

2.2.1 HYDROLOGY AND FLOODPLAIN

This section discusses and analyzes the surface hydrology and water quality characteristics of the project. The information provided in this section is based on the *Preliminary Drainage Report for the Interchange and Local Street Improvement in the City of Elk Grove and Sacramento County on SR 99 from 1.0 km south to 1.1 km north of the Sheldon Road interchange and on Sheldon Road from Bruceville Road to Elk Grove-Florin Road* (April 2004), the drainage analysis provided by *Lower Laguna Creek Drainage Master Plan* (May 1996), and the *City of Elk Grove General Plan Conservation Element*.

REGULATORY SETTING

There are several agencies with jurisdiction over flood control and water quality activities in the project area. These agencies include the Department of Water Resources (DWR), Central Valley Regional Water Quality Control Board (RWQCB), Federal Emergency Management Agency (FEMA) and US Army Corps of Engineers (USACOE).

Federal

Federal Emergency Management Agency

The National Flood Insurance Program (NFIP) is administered through the Federal Emergency Management Agency (FEMA). The program was established to carry out a national flood insurance program, which enables interested parties to purchase insurance against loss resulting from physical damage to or loss of real property or personal property related thereto arising from any flood occurring in the United States. Sacramento County is a member of the NFIP. Through conditions of approval, the NFIP program requires new development to eliminate existing flooding problems identified on the Flood Insurance Rate Maps produced under the NFIP. The NFIP has regulations requiring communities to adopt land use restrictions for their 100-year floodplain to qualify for federally subsidized flood insurance.

Executive Order 11988, Floodplain Management

Executive Order 11988 (1977) requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for the following actions:

- acquiring, managing, and disposing of federal lands and facilities;
- providing federally-undertaken, financed, or assisted construction and improvements;

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- conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.
Administering Agency

Each federal agency is responsible for preparing implementing procedures for carrying out the provisions of the Order. Federal Agencies consult with FEMA concerning implementation of this EO.

State

Department of Water Resources

The Department of Water Resources' (DWR) major responsibilities include: preparing and updating the California Water Plan to guide development, and management of the state's water resources, planning, designing, constructing, operating, and maintaining the State Water Resources Development System. Other responsibilities of DWR are protecting and restoring the Sacramento-San Joaquin Delta by regulating dams, providing flood protection, assisting in emergency management to safeguard life and property, educating the public, and serving local water needs by providing technical assistance, cooperating with local agencies on water resources investigations, supporting watershed and river restoration programs, encouraging water conservation, exploring conjunctive use of ground and surface water, facilitating voluntary water transfers, and, when needed, operating a state drought water bank.

Local

City of Elk Grove General Plan

The City of Elk Grove General Plan identifies several policies and action items that relate to hydrology and floodplains within the city, as they relate to the proposed project:

- **CAQ-14** The city shall seek to minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality.
- **CAQ-18** Post-development peak storm water run-off discharge rates and velocities shall be designed to prevent or reduce downstream erosion, and to protect stream habitat.
- **CAQ-19** Encourage the retention of natural stream corridors, and the creation of natural stream channels where improvements to drainage capacity are required.
- **CAQ-20** Fill may not be placed in any 100-year floodplain as delineated by currently effective FEMA Flood Insurance Rate Maps or subsequent comprehensive drainage plans unless specifically approved by the City.

No fill shall be permitted in wetland areas unless approved by the City and appropriate state and federal agencies.

City of Sacramento General Plan

The City of Sacramento General Plan identifies one policy that relates to Hydrology and Floodplains within the City, as they relate to the proposed project:

- **Flood Hazards Policy 1:** Prohibit development of areas subject to unreasonable risk of flooding unless measures can be implemented to eliminate or reduce the risk of flooding.

City of Sacramento Jacinto Creek Planning Area Drainage Masterplan

The northwest quadrant of the project area is part of the Jacinto Creek Planning Area (JCPA). The project would be subject to the City of Sacramento's Jacinto Creek Planning Area Drainage Masterplan.

