DRAFT

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

UPPER BIDWELL PARK ROAD SEDIMENT REDUCTION PROJECT

CAPITAL PROJECT #50303

Lead Agency:

City of Chico

Public Works Department – Park Division

P.O. Box 3420

965 Fir Street

Chico, CA 95928

September 2021

IS/MND – Prepared By:

Linda Herman, City of Chico Parks and Natural Resources Manager and

Thad Walker, Butte County Resource Conservation District (BCRCD)

Initial Study/Environmental Checklist
City of Chico
Upper Bidwell Park Road Sediment Reduction Project

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Appendix A – Tree Assessment/Chico Municipal Code Chapter 16.66
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I. PROJECT DESCRIPTION

A. Project Title: Upper Bidwell Park Road Sediment Reduction Project

B. Project Location: The project site is located in Upper Bidwell Park along Upper Park Road.(Map)

The project is located within an un-sectioned portion of Township 22 North, Range 2 East, of the USGS Richardson Springs, California (1948/1978), 7.5 Series Quad, and un-sectioned portion, plus Section 35 of Township 23 North, Range 2 East, of the USGS Paradise West, California (1948/1978), 7.5 Series Quad located in Upper Bidwell Park. (Latitude 39.771440, Longitude -121.766290).

C. Application(s): City of Chico Capital Improvement Project No. 50303

D. Assessor's Parcel Number (APN): 016-230-007, 056-050-010, and 016-240-002

E. Project Size: The project is approximately 3.42 miles (18,058 ft) of connected road, totaling approximately 42 acres (3.42 miles x 100 feet, up to approximately 50 feet both sides)

F. General Plan Designation: Primary Open Space and Secondary Open Space

G. City of Chico Zoning: OS1 (Primary Open Space) and OS2 (Secondary Open Space)

H. Environmental Setting:

Upper Park Road follows along the north side of Big Chico Creek, on volcanic terraces generally rising in elevation following a ridge to the northeast and descending back to near Creek elevation at the end of the road. The road passes through a mosaic of habitat types; riparian, blue oak savanna, grasslands, blue oak–foothill pine, and mixed chaparral. Dominant trees include Fremont cottonwood (Populus fremontii), Western sycamore (Platunus racemosa), valley oak (Quercus lobata), gray pine (Pinus sabiniana), black oak (Quercus kelloggii), interior live oak (Quercus wislizeni), and blue oak (Quercus douglasii). Dominant shrubs include toyon (Heteromeles arbutifolia), interior live oak, California bay (Umbellularia californica), manzanita (Arctostaphylos manzanita), buckbrush (Ceanothus integerrimus), skunkbush (Rhus trilobata) and poison oak (Toxicodendron diversiloba). A large spring is a source of forested/shrub and emergent wetland area north of the Diversion Dam Parking Area L, dominated by Fremont cottonwood, willow species (Salix spp.), fig (Ficus carica), wild rose (Rosa spp.) and California grape (Vitus californicus). The emergent portion dominants are invasive broomsedge bluestem (Andropogon virginicus), cattails (Typha sp.), herbs and grasses.

I. Project Description:

The purpose of this project is to implement sediment control practices through reduction of road erosion and sediment delivery from 43 potential erosion sites on Upper Park Road in Upper Bidwell Park located within the Big Chico Creek (BCC) Watershed. To reduce salmonid habitat degradation, and sediment delivery to BCC and ultimately the Sacramento River basin, this project will upgrade and stormproof portions of Upper Park Road within the BCC sub-basin. The Project will implement treatments designated as high or moderate immediacy on this largely unpaved forest road and as identified in the sediment source assessment conducted in 2017 by the City's geologic consultant, Pacific Watershed Associates (PWA).

PWA's action plan recommends treating all 43 features on the 3.42 miles of road for erosion control and prevention. Individual treatment features include 40 stream crossings, 2 ditch relief culverts, and 1 spring, as well as road surface drainage and associated erosion treatments, such as rolling dips. The Project will require a total of 37 stream improvements by upgrading 22 stream crossings with culvert replacements, and 15 stream crossings improved with armored fill installations. Maps and a table of the anticipated erosion treatments and type of work to be conducted at each site is attached as **Attachment 1.** It is estimated that this Project will reduce and eliminate the potential threat of 3,572 cubic yards of sediment delivery to Big Chico Creek. The construction work will take place in the Summer/Fall of 2022, outside of the wet weather season. Actual construction is anticipated to take approximately 4 months, weather permitting.

An Assessment of trees that may be removed from the Project was conducted by a Registered Professional Forester (RPF) **(See Appendix A**). The purpose was to document the species, size, diameter measured at breast height (DBH), and general health of trees that could be impacted by the Project. Approximately 44 trees directly in the project area may need to be removed during construction. However, over half of the trees proposed for removal are smaller (i.e., 6-inch diameter at breast height (DBH) or less) or are a non-native species, with a large proportion of all trees experiencing stress and/or compromised health due to overcrowding. However, 31 trees will be planted to mitigate these tree removals.

J. Surrounding Land Uses:
This project is located in Upper Bidwell Park. Surrounding land uses are Primary Open Space (POS) and Secondary Open Space (SOS).

K. Public Agency Approvals:

1) US Army Corp of Engineers: The proposed project will require an Army Corp of Engineers Section 404 Permit (per Clean Water Act).

2) California Regional Water Quality Control Board: The proposed project will require a 401 Water Quality Certification (per Clean Water Act).

3) California Department of Fish and Wildlife (CDFW): The proposed project will require a CDFW Lake and Streambed Alteration Agreement (LSAA) or a waiver thereof (per Section §1602 of the California Fish and Game Code).

L. Native American Tribal Consultation: Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun? X Yes ☐ No

M. Project Sponsor/Lead Agency:
City of Chico
PO Box 3420
Chico, CA 95927
Attn: Linda Herman

Property Owners:
City of Chico
PO Box 3420
Chico, CA 95927

N. Prepared By: Linda Herman, City of Chico and Thad Walker, Butte County Resource Conservation District (BCRCD).

II. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project and could involve at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒ Aesthetics	☒ Greenhouse Gas Emissions	☒ Open Space/Recreation
☐ Agriculture and Forest	☒ Hazards/Hazardous Materials	☐ Population/Housing
☒ Air Quality	☒ Hydrology/Water Quality	☐ Public Services
☒ Biological Resources	☐ Land Use and Planning	☒Transportation/Circulation
☒ Cultural Resources	☐ Mineral Resources	☒Tribal Cultural Resources
☒ Geology/Soils	☒ Noise	☐ Utilities
☒ Energy	☒ Wildfire	☒ Mandatory Findings of Significance

III. COMMUNITY DEVELOPMENT DIRECTOR DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a potentially significant impact or have a potentially significant impact unless mitigated, but at least one effect has been adequately analyzed in an earlier document pursuant to applicable legal standards, and has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because all potentially significant effects have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION including revisions or mitigation measures that are imposed upon the proposed project. No further study is required.

Signature

9/27/21
Date

Brendan Vieg, Community Development Director
Printed Name, Title

IV. EVALUATION OF ENVIRONMENTAL IMPACTS

- Responses to the following questions and related discussion indicate if the proposed project will have or potentially have a significant adverse impact on the environment.
- A brief explanation is required for all answers except "No Impact" answers that are adequately supported by referenced information sources. A "No Impact' answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors or general standards.
- All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

- Once it has been determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there is at least one "Potentially Significant Impact" entry when the determination is made, an EIR is required.

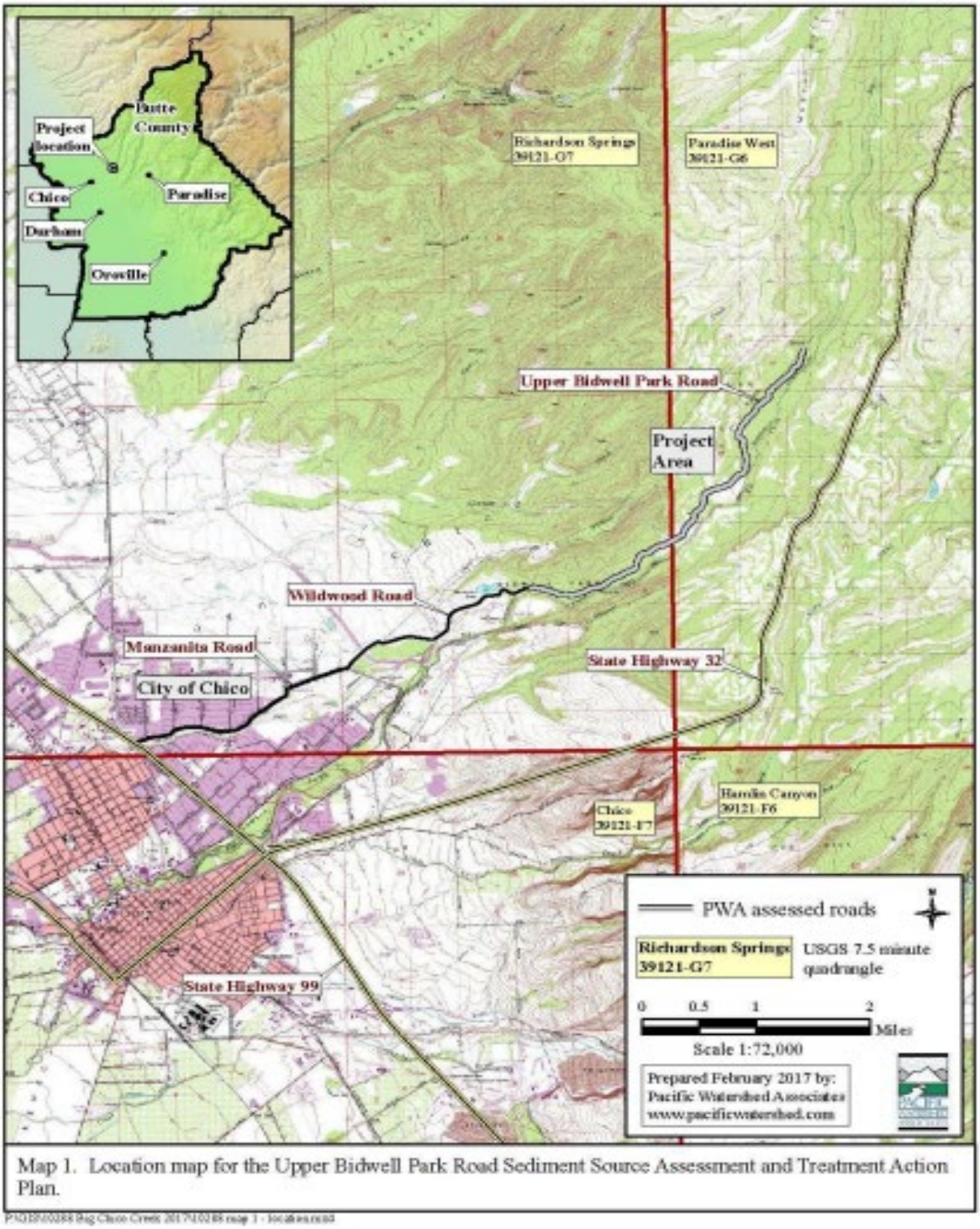
- Negative Declaration: "Less than Significant with Mitigation Incorporated" applies when the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less than Significant Impact." The initial study will describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section 4, "Earlier Analysis," may be cross-referenced).

- Earlier analyses may be used where, pursuant to tiering, a program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration [Section 15063(c)(3)(D)].

- Initial studies may incorporate references to information sources for potential impacts (e.g. the general plan or zoning ordinances, etc.). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated. A source list attached, and other sources used or individuals contacted are cited in the discussion.

    - The explanation of each issue should identify:
    - The significance criteria or threshold, if any, used to evaluate each question; and
    - The mitigation measure identified, if any, to reduce the impact to less than significant.

Figure 1. Project Location Map



Map 1. Location map for the Upper Bidwell Park Road Sediment Source Assessment and Treatment Action Plan.

A. Aesthetics Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Have a substantial adverse effect on a scenic vista, including scenic roadways as defined in the General Plan, or a Federal Wild and Scenic River?				X
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
3. Affect lands preserved under a scenic easement or contract?				X
4. Substantially degrade the existing visual character or quality of the site and its surroundings including the scenic quality of the foothills as addressed in the General Plan?			X	
5. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				X

DISCUSSION: A.1.-A.3. ;A.5 The project involves road upgrading and will reduce and largely eliminate the total threat of 3,572 yd^3 of future sediment delivery to Big Chico Creek. PWA's Action Plan recommends treating all 43 features and 3.42 mi of road for erosion control and erosion prevention (PWA 2017). Individual treatment features include 40 stream crossings, 2 ditch relief culverts, and 1 spring, as well as road surface drainage and associated erosion. The project will not have a substantial adverse effect on a scenic vista, including scenic roadways as defined in the General Plan, or a Federal Wild and Scenic River; nor will it substantially damage scenic resources, including trees, rock outcroppings, and historic buildings within a state scenic highway. The project will not affect lands preserved under a scenic easement or contract, nor will it substantially degrade the scenic quality of the foothills as addressed in the Chico 2030 General Plan, the Butte County General Plan 2030, or their associated Environmental Impact Reports (GPEIRs).In addition, the project is not located near any unique land forms and will not impact trees that qualify for the heritage tree program. The project will not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. The project will have **No Impact** on the abovementioned designated scenic resources; therefore, no mitigation is required.

MITIGATION: None Required

DISCUSSION: A.4. The project site is in the foothills. The project is limited in size, intensity, and scope and would not substantially degrade the existing character of the site or its surroundings.

While most of the construction on Upper Park Road will be within the existing footprint of the road, some trees growing on the uncompacted outer edge of the roadbed will need to be removed to complete grading, shaping road drainage improvements, and stream crossing upgrades. Approximately 44 individual trees, as well as other vegetation directly within the road prism or area of excavation, will need to be removed at various locations distributed along the linear 3.42 miles alignment. However, due to the existing dense and similar tree species canopy along the project length, there will not be a substantial degradation to the existing visual character or quality of the project site and its surroundings. Additionally, according to the Tree Assessment for the Upper Park Road Project prepared by BCRCD (**Appendix A)**, most of the trees proposed for removal are smaller (i.e., 6-inch diameter at breast height (DBH) or less), with a large proportion of the trees experiencing stress and/or compromised health due to overcrowding. Therefore, in some cases, removal of individual trees may ultimately reduce the overcrowding, enhance the health of the oak woodland, improve the visual character of the site, and

improve emergency/ public access. Aesthetic impacts resulting from tree removal outside of the riparian area are considered **Less-Than-Significant.**

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MITIGATION: None required.

B. Agriculture and Forest Resources: Would the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
2. Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
3. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code Section 4526, or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
4. Result in the loss of forest land or conversion of forest land to non-forest use?				X
5. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				X

DISCUSSION: B.1. - B.5. The project site is identified as primary and secondary open space. The site is not zoned for agricultural uses and the project will not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use. There is no conflict with an existing Williamson Act Contract or zoning and will result in no impacts to agriculture and forest lands. Therefore, the project will have **No Impact** on agricultural or forest resources; no mitigation required.

MITIGATION: None required.

C. Air Quality Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Conflict with or obstruct implementation of the applicable air quality plans (e.g., Northern Sacramento Valley Planning Area 2015 Triennial Air Quality Attainment Plan)?			X	
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation.			X	

3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	X
4. Expose sensitive receptors to substantial pollutant concentrations?	X
5. Create objectionable odors affecting a substantial number of people?	X

DISCUSSION: C.1. - C.3. The project would be implemented in compliance with all federal, state, and local regulations regarding air quality. The project will neither conflict with nor obstruct implementation of the applicable air quality plan for the Northern Sacramento Valley, nor will the project violate any air quality standard or contribute substantially to an existing or project air quality violation. The project will not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. According to Butte County Air Quality Management District (BCAQMD) http://bcaqmd.org/planning/air-quality-standards-air-pollutants/, Butte County is designated as a federal and state non-attainment area for ozone and particulate matter.

Table 1: Butte County Ambient Air Quality Attainment Status

BUTTE COUNTY AMBIENT AIR QUALITY ATTAINMENT STATUS (2014)		
POLLUTANT	***STATE***	***FEDERAL***
1-hour Ozone	Nonattainment	--
8-hour Ozone	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Attainment / Maintenance (Chico)
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
24-Hour Particulate (PM10)	Nonattainment	Attainment
24-Hour Inhalable Particulates (PM2.5)	No Standard	Nonattainment
Annual PM10	Attainment	No Standard
Annual PM2.5	Nonattainment	Attainment

Construction activities will result in localized and temporary air quality impacts associated with the operation of heavy-duty vehicles generating ozone precursors (NOx) and particulate emissions. Trenching and grading activities will create a temporary increase in dust generation (particulate) in the project vicinity. However, these impacts are temporary and episodic in nature. Existing City regulations require grading activities to include a dust suppression plan specifying and implementing standard Best Management Practices (BMPs). Full compliance with BCAQMD regulations regarding suppression of fugitive dust emissions (Rule 205) is required. Further, construction activities, including the use of heavy-duty vehicles, trenching, and paving activities proposed as part of normal infrastructure projects will not exceed those already anticipated, analyzed, and mitigated in the GPEIR. Therefore, compliance with City of Chico policies/requirements to utilize BCAQMD Regulations/Rules and BMPs will keep construction related impacts at a **Less-Than-Significant** level.

MITIGATION: None Required.

DISCUSSION: C.4. - C.5. Apart from the potential for temporary odors, airborne particulate and fugitive dust associated with construction activities, the proposed project will not result in exposing sensitive receptors to substantial pollutant concentrations, nor create significant objectionable odors. These potential impacts are short-term in nature, anticipated with infrastructure construction activities, and located in an area primarily flanked by open space and large-scale industrial uses. There are relatively few adjacent residences and no schools in the project area. Therefore, the impacts are considered **Less-Than-Significant**.

MITIGATION: None Required.

D. Biological Resources Will the project or its related activities result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species as listed and mapped in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?		X		
2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.		X		
3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		X		
4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X		
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		X		
6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

DISCUSSION: D.1, D.2 & D.4 The project has the potential to adversely affect, either directly or through habitat modifications, species identified as candidate, sensitive, or special status species as listed and mapped in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. The project consists of upgrading 43 sediment source features and 3.42 miles (18,058 ft) of unimproved forest road with undersized culverts and poor road drainage. In addition, the City applied for a Lake and Streambed Alteration Agreement (LSAA) with the CA Department of Fish and Wildlife and received an

operational law letter stipulating that the City will adhere to all conditions indicated in the City's permit application and any applicable fish and wildlife laws.

Habitat

The City's consultant, Butte County Resource Conservation District (BCRCD), conducted a biological (botanical and wildlife) resource assessment (BRA) along the Upper Park Road Project Biological Study Area (BSA). The purpose of the BRA, conducted in Spring 2020, was to document any rare, endangered, threatened, and sensitive species and their habitats that may occur in the BSA (**Appendix B**).

The BRA determined that the project has the potential to adversely affect species identified as candidate, sensitive, or special status species as listed and mapped in local or regional plans, policies, or regulations, or by the CDFW or U.S. Fish and Wildlife Service (USFWS). A list of 28 special status species resulting from the CDFW Biogeographic Information and Observation System (BIOS) and USFWS Information for Planning and Consultation (IPaC) databases were determined to potentially occur or have suitable habitat in the two quadrangles encompassing Bidwell Park **(Appendix B).** The geologic consultant observed and identified erosion problems at stream crossings and culverts and prescribed standard road upgrading BMP's and recommendations where various treatments will occur. Thirteen special status species were identified based on their probable presence and/or suitable habitat in the BSA. These 13 species are addressed below given their presence in the Park and potential to be impacted by the proposed project.

Valley Elderberry Longhorn Beetle

The BRA identifies that there is **high potentia**l for the occurrence of the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB). The potential occurrence is high due to the suitable habitat that occurs within the BSA and California Natural Diversity Database (CNDDB) records of the species close to the BSA.

Valley elderberry longhorn beetles are a threatened species under the Federal Endangered Species Act (FESA). They conduct their entire lifecycle on blue elderberry shrubs. There are 5 clusters of blue elderberry shrubs located in the western portion of the BSA. These clusters are growing on the outer edge of the road alignment in unrocked, uncompacted road fill and not on natural ground. The majority of the elderberry shrub populations are located in areas that will not be treated as part of the project. Any impacts to this species within the project area will be avoided or mitigated to a level below significance by implementation of mitigation measure outlined in Mitigation Measure D-1 below.

Birds

Three CDFW State Species of Special Concern (SSC) were identified during surveys; the yellow-breasted chat (Icteria virens), yellow warbler (Setophaga petechia) and California black rail (Laterallus jamaicensis) were identified in the BSA. The rail is also listed as a state threatened species and a Bird of Conservation Concern (BCC, USFWS 2020). The chat and warbler are neotropical migrant birds and had just arrived in the area from their wintering grounds south of the country. On the second survey there were two additional chats (four total) singing and establishing territories along the Creek. It is unknown if the yellow warbler nests in the Park as their populations have declined in the Central Valley (Shuford and Gardali 2008). However, two summer observations show evidence that they may (Ebird accessed April 21, 2020).

No Burrowing owls were observed in the project area and no historical sightings of burrowing owls have occurred in the Park according to The Cornell Lab of Ornithology Ebird records (Ebird 2020). No ground squirrels, or ground squirrel burrows were observed in the grasslands that might create nesting structure for burrowing owls. No other raptors, nor nesting songbirds were identified in the study area. Several cavities were identified in trees along the Upper Park Road that could be used by cavity nesting birds like oak titmouse (Baeolophus inornatus) and Nuttall's woodpecker (Picoides nuttallii) or other woodpecker species. Both are considered a USFWS Bird of Conservation Concern (BCC) throughout their range (USFWS 2020). The wrentit, a chaparral associated species is also considered a BCC throughout its range and nests in the Park. A full list of the 62 bird species observed in the BSA during the field survey is provided in **Appendix B**.

Three fully protected raptors were listed in the databases as occurring in the BSA, peregrine falcon (Falco peregrinus), golden eagle (Aquila chrysaetos) and bald eagle (Haliaeetus leucocephalus), also listed as state endangered (CDFW 2017a, Appendix B)
). Bald eagles will not be impacted by this project because they are not known to nest in the Park and suitable nesting habitat is unlikely given the narrow and shallow creek and steep canyon walls. Eight observations of immature to adult bald eagle were documented in the winter and spring almost annually from 2010 to 2020 (Ebird 2020). Three were noted perching on a snag at Horseshoe lake below the project area. These birds were likely hunting for fish or waterfowl. Other observations in Upper Park were likely flyovers.

Peregrines are known to nest in the Park in cliffs across the creek from the project area (pers. obs.) but are found over 0.5 miles away and will not be impacted. Golden eagles have nested upstream of the Park in cliffs of the Big Chico Creek Ecological Reserve (pers. obs.), but are not known to nest in the Park, and would not be impacted by the proposed project.

Amphibians and Reptiles

Two frog species, foothill yellow-legged frog (Rana boylii, FYLF) and Western spadefoot toad (Spea hammondii) are listed as SSC, and R. boylii is a state threatened species. Neither species were observed. No FYLF or egg masses were observed in the limited pools below the culverts and or the ephemeral streams that are tributaries to Big Chico Creek. One Pacific treefrog (Pseudacris regilla) was heard below the spring culvert outlet at the diversion dam parking. One adult bullfrog (Lithobates catesbeianu) and six bullfrog tadpoles were observed in Big Chico Creek. An adult Western toad (Bufo boreas) was found flattened on the Upper Park Road, likely by a vehicle tire.

The Western pond turtle (Emys marmorata) is known to occur in Upper Park. None were observed in the project area during the field surveys.

Three bird species of concern were identified in the wetland and riparian habitats up and downslope of the road. No nesting raptors were identified in the project area. Amphibians were not observed in the stream or culvert crossings, and all but four streams were dry. Therefore, the proposed project is expected to have **Less-Than-Significant with Mitigation Incorporated** on special status nesting birds, amphibians, and turtles.

Migratory Fish

All the streams being worked in are ephemeral Class III stream; seasonal streams that are predominantly fed by intense rainfall and storms, and are not wildlife corridors for migratory fish species because there is a low intrinsic potential due to steep stream gradients, low quality habitat, and barriers to migration and fish passage. Therefore, the Project would **not affect** any migratory fish species.

Full compliance with the Migratory Bird Treaty Act (MBTA), Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and incorporation of the following mitigation measures will reduce potential impacts to the above special-status species and their habitat that have been identified as having the potential to occur within the BSA to a level that is considered **Less-Than-Significant with Mitigation Incorporated.**

Valley Foothill Riparian and Valley Oak Woodland)

Although the project will involve the removal of trees, the majority of the individual trees proposed for removal are smaller (i.e., 4-6-inch diameter at breast height (DBH) or less -**See Appendix A).**), with a large proportion of all trees experiencing stress and/or compromised health due to overcrowding by similar and other species. Therefore, in some cases, removal of individual trees may ultimately reduce the overcrowding, enhance the health of the oak woodland, improve the visual character of the site, and improve emergency/ public access.

MITIGATION D.1. (Biology - Valley Elderberry Longhorn Beetle)

- All elderberry shrubs shall be avoided during construction activities by establishing a no disturbance buffer around any elderberry shrubs containing stems measuring 1-inch or greater at ground level.
- ESA fencing or other appropriate barriers shall be established around elderberry shrubs prior to the start of construction activities.

- Signs shall be established around the buffer with the following language: “This is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines and imprisonment.”
- Prior to commencement of construction, contractors and work crews that are onsite for more than 30 minutes, shall go through a worker environmental awareness training (WEAT) regarding avoidance of elderberry shrubs and the possible penalties for not complying with these requirements. The training can be given by a qualified biologist or the Foreman, if the Foreman has been trained by the qualified biologist to conduct the WEAT. Written documentation of the completion of WEAT shall be provided to the City and include a sign in sheet with all participants signatures.
- The Project shall not result in effects to elderberry shrubs which include trimming, damaging, removal or modification to elderberry shrubs. If effects to shrubs measuring 1-inch or greater at ground level are inevitable, then consultation with the USFWS and mitigation for effects to elderberry shrubs shall take place prior to effects occurring.
- No insecticide, herbicide, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer areas (buffer areas to be established by a professional biologist), or within 100 feet of any elderberry shrub with one or more stems measuring 1.0 inch or greater in diameter at ground level.

