

5.10 HYDROLOGY AND WATER QUALITY

5.10.1 INTRODUCTION

This section describes the existing environmental settings and analyzes the Project's potential to violate water quality standards or waste discharge requirements; decrease groundwater supply or interfere with groundwater recharge; alter the existing drainage pattern of the site; risk release of pollutants in a flood hazard, tsunami, or seiche zone; and conflict with implementation of a water quality or sustainable groundwater plan. Where significant impacts remain despite compliance with the existing regulatory framework, feasible mitigation measures are recommended to avoid or reduce the Project's potentially significant environmental impacts.

Proposed General Plan

The proposed General Plan information in this section is based on methodology and information discussed in **Section 5.10.3: Methodology for Evaluating Impacts** and **Section 5.10.4: Environmental Setting**, respectively.

Barstow International Gateway (BIG)

BIG information in this section is based in part on the following studies:

- *Barstow International Gateway Hydrology and Hydraulic Design Technical Report*; see **Appendix 5.10 BIG-1: Hydrology and Hydraulic Design Technical Report**
- *Water Supply Assessment and Verification for Barstow International Gateway*; see **Appendix 5.17 BIG-2: Water Supply Assessment**

Summary of Findings: Proposed General Plan

Water quality is both a site-specific project concern and a regional concern. During construction and operation, there are a series of best management practices (BMPs) that are applied to projects based on various local, State, and federal permits and through the environmental review process. The BMPs are tailored to each project and are intended to reduce or eliminate stormwater runoff from a site such as dust, debris, or contaminants like spilled oil. On a regional scale it is important that runoff from roadways, parking lots, and disturbed soil is not directed into waterways without going through a process where the dust and debris can be settled out of the water. This section concludes that compliance with regulations, including BMPs; Barstow Code Chapter 15.14, Stormwater and Urban Runoff Pollution Control, and Chapter 15.16, Floodplain Management; Barstow Municipal National Pollutant Discharge Elimination System (NPDES) permit; and Stormwater Pollution Prevention Plan (SWPPP) would reduce impacts to groundwater, drainage, flood hazards, hydrology, and water quality by reducing erosion, runoff, and ensuring adequate design of drainage infrastructure.

Summary of Findings – Barstow International Gateway

BIG would affect the area's hydrology and water quality during construction and through ongoing operations. BIG's construction and operational activities would introduce changes to the drainage patterns and increase impervious surfaces, which could affect both surface and groundwater resources. During construction, activities like grading and excavation would temporarily disrupt soils, potentially increasing erosion and pollutant runoff. To address these effects, BIG would implement best management practices, such as silt fences, fiber rolls, and sediment basins.

Operationally, BIG would involve facilities like a rail yard and transload warehouse center that would generate pollutants, including heavy metals, organic compounds, and hydrocarbons. These pollutants could be carried by stormwater runoff into nearby water bodies, including the Mojave River. BIG would incorporate permanent stormwater management features, such as detention basins and separators, to treat and manage runoff and maintain water quality standards. These design measures have been prepared per local, state and federal requirements and BNSF standards.

BIG also includes improvements to local watercourses, such as the Lenwood Channel, to handle increased flood flows and reduce flood risks. These enhancements would help manage stormwater and reduce the potential for on-site and off-site flooding while ensuring the area complies with relevant water quality regulations. Overall, BIG would reduce its environmental impacts related to hydrology to less than significant levels through implementation of both temporary and permanent mitigation measures.

5.10.2 REGULATORY SETTING

This section describes the federal, State, regional, and local laws, regulations, orders, and plans that are relevant to hydrology and water quality.

5.10.2.1 Federal

Clean Water Act

The Clean Water Act (CWA) (33 U.S. Code [USC] § 1251 et seq.) establishes the basic structure for regulating discharges of pollutants into the “waters of the United States.” CWA § 402 establishes the NPDES, which regulates the discharge of pollutants from point sources. The CWA prohibits discharges except in compliance with a NPDES General Permit. As such, California’s stormwater discharges are regulated through NPDES permits. In California, NPDES permitting authority has been delegated to, and administered by, nine State Regional Water Quality Control Boards (RWQCBs). Additional information regarding the NPDES program is provided below.

The Stormwater Program regulates some stormwater discharges from three sources: construction, industrial, and municipal stormwater. General construction and industrial permits under the CWA are issued and administered by the RWQCBs; they are discussed below.

The Municipal Storm Water Program regulates stormwater discharges from Phase I Municipal Separate Storm Sewer Systems (MS4s) throughout the State. The Municipal Storm Water Program manages the Phase I Permit Program (municipalities over 100,000 people), the Phase II Permit Program (municipalities

less than 100,000), and the Statewide Stormwater Permit for the State of California Department of Transportation (Caltrans). Phase I MS4 permits, which are mostly issued to a group of co-permittees encompassing an entire metropolitan area, require the discharger to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable.

Under the CWA:

- Section 102 requires the planning agency of each state to prepare a basin plan that sets forth regulatory requirements for the protection of surface water quality, including designated beneficial uses for surface waterbodies, as well as specified water quality objectives to protect those uses.
- Section 303(d) requires each state to provide a list of impaired surface waters that do not meet or are expected not to meet state water quality standards, as defined by that section. It also requires each state to develop total maximum daily loads (TMDL).
- Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a dredged or fill material into “waters of the U.S.” must obtain certification that the discharge of fill would not violate water quality standards, including water quality objectives and beneficial uses.
- Under CWA Section 402, all point-source discharges, including, but not limited to, construction-related runoff discharges to surface waters and some post-development discharges, are regulated through the NPDES.
- Under CWA Section 404, the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (U.S. EPA) regulate the discharge of dredged and fill material into “waters of the U.S.” Project sponsors must obtain a permit from the USACE for discharges of dredged or fill materials into jurisdictional waters over which the USACE exerts jurisdiction.

National Pollutant Discharge Elimination System

The NPDES permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States, including discharges from MS4s. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

Under the NPDES program, all facilities that discharge pollutants into “waters of the U.S.” are required to obtain a NPDES permit. Requirements for stormwater discharges are also regulated under this program. In California, the NPDES permit program is administered by the State Water Resources Board (SWRCB) through the nine RWQCBs. The RWQCBs adopt and implement Water Quality Control Plans (Basin Plans), which recognize regional differences in natural water quality, actual and potential beneficial uses, and

water quality problems associated with human activities. The Project is within jurisdiction of the Lahontan Regional Water Quality Control Board (LRWQCB).

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA. FEMA's minimum level of flood protection for new development is the 100-year flood event, also described as a flood that has a 1-in-100 chance of occurring in any given year.

As required by the FEMA regulations, all development constructed within the 100-year floodplain or a Special Flood Hazard Area (as delineated on the FIRM) must be elevated so that the lowest floor is at or above the base flood elevation level. The term "development" is defined by FEMA as any human-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations, and storage of equipment or materials. Per these regulations, if future development in these areas is proposed, a hydrologic and hydraulic analysis must be performed prior to the start of development to demonstrate that the development does not cause any rise in base flood elevation levels, because no rise is permitted within regulatory floodways. Upon completion of any development that changes existing Special Flood Hazard Area boundaries, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision, as soon as practicable, but not later than six months after such data becomes available.

Rivers and Harbors Act of 1899 and General Bridge Act of 1946

The Rivers and Harbors Act (33 U.S. Code §§ 401 et seq.) and the General Bridge Act (33 U.S. Code §§ 525 et seq.) are the primary federal laws for regulating activities that may affect navigation on the nation's waterways, including:

- Rivers and Harbors Act Section 9 and General Bridge Act Section 9 require a U.S. Coast Guard permit for the construction of bridges and causeways over certain navigable "waters of the U.S." to ensure marine traffic is not adversely affected.
- Section 10 of the Rivers and Harbors Act requires authorization from the USACE for the construction of any structure in, over, or under any navigable "waters of the U.S."
- Section 14 of the Rivers and Harbors Act requires the USACE permission for the use, including modification or alteration, of any flood control facility work built by the United States to ensure that the usefulness of the federal facility is not impaired.

