



U.S. Department of the Interior  
National Park Service



ENVIRONMENTAL ASSESSMENT

# Wawona Wastewater Treatment System Rehabilitation Project



Mariposa County, California

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## LIST OF ACRONYMS

ACHP	Advisory Council on Historic Preservation
APE	area of potential effect
BMP	best management practice
CNDDB	California Natural Diversity Database
CFR	Code of Federal Regulations
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
DCB	dichlorobromomethane
DOE	Determination of Eligibility
EA	environmental assessment
ESA	federal Endangered Species Act
Final EIS	Final Environmental Impact Statement
GHG	greenhouse gases
gpd	gallons per day
gpm	gallons per minute
HAER	Historic American Engineering Survey Report
Merced River Plan	2014 Merced Wild and Scenic River Final Comprehensive Management Plan
NEPA	National Environmental Policy Act
NOA	Notice of Applicability
NPS	National Park Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
RWQCB	Regional Water Quality Control Board
STEP	septic tank effluent pumping systems
SHPO	State Historic Preservation Officer
SR	State Route
SWPPP	stormwater pollution prevention plan
TSO	Time Schedule Order
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WWTP	Wawona Wastewater Treatment Plant



# 1 PURPOSE AND NEED

## 1.1 INTRODUCTION

The National Park Service (NPS) proposes to rehabilitate the Wawona Wastewater Treatment System, located within Yosemite National Park in Mariposa County, California (Figure 1-1), to comply with permit limitations related to discharge of the disinfected tertiary-treated domestic wastewater. The project would address deferred maintenance, improve system reliability and efficiency, expand capacity to meet visitation levels and planned community buildout, and upgrade land-based disposal capabilities so that the potential to discharge to the South Fork Merced River is eliminated.

The community of Wawona is located near the south entrance of Yosemite National Park. The community includes the historic Big Trees Lodge (previously known as the Wawona Hotel) and Golf Course, private residences, a commercial store and gas station, and NPS staff housing. The South Fork of the Merced River, which runs through Wawona, is the community's water supply. The community's sewage is handled primarily at the Wawona Wastewater Water Treatment Plant (WWTP); the system consists of collection, mechanical treatment, chlorine disinfection, and discharge of tertiary-treated effluent, primarily through spray irrigation at the Big Trees Lodge Golf Course. Wawona Campground (96 campsites and a group campsite) and a few homes in the community dispose of sewage by individual septic systems (which include a septic tank, drain pipe and leach field). The WWTP was constructed over 30 years ago and the systems are aging and require rehabilitation. The NPS has secured funding for WWTP system improvements, including expansion of select systems to accommodate sewage loads from the Wawona Campground and eventual flows from build-out of the Wawona community; improvement of operational efficiency; and decommission individual septic systems at the Wawona Campground. The project area, as shown in Figure 1-1, is located within and around the current WWTP on Chilnualna Road; adjacent to Chilnualna Road and Wawona Road for approximately 1.7 miles west to the Wawona Campground; within the Big Trees Lodge Golf Course, and within Wawona Campground Loops A, B, and C.

This environmental assessment (EA) analyzes the environmental impacts of a No Action Alternative and two proposed Action Alternatives related to the campground lift stations and the effluent disposal at the Big Trees Lodge Golf Course. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1500–1508 [CEQ 1978]); and the NPS Director's Order 12, Conservation Planning, Environmental Impact Analysis, and Decision-making (NPS 2011), and its accompanying NPS NEPA Handbook (NPS 2015).

This EA has also been prepared consistent with 14 CCR § 15221 to fulfill California Environmental Quality Act (CEQA) requirements without producing a separate CEQA document, and the NPS anticipates a Finding of No Significant Impacts (FONSI) decision following the EA process. The CEQA guidelines (14 CCR § 15221) state:

- (a) *When a project will require compliance with both CEQA and NEPA, State or local agencies should use the EIS or Finding of No Significant Impact rather than preparing an EIR or Negative Declaration if the following two conditions occur:*
  - (1) *An EIS or Finding of No Significant Impact will be prepared before an EIR or Negative Declaration would otherwise be completed for the project; and*
  - (2) *The EIS or Finding of No Significant Impact complies with the provisions of these Guidelines.*
- (b) *Because NEPA does not require separate discussion of mitigation measures or growth inducing impacts, these points of analysis will need to be added, supplemented, or identified before the EIS can be used as an EIR.*







This EA meets the criteria outlined in 14 CCR § 15221 and thus the NPS does not believe a separate CEQA environmental impact report (EIR) or negative declaration (ND) is necessary.

The NPS has also initiated consultation with the State Historic Preservation Officer (per 36 CFR Section 800.8) to coordinate compliance with Section 106 of the National Historic Preservation Act of 1966 with preparation of this EA. Please see Chapter 4 of this EA for further information on the NPS's consultation and coordination with federal agencies.

## 1.2 BACKGROUND

The NPS was previously permitted by the Central Valley Regional Water Quality Control Board (RWQCB) (Order R5-2013-0092 NPDES No. CA0081795) to discharge disinfected, tertiary-treated, domestic wastewater from the WWTP primarily to land via spray irrigation at the Big Trees Lodge Golf Course and secondarily (only if certain conditions are met) to the South Fork Merced River. This permit expired in September 2018. The NPS submitted a Report of Waste Discharge in March 2018 to help define the future effluent limits. The NPS is now operating the WWTP under the General Order Waste Discharge Requirements (WDR) Permit with a Notice of Applicability (NOA) specific to the WWTP (Permit No. 2014-0153-dwq-r5289), which only allows land-based discharge of treated effluent.

The previous RWQCB permit for the WWTP (that expired in September 2018), addressed the potential for discharge of treated effluent to the river and included limits for copper, dichlorobromomethane, zinc, and ammonia. Dichlorobromomethane (DCB) is a byproduct created from the interaction of organics and chlorine disinfectant. The WWTP currently employs chlorine disinfection and, as a result, DCB is difficult to control. The NPS has been issued a Time Schedule Order (TSO) from the RWQCB because of the WWTP's inability to remove DCB. (The TSO involves enforcement actions issued in accordance with Section 13300 of the California Water Code that require the NPS to submit a time schedule establishing the actions that will be taken to address actual or threatened discharges of wastes in violation of requirements.) The NPS has responded to the RWQCB with a plan of action, which would involve WWTP system upgrades to meet permit limitations, including WWTP upgrades, new subsurface effluent disposal at the golf course to replace the secondary discharge at the river, and improved controls. In addition, the current General Order WDR and NOA for WWTP allows for discharge of treated effluent to land only; the potential to discharge treated effluent to surface waters (the South Fork of the Merced River) is no longer allowed. The NPS will continue to work in coordination with the RWQCB to ensure that the WWTP is operated in alignment with the conditions of the permit and to address the enforcement actions in the TSO.

Wastewater treatment for the Wawona Campground is currently served by flush toilets and individual septic systems. The campground's septic systems are beyond their usable life and one has already failed; therefore, porta-potties are currently used in a portion of the campground. In addition, approximately five homes in Wawona are served by individual septic systems. The Wawona Campground's septic systems are located in close proximity to the South Fork of the Merced River, and portions of the associated leachfields are within the 100-year floodplain, which could pose a potential hazard to the water quality value of this Wild and Scenic River and impact health, safety, and visitor experience, if a failure were to occur. This project would expand the WWTP treatment capacity to accommodate sewage from the Wawona Campground, sewage from Wawona residences currently served by septic systems (approximately five), and flows resulting from the future buildout of the Wawona community per the Wawona Town Planning Area Specific Plan (approximately 45 vacant residential lots) (Mariposa County 1987, as amended). The campground septic systems could then be decommissioned, which would eliminate on-site sewage treatment within the 100-year floodplain of the South Fork of the Merced River. Sewage from the campground would instead be conveyed to the central treatment facility, greatly reducing the potential for effluent or sewage to migrate into groundwater and/or the river.

### 1.2.1 Merced Wild and Scenic River Final Comprehensive Management Plan

Congress designated 122 miles of the Merced River as a Wild and Scenic River in 1987 (Public Law 100-149). The NPS manages 81 miles of the Merced River, including sections of the main stem and south fork located within the Yosemite National Park boundaries and the portion of the main stem that flows through the El Portal Administrative Site. The purpose of the Wild and Scenic River designation is to protect the free-flowing character, water quality, and outstandingly remarkable values of the river for the benefit and enjoyment of present and future generations, collectively referred to as “river values” (NPS 2014). The 2014 Merced Wild and Scenic River Final Comprehensive Management Plan (also known as the Merced River Plan and Final Environmental Impact Statement (Merced River Plan) and Record of Decision) describe how the NPS will provide for the protection of river values. The Merced River Plan identified localized water quality concerns and included wastewater treatment-related actions for the Wawona Campground as follows:

Waste Water Collection System for the Wawona Campground: Remove the current septic system and develop a waste water collection system. Build a lift (pump) station above the Wawona Campground to connect the facility to the existing WWTP (NPS 2014).

This EA tiers from the Merced River Plan and analyzes site-specific actions for collecting sewage from the Wawona Campground and conveying it to the WWTP for treatment prior to discharge.

## 1.3 PURPOSE OF AND NEED FOR THE ACTION

The Wawona wastewater facilities were constructed over 30 years ago and require rehabilitation to meet current and projected demand, as well as continue meeting permitting requirements. The WWTP has a permitted monthly average flow limitation of 105,000 gallons per day. Due to recent changes in permit requirements, the system can no longer utilize the South Fork of the Merced River as a secondary treated effluent discharge point for contingencies and will require upgrades to the discharge system capacity in order to continue waste-treatment operations in compliance with operating permits. Furthermore, WWTP treatment capacity needs to be upgraded to implement actions identified in the Merced River Plan to decommission individual septic systems at the Wawona Campground and connect the facilities to the WWTP. Aging wastewater treatment systems at the WWTP and at the Wawona Campground may have maintenance and failure issues that increase maintenance efforts, increase the need for temporary facilities (such as porta-potties) and increase trucking of sewage to service such facilities. This could diminish visitor experience and risk sewage releases that affect environmental conditions, safety, and water quality. Increased maintenance or failure of infrastructure could cause temporary closure of facilities such as the Big Trees Lodge or Wawona Campground, temporary closure of public access to the South Fork and main stem of the Merced River for fishing and swimming, thereby adversely affecting visitor experience. In addition, water quality concerns could affect downstream municipal users and environmental conditions. Furthermore, the effluent discharge infrastructure at the golf course is aging and failure to renovate the system would likely lead to negative affects to operations, turf conditions, and access at the golf course. In 2010, the NPS conducted a facility assessment that recommended WWTP improvements to achieve compliance with permit regulations, address deferred maintenance, and improve reliability and efficiency.

The purpose of the project is to:

- ▲ prevent the loss of critical infrastructure by upgrading the aging WWTP facilities;
- ▲ remove the existing secondary discharge point into the Wild and Scenic Merced River and replace it with a land-based discharge method to meet the TSO and permit requirements for WWTP operation;
- ▲ improve wastewater treatment to help maintain positive visitor experience in the Wawona area of Yosemite National Park;



- ▲ as called for in the Merced River Plan, remove reliance on individual septic systems at the Wawona Campground, some of which are within the 100-year floodplain, and connect the campground to the WWTP for wastewater treatment and discharge;
- ▲ increase WWTP capacity to accommodate service for the Wawona Campground, South Fork Picnic Area, and parcels in the Wawona community;
- ▲ properly treat and dispose of wastewater to protect the health, safety, and welfare of the public and the NPS staff; and
- ▲ improve the operational efficiency, reliability, and sustainability of the WWTP in a cost effective and environmentally friendly manner.

## 1.4 ENVIRONMENTAL ISSUES AND IMPACT TOPICS

### 1.4.1 Impact Topics Evaluated in this Environmental Assessment

Screening of issues raised during internal and public scoping and agency consultation for this EA has determined that evaluation of impacts on the following resources are within the scope of this rehabilitation project. These were considered in the development of a reasonable range of alternatives for rehabilitation of the WWTP system and as part of the analysis of the project's potential environmental consequences.

**Water Resources.** Ending the potential for WWTP direct discharge of tertiary-treated effluent to the Merced River, the removal of the Wawona Campground septic systems, and the upgrade of WWTP systems are intended to improve water quality. However, project construction would result in ground disturbance and use of equipment and materials that could result in potential short-term erosion or water quality concerns. The project would also alter the irrigation system at the Big Trees Lodge Golf Course and could involve project activities within the floodplain. Therefore, this EA evaluates the project's potential effects on water quality, flooding, and hydrology/drainage.

**Cultural Resources.** Due to the presence of a historic district and buildings, historic properties with religious and cultural significance to American Indian tribes and groups, and archeological resources in the project area and the potential for project construction to disturb such resources, this EA evaluates the project's potential effects on historic structures, archeology, and historic properties with religious and cultural significance.

**Biological Resources.** The majority of project construction would occur within developed or disturbed areas of the park, such as roads, parking areas, the Big Trees Lodge Golf Course, the Wawona Campground, and the existing WWTP, where human presence is common. However, the project area includes potentially jurisdictional waters of the United States, including wetlands, and there are special-status wildlife species that could occur within the project area. In addition, trees in the project area may need to be removed or may be affected by construction. Therefore, this EA evaluates the project's potential effects on sensitive habitats, trees, wetlands and waters, and special-status wildlife species.

**Visitor Experience, Health, and Safety.** Improvements to the WWTP system would benefit visitor experience, health, and safety through separating sewage treatment and handling activities from the South Fork of the Merced River (a municipal water source and recreation point), decreasing risks of sewage spills to the environment from sewage hauling, and eliminating risks of introduction of partially treated sewage to river during high flood events at the campground and manhole near the South Fork Bridge (because portions of leach fields and the manhole are within the 100-year flood plain). However, project construction would temporarily disrupt visitor access to the Big Trees Lodge Golf Course, Wawona Campground, and the community of Wawona, affecting visitor use and experience in the park. Therefore, this EA evaluates the project's potential impact on visitor experience, health, and safety.

## 1.4.2 Impact Topics Dismissed from Further Analysis

The following issues and topics are not potentially significant, are not critical to choosing between alternatives, and are not controversial (NPS 2015, pg. 51). Therefore, they were eliminated from further analysis in this EA. A brief rationale for dismissal is provided for each topic.

**Lightscape Management.** Although nighttime work may be necessary within the WWTP, this facility is already lit at night to provide safety. Construction work throughout the rest of the project area would be limited to daylight hours. Therefore, construction activities would not require additional night lighting. In the long term, the majority of the upgraded facilities would be underground and would not require lighting. However, consistent with existing conditions, the above-ground facilities, such as the lift stations and new facilities within the WWTP, would have limited down-shielded outdoor safety lighting. The existing outdoor lighting in Wawona would remain unchanged. The use of outdoor lighting would be limited to only what is necessary for basic safety requirements and would be shielded to the extent possible to keep light on the intended subject, out of the night sky, and to avoid disturbance to wildlife. Therefore, lightscape management and protection of the dark night sky is dismissed from further analysis.

**Visual Resources (Aesthetics and Viewshed).** During construction, the aesthetics of the Wawona community would be temporarily changed by the presence of construction equipment, ground disturbance, and construction vehicles and crews. Views at the Big Trees Lodge Golf Course, the Wawona Campground, along Wawona Road, and along Chilnualna Road would be temporarily affected during construction. The majority of the new infrastructure would be located underground and surface conditions would be returned to pre-project conditions; long-term aesthetic changes would not occur from below-ground facilities. The new and renovated above-ground facilities would be within the Wawona Campground or currently developed or disturbed areas in the community of Wawona. In addition, the above-ground facilities are limited to lift stations within existing developed areas that would not alter viewsheds in the park. Furthermore, the WWTP is not visible from residences in Wawona and improvements within the WWTP would not alter view for residents or visitors. Although the WWTP is visible from a publicly accessible trail, the improvements to the WWTP facilities would be consistent with existing facilities and would not adversely alter the recreational value of the trail. Implementation of the project would not result in the elimination of open space; obstruction of a scenic view or vista; or introduce a visual element that is incompatible, out of scale, in great contrast, or out of character with the Wawona area. Therefore, the topic of visual resources is dismissed from further analysis.

**Socioeconomics.** Construction of the project would bring a short-term need for construction personnel, but this addition would be minimal and would not affect the community's overall population, income, and employment base. After completion of construction, ongoing operation of the Wawona WWTP would not require any additional staff.

The project would save WWTP annual operating costs through the replacement of outdated and inefficient plant infrastructure with energy efficient equipment, improved process automation controls and instrumentation, and scalable operation capability, which would result in overall improvements in process efficiency and reliability. The improvements would reduce the deferred maintenance costs related to the WWTP system by over a million dollars. The improved reliability of the WWTP, reduced operating costs, and water quality benefits to the Merced River would be a benefit to the community. Future utility rates would be established based on standard NPS policies that incorporate many different factors. Therefore, socioeconomics is dismissed from further analysis.

**Growth Inducement:** Rehabilitation of the WWTP would involve expansion of the WWTP treatment capacity to accommodate sewage from the Wawona Campground, sewage from Wawona residences currently served by septic systems (approximately five), and flows resulting from the future buildout of the Wawona community per the Wawona Town Planning Area Specific Plan (approximately 45 vacant residential lots) (Mariposa County 1987, as amended). The campground septic systems would be decommissioned and sewage would instead be conveyed to the WWTP for central treatment. The change in wastewater treatment would not

result in growth inducement. Rather, the project would support the existing Wawona Campground and associated visitors, existing residences, and the currently-planned growth for Wawona, as established in the Wawona Town Planning Area. Supporting previously-approved development planned for Wawona is not considered growth inducing and this issue is dismissed from further analysis.

**Hazards, Life Safety, and Hazardous Materials:** Rockfall, snow avalanche, and landslide risks, are not applicable to the project area because of its topography. In addition, the project is in an area of relatively low historic seismic activity. There are no known faults that cross through the local soils in or near the site, and the site is not located in an Alquist-Priolo Earthquake Fault Zone, as defined by Special Publication 42 (revised 1994) published by the California Geologic Survey. All project facilities would be constructed consistent project-specific geotechnical engineering and with the Uniform Building Code, which would reduce potential human hazard to a less-than-significant level.

Wawona has been identified by local, state, and federal fire management agencies as a community at risk from wildland fire. The NPS will continue to implement the Yosemite Fire Management Plan (2004, as amended in 2009) for the Wawona area. Goals of the plan include reducing the threat of wildland fire to public safety, to the park's communities, and to its resources; another goal is to return the influence of natural fire to park ecosystems. This project would not alter the risk of fire in the community nor the continued implementation of the Fire Management Plan. Therefore, the project would have a less-than-significant impact related to fire hazard.

Improved processes and more efficient operations would result in lower chemical use, reducing the amount of chemicals that could potentially be released into the environment. In addition, the project would provide for on-site solids handling, which would reduce the need to truck solids to El Portal (an approximately 90-mile round trip) and therefore decrease risks of sewage spills to the environment from sewage hauling.

The new facilities at the WWTP and system improvements would be constructed in compliance with all applicable Uniform Building Codes, National Fire Protection Association codes, Occupational Safety and Health Administration, and accessibility requirements. The proposed force mains and majority of the lift station equipment would be underground or within existing built areas and would not alter public accessibility or fire hazards.

Overall, the project's WWTP system improvements would reduce potential hazardous materials exposure and improve life safety. Therefore, hazards, life safety, and hazardous materials issues are dismissed from further analysis.

**Wilderness.** The community of Wawona and the Wawona Campground, including the project area, are not located within the Yosemite Wilderness (Wilderness Connect 2017). This issue is dismissed from further analysis.

**Air Quality.** During construction activities, dust would be emitted into the air by activities that disturb the soil, such as earthmoving and vehicular/equipment traffic on unpaved surfaces. Dust generated during construction activities can degrade visibility and affect sensitive biota near the project area. To avoid these potential effects, standard dust control procedures would be implemented as part of the project to minimize particulate emissions as listed in Appendix A of this EA. Vehicles and equipment idling times would be limited when parked to reduce emissions. Overall, there would be a slight and temporary increase in dust generated from earthmoving activities and emissions from construction equipment. However, the temporary construction-related air quality emissions would be minimized and would last only as long as construction activities occur. In terms of operations, the project would improve the WWTP process efficiencies and improve energy efficiency, which would result in fewer emissions. Odors have not been a problem and are not expected to be a problem at the WWTP due to management, enclosures, and sufficient distance to sensitive receptors to allow for dissipation. However, odors have been an issue at the campgrounds and the South Fork Picnic Area vault toilet. The project would reduce odors by removal of reliance on port-o-potties for the failed septic system at the campground and would diminish odors at the South Fork Picnic Area where the existing vault toilet would be replaced with a double-stalled flushing toilet restroom. In addition,



the project would provide for on-site solids handling, which would reduce the need to truck solids to El Portal (approximately 90-miles round trip) from one to two trips per day, five days a week in the summer and one trip per day, three days a week in the winter, to approximately one trip every ten days. This would reduce associated emissions from sewage transport vehicles. Therefore, operational emissions would be reduced from existing conditions. Therefore, air quality is dismissed from further analysis.

**Greenhouse Gas Emissions and Climate Change.** The primary climate change consideration in environmental impact analysis when evaluating a site-specific project is a change in GHG emissions. Project construction activities would contribute to increased greenhouse gas (GHG) emissions because of construction vehicles and equipment, but such emissions would be short term, ending with cessation of construction. As stated above in “Air Quality,” vehicles and equipment idling times would be limited when parked to reduce emissions. In terms of operations, the project would improve the WWTP process and energy efficiency, which would result in fewer GHG emissions. In addition, the project would provide for on-site solids handling, which would reduce GHG emissions by reducing the need to truck solids to El Portal, as stated above (in Air Quality topic). Therefore, operational GHG emissions would be reduced when compared to existing conditions and the project would reduce the park’s carbon footprint. This would support the Yosemite National Park Climate Action Plan (developed as part of the NPS’ Climate Friendly Parks Program), which includes strategies and actions to address sustainability, reduce GHG emissions, and anticipate the impacts of climate change on park resources (NPS 2017). Therefore, the issue of climate change and GHG emissions is dismissed from further analysis.

**Soundscape Management.** During construction, human-caused sounds would increase as a result of construction activities, equipment, vehicular traffic, and construction crews. Sounds generated from construction would be temporary, lasting only as long as the construction activity is generating the sounds. However, continuous noise abatement is required to prevent disturbance and nuisance to Park visitors, residents, workers, and wildlife. Project-related construction noise shall be minimized through the use of best available noise control techniques as listed in Appendix A of this EA. Although nighttime work may be necessary within the WWTP, construction work would be limited to daylight hours in the rest of the project area to avoid night-time noise disruption. In addition, best management practices (BMPs) would be implemented to properly maintain construction equipment (e.g., mufflers) to minimize noise from use of equipment. Contractors shall use sound attenuated compressors and generators that comply with the most recent California Department of Transportation standards. Equipment and machinery shall not exceed 85 decibels when measured at 100 linear feet distance.

Operation of the improvements to WWTP would not alter the long-term noise environment, because above ground lift stations would be acoustically shielded, improvements to the WWTP would be within the existing facilities footprint located away from sensitive receptors, and other infrastructure would be undergrounded. Impacts on the soundscape would be minimal and temporary. Therefore, this issue is dismissed from further analysis.

## 2 ALTERNATIVES

### 2.1 INTRODUCTION

This EA objectively evaluates two reasonable, technically feasible action alternatives and a no action alternative, as follows:

- ▲ Alternative 1: No Action Alternative (routine maintenance; infeasible because RWQCB permit requirements cannot be met)
- ▲ Alternative 2: Proposed Action – Rehabilitation of the WWTP (Preferred Alternative)
  - Wawona Campground Sewage Conveyance Improvements: Hybrid of Daisy Chain and Individual Lift Stations
  - Big Trees Lodge Golf Course Subsurface Effluent Disposal: Disposal Trenches
- ▲ Alternative 3: Alternative Facilities for Rehabilitation of the WWTP
  - Wawona Campground Sewage Conveyance Improvements: Daisy Chain Lift Stations
  - Big Trees Lodge Golf Course Subsurface Effluent Disposal: Drip Irrigation

Alternatives 2 and 3 are largely similar; however, the design of the Wawona Campground lift stations and the golf course subsurface disposal system differ, as described below.

### 2.2 ALTERNATIVE 1: NO ACTION ALTERNATIVE

Under the No Action Alternative, no improvements would be made to the Wawona WWTP system and the Wawona Campground individual septic systems would continue to operate. Also, use of portable toilets in the campground would continue in places where the septic system failed. Routine maintenance activities and emergency repairs would continue to occur. Due to the aging facilities, it is reasonable to expect that needs for emergency repairs and use of portable toilets would increase. The No Action Alternative would not increase the WWTP inflow treatment capacity to serve the Wawona Campground, South Fork Picnic Area (also locally referred to as the Texas Flat Day Use Area), or build-out of the Wawona Community per the Wawona Town Planning Area Specific Plan (Mariposa County 1987, as amended).

Alternative 1 would not increase treated effluent disposal capacity. It would likely result in non-compliance with RWQCB permit requirements, as it would be infeasible to meet requirements of the Central Valley RWQCB's Wastewater Discharge Permit unless other actions were taken to either greatly curtail sewage flows in to the system, increase effluent storage capacity at the WWTP, or increase the land-based effluent disposal capacity. Furthermore, this alternative would not provide on-site solid waste handling, improvements to energy efficiency, or provide for scalable/automated operations to adapt to high summer and low winter flows. The No Action Alternative would affect the NPS's ability to continue existing services or add services in Wawona due to insufficient effluent disposal capacity. In cases where effluent flows became too close to capacity, the NPS would need to take immediate actions to decrease effluent output as the use of a secondary discharge of treated effluent to the river cannot occur under the current permit. In such a circumstance remedial actions could involve restricting/curtailing outflows of treated effluent by limiting the operation of NPS/concessions facilities, including the historic Wawona Hotel or Pioneer Yosemite History Center, resulting in adverse impacts to visitor experience. Although these properties may close, they would continue to be maintained and preserved. On a longer term-basis, the NPS would likely aim to increase treated effluent storage by undertaking a separate project to build storage tanks, which may have unknown impacts due to construction and soil disturbance. The golf course spray discharge system, which uses treated effluent to irrigate the golf course turf, would not be renovated and would continue to operate as the existing infrastructure further deteriorated. Effluent distribution through the spray field would remain the same, where some areas of the course turf are overwatered and others are too dry. If the Wawona

Wastewater Treatment System is not expanded and improved, system shutdown may be required by RWCQB because a permit violation would likely occur.

The existing conditions under the No Action Alternative serve as baseline from which impacts from other alternatives can be analyzed. The existing conditions within the approximately 106-acre project area (Figure 1-1), which would remain under the No Action Alternative, are described below.

**Existing WWTP Facilities:** For the portions of the Wawona community served by the WWTP, sewage is collected and pumped to the mechanical wastewater treatment plant. The WWTP is located upslope and out of view of the Wawona community. The WWTP is arranged on three levels, with open air treatment basins at the top and mechanical systems on the lower levels. The WWTP also includes an administrative area, lab, control room, and locker rooms. The treatment units are described below:

- ▲ headworks consisting of two comminutors (sewage grinders to shred/screen sewage) and a Parshall flume (for measuring influent),
- ▲ an aerated flow equalization basin (58,000 gallon) with pumping,
- ▲ two 72,000-gallon aeration basins,
- ▲ two 32-foot-by-8-foot secondary clarifiers,
- ▲ a rapid mix and flocculation basin,
- ▲ two 32-foot-by-8-foot final clarifiers,
- ▲ two 7-foot-by-7-foot tertiary sand filters,
- ▲ a surge/effluent equalization tank (58,000 gallon) with effluent pumping and as a secondary point to apply chlorine,
- ▲ two 2.25-million-gallon effluent storage tanks, and
- ▲ two 25,000-gallon aerobic digesters.

**Existing WWTP Treatment Capacity:** The WWTP has a RWQCB-permitted monthly average influent flow limitation of approximately 105,000 gallons per day (gpd). Existing use levels range from about 20,000-25,000 gpd in the winter, 45,000-50,000 gpd in the spring, and 75,000-100,000 gpd at peak vitiation periods. The peak month flow, observed in 2010, was 101,235 gpd.

**Existing WWTP Collection System:** The Wawona collection system consists of small diameter (8-inch and 6-inch) gravity sewers and multiple pumping facilities. The system includes eight small lift stations throughout the community and two primary lift stations (the main central lift station and the main lift station, see Figure 1-1). The main central lift station is a dry pit system with a collection wet well; it has an active wet well volume of 530 gallons, two pumps, 20 horsepower, and capacity of 215 gallons per minute (gpm). The main lift station is also a dry pit system with a collection wet well; it has an active wet well volume of 422 gallons, two pumps, 10 horsepower, and capacity of 166 gpm. All raw sewage passes through the two primary lift stations for conveyance up to the WWTP. Primary power and back-up power for the two primary lift stations is derived from the WWTP site. The small lift stations do not include WWTP back-up power, but have the capability to connect to a mobile back-up generator. The eight small lift stations would not be affected by the proposed action.

**Existing Wawona Campground:** The Wawona Campground provides 96 campsites and one group site with a service capacity of 620 persons. There are six campground restrooms, five of which were built in the 1950s and one that was built in 1986. The restrooms dispose of sewage via individual septic systems that are past their useable life, and partially located within the 100-year floodplain of the wild and scenic South Fork of the Merced River. These septic systems have exceeded their design life by several years. Heavy use of the restrooms, combined with high groundwater at the campground can stress the septic systems and leach fields, creating potential water quality impacts during peak use or wet weather. One leach field is non-operational due to irreparable damage and portable toilets are used in Loop A of the campground. The portable restrooms are a source of odors and must be pumped of raw sewage regularly, which is then trucked to El Portal for treatment. Trucking raw sewage poses risks of accidental release.



**Existing Vault Toilet at South Fork Picnic Area:** The existing vault toilet at the South Fork Picnic Area (South Fork Picnic Area) would remain in its current location (Figure 1-1), which is close to the banks of the South Fork of the Merced River and within the floodplain, posing a risk to water quality. This vault toilet is a source of odors and it must be pumped of raw sewage regularly, which is then trucked to El Portal for treatment. Trucking raw sewage poses risks of accidental release.

**Existing WWTP Office Space:** Staff utilize temporary office trailers at the front of the WWTP for the chief operator and assistants. Administrative areas in the building are over utilized for lunch/break rooms and computer work stations.

**Existing WWTP Groundwater Intrusion:** In the wet season, there has been groundwater intrusion into the WWTP's lower floors. The water not only leaks through walls, but is often piped through electrical conduits discharging into service cabinets creating unsafe conditions. This water intrusion is evident by the excessive staining in the lower floor walls.

**Existing WWTP Electrical and Control:** The WWTP electrical switch gear and panels are old and in need of improvement. The control cabinets and devices are outdated and staff operate the system without a fully-functional SCADA (Supervisory Control and Data Acquisition System). Monitoring devices are needed to support future functional control such as dissolved oxygen probes for blower control.

**Existing WWTP Heating and Ventilation:** The heating and ventilation systems are thought to be in good condition, but some ancillary upgrades may be needed.

**Existing WWTP Chemical Feed:** Most of the chemical feed systems are in good shape and have been well maintained by staff. The main coagulant pump requires replacement and secondary containment walls may be needed in the polymer room.

**Existing WWTP Blowers:** The WWTP aeration system consists of seven different rotary lobe aeration blowers and one large compressor. The compressor is used for specific equipment operations, air operated tools and the clarifier scum pumps. There are no automated controls and the systems are not energy efficient. The blowers and compressor are original, approximately 30-years old.

**Existing WWTP Pumps:** Most of the WWTP process pumps are original, from approximately 30-years ago.

**Existing WWTP Solids Handling:** The WWTP is unable to fully treat and process bio-solids, requiring solids to be transported by tanker truck to the El Portal waste water treatment plant, approximately 90 miles round trip, one to two trips per day, 5 days per week in the summer and one trip per day, 3 days per week in the winter.

**Existing Big Trees Lodge Golf Course Effluent Disposal:** The disinfected tertiary effluent is stored in tanks at the wastewater treatment facilities and used to irrigate the golf course during the spring, summer and fall to meet the water demand of the turf. The stored tertiary-treated effluent is transferred from the WWTP to the Big Trees Lodge Golf Course via a 10-inch force main and is screened and pumped for irrigation. Approximately 22 acres are spray-irrigated at the golf course over a seven-month period from May to November. In addition, normal disposal includes winter irrigation, when weather permits, to manage the effluent stored at the WWTP. The current spray irrigation over waters some areas of the green and under waters others, and the average golf course irrigation demand exceeds the annual treated wastewater available and must be supplemented with river water diversion. Build-out of the Wawona community is planned to occur; however, at build-out flows, the Big Trees Lodge Golf Course spray irrigation system annual capacity would be insufficient and an alternate disposal scheme would be required. Furthermore, the golf course irrigation system is aging and presents mounting maintenance needs, as it was constructed approximately 30 years ago.

**Conclusion:** The No Action Alternative would not meet the purpose and need of the proposed action, due to the infeasibility of continuing to meet WWTP operating permit requirements. In addition, actions identified in the Merced River Plan (NPS 2014) to decommission the Wawona Campground septic systems and connect the facility to the WWTP would not occur, resulting in the continued compromise of river values. The WWTP needs additional capacity to treat the campground sewage flows as well as flows from the planned buildout of

Wawona. Furthermore, this alternative would not provide on-site solids handling, improved energy efficiency, or provide for scalable/automated operations to adapt to high summer and low winter flows. Therefore, transport of solid wastes to El Portal would continue and cost reductions related to system operations would not be realized. Because the No Action Alternative would not meet the compliance requirements, would not address the Merced River Plan-identified improvements for the Wawona Campground, would not improve WWTP reliability and sustainability, and would not provide environmental and public safety improvements, this alternative would not meet the project's purpose and need.

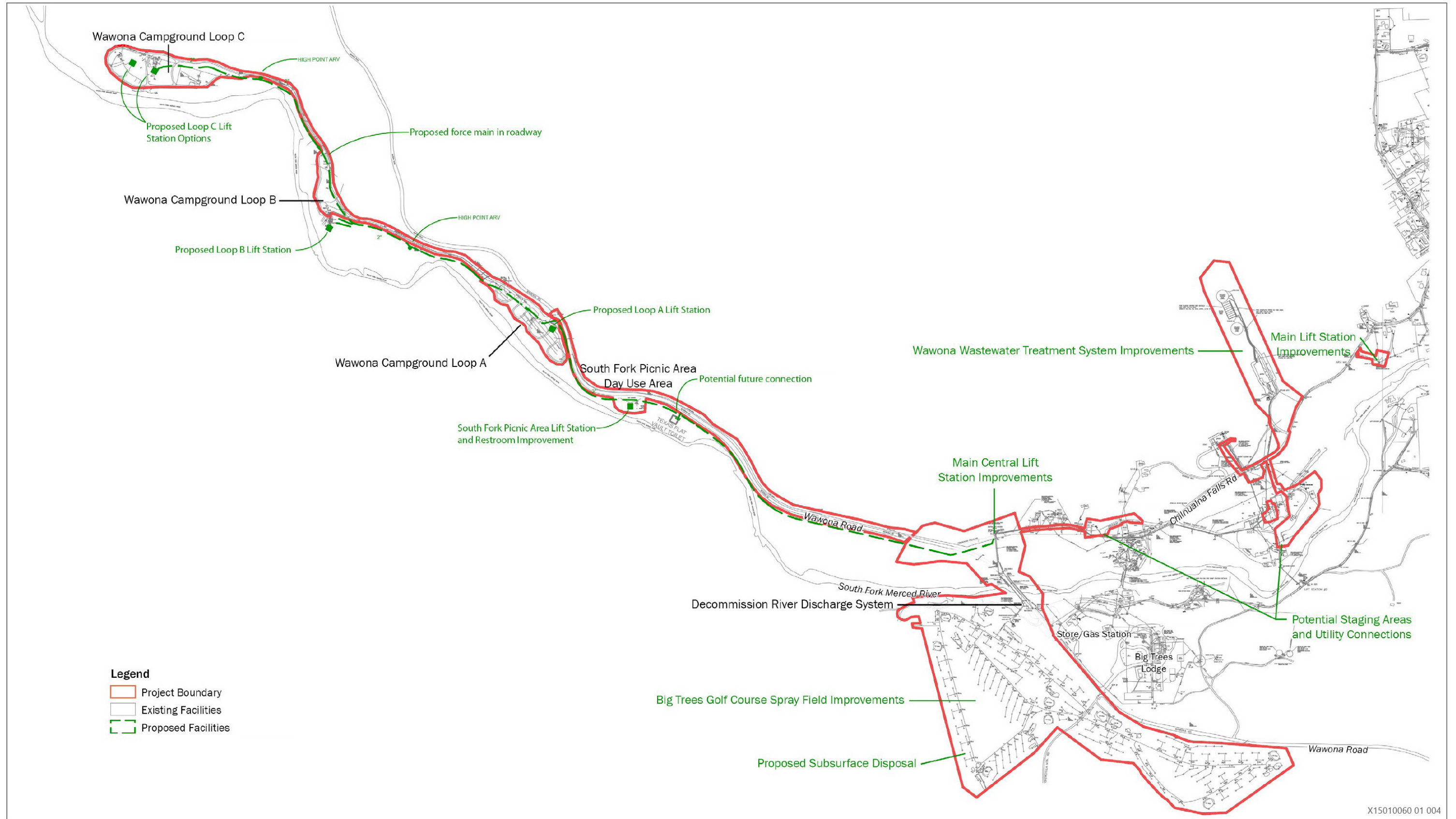
## 2.3 ELEMENTS COMMON TO THE ACTION ALTERNATIVES

The goal of the project is to improve the WWTP process efficiencies as well as update the equipment to a contemporary sustainable operation that has the ability to handle existing and future sewage flows while meeting permit requirements for land based discharge of treated effluent. The proposed improvements are based on peak flow months, represented by the average daily flow for the peak month, commonly July. The project would upgrade the primary treatment to improve solids removal efficiencies; repair and/or replace secondary treatment (aeration and solids pumping) to enhance pollutant removal (biological and solids); and expand treatment capabilities for nutrient removal. The WWTP disinfection and effluent capabilities would be modified and expanded to operate solely on land-based systems for the discharge of tertiary-treated effluent. All project alternatives would consist of improvements to the WWTP, main central lift station, main lift station, Big Trees Lodge Golf Course spray fields, Wawona Campground, and South Fork Picnic Area, as well as necessary pipeline and utility connections. The overall project concept and layout is illustrated in Figure 2-1.

**Repairs to WWTP Facilities:** Improvements at the WWTP would include rehabilitation of the head works structure; replacement of cracked concrete; replacement of the grit removal equipment with improved screening, washing, and handling system; and upgrading the septage and grease receiving equipment. The project would also rehabilitate the electrical and control system, provide arc flash protection, automate the WWTP, and establish scalable operations for seasonal differences in flows. Each pump would be replaced with efficient motors. These system improvements would make the WWTP more energy efficient, supporting green-sustainable operations of park infrastructure. Ancillary upgrades to WWTP facilities and systems would be implemented as required in relation to the upgrades. The existing storage volume of 4.5 million gallons is sufficient for the irrigation management during the winter and would be maintained. The current water balance practice of drawing from the Merced River with winter disposal is proposed to continue.

**Expanded WWTP Treatment Capacity:** WWTP sewage treatment capacity would be expanded from 105,000 to approximately 130,000 gpd (see Appendix B, Table 1). This increased capacity would allow for continued treatment of existing peak wastewater flows (based on the 2010 peak of 101,235 gpd) as well as flows from the planned buildout of the Wawona community per the Wawona Town Planning Area Specific Plan (Mariposa County 1987, as amended) (10,850 gpd), the Wawona Campground (6,260 gpd), and South Fork Picnic Area (600 gpd) (Appendix B, Table 1). The ultimate peak month flow is therefore estimated at 125,245 gpd. The design peak month flow is proposed to be 130,000 gpd, with an ultimate (equalized) design peak hour flow of 340,000 gpd. The expanded WWTP capacity would provide central treatment for sewage flows from approximately fifty private parcels in Wawona (most of which are currently vacant lots that may be built on in the future). These residences would be connected to the sewer system via lateral service piping to the existing sewer main at the time of development or when the septic system is decommissioned.

**Projected Effluent Limits:** As explained in Section 1.2, the RWQCB permit for the WWTP discharge expired in September 2018. The NPS submitted a Report of Waste Discharge in March 2018 to help define the future effluent limits. The NPS is now operating the WWTP under the General Order Waste Discharge Requirements (WDR) Permit with a Notice of Applicability (NOA) specific to the WWTP (Permit No. 2014-0153-dwq-r5289), which allows for discharge of treated effluent to land only; the potential to discharge treated effluent to surface waters (the South Fork of the Merced River) is no longer allowed. The RWQCB establishes effluent limitations for the discharge of tertiary-treated effluent to the Big Trees Lodge Golf Course, and it is proposed that going forward the potential to discharge to the South Fork of the Merced River continue to be disallowed. It is assumed that the current effluent limitations for golf course spray irrigation would apply to the proposed subsurface disposal system. Effluent limits would ultimately be confirmed in the updated RWQCB permit. The anticipated projected effluent limits are presented in Appendix B, Table 2.



**Figure 2-1**

**Wawona Wastewater Treatment System – Common Project Elements**



**Addition of WWTP Solids Handling:** A two-story solids handling building would be added at the north end of the WWTP to house a new screw press, digester, and a pump room. The lower floor would be level with the basement (below grade), and the upper floor would be level with the exterior deck at grade (21 feet by 58 feet, with 6-foot by 12-foot L-shaped extension; up to 10 feet below grade disturbance for foundations). Work at this location would include:

- ▲ Removal of existing septic receiving tank (16 by 16 feet, 12-foot vertical depth) at west end of new building.
- ▲ Addition of new septage receiving tank for storage adjacent to new solids handling building on the north side (10 feet by 20 feet, 14-foot vertical depth) to replace tank described above. The new tank would be for septage receiving, emergency storage, and a receiving tank for excess cake from the conveyance system.
- ▲ Construction of a canopy truck port, adjacent to the new solids handling building on the north (16 feet by 42 feet, 17-foot vertical height, no work below grade)
- ▲ Addition of a concrete retaining wall located 16 feet north of new solids handling building for slope cut into the adjacent hill (approximately 120 feet in length, up to 14-foot vertical height, including 3 feet below grade disturbance)
- ▲ Relocation of all piping and conduit from the effluent tanks to the west side of the new solids handling building; work would occur within the current disturbed footprint (estimated 150 linear-foot trench, 10-foot wide, 4-foot vertical depth)
- ▲ Expansion of asphalt road area and create truck access lane (estimated 2,700 sf paving, road base and asphalt, 12-inch vertical excavation)

Digested sludge would be pumped to a dewatering facility, feeding in at around 50 gpm, producing cake at a rate of approximately 6 gpm. The resulting dehydrated “cake” would then be dumped into a truck (estimated to have a capacity of around 15,000 gallons) and hauled off site approximately once every 10 days.