MITIGATION D.2. (Biology - Western Pond Turtles)

- Before initiating any ground disturbances, restrictive silt fencing will be installed in strategic locations to prevent wildlife (i.e., reptiles, mammals, birds, etc.) from entering the construction site from the adjacent aquatic settings and to prevent construction equipment and personnel from entering sensitive habitat from the construction site.
- If western pond turtles are identified in an area where they will be impacted by Project activities, then a qualified biologist will relocate the turtles outside of the work area or create a species protection buffer (determined by the biologist) until the turtles have left the work area.

MITIGATION D.4 (Biology - Hawks, Owls, Kites and Migratory Birds)

- Vegetation removal should be conducted during the non-breeding season (September 1- January 31). If vegetation removal or construction activities occur during the avian breeding season (February 1 – August 31), then a migratory bird and raptor survey shall be conducted by a qualified biologist to identify any active nests (i.e., nests that contain egg(s) or young) within the project area. A qualified biologist shall:

    - Conduct a survey for all special-status bird species and birds protected by the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (CFGC) within seven (7) days prior to vegetation removal or construction activities. The survey shall cover the area within the BSA and 250 feet outside of the BSA where accessible.
    - If an active nest is found, then the biologist will map the nest location and establish an appropriate species protection buffer around the active nest(s) as determined by the biologist. Construction and vegetation removal activity shall be prohibited within the buffer until the young have fledged (i.e., fly) or the nest fails. Nests shall be monitored once per week and written findings reported to the City (e-mail OK).
    - Conduct an additional migratory bird and raptor survey if vegetation removal and/or construction will be required to stop for more than 15 days. The survey shall be conducted within seven (7) days prior to the continuation of activities.

MITIGATION D.4 (Biology – Valley Foothill Riparian and Valley Oak Woodland)

- Project design shall avoid oak trees and riparian habitat, including the critical root zone (CRZ), to the maximum extent feasible.

- When working within proximity to trees identified for preservation, activities shall comply with the following tree preservation Best Management Practices, which shall be included in the tree removal and construction contracts for the project:

    - Pruning of branches that are in the path of any access roads or work areas on the site shall be conducted to the minimum height requirements of the construction equipment prior to the start of construction

activities to prevent breaking of or damage to the branches. The pruning of branches shall be conducted per current ANSI A300 pruning standards and under the supervision of a Certified Arborist or Registered Professional Forester or Registered Professional Forester.

- If excavation work is conducted within the Critical Root Zone of a tree proposed for preservation, a Certified Arborist or Registered Professional Forester shall be on-site to monitor the excavation activities. The CRZ typically corresponds to the dripline of the tree or a radius equal in feet to the number of inches of the tree's diameter at breast height (DBH), whichever is greater.
- The practice of "directional root pruning" shall be used to prune roots in conflict with planned improvements. Directional root pruning is accomplished by pruning main roots back to lateral roots, similar in concept to pruning limbs in the canopy. The techniques are defined more thoroughly below.
  - Avoid grubbing of vegetation using equipment that breaks the ground surface.
  - If possible, instead of excavating an open trench for pipe or conduit installation, tunnel under the root system or excavate using hydraulic or pneumatic equipment.
  - All root pruning shall be done using hand tools, or other methodology approved by a Certified Arborist or Registered Professional Forester, in order to make clean cuts and prevent the ripping or tearing of roots.
  - Roots are not to be stub pruned or ground, unless the tree is slated for removal.
  - Roots less than two (2) inches in diameter are to be clean cut to a parent root or another lateral root outside of the work area.
  - Roots two (2) inches in diameter and larger shall not be cut without the specific approval of the Certified Arborist or Registered Professional Forester. Where roots greater than two (2) inches in diameter must be cut, they are to be clean cut to a parent root or another lateral root outside of the work area.
  - Roots two (2) inches in diameter and larger exposed to the air are to be kept covered and moist at all times during construction operations.
  - Root pruning shall be done by a Certified Arborist or Registered Professional Forester, Certified Tree Workers under the general guidance of the Certified Arborist or Registered Professional Forester or the contractor under the direct supervision of the Certified Arborist or Registered Professional Forester.

- Compaction prevention measures shall be employed if any work is conducted within the CRZ, unless otherwise authorized by City of Chico Public Works Department. Typical compaction prevention measures include:
  - Avoid parking or driving vehicles or heavy equipment in the CRZ.
  - Avoid storage of equipment or materials in the CRZ.
  - If driving in the CRZ is unavoidable, deflate tires slightly to redistribute the weight over a larger area.
  - Construct temporary 'crossings' within the CRZ by placing up to 6" of mulch and/or placing plywood.

- Grading activities shall be avoided within the CRZ. Grading activities conducted outside of the CRZ shall be designed to prevent significantly altering the drainage within the CRZ. If grading changes cannot be avoided within the CRZ, the grade change shall be limited to 4 inches of cut or fill, where feasible, and a Certified Arborist or Registered Professional Forester shall be consulted to determine if additional mitigation measures are needed to maintain aeration within the root zone.

- If drought conditions exist during the construction period, watering of the protected oak trees may be necessary to maintain proper soil moisture conditions. A Certified Arborist or Registered Professional Forester or qualified Landscaper shall be consulted for specific guidance if drought conditions occur at the time of construction.

- Prior to construction, all individual trees and groups of trees, including the CRZ, shall be identified for protection utilizing methodology approved by the City of Chico Public Works Department. Protection methodology could include highly visible plastic mesh fencing, flagging, notes on construction plans, or City approved equivalent measures.

- Attempts will be made during construction to minimize impacts to existing trees to the greatest extent possible. However, 44 trees, ranging from 1-inch DBH to 30 inches DBH, have been identified for potential

removal.

- The impacts to any native riparian trees will be mitigated by replanting trees at a 2:1 ratio as stipulated in the City's CDFW LSAA permit application.

- Non-riparian native trees will be mitigated utilizing the methodology and replanting ratios outlined in the City of Chico's Tree Preservation Regulations in Chico Municipal Code (CMC) Chapter 16.66. Any trees greater than 18" in DBH and defined as "trees" in CMC 16.66 to be removed will be replanted with one (1) new 15-gallon tree for every 6 inches in DBH removed.

The list of trees to be removed per the LSAA application and CMC Chapter 16.66, and the intended replanting ratios are depicted in **Appendix A**. All replacement trees shall be of similar species, unless otherwise approved by the City's Urban Forest Manager, and replanted in proximity to the project area or other suitable locations within Upper Bidwell Park. Using the above LSAA and CMC 16.66 methodology, 31 trees will be replanted to mitigate the 44 tree removals.

The above Best Management Practices and mitigation measures will reduce potential impacts to the Valley Foothill Riparian and Valley Oak Woodland resources to a level that is considered **Less-Than-Significant with Mitigation Incorporated.**

DISCUSSION: D.3 (Biology – Protected Wetlands).

D.3. Vehicle and heavy equipment access will be limited to the current, existing road prism and work will be limited to the minimum necessary to achieve proper function and hydraulic flow. In addition, the treatment of 37 stream crossings in the project are intended to stormproof the stream crossing and reduce or eliminate chronic and episodic erosion and sediment delivery from undersized or improperly designed stream crossings, and hydrologically connected road segments which contribute fine sediment to the watershed during most storms.

Although it is expected that the project will result in less than one-tenth (<1/10) of an acre in permanent fill or excavation impacts. the project may have adverse effects on federally protected wetlands as defined by Section 404 of the Clean Water Act. Any potential impacts to waters from the project will be addressed through consultation with the United States Army Corps of Engineers (USACE), the California Regional Water Quality Control Board (CVRWQCB), and the California Department of Fish & Wildlife (CDFW), and through any required permits. Adherence to permitting requirements from these agencies would reduce any potentially significant impacts on wetlands associated with implementation of the project to a **Less Than Significant Level with Mitigation Incorporated.**

MITIGATION: The City will obtain and comply with final permits and compensatory mitigation that may be required by the USACE, CVRWQCB and CDFW, or copies of relevant correspondence documenting that no permit is required, as applicable. The City will obtain final copies of the required permits and compensatory mitigation or letters documenting relief thereof, prior to commencing construction at the site.

DISCUSSION: D.5 (Biology – Local Ordinances) The project after mitigation will not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. The City will mitigate the loss of the trees to be removed utilizing the methodology provided in the City's Tree Preservation Regulations (C.M.C. §16.66). The impacts associated with native oak tree removal could potentially result in significant impacts to 44 individual trees, ranging from 1 inch DBH to 30 inch DBH, within riparian and valley oak woodlands; however, implementation of Mitigation Measure D.4 (Biology – Valley Foothill Riparian and Valley Oak Woodland) above would minimize these impacts to a **Less-Than-Significant Impact With Mitigation Incorporated.**

MITIGATION: See **Mitigation Measure D.4 (Biology – Valley Foothill Riparian and Valley Oak Woodland)** above.

DISCUSSION: D.6 (Biology – Conflict with Plans). The project will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Currently, the Butte County Association of Governments (BCAG) is coordinating the development of the Butte Regional Conservation Plan (BRCP), which are both a federal Habitat Conservation Plan (HCP) and a state Natural Community Conservation Plan (NCCP). To date, the BRCP is in draft format and has been neither finalized nor adopted (www.buttehcp.com). Nevertheless, the project does not conflict with the draft BRCP. The project would have **No Impact**.

MITIGATION: None required.

E. Cultural Resources and Tribal Cultural Resources Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Cause a substantial adverse change in the significance of an historical resource as defined in PRC Section 15064.5?				X
2. Cause a substantial adverse change in the significance of an archaeological resource pursuant to PRC Section 15064.5?				X
3. Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?		X		
4. Disturb any human remains, including those interred outside of formal cemeteries?		X		
5. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k).				X
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c), the lead agency shall consider the significance of the resource to a California Native American tribe.			X	

DISCUSSION: E.1.-E.5. Effective July 1, 2015, Assembly Bill 52 (AB 52) amended CEQA to mandate consultation with California Native American tribes during the CEQA process to determine whether the proposed project may have a significant impact on a Tribal Cultural Resource. Section 21073 of the Public Resources Code defines California Native American tribes as "a Native American tribe located in California that is on the contact list maintained by the Native American Heritage Commission for the purposes of Chapter 905 of the Statutes of 2004." This includes both federally and non-federally recognized tribes.

Cultural Research Associates conducted a Phase 1. Archaeological Inventory Survey and prepared an associated report of the project area. The western end of the road has been paved, while the central and eastern portion is a rocked roadbed with small gravels. The Area of Potential Effect (APE) consists of 50 feet on either side of the centerline of Upper Park Road. However, most construction activity will take place within 25 feet of the centerline. The vertical APE varies in-depth but will not exceed 14.5 feet below grade.

The report was completed in compliance with the California Environmental Quality Act (CEQA) and Section 106 (16 U.S. Code 470) of the National Historic Preservation Act of 1966. The scope of work included a records search and literature review from the Northeast Information Center (NEIC), and a pedestrian survey of the project area.

The surveys indicated that the entire APE has been affected by prior development of the establishment of Upper Park Road, consisting of grading, road build, and drainage mitigation measures. In addition, the road, parking areas, and the installation of culverts, in natural runoff areas, and a considerable amount of foot, vehicle, and recreational activity have also continued to disturb the area. There is evidence that, over time, this section of the road has been widened, improved, and relocated and holds no historic integrity.

A records search, performed by the Northeast Information Center (NEIC) at California State University, Chico, indicated that approximately 1 mile of the project area had previously been surveyed by professional archaeologists, and an additional nine surveys have been conducted within the ¼ mile project radius. Six of the surveys were negative for resources. Three surveys were positive for resources.

No cultural resources have been recorded within the current APE. However, 17 resources have been recorded within the ¼-mile project radius. Eleven prehistoric resources were located, consisting of bedrock mortars, milling stations, lithic scatters and rock shelters, and five historic resources were noted. One resource was positive for both a prehistoric and a historic component. However, all of these resources listed above are outside of the current APE and will not be impacted by the proposed project.

DISCUSSION: E.5: The pedestrian survey conducted by Cultural Resources Associates determined that Upper Park Road could be a historic resource since it consists of an unimproved, graveled access road built prior to 1970. Upper Park Road was evaluated using National Register of Historic Places (NRHP) and the California Register of Historic Resources (CRHR) Criteria and was found to be ineligible for listing with the NRHP and the CRHR. UPR-001 was recorded on State Parks DPR (523) forms. No other mitigation measures are recommended for this resource. Therefore, the project will have **No Impact** to historical resources.

MITIGATION: Although cultural sensitivity for this project is considered very low for both historic and prehistoric sub-surface resources, there is always the possibility that cultural resources could be unearthed during construction. This potential impact is considered potentially significant but implementation of the following Mitigation Measures and would reduce this impact to **a less-than significant level.**

- **MITIGATION E1 and E.5 (On-Call Tribal Monitor):** Based on the results of the records search, field survey, and assessment of potential direct or indirect Project impacts, the excavation of the natural drainages, and heavy vegetation in the project area, the City's contractor shall provide for the presence of a Mechoopda Indian Tribal Monitor on an "on-call basis" during all earth moving and ground disturbing activities. The City shall provide the contractor's contact information for the purpose of providing direct information to the Tribal Monitor regarding project scheduling and safety protocol, as well as project scope, location of construction areas, and nature of work to be performed.

- **MITIGATION E.3 and E.4. (Inadvertent Discovery):**

  - If during ground disturbing activities, any potentially prehistoric, protohistoric, and/or historic cultural resources are encountered, the supervising contractor shall cease all work within 10 feet of the find (100 feet for human remains) and notify the City. A professional archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeology and being familiar with the archaeological record of Butte County, shall be retained to evaluate the significance of the find.

City staff shall notify all local tribes on the consultation list maintained by the State of California Native American Heritage Commission, to provide local tribes the opportunity to monitor evaluation of the site.

- If human remains are uncovered, the project team shall notify the Butte County Coroner pursuant to Section 7050.5 of California's Health and Safety Code. If the Butte County Coroner determines that the discovered remains are those of Native American ancestry, then the Native American Heritage Commission must be notified by telephone within 24 hours. Sections 5097.94 and 5097.98 of the Public Resources Code describe the procedures to be followed after the notification of the Native American Heritage Commission.

- Site work shall not resume until the archaeologist conducts sufficient research, testing and analysis of the archaeological evidence to make a determination that the resource is either not cultural in origin or not potentially significant. If a potentially significant resource is encountered, the archaeologist shall prepare a mitigation plan for review and approval by the City, including recommendations for total data recovery, Tribal monitoring, disposition protocol, or avoidance, if applicable. All measures determined by the City to be appropriate shall be implemented pursuant to the terms of the archaeologist's report. The preceding requirement shall be incorporated into construction contracts and documents to ensure contractor knowledge and responsibility for the proper implementation.

F. Geology /Soils Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Expose people or structure to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
a. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines & Geology Special Publication 42)				X
b. Strong seismic ground shaking?				X
c. Seismic-related ground failure/liquefaction?				X
d. Landslides?				X
2. Result in substantial soil erosion or the loss of topsoil?			X	
3. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				X
4. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X

5. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water, or is otherwise not consistent with the Nitrate Action Plan or policies for sewer service control?				X

DISCUSSION: F.1., F.3., F.4. The City of Chico and surrounding area is located in one of the least active seismic regions in California and contains no active faults. Currently, there are no designated Alquist-Priolo Special Studies Zones within the project area or immediate vicinity, nor are there any known or inferred active faults. Thus, the potential for ground rupture within the Chico area is considered very low. Therefore, the improvements proposed at this site will not expose people or structures to a potential substantial adverse geologic effect, including, the risk of loss, injury or death from seismic-related ground failure, including liquefaction or collapse, lateral spreading, subsidence, or on-site or off-site landslides. Furthermore, the proposed project is not located on expansive soils and would not result in impacts associated with being located on expansive soils. Therefore, the project is considered to have **No Impact**.

MITIGATION: None Required

DISCUSSION: F.2. The project site has Chico loam soil which is not highly erosive. Development of an erosion control plan, including incorporation of Best Management Practices (BMPs), is a standard requirement of a project of this size. Additionally, the City has developed a Storm Water Management Program (SWMP) per Phase II of the National Pollutant Discharge Elimination System (NPDES) Program. The project will be constructed in full compliance with applicable standards of the SWMP, which includes both construction activity and post-construction storm water discharge BMPs.

Furthermore, the City and the BCAQMD require implementation of all applicable fugitive dust control measures, which further reduces the potential for construction-generated erosion. All projects disturbing one or more acres, including the Upper Bidwell Park Road Sediment Reduction Project, must comply with and obtain coverage under the applicable National Pollutant Discharge Elimination System (NPDES) System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities from the Regional Water Quality Control Board (RWQCB) per §402 of the Clean Water Act. Compliance with the Storm Water Management Program and existing regulation will keep potential impacts relating to soil erosion or loss of topsoil at a **Less-Than-Significant level**.

MITIGATION: None Required

DISCUSSION: F.5. Septic tanks and alternative wastewater disposal systems would not be installed on the project site. Therefore, implementation of the proposed project would not result in impacts to soils associated with the use of such wastewater treatment systems. Therefore, the project will have **No Impact**.

MITIGATION: None Required

G. Greenhouse Gas Emissions Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Generate greenhouse gas (GHG) emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				X

DISCUSSION: G.1. - G.2. In 2012, the Chico City Council adopted a Climate Action Plan (CAP) which sets forth objectives and actions that will be undertaken to meet the City's GHG emission reduction target of 25 percent below 2005 levels by the year 2020. This target is consistent with the State Global Warming Solutions Act of 2006 (AB 32, Health & Safety Code, Section 38501[a]).

Development and implementation of the CAP are directed by a number of goals, policies and actions in the City's General Plan (SUS-6, SUS-6.1, SUS-6.2, SUS-6.2.1, SUS-6.2.2, SUS-6.2.3, S-1.2 and OS-4.3). Growth and development assumptions used for the CAP are consistent with the level of development anticipated in the GPEIR. The actions in the CAP, in most cases, mirror adopted General Plan policies calling for energy efficiency, water conservation, waste minimization and diversion, reduction of vehicle miles traveled, and preservation of open space and sensitive habitat.

Section 15183.5(b) of Title 14 of the California Code of Regulations states that a GHG Reduction Plan, or a Climate Action Plan, may be used for tiering and streamlining the analysis of GHG emissions in subsequent CEQA project evaluation provided that the CAP does the following:

- Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;
- Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable;
- Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area;
- Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;
- Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels; and
- Be adopted in a public process following environmental review.

The 2005 baseline GHG emissions were calculated to be 514,332 metric tons of carbon dioxide equivalents ($MtCO_2e$). The inventory found a majority of the emissions came from the transportation sector (~65%), while similarly sized portions came from commercial energy consumption (~16%) and residential energy consumption (15%), with small portions coming from solid waste sent to the landfill (~4%) and industrial energy consumption (~1%). The goal of the CAP is to reduce emissions for the year 2020 to 385,749 metric tons of carbon dioxide equivalents ($MtCO_2e$).

Construction activities associated with Upper Park Road Sediment Reduction Project would temporarily generate a small amount of additional GHG emissions, predominantly in the form of CO_2 resulting from the operation of construction equipment. While GHG emissions generated by these construction activities may be considered new, they are temporary and episodic in nature and would not be considered substantial given the project's small size. Further, the construction activities from this project will not exceed those emissions already anticipated, analyzed, and mitigated in the City's 2030 General Plan EIR and Climate Action Plan.

Development of this project would result in neither a significant impact on the environment, nor in the City's inability to meet applicable GHG emission reduction plans, policies or regulations. Therefore, compliance with City of Chico climate action policies/requirements and BCAQMD Rules will keep short term construction related GHG impacts at a **Less-Than-Significant Level**.

MITIGATION: None Required.

H. Energy Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?				X
2. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?				X

DISCUSSION: H.1. Neither construction nor operation of the proposed project would result in a potential significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. Construction activities would require minimal electricity consumption which is not anticipated to have any adverse impact on available energy resources. It is not anticipated that the project would result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction. **Less Than Significant Impact**

DISCUSSION: H.2. The project would not conflict with or obstruct any local plans, including the Chico Climate Action Plan, for renewable energy or energy efficiency. The City of Chico is committed to reducing energy consumption to be consistent with statewide goals, which outlines plans for renewable energy and energy efficiency as a means to reduce greenhouse gas emissions. Therefore, compliance with City of Chico policies/requirements and BCAQMD Rules outlined in Section will keep short term construction related GHG impacts at a **Less-Than-Significant** level.

I. Hazards /Hazardous Materials Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
2. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				X
3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
4. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X

5. For a project located within the airport land use plan, would the project result in a safety hazard for people residing or working in the Study Area?		X
6. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the Study Area?		X
7. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?		X
8. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?		X

DISCUSSION: I.1. The project will not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Hazardous materials will be used during construction activities (e.g., equipment maintenance substances, fuel, solvents, and paving compounds). However, all hazardous material use would be required to comply with all applicable local, state, and federal standards associated with the handling and storage of hazardous materials. Project health and safety plans shall include emergency procedures for responding to hazardous materials releases for materials that would be brought onto or discovered at the site as part of construction activities. Use of hazardous materials in accordance with applicable standards ensures that any exposure of the public to hazardous materials would result in **Less-Than-Significant** Impact.

DISCUSSION: I.2. The project will not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, the project is considered to have **No Impact**.

MITIGATION: None Required

DISCUSSION: I.3. – I.4. The project will not result in emitting hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. The project site is not listed as a state or federal hazardous waste site (pursuant to Governmental Code Section 65962.5). Therefore, **No Impact** would occur.

MITIGATION: None Required.

DISCUSSION: I.5. –I.8. The site is not located within the Airport Influence Area of the Chico Municipal Airport or a private airstrip and would not expose persons to airport-related hazards. The Chico Municipal Airport is approximately 3.72 miles north-west of the project site. The small, private Ranchero Airport is located outside the city limits, approximately 6.05 miles southwest of the project site. The project site is not located in an airport land use plan area. The project would not interfere with an adopted emergency response plan or emergency evacuation plan. The site is surrounded by urban uses and the area is within the service area of the City of Chico Fire Department. Therefore, the project is considered to have **No Impact** with regard to these hazards.

MITIGATION: None Required.

J. Hydrology/ Water Quality Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Violate any water quality standards or waste discharge requirements?		X		
2. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				X
4. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site?				X
6. Otherwise substantially degrade water quality?		X		
7. Place real property within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
8. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
9. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
10. Expose people or structures to inundation by seiche, tsunami, or mudflow?				X

DISCUSSION: J.1. & J.6. The project is not anticipated to result in violations to any water quality standards or waste discharge requirements. Potential impacts to Waters of the U.S. will be avoided by limiting the extent compatible with the goal of the project. Avoidance measures for any potential impacts on riparian vegetation and considering alternatives that are still in line with the goal of the project have been addressed. Minimization measures such as limiting the access of equipment to only the amount feasible within bounds of the road footprint to achieve implementation designs and the proper hydraulic flow design will be practiced. Mitigation in the form of rehabbed aquatic resource function and access, as well as reducing fine-sediment impacts in the Big Chico Creek Watershed are some inherent benefits of this project.

PWA's Action Plan recommends improving water quality and drainage patterns by treating all 43 features and 3.42 mi of road for erosion control and erosion prevention. Individual treatment features include 40 stream crossings, 2 ditch relief culverts, and 1 spring, as well as road surface drainage and associated erosion (PWA 2017). Upgrading Upper Park Road will require a total of 37 stream encroachments (three (3) additional stream crossings will be treated but do not require a CDFW LSAA). The thirty-seven (37) stream encroachments will include upgrading of 22 stream crossings with culvert replacement or new installation, stream crossings that have been determined to require culverts will have culverts replaced or installed that are adequately sized to convey 100-year flood flow and transported stream debris, including upgrading of 15 stream crossings with armored fill replacement or installation.

This project extends over 3.42 miles of Upper Park Road and will reduce and largely eliminate the total threat of 3,572 yd^3 of future sediment delivery to Big Chico Creek (2,082 yd^3 from episodic sources and 1,490 yd^3/decade from hydrologically connected road surfaces). Road surfaces will be treated to disconnect hydrologic connectivity to arrest unnatural erosion by reestablishing a more natural hillside hydrology (PWA 2017). All work will be completed by licensed contractors utilizing industry standard practices and PWA technical advice and construction oversight to properly manage installation of culverts, road shaping, and placement of road rock.

Development of an erosion control plan including incorporation of best management practices (BMPs) is a standard requirement of projects of this size. Additionally, the City has developed a Storm Water Management Program (SWMP) per Phase II of the National Pollutant Discharge Elimination System (NPDES) Program. The project will be constructed in full compliance with applicable standards of the SWMP, which includes both construction activity and post-construction storm water discharge BMPs. All stream channels are dry during the summer time and work schedule. Further, all projects disturbing one or more acres, including the Upper Bidwell Park Road Sediment Reduction Project, must comply with and obtain coverage under the NPDES Construction General Permit (Water Quality Order 2009-0009-DWQ) to minimize water quality impacts. A Storm Water Pollution Prevention Plan (SWPPP) will also be prepared before construction commences.

An U.S. Army Corps of Engineers Clean Water Act Section 404 permit will be required for work in waters that are federally jurisdictional, as well as a Section 401 and/or Waste Discharge Requirements for Discharges of Dredged or Fill Materials to Waters of the State will be required from the California Regional Water Quality Control Board. It is expected that the project will result in less than one-tenth (<1/10) of an acre in permanent fill or excavation impacts. Compliance with the Storm Water Management Program, BMPs, SWPPP, 401/404 permits and other existing regulations will ensure potential impacts relating to water quality and waste discharge requirements are **Less-Than-Significant with Mitigation Incorporated**.

MITIGATION:. The City will obtain and comply with final permits and compensatory mitigation that may be required by the USACE, CVRWQCB and CDFW, or copies of relevant correspondence documenting that no permit is required, as applicable. The City will obtain final copies of the required permits and compensatory mitigation or letters documenting relief thereof, prior to commencing construction at the site.