National Flood Insurance Act and Flood Disaster Protection Act

The purpose of the National Flood Insurance Act (42 U.S. Code §§ 4001 et seq.) is to identify flood-prone areas and provide insurance. The act requires purchase of insurance for buildings in special flood-hazard

areas (SFHA). The Flood Disaster Protection Act (42 U.S. Code §§ 4001 to 4128) requires the purchase of insurance for buildings in SFHAs identified and mapped by FEMA.

National Flood Insurance Program

The NFIP was created by Congress with the passage of the National Flood Insurance Act to help provide flood insurance and is administered by FEMA. As part of the program, flood maps have been created to show a risk of flooding within a community referred to as flood zones. Each flood zone describes the flood risk for a particular area, and those flood zones are used to determine permitting requirements associated with development, insurance requirements, and costs. Property owners, insurance agents, and lenders use flood maps to determine flood insurance requirements and policy costs.

With Risk Rating 2.0: Equity in Action, FEMA addresses rating disparities by incorporating more flood risk variables such as flood frequency, multiple flood types (e.g., river overflow, storm surge, coastal erosion, and heavy rainfall), and distance to a water source, as well as property characteristics such as elevation and the cost to rebuild. FEMA FIRMs identify flood hazard areas as SFHAs. SFHAs are defined as the area that will be inundated by the flood event having a 1 percent chance of being equaled or exceeded in any given year. The 1 percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30. The FIRMs identify moderate flood hazard areas as Zone B or Zone X (shaded), which are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded).

Safe Drinking Water Act of 1974

The Safe Drinking Water Act (42 U.S. Code §§ 300 et seq.) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The Act authorizes the U.S. EPA to set national health-based standards for drinking water to protect against both naturally occurring and human-produced contaminants that may be found in drinking water. It applies to every public water system in the U.S.

The Sole Source Aquifer Protection Program is authorized by § 1424(e) of the Act. The Sole Source Aquifer designation is a tool to protect drinking water supplies in areas where there are few or no alternative sources to the groundwater resource and where, if contamination occurred, using an alternative source would be extremely expensive.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act provides the basic authority for the U.S. Fish and Wildlife Service (USFWS) to evaluate impacts to fish and wildlife from proposed water resource development projects. This act requires that all federal agencies consult with USFWS, the National Marine Fisheries Service, and state wildlife agencies (i.e., the California Department of Fish and Wildlife [CDFW]) for activities that affect, control, or modify waters of any stream or bodies of water. Under this act, the USFWS has

responsibility for reviewing and commenting on all water resources projects. For example, it would provide consultation to the USACE prior to issuance of a Section 404 permit.

An incidental take permit is required if a project may result in the “incidental take” of a listed species. An incidental take permit allows the party (e.g., a developer) to proceed with an activity that is legal in all other respects but that results in the “incidental taking” of a listed species. A habitat conservation plan must also accompany an application for an incidental take permit. The purpose of a habitat conservation plan is to ensure that the effects of the permitted action on listed species are adequately minimized and mitigated.

5.10.2.2 State

California Department of Water Resources

Approximately 99 percent of California communities participate in the NFIP. Of the participating communities, approximately 18 percent participate in the Community Rating System Program, which encourages communities to go above and beyond minimum NFIP requirements.

The California Department of Water Resources (DWR), on behalf of FEMA, conducts Community Assistance Visits and Community Assistance Contacts to each of the NFIP communities to provide individual technical assistance. The California DWR provides statewide NFIP workshops that are designed to interpret and explain the NFIP regulations and to give an overview of the need for community-based floodplain management. DWR developed the model ordinances to help communities adopt local regulations that are written to work with the California Building Standards Code (California Code of Regulations [CCR] Title 24) flood provisions for buildings and structures in SFHA.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code § 13000 et seq.) requires projects that are discharging, or proposing to discharge, wastes that could affect the quality of the State’s water to file a Report of Waste Discharge (ROWD) with the appropriate RWQCB. The RWQCBs are responsible for implementing CWA and §§ 401, 402, and 303(d). The act also provides for development and periodic reviews of basin plans that designate beneficial uses of California’s major rivers and groundwater basins and establish water quality objectives for those waters. Projects primarily implement basin plans using the NPDES permitting guidelines to regulate waste discharges so that water quality objectives are met.

The SWRCB and RWQCBs are the principal agencies responsible for coordination and control of water quality under this Act. The SWRCB allocates water rights, adjudicates water rights disputes, develops statewide water protection plans, establishes water quality standards, and with the nine regional RWQCBs, guides policy in the State’s major watersheds.

Construction Stormwater NPDES Permit

California’s Construction General Permit for Stormwater Discharges Associated with Construction and Land Activities (Construction General Permit [CGP]) Order No. WQ 2022-0057-DWQ which superseded Order 2009-0009-DWQ as amended by Order No. 2010-0014-DWQ and 2012-0006-DWQ, issued by the SWRCB is required for construction or demolition activity resulting in land disturbance of equal to or

greater than one acre. Construction activities including grading, trenching, excavation, stockpiling, and disturbances to the ground are covered under the CGP. Dischargers/the Legally Responsible Person must file Permit Registration Documents with the SWRCB via the Stormwater Multi Application and Report Tracking System. Permit Registration Documents consist of a Notice of Intent, risk assessment, site map, Stormwater Pollution Prevention Plan (SWPPP), signed certification statement, and annual fee. The RWQCB may require a risk assessment when the site poses a significant risk to water quality.

Under the CGP, responsible parties must address pollutants and their sources, including sources of sediment associated with construction, install effective site BMPs that result in the reduction or elimination of pollutants in stormwater discharges, and either eliminate, control, or treat all non-stormwater discharges. BMPs are designed to reduce impacts to the maximum extent practicable by focusing on pollution prevention and source control.

Pursuant to the CWA, in 2001, the SWRCB issued a statewide general NPDES Permit for stormwater discharges from construction sites (NPDES CAS000002). Under this Statewide General Construction Activity permit, discharges of stormwater from construction sites with a disturbance area of one or more acres are required to either obtain individual NPDES permits for stormwater discharges or to be covered by the General Permit. Coverage by the General Permit is accomplished by completing and filing a Notice of Intent with the SWRCB and developing and implementing a SWPPP. Each applicant under the General Construction Activity Permit must ensure that a SWPPP is prepared prior to grading and is implemented during construction. The SWPPP must list BMPs implemented on the construction site to protect stormwater runoff and must contain a visual monitoring program; a chemical monitoring program for “non-visible” pollutants to be implemented if there is a failure of BMPs; and a monitoring plan if the site discharges directly to a water body listed on the State’s 303(d) list of impaired waters.

NPDES Industrial General Permit

The Industrial General Permit (IGP) regulates industrial stormwater discharges and authorized non-stormwater discharges from industrial facilities in California. The statewide General Permit for Discharges of Stormwater Associated with Industrial Activities (SWRCB Water Quality Order No. 2014-0057-DWQ, NPDES No. CAS000001) requires qualifying industrial sites to comply with the following provisions, among others:

- Eliminate unauthorized non-stormwater discharges;
- Develop and implement SWPPPs that include BMPs;
- Implement minimum BMPs, and advanced BMPs as necessary, to achieve compliance with the effluent and receiving water limitations of this General Permit;
- Conduct monitoring, including visual observations and analytical stormwater monitoring for indicator parameters;
- Compare monitoring results for monitored parameters to applicable numeric action levels;
- Perform the appropriate Exceedance Response Actions when there are exceedances of the numeric action levels; and

- Certify and submit all permit-related compliance documents via the Stormwater Multi Application and Report Tracking System.

The IGP establishes a number of action levels that reflect California Environmental Protection Agency benchmark values for selected parameters, minimum BMP requirements, a revised monitoring protocol, and exceedance response actions if a numeric action level is exceeded.

California Department of Transportation NPDES Statewide Stormwater Permit

The Caltrans permit is applicable to portions of a project that involve modifications to State highways. Caltrans operates under a permit (Order No. 2012-0011-DWQ, NPDES No. CAS000003, as amended by 2014-0006-EXEC, 2014-0077-DWQ, 2015-0036-EXEC, and 2017-0026-EXEC) that regulates stormwater discharge from Caltrans properties, facilities, and activities and requires the Caltrans construction program to comply with the adopted statewide CGP. The permit requires Caltrans to implement a year-round program in all parts of the State to control stormwater and non-stormwater discharges effectively. The Caltrans permit is applicable to portions of a project that involve modifications to State highways.

