alternatives would designate a commercial tour bus parking area on the south side of Southside Drive between the intersection of Wawona Road and the east end of Bridalveil Straight (6). This area was formerly ad hoc tour bus and private vehicle parking. Commercial tour buses would be permitted to park only on the south side of Southside Drive. In addition, the crosswalk in the center of Bridalveil Straight would be installed to connect to the Valley Loop Trail (10). Advance warnings and a 20-foot-long no parking zone would be added to the west side of crosswalks.

Road striping on the west end of Southside Drive at Bridalveil Straight would be reconfigured to shift the vehicle travel lanes to the north. A pedestrian path would be delineated on the south road shoulder, on the west end of Bridalveil Straight between the bus parking and the Bridalveil Creek culverts. Pedestrian traffic would be directed to the east.

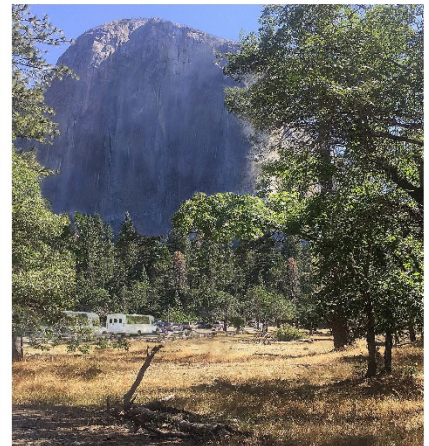
A gathering area with views of Bridalveil Fall and El Capitan, approximately 2,700 square feet in size, would be added on the south side of Southside Drive (8). Less than 10 conifers would be selectively removed to enhance the view of El Capitan. This area would include benches and interpretive/orientation signs and would be hardened with an accessibility acceptable surface. The unpaved portion of the trail between the new gathering area and Bridge 3 would be formalized and would be hardened with an accessibility acceptable surface.



VIEWING AREA BEFORE TREE  
REMOVAL



ALTERNATIVE 2 WITH PARALLEL  
BUS PARKING



ALTERNATIVE 3 WITH ANGLED  
BUS PARKING

### Trails, Bridges, and Viewing Areas

Under both action alternatives, the park would add a new 8-foot to 10-foot-wide accessible loop trail from the parking lot to a viewing platform (14). While the majority of the trail would be at-grade and hardened with an accessibility acceptable surface, portions of the trail would be elevated to cross sensitive areas and large boulders with minimal ground disturbance. The elevated portions of the trail would be accessible and constructed of metal (aluminum or steel) and wood decking (Figure 2-11). This new loop trail would intersect with the trail that leads from the Bridalveil Fall Trail to the existing viewing platform about half way up from its intersection with the Bridalveil Fall Trail. The park would construct an additional platform with views of the fall along the new accessible trail. The segment of the accessible trail leading directly up to the existing platform (14) may be constructed at a later date depending on funding availability. Locations of all new trails were selected with input from Tribal representatives and Park Cultural Resource staff to avoid known archeological sites and areas of religious and cultural significance.

Under both action alternatives, the trail connecting the Bridalveil Fall Trail east of Bridge 3 and the new pedestrian plaza on the south side of Bridalveil Straight would be hardened with an accessibility acceptable surface and made consistent at approximately 12 feet wide (15). The Bridalveil Fall Trail east of Bridge 3 to where it meets the Valley Loop Trail further to the east would be repaired and resurfaced with an accessibility acceptable surface. To meet accessibility standards, the steps that lead up to Bridge 3 along the Bridalveil Fall Trail would be replaced with accessible trail tread that would be hardened with an accessibility acceptable surface. The existing trail from the Bridalveil Fall Trail to the viewing platform would be reconstructed to be a minimum of 8 feet wide with stairs (to code) as needed.

The intersection of the Bridalveil Fall Trail and the trail to the existing viewing platform would be expanded for interpretation, viewing, and gathering (approximately 1,300 square feet) (16). A new viewing area would be added to the northeast side of Bridge 3, adjacent to the Bridalveil Fall Trail (approximately 100 square feet in size) (11). In addition, NPS would improve access to and delineate the viewing area at the southwest side of Bridge 3 (100 square feet). Improvements would be minor – no blasting, rock removal, or heavy grading (7). Trail decking, railings, and site furnishings will be constructed using robust decay-resistant materials, such as Alaska yellow cedar, that do not require toxic preservative treatments.



VIEWING AREA SOUTHWEST OF BRIDGE 3

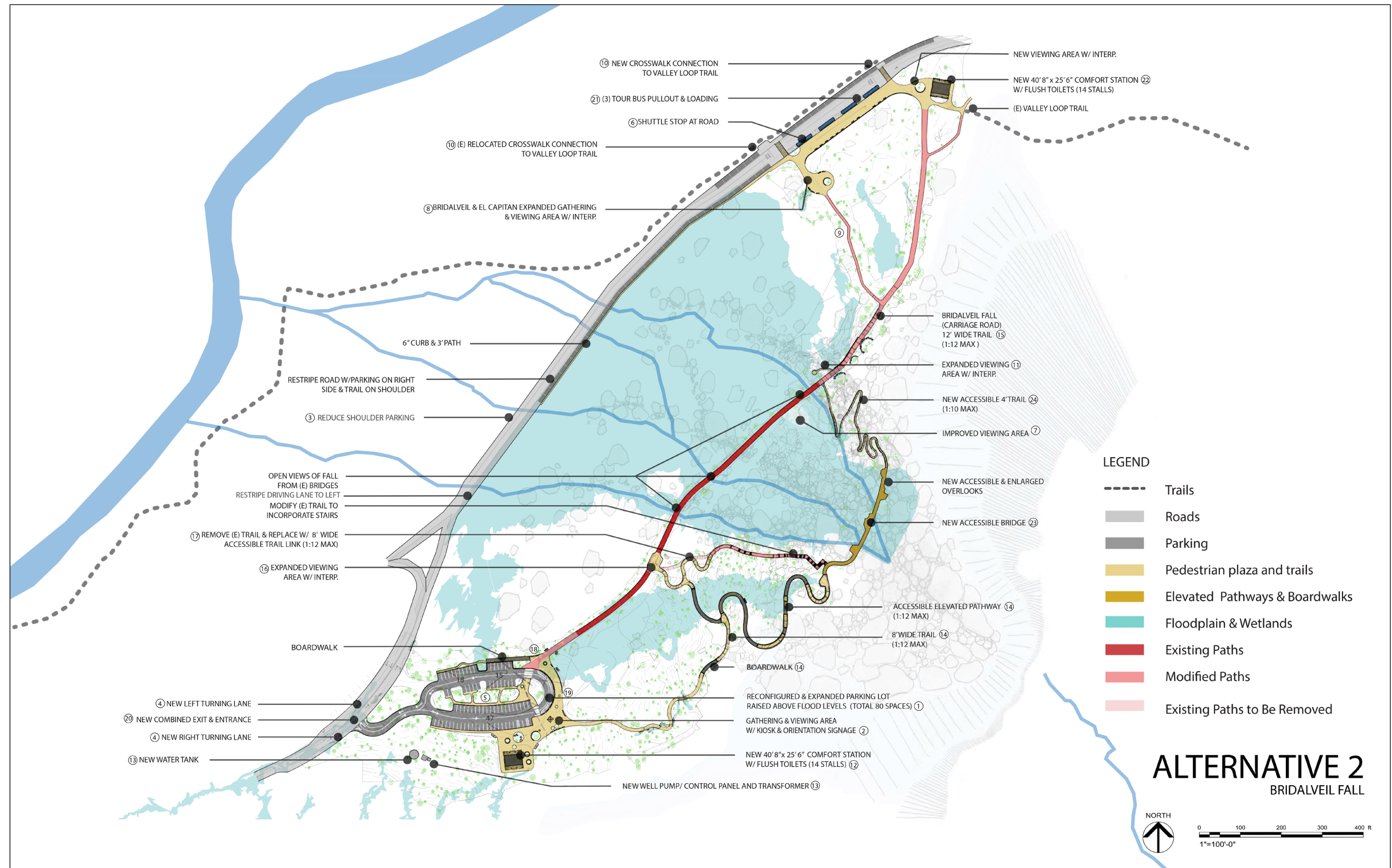
Conifers would be selectively cleared from new and existing viewpoints to enhance views (less than 100 trees). In addition, to improve habitat and sustain the health of mature California black oaks, the park would remove small conifer trees (less than 20 inches diameter at breast height [dbh]) that are growing within the dripline (defined by the outermost circumference of a tree canopy) of selected mature oaks in the project area (less than 40 small trees cut at ground level).

### **Accessibility, Interpretation, and Wayfinding**

Both action alternatives would include a suite of accessibility improvements. All new trails and pathways would be constructed to meet accessibility standards. There would be accessible parking spaces added to the parking lot and Bridalveil Straight, creating a fully accessible path from both parking areas to viewing areas. All new interpretive material and signage would be designed with proper fonts, heights, and contrast for added visibility. The comfort station would be fully accessible.

This page intentionally left blank.

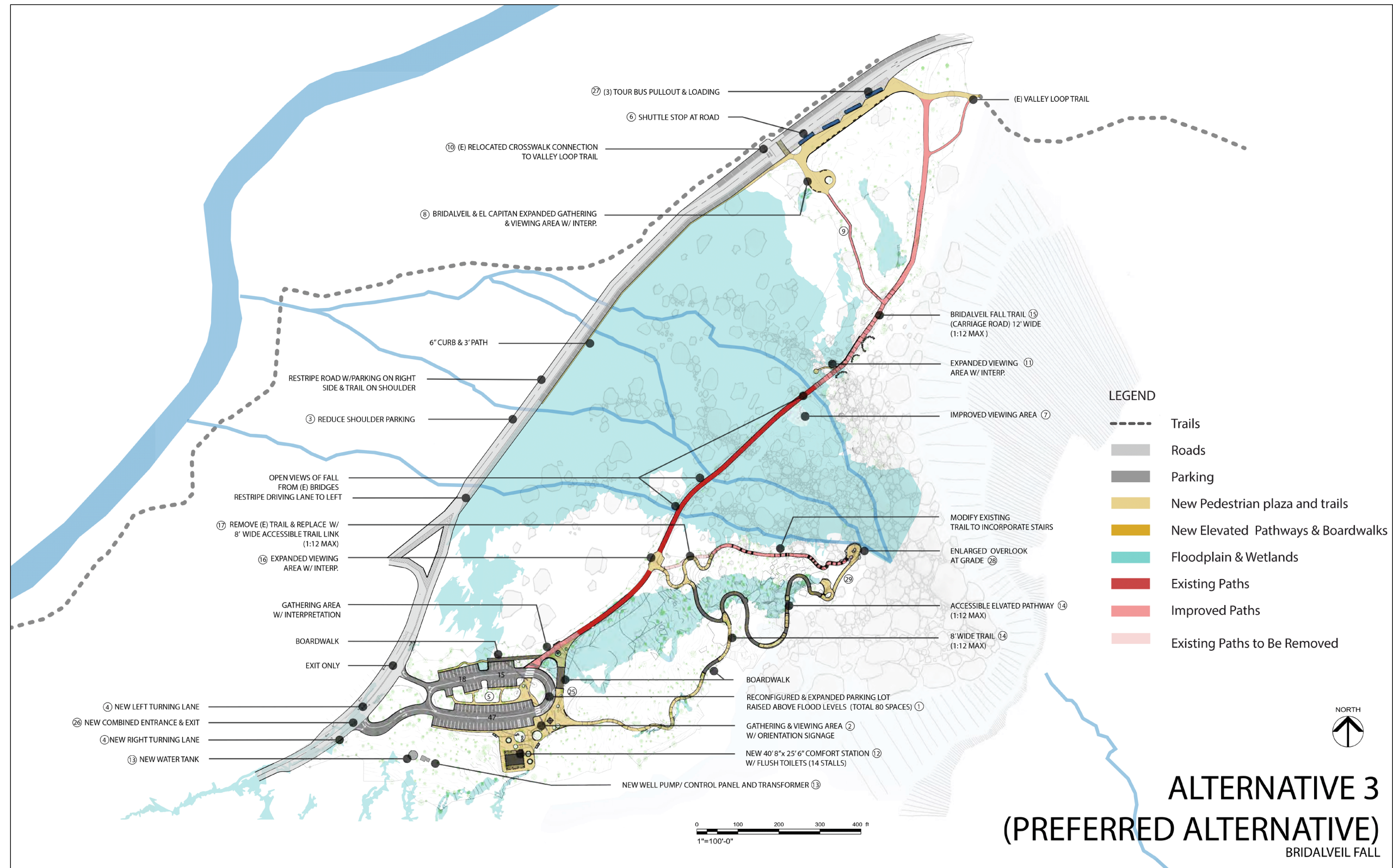




Note: Numbers on map correspond to numbers in Tables 2-2 and 2-3.

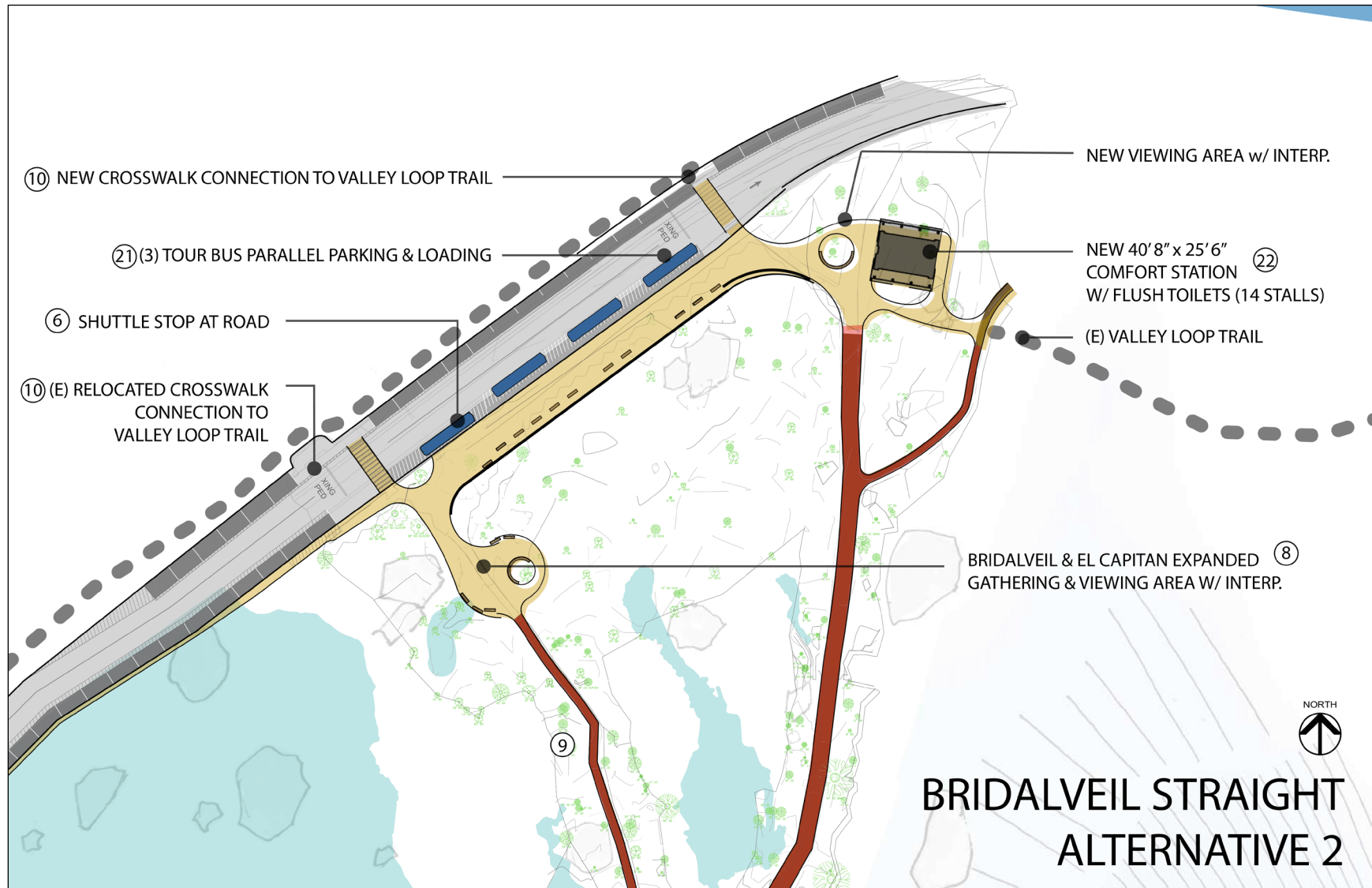
Figure 2-2. Alternative 2





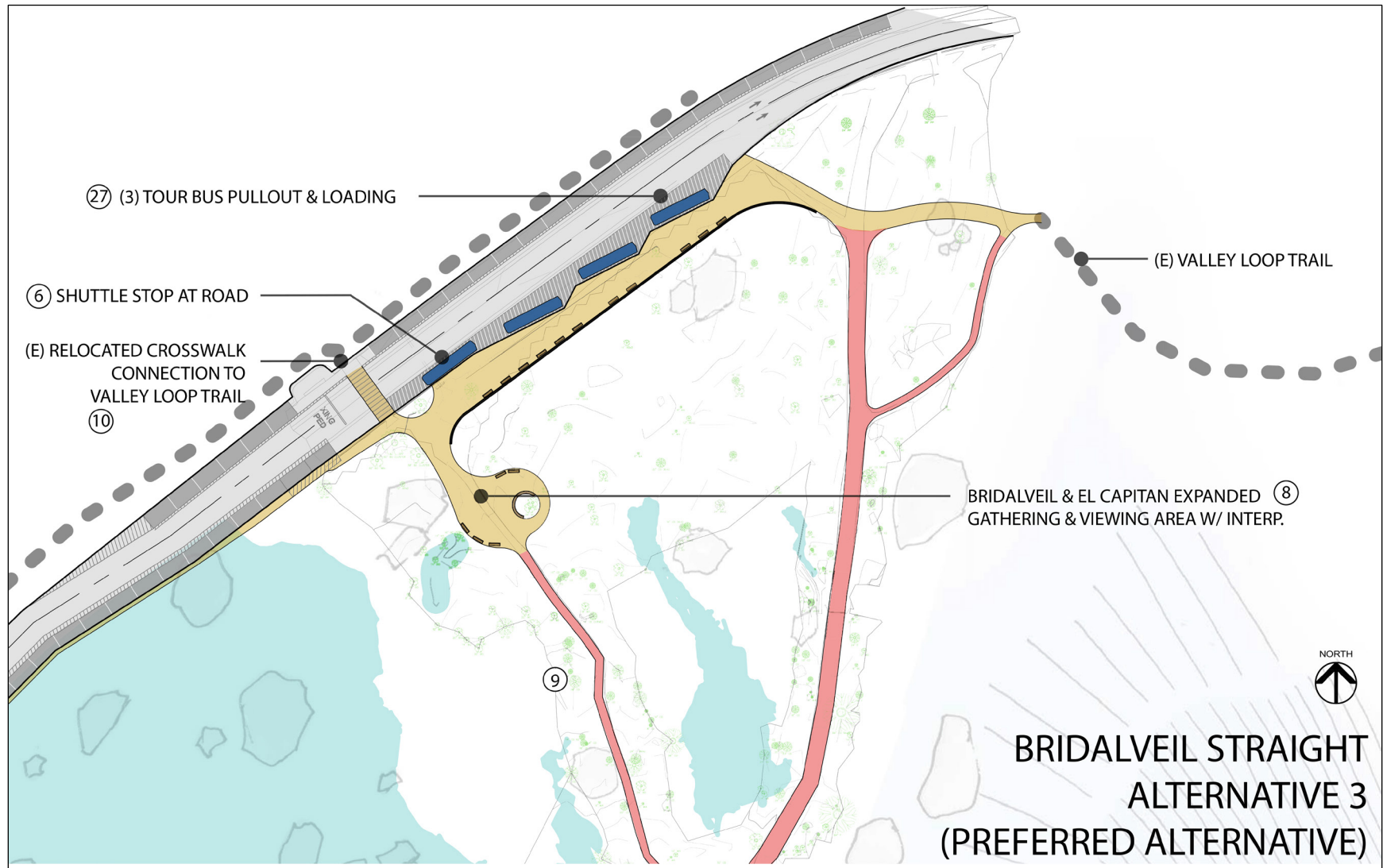
Note: Numbers on map correspond to numbers in Tables 2-2 and 2-3.

Figure 2-3. Alternative 3



Note: Numbers on map correspond to numbers in Tables 2-2 and 2-3.

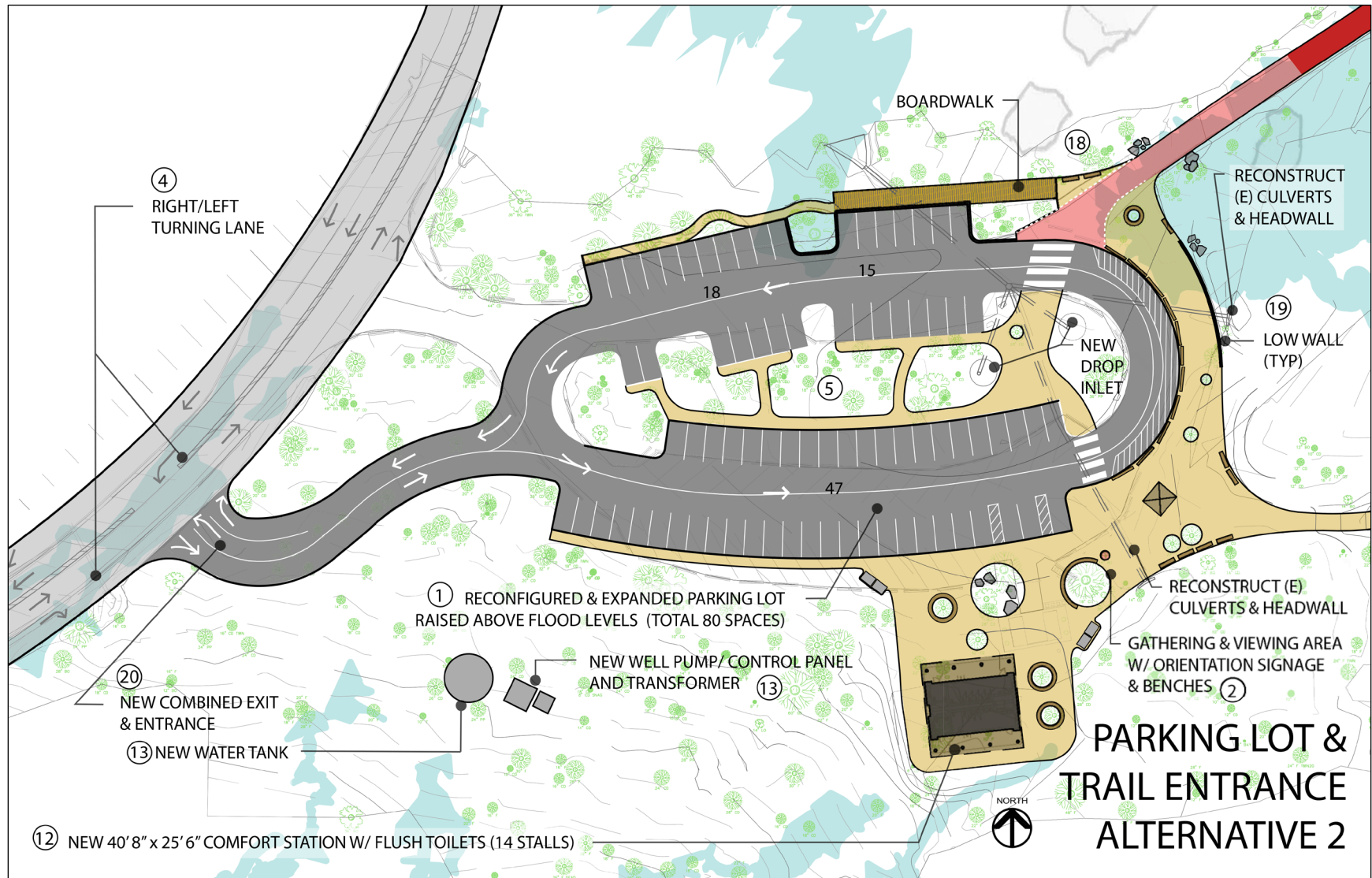
**Figure 2-4. Bridalveil Straight Alternative 2**



Note: Numbers on map correspond to numbers in Tables 2-2 and 2-3.

**Figure 2-5. Bridalveil Straight Alternative 3**



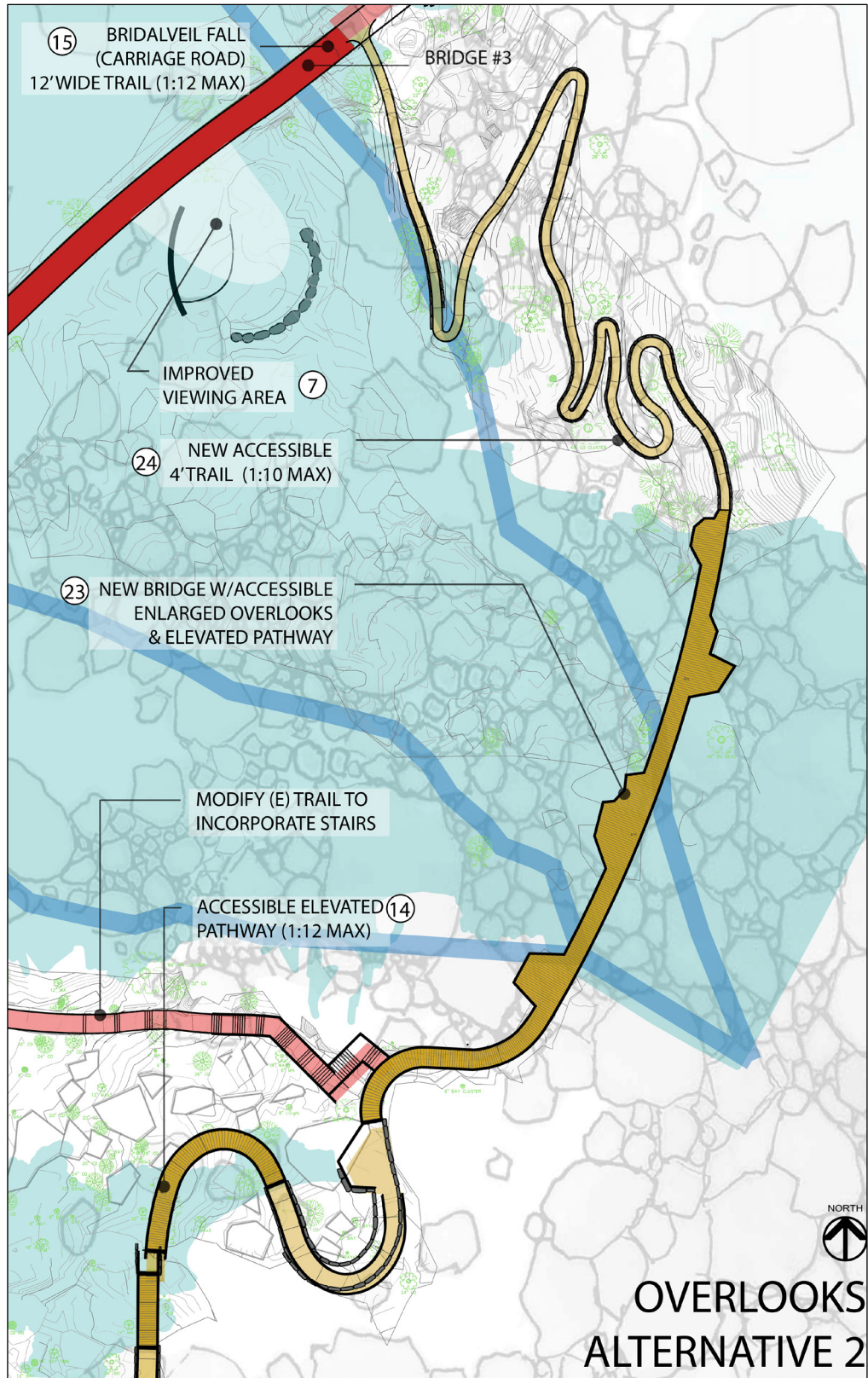


Note: Numbers on map correspond to numbers in Tables 2-2 and 2-3.