DISCUSSION: J.2. The proposed Project would not result in the construction of large areas of impervious surfaces that would prevent water from infiltrating into the groundwater nor would it result in a net deficit in aquifer volume or a significant lowering of the local groundwater table level. Groundwater impacts associated with construction dewatering are temporary in nature and are not anticipated to impact nearby wells and would be conducted in compliance with RWQCB discharge permit requirement; therefore, there will be **No Impact** to groundwater from dewatering.

MITIGATION: None Required.

DISCUSSION: J.3.-J.5. Project will improve the natural hydrologic flow regime and not substantially alter the existing drainage pattern of the site or area, increase the rate or amount of surface runoff, or degrade water quality. The existing drainage pattern of Big Chico Creek will not be altered, as the only work proposed will be located in ephemeral, Class III streams. Instead, the work envisioned for this Project would better direct and improve natural stream flows, hillslope runoff, and aquatic habitat conditions. In addition, the project is not expected to result in any new impacts beyond those already anticipated, analyzed, and mitigated in the 2030

General Plan Environmental Impact Report (GPEIR). Therefore, the project would have **No Impact** on drainage or runoff, and no mitigation is required.

MITIGATION: None Required.

DISCUSSION: J.7. - J.10. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps the project does not place real property within a 100-year flood hazard area nor does the project expose people or structures to the risk of inundation by seiche, tsunami, or mudflow. **No Impact.**

MITIGATION: None Required

K. Land Use and Planning Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Result in physically dividing an established community?				X
2. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the City of Chico General Plan, Title 19 "Land Use and Development Regulations", or any applicable specific plan) adopted for the purpose of avoiding or mitigating an environmental effect?				X
3. Results in a conflict with any applicable Resource Management or Resource Conservation Plan?				X
4. Result in substantial conflict with the established character, aesthetics or functioning of the surrounding community?				X
5. Result in a project that is a part of a larger project involving a series of cumulative actions?				X
6. Result in displacement of people or business activity?				X

DISCUSSION: K.1. - K.6. The project will neither physically divide an established community, nor conflict with any applicable land use plan or resource management or conservation plan, nor result in substantial conflict with the established character, aesthetics or functioning of the surrounding community. The project is not part of a larger project involving a series of cumulative actions. The project will not result in displacement of people or business activities. The project would have **No Impact** on land use and planning; therefore, no mitigation is required.

MITIGATION: None Required.

L. Mineral Resources Would the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
				X

1. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				
2. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

DISCUSSION: L.1. - L.2. The project would not result in the loss of availability of a known mineral resource or mineral resource recovery site. Mineral resources are not associated with the project or located on the project site. Therefore, the project will have **No Impact** on mineral resources and no mitigation is required.

MITIGATION: None Required.

M. Noise Will the project or its related activities result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Exposure of persons to or generation of noise levels in excess of standards established in the 2030 Chico General Plan, noise ordinance, or applicable standards of other agencies?				X
2. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				X
3. Exposure of sensitive receptors (residential, parks, hospitals, schools) to exterior noise levels (CNEL) of 65 dBA or higher?			X	
4. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X
5. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
6. For a project located within the airport land use plan, would the project expose people residing or working in the Study Area to excessive noise levels?				X
7. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the Study Area to excessive noise levels?				X

DISCUSSION: M.1. - ML.2., M.4. The project is not residential in nature. The project area is primarily adjoined by lands zoned for and used for dispersed recreational purposes. The project will not expose persons to or generate noise levels in excess of standards established in the 2030 Chico Plan or respective noise ordinance, nor will it expose persons to or generate excessive groundborne vibration or noise levels. Once construction activities have ceased, the day-to-day operations of the project will not contribute to an increase in ambient noise levels; therefore, there will be **No Impact**.

MITIGATION: None Required

DISCUSSION: M.3.,ML.5. The project is consistent with the City's 2030 General Plan and is not anticipated to result in any new impacts beyond those identified by the General Plan EIR. The project construction will temporarily increase ambient noise levels from the use of heavy equipment, which may include pneumatic jack hammers, backhoe trenchers, generators or other similar devices. Although temporary single-noise events will be generated during the construction phase, these impacts are considered to be less-than-significant because they are short term, and project contractors will be required to comply with existing City noise regulations (Chapter 9.38 of the Chico Municipal Code) which limit the hours of construction to minimize construction related noise impacts. Additionally, the construction area is surrounded by open space, with few adjacent residences; thus further reducing the potential for disturbance associated with the temporary increase in ambient noise. Therefore, the transient noise impacts will be **Less-Than-Significant.**

MITIGATION: None Required

DISCUSSION: M.6. - M.7. The site is not located within the Airport Influence Area of the Chico Municipal Airport or a private airstrip. The Chico Municipal Airport is approximately 4.5 miles north of the project site. The project site is not located in an airport land use plan area. Therefore, there would be **No Impact** associated with excessive noise to people or land uses at or within the vicinity of the Municipal Airport or a private airstrip.

MITIGATION: None Required

N. Open Space/ Recreation Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Affect lands preserved under an open space contract or easement?				X
2. Affect an existing or potential community recreation area?			X	
3. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			X	
4. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

DISCUSSION: N.1. The site is designated Primary Open Space and Secondary Open Space on the General Plan Land Use Diagram and is located within Upper Bidwell Park recreation area. There are no existing open space contracts or easements that would be compromised by the project; therefore, there will be **No Impact** to open space or easement lands.

DISCUSSION: N.2 – N.3. The project is consistent with the City's 2030 General Plan and is not anticipated to result in any new impacts beyond those already identified, analyzed and mitigated in the General Plan Environmental Impact Report (GPEIR). Upgrading sediment source features along the 3.42 miles of connected road could result in temporary impacts to existing recreational facilities. Visitors may experience temporary and minor construction generated aesthetic and noise impacts, including minor detours during their visit to the area. Recreationalists displaced during construction could, however, use other improved areas of Upper Bidwell Park and trails away from active construction locations, or any of the other parks within the vicinity and in Chico. Temporary construction-related impacts resulting in use of nearby parks would not result in substantial increases of people using other parks. Once the project is completed, the area will function in a similar manner as prior to

the project. Construction of the project would not permanently impact an existing recreation area or substantially increase the use of recreational facilities; therefore, the impact would be **Less-Than- Significant**.

DISCUSSION: N.4. This project was identified through the Upper Bidwell Park Road Sediment Source Assessment and Treatment Action Plan that was presented to the City of Chico Parks Division in May of 2017. Any future development projects requiring the construction or expansion of recreational facilities will be subject to a separate project specific level of environmental review, including analysis of potential impacts and implementation of mitigation if necessary. The project does not increase the use of, or require the construction or expansion of, existing neighborhood and regional parks or other recreational facilities. Therefore, the proposed project would have **No Impact** on these resources.

MITIGATION: None Required.

O. Population/ Housing Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
2. Displace substantial existing housing, necessitating the construction of replacement housing elsewhere?				X
3. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X

DISCUSSION: O.1.-O.3. The project does not induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure). The project will not displace substantial existing housing, necessitating the construction of replacement housing elsewhere nor will the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere. Therefore, the proposed project would have **No Impact** on these resources.

MITIGATION: None Required.

P. Public Services Will the project or its related activities have an effect upon or result in a need for altered governmental services in any of the following areas:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Fire protection?				X
2. Police protection?				X
3. Schools?				X
4. Parks and recreation facilities? (See Section J Open Space/Recreation)				X
5. Other government services?				X

DISCUSSION: P.1. - P.5. The project is consistent with the City's 2030 General Plan and is not anticipated to result in any new impacts beyond those already identified, analyzed and mitigated in the General Plan Environmental Impact Report (GPEIR). The project will not result in a direct increase in population that would affect fire, police, schools, parks and recreation facilities, or other government services. The project consists of upgrading 43 sediment source features and 3.42 miles (18,058 ft) of connected road. . Once the project is completed, the area will function in a similar manner as prior to the project. Since the proposed project would not result in a direct population increase or a substantial increase in use of the area, the expansion of existing public services would not be required. The project would have **No Impact** on these resources.

MITIGATION: None Required.

Q. Transportation/Circulation Will the project or its related activities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?				X
2. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				X
3. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
5. Result in inadequate emergency access?				X
6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

DISCUSSION: Q.1. - Q.6. The project would not conflict with an applicable plan, ordinance or policy regarding the circulation system, nor will it conflict with a congestion management program, result in changes in air traffic levels, or affect air traffic patterns. There will be no permanent route modification or design changes of the existing road, nor are there any above ground structures associated with the project. The project consists of upgrading 43 sediment source features and 3.42 miles (18,058 ft) of connected road. The project is not located along any existing paved roadways that provide access to the community. Construction activities will have minimal impacts on traffic patterns and will not impact emergency access to the area. In fact, it is anticipated that the road and drainage treatments will improve access for emergency vehicles. All impacts to ground

transportation will be temporary and exist only during construction. The project would have **No Impact** on these resources; therefore, no mitigation is required.

MITIGATION: None Required.

R. Utilities Will the project or its related activities have an effect upon or result in a need for new systems or substantial alterations to the following utilities:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Water for domestic use and fire protection?				X
2. Natural gas, electricity, telephone, or other communications?				X
3. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
4. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
5. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
6. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
7. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
8. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X
9. Comply with federal, state, and local statutes and regulations related to solid waste?				X

DISCUSSION: R.1. - R.9. The project will not result in a need for new systems or substantial alterations to the following utilities: water, natural gas, telephone or other communications; nor will the project require the construction or expansion of water or storm drainage facilities. No additional water will be necessary. Any impact to utilities will be temporary.

The project consists of upgrading sediment source features on an existing road so the project will not result in direct population growth or increase in capacity at the Water Pollution Control Plant (WPCP).

During construction of the project, a small amount of construction waste would be generated. The locally permitted landfill facilities have sufficient capacity and would be available to accept the construction waste. The project would have **No Impact** on these resources; therefore, no mitigation is required.

MITIGATION: None Required.

S. Wildfire If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Substantially impair an adopted emergency response plan or emergency evacuation plan?				X
2. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				X
3. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?			X	
4. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				X

DISCUSSION: S.1-S.4: In determining the level of significance, this analysis assumes that the project will be implemented with the following best management practices (BMPs), and would comply with relevant federal and state laws, regulations, and ordinances.

- To reduce impacts associated with exposure of people to wildland fires, Contractors shall ensure that adequate fire protection equipment is available at the work sites. This shall include fire extinguishers attached to all mechanized equipment. I
- Firefighting hand tools shall be made available at all areas where equipment is operated. Contractors shall comply with all applicable fire safe standards as found in Public Resources Code Division 4, Chapter 6, (PRC's 4427, 4428, 429, 4431, 4442, list not all inclusive).
- Vehicles shall not be parked in tall grass or any other location where heat from the exhaust system could ignite a fire. All motorized equipment shall have approved spark arrestors.
- If crews accidentally ignite a fire while conducting the road maintenance and culvert work, they are to call 911 for response from the Fire Department. If the fire's spread is slow and crews can safely extinguish the fire with the tools, water, and fire extinguishers they have on hand, they should attempt to do so. If the fire becomes well-established and the forward spread is clearly beyond control, crews should not engage in firefighting at the head of the fire. If crews are in an area where the location of the fire makes egress impossible, they should move into an area already burned by the fire and wait for conditions to change before attempting to leave the area.
- During periods of high fire hazard project supervisor shall check the National Fire Danger Rating System (NFDRS) maps at https://www.wfas.net daily. If the NFDRS rating for the project area is above 'High', all implementation personnel and contractors shall:
  - Provide a 4BC fire extinguisher or larger on each vehicle, and a complement of fire tools to equip every worker on the project site with at least one tool.

- Every chainsaw operator will carry a fire extinguisher of at least 8oz. Each chipper, mower, or masticator should be equipped with a 4BC fire extinguisher and at least 1 fire tool per operator.
- Consider working a schedule which starts early in the morning and halts work by 2pm.
- Not use metal-bladed weed trimmers.

MITIGATION: Since impacts would be **Less Than Significant** by implementing the above BMPs, no mitigation measures are needed.

T. MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	LessThan Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. The project has the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.		X		
2. The project has possible environmental effects which are individually limited but cumulatively considerable. (Cumulatively considerable means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past, current and probable future projects).		X		
3. The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.				X

DISCUSSION: T.1. - Based on the preceding environmental analysis, with the incorporation of measures identified within this environmental review into the project, potential impacts related to Biological, Historic, Hydrology/Water Quality, and Cultural/Tribal Resources will be mitigated to a less than significant level. It is expected that the project will result in improvement to the Upper Park Road, water quality, natural streamflow function, and public safety access.

As discussed above, the proposed project would not restrict the range or population levels of a plant or animal community, substantially reduce biological habitats, affect rare or endangered species or eliminate important historic or prehistoric resources. Although the potential for nesting bird and roosting species to be present in the project area are low, disturbances during construction could result in significant impacts. The potential for impacts to previously unknown buried archaeological or paleontological resources is low; however, impacts to such resources, if they are unearthed during construction, could be significant. With implementation of avoidance where possible, Best Management Practices, and mitigation measures identified in this document, the project's potential impacts would be **Less-Than-Significant with Mitigation Incorporated**.

MITIGATION: See mitigation measures in Sections D - Biological Resources, Section J – Hydrology/Water Quality and Section E - Cultural Resources and Tribal Cultural Resources.

DISCUSSION: T.2. - The proposed project would not result in direct or indirect adverse effects on human beings that would result in cumulatively considerable contributions to cumulative impacts. The project will result in improvement to water quality, natural habitat functioning and public safety, so the long term effects of the project are expected to be beneficial**.** Temporary changes in air quality emissions would be within acceptable thresholds and would not result in a considerable contribution to cumulative impacts. The project includes installation of

replacement trees within the project footprint and would not result in a considerable contribution to loss of trees and other vegetation.

Effects of temporary construction noise on nesting bird species could result in a contribution to significant effects on the reproduction of these species. Mitigation identified in Section D, Biological Resources, would reduce the project's cumulative contribution. While there are no known archaeological resources within the project limits, damage to previously unknown cultural resources during construction could result in a considerable contribution to cumulative impacts. Mitigation identified in Section E, Cultural Resources to implement appropriate procedures in the event that a cultural resource is encountered ground disturbing activities would minimize the potential for impacts and reduce the project's cumulative contribution. The effects of the project are considered **Less Than Cumulatively Significant with Mitigation**.

MITIGATION: See mitigation measures in Sections D - Biological Resources, and Section E - Cultural Resources and Tribal Cultural Resources.

DISCUSSION: T.3. The proposed project would not result in substantial adverse effects on human beings. The analysis of the project shows that temporary impacts during construction, such as air quality emissions and temporary noise increases, would be within acceptable thresholds and ordinance standards. Potential impacts to human health are considered **No Impact.**

MITIGATION: None required.

V. REFERENCES

Butte County. 2010. Butte County General Plan 2030, adopted October 26, 2010. Available at https://www.buttecounty.net/dds/Planning/GeneralPlan/Chapters.aspx.

Butte County. 2000. Butte County Airport Land Use Compatibility Plan, December 20, 2000. Available at https://www.buttecounty.net/Portals/10/Docs/ALUC/ALUC_Complete_Reduced.pdf.

Butte County Air Quality Management District (BCAQMD). 2014. CEQA Air Quality Handbook, October 23, 2014. Available at https://bcaqmd.org/wp-content/uploads/CEQA-Handbook-Appendices-2014.pdf.

Butte County Air Quality Management District (BCAQMD). 2010. Rule 205, Fugitive Dust Emissions, May 27, 2010. Available at https://www.arb.ca.gov/DRDB/BUT/CURHTML/R205.PDF.

Butte County Air Quality Management District (BCAQMD). Butte County – State and Federal Ambient Air Quality Attainment Status. Accessed on June 6, 2018. Available at http://bcaqmd.org/planning/air-quality-standards-air-pollutants/.

Butte County Association of Governments (BCAG). Butte Regional Conservation Plan. Accessed on Accessed on June 6, 2018. Available at http://www.buttehcp.com/.

Butte County Department of Water and Resource Conservation. 2004. Butte County Groundwater Management Plan, September 2004. Available at https://www.buttecounty.net/waterresourceconservation/GroundwaterManagementPlan.aspx.

Butte County Department of Water and Resource Conservation. 2005. Butte County Integrated Water Resource Program, May 2005. Available at https://www.buttecounty.net/Portals/26/IWRP/ExecutiveSummary.pdf.

California Department of Conservation. 2018. Earthquake Fault Zones. A guide for Government Agencies, Property Owners/Developers, and Geoscience Practitioner for Assessing Fault Rupture Hazards in California. Special Publication 42. Revised 2018. Available at ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf.

California Department of Conservation, Division of Land Resource Protection. Farmland Mapping and Monitoring Program. Accessed on Accessed on June 6, 2018. Available at https://maps.conservation.ca.gov/dlrp/ciff/.

California Department of Toxic Substances Control. Envirostor Database. Accessed on Accessed on June 6, 2018. Available at https://www.envirostor.dtsc.ca.gov/public/.

California Water Service Company. 2011. California Water Service Company, 2010 Urban Water Management Plan, Chico-Hamilton District, adopted June 2011. Available at http://www.water.ca.gov/urbanwatermanagement/2010uwmps/CA%20Water%20Service%20Co%20-%20Chico%20Hamilton%20City%20District/_CH-Ham_UWMP_2010.pdf.

City of Chico. 2011. Chico 2030 General Plan, adopted April 12, 2011. Available at http://www.chico.ca.us/document_library/general_plan/GeneralPlan.asp.

City of Chico. 2010. Chico 2030 Draft General Plan Environmental Impact Report, September 2010. State Clearinghouse Number 2008122038. http://www.chico.ca.us/document_library/general_plan/DraftEIR.asp

City of Chico. 2012. Chico 2020 Climate Action Plan, Final Draft September 24, 2012. Available at http://chicosustainability.org/documents/ClimateActionPlan.pdf.

City of Chico. Chico Municipal Code. Accessed on Accessed on June 6, 2018. Available at www.ci.chico.ca.us/government/municipal_code.asp.

Federal Emergency Management Agency. 2011. Flood Insurance Rate Maps 06007C0505E, revised January 6, 2011. Available at http://map1.msc.fema.gov/.

Natural Resource Conservation Service. 2006. Soil Survey of Butte Area, California, Parts of Butte and Plumas Counties. Available at http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA612/0/Butte_CA.pdf.

Pacific Watershed Associates. 2007. Upper Bidwell Park Road Sediment Source Assessment and Treatment Action Plan, Butte County, California. Report No. 171028801. Produced for City of Chico. Available at https://chico.ca.us/sites/main/files/file-attachments/upperbidwellparkroadreport.pdf?1578614760

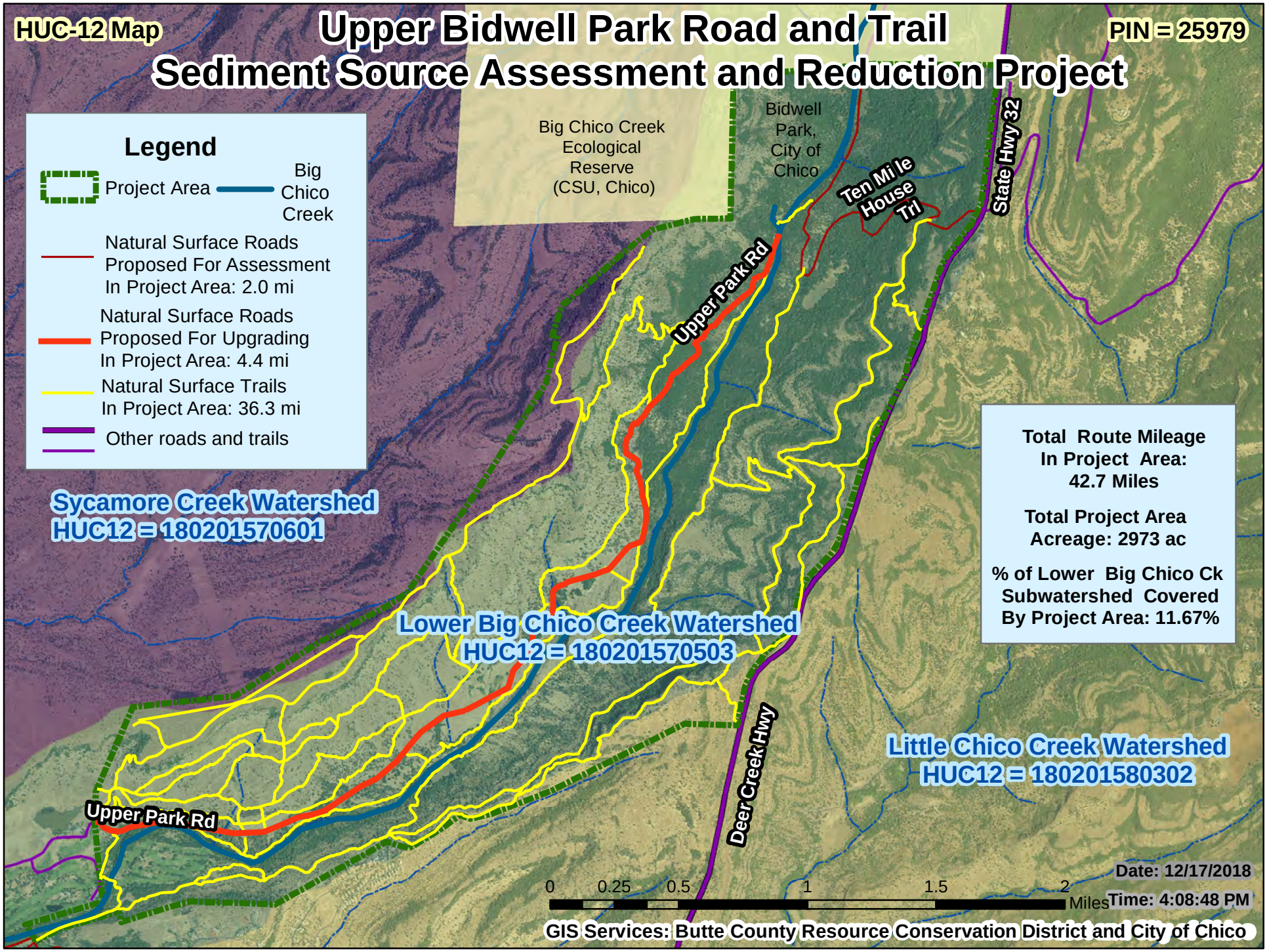
State Water Resources Control Board. GeoTracker. Accessed on June 6, 2018. Available at https://geotracker.waterboards.ca.gov/.

U.S. Army Corps of Engineers. 2010. Waters of the United States Preliminary Jurisdictional Determination, August 27, 2010.

U.S. Fish and Wildlife Service. 2009. National Wild and Scenic Rivers System, September 2009. Available at https://www.rivers.gov/river-app/index.html?state=CA.

U.S. Fish and Wildlife Service. 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle, July 9, 1999. Accessed on June 6, 2018 at https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/Documents/velb_conservation.pdf.

Attachment 1:
Project Maps, Tables and Figures


HUC-12 Map
Upper Bidwell Park Road and Trail
Sediment Source Assessment and Reduction Project
PIN = 25979
Legend
Project Area
Big Chico Creek
Natural Surface Roads Proposed For Assessment In Project Area: 2.0 mi
Natural Surface Roads Proposed For Upgrading In Project Area: 4.4 mi
Natural Surface Trails In Project Area: 36.3 mi
Other roads and trails
Big Chico Creek Ecological Reserve (CSU, Chico)
Bidwell Park, City of Chico
Ten Mile House Trl
State Hwy 32
Upper Park Rd
Sycamore Creek Watershed
HUC12 = 180201570601
Lower Big Chico Creek Watershed
HUC12 = 180201570503
Deer Creek Hwy
Little Chico Creek Watershed
HUC12 = 180201580302
Upper Park Rd
Total Route Mileage In Project Area: 42.7 Miles
Total Project Area Acreage: 2973 ac
% of Lower Big Chico Ck Subwatershed Covered By Project Area: 11.67%
0 0.25 0.5 1 1.5 2 Miles
Date: 12/17/2018
Time: 4:08:48 PM
GIS Services: Butte County Resource Conservation District and City of Chico

Map 2. Road related sediment sources by type for the Upper Bidwell Park Road, Big Chico Creek, Butte County, California.

Sites by type

- Stream crossing
- Ditch relief culvert
- Spring
- Start of survey
- End of survey
- Parking areas
- Gate

- PWA assessed roads
- Other roads
- Streams
- State Highway 32
- Map 2A/2B area of interest

0 750 1,500 3,000 Feet

Scale: 1:18,000 1 in : 1,500 ft
Contour interval: 10m

Imagery: NAIP 2016

Note: Streams displayed are based on field mapping and aerial photo interpretation.

Prepared May 2017 by:
Pacific Watershed Associates
www.pacificwatershed.com

Map 2B

Map 2A

Caution: Wet crossing Seasonal access

End of survey

Parking Area "U"

Parking Area "T"

Parking Area "P"

Parking Area "O"

Parking Area "Q"

Parking Area "M"

Parking Area "I"

Parking area "J"

Parking Area "G"

Parking Area "F"

Salmon Hole Parking Area "N"

Brown's Hole Parking Area "S"

Diversion Dam Parking Area "L"

Bear Hole Parking Area "K"

Day Camp Parking Area "H"

Main Parking Area "E" (paved)

Gate

Start of survey

10 mile House Road

Annie Bidwell Trail

Upper Bidwell Park Road

Big Chico Creek

State Highway 32

Horseshoe Lake

Wildwood Road

Big Chico Creek

Annie Bidwell Trail

P:\GIS\10288 Big Chico Creek 2017\10288 map 2 - site type.mxd

Map 2A. Road related sediment sources by type for the Upper Bidwell Park Road (South), Big Chico Creek, Butte County, California.

Sites by type

- Stream crossing
- Ditch relief culvert
- Spring
- Start of survey
- End of survey
- Parking Areas
- Gate

PWA assessed roads
Other roads
Streams
State Highway 32

0 350 700 1,400 Feet

Scale: 1:8,400 1 in : 700 ft
Contour interval: 10m

Imagery: NAIP 2016

Note: Streams displayed are based on field mapping and aerial photo interpretation.