AFFECTED ENVIRONMENT - SURFACE HYDROLOGY

The City of Elk Grove is within the Sacramento River Basin, which covers 43,790-square kilometers (27,210-square miles). The basin includes all watersheds tributary to the Sacramento River located north of the Cosumnes River watershed. The City of Elk Grove is located within the Morrison Creek Stream group drainage basin, a 309-square kilometer (192-square mile) watershed tributary to the Sacramento River Basin. Storm water in most of the area flows west through Morrison Creek, Laguna Creek, Elder Creek, Elk Grove Creek, and other associated tributaries to the Beach-Stone Lakes basin west of Interstate 5.

The hydrologic area within the Sheldon Road/SR 99 interchange includes the Lower Laguna Creek watershed (upstream to the Waterman Road vicinity), including the tributaries of Jacinto Creek, Whitehouse Creek, and Elk Grove Creek, upstream of the confluence with Morrison Creek. Caltrans District 3 flood records and project history files do not identify historical flooding within the project limits. Additionally, Sacramento County Public Works does not have any records of flooding on Sheldon Road.

Excessive standing water at the sag location along mainline SR 99 has been observed, though this appears to have been a function of debris clogging the inlets and not the capacity of the pumping plant. The pumping plant sits adjacent to SR 99 in the southwestern quadrant of the interchange.

The majority of stormwater flows from the project site into Whitehouse Creek which is located to the southeast of the project site. Downstream of SR 99, Whitehouse Creek has been partially filled and altered over the years by agricultural uses. Whitehouse creek flows overland, generally west and southwest, in several swales and ditches to Laguna Creek. The middle reach of Whitehouse Creek is an improved channel except for the 1.6 kilometers (1.0 mile) of creek upstream of SR 99. Developments along the creek have provided improvements including flood control, habitat trails, and open space. The portion of Whitehouse Creek that passes through the project area now channels only high flow volumes to the east of the project area that are diverted

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from a seasonal wetland that has been converted to a detention basin. This structure allows low flow volumes to flow directly into Laguna Creek to the south via an earthen/concrete-lined channel.

Laguna Creek is also directly south of the project area. Laguna Creek drains 77-square kilometers (48-square miles) of the 230-square kilometer (143-square mile) regional watershed of the Morrison Creek Stream Group in southern Sacramento County, California. See **Figure 2.2.1-1**. Laguna Creek flows westward from the foothills of the eastern watershed boundary to its confluence with Morrison Creek near Beach Lake. Runoff conveyed by Morrison Creek through the Beach Lake-Stone Lake system ultimately discharges through Snodgrass Slough and the Mokelumne River to the Sacramento-San Joaquin Delta.

The Lower Laguna Creek is the portion of the Laguna Creek watershed from the Sacramento City limits on the west to Waterman Road on the east. This 20.2-square kilometer (12.6-square-mile) area is traversed by the creek mainstream and by several tributary streams.

The hydrologic area is comprised of five sub-watersheds that are detailed in **Table 2.2.1-1**.

TABLE 2.2.1-1
HYDROLOGIC STUDY AREA OF THE LOWER LAGUNA CREEK DRAINAGE
MASTER PLAN AND STUDY AREA FOR THE SHELDON ROAD/SR 99 INTERCHANGE

Sub-Watershed	Drainage Area in km² (square miles)
Jacinto Creek (also known as the North Fork of Laguna Creek)	1.4 (0.9)
Whitehouse Creek	2.9 (1.8)
Lower Laguna Creek	20.2 (12.6)
Upper Laguna Creek	51.3 (31.9)
Elk Grove Creek	10.5 (6.5)

Tributaries

Jacinto Creek-Jacinto Creek begins on the east side of SR 99 and flows westerly, approximately 1.6 km (1.0 mile), to its confluence with Laguna Creek, on the west side of SR 99.

Whitehouse Creek-Whitehouse Creek begins at Waterman Road and flows westerly to its confluence with Laguna Creek, on the west side of SR 99.

Elk Grove Creek-Elk Grove Creek begins southeast of the community of Elk Grove. It flows westerly 8.85 km (5.5 miles) to its confluence with Laguna Creek, 0.8 km (0.5 mile) east of Bruceville Road.