**Figure 2-6. Parking Lot and Trail Entrance Alternative 2**



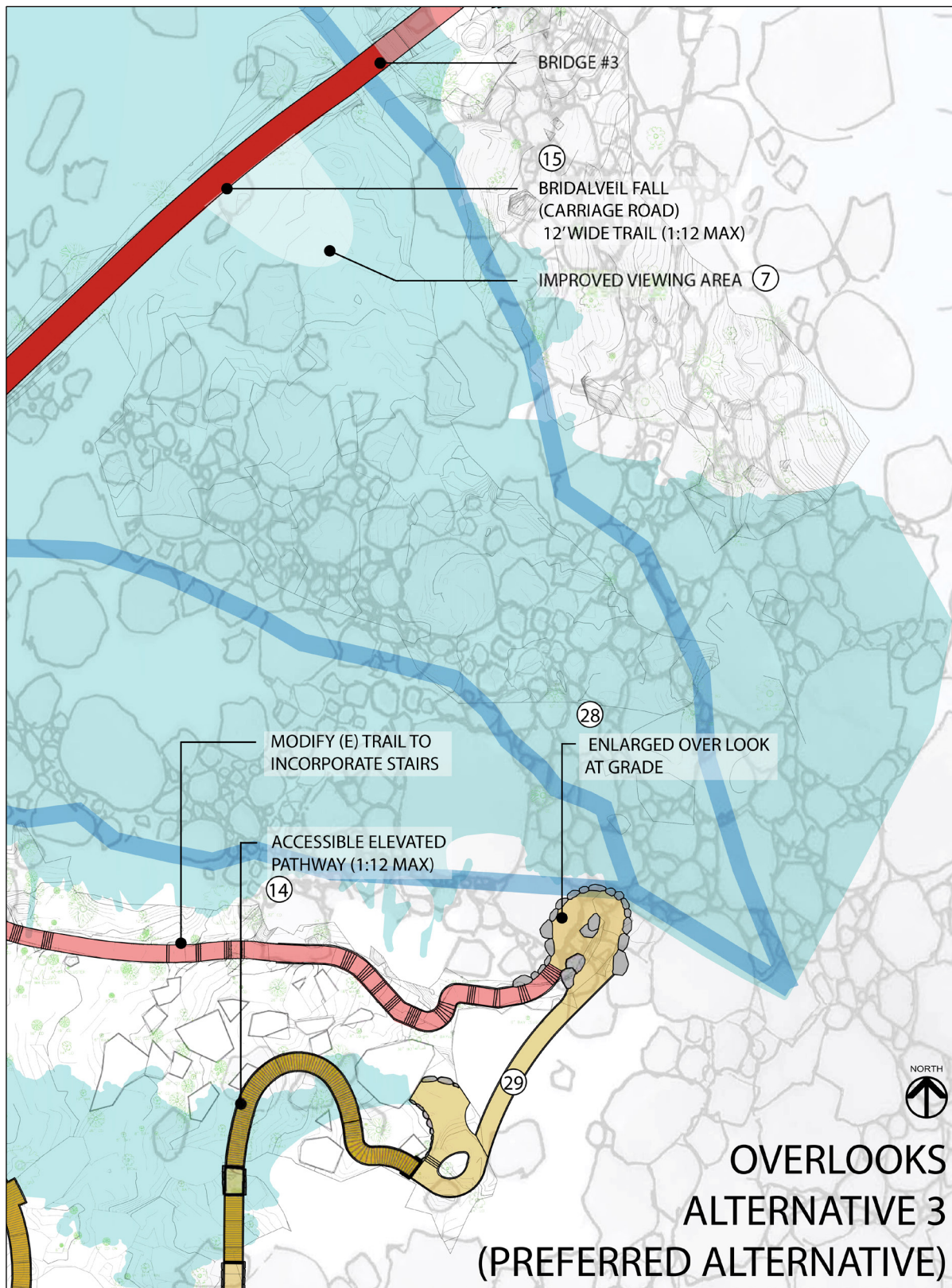




Note: Numbers on map correspond to numbers in Tables 2-2 and 2-3.

**Figure 2-8. Overlooks Alternative 2**





Note: Numbers on map correspond to numbers in Tables 2-2 and 2-3.

**Figure 2-9. Overlooks Alternative 3**

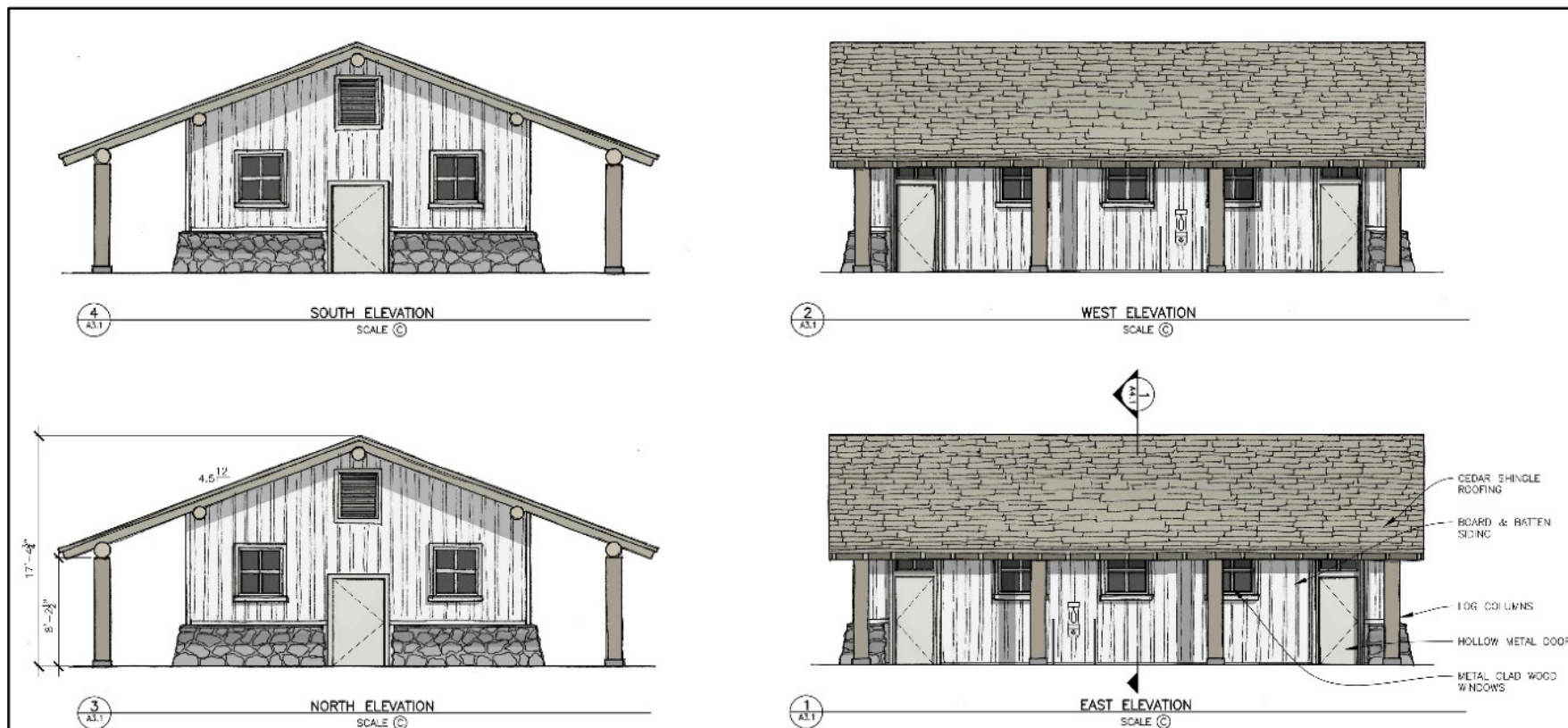
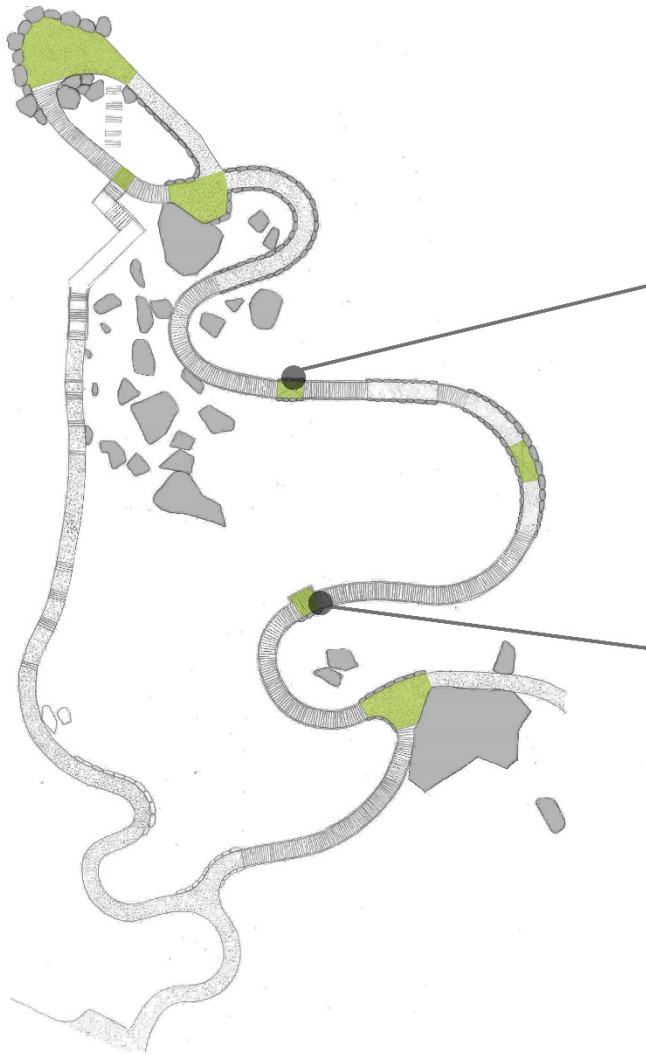


Figure 2-10. Illustration of Proposed Comfort Stations





**Figure 2-11. Elevated Pathway**



## MITIGATION MEASURES COMMON TO ALL ACTION ALTERNATIVES

The NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To protect natural resources and the quality of the visitor experience, the mitigation measures outlined in Appendix B would be implemented as part of each action alternative. The analysis of impacts for each alternative (Chapter 3) considers these mitigation measures as part of each alternative.

## ALTERNATIVE 2 – BRIDALVEIL CREEK PEDESTRIAN BRIDGE

Alternative 2 includes construction of a new bridge across Bridalveil Creek from the existing viewing platform to a new trail on the east side of Bridalveil Creek (23). The alternative also includes construction of a comfort station at Bridalveil Straight (22), in addition to the *Actions Common to Alternatives 2 and 3* listed previously. Figure 2-2 displays the Alternative 2 project components.

### Parking Lot and Entrance

Under Alternative 2, a new combined entrance and exit road to the parking lot would replace the existing entrance/exit road approximately 150 feet south of the existing entrance/exit (20). An island would be added to separate the exit and entrance lanes and there would be separate exit lanes for right-hand and left-hand turns.

The connection between the existing Bridalveil Fall Trail and the parking lot would be widened and raised with fill material to avoid areas that flood during high water periods (18). A different paving material would be used to delineate the historic alignment of the Bridalveil Fall Trail to the parking lot. The trailhead would be connected to the new gathering and viewing area at the parking lot with a sidewalk (19). The north end of the parking lot would also have a sidewalk and boardwalk leading to the existing trailhead.

### Comfort Station

Under Alternative 2, a new 40-foot, 8-inch-long by 25-foot, 6-inch-wide building with flush toilets would be added at Bridalveil Straight (22) in addition to the new flush toilets at the parking lot described under *Actions Common to Alternatives 2 and 3*. There would be 14 stalls in each comfort station. Electrical and sewer lines for the new comfort station at Bridalveil Straight would run southwest along Southside Drive to the intersection with the Wawona Road and join the new lines from the proposed comfort station at the parking lot. These joined lines would connect to Northside Drive at Pohono Bridge. If trenching were used to install electrical and sewer lines, the ground disturbance from trenching would be approximately 3 feet wide and 4 feet deep. If directional drilling were used, the surface ground disturbance would only occur where the borer enters the ground at specific intervals along the route, while subsurface disturbance would occur where the lines are installed. Electrical and sewer lines would be placed within the existing road footprint. Manholes, approximately 8 feet deep and 5 feet wide, would be installed at regular intervals. A new well pump and control panel would be installed at Bridalveil Straight.

### Bridalveil Straight

As described in *Actions Common to Alternatives 2 and 3*, a dedicated parking and loading area would be added on the south side of Southside Drive at Bridalveil Straight. Under Alternative 2, tour bus parking would be in a parallel configuration (see Figure 2-4) (21).

In addition to the gathering and viewing area described at Bridalveil Straight under *Actions Common to Alternatives 2 and 3*, a second gathering and viewing area, approximately 1,700 square feet in size, would be added east of the tour bus pullout and loading area, near the new comfort station (22).

### **Trails, Bridges, and Viewing Areas**

Under Alternative 2, the park would construct a bridge from the existing viewing platform location across Bridalveil Creek to the east side of Bridalveil Creek (23). The bridge would expand in several places with accessible and enlarged overlooks. The entire bridge would serve as a viewing area spanning approximately 3,300 square feet. The west side of the bridge would connect to the existing trail that leads to the viewing platform, which would be widened to 8 feet. The east side of the bridge would connect to a new four-foot-wide trail that leads to the Bridalveil Fall Trail adjacent to Bridge 3 (24).

### **ALTERNATIVE 3 – EXPANDED VIEWING PLATFORM (PREFERRED ALTERNATIVE)**

Alternative 3 would replace and expand the existing platform in its current location and construct an additional viewing platform on the new accessible loop trail, in addition to the *Actions Common to Alternatives 2 and 3* listed previously. Figure 2-3 displays the Alternative 3 project components.

### **Parking Lot and Entrance**

Alternative 3 would create a separate entrance and exit road into the parking lot (26). The new entrance would be constructed southeast of the existing entrance off Wawona Road. The existing entry road would become an exit-only road.

The existing trailhead at the parking lot would be moved a short distance to minimize ponding during high water events. A short boardwalk on the east side of the parking lot would be constructed over the drainage area to connect with the new gathering and viewing area (25). The north end of the parking lot would connect to the existing trailhead with a sidewalk and boardwalk. Stones, or a similar material, would delineate the historic carriage road alignment and visually connect it with the new gathering and viewing area.

### **Comfort Station**

Under Alternative 3, there would be no additional comfort station improvements beyond addition of a new comfort station at the parking lot as described under *Actions Common to Alternatives 2 and 3*.

### **Bridalveil Straight**

As described in *Actions Common to Alternatives 2 and 3*, a dedicated parking and loading area would be added on the south side of Southside Drive at Bridalveil Straight. Under Alternative 3, tour bus parking would be slightly angled to allow buses to pull out without backing into the traffic lane (see Figure 2-5) (27).

### **Trails, Bridges, and Viewing Areas**

Under Alternative 3, the existing viewing platform at the base of Bridalveil Fall would expand from 400 square feet to approximately 1,500 square feet (28). The viewing platform would be replaced and expanded in its current location. The new viewing platform would be constructed of robust materials suitable for the site conditions. The finished elevation of the new viewing platform surface would be between 4 inches and 18 inches above the existing viewing platform. A safety railing would be installed at the edge of the overlook. In addition to the new viewing platform that would be constructed on the new

accessible trail (Actions Common), a smaller platform would be added southwest of the existing platform (29) as funding permits.

The park would not construct a bridge across Bridalveil Creek under Alternative 3.

## ALTERNATIVES CONSIDERED BUT DISMISSED

The NPS considered a range of actions when developing the alternatives for the rehabilitation of Bridalveil Fall. Table 2-1 lists the actions that the planning team analyzed, considered, and dismissed because they did not fully satisfy the objectives of this planning effort.

**Table 2-1. Alternatives Considered but Dismissed**

Action	Reasons for Dismissal
Allow buses to unload passengers at the parking lot and pick up passengers at Bridalveil Straight.	There would be no guarantee that bus parking would be available at Bridalveil Straight for passenger pick-up. Buses waiting for parking could create additional congestion and confusion along Bridalveil Straight.
Add vault toilets at Bridalveil Straight.	Vault toilets require consistent pumping and regular cleaning. Park staff must have specialized training to operate pumping equipment. The park does not have the operational capacity to add another vault toilet considering the intensive maintenance required to maintain vault toilets. This EA considers the addition of flush toilets at Bridalveil Straight, but not vault toilets, under Alternative 2.
Construct a leach field in the historic sewer plant location north of Bridalveil Fall, adjacent to the Merced River near its confluence with Bridalveil Creek. This new leach field could serve the new flush toilet at the parking lot and remove the need to construct lengthy sewer and power lines to connect to the existing system.	<p>This option is inconsistent with the 2014 <i>Merced River Plan</i>, which calls for removal of the remains of the abandoned plant and restoration to natural conditions. The park abandoned and demolished the historic sewer plant in 1975 when the park constructed a new tertiary sewage treatment plant in El Portal.</p> <p>The park must protect and enhance the water quality of the Wild and Scenic Merced River. Construction of a new leach field in this area would likely require the park to amend the <i>Merced River Plan</i>. It is uncertain whether the park could obtain permits under the Clean Water Act to construct a leach field in close proximity to the Merced River.</p> <p>A new leach field would require the park to connect to a power source and construct additional infrastructure.</p>
Construct a new trail and viewing platform from the Bridalveil Fall Trail near Bridge #3 toward the base of Bridalveil Fall.	The trail would be constructed within the bed-and-banks of Bridalveil Creek stream system. It would be subjected to high water velocities and high water depths during peak flows, creating the need for additional repair, maintenance, and debris clearing. The trail would be constructed into a relatively pristine area, with associated impacts to the natural habitat. The existing viewing platform would be visible from the new platform and hikers may hike cross-country from one to the other, creating new social trails in a relatively pristine area.
Remove the ability to make left hand turns out of the parking lot to decrease congestion.	If vehicles want to make a left turn, they would need to travel to Southside Drive and then make the one-way loop across El Capitan Crossover to Northside Drive and then back across Pohono Bridge. This is a considerable distance, it could take considerable time during congested periods of visitation, and the action could promote illegal U-turns on Wawona Road.

**Table 2-1. Alternatives Considered but Dismissed**

Action	Reasons for Dismissal
Move all parking to the right side of Bridalveil Straight and enhance views of El Capitan from the south side of the road. This would encourage visitors to stay on the south side of the road and improve safety in the area.	The vast majority of visitors stop along Bridalveil Straight for the breathtaking views of El Capitan (on the left side of the road). Visitors also stop for a number of other reasons including stretching their legs, checking maps, picnic lunches, river access. Keeping parking on the right side of the road may encourage some users to stay on the right side and not cross the street, but a substantial amount of visitors would be expected to cross the street.
Construct the proposed new loop trail from the parking lot to the viewing platform completely on-grade, without elevated portions of the trail. This design may be more compatible with other trails in the Yosemite Valley Historic District.	There is a 60-foot rise in elevation from the parking lot to the viewing platform. While it is possible to construct an accessible trail completely on grade using causeways to accommodate the rise of the trail, it would require extensive ground disturbance in sensitive areas to construct the causeways. Causeways would also restrict and confine natural wetland water flows in the lot, requiring flows to move through culverts in the causeways.
Significantly improve the Valley Loop Trail near Bridalveil Creek, on the north side of Southside Drive. Improvements to the trail in this area would allow year-round use rather than seasonal use during low-flow periods.	Improving the Valley Loop Trail near Bridalveil Creek has been a long-term goal of the park. Improvements would require the construction of several new bridges and extensive design with hydraulic modeling. The park intends to address this need as a separate project when additional funding and resources are available.
Require reservations for bus parking at Bridalveil Straight to help manage bus parking.	Both action alternatives accommodate parking for 3 tour buses and one shuttle bus at Bridalveil Straight. The park expects to enact tour bus reservations in other park locations in the future (see Cumulative Actions Appendix C). If needed, the park could expand bus reservations to the Bridalveil area at a later date, after the park implements the Bridalveil Fall project and evaluates the effectiveness of designated bus parking at Bridalveil Straight.

## SUMMARY OF THE ALTERNATIVES

Tables 2-2 and 2-3 summarize the project components for Alternative 2 and Alternative 3.

**Table 2-2. Summary of Actions Common to Alternatives 2 and 3**

(Numbers in the table correspond to numbers on Figures 2-2 through 2-9)

Project Components	All Action Alternatives
Parking Lot	<ul style="list-style-type: none"> <li>The park would reconfigure the existing parking lot footprint to add 20-24 parking spaces for a total of about 80 spaces (including four accessible spaces). (1)</li> <li>Regrade/raise the northeast east end of the parking lot to reduce flooding. (1)</li> <li>Construct a plaza/gathering area with wayfinding and interpretation at the southeast corner of the parking lot. (2)</li> <li>Add right-hand and left-hand turn lanes from Wawona Road into the parking lot. (4)</li> <li>Add a formal trail from the north side to the south side of the parking lot through the island. (5)</li> <li>Add bear boxes and additional animal-proof trash and recycling receptacles or dumpsters.</li> </ul>

**Table 2-2. Summary of Actions Common to Alternatives 2 and 3**

(Numbers in the table correspond to numbers on Figures 2-2 through 2-9)

Project Components	All Action Alternatives
Vault Toilets at the Parking Lot	<ul style="list-style-type: none"> <li>• Replace the existing four vault toilets at the parking lot with a new comfort station with flush toilets (14 fixtures). (12)</li> <li>• Install necessary infrastructure for the flush toilets (new sewer, electrical lines, transformer, well pump, control panel, water tank, and sewer lift station). (13)</li> <li>• Connect sewer and electrical lines to the main lines in Northside Drive. This will require approximately 1 mile of trenching or directional drilling in Wawona Road/Southside Drive up to Pohono Bridge, where the line will cross as part of the bridge (within the bridge deck).</li> </ul>
Southside Drive at Bridalveil Straight	<ul style="list-style-type: none"> <li>• Designate parking for one shuttle bus on the south side of Bridalveil Straight. (6)</li> <li>• Remove private vehicle parking, if necessary, to balance additional parking spaces proposed at the Bridalveil Fall Parking Lot. (3)</li> <li>• Construct a gathering and viewing area on the south side of Southside Drive. Selectively remove about 10 conifers to enhance views of El Capitan. Install benches and interpretive/wayfinding information. (8)</li> <li>• Formalize a trail from the gathering/viewing area to the Bridalveil Fall Trail with an accessibility acceptable hardened surface. (9)</li> <li>• Install one crosswalk in the center of Bridalveil Straight. (10)</li> </ul>
Trails and Viewing Areas	<ul style="list-style-type: none"> <li>• Add a new accessible loop trail from the parking lot to a viewing platform. The majority of the trail would be 8 to 10 feet wide, at-grade, and hardened with an accessibility acceptable surface. Portions of the trail would be elevated to reduce impacts to sensitive areas. (14)</li> <li>• Repair the Bridalveil Fall Trail from the third bridge to the east, where it meets the Valley Loop Trail with an accessibility acceptable hardened surface. (15)</li> <li>• Expand the intersection of the Bridalveil Fall Trail and trail to the existing viewing platform for interpretation and gathering. (16)</li> <li>• Rework the existing trail from the Bridalveil Fall Trail to the viewing platform. The trail will be a minimum of 8-feet wide with stairs as needed. Rework the stairs to meet code. (17)</li> <li>• Improve the viewing area to the northeast side of Bridge 3, adjacent to the Bridalveil Fall Trail (approximately 100 square feet in size) (11).</li> <li>• Improve and delineate the access to the viewing area at the southwest side of Bridge 3 (760 square feet). Improvements would be minor – no blasting, rock removal, or heavy grading. (7)</li> <li>• Add wayfinding and interpretive signage throughout the project area.</li> <li>• Remove small conifer trees (&lt;20 inches dbh) from within the dripline of selected mature California black oaks to improve oak habitat (&lt;40 small trees).</li> </ul>
Accessibility	<ul style="list-style-type: none"> <li>• Ensure that all new trails and pathways are accessible.</li> </ul>

**Table 2-3. Summary of Actions that vary Among the Action Alternatives**

(Numbers in the table correspond to numbers on the Alternative Figures 2-2 through 2-9)

<b>Project Components</b>	<b>Alternative 2 Bridalveil Creek Pedestrian Bridge</b>	<b>Alternative 3 Expanded Viewing Platform/Loop Trail</b>
Parking Lot	<ul style="list-style-type: none"> <li>Widen the connection between the trailhead and parking lot. Bring in fill and install a culvert to direct water under the walkway. (18)</li> <li>Connect the trailhead to the visitor plaza with a sidewalk. (19)</li> </ul>	<ul style="list-style-type: none"> <li>Move the trailhead a short distance from the parking lot (to avoid high water) and build short boardwalks to connect the trailhead with plaza to the south and parking lot to the east. (25)</li> <li>Delineate the historical alignment of the Carriage Road (Bridalveil Fall Trail) as it continues to the parking lot with stones or other materials to retain a visual connection to the historic landscape.</li> </ul>
Parking Lot Entrance	<ul style="list-style-type: none"> <li>Construct a new combined entrance and exit to the parking lot that is farther south and has separate exit lanes for right-hand and left-hand turns. (20)</li> </ul>	<ul style="list-style-type: none"> <li>Construct an additional entrance into the parking lot so that there is a single entry and single exit. (26)</li> </ul>
Southside Drive at Bridalveil Straight	<ul style="list-style-type: none"> <li>Parallel park three tour buses along the south side of road. (21)</li> <li>Add a second flush toilet and small interpretive plaza to the east end of Bridalveil Straight. (22)</li> </ul>	<ul style="list-style-type: none"> <li>Install slightly angled parking for three tour buses on the south side of road. (27)</li> </ul>
Trails and Viewing Areas	<ul style="list-style-type: none"> <li>Construct a bridge/viewing platform that runs across Bridalveil Creek from the existing viewing platform to the east side of the creek (approximately 3,300 square feet in total). (23)</li> <li>Construct a 4-foot-wide accessible trail along east side of Bridalveil Creek between the east end of the bridge and the Bridalveil Fall Trail. (24)</li> </ul>	<ul style="list-style-type: none"> <li>Expand the existing viewing platform from 400 square feet to 1,500 square feet. Install safety railing. (28)</li> <li>Create an accessible loop trail with views of the fall.</li> </ul>



## SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The two action alternatives presented in this document represent a reasonable range of options for rehabilitation of Bridalveil Fall. Table 2-4 provides a summary comparison of the potential impacts associated with the No Action Alternative and the two action alternatives, based on the environmental analysis provided in Chapter 3.

**Table 2-4. Summary Comparison of Impacts for the No Action and Action Alternatives**

Alternative 1 No Action Alternative	Alternative 2 Bridalveil Creek Pedestrian Bridge	Alternative 3 Expanded Viewing Platform
<b>Hydrology, Floodplains, and Water Quality</b>		
<ul style="list-style-type: none"> <li>• There would be no new impacts to hydrology, floodplains, and water quality.</li> <li>• The parking lot would continue to flood.</li> <li>• There would be continued erosion and subsequent sediment discharge in proximity of the parking lot.</li> <li>• There would continue to be high levels of human waste in natural areas.</li> </ul>	<ul style="list-style-type: none"> <li>• There would be intensive short-term construction-related effects within the bed and banks of Bridalveil Creek associated with bridge construction. Effects may include discharge of sediment and other pollutants. Standard BMPs would partially mitigate the adverse effects.</li> <li>• The new flush toilet would reduce levels of human waste in natural areas near the parking lot and Southside Drive.</li> <li>• Additional trails and viewing areas would reduce informal trailing in natural areas, with the exception of the east trail between the bridge and the Bridalveil Fall trail.</li> <li>• The raised parking lot and design of the trailhead would reduce flooding in the parking lot.</li> <li>• There may be permanent effects to streamflow dynamics during peak flows associated with the bridge across Bridalveil Creek. Design requires site-specific engineering to minimize interference with runoff or additional flooding.</li> <li>• High water flood events could overtop bridge and result in damage to the bridge.</li> </ul>	<ul style="list-style-type: none"> <li>• The new flush toilet would reduce levels of human waste in natural areas near the parking lot.</li> <li>• The additional loop trail and viewing areas would reduce informal trailing in natural areas.</li> <li>• The raised parking lot and design of the trailhead would reduce flooding in the parking lot.</li> </ul>

**Table 2-4. Summary Comparison of Impacts for the No Action and Action Alternatives**

Alternative 1 No Action Alternative	Alternative 2 Bridalveil Creek Pedestrian Bridge	Alternative 3 Expanded Viewing Platform
<b>Wildlife</b>		
<ul style="list-style-type: none"> <li>There would be no new impacts to wildlife. Informal trailing that fragments wildlife habitat would continue.</li> </ul>	<ul style="list-style-type: none"> <li>During construction, the use of equipment, disturbance of habitat, work within wetland and riparian areas, tree removal activities, and the generation of noise would cause widespread, short-term adverse impacts to wildlife. These impacts would be partially mitigated by implementing standard BMPs and mitigation measures (i.e., pre-construction wildlife surveys, avoidance of nests and roosts, clear delineation of work and staging areas, monitoring when necessary, and restoration of disturbed areas).</li> <li>Additional trails and viewing areas would reduce informal trailing in wildlife habitat. However, the new trail on the east side of the creek may increase informal trailing.</li> </ul>	<ul style="list-style-type: none"> <li>During construction, the use of equipment, disturbance of habitat, work within wetland and riparian areas, tree removal activities, and the generation of noise would cause local, short-term adverse impacts to wildlife. These impacts would be partially mitigated by implementing standard BMPs and mitigation measures (i.e., pre-construction wildlife surveys, avoidance of nests and roosts, clear delineation of work and staging areas, monitoring when necessary, and restoration of disturbed areas).</li> </ul>
<b>Vegetation</b>		
<ul style="list-style-type: none"> <li>There would be no new impacts to vegetation.</li> <li>Informal trailing that denudes vegetation would continue.</li> </ul>	<ul style="list-style-type: none"> <li>Construction activities would result in permanent loss of 1.75 acres of vegetation at the new accessible loop trail from the parking lot and the new east trail along Bridalveil Creek that would traverse between the eastern bridge abutment and the Bridalveil Fall Trail.</li> <li>There would be a direct permanent loss of vegetation for vista clearing (less than 100 trees).</li> <li>Additional trails and viewing areas would reduce informal trailing. However, the new trail on the east side of the creek may increase informal trailing.</li> <li>Conifers cut from within the driplines of California black oaks for habitat improvement would enhance the health of mature oaks.</li> <li>Construction activities could increase the potential for the spread of invasive species.</li> </ul>	<ul style="list-style-type: none"> <li>Construction activities would result in permanent loss of 1.38 acres vegetation at the new accessible loop trail from the parking lot.</li> <li>There would be a direct permanent loss of vegetation for vista clearing (less than 100 trees).</li> <li>The additional loop trail and viewing areas would reduce informal trailing in natural areas.</li> <li>Conifers cut from within the driplines of California black oaks for habitat improvement would enhance the health of mature oaks.</li> <li>Construction activities could increase the potential for the spread of invasive species.</li> </ul>