Cobey-Alquist Floodplain Management Act

The Cobey-Alquist Floodplain Management Act (California Water Code §§ 8400 et seq.) encourages local governments to adopt and enforce land use regulations to accomplish floodplain management. It also provides State assistance and guidance for flood control.

California Fish and Game Code (for Lake and Streambed Alteration)

California Fish and Game Code (CFGF) § 1600 et seq. requires notifying the CDFW prior to any project activity that might (1) substantially divert or obstruct the natural flow of any river, stream or lake; (2) substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Although not specifically defined in CFGF § 1602, jurisdiction in some instances may include adjacent riparian vegetation.

If after this notification CDFW determines that the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement would need to be obtained.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act of 2014 (SGMA) is a comprehensive three-bill package that was signed into law by then-Governor Jerry Brown in September 2014. SGMA provides a framework for sustainable management of groundwater supplies by local authorities, with a limited role for State intervention only if necessary to protect the resource. The plan is intended to ensure a reliable groundwater water supply for California for years to come.

State Water Resources Control Board - General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality

Low-threat discharges, which include small/temporary dewatering projects such as excavations during construction, are regulated under this regional general permit (Low-Threat Discharge General Permit)

(Order No. 2003-0003-DWQ). Low-threat construction discharges cannot contain concentrations of pollutants in excess of the Basin Plan groundwater or surface water quality objectives.

5.10.2.3 Regional

Lahontan Regional Water Quality Control Board

The Water Quality Control Plan for the Lahontan Region (Basin Plan) contains water quality standards and control measures for the Lahontan Region's surface and groundwaters. The Basin Plan designates beneficial uses for water bodies and establishes water quality objectives, waste discharge prohibitions, and other implementation measures to protect those beneficial uses. State water quality standards also include a Non-Degradation Policy. Water quality control measures include TMDLs.

The Basin Plan for the Lahontan Region is the basis for the RWQCB's regulatory program. It sets forth water quality standards for the surface and groundwaters of the Lahontan Region, which include both designated beneficial uses of water and the narrative and numerical objectives which must be maintained or attained to protect those uses. It identifies general types of water quality problems, which can threaten beneficial uses in the Region. It then identifies required or recommended control measures for these problems. In some cases, it prohibits certain types of discharges in particular areas.

Mojave Basin Area Adjudication

The Mojave Water Agency (MWA) was appointed as Watermaster in 1993 pursuant to the Court Judgment in the *City of Barstow et al, v. City of Adelanto et al*, in the Riverside County Superior Court Case No. CIV208568 (Judgment), which adjudicated the rights to pump groundwater in the Mojave Basin Area. The Watermaster's main responsibilities are to monitor and verify water production for approximately 450 parties (1,700 wells), collect required assessments, conduct studies, and prepare an annual report of its findings and activities to the Court. The Watermaster also acts as the clearinghouse for recording water transfers, maintains records for all such transfers and reports changes in ownership of Base Annual Production rights to the Court. The study area is located within the Centro Subbasin of the Mojave Basin Area and is covered by the Court Judgment.

5.10.2.4 Local

County of San Bernardino Countywide Plan

The County adopted the Countywide Plan (CWP) in October 2020. The CWP Policy Plan addresses the physical, social, and economic issues facing the County's unincorporated portions. **Table 5.10-1: Countywide Plan Policy Plan – Relevant Hydrology and Water Quality Goals and Policies** includes the hydrology and water quality-related goals and policies relevant to the Project:

Table 5.10-1: Countywide Plan Policy Plan – Relevant Hydrology and Water Quality Goals and Policies	
Goal or Policy	
INFRASTRUCTURE & UTILITIES ELEMENT	
Goal IU-1	Water supply and infrastructure are sufficient for the needs of residents and businesses and resilient to drought.
Policy IU-1.8	Groundwater management coordination. We collaborate with watermasters, groundwater sustainability agencies, water purveyors, and other government agencies to ensure groundwater basins are being sustainably managed. We discourage new development when it would create or aggravate groundwater overdraft conditions, land subsidence, or other “undesirable results” as defined in the California Water Code. We require safe yields for groundwater sources covered by the Desert Groundwater Management Ordinance.
Goal IU-3	A regional stormwater drainage backbone and local stormwater facilities in unincorporated areas that reduce the risk of flooding.
Policy IU-3.1	Regional flood control. We maintain a regional flood control system and regularly evaluate the need for and implement upgrades based on changing land coverage and hydrologic conditions in order to manage and reduce flood risk. We require any public and private projects proposed anywhere in the county to address and mitigate any adverse impacts on the carrying capacity and stormwater velocity of regional stormwater drainage systems.
Policy IU-3.2	Local flood control. We require new development to install and maintain stormwater management facilities that maintain predevelopment hydrology and hydraulic conditions.
Policy IU-3.5	Fair share requirements. We require new development to pay its fair share of capital costs to maintain adequate capacity of the County’s regional flood control systems.
HAZARDS ELEMENT	
Goal HZ-1	Natural Environmental Hazards. Minimized risk of injury, loss of life, property damage, and economic and social disruption caused by natural environmental hazards and adaptation to potential changes in climate.
Policy HZ-1.2	New development in environmental hazard areas. We require all new development to be located outside of the environmental hazard areas listed below. For any lot or parcel that does not have sufficient buildable area outside of such hazard areas, we require adequate mitigation, including designs that allow occupants to shelter in place and to have sufficient time to evacuate during times of extreme weather and natural disasters. - Flood: 100-year flood zone, dam/basin inundation area - Geologic: Alquist Priolo earthquake fault zone; County-identified fault zone; rockfall/debris-flow hazard area, medium or high liquefaction area (low to high and localized), existing and County-identified landslide area, moderate to high landslide susceptibility area) - Fire: high or very high fire hazard severity zone
Policy HZ-1.3	Floodplain mapping. We require any new lots or subdivisions partially in, and any new development partially or entirely in 100-year flood zones or 100-year flood awareness areas to provide detail floodplain mapping for 100- and 200-year storm events as part of the development approval process.
Policy HZ-1.4	500-year flood zone. We may collaborate with property owners in the Valley region to establish funding and financing mechanisms to mitigate flood hazards in identified 500-year flood zones.

Table 5.10-1: Countywide Plan Policy Plan – Relevant Hydrology and Water Quality Goals and Policies	
Goal or Policy	
NATURAL RESOURCES ELEMENT	
Goal NR-2	Water Quality. Clean and safe water for human consumption and the natural environment.
Policy NR-2.4	Wastewater discharge. We apply federal and state water quality standards for wastewater discharge requirements in the review of development proposals that relate to type, location, and size of the proposed Project in order to safeguard public health and shared water resources.
Policy NR-2.5	Stormwater discharge. We ensure compliance with the County’s Municipal Stormwater NPDES (National Pollutant Discharge Elimination System) Permit by requiring new development and significant redevelopment to protect the quality of water and drainage systems through site design, source controls, stormwater treatment, runoff reduction measures, best management practices, low impact development strategies, and technological advances. For existing development, we monitor businesses and coordinate with municipalities.
Source: County of San Bernardino. 2020a. <i>Countywide Plan</i> . https://countywideplan.com/ .	

The CWP Policy Plan includes the following Policy Maps that address hydrology and water quality:

- Policy Map IU-2 Groundwater Basins: This map depicts County areas with:
 - SGMA very low, low, medium, and high Groundwater Basin Prioritization,
 - Over drafted groundwater basins, and
 - Adjudicated groundwater areas.
- Policy Map IU-4 Regional Flood Control Facilities: This map depicts the County’s channels, basins, dams, and Flood Control District Zones.
- Policy Map HZ-3 Dams & Basin Hazards: This map depicts the County’s:
 - Dam inundation areas,
 - Dam jurisdiction areas, and
 - Dams with low, significant, and high hazard potential.
- Policy Map HZ-4 Flood Hazards: This map depicts County areas within a California Department of Water Resources (DWR) 100-year flood zone, FEMA 100-year flood zone, and FEMA 500-year flood zone.¹
- Policy Map HZ-11 Wind Erosion Hazards: This map depicts County areas with low, low-medium, medium, medium-high, and high wind erodibility potential.

