

Appendix C Summary of Mitigation and Avoidance Measures

The following is a comprehensive list of the recommended mitigation and avoidance measures for the proposed project. The list addresses all impacts, by resource area, regardless of their classification or magnitude.

Mitigation measures have been specified where applicable in the discussions for each environmental and community topic area evaluated in this Environmental Assessment/Initial Study (EA/IS). The following provides additional explanation of the mitigation measures.

Hazardous Waste and Material

Prior to construction, steps would be taken to verify whether site contamination in the study area may impact any of the proposed phases of the interchange. The proposed steps would include but are not limited to the following:

- **Investigations of all buildings acquired for the project.** The Initial Site Assessment did not address any potential contamination issues regarding existing structures. Because the project would involve the acquisition of commercial and residential properties, these structures should be investigated for potential hazardous materials or contamination issues prior to construction. The investigations should include checking for the presence of building materials painted with lead-based paint, storage buildings that might contain hazardous materials, asbestos (i.e., transit pipe, insulation, and siding), home heating fuel storage tanks, and other similar issues.
- **Soil and groundwater sampling.** Further investigation of the four identified potential hazardous waste sites is recommended prior to construction to evaluate the potential for hydrocarbon impacts. Soil sampling and analysis will be required if the excavated material is used on-site, disposed of off-site in a landfill, or reused off-site. This sampling and analysis should be conducted prior to construction. Although none of the reports and databases reviewed indicates that the project phases are likely to be contaminated, potential hazards or construction delays would be avoided by early investigation.

Where contamination is present, a remediation plan that complies with State and Federal standards would be developed and implemented in cooperation with the current landowner.

Air Quality

No substantial impacts to air quality would result from operation of Phases 1 and 2, or from cumulative implementation of Phases 1 through 5. To mitigate potential construction impacts, dust control practices would be employed to minimize or avoid potential exceedances (violations) of the air quality standard for particulate matter less than 10 micrometers in diameter (PM₁₀) during construction. Mitigation measures that would be employed include the following (BAAQMD 1999):

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials *or* require all trucks to maintain at least 0.6 meter (2 feet) of freeboard.
- Pave, apply water three times daily, or apply nontoxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily or apply nontoxic soil binders to exposed stockpiles (dirt, sand, etc.)
- Limit traffic speeds on unpaved roads to 24 km per hour (15 miles per hour).
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

In addition, the following can mitigate pollutant emissions in construction equipment exhaust:

- Keeping engines properly tuned

- Limiting idling
- Avoiding unnecessary concurrent use of equipment

The proposed measures would be implemented for the construction of Phases 1 through 5. Implementation of the above mitigation measures would result in construction emissions occurring at a less-than-substantial level.

Noise

The installation of soundwalls would mitigate for long-term noise impacts, and the location of each preliminarily evaluated wall is included in this EA/IS. For each of the soundwalls, a “reasonableness allowance” has been calculated that considers the future noise level, the noise level increase caused by the project (e.g., most increases are within 1 to 3 A-weighted decibels [dBA]), and the age of the dwelling units protected. The calculated reasonableness allowance provides an indication of an amount that, under the Federal Highway Administration (FHWA) and Caltrans criteria, is a reasonable expenditure of funding to existing dwellings impacted by highway noise. The cost of constructing a barrier has been estimated and compared to the calculated allowance. Barriers have been preliminarily identified that are generally cost effective, that are reasonably close to being cost effective, or that provide benefits as noted in the discussion of noise mitigation. Section 2.4.5 provides additional details.

To minimize construction impacts, the following measures would be required for construction contractors:

- Equip all internal combustion engine–driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Strictly prohibit unnecessary idling of internal combustion engines within 100 feet of residences.
- Avoid staging construction equipment within 200 feet of residences and locate all stationary noise-generating construction equipment, such as air compressors and portable power generators, as far as practical from noise-sensitive residences.
- Construction equipment should be required to conform to the provisions in Section 7-1.01I, Sound Control Requirements, of the latest Standard Specifications. These requirements are meant to minimize the impact from

construction noise yet in no way relieve the contractor from complying with local noise ordinances.

Soundwalls will be aesthetically treated with colors, patterns, and textures that are similar to existing walls along the corridor. Vines could be planted on walls during the interchange construction project to deter graffiti and reduce glare.