**Additional WWTP Office Space:** The WWTP control/laboratory building would be expanded to provide an additional approximately 750 sf of space and approximately 10-foot vertical disturbance below ground surface. The office space would be entirely within the existing WWTP site and would include removal of the office trailer currently located in the WWTP parking lot. The improvements would include accessible design in compliance with the accessibility standards, in particular for the parking lot, sidewalk, and bridge grades.

**Replace WWTP Generator and Fuel Tank:** The existing diesel generator and fuel tank need to be replaced due to emission requirements and age. An outdoor-rated generator with its own enclosure would be placed in the WWTP parking area in the location of the current office trailer (to be removed as part of this project) or adjacent to the parking area near the transformer. The existing 4,000-gallon buried fuel tank (6-foot diameter, 22-foot length, 14-foot bury depth) would be replaced with a partially buried 18,000-gallon liquid propane tank (10-foot diameter, 45-foot length, 8-foot bury depth) adjacent to the south side of parking area. Overall disturbance in the parking lot would be approximately 10 feet by 25 feet, with 16-foot vertical depth for the removal of the existing buried fuel tank, and 25 feet by 55 feet, with 10-foot vertical depth for installation of the partially buried liquid propane tank.

**Prevent Surface Runoff and Groundwater Intrusion at the WWTP:** Improvements would be made on the west side of the WWTP to prevent surface run-off and groundwater from penetrating the building and electrical controls. This includes:

- ▲ Installation of a paved area between the existing building and fence (approximately 2,385 sf of 6 inch asphalt over 6 inch aggregate base)
- ▲ Replacement of the chain-link fence behind the WWTP with a retaining wall to minimize groundwater and sediment transport (200 linear feet of trench, 2-foot wide by 5-foot deep)
- ▲ Construction of a French drain along the west side of the facility (230 linear foot trench, 2 feet wide by 10 feet deep) with 4-inch drain piping to daylight (or sump pump basin) on southeast side of WWTP

**WWTP Controls:** Connect WWTP controls to the park-wide Communication Data Network instead of landlines, requiring:

- ▲ Installation of 4-inch communications conduit to connect to an existing CDN equipment cabinet/pullbox near the Wawona fire station (approximately 275 linear foot trench, 2 feet wide, 3-foot vertical depth, in the existing sewer trench/alignment).
- ▲ Installation of P25 radio antennas on the existing 125-foot Wawona CDN tower for future wireless communication to lift stations remote terminal units (no ground disturbance).
- ▲ Installation of new communication pull box on the existing WWTP communication conduit, near the entrance to the WWTP (3 feet by 4 feet, 4-foot vertical depth).
- ▲ Installation of 4-inch communication conduit to provide WWTP and Wawona Water Treatment Plant system connectivity (approximately 1,200 linear feet, 2 feet wide, 3-foot vertical depth; trench alignment following existing raw water pipe).

**Main Central Lift Station Improvements:** The existing wet well/dry well arrangement would be retrofitted to ensure effective conveyance to the WWTP. Retrofitting the existing infrastructure, as opposed to replacement, is proposed to avoid additional ground disturbance. The improvements would include the following:

- ▲ Installation of submersible pumps and a concrete cover in existing wet well (no ground disturbance)
- ▲ Improvements to electrical system and controls at the existing lift station (no ground disturbance)
- ▲ Installation of concrete pad (12 feet by 30 feet, 12-inch vertical depth) over the existing dry well. The following items would be constructed within the footprint of the concrete slab:
  - Abandon existing drywell, remove top 10 feet of the manway and backfill to the meter vault
  - Install valve vault (6 feet by 6 feet, 6-foot vertical depth) and associated electrical and communication conduit (30-inches deep) from the adjacent control shed, new overflow (16-foot vertical depth), and force main piping (3-foot vertical depth)
  - Install new meter vault (3 feet by 3 feet, 6-foot vertical depth)
  - Install permanent bypass connection vault (3 feet by 3 feet, 6-foot vertical depth) on top of the existing 6-inch diameter force main
- ▲ Installation of buried emergency storage overflow tank (24 feet by 10 feet, bury depth 18 feet) northeast of the current drywell. Shoring to be used to limit disturbance with an approximate footprint 20 feet wide (north) by 34 feet long (east).

The useable volume within the wet well and emergency storage tank is limited by the low elevation of the manhole upstream of the lift station, by the bridge on Wawona Road. As such, the lift station would be equipped with the following back-up options:

- ▲ back-up power generator at the WWTP;
- ▲ generator plug to accommodate portable generator; and
- ▲ piping to accommodate bypass pumping using portable diesel pump.

Once construction is complete, surface conditions would be restored to pre-project conditions. It is assumed that two thirds of the proposed 130,000 gpd peak month flow into the WWTP would come through the main central lift station. For further detail on the main central lift station improvements, see Appendix B, Table 3.

**Main Lift Station Replacement:** As with the main central lift station, the main lift station would be replaced adjacent to the existing lift station within a previously-developed area consisting of graded material. The area of construction disturbance and improvement would be approximately 60 feet by 60 feet, and would include the following:

- ▲ Installation of a concrete pad (15 feet by 30 feet, 12-inch vertical depth) in which the following would be installed:
  - Wet well (8 feet by 25 feet)
  - Valve vault (6 feet by 6 feet, 6-foot vertical depth)
  - Meter vault (3 feet by 3 feet, 6-foot vertical depth)

- Bypass connection vault (3 feet by 3 feet, 6-foot vertical depth)
- Electrical control panel and weather roof (10 feet by 5 feet, 36-inch vertical depth)
- ▲ Installation of buried precast concrete emergency overflow tank (21 feet by 10 feet, 25-foot vertical depth)
- ▲ Installation of two new interconnecting manholes with 6-inch and 8-inch gravity pipe (5-foot diameter, bury depth of 4 and 16-feet)
- ▲ Installation of two separate trenches for connecting to existing systems:
  - Force main connection (6-inch diameter, approximately 70 linear feet of trench, 30-inch width, 3-foot vertical depth)
  - 4-inch diameter electrical conduit connection (approximately 70 linear feet of trench, 30-inch width, 3-foot vertical depth)
- ▲ Abandon existing drywell (remove top 10 feet of manway and backfill) and wet well (remove top 5 feet of cover/barrel section and backfill) and remove existing electrical control panel (4 feet by 6 feet, 3-foot vertical depth)

Combining the storage from a new emergency storage tank, the incoming manhole, and the new lift station wet-well, a total of approximately 3,500 gallons storage would be available. At peak-month flows this equates to around 2 hours, and at peak-day flows, around 30 minutes. Given the relatively little emergency storage available, the following back-up options are proposed:

- ▲ back-up power generator at the WWTP,
- ▲ generator plug to accommodate portable generator, and
- ▲ piping to accommodate bypass pumping using portable diesel pump.

Once construction is complete, surface conditions would be restored to pre-project conditions. It is assumed that one third of the 130,000 gpd peak month flow into the WWTP would come through the main lift station. For further detail on the main lift station replacement, see Appendix B, Table 4.

**Manhole Reconstruction:** A manhole near the South Fork of the Merced River would be reconstructed to protect the river from potential sewage spills as follows:

- ▲ The manhole is within the road prism, approximately 60 feet north of the existing bridge wall (5-foot diameter, 8-foot bury depth, 10 by 10 foot area of disturbance).
- ▲ Remove the top 3 feet of concrete rings and the 3-foot cone section would be removed. A new 3-foot barrel section would be installed and the 3-foot cone section would be reset on top of the existing manhole to raise its rim elevation. The work area would be backfilled (10 by 10 foot area of soil disturbance) and the road shoulder restored.

**Decommission River Discharge System:** Infrastructure for the South Fork of the Merced River discharge system would be decommissioned by:

- ▲ cutting the existing discharge pipes above the high-water mark, removing the pipe below the cut, and removing the remaining section above the high water mark from the bank (estimated trenching 50 linear feet each, 3-feet wide, 4-foot vertical depth)
- ▲ work may include plugging the existing discharge manhole and removing the discharge pipe upstream to the T-connection with 10 inch recycled water line from the WWTP (approximately 75 linear feet, 3-feet wide, 4-foot vertical depth)
- ▲ removal of two valves in the road shoulder for river effluent discharge point requires digging (4 feet by 6 feet, 4-foot vertical depth) in previously disturbed soil to the 10-inch pipe to remove the valve and install a plug. The area would be backfilled and the road shoulder restored.

**Big Trees Lodge Golf Course Effluent Spray Irrigation System Improvements:** The existing spray irrigation system would be replaced to improve turf watering and replace aging infrastructure (see Figure 2-2). The existing layout and capacity of the system would be maintained. The pipelines, pumps, and controls would be replaced to improve system reliability and functionality. The sprinkler mains would be pressure tested and the

laterals replaced; the mains may require replacement pending pressure test results. Soil disturbance would mostly occur in soils previously disturbed by the former installation of the existing spray field.

- ▲ Main lines would be replaced in the same location as existing main lines. Additional control valves would be constructed along the main lines in the same trench (approximately 8,100 linear feet, 2-foot wide, 3-foot vertical depth)
- ▲ In areas with known sensitive resources, new system laterals and spray heads would be placed in near proximity to the existing laterals and spray heads so as to remain within disturbed soil (1-foot wide, 2-foot vertical depth).
- ▲ In areas that do not contain sensitive resources, location of new system laterals and spray heads may vary from existing alignments to accomplish distribution of the effluent in the golf course (up to 28,000 linear feet trenching, 1-foot width, 2-foot vertical depth).
- ▲ Control system conduits for power and communication would be placed in the same trench as irrigation system mains and laterals (1-foot wide, 30 vertical depth)
- ▲ Approximately 10 satellite controllers may be installed in new locations, as necessary (estimated soil disturbance for each: 5 by 5 feet, up to 4-foot vertical depth)
- ▲ Existing main line drains would be replaced with drains that have means to dechlorinate treated effluent (5 by 5 feet, 2-foot vertical depth)

**Subsurface Effluent Disposal at the Big Trees Lodge Golf Course:** A subsurface disposal system would be constructed at the Big Trees Lodge Golf Course that would function for approximately five months of the year, generally from November to April (with exact times dependent on weather), with a design flow as detailed in Appendix B, Table 5. The design flow for the subsurface disposal would be approximately 26,550 gpd; the design disposal capacity would provide for 100 percent redundancy, allowing for approximately 53,100 gpd. Because the WWTP provides tertiary-level treatment, additional soil treatment would not be necessary for the subsurface system. The subsurface system would be used to dispose of treated effluent when the weather and turf conditions are not favorable for spray irrigation. In addition, disposal would occur when groundwater is at a sufficient depth below the bottom of the disposal field. See Alternatives 2 and 3 below for descriptions of the proposed disposal alternatives.

**Expand Service to the Wawona Campground:** The expansion of WWTP capacity would include treatment of flows from the Wawona Campground, which are currently served by individual septic systems (six total), and the South Fork Picnic Area, which is currently a vault toilet requiring regular pumping by tanker truck. The maximum daily flows from the facilities are estimated as follows:

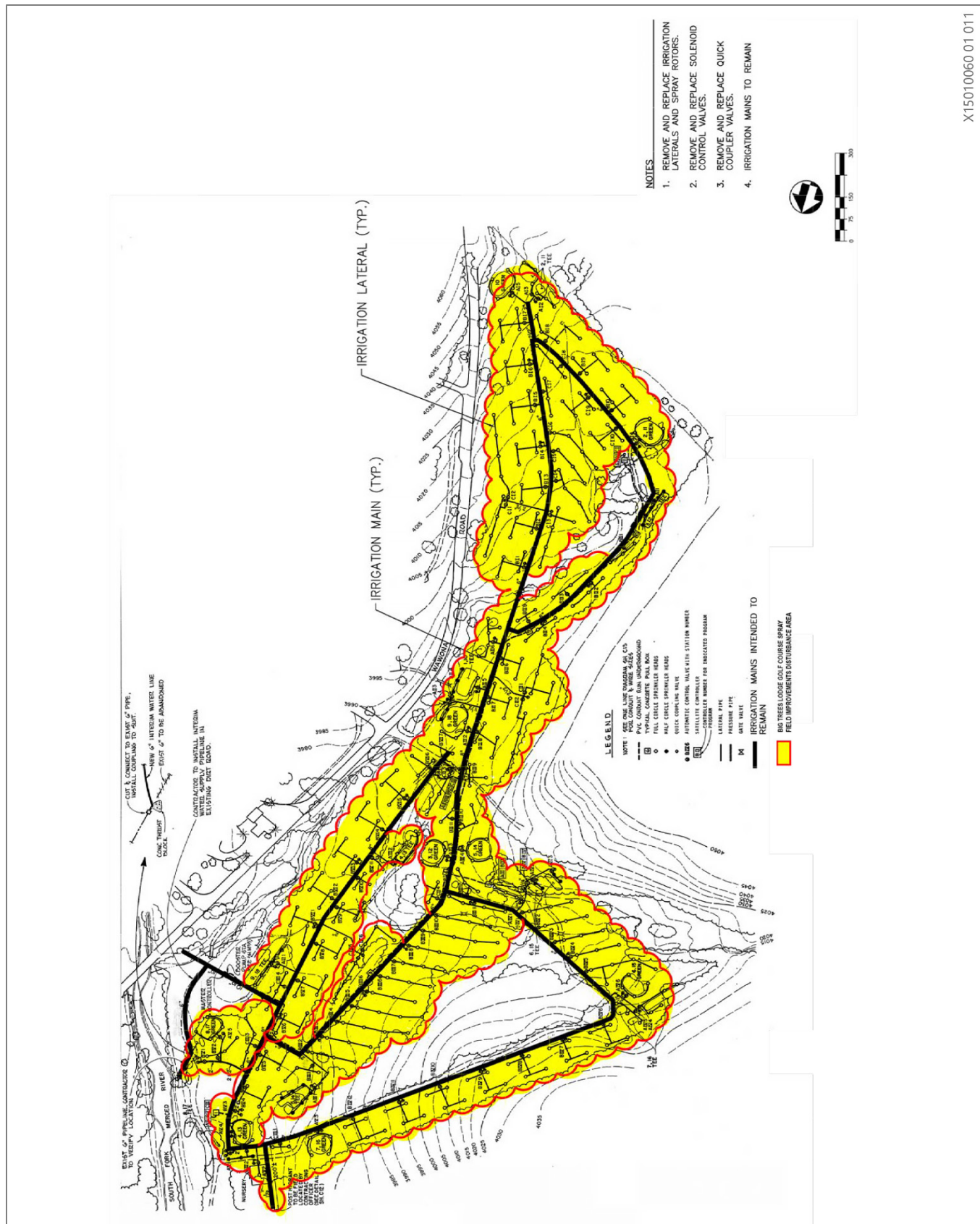
- ▲ Wawona campground regular campsites: 60 gpd x 96 sites = 5,760 gpd, and
- ▲ Wawona group campsite: 500 gpd, and
- ▲ South Fork Picnic Area: 600 gpd.

**Wawona Campground Lift Stations:** Lift stations would be installed to convey sewage from the campground and South Fork Picnic Area to the main central lift station. The campground lift stations would be constructed outside of existing roadways, in previously disturbed areas where possible. The lift stations would pump sewage from the campground and South Fork Picnic Area to the main central lift station, which would then pump sewage to the WWTP for treatment. See Alternatives 2 and 3, below, for descriptions of the proposed campground lift station alternatives.

**Sewage Conveyance Lines to Wawona Campground:** To convey sewage from campground lift stations and South Fork Picnic Area to the main central lift station, to provide electrical power to the campground, and to replace the aging water line, the following trenching underneath existing roadways would be required:

- ▲ Conduit and sewer force main installation in the roadway within the limits of the developed campground (estimated 4,400 linear foot trench, up to 3 feet wide, up to 5-foot vertical depth)
- ▲ Conduit and sewer force main installation underneath Wawona Road from the campground to the main central lift station (estimated 4,700 linear foot trench, up to 3 feet wide, up to 5-foot vertical depth)





### Figure 2-2

### Big Trees Lodge Golf Course Spray Field Improvements Disturbance Area

- ▲ Conduit installation from the main central lift station junction along Chilnualna Falls Road to the power pole in the developed area near the AT&T building in Wawona, just off Chilnualna Falls Road (500 linear foot trench, up to 2 feet wide, up to 5 feet deep)
- ▲ Water line replacement from the Wawona Campground to the main central lift station (estimated 4,300 linear foot trench)
  - Water line replacement in a new alignment in the vicinity of the intersection of Chilnualna Falls Road and Wawona Road (200 linear foot trench, up to 2 feet wide, up to 3 feet deep). The trenching would be shallow to limit soil-disturbing activities to roadbed fill.
  - Replacement in-kind of the water line in alignment along Wawona Road (4,100 linear feet, up to 3 feet wide, up to 5-foot vertical depth)

**South Fork Picnic Area Flush Comfort Station:** The single vault toilet would be replaced in the future as part of a separate project (pending funding) with a double unisex flush toilet restroom in the existing developed area, the expected soil disturbance is as follows:

- ▲ Restroom replacement (approximately 12 feet by 18 feet, 18-inch vertical depth)
- ▲ Force main sewer to connect the restroom to the sewer that would run underneath Wawona Road. Electrical conduit would be installed in the same trench (80 linear foot trench, up to 2 feet wide, up to 6-foot vertical depth)
- ▲ Water line installation (80 linear foot trench, up to 2 feet wide, and 4-foot vertical depth)
- ▲ Lift station to convey sewage to the main central lift station (500 sf area, 15-foot vertical depth)

**Power for Campground Lift Stations:** To provide power to the campground lift stations and comfort stations, a power pole would be installed near Chilnualna Falls Road near the stables, as follows:

- ▲ Approximately 800 linear foot trench beneath the road (3 feet wide, 3-foot vertical depth)
- ▲ Excavation for pole installation (2-foot diameter, 5-foot vertical depth) and limited trenching to roadway trench (approximately 25 feet, 3-foot width, 3-foot vertical depth)
- ▲ Installation of a concrete pad to house a transformer and switchgear enclosure (8 feet by 12 feet, 2-foot vertical depth)

**Decommission Existing Wawona Campground Septic Systems:** After the WWTP improvements are constructed and operational, the existing Wawona Campground septic system tanks and pipes would be emptied, cleaned, cracked, filled with slurry, and abandoned in place

**Green-Sustainable Operations:** The project would save energy through automating and scaling WWTP processes and upgrading with modern equipment. The project would achieve compliance with the Central Valley RWQCB's permit limits and would result in long-term beneficial effects on surface and groundwater quality. Finally, the project would decrease truck trips, reducing associated criteria air pollutant and carbon emissions.

**Construction Disturbance:** Construction is scheduled to begin in summer or fall 2019 and is estimated to take approximately one year to complete. Construction would involve trenching for utility lines, excavation for lift stations and WWTP improvements, decommissioning septic systems, and backfilling disturbed areas to restore the ground surface after subsurface infrastructure is installed. Directional drilling would be utilized in some parts of the Wawona Campground to install sewer lines. The entry and exit points for the drilling would occur in previously disturbed areas of the campground.

The WWTP system improvements would be implemented without disrupting the existing wastewater treatment services in Wawona. Bypass systems would be implemented where needed during construction to allow for continued sewer service to the areas of Wawona already served by the WWTP. In addition, the campground would be operated until connection to the WWTP is operational.

Construction activities would require the temporary disruption of roadways and other facilities in Wawona related to construction worker and truck trips and installation of new sewer lines. The primary roadway disruption would occur during installation of the forcemain along Wawona Road, which is estimated to take

approximately two months. Vehicular access, including emergency vehicle access, would be maintained throughout the entire construction period implementing traffic control measures, including detours and protection of open lanes. Construction would require the temporary closure of Wawona Campground Loop A. It is estimated that Campground Loop A would need to be closed because of construction of the forcemain and comfort station for approximately two months. However, Loops B and C are regularly shut down during the winter (December through March) and construction of facilities in these two loops would occur during the winter closure period so that there would be no anticipated disruption of normal campground operations during the April to November season. Although not anticipated, if weather conditions or other factors caused construction to extend outside of that season, the NPS anticipates that construction could require an additional a month or two of closure of Loops B and C. The South Fork Picnic Area would not need to be closed and recreational access to the day use area would continue throughout the construction of the forcemain and future restroom; however, parking may be temporarily impacted. Finally, construction would require the closure of the entire Big Trees Lodge Golf Course for approximately one year, beginning in late-summer 2019 to construct disposal trenches, distribution piping, and irrigation system repairs. The usual operational season at the golf course is April through November.

Construction staging areas would be located with existing developed or disturbed areas. Areas where heavy equipment or materials are staged would be surrounded with chain-link fencing that would not penetrate the ground surface. Areas of resource sensitivity would be marked as avoidance areas and protected from disturbance. The following proposed staging areas are included in the project boundary shown on Figure 2-1:

- ▲ The fenced and disturbed area of the WWTP would be used to stage equipment and materials for WWTP upgrades; mostly be staged on the paved abandoned sludge drying beds.
- ▲ The Wawona fire station parking areas and vicinity would be used to temporarily house two trailers to serve as construction management offices.
- ▲ The hard-packed area at the Wawona maintenance area and boneyard, which is currently used for staging for park maintenance, would be used to stage materials, equipment, and vehicles, as well as cast-off materials.
- ▲ The envelope of current disturbance at the main lift station would be used to stage equipment and materials for construction activities occurring at the main lift station and main central lift station.
- ▲ The Big Trees Lodge Golf Course would be used to stage materials and equipment for construction activities at the golf course. Work would be sequenced so that all construction staging for golf course activities is staged on-site at the golf course.
- ▲ The developed areas of Wawona Campground Loops A and B would be used to stage equipment and materials for upgrades to the campground sewer. No equipment or materials would be staged in Loop C.
- ▲ The South Fork Picnic Area paved pullout and parking area would serve as a staging area for the trenching work occurring along Wawona Road.
- ▲ A dirt lot (13,200 sf) on Chilnualna Falls Road, recently used as a log deck, would be used for staging equipment, materials, and soil excavated from the Wawona Road trenching.

## 2.4 ALTERNATIVE 2: PROPOSED ACTION – REHABILITATION OF THE WWTP (PREFERRED ALTERNATIVE)

### 2.4.1 Wawona Campground: Hybrid of Daisy Chain and Individual Lift Stations

In Alternative 2, three individual lift stations for Wawona Campground Loop C (Comfort Stations C1, C2, and C3), Loop A (Comfort Stations A1 and A2), and the comfort station in Loop B would be pumped to the high point between Loop B and Loop A. The sewage would then flow by gravity to a lift station in Loop A. The sewage from the Loop A comfort stations would flow by gravity to the Loop A lift station. Sewage would be pumped from the Loop A lift station to the main central lift station.

The lift stations would require the following ground disturbance within the limits of the developed campground:

- ▲ Loop A lift station (500 sf area, 15-foot vertical depth)
- ▲ Loop B lift station (500 sf area, 15-foot vertical depth)
- ▲ Loop C lift station (500 sf area, 15-foot vertical depth)

The proposed installation would be mostly within the footprint of the existing septic tank to minimize new ground disturbance (which is estimated to be 8 feet by 16 feet, 6-foot vertical depth).

Gravity sewer lines would be installed to collect sewage from the comfort stations and convey it to loop lift stations. Electrical conduit would be installed concurrently along the same alignment to provide power to comfort stations (the connection would occur as a later project). This work would involve approximately 620 linear feet of open cut trenching (4 feet wide, 8-foot vertical depth) and approximately 800 linear feet of directional horizontal drilling (10-inch auger, 6 to 15 foot vertical depth).

Directional drilling would be employed in portions of Wawona Campground. The entry and exit pits for the drilling would be located within the footprint of disturbance of the existing septic tanks whenever feasible.

- ▲ Exit pit - (6 feet wide, 8 feet long, 6-foot vertical depth) for directional drill to connect the force main sewer to the trenched force main.
- ▲ Power would be junctioned at each lift station and terminated at each restroom.

In Alternative 2, the three Wawona Campground lift stations would be interconnected in series (one after another) creating a 'daisy chained' arrangement in a portion of the system for conveyance. This hybrid lift station configuration is the Preferred Alternative for the Wawona Campground sewage conveyance improvements, because it would result in the fewest lift stations (three) and the least ground disturbance (3,600 sf, approximately 2,400 sf less than Alternative 3).

The hybrid alternative is better at:

- ▲ reducing long-term odor,
- ▲ limiting changes to the viewshed,
- ▲ creating reliability and flexibility to operate the system, and
- ▲ minimizing the amount of maintenance required.

## 2.4.2 Big Trees Lodge Golf Course Subsurface Disposal: Disposal Trenches

The tertiary-treated effluent currently gravity flows from the WWTP storage tanks to an irrigation booster pump station at the Big Trees Lodge Golf Course. A bypass would be installed to switch flows from the spray irrigation to a new subsurface disposal field in Fairway 7 (Figure 2-3). Work related to the construction of the subsurface disposal field would involve:

- ▲ Four new effluent disposal transmission pipelines, in the same trench, installed from the booster pump station to Fairway 7 to convey treated effluent to the disposal field (approximately 3,000 linear foot trench, 4 feet wide, 4-foot vertical depth)
- ▲ Approximately 25 distribution boxes to convey effluent from the disposal transmission pipelines to the distribution pipelines leading to disposal laterals (each 3 by 3 feet, 5-foot vertical depth)
- ▲ Effluent distribution pipelines to carry effluent from distribution boxes to the disposal laterals (approximately 3,700 linear foot trench, 3 feet wide, up to 6-foot vertical depth)
- ▲ Effluent disposal laterals to leach effluent to the subsurface disposal trenches (approximately 6,700 linear foot trench, 2 feet wide, 6-foot vertical depth)

To facilitate conservation of the topsoil, Fairway 7 may be scraped to remove the top 6 to 10 inches of topsoil. This topsoil would be stored nearby and re-spread over the course after construction of the disposal



trenches and renovations to the spray irrigation system. Prior to construction, the topography and edges of the work area would be thoroughly documented (including photo documentation). After construction, the conditions of Fairway 7, including topography and green edges, would be accurately restored.

Groundwater monitoring equipment would be installed to improve the management of effluent releases in relation to ground saturation conditions. This would require ground disturbance in the disposal area for the installation of:

- ▲ Approximately 15 piezometers and/or groundwater monitoring wells (3 by 3 feet, approximately 15-foot vertical depth)
- ▲ Approximately 15 water gauge probes (2 by 2 feet, 2-foot vertical depth)
- ▲ Power and communication conduits from the piezometers and/or groundwater monitoring wells and gauge probes to the booster pump station, mostly following main line trench (approximately 3,000 linear feet, 1-foot wide, up to 30-inches vertical depth).
- ▲ Power and communication conduit from the groundwater monitoring equipment to the booster pump station (approximately 3,000 linear foot trench, 2 feet wide, up to 3-foot vertical depth)

In addition, pipe pressure would be reduced at the pump station to decrease risk of a pipe bursting and to allow a gravitational feed to the distribution boxes. Four valves would be used to control the flow to disposal trench zones; the zones could be used individually or in combination to allow flexibility in operation and maintenance.

A temporary access route to Fairway 7 would be developed for construction, which would require temporary improvements to an existing golf cart path (600 linear feet, 15 feet wide) and installation of a new temporary access road (850 linear feet, 15 feet wide). Geomat and road base gravel (up to 12 inches) would be laid over the existing ground surface; minimal grading may be required (approximately 200 linear feet, 15 feet wide, up to 2-foot vertical depth). Documentation of existing site conditions would occur prior to commencing work; the landscape would be restored to current condition at the end of the construction.

Compared to Alternative 3, disposal trenches are the preferred alternative for the Big Trees Lodge Golf Course subsurface disposal system, because they improve operational flexibility and minimize the maintenance requirements. Alternative 2 also requires a lesser area of construction disturbance than Alternative 3, which would require disturbance to Fairway 7 and Fairways 4, 8, and 9.

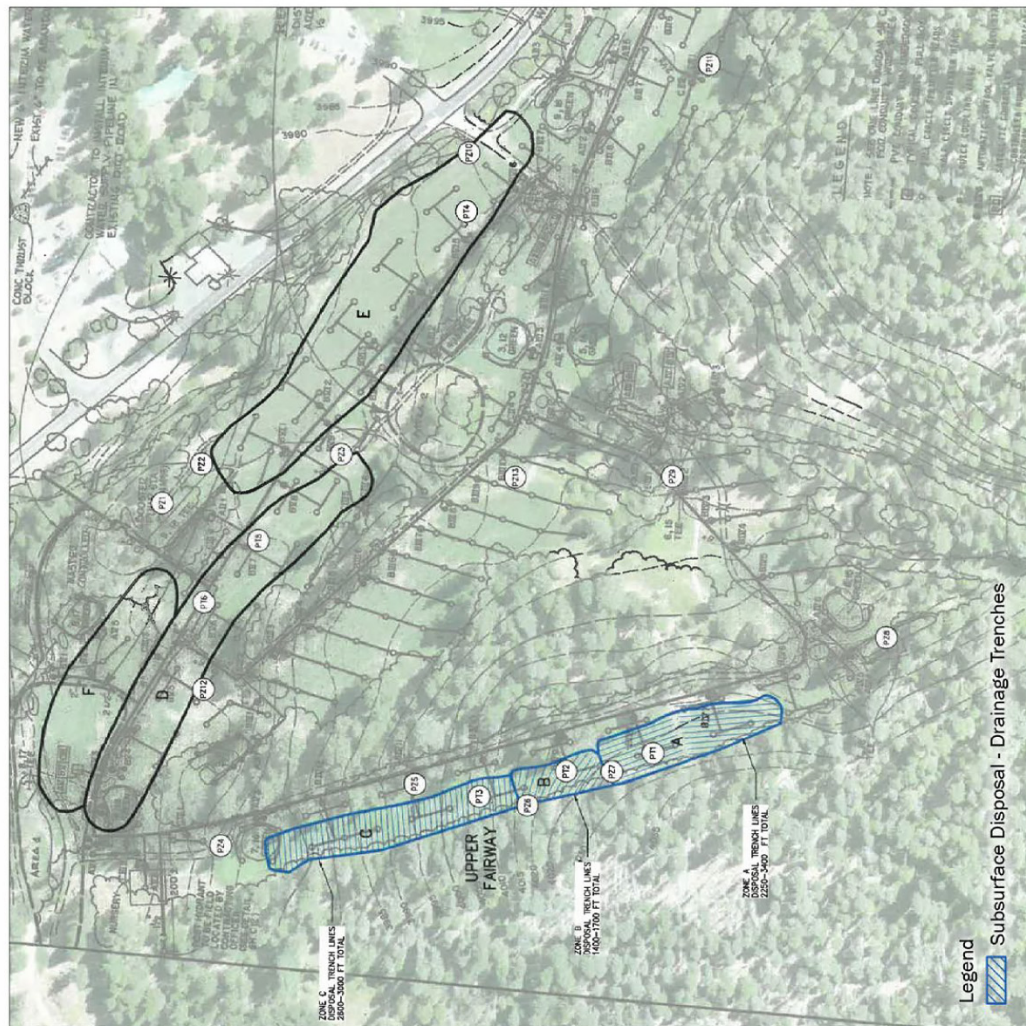
## **2.5 ALTERNATIVE 3: ALTERNATIVE FACILITIES FOR REHABILITATION OF THE WWTP**

### **2.5.1 Wawona Campground: Daisy Chain Lift Stations**

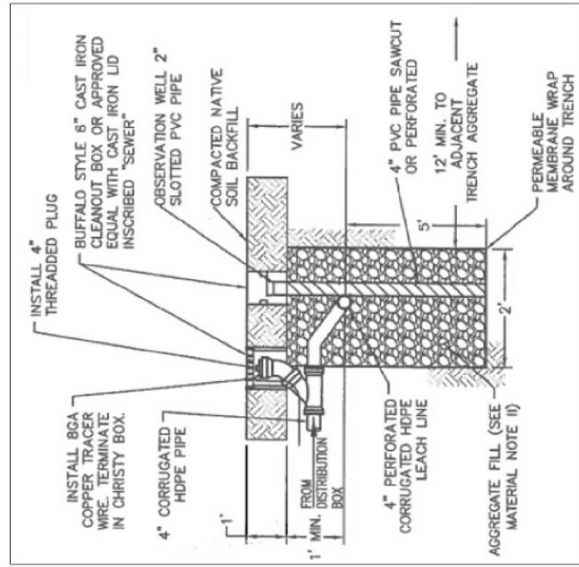
Under Alternative 3, five Wawona Campground lift stations would be configured in a ‘daisy chain’ arrangement for sewage conveyance throughout the entire system. Individual lift stations for each comfort station in Loop C (C1, C2 and C3) and the comfort station in Loop B would be pumped to the high point between Loop B and Loop A. The sewage would then flow by gravity to a central lift station in Loop A. The sewage from the Loop A comfort stations would flow by gravity to the central lift station and be pumped to the existing main central lift station. This alternative would result in five lift stations and approximately 6,000 sf of ground disturbance (approximately 2,400 sf more than Alternative 2).

### **2.5.2 Big Trees Lodge Golf Course Subsurface Disposal: Drip Irrigation**

Subsurface drip irrigation lines would be installed around Big Trees Lodge Golf Course Fairways 7, 4, 8, and 9, with potential expansion into Fairways 1 and 3. The subsurface drip irrigation lines would be buried approximately 6 to 9 inches deep with rows approximately 1 to 2 feet apart. Emitters would be arranged in 1 to 2 feet intervals along the lines to create a grid for even distribution. The lines would be pressure fed to discharge at a designated dosing rate, typically 0.5 gallons/hour. The lines would be flushed before and



Subsurface Disposal - Drainage Trenches



Example Trench Drain Cross Section

Figure 2-3

Alternative 2 Big Trees Lodge Golf Course Disposal: Drainage Trenches

after the dosing cycle to remove silt or debris and prevent clogging. Gravel or chicken wire would be used to protect the lines from rodent damage. Construction of the drip irrigation lines would result in approximately 18,400 sf of ground disturbance. At an application rate ranging from 1.4 to 0.9 gpd/sf, the proposed drip irrigation lines illustrated in Figure 2-4 would be adequate for a conceptual design flow of 53,100 gpd for tertiary treated effluent disposal.

## **2.6 PRELIMINARY OPTIONS CONSIDERED AND DISMISSED FROM FURTHER EVALUATION**

### **2.6.1 Relocation of the Main Central Lift Station**

Because the main central lift station is located in a sensitive resource area, relocation of this lift station was considered. However, potential alternate site options are limited and had similar resource sensitivity. Decommissioning the existing lift station and constructing a new lift station would result in greater construction disturbance and greater potential impacts to resources than repairing the existing lift station. Because there are feasible alternatives that meet the goals of the project while reducing the impacts of improvements to the main central lift station, relocation of this facility was removed from further consideration.

### **2.6.2 Wawona Campground: Repair of On-Site Septic System**

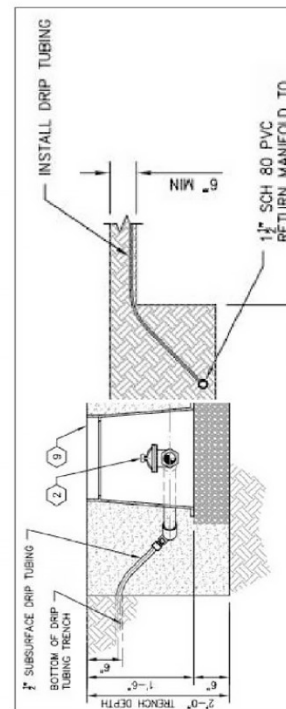
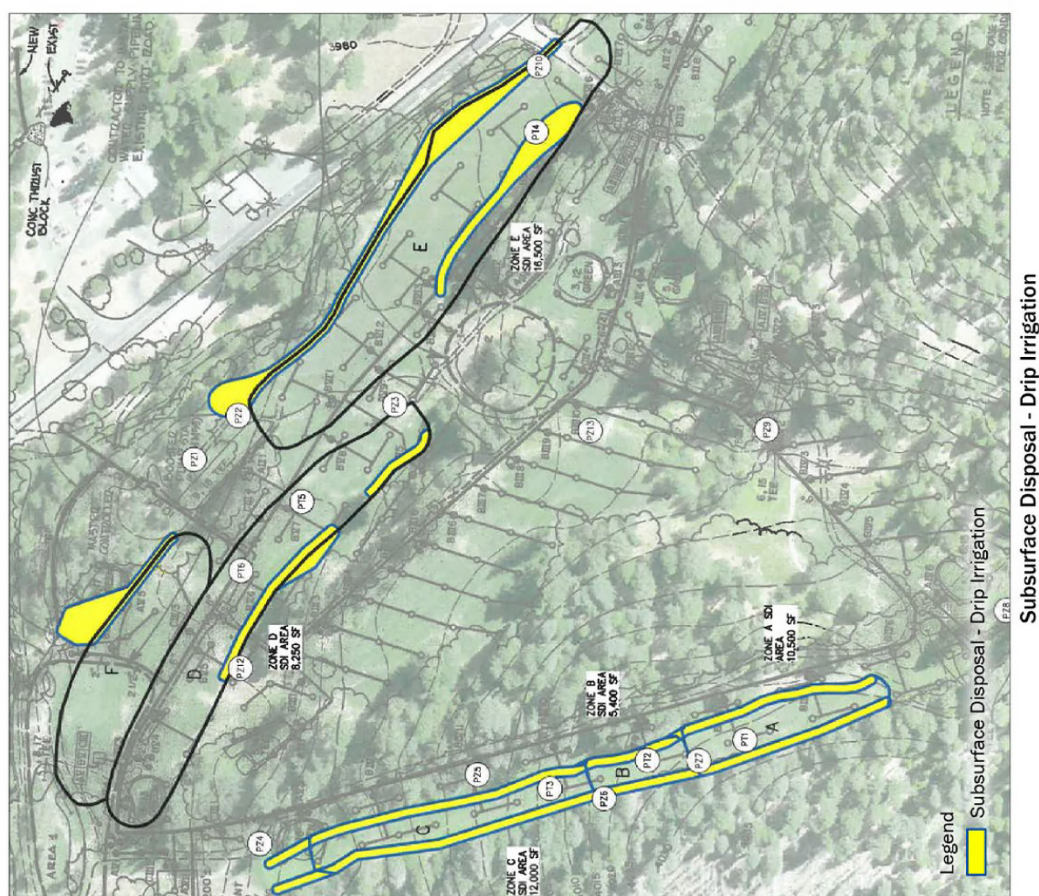
Repair or replacement of the existing Wawona Campground septic systems with alternate technologies (such as mound systems) was considered but eliminated from further evaluation because of continued environmental concerns related to treatment of wastewater in close proximity to, and potentially in the floodplain of, the South Fork of the Merced River. Due to the continued flood risk and failing septic systems at the Wawona Campground that could pose risks to human health and safety and the wild and scenic river values of the South Fork of the Merced River, and because of mounting maintenance burdens posed by the aging WWTP, repair of the on-site septic system was removed from consideration. An option of installing septic tank effluent pumping systems (STEP) was also eliminated from further consideration. The STEP system would convey the effluent, but leave the solids behind requiring continued periodic solids removal by truck to El Portal. Trucking solids has increased risk of spills and accidents, which could expose employees and/or visitors to raw or partially treated sewage.

### **WAWONA CAMPGROUND: INDIVIDUAL LIFT STATIONS**

Individual lift stations were considered for each Wawona Campground comfort station or loop (a total of six lift stations and 7,200 sf of ground disturbance), with all flows pumped directly to the main central lift station. Gravity sewers would connect the Loop A comfort stations to the proposed Loop A Lift Station. In this alternative, the Loop C and Loop B lift station sizes would increase because of the increase in pumping head or pressure, and the Loop A lift station size would decrease.

The individual lift station configuration would require the largest number of lift stations to serve the Wawona Campground, resulting in the greatest ground disturbance and associated environmental impacts. Because there are feasible alternatives that meet the goals of the project while reducing the impacts of the Wawona Campground lift stations, this alternative was dismissed from further consideration.





Typical Subsurface Drip Irrigation Section

15010060 01 008

Figure 2-4

Alternative 3 Big Trees Lodge Golf Course Disposal: Drip Irrigation



## 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment associated with the Wawona Wastewater Treatment System Rehabilitation Project alternatives. The direct, indirect, and cumulative effects on the environment that could result from implementation of the alternatives are discussed. The resource topics evaluated in this chapter are:

- ▲ Cultural Resources,
- ▲ Biological Resources,
- ▲ Water Resources, and
- ▲ Visitor Use and Experience.

As presented in Appendix C, there are no current or future cumulative projects in Wawona that would result in overlapping construction disturbance. The cumulative study area, cumulative conditions, and project's potential contribution to cumulative impacts are discussed in each resource topic section.

### 3.1 CULTURAL RESOURCES

#### 3.1.1 Affected Environment/Study Area

##### AREA OF POTENTIAL EFFECTS

The area of potential effects (APE) to cultural resources for the WWTP Rehabilitation Project was established by the NPS in consultation with the California State Historic Preservation Officer (SHPO) in compliance with the Advisory Council on Historic Preservation's (ACHP) regulations implementing National Historic Preservation Act (NHPA) Section 106. The APE includes: the historic Wawona Golf Course (now known as Big Trees Lodge Golf Course), the WWTP, the main lift station and the main central lift station, Chilnualna Falls Road and adjacent areas near the WWTP, Wawona Road (force main sewer line to the campground and South Fork Picnic area restroom upgrades), the parking area at the Yosemite Pioneer History Center, Wawona Campground, and the Wawona maintenance yard and fire station vicinity. The vertical APE (depth of ground disturbance) may be up to 25 feet at the main lift station, 18 feet at the main central lift station, 15 feet for each of the three campground lift stations, 15 feet at the golf course, and 15 feet for new 12,000-gallon liquid propane tanks at the WWTP; pipeline depths would be less.

##### HISTORIC PROPERTIES

##### Historic Districts and Buildings

###### Wawona Hotel and Pavilion Historic District

The historic Wawona Hotel (now known as Big Trees Hotel) and Pavilion (also known as the Thomas Hill Studio, now a visitor center operated by the NPS) was listed as a historic district in the National Register of Historic Places (NRHP) in 1975. Portions of the property were designated as a National Historic Landmark in 1987, known as the Wawona Hotel and Thomas Hill Studio. The Wawona Hotel and Pavilion historic district comprises 16.5 acres at the south end of Yosemite National Park in Mariposa County, California. The district is composed of the Wawona Hotel, a grouping of six lodging buildings (the Wawona Hotel main building, the Little Brown Building, the Long Brown Building, the Long White Building, the Little White Building, and the Hotel Annex), the Pavilion, and various recreational amenities and maintenance buildings. All six of the lodge buildings and the Pavilion are included as contributors to the 1975 NRHP historic district.

The Wawona Hotel and Pavilion NRHP nomination outlines the district's historic significance under Criterion A for its association with the early development of tourism in Yosemite; under Criterion B for its association with Yosemite pioneer Galen Clark and renowned landscape painter Thomas Hill; and under Criterion C as an excellent example of a Victorian-era hotel complex.