**Table 2-4. Summary Comparison of Impacts for the No Action and Action Alternatives**

<b>Alternative 1 No Action Alternative</b>	<b>Alternative 2 Bridalveil Creek Pedestrian Bridge</b>	<b>Alternative 3 Expanded Viewing Platform</b>
<b>Wetlands</b>		
<ul style="list-style-type: none"> <li>There would be no new impacts to wetlands. Existing impacts would continue, including erosion and subsequent sediment discharge.</li> <li>Informal trailing that fragments wetland habitat, alters wetland hydrology, and denudes vegetation would continue.</li> </ul>	<ul style="list-style-type: none"> <li>Construction activities may result in a direct loss of wetlands from grade and/or fill activities near piers to support new trails and near bridge abutments.</li> <li>Short-term adverse impacts, including trampling, increased sedimentation, and other temporary impacts to wetlands may occur from construction related activities in the project area. Mitigation measures and BMPs (i.e., fencing of construction areas, trench plugs, stabilization mats, etc.) would minimize these impacts.</li> <li>Additional trails and viewing areas in the vicinity of the accessible trail to the existing viewing platform would reduce informal trailing and impacts to wetlands such as waste disposal.</li> </ul>	<ul style="list-style-type: none"> <li>Construction activities may result in a direct loss of wetlands from grade and/or fill activities near piers to support new trails.</li> <li>Short-term adverse impacts, including trampling, increased sedimentation, and other temporary impacts to wetlands may occur from construction related activities in the project area. Mitigation measures and BMPs (i.e., fencing of construction areas, trench plugs, stabilization mats, etc.) would minimize these impacts.</li> <li>Additional trails and viewing areas in the vicinity of the accessible trail to the existing viewing platform would reduce informal trailing and impacts to wetlands such as waste disposal.</li> </ul>
<b>Scenic Resources</b>		
<ul style="list-style-type: none"> <li>There would be no new impacts to scenic resources.</li> <li>The park would continue to maintain the six scenic views of Bridalveil Fall identified in the <i>Merced River Plan</i>, including two historic views.</li> </ul>	<ul style="list-style-type: none"> <li>There would be short-term impacts on scenic resources including visually intrusive light and heavy construction vehicles, equipment, materials, personnel, and construction staging areas visible in the visitor use areas.</li> <li>The addition of multiple viewing areas and trails as well as selective tree removal would improve existing views of Bridalveil Fall and increase viewing opportunities for visitors.</li> <li>There would be opportunities for dramatic views from the new bridge.</li> <li>Two new structures would be introduced into the native landscape – a comfort station along Bridalveil Straight and a new pedestrian bridge across Bridalveil Creek.</li> </ul>	<ul style="list-style-type: none"> <li>There would be short-term impacts on scenic resources including visually intrusive light and heavy construction vehicles, equipment, materials, personnel, and construction staging areas visible in the visitor use areas.</li> <li>The addition of multiple viewing areas and trails as well as selective tree removal would improve existing views of Bridalveil Fall and increase viewing opportunities for visitors.</li> <li>The existing viewing platform at the base of Bridalveil Fall would be increased in size.</li> </ul>

**Table 2-4. Summary Comparison of Impacts for the No Action and Action Alternatives**

Alternative 1 No Action Alternative	Alternative 2 Bridalveil Creek Pedestrian Bridge	Alternative 3 Expanded Viewing Platform
<b>Soils and Geology</b>		
<ul style="list-style-type: none"> <li>No new impacts to soils and geology would occur.</li> <li>Current operation related impacts would include continued soil erosion and compaction on unpaved trails and potential exposure to rockfall.</li> </ul>	<ul style="list-style-type: none"> <li>There would be short-term construction-related impacts to approximately 4.23 acres of soils including soil compaction, soil erosion, and soil contamination, and displacement of soil and boulders. These effects would be minimized by following standard mitigation measures and BMPs (i.e. structural and stabilization practices to minimize erosion and runoff, etc.).</li> <li>Approximately 1.75 acres of new impervious surfaces would be installed.</li> <li>Additional trails and viewing areas in the vicinity of the accessible trail to the existing viewing platform would reduce informal trailing, soil erosion, and soil compaction, resulting in long-term beneficial impacts.</li> </ul>	<ul style="list-style-type: none"> <li>There would be short-term construction-related impacts to approximately 3.75 acres of soils including soil compaction, soil erosion, and soil contamination, and displacement of soil and boulders. These effects would be minimized by following standard mitigation measures and BMPs (i.e. structural and stabilization practices to minimize erosion and runoff, etc.).</li> <li>Approximately 1.38 acres of new impervious surfaces would be installed.</li> <li>Additional trails and viewing areas in the vicinity of the accessible trail to the existing viewing platform would reduce informal trailing, soil erosion, and soil compaction, resulting in long-term beneficial impacts.</li> </ul>
<b>Visitor Experience and Recreation</b>		
<ul style="list-style-type: none"> <li>No new impacts to visitor experience and recreation would occur.</li> <li>Visitors would continue to experience low-functioning vault toilets, congestion associated with the parking lot, busy trails, crowded viewing platform, a lack of accessible path of travel to the primary viewing platform, and unclear wayfinding.</li> </ul>	<ul style="list-style-type: none"> <li>There would be a short-term impact on visitor experience during the construction period due to noise from the construction, increased traffic from construction personnel, and limited access to construction areas.</li> <li>Restroom facilities at the parking lot and along Southside Drive would be improved.</li> <li>Crowding on the trails and the viewing platform would be reduced.</li> <li>Safety and congestion in and around the parking lot, existing viewing area, and along Southside Drive would be improved.</li> <li>Interpretation, wayfinding, and accessibility would be improved.</li> </ul>	<ul style="list-style-type: none"> <li>There would be a short-term impact on visitor experience during the construction period due to noise from the construction, increased traffic from construction personnel, and limited access to construction areas.</li> <li>Visitor services at the parking lot would be improved.</li> <li>Crowding on the trails and the viewing platform would be reduced.</li> <li>Safety and congestion in and around the parking lot, existing viewing area, and along Southside Drive would be improved.</li> <li>Interpretation, wayfinding, and accessibility would be improved.</li> </ul>

**Table 2-4. Summary Comparison of Impacts for the No Action and Action Alternatives**

Alternative 1 No Action Alternative	Alternative 2 Bridalveil Creek Pedestrian Bridge	Alternative 3 Expanded Viewing Platform
<b>Park Operations and Facilities</b>		
<ul style="list-style-type: none"> <li>• No new impacts to park operations and facilities would occur.</li> <li>• Low-functioning vault toilets would continue to require frequent pumping by staff, as well as cleaning.</li> <li>• Traffic management would continue to be required at the parking lot entrance during peak visitation.</li> <li>• Maintenance and repair needs would likely increase with continued visitation and aging infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance time and effort at the parking lot toilets would decrease dramatically as flush toilets do not require pumping, just cleaning.</li> <li>• Safety railings may reduce off-trail hiking toward the falls and may reduce the need for search and rescue operations.</li> <li>• Additional time and effort would be required to maintain the 2<sup>nd</sup> toilet at Southside Drive.</li> <li>• There would be substantial additional staff time and funding required to regularly maintain and repair bridge and clear woody debris from bridge abutments.</li> <li>• Additional ranger patrols may be required to patrol and close the bridge when conditions are unsafe.</li> <li>• There would be additional staff time required to maintain and repair new loop trail.</li> <li>• Traffic management would continue to be required at the parking lot entrance during peak visitation.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance time and effort at the parking lot toilets would decrease dramatically as flush toilets do not require pumping, just cleaning.</li> <li>• Safety railings may reduce off-trail hiking toward the falls and may reduce the need for search and rescue operations.</li> <li>• There would be additional staff time required to maintain and repair the new loop trail and the new trail heading from Bridge 3 toward the Falls.</li> <li>• Traffic management would continue to be required at the parking lot entrance during peak visitation.</li> </ul>



**Table 2-4. Summary Comparison of Impacts for the No Action and Action Alternatives**

Alternative 1 No Action Alternative	Alternative 2 Bridalveil Creek Pedestrian Bridge	Alternative 3 Expanded Viewing Platform
<b>Cultural Resources – Built Environment (Historic Structures and Landscapes)</b>		
<ul style="list-style-type: none"> <li>• No new impacts to cultural resources would occur.</li> <li>• Existing use of area would continue to allow increased degradation of archeological sites and areas of cultural sensitivity due to off-trail use.</li> <li>• Existing historic structures and features in the Bridalveil Fall area would remain largely the same as their existing state, and receive the required level of maintenance and upkeep to retain their integrity.</li> <li>• Significant views and vistas in the area of potential effect would remain the same, as selective tree and vegetation removal outside that prescribed in the <i>Merced River Plan</i>, would not occur.</li> <li>• No adverse effect on the Yosemite Valley Historic District would occur.</li> </ul>	<ul style="list-style-type: none"> <li>• Pending final design to ensure compatibility with the Yosemite Design Guidelines (NPS 2011a), and determination of no adverse effect to historic properties that are contributing to the Yosemite Valley Historic District, Yosemite Valley Archeological District, as well as known properties of cultural, traditional, and religious significance to Yosemite's consulting tribes and groups, there would be no adverse effect on the Yosemite Valley Historic District.</li> <li>• Selective tree and vegetation removal would restore historic vistas and improve existing views of Bridalveil Fall. This would result in a beneficial impact on the Yosemite Valley Historic District.</li> <li>• Additional trails and viewing areas in the vicinity of the accessible trail to the existing viewing platform would reduce informal trailing, resulting in long-term beneficial impacts.</li> </ul>	<ul style="list-style-type: none"> <li>• Pending final design to ensure compatibility with the Yosemite Design Guidelines (NPS 2011a), and determination of no-adverse effect to historic properties that are contributing to the Yosemite Valley Historic District, Yosemite Valley Archeological District, as well as known properties of cultural, traditional, and religious significance to Yosemite's consulting tribes and groups, there would be no adverse effect on the Yosemite Valley Historic District.</li> <li>• Selective tree and vegetation removal would restore historic vistas and improve existing views of Bridalveil Fall. This would result in a beneficial impact on the Yosemite Valley Historic District.</li> <li>• Additional trails and viewing areas in the vicinity of the accessible trail to the existing viewing platform would reduce informal trailing, resulting in long-term beneficial impacts.</li> </ul>
<b>Cultural Resources – Archeological and Ethnographic Resources</b>		
<ul style="list-style-type: none"> <li>• No new impacts to cultural resources would occur.</li> <li>• No adverse effect on the Yosemite Valley Historic District would occur.</li> </ul>	<ul style="list-style-type: none"> <li>• Pending concurrence with the SHPO and tribes, there would be no adverse effect on the Yosemite Valley Archeological District or ethnographic resources, with mitigation and avoidance measures in place.</li> </ul>	<ul style="list-style-type: none"> <li>• Pending concurrence with the SHPO and tribes, there would be no adverse effect on the Yosemite Valley Archeological District or ethnographic resources, with mitigation and avoidance measures in place.</li> </ul>

## CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

### BACKGROUND

This chapter describes the existing environment associated with the alternatives in this EA. It also describes the direct, indirect, and cumulative impacts that could result from implementation of the alternatives. A summary of the environmental consequences of each alternative is located in Chapter 2, Table 2-4.

This chapter organizes information under 11 resource topics. Resource topics dismissed from further analysis and the rationale for their dismissal follows the list of resource topics considered. The general methodology for determining impacts is found after the list of resource topics.

### Resource Topics Considered

- Natural Resources
  - Hydrology, Floodplains, and Water Quality
  - Wildlife (including special status species)
  - Vegetation (including special status species)
  - Wetlands
  - Scenic Resources
  - Soils and Geology
- Cultural Resources
  - Built Environment
  - Archeological Resources
  - Ethnographic Resources
- Sociocultural Resources
  - Visitor Experience and Recreation (including transportation and capacity issues)
  - Park Operations and Facilities

### Resource Topics Dismissed from Further Analysis

The following resources are not expected to be affected or may be negligibly affected by implementation of the alternatives.

**Air Quality** - Implementation of any of the action alternatives would result in short-term impacts from emissions generated from construction equipment. However, the overall impacts on air quality would be short-term and negligible. There would be no long-term impacts on air quality from implementation of this project. Therefore, this topic has been dismissed from further analysis in this document.

**Energy Consumption** - Overall energy consumption within the park would not be influenced by the alternatives.

**Environmental Justice** – Presidential Executive Order 12898, *General Actions to Address Environmental Justice in Minority Populations*, requires all federal agencies to identify and address the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. According to the U.S. Environmental Protection Agency (USEPA), environmental justice is the

...fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. Fair treatment means that no group of people,

including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies (USEPA 1998).

Park staff and planning team members actively solicited public participation as part of the planning process and gave equal consideration to all input from persons regardless of age, race, income status, or other socioeconomic or demographic factors. Environmental justice is dismissed as an impact topic for the following reasons:

- The impacts associated with implementation of the preferred alternative would not disproportionately affect any minority or low-income population or community.
- Implementation of the preferred alternative would not result in any identified effects that would be specific to any minority or low-income community. Restrictions on travel or access to any area of the park that might result from the project would be equally applied to all visitors, regardless of race or socioeconomic standing.
- The action alternatives would not result in destruction or disruption of community cohesion and economic vitality, displacement of public and private facilities and services, increased traffic congestion, and/or exclusion or separation of minority or low-income populations from the broader community.

**Indian Trust Resources** - Indian Trust Resources are legal obligations of the U.S. Government to protect tribal lands, assets, resources, and/or treaty rights as granted under treaty or other legal instrument. No trust treaties exist within Yosemite. The consideration of Indian Trust Resources (as specified in Director's Order 12, Secretary's Order 3175, and other policies/regulations) do not apply to the Bridalveil Fall Rehabilitation project or any project within Yosemite.

**Land Use** - Yosemite National Park classifies land uses within the park as "Parklands" regardless of the individual types of land uses within the park. Implementation of the Bridalveil Fall Rehabilitation Project would not affect this classification, or any land uses within the park.

**Museum Collections** - Park projects can indirectly affect the museum collections by generating additions to the collections from archeological data recovery performed as mitigation for direct site impacts. To the maximum extent feasible, impacts to archeological resources would be avoided. Based on the alternatives developed for analysis, data recovery is unlikely to be necessary.

**Night Sky** - No aspect of the alternatives would have an impact on night sky.

**Prime and Unique Farmlands** - There are no agricultural lands within Yosemite National Park. No alternative in this EA would have direct or indirect effects on downstream agricultural lands.

**Public Health and Safety** - Public health and safety is a fundamental element of the purpose and need for the Bridalveil Fall Rehabilitation Project. As such, it is analyzed under the following topics, rather than as one separate topic: Visitor Experience (which considers visitor safety) and Park Operations (which considers employee safety).

**Socioeconomics** (including growth inducing impacts per the California Environmental Quality Act [CEQA]) - There would be no measureable changes expected in park-wide annual visitation (estimated at over five million people in 2016) as a result of the Bridalveil Fall Area Rehabilitation Project. The project would accommodate current visitor use levels in west Yosemite Valley as directed in the *Merced River Plan*. Yosemite visitors spent over \$381 million measured in 2010 dollars, per Money Generation Model 2 (MGM2) models. This is a measure of the most directly observable socioeconomic impact visitors have on the region before estimating multiplier effects. Visitor spending generates over 5,300 jobs and over a quarter billion dollars in value added to the four-county Yosemite region. Value added is technically the sum of labor income, profits and rents,

and indirect business taxes, and serves as the best overall measure of the total socioeconomic importance of visitor spending within the region. The project would have no anticipated effect on regional income and jobs would not be lost or shifted. Overall, the project is expected to result in negligible impacts on the socioeconomic environment, visitor populations, and the regional economy. Similarly, the project is not expected to result in growth-inducing impacts for the region or in nearby communities. Therefore, socioeconomics is dismissed from further analysis.

**Soundscape** - No aspect of the alternatives would have a long-term impact on the natural soundscapes. Construction would be phased during 2018 and 2019. During construction, workers would ensure that all construction equipment has functional exhaust muffler systems; use hydraulically or electrically powered construction equipment when feasible; locate stationary noise sources as far from sensitive receptors as possible; limit the idling of motors except as necessary (e.g., concrete mixing trucks); and develop a construction schedule that minimizes impacts to adjacent noise-sensitive activities. The contractor would submit a work plan/schedule that specifies measures that would minimize construction-related noise in noise-sensitive areas and any additional protective measures they would enact (Appendix B). These measures are expected to limit short-term noise-related impacts under both action alternatives; therefore, Soundscapes is dismissed from further analysis.

## GENERAL METHODOLOGY FOR ESTABLISHING IMPACTS

The environmental consequences analysis describes direct and indirect impacts, and their significance for each alternative. The analysis is based on the assumption that the mitigation measures identified in the *Mitigation Measures Common to All Action Alternatives* section of Chapter 2 (and Appendix B) would be implemented in concert with each action alternative. Potential impacts are described in terms of context, duration, and type. General impact significance determination definitions are described below.

**Context.** The context of an impact considers where impacts would occur and whether they would be site-specific (within the project area), local (beyond the project area within Yosemite National Park), regional (Sierra Nevada), or broader.

**Duration.** The duration of an impact considers the length of time an effect would last, either short-term or long-term:

- Short-term is generally used for impacts lasting only for the project duration, generally 1 year from the implementation date.
- Long-term impacts occur beyond the date a project is considered fully implemented.

**Type.** Type describes impacts as beneficial or adverse:

- Beneficial impacts result in a positive change in the condition or appearance of a resource or a change that moves a resource toward a desired condition.
- Adverse impacts are changes that move a resource away from a desired condition or detracts from its appearance or condition.

## CUMULATIVE IMPACTS

The CEQ defines a cumulative impact as follows (40 Code of Federal Regulations [CFR] 1508.7):

*A “cumulative impact” is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions.*



*Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

The cumulative impacts analysis evaluates impacts in terms of the specific resources, ecosystem, and human community affected and focuses on impacts that are truly meaningful (CEQ Handbook 1997). Cumulative projects considered in this analysis include past and present actions and planning development activity currently being implemented or planned for implementation in the reasonably foreseeable future. The cumulative analysis evaluates the impacts of each alternative in conjunction with other past, present, and reasonably foreseeable actions that would result in beneficial or adverse additive effects on a resource. A summary of cumulative projects is included in Appendix C.

## HYDROLOGY, FLOODPLAINS, AND WATER QUALITY

### Affected Environment

**Hydrology.** The Bridalveil Falls project area is located within the Merced River basin, which is part of the San Joaquin River Hydrologic Area. The Merced River begins at the crest of the Sierra Nevada and is joined by several tributaries, including Bridalveil Creek, as it drains westward toward the Central Valley before joining the San Joaquin River. In areas of the Merced River basin above 5,000 feet, precipitation generally falls as snow between the months of November and April. Peak stream flows, as a result of snowmelt, occur in May and June. In September and October, the river is at minimum flow.

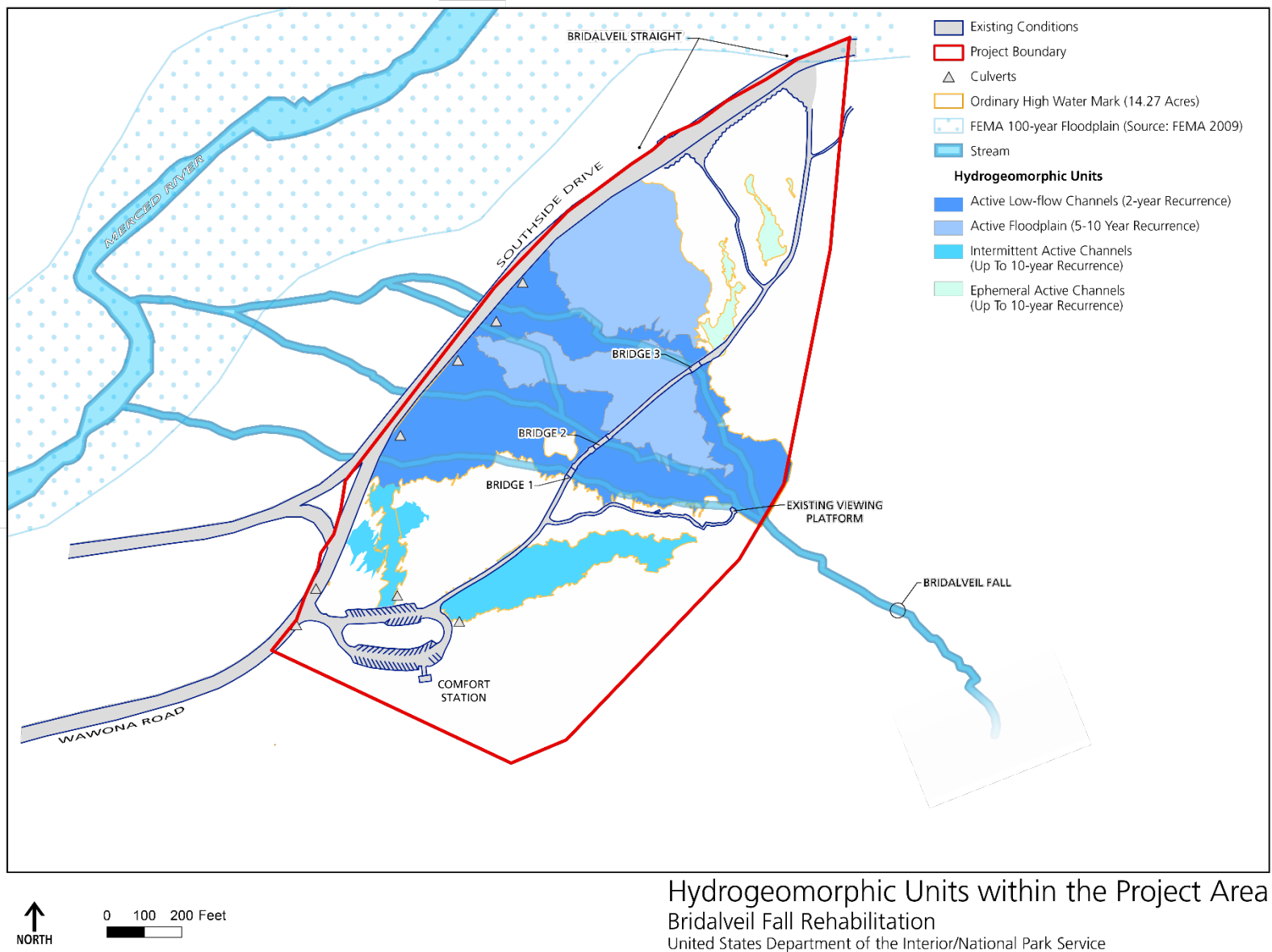
Bridalveil Creek forms the core of the project area as it flows northwest from the base of Bridalveil Fall. At the base of the fall, Bridalveil Creek forms multiple braided stream channels as it descends a steep debris flow fan. The gradient of Bridalveil Creek decreases as it reaches the edge of the project area at Northside Drive. The project area does not include the confluence of Bridalveil Creek with the Merced River, which is approximately 600 feet downstream of the project area boundary.

The stream system includes active low-flow channels, floodplain, and high-flow channels (Figure 3-1). Apart from the perennial Bridalveil Creek, multiple intermittent and ephemeral channels exist in the project area. These channels originate from the walls of Yosemite Valley or high water flows in Bridalveil Creek. Flows in the project area generally peak during the spring snowmelt, although some intermittent and ephemeral channels may only have flow during heavy rain events (NPS 2017a).

The parking area, a historic carriage road, and trails lead from outlying areas to a waterfall viewing platform. This local infrastructure, along with culverts and bridges, diverts some stream channels. One culvert directs flow from an intermittent channel either under or directly adjacent to the current parking lot (NPS 2017a).

**Floodplains.** Since 1916, Yosemite National Park has experienced 11 winter floods large enough to cause damage to property. The northernmost tip of the Bridalveil Fall project area is located within the 100-year floodplain associated with the Merced River floodplain (Figure 3-1). The Bridalveil Creek stream system in the project area is bounded by a 2- to 10-year active floodplain (Figure 3-1). For the purposes of this document, the NPS assumes that current and proposed facilities are located in the 100-year floodplain, per NPS Procedural Manual 77-2: *Floodplain Management* (update 2004).

Executive Order 11988, *Floodplain Management*; Director's Order 77-2: *Floodplain Management*; and the NPS Procedural Manual 77-2: *Floodplain Management* require the NPS to protect floodplain values and minimize flood risks. The NPS Procedural Manual requires that parks develop a Statement of Findings to: (1) provide an understanding of risks to human health and safety, (2) analyze risks to property, and (3) describe the effects of the proposed action on floodplain values (Appendix D).



**Figure 3-1. Hydrogeomorphic Units within the Project Area**

**Water Quality.** Constituents such as dissolved oxygen, suspended sediment, nutrients, and chemical pollutants measure water quality. Water quality in the Upper Merced River Watershed is considered to be good and generally above state and federal standards (United States Geological Survey [USGS] 1999).

The State of California considers the surface water quality of most park waters to be beneficial for wildlife habitat, freshwater habitat, and for canoeing, rafting, and other recreation, as indicated in the Central Valley Regional Water Quality Control Board's (RWQCB) Water Quality Control Plan (Central Valley RWQCB 2016a). The USEPA 303(d) list of water quality limited segments in the vicinity of the facility sites does not list the Merced River and the Tuolumne River as impaired (Central Valley RWQCB 2016b). The NPS Freshwater Resource Management Guidelines (found in NPS-77) require the NPS to "maintain, rehabilitate, and perpetuate the inherent integrity of water resources and aquatic ecosystems." The Clean Water Act requires the NPS to "comply with all federal, state, interstate, and local requirements" (NPS 2004).

In general, water in the Upper Merced River Watershed is noted for low conductivity (limited dissolved solids), near-neutral pH (a measure of acid or base conditions) – low alkalinity, and low nutrient concentrations. Due to low alkalinity of the stream water, the Merced River also has low buffering capability (ability to withstand changes in water chemistry due to impacts) (NPS 1994).

The Yosemite Valley Groundwater Basin has exceptionally high quality groundwater and substantial well yields and supplies water to Yosemite National Park (California Department of Water Resources 2003).

### **Environmental Consequences – Methodology**

Impacts to hydrology, floodplains, and water quality were assessed by reviewing existing literature and characterizing the effects based on the types of impacts that could occur, and analyzing factors that could contribute to impacts under each alternative. The analysis was based on a qualitative assessment of surface and groundwater resources, and the effects likely caused by construction and operation of proposed plan elements and infrastructure improvements.

Types of impacts include the discharge of pollutants to surface and ground waters, including sediment, hydrocarbons, and other materials; changes in the direction and runoff rate of water; and impacts to floodplains. Beneficial impacts would include protection of water resources, restoration of streambanks, maintaining natural flows and conditions, and improvements to water quality. Adverse impacts would include degradation of the chemical or physical properties of water resources, including natural or human-constructed structures. Impacts can be direct (an immediate result of the action) or indirect (resulting from the action but occurring later in time or removed from the location of direct physical impacts).

The analysis of impacts to hydrology, floodplains, and water quality is based on the assumption that the proposed action would include standard procedures related to grading and erosion control and stormwater runoff. Implementation of standard mitigation measures and best management practices (BMPs) in Appendix B would be implemented by the park, which would minimize the potential for sediment and pollutant discharge. Prior to construction, if determined necessary, the NPS would file a Notice of Intent to discharge stormwater to the RWQCB and prepare and implement provisions of a Storm Water Pollution Prevention Plan (SWPPP) to control runoff from construction activities, which would be short-term in nature. The BMPs specified in the SWPPP would specify means of waste disposal, post-construction sediment and erosion control, and maintenance responsibilities. The construction contractor(s) would also be required to implement appropriate hazardous materials management practices to reduce the possibility of chemical spills or releases of contaminants, including any non-stormwater discharge to drainage channels. Post-construction

permanent BMPs would also be implemented where deemed necessary, to minimize long-term effects from land disturbances, increased runoff, and contaminated runoff.

### **Environmental Consequences of Alternative 1 – No Action Alternative**

**Analysis.** Under the No Action Alternative, hydrology, floodplains, and water quality would remain the same, and no new impacts would occur. No modifications in the project area would occur, including installation of bridges and raised walkways or raising the parking lot out of the flood zone. Existing impacts would continue, including erosion and subsequent sediment discharge, and flooding of the parking area. Informal trailing that fragments wetland habitat and alters wetland hydrology would continue. Areas that have been denuded of vegetation due to trampling would remain, resulting in compacted soils and altered runoff characteristics. This would result in an alteration of the runoff characteristics from natural conditions, though not in a detectable manner. These actions would result in a local, long-term adverse impact on hydrology.

**Cumulative Impacts.** Cumulative effects to hydrology are based on analysis of past, present, and reasonably foreseeable future actions within the project area in combination with the potential effects of this alternative. Past actions that cumulatively impact hydrology within the project area include construction projects, such as the *Reconstruct Critically Eroded Sections of El Portal Road*, *Parkwide Emergency Road Repairs*, *Rehabilitate the Yosemite Valley Loop Road*, and *Wawona Road Rehabilitation* projects. These may have short-term adverse impacts to hydrology, but long-term beneficial impacts. Continued implementation of the Fire and Vegetation Management Plans may include removal or trimming of trees and vegetation, which may result in localized effects to water quality, including displacement of soil. *Restoration of the Mariposa Grove of Giant Sequoias* would result in short-term ground disturbance and long-term habitat restoration with water flows directed to natural drainages and decreased traffic in the Mariposa Grove area. This could decrease erosion. Implementation of scenic vista clearing actions in the *Merced River Plan* would include removal of trees and roadside vegetation, resulting in erosion and sedimentation. Short-term effects of all projects would be mitigated by implementation of standard BMPs to protect water quality.

Reasonably foreseeable future actions that could contribute to cumulative impacts to hydrology include the Construct a Comfort Station West of Yosemite Lodge at the Yosemite Falls Parking Area and Wawona Wastewater Treatment System Project. These projects may have short-term adverse impacts to water quality during construction, which would be reduced by implementation of standard mitigation measures and BMPs discussed in Appendix B. The Wawona Wastewater Treatment System Project would result in long-term beneficial impacts to water quality through improved treatment at the upgraded facility.

Therefore, total cumulative impacts would be adverse in the short-term and adverse but beneficial in the long-term, despite the No Action Alternative contributing long-term adverse impacts to overall cumulative impact.

### **Environmental Consequences of Alternative 2**

**Analysis.** Ground disturbance during construction would displace soils, potentially resulting in erosion and discharge of sediment into creeks and drainages. Use of heavy equipment to construct parking areas, bridges, facility structures, and infrastructure may result in the discharge of hydrocarbons into surface waters. These adverse impacts would be mitigated by applying standard mitigation measures and BMPs discussed in Appendix B, including delineation of project boundaries, establishment of appropriate staging areas, application of intensive erosion control measures, stabilization of loose soils and stockpiles, consistent maintenance of equipment, and adherence to spill prevention and contingency plans. This would result in a local, short-term adverse impact.