Wetlands and Other Waters of the United States

An estimated less than 0.01 hectare (ha) (less than 0.03 acre) of wetlands would be permanently impacted by the proposed project. To avoid or minimize any potential impacts to wetlands and waters of the United States, the following measures are recommended:

- Disturbance to existing grades and vegetation will be limited to the actual site of the project and necessary access routes. Placement of all roads, staging areas, and other facilities shall avoid and limit disturbance to wetland habitat. Existing ingress or egress points shall be used. Following completion of the work, the contours of the area shall be returned to preconstruction condition or better.
- Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, straw bales, or silt fences) shall be incorporated into the project design and implemented at the time of construction. These devices shall be in place during construction activities, and after if necessary, for the purposes of minimizing sediment impact to the wetlands and input to waters of the United States. These devices will be placed at all locations where the likelihood of sediment input exists. A supply of erosion control materials would be kept on hand to respond to sediment emergencies and to cover small sites that may become bare.
- All disturbed soils at each site will undergo erosion control treatment prior to October 31 and after construction is terminated. Treatment includes hydroseeding and sterile straw mulch. Disturbed soils on a gradient of over 30 percent will have erosion control blankets installed. Permanent revegetation and tree replanting will take place in small openings in the erosion control blanket, with native species.
- Work within the Grayson and Walnut Creek channels will be seasonally restricted. It is expected that necessary regulatory permits will specify that no work within the channels should occur between mid-October and mid-April.

Temporary construction access to and within the channels would be necessary for installation of new piers. Installation of the piers should be completed within a single year's seasonal work window (e.g., from June 1 to mid-October). This work period limitation shall be specified in the construction contracts to ensure that the construction access is considered temporary.

- Permanent revegetation and tree replanting will be performed. Native plant species will be considered for revegetation. Section 2.17.5 outlines conceptual revegetation and planting concepts.
- For unavoidable impacts to wetlands, development of on-site mitigation is limited. Off-site mitigation is available within the local and regional area through approval of use of a conservation bank.

Vegetation and Wildlife

Some trees in the project area may need to be removed to allow for construction. Loss of nesting habitat trees of any special-status species discovered during preconstruction surveys shall be mitigated by preserving those trees or ones similar on the site that can produce substitute nesting habitat. Removal of potential nest trees will occur between September and January to avoid nesting season. If preserving the required habitat is infeasible, then replacement trees shall be installed as part of the project landscaping. Tree replacement should occur at a minimum 3:1 ratio or greater to compensate for tree mortality. Trees that replace lost nesting habitat should be the same species as those removed and installed in a minimum of 57-liter (15-gallon) containers.

Impacts to wildlife and vegetation are not considered substantial, and no specific mitigation is proposed. However, in October of each construction year and at completion of the project, slopes and graded areas will be reseeded for erosion control. Conceptual landscaping for the project is discussed in Section 2.17.

Threatened and Endangered Species

Central Valley ESU steelhead and chinook salmon have been known to pass through the Grayson Creek and Walnut Creek areas in or near the project site. To avoid impacts to these federally listed species, the following measures would be implemented:

- All work would be conducted during the dry season (June 1 through October 31) within the Walnut and Grayson Creek channels.
- Work will only occur in a dry channel. If it is necessary to conduct work in a live stream, the workspace shall be isolated to avoid construction activities in flowing water. The proposed project shall not dewater the entire stream and shall allow fish passage past the project area. Adequate water depth and channel width must be maintained at all times for fish passage. Prior to construction activities, the workspace will be isolated from flowing water to prevent sedimentation and turbidity and avoid effects to fish. The diversion shall remain in place during the project and be removed immediately after work is completed, in a manner that will allow flow to resume with the least disturbance to the substrate.
- If a project requires dewatering any area, either a pump shall remove water to an upland disposal site, or a filtering system shall be used to collect the water and return clear water to the creek. The pump intake shall be fitted with a fish exclusion device that meets NOAA Fisheries fish screening criteria (refer to <http://www.nwr.noaa.gov/1salmon/salmesa/pubs/swrscrng.pdf> or an equivalent source).
- All materials placed in stream, such as pilings and retaining walls, shall be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings or other materials used for in-channel structures shall not contain coatings or treatments or consist of substances deleterious to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.
- All construction materials and fill will be stored and contained in a designated area that is located away from channel areas to prevent inadvertent transport of materials into the adjacent stream channel.
- Disturbance to existing grades and vegetation will be limited to the actual site of the project and necessary access routes. Placement of all roads, staging areas, and other facilities shall avoid and limit disturbance to streambank or stream channel habitat as much as possible. When possible, existing ingress or egress points shall be used and/or work performed from the top of the creek banks. Following completion of the work, the contours of the creek bed and creek flows shall be returned to preconstruction condition or better with an emphasis on creating easy fish passage through the area. Obvious barriers to fish passage should be removed to facilitate upstream movement.

- Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, straw bales, “Aqua Dam,” or silt fences) shall be incorporated into the project design and implemented at the time of construction. These devices shall be in place during construction activities, and after if necessary, for the purposes of minimizing fine sediment and sediment/water slurry input to flowing water, and of detaining sediment laden water on-site. These devices will be placed at all locations where the likelihood of sediment input exists. A supply of erosion control materials would be kept on hand to cover small sites that may become bare and to respond to sediment emergencies.
- All debris, sediment, rubbish, vegetation or other material removed from the channel banks, channel bottom, or sediment basins shall be disposed of at an approved disposal site. All petroleum products chemicals, silt, fine soils, and any substance or material deleterious to listed species shall not be allowed to pass into, or be placed where it can pass into the stream channel. There will be no sidecasting of material into any waterway.
- Any soils within the active channel that are disturbed, moved, or uncovered shall be tested for chemical contaminants. If such soils are found to be contaminated at levels that are deleterious to aquatic life, including salmonids, those soils shall be removed from the area and disposed of in an appropriate upland or off-site facility.
- Fueling, cleaning or maintenance of equipment would be prohibited except in designated areas located as far from the creek as possible. In addition, the contractor would maintain adequate materials onsite for containment and cleanup of any spills.
- After construction and prior to October 31, all disturbed soils at each site would undergo erosion control treatment consisting of temporary seeding, straw mulch, or other measures pursuant to a Storm Water Pollution Prevention Plan (SWPPP) approved by the Regional Water Quality Control Board. Any disturbed soils on a gradient of over 30 percent would also have an erosion control blanket installed. Permanent revegetation or tree replanting should then take place in small openings in the erosion control blanket, with suitable species that are compatible with native vegetation.
- During dewatering activities a fisheries biologist shall be present to salvage chinook and steelhead individuals, should they be present. Fish will be netted, placed in a bucket of water and immediately moved to a downstream portion of

the creek. Records of species, relative size, and number individuals shall be kept. Periodic checks of the work area shall occur to ensure that salmonids have not re-entered the work area.

Geology

The design and construction of the proposed project would incorporate features that would offset the potential geological impacts associated with the project, given its location and sensitivity to hazards. The following measures are listed according to type of hazard.

Fault Rupture and Subsidence

- Any proposed engineering design would have to be carried out in accordance with Caltrans Seismic Design Criteria and the regulations detailed in the Alquist-Priolo Earthquake Fault Zoning Act. This will involve detailed, site-specific subsurface geologic investigations to accurately locate the active trace(s) of the fault.
- Potential surface deformation resulting from aseismic creep can be mitigated by a regular maintenance program to repair the road surface, curbs, and other engineered facilities. Annual inspection should be carried out to assess ongoing creep damage.

Earthquake Shaking

- Roadways and bridges will have to be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Uniform Building Code for seismic zone 4.
- To satisfy the provisions of the 1998 California Building Code, the proposed phase facilities will have to be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedance in 50 years). Bridges will have to be designed in accordance with the latest Caltrans Seismic Design Criteria.

Liquefaction and Lateral Spreading

- Site-specific exploratory borings and accompanying laboratory testing during or prior to final design of the project will be required to delineate any potentially liquefiable materials. Potentially liquefiable deposits will either have to be removed or engineered (dewatered or densified) to reduce their liquefaction

potential or the engineering design will have to incorporate pile foundations that extend beyond potentially liquefiable deposits.

Expansive Soil

- Site-specific borings and testing should include investigation for subsurface materials that might contribute to heaving. To prevent heaving, pyritic shales should be overexcavated and replaced with fill that will isolate the remaining rock from either air or water.

Landsliding

- Site-specific geologic and geotechnical investigations and laboratory testing, as needed during the final design/plans, specifications, and estimates (PS&E) phase, will determine the stability of slopes and their parent material. Using these data, appropriate slope-strengthening and stabilizing designs can be developed and this impact avoided or minimized.