Prepared May 2017 by:
Pacific Watershed Associates
www.pacificwatershed.com

N

Horseshoe Lake
Main Parking Area "E (paved)"
Start of survey
Gate
Wildwood Road
Big Chico Creek
Annie Bidwell Trail
Parking Area "F"
Parking Area "G"
Parking area "I"
Day Camp Parking area "H"
Parking area "J"
Bear Hole Parking Area "K"
Salmon Hole Parking Area "N"
Parking Area "M"
Diversion Dam Parking Area "L"
Gate

1 2 3 4 5 6 7 8 9 10 11 12A 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

P:\GIS\10288 Big Chico Creek 2017\10288 map 2a - site type.mxd

Map 2B. Road related sediment sources by type for the Upper Bidwell Park Road (North), Big Chico Creek, Butte County, California.

Caution:
Wet Crossing
Seasonal Access

End of survey

Parking Area "U"

43

Parking Area "T"

42

Upper Bidwell Park Road

41

Annie Bidwell Trail

40

Brown's Hole Parking Area "S"

Big Chico Creek

39

38

37

36

35

34

Parking Area "Q"

33

32

Parking Area "P"

31

30

29

28

Parking Area "O"

27

26

25

24

Salmon Hole Parking Area "N"

23

22

21

Parking Area "M"

Gate

20

Diversion Dam Parking Area "L"

Sites by type

- Stream crossing
- Ditch relief culvert
- Spring
- Start of survey
- End of survey
- Parking Areas
- Gate
- PWA assessed roads
- Other roads
- Streams
- State Highway 32

N

0 350 700 1,400 Feet

Scale: 1:8,400 1 in : 700 ft
Contour interval: 10m

Imagery: NAIP 2016

Note: Streams displayed are based on field mapping and aerial photo interpretation.

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P:\GIS\10288 Big Chico Creek 2017\10288 map 2b - site type.mxd

Table B1. Field observations and treatment recommendations for road related features, Upper Bidwell Park Road, Butte County California.

Site #	Treatment immediacy	Problem	Estimated future sediment delivery (yd^3)	Hydrologically connected road length		Comment on Problem	Comment on treatment
				Left road length (ft)	Right road length (ft)		
1	M	Stream crossing	465	0	750	Paved road, Cement inlet. High in fill. Hiking trail crosses fill prism below road. Stream could divert left in future. First five hundred feet is through cut. Ditch shows no sign of wear. Road is paved with a deep through cut. Outer edge is 50' wide. No options for drainage within through cut. Most of the erosion at this site occurs last 10' where pipe outlet is set high in the fill. Hiking trail crosses stream below road prism.	1. Excavate crossing from top flag to bot flag. 2. Install 24" diameter cmp set at grade. 3. Armor inboard fillslope with 35 yd^3 of 1' - 2' diameter riprap. 4. Armor outboard fillslope with 55 yd^3 of 1' - 2' diameter riprap 5. Install critical dip on left hinge line. 6. Cut the ditch for 50' to right of DRC and armor ditch with 1 yd^3 of 0.5' diameter rock. 7. Install 18" diameter x 40' long DRC, 80' up right road at end of throughcut. 8. Install 18" diameter x 20' long downspout to DRC. 9. Endhaul spoils.
2	M	Stream crossing	129	300	0	Two 2' x 0.5' streams flow down to this 24" diameter concrete culvert. The pipe is very short/high in fill, creating a large gully down to Big Chico creek. Road to left is gravel, road to right is paved. An old gully exists to right of outlet gully.	1. Excavate crossing from top flag to bottom flag. 2. Install 24" diameter cmp set at grade. 3. Armor inboard fillslope with 15 yd3 of 1' - 2' diameter riprap. 4. Armor outboard fillslope with 20 yd3 of 1' - 2' diameter riprap 5. Install critical dip on right hinge line. 6. Stockpile spoils local.
3	L	Stream crossing	63	15	0	Culvert set high in fill, old concrete culvert buried/plugged adjacent. Problem here is culvert is short, high in fill. Small gully from culvert outlet to Class I, Big Chico Creek.	1. Excavate crossing from top flag to bottom flag. 2. Replace culvert with 24" diameter culvert set to grade. 3. Armor outboard fillslope with 10 yd^3 of 1' - 2' diameter rip rap. 4. Armor inboard fillslope with 5 yd^3 of 1' -2' diameter riprap. 5. Install critical dip on right hinge line. 6. Outslope road for 115' to left. 7. Stockpile spoils locally.
4	ML	Stream crossing	36	145	0	A very small near origin Class III stream originates upslope in a grassland prairie. Bedrock is exposed in the channel directly above the inlet.	1. Construct a broad dip through road prism. 2. Excavate a keyway 7'W x2'D x 20'L=10 yd^3. 3. Armor keyway with 10yd3 of 0.5' - 1.5' diameter riprap 4. Install 20 yd^3 road rock to driving surface. 5. Install 1 rolling dip up left road ~75' at spring near power pole. 6. Store spoils locally left and right.
5	L	Ditch relief culvert	20	180	0	Plugged DRC set ~50' to right of road low point, where water ponds in rain event. DRC no longer functioning. Small swale behind road leads to low point. Ponding can be fixed by outsloping road.	1. Outslope road for 180' and remove ditch. 2. Clean inlet if DRC.
6	M	Stream crossing	0	0	0	A rowdy Class III stream flows down to an undersized 18" diameter concrete culvert. The culvert is in a high spot with puddles in the road left and right. Diversion potential to left and right.	1. Excavate top to inlet to create a 6' wide channel bottom and 2:1 stream sideslopes. 2. Create a broad dip through road prism. 3. Excavate keyway 10"W x 2'D x 25'L=20 yd^3. 4. Armor keyway with 20 yd^3 of 1' - 2' diameter riprap. 5 Install 20 yd^3 road rock to driving surface through crossing. 6. Stockpile spoils locally.

Table B1. Field observations and treatment recommendations for road related features, Upper Bidwell Park Road, Butte County California.

Site #	Treatment immediacy	Problem	Estimated future sediment delivery (yd^3)	Hydrologically connected road length		Comment on Problem	Comment on treatment
				Left road length (ft)	Right road length (ft)		
7	L	Stream crossing	86	225	0	Small near origin stream. Undersized concrete culvert set high in fill at outlet. Channel deeply incised at culvert outlet. Headcut active at OBF. Road is flat and captured by berm. Fine sediment drains past crossing and to puddle on right road approach.	1. Excavate crossing from top flag to bottom flag. 2. Install 30" diameter x 40' long cmp set to grade. 3. Install critical dip on right hinge line. 4. Outslope road 225' left. 5. Remove berm for 200' left. 6. Armor 100% of outboard fillslope with 1' - 2' diameter riprap. 7. Armor 100% of inboard fillslope with 1' - 2' diameter riprap. 8. Stockpile spoils locally.
8	L	Stream crossing	59	0	120	A small Class III stream with a 30" diameter plastic culvert, set slightly askew to the right. This is a low power stream with low erosion potential.	1. Install a critical dip on the left hinge line.
9	M	Stream crossing	134	300	115	Road is aggressively insloped. Two concrete culverts are undersized and plugged. Inboard ditch leads to crossing (rilling and gully before inlet). Stream has a moderate power moving cobble sized rock and gravel, big scour hole at the outlet.	1. Excavate crossing from top flag to bottom flag. 2. Install a 36" diameter x 50' long cmp, and re-align left road from left hinge line of crossing to drainage break left (300 ft), move out 25' upon rebuild. 3. Armor outboard fillslope with 30 yd^3 of 1' - 2' diameter riprap. 4. Armor inboard fillslope with 15 yd^3 of 1' - 2' diameter riprap. 5. Outslope road and remove ditch for 300' to left. 6. Outslope and remove ditch for 115' to right. 7. Remove 250' of berm. 8. Install 1 rolling dip to left road.
10	L	Stream crossing	76	750	90	An 18" diameter plastic culvert drains a broad flat springy prairie area. There is no defined channel above the road, but overland flow is clearly evident and a 1' headcut has developed ~15' above the inlet. A small pool exists at the outlet and flow veers hard to right below bottom flag.	1. Create a broad dip through road prism. 2. Excavate keyway 7'W x 2'D x 20'L= 10 yd^3. 3. Install 10 yd^3 of 0.5' - 1.5' diameter riprap to keyway. 4. Stockpile spoils locally. 5. Outslope right road for ~100' by removing 7' x 2' berm and placing on inboard edge of road. 6. Rebuild road at 15' wide.
11	ML	Stream crossing	80	0	270	Small near origin stream with almost no erosion. Right road berm begins at road crest. A large rock plugs outlet of culvert.	1. Excavate crossing from top flag to bottom flag. 2. Replace culvert with a 24" diameter x 50' long cmp, set to grade. 3. Install a critical dip on left hinge line. 4. Armor lower 50% of outboard fillslope with 20 yd^3 of 1-2' rip rap. 5. Outslope and remove berm right for 270'. 6. Install 2 rolling dips to right road approach.
12	ML	Stream crossing	38	0	320	A small Class III stream flows down to an 18" diameter concrete pipe. Both inlet and outlet are well protected by hand made concrete walls. Flow exits the culvert and enters a second smooth steel culvert ~15' downslope. An old trail must have crossed here but is now abandoned and difficult to find.	1. Excavate crossing from top flag to bottom flag. 2. Replace culvert with a 24" diameter x 40' long cmp, set to grade. 3. Install a critical dip on left hinge line. 4. Armor lower 50% of outboard fillslope with 5cyds of 0.5-1.5' rip rap 5. Outslope 300' of right road by removing berm on OBF and place along inboard road. 6. Install 2 rolling dips to right road approach. 7. Remove lower metal cmp and create a 3' wide channel bottom and 2:1 streamside sideslopes, ~30 yd^3. 8. Stockpile spoils locally.

Table B1. Field observations and treatment recommendations for road related features, Upper Bidwell Park Road, Butte County California.

Site #	Treatment immediacy	Problem	Estimated future sediment delivery (yd^3)	Hydrologically connected road length		Comment on Problem	Comment on treatment
				Left road length (ft)	Right road length (ft)		
13	L	Ditch relief culvert	19	225	85	Road is through cut and insloped. Water can't drain off road. Long distance if uncontrolled run off leading to DRC. Delivers to Big Chico Creek. Big scour hole at outlet with ~2 yd3 past erosion.	1. Outslope road and remove berm for 80' to right. 2. Install 1 rolling dip to right road. 3. Outslope road and remove berm 400' to left of DRC. 4. Re-route road alignment towards creek for 500' near site #14. 5. Install 3 rolling dips to left road approach.
14	ML	Stream crossing	137	870	0	A small Class III stream flows down an 18" diameter concrete cmp. The pipe is set at grade with low erosion potential, but this site also receives 870' of left road contribution in the form of major rilling which is where the majority of sediment contribution comes from.	1. Create a broad dip through crossing prism. 2. Excavate a keyway 10'W x 2'D x 15'L= 11 yd^3. 3. Install 10 yd^3 of 0.5' - 1.5' diameter rock armor to keyway. 4. Stockpile spoils locally. 5. Outslope ~500' of left road by removing 4' x 3' berm on outboard fill and place it along IBR. 6. Remove remaining berm for 350'. 7. Install 3 rolling dips up left road approach.
15	L	Stream crossing	133	675	0	Proper sized culvert with low volume. Erosion is on road, not related to culvert. Outlet has large tree with in channel. Right road to site #14 is 890', with gully and rill development along the inboard side.	1. Install a critical dip, off set 30' to right of crossing. 2. Outslope left road 675' and remove berm for 600'. 3. Install 3 rolling dips to left road approach.
16	M	Stream crossing	104	330	0	Two small streams flow down to an 18" diameter concrete culvert. The site also receives ~330' of left road via major rilling directly down to culvert inlet. Best to treat left road approach by moving road out ~25' and reconstructing with a 5% - 6% outslope. The old road alignment should be decommissioned by ripping the road prism and pulling back the berm.	1. Excavate crossing from top flag to bottom flag. 2. Install 24" diameter cmp set at grade. 3. Install a critical dip on right hinge line. 4. Stockpile spoils locally. 5. Move road out ~25' and re-align for 225' up left road and build with a 5% - 7% outslope (begin at upper edge of Parking Area J). 6. Rip old road prism to decommission.
17	L	Stream crossing	44	80	125	Inboard ditch delivers sediment to stream crossing inlet from left to right. Stream approaches culvert from multiple locations. Inboard berm is supposed to direct flow toward culvert. Culvert is undersized, small fill volume makes good condition for armored fill.	1. Excavate a broad dip through the road prism 60'W x 1'D x 20'L= 53 yd^3. 2. Excavate a keyway 7'W x 2'D x 15'L= 8 yd^3. 3. Armor keyway 7'W x 2'D x 15'L= 10 yd^3 of 0.5' - 1.5' diameter riprap. 4. Outslope left road 80' and remove berm and fill ditch. 5. Outslope right road 125' and remove berm and fill ditch. 6. Transition right approach into new road alignment, detailed in site #16 notes.
18	ML	Stream crossing	72	50	460	A very small near origin Class II stream flows out of a broad headwall prairie area down to a 12" diameter concrete culvert. The inlet is close to plugging, but is open. The outlet is protected with hand placed rock armor.	1. Excavate a broad dip through the road prism. 2. Excavate a keyway 10'W x 2'D x 15'L= 11 yd^3. 3. Armor keyway 10'W x 2'D x 15"L= 10 yd^3 of 0.5' - 1.5' diameter riprap. 4. Remove berm up right road 4' x 2' x 450'. 5. Install 1 rolling dip ~75' up right road approach.

Table B1. Field observations and treatment recommendations for road related features, Upper Bidwell Park Road, Butte County California.

Site #	Treatment immediacy	Problem	Estimated future sediment delivery (yd^3)	Hydrologically connected road length		Comment on Problem	Comment on treatment
				Left road length (ft)	Right road length (ft)		
19	ML	Stream crossing	148	765	105	Road runoff causes gully on OBF ~35' to right of crossing. Plastic culvert inlet with cement outlet. Culvert non-functional, flow beneath current culvert exits fillslope below outlet. Inboard ditch directs flow diverted from stream to left at site #20 to this crossing. Springy ponds in road and cannot drain ~90' to right of crossing. Outboard headcut and inboard ditch/gully give us ~5 yd3 of past erosion.	1. Excavate crossing from top flag to bottom flag. 2. Replace culvert with a 36" diameter x 50' culvert set to grade. 3. Install a rolling dip 90' to right of crossing to drain spring. 4. Armor outboard edge of rolling dip with 10 yd^3 of 0.5-1.5' diameter riprap. 5. Outslope 90' and remove berm for 105' to right, and fill the ditch. 6. Install 5 rolling dips to left road. 7. Outslope 900' and remove berm for 800' to left, and fill ditch. 8. Road will be re-aligned to the left, see site # 20 for details.
20	L	Spring	106	1010	250	A large spring originates above the road over a wide stretch of open prairie. Some flow goes right to site #19 and some flow left to this site. Water ponds along the inboard road for ~50' up right road. Flow enters two culverts. One is a concrete culvert and the other is steel at the inlet, but concrete at the outlet.	1. Clean inboard ditch for ~50' up right road to help drain spring flow down to culvert inlets. 2. Remove berm for 4' x 2' x 250' up right road. 3. Inslope left road for 500' from gate, up road. 4. Install 3 rolling dips beyond inslope section.
21	L	Stream crossing	70	421	110	Culvert here is set lower than stream grade. Stream channel has eroded back from inlet ~25' with headcut at terminus. Ditch to right is covered in duff and inactive. Ditch to left.	1 Inslope left road for 400', retain ditch. 2. Install 2 rolling dips to left road, connected to ditch. 3. Remove berm to left for 495'. 4. Outslope right road and remove berm 110', retain ditch.
22	ML	Stream crossing	103	280	0	A rowdy Class II stream flows down to an undersized 18" diameter concrete culvert. Both inlet and outlets are well armored with hand placed rock retaining walls.	1. Excavate from top flag to bottom flag. 2. Install a 36" diameter cmp set to grade. 3. Install a critical dip on right hinge line. 4. Install 20 yd^3 of 0.5' - 1.5' diameter rip rap to outboard fillslope. 5. Stockpile spoils locally. 6. Install 1 rolling dip up left road.
23	L	Stream crossing	70	496	100	Most of the erosion here is from the road, not crossing related. Culvert is over sized, but too long. Bent and plugged with in road fill. Ditches seem fine, vegetated. Berm along most of road length. Left road grade changes abruptly 200' left of crossing.	1. Excavate a broad dip through crossing 60'W x 2'D x 10'L=44 yd3. 2. Excavate keyway 7'W x 2'D x 20'L= 10yd^3. 3. Armor keyway 7'W x 2"D x 20'L= 10yd^3. 4. Outslope 420' of left road and remove berm and ditch. 5. Install 1 rolling dip with in first 200' of crossing, install 2 rolling dips in last 420'. 6. Stockpile spoils locally.
24	ML	Stream crossing	59	75	0	A small Class III stream flows down to a 24" diameter cmp. The culvert is set at a sharp angle across the road but is in line with flow. The armor at the OBF is failing because of the culvert being set short and high in the fill.	1. Excavate crossing from top flag to bottom flag. 2. Install a 24" diameter cmp. 3. Lower road 2' after rebuild. 4. Install a critical dip on right hinge line. 5. Salvage rock armor and place on outboard fillslope, when pipe replacement is complete. 6. Stockpile spoils locally.
25	M	Stream crossing	31	0	120	No real crossing related erosion. Fines from road main contribution erosion and sediment delivery. Undersized culvert with slight diversion potential. Near origin tiny stream.	1. Excavate crossing from top flag to bottom flag. 2. Install a 24" diameter x 60' cmp. 3. Install a critical dip on right hinge line. 5. Armor lower 50% outboard fillslope with 5 yd3 of 1' - 2' diameter riprap. 6. Stockpile spoils locally.

Table B1. Field observations and treatment recommendations for road related features, Upper Bidwell Park Road, Butte County California.

Site #	Treatment immediacy	Problem	Estimated future sediment delivery (yd^3)	Hydrologically connected road length		Comment on Problem	Comment on treatment
				Left road length (ft)	Right road length (ft)		
26	M	Stream crossing	65	215	0	A rowdy Class III stream flows down to an undersized 18" concrete culvert. The pipe is short in fill, but set at grade. A large berm has been created between the inlet and IBR. There is ~200' of eroding inboard edge of the road. The left road approach is a deep through cut with no effective way to drain.	1. Excavate crossing from top flag to bottom flag. 2. Install a 36" diameter x 50' long cmp. 3. Install a critical dip on right hinge line. 4. Stockpile spoils locally.
27	HM	Stream crossing	118	620	0	Plastic culvert properly sized but set high in fill and exposed at road surface. Most of the erosion for this site comes from left road. Fix is with outsloping and rolling dips. Inboard ditch to left is being actively headcut. Left road has active rilling and gullying. Right road is badly gullied. Low volume of fill in crossing points to potential armored fill candidate if diversion potential removed.	1. Excavate a broad dip through road prism 60'W x 1'D x 15'L= 33 yd^3, remove old culvert and rebuild with no diversion potential. 2 Excavate a keyway 7'W x 2'D x 20'L= 10 yd^3. 3. Armor the keyway 7'W x 2'D x 20'L= 10 yd^3. 4. Outslope left road and remove ditch and berm for 620'. 5. Install 3 rolling dips to left road. 6. Stockpile spoils locally.
28	M	Stream crossing	36	160	0	A very small near origin Class III stream flows down to a 24" diameter cmp. The inlet is 10% plugged, but the outlet is 50% plugged with sandy fines. Flow veers hard right below the road.	1. Create a broad dip through road prism 2 Excavate a keyway 10'W x 2'D x 20'L=10 yd^3. 3. Armor the keyway 10'W x 2'D x 20'L= 10 yd^3, with 0.5' - 1.5' diameter riprap. 4. Install 20 yd3 road rock to driving surface. 5. Outslope left road 180' by removing 4' x 2' berm and placing along inboard road. 6. Install 1 rolling dip to left road. 7. Stockpile spoils locally.
29	L	Stream crossing	93	695	0	Road drainage uncontrolled with erosion and sediment delivery. Sediment delivery mostly road surface. Old rusty cmp. Left road contribution relatively easy to treat with outslope/remove berm/rolling dips.	1. Excavate a broad dip through road prism 60'x1'x15'= 33yd^3. Remove cmp and rebuild with no diversion potential. 2. Excavate keyway 7Wx2'Dx 15'L= 8yd^3. 3. Armor keyway 7Wx2'Dx15'L=1 03yd^3. 4. Outslope left road, fill ditch and remove berm for 695'. 5. Install 3 rolling dips to left road. 6. Stockpile spoils locally.
30	ML	Stream crossing	53	275	0	A very small near origin Class III stream flows down to an undersized 12" diameter cmp. The pipe inlet is steel but the outlet is concrete. This site also receives ~235' of left road, which contributes most, if not all fine sediment at this location. There is no evidence of stream flow below the road.	1. Excavate a broad dip through road prism. 2. Excavate keyway 10'W x 2'D x 15'L= 10 yd^3. 3. Armor keyway 10'W x 2'D x 15'L= 10 yd^3 of 0.5'-1.5' diameter riprap 4. Outslope ~275' of left road by removing 6' x 4' berm on outboard fill and placing material along inboard edge of road. 5. Install 2 rolling dips up left road. 6. Stockpile spoils locally.
31	M	Stream crossing	100	676	0	DRC with no delivery, 100' left of crossing. Spring 60' to left should be drained with rolling dip connected to ditch. Should maintain berms in parking lots and along parking zones.	1. Excavate a broad dip through road prism 60'W x 1'D x 15'L. 2. Excavate keyway 7'W x 2'D x 15'L= 10 yd^3. 3. Armor keyway 7'W x 2'D x 15'L= 10 yd^3 of 0.5' - 1.5' diameter riprap. 4. Outslope road and remove berm, and remove ditch for 60' to left. 5. Install 1 rolling dip 60' to left of crossing and connect to ditch. 6. Outslope left road past parking lot for 900', remove berm and fill the ditch. 7. Install 5 rolling dips up left road, past the parking lot. 8. Stockpile spoils locally.

Table B1. Field observations and treatment recommendations for road related features, Upper Bidwell Park Road, Butte County California.

Site #	Treatment immediacy	Problem	Estimated future sediment delivery (yd^3)	Hydrologically connected road length		Comment on Problem	Comment on treatment
				Left road length (ft)	Right road length (ft)		
32	ML	Stream crossing	55	375	0	Small near origin Class III stream. Low stream power. Iron canyon cliff is ~35' from outlet. Ditch shows signs of erosion, drains to DRC with no sediment delivery.	1. Construct armored fill with broad dip. 2. Install 10 yd3 of 0.5' - 1.5 ' diameter riprap. 3. Install 3 rolling dips, connected to the ditch. 4. Outslope 400' of left road.
33	L	Stream crossing	48	450	0	Undersized concrete culvert, small near origin stream. Very little erosion at this site. Most of erosion from gully/rill system developed in left road. Road is insloped with berm/inboard ditch along most of the length.	1. Excavate a broad dip through crossing, remove old culvert, rebuild crossing with no diversion potential. 2. Excavate a keyway 7'W x 1'D x 20'L= 10 yd^3. 3. Armor keyway 7'W x 2'D x 20'L= 10 yd^3. 4. Outslope left road and remove ditch and berm for 400'. 5. Install 3 rolling dips up left road. 6. Stockpile spoils locally 7. Retain insloped road through parking lot.
34	M	Stream crossing	82	100	0	Undersized concrete culvert is set short and high in the fill. Inlet well armored. Outlet well armored, but vertical.	1. Excavate crossing from top flag to bottom flag. 2. Install a 24" diameter cmp. 3. Install a critical dip on right hinge line. 4. Install 15 yd^3 of 0.5' - 1.5' diameter riprap on outboard fillslope. 5. Remove berm for 100' up left road. 6. Stockpile spoils locally.
35	M	Stream crossing	26	350	0	Stream diversion, fill crossing, small near origin stream. Left inboard ditch is vegetated and broad 5 'x 1'. No large gully, but rilling developed on left road approach. Site #34 is only 100' down right road (culvert). This sites flow diverts to site #34. 70' up left road is a swale with associated spring, needs rocked rolling dip.	1. Excavate a broad dip through the crossing 60"W x 1"D x 10"L=22 yd^3, rebuild road prism with no diversion potential 2. Excavate keyway 7'W x 2'D x 20'L= 10 yd^3. 3. Armor keyway 7'W x 2'D x 20'L= 10 yd^3 with 0.5' - 1.5' diameter riprap. 4. Outslope the road to left and remove the berm for 350', retain ditch. 5. Install 2 rolling dips to left road and connect to the ditch, first rolling dip 70' to left of crossing at swale, rock the dip 270 ft^2. 6. Stockpile spoils locally.
36	M	Stream crossing	49	130	0	Small stream flows down to a plugged 12" diameter concrete culvert. Pipe is short and high in the fill, but is well armored below outlet.	1. Excavate crossing from top flag to bottom flag. 2. Install 24" diameter cmp. 3. Install a critical dip on left hinge line. 4. Armor entire outboard fillslope with 10 yd3 of 0.5' - 1.5' diameter riprap. 5. Install 1 rolling dip to left.
37	M	Stream crossing	21	240	0	Small near origin stream, fill crossing. Diverted to right, delivers to site #36. Fines and small gravel from stream and fines from road are main sediment contribution. Water ponds at low spot ~90' up left road approach adjacent to functional DRC with no sediment delivery. 240' up left road is drainage divide.	1. Excavate a broad dip through the crossing 60"W x 1"D x 10'L=22 yd^3, rebuild road prism with no diversion potential 2. Excavate keyway 7'W x 2'D x 15'L= 8 yd^3. 3. Armor keyway 7'W x 2'D x 15'L= 10 yd^3 with 0.5' - 1.5' diameter riprap. 4. Outslope the road to left and remove the berm and fill ditch, for 240'. 5. Install 2 rolling dips to left road and connect to the ditch, with first adjacent to functional DRC, 90' left of crossing. 6. Stockpile spoils locally.

Table B1. Field observations and treatment recommendations for road related features, Upper Bidwell Park Road, Butte County California.