An amendment to the Wawona Hotel and Pavilion historic district was submitted to the SHPO for review and concurrence for Section 106 purposes. In a letter dated March 7, 2018 the SHPO provided comments on the draft amendment to the Wawona Hotel and Pavilion historic district and concurrence with most aspects (including the boundary revision) of the amendment; additional information related to Courtyard Drive and pedestrian circulation features was requested. The proposed historic district boundary expansion more accurately reflect the extent of the lodge operations and incorporates resources that provide a more thorough understanding of the hotel's development. The boundary increase adds about 319 acres to the district (which expands the district to a total of approximately 335 acres) and extends the boundaries of the district south of Wawona Road to include the golf course, meadow, and meadow loop trail. The amendment adds an additional 21 contributing buildings, structures, and sites to the 1975 NRHP historic district.

The boundary increase includes the Wawona Golf Course and Wawona Meadow, as well as other historic resources in their vicinity. Both the golf course and meadow have been identified as contributors to the expanded historic district. The Wawona Golf Course is a nine-hole course on the south side of Wawona Road, southwest of the hotel complex. Designed by noted golf course designer Walter Fovargue and completed in 1917, the course continues to serve as an integral part of the Wawona Hotel's tourist accommodations. East of the golf course and south of Wawona Road is the Wawona Meadow. Historically used by the hotel for livestock grazing and growing crops, the meadow currently serves as a scenic attraction for visitors, which can be enjoyed on foot, by horse, or by bicycle along the Meadow Loop trail. Contributing elements of the historic golf course property include remnants of the Washburn Orchard, a historic ditch, perimeter fencing, and circulation features (stagecoach road and bridle path).

#### **Wawona Road and Chilnualna Falls Road**

Wawona Road extends from the park's southern entrance to Yosemite Valley and was constructed between 1932 and 1933. A Historic American Engineering Survey Report (HAER) identified it is significant as being the most successful of the Yosemite toll roads and that it remains the chief entrance road to the park from southern California. The road may also be potentially significant under Criterion C for its embodiment of distinctive construction techniques (national park roads).

The Chilnualna Falls Road corridor makes up the far northern perimeter of the Wawona Basin. Although it is unclear exactly when this road was constructed, it is known to date to at least 1933 and is possibly older and may be a portion of an 1870 alignment of a foot trail from Wawona to the lower Chilnualna Falls. Most of the park development associated with this corridor dates back to the 1930s and the work completed by the Civilian Conservation Corps (CCC) including the construction of two ranger residences, an equipment storage shed, CCC mess hall (now the Wawona sub-district ranger office), the schoolhouse and storage shed. These facilities were important in developing Wawona into a recreational destination that could help alleviate overcrowding in Yosemite Valley. In 1962, a portion of the alignment of the Chilnualna Falls Road was rerouted so it ran along the north side of the stables in order to make space for the newly conceived Pioneer Yosemite History Center. The NPS is proposing to treat the road as eligible for listing on the NRHP under Criterion A for events significant to broad patterns of our history (development of Yosemite National Park).

#### **Pioneer Yosemite History Center Historic District**

The Pioneer Yosemite History Center was determined eligible for listing in the NRHP as a historic district in 2011, through a consensus determination by the SHPO. The Pioneer Yosemite History Center is located at the south end of Yosemite National Park in Mariposa County, California. The 10-acre site is located on both sides of the South Fork of the Merced River and is bounded by Chilnualna Falls Road to the north and Forest Drive to the south. The Pioneer Yosemite History Center historic district is composed of several late 19th- and early 20th-century buildings, most of which were moved to the site in the late 1950s and early 1960s under the NPS's Mission 66 program. The historic district includes 23 contributing buildings, structures, and objects.

The Pioneer Yosemite History Center historic district is significant under NRHP Criterion A as a highly intact interpretive exhibit established as part of Yosemite's Mission 66-era master plan. The district's period of significance has been defined as 1956 to 1964, beginning with the introduction of the National Park Service's Mission 66 program and ending with the completion and dedication of the interpretive center.

## Archeological Resources

### Wawona Archeological District

Archeological resources located within the project area also fall within the Wawona Archeological District. The Wawona Archeologist District was determined eligible for listing in the NRHP by the Keeper of the National Register in December 1978. The district was originally defined in a 1977 NRHP Inventory Nomination Form to include approximately 4,940 acres. The district generally includes the canyon bordering the South Fork of the Merced River as it opens to the south and east into a broad, bowl-shaped valley drained by Meadow Creek, and the district spans much of the valley at or below the 4,400-foot contour.

The 1977 NRHP Inventory Nomination Form states that the archeological resources that make up the Wawona Archeological District are significant at the state and regional level (under Criteria A, C, and D<sup>1</sup>) with the potential to provide information pertaining to subsistence strategies, seasonal use of specific ecological zones, demographic patterns, and historic and pre-contact use and occupation of the area. No formal listing of individual resources was included in the 1977 NRHP Inventory Nomination Form; however, a listing of resources was included with materials from the Yosemite Archeology Office that references 72 archeological sites regarded as a part of the Wawona Archeological District. Currently the area within the boundary of the Wawona Archeological District includes over 100 prehistoric, historic period, and multi-component archeological sites. Additional archeological resources have been documented in the Wawona area but have not been evaluated for NRHP eligibility.

### Archeological Sites

Nine archeological sites exist in the project area. Two additional archeological sites are located adjacent to the project area, in locations that would be fenced to exclude construction personnel and equipment. Of the sites within the project area, seven are listed in the NRHP as contributing elements of the Wawona Archeological District and, although not formally listed, two of the sites are not currently evaluated but are considered to be contributing to the district. The archeological sites within the project area that are listed or considered eligible to be listed as contributing elements to the Wawona Archeological District are eligible under Criterion D<sup>1</sup> of the NRHP 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.

Due to the sensitive nature of the archeological site information, detailed locations and summaries regarding these historic properties are not provided in this public document. Some of the documented sites are significant and have integrity to yield important information about the past occupations of the area. The resources are protected by various federal regulations including the Archeological Resources Protection Act and the U.S. Code of Federal Regulations specific to the management of NPS resources. During the planning and design of new development, appropriate measures would be taken to assure that no adverse effects to historic properties would occur.

Previous archeological information for sites within or near the project work areas in the Wawona Campground area and along Wawona Road was insufficient to fully inform project designs. In 2017, the NPS contracted for archeological testing and studies in the project area where construction activities may impact archeological resources. By using the results of these investigations, disturbance of significant archeological deposits have been avoided through project design. Below ground disturbances for utility trenches and

<sup>1</sup> NRHP eligibility criteria: A – The property possesses information that contributes to a major pattern of American history; B – The property is associated with a significant person or peoples; C – The property exhibits distinctive characteristics of architectural design or construction; and/or D – The property has yielded or is likely to yield information important to history or prehistory.

facilities have been located outside of site boundaries or within areas of previous disturbances, such as roads and pre-existing utility trenches.

Studies of archeological sites in the vicinity of the Wawona Golf Course (now known as the Big Trees Lodge Golf Course) occurred in the 1980s during the installation of the existing effluent disposal infrastructure. At that time, testing and archeological monitoring occurred at the majority of these sites and park archeologists worked in coordination with project engineers when designing the infrastructure layout. The layout of effluent disposal infrastructure was placed either outside of or adjacent to and/or partially within boundaries of sites where densities of archeological deposits were low. A previously unknown archeological site was discovered during installation of infrastructure; it was tested in 1989 and monitored by archeologists during construction; and was later formally documented in 2003 (NPS 2018a). In 2016, archeologists monitored geo-technical work for the planned WWTP Rehabilitation Project. Two boring locations, including one area near an archeological site boundary, tested positive for a small quantity of flaked stone. The remaining 17 boring locations did not result in subsurface archeological deposits (NPS 2018a). The information gleaned during these previous archeological investigations, combined with recent studies, was sufficient to inform the plans for the proposed project.

Recent archeological field reconnaissance within the project area confirmed that planned construction staging areas and buried communication conduits would be placed in areas outside of site boundaries or within areas of previous disturbances such as existing utility trenches.

### **Historic Properties of Religious and Cultural Significance to American Indians**

Traditional cultural resources are defined as objects and places, including sites, structures, landscapes, and natural resources, with traditional cultural meaning and value to associated peoples. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. Available ethnographic data for the proposed project area is limited. Information from an ethnographic overview for the project has been incorporated into this EA.

#### **Traditional Resources**

Tribal consultation regarding the project was initiated in April 2017 (see Chapter 4, "Consultation and Coordination," for more information). Sensitive spiritual and/or cultural resources with intrinsic value to traditionally associated American Indian tribes and groups were identified by representatives from Picayune Rancheria of the Chuckchansi Indians and North Fork Rancheria of Mono Indians of California in some portions of the APE.

During consultation, Tuolumne Band of Me-Wuk Indians requested that actions be taken by NPS to protect and/or block off an area of high significance to traditional American Indian spiritual values and other sensitive cultural resources during all phases of construction. Traditionally associated tribes and groups were supportive of the project's benefits to the Merced River and water quality, which were identified as resources with religious and cultural significance. In addition, information regarding the proposed use of horizontal directional drilling to avoid adverse effects to the sensitive archeological resources in the vicinity of Wawona Campground was disseminated to tribes and groups in August 2018 as explained in Chapter 4. Archeological resources were identified as having religious and cultural significance to traditionally associated American Indian tribes and groups and horizontal directional drilling was supported by consulting tribes to avoid disturbing certain archeologically sensitive areas.

#### **Traditional Plants**

In June 2017 the Picayune Rancheria of the Chuckchansi Indians and the North Fork Rancheria of Mono Indians of California participated in a survey of traditionally-used plant species with cultural resource significance to traditionally associated American Indian tribes and groups, along with NPS staff and University of California Merced botanists (NPS 2018b). The survey identified 32 plant species of cultural or traditional significance (or potential significance) to traditionally associated American Indian tribes and groups (Table 3-1).

**Table 3-1 Traditionally-Used Plant Species Identified in the Project Area**

Botanical Name	Common Name
<i>Achillea millefolium</i>	Yarrow
<i>Amelanchier utahensis</i>	Service berry
<i>Apocynum</i> spp.	Dogbane, Indian hemp
<i>Arctostaphylos</i> spp.	Manzanita
<i>Artemisia douglasiana</i>	Mugwort, wormwood
<i>Calocedrus decurrens</i> :	Incense cedar
<i>Calochortus venustus</i>	Mariposa lily
<i>Cirsium</i> spp.	Thistle (non-native)
<i>Ceanothus</i> spp.	Buck brush, deer brush
<i>Chamaebatia foliolosa</i>	Bear clover, mountain misery "Bear grass"
<i>Chlorogalum pomeridianum</i>	Soaproot, soap plant
<i>Claytonia perfoliata</i>	Miner's lettuce
<i>Cornus</i> spp.	Dogwood
<i>Dichelostemma capitatum</i>	Blue dicks
<i>Equisetum</i> spp.	Horsetail/scouring rush
<i>Fragaria</i> spp.	Strawberry
<i>Frangula</i> spp.	Coffeeberry
<i>Heracleum lanatum</i>	Cow parsnip
<i>Iris</i> spp.	Iris
<i>Juncus</i> spp.	Bulrush
<i>Mentha</i> spp.	Mint
<i>Lupinus</i> spp.	Lupine
<i>Prunus virginiana</i>	Chokecherry
<i>Pteridium aquilinum</i>	Bracken fern
<i>Quercus kelloggii</i>	California black oak
<i>Rhus trilobata</i>	Sourberry, skunkbrush
<i>Rosa</i> spp.	Wild rose
<i>Rubus</i> spp.	Blackberry (non-native, invasive)
<i>Salix</i> spp.	Willow
<i>Sambucus mexicana</i>	Elderberry
<i>Vitis</i> spp.	Wild grape
<i>Wyethia</i> spp.	Mule ears

\*This plant species list is based on surveys conducted in June 2017 in the WWTP Rehabilitation Project area. Where only common names were identified during fieldwork, Latin names were derived from Botti 2001 and/or [www.calflora.org](http://www.calflora.org).

Source: NPS 2018b



### 3.1.2 Methodology and Assumptions

In accordance with the ACHP's regulations implementing Section 106 of the NHPA, effects to historic properties (defined above; i.e. historic resources (built environment), archeological resources, or historic properties with religious and cultural significance) are evaluated by: identifying historic properties present in the APE; applying the criteria of adverse effects; and considering ways to avoid, minimize, or mitigate adverse effects. Since the project has the potential to cause effect on historic properties, the project is considered an undertaking. The alternatives presented in this EA are evaluated to determine if actions would result in either no adverse effect or an adverse effect on the historic district as a whole and/or on individually eligible properties or contributing elements of a district.

Under ACHP regulations, a determination of no historic properties affected, no adverse effect, or adverse effect must be made for affected NRHP eligible cultural resources. 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 would qualify it for inclusion in the NRHP. An adverse effect occurs whenever an action alters, directly or indirectly, any characteristic of a cultural resource which qualifies it for inclusion on the NRHP, by diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects 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.

None of the contributing buildings, structures, sites or landscape features identified in the Wawona Hotel and Thomas Hill Studio National Historic Landmark nomination, the proposed amendment to the Wawona Hotel and Pavilion historic district nomination (consensus DOE), or the Pioneer Yosemite History Center consensus determination of eligibility (DOE), would be adversely affected by any alternative and will not be further analyzed in this EA. Of the contributing resources potentially eligible for listing in the NRHP as part of the Wawona Hotel and Pavilion historic district nomination (SHPO consensus DOE), only one, the Wawona Golf Course (now known as the Big Trees Lodge Golf Course), has the potential to be affected as evaluated below.

### 3.1.3 Alternative 1: No Action

Under the No Action Alternative, there would be no improvements to the WWTP system's sewage inflow treatment capacity or outflow effluent disposal capacity, and no installation of central sewer infrastructure at Wawona Campground and along Wawona Road. There would be no change to the existing septic systems serving the Wawona Campground. This alternative would involve no construction and would, therefore, avoid temporary construction disturbance to the Wawona Campground, Wawona Golf Course, WWTP infrastructure, and roadways in Wawona. The No Action Alternative would have no construction-related impacts on historic properties, including historic districts and buildings and archeological resources.

In the short-term, if the WWTP treated effluent disposal capacity was not expanded by installing a subsurface disposal system at the golf course, the WWTP would not meet its existing RWQCB permit requirements for operation at current effluent disposal levels (and the system would not be able to handle any additional sewage inputs). The NPS would need to take immediate actions to decrease effluent output to ensure that a secondary discharge of treated effluent to the river would not occur, such as restricting/curtailing outflows of treated effluent by limiting the operation of concession facilities, including the historic Wawona Hotel or Pioneer Yosemite History Center. Although these properties may close, they would continue to be maintained and preserved. On a longer term-basis, the NPS would likely aim to increase treated effluent storage by building large storage tanks, which may have unknown impacts to archeological properties due to construction and soil disturbance. Historic properties with religious and cultural significance to traditionally associated American Indian tribes and groups would remain unchanged if the effluent discharge sewage capacity were not increased.

The golf course spray discharge system, which uses treated effluent to irrigate the golf course turf, would not be renovated and would continue to operate as the existing infrastructure further deteriorated. Effluent distribution through the spray field would remain the same, where some areas of the course turf are overwatered and others are too dry. Archeological properties and properties with religious and cultural significance to traditionally associated American Indian tribes and groups would remain unchanged by leaving the golf course spray discharge system in its current state.

The WWTP would not modernize and the WWTP would not increase inflow treatment capacity, and therefore would not be able to accept additional sewage in-flows from Wawona Campground, the South Fork Picnic Area, or the eventual buildout of the Wawona community. The inflow capacity would be sufficient to treat existing inflow volumes. The Wawona Campground would continue reliance on individual septic systems that are aging and these septic systems over time have a higher likelihood of breaking or failing requiring actions to fix and/or replace them. If campground leach field components failed, it may lead to “clean-up” efforts and system repair/reconfiguration, which would require considerable ground disturbance and may result in unknown impacts to archeological resources. Breaks or failures in the campground individual septic and leach field systems would likely result in an increased reliance in the short or long-term on portable toilets. This would increase the need for sewage handling and transport in close proximity to the Merced River, posing an increased risk to water quality and the Merced River, which are resources with religious and cultural significance to traditionally associated American Indian tribes and groups. In addition, the WWTP would not undergo improvements for solids handling and the South Fork Picnic area vault toilet would continue to operate; solids would continue to be transported via truck regularly to El Portal for treatment, which would continue to pose a level of risk due to continued sewage transport. Furthermore, as some campground leach fields would remain within the 100-year floodplain, the Merced River and water quality would continue to be exposed to potential risks of introducing partially treated sewage into the river during large flood events in the future.

No action, resulting in system deterioration and increased risks of sewage introduction into the natural environment would have an unknown effect on resources that have been identified by traditionally associated tribes and groups as being historic properties with religious and cultural significance. Effects would depend on the nature of the incident and proximity to resources. Although the no action could result in the continued deterioration of turf conditions at the historic golf course, this element is not considered a contributing resource, so no adverse effect would result to the historic golf course. The no action alternative could also necessitate system repairs or waste “clean ups,” requiring ground disturbance, which could have unknown effects on archeological resources.

## CONCLUSION

Because there would be no ground disturbance under the No Action Alternative, there would be no adverse effects to historic properties due to construction. The Wawona Golf Course (contributor to the Wawona Hotel and Pavilion historic district), archeological resources, or resources with value to traditionally associated American Indian tribes and groups could be adversely impacted if sewage was released into the environment due to a trucking accident or floodwaters reaching the portions of some leach fields in Wawona Campground and subsequent cleanup. However, the potential effects would be incident specific and the NPS would work with the appropriate parties (e.g. SHPO and American Indian tribes) to avoid effects contingent on the specific circumstances presented during the incident.

### 3.1.4 **Alternative 2: Proposed Action: Rehabilitation of the WWTP (Preferred Alternative) and Alternative 3: Alternative Facilities for Rehabilitation of the WWTP**

Alternatives 2 and 3 would have similar impacts on cultural resources and thus they are analyzed jointly. Design differences of the alternatives are discussed where relevant.

## **HISTORIC STRUCTURES/DISTRICTS (BUILT ENVIRONMENT)**

### **Wawona Golf Course**

Under Alternative 2 or Alternative 3, the Wawona Golf Course, a contributing resource in the amendment to the Wawona Hotel and Pavilion (SHPO concurrence in 2018), would be closed during construction for approximately one year. The existing irrigation system (spray fields) would be repaired, which would require disturbance of the majority of the golf course to replace/upgrade the components of the spray irrigation system. The system configuration would not be altered in areas where sensitive resources occur; spray system components would be replaced and/or upgraded in their current locations (Figure 2-2). In addition, under Alternative 2, a subsurface disposal system comprising approximately 6,800 linear feet of disposal trenches would be installed under Fairway 7 of the golf course (Figure 2-3). After thorough documentation of pre-project conditions, including topography and green edges, the top 6 to 10 inches of topsoil at Fairway 7 may be scraped and stored during construction. The trenches would be installed approximately 5 to 6 feet deep with the pipe buried approximately 2 feet below the surface inside a drain rock backfill. The trenches would be aligned with 10-foot separation and would be contoured with the topography to provide even distribution. A temporary access route to Fairway 7 would be developed for construction, which would require temporary improvements to an existing golf cart path (600 linear feet, 15 feet wide) and installation of a new temporary access road (850 linear feet, 15 feet wide). Geomat and road base gravel (up to 12 inches) would be laid over the existing ground surface; minimal grading may be required (approximately 200 linear feet, 15 feet wide, up to 2-foot vertical depth). After construction, the topsoil would be re-spread and the landscape would be restored to the documented pre-project conditions.

Alternatively, the subsurface disposal system in Alternative 3 would involve installing subsurface drip irrigation lines around Fairways 7, 4, 8, and 9, with potential expansion into Fairways 1 and 3 (Figure 2-4). The drip irrigation lines would be buried approximately 6 to 9 inches deep with rows approximately 1 to 2 feet apart.

NPS places a strong emphasis on avoiding potential adverse impacts to historic properties. To protect the integrity of the Wawona Golf Course, a contributing element of the Wawona Hotel and Pavilion historic district, prior to construction under Alternative 2 or Alternative 3, photographic and written documentation of the Wawona Golf Course would be conducted so that the surface conditions of the golf course could be restored after excavation. It should be noted that the golf course is considered a historic property for its spatial organization and course layout, and that the turf, or sod, is not a contributing element. Prior to construction, in close coordination with NPS cultural resources staff, the course topography and layout would be thoroughly documented and photographed in detail to ensure that the golf course is restored to its historic appearance. Contributing elements of the historic golf course property also include remnants of the Washburn Orchard, historic ditch, perimeter fencing, and circulation features (stagecoach road and bridle path), which would be protected during construction activities. Alternatives 2 or Alternative 3 would result in no adverse effects to the Wawona Hotel and Pavilion historic district.

### **Wawona Road and Chilnualna Falls Road**

Trenching in the roadways of Chilnualna Falls Road and Wawona Road (resources not yet formally evaluated for listing in the NRHP), would not change any of the character defining features of the roadways. The trenching would be filled and the asphalt replaced in-kind within the road. The roads would not be adversely affected by the trenching necessary to implement this project.

### **Pioneer Yosemite History Center Historic District**

Under either Alternative 2 or 3, a power pole would be installed in the parking lot on Chilnualna Falls Road and trenching would occur under the road. Prior to construction, contributing features to the District adjacent to construction activity would be flagged and fenced as avoidance areas. The proposed actions would not alter the contributing buildings, structures, or associated landscape features eligible for listing in the NRHP as part of the Pioneer Yosemite History Center historic district. Alternative 2 or 3 would result in no adverse effect to this Historic District.

## ARCHEOLOGICAL RESOURCES

Nine archeological sites are within the APE. Of these, seven are contributing and two are considered and treated as being eligible as contributors to the Wawona Archeological District. Two additional sites are located within areas immediately adjacent to the work area or where no ground disturbing activities are planned. Nine sites could be potentially impacted by this project.

Directional drilling would be utilized to avoid disturbance of significant archeological deposits in Wawona Campground. In culturally sensitive areas of Wawona Road and Chilnualna Falls Road where trenching is necessary to install utility and sewer piping, trenching depths would be kept shallow and within the previously disturbed portions of the existing road to avoid disturbance of deeper archeological deposits. Furthermore, in culturally sensitive areas, insertion pits for the directional drilling as well as the installation of lift stations or other infrastructure would be located outside of sensitive resource areas and/or located within previously-disturbed areas.

During the installation of the sewage force main electrical/communication conduit, and construction staging areas adverse impacts to NRHP listed or eligible archeological sites would be avoided by designing subsurface utility lines and surface staging areas to be located within the disturbed bed of the existing roadway, away from significant areas of cultural deposits and features, or within areas of previous disturbance.

Under Alternative 2 or Alternative 3, the golf course sewage disposal infrastructure would be upgraded. In order to avoid impacts to archeological resources, sewage disposal infrastructure in areas within or adjacent to archeological sites would be replaced or upgraded in the same configuration as it exists currently, limiting soil disturbance to previously disturbed soils.

Prior to ground disturbing activities of construction, NPS and American Indian monitors would install temporary construction fencing at the limits of disturbance to protect cultural resources in the vicinity of the work area. NPS and American Indian monitors would monitor the ground disturbing construction activities and document any inadvertent discoveries of cultural material. Alternatives 2 and 3 would avoid adverse effects to archeological sites.

## HISTORIC PROPERTIES WITH RELIGIOUS AND CULTURAL SIGNIFICANCE

Thirty-two plant species of cultural or traditional significance (or potential significance) to traditionally associated American Indian tribes and groups were identified (Table 3-1). In addition, sensitive spiritual and/or cultural resources with value to traditionally associated American Indian tribes and groups were identified by representatives from Picayune Rancheria of the Chuckchansi Indians and North Fork Rancheria of Mono Indians of California. Prior to construction activities or ground disturbance in areas of sensitive cultural resources, NPS shall install temporary construction fencing at the 'limits of disturbance' to protect traditional plants and sensitive spiritual and/or cultural resources identified by the tribes. Plans will be developed to salvage/transplant plants that may be affected by construction excavation. NPS, American Indian monitors, and an NPS botanist would assist in establishing the work boundaries, fencing, monitoring, and salvaging and replanting if deemed necessary. Therefore, Alternatives 2 and 3 would have no adverse effect on traditional plants and cultural resources with intrinsic value to traditionally associated American Indian tribes and groups.

## Conclusion

Construction of Alternative 2 or Alternative 3 would involve temporary ground disturbance within the Wawona Archeological District, Pioneer Yosemite History Center historic district, and the golf course located within the amended boundary of the Wawona Hotel and Pavilion historic district. However, both Alternatives 2 and 3 would result no adverse effects to historic structures and districts. Alternatives 2 and Alternative 3 would result in no adverse effects to archeological sites and historic properties of religious and cultural significance to traditionally associated American Indian tribes and groups associated with the park because

NPS would avoid new ground disturbance in areas of sensitive cultural resources, would utilize directional drilling to avoid ground disturbance sensitive areas in Wawona Campground, and would install temporary construction fencing at the 'limits of disturbance' to protect the resources. Furthermore, NPS and American Indian monitors would assist in establishing the work boundaries and fencing and would monitor construction activities.

### **3.1.5 Cumulative Impacts**

The cumulative context for historic resources is the amended Wawona Hotel and Pavilion NRHP documentation and the Pioneer Yosemite History Center District; and the cumulative context for archeological resources is the Wawona Archeological District. Alternative 2 or Alternative 3, in combination with existing and potential future development in Wawona could contribute to the loss or diminished integrity of historic resources, archeological resources, or historic properties with religious and cultural significance. Because all significant cultural resources are unique and nonrenewable, all adverse impacts add to the continual degradation of the resource base. The loss of any one archeological site could affect the scientific value of others in a region because these resources are best understood in the context of the entirety of the cultural system of which they are a part. As a result, a meaningful approach to preserving and managing cultural resources must focus on total distribution of cultural resources, rather than on a single project.

As discussed above, project planning for Alternatives 2 and 3 has identified cultural resources in consultation with SHPO and traditionally associated American Indian tribes and groups. Both alternatives would result in temporary construction disturbance but would avoid adverse effects to identified historic sites and structures, archeological sites, and historic properties of religious and cultural significance to American Indian tribes and groups associated with the park through project design, construction methods, fencing sensitive areas, and monitoring resources throughout the construction period. The contributors to the Pioneer Yosemite History Center historic district would be avoided through fencing and protection of avoidance areas and the historic Wawona Golf Course would be returned to pre-project conditions, resulting in no adverse effects by maintaining the historic setting and contribution to the Wawona Hotel and Pavilion historic district. Through avoidance, monitoring, and restoration of pre-project ground surface conditions, Alternatives 2 and 3 would not contribute to a cumulative loss of historic, archeological, or historic properties with religious and cultural significance.

## **3.2 BIOLOGICAL RESOURCES**

### **3.2.1 Affected Environment/Study Area**

The study area for biological resources is the approximately 106-acre project area (Figure 2-1). Habitat, aquatic resources, and potential for occurrence of special-status species within the project area were evaluated through database searches, a reconnaissance-level habitat survey, and a protocol-level aquatic resources delineation.

#### **HABITAT**

Before conducting field surveys, a vegetation map was developed using U.S. Fish and Wildlife Service (USFWS) Pacific Southwest Region (Region 5) EVeg data and high-resolution aerial imagery. Biologists reviewed the vegetation map, color aerial imagery on Google Earth, USFWS National Wetlands Inventory data (USFWS 2017a), and the Natural Resources Conservation Service's soil survey of Yosemite National Park, California (NRCS 2017) to determine potential habitat types present in the project area prior to conducting field surveys. The reconnaissance-level field survey involved habitat assessments for terrestrial wildlife and aquatic resources, and refining land cover/vegetation mapping based on ground verification of vegetation composition and structure. Habitat suitability for special-status species was also assessed in the field.



Table 3-2 lists the nine habitat types present within the project area, and provides a brief description and the acreage of each type. Classification and community descriptions generally follow California Wildlife Habitat Relationships (CDFW 2014) (Figure 3-1), with modifications to account for local variability and communities not specifically treated in the California Wildlife Habitat Relationships classification system.

**Table 3-2 Habitat Types Present in the Project Area**

Habitat Type	Description
Ponderosa Pine	This is an open-to-dense canopied forest habitat with up to 100 percent tree canopy closure. Within the project area understory shrub cover ranges from 0 to 25 percent and herb cover ranges from sparse (5 percent) to dense (60 percent). Ponderosa pine ( <i>Pinus ponderosa</i> ) is the dominant tree species and comprises at least 50 percent of the tree canopy, and sugar pine ( <i>Pinus lambertiana</i> ), incense cedar ( <i>Calocedrus decurrens</i> ), and black oak ( <i>Quercus kelloggii</i> ) are common associate tree species. whiteleaf manzanita ( <i>Arctostaphylos viscida</i> ), buck brush ( <i>Ceanothus cuneatus</i> ), and mountain misery ( <i>Chamaebatia foliolosa</i> ) are common shrub associates and typical herbs include common yarrow ( <i>Achillea millefolium</i> ), pine blue grass ( <i>Poa secunda</i> ), and blue wildrye ( <i>Elymus glaucus</i> ). Tree snags and hollow logs are common in this habitat type. This is the most common habitat type in and surrounding the project area.
Sierran Mixed Conifer	This habitat type is similar to the ponderosa pine habitat, but ponderosa pine represents less than 50 percent of the tree canopy cover and three or more of the following species are codominant: incense cedar, sugar pine, white fir ( <i>Abies concolor</i> ), and Jeffrey pine ( <i>Pinus jeffreyi</i> ). Canopy cover varies from nearly 100 percent to a more open canopy. In open areas, the understory consists of a variety of shrubs, grasses, and forbs, including buck brush, deerbrush ( <i>Ceanothus integerrimus</i> ), greenleaf manzanita ( <i>Arctostaphylos patula</i> ), birch leaf mountain mahogany ( <i>Cercocarpus betuloides</i> ), cheatgrass ( <i>Bromus tectorum</i> ), bulbous bluegrass ( <i>Poa bulbosa</i> ), and blue wildrye. Tree snags and hollow logs are common in this habitat type.
Perennial Grassland	Characterized by dense growth of perennial herbs and graminoids such as Kentucky bluegrass ( <i>Poa pratensis</i> ), flat-stem bluegrass ( <i>Poa compressa</i> ), red fescue ( <i>Festuca rubra</i> ), sticky cinquefoil ( <i>Drymocallis glandulosa</i> ) graceful cinquefoil ( <i>Potentilla gracilis</i> ), and woodland strawberry ( <i>Fragaria vesca</i> ). This habitat type is found adjacent to Wawona Meadow at the southeast end of Big Trees Lodge Golf Course and is very limited in the project area.
Turf	This habitat type is characterized by dense cover of managed turf grasses grown on the golf course fairways. This habitat was created by draining 44 acres of Wawona Meadow and converting it to a golf course in 1917. Typical grasses include Bermuda grass ( <i>Cynodon dactylon</i> ), Kentucky bluegrass, velvet grass ( <i>Holcus lanatus</i> ), orchardgrass ( <i>Dactylis glomerata</i> ), and red fescue. These grasses are mowed regularly to maintain a short, even playing surface. This turf cover is the second most common habitat type in the project area.
Wet Meadow	Wet meadow is a wetland habitat type comprising a wide variety of grasses and forbs adapted for growth in saturated soils. Common associate species observed in the project area include Bolander's sedge ( <i>Carex bolanderi</i> ), small-fruited bulrush ( <i>Scirpus microcarpus</i> ), Baltic rush ( <i>Juncus balticus</i> ), Kentucky blue grass, velvet grass, fowl blue grass ( <i>Poa palustris</i> ), Canada reedgrass ( <i>Calamagrostis canadensis</i> ), and Italian ryegrass ( <i>Festuca perennis</i> ). Wet meadows in the project area have seasonally saturated soils and are associated with adjacent waterways. The wet meadow habitat occurs in four patches within the golf course that are currently not mowed and represent remnants of the former Wawona Meadow that was converted to create the nine-hole golf course in 1917, although the vegetation contains a large percentage of introduced grasses that were likely not present in the original wet meadow. The remainder of Wawona Meadow, an approximately 200-acre, low-elevation, alluvial floodplain wet meadow, is adjacent to the project area and the remnant patches of wet meadow vegetation in the golf course are contiguous with the intermittent channels and ditches that drain the meadow to the South Fork Merced River.
Montane Riparian	This habitat type varies greatly in vegetative structure and species composition. Along the South Fork Merced River, white alder ( <i>Alnus rhombifolia</i> ), arroyo willow ( <i>Salix lasiolepis</i> ), and shining willow ( <i>Salix lasiandra</i> ) are the dominant species, with American dogwood ( <i>Cornus sericea</i> ), mountain pink currant ( <i>Ribes nevadense</i> ), and western azalea ( <i>Rhododendron occidentale</i> ) as common associate shrubs. Willows often colonize sandbars that are deposited at the margins of or within the river channel. Tall scouring rush ( <i>Equisetum hyemale</i> ), Baltic rush ( <i>Juncus balticus</i> ), greensheath sedge ( <i>Carex feta</i> ), and torrent sedge ( <i>Carex nudata</i> ) are characteristic herb species in the understory of the riparian habitat. Trampling of riparian vegetation and associated erosion occur along the river in the project area, because of heavy use of the Wawona Campground, South Fork Picnic Area, and the Wawona community, and therefore, understory herbaceous vegetation is generally sparse. Montane riparian habitat in and adjacent to the golf course consists of dense, shrubby willow ( <i>Salix</i> spp.) with an extensive understory of a wide variety of herbaceous species consistent with those found in the wet meadow habitat type. Riparian habitat occurs along the South Fork Merced and larger tributaries, primarily within the high-water line of these waterways, but dense patches occur above the high-water line of tributaries within the golf course.

**Table 3-2 Habitat Types Present in the Project Area**

Habitat Type	Description
Riverine	Riverine habitat in the project area consists of channels that convey flowing water either seasonally or year-round. Riverine habitat in the project area exists within the high-water line of the South Fork Merced River and tributary streams. The project area is primarily located adjacent to, but outside of the high-water line of the South Fork Merced River; however, there are five locations where the project area crosses over the high-water line of the river. In addition, there are 16 intermittent tributaries to the South Fork Merced River that traverse the project area, and three human-made ditches that convey flow, at least intermittently, to these tributaries. Five ephemeral tributaries to the South Fork Merced River are also present in the project area.
Seasonal Wetland	Seasonal wetlands are ephemeral wetlands that remain saturated for extended periods during the early growing season, but typically dry up by summer. The seasonal wetlands in the project area occur in shallow depressions within the 100-year floodplain of the South Fork Merced River. Vegetation in these wetlands is characterized by sparse cover of mostly small, annual herbaceous species including Mediterranean barley ( <i>Hordeum marinum</i> ssp. <i>gussoneanum</i> ), stalked popcornflower ( <i>Plagiobothrys stipitatus</i> ), mountain navarretia ( <i>Navarretia divaricata</i> ), and marsh cudweed ( <i>Gnaphalium palustre</i> ).
Urban	These areas consist of paved roads, parking areas, and the paved surfaces of the WWTP.

## AQUATIC RESOURCES

Aquatic resources in the project area include: riverine habitat composed of segments of the South Fork Merced River (riverine upper perennial rock bottom), riverine intermittent streambed, riverine intermittent drainage ditches, and riverine ephemeral drainage channels; and wetland habitat composed of palustrine emergent nonpersistent (i.e., seasonal) wetlands, palustrine emergent persistent wetlands (i.e., wet meadow), and palustrine scrub-shrub (i.e., montane riparian) wetland habitat.

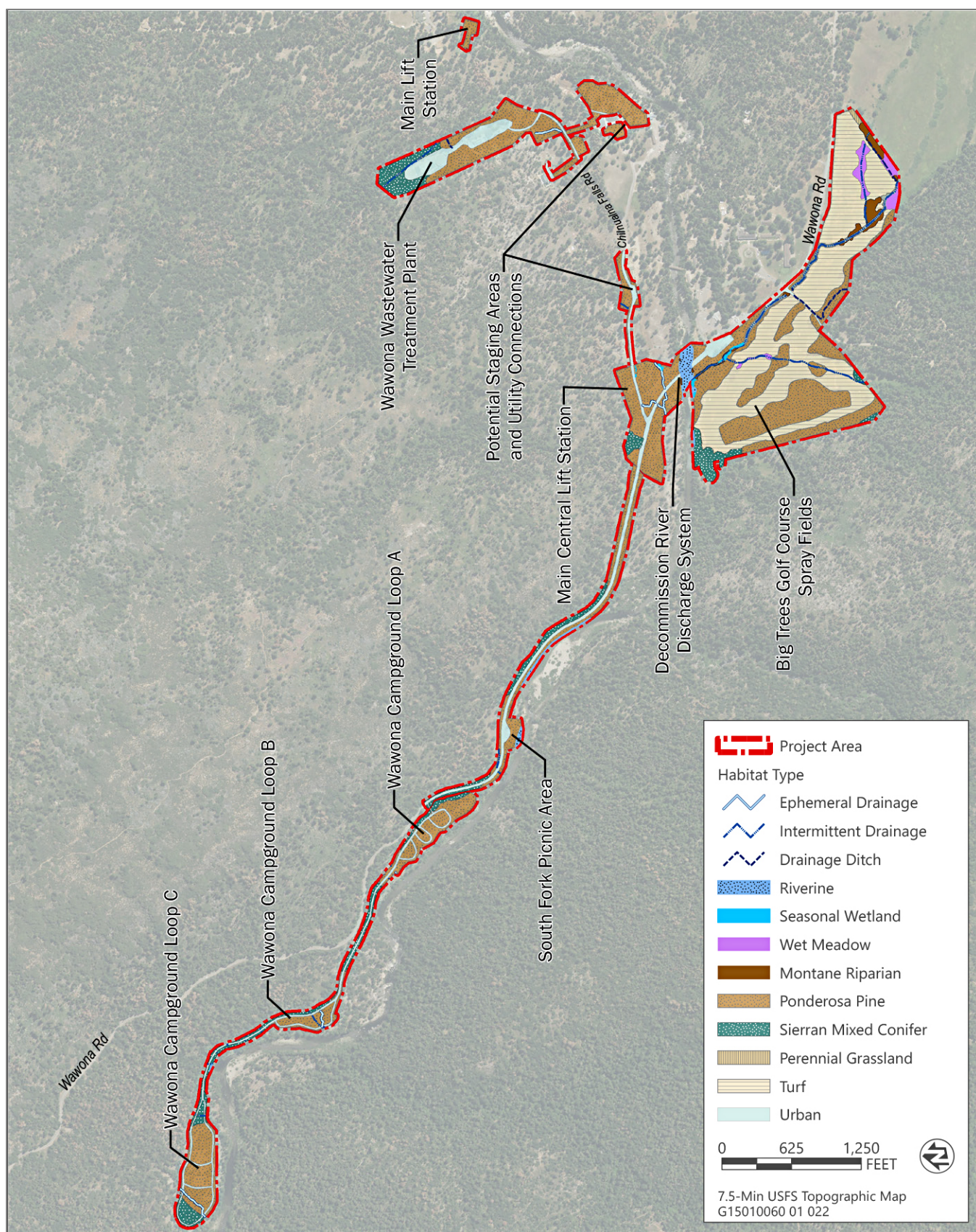
## SPECIAL-STATUS SPECIES

The USFWS and the California Department of Fish and Wildlife classify threatened, endangered, or rare species of plants and animals as those that have undergone serious national, state or local declines and which may be threatened with extinction if not otherwise protected. In addition, Yosemite National Park maintains its own list of “park sensitive species.” These species may have extremely limited distributions, represent relict populations from past climatic or topographic conditions, or have unique adaptations to local conditions (endemics). Many of these are tracked in the California Natural Diversity Database (CNDDDB); however, the CNDDDB is not a comprehensive inventory of all special-status species occurrences and not all detections of special-status species in Yosemite National Park have been reported to the CNDDDB.

### Special-Status Wildlife

Before conducting field surveys, biologists searched the California Natural Diversity Database (CNDDDB 2017) for records of special-status wildlife occurring within a nine-quadrangle area containing and surrounding the project (Figure 1-1). The biologists also consulted the *USFWS Information for Planning and Consultation* project planning tool (USFWS 2017b) and *Yosemite National Park List of Special-Status Animal Species* (Yosemite National Park 2015) for species that could occur in the project area and possibly be affected by project activities. In addition to the database searches and federal species lists, information was obtained from NPS survey data provided by park biologists and previously prepared environmental documents that address biological resources in the area, including *Special-Status Wildlife Species Report for the Merced River Corridor in Yosemite National Park* (NPS 2011) and *Merced Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement* (NPS 2014a,b).





**Figure 3-1**

**Habitat Types Present in the Project Area**

Habitats present in the project area (Table 3-2) were evaluated for their potential to support special-status wildlife species known to occur in the region; no protocol-level surveys for wildlife species were conducted. Twenty special-status wildlife species known or with potential to occur in Yosemite National Park were determined not to have potential to be affected by the project either because the project area is outside the species' known range, or because the project area lacks suitable habitat conditions for the species. These species, the habitat and elevation range in which they are typically found, and the potential for each species to occur in the project area is discussed in Special-status Wildlife Species Evaluation for the Wawona Wastewater Treatment Plant Rehabilitation Project (Ascent Environmental 2018). Table 3-3 lists the special-status wildlife species that were not ruled out based on geographic range, elevation range, or habitat requirements. Special status species that potentially could occur in the project area based on potential suitable habitat are described in the table below.

**Table 3-3 Threatened, Endangered, and Special-Status Wildlife Species with Potential to Occur in the Project Area**

Species	Status
California red-legged frog ( <i>Rana draytonii</i> )	T, SC
Foothill yellow-legged frog ( <i>Rana boylei</i> )	CE
Western pond turtle ( <i>Emys marmorata</i> )	SC
Harlequin duck ( <i>Histrionicus histrionicus</i> )	SC
Golden eagle ( <i>Aquila chrysaetos</i> )	FP
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	D, CE, FP
Peregrine falcon ( <i>Falco peregrinus anatum</i> )	D, FP
Long-eared owl ( <i>Asio otus</i> )	SC
Great gray owl ( <i>Strix nebulosi</i> )	CE
California spotted owl ( <i>Strix occidentalis</i> )	SC
Vaux's swift ( <i>Chaetura vauxi</i> )	SC
Olive-sided flycatcher ( <i>Contopus cooperi</i> )	SC
Willow flycatcher ( <i>Epidonax traillii</i> )	CE
Yellow warbler ( <i>Setophaga petechia</i> )	SC
Pallid bat ( <i>Antrozous pallidus</i> )	SC
Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	SC
Spotted bat ( <i>Euderma maculatum</i> )	SC
Western red bat ( <i>Lasiurus blossevillei</i> )	SC
Western mastiff bat ( <i>Eumops perotis</i> )	SC
Fisher ( <i>Pekania pennanti</i> )	P, CE
DPS Distinct Population Segment	
Status Definitions:	
E	Endangered species under the Federal Endangered Species Act
T	Threatened species under the Federal Endangered Species Act
C	Candidate for listing under the Federal Endangered Species Act
P	Proposed for listing under the Federal Endangered Species Act
D	Delisted under the Federal Endangered Species Act
SC	California Species of Special Concern
FP	California Species Fully Protected Species
CE	Endangered, Threatened, or Candidate species under the California Endangered Species Act

**Federally-Listed Species:** 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 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 federally-listed species were included on the Official Species List, the 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. The Yosemite toad generally occurs above 6,000 feet in elevation; while the Sierra Nevada Yellow-legged frog occurs primarily above 5,000 feet in elevation (the project area occurs at about 4,200 feet in elevation). Therefore, the Delta smelt, steelhead- Northern California DPS, Yosemite toad, and Sierra Nevada yellow-legged frog have been excluded from further analysis. The federally-listed California red-legged frog (*Rana draytonii*) is included in this analysis, as it historically occurred at similar elevations in this part of the Sierra and was reintroduced to several sites in Yosemite Valley in 2016. No critical habitat for any federally listed species occurs within the project area. The California red-legged frog (*Rana draytonii*) is the only federally listed species that has the potential to be present in the project area.