Watershed Characteristics

Characteristics of the hydrologic study area, including slope, soil type, percent impervious cover, and others, were used to determine the discharge volumes of Lower Laguna Creek. The watershed areas were used to determine the runoff discharge for the different alternatives. The watershed was divided into 92 sections for the interchange project, which outline the effects of the rate at which runoff supplies the various drainage systems within the basin area. Most sections are characterized as long narrow watersheds that are consistent with producing low peak runoff discharges.

Slope

Sheldon Road is located on a natural drainage watershed divide. Stormwater that falls to the north of Sheldon Road will flow into Jacinto Creek or Strawberry Creek. Stormwater that falls to the south of Sheldon Road flows into Whitehouse Creek, which then flows into Laguna Creek, which later terminates at the Sacramento River. Drainage in this area generally travels in an east to west pattern. The entire project area is relatively flat, and high side slopes exist at the sag of SR 99.

Soil and Geology

The tributary areas are comprised mostly of highway and local road infrastructures built on clayey soils, with the majority of the surfaces being asphaltic.

Storage

Potential areas for water storage are present within the ramps and SR 99, depending on which alternative is selected. These areas would be utilized to treat and detain water if needed.

Watershed Analysis

The overall drainage strategy for the Sheldon Road/SR 99 Interchange Improvement project is to convey the roadway runoff to the Laguna Creek Bypass Channel utilizing existing outfall locations. The two existing outfalls include the 1,524mm (60") corrugated metal pipe (CMP), which was installed as part of the Sheldon Pacific development and is located west of SR 99 in

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the old West Stockton Boulevard right-of-way, and the 1,219 mm (48-inch) reinforced concrete pipe (RCP) installed as part of the Winco development. The primary outfall for the interchange stormwater has been assigned to the 1,524mm (60") CMP, while the 1,219 mm (48-inch) RCP has been designed as the secondary outfall.

The Letter of Map Revision (LOMR) issued on August 14, 2003 (Case No. 01-09-157R) for the Sheldon Pacific Project amended the Laguna Creek 100-year flood profile to include the impacts from the Sheldon Pacific Project. This LOMR included measures to not increase flood elevations in Laguna Creek as part of the development. Currently, the interim plan directs residential stormwater runoff from the Sheldon Pacific development to a temporary detention basin that outfalls to the 1,524 mm (60") pipe that currently conveys the 100-year flow of 1.557 cms (55 cfs), of which 0.283 cms (10 cfs) is designated to supply flow for wetlands.

IMPACTS

No Build Alternative

Under the No Build alternative, changes to the hydrology of the project area would not occur because the project would not be implemented.

Build Alternatives (2A and 3A) Impacts

Site improvements associated with the proposed project would not appreciably change the general drainage pattern. Slightly more stormwater would be directed into Whitehouse Creek due to the increase in impervious surfaces resulting from the overcrossing widening.

The existing pump plant that sits adjacent to SR 99 in the southwest quadrant would be replaced by both build alternatives. The underground storage tanks would also be enlarged to provide the additional capacity required to accommodate the increase in stormwater flows draining toward the sag.

CEQA FINDING

The proposed project would result in substantial impacts to surface hydrology if it would:

- Generate substantial stormwater runoff;
- Substantially alter the course, direction, or volume of surface water flows; or
- Substantially degrade or deplete groundwater resources.

The proposed project would not substantially change the drainage pattern in the project area or increase the impervious surfaces. As a result, the project would not generate substantial stormwater runoff, alter the course or volume of surface water flows, or degrade or deplete groundwater resources. Therefore, impacts to the hydrology of the project area are considered **less than significant**.

AFFECTED ENVIRONMENT - FLOODING

Flooding within the Sheldon Road/SR 99 interchange area is similar to that of many portions of southern Sacramento County. Soils in the area are predominantly of the San Joaquin series, and another series described as hydrologic group D soils, which have very low permeability or slow infiltration rates, which contributes to surface runoff and flooding. The existing topography of the area is fairly flat, which inhibits drainage. During high flows, water drainage within the watershed may temporarily pond and spread upstream of bridge crossings and road culverts with insufficient capacities.