Under Alternative 2, actions within the floodplain would include raising and improving the parking lot, trenching for utility and sewer lines, trail development (accessible and rustic), boardwalks, and ecological restoration. Under Alternative 2, there would be an addition of approximately 1.75 acres of new impervious surface. The parking lot would be raised to be above flood levels. A raised boardwalk would be installed and wetlands would be restored adjacent to the parking lot, improving water quality and wetland function. Trenching for electrical and sewer lines along the road could potentially cause direct and indirect long-term adverse impacts by altering the hydrology within Bridalveil Meadow. These adverse impacts would be mitigated by applying mitigation measures such as MM-GCM-9 (Appendix B), that states that the design of the utility trench and directional drilling will allow subsurface flows to continue unimpeded, without creating an underground dam.

Under this alternative, trail improvements would include bridges, boardwalks, and elevated pathways to keep foot traffic out of many wetlands, streams, and flood zones. The addition of the bridge across Bridalveil Creek could potentially produce long-term adverse impacts by impeding flow during extreme flow events due to woody debris build up around pilings. Long-term beneficial impacts to water quality would occur as a result of reduced visitor impacts (i.e., bank and vegetation trampling), restored and revegetated areas and wetlands, and improved drainage systems. Trail improvements would include bridges and boardwalks to provide visitor access over creeks, waterways, and wetlands.

**Cumulative Impacts.** Past, present, and reasonably foreseeable future actions within the project area are the same as those discussed under the No Action Alternative and would result in local, short-term adverse impacts and long-term beneficial impacts to hydrology, floodplains, and water quality. Implementation of Alternative 2 would have local, long-term beneficial impacts. Therefore, cumulative impacts would be adverse in the short-term and beneficial in the long-term, with Alternative 2 contributing long-term beneficial impacts to overall cumulative impacts.

### **Environmental Consequences of Alternative 3**

**Analysis.** Alternative 3 would involve less construction and ground disturbance than Alternative 2, resulting in reduced impacts. There would be a smaller boardwalk area near the parking area and no bridges or elevated pathway over the upper portion of the Bridalveil Creek braided channel.

Ground disturbance during construction would displace soils, potentially resulting in erosion and discharge of sediment into creeks and drainages. Use of heavy equipment to construct parking areas, bridges, facility structures, and infrastructure may result in the discharge of hydrocarbons into surface waters. These adverse impacts would be mitigated by applying standard mitigation measures and BMPs discussed in Appendix B, including delineation of project boundaries, establishment of appropriate staging areas, application of intensive erosion control measures, stabilization of loose soils and stockpiles, consistent maintenance of equipment, and adherence to spill prevention and contingency plans. This would result in a local, short-term adverse impact.

Under Alternative 3, actions within the floodplain would include raising and improving the parking lot, trail development (accessible and rustic), boardwalks, and wetland restoration. However, Alternative 3 would result in approximately 1.38 acres of new impervious surface, which is less than 1.75 acres under Alternative 2; and there would no bridges or elevated pathway over the upper portion of the Bridalveil Creek braided channel. The parking lot would be raised to be above flood levels. A smaller raised boardwalk would be installed and wetlands would be restored adjacent to the parking lot, improving water quality and wetland function.

Under this alternative, trail improvements would include boardwalks and elevated pathways to keep foot traffic out of many wetlands, streams, and flood zones. While the expanded portion of the viewing platform would not extend into the bed and banks of Bridalveil Creek, a small portion of the existing platform extends into the bed and banks. Creek flows do not reach the platform at low

flows. During moderate and high flows, the platform would not substantially impact flows more than the existing boulders and trees in the very rough alluvial fan environment. Implementation of this alternative would produce long-term beneficial impacts to water quality as a result of reduced visitor impacts (i.e., bank and vegetation trampling), restored and revegetated areas and wetlands, and improved drainage systems. Trail improvements would include bridges and boardwalks to provide visitor access over creeks, waterways, and wetlands. Therefore, Alternative 3 would result in long-term beneficial impacts to hydrology, floodplains, and water quality.

**Cumulative Impacts.** Past, present, and reasonably foreseeable future actions within the project area are the same as those discussed under the No Action Alternative and would result in local, short-term adverse impacts and long-term beneficial impacts to hydrology, floodplains, and water quality. Implementation of Alternative 3 would have local, long-term beneficial impacts. Therefore, cumulative impacts would be adverse in the short-term and beneficial in the long-term, with Alternative 3 contributing long-term beneficial impacts to overall cumulative impacts.

## WILDLIFE

### Affected Environment

**Wildlife.** Wildlife in Yosemite National Park is diverse and abundant, reflecting the wide range of Sierra Nevada habitats. Yosemite National Park supports over 400 species of vertebrates including fish, amphibians, reptiles, birds, and mammals (NPS 2017b).

Wildlife habitat in the project area primarily consists of mixed conifer and mixed hardwood communities. Wildlife in the project area are exposed to high levels of disturbance associated with human foot-traffic, human presence, and vehicular operation within and in the vicinity of Bridalveil Fall. Wildlife species commonly occurring in the Yosemite Valley in the vicinity of the project area include black bear (*Ursus americanus*), western grey squirrel (*Sciurus griseus*), mule deer (*Odocoileus hemionus*), acorn woodpecker (*Melanerpes formicivorus*), Steller's jay (*Cyanocitta stelleri*), dark-eyed junco (*Junco hyemalis*), mountain chickadee (*Poecile gambeli*), and peregrine falcon (*Falco peregrinus*) (California Department of Fish and Wildlife [CDFW] 2017a; NPS 2017a). There are several species of bats that are likely to occur in or near the project area, including special status bat species (see Appendix E).

**Special Status Species.** Special status species include species listed, proposed, or candidates for listing as endangered or threatened under the federal Endangered Species Act or California Endangered Species Act and other special status species as recognized by the United States Fish and Wildlife Service (USFWS), CDFW, or Yosemite National Park.

For this analysis, habitat associations and previous records of occurrence for park-listed sensitive animals were reviewed to determine which have the potential to occur in the project area. A USFWS Official Species List (USFWS 2017) for the proposed action was received on June 20, 2017. Two species of federally listed fish included on the list do not occur in the vicinity of the project area – Delta smelt (*Hypomesus transpacificus*) and steelhead, Northern California distinct population segment (DPS) (*Oncorhynchus mykiss*). Project activities will not impact the waters of the Merced River or its tributaries, which flow into the San Joaquin drainage and the listed species habitat, hundreds of miles below the project area. Two additional federal listed species were included on the Official Species List, Yosemite toad (*Anaxyrus canorus*) and the Sierra Nevada yellow-legged frog (*Rana sierrae*). Both of these species are not expected to occur in the project area due to habitat requirements. These species generally occur above 6,000 feet in elevation or higher (the project area occurs at about 4,000 feet in elevation). The federal listed California red-legged frog (*Rana draytonii*) is included in this analysis as it was reintroduced to several sites in east Yosemite Valley in 2017. No critical habitat for any federally listed species occurs within the project area.

(USFWS 2017). Appendix E includes a table that describes the special status wildlife species potentially occurring in Yosemite Valley and their potential to occur within the project area. Special status species that potentially occur in the project area are described below.

The California red-legged frog (*Rana draytonii*) is the only federally listed species that would potentially occur in the project area. California red-legged frogs occur most commonly in lowlands or foothills near ponds in forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover. Breeding habitat is in permanent or ephemeral water sources, including lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps (California Herps 2017). The species is believed to have been extirpated from Yosemite National Park, and had not been observed in the park in over 50 years (NPS 2016a). However, efforts are currently underway to reintroduce the species to the park. NPS, in conjunction with the USFWS, is reintroducing 4,000 tadpoles and 500 adults between 2017 and 2019 into several sites in east Yosemite Valley (NPS 2016a). It is highly unlikely that individuals would travel to the Bridalveil Fall project area before construction is complete.

The Mount Lyell salamander (*Hydromantes platycephalus*) is a CDFW watch list species that is generally restricted to alpine or subalpine vegetation associations in outcrops of rocks and boulders with free surface water, such as a seep, waterfall, or melting snow nearby (CDFW 2014). The species is known to occur in Yosemite Valley, and potential habitat occurs within the project area at the base of the waterfall and the associated stream channels. A daytime survey was conducted in September of 2017 at the base of the Fall above the viewing platform. No salamanders were observed during this survey.

The western pond turtle (*Actinemys marmorata*) was believed to have been extirpated from Yosemite Valley. Efforts are currently underway to reintroduce the species to the park (NPS 2016a). Reintroduced western pond turtles are being monitored using radio telemetry and are currently less than 1.5 miles from project area. There is a low probability that they could occur within the project area during construction.

Special status bird species with the potential to occur in the project area, and described in Appendix E include:

- northern goshawk (*Accipiter gentilis*)
- golden eagle (*Aquila chrysaetos*)
- Vaux's swift (*Chaetura vauxi*)
- olive-sided flycatcher (*Contopus cooperi*)
- black swift (*Cypseloides niger*)
- yellow warbler (*Dendroica petechia*)
- peregrine falcon (*Falco peregrinus*)
- bald eagle (*Haliaeetus leucocephalus*)
- California spotted owl (*Strix occidentalis occidentalis*)

Special status bat species with the potential to occur in the project area, and described in Appendix E include:

- pallid bat (*Antrozous pallidus*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- spotted bat (*Euderma maculatum*)
- western mastiff bat (*Eumops perotis californicus*)
- western red bat (*Lasiurus blossevillei*)

## Environmental Consequences – Methodology

Determination of the significance of potential impacts on wildlife is based on the duration and type of impact; the scale (area) of impact influences all. Impacts can be direct (an immediate result of the action) or indirect (resulting from the action but occurring later in time or removed from the location of direct physical impacts). Impacts to wildlife were evaluated through a qualitative assessment of changes in the diversity, continuity, and/or integrity of wildlife populations and/or habitats and an assessment of potential impacts to individual wildlife.

This impact analysis defines potential impacts as either adverse (negative) or beneficial (positive). For wildlife, direct and indirect adverse impacts remove, relocate, affect, or cause an increased disturbance to wildlife. Beneficial impacts result from preservation and minimization of impacts to wildlife and their habitats. The duration of an impact considers whether the impact would occur in the short-term (temporary) or over the long-term (permanent).

Determination of the significance of potential impacts on special status wildlife species is based on the locality, duration, and type of impact. The impact evaluation for special status species was based on the following: (1) the known or likely occurrence of a species or its preferred habitat in the vicinity of the project area; (2) the direct physical loss or adverse modification of habitat; and (3) the loss or degradation of habitat, such as could occur through avoidance or abandonment due to construction or rehabilitation activity or noise, or the species' sensitivity to human disturbance. For plant species, this could occur due to loss of habitat features such as surface water flows.

Impacts were evaluated through determination of the location of the species or their habitat with respect to the proposed rehabilitation project. Sensitivity of a species to impacts was assessed through consideration of rarity, resilience, population size, and distribution throughout the park.

*Federal listed species.* Determinations on federal listed species are made as follows:

- No effect – The action will not affect federal listed species or critical habitat.
- Not likely to adversely affect – The effects on listed species will be discountable, insignificant, or completely beneficial.
- Nonconcurrence – Not enough information to adequately determine the nature of the effects.
- Likely to adversely affect – An adverse impact on the species may occur as a direct or indirect result of the proposed action.

## Environmental Consequences of Alternative 1 – No Action Alternative

**Analysis.** Under the No Action Alternative, Bridalveil Fall would not be rehabilitated and no repairs would be made with the exception of emergency repairs and routine and periodic maintenance activities. Ongoing disturbance to wildlife and sensitive species from noise, human presences, and vehicle traffic associated with the Yosemite Valley and Bridalveil Fall complex daily operations and maintenance would continue. In addition, off-trail foot traffic would continue within the project area. Therefore, there would be no new impacts on wildlife, including special status wildlife species.

**Cumulative Impacts.** Past and present projects that would impact wildlife within the project area include the Bridalveil Fall Vault Toilet Ventilation and Interior Lighting System Installation, Wawona Road Rehabilitation, Parkwide Emergency Road Repairs, and scenic vista management prescribed in the Merced River Plan. These actions would result in visual and noise disturbance of wildlife within the project area and thus would have localized, short-term, adverse impacts on wildlife. Additionally, these projects would result in removal of vegetation, including trees, in areas where needed, for scenic management and/or construction access.



Potential actions under the park's *Invasive Plant Management Plan Update* would result in the protection of wildlife habitat within the project area and thus would have localized, long-term beneficial impacts on wildlife.

As the No Action Alternative would impart no impact on wildlife, cumulative impacts on wildlife would be adverse in the short-term and beneficial in the long-term, with the No Action Alternative contributing no impact to overall cumulative impacts.

## **Environmental Consequences of Alternative 2**

**Analysis.** Construction under Alternative 2 would have a total area of disturbance of 4.23 acres, much of which is previously disturbed and/or existing impervious surface. A total of 1.75 acres of new impervious surface would be added during construction under Alternative 2, which would entail a direct loss of potential wildlife habitat.

Local, short-term adverse impacts on wildlife would occur due to noise, increased human presence, and heavy equipment use during construction activities. Visual and noise impacts to wildlife would occur primarily in areas where wildlife are already subject to similar impacts (traffic noise, human presence, etc.). Noise and visual disturbance associated with construction may temporarily interrupt foraging, mating, and nesting behavior, or cause wildlife to temporarily avoid the area. Construction activity could also interfere with animal movement patterns. Noise, as well as an increase in general human activity and presence, could evoke negative reactions in wildlife. Trees that would be selectively removed in the project area could provide roosts, perches, or nest sites for bird and bat species, including special status species. However, by scheduling construction to largely avoid the bird breeding and nesting season, conducting pre-construction surveys for nesting birds so that no removal of active nests would occur, and avoiding construction activities at night (or, if night lighting is necessary, lighting would be designed to be minimal, directed downward, and shielded), impacts on migratory bird species and bats would be reduced. The construction of the east trail along Bridalveil Creek to the new bridge would impact habitat in a pristine area with little to no foot traffic. The presence of a new trail in this area would encourage informal trailing between the new trail and Bridalveil Creek, impacting a greater area than the trail itself.

The Mount Lyell salamander would potentially be directly impacted during trail and viewing platform construction because of the potential for harm or crushing to individuals and the potential loss of habitat. However, portions of the trail that cross aquatic habitats and areas of large boulders would be elevated or consist of a boardwalk instead of being at-grade and hardened, to reduce impacts to sensitive habitats. Therefore, impacts to the species during construction would largely be avoided and any adverse impacts would not affect the relative abundance of the local population. Following construction activities, local, indirect adverse impacts from improper disposal of human waste or foot traffic in and along streamside areas could affect this species' habitat, especially if hikers enter areas where this species and its habitat occur. However, the improved viewing area for visitors and additional trails is intended to decrease the amount of foot traffic (people going off trails and platforms) into areas where this species occurs. Likewise, under Alternative 2, additional trash cans, bear boxes, and restrooms would reduce the human impact on adjacent wildlife habitat and impart beneficial impacts on species such as the Mount Lyell salamander.

*Federal listed species.* In 2017, the NPS reintroduced the California red-legged frog to suitable habitat in Yosemite Valley about 1.5 miles east of the Bridalveil Fall project area. It is unlikely that frogs from this new population would travel to the Bridalveil Fall project area before construction is complete in 2019. In the highly unlikely event that the individual frogs travel to the site during construction, the NPS determined that effects on this listed species would be discountable or insignificant, and not likely to adversely affect the population.

**Cumulative Impacts.** Past and present projects that would impact wildlife within the project area include the Bridalveil Fall Vault Toilet Ventilation and Interior Lighting System Installation, Wawona Road Rehabilitation, Parkwide Emergency Road Repairs, and scenic vista management prescribed in the Merced River Plan. These actions would result in visual and noise disturbance of wildlife within the project area and thus would have localized, short-term adverse impacts on wildlife. Additionally, these projects would result in removal of vegetation, including trees, in areas where needed, for scenic management and/or construction access. Potential actions under the park's Invasive Plant Management Plan Update would result in the protection of wildlife habitat within the project area and thus would have localized, long-term beneficial impacts on wildlife. When combined with the potential beneficial and adverse impacts under Alternative 2, cumulative impacts on wildlife would be adverse in the short-term and beneficial in the long-term.

### **Environmental Consequences of Alternative 3**

**Analysis.** Impacts to wildlife under Alternative 3 would be similar to those under Alternative 2, except that there would be less construction and associated stressors (noise and visual impacts).

Construction under Alternative 3 would have a total area of disturbance of 3.75 acres, much of which is previously disturbed and/or existing impervious surface. A total of 1.38 acres of new impervious surface would be added during construction under Alternative 3, which would entail a direct loss of potential wildlife habitat.

Local, short-term adverse impacts on wildlife would occur due to noise, increased human presence, and heavy equipment use during construction activities. Visual and noise impacts to wildlife would occur primarily in areas where wildlife are already subject to similar impacts (traffic noise, human presence, etc.). Noise and visual disturbance associated with construction may temporarily interrupt foraging, mating, and nesting behavior, or cause wildlife to temporarily avoid the area. Construction activity could also interfere with animal movement patterns. Noise, as well as an increase in general human activity and presence, could evoke negative reactions in birds and bats. Trees that would be selectively removed in the project area could provide roosts, perches, or nest sites for bird and bat species, including special status species. However, by scheduling construction to largely avoid the bird breeding and nesting season, conducting pre-construction surveys for nesting birds so that no removal of active nests would occur, and avoiding construction activities at night (or, if night lighting is necessary, lighting would be designed to be minimal, directed downward, and shielded), impacts on migratory bird species and bats would be reduced.

The Mount Lyell salamander would potentially be directly impacted during trail and viewing platform construction because of the potential for harm or crushing to individuals and the potential loss of habitat. However, portions of the trail that cross aquatic habitats and areas of large boulders would be elevated or consist of a boardwalk instead of being at-grade and hardened, to reduce impacts to sensitive habitats. Therefore, impacts to the species during construction would largely be avoided and any adverse impacts would not affect the relative abundance of the local population. Following construction activities, local indirect adverse impacts from improper disposal of human waste or foot traffic in and along streamside areas could affect this species' habitat, especially if hikers enter areas where this species and its habitat occur. However, the improved viewing area for visitors and additional trails is intended to decrease the amount of foot traffic (people going off trails and platforms) into areas where this species occurs. Likewise, under Alternative 3, additional trash cans, bear boxes, and restrooms would reduce the human impact on adjacent wildlife habitat.

*Federal listed species.* In 2017, the NPS reintroduced the California red-legged frog to suitable habitat in Yosemite Valley about 1.5 miles east of the Bridalveil Fall project area. It is unlikely that frogs from this new population would travel to the Bridalveil Fall project area before construction is complete in 2019. In the highly unlikely event that the individual frogs travel to the site during construction, the NPS determined that effects on this listed species would be discountable or insignificant, and not

likely to adversely affect the population. The NPS will consult with the USFWS regarding this finding prior to finalizing the NPS decision document for this environmental assessment.

Implementation of standard mitigation measures in Appendix B, as well as following avoidance procedures, would reduce the potential for disturbance and harm to wildlife. Therefore, adverse impacts to wildlife under Alternative 3 would be reduced.

**Cumulative Impacts.** Past and present projects that would impact wildlife within the project area include the Bridalveil Fall Vault Toilet Ventilation and Interior Lighting System Installation, Wawona Road Rehabilitation, Parkwide Emergency Road Repairs, and scenic vista management prescribed in the Merced River Plan. These actions would result in visual and noise disturbance of wildlife within the project area and thus would have localized, short-term adverse impacts on wildlife. Additionally, these projects would result in removal of vegetation, including trees, in areas where needed, for scenic management and/or construction access. Potential actions under the park's Invasive Plant Management Plan Update would result in the protection of wildlife habitat within the project area and thus would have localized, long-term beneficial impacts on wildlife. When combined with the potential beneficial and adverse impacts under Alternative 3, cumulative impacts on wildlife would be adverse in the short-term and beneficial in the long-term.

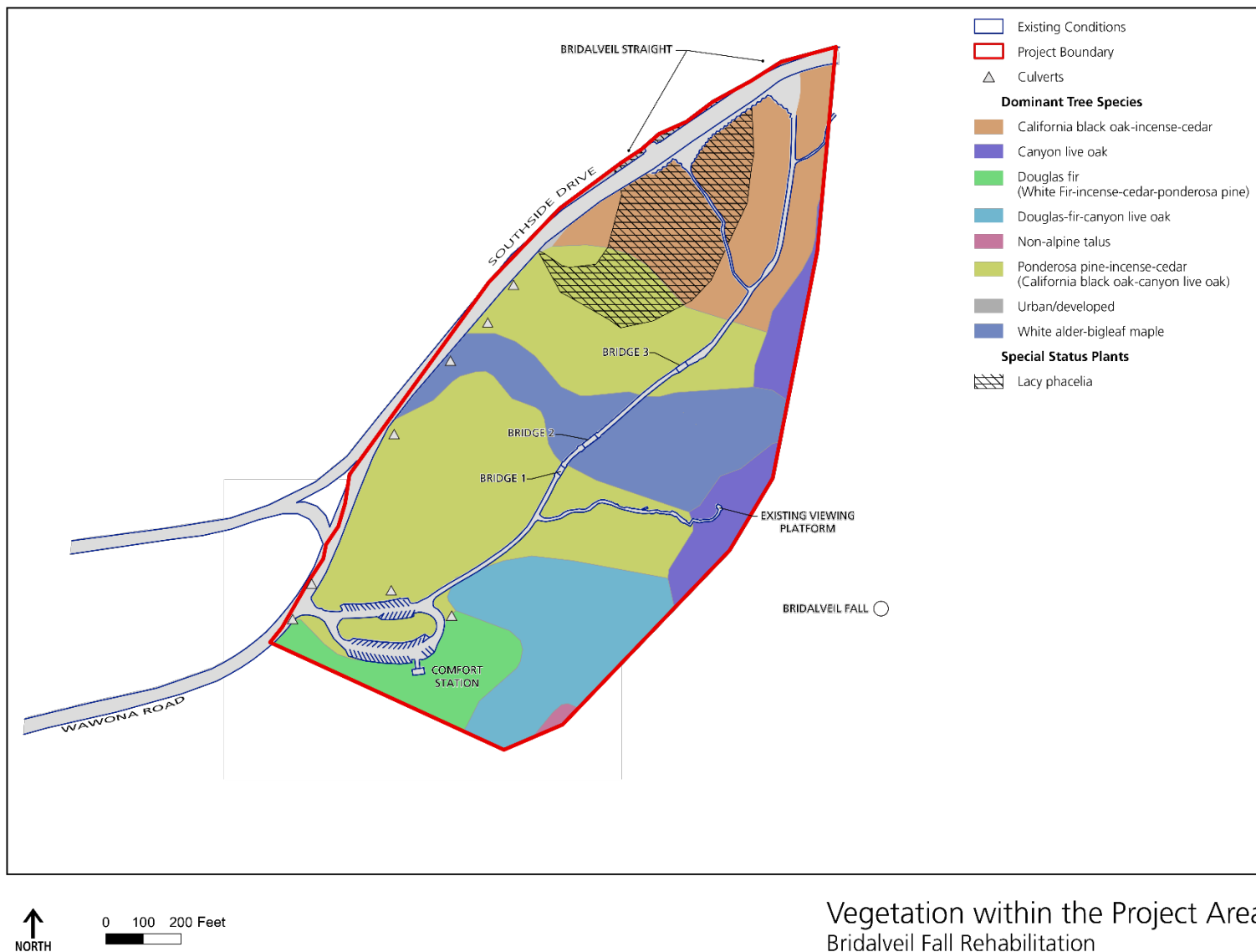
## VEGETATION

### Affected Environment

**Vegetation.** Yosemite Valley is located in the “lower montane mixed conifer zone.” Vegetation within the project area is classified as lower montane broadleaf forest, lower montane coniferous forest, and riparian habitat. The California black oak forest is a component of the lower montane broadleaf forest with unique biological and cultural values. Figure 3-2 illustrates the dominant plant communities in the project area, which include coniferous trees (ponderosa pine [*Pinus ponderosa*], Douglas fir [*Pseudotsuga menziesii*], and incense cedar [*Calocedrus decurrens*]), broadleaf trees (California black oak [*Quercus kelloggii*], canyon live oak [*Quercus chrysolepis*], bigleaf maple [*Acer macrophyllum*], and white alder [*Alnus rhombifolia*]), or a mixture of coniferous and broadleaf trees. In addition, two unvegetated rock/talus areas occur in the southeastern corner of the project area along with urban developed/areas, which include dirt and paved roads, road shoulders, and other sparsely vegetated, disturbed areas (Figure 3-2).

**Lower Montane Broadleaf Forest** — Found between approximately 3,000 feet to 6,000 feet in elevation, the lower montane broadleaf forest is a transitional community between low-elevation broadleaved forests and higher elevation coniferous forests. In Yosemite Valley, this forest community includes areas dominated by either California black oak or canyon live oak. Canyon live oak communities grow on both north- and south-facing talus slopes and often form pure or almost pure stands.

**California Black Oak Stands** — The NPS recognizes California black oak trees in Yosemite Valley as a valued biological, cultural, and scenic resource. California black oak acorns play a foundational role in the diets of various animals, including bears, deer, woodpeckers, and squirrels, in the fall and winter when other food sources are not available. In addition, California black oaks provide an important habitat element for sensitive species, including the California spotted owl (*Strix occidentalis*) and the fisher (*Pekania pennanti*). California black oak stands are also associated with various fungi, including mycorrhizal species that help to exchange carbon, nitrogen, and water within soils and among plants. They also create heterogeneity of species and habitat and contribute to ecosystem resiliency (Hankins 2015). Figure 3-2 shows individual California black oaks that are within the project area and found outside of the California black oak-incense-cedar stand. Refer to the Cultural Resources section for discussion of California black oaks as a valued cultural and scenic resource.



Vegetation within the Project Area  
Bridalveil Fall Rehabilitation  
United States Department of the Interior/National Park Service

Figure 3-2. Vegetation within the Project Area



The NPS and the Yosemite Conservancy have funded a series of studies on California black oaks in response to a long-held perception that they are declining within Yosemite Valley and perhaps throughout the park. Results to date have shown that total canopy cover at 18 study locations has not decreased since 1944. Since the 1920s, however, reduced survival of saplings and juveniles has resulted in an unbalanced population structure consisting of mostly mature trees (NPS 2015).

*Lower Montane Coniferous Forest* — Lower montane broadleaf forest transitions to lower montane coniferous forest as elevation increases in the forest ecosystem between approximately 3,000 feet to 6,000 feet. Typically dominated by ponderosa pine, the forest community in Yosemite Valley can also contain incense cedar, sugar pine (*Pinus lambertiana*), Douglas fir, and occasional California black oaks. The most common understory shrubs are Mariposa manzanita (*Arctostaphylos viscida* spp. *mariposa*), and deerbrush (*Ceanothus integerrimus*).

*Riparian Habitat* — In Yosemite Valley, riparian habitat extends outward from bank edges of the Merced River and its tributaries into adjacent meadow and forest communities. Characterized by two broadleaf deciduous tree species, riparian habitat in the project area contains white alder and big-leaf maple (see Figure 3-2). Understory plants in this dynamic habitat type colonize readily on new river-edge deposits.

Riparian habitats are among the most productive and biologically diverse in Yosemite Valley. The NPS has undertaken numerous efforts to restore the underlying natural processes that sustain wetlands and riparian habitats in Yosemite Valley. These efforts include prescribed burns, invasive plant treatment, fencing, and increasing inundation levels through restoration of natural drainage patterns, among others. While these efforts have improved the overall condition of riparian habitat in Yosemite Valley, roads, parking areas, structures, campgrounds, and informal trails remain as persistent stressors. These stressors are the focus of ongoing park management efforts.

Approximately 180 nonnative plant species identified in Yosemite National Park are primarily in the chaparral/oak and mid-elevation forests. Previous invasive species mapping in the project area identified a small number of isolated, invasive plant populations prioritized for treatment, including two annual grasses (soft brome [*Bromus hordeaceus*] and cheatgrass [*B. tectorum*]), one perennial grass (bulbous bluegrass [*Poa bulbosa*]), two annual herbs (common chickweed [*Stellaria media*] and Jerusalem oak goosefoot [*Dysphania botrys*]), one perennial herb (bull thistle [*Cirsium vulgare*]), and two shrubs (Himalayan blackberry [*Rubus armeniacus*] and cutleaf blackberry [*R. laciniatus*]). The primary concern for these populations is their potential to spread. In 2011, the NPS implemented a revision to the 2008 *Invasive Plant Management Plan* to detect and control or eradicate these and other invasive non-native plants (NPS 2011b).

**Special Status Species.** No federally- or state-listed threatened or endangered plant species occur in the project area. One plant species in the project area, lacy phacelia (*Phacelia tanacetifolia*), is included on Yosemite National Park's (2002) list of sensitive plants. Found in the northern portion of the project area, lacy phacelia grows in moist sandy and gravelly open areas (see Figure 3-2).

### Environmental Consequences – Methodology

This vegetation analysis is based on an assessment of project area vegetation and the effects anticipated as a result of construction and continued use of the area as a sightseeing and visitor use area.

The essential qualities of plant communities include their spatial extent, integrity of species composition, association with other natural resources, and vigor in terms of growth and reproduction. Actions that reduce or degrade these qualities are considered to have adverse impacts; actions that preserve, restore, or enhance these qualities have beneficial impacts. Beneficial effects would cause no detrimental effect and would result in an increase in rare species or habitat components, native ecosystem processes, native species richness or diversity, or native habitat quantity and quality. Impacts can

be direct (an immediate result of the action) or indirect (resulting from the action but occurring later in time or removed from the location of direct physical impacts). The duration of an impact considers whether the impact would occur in the short-term (temporary) or over the long-term (permanent).

Non-native species can alter soil chemical and physical properties, hamper native species establishment, and ultimately impact native plant community structure and function. This impact analysis considered whether proposed actions would favor the establishment of non-native species, as well as the ability to contain and reverse non-native plant infestation.

### **Environmental Consequences of Alternative 1 – No Action Alternative**

**Analysis.** Under the No Action Alternative, Bridalveil Fall would not be rehabilitated and no repairs would be made with the exception of emergency repairs and routine and periodic maintenance activities. Although there would be no new impacts on vegetation, it is likely that under the No Action Alternative visitors would continue to experience congestion and crowded trails/viewing platforms, and vegetation would continue to be trampled in areas where visitors go off-trail to avoid such congestion. Therefore, adverse, long-term impacts to vegetation would continue under the No Action Alternative.