Erosion

- Soil and slope stability measures can prevent or reduce erosion. Erosion of soils during construction can be minimized using temporary hydroseeding to provide a vegetation cover or straw bales, visquine plastic slope cover, and temporary drainage measures to prevent excessive slope runoff. These measures are addressed in more detail in the *Water Quality Report, Interstate 680/State Route 4 Interchange Improvements, Contra Costa County, CA* (URS 2002).

Floodplains

To minimize the potential for effects from placement of the project within a 100-year flood hazard area, which could result in impeding or redirecting flood flows, the proposed new bridge structure would be designed to maintain the current flow capacity.

During a flood event, water elevations south of Grayson Creek could increase by a maximum of 2 cm (1 inch) at the point of greatest change, near Pacheco Boulevard, with the first four phases in place, and by up to 0.09 meter (3.5 inches) when Phase 5 is completed. The Contra Costa County Flood Control and Water Conservation District concurred that a minor amount of fill could be placed and compacted on the top of the existing maintenance road just upstream of the interchange as necessary to increase existing levee height to offset the changes. This action would be coordinated between CCTA and the Contra Costa Flood Control and Water Conservation District.

Hydrology

Construction. Construction best management practices (BMPs) are temporary BMPs that the project contractors would have to implement to meet Best Available Technology/Best Conventional Technology for construction projects. The selected construction site BMPs would be consistent with those practices to achieve compliance with requirements of the State of California National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activities.

Construction BMPs that have been identified in the project's Storm Water Data Report (May 2005) include the use of vegetated swales to minimize velocity and erosive conditions and revegetation of slopes to reduce erosion and sediment loads. Other construction BMPs that may be set forth in SWPPPs include using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter storm drain systems or surface water; developing and implementing a spill prevention and cleanup plan; installing traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains; and using barriers such as straw bales or plastic to minimize the amount of uncontrolled runoff that could enter drains or surface water. Because of piling operations, construction dewatering BMPs will also be included in the SWPPP and implemented during construction to prevent any non-storm water from entering into waterways or environmentally sensitive areas.

Erosion control measures would be developed as part of the SWPPP and applied to exposed areas during construction. Erosion control measures may include the trapping of sediments within the construction area by placing barriers such as straw bales, sandbags, or gravel barriers at the perimeter of downstream drainage points. Other methods of minimizing erosion impacts include limiting the amount and length of exposure of graded soil, hydromulching and hydroseeding (applying a mixture of mulch, seed, and fertilizer), and other soil protection measures such as straw mulch or compaction.

The overall mitigation structure for water quality impacts is a condition of the NPDES permit, other planning agreements, and the expected need for county storm water management programs. Implementation details for all BMPs would be developed and incorporated into the SWPPP, project design, and operations prior to the beginning of project construction. With proper implementation of these measures

and compliance with the new NPDES permit, short-term construction-related water quality impacts would be avoided or minimized.

Long Term. The project design will incorporate Design Pollution Prevention (DPP) BMPs. DPP BMPs are intended to stabilize soil and prevent contaminants and soil from entering storm water runoff. Another category of BMPs called Permanent Treatment BMPs are intended to treat storm water runoff and remove contaminants and sediments that have already entered the runoff. The project's NPDES permit will likely stipulate that Permanent Treatment BMPs to control pollutant discharges be considered and implemented for all new or reconstructed facilities. Permanent Treatment BMPs that are generally considered are infiltration basins, detention basins, and biofiltration swales/strips.

Although design plans for the interchange have not been finalized, the use of existing biofiltration swales will likely be the primary Permanent Treatment BMP. An existing biofiltration swale already exists in the southwestern corner of the interchange area, adjacent to Grayson Creek, and treats runoff from portions of the western half of the interchange area. This swale will remain in place with the interchange project modifications. Additional drainage areas that can be used as biofiltration swales have been identified in the Storm Water Data Report along most of both sides of SR-4 within the project limits and on short segments of I-680. The swales will be designed to also minimize velocity and erosive conditions. New and existing slopes that are disturbed will be vegetated, and an erosion control plan will be developed. Outlet protection/energy dissipation devices consisting of flared end sections and rock slope protection will be provided at all newly constructed outlets to reduce velocities and prevent scouring and sediment resuspension.

The use of large infiltration or detention basins is generally not considered feasible for modifying or controlling large storm events because of the lack of necessary right-of-way in the interchange area. The only area identified for a potential small detention basin (or swale area) is west of I-680 and south of Grayson Creek. This basin or swale can be considered during final design, but the use of the biofiltration measures discussed above is considered more feasible and practicable.