For applicability of the above CWP goals and policies to the Project, see **Section 5.0: Environmental Analysis**.

¹ The map reflects FEMA flood map data as of April 2017 and is only intended for general reference as part of the CWP.

Codified Ordinances of the County of San Bernardino

The Codified Ordinances of the County of San Bernardino (County Code) regulations addressing hydrology are provided below.

County Code Title 8 Division 5 Chapter 85.07: Flood Hazard Development Reviews and Title 3 Division 5 Chapter 1: Pollutant Discharge Elimination System Regulations. This chapter requires a Floodplain Development Standards Review before approval of a land use application or issuance of a development permit in specified flood areas or where required by the Director of Public Works or the Building Official. Additionally, County Code Title 3, Division 5, Chapter 1, Pollutant Discharge Elimination System Regulations requires any discharger associated with construction activity subject to any NPDES General Permit issued by the U.S. EPA, the SWRCB, or RWQCB, to comply with all requirements of such permit. Upon demand by County Director, such discharger must provide County proof of coverage under such permit. Proof of coverage under such permit may also be required prior to issuance of any County permit, including, but not limited to, grading, building, or occupancy permits. Proof of coverage must be in a form acceptable to the County Director. This ordinance ensures the protection of health and safety of, and promotes the welfare of, the County's inhabitants by controlling non-stormwater discharges to the stormwater conveyance system, and by reducing pollutants in stormwater discharges, including those pollutants taken up by stormwater as it flows over urban areas, to the maximum extent practicable to achieve applicable receiving water quality objective.

For applicability of the County Code standards to the Project, see **Section 5.0: Environmental Analysis**.

Technical Guidance Document for WQMPs

In compliance with the NPDES General Permit for San Bernardino County, the San Bernardino County Areawide Storm Water Program prepared the Technical Guidance Document for Water Quality Management Plans (WQMP) by new development and major redevelopment projects of specific land uses and sizes in the County. A WQMP is required as part of the permit process and commits the master developer and/or site developer, as applicable, to the implementation of long-term BMPs for use during the operation of a project. It should be noted that WQMPs typically identify permanent BMPs that would be in use during a project's operational life cycle. Individual WQMPs need to identify pollutants of concern based on the proposed land use and site activities, as well as select applicable site design, source control, and treatment control BMPs that would effectively prohibit non-stormwater discharges from entering the storm drain system and that would reduce the discharge of pollutants from stormwater conveyance systems to the maximum extent possible. The WQMP also calls for the on-site retention of stormwater to prevent hydrologic conditions of concern (HCOC), which refer to flooding, erosion, scour, sedimentation, natural habitat impacts, vegetation stress, slope stability, water quality degradation, and altered flow regime at downstream water channels/bodies that may occur if the storm drainage facilities have not been engineered to their ultimate capacities or if natural conditions are present. However, the Technical Guidance Document also designates "HCOC-Exempted Areas," which are areas where the HCOC analysis is not required if the following occurs: a sump condition; predevelopment runoff would equal post-development runoff; stormwater is diverted to a storage area; disturbance is less than one acre; or the watershed area is built out (i.e., 90 percent developed).

San Bernardino County Municipal Separate Storm Sewer System Permit

In compliance with the requirement to develop a Stormwater Management Program, San Bernardino County has developed a Stormwater Management Program for the Mojave River area, in conjunction with the Town of Apple Valley and the cities of Victorville and Hesperia. The Phase II MS4 covers the watershed's urbanized area, including the City of Barstow. The Stormwater Management Program was developed under NPDES General Permit Number CAS000004 requirements. The purpose of the program is to keep the Mojave River clean to the maximum extent practicable utilizing BMPs to reduce stormwater runoff and non-stormwater runoff flowing in the Mojave River. The program also serves to keep contamination, such as sediment, non-sediment solids, nutrients, pathogens, oxygen-demanding substances, petroleum hydrocarbons, heavy metals, floatables, polycyclic aromatic hydrocarbons, pesticides, herbicides, and trash from entering the storm drain system.

The City obtains coverage under the County's Phase II MS4 permit. Barstow is individually responsible for complying with the County's Stormwater Management Program requirements including, but not limited to, establishing a stormwater management plan, implementing BMPs, conducting regular inspections, ensuring compliance with TMDLs and local stormwater ordinances, and filing annual reports and monitoring data to the State Water Board.

City of Barstow 2015-2020 General Plan

The City adopted the City of Barstow 2015-2020 General Plan (2015 General Plan) in February 2015. The 2015 General Plan is the overarching guide for implementation of the Development Code, which defines development regulations and establishes zoning districts throughout the City. **Table 5.10-2: 2015 General Plan Relevant Goals and Policies – Hydrology and Water Quality** includes the hydrology-related goals and policies relevant to the Project. For applicability of the 2015 General Plan goals and policies to the Project, see **Section 5.0: Environmental Analysis**.

Table 5.10-2: 2015 General Plan Relevant Goals and Policies – Hydrology and Water Quality	
Goal or Policy	
RESOURCE CONSERVATION AND OPEN SPACE ELEMENT	
Goal 1	Ensure protection of water quality and quantity for the community by working in cooperation with all water purveyors in the area to preserve, augment, capture and purify all waters in the Mojave River system.
Policy 1 A	Ensure a water supply system capable of meeting normal and emergency demand through cooperation between the City and water purveyors.
Policy 1 B	Ensure protection of water quality and quantity for the community by working in cooperation with all water purveyors in the area to preserve, augment, capture and purify all waters in the Mojave River system.
Policy 1 C	Strive to ensure that adequate water remains available to the community in order to maintain continued growth.
Policy 1 E	Maintain a storm drainage system adequate to protect the lives and property of Barstow residents.
Source: City of Barstow. 2015. <i>City of Barstow 2015-2020 General Plan</i> . https://www.barstowca.org/home/showpublisheddocument/5359/636607004808630000	

Code of the City of Barstow

The Code of the City of Barstow (Barstow Code) regulations addressing hydrology and water quality are provided below. For applicability of the Barstow Code to the Project, see **Section 5.0: Environmental Analysis**.

Barstow Code Chapter 13.40: Water Conservation Plan. This chapter applies to all water users; water users being those persons, customers and property served within the incorporated boundaries of the City. Water users are deemed to have under control at all times their water distributions and facilities and to know the manner and extent of their water use and excess runoff. This chapter lists water uses prohibited and new development standards as well as exceptions and penalties. New development standards include the suggested and encouraged use of drought tolerant plant species for landscaping purposes and encouragement to large water users to implement water recycling and reuse processes.

Barstow Code Chapter 15.14: Stormwater and Urban Runoff Pollution Control. The purpose of this chapter is to ensure the future health, safety and general welfare of the citizens of the City and the water quality of the receiving waters and surrounding areas by: (1) reducing pollutants in stormwater discharges to the maximum extent practicable; (2) regulating illicit connections and illicit discharges and thereby reducing the level of contamination of stormwater and dry weather runoff into the MS4; and (3) regulating non-stormwater discharges to the MS4. Prohibited activities are listed as are requirements for industrial/commercial and construction activities.

Barstow Code Chapter 15.16: Floodplain Management. This chapter applies to all SFHA as defined in this chapter within the jurisdiction of the City. This chapter includes provisions for flood hazard reduction including standards of construction; standards for utilities; standards for subdivisions and other proposed development; standards for manufactured homes and recreational vehicles; and for floodways. Since floodways are an extremely hazardous area due to the velocity of floodwaters, which carry debris, potential projectiles, and erosion potential, the following provisions of Barstow Code § 15.16.050(f) apply:

- (1) Until a regulatory floodway is adopted, no new construction, substantial development, or other development (including fill) shall be permitted within Zones A1-30 and AE, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other development, will not increase the water surface elevation of the base flood more than one foot at any point within the City.
- (2) Within an adopted regulatory floodway, the City shall prohibit encroachments, including fill, new construction, substantial improvements, and other development, unless certification by a registered civil engineer is provided demonstrating that the proposed encroachment shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- (3) If subsections (f)(1) and (2) of this section are satisfied, all new construction, substantial improvement and other proposed new development shall comply with all other applicable flood hazard reduction provisions of this chapter.
- (4) Prohibit the placement of any manufactured home, temporary or permanent.