California red-legged frogs occupy a wide range of habitats and previously occupied a few habitats up to 5,200 feet in elevation in Yosemite. Their preferred habitat generally includes slow and still water areas such as pools in or adjacent to streams and ponded areas dominated by dense emergent vegetation (U.S. Fish and Wildlife Service, 2002). Breeding habitat generally consists of calm waters deeper than 2 feet with submerged woody structure or emergent vegetation. Prior to 2016, this species was extirpated from Yosemite National Park, and had not been observed within the park boundary for over 50 years. In 2016, the frog was reintroduced to Yosemite Valley. It is highly unlikely that individuals from those reintroductions would have travelled to the project area during the time elapsed (over 12 air miles). The species has not been documented (historically or recently) in the Wawona area, but targeted surveys in this area of the park have not been conducted. Targeted red-legged frog surveys on the adjacent Sierra National Forest did not indicate red-legged frog presence. The nearest known historical observations of the species occurred 27 air miles to the northwest at Camp Mather and 37 air miles to the west at Piney Creek. While suitable breeding and foraging habitat is present within the project area, the potential for the frog to be present in the project area is low due to elevation, limited favorable habitat, and lack of prior historical observations in the area.

## Special-Status Plants

NPS botanists conducted surveys for plants of concern, including nonnative invasive plants, and special-status/rare plants in the project area during June, July and August of 2017. There are no state or federally listed threatened or endangered plant species in the project area. Six special-status or rare/sensitive plant species were found in the project area during these surveys as described in Table 3-4.

**Table 3-4 Special-Status and Rare/Sensitive Plant Species Identified in the Project Area**

General Location	Scientific Name	Common Name
Main Central Lift Station	<i>Mimulus bicolor</i>	Yellow and white monkeyflower
	<i>Staphylea bolanderi</i>	Bladdernut
Wastewater Treatment Plant	<i>Carex sartwelliana</i>	Yosemite sedge
	<i>Helianthus californicus</i>	California sunflower
Campground Loop B	<i>Myrica hartwegii</i>	Sierra sweet bay
Campground Loop C	<i>Myrica hartwegii</i>	Sierra sweet bay
	<i>Wyethia elata</i>	Hall's mule ears
South Fork Picnic Area Vault Toilet	<i>Helianthus californicus</i>	California sunflower
	<i>Myrica hartwegii</i>	Sierra sweet bay

Sierra sweet bay is an Outstandingly Remarkable Value (ORV) species endemic to only a few riparian areas in California, including the South Fork of the Merced River, which makes it a species of heightened concern. It is listed as an ORV in the Merced River Plan (NPS 2014a,b) as a rare plant found on the South Fork of the Merced River. Its range includes the project area, most notably in Loop C of the Wawona Campground (Dickman 2017). Hall's mule ears is a California endemic and a watch list species that is locally abundant,

but has a limited distribution (only found in four counties in California). The remaining species have no state or federally assigned status but are of special management concern to NPS because they are rare, declining, sensitive, or unique species within Yosemite National Park (Dickman 2017).

### **Invasive Plants**

Invasive plants including annual grasses, such as cheat grass (*Bromus tectorum*), that commonly occur in developed areas in Wawona were found in or adjacent to the project area. Several higher priority species that have a high risk of spread during construction activities were found within the project area including blackberry (*Rubus armeniacus* and *Rubus laciniatus*), bull thistle (*Cirsium vulgare*), velvet grass (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*), and oxeye daisy (*Leucanthemum vulgare*).

## **3.2.2 Methodology and Assumptions**

### **HABITAT AND AQUATIC RESOURCES**

The footprint of disturbance for the two action alternatives (Alternatives 2 and 3) was overlaid onto the mapped habitat types to determine potential impacts. Although the habitats present within the project area are not anticipated to change, detailed acreage of habitat types will change. Final project area habitat surveys and delineation of jurisdictional wetlands and waters will be completed and validated for final project permits. 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. Impacts are considered adverse if implementation of an alternative would reduce the size, continuity, or integrity of a sensitive habitat, including wetlands and waters (NPS 2002).

### **SPECIAL-STATUS SPECIES**

The NPS strives to ensure that special status species (both wildlife and plants) are protected and conserved within the park. If special status species are potentially present in the project area, or may be present adjacent to the project area and exposed to impacts from the project, the park evaluates the proposed project activities and any direct or indirect impacts that the action may have on special status species. The determination of "possibly present, negative impacts not anticipated" is designated when a species may occur in or near the project area, but negative impacts that would threaten the local population are not reasonable to expect if a proposed alternative were implemented. The determination of effect in this EA is based on the species' likelihood of occurring in the area, the magnitude of potential direct or indirect impacts from the project, the duration of the potential impacts, and the nature of the impact on components of the species' habitat, behavior, or life-cycle. The "possibly present, negative impacts not anticipated" determination is applied to special status species not listed under the federal Endangered Species Act (ESA) (determinations for federally-listed species are described below).

Federal agencies must consult with the USFWS to ensure their actions would not jeopardize the continued existence of any federally listed or proposed threatened or endangered species, or adversely modify designated or proposed critical habitat (ESA Section 7 (a) (2)). If listed species or their critical habitat are present, the federal agency must determine if the action would have "no effect," "may affect, not likely to adversely affect," or "may affect, likely to adversely affect" those species or their habitat. The determination of effect in this EA is based on the species' likelihood of occurring in the project area, the direct removal or modification of species' habitat, and the indirect loss of habitat because of short-term construction disturbances that cause wildlife to relocate or avoid the area, or abandon occupied habitat.



### 3.2.3 Alternative 1: No Action

The No Action Alternative would have no short-term construction-related biological resource impacts. No temporary ground disturbance would occur and no new or rehabilitated wastewater facilities would be constructed. Therefore, Alternative 1 would have no short-term construction impacts on wetlands or waters or other habitats, or special-status plants or wildlife. The WWTP would not modernize and the WWTP would not increase inflow treatment capacity, and therefore would not be able to accept additional sewage in-flows from Wawona campground and the South Fork Picnic Area. The Wawona Campground would continue reliance on individual septic systems that are aging and these septic systems over time have a higher likelihood of breaking or failing requiring actions to fix and/or replace them, and may result in an increased reliance in the short or long-term on portable toilets. This would increase the need for sewage handling and transport in close proximity to the Merced River. In addition, the WWTP would not undergo improvements for solids handling and the South Fork Picnic area vault toilet would continue to operate; solids would continue to be transported via truck regularly to El Portal for treatment, which would continue to pose a level of risk due to continued sewage transport. Furthermore, as some campground leach fields would remain within the 100-year floodplain, the Merced River and water quality would continue to be exposed to potential risks of introducing partially treated sewage into the river during large flood events in the future. The potential effects to riverine habitat, fisheries, and special-status species of such introductions of sewage into the aquatic environment are unknown, as they would be dependent on the nature of the event (for example, the volume of sewage introduced and duration of exposure event). Furthermore, the No Action Alternative could result in the degradation of river values that led to its inclusion in the Wild and Scenic Rivers System, as documented in the Merced River Plan (NPS 2014a,b).

#### Conclusion

The No Action Alternative would have no temporary construction-related impacts on biological resources. However, the No Action Alternative would result in long-term unknown effects on the South Fork of the Merced River, fisheries, and special-status species (including federally listed species).

### 3.2.4 Alternative 2: Proposed Action: Rehabilitation of the WWTP (Preferred Alternative) and Alternative 3: Alternative Facilities for Rehabilitation of the WWTP (Action Alternative)

Alternatives 2 and 3 would have similar effects on biological resources and thus they are analyzed jointly. Design differences of the alternatives are discussed where relevant.

#### HABITAT

Under both Alternative 2 and Alternative 3, the majority of ground disturbance would occur in disturbed/developed areas; facilities would be installed underground; surface conditions would be restored; and new above ground facilities would be located within developed areas (at the WWTP, at existing lift stations, and within the campground). Activities in developed and disturbed areas of Wawona would not alter or adversely affect habitat.

Alternatives 2 and 3 would involve removal of a limited number of individual trees, approximately six pine trees and one cedar tree, from the ponderosa pine and Sierran mixed conifer forest habitat. In addition, trenching and excavation could result in cutting roots of trees, which could potentially lead to tree mortality. Approximately 235 trees may be impacted due to project work occurring within their driplines. This includes the following: approximately 32 pine, 32 cedar, and 24 black oak within the campground; approximately 31 pine, 13 cedar, and five black oak along Wawona Road; and approximately 52 pine, 38 cedar, one fir, and seven black oak at the golf course (Architectural Resources Group 2018). Resource protection measures listed in Appendix A include establishing a construction boundary to limit disturbance, temporary construction fencing around trees that should be avoided, conducting a tree inventory, avoiding construction

activities within the drip lines of black oak (*Quercus kelloggii*) to the extent feasible, and minimizing disturbance to tree trunks and root zones to prevent tree mortality and reduce the potential for adverse effects. Alternative 2 and Alternative 3 would not result in a loss of acreage of these forest habitat types and, with implementation of resource protection measures, they would result in negligible tree mortality.

Trenching and excavation throughout the Big Trees Lodge Golf Course to install the subsurface disposal system and replace the spray irrigation system would involve temporary removal of turf grasses and herbaceous wetland vegetation. Replacement of the spray irrigation at the Big Trees Lodge Golf Course, would involve temporary disturbance of aquatic habitat, consisting of riverine intermittent drainage ditch, riverine intermittent streambed, montane riparian habitat, and wet meadow habitat. In addition, Alternative 2 construction activities for the subsurface disposal trenches would temporarily disturb ponderosa pine habitat and turf at the golf course. Alternative 3 construction activities for the subsurface drip irrigation would temporarily disturb ponderosa pine habitat, Sierran mixed conifer habitat, and golf course turf. Installation of communications lines from the WWTP to the CDN pullbox (275 linear feet) and from WWTP to WTP (1,200 linear feet) and power conduit to provide power from a new pole to the Main Lift Station (approximately 800 linear feet of trenching along Chilnualna Falls Road) could result in additional tree loss and temporary disturbance of ephemeral drainage and seasonal wetland.

Under Alternatives 2 and 3, infrastructure for the South Fork Merced River discharge system would be decommissioned. This work would include removal of three discharge pipes and/or valves from the river by cutting them above the ordinary high-water line and lifting the cut pipe out of the river. The pipes and valves are exposed above the river surface elevation; removal would not involve disturbance of bed sediments and would not result in fill of waters of the United States or a change in the surface elevation of the river bed. No ground disturbance, other than minor shifting of some boulders would occur within the ordinary high-water mark. Approximately 50 feet of trenching (3-feet-wide, 4-feet deep) each through previously disturbed soil near the bridge abutment would occur to remove the buried portion of the discharge pipes/valves from the bank.

After the spray irrigation system is renovated and the subsurface disposal system is installed, the facilities would be underground and the disturbed surface areas would be restored to pre-project conditions. Any new above ground facilities would be located within previously disturbed or developed areas. Therefore, no perennial grassland, wet meadow, montane riparian, riverine, or seasonal wetland habitat would be permanently affected as a result of either alternative. Construction disturbances because of either Alternative 2 or Alternative 3 would result in temporary adverse habitat impacts; however, in the long-term, neither alternative would result in a noticeable adverse effect on native resources, natural processes, or other park resources.

Furthermore, Alternatives 2 and 3 would result in diminished risks to long-term water quality in the segment of the South Fork of the Merced River through sewer system improvements, removal of failing septic systems, removing potential for direct discharge of tertiary-treated effluent to the river, and decreasing the need for overland hauling of sewage, which would result in long-term beneficial impacts on riverine habitat, as well as water quality downstream of Wawona. Therefore, Alternatives 2 and 3 would result in long-term beneficial effects on riverine habitat.

## Conclusion

Construction disturbances resulting from installation of facilities for either Alternative 2 or Alternative 3 would result in temporary minor adverse habitat impacts; however, in the long term, neither would result in a noticeable adverse effect, because facilities would be underground, surface conditions would be restored; and new above ground facilities would be located within previously disturbed or developed areas of Wawona. Alternatives 2 and 3 would result in long-term water quality improvements in the South Fork of the Merced River through sewer system improvements, including removal of failing septic systems, removing potential for direct discharge of tertiary-treated effluent to the river, and decreasing the need for overland hauling of sewage, which would result in long-term beneficial effects on riverine habitat.

## AQUATIC RESOURCES

Both Alternatives 2 and 3 would have potential short-term indirect adverse impacts on wetlands and waters of the U.S. related to potential stormwater runoff during construction. Construction would require temporary removal of vegetation and topsoil for trenching, excavation, and construction or installation of sewer infrastructure. The majority of these activities would create ground disturbance in upland areas; however, trenching for pipelines and replacement of the spray field components throughout the golf course would temporarily disturb ephemeral drainage, seasonal wetland, aquatic habitat, consisting of riverine intermittent drainage ditch, riverine intermittent streambed, montane riparian habitat, and wet meadow habitat. Alternative 3 would result in additional temporary direct impacts on intermittent drainage adjacent to Fairway 9 because of construction of a drip irrigation system. Construction activities could accelerate erosion and introduce nutrients or suspend sediments which could degrade the water quality. Additionally, the heavy equipment and tools required for construction of the project have the potential to introduce oil, grease, and chemical pollutants into aquatic habitats through leakage or an accidental spill. Aquatic resources would be avoided to the extent feasible by following existing utility alignments and disturbance is expected to be minimal.

Under Alternatives 2 and 3, infrastructure for the South Fork Merced River discharge system would be decommissioned. This work would include removal of three discharge pipes and/or valves from the river by cutting them above the ordinary high-water line and lifting the cut pipe out of the river. The pipes and valves are exposed above the river surface elevation and removal would not involve disturbance of bed sediments and would not result in fill of waters of the United States or a change in the surface elevation of the river bed. No ground disturbance, other than minor shifting of some boulders would occur within the ordinary high-water mark.

Construction of either alternative would occur during the summer and early fall when the drainages and ditches are typically dry. In addition, as explained in Section 3.3, Water Resources, NPS would implement construction-related stormwater management measures to protect water quality, which would be detailed in a stormwater pollution prevention plan (SWPPP) (see Section 3.3, "Water Resources" and Appendix A). General construction management measures, best management practices (BMPs), soil protection measures, and erosion and sediment control measures (as listed in Appendix A) are included in the project and would be implemented for all construction activities. Fill materials brought in from offsite would be clean, chemically inert, and handled with appropriate containment to prevent contamination of stormwater. Ground disturbing activities would be required to eliminate direct routes for conveying potentially contaminated runoff to the South Fork of the Merced River. Erosion control barriers, such as silt fences and mulching material, would be installed. The SWPPP would contain specific measures for stabilizing soils before the onset of the winter season.

Although work would occur during typically low precipitation periods, if dewatering is required, the SWPPP would include a dewatering plan, which would establish measures to treat groundwater pumped from the construction site prior to release. The dewatering plan measures to prevent/minimize releases of sediment and contaminants into groundwater during excavation and methods of cleaning up releases may include using temporary berms or dikes to isolate construction activities; using vacuum trucks to capture contaminant releases; and maintaining absorbent pads and other containment and cleanup materials on-site to allow an immediate response to contaminant releases if they occur.

Through implementation of BMPs and restoration of pre-construction contours, hydrology, and native wetland vegetation, Alternatives 2 and 3 would result in negligible short-term adverse indirect impacts on wetlands or waters.

In the long term, Alternatives 2 and 3 would not substantially alter hydrologic regimes in the project area. Under both action alternatives, the majority of ground disturbance would occur in disturbed/developed areas such as the WWTP, the lift stations, roadways, the campground, and the golf course. Sewer lines, irrigation system improvements, and subsurface disposal lines would be underground; surface conditions would be restored; and new above ground facilities would be located within developed areas (at the WWTP, at existing

lift stations, and within the campground). Disturbed ground surfaces, wetlands, and waters would be restored to preexisting elevations and soil, hydrology, and native vegetation would be restored as soon as construction is complete. Existing drainage patterns in the project area would be maintained, and impervious surfaces would not be increased. No permanent alteration or fill of aquatic resources would occur. Furthermore, the new subsurface effluent ground disposal (approximately 53,100 gallons per day) would be negligible in comparison to South Fork Merced River flood flow of 1.3 billion gallons per day. Therefore, Alternatives 2 and 3 would have result in a negligible effect on hydrology and would not alter aquatic habitat functions.

## Conclusion

Alternatives 2 and 3 would result in negligible indirect adverse construction impacts on aquatic resources, because implementation of stormwater management measures during construction would protect existing habitat from project runoff. Direct impacts on wetlands or waters would be limited, temporary, and negligible in the long-term, because the habitats temporarily altered by limited direct disturbance would be returned to pre-construction conditions, resulting in negligible long-term alteration of aquatic resources. Furthermore, Alternatives 2 and 3 would result in long-term water quality improvements in the South Fork of the Merced River, which would result in long-term beneficial effects on riverine habitat.

Neither Alternative 2 nor Alternative 3 would warrant a Statement of Findings for effects on wetlands per Director's Order 77-1 because the in-kind replacement of the golf course spray field infrastructure, which would cause the temporary impacts to aquatic resources, meets an exception as a "Maintenance, Repair, or Renovation."

## SPECIAL-STATUS WILDLIFE

Table 3-5, below, provides an analysis of the action alternatives' potential to affect special-status wildlife species, including rationale for the effect determination. The determination of effect is based on the species' likelihood of occurring in the project area, the direct removal or modification of species' habitat, and the indirect loss of habitat because of short-term construction disturbances that cause wildlife to relocate or avoid the area, or abandon occupied habitat such as active nest or roost sites. Short-term construction disturbances include noise, increased human presence, and use of heavy equipment. Indirect effects from short-term construction disturbances are considered relative to the species' sensitivity to human disturbance. Although disturbance from construction activities for either Alternative 2 or 3 would be temporary, they may result in displacement of breeding bats and birds and loss of reproduction for the season. Loss of reproduction could have a negative impact on local special-status bat and bird populations. However, bird and bat protection measures would be implemented under either Alternative 2 or Alternative 3, as listed in Appendix A. Furthermore, although special-status species may occur in the project area, resource protection measures listed in Appendix A of this document would reduce any potential for Alternative 2 or 3 to adversely affect these species.

Suitable habitat for fisher is present in the project area and fishers are known to occur in adjacent areas, as suitable mature forest habitat is present. However, this species is sensitive to human disturbance and is not likely to use habitats in the immediate project area for denning or cover because of heavy human use. Fisher could nest in hollow trees near the project area; however, nesting would likely occur far enough from the project area (greater than 100 feet) that short-term construction disturbance would be unlikely to cause nest abandonment and construction would be limited to daylight hours in the majority of the project area, allowing fisher to forage at night without additional impacts. Furthermore, the project activities near known denning areas would be limited to prevent construction activities in the sensitive denning/rearing period. Fisher could suffer road mortality or injuries from collisions with construction vehicles, but the potential for this is low because fisher activity periods are mostly at nighttime and do not coincide with construction hours (daytime, except at the existing WWTP). Project construction would not substantially increase the amount of vehicle traffic above existing levels. The area is developed and has a high volume of traffic as the baseline condition. General protection measures in Appendix A, including observance of a 25-miles per hour speed limit and limiting construction to daylight hours between 7 a.m. and 7 p.m., except at the existing WWTP,

which would reduce the potential for construction vehicle strikes. Additionally, fisher could be subject to project noise disturbances if foraging near the project area; however, they would likely avoid the construction area during noise disturbances and this impact would be negligible.

As summarized in Table 3-5, no suitable habitat for special status species would be removed or rendered unsuitable because of the project. In addition, resource protection measures listed in Appendix A of this document would further reduce any potential for Alternative 2 or 3 to negatively impact these species. As such, Alternative 2 or Alternative 3 would result in negligible impacts on special-status wildlife.

**Federally-Listed Species:** No recent or historic observations of the California red-legged frog have occurred in or nearby to the project area; however, suitable habitat exists in the project area. In the event, that a California red-legged frog is observed at 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. Any potential direct or indirect effects to California red-legged frogs from project activities are believed to be discountable because the potential for the species to be present at this location is unlikely due to limited amounts of breeding and foraging habitat, a lack of historical occurrences in the direct and general vicinity, and a lack of species detection during general amphibian surveys in the area. Furthermore, the elevation at the project area (4,200 feet) is near the elevational range of the species, and most California red-legged frog occurrences are found at or below 3,500 feet (USFWS 2002). Although characterization of high elevation habitat is difficult because the species is not often found in high elevation areas, the suitable habitat in the project area is extremely small and offers less favorable upland areas (disturbed areas and golf course turf), as compared with other high elevation habitats where the frogs occurred. For these reasons, it is unlikely that the frogs would occur in the project area. In addition, implementation of resource protection measures (Appendix A) would further decrease the chances of adversely impacting the frog if it were present. Before construction, targeted visual surveys and environmental DNA surveys would occur, and if a California red-legged frog was discovered either during pre-construction surveys or during construction, the park would re-initiate consultation with USFWS to ensure the continued protection of the species. The NPS will consult with the USFWS regarding this finding prior to finalizing the NPS decision document for this environmental assessment. No suitable habitat for the California red-legged frog would be removed or rendered unsuitable as a result of this project.

While fisher is not currently a federally-listed species and are not formally protected under the ESA, they are proposed for listing under the ESA and the park management places emphasis on avoiding negative impacts to the species (similarly to how the park would avoid adversely affecting federally listed species). Yosemite National Park has developed resource protection measures (Appendix A) to ensure that the species does not experience negative impacts from the project. If that status of the fisher changes to being officially protected under the ESA during the course of project planning or construction, the park would initiate consultation with the USFWS to ensure the species incurs no adverse effects due to project activities.

**Table 3-5 Effects Determination and Rationale for Threatened, Endangered, and Special-Status Wildlife Species**

Species	Status	Determination of Effect	Rationale <sup>1</sup>
California red-legged frog <i>Rana draytonii</i>	T, SC	MA/NL	While suitable habitat is located in the project area, the species has not been documented to occur in the area. Targeted visual surveys, as well as environmental DNA surveys, would be completed before construction activities commenced to bolster out confidence that the frog is not present in the project area. Furthermore, the project is unlikely to affect individuals as due to the implementation of resource protection measures (Appendix A) that would further reduce the potential to adversely affect California red-legged frogs.
Foothill Yellow-legged frog <i>Rana boylei</i>	CE	PP/NNI	While suitable habitat is located adjacent to the project area, the project is unlikely to affect individuals, because the species has not been historically known in the project area and the project does not impact its habitat (streams and rivers). There would be no direct impacts to favorable habitat in the South fork of the Merced River or its tributaries). Implementing the resource protection measures listed in Appendix A would further reduce the potential to negatively impact Foothill yellow-legged frogs.

**Table 3-5 Effects Determination and Rationale for Threatened, Endangered, and Special-Status Wildlife Species**

Species	Status	Determination of Effect	Rationale <sup>1</sup>
Western pond turtle <i>Emys marmorata</i>	SC	PP/NNI	There would be no direct impacts on aquatic habitat, but trenching and excavation in adjacent uplands could result in direct mortality of aestivating adults or of eggs or hatchlings during the nesting season (June to August). Implementing the resource protection measures listed in Appendix A would avoid loss of western pond turtle and their nests.
Harlequin duck <i>Histrionicus histrionicus</i>	SC	PP/NNI	There is potential for this species to nest near the project area, in less disturbed areas. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of harlequin duck nests.
Golden eagle <i>Aquila chrysaetos</i>	FP	PP/NNI	This species could nest on cliffs and rock outcroppings near the project area. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of golden eagle nests.
Bald eagle <i>Haliaeetus leucocephalus</i>	D, CE, FP	PP/NNI	This species has a low probability of nesting in the project area (uncommon to breed in park and marginal habitat due to lack of adequate prey base). However, construction disturbance could cause nest abandonment if an active nest were present nearby. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of bald eagle nests.
Peregrine falcon <i>Falco peregrinus anatum</i>	D, FP	PP/NNI	This species could nest on cliffs and rock ledges near the project area. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of peregrine falcon nests.
Long-eared owl <i>Asio otus</i>	SC	PP/NNI	This species could nest in trees within or near the project area. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of long-eared owl nests.
Great gray owl <i>Strix nebulosa</i>	CE	PP/NNI	This species is likely to nest in tree snags adjacent to Wawona meadow. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of nests by restricting construction within 1,000 feet of Wawona Meadow to outside the great gray owl nesting season.
California spotted owl <i>Strix occidentalis</i>	SC	PP/NNI	This species could nest in trees within or near the project area. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of California spotted owl nests.
Vaux's swift <i>Chaetura vauxi</i>	SC	PP/NNI	This species could nest in hollow trees or snags within or near the project area. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of Vaux's swift nests.
Olive-sided flycatcher <i>Contopus cooperi</i>	SC	PP/NNI	This species could nest in conifer forest habitat within or near the project area. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of olive-sided flycatcher.
Willow flycatcher <i>Epidonax traillii</i>	CE	PP/NNI	This species could nest in montane riparian habitat within or near the project area. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of willow flycatcher nests.
Yellow warbler <i>Setophaga petechia</i>	SC	PP/NNI	This species could nest in montane riparian habitat within or near the project area. Construction disturbance could cause nest abandonment. Implementing the Bird Protection Measures listed in Appendix A would avoid loss of yellow warbler nests.
Pallid bat <i>Antrozous pallidus</i>	SC	PP/NNI	Potential roost habitat is present in rock outcrops and tree snags in the project area, but this species is very sensitive to human disturbance and is not likely to establish winter hibernation or maternity roosts in developed areas. Hibernation and maternity roosts would likely be far enough away that construction disturbance would be unlikely to cause roost abandonment and effects to this species would be negligible. Implementing the Bat Protection Measures listed in Appendix A would prevent effects to active bat roosts.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	SC	PP/NNI	This species typically roosts in caves or mines, which are not present in or near the project area. This species is highly sensitive to human disturbance, which can cause roost site abandonment. Because the project area is developed with a high level of human disturbance and no caves or mines are present, maternity roosts and winter hibernation roosts are expected to be located far enough away that construction disturbance would be unlikely to cause roost abandonment and effects to this



**Table 3-5 Effects Determination and Rationale for Threatened, Endangered, and Special-Status Wildlife Species**

Species	Status	Determination of Effect	Rationale <sup>1</sup>
			species would be negligible. Implementing the Bat Protection Measures listed in Appendix A would prevent affects to active bat roosts.
Spotted bat <i>Euderma maculatum</i>	SC	PP/NNI	This species roosts in high cliffs; potential roost sites are far enough away that construction disturbances would be unlikely to cause roost abandonment and effects to this species would be negligible. Implementing the Bat Protection Measures listed in Appendix A would prevent affects to active bat roosts.
Western red bat <i>Lasiurus blossevillii</i>	SC	PP/NNI	Potential roost habitat is present in the project area; construction disturbance could cause roost abandonment. Implementing the Bat Protection Measures listed in Appendix A would prevent affects to active bat roosts.
Western mastiff bat <i>Eumops perotis</i>	SC	PP/NNI	Potential roost habitat is present in the project area; construction disturbance could cause roost abandonment. Implementing the Bat Protection Measures listed in Appendix A would prevent affects to active bat roosts.
Fisher <i>Pekania pennanti</i>	P, CT	PP/NNI	Suitable mature forest habitat is present and fisher are known to occur in adjacent areas. However, fisher are sensitive to human disturbance and not likely to use habitats in the immediate project area for denning or cover due to heavy human use. Fisher could be subject to construction noise or suffer road mortality/injuries from construction vehicles. This potential is low because fisher are active at night which would not coincide with daytime construction. General protection measures in Appendix A would reduce the potential impacts to fisher.

MA/NL May affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability.

PP/NNI Species possibly present, negative impacts not anticipated to local population

DPS Distinct Population Segment

**Status Definitions:**

E Endangered species under the Federal Endangered Species Act

T Threatened species under the Federal Endangered Species Act

C Candidate for listing under the Federal Endangered Species Act

P Proposed for listing under the Federal Endangered Species Act

D Delisted under the Federal Endangered Species Act

SC California Species of Special Concern

FP California Species Fully Protected Species

CE Endangered, Threatened, or Candidate species under the California Endangered Species Act

<sup>1</sup> Detailed rationale provided in *Special-status Wildlife Species Evaluation for the Wawona Wastewater Treatment Plant Rehabilitation Project* (Ascent Environmental 2018)

## Conclusion

Under both Alternative 2 and Alternative 3, special-status species would be negatively impacted in the short term. Temporary construction disturbance would potentially displace breeding bats and birds, which could have a negative impact due to potential disruption of reproduction for the season. If loss of reproduction occurred, it could have a short-term negative impact on local special-status bat and bird populations. However, implementation of resource protection measures (see Appendix A) with a focus on avoidance, limiting construction activities during breeding seasons, and limiting areas of impacts would reduce the intensity of the negative impacts to negligible. Construction disturbance could also affect fisher, which are known to occur in the project area. However, construction would be restricted to daytime hours except at the existing WWTP, which would reduce disturbance to fisher, which are active at night. Additionally, resource protection measures in Appendix A, such as limiting construction activities in the vicinity of known denning sites to avoid disturbance during the sensitive denning/rearing periods, construction vehicle speed limits, would reduce the potential adverse effects to fisher. Therefore, Alternatives 2 and 3 are not anticipated to cause negative impacts on special-status wildlife.

**Federally-Listed Species:** For species listed under the federal ESA, a “may affect, not likely to adversely affect” determination under Section 7 of the ESA means that the action may pose effects on the listed species, but given circumstances or resource protection measures, the effects may be discounted, insignificant, or completely beneficial. Insignificant effects would not result in take. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not (1) be able to meaningfully measure, detect, or evaluate insignificant effects or (2) expect discountable effects to occur (USFWS 1998).

Effects on California red-legged frog are discountable because they are unlikely to occur in the project area, as the amount of breeding habitat is limited and there are no known historical observations the vicinity, and the elevation at the project (4,200 feet) is near the species' elevational range limit. Furthermore, the suitable habitat in the project area is drastically smaller in extent and offers less favorable upland areas as compared with other high elevation habitats where the species occurred. For these reasons, it is unlikely that the frogs would occur in the project area. Successful implementation of the resource protection measures (see Appendix A) would further minimize potential impacts to the California red-legged frog, if it were present in the project area. This project has been determined to may affect, but is not likely to adversely affect the California red-legged frog, which means the project is not likely to jeopardize the species.

Fisher are not currently listed under the ESA; the discussion of potential project impacts on this species can be found in Special-Status Wildlife sections above.

## **SPECIAL-STATUS PLANTS**

Alternatives 2 and 3 both have potential to result in disturbance of populations of Hall's mule ears, Sierra sweet bay, and California sunflower during trenching or excavation activities in Loop C of the Wawona Campground or at the South Fork Picnic Area. Impacts to special-status plant populations near the WWTP and Loop B of the campground are unlikely because these populations are outside of the project area boundary. However, populations of yellow and white monkeyflower and bladdernut could be disturbed by project construction activities at the main central lift station. Disturbance of these special-status plant populations and loss of individuals would be avoided through implementation of resource protection measures, as listed in Appendix A. Specifically, the special-status plant occurrences near the main central lift station would be flagged and fenced to prevent construction disturbance. There would be no alteration or loss of special-status plants, and Alternatives 2 and 3 would not adversely affect special-status plants.

## **Conclusion**

Alternatives 2 and 3 would avoid disturbance of special-status plant populations and loss of individuals through implementation of resource protection measures, as listed in Appendix A. Special-status plant occurrences would be flagged and fenced to prevent construction disturbance. Therefore, there would be no alteration or loss of special-status plants. Alternatives 2 and 3 would not negatively impact special-status plants.

## **INVASIVE PLANTS**

Construction activities that involve earthmoving for either Alternative 2 or Alternative 3 could create conditions for the establishment of new invasive plant populations. Although the golf course would be revegetated with turf and landscaping (preferred method is seeding, see Appendix A), both alternatives could leave sections of unvegetated ground, which would create habitat for invasive plants to establish. However, resource protection measures, as listed in Appendix A, would be implemented to prevent the spread of invasive plants. All equipment would be cleaned before it arrives on site so that it is free of soil, seeds, and plant parts, and it would be washed prior to moving between sites. Any imported fill or erosion control materials would be weed free. Soils would not be moved between locations, in particular no soil would be moved from the golf course to prevent the spread of weeds or nonnative species associated with golf course turf. Any soil from trenching or excavation at the golf course would be stored or disposed of in a manner that prevents the spread of weeds. Wetland areas would be revegetated immediately following construction using salvaged wetland soil/sod. The NPS would also treat medium and high priority invasive plants prior to and after construction to prevent spread and establishment of new populations in disturbed areas. Furthermore, NPS conducted directed surveys for nonnative species, consistent with the Yosemite National Park Invasive Plant Management Plan Update (NPS 2010). This Plan provides a framework for protecting Yosemite's natural and cultural resources from degradation or displacement by nonnative invasive species. NPS uses an integrated pest management approach to detect, control, and prevent priority invasive plants from spreading to uninfested areas and would survey project disturbance areas for a minimum of two years after

construction is completed, consistent with the Yosemite National Park Invasive Plant Management Plan Update (NPS 2010). Therefore, the potential spread of invasive species because of temporary project-related construction disturbance and the WWTP improvements under either alternative would have no long-term adverse effects related to invasive plants.

## Conclusion

The NPS would implement treatment and control measures during construction of either Alternative 2 or Alternative 3 to prevent the spread of weeds and non-native species. The NPS uses an integrated pest management approach to detect, control, and prevent priority invasive plants from spreading to uninfested areas and would survey project disturbance areas for a minimum of two years after construction is completed, consistent with the Yosemite National Park Invasive Plant Management Plan Update (NPS 2010). Therefore, the potential spread of invasive species due Alternative 2 or Alternative 3 would not be adverse.

### 3.2.5 Cumulative

The cumulative study area for biological resources is the Wawona area and surrounding areas at similar elevations as the project area that support similar habitats and special-status species (as presented in Tables 3-2 through Table 3-5). The cumulative setting for riverine habitat and species would be the South Fork Merced River and mainstem Merced River. Past projects have contributed to adverse impacts on special-status species within the project area, including construction, modification, and expansion of the community of Wawona; past and present routine maintenance activities; and emergency stabilization measures.

The only cumulative project that is anticipated to have an overlapping construction schedule is the Big Trees Hotel Renovation, which would not involve ground disturbance or habitat alterations (Appendix C). Habitat improvements pursuant to the Merced Wild and Scenic River Comprehensive Management Plan are anticipated to improve water quality and would result in long-term, minor, direct and indirect, beneficial impacts on habitats and special-status species in the riverine habitat of the South Fork of the Merced River. Furthermore, potential actions under the park's *Invasive Plant Management Plan* and *Fire Management Plan* would result in no effect on special-status species populations and habitat within the project area.

The No Action Alternative would not involve any construction and would make no contribution to cumulative construction-related impacts to wildlife habitat, wetlands or waters, or special-status species. However, the No Action Alternative would contribute to long-term unknown impacts on the South Fork of the Merced River, fisheries, and special-status species. These unknown effects would stem from the continued reliance on campground leach fields within the 100-year floodplain, the continued need for frequent sewage transport (due to the WWTP not upgrading and the South Fork Picnic Area pit toilet remaining), and a potential increase in sewage handling/transport near the river (due to likely failures of aging campground septic systems and increased use of portable toilets). Because there would be no loss of forest habitat types and the project would not cause a lack of suitable trees in the area to support the life history needs of local wildlife populations, the project would not contribute substantially to a cumulative loss of trees in Yosemite National Park.

Alternative 2 and Alternative 3 would contribute to temporary minor adverse impacts to habitats because of construction disturbance for installation of facilities. However, stormwater control and erosion control measures would be implemented as directed by a SWPPP and by the resource protection measures listed in Appendix A. Ground surface features would be returned to pre-project conditions. In addition, special-status plant species would be flagged and avoided during construction and special-status wildlife species would be avoided and minimized through implementation of resource protection measures listed in Appendix A. In the long-term, there would be no noticeable adverse effects to biological resources. Furthermore, Alternatives 2 and 3 would improve treatment processes and capacity at the WWTP and would decommission failing leach fields and septic systems, which would decrease risks to water quality in the South Fork of the Merced River. Alternatives 2 and 3 would therefore contribute to cumulative long-term beneficial impacts on riverine habitat.

### **3.3 WATER RESOURCES**

#### **3.3.1 Affected Environment/Study Area**

##### **SURFACE WATERS**

The majority of the project area is within the central South Fork Merced River corridor, and the remainder is along tributaries to the central South Fork of the Merced River. The Wild and Scenic South Fork of the Merced River is a single-thread, meandering, perennial stream that originates high in the peaks east of Wawona at an elevation of approximately 10,500 feet, and flows southwesterly through Wawona (elevation 4,000 feet), then northwesterly to its confluence with the mainstem Merced River at an elevation of approximately 1,400 feet west of the Yosemite National Park boundary. The Merced River is a tributary to the San Joaquin River.

The South Fork of the Merced River is 43 miles long from its headwaters to the confluence with the mainstem (NPS 2014a) and its watershed area is approximately 63,000 acres (NPS 2014a). Average annual precipitation in Wawona is approximately 40 inches and it typically falls as rain or fast-melting snow (NPS 2014a). Average annual precipitation in the upper reaches of the river basin is 50-60 inches per year and is in the form of slower melting snow that feeds the river through spring and early summer (NPS 2014a). Peak runoff in the watershed is typical between late April and June. Some water is diverted from the South Fork Merced River through a small impoundment and intake structure located upstream of the project area to provide drinking water to the Wawona community, including concessions and campgrounds. NPS is permitted to divert up to 480 gallons per minute, but has maintained a limit of 288 gallons per minute since 1987, consistent with the Wawona Water Conservation Plan.

Recreational uses at the Wawona Campground and South Fork Picnic Area have led to soil compaction and erosion along the banks of the South Fork of the Merced River, and portions of intermittent drainage channels through the Big Trees Lodge Golf Course have been realigned or diverted and portions are incised. Intermittent and ephemeral drainage channels have been interrupted by Wawona Road and are culverted at the road crossing. Otherwise, the surface waters in the project area are generally in good condition.

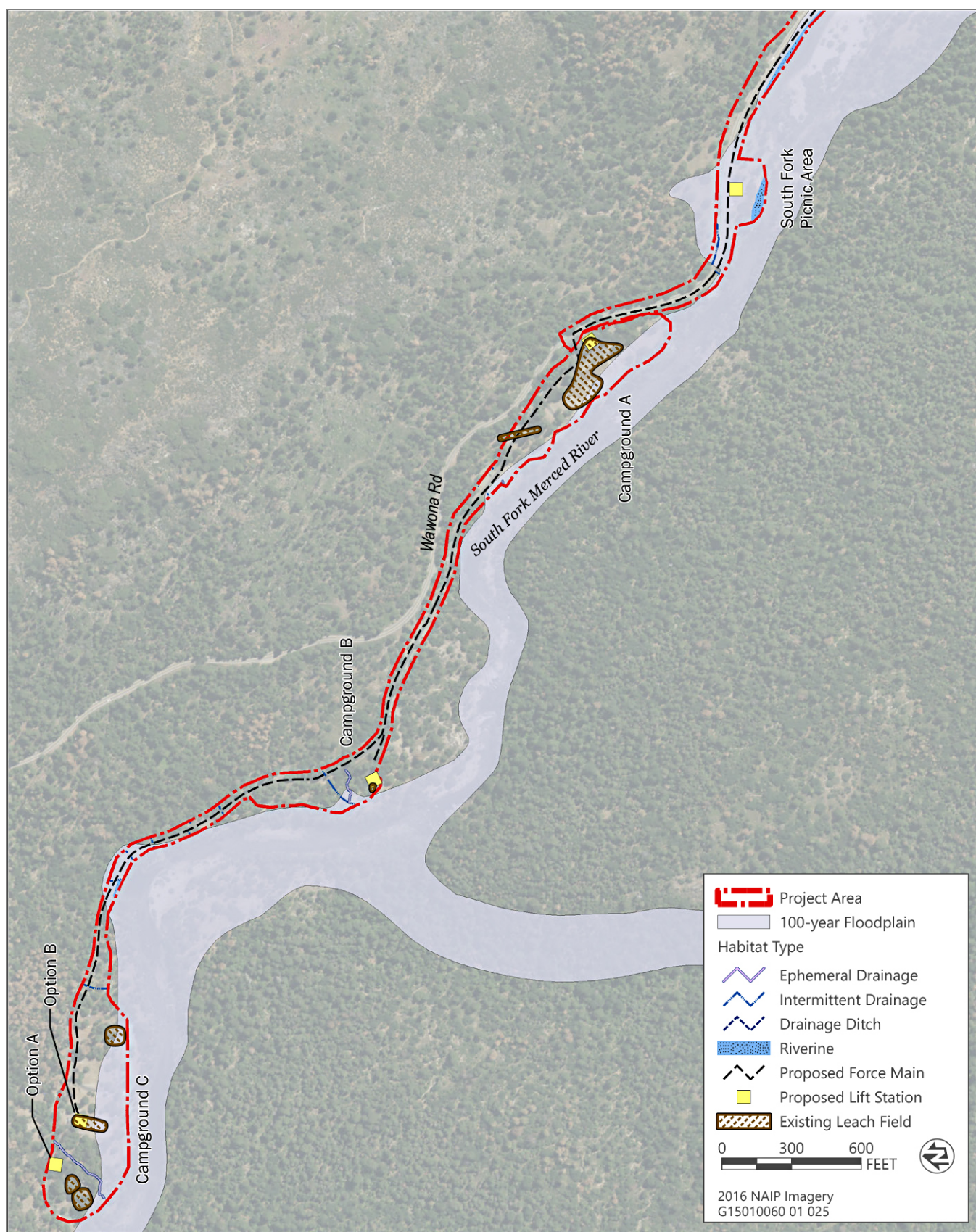
##### **GROUNDWATER**

Field investigations to inform the design of the subsurface disposal system at the Big Trees Lodge Golf Course commenced in October and November 2016, with continued monitoring in 2017 (NPS 2017). Groundwater elevations in the project area vary greatly based on seasonal precipitation. In dry summer months, the depth to groundwater is generally greater than 15 feet. However, during the winter (precipitation season), the depth to groundwater may be reduced to less than two feet. In addition, depth to groundwater is less in areas adjacent to the water courses including Big Trees Creek and the South Fork of the Merced River.