Site #	Treatment immediacy	Problem	Estimated future sediment delivery (yd^3)	Hydrologically connected road length		Comment on Problem	Comment on treatment
				Left road length (ft)	Right road length (ft)		
38	H	Stream crossing	116	0	935	A rowdy Class III stream is diverted to left ~80' to a small concrete culvert at stream crossing #39. A 7' tall x 25' wide rock retaining wall was constructed along outboard fill, no pipe evident at this site.	1. Excavate crossing from top flag to bottom flag. 2. Install 24" diameter cmp. 3. Install a critical dip on left hinge line. 4. Armor entire outboard fillslope with 10 yd^3 of 0.5' - 1.5' diameter riprap. 5. Install 4 rolling dip to right and remove berm for 750'. 6. Stockpile spoils locally.
39	HM	Stream crossing	32	0	90	Undersized concrete culvert is buried at the inlet by aggraded sediment wedge. Cobbles piled near buried inlet no berm to prevent diversion, water will overtop. Sediment from right road ditch delivered as fine sediment grading to cobble, vegetated. Concrete culvert high and short in fill, exposed in road surface. Site #38 flow is diverted and delivers to this crossing via inboard ditch right. Stream actively headcutting at outlet with in outboard fill, 6' drop to bottom flag.	1. Excavate a broad dip through the crossing 60"W x 1'D x 1'L= 33 yd^3, remove old culvert, rebuild road prism with no diversion potential 2. Excavate keyway 7'W x 2'D x 15'L= 10 yd^3. 3. Armor keyway 7'W x 2'D x 15'L= 10 yd^3 with 0.5' - 1.5' diameter riprap. 4. Outslope the road to left and remove the berm and fill ditch, for 90'. 5. Install 1 rolling dip to right road and connect to the ditch. 6. Stockpile spoils locally.
40	M	Stream crossing	36	310	0	A rowdy Class III stream has completely buried thin inlet at this location. The outlet is well rocked. Long length of undrained road delivers fine sediment to the stream crossing.	1. Excavate crossing from top flag to bottom flag. 2. Install 24" diameter cmp. 3. Install a critical dip on right hinge line. 4. Install 1 rolling dip left, connect to ditch. 5. Remove 310 feet of berm. 6. Stockpile spoils locally.
41	M	Stream crossing	89	100	120	Moderate powered stream approaches undersized concrete culvert. No crossing erosion. Ditches on left and right deliver fine sediment to this crossing. Cobble retaining wall with 8' drop to stream channel on OBF. Culvert set to proper grade and functional. Cobble retaining wall inboard fill as well. Stream channel rocky cobble through fine sediment.	1. Excavate crossing from top flag to bottom flag. 2. Install 36" diameter cmp. 3. Remove berm for 120' right. 4. Install 1 rolling dip left, connect to ditch. 5. Remove berm for 100' to left. 6. Stockpile spoils locally.
42	ML	Stream crossing	222	0	1265	A small flowing Class II stream flows down to a 36" diameter plastic culvert. There is a long road approach well suited for rolling dip installation. A small concrete culvert directly next to the newer 36" diameter pipe and appears to still function.	1. Excavate crossing from top flag to bottom flag. 2. Install 36" diameter cmp. 3. Install critical dip on left hinge line. 4. Armor outboard fill slope with 10 yd^3 of 1' - 2' diameter riprap. 5. Install 5 rolling dip left, connect to ditch. 6. Stockpile spoils locally.
43	M	Stream crossing	49	0	720	Undersized concrete culvert plugged and buried at inlet. Sediment debris lobe aggraded and developed at inlet. Erosion at this site is primarily from right road, ditches well vegetated. Right ditch is springy and delivers to culverted pedestrian crossing. No erosion at outlet of culvert or fillslope. Class I stream, Big Chico creek is ~100' below crossing. Yahi Trail crosses stream near culvert outlet/bottom flag.	1. Excavate a broad dip through the crossing 60'W x 1'D x 15'L=33 yd^3, remove old culvert, rebuild road prism with no diversion potential. 2. Excavate keyway 7'W x 2'D x 15'L= 10 yd^3. 3. Armor keyway 7'W x 2'D x 15'L= 10 yd^3 with 0.5' - 1.5' diameter riprap. 4. Install 5 rolling dips to right road and connect to the ditch. 5. Remove berm to right for 960'. 6. Stockpile spoils locally.

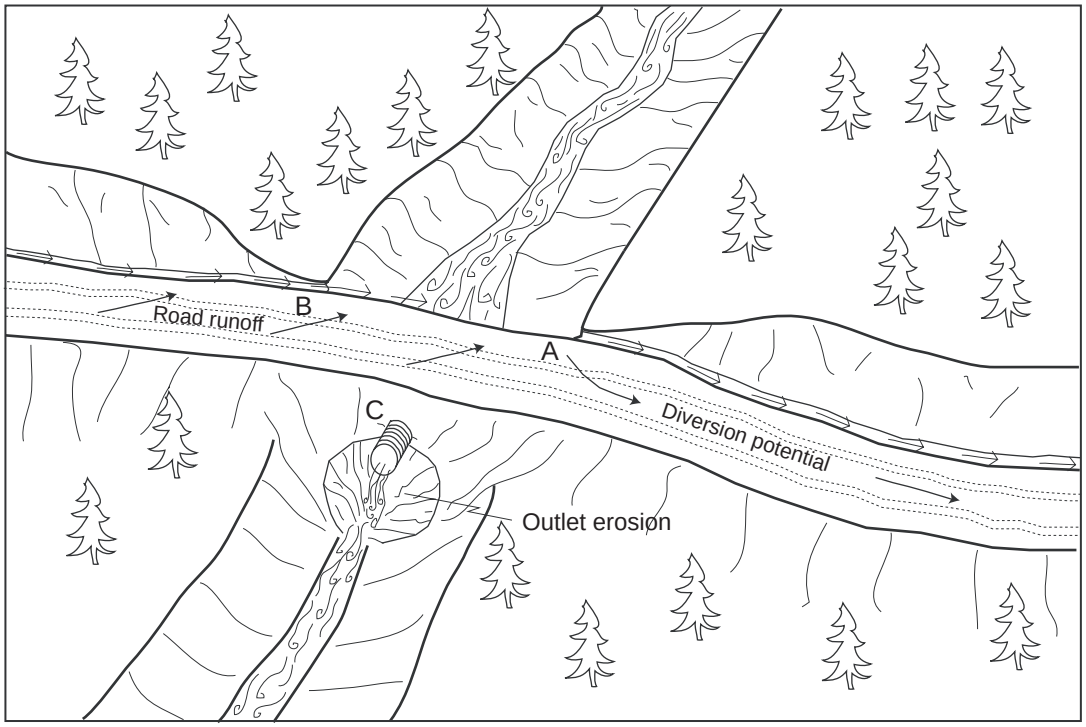
Typical Problems and Applied Treatments for a Non-fish Bearing Upgraded Stream Crossing

Problem condition (before)

A - Diversion potential

B - Road surface and ditch drain to stream

C - Undersized culvert high in fill with outlet erosion

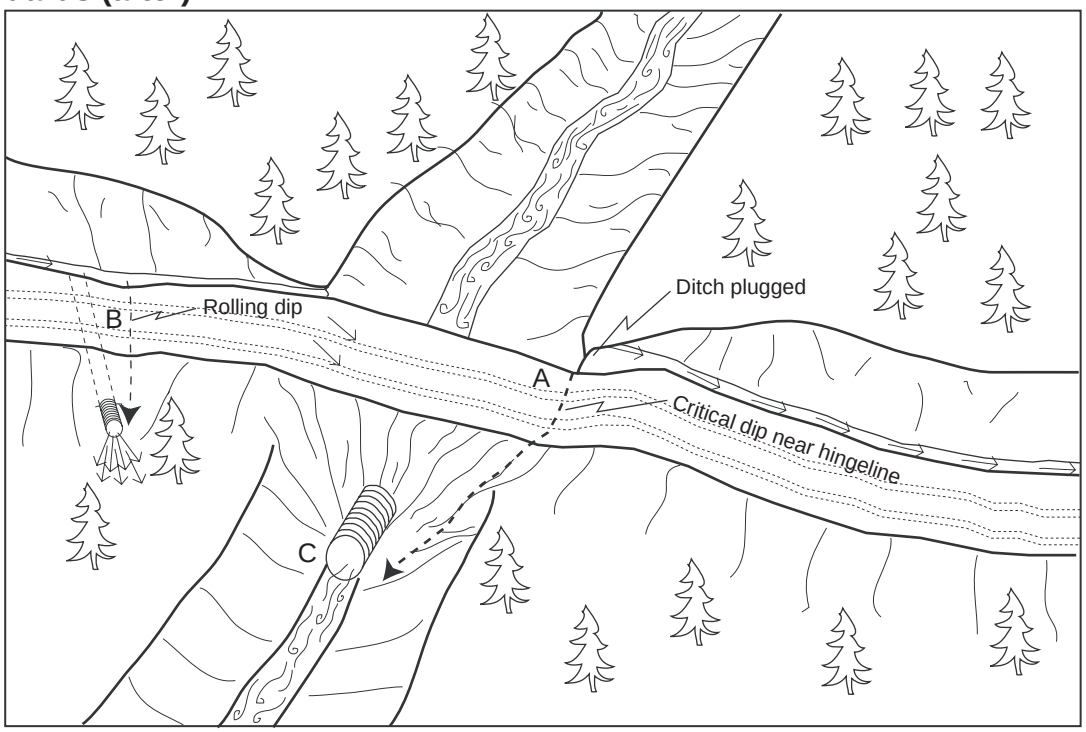


Treatment standards (after)

A - No diversion potential with critical dip installed near hingeline

B - Road surface and ditch disconnected from stream by rolling dip and ditch relief culvert

C - 100-year culvert set at base of fill



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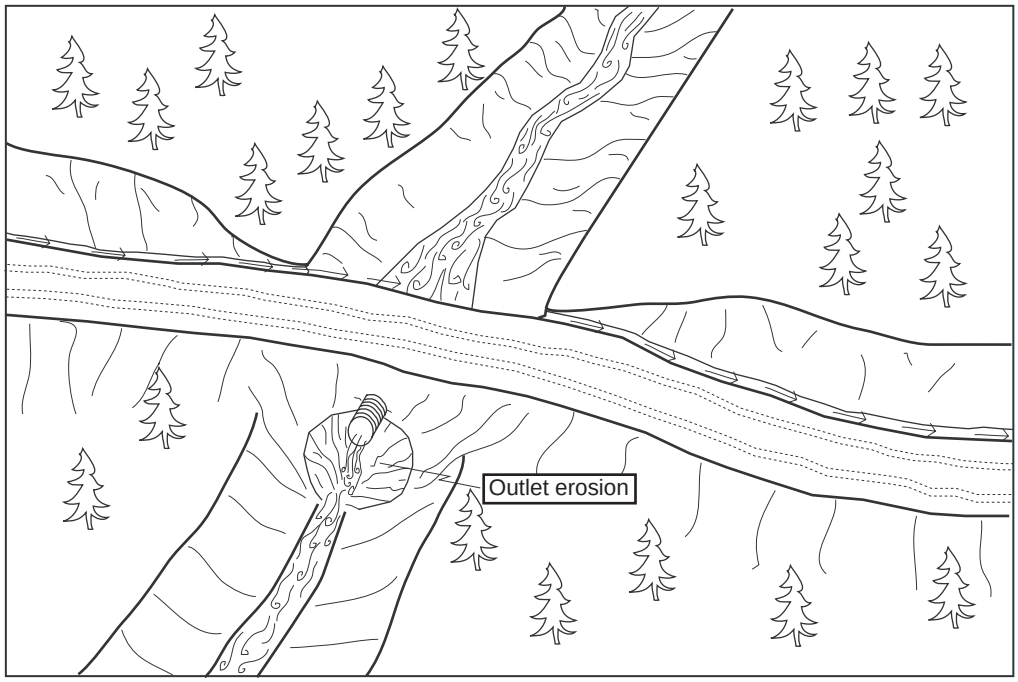
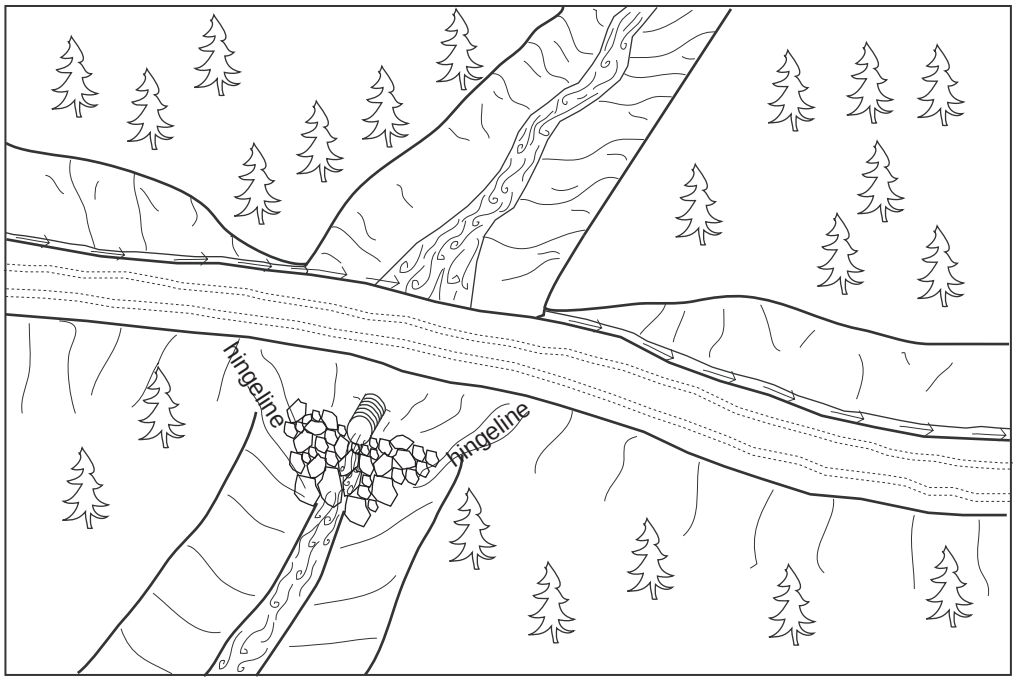
PWA Typical Drawing #1a

Armoring Fill Faces to Upgrade Stream Crossings



Problem: Culvert set high in outboard fill has resulted in scour of the outboard fill face and natural channel.
Conditions: The existing stream crossing has a culvert sufficient in diameter to manage design stream flows and has a functional life.



Action: The area of scour is backfilled with rip-rap to provide protection in the form of energy dissipation for the remaining fill face and channel.

Treatment Specifications:

1) Placement of rip-rap should be between the left and right hingelines and extend from a keyway excavated below the existing channel base level at the base of the fill slope up and under the existing culvert.
2) Rock size and volume is determined on a site by site basis based on estimated discharge and existing stream bed particle size range (See accompanying road log).

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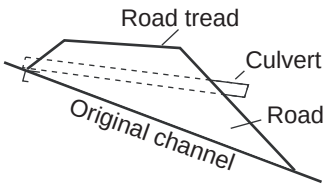
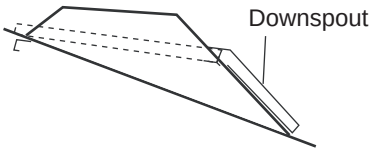
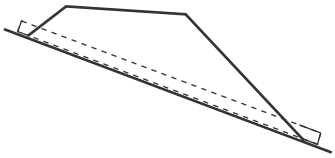
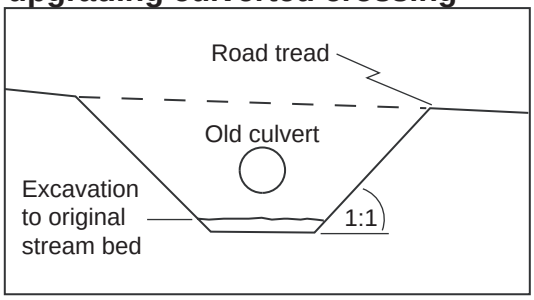
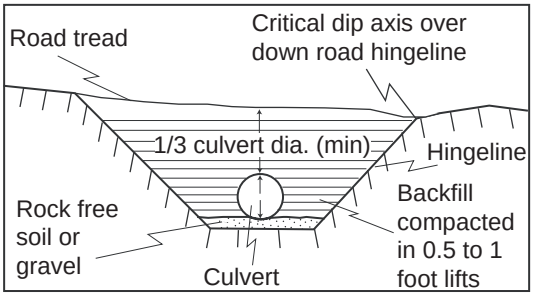
Typical Design of a Non-fish Bearing Culverted Stream Crossing

Existing	Upgraded	Upgraded (preferred)
		
1. Culvert not placed at channel grade. 2. culvert does not extend past base of fill.	1. Culvert not placed at channel grade. 2. Downspout added to extend outlet past road fill.	1. Culvert placed at channel grade. 2. Culvert inlet and outlet rest on, or partially in, the originial streambed.

Excavation in preparation for upgrading culverted crossing



Upgraded stream crossing culvert installation



Note:
Road upgrading tasks typically include upgrading stream crossings by installing larger culverts and inlet protection (trash barriers) to prevent plugging. Culvert sizing for the 100-year peak storm flow should be determined by both field observation and calulations using a procedure such as the Rational Formula.

Stream crossing culvert Installation

1. Culverts shall be aligned with natural stream channels to ensure proper function, and prevent bank erosion and plugging by debris.
2. Culverts shall be placed at the base of the fill and the grade of the original streambed, or downspouted past the base of the fill.
3. Culverts shall be set slightly below the original stream grade so that the water drops several inches as it enters the pipe.
5. To allow for sagging after burial, a camber shall be between 1.5 to 3 incher per 10 feet culvert pipe length.
6. Backfill material shall be free of rocks, limbs or other debris that could dent or puncture the pipe or allow water to seep around pipe.
7. First one end then the other end of the culvert shall be covered and secured.;The center is covered last.
8. Backfill material shall be tamped and compacted throughout the entire process:
   - Base and side wall material will be compacted before the pipe is placed in its bed.
   - Backfill compacting will be done in 0.5 - 1 foot lifts until 1/3 of the diameter of the culvert has been covered. A gas powered tamper can be used for this work.
9. Inlets and outlets shall be armored with rock or mulched and seeded with grass as needed.
10. Trash protectors shall be installed just upstream from the culvert where there is a hazard of floating debris plugging the culvert.
11. Layers of fill will be pushed over the crossing until the final designed road grade is achieved, at a minimum of 1/3 to 1/2 the culvert diameter.

Erosion control measures for culvert replacement

Both mechanical and vegetative measures will be employed to minimize accelerated erosion from stream crossing and ditch relief culvert upgrading. Erosion control measures implemented will be evaluated on a site by site basis. Erosion control measures include but are not limited to:

1. Minimizing soil exposure by limiting excavation areas and heavy equipment distrubance.
2. Installing filter windrows of slash at the base of the road fill to minimize the movement of eroded soil to downslope areas and stream channels.
3. Retaining rooted trees and shrubs at the base of the fill as “anchor” for the fill and filter windrows.
4. Bare slopes created by construction operations will be protected until vegetation can stabilize the surface. Surface erosion on exposed cuts and fills will be minimized by mulching, seeding, planting, compacting, armoring, and/or benching prior to the first rains.
5. Excess or unusable soil will be stored in long term spoil disposal locations that are not limited by factors such as excessive moisture, steep slopes greater than 10%, archeology potential, or proximity to a watercourse.
6. On running streams, water will be pumped or diverted past the crossing and into the downstream channel during the construction process.
7. Straw bales and/or silt fencing will be employed where necessary to control runoff within the construction zone.

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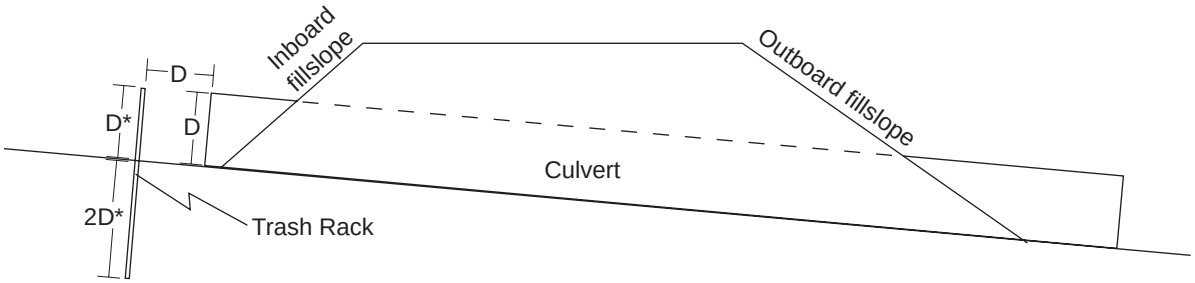
Typical Design of a Single-post Culvert Inlet Trash Rack

Cross section view



D - Culvert diameter

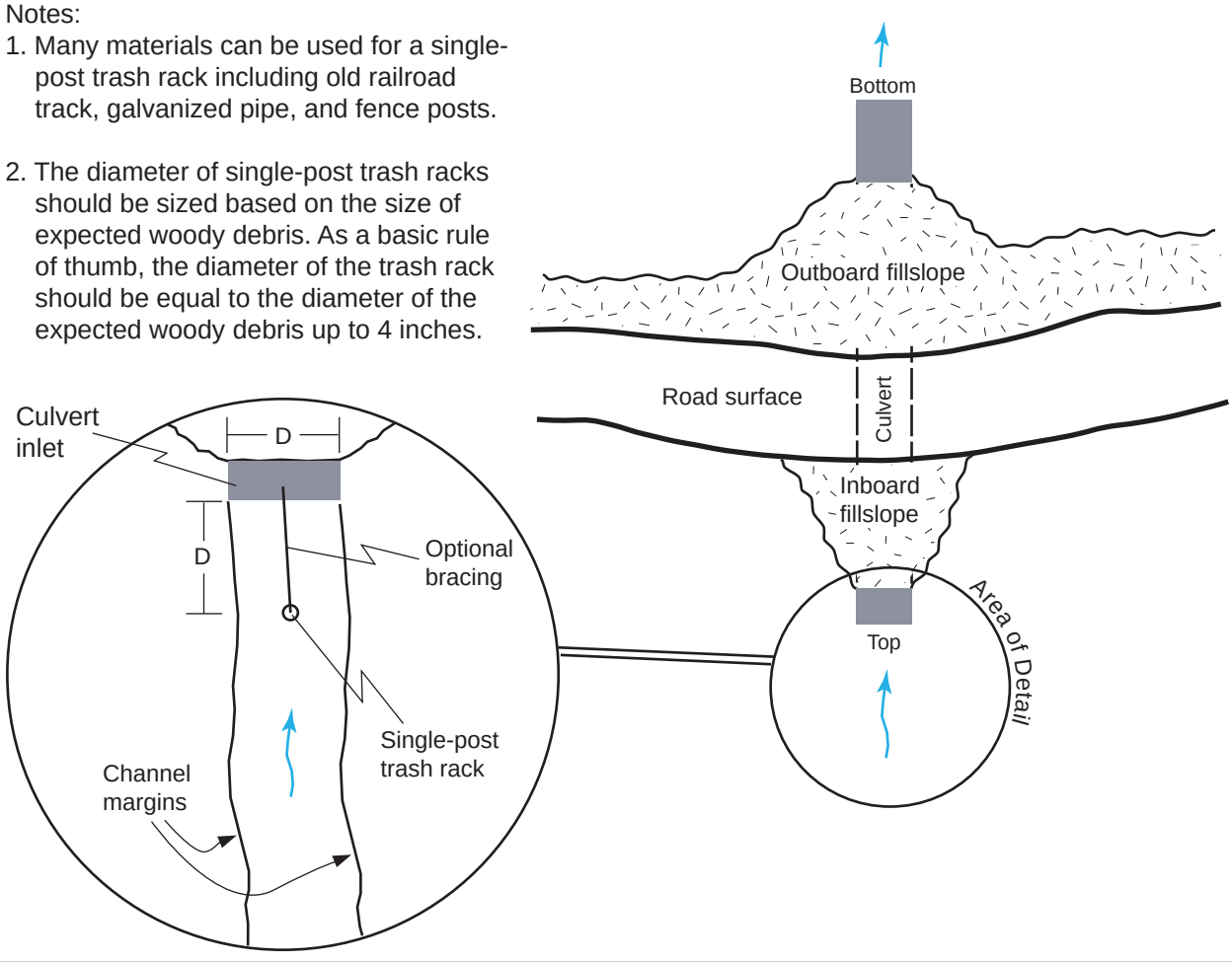
D* - If the culvert is designed for the 100-year peak storm flow, the trash rack height above the streambed should equal D.
If the culvert is undersized, then the trash rack needs to be extended vertically above the streambed to match or exceed the expected headwall height.

Plan view

Notes:

1. Many materials can be used for a single-post trash rack including old railroad track, galvanized pipe, and fence posts.

2. The diameter of single-post trash racks should be sized based on the size of expected woody debris. As a basic rule of thumb, the diameter of the trash rack should be equal to the diameter of the expected woody debris up to 4 inches.