Three out of four quadrants of the project area are located in Zone X, as identified on Flood Insurance Rate Maps (FIRM maps). These are the northeast, northwest, and southwest quadrants. Zone X corresponds to areas outside the 100-year floodplains, areas of 100-year sheet flow flooding where average depths are less than 0.3 meters (1.0 foot), areas of 100-year stream flooding where the contributing drainage area is less than 1.6-square kilometer (1.0-square mile), or areas protected from the 100-year flood by levees.

A portion of the southeast quadrant is identified on the FIRM map as Zone AH. Zone AH corresponds to areas of 100-year shallow flooding with a constant water-surface elevation (usually areas of ponding) where average depths are between 0.3 meters (1.0 feet) and 0.9 meters (3.0 feet). **Figures 2.2.1-2a** and **2.2.1-2b** illustrate the most recent FIRM maps for the project area that reflect an August 14, 2003 change in zone designations (discussed below).

The primary cause for designating the portion of the southeast quadrant as Zone AH is a result of the current design of the bridge on West Stockton Boulevard spanning Laguna Creek. The West Stockton Boulevard Bridge is currently constructed at a low elevation over Laguna Creek, and has the potential to restrict the flow of Laguna Creek during flood conditions, thus causing a backup that could result in flooding in the area during 100-year flood conditions.

FEMA Designations

The Lower Laguna Creek Drainage Master Plan study data was used as a basis for revising FEMA's Flood Insurance Rate Maps along Laguna and Whitehouse Creeks. A phased Conditional Letter of Map Revision (CLOMR) was prepared for the Lower Laguna Creek area. The Letter of Map Revision (LOMR) issued on August 14, 2003 (Case No. 01-09-157R) for the Sheldon Pacific Project amended the Laguna Creek 100-year flood profile to include the impacts from the Sheldon Pacific Project. This LOMR included measures to not increase flood elevations in Laguna Creek as part of the development. Currently, the interim plan is in place that sends Sheldon Pacific residential stormwater to a temporary detention basin that outfalls to the 1,524 mm (60") pipe that currently conveys the 100-year flow of 1.557cms (55 cfs), of which 0.283 cms (10 cfs) is designated to supply flow for wetlands.

After the LOMR was incorporated, the northeast quadrant of the project area was designated as Zone X. The remainder of the project area FIRM zones remain as they were prior to the August 14, 2003 LOMR. **Figures 2.2.1-2a** and **2.2.1-2b** illustrate the updated FIRM maps for the project area that reflect the August 14, 2003 LOMR.

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Lower Laguna Creek Drainage Master Plan

The Lower Laguna Creek Drainage Master Plan is dated May 1996 and was completed by the County of Sacramento Department of Water Resources. This document was completed prior to the incorporation of the City of Elk Grove. The County of Sacramento Department of Environmental Review and Assessment completed a Final Environmental Impact Report for the Lower Laguna Creek Drainage Master Plan in April 1996. **Figure 2.2.1-3** shows the Lower Laguna Creek Drainage Master Plan.

The project goals and objectives for the Lower Laguna Creek Drainage Master Plan, addresses the issues of flood control, drainage, water quality, wetlands, endangered species and recreational trails.

Four roadways cross the Laguna Creek channel and include from west to east: Bruceville Road, West Stockton Boulevard, SR 99, and East Stockton Boulevard. According to the Drainage Master Plan, Whitehouse Creek flows would be diverted south to the Laguna Creek bypass channel east of SR 99, and the existing unimproved portion of Whitehouse Creek east of SR 99 would be used for localized drainage and for seasonal marsh creation. The drainage improvements would divert Whitehouse Creek to Laguna Creek before it intersects with SR 99.

According to the Drainage Master Plan, the SR 99 Bridge over Laguna Creek would be reconstructed over the existing creek and at-grade over the alignment of the future bypass channel. The proposed Drainage Master Plan project would involve excavation of the bypass channel under the highway after the bridge is constructed.

Precipitation

Precipitation is the principal source of runoff from the site. Mean annual precipitation is approximately 43 cm (17 inches) per year. Most annual rainfall arrives during the winter storm season from October through April, with the heavier rainfall occurring between December and February.