5.10.3 METHODOLOGY FOR EVALUATING IMPACTS

This section defines the study area (i.e., affected environment) and summarizes the methodology used to analyze potential impacts concerning hydrology and water quality.

5.10.3.1 Definition of Study Area

The study area is the geographic area(s) in which potential effects on environmental resources are described and for which the environmental investigations were conducted specific to each resource topic.

Proposed General Plan

The study area for the proposed General Plan is the City and its Sphere of Influence (SOI) as shown in **Figure 3-1: Regional Vicinity Map** and **Figure 3-2: Local Vicinity Map - BIG**, as well as downstream and regional water resources, such as the Mojave River.

Barstow International Gateway

This section identifies the methods used to evaluate the effects of BIG on the hydrologic and hydraulic parameters associated with the Mojave River, Lenwood Channel, and the Unnamed Tributary to the Mojave River passing through the existing BNSF mainline at Bridge 10.9a and Bridge 11.2. The Lenwood Channel and Unnamed Tributary to the Mojave River water features are the main jurisdictional conveyance locations for runoff flowing toward the Mojave River through the BIG footprint. The reconstruction of the Hinkley Road bridge over the Mojave River is an off-site improvement that is also analyzed in this section.

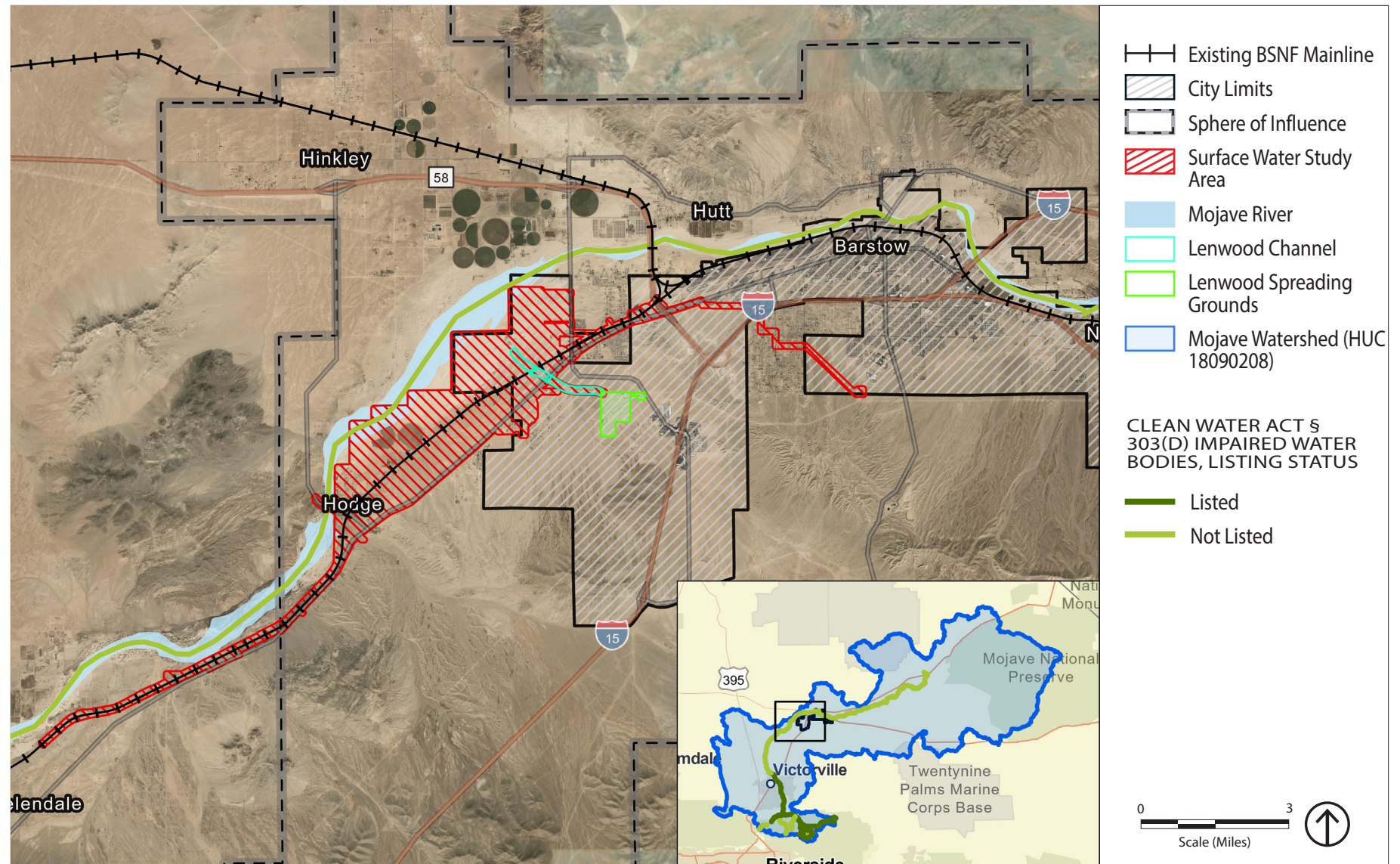
The analysis considers resources within the study areas defined in **Table 5.10-3: Definition of Study Areas – BIG** and depicted on **Figure 5.10-1: Surface Water Study Area - BIG**, **Figure 5.10-2: Groundwater Study Area – BIG**, and **Figure 5.10-3: Flooding and Stormwater Drainage - BIG**. Additionally, **Figure 5.10-4a: Proposed Bridge and Culvert Improvements - BIG** show the location of and type of improvements related to hydrology and stormwater flows within the BIG footprint and

Figure 5.10-5: FEMA Flood Zones - BIG

shows which FEMA FIRM flood zones exist within the BIG footprint.

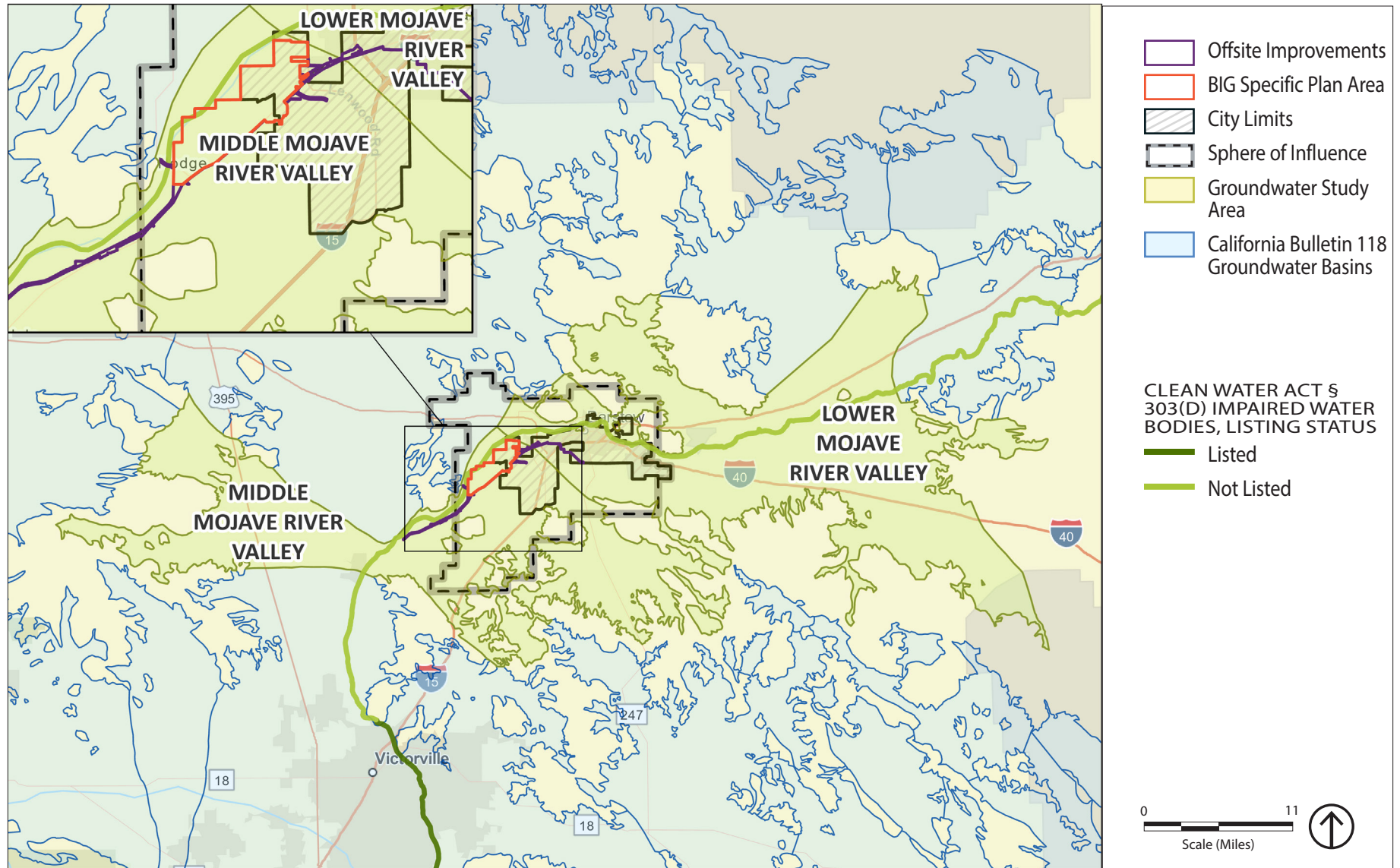
Table 5.10-3: Definition of Study Areas – BIG