##### **FLOODPLAIN**

According to the Federal Emergency Management Agency Flood Insurance Rate Map, portions of the project area are located within the 100-year flood hazard area (1 percent annual chance of floodplain boundaries) of the South Fork of the Merced River as shown on Figures 3-2, 3-3, and 3-4. In particular, portions of the Wawona Campground septic system leach fields are partially within the 100-year floodplain, as well as the South Fork Picnic Area, portions of the Big Trees Golf Course spray irrigation system, and the effluent discharge infrastructure near the South Fork Bridge. Short sections of the proposed utility alignment along the Wawona Campground Loop Road, Wawona Road, and Chilnualna Falls Road are also within the 100-year floodplain.





**Figure 3-2**

**Wawona Campground Lift Stations and 100-year Floodplain**



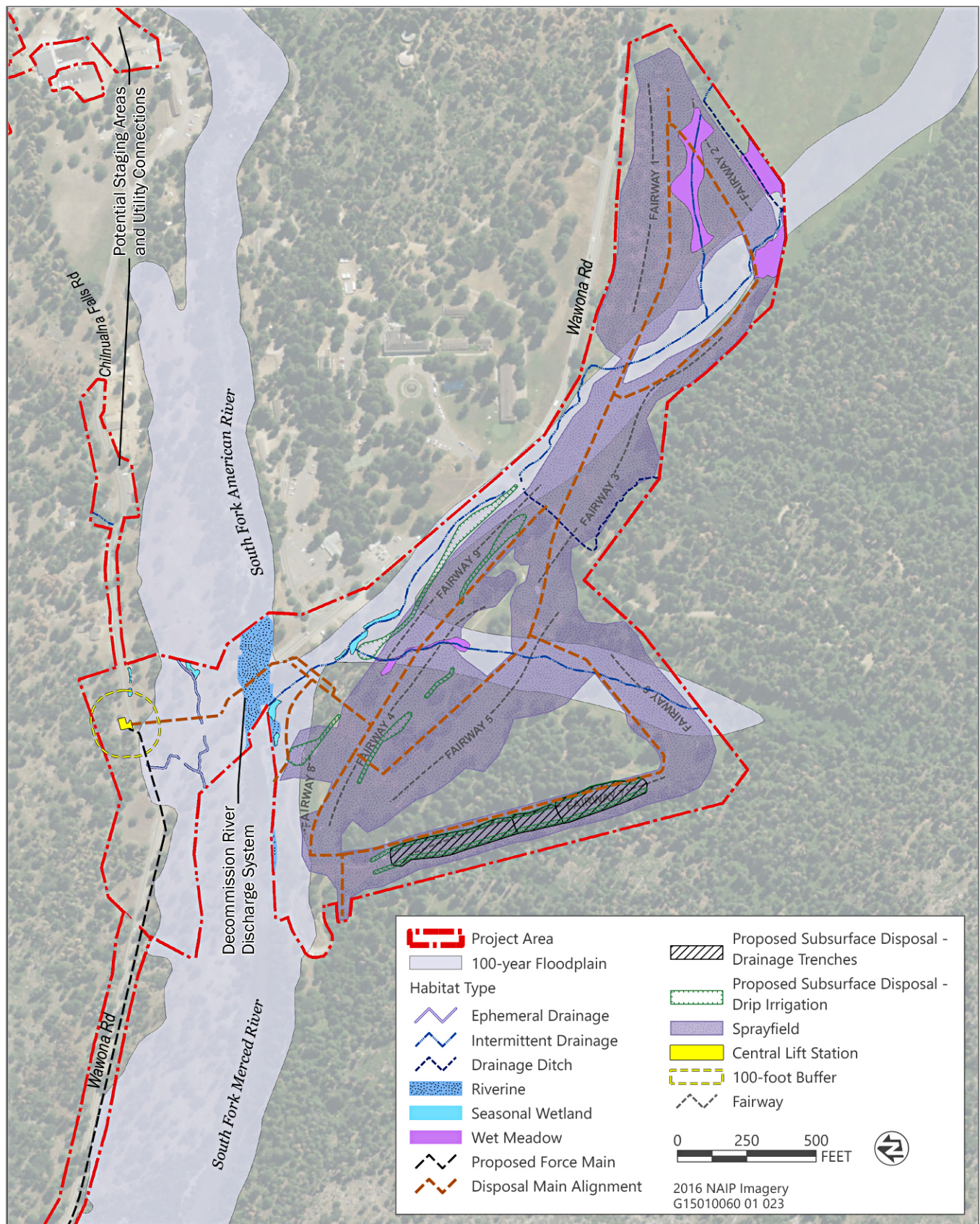
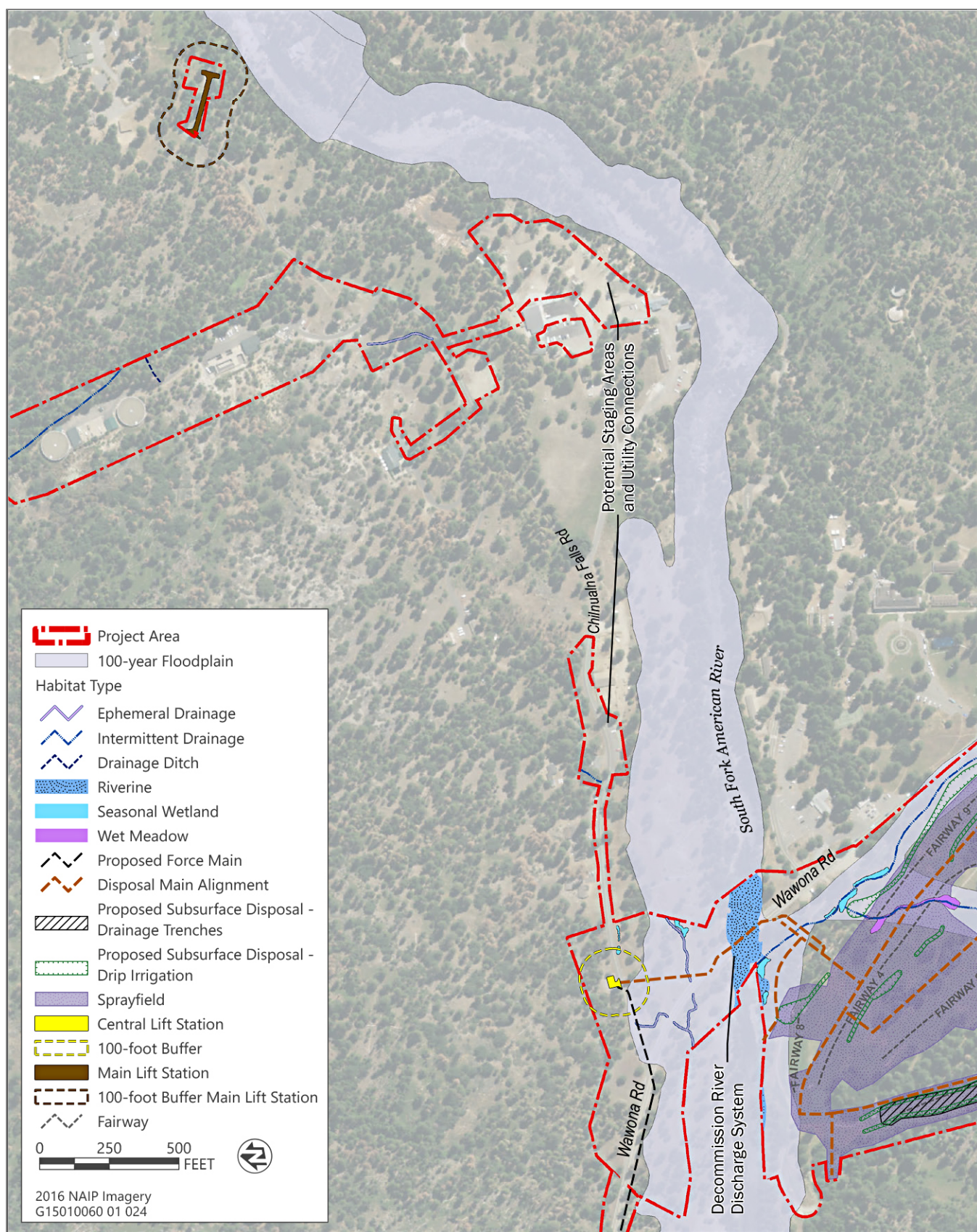


Figure 3-3

Wawona Golf Course Disposal Alternatives and 100-year Floodplain





**Figure 3-4**

**Main Lift Station, Central Main Station, and 100-year Floodplain**

## SOILS

Soils in the project area are primarily alluvial soils along the South Fork Merced River and its tributaries, with residual soils on adjacent slopes, and are generally 2 to 4 feet deep over bedrock (NPS 2014a). The major soil types are mixtures of loam, sand, and silt and are distinguished by the amount and type of rock fragments. These soils are moderately to strongly acidic and are highly susceptible to erosion, as evidenced at the Wawona Campground where heavy use has resulted in loss of vegetation cover and riverbank erosion (NPS 2014a).

## WATER QUALITY

The term “water quality” is used to describe the physical, chemical, and biological condition of water as influenced by natural processes and human activities. The Central Valley Regional Water Quality Control Board’s (RWQCB’s) Basin Plan identifies much of the upper portions of the Merced Basin as having good water quality (2016). Water quality throughout Yosemite National Park is generally excellent; however, atmospheric deposition of nitrogen may be impacting high elevation areas. Most surface and subsurface waters have low concentrations of minerals and organic contaminants. The direct input of contaminants into Yosemite’s water bodies is small and localized to high-use areas. Surface water in the park exhibits considerable variability in chemical composition, despite the relatively consistent composition of the bedrock. Surface water in most of the Merced River basin lacks dissolved solids, making the ecosystem sensitive to human disturbances and pollution (NPS 2014a, 2014b).

### 3.3.2 Methodology and Assumptions

Construction and operational impacts of either Alternative 2 or 3 are evaluated herein to determine whether water quality standards or waste discharge requirements would be violated; whether drainage patterns would be changed in a way that would result in erosion or siltation; or whether flood risk would be increased. Impacts are evaluated for both surface waters and groundwater.

### 3.3.3 Alternative 1: No Action

#### SHORT-TERM WATER QUALITY/FLOODPLAIN/GROUNDWATER IMPACTS

Under Alternative 1, the No Action Alternative, no construction or soil disturbance would occur. There would be no short-term disturbance to drainages, runoff conditions, floodplain, groundwater interaction, or soil erosion.

#### LONG-TERM WATER QUALITY/FLOODPLAIN/GROUNDWATER IMPACTS

The No Action Alternative would make no improvements to the WWTP system. Alternative 1 would have no impact to the floodplain or flood risk because there would be no long-term disturbance to, or development of facilities or structures within, the floodplain. However, facilities that could pose a risk to water quality during large flood events, such as the vault toilet at the South Fork Picnic Area, septic systems at the Wawona Campground, and the manhole near the South Fork Bridge, would remain in the floodplain without improvements that would decrease the risk of sewage release during flood events.

The Wawona Campground would continue to be served by individual septic systems; the WWTP capacity would not be expanded to provide sewer service to these areas. In addition, the South Fork Picnic Area vault toilet would continue to be pumped and the raw sewage trucked to El Portal for treatment. The septic systems at Wawona Campground, which serve six restrooms, have exceeded their design life by several years. Heavy use of the restrooms, combined with high groundwater at the campgrounds can stress the septic system and associated leach field, creating potential water quality impacts during peak use or wet

weather. One leach field has failed and cannot be repaired in its current location and configuration. When the capacity is exceeded, or if other system failures occur or existing failures are not repaired, there would be potential for effluent to migrate into groundwater and the river (NPS 2014a pg 9-98, Volume 2A). Human waste contains high concentrations of microorganisms (some of which are pathogenic) and many chemicals, including carbon, nitrogen, phosphorus, salts, and trace elements. The WWTP capacity would not be increased to accommodate flows from the Wawona Campground, the South Fork Picnic Area, or buildout flows from undeveloped parcels in Wawona. It would be infeasible for the WWTP to comply with the Central Valley RWQCB's permit limitations related to land-based effluent discharge of the disinfected tertiary-treated domestic wastewater without curtailing sewage inflow (closing serviced facilities), increasing effluent storage, or constructing additional land-based discharge points. Furthermore, the No Action Alternative would not implement actions identified in the Merced River Plan and would result in the continued compromise of river values that led to its inclusion in the Wild and Scenic Rivers System (NPS 2014a,b).

The WWTP is unable to fully treat and process solids. Under Alternative 1, the WWTP solid waste would still need to be trucked by tanker to the El Portal waste water treatment plant, approximately 90 miles round trip. In addition, sewage from the South Fork Picnic Area vault toilet would continue to be pumped and trucked to El Portal. While there have been no serious accidents to date, there are risks and hazards with regularly transporting raw sewage and sludge. An accident could result in the spill of raw or partially treated sewage that could adversely affect both surface water and groundwater. The potential impacts of a spill are unknown as they would be based on the location of the accident and the nature of the event.

## Conclusion

Without upgrades to the WWTP system, it will be infeasible to meet requirements of the Central Valley RWQCB's Wastewater Discharge Permit and prevent the potential migration of sewage from septic systems and other facilities in the floodplain that could adversely affect both surface water and groundwater during large flood events. The No Action Alternative would result in on-going risks of adverse water quality concerns during large flood events.

### 3.3.4 Alternative 2: Proposed Action: Rehabilitation of the WWTP (Preferred Alternative) and Alternative 3: Alternative Facilities for Rehabilitation of the WWTP

Alternatives 2 and 3 would result in similar short-term construction disturbances and similar long-term improvements to the WWTP system; therefore, water quality, floodplain, and groundwater impacts are discussed collectively.

## SHORT-TERM WATER QUALITY/FLOODPLAIN/GROUNDWATER IMPACTS

Implementation of either Alternative 2 or Alternative 3 would require construction activities that include vegetation removal, grading, earth moving, trenching, and building construction. Disturbed areas would be subject to wind, rainfall, stormwater runoff, and snowmelt, which may expose subsurface materials and groundwater such that a risk of contamination to surface or groundwater water quality could result. Materials such as aggregate-base rock and sand bedding and backfill for sewer lines, and crushed rock for building foundations would be brought to the project site. Imported or excavated material could become exposed to stormwater and potentially result in contamination of surface water, or could directly connect with and contaminate groundwater. In addition, construction equipment may contain toxic or hazardous substances, including fuels, lubricants, oil, grease, and paint. These materials could also become exposed to stormwater runoff or to groundwater if they are not properly contained. Multiple small incidents of contamination, or larger single releases (e.g., fuel spill) could result in adverse effects on surface water and/or groundwater quality.

As illustrated in Figures 3-3 and 3-4, the project area boundaries overlap the 100-year floodplain. Both Alternative 2 and Alternative 3 would require temporary construction disturbance in the floodplain to install new sewer pipelines, upgrade the spray fields, and install subsurface disposal at the golf course.



Prior to construction, NPS would obtain coverage under the Statewide Construction General NPDES Permit from the Central Valley RWQCB and a stormwater pollution prevention plan (SWPPP) would be prepared detailing measures to control soil erosion and waste discharges from project construction. All contractors conducting construction-related work would be required to implement the SWPPP. The general contractor(s) and subcontractor(s) conducting the work would be responsible for implementing all best management practices (BMPs) detailed in the SWPPP.

The SWPPP would identify the grading and erosion-control BMPs and specifications necessary to avoid and minimize water-quality impacts to the extent practicable. General construction management measures, BMPs, soil protection measures, and erosion and sediment control measures (as listed in Appendix A) are included in the project and would be implemented for all construction activities. Fill and grading materials brought in from offsite would be clean, chemically inert, and handled with appropriate containment to prevent contamination of stormwater. Grading operations would be required to eliminate direct routes for conveying potentially contaminated runoff to the South Fork of the Merced River. Erosion control barriers, such as silt fences and mulching material, would be installed. The SWPPP would contain specific measures for stabilizing soils before the onset of the winter season.

Although work would occur during low water periods, if dewatering is required, the SWPPP would include a dewatering plan, which would establish measures to treat groundwater pumped from the construction site prior to release. The dewatering plan measures to prevent/minimize releases of sediment and contaminants into groundwater during excavation and methods of cleaning up releases may include using temporary berms or dikes to isolate construction activities; using vacuum trucks to capture contaminant releases; and maintaining absorbent pads and other containment and cleanup materials on site to allow an immediate response to contaminant releases if they occur.

## **Conclusion**

Alternatives 2 and 3 would result in short-term construction disturbances that would occur within the floodplain and that could result in adverse water quality impacts to surface waters or groundwater. Alternative 2 or Alternative 3 would warrant a Statement of Findings for effects on floodplains per Director's Order 77-1 (please see Appendix D for the Draft Statement of Findings). However, implementation of the SWPPP and the measures in Appendix A of this document would reduce the potential for erosion and sedimentation of stormwater runoff, as well as the potential for groundwater contamination during construction. Therefore, both action alternatives, Alternative 2 or Alternative 3, would result in negligible short-term adverse effects on water quality, floodplain, and groundwater.

## **LONG-TERM WATER QUALITY/FLOODPLAIN/GROUNDWATER IMPACTS**

Alternative 2 or Alternative 3 would achieve compliance with the Central Valley RWQCB's permit limits. The WWTP system improvements would expand the land based effluent disposal capacity to meet operational permit requirements and increase treatment capacity to accommodate sewage flows from the Wawona campground, South Fork Picnic Area, residences in Wawona currently on septic systems, and undeveloped private parcels in Wawona. This would, in turn, allow homeowners the option of the decommissioning of residential septic systems in the Wawona community and would allow the NPS to decommission the Wawona Campground septic systems. Action alternatives would provide central wastewater treatment for the campground, consistent with the 2014 Merced Wild and Scenic River Final Comprehensive Management Plan. Decommissioning the campground septic systems, replacing the vault toilet at the South Fork Picnic Area with flushing toilets, and raising the top elevation of the manhole at the South Fork Bridge would result in substantial long-term beneficial water quality impacts to both surface water and groundwater by reducing the potential release of sewage or effluent from these systems during large flood events.

The increase in WWTP discharge from Alternative 2 or 3 would not cause degradation of the underlying groundwater or surface waters because the discharge would be treated to tertiary levels and discharged to land. Additionally, the tertiary-treated effluent discharged to the golf course is diluted with river water during

portions of the year and an appreciable amount of snowmelt and precipitation migrates to underlying groundwater, also providing dilution.

As illustrated in Figures 3-3 and 3-4, the project area boundaries overlap the 100-year floodplain. Although either Alternative 2 or 3 would require temporary construction disturbance in the floodplain, in the long-term, most project facilities located in the floodplain would be underground; neither action alternative would result in above-ground structures or increased impervious surfaces within the floodplain. The vault toilet at the South Fork Picnic area would be replaced with a flushing toilet restroom, which would be an above ground facility, but it would be a small facility and should not increase the impact on the floodplain function beyond what currently exists. Construction of either alternative would occur during the summer and early fall when the drainages and ditches are typically dry and precipitation is limited. In addition, the design of the utility trenches and directional drilling would allow any existing subsurface flows to continue unimpeded. Therefore, neither action alternative would increase the limits of water surface elevation of the 100-year floodplain or increase flood hazards. Alternatives 2 and 3 would therefore result in negligible adverse long-term effects to the floodplain.

## Conclusion

Alternative 2 or Alternative 3 would implement the same WWTP system upgrades, which would reduce risk of adverse water quality impacts because of reduced potential for sewage release to surface waters or groundwater. In addition, neither alternative would alter the 100-year floodplain in the long term. Both alternatives would achieve long-term compliance with the Central Valley RWQCB's permit limits and would result in long-term beneficial effects on surface and groundwater quality.

### 3.3.5 Cumulative

The cumulative study area for water resources is the Wawona area, South Fork Merced River, and mainstem Merced River and surrounding areas at similar elevations as the project area. Continued use of the campground septic systems and the residential septic systems may adversely affect the water quality of both groundwater and surface waters because of the potential for migration of effluent or outflow of human waste from these systems. The WWTP is also in need of upgrades to address compliance with the Central Valley RWQCB's permit limitations related to land-based discharge capacity for the disinfected tertiary-treated wastewater. Although the Merced Wild and Scenic River Comprehensive Management Plan would result in beneficial long-term impacts to the riverine habitat of the Merced River, the cumulative water quality setting is considered to be adverse.

The only cumulative projects that are anticipated to have concurrent activities or construction period to the WWTP Rehabilitation Project are the ongoing maintenance of wastewater treatment facilities, the Merced River Plan, and the Big Trees Hotel Renovations, which would not involve ground-disturbing activities (Appendix C). Alternatives 2 and 3 would result in short-term construction disturbances that would occur within the floodplain and that could result in adverse water quality impacts to surface waters or groundwater. However, implementation of a SWPPP and the measures in Appendix A of this document would reduce the potential for Alternative 2 or 3 to contribute to erosion and sedimentation of stormwater runoff as well as for potential groundwater contamination during construction. Therefore, both action alternatives, Alternative 2 or Alternative 3, would result in negligible short-term contributions to cumulative adverse water quality conditions and floodplain disturbance.

In the long term, Alternative 2 or Alternative 3 would contribute to cumulative water quality improvements through WWTP system upgrades, which would reduce risk of adverse water quality impacts related to the release of sewage during large flood events. It is anticipated that the Merced River Plan would also contribute to improved water quality in the Merced River. In addition, neither alternative would result in long-term alteration of the 100-year floodplain. Both alternatives would achieve compliance with the Central Valley RWQCB's permit limits and would result in beneficial long-term contributions to cumulative surface and groundwater quality.

## 3.4 VISITOR EXPERIENCE, HEALTH, AND SAFETY

### 3.4.1 Affected Environment/Study Area

The study area related to the issue of visitor experience, health, and safety encompasses the Wawona community, including the historic Big Trees Lodge, Big Trees Lodge Golf Course, Wawona Campground, South Fork Picnic Area, private residences, a commercial store and gas station, and NPS staff living quarters. Approximately 1.3 million annual visitors to Yosemite National Park (one third of all park visitors) use the Wawona area of the park (NPS 2017). These visitors enjoy the South Fork of the Merced Wild and Scenic River for fishing, swimming, picnicking and camping, and many stay at the historic Big Trees Lodge or vacation rental homes in Wawona. There are private residences for approximately 160 year-round occupants and NPS housing for about 70 permanent and 60 seasonal staff. The WWTP, septic systems, and South Fork Picnic Area vault toilet provide sewer services to the Wawona community, as well as visitors travelling to Wawona for the day, or stopping through on their way to Yosemite Valley. Wawona has approximately eight public restroom facilities.

### 3.4.2 Methodology and Assumptions

NPS Management Policies 2006 state that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate high-quality opportunities for visitors to enjoy the parks. Consequently, one of the parks' goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.

To assess visitor experience, health, and safety impacts, the current WWTP system and individual septic systems were considered along with the park facilities that are served by this infrastructure. Then, the potential impacts of construction and operation under the proposed actions were analyzed. Short-term impacts to visitor experience were considered to be those impacts that would last only during project construction activities (estimated to take one year, starting in the summer of 2019), while long-term impacts would be those that extend beyond project construction and throughout operation of the proposed WWTP facilities (over many decades). Specific context for assessing impacts of the alternatives on visitor experience, health, and safety includes:

- ▲ The ability of visitors to experience the Wawona area and learn about the area's resources.
- ▲ The ability of visitors to enjoy a safe experience while visiting the Wawona area.
- ▲ The availability and quality of visitor facilities and services in the Wawona area (roads, campground, day use area, cabins, Big Trees Lodge and Golf Course, and the gas station and store).

This analysis was based on information provided by the project engineers and NPS staff familiar with the current WWTP operations and maintenance, as well as the WWTP system upgrades proposed in the alternatives.

### 3.4.3 Alternative 1: No Action

Under the No Action Alternative, existing visitor services would continue to be provided and maintained in Wawona; however, there would be no improvements to the WWTP system and no change to the existing septic systems serving the Wawona Campground and portions of the residential community. This alternative would involve no construction and would, therefore, avoid temporary construction disturbance to the Wawona Campground, Big Trees Lodge Golf Course, WWTP infrastructure, and roadways in Wawona. Alternative 1 would have no short-term impacts on visitor experience, health, and safety.



In the short-term, if the WWTP disposal capacity was not expanded at the golf course, the WWTP would likely struggle to meet its existing RWQCB permit requirements for operation at current effluent disposal levels. The NPS would need to take immediate actions to decrease effluent output to remain compliant. This could involve limiting the operation of concession facilities including the Big Trees Lodge or Pioneer Yosemite History Center, periodic closures of serviced facilities, or long-term closures of facilities. Although these properties may close under the No Action Alternative, the NPS would continue to maintain and preserve these properties. In addition, the golf course spray discharge system would not be renovated and would continue to operate as the existing infrastructure further deteriorated. Effluent distribution through the spray field would continue to result in overwatering in some areas and under watering in other portions of the turf. Over the long-term, NPS staff would continue to perform routine maintenance work on wastewater treatment and disposal facilities to keep them operational and safe. In the long-term, the NPS would likely undertake a separate project to increase treated effluent storage by building large storage tanks. However, facilities would continue to deteriorate and degrade, making routine maintenance difficult, costly, and arduous. Furthermore, the Wawona Campground septic system leach fields are partially within the 100-year floodplain and directly adjacent to the South Fork of the Merced River. The campground septic systems are beyond their usable life and one has been irreparably damaged, resulting in the long-term use of portable toilets, which are unpleasant for visitors. As discussed in Section 3.3 of this EA, continued use of the campground leach fields could adversely affect the water quality of both groundwater and surface waters because of the potential for migration of effluent from these systems. Adverse water quality could, in turn, affect recreational opportunities in the river through Wawona as well as downstream, adversely affecting visitor experience and safety. Furthermore, if temporary use of porta-potties becomes necessary, it would increase the need for sewage handling and transport in proximity to the Merced River, posing both a negative effect on visitor facilities and an increased risk to water quality. In addition, the vault toilet at the South Fork Picnic Area would continue to operate, subjecting visitors to unpleasant odors and continuing the need for sewage handling and transport in close proximity to the river. Although the NPS would manage wastewater treatment, the No Action Alternative would make it infeasible to comply with WWTP operating permits, which could cause the NPS to restrict wastewater flows through restriction or closure of visitor facilities such as the campground or Big Trees Lodge. The No Action Alternative could, depending on storm events, result in potential migration of effluent in the floodplain causing water quality concerns and limits on visitor access to the Merced River, both in Wawona as well as other downstream areas in the park. Therefore, the No Action Alternative could have a long-term adverse impact on the experience and safety of visitors, residents, and NPS employees.

## CONCLUSION

The No Action Alternative would avoid temporary construction-related impacts on visitor experience and safety. However, because of the deteriorating wastewater infrastructure, inability to meet permit requirements, potential disruption to visitor facilities, adverse water quality in the South Fork of the Merced River, and potential disruption to visitor recreation and safety, the No Action Alternative could result in long-term, adverse impacts on visitor experience, health, and safety.

### 3.4.4 Alternative 2: Proposed Action: Rehabilitation of the WWTP (Preferred Alternative) and Alternative 3: Alternative Facilities for Rehabilitation of the WWTP

Construction for either Alternative 2 or 3 is scheduled to begin in summer or fall 2019 and is estimated to take approximately one year to complete. The WWTP system improvements proposed in Alternative 2 or Alternative 3 would be implemented without disrupting the existing wastewater services in Wawona. Bypass systems would be implemented where needed during construction to allow for continued sewer service to the areas of Wawona already served by the WWTP. In addition, the residential septic systems would be operated until a residence decides to establish a connection for service, preventing any disruption of sewer service.

Construction activities would require the temporary disruption of roadways in Wawona related to construction worker vehicle and truck trips, as well as for installation of new sewer lines, resulting in the closure of one lane and in one-way traffic. Roadway disruption would be minimized through project site plans that avoid work within the roadway where possible. Vehicular access, including emergency vehicle access, would be maintained throughout the entire construction period by detours and protection of open lanes (see Appendix A).

Under either Alternative 2 or 3, construction would require the temporary closure of Wawona Campground Loop A, which is currently served by porta-potties due to the failed septic system. It is estimated that Campground Loop A would need to be closed for approximately two months during construction of the forcemain, lift station, and comfort station. Loops B and C are closed regularly during the winter (December - March) and construction of the forcemain, lift stations, and comfort stations in these two loops is intended to occur during the winter closure period to avoid disruption of normal campground operations during the April to November season. Although not anticipated, if weather conditions or other factors caused construction to extend outside of that season, the NPS anticipates that construction could require a month or two of closure of Loops B and C. The South Fork Picnic Area would not need to be closed and recreational access to the day use area would continue throughout the construction of the forcemain and future restroom; however, parking may be temporarily impacted. Alternatives 2 and 3 would require closure of the Big Trees Lodge Golf Course for part of the 2019 season (construction will likely begin in late summer) and last approximately one year to construct disposal trenches or drip irrigation, distribution piping, and irrigation (spray field) system upgrades. The usual season of operation at the golf course is April to November.

The temporary closure of recreational facilities, such as the golf course and campground, and construction disturbances such as trucks on the roadways, noise, equipment in view, or dust would represent a short-term adverse impact on visitor experience in Wawona. However, NPS would maintain the health and safety of visitors during the construction period by maintaining roadway access and emergency vehicle access; by maintaining wastewater services; by avoiding the temporary closure of facilities through project design; and by implementing general construction management measures and best management practices (see Appendix A). Therefore, construction would have negligible effects on visitor health and safety.

Upon completion of construction, the roadways, campgrounds, golf course, and other temporarily disrupted visitor facilities would be restored and made accessible to visitors, residents, and employees. Alternatives 2 and 3 would provide improved wastewater conveyance and treatment facilities, increasing capacity for treatment, which would allow for the decommissioning of septic systems. Therefore, both Alternatives 2 and 3 would reduce the risk of possible exposure of people to raw or partially treated sewage. The WWTP system improvements would prevent a wide range of potential visitor service disruptions related to wastewater system failures such as closure of the Wawona Campground, Big Trees Hotel or Golf Course, private vacation homes, South Fork Picnic Area, or limitation on river access. Both alternatives would support the same number of campsites, and would improve conditions at the campground and South Fork Picnic Area by reducing odors and visual impacts associated with removal of porta-potties, removal manhole covers (for the septic tanks) from some campsites, and provision of flush toilets. Alternatives 2 and 3 would eliminate risks to water quality posed during 100-year flood event and reduce potential for accidents during overland transport of sewage. Furthermore, the increased WWTP capacity would allow for build-out of the planned but vacant residential lots in Wawona. Additionally, the vault toilet at the South Fork Picnic Area would eventually be replaced with a double-stall flush toilet restroom, improving visitor experience and greatly reducing unpleasant odors. Therefore, Alternatives 2 and 3 would result in long-term beneficial impacts on visitor experience, health, and safety.

## Conclusion

Implementation of Alternative 2 or Alternative 3 would require the temporary closure the golf course and campground, and construction disturbances such as trucks on the roadways, noise, equipment in view, or dust, which would represent a short-term adverse impact on visitor experience in Wawona. However, NPS would maintain roadway access, emergency vehicle access, and wastewater services throughout construction. The NPS would also implement general construction management measures and best

management practices as identified in Appendix A. Upon completion of construction, facilities would be reopened and there would be long-term beneficial impacts on visitor experience, health, and safety because of improved wastewater treatment supporting the recreational facilities, residences, and commercial facilities in Wawona. The overall impacts of Alternatives 2 and 3 on visitor experience, health, and safety would be long term and beneficial.

### 3.4.5 Cumulative

Cumulative projects occurring or planned in Wawona include: the ongoing maintenance of wastewater treatment facilities, concessionaire facilities, campgrounds, vacation rentals, and Big Trees Hotel and Golf Course; the Merced River Plan Wawona Flatrock Bathroom; the Big Trees Hotel Renovations; the Wawona Ambulance Bay; Demolition and Restoration of the Old Wawona Fire Station; and Camp Wawona Redevelopment (Appendix C). In particular, under the Merced River Plan, seven campsites at the Wawona Campground are planned to be removed, reducing visitor access/amenities in Wawona. Under the No Action Alternative, the amenities and infrastructure in Wawona would remain in their existing condition and would continue to be maintained. There would be no temporary construction disturbance, so this alternative would have no contribution to cumulative construction-related disturbance to visitor experience in Wawona. However, over the long term, the wastewater facilities would continue to deteriorate, leading to the potential for inadequate treatment or exceedance of WWTP capacity, which could adversely affect visitor facilities and recreational opportunities. Therefore, the No Action Alternative would contribute to overall cumulative impacts on visitor experience, health, and safety because of continued wastewater treatment deficiencies.

The only project that is anticipated to be in construction concurrently with the WWTP Rehabilitation Project is the Big Trees Hotel renovations (Appendix C). The concurrent activities could result in a short-term adverse cumulative impact on visitor experience as a result of construction disturbance and temporary closure of recreation facilities in Wawona. However, NPS would maintain the health and safety of visitors during the construction period by maintaining roadway access and emergency vehicle access; by maintaining wastewater services; by avoiding the temporary closure of facilities through project design; and by implementing general construction management measures and best management practices as identified in Appendix A. In the long-term, implementation of either Alternative 2 or 3 would result in beneficial contributions to visitor experience, health, and safety through improved wastewater conveyance, treatment, and disposal that would support improved campground comfort stations, a flush toilet at South Fork Picnic Area, buildout of lots in Wawona, and safer water quality in the Merced River. The cumulative projects in Wawona would also contribute to improved visitor facilities, infrastructure, and safety. Therefore, cumulative impacts on visitor experience, health, and safety would be long term and beneficial, with Alternatives 2 and 3 having a noticeable beneficial contribution.

## **4 CONSULTATION AND COORDINATION**

### **4.1 PROJECT SCOPING HISTORY**

Public scoping for the WWTP Rehabilitation Project was initiated on April 17, 2017, and the NPS accepted scoping comments through May 17, 2017. The NPS used the scoping process to define the project purpose and need and to identify issues and impact topics associated with the project proposal. Based on internal and public scoping comments and applicable federal law, regulations, and executive orders, the NPS determined that an EA would be the appropriate level of compliance for the project. Public scoping comments were used to assist the NPS in developing a range of reasonable and feasible project alternatives that meet the purpose and need, and in analyzing the environmental impacts of each alternative in the EA.

The NPS held a public scoping meeting in Wawona at the Community Center on April 26, 2017, from 5:30 p.m. to 7:00 p.m. Members of the public were invited to submit comments through the Planning, Environment, and Public Comment website (<http://parkplanning.nps.gov/WWTP>) and on hardcopy comment forms provided at the meeting. Nine members of the community asked clarifying questions at this meeting; questions regarded capacity of the improved facility, solids handling options for the new facility, disposal options for the treated effluent, impacts to traffic patterns, and the possibility of installation of a bathroom at the Flatrock swimming area. There was also a suggestion that the new spray field (at the Big Trees Lodge Golf Course) would allow the concessioner more control over watering and operation. Overall, the attendees informed the NPS staff that they would like to receive more information about the project as plans progress and that they would like to remain involved and informed.

The following three comment letters were received: two from individuals and one from the Mariposa County Board of Supervisors. Mariposa County recommended that the NPS consider all current demands from structures and development in Wawona, Section 35, as well as the potential ultimate buildout of undeveloped parcels when calculating the additional capacity of the WWTP. One comment suggested that the spray fields create odor and do not benefit the park, and that the NPS should correct current flaws in the new project design. The third comment recommended adding a bathroom at the Flatrock swimming area near the treatment plant, which is outside the scope of the Wawona Wastewater Treatment System Rehabilitation Project. The NPS is seeking funding for this action as a separate project; it is considered as a related project within the cumulative impact analysis.

The NPS presented the project at two additional meetings in Wawona after the public scoping period ended. On June 3, 2017, the NPS presented the project to the Wawona Property Owners Association and on June 30, 2017, the NPS presented at the Wawona Town Planning Advisory Committee. The NPS staff described the scope of the project; answered questions; and clarified that the rehabilitation of the WWTP would include additional capacity to accept flows from unserved parcels in the community currently served by septic systems and future services of currently undeveloped parcels, considering the ultimate buildout of Section 35 in Wawona, a concern of the community.

### **4.2 CONSULTATION WITH TRADITIONALLY-ASSOCIATED AMERICAN INDIAN TRIBES AND GROUPS**

The NPS has completed the following consultation with traditionally associated American Indian tribes and groups in relation to the WWTP Rehabilitation Project (as of August 2018). The following traditionally associated American Indian tribes and groups were included: federally recognized Bridgeport Indian Colony, Bishop Paiute Tribe, North Fork Rancheria of Mono Indians of California, Picayune Rancheria of the Chukchansi Indians, Tuolumne Band of Me-Wuk Indians, and two federally non-recognized American Indian

groups the American Indian Council of Mariposa County, Inc. (also known as the Southern Sierra Miwuk Nation) and the Mono Lake Kutzadika<sup>a</sup> Tribe.

### 4.2.1 Tribal Consultation

- ▲ NPS initiated Section 106 consultation with traditionally associated American Indian tribes and groups via a written letter sent on April 25, 2017.
- ▲ Formal comments were received from North Fork Rancheria of Mono Indians and Picayune Rancheria of the Chuckchansi Indians in July 2017 requesting further consultation and involvement in project planning.
- ▲ Project site visits with tribal representatives from park-associated tribes were conducted on June 12, 2017 and June 20, 2017. Sensitive resources with intrinsic value to American Indians were identified during these visits.
- ▲ An in-person meeting was held on November 6, 2017 in Mariposa, California, to discuss the project and planned archeological testing related to the EA with traditionally associated tribes and groups of Yosemite National Park: federally recognized Bridgeport Indian Colony, Bishop Paiute Tribe, North Fork Rancheria of Mono Indians of California, Picayune Rancheria of the Chukchansi Indians, Tuolumne Band of Me-Wuk Indians, and two federally non-recognized American Indian groups the American Indian Council of Mariposa County, Inc. (also known as the Southern Sierra Miwuk Nation) and the Mono Lake Kutzadikaa Tribe.
- ▲ Based on requests for continued involvement and the availability of personnel from associated tribes, a tribal cultural monitor from the North Fork Rancheria of Mono Indians of California was selected by the NPS to monitor the archeological investigations carried out by Pacific Legacy in November 2017.
- ▲ Information regarding proposed geo-technical investigations to support construction planning and to determine the geology of areas proposed for new buildings or infrastructure for the WWTP and existing main lift station was disseminated to tribes and groups in the April 2018 project spreadsheet. No comments were received.
- ▲ A meeting and site visit was held with tribes and groups to discuss proposed designs and avoidance measures to protect archeological resources and other culturally significant resources within the project area on May 16, 2018. Comments supported the use of directional drilling to avoid sensitive archeological deposits, supported hand digging to avoid damage to black oak trees that are near utility lines that cannot be re-routed, supported the project objective to remove infrastructure from the river, and supported removing the ability to discharge treated effluent directly to the South Fork of the Merced River.
- ▲ Information regarding proposed geo-technical investigations to support further study for the preferred alignment of the sewer force main and utilities lines installation within the road prism was disseminated to tribes and groups in the June 2018 project spreadsheet. No comments were received.
- ▲ Information regarding the proposed use of horizontal directional drilling to avoid adverse effects was disseminated to tribes and groups in the August 2018 project spreadsheet.
- ▲ On August 15, 2018, the Tribal Chair of the Tuolumne Me-Wuk Tribal Council sent a letter of support to the Yosemite Superintendent for the use of directional drilling to avoid adverse effects.

### 4.2.2 Ethnographic Study

- ▲ A traditionally-used plant survey was conducted with American Indian ethnobotanical specialists from park-associated tribes on June 12, 2017 and June 20, 2017 to identify plant species within the project area with potential traditional significance to American Indians. A meeting with park-associated tribes and groups was held on November 6, 2017 to discuss the survey results.
- ▲ Sensitive resources with intrinsic value to American Indians were identified as traditional resources of religious and cultural significance with high value by park-associated tribes and groups during in-person consultation site visits on June, 12 and 20, 2017 and May 16, 2018.
- ▲ During in-person project consultation on November 6, 2017, tribal representatives expressed a desire that protective measures be taken to ensure avoidance of sensitive resources.

- ▲ The NPS is currently evaluating actions to address these concerns and will formalize responses based on continued consultation with associated tribes and groups during project design and engineering ongoing in 2018.

### 4.2.3 Summary of Tribal Concerns and the NPS Response

- ▲ Formal comments were received by North Fork Rancheria of Mono Indians of California in July 2017 via written letter indicating concerns regarding placement of project features and areas of sensitive resources.
- ▲ During in-person consultation on November 6, 2017, tribal representative from the Tuolumne Band of Me-Wuk Indians requested that actions be taken by the NPS to protect sensitive resources during all phases of construction.
- ▲ The NPS is evaluating strategies to address these concerns and will formalize responses based on continued consultation with associated tribes and groups during project design and engineering ongoing in 2018.
- ▲ The NPS will continue to actively consult with traditionally associated tribes and groups to address concerns as the specific design of the wastewater treatment system is developed.
- ▲ The tribes will receive copies of this EA for review and comment. Consultation and partnering will continue with the throughout the planning and implementation of the Wawona Wastewater Treatment Rehabilitation Project.

## 4.3 CONSULTATION WITH FEDERAL AGENCIES

**U.S. Army Corps of Engineers.** The NPS is consulting with the U.S. Army Corps of Engineers (USACE) with regard to wetlands delineation and permit requirements necessary to implement project in accordance with Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. The NPS anticipates obtaining a Nationwide Permit (NWP) under Section 404 of the CWA and will work with the USACE to obtain the necessary permit prior to implementing the project.

**U.S. Fish and Wildlife Service.** The NPS obtained a list of federally-listed endangered and threatened species that may be present in the project area from the U.S. Fish and Wildlife Service (USFWS) on May 31, 2017. The list was used as the basis for the special status species analysis in this EA. NPS initiated informal consultation on August 29, 2017. Currently, the NPS anticipates “no effect” or “not likely to adversely affect” determinations on federally listed species, which are not believed to be present in the project area. The NPS will seek concurrence with the park’s assessment of effects on federal listed species prior to finalizing the NPS decision document for this EA.

**Advisory Council on Historic Preservation.** Yosemite notified the Advisory Council on Historic Preservation (ACHP) for the WWTP Rehabilitation Project in April 25, 2017 via the ACHP Electronic Section 106 Documentation Submittal System (e106) website. The ACHP did not request consulting party status for this undertaking.