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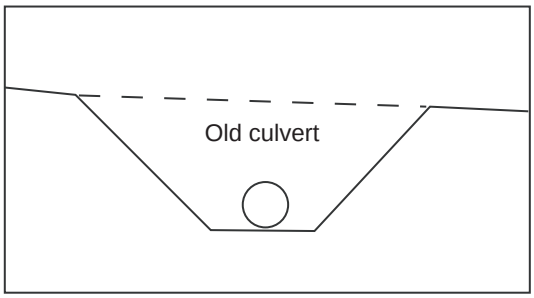
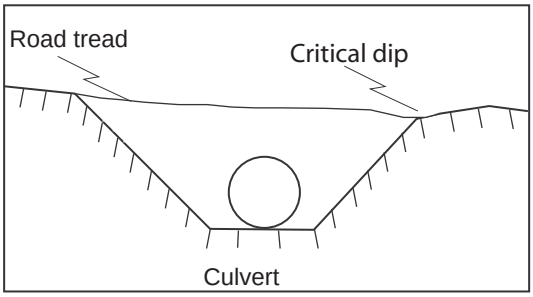
Typical Design of Upgraded Stream Crossings





Stream crossing culvert Installation

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5. To allow for sagging after burial, a camber shall be between 1.5 to 3 incher per 10 feet culvert pipe length.
6. Backfill material shall be free of rocks, limbs or other debris that could dent or puncture the pipe or allow water to seep around pipe.
7. First one end and then the other end of the culvert shall be covered and secured. The center is covered last.
8. Backfill material shall be tamped and compacted throughout the entire process:
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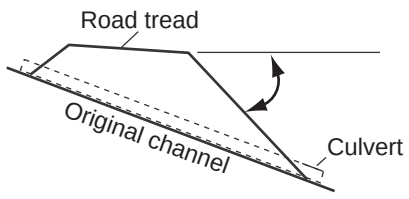
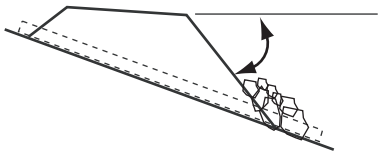
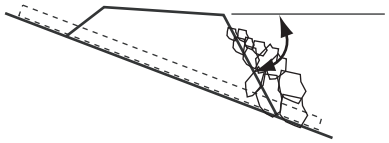
   - backfill compacting will be done in 0.5 - 1 foot lifts until 1/3 of the diameter of the culvert has been covered. A gas powered tamper can be used for this work.
9. Inlets and outlets shall be armored with rock or mulched and seeded with grass as needed.
10. Trash protectors shall be installed just upstream from the culvert where there is a hazard of floating debris plugging the culvert.
11. Layers of fill will be pushed over the crossing until the final designed road grade is achieved, at a minimum of 1/3 to 1/2 the culvert diameter.

Note:
Road upgrading tasks typically include upgrading stream crossings by installing larger culverts and inlet protection (trash barriers) to prevent plugging. Culvert sizing for the 100-year peak storm flow should be determined by both field observation and calculations using a procedure such as the Rational Formula.

Armoring fill faces

Fill angles ≤ 2:1	Fill angles (between 2:1 & 1.5:1)	Fill angles (between 2:1 & 1.5:1)
 No rock armor needed	 Armor 1/4 up fill face	 Armor 3/4 way up fill face

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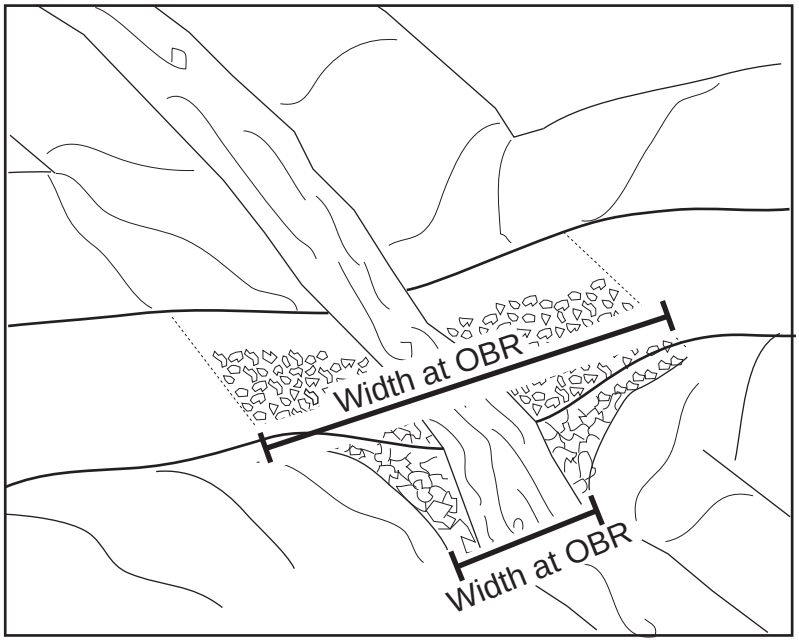
PWA Typical Drawing #4

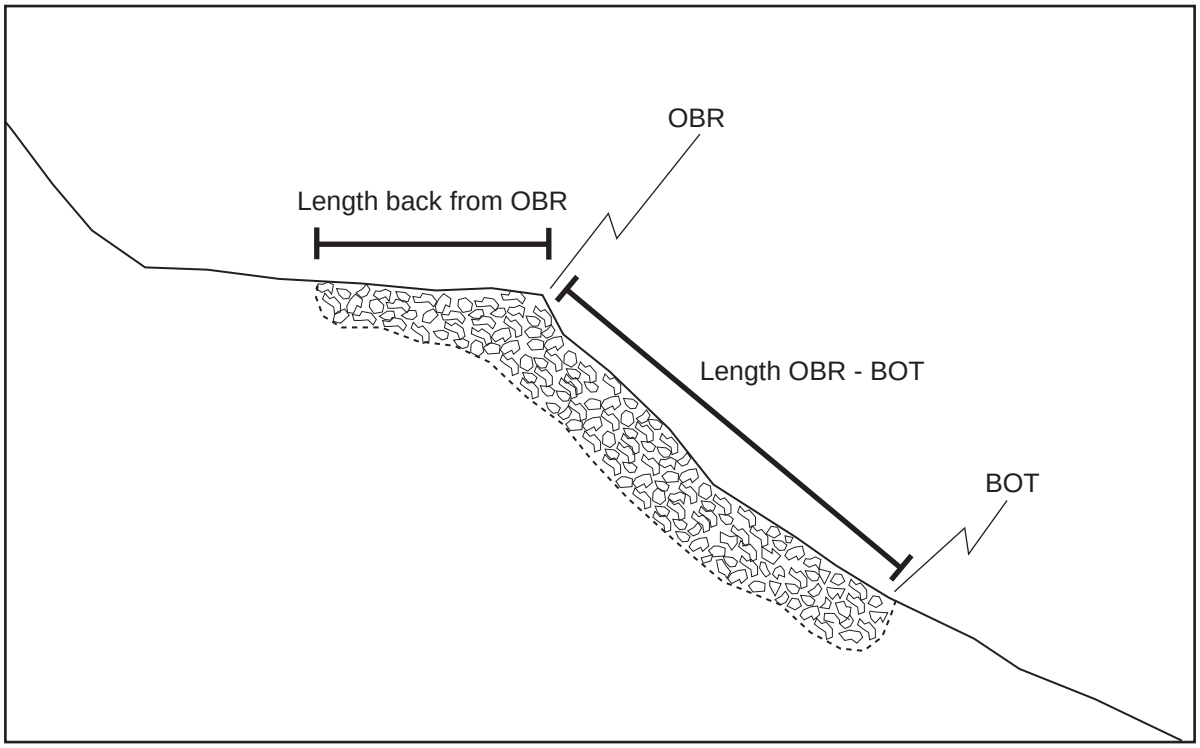
Typical Dimensions Refered to for Armored Fill Crossings

Widths in oblique view



OBR - Outboard edge of road

Lengths in profile view



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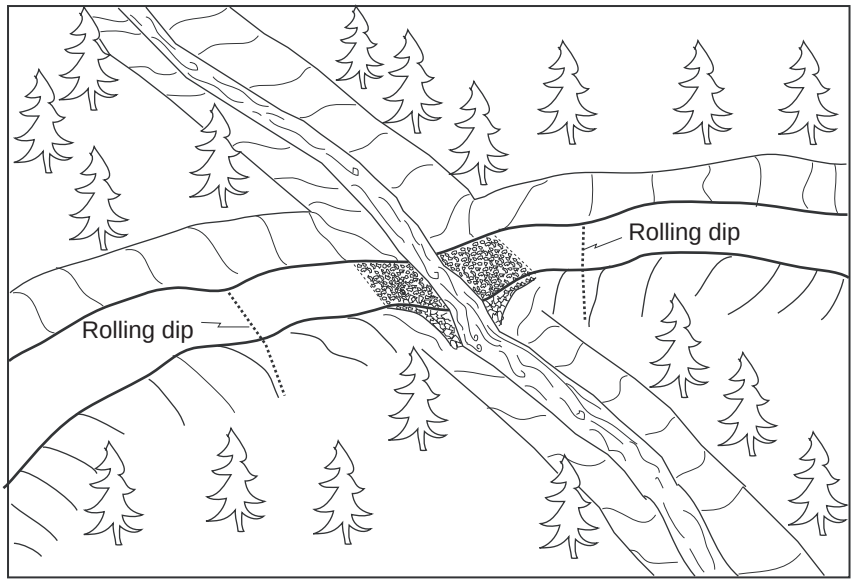
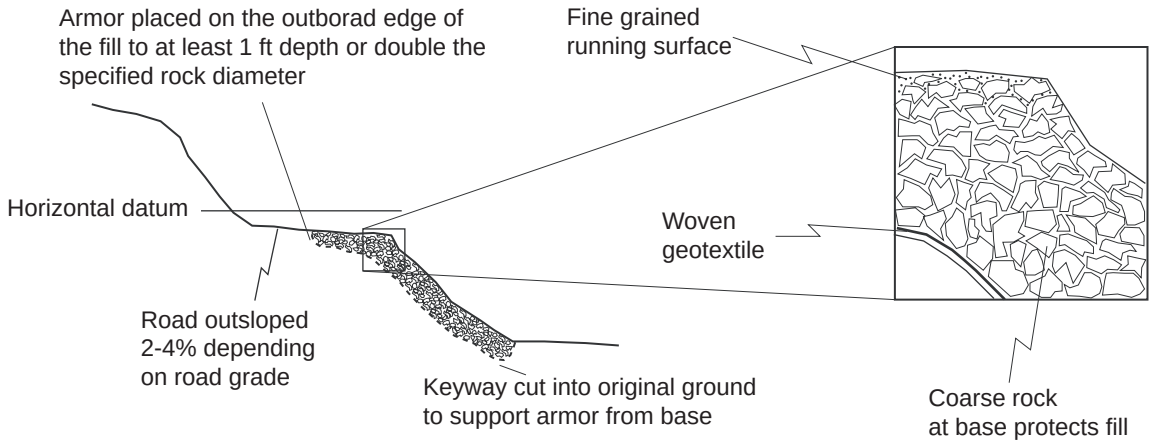
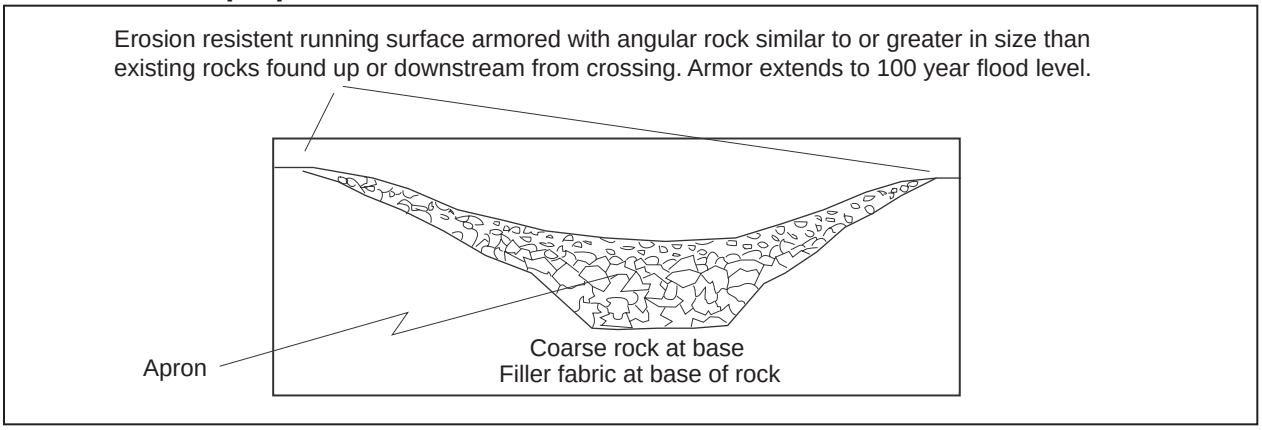
Typical Armored Fill Crossing Installation



Cross section parallel to watercourse



Cross section perpendicular to watercourse



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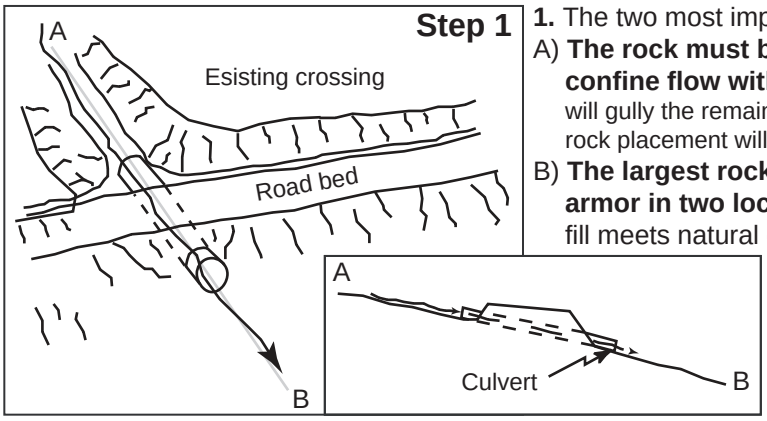
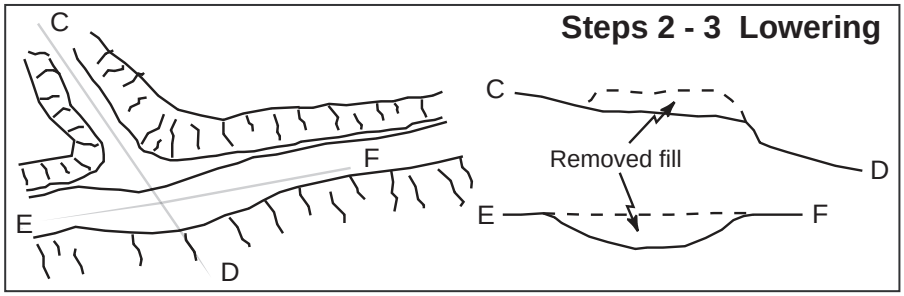
Ten Steps for Constructing a Typical Armored Fill Stream Crossing



1. The two most important points are:

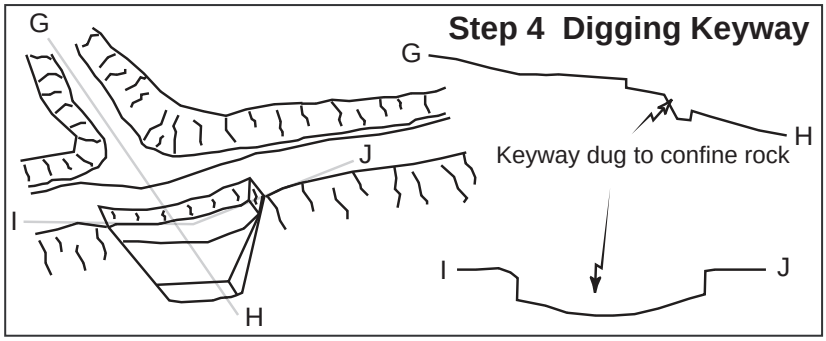
A) **The rock must be placed in a "U" shape across the channel to confine flow within the armored area.** (Flow around the rock armor will gully the remaining fill. Proper shape of surrounding road fill and good rock placement will reduce the likelihood of crossing failure).

B) **The largest rocks must be used to buttress the rest of the armor in two locations:** (i) The base of the armored fill where the fill meets natural channel. (This will butress the armor placed on the outboard fill face and reduce the likelihood of it washing downslope). (ii) The break in slope from the road tread to the outer fill face. (This will butress the fill placed on the outer road tread and will determine the "base level" of the creek as it crosses the road surface).



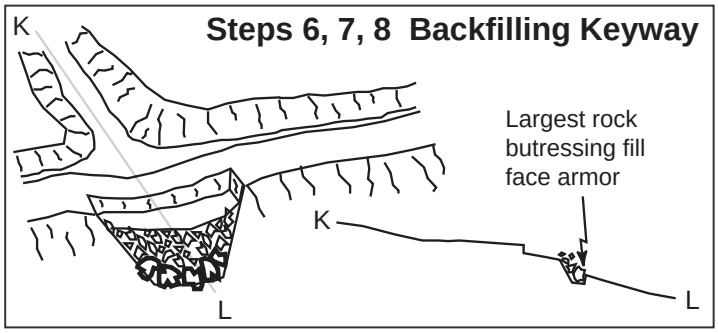
2. Remove any existing drainage structures including culverts and Humboldt logs.

3. Construct a dip centered at the crossing that is large enough to accomodate the 100-year peak storm flow and prevent diversion (C-D, E-F).



4. Dig a keyway (to place rock in) that extends from the outer 1/3 of the road tread down the outboard road fill to the point where outbaord fill meets natural channel (up to 3 feet into the channel bed depending on site specifics) (G-H, I-J).

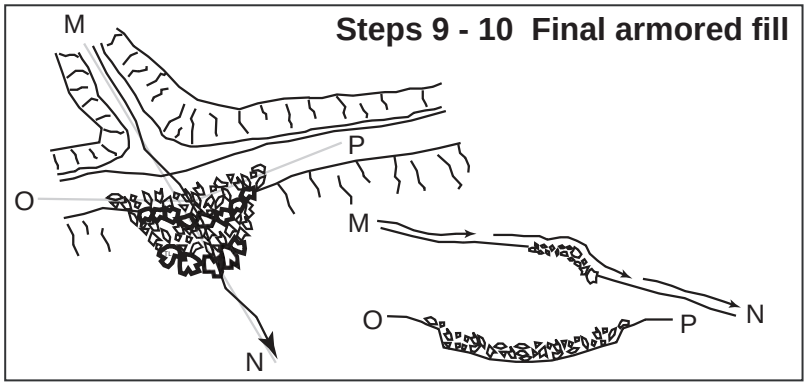
5. Install geofabric (optional) within keyway to support rock in wet areas and to prevent winnowing of the crossing at low flows.



6. Put aside the largest rock armoring to create 2 buttresses in the next step.

7. Create a buttress using the largest rock (as described in the site treatments specifications) at the base of fill. (This should have a "U" shape to it and will define the outlet of the armored fill.)

8. Backfill the fill face with remaining rock armor making sure the final armored area has "U" shape that will accomodate the largest expected flow (K-L).



9. Install a second buttress at the break in slope between the outboard road and the outboard fill face. (This should define the base level of the stream and determine how deep the stream will backfill after construction). (M-N)

10. Back fill the rest of the keyway with the unsorted rock armor making sure the final armored area has a "U" shape that will accommodate the largest expected flow (O-P).

Typical Drawing #7

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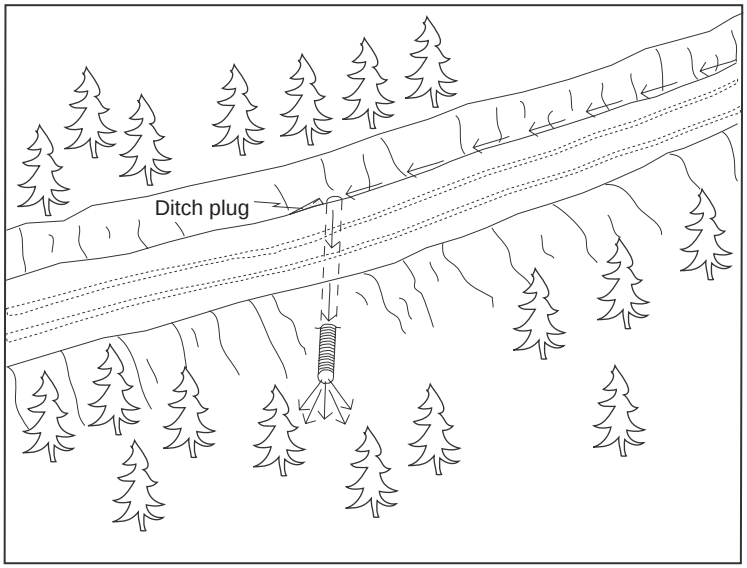
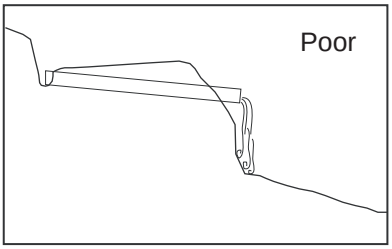
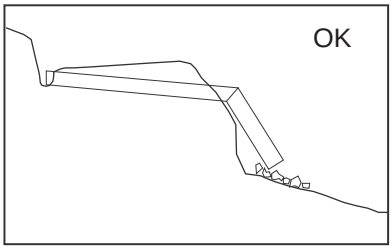
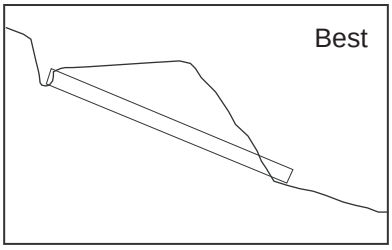
Typical Ditch Relief Culvert Installation









Ditch relief culvert installation

1) The same basic steps followed for stream crossing installation shall be employed.
2) Culverts shall be installed at a 30 degree angle to the ditch to lessen the chance of inlet erosion and plugging.
3) Culverts shall be seated on the natural slope or at a minimum depth of 5 feet at the outside edge of the road, whichever is less.
4) At a minimum, culverts shall be installed at a slope of 2 to 4 percent steeper than the approaching ditch grade, or at least 5 inches every 10 feet.
5) Backfill shall be compacted from the bed to a depth of 1 foot or 1/3 of the culvert diameter, which ever is greater, over the top of the culvert.
6) Culvert outlets shall extend beyond the base of the road fill (or a flume downspout will be used). Culverts will be seated on the natural slope or at a depth of 5 feet at the outside edge of the road, whichever is less.

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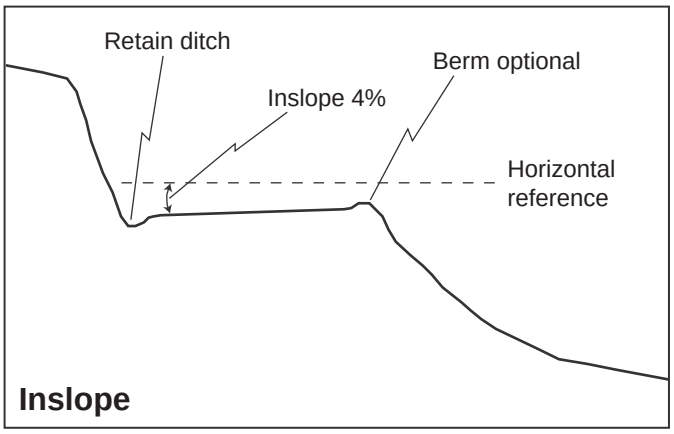
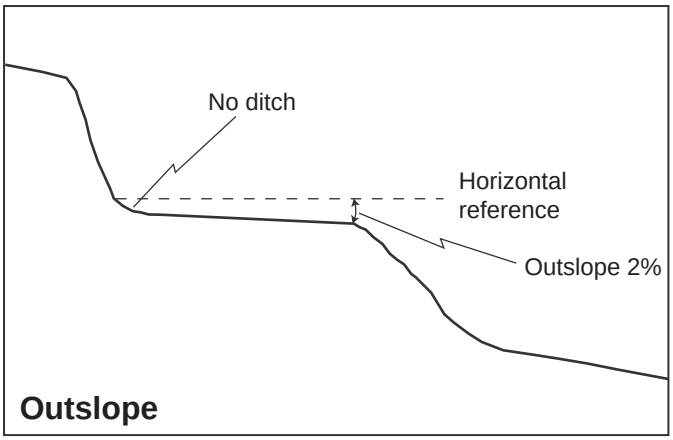
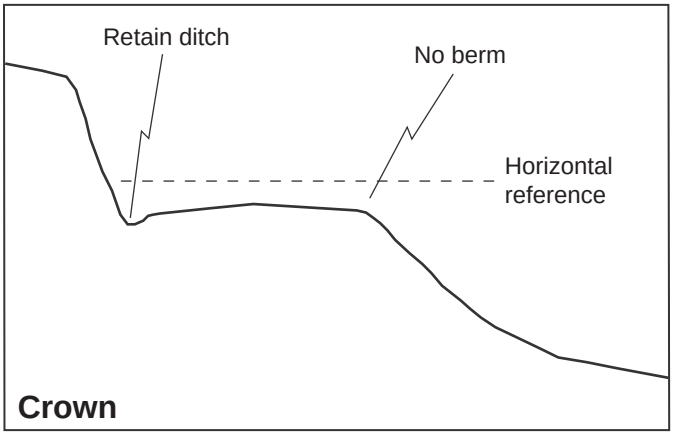
Typical Designs for Using Road Shape to Control Road Runoff







Outsloping Pitch for Roads Up to 8% Grade		
Road grade	**Unsurfaced roads**	**Surfaced roads**
4% or less	3/8" per foot	1/2" per foot
5%	1/2" per foot	5/8" per foot
6%	5/8" per foot	3/4" per foot
7%	3/4" per foot	7/8" per foot
8% or more	1" per foot	1 1/4" per foot