Study Area	Study Area Boundary
Surface Water Study Area --Surface Water Quality; Erosion/Siltation; Flood Hazard; Tsunami; and Seiche Zones	BIG footprint, plus 250-foot buffer, and downstream water resources that would receive runoff and sediment from BIG footprint
Groundwater Study Area -- Groundwater Quality; Supplies; Groundwater Management	BIG footprint and aquifer(s) underlying BIG footprint
Flooding and Stormwater Drainage Study Area -- Flooding; Stormwater Drainage Capacity; Flood Flows	BIG footprint, plus 250-foot buffer
Note: ¹ FEMA = Federal Emergency Management Agency	



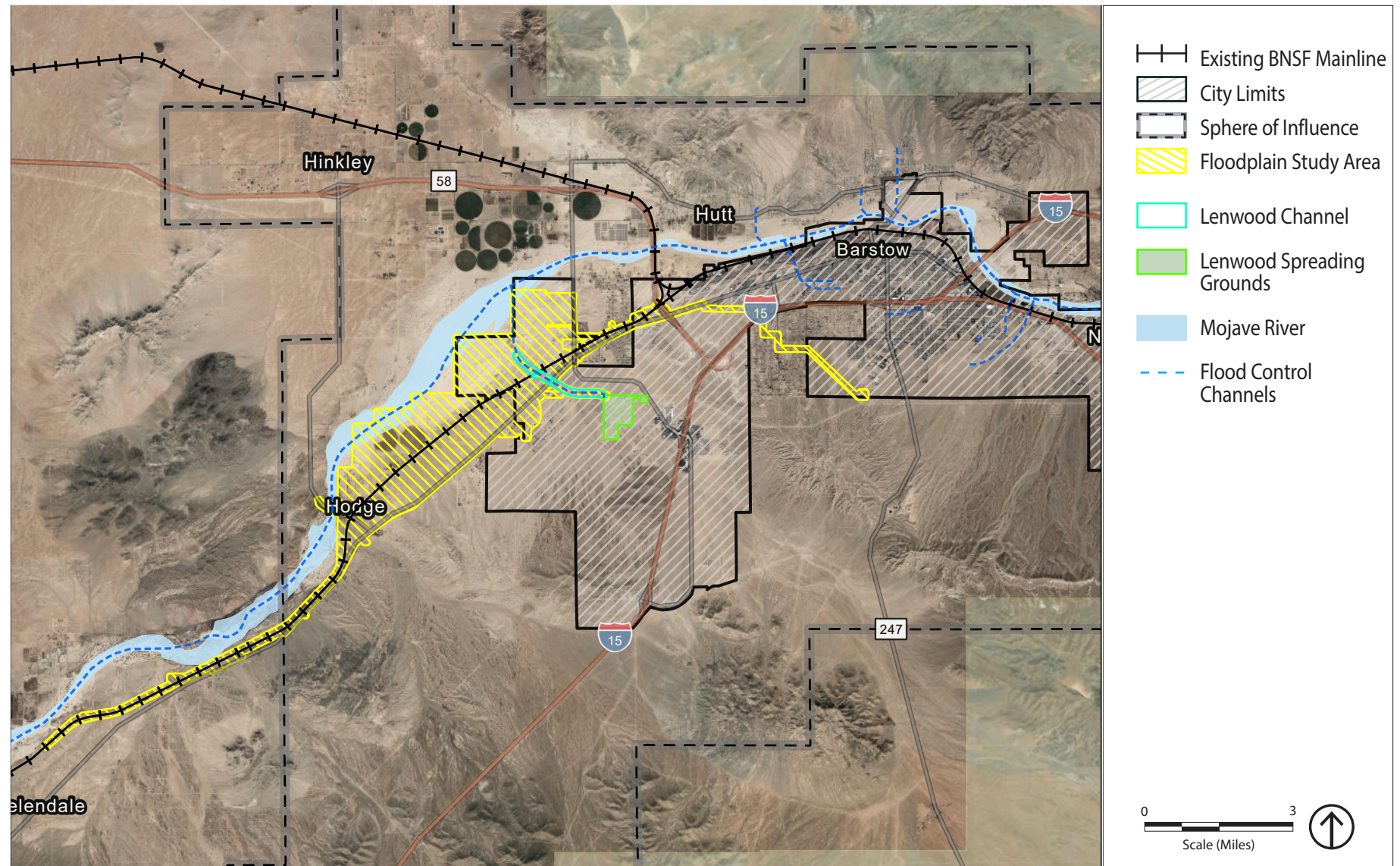
Sources: County of San Bernardino, Y2023_PUA_Cache [aerial imagery], 2023.; ESRI, World Street Map [Basemap], 2024.; County of San Bernardino, Cities and Towns [Data set], 2022.; County of San Bernardino, City Spheres of Influence [Data set], 2022.; Mojave Water Agency, Mojave River Active Channel (2005) [Data set], 2005.; United States Geological Service, National Hydrography Dataset (NHD)[Data set], 2023.; U.S. Environmental Protection Agency, 303(d) Listed Impaired Waters [Data set], 2017.

Figure 5.10-1
Surface Water Study Area - BIG



Sources: ESRI, World Street Map [Basemap], 2024.; County of San Bernardino, *Cities and Towns* [Data set], 2022.; County of San Bernardino, City Spheres of Influence [Data set], 2022.; California Department of Water Resources, *108_B118_CA_GroundwaterBasins_MapService* [Data set], 2022.; U.S. Environmental Protection Agency, 303(d) *Listed Impaired Waters* [Data set], 2017.