## 4.4 CONSULTATION WITH STATE AGENCIES

**California Office of Historic Preservation.** The NPS initiated consultation with the State Historic Preservation Officer (SHPO) at the Office of Historic Preservation for the WWTP Rehabilitation Project on April 24, 2017. On June 6, 2017, the SHPO responded acknowledging the initiation of consultation and the park’s identification of the undertaking. On September 26, 2017, the NPS requested review of its determination of the area of potential effect (APE) and concurrence with the findings of a draft amendment to the National Register nomination for the Wawona Hotel and Pavilion (National Register #75000223). The amendment to the National Register nomination was prepared to update information in the 1975 National Register



nomination and included recently evaluated resources associated with the development of the Wawona Hotel and Pavilion that may be affected by the WWTP Rehabilitation Project. In a letter dated March 7, 2018 the SHPO provided comments on the draft amendment to the Wawona Hotel and Pavilion Historic District and concurrence with most aspects of the amendment (including the boundary revision). In a letter dated April 6, 2018, the NPS provided draft plans for the project, as well as information on geotechnical investigations, and additional information regarding the APE.

The NPS will continue to consult with the SHPO throughout the project. Additional identification of historic properties has been completed, including the archaeological survey of the APE and a traditional-plant-use assessment. Results of both studies have been provided to SHPO and NPS will continue to consult on the future identification of historic properties. The NPS is seeking SHPO concurrence with a no adverse effect finding and anticipates completion of the Section 106 process in early 2019.

**Central Valley Regional Water Quality Control Board.** The NPS was previously permitted by the Central Valley Regional Water Quality Control Board (RWQCB) (Order R5-2013-0092 [National Pollutant Discharge Elimination System] NPDES No. CA0081795) to discharge disinfected tertiary-treated domestic wastewater from the WWTP primarily via spray irrigation at the Big Trees Lodge Golf Course and secondarily (only if certain conditions are met) to the South Fork of the Merced River. This permit expired in September 2018 and the NPS is now operating the WWTP under the General Order Waste Discharge Requirements (WDR) Permit with a Notice of Applicability (NOA) specific to the WWTP (Permit No. 2014-0153-dwq-r5289). The NPS submitted a Report of Waste Discharge in March 2018 to help define the future effluent limits and the NPS has until July 2018 to comply with a Time Schedule Order (TSO) from the RWQCB. (The TSO involves enforcement actions issued in accordance with Section 13300 of the California Water Code that require the NPS to submit a time schedule establishing the actions that will be taken to address actual or threatened discharges of wastes in violation of requirements.) This project proposes WWTP upgrades to meet permit limitations, including WWTP system upgrades, new subsurface effluent disposal, and improved controls.

This EA has been prepared consistent with 14 CCR § 15221 to fulfill California Environmental Quality Act (CEQA) requirements without producing a separate CEQA document, and the NPS anticipates a Finding of No Significant Impacts (FONSI) decision following the EA process. The CEQA guidelines (14 CCR § 15221) state:

- (a) When a project will require compliance with both CEQA and NEPA, State or local agencies should use the EIS or Finding of No Significant Impact rather than preparing an EIR or Negative Declaration if the following two conditions occur:*
  - (1) An EIS or Finding of No Significant Impact will be prepared before an EIR or Negative Declaration would otherwise be completed for the project; and*
  - (2) The EIS or Finding of No Significant Impact complies with the provisions of these Guidelines.*
- (b) Because NEPA does not require separate discussion of mitigation measures or growth inducing impacts, these points of analysis will need to be added, supplemented, or identified before the EIS can be used as an EIR.*

This EA meets the criteria outlined in 14 CCR § 15221 and thus the NPS does not believe a separate CEQA environmental impact report (EIR) or negative declaration (ND) is necessary.

In relation to an anticipated USACE Nationwide Permit, the NPS is coordinating with the Central Valley RWQCB to obtain a Water Quality Certification for the project.

Prior to construction, NPS would obtain coverage under the Statewide Construction General NPDES Permit from the Central Valley RWQCB. In compliance with the General Permit, a stormwater pollution prevention plan (SWPPP) would be prepared detailing measures to control soil erosion and waste discharges from project construction areas. All contractors conducting construction-related work would be required to implement the SWPPP to control soil erosion and waste discharges. The general contractor(s) and subcontractor(s) conducting the work would be responsible for implementing all BMPs detailed in the SWPPP.

## 4.5 PUBLIC REVIEW OF THE ENVIRONMENTAL ASSESSMENT

Updated information about various aspects of the WWTP Rehabilitation Project will be periodically distributed via newsletters, mailings, the Yosemite National Park website (<https://www.nps.gov/yose/getinvolved/wawonawwtp.htm>), and regional and local news media.

There will be a 30-day public comment period on this EA. Printed copies of this document will be available for review at the following locations:

Wawona Library  
7971 Chilnualna Road  
Wawona, CA 95389  
Hours:  
M-W-F 12-5, Sat 10-3

Mariposa Library  
4978 10<sup>th</sup> Street  
Mariposa, CA 95338  
Hours:  
M 8:30-4, T-F 8:30-6, Sat 8:30-4

Oakhurst Library  
49044 Civic Cir  
Oakhurst, CA 93644  
Hours:  
M-Th 10-5, Fri/Sat 10-2

Readers are encouraged to submit comments electronically through the NPS Planning, Environment and Public Comment (PEPC) system. A link to PEPC can be found on the project website, above, or directly at <http://parkplanning.nps.gov/WWTP>.

Written comments regarding this document should be directed to:

Superintendent, Yosemite National Park  
ATTN: Wawona Wastewater Treatment System Rehabilitation Project  
P.O. Box 577  
Yosemite, California 95389  
Fax: 209-379-1294

To request a printed copy or CD of this EA (available in limited quantity), please email: [Yose\\_Planning@nps.gov](mailto:Yose_Planning@nps.gov).

## 5 REFERENCES

### Chapter 1, Introduction

CEQ. See Council on Environmental Quality.

Council on Environmental Quality. 1997. Environmental Justice Guidance Under the National Environmental Policy Act. Washington D.C. Published December 10, 1997.

NPS. See U.S. Department of the Interior, National Park Service.

U.S. Census Bureau. 2010. American FactFinder. Community Facts. Race and Hispanic or Latino Origin: 2010. 2010 Census Summary File 1. Wawona CDP, California. Available: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>. Accessed on September 12, 2017.

———. 2011–2015a. American FactFinder. Community Facts. 2011–2015 American Community Survey 5-Year Estimates. Poverty in the Past 12 Months. Wawona CDP, California. Available: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>. Accessed on September 12, 2017.

———. 2011–2015b. American Community Survey 5-Year Estimates. Community Facts. Wawona CDP. Individuals below poverty level. Available: [https://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml). Accessed on September 12, 2017.

U.S. Department of the Interior, National Park Service. 2004 as amended in 2009. *Yosemite National Park Fire Management Plan*. Accessed via <https://www.nps.gov/yose/getinvolved/fireplan.htm>. Accessed on December 12, 2017.

———. 2011. *Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-Making*.

———. 2014 (February). *Merced Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement*.

———. 2015 (September). *National Park Service NEPA Handbook*. Washington, DC.

———. 2017. *Yosemite National Park Climate Action Plan*. Accessed via <https://www.nps.gov/subjects/climatechange/cfpprogram.htm>. Accessed on December 12, 2017

Wilderness Connect. 2017. Yosemite Wilderness. Wawona, CA. Available: <http://www.wilderness.net/map.cfm?xmin=-13345680.4739&ymin=4508172.1682&xmax=-13269228.1234&ymin=4605800.1836>. Accessed on November 8, 2017.

### Chapter 2, Alternatives

Mariposa County. 1987. *Wawona Town Planning Area Specific Plan Update*, as amended. Adopted October 13, 1987. Last amended March 15, 2016. Mariposa, CA. Available: <http://www.mariposacounty.org/DocumentCenter/View/8628>. Accessed November 29, 2017.

NPS. See U.S. Department of the Interior, National Park Service.

U.S. Department of the Interior, National Park Service. 2014. *Merced Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement*. February 2014.

## Chapter 3, Affected Environment and Environmental Consequences

No references were used in this portion of the chapter.

### Section 3.1, Cultural Resources

NPS. See U.S. Department of the Interior, National Park Service.

Pacific Legacy, Inc. 2018 (February). Interim Report of Archaeological Investigations for the Wawona Wastewater Treatment System Rehabilitation Project. Yosemite National Park, California. PMIS Number: 196447.

U.S. Department of the Interior, National Park Service. 2017 (September 26). Letter to Julianne Polanco, State Historic Preservation Officer, H3015 (YOSE-PM). Wawona Wastewater Treatment System Project. SHPO Tracking #NPS\_2017\_0426\_001.

———. 2018a (March 9). Yosemite National Park Archaeologist Memo regarding archaeological resources in and adjacent to the Wawona Golf Course. Prepared by Sara Dolan.

———. 2018b (January 2). Yosemite National Park Field Report. Prepared by Joe Dolan, Cultural Anthropologist. American Indian Consultation Program. Yosemite National Park.

### Section 3.2, Biological Resources

Architectural Resources Group. 2018. Wawona WWTP Campground Impact to Trees. October 23, 2018.

Ascent Environmental. 2018. Special-status Wildlife Species Evaluation for the Wawona Wastewater Treatment Plant Rehabilitation Project. Prepared for National Park Service under contract to Architectural Resources Group. Sacramento, CA.

California Natural Diversity Database. 2017 (April). RareFind 5 (Commercial Version): *An Internet Application for the Use of the California Department of Fish and Wildlife's Natural Diversity Database. Biogeographic Data Branch*, California Department of Fish and Wildlife, Sacramento, CA. Available: <http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp>. Accessed May 31, 2017.

California Department of Fish and Wildlife. California Interagency Wildlife Task Group. 2014. California Wildlife Habitat Relationships (CWHR) version 9.0 personal computer program. Sacramento, CA. Available: <https://www.wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>.

Dickman, Garrett. 2017. *Wawona Wastewater Treatment Plant Invasive and Rare Plant Surveys*. Prepared by Garrett Dickman, Yosemite National Park Service.

National Park Service. 2002 Director's Order 77-1: Wetland Protection. United States Department of the Interior, National Park Service.

———. 2010. Invasive Plant Adaptive Management Plan Update. Accessed: [https://www.nps.gov/yose/learn/management/invasive\\_docs.htm](https://www.nps.gov/yose/learn/management/invasive_docs.htm). Accessed on December 12, 2017.

———. 2011 (May). *Special Status Wildlife Species Report for the Merced River Corridor in Yosemite National Park*. Wildlife Management and Resources Management and Science. Yosemite National Park, CA.

———. 2014a. *Record of Decision. Merced Wild and Scenic River Comprehensive Management Plan*. Yosemite National Park, California.

- . 2014b (February). *Merced Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement*. Volume 2: Chapter 9 and Appendix C. Yosemite National Park, CA.
- Natural Resources Conservation Service. 2017. Web Soil Survey. Soil Survey for Yosemite National Park, California. Available: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Accessed: June 16, 2017.
- NPS. See National Park Service.
- U.S. Fish and Wildlife Service. 1998. *Endangered Species Act Consultation Handbook: Procedures for Conducting Section 7 Consultations and Conference Activities*. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.
- . 2002. *Recovery Plan for the California Red-legged Frog (Rana aurora draytonii)*. U.S. Fish and Wildlife Service, Portland, Oregon. viii + 173 pp.
- . 2017a. National Wetlands Inventory dataset. Wetlands Mapper. Accessed June 5, 2017. Available: <http://www.fws.gov/wetlands/data/Mapper.html>
- . 2017b. Official Species List for the Wawona Wastewater Treatment Plant Project. Consultation Code: 08ESMF00-2017-SLI-22214, Event Code: 08ESMF00-2017-E-05720. Letter obtained May 31, 2017. Sacramento Fish and Wildlife Office, Sacramento, CA.
- Yosemite National Park. 2015 (March). *Special Status Animal Species*. Available: <https://www.nps.gov/yose/learn/nature/ss-animal-species.htm>. Last updated March 1, 2015. Accessed May 31, 2017.

### Section 3.3, Water Resources

California Regional Water Quality Control Board, Central Valley Region. 2016. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region*. Fourth Edition. Revised April 2016 (with Approved Amendments). The Sacramento River Basin and the San Joaquin River Basin.

NPS. See U.S. Department of the Interior, National Park Service.

- U.S. Department of the Interior, National Park Service. 2014a. *Record of Decision. Merced Wild and Scenic River Comprehensive Management Plan*. Yosemite National Park, California.
- . 2014b (February). *Merced Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement*. Volume 2: Chapter 9 and Appendix C. Yosemite National Park, CA.
- . 2017. *Wawona Wastewater Treatment Plant Upgrade. Draft Basis of Design Report – Schematic Design*. December. Prepared by Architectural Resources Group with assistance from Mott MacDonald and Provost & Prichard.

### Section 3.4, Visitor Use and Experience

NPS. See U.S. Department of the Interior, National Park Service.

U.S. Department of the Interior, National Park Service. 2017. *Project Identification – PMIS 196447. Rehabilitate Wawona Wastewater Treatment Plant*. Updated October 12, 2017.

## Chapter 4, Consultation and Coordination

No references were used in this chapter.

# Appendix A

## Resource Protection Measures

The National Park Service places a strong emphasis on avoidance, minimization, and mitigation of impacts. To help ensure that field activities protect natural, cultural, and social resources and the quality of the visitor experience, mitigation measures have been developed. The following section discusses mitigation measures that would occur prior to, during, and after construction of specific management actions.

The majority of the project area is in the Merced Wild and Scenic River corridor (with the exception of the existing viewing platform). This table consists of relevant mitigation measures from the Merced River Plan Final Environmental Statement and Finding of No Significant Impact as well as additional mitigation measures added for this specific project.

Topic	Resource Protection Measures	Responsibility
<b>A. General Construction Management Measures</b>		
<b>A.1</b> General Construction Management	<p>All Contractor and subcontractor employees shall receive a brief orientation about working in Yosemite National Park prior to actually performing work. The orientation describes the efforts to be taken by the Contractor and subcontractor employees to protect the natural, cultural and physical resources of Yosemite National Park while working on this and other projects. This orientation also describes mitigation and other environmental protection measures that must be adhered to at all times while in the Park.</p> <p>All contractor and subcontractor employees shall view a government provided orientation video to ensure each is fully aware of the natural and cultural resource protection and mitigation requirements of work at Yosemite National Park. Government staff will provide the initial orientation. Subsequent on-going awareness orientation for new employees and when site conditions change shall be performed by contractor and integrated into construction operation procedures.</p> <p>The Contractor shall maintain a manifest tracking all contractor personnel, when they received their orientation training, and when they started work. Contractor personnel shall be field identifiable as having received their orientation training by means of a readily visible sticker on their hard hat.</p> <p>Prior to entry into the park, Contractor shall steam-clean heavy equipment to prevent importation of non-native plant species, tighten hydraulic fittings, ensure hydraulic hoses are in good condition and replace if damaged, and repair all petroleum leaks. Inspect the project to ensure that impacts stay within the parameters of the project area and do not escalate beyond the scope of the environmental assessment, as well as to ensure that the project conforms with all applicable permits or project conditions. Store all construction equipment within the delineated work limits. Contractor shall also confine work areas within creek channels to the smallest area necessary.</p> <p>If deemed necessary, demolition/construction work on weekends or federal government holidays may be authorized, with prior written approval of the Superintendent.</p> <p>Contractor shall remove all tools, equipment, barricades, signs, surplus materials, and rubbish from the project work limits upon project completion. Contractor shall repair any asphalt surfaces that are damaged due to work on the project to original condition. Contractors shall also remove all debris from the project site, including all visible concrete, timber, and metal pieces.</p> <p>The park shall develop a Communications Strategy Plan to alert necessary park and Concessioner employees, residents and visitors to pertinent elements of the construction work schedule.</p> <p>Contractor shall verify utility locations by contacting the Underground Services Alert prior to the start of construction.</p> <p>The Contractor shall provide protective fencing enclosures around construction areas, including utility trenches to protect public health and safety.</p> <p>The NPS will apply for and comply with all federal and state permits required for construction-related activities.</p> <p>Contractor and NPS shall implement compliance monitoring to ensure that the project remains within the parameters of National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) compliance documents.</p> <p>Develop an emergency notification plan that complies with park, federal, and state requirements and allows contractors to properly notify park, federal, and/or state personnel in the event of an emergency during construction activities. This plan will address notification requirements related to fire, personnel, and/or visitor injury, releases of</p>	Yosemite National Park; Contractor



Topic	Resource Protection Measures	Responsibility
<b>A.1</b> General Construction Management (continued)	<p>spilled material, evacuation processes, etc. The emergency notification plan will be submitted to the park for review/approval prior to commencement of construction activities.</p> <p>Notify utilities prior to construction activities Identify locations of existing utilities prior to removal activity to prevent damage to utilities. The Underground Services Alert and NPS maintenance staff will be informed 72 hours prior to any ground disturbance. Construction-related activities will not proceed until the process of locating existing utilities is completed (water, wastewater, electric, communications, and telephone lines). An emergency response plan will be required of the contractor.</p>	Yosemite National Park; Contractor
<b>A.2</b> Design	In accordance with the National Park Service's Denver Service Center's Workflows, the standard business practices outlining the requirements for general, predesign, schematic design, design development, and construction documents shall be followed ( <a href="http://www.nps.gov/dscw/design.htm">www.nps.gov/dscw/design.htm</a> )	National Park Service
<b>A.3</b> Construction	In accordance with the most current version of Yosemite National Park's Division 1 Specifications (also referred to as General Requirements for Construction), the standard business practices outlining the requirements for Summary of Work; Seismic Requirements; Definition of Bid Items; Project Meetings; Critical Path Method Construction Schedule; Project Schedules (small and large projects); Submittal Procedures; Submittals; Natural, Cultural, and Physical Resources Protection; Storm Water Pollution Prevention Measures; Accident Prevention; Reference Standards; Contractor Quality Control; Temporary Services and Controls; Field Support Offices; Traffic Control; Product Substitutions and Variations; Material and Equipment Handling and Storage; Field Engineering; Project Closeout; Operation and Maintenance Data; and, System Start, Demonstration and Training shall be incorporated into all construction requirements documents (plans and specifications).	National Park Service
<b>A.4</b> Yosemite National Park Design Guidelines	A Sense of Place: Design Guidelines for Yosemite National Park shall be followed to ensure that park facilities are designed to be compatible with the existing resources.	National Park Service
<b>A.5</b> Design Approvals	All final construction documents (plans and specifications) will be approved by the Park Superintendent prior to implementation.	National Park Service
<b>A.6</b> Pre-Construction	In accordance with the National Park Service's Denver Service Center's Workflows, the standard business practices outlining the requirements for a SharePoint Project Website, Permits, Accident Prevention & Blasting Safety Plans, Division 01 Management Plans, Baseline Construction Schedule, the Schedule of Values and the Pre-Construction Conference shall be followed ( <a href="http://www.nps.gov/dscw/design.htm">www.nps.gov/dscw/design.htm</a> ).	National Park Service
<b>A.7</b> Construction	In accordance with the National Park Service's Denver Service Center's Workflows, the standard business practices outlining the requirements for Submittals, Coordination, Documentation, Tracking, Modifications, Beneficial Occupancy & Milestone Inspections, Closeout Submittals, and Substantial Completion shall be followed ( <a href="http://www.nps.gov/dscw/design.htm">www.nps.gov/dscw/design.htm</a> ).	National Park Service
<b>A.8</b> Post-Construction	In accordance with the National Park Service's Denver Service Center's Workflows, the standard business practices outlining the requirements for the Construction Contractor's Performance Evaluation, Draft Completion Reports (Fixed Assets), and Demobilizing Field Office (s) shall be followed ( <a href="http://www.nps.gov/dscw/design.htm">www.nps.gov/dscw/design.htm</a> ).	National Park Service
<b>A.9</b> Pre-Construction and Construction	Design the utility trench and directional drilling to allow subsurface flows to continue unimpeded, without creating an underground dam. Do not allow asphalt as backfill material.	National Park Service
<b>A.10</b> Construction timing	<p>The National Park Service will limit the operating period for construction to daylight hours.</p> <p>No on-site work shall be performed between the hours of 7:00 p.m. Friday and 7:00 a.m. Monday, unless approved by the Contracting Officer.</p> <p>No on-site work shall be performed between the hours of 7:00 p.m. and 7:00 a.m., unless approved by the Contracting Officer and park Wildlife Biologist; with the exception that work at the Wawona Wastewater Treatment Plant is permissible during night time hours and at the Main Lift Station. No machinery shall be operated in visitor use areas before 9:00 a.m. without prior approval of the Contracting Officer. Visitor Use Areas shall be indicated on contractor drawings.</p>	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility
<b>A.11</b> Construction Vehicles and Equipment	<p>Construction vehicles will be confined to established roadways and pull-outs, and pre-approved access roads and turn-outs, and project work areas. All construction vehicles, equipment, and materials shall be parked or stored in designated staging areas or parking areas. Yosemite National Park resources staff (natural and cultural) shall review and approve proposed staging areas prior to use for construction equipment and materials.</p> <p>Construction vehicles and passenger vehicles transporting construction personnel to work sites will observe a 25 mile per hour (mph) speed limit on all roads and access routes in the project area. No off-road travel will be permitted except for equipment and vehicles necessary to carry out the specific construction activities required in the construction footprint.</p> <p>All equipment will be maintained to avoid leaks of automotive fluids, such as fuels, solvents, or oils. Staging and storage areas for equipment, materials, fuels, lubricants, and solvents shall be located more than 100 feet from stream channel and banks. All equipment and fuel stored on-site shall be bermed to contain any spilled material and shall be protected from rain. Berms shall consist of plastic covered dirt or sand bags.</p>	Contractor
<b>B. Soils and Geohazards</b>		
<b>B.1</b> Soils Management	<p>The Contractor shall confine all earth moving activities to within the work limits as defined in the site plans. The displacement of soil or other materials outside the defined limits shall be approved by the contracting officer.</p> <p>Landscape: Land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.</p> <p>Topsoil shall be salvaged and placed in a separate location from sub-soils and replaced on top of other soils as the trench is backfilled. The location for stock piling soils and other woody materials shall be approved by the contracting officer.</p> <p>Fungal Pathogens In Soil (Root Rot): Soil infected with fungal pathogens shall not be imported into areas that are free of the pathogens. Soils at work sites for this project are assumed to be infected with fungal pathogens; the following procedures must be followed:</p> <ul style="list-style-type: none"> <li>▲ All plant material used on the project, including sources for turf, must be approved by Vegetation and Ecological Restoration to prevent the introduction of non-native invasive plants, phytophthora or other pathogens. The Contractor will; present the NPS with data, protocols, and testing procedures relating to the prevention of Phytophthora contamination for their proposed plant material (sod, seed, etc) supplier in advance of purchasing any materials by at least 30 days for approval by NPS Botanists or Restoration Ecologists.</li> <li>▲ Ensure that soil is stored within the construction zone. Should soils be stockpiled outside of the construction zone, ensure that stockpiles are placed outside of areas that do not have the fungal pathogen. Protect stockpiles of infected soil to prevent transport by wind, water, animal, or human traffic.</li> <li>▲ Clean equipment buckets and tires or hand tools used in areas containing fungal pathogens before moving to or working in unaffected areas. Sterilize saws with a 10% bleach solution or ethanol before using on the project to prevent introduction of root borne pathogens.</li> <li>▲ Whenever possible, all stumps shall be removed from excavations and disposed of in a legal manner outside of the Yosemite National Park boundary.</li> <li>▲ Stump Treatment when stumps cannot be removed: The treatments following tree removal must be universal throughout the park to avoid inadvertently spreading infection. Eradication of the disease is not possible, but its' spread can be managed.</li> <li>▲ Conifers: Treat all stumps (&gt;6 inches in diameter in recreational use areas, &gt;12 inches diameter in undeveloped areas) with Sporax within a few days of felling the tree. If a stump is ground, it still must be treated with Sporax, and then covered with soil. If the stump is removed, no chemical treatment is required. Remove all of the root material &gt;3 inches in diameter. Standing trees that have been dead for less than one year must have stumps treated with Sporax once they are removed.</li> <li>▲ Deciduous: Oaks should be left whenever possible, if the tree must be cut, the entire stump and root system must be removed from the Park.</li> <li>▲ Disturb no more than 15 percent of the roots for any given tree.</li> <li>▲ Disturb no more than 15 percent of the roots for any given tree.</li> <li>▲ Do not over-water oak trees.</li> </ul>	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility																					
<b>B.1</b> Soils Management (continued)	<ul style="list-style-type: none"> <li>▲ Do not compact soil within drip lines of the tree.</li> <li>▲ Treatment of Infected Soils: Remove root material by sifting or sorting soil before backfilling.</li> <li>▲ Treatment of soils in an annosus zone. Only infected HA areas need to be treated for removal of root material. Standard specification for roots to be removed from disturbed soil: &gt;3 inches diameter or &gt;20 inches in length. Remove ALL stumps from excavation.</li> <li>▲ Do not move soil from infected areas.</li> <li>▲ Topsoil shall be salvaged and reused in the same place from which it was excavated. If the soil is to be windrowed and used later, it should be sorted for root chunks prior to storage.</li> <li>▲ Conserve and salvage topsoil for reuse. Materials will be reused to the maximum extent possible</li> </ul> <p>All disturbed soil and fill slopes shall be stabilized in a manner consistent with other provisions of this document.</p>	Yosemite National Park; Contractor																					
<b>C. Hydrology and Water Quality</b>																							
<b>C.1</b> Stormwater Pollution Prevention Plan	<p>Contractor shall prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) that designates construction best management practices to be used to control the sources of fine sediment and to capture and filter it before entering the river. The SWPPP shall define the characteristics of the site, identify the type of construction that will be occurring, and describe the practices that will be implemented to control erosion and the release of pollutants in stormwater. At a minimum, the SWPPP shall address the following, as applicable</p> <p><b>Straw Bales</b></p> <p>Straw bales are not authorized for use in storm water control at Yosemite National Park. They have the potential to introduce exotic species into the Park environment.</p> <p><b>Diversion Dikes</b></p> <p>Diversion dikes shall have a maximum channel slope of 2 percent and shall be adequately compacted to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel shall be 18 inches. The minimum base width shall be 6 feet and the minimum top width shall be 2 feet. The Contractor shall ensure that the diversion dikes are not damaged by construction operations or traffic. Diversion dikes shall be located as shown on the drawings or as needed based on Contractor operations. Location of diversion dikes shall be fully coordinated with cultural and natural environmental protection requirements described in Section 01355, Natural, Cultural, and Physical Resources Protection.</p> <p><b>Filter Fabric</b></p> <p>The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments that are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:</p> <table border="1"> <thead> <tr> <th colspan="3">Filter Fabric for Silt Screen Fence</th></tr> <tr> <th>Physical Property</th><th>Test Procedure</th><th>Strength Requirement</th></tr> </thead> <tbody> <tr> <td>Grab Tensile</td><td>ASTM D 4632</td><td>100 lbs. min.</td></tr> <tr> <td>Elongation (%)</td><td></td><td>30 % max.</td></tr> <tr> <td>Trapezoid Tear</td><td>ASTM D 4533</td><td>55 lbs. min.</td></tr> <tr> <td>Permittivity</td><td>ASTM D 4491</td><td>0.2 sec-1</td></tr> <tr> <td>AOS (U.S. Std Sieve)</td><td>ASTM D 4751</td><td>20-100</td></tr> </tbody> </table> <p><b>Silt Fence Stakes and Posts</b></p> <p>The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches when hardwood is used and 4 inches by 4 inches when softwood is used, and shall have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 5 feet.</p>	Filter Fabric for Silt Screen Fence			Physical Property	Test Procedure	Strength Requirement	Grab Tensile	ASTM D 4632	100 lbs. min.	Elongation (%)		30 % max.	Trapezoid Tear	ASTM D 4533	55 lbs. min.	Permittivity	ASTM D 4491	0.2 sec-1	AOS (U.S. Std Sieve)	ASTM D 4751	20-100	Contractor
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Topic	Resource Protection Measures	Responsibility
<b>C.1</b> Stormwater Pollution Prevention Plan (continued)	<p><b>Identification Storage and Handling</b></p> <p>Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.</p> <p><b>Maintenance</b></p> <p>The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.</p> <p>Silt fences shall be inspected in accordance with the below paragraph, Inspections. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed with approval of COR. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade.</p> <p>Diversion dikes shall be inspected in accordance with the below paragraph, Inspections. Close attention shall be paid to the repair of damaged diversion dikes and necessary repairs shall be accomplished promptly. When diversion dikes are no longer required, they shall be shaped to an acceptable grade.</p> <p>Concrete wash areas shall be located so they do not drain directly into water bodies. If a concrete wash area drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. Concrete wash areas shall be graded, if necessary to avoid the potential for erosion.</p> <p><b>Inspections</b></p> <p>The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every 7 calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month.</p> <p>Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.</p> <p>For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the COR within 24 hours of the inspection as a part of the Contractor's daily CQC Report. A copy of the inspection report shall be maintained on the job site.</p>	Contractor
<b>C.2</b> Non-Hazardous Liquid Waste Management	<p>Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related wastewater off Government property in accordance with all Federal, State, Regional and Local laws and regulations.</p> <p>Water contaminated with silt, grout, or other construction by-product must be pumped to a holding tank. Location of the holding tank will be proposed by Contractor and approved by Contracting Officer.</p>	Contractor
<b>C.3</b> Hazardous Materials/Wastes	<p>Identify potentially hazardous substances to be used on the job site.</p> <p>Identify handling procedures to ensure that hazardous substances are not released into the air, water, or ground.</p> <p>Comply with Federal, State, and local laws and regulations for storage, handling, and disposal of these materials.</p> <p>Storage of hazardous or flammable chemicals in the staging area or elsewhere on the site is prohibited except as approved by the Contracting Officer.</p> <p>Hazardous materials shall not be discarded into the jobsite debris or waste-disposal facilities.</p> <p>Empty containers shall be removed from the site and disposed of in a manner prescribed by law.</p>	Contractor

Topic	Resource Protection Measures	Responsibility
<b>C.3</b> Hazardous Materials/Wastes (continued)	<p>Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations.</p> <p>A copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time is to be maintained on site and submitted to the Contracting Officer.</p> <p>Before new hazardous materials are brought on site or removed from the site, the MSDS file shall be updated and submitted to the Contracting Officer.</p>	Contractor
<b>C.4</b> Spill Prevention and Response Plan (SPRP)	<p>The California Regional Water Quality Control Board has issued a Cleanup and Abatement Order and Time Schedule Order to Yosemite National Park ordering that no sewage spills occur. The Contractor shall be required to follow the requirements of the Order and shall prepare a Spill Prevention and Response Plan and take appropriate spill prevention measures during all phases of the work. The California Regional Water Quality Control Board requires a minimum of 10 days to review the SPRP. All recommendations by the Board will be implemented at no additional cost to the NPS.</p> <p>The primary purpose of the SPRP is to prevent sewage spills from occurring by proper planning and protection of the project area, and then to respond to any sewage spills that may occur during the course of this project including appropriate notification of staff. The Plan will be general in nature and typical to all phases of the work with site specific plans required for each area involving trenching or any work with the possibility of accessing the existing system. The sewer lines are located throughout Yosemite Valley and in close proximity to waterways and stream channels such that spilled sewage could possibly reach the Merced River.</p> <p>The SPRP is structured in two parts – first a Spill Prevention Plan and then a Spill Response Plan. The Spill Prevention Plan (SPP) includes evaluation of specific conditions, set-up of containment for actual construction work as well as for bypass pumping. Sewer bypasses must be constructed to tie existing lines into the new system and to tie the new system into the existing system. The Spill Response Plan (SRP) includes the initial response to stop and contain a spill, notification of staff, clean-up, and follow-up documentation. The SPP and the SRP together comprise the entire SPRP. A template of a plan follows at the end of this Section. An electronic version of this template will be provided to the successful bidder.</p> <p>All Contractor employees are required to be trained in the Spill Prevention Control in accordance with this SPRP.</p>	Contractor
<b>C.5</b> Hazardous Materials Spill Prevention and Response Plan	<p>Contractor shall provide a Hazardous Materials Spill Prevention and Response Plan to address spill prevention and response measures for hazardous substances used on site, including fuels. Prior to the start of work, the Contractor shall submit a plan that complies with Yosemite National Park, Federal and State requirements and allows contractors to properly notify officials in the event of an emergency occurring during construction activities. Yosemite National Park requirements include, and the plan shall state, at a minimum:</p> <ul style="list-style-type: none"> <li>▲ During non-work operations, stationary equipment shall be parked over specially prepared containment pads designed to trap any leaking oil, fuel, or hydraulic fluids.</li> <li>▲ Inspect construction site daily for proper storage of hazardous materials, proper parking of equipment on containment pads, and for hydraulic and oil leaks of equipment, tighten hoses, and ensure they are in good condition.</li> <li>▲ Routine oiling and lubrication shall be conducted in areas with secondary containment using Best Management Practices (BMPs) at all times. Refueling of equipment in wetlands or stream channel areas is not allowed at any time.</li> <li>▲ Contractor shall maintain secondary containment for all equipment operating with fluids (such as drilling) or when direct discharge of leakage, spills, or other source of construction or equipment fluids can flow directly to any streambed, whether flowing with water or dry. Containment shall be designed and installed so as to prevent accidental spills into streambeds in the event of mechanical failure or hose breakage.</li> <li>▲ Contractor shall maintain spill response materials on the project site when using heavy equipment to ensure rapid response to small spills. These materials shall include absorbent pads, booms, or other materials as appropriate to contain oil, hydraulic fluid, solvents, and hazardous material spills. A list of the spill response materials to be kept on site shall be submitted to the Contracting Officer.</li> <li>▲ Contractor shall provide names and phone numbers of appropriate contractor's personnel to be contacted at any time (24 hours per day) regarding accidental release of hazardous substances to air, soil or water. This list shall be submitted to the Contracting Officer and a copy visibly displayed in work areas on site.</li> </ul>	Contractor