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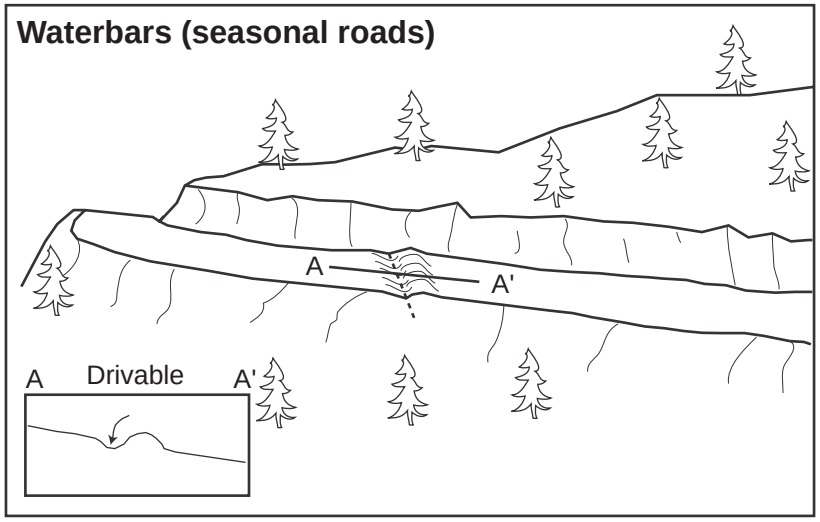
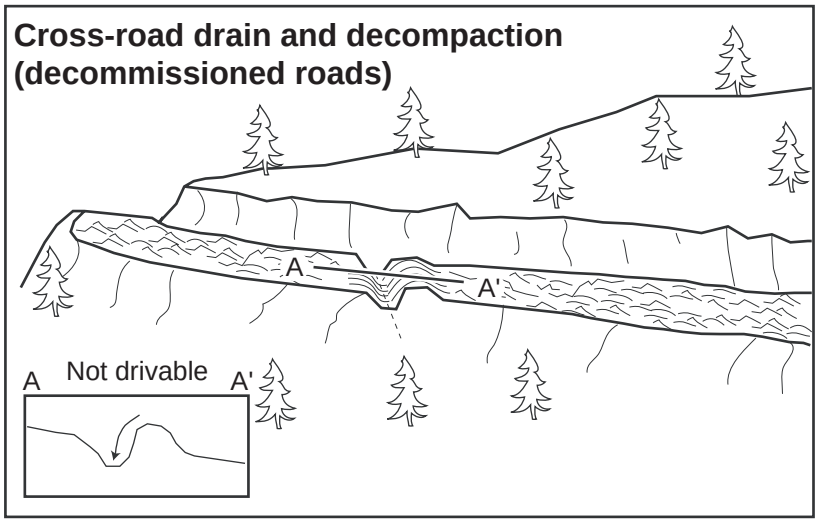
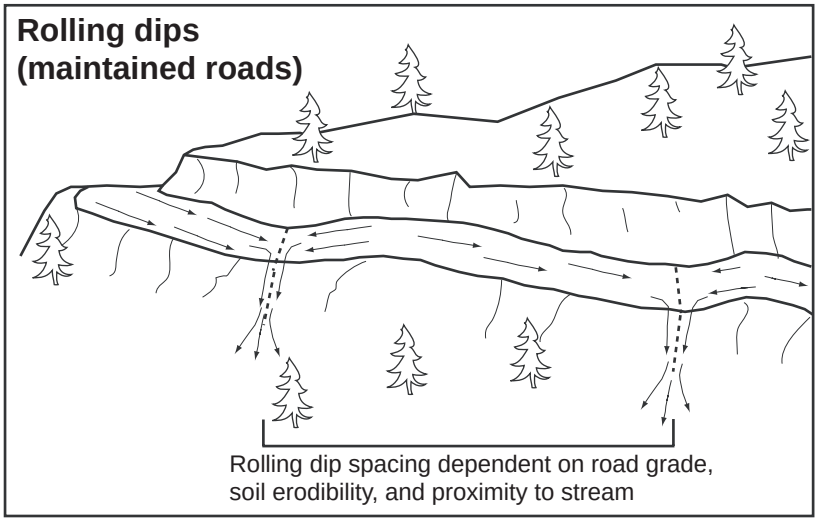
Typical Methods for Dispersing Road Surface Runoff with Waterbars, Cross-road Drains, and Rolling Dips







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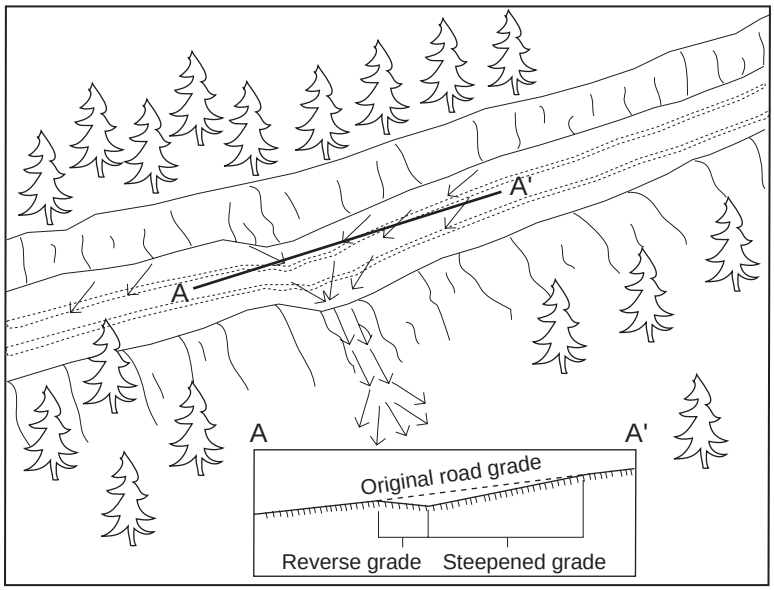
Typical Road Surface Drainage by Rolling Dips



Rolling dip installation:

1. Rolling dips will be installed in the roadbed as needed to drain the road surface.
2. Rolling dips will be sloped either into the ditch or to the outside of the road edge as required to properly drain the road.
3. Rolling dips are usually built at 30 to 45 degree angles to the road alignment with cross road grade of at least 1% greater than the grade of the road.
4. Excavation for the dips will be done with a medium-size bulldozer or similar equipment.
5. Excavation of the dips will begin 50 to 100 feet up road from where the axis of the dip is planned as per guidelines established in the rolling dip dimensions table.
6. Material will be progressively excavated from the roadbed, steepening the grade unitl the axis is reached.
7. The depth of the dip will be determined by the grade of the road (see table below).
8. On the down road side of the rolling dip axis, a grade change will be installed to prevent the runoff from continuing down the road (see figure above).
9. The rise in the reverse grade will be carried for about 10 to 20 feet and then return to the original slope.
10. The transition from axis to bottom, through rising grade to falling grade, will be in a road distance of at least 15 to 30 feet.

Table of rolling dip dimensions by road grade

Road grade %	**Upslope approach distance** (from up road start to trough) ft	**Reverse grade distance** (from trough to crest) ft	**Depth at trough outlet** (below average road grade) ft	**Depth at trough inlet** (below average road grade) ft
<6	55	15 - 20	0.9	0.3
8	65	15 - 20	1.0	0.2
10	75	15 - 20	1.1	0.01
12	85	20 - 25	1.2	0.01
>12	100	20 - 25	1.3	0.01

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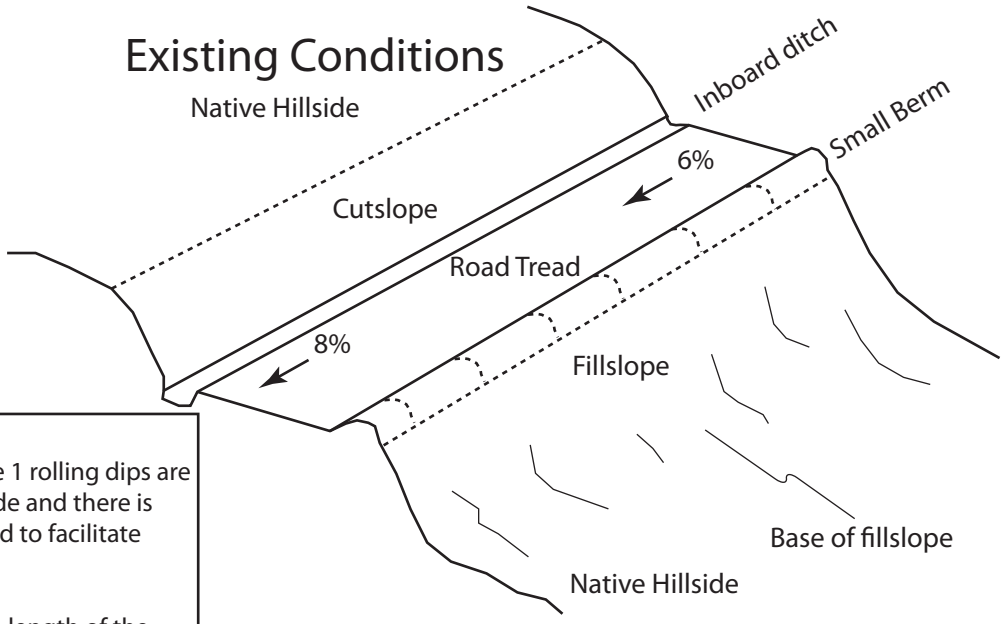
Standard (Type 1) Rolling Dip Construction

Existing Conditions



Notes

Rolling dip type 1 existing conditions: Type 1 rolling dips are utilized when roads are less than 12-14% grade and there is proximal outfall adjacent to the outboard road to facilitate road drainage.

Design Notes:

1) The berm should be removed for the entire length of the dip.

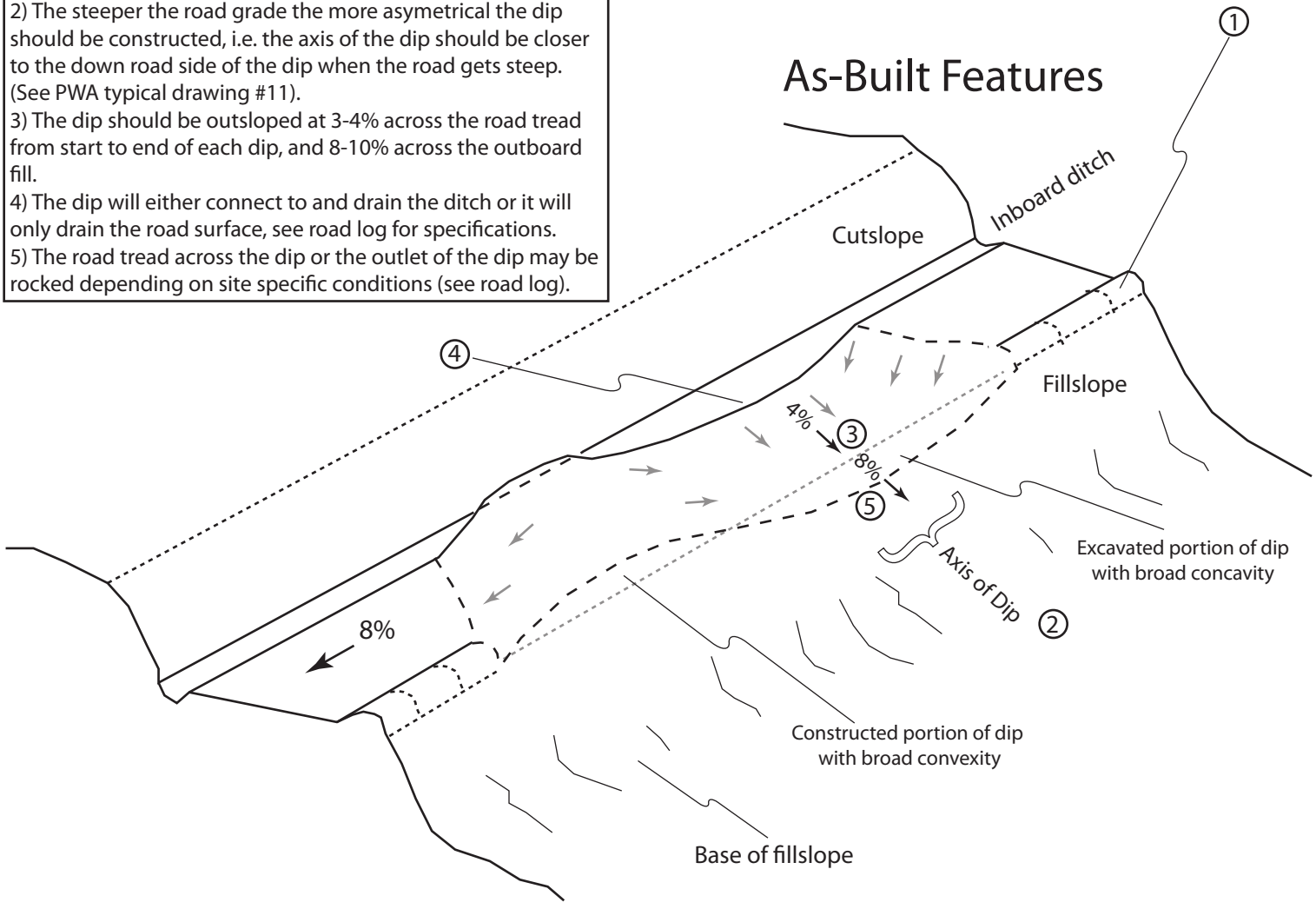
2) The steeper the road grade the more asymetrical the dip should be constructed, i.e. the axis of the dip should be closer to the down road side of the dip when the road gets steep. (See PWA typical drawing #11).

3) The dip should be outsloped at 3-4% across the road tread from start to end of each dip, and 8-10% across the outboard fill.

4) The dip will either connect to and drain the ditch or it will only drain the road surface, see road log for specifications.

5) The road tread across the dip or the outlet of the dip may be rocked depending on site specific conditions (see road log).

As-Built Features



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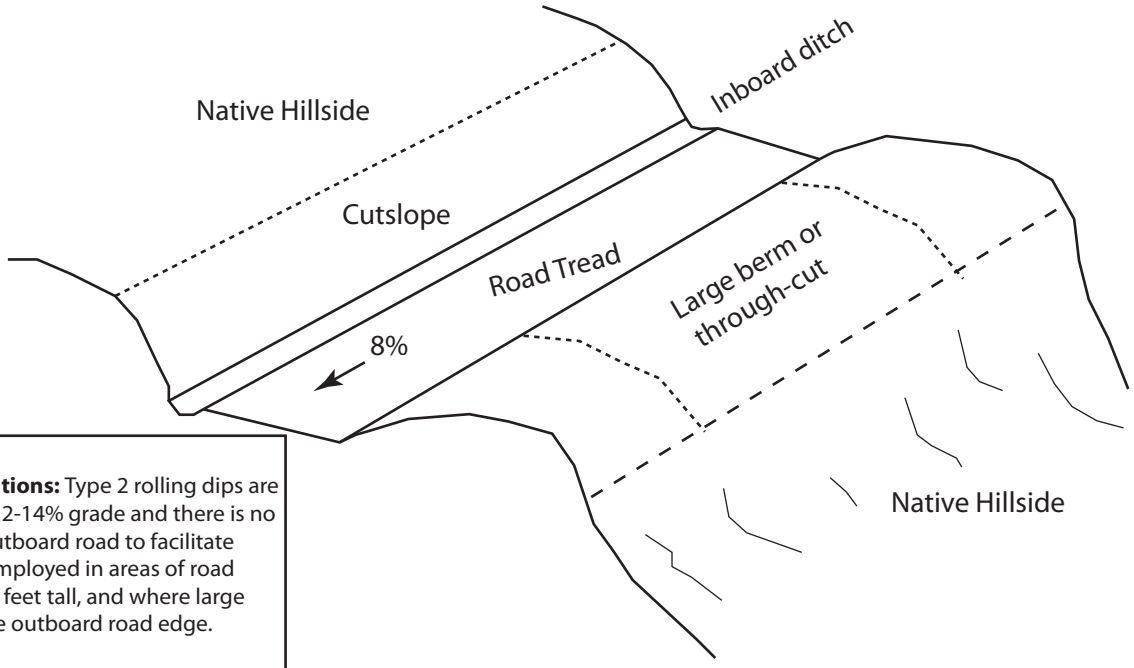
PWA Typical Drawing #19a

Type 2 Rolling Dip Construction

(Through-cut or thick berm road reaches)



Notes

Rolling dip type 2 existing conditions: Type 2 rolling dips are utilized when roads are less than 12-14% grade and there is no proximal outfall adjacent to the outboard road to facilitate road drainage. These should be employed in areas of road through-cuts generally less than 3 feet tall, and where large wide and/or tall berms exist on the outboard road edge.

Design Notes:

1) The berm or native hillside should be removed for the entire length of the excavated portion of the dip, or, at a minimuim through the axis of the dip.

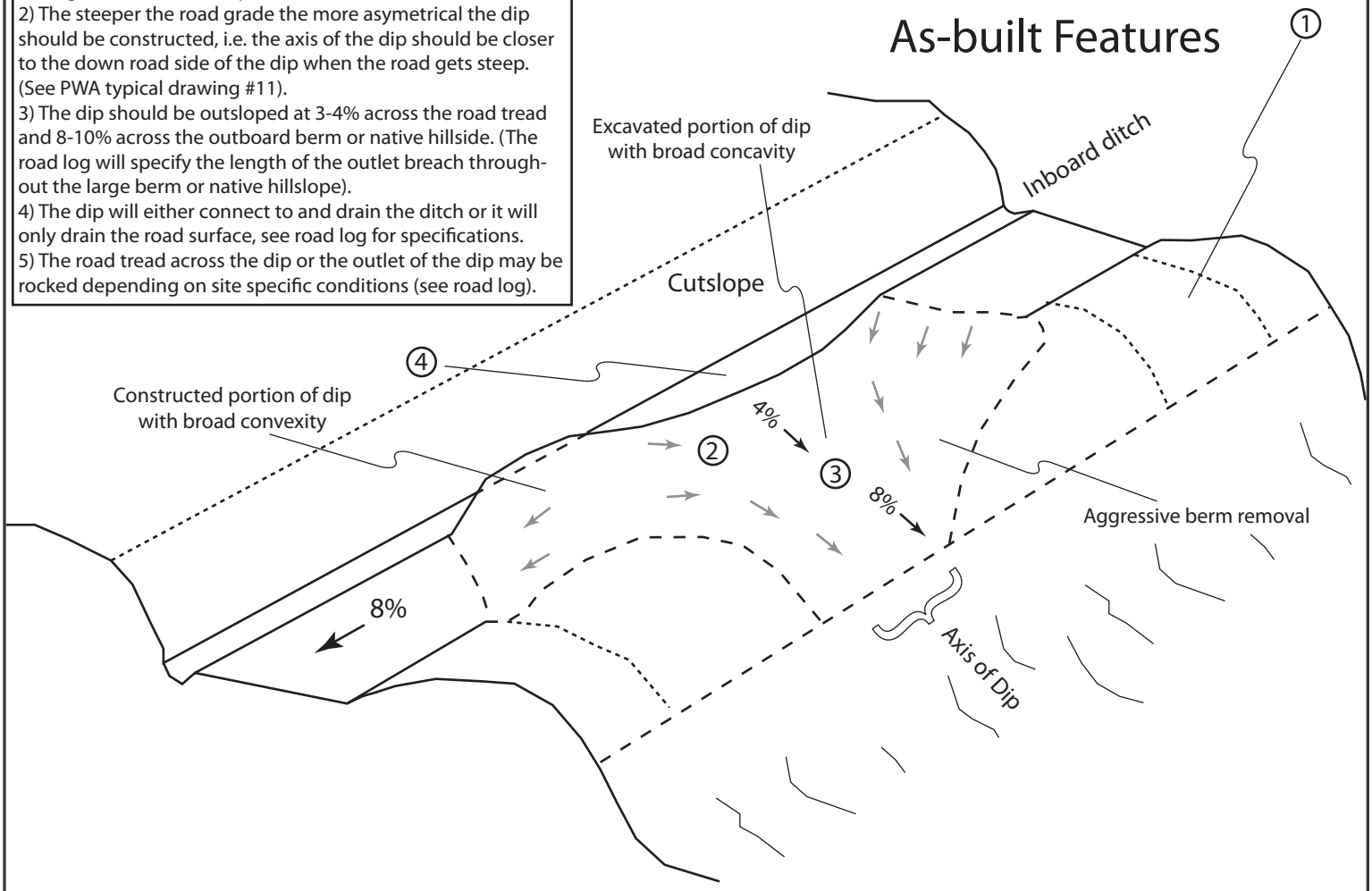
2) The steeper the road grade the more asymetrical the dip should be constructed, i.e. the axis of the dip should be closer to the down road side of the dip when the road gets steep. (See PWA typical drawing #11).

3) The dip should be outsloped at 3-4% across the road tread and 8-10% across the outboard berm or native hillside. (The road log will specify the length of the outlet breach through-out the large berm or native hillslope).

4) The dip will either connect to and drain the ditch or it will only drain the road surface, see road log for specifications.

5) The road tread across the dip or the outlet of the dip may be rocked depending on site specific conditions (see road log).

As-built Features



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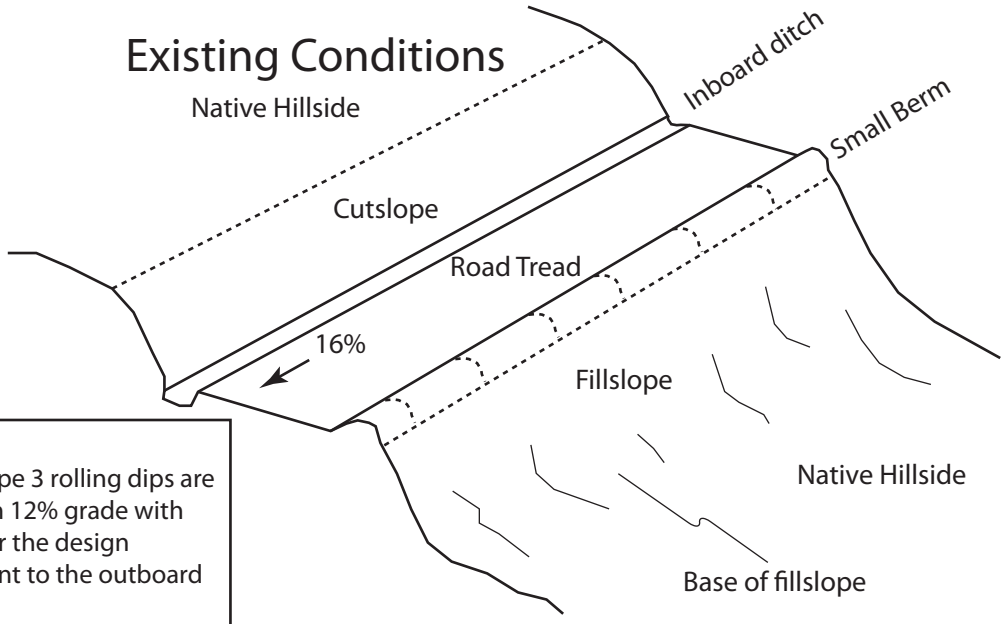
PWA Typical Drawing #19b

Type 3 Rolling Dip Construction
(steep slope outslope)



Notes

Rolling dip type 3 existing conditions: Type 3 rolling dips are utilized when roads grades are steeper than 12% grade with little opportunity to create reverse grade for the design vehicle, and there is proximal outfall adjacent to the outboard road to facilitate road drainage.

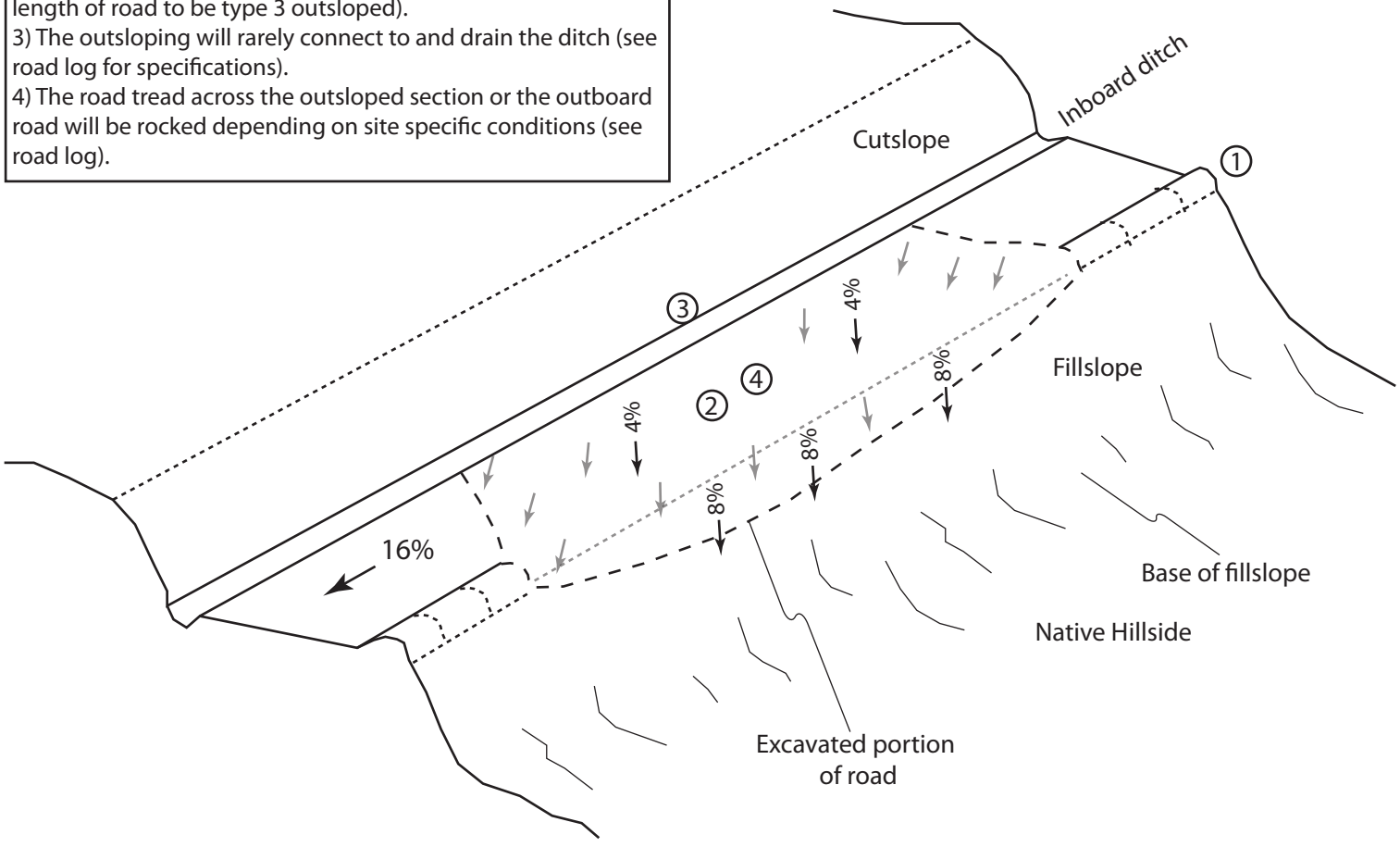
Design Notes:

1) The berm should be removed for the entire length of the outsloped section.