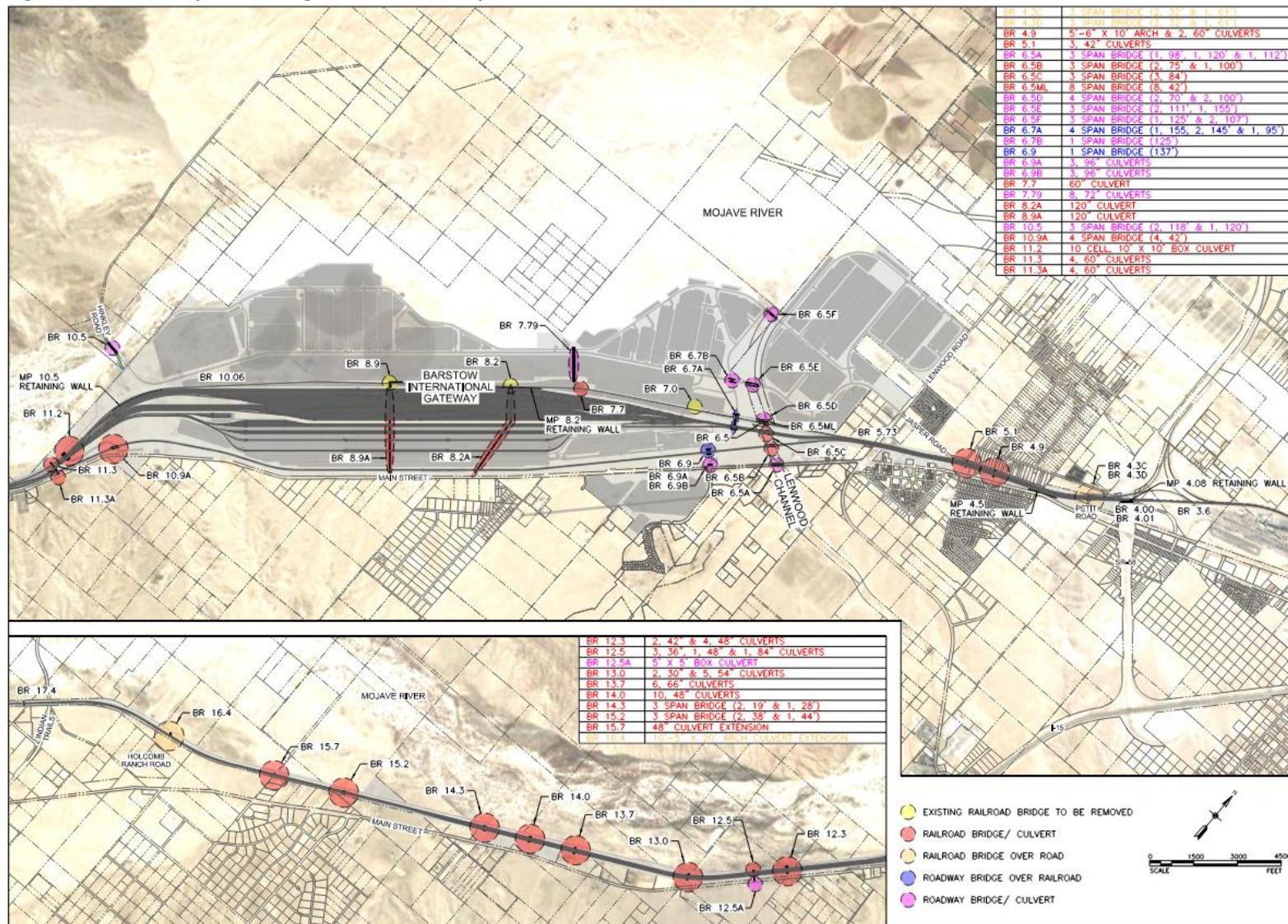
Figure 5.10-2
Groundwater Study Area - BIG



Source: County of San Bernardino, Y2023_PUA_Cache [aerial imagery], 2023.; ESRI, World Street Map [Basemap], 2024.; County of San Bernardino, Cities and Towns [Data set], 2022.; County of San Bernardino, City Spheres of Influence [Data set], 2022.; County of San Bernardino, Countywide Plan Policy Map IU-4 Regional Flood Control Facilities [Data set], 2020.

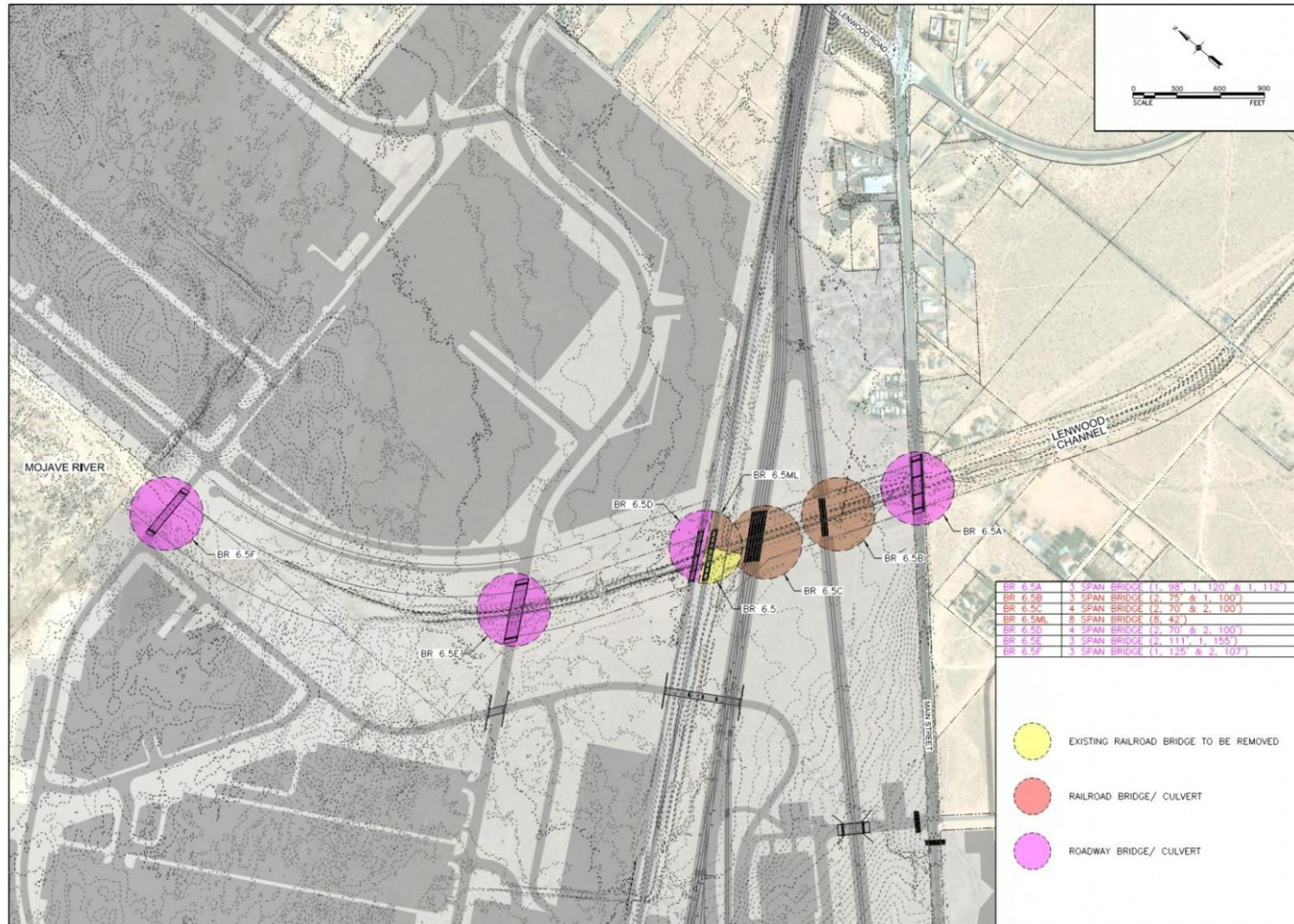
Figure 5.10-3
Flooding and Stormwater Drainage - BIG