Topic	Resource Protection Measures	Responsibility
<b>C.5</b> Hazardous Materials Spill Prevention and Response Plan (continued)	<ul style="list-style-type: none"> <li>▲ Contractor shall have the Contracting Officer's and other appropriate Government emergency numbers posted and shall immediately notify the Contracting Officer or other Government representative on any accidental release of hazardous substances to air, soil or water.</li> <li>▲ Hazardous or flammable chemicals shall be prohibited from storage in the staging area, except for those substances identified in the Oil and Hazardous Materials Spill Prevention, Control, and Countermeasure Plan. Hazardous waste materials shall be immediately removed from project site in approved containers.</li> <li>▲ Comply with all applicable regulations and policies during the removal and remediation of asbestos, lead paint, and polychlorinated biphenyls.</li> <li>▲ Place drip pans under construction vehicles and all parked equipment.</li> <li>▲ Check construction equipment for leaks regularly.</li> <li>▲ Refuel vehicles and equipment no less than 100 feet from adjacent creeks, drainages, and storm drains to minimize the risk of run-on, runoff, and spills that could affect water bodies. Conduct fueling in paved and curbed areas to contain spills if this is possible; if not, refuel over drip pans or absorptive mats.</li> <li>▲ Cover all storm drain inlets when paving or applying seals or similar materials to prevent the offsite discharge of these materials.</li> <li>▲ Equipment and materials shall be stored at least 100 feet from waterways. No debris (such as trash and spoils) shall be deposited within 100 feet of creeks. Staging and storage areas for equipment, materials, fuels, lubricants, and solvents shall be located outside of the stream channel and banks.</li> </ul>	Contractor
<b>C.6</b> Establish Boundary of Riparian Buffer Zone	Prior to developing construction design documents for projects within the river corridor, the contractor shall survey the ordinary high-water mark; the determination of the high water mark will be in accordance with U.S. Army Corps of Engineers guidance. Survey(s) of the ordinary high-water mark will be used to determine the boundary of the riparian buffer. All new development shall be located outside of the riparian buffer, which encompasses the area within 150 feet of the ordinary high-water mark on both sides of the river.	Contractor
<b>D. Vegetation and Wetlands</b>		
<b>D.1</b> Protection from Exotic Plant Species	<p>The park and contractor shall undertake measures to prevent the introduction of exotic species in the project area and staging areas. All earth moving equipment must enter the Park free of dirt, dust, mud, seeds, or other potential contaminant. Equipment exhibiting any dirt or other material attached to frame, tires, wheels, or other parts shall be thoroughly cleaned by the Contractor before entering the Park. All heavy equipment shall be steam-cleaned or pressure washed to prevent importation of non-native plant species prior to entry to the project area. Wash heavy equipment prior to moving between sites or phases of the project to prevent further spread of invasive plants between sites.</p> <p>All equipment will be directed to the El Portal Maintenance Facility for inspection prior to commencing work. Areas inspected shall include, but not be limited to, tracks, track guard/housings, belly pans/under covers, buckets, rippers, and other attachments.</p> <p>Equipment that does not pass inspection will be turned around to the nearest cleaning facility outside the park. If vehicles are unable to drive to El Portal due to size or load restrictions, vehicles will be inspected at a mutually agreed site by the Contracting Officer prior to entering the Park. The Contractor shall notify the Construction manager at least two work days (not including weekends) prior to bringing any equipment into the Park. Equipment found to have entered the Park with potential contaminants will be removed from the Park at the direction of the Contracting Officer at Contractor's sole expense.</p> <p>Contractor shall minimize ground disturbance to the greatest extent possible.</p> <p>The contractor shall get approval in writing from the Contracting Officer for fill material that must be used in a way or stored in a location not clearly specified in the contract.</p> <p>Fill materials used within the top 12 inches of finished grade are required to be free of exotic and noxious weed species and shall have the source locations approved by the Contracting Officer. The Contractor shall submit to the Contracting Officer a list of proposed sources for imported fill materials requiring certification 30 calendar days in advance of importing material; materials will only be imported from NPS certified weed-free sources. The presence of noxious weed species is grounds for rejection of the source.</p> <p>If exotic weed species are found or suspected, the Contractor may be required to strip the top 12 inches of source material and only import sub-surface material and/or sterilize the material, at the Contracting Officer's discretion. The presence of the following particularly noxious weed species are grounds for rejection of the source: spotted knapweed,</p>	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility
<b>D.1</b> Protection from Exotic Plant Species (continued)	<p>yellow star-thistle, perennial pepperweed, broom species, and other species on the California State List of Noxious Weeds. If spraying is required, the Contractor shall provide a licensed operator to spray according to applicable state regulations and park management guidelines (e.g., the Invasive Species Management Plan). The Contractor shall not spray any herbicides until approved in writing by the Contracting Officer.</p> <p>Survey for invasive plants in subsequent years following construction and treat any plants found to prevent the establishment of new infestations. Treat medium and high priority invasive plants prior to and after construction to prevent spread and establishment of new populations in disturbed areas</p> <p>Drain and flush all pumps, tanks, live wells, buckets and other containers that might carry water contaminated with exotic plants and animals, such as the zebra mussel, prior to bringing equipment into the park. Thoroughly wash all hauling tanks and equipment using a hard spray from a garden hose. If equipment was used in infested waters, use the following steps to clean the equipment:</p> <ul style="list-style-type: none"> <li>▲ Wash with hot water (140 F or 40 C) or a high-pressure washer (250 pounds per square inch). Remove all aquatic weeds – they can carry zebra mussels.</li> <li>▲ Disinfect equipment. Recent research shows that disinfection of nets and equipment with benzalkonium chloride at typical treatment rates (10 milligrams per liter for 24 hours, 100 milligrams per liter for 3 hours, or 250 milligrams per liter for 15 minutes) will effectively eliminate most exotic animals. Two other commonly used disinfectants, calcium hypochlorite and iodine, are ineffective against zebra mussels.</li> <li>▲ Adult zebra mussels can live more than a week out of water in moist, shaded areas. Dry pumps, nets and other equipment used in infested waters in the sun for two to four days after cleaning. If adult mussels are present, dry equipment for two weeks.</li> </ul>	Yosemite National Park; Contractor
<b>D.2</b> Vegetation Inventory and Assessment	<p>The project will supply a NPS natural resource monitor to consult on vegetation protection periodically throughout construction.</p> <p>Plant Condition Inventory: The Contractor and the Contracting Officer or designated representative, shall perform an on-site inventory of trees and other overall vegetation features within or near to the work limits. A print of the contract drawings showing tree locations and a photo record will be used to note condition of trees and vegetation. This annotated drawing will be retained by the Contracting Officer for use during the final walk-through and tree/vegetation assessment. This walk through shall be a part of the project closeout requirements (see Section 01770, Project Closeout).</p> <p>On-site inventory shall be scheduled in coordination with the pre-construction conference.</p> <p>Avoid construction, trenching, grading, paving, and staging within the drip line of black oaks (<i>Quercus kelloggii</i>). If removal, damage or such activity cannot be avoided, contractor shall consult with the Park Botanist to develop a mitigation strategy prior to construction in addition to the measures outlined below. Access to work sites requiring travel through undeveloped areas outside the work limits must be approved by the contracting officer.</p> <p>Contractor should consult with a natural resource specialist when removal or damage of black oaks or large diameter (&gt;40-inch dbh) trees cannot be avoided. Adjust trenches and excavations to keep them beyond tree drip lines where possible. Provide temporary barriers (e.g., orange construction fence) to protect existing trees, plants and critical root zones that are designated to remain, but are: (1) within the construction limits; (2) on or just outside the construction limits; (3) within the clearing limits (i.e., the zone extending 5 feet beyond the staked construction limits); or (4) on, or just outside the clearing limit line. Barriers shall be in place before construction begins.</p> <p>Trees, shrubs, vines, grasses, and other vegetative features indicated and defined on the construction drawings to be preserved shall be clearly identified by marking, fencing, or any other approved techniques. The Contractor shall restore vegetative features damaged or destroyed during construction operations outside the limits of the approved work area.</p> <p>Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy vegetation resources including trees, shrubs, vines, grasses, topsoil, and landforms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized.</p> <p>Removal of trees will be performed by Yosemite National Park in advance of Contractor's work. Should it be determined during the course of work that additional trees or tree roots require removal, Contractor shall notify the Contracting Officer who will coordinate an inspection and determination by the appropriate authorities whether to remove the tree or not.</p> <p>After tree removal, large roots may remain in the ground. Contractor shall be responsible for carefully removing in-ground tree roots of removed trees to permit excavation, drilling, or other ground penetrating construction activities.</p>	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility
<b>D.2</b> Vegetation Inventory and Assessment (continued)	<p>During tree root removal, do not use backhoes, chains, or other equipment in a manner that will harm roots of adjacent trees.</p> <p>Minimize disturbance to tree trunks and root zones to prevent damage to trees; avoid disturbance of more than 15 percent of a tree's roots. Avoid soil compaction within drip lines of trees and do not pile soil against tree trunks.</p> <p>Maintain original soil topography</p> <p>Adjust trenches and other excavations to keep them beyond the drip line wherever possible. If trenching is proposed with the dripline, it will be done with on-site consultation of a natural resource monitor.</p> <p>Adjust the survey line, as necessary to maintain required clearances.</p> <p>Notify the Contracting Officer and consult with NPS natural resource monitor on implementing tree and root protections of any proposed trenches or other excavations within the drip line of trees.</p> <p><b>Steps to Mitigate Damage to Roots Due to Excavation:</b></p> <p>Take steps (as called for below) to mitigate damage to tree roots due to excavation, wherever the following circumstances apply:</p> <ul style="list-style-type: none"> <li>▲ Wherever excavation must take place within the drip line of oak trees regardless of diameter.</li> <li>▲ Wherever excavation must take place within the drip line of trees other than oaks, for all trees 12 inches or larger in diameter.</li> <li>▲ Trees which are anticipated to meet these criteria and therefore require steps to mitigate damage to roots due to excavation are shown on the drawings. Adjustments in trench alignment or other factors may result in variations in which trees are affected. The Contractor shall accommodate these variations at no additional expense to the Government.</li> </ul> <p><b>Following are the steps which are required to mitigate damage to roots due to excavation:</b></p> <ul style="list-style-type: none"> <li>▲ Excavate carefully where tree roots might be encountered. Where roots 2 inches and larger are encountered, hand excavate as required to prevent damage to roots. Tunnel under roots to be saved, hand excavating as necessary.</li> <li>▲ Do not cut roots over 2-inch-in-diameter without approval of Contracting Officer.</li> <li>▲ Cleanly saw-cut roots between 1-inch and 2-inch-in-diameter where they interfere with work; do not cut roots except as necessary. Roots between 1-inch and 2-inch-in-diameter which must be cut shall be cleanly saw-cut near the edge of trench closest to the tree to prevent roots from being dislodged from soil by equipment.</li> <li>▲ Avoid soil compaction within plant root zones with heavy equipment and vehicles within the project work limits.</li> <li>▲ Do not cut wheels or make sharp turns with wheeled or tracked equipment in root zones.</li> <li>▲ Do not pile excavated soil against tree trunks.</li> <li>▲ Do not mechanically compact soils in undeveloped areas except to meet minimum compaction requirements as approved by the contracting officer.</li> <li>▲ Maintain original soil topography in plant root zones whenever possible.</li> <li>▲ Preserve tree snags where feasible as potential bat or bird habitat</li> </ul>	Yosemite National Park; Contractor
<b>D.3</b> Plant Appraisal	<p>If the Contractor destroys or injures trees and vegetation designated for protection or outside the work limits, the Contractor will be assessed damages prior to final progress payment.</p> <p>Replacement costs for damaged vegetation will be computed according to the method described in the International Society of Arboriculture's 1992 Guide for Plant Appraisal. This method is based on the cost of the largest commonly available tree or shrub, with modifications based on species value, condition, and location. A trained arborist or professional plant appraiser from the California region will be hired by the NPS to make the damage appraisal. The arborist's fees will be included in the damage assessment.</p> <p>This damage appraisal process will be triggered by any of the following types of damage to vegetation outside the work limits or unauthorized disturbance of vegetation within the work limits:</p> <ul style="list-style-type: none"> <li>▲ Removal of any tree or shrub.</li> <li>▲ Pruning or removal of more than 30 percent of a tree or shrub canopy.</li> <li>▲ Removal or fracture of any limb or trunk that is one of the major structural entities of the damaged plant.</li> <li>▲ Removal or fracture of any limb greater than 12 inches in diameter.</li> </ul>	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility
<b>D.3</b> Plant Appraisal (continued)	<p>▲ Bark damage or removal around more than 30 percent of the trunk circumference.</p> <p>▲ Trenching or soil disturbance within the critical root zone that is deeper than 1-foot unless shown on the Drawings.</p> <p>▲ If the damaged vegetation is protected under the Endangered Species Act or other special legislation, additional penalties may be assessed as per consultation with the U.S. Fish &amp; Wildlife Service.</p> <p>▲ Pruning or removal of vegetation shall be supervised by Contracting Officer. The designated personnel may designate plant species for salvage. When authorized and supervised by the Contracting Officer, the Contractor is exempted from any penalties that might be assessed due to damage to vegetation.</p> <p>Acceptable disturbance to roots is limited to 15 percent of the area under the drip line being either cut or filled. Any tree with more than 50 percent of its roots disturbed should be removed during construction at the direction of the Contracting Officer.</p> <p>Wounds occurring from construction activity may be possible entry sites for disease spores. If a tree is accidentally injured during construction, it may need to be removed at the direction of the Contracting Officer.</p> <p>Trench alignments or other factors may result in variations in which trees are affected. The Contractor shall accommodate these variations at no additional expense to the Government.</p> <p>Minor cuts and damaged areas shall be assessed by the Contracting Officer. Repair to the plant will be at the recommendation of the Yosemite National Park personnel and approval of the Contracting Officer.</p>	Yosemite National Park; Contractor
<b>D.4</b> Wetlands Delineation	Delineate wetlands and apply protection measures during construction. Wetlands shall be delineated by qualified National Park Service staff or certified wetland specialists and clearly marked prior to work. Perform activities in a cautious manner to prevent damage caused by equipment, erosion, siltation, etc.	Yosemite National Park; Contractor
<b>D.5</b> Wetlands Regulation	<p>The Contractor shall adhere at all times to the conditions of U.S. Army Corps of Engineers Nationwide Permit No. 33, Temporary Construction, Access and Dewatering, with the following conditions as a minimum:</p> <p>All work will be subject to the Standard and Technical Conditions of the Certification of the California Regional Water Quality Control Board, a copy which will be provided to the Contractor.</p> <p>Work in streambeds is to be performed in periods of low water conditions. Contractor shall monitor stream flow conditions and weather forecasts at all times during the course of the work. During thunderstorms or other intense rain conditions, streambeds at Yosemite can fill rapidly.</p> <p>Re-grade and restore disturbed areas to preexisting contours to maintain drainage patterns.</p>	Contractor
<b>D.6</b> Wetlands Protection	<p>The Contractor shall fence construction areas adjacent to aquatic habitats to prohibit the movement of aquatic species into the construction area and to control siltation and disturbance in aquatic habitats.</p> <p>The Contractor shall salvage and reuse wetland soils as fill to the maximum extent possible.</p> <p>The Contractor shall use trench plugs where designated on the drawings in wetland areas to prevent changes to natural flow patterns.</p> <p>During dewatering, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent aquatic species from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction.</p> <p>Access routes to and through work locations in the meadows and wetlands shall be planked with 1 1/8" plywood, stabilization mats or other method approved by the contracting officer.</p>	Yosemite National Park, Project Manager; Contractor
<b>D.7</b> Subsequent Wetland Statements of Finding	As site-specific information becomes available at a level of detail needed to fully and accurately disclose anticipated impacts on wetland habitats, processes, functions, and values, subsequent WSOFs for all other actions will be developed.	Yosemite National Park
<b>D.8</b> Special Status Plant Species	Yosemite National Park natural resources staff will flag avoidance zones around special status plant species prior to work. If special-status plant species are identified within the construction disturbance zone, in particular within restoration and revegetation areas, avoid special-status plant populations to the extent feasible during construction activities.	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility
<b>D.8</b> Special Status Plant Species (continued)	If it is not feasible for construction activities to avoid special status plant species, species conservation measures will be developed in coordination with Yosemite National Park natural resources staff. Measures may include salvage of special-status plants for use in revegetating disturbed areas and transplantation of special-status plants wherever possible using methods and monitoring identified in the revegetation plan, monitoring to ensure successful revegetation, protection of plantings, and replacement of unsuccessful plant materials if practicable.	Yosemite National Park; Contractor
<b>E. Wildlife and Special-Status Species</b>		
<b>E.1</b> General Fish and Wildlife Protection	<p>The Contractor and Contractor's employees shall not feed any animals within Yosemite National Park.</p> <p>Contractor shall schedule construction activities with seasonal consideration of wildlife lifecycles (see below sections) to minimize impacts during sensitive periods (i.e., after bird nesting seasons, when bats are neither hibernating nor have young, etc.); limit the effects of light and noise on adjacent habitat through controls on construction equipment; and provide adequate education and enforcement to limit construction worker activities that are destructive to wildlife and habitats.</p> <p>Tree removal shall occur between August 15 and October 31 if at all feasible. If this is infeasible, consult with the Terrestrial Ecologist.</p> <p>Night-time work only permitted to occur at the Wawona Wastewater Treatment Plant, with the exception of bypass-pumps which may need to operate at all hours.</p> <p>To avoid impacting reptile and amphibian species, only tightly woven netting or similar material (such as natural fiber rolls and geotextiles) or durable/reusable materials (such as Animex or Ertec fencing) will be used for erosion control. No plastic monofilament netting will be used.</p> <p><b>Special Status Species:</b></p> <p>The Contractor shall make all reasonable efforts in accordance with the plans and specifications for the protection of threatened or endangered or candidate species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.</p> <p>If a special status species is encountered within work areas, work crews will stop all activities in the surrounding area with the potential to harass, injure, or cause death of the individual, and contact the Branch Chief of Wildlife or the park Aquatic or Terrestrial Ecologist to select a course of action that will avoid adverse effects to the individual</p> <p>If deemed appropriate by the Park Aquatic or Terrestrial Ecologist, an NPS biologist will conduct a once-a-month survey throughout the active season for special-status species</p> <p><b>Contractor Training:</b></p> <p>The NPS will brief the contractor regarding wildlife concerns at project initiation and periodically throughout the project to avoid activities that are destructive to wildlife and habitats</p> <p>Before the onset of construction activities, a NPS and USFWS-approved biologist will conduct an education program for construction personnel. At a minimum, the training program will include a description of California red-legged frog, western pond turtle, great gray owl, willow flycatcher, all other species listed in Table 3.2-2 of this EA, and their habitats; the potential occurrence of these species within the action area; an explanation of the status of the species and protection under the federal ESA, CESA, and the NPS Management Policies (NPS 2006); the measures to be implemented to conserve these species and their habitats as they relate to the work site; and the boundaries within which construction may occur.</p> <p><b>Excavated Pits:</b></p> <p>Contractor shall maintain routes of escape from excavated pits and trenches for animals that might fall in. During construction activities, Contractor personnel shall maintain vigilance for animals caught in excavations and take appropriate action to free them.</p> <p>Excavation pits shall have a ramp or incline at either end to allow for human and wildlife escape.</p> <p>Each morning prior to commencing work activities, Contractor shall inspect the site for trapped wildlife in excavation pits and carefully remove the animal, except for California red-legged frog (CRLF), which shall not be captured or handled. If the animal cannot be easily or safely removed, contact NPS wildlife staff immediately at (209)372-0322.</p>	Yosemite National Park; Contractor



Topic	Resource Protection Measures	Responsibility
<b>E.2</b> Bear Precautions, Human-Wildlife Conflict	<p>Bears may be present at any location within the Yosemite National Park boundaries, including at the project site. The Contractor shall incorporate the following precautions in all activities within the Yosemite National Park boundary.</p> <p>All food, toiletries, and scented items (i.e., bug spray) shall be placed in bear-proof food lockers (also known as, “bear boxes”) at the construction site provided by the Contractor. Bear-proof food lockers must remain closed and latched at all times, unless items are being retrieved. No food, toiletries, or scented items shall be stored in vehicles or left out.</p> <p>All food waste and food-related waste shall be disposed of in accordance with Non-Hazardous Solid Wastes requirements described elsewhere within this section.</p> <p>All windows and doors in recreational vehicles or trailers used for lodging or office space shall be closed and latched when not occupied.</p> <p>All vehicles shall be checked daily to ensure that no items that may attract bears remain inside an unattended vehicle. Items that shall not be left in vehicles include canned food, drinks, soap, cosmetics, toiletries, domestic trash, recyclable food containers, ice chests, grocery bags, and unwashed items used for preparing or eating meals.</p> <p>The Contractor shall walk the job site at the end of each day and check for trash, food, and food-related items remaining at the site and dispose of the items in a bear-proof receptacle.</p> <p>Proper food storage is important to the welfare of the Yosemite bear population and is required by law. The Contractor shall receive and all Contractor personnel shall read a brochure entitled, The Bears are not to Blame, provided by NPS staff as a courtesy. Contractor staff shall call the Save-a-Bear hotline (209) 372-0322 to report overflowing trash containers, improperly stored food, or bear sightings.</p>	Contractor
<b>E.3</b> Bat Protection Guidelines	<p>A qualified bat biologist will conduct surveys prior to construction to evaluate whether habitat that will be affected by the proposed action provide hibernacula or nursery colony roosting habitat for bat species.</p> <p>If bats are detected during reproduction May 15 to August 15 or hibernation periods: October 31 to April 15, disturbance of potential habitat will be delayed until the bats can be excluded from the area in a manner that does not adversely affect their survival or that of their young.</p> <p>If surveys conducted immediately prior to construction do not reveal any bat species present within the project area, then the action will begin within three days to prevent the destruction of any bats that could move into the area after the survey.</p> <p>Within 30-days prior to initiating ground disturbance (e.g., grading, trenching, excavation) or vegetation removal, a qualified bat biologist shall conduct surveys to evaluate whether habitat that will be affected by the proposed construction activity provides hibernacula or maternity roost habitat for bats. Generally, the survey area shall include the project area plus a 50-foot buffer. Surveys shall be conducted in the fall to determine if roost sites are used as hibernacula and in spring and/or summer to determine if they are used as maternity or day roosts. Surveys shall consist of evening emergence surveys to note the presence or absence of bats and could consist of visual surveys at the time of emergence. If evidence of bat use is observed, the number and species of bats using the roost shall be determined. Bat detectors may be used to supplement survey efforts, but are not required. If no bat roosts are found, then no further study is required.</p> <p>Tree removal shall occur between August 15 to October 31 if at all feasible. If this is not infeasible, consult with the park Terrestrial Ecologist. The park Terrestrial Ecologist will conduct bat surveys before any tree removal occurs during this sensitive time period involving roosting/hibernating. If the park Terrestrial Ecologist deems tree removal acceptable, then the ecologist might recommend actions to reduce bat mortality that may include, but not be limited to:</p> <p>Limb trees the day before felling them (or make some other loud noises).</p> <p>Limb and fell trees later in the day when temperatures are above 55 degrees Fahrenheit and the weather forecast for the night is clear. This will allow bats that are not hibernating or that are not in a maternity roost to depart that night and find another roost.</p> <p>If snags can remain in the project site, top snags to ~20 ft. so they can still serve as a bat roost sites.</p>	Yosemite National Park; Contractor
<b>E.4</b> Bird and Bird Habitat Protection Guidelines	<p>Beginning in early spring, a park Terrestrial Ecologist will conduct bird surveys and review current owl reports to determine whether special status species are present and may be mating, nesting, or foraging in the project vicinity. If nesting birds are observed (e.g., discovered by workers) that are not special status species, the project manager will notify the park Terrestrial Ecologist who will recommend steps to avoid undesirable impacts to the nest or young.</p> <p><b>Great Gray Owls, California Spotted Owl, and other Raptors:</b></p> <p>No construction work shall occur at dawn, dusk, or night-time hours, except at the Wastewater Treatment Plant and the Main Lift Station (where night-time work is permissible)</p>	Yosemite National Park, Project Manager

Topic	Resource Protection Measures	Responsibility
<b>E4</b> Bird and Bird Habitat Protection Guidelines (continued)	<p>Construction or staging activities within 0.25 miles of Wawona Meadow that could disrupt great gray owl nesting shall be implemented outside of the great gray owl nesting season (March 1 to July 31); if this is for some reason unavoidable the park Terrestrial Ecologist will be contacted for consultation well ahead of work commencing.</p> <p>All construction fencing along or adjacent to any roadway shall be outfitted with spikes or other devices that prevent large or raptorial birds from using the structure as a perch.</p> <p>If by-pass pumping is required during night-time hours in the vicinity of the Wawona Golf Course or the Main Central Lift Station, it will be staged if to occur between August 1 and February 28. If by-pass pumping must occur between March 1 and July 31, then the planned duration of operation will be minimized and pumps that minimize noise will be selected; plans for the duration of operation and selection of noise-minimizing pumps will be subject to the approval of the park Terrestrial Ecologist at least 30 days before planned operation.</p> <p>Night-time lighting at the Main Central lift station and Wawona Golf course will remain un-changed from pre-construction conditions.</p> <p><b>Other Birds:</b></p> <p>For any project activity that would occur during the songbird nesting season (May 15–June 30), the park Terrestrial Ecologist shall conduct preconstruction nesting bird surveys. The preconstruction surveys shall be conducted before any activity occurring within 500 feet of suitable nesting habitat for any special-status bird species. Nesting surveys shall be timed to maximize the potential to detect special-status nesting birds, and should be repeated within 10 days of the start of project-related activity.</p> <p>If an active bird nest is found during preconstruction surveys, an appropriate no-disturbance buffer shall be determined by the park Terrestrial Ecologist based on site-specific conditions, the species of nesting bird, nature of the project activity, noise level of the project activity, visibility of the disturbance from the nest site, and other relevant circumstances.</p> <p>Monitoring of active nests by the park Terrestrial Ecologist during construction activities will be required if the activity has potential to adversely affect the nest. If construction activities cause the nesting bird to vocalize, make defensive flights at intruders, get up from a brooding position, or fly off the nest, then the no-disturbance buffer shall be increased until the agitated behavior ceases. The exclusionary buffer will remain in place until the chicks have fledged or as otherwise determined by the park Terrestrial Ecologist.</p>	Yosemite National Park, Project Manager
<b>E5.</b> General Aquatic Species Protection	<p>The contractor shall fence construction areas adjacent to aquatic habitats to prohibit movement of aquatic species into the construction area and to control siltation and disturbance in aquatic habitats at the discretion of the Aquatic Ecologist.</p> <p>If dewatering becomes necessary, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent aquatic species from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction.</p> <p>If project construction will occur within 500 feet of favorable aquatic habitat during the Western Pond turtle's (<i>Emys marmorata</i>) nesting season (June to August), the NPS biologist shall conduct preconstruction surveys for Western pond turtle, including surveys for nesting habitat and preferred aquatic habitats, and recommend exclusion fencing where applicable.</p>	Contractor
<b>E6.</b> California Red- legged Frog Protection	<p>Preconstruction surveys and surveys during construction activity:</p> <p>Preconstruction surveys for California red-legged frog (<i>Rana draytonii</i>) will occur in suitable habitat (standing water, and low gradient streams &lt;4%), both using eDNA and visual encounter survey (day and night) methods.</p> <p>If deemed appropriate by the Park Aquatic Ecologist, an NPS biologist will conduct a once-a-month survey throughout the active season for California red-legged frogs.</p> <p>Contractor will encourage employees to drive slowly on rainy, warm nights (nights where California red-legged frog dispersal is likely).</p> <p>If a California Red-legged Frog is encountered in the project area, all activity in the surrounding area shall stop and the frog shall be allowed to move out of the project area on its own volition. Prior to commencing project activities, the NPS will contact the Fish and Wildlife Service to reinstate consultation. Under no circumstance shall Contractor personnel nor NPS staff capture, handle, or relocate the frog.</p>	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility
<b>E7. Fisher Protection</b>	<p>In construction or staging zones, conduct remote camera surveys targeting fishers (<i>Pekania pennati</i>) to inform proper mitigation actions that would reduce impacts to wildlife as directed by the park Terrestrial Ecologist.</p> <p>Culverts shall not be blocked during construction activities, as they are important for Fisher dispersal and movement through the area.</p> <p>Park biologists will survey the area and designate a buffer around essential habitat elements (e.g., downed logs, hollow trees, etc.) or sign of fisher, and may conduct more intensive surveys if appropriate to determine the presence or absence of active dens or place protective barriers around areas adjacent to the project area that requires special attention as identified by the park, such as sensitive wildlife habitats.</p> <p>The park forester, fire management, and design contractor will consult with the park Terrestrial Ecologist to retain key habitat features for fisher including overhead cover, large diameter snags, large diameter down logs, large diameter live conifer and oak trees with decadence such as broken tops or cavities, root masses, live branches, and multi-layered vegetation.</p> <p>No night work shall occur on project elements on Wawona Road (Highway 41), at the South Fork Picnic Area (Texas Flat), the Golf Course, or the Wawona Campground vicinities.</p> <p>Project activities and staging shall not occur during the sensitive period of March 17 to June 24 (sensitive denning and mating periods) in sensitive habitats designated as avoidance areas as directed by the park Terrestrial Ecologist.</p> <p>Adaptively manage for fishers through continued targeted surveys during key time periods during construction as directed by the park Terrestrial Ecologist. This will include camera monitoring for fisher in sensitive habitat locations as designated by the park Terrestrial Ecologist.</p>	Yosemite National Park; Contractor
<b>F. Lightscales</b>		
<b>F.1</b> Yosemite Lighting Guidelines	All new sources of lighting, or substantial modifications to structures with existing sources of exterior lighting, shall conform to the standards set forth in the Yosemite Lighting Guidelines, available on the park's website at: <a href="http://www.nps.gov/yose/naturescience/dark-night-sky.htm">http://www.nps.gov/yose/naturescience/dark-night-sky.htm</a> .	Yosemite National Park; Contractor
<b>F.2</b> Yosemite National Park Lighting Guidelines	Yosemite National Park Lighting Guidelines shall be followed to ensure that all exterior lighting in the park is designed to mitigate light pollution and to preserve the natural darkness as much as possible.	National Park Service
<b>G. Soundscapes</b>		
<b>G.1</b> Construction Work Plan and Noise	<p>Contractor shall submit to the park for review and approval prior to commencement of construction a construction work plan/schedule that specifies the ways in which the contractor will minimize construction-related noise in noise-sensitive areas. At a minimum, the plan shall state the following:</p> <ul style="list-style-type: none"> <li>▲ Ensure that all construction equipment has functional exhaust muffler systems.</li> <li>▲ Use hydraulically or electrically powered construction equipment, when feasible.</li> <li>▲ Locate stationary noise sources as far from sensitive receptors as possible.</li> <li>▲ Limit the idling of motors except as necessary (e.g., concrete mixing trucks).</li> <li>▲ A construction schedule that minimizes impacts to adjacent noise-sensitive activities.</li> <li>▲ Engine braking ("jake" brakes) shall not be used in lodging, camping or residential areas. Engine brakes that are used shall be muffled.</li> <li>▲ Continuous noise abatement is required to prevent disturbance and nuisance to Park visitors and workers and to the occupants of adjacent premises and surrounding areas.</li> <li>▲ If the Contracting Officer determines excessive noise is emanating from the construction site, the Contractor may be required to provide sound barriers to deflect noise transmission from visitor areas or other areas impacted by noise.</li> <li>▲ Ensure that noise barriers, if needed are not located in sensitive habitats.</li> <li>▲ Construction noise shall be minimized through use of best available noise control techniques wherever feasible. Sound levels must be kept to a minimum at all times. Equipment and machinery shall not exceed 85 db when measured at 100 linear feet distance. Contractor shall use sound attenuated compressors and generators that comply with the most recent California Department of Transportation standards.</li> </ul>	Contractor

Topic	Resource Protection Measures	Responsibility																																																
G.2 Noise Management	Contractor shall ensure that all construction equipment and practices adhere to the following noise limitations: ▲ Repetitive and/or intermittent, high-level noise: Permitted only during Daytime. Do not exceed the following dB(A) limitations at 50 feet:	Contractor																																																
	<table><tr><th>Sound Level in dB(A)</th><th>Time Duration of Impact Noise</th></tr><tr><td>70</td><td>More than 12 minutes in any hour</td></tr><tr><td>80</td><td>More than 3 minutes in any hour</td></tr></table>		Sound Level in dB(A)	Time Duration of Impact Noise	70	More than 12 minutes in any hour	80	More than 3 minutes in any hour																																										
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Ambient Noise: Maximum noise levels (dB) for receiving noise area at property line shall be as follows: Residential receiving area                      Daytime:     65 dB 																																																		

Topic	Resource Protection Measures	Responsibility
<b>H.1</b> Dust Abatement Program (continued)	<ul style="list-style-type: none"> <li>▲ re-vegetate disturbed areas post construction;</li> <li>▲ at construction zone access points, prevent paved areas from accumulating mud, soils, and other organic materials.</li> </ul>	Yosemite National Park; Contractor
<b>H.2</b> Equipment Exhaust Controls	<p>The Yosemite National Park and/or a contractor (as appropriate) shall prepare, implement, and comply with equipment exhaust controls program during construction. Measures include, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>▲ idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes. Clear signage shall be provided for construction workers at all access points;</li> <li>▲ require that all construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NO<sub>x</sub> and PM;</li> <li>▲ require all contractors use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines;</li> <li>▲ require all equipment operations to occur during daytime hours to minimize effects of local inversions;</li> <li>▲ equipment operations shall be in accordance with all Federal and State air emission and performance laws and standards; and</li> <li>▲ vehicles or equipment with excessive emissions or discharging black smoke will be removed from operation immediately and may not be used until appropriate maintenance and repairs have corrected the emissions problem.</li> </ul>	Yosemite National Park; Contractor
<b>I. Visitor Experience</b>		
<b>I.1</b> Non-Hazardous Solid Waste Management Measures	<p>Waste, trash, and debris shall be controlled at all times and disposed in authorized containers in the Contractor's staging area.</p> <p>All sanitary waste (garbage) must be disposed of in approved, bear-proof disposal bins. Provide lockable, bear-proof dumpsters with lids for waste (garbage) storage. Lids shall be equipped with carabineers/heavy wire lid locks. Verify that dumpster lids are secure at close of work each day.</p> <p>Construction debris (rubbish) may be stored in unlidded dumpsters or construction debris truck/trailers and removed on a regular basis. Do not mingle sanitary or green waste with construction debris.</p> <p>All large, normally open top, waste bins or dumpsters shall be lidded and clearly marked "No Food or Trash".</p> <p>All construction personnel shall adhere to park regulations concerning food storage and refuse management.</p> <p>The Contractor shall designate an employee to police the work site daily for waste, wrappers, food packaging and the like. All waste shall be picked up and disposed of in lidded bear-proof dumpsters.</p> <p>Green waste shall be segregated from other non-green waste for processing at disposal site.</p> <p>Burying or burning of trash and debris on-site is not permitted. All un-used materials, trash, and debris shall be the property of the Contractor and shall be transported outside of the Yosemite National Park boundary for disposal in accordance with law.</p> <p>Remove debris from permanently closed spaces prior to enclosing them.</p> <p>Properly secure trash during the workday and remove all trash from site at the end of each workday</p>	Yosemite National Park; Contractor
<b>I.2</b> Scenic Resource Protection	<p>Fence construction staging areas and construction activity areas to visually screen construction activity and materials.</p> <p>Consolidate construction equipment and materials to the staging areas at the end of each work day to limit the visual intrusion of construction equipment during nonwork hours.</p>	Yosemite National Park; Contractor
<b>I.3</b> Campsite Closures	<p>Any work requiring the closure of a camping areas should be scheduled, if at all feasible, out of the normal season of operation for that facility. If work must occur during the normal season of operation at the campground, the park campground manager will be informed of the closure at least 6 months ahead of the first date of planned closure period. Construction activities in camping areas will be planned to minimize campground or campsite closure periods. Wawona Campground Loop A is generally open year-round; Loops B and C are generally operational from April to September.</p>	Contractor

Topic	Resource Protection Measures	Responsibility
<b>J. Transportation</b>		
<b>J.1</b> Traffic Control Plan	<p>Contractor shall prepare a Traffic Control Plan. This plan shall include but not be limited to the following:</p> <ul style="list-style-type: none"> <li>▲ Maps showing how any detour routes will be signed and controlled.</li> <li>▲ Submission of specific street closure and detour plans for each segment of the project no less than 3 weeks prior to beginning construction on any segment.</li> <li>▲ Description of how Contractor shall provide for the protection of pedestrians and bicyclists, and safe vehicle passage through the use of signs and flag-persons. In addition, address how access for emergency vehicles, chain-up areas and snow plow turn around areas, police, rangers, fire and disaster units shall be maintained at all times.</li> <li>▲ Show how any detour routes will be signed and controlled. Furnish and install all signs. Provide flag-persons as required.</li> <li>▲ Revise and update the Traffic Control Plan to reflect changes in the project schedule or sequence of work, as required.</li> <li>▲ Show measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud and dust transported onto paved public roads by vehicles or runoff.</li> <li>▲ Revise and update specific Traffic Control Plan to reflect changes in the project schedule as required, or to accommodate the traffic control plans of other projects concurrently under construction in the project vicinity or the Yosemite Valley.</li> <li>▲ The Yosemite National Park Project Manager will provide temporary traffic routing and control information from other on-going or planned projects that may affect the Contractor's Traffic Control Plan. The Contractor shall accommodate the information from these other traffic control plans as necessary and bring any conflicts to the attention of the COR immediately.</li> <li>▲ Show measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud and dust transported onto paved public roads by vehicles or runoff.</li> <li>▲ Revise and update specific Traffic Control Plan to reflect changes in the project schedule as required, or to accommodate the traffic control plans of other projects concurrently under construction in the project vicinity or the Yosemite Valley.</li> <li>▲ The Yosemite National Park Project Manager will provide temporary traffic routing and control information from other on-going or planned projects that may affect the Contractor's Traffic Control Plan. The Contractor shall accommodate the information from these other traffic control plans as necessary and bring any conflicts to the attention of the COR immediately.</li> </ul>	Contractor
<b>J.2</b> Road Closure Traffic Control and Detour Plans contents	<p>Prepare and submit specific Road Closure Traffic Control and Detour Plans for each area of the project not less than 3 weeks before beginning construction on any segment. Provide for the following:</p> <ul style="list-style-type: none"> <li>▲ Temporary closure of both lanes of traffic (subject to the requirements listed herein) shall be limited to periods of 20 minutes maximum. Requests for additional closure periods shall be submitted in writing to the Contracting Officer a minimum of 7 days prior to any planned road closures.</li> <li>▲ Single lane traffic diversions shall comply with the detail in "Traffic Control System for Two Lane Conventional State Highways" in California Department of Transportation Standard Specifications, Section 02201, Paragraph 1.1 D.</li> </ul>	Contractor
<b>J.3</b> Traffic Control Devices	<p>Traffic control devices shall be provided in sufficient quantities and types as required to provide safe and adequate traffic control.</p> <p>During hours of darkness, approved lights and/or flares shall be included, in proper working order, to illuminate signs and hazards and alert approaching traffic.</p> <p>Barricades shall be furnished and maintained along all open trenches in contact with traffic.</p> <p>No work may begin on any day or at any time before traffic control devices have been placed, test driven and, if required, adjusted and revised.</p> <p>All traffic control devices shall be placed in accordance with the Manual of Traffic Controls and favorably reviewed Traffic Control Plan.</p> <p>Locations of devices shall be adjusted to suit the conditions and circumstances of each detour situation. In all cases, signs shall be placed to most effectively convey their messages to approaching traffic.</p>	Contractor



Topic	Resource Protection Measures	Responsibility
<b>J.3</b> Traffic Control Devices (continued)	<p>Immediately after traffic control devices have been placed, the detour shall be test driven by the COR and Contractor's representative.</p> <p>Test drive shall include approach to the detour from each possible direction and traversing full length of each detour route.</p> <p>The Contractor shall adjust and revise all traffic control devices as determined to be required by test drive through and shall repeat test drive if determined necessary by the COR.</p> <p>The Contractor shall provide additional traffic control devices if required to maintain flow of traffic through construction operation.</p> <p>The Contractor shall maintain all traffic control devices, at proper locations and in proper working order, at all times during construction operations and whenever a hazard resulting from Contractor's operations exists.</p> <p>The Contractor shall adjust and revise traffic control devices, placement, etc., to suit changing conditions around construction operations.</p> <p>Traffic control devices shall remain in place at all times required to alert approaching traffic of upcoming hazards.</p> <p>After hazard has been removed, all traffic control devices shall be removed. Signs shall be removed or their messages covered.</p> <p>The Contractor shall maintain all traffic control devices, at proper locations and in proper working order, at all times during construction operations and whenever a hazard resulting from Contractor's operations exists.</p> <p>The Contractor shall adjust and revise traffic control devices, placement, etc., to suit changing conditions around construction operations.</p> <p>Traffic control devices shall remain in place at all times required to alert approaching traffic of upcoming hazards.</p> <p>After hazard has been removed, all traffic control devices shall be removed. Signs shall be removed or their messages covered.</p>	Contractor
<b>J.4</b> Traffic Control Flaggers	<p>The Contractor shall employ flaggers:</p> <ul style="list-style-type: none"> <li>▲ As required for each specific detour.</li> <li>▲ At all locations on a construction site where barricades and warning signs cannot control the moving traffic.</li> <li>▲ Where flaggers are required, they shall be logically placed in relation to the equipment or operation so as to give adequate warning and shall be placed approximately 100 feet ahead of impact point.</li> <li>▲ A warning sign shall be placed ahead of the flagger reading: "Flagger Ahead." The distance between the sign and the flagger should be based on the average traffic speed, allowing approximately 50 feet for each 10 miles per hour.</li> <li>▲ During hours of darkness, flagger stations shall be illuminated such that the flagger will be clearly visible to approaching traffic. Lights for illuminating the flagger station shall receive favorable review by the COR.</li> <li>▲ The flagger shall be provided with and wear a red or orange warning garment when flagging. Flaggers shall be provided with approved hand signs and two-way radios for communication.</li> <li>▲ When flagging during hours of darkness, the flagger shall signal with a red light or flare and shall have a belt and suspender harness outside his garment fitted with reflectors or made from reflectorized cloth, unless the garment is well reflectorized in one of these ways.</li> </ul>	Contractor
<b>J.5</b> Traffic Control and Maintenance	<p>Traffic control and construction operations shall conform to the requirements of California Department of Transportation Standard Specifications, Section 12, except as modified herein.</p> <p>The Contractor shall provide, install, and maintain all necessary signs, lights, flares, barricades, markers, cones, flagmen, and other protective facilities and shall take all necessary precautions for the protection and for the convenience and safety of Park employees, public traffic, and Yosemite Concession Service operations. All such protective facilities and precautions to be taken shall conform to the U. S. Department of Transportation, Federal Highway Administration Manual on Uniform Traffic Control Devices for Streets and Highways, Part VI-Traffic Control for Highway Construction and Maintenance Operations, latest edition, and as amended.</p> <p>Provide for the protection of pedestrians, bicyclists, and equestrians at all times. Provide adequate, safe, non-skid bridging material over trenches, including shoring when trenching in pavement areas to handle all types of vehicular traffic.</p> <p>Whenever the Contractor's operations create a hazardous condition, the Contractor shall furnish flagpersons and guards as necessary to give adequate warning of any dangerous conditions to be encountered, and shall furnish,</p>	Contractor

Topic	Resource Protection Measures	Responsibility
<b>J.5</b> Traffic Control and Maintenance (continued)	<p>erect, and maintain such fences, barricades, lights, signs, and other devices as necessary to prevent accidents and avoid damage or injury to persons. Employ flagpersons to direct traffic as required to ensure safe vehicular travel. While on duty, flagpersons and guards shall be equipped with orange safety wearing apparel and a paddle-type signal, which shall be clean and in good repair.</p> <p>Provide two-way programmable radios to flagpersons if they are not in sight of each other at all times, or if necessary to ensure safe passage of vehicles.</p> <p>Provide, install, and maintain all signs, barricades, posts, guards and notices whenever a road or trail must be completely closed. Note that if posts are installed in ground, Contractor must contact USA-Dig and Archaeological Monitor for clearance to avoid culturally-sensitive areas. Remove or cover signs in conflict with traffic control requirements.</p> <p>Provide for passage and access of emergency vehicles, police, rangers, fire and disaster units at all times. Contractor assumes any and all liability for any damages resulting from failure to provide said access.</p> <p>Replace permanent pavement markings and traffic signs upon completion of each phase of work.</p> <p>At the end of each day's work or as soon as the work is completed remove all traffic control devices no longer needed to permit free and safe passage of traffic. Removal shall be in reverse order of installation. The traveled way shall not be obstructed with material, bedding, trench soil, nor with barricades or excavations. Excavations shall be backfilled, covered with steel traffic plate covers, or otherwise suitably protected so that traffic can pass unobstructed, as required, at night or over weekends and holidays. Temporary road repairs shall include road base and cold mix as specified to maintain a smooth, hard surface. The Contractor shall provide weekend and holiday road maintenance and repairs as necessary.</p> <p>All roads shall be kept open for public travel at all times unless specific written permission to close or restrict the use of a particular road is given by the COR. The Contractor is responsible for snow and ice control within the project limits utilizing NPS approved methods. Permission shall be granted upon approval of the specific Street Closure Traffic Control and Detour Plan for the intended closure. In the event that closing of a particular road is approved, it shall be the responsibility of the Contractor to notify the COR to reconfirm the hours and dates of the street closure and routes of detours at least 7 calendar days in advance of their occurrence, and again to notify the COR when the travel restriction is discontinued.</p> <p>No materials or equipment shall be stored where it will interfere with the free and safe passage of public traffic, and at the end of each day's work and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from that portion of the roadway to be opened for use by public traffic. No material or other obstructions shall be placed within 20 feet of fire hydrants, which shall at all times be readily accessible to the fire department, nor within 10 feet of United States mailboxes. Off-loading of materials at staging area shall be coordinated with the Contracting Officer as necessary</p> <p>Traffic delays due to Contractor's activities and associated traffic control shall not exceed 20 minutes, unless prior written approval has been received from the Contracting Officer.</p> <p>Alternative access for Park visitors to all major features and facilities in the Park shall be maintained using the existing road system.</p> <p>Full access shall be provided year-round to the public for all operating Park facilities (hotels, campgrounds, bike paths, trails, stores, restaurants, museums, restrooms, etc.), unless the project includes closing, rehabilitating or reconstructing those facilities, except trail closures for equipment and material transfer or transport described in Section 01110, Summary of Work.</p>	Contractor
<b>K. Cultural Resources</b>		
<b>K.1</b> Evaluation of Revetment Removal Sites	<p>Prior to any ground disturbing activities associated with construction, further analysis and possible documentation at each site would be required in order to assess potential adverse effects to historic resources.</p>	Yosemite National Park; Contractor
<b>K.2</b> Evaluation of Revetment Removal Sites	<p>As per Section 106 of the NHPA, prior to construction or demolition activities, the Park shall survey the project area for potential impacts to historic buildings, structures, and districts within the project area of potential effect (APE). This will include a review of existing known historic resources for their continued integrity and eligibility for listing in the National Register, identification of currently unknown historic properties within the APE, determination of potential adverse effects and resolution of those effects in compliance with 36 CFR Part 800 – Protection of Historic Properties. Every effort shall be made to avoid adverse impacts. These efforts may include screening and/or sensitive design that would be compatible with cultural landscape resources.</p>	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility
<b>K.3</b> Submittals	<p>Historic Properties Treatment Program: The contractor shall submit a written plan for each phase or process including protection of surrounding materials during operations. Contractor shall describe in detail materials, methods, and equipment to be used for each phase of work and in each area.</p> <p>If alternative methods and materials to those indicated are proposed for any phase of work, contractor shall provide a written description including evidence of successful use on other, comparable projects, and program of testing to demonstrate effectiveness for use on this Project.</p> <p>The contractor shall document, through videotape or photograph and submit to the Contracting Officer prior to commencement of work, existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by historic treatment operations.</p>	Yosemite National Park; Contractor
<b>K.4</b> Removed and Salvaged Historic Materials:	<p>Contractor shall handle removed and salvaged historic materials in accordance with the following:</p> <ul style="list-style-type: none"> <li>▲ Clean salvaged historic items.</li> <li>▲ Pack or crate items after cleaning. Identify contents of containers.</li> <li>▲ Store items in a secure area until delivery to the NPS.</li> <li>▲ Transport items to storage area approved by Contracting Officer.</li> <li>▲ Protect items from damage during transport and storage.</li> <li>▲ Do not dispose of items removed from existing construction without prior written consent of Contracting Officer.</li> </ul>	Yosemite National Park; Contractor
<b>K.5</b> Existing Historic Materials to Remain	<p>The contractor shall protect against damage and soiling of retrieved cultural artifacts or features during construction. When permitted by Contracting Officer, and in coordination with Park's cultural resources staff, items may be removed to a suitable, protected storage location during project.</p>	Yosemite National Park; Contractor
<b>K.6</b> General Historic Resource Protection	<p>Contractor shall undertake the following historic resource protection measures:</p> <ul style="list-style-type: none"> <li>▲ Ensure that construction supervisors and crews view the Yosemite video "Working in Yosemite" (<a href="https://www.youtube.com/watch?v=CuRn-tZ8SL4&amp;feature=youtu.be">https://www.youtube.com/watch?v=CuRn-tZ8SL4&amp;feature=youtu.be</a>), to familiarize crews with the importance of resource protection responsibilities while working within the park.</li> <li>▲ Ensure that supervisory personnel are present when work begins and during its progress.</li> <li>▲ If specific construction areas/phases will be subject to archeological and/or tribal monitoring, contractor will notify Contracting Officer at least 7 days in advance of work to schedule on-site monitoring.</li> <li>▲ Protect existing materials during installation of temporary protections and construction. Not deface or remove existing materials.</li> <li>▲ Obtain Contracting Officer approval prior to Attaching temporary protection to existing construction.</li> <li>▲ Protect landscape work adjacent to or within work areas as follows: <ul style="list-style-type: none"> <li>▲ Provide barriers to protect tree trunks.</li> <li>▲ Bind spreading shrubs.</li> </ul> </li> <li>▲ Use coverings that allow plants to breathe and remove coverings at the end of each day. Do not cover plant material with a waterproof membrane for more than 8 hours at a time.</li> <li>▲ Set scaffolding and ladder legs away from plants.</li> <li>▲ Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly.</li> <li>▲ Notify Contracting Officer immediately of drains or systems that are stopped or blocked. Not begin Work of this Section until the drains are in working order.</li> <li>▲ Provide a method to prevent solids including stone or mortar residue from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of work performed on corresponding project.</li> <li>▲ Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.</li> </ul>	Yosemite National Park; Contractor