IMPACTS

No Build Alternative

Under the No Build alternative, there would be no changes to the flood potential for the project area because the project would not be implemented.

Build Alternatives (2A and 3A) Impacts

The *Drainage Report for the Interchange and Local Street Improvement in the City of Elk Grove and Sacramento County on SR 99 from 1.0 km south to 1.1 km north of the Sheldon Road Interchange and on Sheldon Road from Bruceville Road to Elk Grove-Florin Road* identifies four different possible drainage configurations for the Sheldon Pacific development and the Sheldon Road/SR 99 Interchange Reconstruction Project for Laguna Creek and Whitehouse Creek. The floodplain evaluation evaluates the project's effects on the 100-year floodplain.

Under the existing configuration of the project area, the West Stockton Boulevard Bridge spanning Laguna Creek is at an elevation low enough to potentially obstruct Laguna Creek flows during 100-year flood conditions, resulting in flooding in the area of East Stockton Boulevard. The current plans to reconstruct the West Stockton Boulevard Bridge would raise the bridge out of the 100-year floodplain. When this project is completed, it would remove the southeast quadrant of the interchange from the 100-year floodplain and the project would not have any impact to the 100-year floodplain.

While the construction of the West Stockton Boulevard Bridge project is likely, it is not yet completed. Therefore, it must be assumed for the purposes of this document that the Sheldon Road/SR 99 Interchange project would be constructed under current floodplain conditions.

Because the northeast, northwest, and southwest quadrants of the project area are already located outside of the 100-year floodplain, implementation of the proposed project would not result in flooding impacts to these areas of the project. All impacts addressed below relate to the southeast quadrant of the project area.

The proposed realignment of East Stockton Boulevard, under both build alternatives, would encroach upon the current 100 year floodplain at the 'old' Whitehouse Creek channel.

Configuration 1

The first configuration assumes the West Stockton Boulevard Bridge is not replaced and that the interim condition of the Sheldon Pacific development is maintained¹. Since the 1,524mm (60") CMP currently flows at capacity due to both the seasonal wetland and Laguna Creek 100-year flood flow, a parallel or upsized CMP would be required to outlet the interchange water to the Laguna Creek Bypass. This configuration does not divert the future commercial Sheldon Pacific stormwater into Laguna Creek upstream of the West Stockton Boulevard Bridge. Additionally, the 100-year Laguna Creek flow spills into the historic Whitehouse Creek channel and floods adjacent to East Stockton Boulevard, effectively placing this location within the 100-year floodplain. Due to the passing of the Laguna Creek floodwater in the old Whitehouse Creek alignment, the cross drainage facilities at East Stockton Boulevard must have capacity to convey this flow.

Configuration 2

The second configuration assumes the West Stockton Boulevard Bridge is replaced and the interim condition of the Sheldon Pacific development is maintained. Replacing the bridge at West Stockton Boulevard would decrease the 100-year flood elevation in Laguna Creek. Laguna Creek would no longer spill into the old Whitehouse Creek channel and would not have to be conveyed through the 1,524mm (60") CMP. The facilities that convey the old Whitehouse Creek would only have to convey the 0.283cms (10cfs) wetlands supply flow and a small portion of overland flow from the adjacent areas. The 1,524mm (60") CMP would then have approximately 1.577cms (10cfs) of capacity that could be used to convey interchange-generated

¹ "Interim condition" means the pre-commercial development of the Sheldon Pacific development.

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stormwater to the Laguna Creek Bypass Channel. Lowering the 100-year Laguna Creek flood elevation would also remove the realigned East Stockton Boulevard from the 100-year floodplain. This configuration does not divert the future commercial Sheldon Pacific stormwater into Laguna Creek upstream of the West Stockton Boulevard Bridge.