**Cumulative Impacts.** Past and present projects that would impact vegetation within the project area include the *Wawona Road Rehabilitation*, *Parkwide Emergency Road Repairs*, and scenic vista management prescribed in the *Merced River Plan*. These actions would potentially result in temporary and permanent impacts to vegetation within the project area, including removal of trees in areas, where needed, for scenic management and/or construction access. Relative to the total vegetation within and in the vicinity of the project area, and with adherence to mitigation measures specific to each project, these adverse impacts would be reduced. Potential actions under the park's *Invasive Plant Management Plan Update* would enhance and protect native vegetation within the project area resulting in localized, long-term beneficial impacts on vegetation. Therefore, as discussed above, cumulative impacts would be adverse in the short-term and adverse and beneficial in the long-term, with the No Action Alternative contributing long-term adverse impacts to overall cumulative impacts.

### **Environmental Consequences of Alternative 2**

**Analysis.** Construction activities under Alternative 2 would disturb 4.23 acres, much of which is previously disturbed and/or existing impervious surface. A total of 1.75 acres of new impervious surface would be added during construction under Alternative 2, which would entail a direct loss of lower montane broadleaf and coniferous forest and riparian vegetation. These permanent impacts would be a result of vegetation removal associated with construction activities. Additionally, individual trees would be selectively removed to improve vistas, and immature conifer trees located within the driplines of California black oaks would be removed in order to improve habitat and enhance the health of the mature oaks. Trees removed would not be of special status, and would represent an insignificant fraction of the numbers of trees in the project area. The construction of the east trail along Bridalveil Creek to the new bridge would remove vegetation from a pristine area with little to no foot traffic. The presence of a new trail in this area would encourage informal trailing between the new trail and Bridalveil Creek, impacting a greater area than the trail itself.

Short-term impacts on vegetation during construction activities could include inadvertent crushing of vegetation and soil compaction. Such impacts would be short in duration and vegetation would be expected to recover after construction activities. Adherence to mitigation measures in Appendix B, including consultation with the park vegetation ecologist and forester, would minimize potential impacts on trees and understory vegetation, as well as potential root damage. Additionally, under

Alternative 2, it is intended that informal trailing by visitors within the existing visitor use area would be reduced and impart long-term, beneficial impacts on vegetation.

Indirect effects of construction activities and continued visitor use of the Bridalveil Fall area would include the potential for non-native plant establishment and spread. Implementation of standard mitigation measures in Appendix B would reduce the potential for non-native plant dispersal. Therefore, potential impacts to vegetation under Alternative 2 would be adverse in the short-term and beneficial in the long-term.

**Cumulative Impacts.** Past and present projects that would impact vegetation within the project area include the *Wawona Road Rehabilitation*, *Parkwide Emergency Road Repairs*, and scenic vista management prescribed in the *Merced River Plan*. These actions would potentially result in temporary and permanent impacts to vegetation within the project area. Relative to the total vegetation within and in the vicinity of the project area, and with adherence to mitigation measures specific to each project, these impacts would be reduced. Potential actions under the park's *Invasive Plant Management Plan Update* would result in the enhancement and protection of native vegetation within the project area and thus would have localized, long-term beneficial impacts on vegetation. When combined with the impacts under Alternative 2, cumulative impacts on vegetation would be adverse in the short-term and beneficial in the long-term.

### Environmental Consequences of Alternative 3

**Analysis.** Impacts to vegetation under Alternative 3 would be similar to those under Alternative 2, except that there would be less ground disturbance from construction activities under Alternative 3. Construction activities under Alternative 3 would disturb 3.75 acres, much of which is previously disturbed and/or existing impervious surface. A total of 1.38 acres of new impervious surface would be added during construction under Alternative 3, which would entail a direct loss of lower montane broadleaf and coniferous forest and riparian vegetation. These permanent impacts would be a result of vegetation removal associated with construction activities. Additionally, individual trees would be selectively removed to improve vistas, and immature conifer trees located within the driplines of California black oaks would be removed in order to improve habitat and enhance the health of the mature oaks. Trees removed would not be of special status, and would represent an insignificant fraction of the numbers of trees in the project area.

Short-term impacts on vegetation during construction activities could include inadvertent crushing of vegetation and soil compaction. Such impacts would be short in duration and vegetation would be expected to recover after construction activities. Adherence to mitigation measures in Appendix B, including consultation with the park vegetation ecologist and forester, would minimize potential impacts on trees and understory vegetation, as well as potential root damage. Additionally, under Alternative 3, it is expected that the additional loop trail would reduce informal trailing by visitors and impart long-term, beneficial impacts on vegetation.

Indirect effects of construction activities and continued visitor use of the Bridalveil Fall area would be the potential for non-native plant establishment and spread. Implementation of standard mitigation measures in Appendix B would reduce the potential for non-native plant dispersal. Therefore, potential impacts to vegetation under Alternative 3 would be adverse in the short-term and beneficial in the long-term.

**Cumulative Impacts.** Past and present projects that would impact vegetation within the project area include the *Wawona Road Rehabilitation*, *Parkwide Emergency Road Repairs*, and scenic vista management prescribed in the *Merced River Plan*. These actions would potentially result in temporary and permanent impacts to vegetation within the project area. Relative to the total vegetation within and in the vicinity of the project area, and with adherence to mitigation measures

specific to each project, these impacts would be reduced. Potential actions under the park's *Invasive Plant Management Plan Update* would result in the enhancement and protection of native vegetation within the project area and thus would have localized, long-term beneficial impacts on vegetation. When combined with the impacts under Alternative 3, cumulative impacts on vegetation would be adverse in the short-term and beneficial in the long-term.

## WETLANDS

### Affected Environment

Wetlands are ecologically sensitive and productive habitats that support a rich array of both plant and animal life. They sustain a great variety of hydrologic and ecological functions vital to ecosystem integrity.

The NPS classifies and maps wetland habitats according to the Federal Geographic Data Committee (FGDC) Wetlands Classification Standard (FGDC-STD-004-2013). This is a revision of the 1979 USFWS publication *Classification of Wetlands and Deepwater Habitats of the U.S.* (Cowardin et al. 1979), commonly known as the Cowardin classification system.

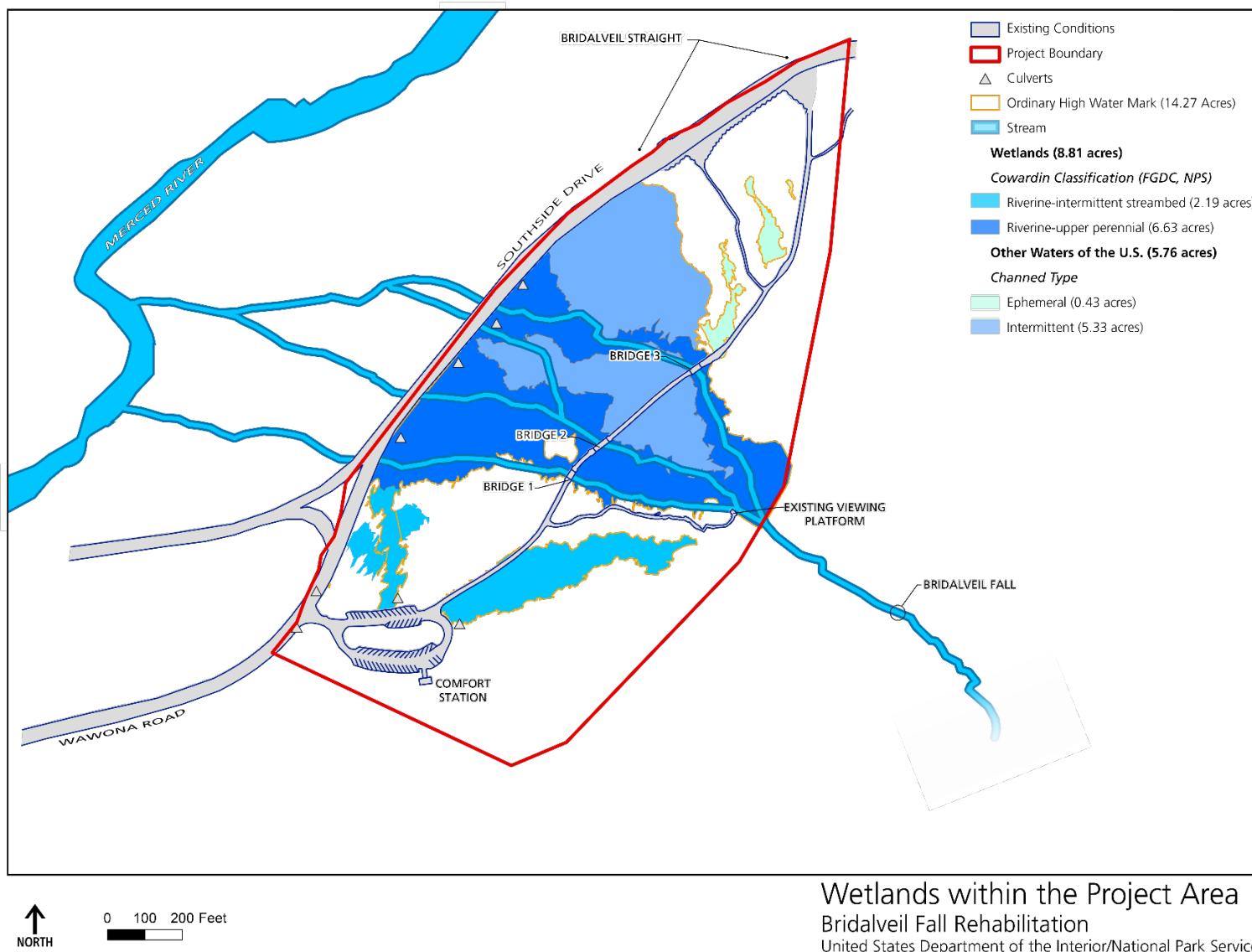
For wetland permitting purposes, the Clean Water Act assigns jurisdiction over “Waters of the U.S.” to the USEPA, which bestowed regulatory management to the U.S. Army Corps of Engineers (USACE). “Waters of the U.S.” include features such as streams, rivers, bays, mudflats, washes, tributaries, and impoundments. “Waters of the U.S.” that do not meet the specific qualifications for a jurisdictional wetland may be classified as “Other waters of the U.S.” These “Other waters” may include unvegetated portions of waterways and drainages along creeks and rivers. The USACE uses the *1987 Corps of Engineers Wetlands Delineation Manual* (1987 Environmental Laboratory) and regional supplements as the standard for regulatory purposes.

The FGDC Wetlands Classification Standard (NPS policy) encompasses more aquatic habitat types than the 1987 USACE Manual used for permitting purposes. The first step for a NPS wetland analysis is to delineate all wetlands in the project area, without regard to regulatory jurisdiction. Once complete, the NPS and USACE determine the treatment of each wetland affected by the proposed action. Any direct impacts to wetlands from grade and/or fill activities would be permitted and mitigated for under Section 404 of the Clean Water Act.

The NPS Director's Order 77-1: *Wetland Protection* states that NPS units are required to: (1) minimize the destruction, loss, or degradation of wetlands; (2) preserve and enhance the natural and beneficial values of wetlands; and (3) avoid direct or indirect support of new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable measures to minimize harm to wetlands. The USACE Section 404 permit program regulates only the dredging or placement of fill material in jurisdictional waters of the U.S.

The Bridalveil Fall project area is a dynamic wetland area with 8.81 acres of wetland features including the braided stream channel of Bridalveil Creek (Riverine Upper Perennial Streambed wetland) and Riverine Intermittent Streambed wetlands that flow in and out of the northeast corner of the parking lot area. There are also channels that flow less often that the USACE considers Intermittent Other Waters of the U.S. and Ephemeral Other Waters of the U.S. (5.76 acres) (Figure 3-3). Two hydrophytic plant species were identified within the ordinary high water mark for many mapped features (white alder [*Alnus rhombifolia*] and California bay laurel [*Umbellularia californica*]). Soils in the area are classified as mollic xerofluvents (young hydric soils with shallow organic horizons).





**Figure 3-3. Wetlands within the Project Area**

## Environmental Consequences – Methodology

Wetland resources were analyzed using qualitative and quantitative assessment of impacts on wetland resources likely caused by the construction activities associated with rehabilitation of Bridalveil Fall. The results of the 2015/2016 wetland delineation (NPS 2017a) conducted within the proposed project area were used to inform the following analysis.

The wetland protection statutes that guide the NPS include Executive Order 11990, *Protection of Wetlands*; Director's Order 77-1: *Wetland Protection*, and its accompanying Procedural Manual 77-1; the Clean Water Act Sections 10 and 404; and the “no net loss” goal outlined by the White House Office on Environmental Policy in 1993. Executive Order 11990 requires agencies to minimize the destruction, loss, or degradation of wetlands. NPS's Director's Order 77-1 and Procedural Manual 77-1 provide specific procedures for carrying out Executive Order 11990.

This project is exempt from preparation of a Wetland Statement of Findings because the proposed actions in the preferred alternative are “excepted actions” according to Section 4.2.1 of NPS Procedural Manual 77-1: *Wetland Protection*. Excepted actions as defined in Director's Order 77-1 may include:

- Scenic overlooks and foot/bike trails or boardwalks, including signs, where primary purposes include public education, interpretation, or enjoyment of wetland resources, and where total wetland impacts from fill placement are 0.1 acre or less.
- Maintenance, repair, or renovation (but not full reconstruction or expansion) of currently serviceable facilities or structures.
- Minor stream crossings for underground utility lines.

## Environmental Consequences of Alternative 1 – No Action Alternative

**Analysis.** Under the No Action Alternative, Bridalveil Fall would not be rehabilitated and no repairs would be made with the exception of emergency repairs and routine and periodic maintenance activities. Although there would be no new impacts on wetlands, it is likely that under the No Action Alternative visitors would continue to experience congestion and crowded trails/viewing platforms, and wetlands would continue to be adversely impacted in areas where visitors go off-trail to avoid such congestion. Potential short- and long-term impacts to wetlands include erosion and sedimentation, altered hydrology, and trampling of wetland vegetation. Therefore, adverse short- and long-term impacts to wetlands would continue under the No Action Alternative.

**Cumulative Impacts.** Past and present projects that would potentially impact wetlands within the project area include the *Wawona Road Rehabilitation*, *Parkwide Emergency Road Repairs*, and scenic vista management prescribed in the *Merced River Plan*. These actions would potentially result in localized adverse impacts on wetlands. Any permanent impacts to wetlands from grade or fill activities would be permitted and mitigated for under Section 404 of the Clean Water Act. Therefore, any impacts to wetlands would be mitigated for and potential adverse impacts would be reduced. Potential actions under the park's Invasive Plant Management Plan Update would result in the enhancement and protection of wetland vegetation within the project area and thus would have localized, long-term beneficial impacts on wetland values. Therefore, cumulative impacts would be adverse in the short-term and adverse and beneficial in the long-term, with the No Action Alternative contributing long-term adverse impacts to overall cumulative impacts.

## Environmental Consequences of Alternative 2

**Analysis.** Under Alternative 2, piers constructed to support the bridge across Bridalveil Creek would impact Riverine Upper Perennial Streambed wetlands. The exact acreage would be determined as bridge design progresses, but impacts would be less than 0.10 acre. Piers constructed to support the

pedestrian paths over wetland areas toward the existing viewing platform would be constructed to avoid Riverine Intermittent Streambed wetlands, but there could be minor impacts if piers are necessary within the wetland (less than 0.10 acre). The viewing area to the southwest of Bridge 3 would be improved within an Ephemeral Other Waters of the U.S. Imported material to improve the site would be pervious material. Boardwalk, decking, and platform materials and sealants will be non-toxic where possible. There would be no impacts to existing hydrophytic vegetation, as none is present, or hydrologic flows. Impacts would be negligible. The small viewing platform constructed to the northeast of Bridge 3 would also be within an Ephemeral Other Waters of the U.S. The viewing area would not impact hydrophytic vegetation, as none is present, or hydrologic flows. Impacts to the Ephemeral Other Waters of the U.S. in this location would also be negligible. The pedestrian pathway would be designed and constructed with elevated portions over wetland drainages to avoid permanent impacts to wetlands and hydrological processes that sustain wetlands. Any direct impacts to wetlands from grade and/or fill activities would be permitted and mitigated for under Section 404 of the Clean Water Act, and potential adverse impacts would be reduced.

Short-term impacts, including trampling, increased sedimentation, and other temporary impacts to wetlands may occur from construction-related activities in the project area. Adherence to mitigation measures in Appendix B that specify conditions for work in streambeds, regrading and restoration within streams and wetlands, fencing and avoidance of aquatic habitats, and monitoring would minimize these adverse impacts to localized and short-term. Additionally, under Alternative 2, it is expected that informal trailing by visitors within the existing visitor use area would be reduced and impart long-term, beneficial impacts on wetlands. However, the new trail on the east side of the creek is likely to encourage new informal trailing towards the existing viewing platform. This would result in long-term adverse impacts to wetlands.

**Cumulative Impacts.** Past and present projects that would potentially impact wetlands within the project area include the *Wawona Road Rehabilitation*, *Parkwide Emergency Road Repairs*, and scenic vista management prescribed in the *Merced River Plan*. These actions would potentially result in localized adverse impacts on wetlands. Any permanent impacts to wetlands from grade or fill activities would be permitted and mitigated for under Section 404 of the Clean Water Act. Therefore, any impacts to wetlands would be mitigated for and potential adverse impacts would be reduced. Potential actions under the park's *Invasive Plant Management Plan Update* would result in the enhancement and protection of wetland vegetation within the project area and thus would have localized, long-term beneficial impacts on wetlands. Therefore, cumulative impacts would be adverse in the short-term and adverse and beneficial in the long-term, with Alternative 2 contributing short-term adverse impacts and long-term beneficial impacts to overall cumulative impacts.

### Environmental Consequences of Alternative 3

**Analysis.** Piers constructed to support the pedestrian paths over wetland areas toward the existing viewing platform would be constructed to avoid Riverine Intermittent Streambed wetlands, but there could be minor impacts if piers are necessary within the wetland (less than 0.10 acre). The viewing area to the southwest of Bridge 3 would be improved within an Ephemeral Other Waters of the U.S. Imported material to improve the site would be pervious material. There would be no impacts to existing hydrophytic vegetation, as none is present, or hydrologic flows. Impacts would be negligible. The small viewing platform constructed to the northeast of Bridge 3 would also be within an Ephemeral Other Waters of the U.S. The viewing area would not impact hydrophytic vegetation, as none is present, or hydrologic flows. Impacts to the Ephemeral Other Waters of the U.S. in this location would also be negligible. The pedestrian pathway would be designed and constructed with elevated portions over wetland drainages to avoid permanent impacts to wetlands and hydrological processes that sustain wetlands. Short-term impacts, including trampling, increased sedimentation,

and other temporary impacts to wetlands may occur from construction-related activities in the project area. Adherence to mitigation measures in Appendix B that specify conditions for work in streambeds, regrading and restoration within streams and wetlands, fencing and avoidance of aquatic habitats, and monitoring would minimize these adverse impacts to localized and short-term. Additionally, under Alternative 3, it is expected that the new loop trail would reduce informal trailing by visitors and impart long-term beneficial impacts on wetlands.

**Cumulative Impacts.** Past and present projects that would potentially impact wetlands within the project area include the *Wawona Road Rehabilitation*, *Parkwide Emergency Road Repairs*, and scenic vista management prescribed in the *Merced River Plan*. These actions would potentially result in localized adverse impacts on wetlands. Any permanent impacts to wetlands from grade or fill activities would be permitted and mitigated for under Section 404 of the Clean Water Act. Therefore, any impacts to wetlands would be mitigated for and potential adverse impacts would be reduced. Potential actions under the park's *Invasive Plant Management Plan Update* would result in the enhancement and protection of wetland vegetation within the project area and thus would have localized, long-term beneficial impacts on wetlands. Therefore, cumulative impacts would be adverse in the short-term and adverse and beneficial in the long-term, with Alternative 3 contributing short-term adverse impacts and long-term beneficial impacts to overall cumulative impacts.

## SCENIC RESOURCES

### Affected Environment

In 1864, Congress passed landmark legislation to set aside Yosemite Valley and Mariposa Grove “for public use, resort, and recreation.” This was the first time Congress set aside public lands for the express purpose of preserving scenic and natural values. The Organic Act (16 United States Code [USC] 1) of 1916 mandated that all visual resources within National Parks are to be conserved and managed in an unimpaired condition for the enjoyment of future generations. The 1980 *Yosemite General Management Plan* (NPS 1980) specifies the following management objectives to preserve, protect, and restore scenic resources:

- Identify the major scenic resources and the places from which they are viewed.
- Provide for the preservation or protection of existing scenic resource and viewing stations.
- Provide for historic views through vista clearing.
- Permit only those levels and types of use that are compatible with the preservation or protection of the scenic resources and with the quality of the viewing experience.

A Yosemite visitor study conducted in the summer of 2009 indicated that the most common visitor activity was viewing scenery (93%) (Blotkamp et al. 2010). A comprehensive analysis of existing and historic views conducted in the late 1970s found that Bridalveil Fall was one of 11 most important scenic icons in Yosemite Valley.



BRIDALVEIL FALL

This description and analysis considers scenic vistas in the project area from three perspectives:

- Selective clearing proposed in this plan to enhance views as proposed in Alternatives 2 and 3 and impacts of the plan on established viewpoints in the *Merced River Plan*.
- Historic viewpoints that are contributing elements to the Yosemite Valley Historic District (analyzed under Cultural Resources - Built Environment).
- Effects of Bridalveil Fall scenic vista treatments that are prescribed in the *Merced River Plan* (described in Appendix B, Cumulative Effects of the *Merced River Plan* and analyzed under Cumulative Effects for each alternative). The plan also considers views of El Capitan from Bridalveil Straight.

The *Merced River Plan* identifies six Bridalveil Fall vistas in west Yosemite Valley and it prescribes treatments to maintain the views. Originally, the *Scenic Vista Management Plan/Environmental Assessment (Scenic Vista Plan)* (NPS 2011c) identified and described treatments for these six scenic vistas. The *Merced River Plan* ultimately analyzed and directed the six vista management actions and others in the Merced River corridor. The *Scenic Vista Plan* based the selection of the six scenic vistas on vividness, uniqueness, access, and intactness of each vista point. The *Scenic Vista Plan* also considered a comprehensive scenic analysis conducted in the late 1970s in conjunction with the *Yosemite General Management Plan*. Bridalveil Fall project actions that could impact these six vistas (e.g., new development in a native landscape) are considered in the analysis of each Alternative.

This description and analysis also considers the mandated protection of scenic ORVs as prescribed in the *Merced River Plan*. The *Merced River Plan* identifies one scenic ORV in Segment 2B - *Iconic Scenic Views in Yosemite Valley: Visitors to Yosemite Valley experience views of some of the world's most iconic scenery, with the river and meadows forming a placid foreground to towering cliffs and waterfalls*. The NPS must maintain high priority scenic vista points, perform a contrast analysis on all new proposed structures in the segment, and take action to keep proposed structures appropriate to the Yosemite Valley landscape to protect the scenic ORV.

### Environmental Consequences – Methodology

The scenic resources analysis considers substantial changes that could alter the (1) existing landscape character, whether foreground, intermediate ground, or background, that would be visible from important viewpoints; (2) access to historically important viewpoints or sequence of viewpoints; or (3) the visibility of a viewpoint or sequence of viewpoints. This analysis considers impacts on the six scenic vistas identified in the *Merced River Plan*, the selective clearing proposed in this plan to enhance additional views, and additional opportunities for viewing as proposed in



Alternatives 2 and 3. The analysis considers actions to maintain scenic vistas in the *Merced River Plan* under the cumulative analysis.

Impacts on scenic resources were examined and determined by comparing the existing visual character of the landscape in terms of the color, contextual scale, and formal attributes of landscape components and features, and the degree to which actions that may result from the proposed action would affect (i.e., contrast or conform with) that character. The analysis considers changes in experiential factors, such as whether a given action would result in a visible change, the duration of any change in the visual character, the distance and viewing conditions under which the change would be visible, and the number of viewers that would be affected.

Impacts were evaluated in terms of whether they would be beneficial or adverse to scenic resources. Beneficial impacts would enhance the existing landscape character, access to historically important viewpoints or sequence of viewpoints, or the visibility of a viewpoint or sequence of viewpoints. Adverse impacts were considered those that focus viewing on human constructed modifications or add development into the native landscape. Beneficial impacts would enhance a natural scenic view or provide additional opportunities for viewing.

### **Environmental Consequences of Alternative 1 – No Action Alternative**

**Analysis.** Under Alternative 1, the No Action Alternative, scenic resources would remain the same, and no new impacts would occur. Existing views would be maintained, but would not be enhanced, no additional project specific selecting thinning would occur from viewpoints, and no new viewing areas would be created. Historic scenic views of Bridalveil Fall would continue to be obscured, except where prescribed in the *Merced River Plan*. As a result, there would be a local, long-term adverse impact on scenic resources.

**Cumulative Impacts.** Cumulative impacts to scenic resources are based on analysis of past, present, and reasonably foreseeable future actions within the project area in combination with the potential effects of this alternative. Present actions that cumulatively impact scenic resources within the project area include treatments to maintain the six Bridalveil Fall views described in the *Merced River Plan*. These projects have a long-term beneficial impact on scenic resources. Under Alternative 1, no existing views would be enhanced and no new viewing areas would be created. As a result, Alternative 1, in conjunction with past actions, would contribute to a long-term beneficial cumulative impact on scenic resources.

### **Environmental Consequences of Alternative 2**

**Analysis.** Under Alternative 2, there would be short-term adverse impacts on scenic resources within the project area during construction due to ground disturbance, intrusive light, presence of construction equipment and vehicles, and presence of personnel. Construction within the project area would impact both scenic views of El Capitan and Bridalveil Fall. These impacts would be localized and end once the construction is complete.

There would be long-term beneficial impacts to scenic resources within the project area as a result of selective tree thinning to enhance existing views and additional opportunities for viewing areas within the project area. A new gathering area with views of Bridalveil Fall and El Capitan along Southside Drive would be constructed, with trees selectively removed to enhance the view of El Capitan. Several additional viewing areas would be created, including a new viewing area near the parking lot restrooms, a new viewing platform on the new accessible loop trail, a new viewing area northeast and southwest of Bridge 3, a viewing area near the new comfort station at Bridalveil Straight, and the entire new bridge spanning 3,300 square feet across Bridalveil Creek would serve as a dramatic new viewing area. Selective tree clearing would take place as needed to enhance views.

Construction of the new comfort station on Bridalveil Straight and a new bridge across Bridalveil Creek would introduce new structures into a native landscape. The degree to which these structures would harmonize or detract from the landscape would be mitigated in part by the application of the Yosemite Design Guidelines (NPS 2011a). The new comfort station would intrude into the Bridalveil Straight Interpretive Sign scenic vista identified in the *Merced River Plan*. The bridge would be within some views of Bridalveil Fall from the west trail along Bridalveil Creek. While designed to fit into the natural landscape, the scale and presence of the bridge would change the existing character of the natural setting. The design features of the proposed improvements and facilities would be compatible with the Yosemite Design Guidelines (NPS 2011a), but they would change the setting and character of the natural landscape, and would result in reduced scenic quality.

**Cumulative Impacts.** Cumulative impacts to scenic resources are based on analysis of past, present, and reasonably foreseeable future actions within the project area in combination with the potential effects of this alternative. Present actions that cumulatively impact scenic resources within the project area include treatments to maintain the six Bridalveil Fall views described in the *Merced River Plan*. The new comfort station would intrude into the Bridalveil Straight Interpretive Sign scenic vista identified in the *Merced River Plan*. These projects, in conjunction with Alternative 2, would have long-term beneficial cumulative impacts on scenic resources.

### Environmental Consequences of Alternative 3

**Analysis.** Short-term impacts to scenic resources under Alternative 3 would be similar to those under Alternative 2, except that construction activities under Alternative 3 would likely take less time under Alternative 2. Short-term adverse impacts on scenic resources within the project area would occur during construction due to ground disturbance, intrusive light, presence of construction equipment and vehicles, and presence of personnel. Construction within the project area would impact both scenic views of El Capitan and Bridalveil Fall. These impacts would be localized and end once the construction is complete.

Long-term impacts to scenic resources under Alternative 3 would differ from Alternative 2, as there would not be a viewing bridge across Bridalveil Creek. Instead, the existing viewing platform at the base of the Fall would be enlarged from 400 square feet to 1,500 square feet. This expanded platform would impact views at ground level from the west trail, but it would not silhouette or block views of the fall. There would be long-term beneficial impacts to scenic resources within the project area as a result of selective tree thinning to enhance existing views and open up additional viewing areas within the project area. A new gathering area with views of Bridalveil Fall and El Capitan along Southside Drive would be constructed, with trees selectively removed to enhance the view of El Capitan. Several additional viewing areas would be created, including a new viewing area near the parking lot restrooms, a new viewing platform on the new accessible loop trail, a new viewing area northeast and southwest of Bridge 3, and a smaller overlook with views of the fall would be added to the new accessible loop trail, approximately 700 square feet, would be added to the new accessible loop trail south of the existing platform. Selective tree clearing would take place as needed to enhance views. The design features of the proposed improvements and facilities would be compatible with the Yosemite Design Guidelines (NPS 2011a), would be compatible with the setting and character of the area, and would not result in reduced scenic quality.

**Cumulative Impacts.** Cumulative effects to scenic resources are based on analysis of past, present, and reasonably foreseeable future actions within the project area in combination with the potential effects of this alternative. Present actions that cumulatively impact scenic resources within the project area include treatments to maintain the six Bridalveil Fall views described in the *Merced River Plan*. These projects, in conjunction with Alternative 3, would have long-term beneficial cumulative impacts on scenic resources.

## SOILS AND GEOLOGY

### Affected Environment

Bridalveil Fall is in the southwestern portion of the Yosemite Valley within Yosemite National Park and is the first major waterfall that visitors see when entering the valley. The cliffs of Yosemite Valley, including those in the Bridalveil Fall project area, are composed of Cretaceous-age granitic rocks (Calkins et al. 1985). These granitic rocks are particularly strong and generally lack fractures, allowing for the preservation of very steep cliffs.