Existing storm sewer subcatchments within the project site drain directly into drainage inlets, which lead to deep trunk storm sewer systems. These systems drain directly to Grayson Creek. Storm water treatment of these systems was considered, but to construct a new treatment facility and to reconstruct large portions of the

existing storm sewer system to divert storm water to a treatment facility was determined to be cost-prohibitive.

Community Impacts

Relocation assistance payments and counseling will be provided to persons and businesses in accordance with the Federal Uniform Relocation Assistance and Real Properties Acquisition Policies Act, as amended, to ensure adequate relocation and a decent, safe, and sanitary home for displaced residents. All eligible displacees will be entitled to moving expenses. All benefits and services will be provided equitably to all residential and business relocatees without regard to race, color, religion, age, national origins and disability as specified under Title VI of the Civil Rights Act of 1964.

Mitigation measures for the loss of homes and an area business would be adopted and finalized by Contra Costa Transportation Authority and Caltrans. Appropriate mitigation may involve compensation for the cost of comparable units in the vicinity. Displacees would also be entitled to moving expenses. The Caltrans Relocation Assistance Program, as established by Federal and State law, would provide relocation assistance to the displacees. To the extent possible, the aim will be to relocate households and the commercial property as close to the existing locations as possible.

A limited loss of property may be required within the existing parking areas for up to two area businesses and the California Highway Patrol, but business operations would not be affected. Public parking would be maintained throughout the project vicinity. While areas of the Caltrans Park and Ride lot may be affected by project construction, steps would be taken during the project construction phases to ensure that a net loss of parking is avoided. Any portions of the property impacted by construction would be fenced off and include appropriate signage. Circulation and access in the area would also be maintained.

Utilities and Emergency Services

The contractor would notify emergency service providers of the proposed dates of the construction of the overall project work and utility relocation work.

Traffic and Transportation

Construction of Phases 1 and 2 is anticipated over a 2-year period. Caltrans will require the contractor to include measures to avoid and minimize regional and local

traffic disruption through notification of upcoming work and posting of detour or closure plans.

Visual/Aesthetics

The following measures would be developed in detail in landscaping plans for the project, during the project design phase.

- Design and place landscaping along areas disturbed by construction to screen the roadway and associated vehicles. Categories of landscaping have been initially identified at a conceptual level for the project right-of-way in the visual resources technical report. These categories identify general areas suitable for varying heights of ground cover and shrubs, trees, grasses and wildflowers (for erosion control), and vines (potentially for soundwalls). An actual planting design would be developed during the overall design stage of project planning. New and replacement planting will be carried out within State right-of-way in conformance with Caltrans standards for types of species, setback clearances, and maintenance criteria. Native plant species will be considered. In areas where direct replacement planting is not possible due to setback requirements, planting would be placed within interchange areas. The planting design will conform to FAA standards for height restrictions in and around Buchanan Field Airport.
- Slope rounding techniques would be utilized to integrate the structures into the landscape by sculpting the earth so that it follows the horizontal direction and the gradient of the slopes of the ramps, and by making the transitions from the flat areas to the slopes gradual in appearance.
- To avoid or minimize impacts on adjacent properties, retaining walls will be constructed. The wall's color and textures will match existing walls within the project limits.
- Limit and design lighting to minimize light intrusion into adjacent areas. Include landscaping, where space allows, to help screen lighting from vehicles to residential areas adjacent to the freeways.
- Soundwalls are proposed for noise abatement purposes. Walls will be similar in design and treated with aesthetic finishes to be consistent with existing walls within the project limits and along the I-680/SR-4 corridor. Soundwalls and retaining walls will be reviewed during project development for installation of planting where adequate space is available and maintenance is feasible. Vine plantings at even intervals along the soundwalls would be planted as a minimum

mitigation measure (where space allows) to reduce the walls' visual dominance and glare and to deter graffiti.

Archaeological Resources

No further archaeological work is necessary within the current project Area of Potential Effect (APE). If in the future the project expands to include unsurveyed lands, then additional archaeological work may be necessary. Likewise, if cultural materials are encountered during ground-disturbing activity associated with this project, all work in the vicinity of the discovery must halt until a qualified archaeologist makes an assessment of the find and follows the proper protocol for the specific type of cultural material. Special note should be made regarding this stop work requirement in the area outside of the APE, southeast of the I-680/SR-4 interchange toward Buchanan Field Airport, consistent with the concern expressed about a known site in that area.