Configuration 3

The third configuration assumes that the West Stockton Boulevard Bridge is not replaced and that the Sheldon Pacific commercial development is completed. As part of the Letter of Map Revision issued on August 14, 2003 (Case No. 01-09-157R), a stormwater detention basin must be constructed adjacent to the Sheldon Pacific commercial development. The stormwater generated by the commercial development would be conveyed to this basin and outlet to the realigned Whitehouse Creek, which outfalls to Laguna Creek. The additional stormwater generated by the Sheldon Pacific commercial development would not raise the 100-year flood elevation of Laguna Creek. The 100-year Laguna Creek flow would still spill into the historic Whitehouse Creek channel and flood adjacent to East Stockton Boulevard, effectively placing this portion of the interchange project within the 100-year floodplain. Due to the passing of the Laguna Creek floodwater in the old Whitehouse Creek alignment, the facilities at East Stockton Boulevard must have capacity to convey this flow. Additionally, the 1,524mm (60") CMP currently flows at capacity due to both the seasonal wetland and Laguna Creek 100-year flood flow, so a parallel or upsized CMP would be required to outlet the interchange water to the Laguna Creek Bypass.

Configuration 4

The fourth and final configuration assumes that the West Stockton Boulevard Bridge is replaced and the Sheldon Pacific commercial development is completed. The stormwater detention basin and outlet to the realigned Whitehouse Creek would still require completion as prescribed by the Sheldon Pacific LOMR, but since the 100-year flood elevation upstream of the West Stockton Boulevard Bridge would be reduced, the facilities that convey the old Whitehouse Creek would only have to be sized to flow the 0.283cms (10cfs) wetlands supply flow, and a small portion of overland flow from the adjacent areas. Lowering the 100-year Laguna Creek flood elevation would also remove the realigned East Stockton Boulevard from the 100-year floodplain. The 1,524mm (60") CMP would then have approximately 1.577cms (10cfs) of capacity that could be used to convey interchange-generated stormwater to the Laguna Creek Bypass Channel.

Table 2.2.1-2 summarizes the various components and results of the four different possible drainage configurations.

TABLE 2.2.1-2
SUMMARY OF FOUR POTENTIAL DRAINAGE CONFIGURATIONS

Configuration Number	Would Configuration Replace W. Stockton Bridge	Would Interim Sheldon Pacific Condition be Maintained	Would a Stormwater Detention Basin be Installed	Would Additional CMP Capacity be Needed	Would the Configuration Remove E. Stockton Blvd. from Floodplain	Would a Revision to FEMA Map be Necessary ¹	Would a Hydro Study be Needed ²	Would a Floodplain Encroachment Report be Needed ²	Would the Configuration Result in Flooding from Whitehouse Channel
1	No	Yes	No	Yes	No	No	Yes	Yes	Yes
2	Yes	Yes	No	No	Yes	Yes	No	No	No
3	No	No	Yes	Yes	No	No	Yes	Yes	Yes
4	Yes	No	Yes	No	Yes	Yes	No	No	No

¹ A FEMA map revision would be necessary if the configuration would remove E. Stockton Blvd. from the 100-year floodplain.

² A Hydrology Study and Floodplain Encroachment Report would be needed if the configuration would leave the roadway within the 100-year floodplain.

The floodplain evaluation concluded that based on the limited extent of the projects encroachment on the 100-year floodplain and the projects incorporation of sufficient drainage facilities that the realignment of East Stockton Boulevard will have no or a negligible impact to the 100-year flood plain in design scenario 1 and design scenario 3. The realignment of East Stockton will have no impact to the 100-year flood plain in design scenarios 2 and 4.

CEQA FINDING

For purposes of CEQA the proposed project would result in substantial impacts from flooding if it would result in:

- Substantial flooding; or
- Exposure of people or structures to flood hazards.

Configurations 1 and 3 would encroach upon the 100-year floodplain but the installation of sufficient cross drainage under East Stockton Boulevard would convey the flows of a 100-year flood. This would result in the project having a negligible impact on the 100-year floodplain. Therefore, floodplain impacts for configurations 1 and 3 are considered **less than significant**.

Configurations 2 and 4 assume several projects are constructed (reduction of 100-year flood level, remainder of the Sheldon Pacific commercial development is completed, and West Stockton Boulevard Bridge is replaced) prior to the proposed project. As a result, the project would no longer encroach upon the 100-year floodplain and **no impact** would occur.