A combination of uplift of the Sierra Nevada, stream erosion, and glacial erosion formed the hanging valleys and multiple waterfalls in Yosemite Valley. The Bridalveil Creek hanging valley is unique to the area due to its deeply incised V-shape, indicating prolonged stream erosion. Differential erosion between the glacially carved Yosemite Valley and the primarily stream carved Bridalveil Creek valley left the latter valley “hanging” above the floor of the former. From the lip of this hanging valley, Bridalveil Fall plummets 617 feet, producing the famous drenching mists as the base of the fall (Matthes 1930).

Since glaciers last retreated from Yosemite Valley approximately 15,000 years ago, rockfalls have become the most potent geological force acting in Yosemite Valley, with a rockfall occurring somewhere in the valley every week on average (Stock et al. 2013). Some of the Bridalveil Fall project area is considered subject to rockfall hazard (Stock et al. 2014), most notably the viewing platform at the base of the waterfall.

Ground shaking associated with earthquakes generated by distant seismically active fault zones is also a risk for the Bridalveil Fall project area. Relative to other areas of California, the project area is located in a low seismic hazard zone. However, large earthquakes are possible along the active fault zone along the eastern edge of the Sierra Nevada range resulting in ground shaking severe enough to cause structural damage to the Bridalveil Fall amenities and rockfalls along the steep cliffs adjacent to the waterfall.

The Natural Resources Conservation Service (NRCS) has identified approximately 120 soil types within Yosemite National Park. The variation in soil composition within the region is dependent on glacial history, current weathering and stream erosion/deposition, and differences in microclimates and vegetation. Primarily, the soil in the region is of granitic composition from the underlying granitic bedrock (NRCS 2007).

The Bridalveil Fall project area has two distinct types of sedimentary substrate: (1) colluvial deposits at the top of the fall and at the base of the cliff, and (2) alluvial deposits within the valley adjacent to the fall. The colluvial deposits are derived primarily from rockfalls, and consist mainly of coarse, angular rock fragments with minor components of granitic sand and decomposed plant material. The majority of the infrastructure within the Bridalveil Fall project area is built on top of the alluvial deposits. These alluvial deposits consist primarily of fine to coarse granitic sandy loam and include minor components of coarse rock fragments and occasional boulders. There is a high erosive potential for the alluvial deposits due to poorly developed topsoil that is generally thin and sandy, and the proximity to flowing water that can cause erosion through flooding, channel cutting, undercutting, and other stream mechanisms (NRCS 2007).

Along the Bridalveil Fall trails, erosion is a serious concern due to the high traffic volume and soil characteristics. The high traffic volume along the Bridalveil Fall trails also causes soil compaction due to the thin layer of soil and the hard granitic bedrock. Soil compaction reduces the ability of surface water to infiltrate soil and increases runoff and erosion of the already highly erosive alluvial deposits.

### Environmental Consequences – Methodology

Impacts to geology and soils were analyzed through qualitative assessment of soil types, geological features, and rock fall hazard zones. Types of geology and soil impacts include those resulting from soil removal, compaction, erosion, and contamination; increased risk of rock fall hazards; and construction on top of rocks and boulders. These factors along with mitigation strategies were considered in determining potential impacts on geology and soils under each alternative.

Potential impacts were characterized into short- and long-term impacts and beneficial and adverse impacts. Beneficial impacts would protect soils from erosion, decrease rock fall hazards, and include very little soil or rock/boulder removal; adverse impacts would increase erosion of soil, increase the rock fall hazard, and include a considerable amount of soil or rock/boulder removal. Impacts can be direct (an immediate result of the action) or indirect (resulting from the action but occurring later in time or removed from the location of direct physical impacts).

### Environmental Consequences of Alternative 1 – No Action Alternative

**Analysis.** Under the No Action Alternative, there would be no new impacts to the geology and soils in the Bridalveil Fall project area. Bridalveil Fall would not be rehabilitated and no repairs would be made with the exception of emergency repairs and routine and period maintenance activities. The current configuration of the Bridalveil Fall area does not support the amount of visitors who frequent the area. The parking lot would continue to be overcrowded and prone to flooding allowing an increased risk of soil contamination from surface runoff. The Bridalveil Fall trail system and viewing platform would continue to be heavily congested and visitors may move off the developed trails compacting soils and increasing soil erosion. With the current conditions at the Bridalveil Fall area, potential soil contamination from surface runoff, soil compaction, and soil erosion would continue causing long-term adverse impacts.

**Cumulative Impacts.** Localized, short-term adverse impacts on surface and sub-surface soils could result from construction activities associated with some of the past, current, and reasonably foreseeable actions planned or approved within the park. Past projects that contributed to adverse impacts on soils include *Parkwide Emergency Road Repairs*, *Wawona Road Rehabilitation*, and *Reconstruct Critically Eroded Sections of El Portal Road*. However, these projects would also result in localized long-term, beneficial impacts by improving drainage and decreasing soil erosion. Present work that has the potential to affect geology and soils includes planned tree removal of moderate to large conifers at several scenic vistas in the Bridalveil Fall area. No future or foreseeable projects within the park could affect geology and soils.

When combined with the long-term adverse impacts associated with the No Action Alternative, cumulative impacts on geology and soils would be long-term and adverse, with the No Action Alternative contributing noticeable adverse impacts to overall cumulative impacts.

### Environmental Consequences of Alternative 2

**Analysis.** Under Alternative 2, disturbance to geology and soils could result from the following activities: parking lot and entrance modifications, expansion of the trails and gathering and viewing areas, construction of the new comfort stations and bridge across Bridalveil Creek, and paving of the Carriage Road Trail (Bridalveil Fall Trail). Geology and soils would be affected within the project area wherever paving, excavation, and/or fill is proposed. Under Alternative 2, approximately 4.23 acres of surface and near-surface soils would potentially be disturbed as part of the construction activities, the majority of which would include the repavement of parking area and existing trails and the paving of the existing Bridalveil Fall Trail. As a part of these construction activities, there would be an increase of approximately 1.75 acres of impervious surfaces and an additional 0.22 acre of boardwalks and elevated paths installed.

Construction-related impacts from the use of equipment and worker foot-traffic within the project area would cause local, short-term adverse impacts due to soil compaction, soil erosion, soil contamination, and displacement of soil and boulders. BMPs and mitigation measures such as MM-GEO-1 found in Appendix A would minimize these impacts and risks.

Under Alternative 2, the parking lot would be reconfigured to be above flood levels, existing culverts and headwalls would be reconstructed, and the connection between the existing trailhead and the parking lot would be widened and raised using fill. This would reduce flooding and the potential for soil contamination from surface water runoff, thus providing a local, long-term beneficial impact. Electric and sewer lines for the new comfort station would be placed within the existing footprint of the road avoiding the disturbance of any previously undisturbed soil. However, during the installation of the electric and sewer lines, some soil would be displaced.

The construction of the new trails and viewing areas would cause local, short-term adverse impacts of soil erosion, soil compaction, and displacement of soil and boulders. However, they are intended to reduce informal trailing in natural areas, which would be beneficial in the long-term by decreasing soil erosion and compaction. In addition, the expansion of trails within the rockfall hazard zone would likely increase visitor exposure to rockfall hazards. This would be a local, long-term adverse impact. Therefore, impacts to geology and soils under Alternative 2 would be adverse in the short-term and both adverse and beneficial in the long-term.

**Cumulative Impacts.** Localized, short-term adverse impacts on surface and sub-surface soils could result from construction activities associated with some of the past, current, and reasonably foreseeable actions planned or approved within the park. Past projects that contributed to adverse impacts on soils include *Parkwide Emergency Road Repairs*, *Wawona Road Rehabilitation*, and *Reconstruct Critically Eroded Sections of El Portal Road*. These projects would also result in localized, long-term beneficial impacts by improving drainage and decreasing soil erosion. Present work that has the potential to affect geology and soils includes planned tree removal of moderate to large conifers at several scenic vistas in the Bridalveil Fall area. No future or foreseeable projects within the park could affect geology and soils.

When combined with the impacts under Alternative 2, cumulative impacts on geology and soils would be adverse in the short-term and beneficial in the long-term.

### Environmental Consequences of Alternative 3

**Analysis.** Under Alternative 3, disturbance to geology and soils would be similar to that under Alternative 2; however, disturbance to soils would be less. Under Alternative 3, approximately 3.75 acres of surface and near-surface soils would potentially be disturbed as part of the construction activities, the majority of which would include the repavement of parking area and existing trails, expansion of the existing viewing platform, and the paving of the existing Bridalveil Fall Trail. As a part of these construction activities, there would be an increase of approximately 1.38 acres of impervious surfaces and an additional 0.16 acre of boardwalks and elevated paths installed. Additional disturbance would result from the construction of an additional entrance into the parking lot; however, there would not be an additional bathroom at Bridalveil Straight, a bridge/viewing platform across Bridalveil Creek, or a second continuous loop trail from the existing viewing platform to the Bridalveil Fall Trail.

Construction-related impacts from the use of equipment and worker foot traffic within the project area would cause local, short-term adverse impacts due to soil compaction, soil erosion, soil contamination, and displacement of soil and boulders. BMPs and mitigation measures such as MM-GEO-1 found in Appendix A would minimize these impacts and risks.



Under Alternative 3, the parking lot would be reconfigured to be above flood levels, existing culverts and headwalls would be reconstructed, and the connection between the existing trailhead and the parking lot would be widened and raised using fill. This would reduce flooding and the potential for soil contamination from surface water runoff, thus providing a local, long-term beneficial impact. Electric and sewer lines for the new comfort station would be placed within the existing footprint of the road avoiding the disturbance of any previously undisturbed soil. However, during the installation of the electric and sewer lines, some soil would be displaced.

The construction of the new trails and viewing areas would cause local, short-term adverse impacts of soil erosion, soil compaction and displacement of soil and boulders. However, the new loop trail is intended to reduce informal trailing in natural areas, which would be beneficial in the long-term by decreasing soil erosion and compaction.

**Cumulative Impacts.** Localized, short-term adverse impacts on surface and sub-surface soils could result from construction activities associated with some of the past, current, and reasonably foreseeable actions planned or approved within the park. Past projects that contributed to adverse impacts on soils include *Parkwide Emergency Road Repairs*, *Wawona Road Rehabilitation*, and *Reconstruct Critically Eroded Sections of El Portal Road*. These projects would also result in localized, long-term beneficial impacts by improving drainage and decreasing soil erosion. Present work that has the potential to affect geology and soils includes planned tree removal of moderate to large conifers at several scenic vistas in the Bridalveil Fall area. No future or foreseeable projects within the park could affect geology and soils.

When combined with the impacts under Alternative 3, cumulative impacts on geology and soils would be adverse in the short-term and beneficial in the long-term.

## VISITOR EXPERIENCE AND RECREATION

### Affected Environment

Bridalveil Fall is one of the most popular attractions within Yosemite National Park (NPS 2009). Bridalveil Fall is often the first waterfall visitors see when entering Yosemite Valley and the area offers a spectrum of opportunities for recreation, including hiking, sightseeing, photography, and nature study. This resource considers the experience of visitors to the Bridalveil Falls area in terms of the availability of diverse viewing and trail options, accessibility for all park visitors, crowding, visitor density, safety, and adequate restrooms. It also considers traffic congestion for private vehicles, tour buses, and NPS shuttle buses.

Over five million people visited Yosemite National Park in 2016 (NPS 2016). About 52% of the park's visitors visit the base of Bridalveil Fall per a 2009 summer visitor use study (NPS 2009). Peak flows at Bridalveil Fall occur in spring and early summer, and visitation to the area generally reflects the size of the waterfall. Comments on the poor condition and wait times at the low-functioning vault toilets at the parking area are a common complaint letter received in the park.



EXISTING COMFORT STATION AT BRIDALVEIL FALL

The paved trail to the viewing platform at the base of the waterfall from the Bridalveil Fall parking area follows a historic carriage road for about half of the route. The final part of the trail is not fully accessible (Architectural Barriers Act [ABA]-compliant) due to its steep grade as one approaches the viewing platform. Another visitation access point for Bridalveil Fall is Bridalveil Straight. Based on 2017 visitor experience data, the majority of the use on Bridalveil Straight is to view El Capitan. Visitors also stop on Bridalveil Straight to orient themselves to this entry into Yosemite Valley, take a break, or hike to the Merced River. The trail from Southside Drive at Bridalveil Straight that connects to the trail to the viewing platform is not paved.

The trails in the Bridalveil Fall area are often busy and the viewing platform is often crowded during times of peak visitation. The *Merced River Plan* determined a standard for visitors on the viewing platform of 20 square feet per person during the busiest hours of the day on the busiest days of the year (NPS 2014a). Based on a July 2017 study that evaluated visitor volumes and characteristics between the hours of 10:00 a.m. and 4:00 p.m., the average number of people arriving to the viewing platform area per hour was 630, with a maximum of 800 and a minimum of 437 (Hockett 2017). The average number of people on the platform at one time was 36 (approximately 11 square feet per person). Tour bus visitors tended to arrive within minutes of each other, causing congestion on the platform (Hockett 2017). Parking in unsanctioned areas in the parking lot and along roadways likely contributes to congestion during the busiest visitation times of the year. At lower water levels, many visitors to the Bridalveil Fall platform explore the boulders around the platform area and up to the waterfall. The boulders are slippery and accidents occur regularly.



CROWDED VIEWING PLATFORM



VISITORS CLIMBING ON BOULDERS NEAR VIEWING PLATFORM

Traffic congestion is an important consideration for park visitors. The majority of visitors to the park travel by private vehicle (88%), while 10% travel by bus service or commercial tour/school bus and 2% travel using the Yosemite Area Regional Transportation System. Bus transportation within the park includes public transportation, charter and tour bus operators, concessionaire-operated tours, and NPS shuttle bus services. Currently, tour buses may park at Bridalveil Straight on either side of the roadway. These parking areas are on a first come first serve basis and shared with private vehicles. As a result, there are often no spaces for buses. Cars attempting to enter the parking lot when it is full frequently backs up traffic on to Wawona Road in both directions, creating large traffic hold-ups. Cars exiting the parking lot and turning left toward Wawona block southbound traffic on Wawona Road. During peak visitation, these situations require the services of traffic management staff to clear traffic in the area.

### Environmental Consequences – Methodology

The analysis of impacts to visitor experience is based on whether there would be a complete loss of a recreation opportunity, a change in access to or availability of a recreation opportunity, a change in the quality of visitor experience or recreational opportunities, or a change in safety.

Impacts were evaluated in terms of whether they would be beneficial or adverse to visitor experience. Beneficial impacts would enhance visitor participation and quality of visitor experience. Adverse impacts reduce visitor participation or quality of visitor experience. Impacts can be direct (an immediate result of the action) or indirect (resulting from the action but occurring later in time or removed from the location of direct physical impacts). The duration of an impact considers whether the impact would occur in the short-term (temporary) or over the long-term (permanent).

### Environmental Consequences of Alternative 1 – No Action Alternative

**Analysis.** Under the No Action Alternative, Bridalveil Fall would not be rehabilitated and no repairs would be made with the exception of emergency repairs and routine and periodic maintenance activities. Visitor experience, services, and safety would remain in their current condition. Under the No Action Alternative, visitors would continue to experience low-functioning vault toilets, congestion associated with the parking lot, busy trails, a crowded viewing platform that does not meet the visitor experience standards established in the *Merced River Plan*, a lack of accessible path of travel to the primary viewing platform, and unclear wayfinding. Overall, the No Action Alternative would result in a local, long-term adverse impact on visitor experience.

**Cumulative Impacts.** All of the past, present, and reasonably foreseeable future actions in Appendix B would likely impart short-term adverse impacts on visitor experience and recreation during initial construction and/or rehabilitation activities. All of the actions would impart more long-term

beneficial impacts on visitor experience and recreation. However, the No Action Alternative would contribute noticeable adverse impacts to overall cumulative impacts.

## Environmental Consequences of Alternative 2

**Analysis.** The rehabilitation of Bridalveil Fall under Alternative 2 would have a local, short-term adverse impact on visitor experience during the construction period due to noise from the construction, increased traffic from construction personnel, and limited access to areas under construction. Construction would avoid the higher visitation period from Memorial Day to Labor Day to the extent possible.

Under Alternative 2, there would be a reduction of private vehicle parking spaces along Bridalveil Straight and an addition of dedicated parking spaces for three tour buses and one shuttle bus. There would be additional parking spaces in the reconfigured parking lot for Bridalveil Fall. To retain existing visitor capacity in west Yosemite Valley per the *Merced River Plan*, parking spaces would be removed along Bridalveil Straight. As most people parking on Bridalveil Straight do not intend to visit the base of Bridalveil Fall, this would shift some use from Bridalveil Straight activities to the Bridalveil Fall area. As more parking is available in the Bridalveil Fall parking lot, there is likely to be a reduction in “non-sanctioned” parking and associated congestion near the entrance to the parking lot during periods of moderate visitation. This would not be the case during peak visitation, as the demand for parking spaces exceeds the supply.

Under Alternative 2, visitor services and experience would be improved at Bridalveil Fall with the addition of a new comfort station with 14 stalls and flush toilets, a new gathering plaza and viewing area to provide room for restroom lines, and benches and interpretative signage. Additionally, the trail system and viewing platforms would be expanded, a new viewing area and additional signage would be added to the northeast and southwest side of Bridge 3, and trees would be removed in select areas to increase the viewshed. The comfort station on Bridalveil Straight would be beneficial to tour bus riders and the majority of the visitors who stop along Bridalveil Straight, providing an additional restroom. The new bridge would provide better pedestrian flow, better views of Bridalveil Fall, and more viewing space to accommodate existing and increased use. Overall, interpretation, wayfinding, and accessibility would be improved.

Under Alternative 2, accessibility would be improved by making the existing trails accessible (with the exception of the existing trail to the viewing platform) through decreasing the grade and paving the Bridalveil Fall Trail. In addition, all of the new trails would be accessible. Safety would be enhanced by decreasing the grade of trails; crosswalks would be added across Bridalveil Straight, commercial tour bus parking would be moved to the south side of Southside Drive and travelers would exit buses to a loading/unloading sidewalk instead of the traffic lane, a clear area that is free from parking and advance warnings would be added in front of the crosswalks, and a pedestrian path would be delineated at the west end of Bridalveil Straight on the south road shoulder. Likewise, traffic would be improved under Alternative 2 with the addition of left and right turn lanes, and the reconfiguration of the parking lot.

Therefore, under Alternative 2 there would be short-term adverse impacts on visitor experience and recreation, and overall long-term beneficial impacts.

**Cumulative Impacts.** All of the past, present, and reasonably foreseeable future actions in Appendix B would likely impart short-term adverse impacts on visitor experience and recreation during initial construction and/or rehabilitation activities. However, all of the actions would impart more long-term beneficial impacts on visitor experience and recreation. When combined with the short-term adverse impacts and long-term beneficial impacts associated with Alternative 2, cumulative impacts

on visitor experience and recreation would be adverse in the short-term and beneficial in the long-term.

### **Environmental Consequences of Alternative 3**

**Analysis.** Short-term impacts to visitor experience and recreation under Alternative 3 would be similar to those under Alternative 2, except that construction activities under Alternative 3 would likely take less time under Alternative 2. The rehabilitation of Bridalveil Fall under Alternative 3 would have a local, short-term adverse impact on visitor experience during the construction period due to noise from the construction, increased traffic from construction personnel, and limited access to areas under construction. Construction would avoid the busy season to the extent possible.

Under Alternative 3, there would be a reduction of private vehicle parking spaces along Bridalveil Straight and an addition of dedicated parking spaces for three tour buses and one shuttle bus. There would be additional parking spaces in the reconfigured parking lot for Bridalveil Fall. To retain existing visitor capacity in west Yosemite Valley per the *Merced River Plan*, parking spaces would be removed along Bridalveil Straight. As most people parking on Bridalveil Straight do not intend to visit the base of Bridalveil Fall, this would shift some use from Bridalveil Straight activities to the Bridalveil Fall area. As more parking is available in the Bridalveil Fall parking lot, there is likely to be a reduction in “non-sanctioned” parking and associated congestion near the entrance to the parking lot during periods of moderate visitation. This would not be the case during peak visitation, as the demand for parking spaces exceeds the supply.

Under Alternative 3, there would be a long-term beneficial impact to visitor experience. Visitor services, including restroom facilities, would be improved; crowding on the trails and the viewing platforms would be reduced from the addition of more trails and viewing platforms; congestion in and around the parking lot and along Southside Drive would be improved through the reconfiguration of the parking lot and dedicated tour bus parking; and interpretation, wayfinding, and accessibility would be improved. Bus tour groups would be expected to frequent the viewing platform near Bridge 3 as an alternative to the longer walk to the existing viewing platform. Safety would be enhanced by decreasing the grade of trails, bus parking would be moved to the south side of Southside Road and travelers would exit buses to a loading/unloading sidewalk instead of the traffic lane, a clear area that is free from parking and advance warnings would be added in front of the crosswalks, and a pedestrian path would be added on the south road shoulder along Bridalveil Straight.

Under Alternative 3 there would be fewer trails and viewing platform areas than under Alternative 2, and a second flush toilet would not be added to Bridalveil Straight. As a result, since the number of visitors would be the same under each alternative, crowding on the viewing platforms would be greater and the trails would be busier under Alternative 3. In addition, lines at the comfort stations would be greater under Alternative 3.

**Cumulative Impacts.** All of the past, present, and reasonably foreseeable future actions in Appendix B would likely impart short-term adverse impacts on visitor experience and recreation during initial construction and/or rehabilitation activities. However, all of the actions would impart more long-term beneficial impacts on visitor experience and recreation. When combined with the short-term adverse impacts and long-term beneficial impacts associated with Alternative 3, cumulative impacts on visitor experience and recreation would be adverse in the short-term and beneficial in the long-term.



## **PARK OPERATIONS AND FACILITIES**

### **Affected Environment**

The Park Operations and Facilities topic evaluates the ability of the park to maintain a safe, functional, and orderly environment as well as provide protection for resources, visitors, and staff. The NPS Visitor Protection Division and Facilities Management Divisions play key operational roles in managing the area.

The Visitor Protection Division performs a range of activities including law enforcement, ranger patrols, preventative and real-time search and rescue, and traffic management during heavily congested periods. Rescue missions at the base of Bridalveil Falls are necessary several times a year. Rescues at the base of the waterfall are extremely difficult to perform due to the inaccessibility of the site for helicopters and sharp, wet, slippery, and steep surfaces to traverse with rescue equipment. The visitor Protection Division also will manage or evacuate areas due to rock fall, tree hazards, and wildfire.

The Facilities Maintenance Division operates and maintains park infrastructure including parking and roads, trails, buildings, water, wastewater, electrical utilities, vault toilets, paved and unpaved trails, hazard tree removal, solid waste and recycling processing and removal, and signs. Facilities Management Division workers with special skills clean and pump vault toilets. Trail workers spend approximately 3 to 4 days a year clearing downed trees and blowing debris off trails in the spring and after high wind events.

Currently, Bridalveil Fall has a number of maintenance backlog issues. The vault toilets at Bridalveil Fall are failing due to inadequate sunlight and a lack of air circulation needed to function properly. The NPS has attempted to correct the problem many times, including installation of the current propane-electric motor venting device, but with little effect.

### **Environmental Consequences – Methodology**

The analysis of park operations and facilities focuses on the ability of the park to perform law enforcement, ranger patrols, and search and rescue activities. It also considers how each alternative affects the need for traffic management and facilities maintenance activities. Impacts were evaluated in terms of whether they would be beneficial or adverse to park operations.

Beneficial impacts would improve operations and/or facilities. Adverse impacts would negatively affect operations and/or facilities, or they could impede the ability to provide adequate services and facilities to visitors and staff. Beneficial impacts represent a decrease in operating costs or management activities. Impacts can be direct (an immediate result of the action) or indirect (resulting from the action but occurring later in time or removed from the location of direct physical impacts). Short-term impacts would be temporary in duration and would be associated with construction, ecological restoration, and transitional activities. A long-term impact would have a permanent effect on operations and facilities.

### **Environmental Consequences of Alternative 1 – No Action Alternative**

**Analysis.** Under the No Action Alternative, facilities at the Bridalveil Fall area would not be improved with the exception of emergency repairs and routine maintenance activities. Existing facilities would continue to serve the area; however, maintenance issues with the existing vault toilets would continue, trails would not be improved, and the existing trails would not be accessible. Workloads on staff and funding would continue to increase with growing maintenance and repair costs and continuous search and rescue requirements. Therefore, impacts to park operations under the No Action Alternative would be local, long-term, and adverse.

**Cumulative Impacts.** Localized, short-term adverse impacts and long-term beneficial impacts on park operations would result from all of the past, current, and reasonably foreseeable actions listed and described in Appendix B. Construction projects throughout the park would require short-term additional staff time to manage contracts and construction crews. In the long-term, these projects would reduce maintenance costs and workloads. Alternative 1 would contribute long-term adverse cumulative impacts to park operations.

### Environmental Consequences of Alternative 2

**Analysis.** Under Alternative 2, there would be local, short-term adverse impacts to park operations due to additional staff time needs for contract management, visitor and resource protection, communication, and management of construction crews. Operations within the Bridalveil Fall area would be temporarily affected by construction activities, including closure of parking areas, trail routes, and road closures.

There would be local, long-term beneficial effects resulting from the reduction of maintenance time and effort needed to pump and maintain the existing vault toilets at the parking lot, as these toilets would be replaced with flush toilets. The park's current sewage treatment plan would have the capacity to handle the additional sewage generated from the proposed flush toilets. Re-paving trails and the parking lot, and raising the parking lot above flood level would reduce the need for ongoing repairs. The addition of safety railings at the current viewing area as well as the reduced grade of the trails would potentially decrease the need for search and rescue operations.

There would be local, long-term adverse impacts to park operations particularly due to the installation of the bridge across Yosemite Creek. Although the bridge is planned to be constructed above high water flows, there may be a significant need for maintenance and repair activity during high water flow to clear woody debris from bridge abutments, and there is the potential for large woody debris and frazzle ice (during winter) to cause damage and increase maintenance costs for the bridge. An additional flush toilet along Bridalveil Straight would require additional cleaning and light maintenance crews. Additional trails, including elevated pathways and boardwalks would require additional staff time and funding for maintenance. There would be more upkeep and higher skilled labor needed for maintenance of power, pumps, and water tanks associated with the new comfort stations.



WOODY DEBRIS BUILDUP ON BRIDALVEIL CREEK

**Cumulative Impacts.** Localized, short-term adverse impacts and long-term beneficial impacts on park operations would result from all of the past, current, and reasonably foreseeable actions listed and described in Appendix B. Construction projects throughout the park would require short-term additional staff time to manage contracts and construction crews. In the long-term, these projects would reduce maintenance costs and workloads. Alternative 2 would contribute long-term adverse cumulative impacts to park operations.

### Environmental Consequences of Alternative 3

**Analysis.** Under Alternative 3, there would be local, short-term adverse impacts to park operations due to additional staff time needs for contract management, visitor and resource protection, communication, and management of construction crews. Operations within the Bridalveil Fall area would be temporarily affected by construction activities, including closure of parking areas, trail routes, and road closures.

Adverse impacts to park operations under Alternative 3 would be expected to be less than that of Alternative 2 since there would not be a second comfort station at Bridalveil Straight or construction of a bridge across Bridalveil Creek. Beneficial impacts would result from the elimination of time and effort required to pump the existing vault toilet at the parking lot. The park's current sewage treatment plan would have the capacity to handle the additional sewage generated from the proposed flush toilets. Re-paving trails and the parking lot, and raising the parking lot above flood level would reduce the need for ongoing repairs. The addition of safety railings at the current viewing area as well as the reduced grade of the trails would potentially decrease search and rescue operations.

There would be local, long-term adverse impacts to park operations due to the installation of additional trails, flush toilets, and the elevated pathways and boardwalks and associated staff time and funding required for maintenance. There would be more upkeep and higher skilled labor needed for maintenance of power, pumps, and water tanks associated with the new comfort stations. Although traffic management needs may decrease due to the additional entrance to the parking area and the addition of the right-hand and left-hand turning lanes, traffic management would still be needed during peak visitation.

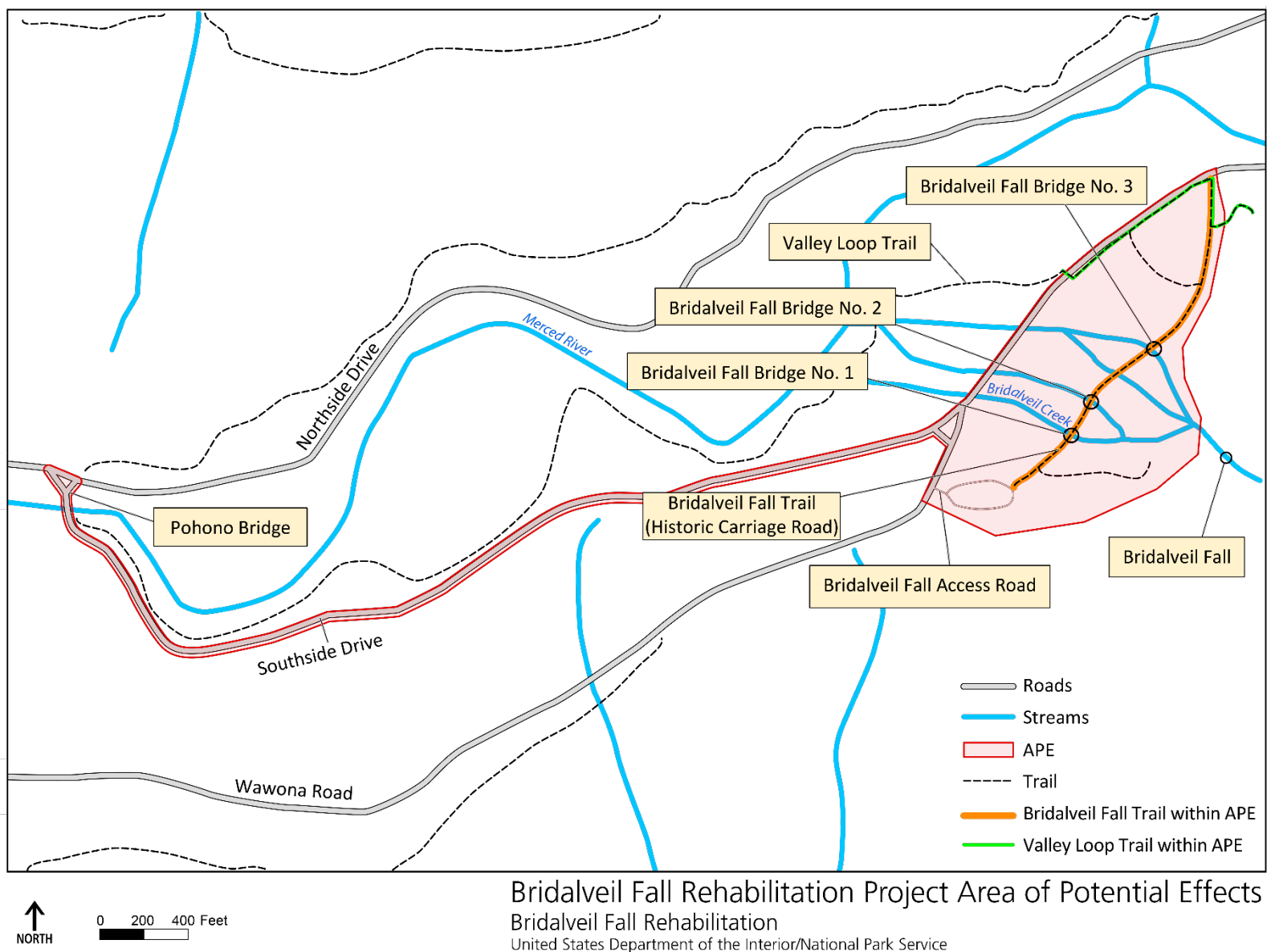
**Cumulative Impacts.** Localized, short-term adverse impacts and long-term beneficial impacts on park operations would result from all of the past, current, and reasonably foreseeable actions listed and described in Appendix C. Construction projects throughout the park would require short-term additional staff time to manage contracts and construction crews. In the long-term, these projects would reduce maintenance costs and workloads. Alternative 3 would contribute long-term adverse cumulative impacts to park operations.