2) The dip should be outsloped at 2-4% across the road tread and 4-8% across the outboard fill. (The road log will specify the length of road to be type 3 outsloped).

3) The outsloping will rarely connect to and drain the ditch (see road log for specifications).

4) The road tread across the outsloped section or the outboard road will be rocked depending on site specific conditions (see road log).



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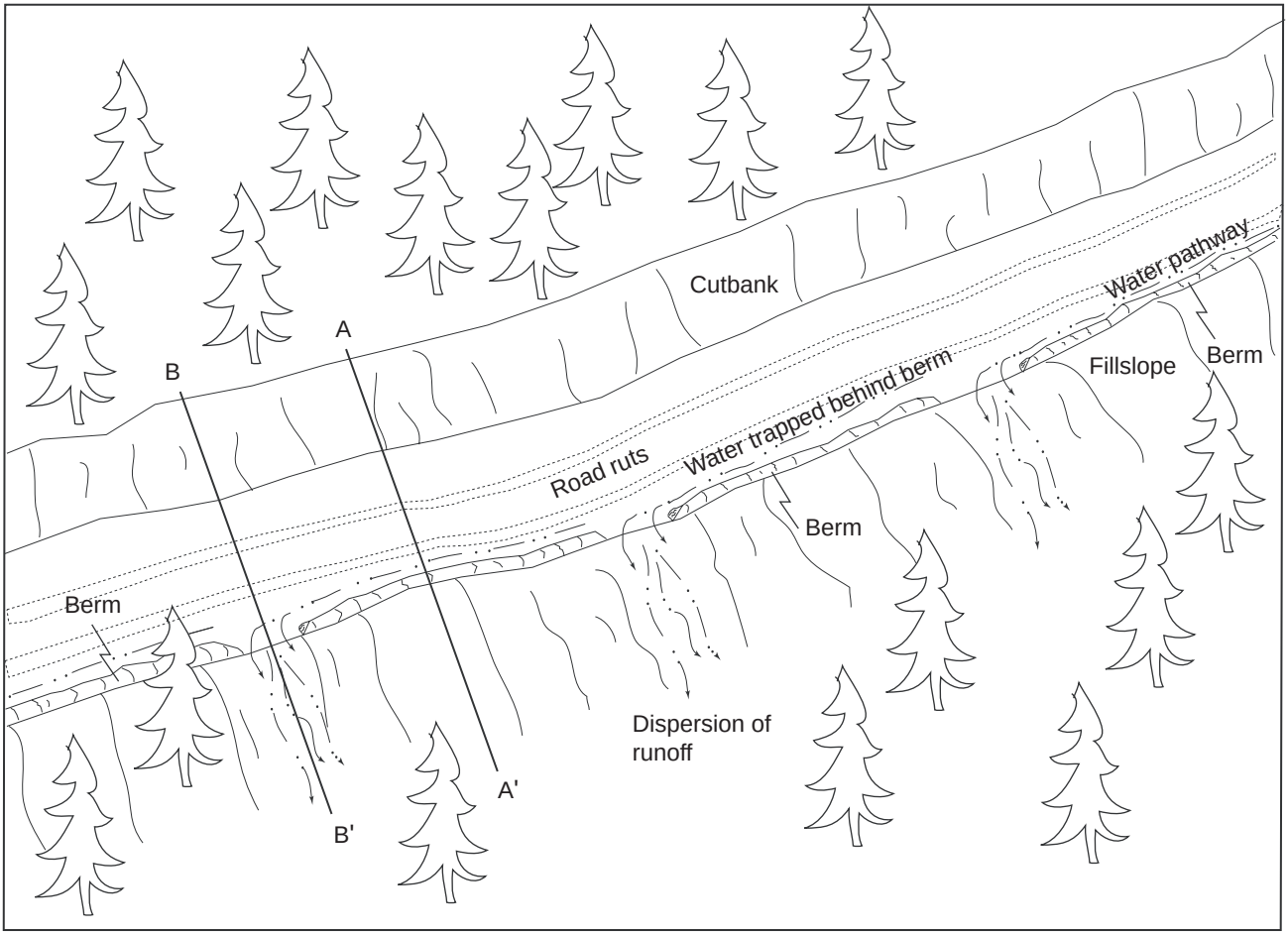
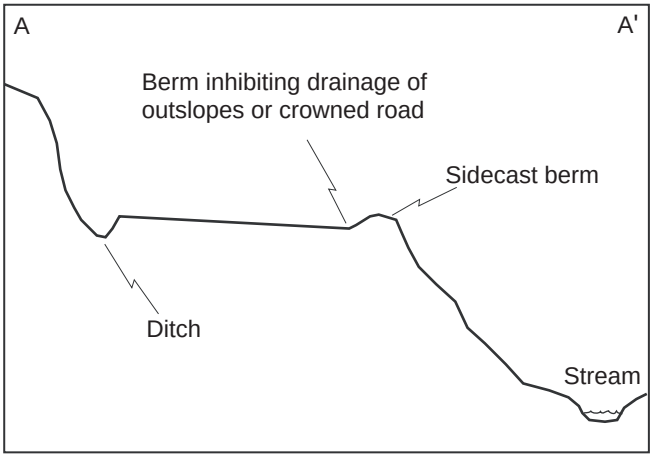
PWA Typical Drawing #19c

Typical Sidecast or Excavation Methods for Removing Outboard Berms on a Maintained Road

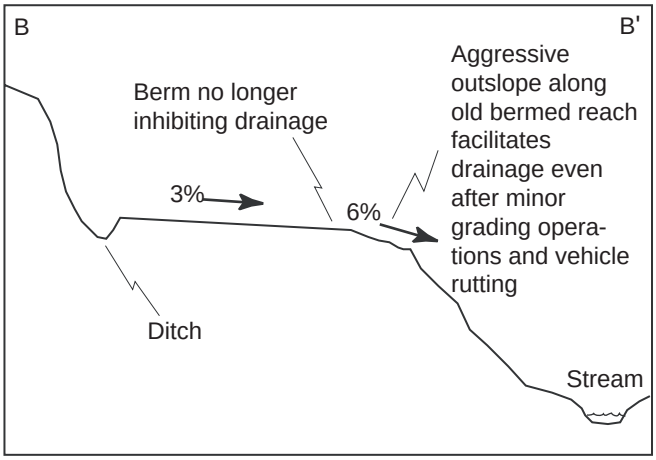
1. On gentle road segments berms can be removed continuously (see B-B').
2. On steep road segments, where safety is a concern, the berm can be frequently breached (see A-A' & B-B') Berm breaches should be spaced every 30 to 100 feet to provide adequate drainage of the road system while maintaining a semi-continuous berm for vehicle safety.



Road cross section between berm breaches



Road cross section at berm breaches



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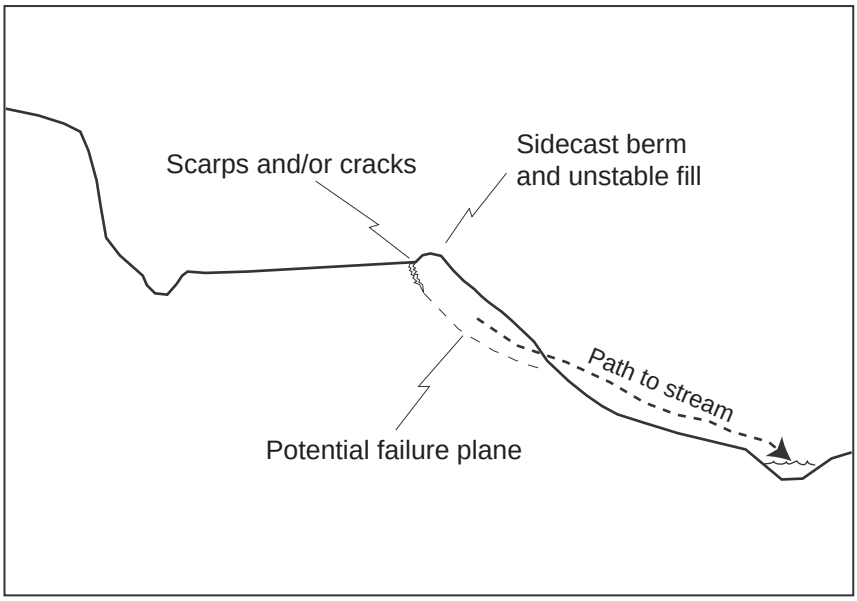
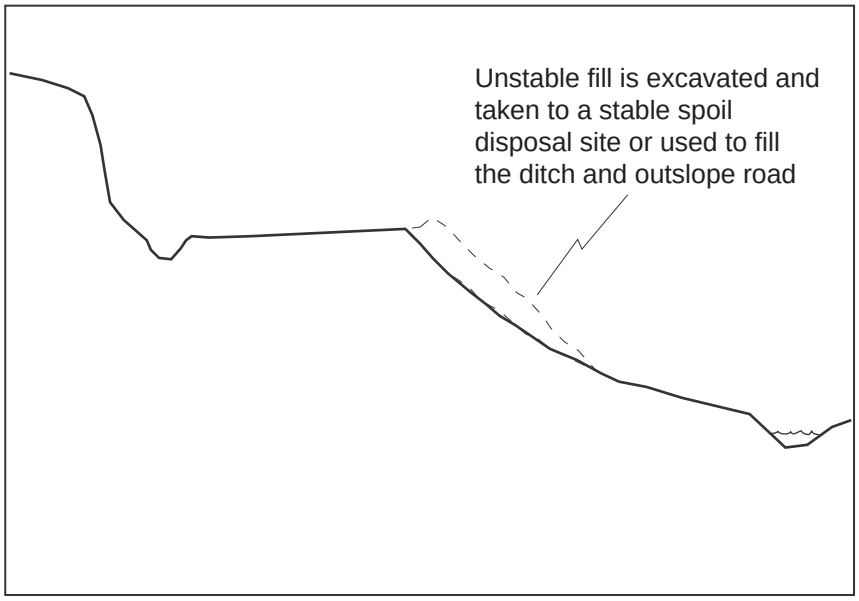
Typical Excavation of Unstable Fillslope on an Upgraded Road

Before



After



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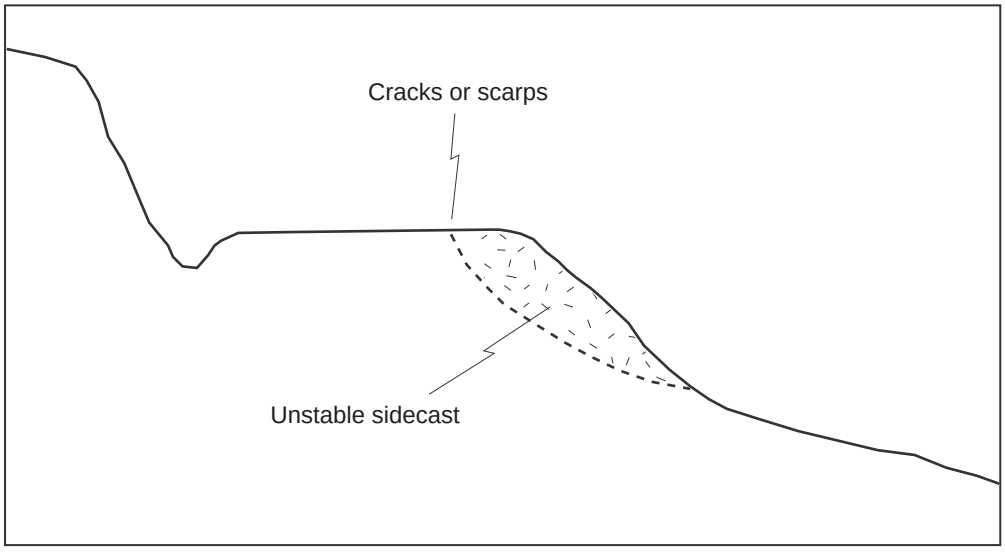
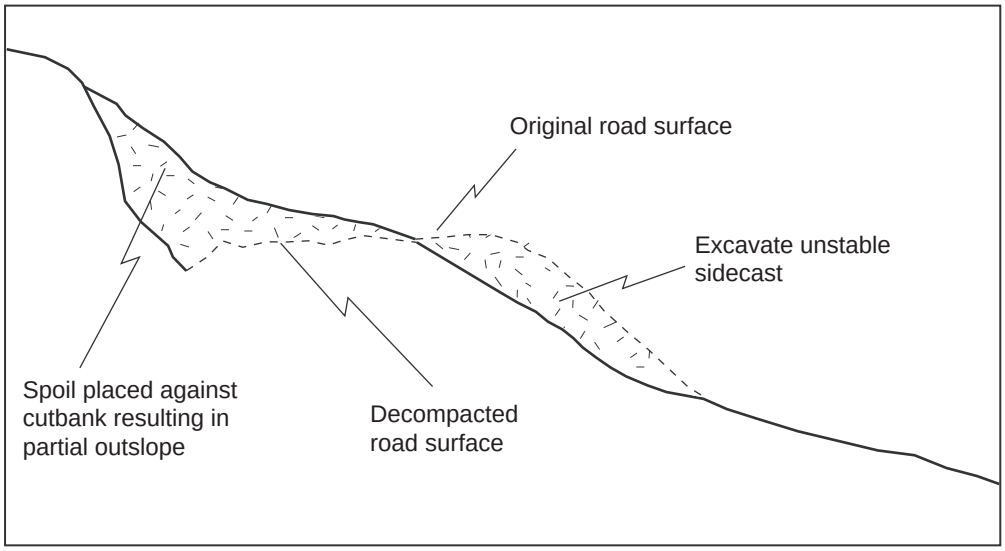
Typical Excavation of Unstable Fillslope on a Decommissioned Road

Before



After



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Attachment 2:

MITIGATION MONITORING AND REPORTING PROGRAM

	ATTACHMENT 2 UPPER BIDWELL PARK ROAD SEDIMENT REDUCTION PROJECT MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)	TIMING	RESPONSIBLE PARTY
D. BIOLOGY			
MITIGATION D.1. (Biology - Valley Elderberry Longhorn Beetle)			
A.	All elderberry shrubs shall be avoided during construction activities by establishing a no disturbance buffer around any elderberry shrubs containing stems measuring 1-inch or greater at ground level.	During construction	City and contractors
B.	ESA fencing or other appropriate barriers shall be established around elderberry shrubs prior to the start of construction activities.	Prior and during construction	City and contractors
C.	Signs shall be established around the buffer with the following language: “This is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines and imprisonment.”	Prior and during construction	City and contractors
D.	Prior to commencement of construction, contractors and work crews that are onsite for more than 30 minutes, shall go through a Worker Environmental Awareness Training (WEAT) regarding avoidance of elderberry shrubs and the possible penalties for not complying with these requirements. The training can be given by a qualified biologist or the Foreman, if the Foreman has been trained by the qualified biologist to conduct the WEAT. Written documentation of the completion of WEAT shall be provided to the City and include a sign in sheet with all participants signatures.	Prior to construction	City and contractors
E.	The Project shall not result in effects to elderberry shrubs which include trimming, damaging, removal or modification to elderberry shrubs. If effects to shrubs measuring 1-inch or greater at ground level are inevitable, then consultation with the USFWS and mitigation for effects to elderberry shrubs shall take place prior to effects occurring.	During construction	City and contractors
F.	No insecticide, herbicide, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer areas (buffer areas to be established by a professional biologist), or within 100 feet of any elderberry shrub with one or more stems measuring 1.0 inch or greater in diameter at ground level.	During construction	City and contractors
MITIGATION D.2. (Biology - Western Pond Turtles)			
A.	Before initiating any ground disturbances, restrictive silt fencing will be installed in strategic locations to prevent wildlife (i.e., reptiles, mammals, birds, etc.) from entering the construction site from the adjacent aquatic settings and to prevent construction equipment and personnel from entering sensitive habitat from the construction site.	Prior to construction	City and contractors
MITIGATION D.3 (Biology - Protecting Wetlands)			
	The City will obtain and comply with final permits and compensatory mitigation that may be required by the he United States Army Corps of Engineers (USACE), the California Regional Water Quality Control Board (CVRWQCB), and the California Department of Fish & Wildlife (CDFW), or copies of relevant correspondence documenting that no permit is required, as applicable. The City will obtain final copies of the required permits and compensatory mitigation or letters documenting relief thereof, prior to commencing construction at the site.	Prior to construction	City
MITIGATION D.4 (Biology - Hawks, Owls, Kites and Migratory Birds)			
A.	Vegetation removal should be conducted during the non-breeding season (September 1-January 31). If vegetation removal or construction activities occur during the avian breeding season (February 1 – August 31), then a migratory bird and raptor survey shall be conducted by a qualified biologist to identify any active nests (i.e., nests that contain egg(s) or young) within the project area. A qualified biologist shall:		
	1. Conduct a survey for all special-status bird species and birds protected by the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (CFGC) within seven (7) days prior to vegetation removal or construction activities. The survey shall cover the area within the BSA and 250 feet outside of the BSA where accessible.	Prior to construction	City and contractors
	2. If an active nest is found, then the biologist will map the nest location and establish an appropriate species protection buffer around the active nest(s) as determined by the biologist. Construction and vegetation removal activity shall be prohibited within the buffer until the young have fledged (i.e., fly) or the nest fails. Nests shall be monitored once per week and written findings reported to the City (e-mail OK).	Prior to construction	City and contractors
	3. Conduct an additional migratory bird and raptor survey if vegetation removal and/or construction will be required to stop for more than 15 days. The survey shall be conducted within seven (7) days prior to the continuation of activities.	Prior to construction	City and contractors
MITIGATION D.4 (Biology – Valley Foothill Riparian and Valley Oak Woodland)			
A.	Project design shall avoid oak trees and riparian habitat, including the critical root zone (CRZ), to the maximum extent feasible.	Prior to construction	City and contractors

ATTACHMENT 2 UPPER BIDWELL PARK ROAD SEDIMENT REDUCTION PROJECT MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)		TIMING	RESPONSIBLE PARTY
B.	When working within proximity to trees identified for preservation, activities shall comply with the following tree preservation Best Management Practices, which shall be included in the tree removal and construction contracts for the project:		
	1. Pruning of branches that are in the path of any access roads or work areas on the site shall be conducted to the minimum height requirements of the construction equipment prior to the start of construction activities to prevent breaking of or damage to the branches. The pruning of branches shall be conducted per current ANSI A300 pruning standards and under the supervision of a Certified Arborist or Registered Professional Forester or Registered Professional Forester.	During construction	City and contractors
	2. If excavation work is conducted within the Critical Root Zone of a tree proposed for preservation, a Certified Arborist or Registered Professional Forester shall be on-site to monitor the excavation activities. The CRZ typically corresponds to the dripline of the tree or a radius equal in feet to the number of inches of the tree's diameter at breast height (DBH), whichever is greater.	During construction	City and contractors
	3. The practice of "directional root pruning" shall be used to prune roots in conflict with planned improvements. Directional root pruning is accomplished by pruning main roots back to lateral roots, similar in concept to pruning limbs in the canopy. The techniques are defined more thoroughly below.	During construction	City and contractors
	a. Avoid grubbing of vegetation using equipment that breaks the ground surface near trees that are to remain.	During construction	City and contractors
	b. If possible, instead of excavating an open trench for pipe or conduit installation, tunnel under the root system or excavate using hydraulic or pneumatic equipment.	During construction	City and contractors
	c. All root pruning shall be done using hand tools, or other methodology approved by a Certified Arborist or Registered Professional Forester, in order to make clean cuts and prevent the ripping or tearing of roots.	During construction	City and contractors
	d. Roots are not to be stub pruned or ground, unless the tree is slated for removal.	During construction	City and contractors
	e. Roots less than two (2) inches in diameter are to be clean cut to a parent root or another lateral root outside of the work area.	During construction	City and contractors
	f. Roots two (2) inches in diameter and larger shall not be cut without the specific approval of the Certified Arborist or Registered Professional Forester. Where roots greater than two (2) inches in diameter must be cut, they are to be clean cut to a parent root or another lateral root outside of the work area.	During construction	City and contractors
	g. Roots two (2) inches in diameter and larger exposed to the air are to be kept covered and moist at all times during construction operations.	During construction	City and contractors
	h. Root pruning shall be done by a Certified Arborist or Registered Professional Forester, Certified Tree Workers under the general guidance of the Certified Arborist or Registered Professional Forester or the contractor under the direct supervision of the Certified Arborist or Registered Professional Forester.	During construction	City and contractors
	4. Compaction prevention measures shall be employed if any work is conducted within the CRZ, unless otherwise authorized by City of Chico Public Works Department. Typical compaction prevention measures include:		City and contractors
	a. Avoid parking or driving vehicles or heavy equipment in the CRZ.	Prior and during construction	City and contractors
	b. Avoid storage of equipment or materials in the CRZ.	Prior and during construction	City and contractors
	c. If driving in the CRZ is unavoidable, deflate tires slightly to redistribute the weight over a larger area.	Prior and during construction	City and contractors
	d. Construct temporary 'crossings' within the CRZ by placing up to 6" of mulch and/or placing plywood.	Prior and during construction	City and contractors
	5. Grading activities shall be avoided within the CRZ. Grading activities conducted outside of the CRZ shall be designed to prevent significantly altering the drainage within the CRZ. If grading changes cannot be avoided within the CRZ, the grade change shall be limited to 4 inches of cut or fill, where feasible, and a Certified Arborist or Registered Professional Forester shall be consulted to determine if additional mitigation measures are needed to maintain aeration within the root zone.	During construction	City and contractors
	6. If drought conditions exist during the construction period, watering of the protected oak trees may be necessary to maintain proper soil moisture conditions. A Certified Arborist or Registered Professional Forester or qualified Landscaper shall be consulted for specific guidance if drought conditions occur at the time of construction.	During construction	City and contractors

	ATTACHMENT 2 UPPER BIDWELL PARK ROAD SEDIMENT REDUCTION PROJECT MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)	TIMING	RESPONSIBLE PARTY
C.	Prior to construction, all individual trees and groups of trees, including the CRZ, shall be identified for protection utilizing methodology approved by the City of Chico Public Works Department. Protection methodology could include highly visible plastic mesh fencing, flagging, notes on construction plans, or City approved equivalent measures.	Prior to construction	City and contractors
D.	Attempts will be made during construction to minimize impacts to existing trees to the greatest extent possible. However, 44 trees, ranging from 1-inch DBH to 30 inches DBH, have been identified for potential removal.	During construction	City and contractors
E.	The impacts to any native riparian trees will be mitigated by replanting trees at a 2:1 ratio as stipulated in the City's CDFW LSAA permit application.	During and after construction	City and contractors
F.	Non-riparian native trees will be mitigated utilizing the methodology and replanting ratios outlined in the City of Chico's Tree Preservation Regulations in Chico Municipal Code (CMC) Chapter 16.66. Any trees greater than 18" in DBH and defined as "trees" in CMC 16.66 to be removed will be replanted with one (1) new 15-gallon tree for every 6 inches in DBH removed. The list of trees to be removed per the LSAA application and CMC Chapter 16.66, and the intended replanting ratios are depicted in Appendix B. All replacement trees shall be of similar species, unless otherwise approved by the City's Urban Forest Manager, and replanted in proximity to the project area or other suitable locations within Upper Bidwell Park. Using the above LSAA and CMC 16.66 methodology, 31 trees will be replanted to mitigate the 44 tree removals.	During and after construction	City and contractors
	MITIGATION D.5 (Biology – Local Ordinances)		
	See **Mitigation Measure D.4 (Biology – Valley Foothill Riparian and Valley Oak Woodland)** above.		City and contractors
E. CULTURAL/TRIBAL RESOURCES			
	MITIGATION E1 and E.5 (On-Call Tribal Monitor):		
A.	Based on the results of the records search, field survey, and assessment of potential direct or indirect Project impacts, the excavation of the natural drainages, and heavy vegetation in the project area, the City's contractor shall provide for the presence of a Mechoopda Indian Tribal Monitor on an "on-call basis" during all earth moving and ground disturbing activities. The City shall provide the contractor's contact information for the purpose of providing direct information to the Tribal Monitor regarding project scheduling and safety protocol, as well as project scope, location of construction areas, and nature of work to be performed.	During construction	City and contractors
	MITIGATION E.3 and E.4. (Inadvertent Discovery):		
A.	If during ground disturbing activities, any potentially prehistoric, protohistoric, and/or historic cultural resources are encountered, the supervising contractor shall cease all work within 10 feet of the find (100 feet for human remains) and notify the City. A professional archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeology and being familiar with the archaeological record of Butte County, shall be retained to evaluate the significance of the find. City staff shall notify all local tribes on the consultation list maintained by the State of California Native American Heritage Commission, to provide local tribes the opportunity to monitor evaluation of the site.	During construction	City and contractors
B.	If human remains are uncovered, the project team shall notify the Butte County Coroner pursuant to Section 7050.5 of California's Health and Safety Code. If the Butte County Coroner determines that the discovered remains are those of Native American ancestry, then the Native American Heritage Commission must be notified by telephone within 24 hours. Sections 5097.94 and 5097.98 of the Public Resources Code describe the procedures to be followed after the notification of the Native American Heritage Commission.	During construction	City and contractors
C.	Site work shall not resume until the archaeologist conducts sufficient research, testing and analysis of the archaeological evidence to make a determination that the resource is either not cultural in origin or not potentially significant. If a potentially significant resource is encountered, the archaeologist shall prepare a mitigation plan for review and approval by the City, including recommendations for total data recovery, Tribal monitoring, disposition protocol, or avoidance, if applicable. All measures determined by the City to be appropriate shall be implemented pursuant to the terms of the archaeologist's report. The preceding requirement shall be incorporated into construction contracts and documents to ensure contractor knowledge and responsibility for the proper implementation.	During construction	City and contractors
J. HYDROLOGY/WATER QUALITY			
	MITIGATION J.1 and E.4. (Permits/Compensatory Mitigation):		
A.	The City will obtain and comply with final permits and compensatory mitigation that may be required by the he United States Army Corps of Engineers (USACE), the California Regional Water Quality Control Board (CVRWQCB), and the California Department of Fish & Wildlife (CDFW), or copies of relevant correspondence documenting that no permit is required, as applicable. The City will obtain final copies of the required permits and compensatory mitigation or letters documenting relief thereof, prior to commencing construction at the site.	Prior to construction	City