Topic	Resource Protection Measures	Responsibility
<b>K.7</b> Plan-Specific Programmatic Agreements	Following agreement on the assessment of adverse effect to historic properties, the NPS and relevant consulting parties have engaged in consultation to develop measures to minimize or mitigate adverse effects pursuant to 36 CFR Part 800.6. Where appropriate, the results of that consultation have been documented in the plan-specific Programmatic Agreement. This agreement may include treatments established by the ACHP under 36 CFR Part 800.14(d) and may also defer to or build upon the 2008 Nationwide PA that streamlines the Section 106 process for actions not affecting or not adversely affecting historic properties. This agreement also diagrams the NHPA review process for actions requiring phased identification and/or phased assessment of adverse effects. Additional minimization and mitigation measures will be developed through this tiered compliance process.	Yosemite National Park
<b>K.8</b> Protection of Properties with Religious and Cultural Value	A government provided botanist, and as necessary, a Native American Monitor, will identify traditionally used plants in the project area. The botanist and Native American Monitor will work with the Contractor to establish fencing to protect the traditionally used plants from construction disturbance. The Native American Monitor may check on the fencing throughout the construction period to confirm that the traditionally used plants are sufficiently protected.	National Park Service and traditionally-associated American Indian tribes and groups
<b>K.9</b> Archeological Resources	<p>Train all members of the restoration/construction teams in proper handling of inadvertent discovery of archaeological resources. Training would involve information regarding the types of archeological materials that are likely present in the specific project area, how to identify archeological materials, and the procedures for contacting the appropriate parties in the event that archeological materials are encountered during restoration/construction activities.</p> <p>All construction personnel would be required to participate in the training, and written guidelines would be prepared and distributed to aid in identification of archeological materials and to inform workers of the procedures to follow in case of a discovery or potential discovery. If buried prehistoric or historic archeological artifacts, features, or bone are inadvertently discovered during ground-disturbing activities, work shall stop in that area and within a 100-foot radius of the find until a qualified archeologist can assess the significance of the find.</p> <p>Inadvertent discoveries would be treated in accordance with 36 CFR 800.13 (Protection of Historic Properties: Post-review discoveries). The archeological resource would be assessed for its eligibility for listing on the National Register in consultation with the SHPO and representatives of traditionally associated American Indian tribes and groups (if it is an American Indian archeological site), and a determination of the project effects on the site would be made. If the site would be adversely affected, a treatment plan would also be prepared as needed during the assessment of the site's significance. Assessment of inadvertent discoveries may require archeological excavations and/or archival research to determine resource significance. Treatment plans would fully evaluate avoidance, project redesign, and data recovery alternatives before outlining actions proposed to resolve adverse effects.</p> <p>If human skeletal remains are encountered, protocols under federal and state law would apply. All work shall stop in the vicinity of the discovery, and the find would be secured and protected in place. The appropriate county coroner (Mariposa or Merced) and Park Archeologist would both be immediately notified. If analyses determine that the remains are American Indian, and that no further coroner investigation of the cause of death is required, the coroner would then be required to contact the NAHC (pursuant to Section 7050.5[c] of the California Health and Safety Code) and the County Coordinator of Indian Affairs. The remains would also be treated in accordance with the Native American Graves Protection and Repatriation Regulations at 43 CFR 10.4 (Inadvertent discoveries).</p>	Yosemite National Park; Contractor
<b>K.10</b> Ground Disturbance and Monitoring	<p>A Government provided Archeological Monitor, and as necessary, Native American Monitor, will observe all ground-disturbing site work, including construction of temporary facilities at all culturally sensitive areas, from a safe location mutually agreed on by Contractor, Contracting Officer and Monitors. As new ground is broken, Monitors will examine excavated materials, using construction layout centerline and perimeter staking as a reference point to record locations of findings.</p> <p>Monitoring may also be included as part of a treatment plan for individual resources following initial testing as per MM-AR-2</p> <p>Prior to construction, mark with flagging all sensitive cultural resources to be protected within the project area identified per the requirements of the plans and specifications. Proper placement of flagging shall be verified by the Contracting Officer. Upon verification, erect necessary fencing to identify and protect cultural resources from disturbance.</p> <p>Do not begin ground-penetrating work such as excavation, trenching, drilling, or stump and root removal in culturally sensitive areas without the presence of Archeological Monitor, and if required, Native American Monitor.</p>	Yosemite National Park; Contractor; Traditionally-associated American Indian tribes and groups

Topic	Resource Protection Measures	Responsibility
<b>K.10</b> Ground Disturbance and Monitoring (continued)	<p>The archeological monitor shall record and be authorized to collect soil samples artifacts, cultural features, and other material as warranted for analysis. If the monitor determines that any portion of the proposed action could have an adverse effect on the site, alternative methods of accomplishing the action shall be discussed with the restoration personnel. Restoration activities within site boundaries shall be conducted using manual tools rather than mechanized equipment whenever possible, and no stock animals or wheeled vehicles used for transport of workers and tools shall be allowed within 10 meters of the known site boundary.</p> <p>If Archeological Monitor or Tribal Monitor discovers resources, immediate relocation of the work to a non-sensitive area may be required to allow Monitors to take soil samples and record resources. While Monitors are documenting resources in sensitive areas, Contractor shall relocate work to non-sensitive areas.</p> <p>If an Archeological Monitor requires access to a construction area the contractor shall furnish safe access, free from recognized hazards, to enable the monitor to complete his/her duties. This will commonly involve trench access when soil sampling is deemed necessary by the Archeologist.</p> <p>If resources are discovered while Monitors are absent, stop work immediately and report the discovery to the Contracting Officer.</p> <p>Stop Work: Cease all activities in the area of discovery and protect the resources discovered. In the event the discovery represents human remains or any objects subject to the Native American Graves Protection and Repatriation Act (NAGPRA), the NPS will follow procedures outlined in NAGPRA regulations. This will require a stoppage of work in the area of work for a minimum of 30 calendar days. In the event of an inadvertent discovery of Cultural Resources, be prepared to stop work and continue in other areas.</p> <p>The Contractor shall plan, schedule, and execute the work to prevent stoppages at one area from stopping all work at the construction site.</p> <p>Adjustments for Work Stoppage. See Federal Acquisition Regulations.</p>	Yosemite National Park; Contractor; Traditionally-associated American Indian tribes and groups
<b>K.11</b> Consultation with American Indians	<p>The NPS and traditionally-associated American Indian tribes and groups will continue to collaborate on resources management and historic preservation activities guided by existing cooperative agreements to ensure that adverse effects to historic properties with traditional religious and cultural significance can be avoided.</p>	National Park Service; Traditionally-associated American Indian tribes and groups
<b>K.12</b> Section 106 Compliance	<p>Continue consultation with the SHPO, ACHP, traditionally-associated American Indian tribes and groups and other consulting parties consistent with 36 CFR §800.5 to minimize or mitigate adverse effects and seek ways to resolve adverse effects through project specific agreements through 36 CFR §800.6 (b) and (c) for projects/actions assigned to Category 2 in Exhibit 5 of the 2014 Programmatic Agreement Among the National Park Service at Yosemite National Park, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding Compliance with Section 106 of the National Historic Preservation Act for the Merced Wild and Scenic River Comprehensive Management Plan.</p>	National Park Service
<b>K.13</b> Inadvertent Discovery of Historic Properties or American Indian Human Remains	<p>In accordance with the 2014 Programmatic Agreement Among the National Park Service at Yosemite National Park, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding Compliance with Section 106 of the National Historic Preservation Act for Merced Wild and Scenic River Comprehensive Management Plan; protocols and requirements for Inadvertent Discovery of Historic Properties or American Indian Human Remains shall be incorporated into all construction requirements documents (plans and specifications).</p>	National Park Service

## Appendix B

### Detailed Project Information Tables

**Table 1 Wawona Wastewater Treatment Plant Flow Projections**

Source	Flow (gpd)
Current Peak Month (2010)	101,235
Privately Owned Parcels	10,850
Commercial Sites	6,000
NPS Maintenance Facilities	300
Wawona Campground (96 sites – 1 group site)	6,260
Texas Flat Flush Toilets (100 daily visitors)	600
Subtotal Ultimate Peak Month Flow	125,245
Ultimate Design Peak Month Flow (rounded)	130,000
Ultimate Design Peak Day Flow (peaking factor = 1.4)*	180,000
Ultimate Peak Hour Flow (peaking factor = 3.3)**	430,000
Ultimate Design Peak Hour Flow (Equalized)***	340,000

**Table 2 Projected Wawona Wastewater Treatment Plant Effluent Limits**

Parameter	Average/Maximum
Biochemical Oxygen Demand (BOD – 5-day 20°C)	10/20 mg/L
Total Suspended Solid (TSS)	10/20 mg/L
Total Phosphorous (as P)	0.50/1.0 mg/L
Percent Removal	90%
Total Coliform	240 MPN/100 mL
pH	6.5 to 8.5

**Table 3 Main Central Lift Station Upgrade Characteristics**

Characteristic	Value
Active Wet Well Volume	≈ 3000 gal
Number of Pumps	2
Unit Horsepower	≈ 30 HP
Unit/Firm Capacity	≈ 280 gpm
Assumed peak month inflow	60 gpm
Emergency storage – peak hour	15 minutes
Emergency storage – peak month	1 hour



**Table 4 Main Lift Station Upgrade Characteristics**

Characteristic	Value
Active Wet Well Volume	≈ 3500 gal
Number of Pumps	2
Unit Horsepower	≈ 15 HP
Unit/Firm Capacity	≈ 215 gpm
Assumed peak month inflow	30 gpm
Emergency storage – peak hour	30 minutes
Emergency storage – peak month	2 hours

**Table 5 Wawona Wastewater Treatment System Design Flows for Subsurface Disposal**

	GPD	
Projected Flow from Historical Data and Expansion	104,393	Estimate from Method 1 from Mass Balance Report
Winter Month	78,295	75% lower flow in winter months
Average Daily Flow for Disposal	66,551	85% flow reduction measures
Estimated Irrigation	13,000	3 inches on 25 acres
Estimated Storage Volume	27,000	90% of 4.5 MGD spread from Nov. to Mar.
Design Flow for Disposal Field	26,551	Subtract irrigation and storage from the effluent flow
Total Design Disposal Capacity	53,100	With 100% redundancy
GPD = gallons per day		

## Appendix C

### Cumulative Projects List

Action or Project	Status	Brief Description
<b>Past Actions</b>		
Wawona Campground Site Accessibility Enhancements	Past	This project, completed in 2017, modified four campsites (#'s 67, 69, 70, 89) in the C Loop of Wawona Campground to provide accessible sites. Each site is now equipped with accessible food storage lockers, fire rings, wooden picnic tables with galvanized steel frames with attached bench seating and an extended accessible table top. Accessibility upgrades also included installation of a hardened surface in campsites #89 and #67 to stabilize the campsite surface and improvements to the path of travel from those sites to the accessible restroom. This project also removed tent platforms to improve accessibility and allow tent campers flexibility in where they place their tent, add decomposed granite to accessible parking pads (sites #89 and #67) and relocated camp site #89 closer to the accessible bathroom.
South Fork Fire Burned Area Response Plan – Water Inlet Protection	Past	The purpose of this project was to provide one-time modifications to several components of the water inlet system so that the system can more likely survive and recover from floods/floods carrying debris and debris flows associated with the post-fire watershed. The intake is located adjacent to a small diversion dam in the South Fork of the Merced River. The inlet is at risk because of the potential for high flood flows, flood flows carrying debris, or debris flows. This project protects the screened inlet and the exposed pipe in the river, and provides for drawing the reservoir at a higher elevation if debris clogs the reservoir.
Merced River Plan Implementation: Construct Fire Station in Wawona	Past	This project constructed a 4,234 square foot Fire Station/Operations Building, including utilities and site improvements, in the current Wawona District Maintenance Yard. The new facility included three garage bays to house fire apparatus, offices and required maintenance/ work spaces to support the Wildland Fire Operations, and was designed to serve as an Incident Command Center. The station adequately houses modern fire engines, vehicles, equipment and personnel to provide a reasonable level of fire and emergency response capability. The project required significant ground disturbing activities, including trenching and grading.
<b>Current Approved Actions</b>		
Big Trees Hotel Renovations	Current	Renovations to the historic Wawona Hotel (Big Trees Lodge), a National Historic Landmark. Replacement of wood roof shingles is scheduled to begin fall 2019. The project will evaluate and replace in-kind as required all fascias, flashings, and roof trim. The project will evaluate and replace as necessary roof framing. Doors at the hotel were upgraded, based upon the requirements in the National Fire Prevention Association 101 Life Safety Code. Guest room doors opening onto an interior corridor were upgraded to be self-closing doors (door retrofit complete).
<b>Potential Future Actions</b>		
Merced River Plan Implementation: Wawona Flatrock Bathroom Construction	Future	This project would provide a restroom facility at the popular Flat Rock Swimming Area parking area in Wawona. The action would likely entail installation of water and sewer service at this location, requiring trenching, if the restroom is to be a flush restroom. Additional study is required to determine whether historic properties exist. The park would design the project to avoid archeological resources. This project has not been designed and is not funded but was mentioned in the Merced River Plan.
Wawona Ambulance Bay Construction	Future	This project would construct a new ambulance bay and emergency medical services (EMS) cache in Wawona. The existing Wawona ambulance would be replaced with a new, slightly larger, advanced life support ambulance. The current ambulance is being parked in the county owned garage which is too small to accommodate the larger new ambulance. Directly adjacent to the county owned garage is the NPS owned EMS Cache, used to store medical supplies and for washroom clean up after emergency calls. One proposal would remove the NPS owned EMS cache and replace it with a larger structure that would house the new ambulance, EMS supplies, and washroom. This would allow the NPS to move out of the county owned building that spans both county-owned and NPS owned property. The proposed location of the new garage is in Section 35, at the intersection of West Bruce Street and Chilnualna Falls Road. The park is seeking funding for design of options and construction funding.

Action or Project	Status	Brief Description
Wawona Old Fire Station Demolition and Restoration	Future	The building that was used as a fire station was constructed by the Civilian Conservation Corps in 1934. It was not designed as a fire station, was not adequately sized for firefighting operations, and did not meet current Building Codes, National Fire Protection Association (NFPA) standards, or Seismic Codes and Standards. It was abandoned, and a new station was built (see Past Actions). The old station is proposed to be demolished (likely sometime in the next 5 years) and the land restored. In 2014, a determination of eligibility was developed for the buildings comprising the Wawona Basin CCC Camp #3 property; they were determined to be ineligible as a district and as individual buildings because they have been substantially modified. The area is a prehistoric site and is in the 100-year floodplain of the Merced River.
Camp Wawona Redevelopment Project	Future	This project would redevelop an existing summer camp facility located on a private inholding in Yosemite. It is planned to include a 15-acre land exchange to improve the buffer between the camp and Yosemite wilderness. The redevelopment includes accessibility upgrades and changes so that the facility can meet camp accreditation requirements and building code requirements, and address safety concerns. The proposal includes changes that would allow the camp to expand their operational season and increase square footage of facilities by almost double. If this project moves forward, construction would occur in a phased manner over 20 years.
Wawona Dome Road Removal and Restoration	Future	During a 2017 fire, a bulldozer created a containment line by opening an abandoned road to Wawona Dome. The 3.5-mile road has numerous failing culverts spanning 16 streams, and has wasted away 6,500 cubic yards of soil. Erosion has carved 50-foot-deep ravines and the slope is denuded of vegetation. This project would remove the culverts, provide erosion protection, and outslope the road.
Restore Hillside Behind Wawona Wastewater Treatment Plant	Future	The hillside behind the Wawona Wastewater Treatment Plant is heavily eroded. Unnatural gullies carry and deposit sediments at the plant fence and convey runoff to the plant, causing plant operations difficulties and concerns. It is thought that the gullies originated when the area was used previously as a sand mine. The hillside would be regraded, stabilized, and undergo revegetation.

# Appendix D

## Draft Floodplain Statement of Findings

### INTRODUCTION

The National Park Service (NPS) has prepared the *Wawona Wastewater Treatment System Rehabilitation Project Environmental Assessment (EA)* to upgrade the waste treatment and disposal facilities in Wawona. The purpose of this Floodplain Statement of Findings is to review the *Wawona Wastewater Treatment System Rehabilitation Project EA* in sufficient detail to:

- Justify the use of a floodplain location
- Provide an accurate and complete understanding of the risks to human health and safety assumed by implementation of the preferred alternative.
- Provide an analysis of the risks to property in the project area and the comparative flood risk among the alternatives.
- Describe the effects on floodplain values associated with the preferred action.
- Provide a description and evaluation of mitigation measures to reduce impacts to the floodplain.

### Floodplains and Floodplain Extent

The Regulatory Floodplain for the proposed action at this site is the 100-year floodplain (1% annual chance of inundation), as described in the NPS Guidelines (NPS Director's Order 77-2). The 100-year floodplain boundary in the Wawona Wastewater Treatment Plant Rehabilitation project area has been defined using publically available floodplain data from the National Flood Hazard Layer database downloaded from the Federal Emergency Management Agency (FEMA) website. The 500-year floodplain has not been formally defined. The NPS has determined that some current and proposed facilities are located in the 100-year floodplain, per NPS Procedural Manual 77-2: Floodplain Management (update 2004).

### GENERAL CHARACTERISTICS OF FLOODING IN THE AREA

Flooding in the Wawona Wastewater Treatment System Rehabilitation project area can be categorized as one of two types: (1) *Spring floods* that occur with snowmelt and associated runoff, and (2) *Winter floods or rain on snow events* that occur in the late fall and winter during intense rainfall or rainfall on snow events. Data on flooding in the Merced River in the park from 1914 to 1989 suggest that the majority of floods in this system occur in response to spring or early summer snowmelt conditions (Madej et al. 1994). Only about 10% of total floods in the park are winter floods or rain on snow events. However, these events are responsible for the highest floods recorded, especially where warm heavy rains fall on snow in higher elevations. A greater proportion of flooding in the Wawona Meadow portion of the project area (known locally as Big Trees Creek) may be driven by winter storm events because the maximum elevation in this smaller watershed is around 6,500 feet meaning most storms consist solely of rain.

At the beginning of the wet season the ground is extremely dry and about 3 to 5 inches of precipitation is required to satisfy the retention storage capacity of the soil before any significant runoff occurs. Later in the season when the ground may be very wet and there may be a moderate snow cover at higher elevations, heavy rainfall over the

basin can cause large flood runoff. An intense storm with a high freezing elevation may also result in flood runoff from almost the entire basin. Most of the runoff from the Merced River basin occurs from November through July (Madej et al. 1994).

#### Floodplain Attributes of Big Trees Creek and the South Fork of the Merced River

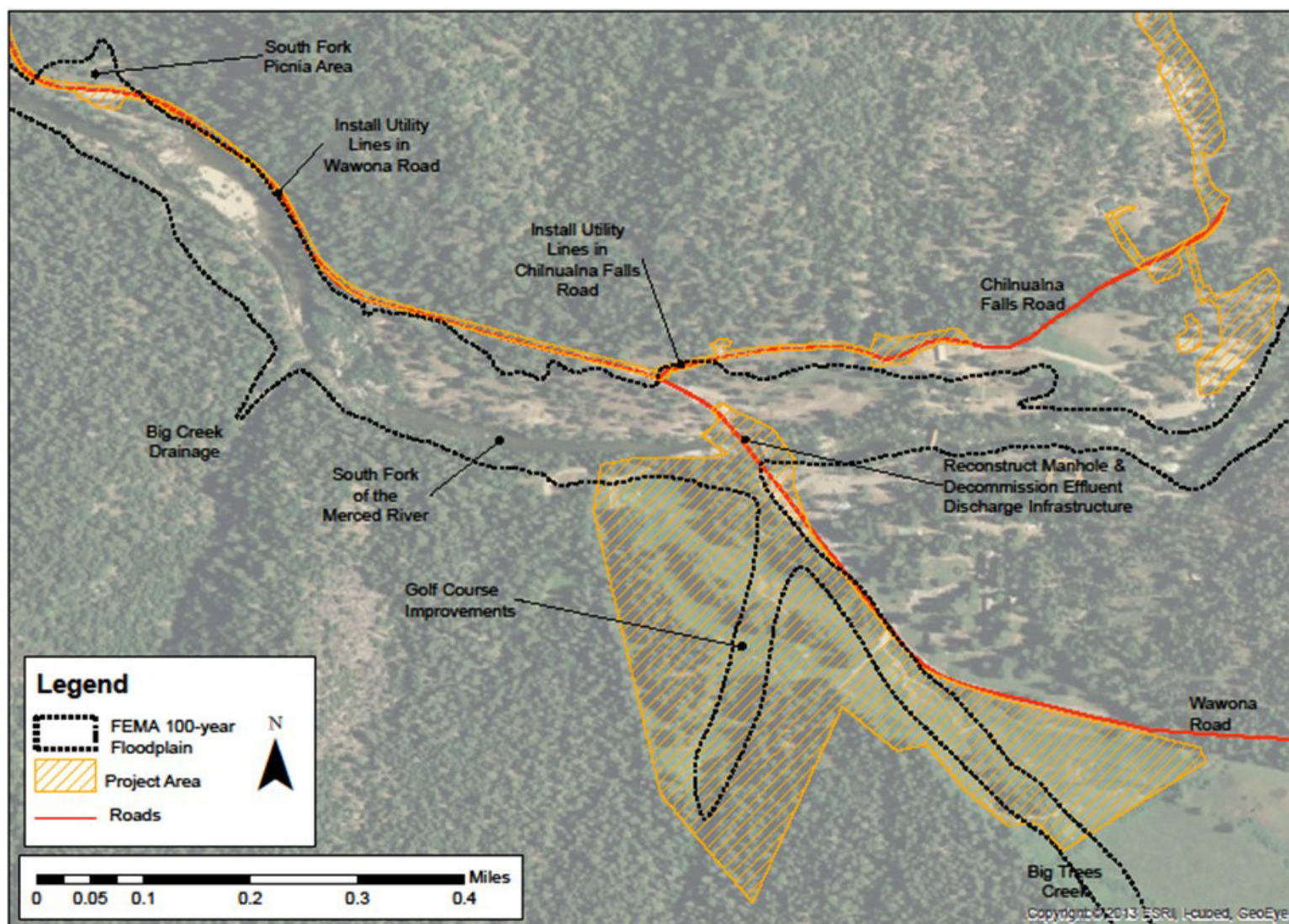
Floodplains considered in this analysis include those of the South Fork of the Merced River in the project vicinity, which enters Wawona from the east and flows west through Wawona before turning northward near the South Fork Bridge, and the floodplains of Big Trees Creek, a tributary of the South Fork of the Merced River. Big Trees Creek flows through Wawona Meadow and the golf course before its confluence with the South Fork of the Merced River. The floodplain along the South Fork of the Merced River is an elongated alluvial valley in Wawona. In this area, the river meanders through a floodplain meadow just south of Chilnualna Falls Road, where the channel can shift laterally during large floods (Figure D-1). From here, the river flows westward to confluence with Big Trees Creek and Big Creek in the vicinity of the South Fork Bridge, and it continues to flow through a broad canyon northward along the Wawona Road to the Wawona Campground (Figure D-2). Upstream of the Big Creek confluence, the average annual flow was 174 cubic feet per second between 1958 and 1968, as measured at the Wawona gaging station, with an estimated maximum flow of 15,000 cubic feet per second in December 1955. The 100-year discharge of the South Fork Merced River is estimated to be 19,700 cubic feet per second (PBS&J 2011). The headwaters of the South Fork of the Merced River originate at over 10,000 feet in elevation and the watershed encompasses about 100 square miles

In river reaches where the gradient is gentlest, riparian vegetation (willows and alders) becomes more prevalent. Willows often colonize sandbars that are deposited at the margins of or within the river channel. In the Wawona area reach, the riparian corridor of the South Fork of the Merced resembles that of the main stem of the Merced River as it flows through Yosemite Valley. Also found in the riparian area is Sierra sweet bay (*Myrica hartwegii*), a shrub endemic to the Sierra Nevada. In Yosemite National Park, Sierra sweet bay is found at the average high water line of the South Fork Merced River downstream from Wawona and along Big Creek (NPS 2012). The NPS (2002) considers Sierra sweet bay a sensitive species, and the California Native Plant Society (California Native Plant Society Rank 4.3) identifies the plant as being of limited distribution.

Big Trees Creek is a tributary to the South Fork of the Merced River in Wawona in the vicinity of the golf course. Big Trees Creek flows from the southeast through Wawona Meadow, the golf course, and the project area. Big Trees Creek joins the South Fork of the Merced River near the South Fork Bridge and just north of the golf course, within the project area. The Big Trees Creek watershed originates at 6500 feet in elevation and is about 5 square miles.

Facilities located within the 100-year floodplain of the South Fork of the Merced River or Big Trees Creek within the project area include the South Fork Picnic Area, a portion of the Wawona Campground, effluent discharge infrastructure and a manhole near the South Fork Bridge, portions of the Big Trees Lodge Golf Course, parts of Wawona Road, and parts of Chilnualna Falls Road (Figures D-1 and D-2). This infrastructure has impacted floodplain habitats and trampling of riparian vegetation and associated erosion also occurs in this area, resulting from use in the vicinity of the Wawona Store and Gas Station area and the Wawona Campground.





**Figure D-1. Project Elements In the Big Trees Gold Course and Along Chilnualna Falls Road**



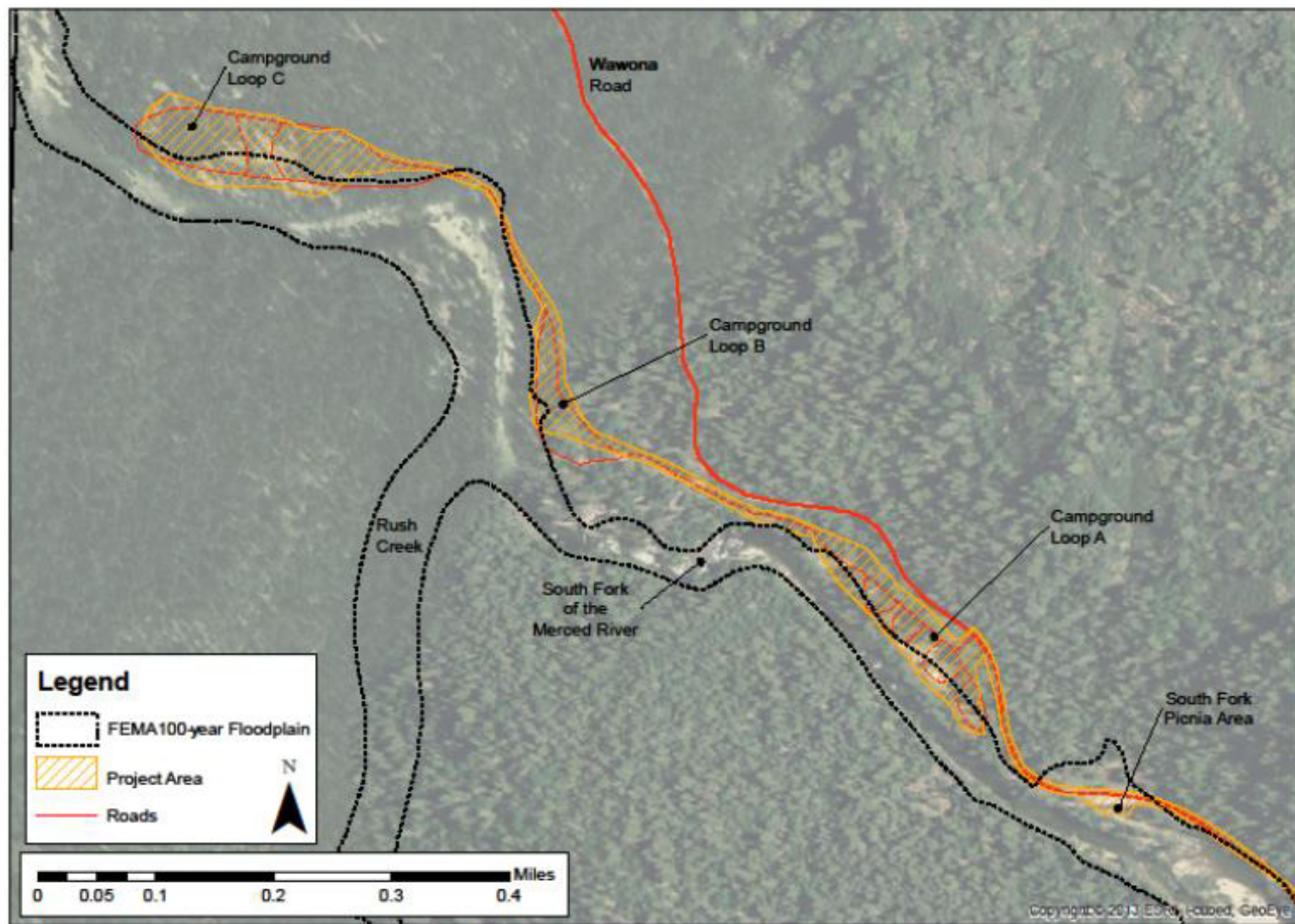


Figure D-2. Project Elements In the Wawona Campground and Along Wawona Road

## POTENTIAL RISKS TO HUMAN HEALTH AND SAFETY

Floods of consequence along the South Fork of the Merced River drainage in the project area and Wawona occur with warning. Flooding within the area typically requires a prolonged period of intense rain for at least 24 hours to create flood conditions. The NPS and other agencies have a comprehensive monitoring system in place to provide an early warning system for major flooding, which provides sufficient time for evacuation. Risks to humans can typically be mitigated by warning and evacuation.

Pedestrian and vehicular access to some areas of the project area is subject to flooding due to extreme weather events. Flooding may also impact trails, bridges, and utilities that provide access to or service the project area. When necessary, the NPS will close areas within Wawona including the project area to mitigate risks to human life due to flooding. Early warning, evacuation, and closure of the area would mitigate risks to humans in the project area.

## POTENTIAL RISKS TO PROPERTY

Since 1916, Yosemite National Park has experienced 11 winter floods large enough to cause damage to property; however, most damages were sustained in Yosemite Valley. This section describes the existing and proposed new structures in the 100-year floodplain described under the preferred alternative in the Wawona Wastewater Treatment Plant Rehabilitation project, and associated risks to property and potential new capital investment.

The NPS categorizes buildings and facilities into the following three categories to evaluate floodplain risks (per NPS Director's Order 77-2 and Procedural Manual 77-2):

- *Class I Actions* include the location or construction of administrative, residential, warehouse, and maintenance buildings and non-excepted (overnight) parking lots, if they lie within the 100-year floodplain.
- *Class II Actions* create "an added disastrous dimension to the flood event." Class II actions include the location or construction of schools, clinics, emergency services, fuel storage facilities, large sewage treatment plants, and structures such as museums that store irreplaceable records and artifacts, if they lie within the 500-year floodplain.
- *Class III Actions* include Class I or Class II Actions that are located in high hazard areas such as those subject to flash flooding.

The following existing or proposed new structures in the preferred alternative of the *Wawona Wastewater Treatment Plant Rehabilitation EA* constitute Class I Actions (Figure D-1 and D-2) (see also Figures 3-2, 3-3, and 3-4 in the EA):

- **Install utility lines in the Wawona Campground Loop Road.** Installation of new utilities (electrical, communications, and sewer lines) would occur in Wawona Campground Loop Road; 100 linear feet of the alignment would run through the 100-year floodplain. There is an existing water line in the Campground Loop Road. During a large flood event, water depth would be expected to be low, but velocities could be swift due to the river morphology forming a bend. The utilities could sustain damage during extreme flood events, though the need for repair would be rare as the paved road above would provide some armoring and the infrastructure would not exert drag on floodwaters passing over the area.

- **Decommission individual septic systems at the Wawona Campground.** The existing leach fields that serve six comfort stations, portions of which are within the 100-year floodplain, would be abandoned in place by filling their lines with concrete. This action would protect public safety by preventing the potential for introduction of sewage into surface waters during large flood events and would greatly reduce the risk of sewer infrastructure being damaged due to large flood events.
- **Install utility lines in Wawona Road and Chilnualna Falls Road.** Electrical, communications, water, and sewer utility lines would be installed within Wawona Road and Chilnualna Falls Road. In Chilnualna Falls Road, 266 linear feet of the utility alignment would be located within the 100-year floodplain and in Wawona Road 545 linear feet of the utility alignment would be located in the 100-year floodplain. Along Wawona Road, an additional 950 linear feet of the utility alignment would be located on the margin of the 100-year floodplain. The project would install a new water line to replace an aging existing water line. Portions of the proposed utility alignments that are within the 100-year floodplain are located in broad, flat areas where water levels and velocities would be low during a large flood event. The utilities would be located underground beneath a paved road, further protecting them from flood damage. Although a large flood event may damage utilities, damages would likely be minor and easily repairable.
- **Install a new restroom at South Fork Picnic Area with a Flushing Toilet.** The NPS would construct a new restroom with two flush toilets at the South Fork Picnic Area to replace the existing vault toilet. The park would construct the restroom using robust building materials suitable for the site conditions, making it flood resistant. A lift station would be installed to convey sewage into the sewer force main in Wawona Road and on to the Wawona Wastewater Treatment Plant. The restroom is located about 70 feet from the top of the bank of the South Fork of the Merced River, where flood depth would be expected to be low and flood velocities would be high during extreme flood events. The existing vault toilet would be removed, which would protect public safety by greatly reducing the possibility of raw sewage being introduced into surface waters during a large flood event.
- **Reconstruct manhole near the South Fork Bridge.** An existing manhole in the 100-year floodplain north of the South Fork Bridge would be reconstructed to raise the top of the manhole by three feet. This action elevates the manhole in the floodplain profile, and although not completely removing it from the 100-year floodplain, it would reduce the risk that floodwaters may overtop the manhole in a large flood event. In a flood event, damage sustained would be low due to the low water velocities in the broad floodplain in this area.
- **Decommission effluent disposal pipe and valves to the South Fork of the Merced.** The pipe and valves that allow for the potential release of treated effluent to the South Fork of the Merced River would be decommissioned. The pipe is currently located at the ordinary high water mark of the South Fork of the Merced River adjacent to the South Fork Bridge. The valves are at road-level within the floodplain near the South Fork Bridge. This action eliminates some infrastructure in the 100-year floodplain and is thus beneficial.
- **Renovate the effluent disposal system at the golf course.** Aging spray field components that irrigate the golf course turf with treated effluent would be

replaced and upgraded. A new subsurface drainage field would be constructed in Fairway 7. These improvements would replace and re-install roughly 6,625 linear feet of sub-surface pipes 100-year floodplain. The renovations would allow for better monitoring of ground moisture and increased control of the system, which will protect the floodplain by allowing for greater flexibility in operating the disposal system. When flooding is imminent, effluent disposal to these areas would be turned off until favorable ground moisture conditions resumed. Water depths and velocities at these locations during a larger flood event are expected to be low due to the gentle gradient of the golf course, which was previously a meadow. The majority of the infrastructure being installed would be below ground (underground spray field piping and sub-surface disposal system) and resilient to water impacts (due to being effluent conveyance infrastructure). The need to repair portions of the golf course effluent disposal system after extreme flood events is expected to be low.

- **The Big Trees Lodge Golf Course, Wawona Campground, and the South Fork Wawona Picnic Area would remain in the floodplain.** These facilities would not be removed from the floodplain. Evacuation or closures of these facilities could occur with ample warning as flood conditions in this area usually occur with at least 24 hours' notice.

There are no Class II or Class III actions proposed in the project under any of the alternatives.

#### Alternatives Considered

The *Wawona Wastewater Treatment Plant Rehabilitation Project EA* considered one action alternative, Alternative 2, in addition to the preferred alternative considered in this Statement of Findings. Alternative 2 would have no differences with regard to the amount of facilities located within the floodplain. The No Action alternative, Alternative 1, evaluated existing conditions in the area with no additional structures in the floodplain.

#### POTENTIAL RISKS TO FLOODPLAIN VALUES

Floodplains provide an array of natural and physical resource values within Yosemite. These values include habitat for vegetation and wildlife, periodic disturbance to habitats within floodplains, which can support ecological value and spatial diversity in habitat, dissipation of flood energy, and benefits to waterway hydrologic processes including fluvial transport mechanisms and river geomorphic processes. The floodplain also recharges groundwater in areas where soils are sufficiently pervious.

Installation of utility lines in the Wawona Campground Loop Road, Wawona Road, and Chilnualna Road would greatly improve and protect floodplain values by conveying sewage to a central treatment facility at the Wawona Wastewater Treatment Plant outside of the 100-year floodplain. In addition, a manhole in the floodplain would be reconstructed to elevate its top section, and although not completely removing it from the 100-year floodplain, this would be beneficial in reducing the risk that floodwaters may overtop the manhole in a large flood event. Installing a sewer force main, electrical service, and communications utility lines allows for the decommissioning of leach fields which are partially located within the 100-year floodplain in the Wawona Campground and allows for the replacement of a vault toilet with a flush toilet

restroom at the South Fork Picnic Area. These actions would reduce the risk of sewage being released to surface waters during a large flood event.

Replacement of the vault toilet with a restroom with flush toilets at the South Fork Picnic Area would substantially improve natural resource conditions and water quality in the area in the long-term. It would eliminate the need for regular pumping and overland transport of human waste for facility maintenance in this portion of the 100-year floodplain. It would also reduce the risk of human waste being introduced into surface water during a large flood event at the South Fork Picnic Area.

Infrastructure would be reduced in the floodplain, which would have a beneficial impact on floodplain values. The project would decommission leach fields at Wawona campground, as well as the piping and valves that have the ability to release effluent into the South Fork of the Merced River (although the Wawona Wastewater Treatment Plant is no longer permitted to discharge treated effluent to the river). None of this infrastructure is above ground, and no impacts to natural floodplain functions would be impacted by decommissioning and abandoning the infrastructure in place.

Renovation of the effluent disposal system at the golf course would have no impacts on floodplain values, as the park would reconfigure the spray irrigation system in a similar alignment to the current infrastructure and the disposal field would be constructed out of the floodplain.

Portions of the Big Trees Lodge Golf Course, Wawona Campground, and the South Fork Wawona Picnic Area would remain in the floodplain; these facilities would result in only minor to minimal interference with potential flood flows.

#### JUSTIFICATION FOR THE USE OF A FLOODPLAIN

Although components of the project remove or decommission infrastructure located in the 100-year floodplain, portions of the project would also install, retain, or improve infrastructure located within the 100-year floodplain. Overall, the proposed project actions will improve the conditions within the floodplain as compared to current conditions.

Installing a sewer force main (and associated utilities) from Wawona Campground to the Main Central Lift Station to connect the campground with central sewage treatment at the Wawona Wastewater Treatment Plant requires crossing the floodplain, and locating the infrastructure outside of the floodplain is unavoidable. These utility lines would be located under the existing roads and only intersect the floodplain in a few short segments. The proposed action would enhance floodplain values as compared to existing conditions by allowing for the decommissioning the campground septic systems, which now treats sewage partially within the 100-year floodplain. The Wawona Campground would remain in the floodplain; the facility is currently in use and offers a unique recreational experience in the Wawona area.

The project proposes to install a new double stall flush-toilet restroom and lift station at the South Fork Picnic Area to replace the existing vault toilet located within the 100-year floodplain. Complete removal of the restroom facility to improve floodplain values was not considered viable, as access to a restroom at this location is important for visitors and removing it would likely result in visitors inappropriately disposing of their human waste in close proximity to the South Fork of the Merced River. The proposed actions to replace the vault toilet with flushing-toilets and convey the sewage

to the Wawona Wastewater Treatment Plant would enhance floodplain values as compared to existing conditions by conveying waste out of the floodplain and eliminating the need for waste handling and overland transportation in this area.

The manhole near the South Fork Bridge is critical infrastructure for the Wawona sewer system in its present location and this it cannot be removed/relocated out of the floodplain, without significant system redesign. The proposed actions would elevate the top portion to decrease the risks of floodwaters overtopping the manhole, improving the floodplain values over the existing condition.

The project would improve the sewage effluent disposal system, partially within the 100-year floodplain, at Big Trees Lodge Golf Course. This effluent disposal system is critical infrastructure, without which the Wawona Wastewater Treatment System cannot function; removing components of this system is not feasible. Portions of the Big Trees Lodge Golf Course would remain in the floodplain. The golf course is currently in use and offers a unique recreational experience in the Wawona area. In addition, the golf course is an important contributing element to the Wawona Hotel and Pavilion National Register Nomination, and its removal or demolition would result in an adverse effect on this historic resource. For these reasons, the golf course facilities would remain in the floodplain.

#### DESIGN OR MODIFICATIONS TO MINIMIZE HARM TO FLOODPLAIN VALUES OR RISKS TO LIFE AND PROPERTY

The design of all new structures or substantial improvements to existing structures will incorporate requirements and methods for minimizing flood damage, as contained in the National Flood Insurance Program “Floodplain Management Criteria for Flood-Prone Areas” (CFR 44, 60.3). Park staff will maintain an active flood evacuation plan. The plan details responsibilities of individual park employees for advanced preparedness measures; removing or securing park property; records and utility systems; monitoring communication; and conducting rescue and salvage operations. Impacts on the site’s resources will be minimized and avoided per Resource Protection Measures (Appendix A) in the environmental assessment.

#### Site-Specific Mitigation

- Active flood plans will be in place for timely and safe evacuation of people in times of rising water. Areas will be evacuated prior to major storm events that could potentially produce flooding, based on ongoing monitoring within the Park. Risks to humans will be mitigated by monitoring of storm or potential storm conditions, warning, and evacuation as warranted. Given that flooding within the vicinity of Wawona occurs with at least 24 hours of warning, and that areas suitable for evacuation are located in the adjacent areas of Wawona, these facilities could be easily evacuated in the event of an anticipated flood.
- In order to minimize potential damage to facilities located within the floodplain, prior to an anticipated flood event, any removable facilities that could be damaged by flooding would be removed and stored outside of the floodplain. Minor and localized armoring may be also installed so as to minimize potential damage from debris and floodwaters. Residual flood damage would require intermittent minor repairs to the affected facilities.



- No mitigation is available to offset the potential minor effects of these facilities on floodplain hydrology during flooding events; however, associated effects would be minor.

## CONCLUSION

Implementation of the preferred alternative in the *Wawona Wastewater Treatment System Rehabilitation Project EA* will take place in compliance with regulations and policies to prevent impacts to floodplain values and loss of human life or property. The park and contractors will strictly adhere to resource protection measures during and after construction activities. Individual permits with other agencies will be obtained prior to construction activities. The NPS concludes that there will be no unacceptable risks to human health and safety, unacceptable impacts to property, or substantial long-term adverse impacts to floodplain values. Therefore, the NPS finds the preferred alternative in the *Wawona Wastewater Treatment System Rehabilitation Project EA* to be acceptable under Executive Order 11988 and the NPS Directors Order 77-2 for the protection of floodplains.

## REFERENCES

### Cardno ENTRIX

- 2011 Merced River and Riparian Vegetation Assessment. Prepared by Cardno ENTRIX for Yosemite National Park, National Park Service.

### Eagan

- 1998 Modeling Floods in Yosemite Valley, California Using Hydrologic Engineering Center's River Analysis System. Master's Thesis, University of California, Davis.

### Madej, M. A., W. E. Weaver, and D.K. Hagans

- 1994 Analysis of Bank Erosion on the Merced River, Yosemite Valley, Yosemite National Park, California, USA. Environmental Management Vol 18, Issue 2, pp 235-250. March.

### NPS

- 1997 EFRO Report, Yosemite National Park, Highwater 97. April.
- 2003 Director's Order #77-2: Floodplain Management. September 8, 2003.
- 2004 NPS Procedural Manual 77-2: Floodplain Management. February 5, 2004.
- 2012 Merced Wild and Scenic River Values Draft Baseline Conditions Report. National Park Service files, Yosemite National Park, CA.

### PBS&J

- 2011 Floodplain Modeling Report Floodplain Mapping of the Merced River in Wawona and El Portal Yosemite National Park, California.