### CULTURAL RESOURCES

The following analysis of all three alternatives is intended to meet the purposes of NEPA. Appendix F provides a standalone NHPA Section 106 analysis for Alternative 3 (preferred alternative) to facilitate Section 106 consultation.

#### Built Environment (Historic Structures and Landscapes)

**Affected Environment.** The area of potential effects (APE) for this project extends along Southside Drive from Pohono Bridge through Bridalveil Straight, a distance of approximately 6,500 feet, and includes the area from Southside Drive up to Bridalveil Fall along the base of the talus slope. The western boundary for the APE includes approximately 400 feet of the Wawona Road and its intersection with Southside Drive (Figure 3-4). The vertical APE extends approximately 4 to 6 feet below surface to encompass the trenching associated with the potential utility corridor (approximately 4 feet deep) and the manholes (between 5 and 6 feet deep).



**Figure 3-4. Bridalveil Fall Rehabilitation Project Area of Potential Effects**

The APE is located in the southwestern portion of the Yosemite Valley Historic District, which is a single, contiguous district that extends roughly from Pohono Bridge on the west to Mirror Lake and Vernal Fall to the east, and from the base of the valley walls from the north to the south. This district includes documentation of landscape characteristics including natural systems and features, spatial organization, vegetation, circulation, land use, views and vistas, historic buildings and structures, and sites, which collectively make up the historically significant cultural landscape of Yosemite Valley (Carr et al. 2006). Bridalveil Fall is near the west end of the district, and is one of the major defining natural features that form the granite cliff setting for the Valley.

The Yosemite Valley Historic District was entered into the National Register of Historic Places (NRHP) in December 2006. The district possesses a national level of significance in the areas of politics/government, transportation, entertainment/recreation, and conservation under Criterion A, and a national level of significance in the areas of landscape architecture, architecture, and community planning and development under Criterion C. The period of significance of the Yosemite Valley Historic District is 1855–1942.

The following is a detailed description of the built environment in the Bridalveil Fall area. Specifically, the discussion focuses on the natural systems and features, historic structures, and views and vistas that would be affected by the implementation of the Bridalveil Fall Area Rehabilitation Project.

*Natural Systems and Features* — Bridalveil Creek runs through a hanging valley, forming the dramatic 617-foot single drop Bridalveil Fall. The Merced River and its tributaries, including Bridalveil Creek, are natural systems that contribute to the significance of the Yosemite Valley cultural landscape (Carr et al. 2006; Land and Community Associates 1994). The Merced River and its tributary corridors have historically shaped the human environment of Yosemite Valley, physically defining the character of the valley landscape.

Bridalveil Fall is among the important natural features of the valley scenery that have directly influenced the pattern of development and human activity in Yosemite Valley since the mid-19th century. Although Yosemite Valley's granite cliffs and waterfalls are outside the historic district boundary, Bridalveil Fall is important to the setting of the historic district as well its overall significance and integrity (Carr et al. 2006).

*Historic Structures* — Contributing structures of the Yosemite Valley Historic District in the Bridalveil Fall project area include Pohono Bridge, Southside Drive, Valley Loop Trail, Bridalveil Fall Access Road, Bridalveil Fall Trail, and Bridalveil Fall Bridges Numbers 1–3. Non-contributing structures include the Bridalveil Fall parking area, the comfort station, the Bridalveil Fall viewing platform, and the hardened path from Bridalveil Fall Trail to the viewing platform.

Pohono Bridge was first listed in the NRHP as part of the 1977 Yosemite Valley Bridges nomination. It is also a contributing structure within the Yosemite Valley Historic District. Pohono Bridge is a reinforced concrete, semielliptical arch structure faced with native granite laid in an uncoursed rubble pattern. Wedge-shaped, rock-faced stones line the curve of the arch on both side walls of the bridge. The 32-foot-wide bridge spans 80 feet across the Merced River at the beginning of El Portal Road. It is one of eight concrete arch road bridges built in the Valley between 1922 and 1933; the NPS built Pohono Bridge in 1928. The stone spandrel walls of rough quarried granite reflect the Rustic Style developed by the NPS in the 1920s and 1930s to blend these structures with the natural environment (Wilson 1976).

Southside Drive follows sections of a carriage road around Yosemite Valley that was completed in 1882. The loop road was first paved in 1909, and culverts were installed a year later beneath stretches of Southside Drive. The NPS designed the present day Yosemite Valley Loop Road (Southside and Northside Drives) in 1938. Major floods in 1938, 1950, and 1997 necessitated repaving sections of the road and major repairs to road structures (e.g., bridges, culverts, shoulders) (NPS 2005a).



Southside Drive is a two-lane asphalt road with no shoulders and occasional turnouts. Both lanes carry one-way traffic. Over time, the NPS has provided parking to view both El Capitan and provide overflow access to the falls on the side of the road. An NPS survey in 2005 identified 71 culvert headwalls as character-defining features that contribute to the significance and historic character of the road corridor throughout the Valley (NPS 2005b). None of the contributing culvert headwalls is located in the Bridalveil Fall project area. The road generally follows the 1938 curvilinear horizontal alignment and maintains minimal cut and fill slopes to blend in with the surrounding landscape. Non-historic treatments or repairs of pavement or individual structural features do not diminish the historic character of the road.

The Valley Loop Trail is a contributing structure within the Yosemite Valley Historic District. The trail dates from the late 1920s, and is one of the primary trails originating in the Valley. It was originally built as a bridle trail, generally aligned along existing circulation routes. In 1928, the NPS added 13 miles to the Valley Loop Trail, requiring the construction of 14 bridges. By the early 1930s, construction of most of the bridle trails in the Valley was complete (Fox and Shaw 1998). Today, the Valley Loop Trail is approximately 21 miles long and includes the entire remaining bridle trail system in the Valley (Carr et al. 2006). The trail follows the historic alignment and the majority of its associated features are intact.

Bridalveil Fall Access Road consists of the two-lane entrance from Wawona Road (1933) to the loop parking area at Bridalveil Fall. The access road is asphalt and has no shoulder. The NPS likely constructed the access road in 1935 along with the new Bridalveil Fall looped parking area (NPS 1934, 1935). The access road follows the historic alignment and is in good condition.

Bridalveil Fall Trail follows the alignment of a carriage road built by the U.S. Cavalry, which managed Yosemite National Park from 1890–1914. The trail extends from the Bridalveil Fall parking area to Southside Drive, a distance of approximately 0.4 mile. The majority of the trail is paved with asphalt; however, the portion of the trail from Bridalveil Fall Bridge Number 3 to Southside Drive is dirt, lined with stones. A wider layer of paving is evident underneath the southwest end of the existing trail. Mortared stone gutters are located near the southwest end of the trail. The stone gutters may date to 1935 when the old carriage road was narrowed to 8 feet to convert it into a footpath from the newly built Bridalveil Fall parking area to Bridalveil Fall (NPS 1934, 1935). Sections of the trail near Bridalveil Fall Bridges Numbers 2 and 3 are built on fill and retained by dry-laid, uncoursed, granite walls. The Bridalveil Fall Trail is in good condition.

Along the Bridalveil Fall Trail, at the foot of Bridalveil Fall, are Bridalveil Fall Bridges Numbers 1–3. Each bridge is a reinforced concrete arch structure filled with earth and faced with stone. The spandrel walls, built of granite set in a coursed rubble pattern with mortar, include 2-foot-high guard walls terminating in cut stone end posts. Dry-laid granite wing walls with cement caps extend along the approaches to all three bridges. Bridalveil Fall Bridges Numbers 1 and 3 have a single, 20-foot span, and Bridalveil Fall Bridge Number 2 consists of two, 20-foot spans resting on a central pier. Each span is 18 feet wide (Quin 1991). The east approach to Bridge Number 3 consists of four full-width stone steps. The NPS built the existing set of steps in 1998 after the 1997 flood (NPS 2013). It is unclear when the steps that existed prior to the flood were built. A 1991 photo of Bridge Number 3 indicates the east approach consisted of three steps of compacted soil lined with stones (Quin 1991).

The U.S. Cavalry contracted for the construction of Bridalveil Fall Bridges Numbers 1–3 on a carriage road below Bridalveil Fall in 1913 including the spandrel walls and the roadway (Quin 1991). The Historic American Engineering Record (HAER) documented Bridalveil Fall Bridges Numbers 1–3 as part of the Yosemite National Park Roads and Bridges (CA-117). The HAER report identifies the Bridalveil Fall Bridges Numbers 1–3 (CA-91 through CA-93) are significant for being among the last extant park structures built under the auspices of the U.S. Cavalry (1890–1914), and as representatives of the first use of reinforced concrete in bridge construction in Yosemite National

Park (Quin 1991). One of the pylons on Bridge Number 1 is missing, but no other major deterioration is evident.



BRIDGE 3

*Views and Vistas* — Views and vistas to natural features like Bridalveil Fall are also historically significant components of the Yosemite Valley Historic District. Two vistas identified in the historic district NRHP nomination as contributing to defining the character of the cultural landscape in Yosemite Valley include the view from Northside Drive looking to Bridalveil Fall and the view from the pull-off on Southside Drive to Bridalveil Fall and Leaning Tower (Carr et al. 2006). Refer to the Scenic Resources section for the analysis of impacts to additional views beyond those included in the Yosemite Valley Historic District nomination.

### **Environmental Consequences.**

*Methodology* — The potential effects of implementing the No Action Alternative and each action alternative on Bridalveil Fall were assessed by applying the criteria of adverse effect, which are contained in the Federal regulations for implementing NHPA Section 106 [36 CFR 800.5(a)(1)]. In accordance with these criteria, an adverse effect occurs when an action alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for listing in the NRHP by diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. An adverse effect may also include reasonably foreseeable effects caused by the alternatives that would occur at a later time or that would be cumulative over the course of time.

Under Federal regulations, the assessment of effect of a proposed action on NRHP-eligible cultural resources will result in a determination of no historic properties affected, no adverse effect, or adverse effect. A determination of no historic properties affected occurs when there are no historic properties present, or the action will have no effect on historic properties. A determination of no adverse effect means that there is an effect, but the effect would not diminish characteristics of a cultural resource that qualify it for inclusion in the NRHP.

The effects of the proposed actions on the built environment at Bridalveil Fall were analyzed qualitatively, based on modifications that would be made to character-defining features (features

that qualified the property for inclusion in the NRHP as a contributing resource to the Yosemite Valley Historic District).

### **Environmental Consequences of Alternative 1 – No Action Alternative.**

*Analysis* — In general, past development, operation, and maintenance of facilities throughout Yosemite National Park have protected and preserved the integrity of historic resources affected by this project. Cumulative impact analysis focuses on those historic resources affected by this project including the Bridalveil Fall access road, Bridalveil Fall trail (carriage road) and the three carriage road bridges in conjunction with past present and future projects. Other affected historic resources include Southside Drive, Pohono Bridge and the historic views of the fall from the Valley View pullout and Southside Drive in the vicinity of the fall. For the purpose of cumulative effects analysis, the NPS has identified past projects that may have affected these historic resources since completion of the Yosemite Valley Historic District National Register nomination, which established the historic status of these resources in 2006. For the Pohono Bridge, historic structure status was established in the Yosemite Valley Bridges National Register nomination (1977). Effects to the trail and carriage road bridges since 2006 have been limited to standard trail/bridge maintenance, which is completed on an as-needed basis to address the high visitor use of the area and any damage from winter storm events. No changes to the historic carriage road alignment or its associated features have been made since completion of the nomination in 2006. Previous work along Southside Drive has not affected the historic alignment of Southside Road and has typically focused on addressing parking issues in the immediate vicinity of the fall and for the El Capitan viewing area. Likewise, the Pohono Bridge, a contributing structure to both the Yosemite Valley Historic District (2006) and the Yosemite Valley Bridges (1977) National Register nominations has received regular maintenance including minor damage repairs following the 1997 flood. Continued tree growth in the historic viewing areas along Southside Drive and the Valley View pullout is addressed through implementation of the scenic vista management actions.

Cumulatively, these projects, when combined with the No Action Alternative, would result in no adverse effect on the Yosemite Valley Historic District or the Yosemite Valley Bridges. These past projects have improved existing facilities and provided needed maintenance and repair of the roads, trails, and bridges.

Current and reasonably foreseeable actions that would have a cumulative effect on the Yosemite Valley Historic District include ongoing maintenance and repair of the Yosemite Valley Loop Road and implementation of the Scenic Vista Management Plan. The maintenance and repair of culverts and other historic elements of the Yosemite Valley Loop Road has been, and will continue to be, carried out in accordance with *A Sense of Place: Design Guidelines for Yosemite National Park* (NPS 2011a) and the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. Implementation of a program of scenic vista activities will result in the protection and restoration of historic vistas and important viewing areas in the Yosemite Valley. Therefore, these projects/activities in conjunction with the No Action Alternative would result in no adverse effect on the Yosemite Valley Historic District or the Yosemite Valley Bridges.

### **Environmental Consequences of Alternative 2.**

*Analysis* — Alternative 2 would include building two new comfort stations with flush toilets, one next to the Bridalveil Fall parking lot and one at Bridalveil Straight. These new structures would be additional non-contributing features to the Yosemite Valley Historic District. They would not diminish the integrity of the district's setting to the point of an adverse effect, as they would be constructed per Yosemite National Park Design Guidelines (NPS 2011a) (refer to Figure 2-10). Electrical and sewer lines would be installed along existing road alignment and cross Pohono Bridge to connect to existing electrical and sewer lines on Northside Drive. To cross Pohono Bridge, a contributing structure to both the Yosemite Valley Historic District and the Yosemite Valley Bridges

nomination, the lines would be encased within the deck of the bridge. Construction would not adversely affect historic fabric or historic appearance of the bridge, and the utility lines would be encased within the aggregate and asphalt deck, which are not significant character-defining features of the bridge. The electrical and sewer lines would not be visible after construction is completed. Therefore, construction of the electrical and sewer lines would not adversely affect the Pohono Bridge.

Several actions that would occur at Bridalveil Straight under Alternative 2 to improve visitor safety and enhance visitor arrival and site orientation would have the potential to affect Southside Drive, a contributing structure of the Yosemite Valley Historic District. These actions include the relocation of a crosswalk to the Valley Loop Trail, and the additions of a tour bus pullout and loading area and a seasonal shuttle stop. Relocation of the existing crosswalk would not affect the integrity of Southside Drive. Accommodating the tour bus pullout and loading area and seasonal shuttle stop would require widening an approximately 600-foot-long section of Southside Drive. Over time, the NPS provided parking on both sides of the existing road at Bridalveil Straight, so an additional expansion would not alter the overall character of the road in this area. Although the tour bus pullout and loading area would add a new element along Southside Drive, it would not adversely affect the associated significant historic features of the loop road within the Valley.

None of the actions at Bridalveil Straight, as described above, would affect the integrity of the Valley Loop Trail, a contributor to the Yosemite Valley Historic District, as none of its significant historic features would be altered to implement the improvements at Bridalveil Straight.

Under Alternative 2, a new combined entrance and exit with separate exit lanes for right-hand and left-hand turns would replace the existing access road to the Bridalveil Fall parking lot, approximately 150 feet south of the existing access road, to improve roadway safety and ease traffic congestion at the entrance to the parking area. The relocation of the Bridalveil Fall Access Road, a contributing structure of the Yosemite Valley Historic District, has the potential to adversely affect the historic district; however, Yosemite National Park would work with the designer and consult with the State Historic Preservation Office (SHPO) to explore options that would avoid or minimize the effect.

Certain actions associated with the parking lot under Alternative 2 would have the potential to affect the contributing Bridalveil Fall Trail. These actions include widening the trailhead at the parking lot and connecting it to the sidewalk to the visitor plaza, and adding fill at this connection to install a culvert to direct water under the trail. The trailhead hardened surface would incorporate a different paving material to delineate the continuation of the historic alignment of the former carriage road to the parking lot. Although the grade of the trailhead would be up to 18 inches higher, the historic carriage road alignment would be clearly distinguished within the hardened surface of the trailhead; therefore, the Bridalveil Fall Trail would not be adversely affected by the proposed actions.

Under Alternative 2, the unpaved portion of the Bridalveil Fall Trail from Bridalveil Fall Bridge Number 3 to Southside Drive would be hardened with an accessibility acceptable surface. Altogether, the entire trail from the Bridalveil Fall parking lot to Bridalveil Straight would be hardened to 12 feet in width, consistent with existing conditions. In addition, a new viewing area with interpretative signs would be added to Bridalveil Fall Trail at the intersection with the trail leading up to the viewing platform. Although the original carriage road surface material is unknown, the trail would be hardened with an accessibility acceptable surface to accommodate the heavy level of pedestrian use that it receives. To make it appear rustic, a chip-seal surfacing would be applied using gravel that is compatible in color with the surrounding soil. Although not the historic surfacing material, a chip seal surface would still be of similar form and character and would not adversely affect the carriage roads as contributing resources to the historic district. The original alignment of Bridalveil Fall Trail would be retained and no structural features of the carriage road would be adversely affected by implementation of these actions.

The proposed rehabilitation actions to Bridalveil Fall Trail, as described above, would not adversely affect Bridalveil Fall Bridges Numbers 1 and 2. No character-defining features of the bridges, including their reinforced concrete arch spans or stone spandrel and wing walls, would be altered under Alternative 2.

As part of the actions described above for improving Bridalveil Fall Trail, the stone steps at the east approach to Bridalveil Fall Bridge Number 3 would be removed, and the approach graded to meet ABA standards for accessibility. They would remove non-historic elements (the stone steps), and paving the approach would not diminish the integrity of historic materials or character-defining features of the bridge. Meeting ABA standards would have an effect to the vertical alignment of the carriage road; however, the effect would be minor and would not alter the overall character of the road in this area. Meeting ABA standards would not adversely affect the historic carriage road alignments.

Under Alternative 2, some trees and vegetation would be removed to restore historic vistas and expand views of Bridalveil Fall. These actions would have a beneficial impact on the historic views and vistas to Bridalveil Fall within the Yosemite Valley Historic District. However, the new accessible trail and bridge on the east side of Bridalveil Creek may be visible within the view of Bridalveil Fall from the Southside Drive pull-off. Although these structures would be new elements within this historic vista, they would be designed to be in conformance with *A Sense of Place: Design Guidelines for Yosemite National Park* (NPS 2011a).

Alternative 2 would repair and improve the Bridalveil Fall trail system, provide safe, accessible paths of travel and viewing areas, improve site orientation, and improve parking efficiency. However, it has more potential to impact historic structures when compared to Alternative 3. In particular, the replacement of the Bridalveil Fall Access Road with a new combined entrance and exit road approximately 150 feet to the south has the potential to alter, directly and indirectly, characteristics of the Yosemite Valley Historic District that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Yosemite National Park would consult with the SHPO and work with the designer to explore design options that would avoid or minimize the effects to historic properties. If the relocation of the Bridalveil Access Road were determined to be an adverse effect, Yosemite National Park would work with the State Historic Preservation Office to manage the existing historic segment of the access road in a way that avoided an adverse effect to the Yosemite Valley Historic District.

Alternative 2 would not adversely affect the Pohono Bridge as a contributing structure to the Yosemite Valley Bridges nomination.

*Cumulative Impacts* — The list of past, present, and reasonably foreseeable projects and plans that may affect the Yosemite Valley Historic District and the Yosemite Valley Bridges is the same as under the No Action Alternative.

When the effects of Alternative 2 are combined with those of past, current, and reasonably foreseeable projects and plans, there would no adverse effect to either the Yosemite Valley Historic District or the Yosemite Valley Bridges historic district.

### **Environmental Consequences of Alternative 3.**

For an evaluation of effects to historic properties under Alternative 3 in accordance with Section 106 of the NHPA, please refer to Appendix F.

### **Archeological Resources**

**Affected Environment.** The APE for the Bridalveil Fall project extends from Southside Drive up to Bridalveil Fall along the base of the talus slope. The western boundary for the APE includes

approximately 400 feet of Wawona Road and its intersection with Southside Drive (Figure 3-3). The APE also includes the potential utility corridor that would extend from the new comfort station up towards Southside Drive heading west for approximately 6,500 feet, and ending at Pohono Bridge. The trenching associated with the potential utility corridor would be approximately 4 feet deep and the manholes would be between 5 and 6 feet deep. Most of the trenched soil is approximately 75 percent or more of fill and the other 25 percent or less would be within native soils. Directional drilling may be used rather than trenching for the utility corridors.

Eight archeological sites are located within the APE for this project. Seven of these sites are listed in the NRHP as contributing elements of the Yosemite Valley Archeological District, listed in the NRHP in 1978. The Yosemite Valley Archeological District occupies an area of approximately 6,400 acres and contains 107 archeological sites. The archeological sites within the project area that are listed as contributing elements to the Yosemite Valley Archeological District are documented due to their ability to provide information on settlement pattern, social organization, use of natural resources, past ecosystems, subsistence, trade systems, and ethnography, as well as their ethnic affiliation with traditionally associated American Indian peoples (Anderson and Morehead 1978). One site was excavated and subsequently recommended as non-contributing to the Yosemite Valley Archeological District in 2006. One site was documented after the Yosemite Valley Archeological District was listed in the National Register of Historic Places and was therefore not included in the original nomination form. Four sites in the APE have undergone subsurface investigations. The NPS has not performed formal excavations at the other four sites.

Several archeological surveys, archeological monitoring, and excavation projects have been carried out at the Bridalveil Fall area since the mid-1970s. Yosemite National Park undertook additional comprehensive archeological research in 2014-15 and 2017 to better understand the nature and extent of the sites in the area, with an eye toward future rehabilitation of the area under this project.

Due to the sensitive nature of the archeological site information, detailed summaries regarding historic properties are not provided in this public document. All of the documented sites are significant and have integrity to yield important information about the past occupations of the area. The cultural resources are protected by various federal regulations including the National Historic Preservation Act and the Archeological Resources Protection Act. Many of the sites are subjected to disturbance and degradation due to visitor use of the Bridalveil Fall area. During the planning and design of new development, appropriate measures would be taken to assure that no adverse effects to historic properties would occur.

### **Ethnographic Resources**

*Affected Environment* — Four archeological sites within the APE have been determined to be associated with two ethnographic resources. Merriam first documented these sites in 1917 as specifically named American Indian villages (Merriam 1917).

Black oaks are traditional cultural resources within the APE. Native inhabitants of Yosemite Valley used its abundant plant resources, including nuts, roots, seeds, and berries. Acorns, in particular, were an important plant food used by the Indians of Yosemite (Hull and Kelly 1995).

Four traditional use areas are located within the APE. Local tribes used these areas as starting points for gathering resources. Tribal members would start at these locations and move outward in search of hemp, snakeroot, mushrooms, and other fungus (NPS, Thorsgard, pers. comm., 2017c). The hemp fibers were used to make bird snares, rabbit nets, bags, carrying straps, ropes, and ceremonial regalia, and for wrapping on the handle of soaproot brushes and string for making necklaces. Snakeroot was used as an antidote for snake bites. The root was chewed and then applied to the bite. Tribal members would also place the root in a small cloth bag and carry it with them while they were walking to deter a confrontation with a rattlesnake. Mushrooms and other fungi were the most



regularly gathered items by the local tribes in the Valley. Special care was taken when the local tribes collected white mushrooms. After the mushroom was cut off the stem, the remaining stem was covered back over with the soil and forest floor compost to ensure that the plant would continue to live. While collecting tree mushrooms from alder trees, the fungus was cut within an inch or two from the base so that the fungus would grow back quickly and not die. Mushrooms were usually parboiled, drained, sliced, and cooked with the left over juice and grease from beef they had previously cooked. Sometimes, they were dried in the sun for later use (Bibby 1994).

Two Tribal spiritual areas are located near the Bridalveil Fall. These two areas are highly sensitive to the traditionally associated tribes and groups of Yosemite National Park and will not be described any further. For more information on American Indian consultation for this project, please refer to Appendix F.

### **Environmental Consequences.**

*Methodology* — The potential effects of implementing the No Action Alternative and each action alternative on Bridalveil Fall were assessed by applying the criteria of adverse effect, which are contained in the Federal regulations for implementing NHPA Section 106 [36 CFR 800.5(a)(1)]. In accordance with these criteria, an adverse effect occurs when an action alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for listing in the National Register by diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. An adverse effect may also include reasonably foreseeable effects caused by the alternatives that would occur at a later time or that would be cumulative over the course of time.

Under Federal regulations, the assessment of effect of a proposed action on NRHP-eligible cultural resources will result in a determination of either no historic properties affected, no adverse effect, or adverse effect. A determination of no historic properties affected occurs when there are no historic properties present, or the action will have no effect on historic properties. A determination of no adverse effect means that there is an effect, but the effect would not diminish, in any way, characteristics of a cultural resource that qualify it for inclusion in the NRHP.

The effects of the proposed actions on archeological and ethnographic environment at Bridalveil Fall were analyzed qualitatively, based on modifications that would be made to character-defining features (features that qualified the property for inclusion in the NRHP as a contributing resource to the Yosemite Valley Archeological District).

Archeological Resources. All eight archeological sites have the potential to be affected by the project. These archeological sites include the following types of features: rock art, bedrock milling features, rock shelters, lithic scatters, depressions, and rock arrangements. The artifacts present at these same five sites include beads, diagnostic historic artifacts, scrapers, and pestles. Potential impacts to these contributing resources are evaluated based on the evaluation and/or assessment of effects using the criterion for adverse effects to the resources. The subject undertaking is a Category 3 action, where identification, evaluation, and assessment of effects remain to be determined. Consultation for Category 3 actions occurs under the standard review process per 36 CFR Part 800. Curtis (2015) completed the identification effort, where surface inventory and site documentation were completed.

Ethnographic Resources. For purposes of analyzing potential impacts to ethnographic resources, evaluations of how implementation of the alternatives may affect a character-defining pattern or feature of the NRHP-eligible cultural landscape or as historic properties of traditional and religious importance are considered in the determination of effects.

### **Environmental Consequences of Alternative 1 - No Action Alternative.**

*Analysis* — There would be no effect on the Yosemite Valley Archeological District, individual archeological sites, or ethnographic resources in the APE under the No Action Alternative. Under

the No Action Alternative, visitor facilities or services below Bridalveil Fall would not be rehabilitated or repaired and no repairs would be made with the exception of emergency repairs and routine and periodic maintenance activities. The existing comfort station with vault toilets would not be replaced with a new comfort station with flush toilets, so no trenches for new sewer or electrical lines would be excavated.

The No Action Alternative would not affect the archeological or ethnographic resources within the APE because no vegetation would be removed and the existing structures and features in the Bridalveil Fall area would remain largely unaltered from their existing state.

Under the No Action Alternative, the existing infrastructure in the Bridalveil Fall area would remain, and no new trails would be constructed. Therefore, there would be no new impacts to the Yosemite Valley Archeological District, individual archeological sites, or ethnographic resources under the No Action Alternative. Existing use of area would continue to allow increased degradation of archeological sites and areas of cultural sensitivity due to off-trail use.

*Cumulative Impacts* — Past projects with the potential to cause ground disturbance in the Yosemite Valley Archeological District include the restroom installation at the Church Bowl Picnic Area in Yosemite Valley, Bridalveil Fall vault toilet ventilation and interior lighting system installation, reconstruct critically eroded sections of El Portal Road, parkwide emergency road repairs, and Wawona Road rehabilitation. Current projects with the potential to cause ground disturbance in the project area include the rehabilitation of the Yosemite Valley Loop Road. Reasonably foreseeable projects include the replacement of a modular comfort station and construct a new comfort station at Yosemite Village parking areas, and Wawona wastewater treatment system project. Because mitigation measures would be employed to minimize impacts on potentially unidentified and known archeological or ethnographic resources in other proposed and future projects, it is likely that these would protect archeological resources from additional impacts. Therefore, these projects/activities, in conjunction with the No Action Alternative, would result in no adverse effect on the Yosemite Valley Archeological District.

## **Environmental Consequences of Alternative 2.**

*Analysis of Archeological Resources* — Under Alternative 2, the actions associated with improving roadway safety and traffic congestion at the entrance to the parking area at Bridalveil Fall and improving the parking efficiency of the parking lot have the potential to affect one archeological site. However, the archeological site is located approximately 164 feet from the Bridalveil Fall parking lot. This site is not directly located within the construction footprint associated with improving the parking area at Bridalveil Fall; therefore, there would be no adverse effect to Yosemite Valley Archeological District.

Under Alternative 2, the potential utility corridor extending from the new comfort station north towards Southside Drive and then heading west to Pohono Bridge has the potential to affect two archeological sites, which are bisected by Southside Drive. The prehistoric site consists of a prehistoric lithic scatter and two bedrock milling features covering an approximately 3.5 acre area. The site had been previously excavated and was considered to be in fair condition with disturbance from the construction of Southside Drive, a secondary dirt road, and cut stumps. These disturbances suggested that past tree harvesting, bioturbation, and fire occurred within the site. This site was recommended a non-contributing element to the Yosemite Valley Archeological District given the lack of integrity and lack of data potential to yield information important to our understanding of prehistory; therefore, there would be no adverse effect to the Yosemite Valley Archeological District. The second site is historic and consists of a large borrow pit/rock quarry with an associated can and glass scatter. The site was later revisited and two unidentified borrow pits were recorded as part of this historic site. Two auger lines from the adjacent testing project extended into boundaries of the historic site. No cultural materials were recovered during this subsurface testing. Although the site

has not been evaluated, but is located within the Yosemite Valley Archeological District, the site is probably eligible. Due to the testing data, it was confirmed that the site lacked subsurface artifacts near the vicinity of the road corridor and that the site had been assessed/visited recently with no surface features or scatters near the road. As a result, the proposed utility work will have no adverse effects to the site; therefore, there would be no adverse effect to Yosemite Valley Archeological District.

Under Alternative 2, the proposed paving of the unpaved portion of the Bridalveil Fall Trail that begins at Bridalveil Straight would have no adverse effect to archeological sites. There is one prehistoric site nearby but not located within the construction footprint associated with paving the trail. It is a prehistoric site considered to be in good condition and it covers an approximately 0.08 acre area. Therefore, there would be no adverse effect to the Yosemite Valley Archeological District.

Under Alternative 2, additional trails and viewing areas in the vicinity of the accessible trail to the existing viewing platform would reduce informal trailing, resulting in long-term beneficial impacts. The new bridge that would be constructed from the existing viewing platform across Bridalveil Creek to the east side of Bridalveil Creek would have no adverse effect to archeological sites. There is one prehistoric site nearby but not located within the construction footprint associated with the new bridge. It is a prehistoric site considered to be in good condition and covers an approximately 0.08 acre area. Therefore, there would be no adverse effect to the Yosemite Valley Archeological District.

*Analysis of Ethnographic Resources* — The four archeological sites that were determined to be associated with two American Indian villages would not be affected by the project under Alternative 2. Only one site has the potential to be affected. However, this site is not directly located within the construction footprint associated with paving the unpaved portion of the Bridalveil Fall Trail that begins at Bridalveil Straight; therefore, there would be no adverse effect to these ethnographic resources.

Black oaks are traditional cultural resources within the APE. However, these trees would not be removed to enhance views of Bridalveil Fall or for any construction-related activities; therefore, there would be no adverse effect to black oaks.

Four traditional use areas are located within the APE. Local tribes used these areas as starting points for gathering resources. Tribal members would start at these locations and move outward in search of hemp, snakeroot, mushrooms, and other fungus (NPS, Thorsgard, pers. comm., 2017c). Yosemite National Park is currently consulting with the seven Tribes that have ties to this area (see Chapter 4 of this document) in order to protect these resources. The two Tribal spiritual areas located near the Bridalveil Fall would be affected by the proposed action. The new bridge across Bridalveil Creek would impact the viewshed of an area of cultural significance. Yosemite National Park is consulting with the Tribes in order to explore design options for the new bridge that would avoid or minimize an adverse effect to an area of cultural significance under Alternative 2.

With mitigation and avoidance measures in place, rehabilitation activities under Alternative 2 would not have an adverse effect on the Yosemite Valley Archeological District, individual archeological sites, or ethnographic resources.

*Cumulative Impacts* — The list of past, present, and reasonably foreseeable projects and plans that may affect the Yosemite Valley Archeological District is the same as under the No Action Alternative. Cumulatively, these projects would result in no adverse effect on the Yosemite Valley Archeological District when combined with Alternative 2. Because mitigation measures were employed to minimize impacts on potentially unidentified and known archeological or ethnographic resources in past projects, it is likely that these would protect archeological and ethnographic resources from additional impacts. With avoidance, mitigation, and monitoring measures in place for present and reasonably foreseeable projects, there would be no adverse effect.

### Environmental Consequences of Alternative 3.

*Analysis of Archeological Resources* — Under Alternative 3, the actions associated with improving roadway safety and traffic congestion at the entrance to the parking area at Bridalveil Fall and improving the parking efficiency of the parking lot have the potential to affect one archeological site. The archeological site is located approximately 164 feet from the Bridalveil Fall parking lot. This site is not directly located within the construction footprint associated with improving the parking area at Bridalveil Fall; therefore, there would be no adverse effect to Yosemite Valley Archeological District.

Under Alternative 3, the potential utility corridor extending from the new comfort station north towards Southside Drive and then heading west to Pohono Bridge has the potential to affect two archeological sites, which are bisected by Southside Drive. One site consists of a prehistoric lithic scatter and two bedrock milling features covering an approximately 3.5 acre area. The site was considered to be in fair condition with disturbances from Southside Drive, a secondary dirt road, and cut stumps. This suggested past tree harvesting, bioturbation, and fire. This site was considered a non-contributing element to the Yosemite Valley Archeological District given the lack of integrity resulting in a loss of data potential and the ability to yield information important to prehistory. Due to the amount of disturbance and the site was considered a non-contributing element, there would be no adverse effect to the Yosemite Valley Archeological District. The second site is historic and consists of a large borrow pit/rock quarry with an associated can and glass scatter. The site was later revisited and two unidentified borrow pits were recorded as part of this historic site. This site was inadvertently tested when two auger lines from an adjacent site extended east into this site boundary. No cultural materials were recovered during this subsurface testing. Although the site has not been evaluated, but is located within the Yosemite Valley Archeological District, the site is probably eligible. Due to the testing data, it was confirmed that the site lacked subsurface artifacts near the vicinity of the road corridor and that the site had been assessed/visited recently with no surface features or scatters near the road. As a result, the proposed utility work will have no adverse effects to the site; therefore, there would be no adverse effect to Yosemite Valley Archeological District.

Under Alternative 3, additional trails and viewing areas in the vicinity of the accessible trail to the existing viewing platform would reduce informal trailing, resulting in long-term beneficial impacts. The expansion of the existing viewing platform and construction of an additional viewing platform close to the existing platform has the potential to affect one archeological site. In addition, paving the unpaved portion of the Bridalveil Fall Trail that begins at Bridalveil Straight would have no affect to archaeological sites. There is one prehistoric site nearby but not located within the construction footprint associated with paving the trail. It is a prehistoric site considered to be in good condition and covers an approximately 0.08 acre area. Therefore, there would be no adverse effect to the Yosemite Valley Archeological District.

*Analysis of Ethnographic Resources* — The four archeological sites that were determined to be associated with two American Indian villages would not be affected by the project under Alternative 3. Only one site has the potential to be affected. However, this site is not directly located within the construction footprint associated with paving the unpaved portion of the Bridalveil Fall Trail; therefore, there would be no adverse effect to these ethnographic resources.

Black oaks are traditional cultural resources within the APE. However, these trees would not be removed to enhance view of Bridalveil Fall or for any construction-related activities; therefore, there would be no adverse effect to black oaks.

Four traditional use areas are located within the APE. Local tribes used these areas as starting points for gathering resources. Tribal members would start at these locations and move outward in search of hemp, snakeroot, mushrooms, and other fungus (NPS, Thorsgard, pers. comm., 2017c). Yosemite National Park is currently consulting with the seven Tribes that have ties to these areas (see Chapter

4 of this document) in order to protect these resources. The two Tribal spiritual areas located near the Bridalveil Fall would be affected by the proposed action. The new viewing area and trail that are located off Bridalveil Fall Trail would potentially impact the viewshed of an area of cultural significance. Yosemite National Park is consulting with the Tribes regarding this undertaking in order to avoid or minimize an adverse effect to an area of cultural significance under Alternative 3.

Under Alternative 3, a new trail would be constructed from the parking lot towards the Bridalveil Fall viewing platform and would meet the existing trail to form a loop. The trail alignment would be the same as in Alternative 2; however, the loop trail would have less elevated pathways under Alternative 3. The techniques that would be used include suspension of an elevated trail using more traditional construction methods. There are no known archeological sites that contain boulders located within this elevated trail alignment. Tribal members consider the large boulders a significant cultural resource. The Tribes are being consulted with this undertaking; therefore, construction of the elevated trail would not have an adverse effect to significant boulders under Alternative 3.

With avoidance measures in place, rehabilitation activities under Alternative 3 would not have an adverse effect on the Yosemite Valley Archeological District, individual archeological sites, or ethnographic resources.

*Cumulative Impacts* — The list of past, present, and reasonably foreseeable projects and plans that may affect the Yosemite Valley Archeological District is the same as under the No Action Alternative. Cumulatively, these projects would result in no adverse effect on the Yosemite Valley Archeological District when combined with Alternative 3. Because mitigation measures were employed to minimize impacts on potentially unidentified and known archeological or ethnographic resources in past projects, it is likely that these would protect archeological and ethnographic resources from additional impacts. With avoidance, mitigation, and monitoring measures in place for present and reasonably foreseeable projects, there would be no adverse effect.

## CHAPTER 4: CONSULTATION AND COORDINATION

### INTERNAL AND PUBLIC SCOPING

Yosemite National Park conducted a 30-day public scoping period for the Bridalveil Fall Rehabilitation Project from April 26, 2017 through May 26, 2017. The NPS provided the following information to the public:

- An electronic newsletter sent on April 17, 2017 to the park's mailing list. The "eblast" announced the public scoping period, the date of the first public meeting, general project information, and a request for public input.
- An electronic press release on April 24, 2017 to area media outlets. The press release announced the public scoping period, the date of the first public meeting, general project information, and a request for public input.
- Public scoping and project information posted on the NPS PEPC website as well as on the park's planning website at <https://parkplanning.nps.gov/projectHome.cfm?projectId=72027>.
- Several media interviews prior to the scoping meeting.
- Public Open House on May 10, 2017 from 2:30 p.m. to 5 p.m. in the Yosemite Auditorium to inform interested parties about the proposed project and solicit comments that would help the planning team understand the spectrum of concerns, interests, and issues that should be considered in the planning process. The park invited comments by mail, through the PEPC system, and on comment forms that were made available during public scoping meeting.

During the public scoping period, the park received 22 correspondences, generating 77 individual substantive comments. All comments, substantive or non-substantive, received during the scoping period were duly considered and are now part of the decision file for this project. A Value Analysis and Choosing by Advantage workshop was conducted on August 16, 2017 in order to evaluate, rank, and develop alternative recommendations. The workshop team included Yosemite National Park staff, an outside facilitator and consultants.

### NHPA SECTION 106 CONSULTATION

Please see Appendix F, *National Historic Preservation Act Assessment of Effect for Site-Specific Actions* regarding Section 106 consultation.

### AGENCY CONSULTATION

#### Consultation with Federal Agencies

*U.S. Army Corps of Engineers* — The Clean Water Act (Public Law 92-500) requires federal land agencies to consult with the USACE regarding wetlands in the vicinity of proposed projects. The NPS is consulting with the USACE with regard to wetlands delineation and permit requirements necessary to implement proposed actions in the plan in accordance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Representatives from the Army Corps visited the Bridalveil Fall project site on September 13, 2017. Yosemite initiated consultation with the USACE in January 2018.

Under Section 404 of the Clean Water Act (33 USC 1344), permit approval is required for projects that may result in the discharge of dredged or fill material into waters of the U.S. The NPS will work with the USACE to obtain any required Section 404 permits prior to implementing the Bridalveil Fall



Rehabilitation Project. The NPS will serve as the lead agency on behalf of the USACE for consultation with the SHPO, as discussed below.

*U.S. Fish and Wildlife Service* — The Endangered Species Act of 1973, as amended (16 USC 1531 et seq.), requires all federal agencies to consult with the USFWS to ensure any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of federally listed species or critical habitat. The NPS generated a list of federal listed species in the project area from the USFWS website on June 20, 2017, and initiated informal consultation on August 16, 2017. The park requested concurrence with “no effect” or “not likely to adversely affect” determinations on federally listed species in January 2018. The park will obtain concurrence with the park’s assessment of effects on federal listed species prior to finalizing the NPS decision document for this EA.

### **Consultation with State Agencies**

*State Water Resources Control Board and Central Valley Regional Water Quality Control Boards* — The State Water Resources Control Board (SWRCB) and the nine RWQCBs are the regulatory boards within California’s Environmental Protection Agency that derive their authority from Section 401 of the Clean Water Act and Section 13020 of the California Water Code.

SWRCB allocates rights to the use of surface water and, along with nine regional boards, is charged with protecting surface, ground, and coastal waters throughout the state. The RWQCB issues permits that govern and restrict the amount of pollutants discharged into the ground or surface water, which includes regulating storm water during construction activities.

Under the Clean Water Act’s Section 401, every applicant for a federal permit or license for any activity that may result in a discharge to a water body must obtain State Water Quality Certification that the proposed activity will comply with state water quality standards, if an activity would result in a discharge to a water body. If required, the NPS will obtain all required permits issued by the RWQCB, file appropriate notifications, and prepare a SWPPP in advance of any construction activities.

## CHAPTER 5: GLOSSARY AND ACRONYMS

### GLOSSARY OF TERMS

**Affected environment:** Existing natural, cultural, and social conditions of an area that are subject to change, both directly and indirectly, as a result of a proposed human action.

**Area of potential effects (APE):** The geographic area or areas where an undertaking has potential to affect historic properties. Consider physical, visual, auditory, and atmospheric effects; potential changes in land or building use, change in the setting and potential for neglect.

**Archeological resources:** Historic and prehistoric deposits, sites, features, structure ruins, and anything of a cultural nature found within, or removed from, an archeological site.

**Best management practices (BMP):** Effective, feasible (including technological, economic, and institutional considerations) conservation practices and land- and water-management measures that avoid or minimize adverse impacts to natural and cultural resources. Best Management Practices may include schedules for activities, prohibitions, maintenance guidelines, and other management practices.

**Critical habitat:** The area of land and water with physical and biological features essential to the conservation of federally listed threatened and endangered species and which may require special management considerations or protection.

**Cultural resources:** The broad category of socio-cultural resources and historic properties that reflect the relationship of people with their environment.

**Endangered Species Act (16 USC 1531 et seq.)** — An Act which provides a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved and which provides a program for the conservation of such endangered species and threatened species.

**Environmental assessment (EA):** A public document required under the National Environmental Policy Act that identifies and analyzes activities that might affect the human and natural environment. An EA is considered a concise public document, which provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS), aids an agency's compliance with NEPA when no EIS is necessary, and it facilitates preparation of an EIS when one is necessary.

**Environmental consequences:** This section of an environmental assessment describes the impacts a proposed action would have on resources. Direct, indirect, and cumulative impacts, both beneficial and adverse area analyzed.

**Facilities:** Buildings, communications support structures, and the associated supporting infrastructure such as roads, trails, and utilities.

**Finding of no significant impact (FONSI):** A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an environmental impact statement. A FONSI is based on the results of an EA.

**Floodplain:** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Historic and cultural resources:** Under NEPA, culturally valued pieces of real property (not historic properties) and non-tangible values such as cultural use of the biophysical and built environments, and sociocultural attributes such as social cohesion, lifeways, religious practice and other social institutions (40 CFR 1508.27(b)(3)).

**Historic properties:** Under NHPA (16 USC 470 et seq.) and NEPA (USC 432 1-4347), a prehistoric or historic district, site, building, structure, object, landscape, or traditional cultural resource to which American Indians attach cultural and religious significance that is listed in, or eligible for listing in, the National Register of Historic Places (NRHP) (36 CFR 800.16(l)(1) 40 CFR 1508.27(b)(8)).

**National Environmental Policy Act (NEPA):** The federal act that sets national environmental policies and requires preparation of an EIS for major federal actions that may significantly affect the quality of the human environment (USC 432 1-4347).

**National Historic Preservation Act of 1966 (16 USC 470 et seq.):** An Act to establish a program for the preservation of historic properties throughout the nation, and for other purposes, approved October 15, 1966 [Public Law 89-665; 80 STAT.915; 16 USC 470 as amended by Public Law 91-243, Public Law 93-54, Public Law 94-422, Public Law 94-458, Public Law 96-199, Public Law 96-244, Public Law 96- 515, Public Law 98-483, Public Law 99-514, Public Law 100-127, and Public Law 102-575].

**National Register of Historic Places (NRHP):** The official list of the nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the NPS's NRHP is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

**National park service management policies:** A policy is a guiding principle or procedure that sets the framework and provides direction for management decisions. NPS policies are guided by and consistent with the Constitution, public laws, Executive proclamations and orders, and regulations and directives from higher authorities. Policies translate these sources of guidance into cohesive directions. Policy direction may be general or specific. It may prescribe the process by which decisions are made, how an action is to be accomplished, or the results are to be achieved. The primary source of NPS policy is the publication Management Policies 2006. The policies contained therein are applicable Service-wide. They reflect NPS management philosophy. Director's Orders supplement and may amend Management Policies. Unwritten or informal "policy" and people's various understandings of NPS traditional practices are never relied on as official policy.

**National Park Service Organic Act:** In 1916, the NPS Organic Act established the NPS in order to "promote and regulate use of parks. . ." and defined the purpose of the national parks as "to conserve the scenery and natural and historic objects and wild life therein and to provide for the enjoyment of the same in a manner and by such means as will leave them unimpaired for the enjoyment of future generations." This law provides overall guidance for the management of NPS units.

**No action alternative:** The alternative in an EIS that proposes to continue current management direction. "No action" means the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

**Non-native species:** Species of plants or wildlife that are not native to a particular area and often interfere with natural biological systems.

**Ordinary high water mark:** A change in vegetation, impression in the shoreline, or wrack lines approximately corresponding to the two-year flood. In lakes, this can also include areas devoid of vegetation in steep terrain and adjacent to wetlands in areas of low relief.

**Riparian areas:** The land area and associated vegetation bordering a stream or river.

**Riverine:** Of or relating to a river. A riverine system includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts in

excess of 0.5%. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.

**Sediment:** A particle of soil or rock that was dislodged, entrained, and deposited by surface runoff or a stream. The particle can range in size from microscopic to cobble stones.

**Threatened and endangered species:** Species of plants that receive special protection under state and/or federal laws. Also referred to as “listed species,” “endangered species,” or “special-status species.”

**Traditional cultural properties:** A resource to which American Indian tribes attach cultural and religious significance that is eligible for listing or listed in the NRHP and includes structures, objects, districts, geological and geographical features and archeology. National Register Bulletin 38 provides guidance for identifying and evaluating such properties for eligibility.

**Traditional cultural resource:** Any site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it.

**Visitor experience:** The perceptions, feelings, and reactions a park visitor has in relationship with the surrounding environment.

**Watershed:** The region drained by, or contributing water to, a stream, lake, or other body of water. Synonym: basin or drainage basin.

**Wetland:** Wetlands are defined by the U.S. Army Corps of Engineers (Code of Federal Regulations, Section 328.3[b], 1986) as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands, as defined by the U.S. Fish and Wildlife Service (often referred to as the Cowardin classification system) and adopted by the NPS, are lands in transition between terrestrial and aquatic systems, where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following attributes: the land supports predominantly hydrophytes, at least periodically; the substrate is predominantly undrained hydric soils; and/or the substrate is saturated with water or covered by shallow water at some time during the growing season of each year.

## ACRONYMS

ABA	Architectural Barriers Act
ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
BMP	Best Management Practices
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CT	Candidate Threatened
dbh	diameter at breast height

DPS	Distinct Population Segment
E	Endangered
EA	Environmental Assessment
EIS	Environmental Impact statement
FGDC	Federal Geographic Data Committee
FONSI	Finding of No Significant Impact
FP	Fully Protected
HAER	Historic American Engineering Record
MGM2	Money Generation Model 2
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
ORV	Outstandingly Remarkable Values
PEPC	Planning, Environment, and Public Comment
PT	Proposed Threatened
RWQCB	Regional Water Quality Control Board
SHPO	State Historic Preservation Office
SSC	Species of Special Concern
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T	Threatened
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WL	Watch List

## CHAPTER 6: REFERENCES

- Anderson, Keith M. and Mary Thul Morehead  
1976 National Register of Historic Places Inventory—Nomination Form: Yosemite Valley Archeological District. Manuscript on file, Branch of Anthropology, Yosemite National Park, California.
- Bibby, Brian  
1994 An Ethnographic Evaluation of Yosemite Valley: The Native American Cultural Landscape. Manuscript on file, Branch of Anthropology, Yosemite National Park, California.
- Blotkamp, A. B. Meldrum, W. Morse, and S. Hollenhorst  
2010 Yosemite National Park Visitor Study Summer 2009. National Park Service Program.
- California Department of Water Resources  
2003 California's Groundwater, Bulletin 118: Update 2003. Available at: [http://www.water.ca.gov/groundwater/bulletin118/update\\_2003.cfm](http://www.water.ca.gov/groundwater/bulletin118/update_2003.cfm)
- California Herps  
2017 California Red-legged Frog - *Rana draytonii*. Available at: <http://www.californiaherps.com/frogs/pages/r.draytonii.html>.
- Calkins, F.C., Huber, N.K., and Roller, J.A.  
1985 Bedrock geologic map of Yosemite Valley, Yosemite National Park, California: U.S. Geological Survey Miscellaneous investigations Series Map I-1639.
- Carr, Ethan, Paul Cloyd, Randy Fong, Cathy Gilbert, Robbyn Jackson, Laura Kirn, Erica Owens, Robert Page, and Charles Palmer  
2006 Yosemite Valley Historic District. National Register of Historic Places Nomination Form.
- CDFW  
2014 California Wildlife Habitat Relationships System, Mount Lyell Salamander Life History Account.
- 2017a California Natural Diversity Database – Rarefind for Commercial Subscribers. Online at <https://www.wildlife.ca.gov/Data/CNDDDB/Maps-and-Data>. Accessed 28 June 2017.
- 2017b Natural Diversity Database, Special Animals List. Periodic publication. 51 pp.
- Central Valley RWQCB  
2016a The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition. Available at: [http://www.waterboards.ca.gov/centralvalley/water\\_issues/basin\\_plans/](http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/)
- 2016b Regional Water Quality Control Board Central Valley Region Clean Water Act Sections 305(B) and 303(D) 2014 Integrated Report for the Central Valley Region. Available at: [http://www.swrcb.ca.gov/centralvalley/water\\_issues/tmdl/impaired\\_waters\\_list/#newproposed](http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/impaired_waters_list/#newproposed)



CEQ

- 1981 Forty Most Asked Questions Concerning CEQ's NEPA Regulation. 46 Federal Register 18026, 18032.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe.

- 1979 Classification of Wetlands and Deepwater Habitats of the United States. December.

Curtis, David L.

- 2015 Archeological Survey for the 2015 Bridalveil Fall Area Rehabilitation Project, Yosemite National Park, California.

Department of Defense and USEPA

- 2015 Clean Water Rule: Definition of "Waters of the United States." Federal Register 80:37054-37127.

FGDC

- 2013 Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

Fox, Gregory L. and Chester Shaw

- 1998 A Section 110 Inventory and Post-Flood Damage Assessment of the Yosemite Valley and Mirror Lake Loop Trails (CA-22.272), Yosemite National Park, Mariposa County, California. Western Archeological and Conservation Center, National Park Service, Tucson, Arizona.

Hankins, D.L.

- 2015 Restoring Indigenous Prescribed Fires to California Oak Woodlands. Proceedings of the Seventh California Oak Symposium: Managing Oak Woodlands in a Dynamic World. November 3–6, 2014. Visalia Convention Center, Visalia, CA. Available online at: [https://www.researchgate.net/publication/289377452\\_Proceedings\\_of\\_the\\_seventh\\_California\\_oak\\_symposium\\_managing\\_oak\\_woodlands\\_in\\_a\\_dynamic\\_world](https://www.researchgate.net/publication/289377452_Proceedings_of_the_seventh_California_oak_symposium_managing_oak_woodlands_in_a_dynamic_world). Accessed 28 July 2017.

Hockett, Karen

- 2017 Bridalveil Fall Observation Summary, Preliminary Results.

Hull, Kathleen L. and Michael S. Kelly

- 1995 An Archeological Inventory of Yosemite Valley, Yosemite National Park, California. Yosemite Research Center Publications in Anthropology No. 15. Dames & Moore, Inc. Submitted to USDOI National Park Service. Copies available from Branch of Anthropology, Yosemite National Park.

Land and Community Associates

- 1994 Yosemite Valley Cultural Landscape Report, Yosemite National Park, California. YOSE-504-15. Volumes 1 and 2.

Le, Y., E. Papadogiannaki, N. Holmes, and S.J. Hollenhorst

- 2008 Yosemite National Park Visitor Study Winter 2008. Visitor Services Project Report 198. Moscow, ID: University of Idaho.

- Matthes, F.E.  
1930 Geologic History of the Yosemite Valley: U.S. Geological Survey Professional Paper 160.
- Merriam, C. Hart  
1917 Indian Village and Camp Sites in Yosemite Valley. *Sierra Club Bulletin* 10:202-209.
- Natural Resources Conservation Service  
2007 Soil survey of Yosemite National Park, California.  
[https://www.nrcs.usda.gov/Internet/FSE\\_MANUSCRIPTS/california/CA790/0/Yosemite\\_CA.pdf](https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA790/0/Yosemite_CA.pdf).
- NPS  
1934 [Drawing of] Bridalveil Falls [sic] Parking Area. Drawing No. YOS-3140. On file at Yosemite National Park.
- 1935 Final Construction Report - Bridalveil Fall Parking Area. Acc't No. 501.42. On file at Yosemite National Park.
- 1980 Yosemite National Park General Management Plan. Yosemite National Park, CA.
- 1994 Baseline Water Quality Data Inventory and Analysis, Yosemite National Park. Water Resources Division and Servicewide Inventory and Monitoring Program. Technical Report NPS / NRWRD / NRTR-94-03, September. Available at:  
<https://www.nature.nps.gov/water/horizon.cfm>
- 2004 Freshwater Resources Management. Natural Resource Management Reference Manual 77. Available at: <http://www.nature.nps.gov/Rm77/freshwater.cfm>.
- 2005a Yosemite Valley Loop Road Project Environmental Assessment. November.
- 2005b Yosemite Valley Loop Road: Historic Character, Culverts, and Turnouts. Yosemite National Park. December.
- 2009 Yosemite National Park Visitor Study, Summer 2009.
- 2011a A Sense of Place: Design Guidelines for Yosemite National Park.
- 2011b Finding of No Significant Impact for Invasive Plant Management Plan Update. August 4. Available online at:  
<https://parkplanning.nps.gov/document.cfm?parkID=347&projectID=23812&documentID=43054>. Accessed 30 June 2017.
- 2011c Scenic Vista Management Plan for Yosemite National Park, Environmental Assessment, July.
- 2013 1997 Flood Recovery Final Report. June.
- 2014a Merced Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement. February.
- 2014b Ansel Adams Gallery Complex Rehabilitation Environmental Assessment. April.

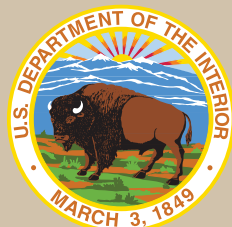
- 2015 Black Oaks. Last updated March 1. Available online at: <https://www.nps.gov/yose/learn/nature/black-oaks.htm>. Accessed 30 June 2017.
- 2016a California Red-Legged Frogs and Western Pond Turtles to be Restored in Yosemite National Park. Available at: <https://www.nps.gov/yose/learn/news/california-red-legged-frogs-and-western-pond-turtles-to-be-restored-in-yosemite-national-park.htm>.
- 2016b Yosemite. Available at: <https://www.nps.gov/yose/planyourvisit/visitation.htm>. Accessed on 31 July 2017.
- 2017a Delineation of Waters of the United States, Including Wetlands and Cowardin Wetlands, Bridalveil Fall Area, Yosemite National Park, CA. May.
- 2017b Yosemite Animals. Accessed on June 27, 2017 at <https://www.nps.gov/yose/learn/nature/animals.htm>.
- 2017c Phone Conversation with Eirik Thorsgard, Pacific West Regional Cultural Anthropologist and American Indian Liaison with the National Park Service.
- Quin, Richard H.  
1991 Historic American Engineering Record (HAER) Nos. CA-91 through CA-93: Bridalveil Fall Bridges Nos. 1–3. Yosemite National Park Roads and Bridges, Spanning Bridalveil Creek on Carriage Road, Yosemite National Park, Mariposa County.
- Stock, G.M., Collins, B.D., Santaniello, D.J., Zimmer, V.L., Wieczorek, G.F., and Snyder, J.B.  
2013 Historical rock falls in Yosemite National Park, California (1857-2011): U.S. Geological Survey Data Series Report 746, <https://pubs.usgs.gov/ds/746/>
- Stock, G.M., Luco, N., Collins, B.D., Harp, E.L., Reichenbach, P., and Frankel, K.L.  
2014 Quantitative rock-fall hazard and risk assessment for Yosemite Valley, Yosemite National Park, California: U.S. Geological Survey Scientific Investigations Report 104-5129, 52 p., <https://pubs.usgs.gov/sir/2014/5129/>
- USEPA  
1998 Final Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses. April.
- USFWS  
2017 List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project. June 20.
- USGS  
1999 Biological, habitat, and water quality conditions in the upper Merced River drainage, Yosemite National Park, California, 1993-1996. Available at: <https://pubs.er.usgs.gov/publication/wri994088>
- Wilson, Merrill Ann  
1976 Yosemite Valley Bridges. National Register of Historic Places Nomination Form.

Yosemite National Park

- 2002 Sensitive Plants of Yosemite National Park. Available online at:  
[https://www.nps.gov/yose/learn/nature/upload/veg\\_sensitive-sm.pdf](https://www.nps.gov/yose/learn/nature/upload/veg_sensitive-sm.pdf). Accessed 30 June 2017.

This page intentionally left blank.

Bridalveil Fall Rehabilitation  
Environmental Assessment  
Yosemite National Park  
P.O. Box 577  
El Portal, CA 95318



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.