Figure 5.10-4a: Proposed Bridge and Culvert Improvements - BIG



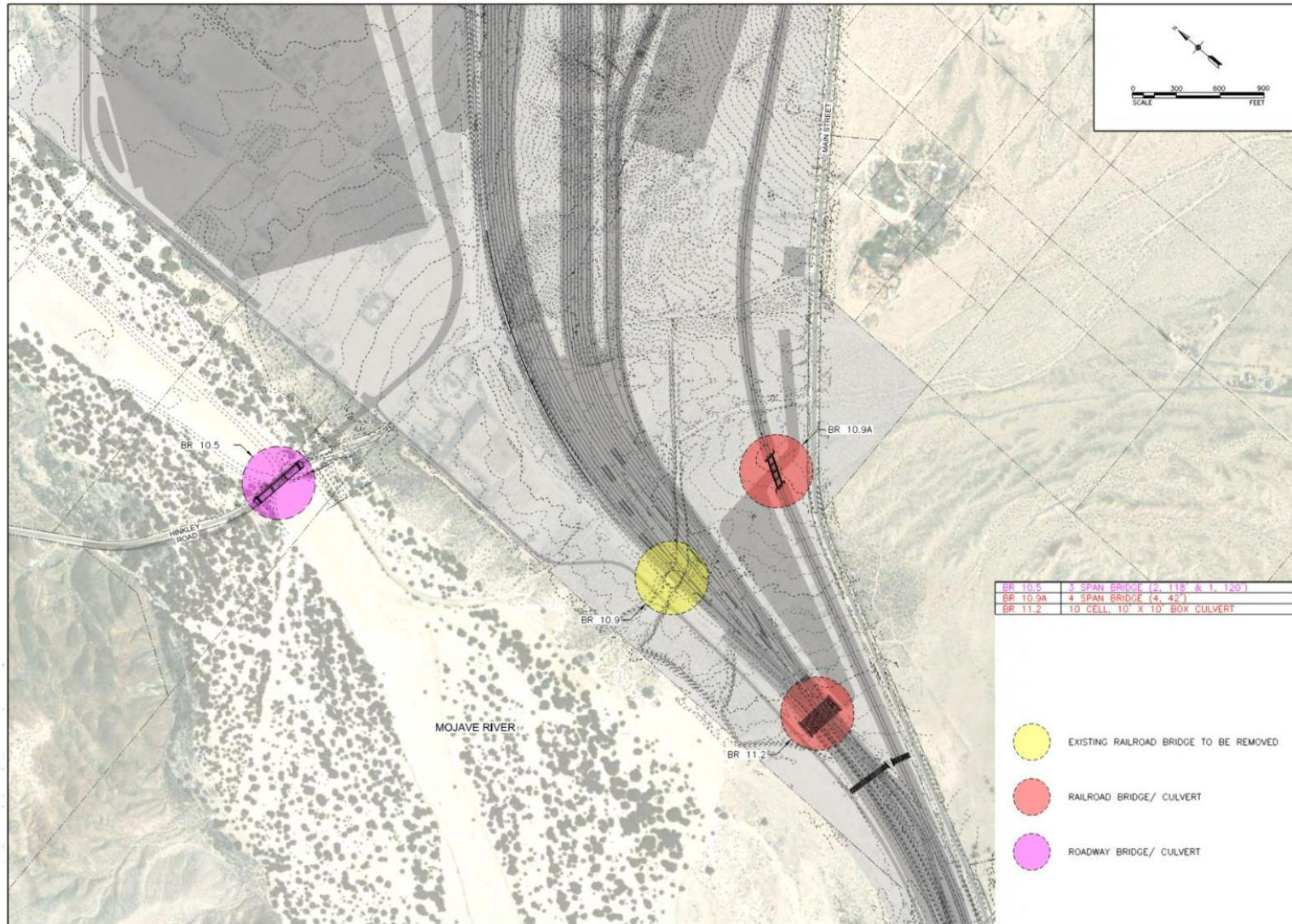
Source: TranSystems, 2025

Figure 5.10-4b: Proposed Bridge and Culvert Improvements - BIG

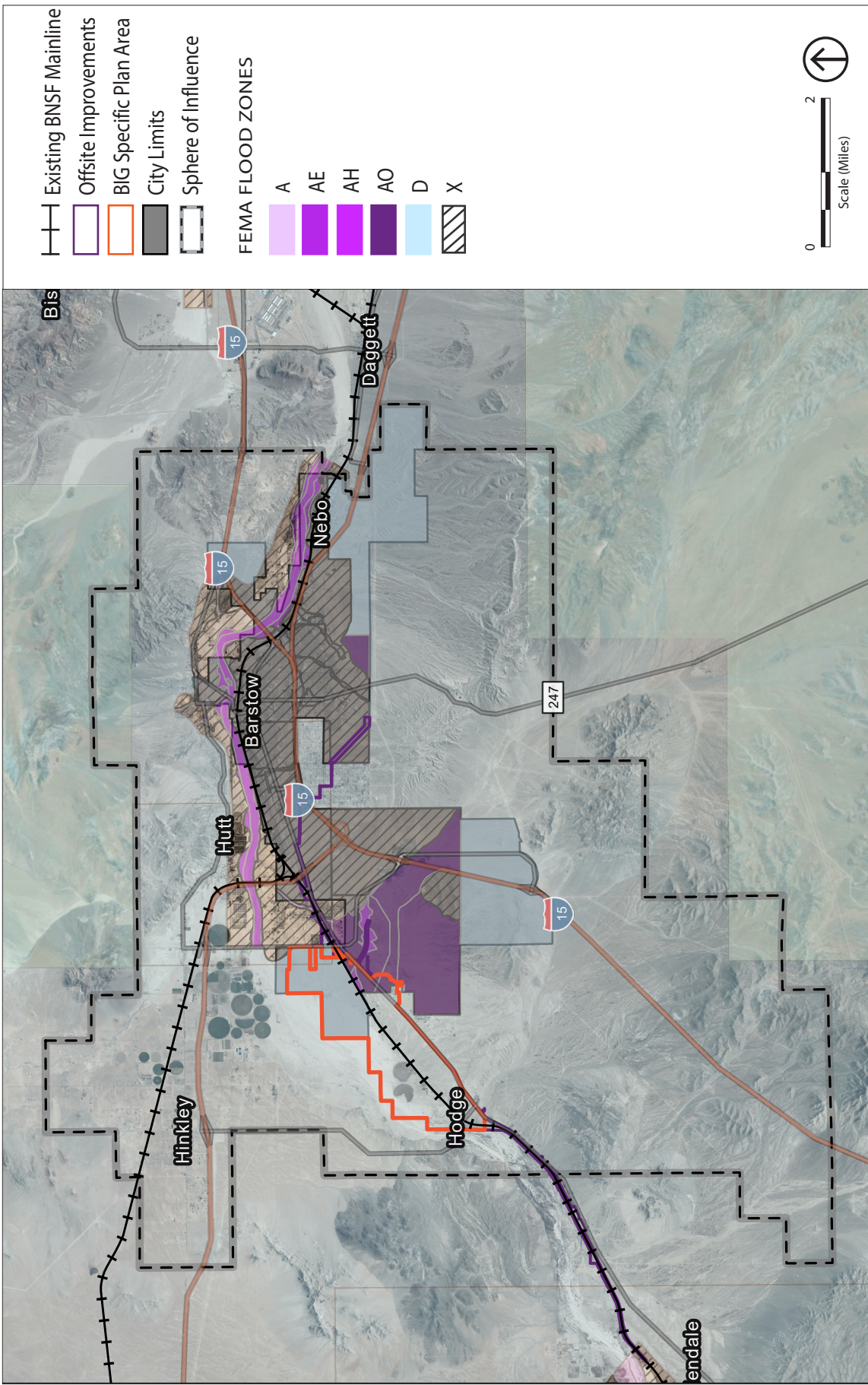


Source: TranSystems, 2025

Figure 5.10-4c: Proposed Bridge and Culvert Improvements – BIG



Source: TranSystems, 2025



Sources: County of San Bernardino, Y2023_PUA_Cache [aerial imagery], 2023.; County of San Bernardino, Cities and Towns [Data set], 2022.; County of San Bernardino, City Spheres of Influence [Data set], 2022.; Federal Emergency Management Agency. (2008-2016). FEMA's National Flood Hazard Layer (NFHL) Viewer [Web App].

Figure 5.10-5
FEMA Flood Zones - BIG

5.10.3.2 Methodology

Proposed General Plan

State mapping systems and the City's 2015 General Plan were used to identify hydrological conditions within the City and its SOI.

Surface and Groundwater Quality

The analysis of the proposed General Plan evaluates its potential impact on water quality by reviewing water quality standards and incorporating expert judgment. The analysis considers both temporary and permanent BMP designs, focusing on their characteristics and methods.

Groundwater Supply and Recharge

The analysis of the proposed General Plan assesses its potential impact on groundwater supplies and recharge by reviewing data from MWA and the U.S. Geological Survey (USGS) and incorporating expert judgment. It examines both temporary and permanent BMP designs, as well as impervious and pervious surfaces and their infiltration capacities. The MWA's 2020 Urban Water Management Plan was used to gather information on groundwater and recharge sites (MWA, 2021).

Alteration of Drainage Pattern

The effects related to hydrology and hydraulic variables from the proposed General Plan are analyzed, based on possible alterations to existing drainage patterns due to the proposed General Plan, which could result in erosion or siltation, on- or off-site flooding, exceedances of stormwater drainage system capacities, and impedance/redirection of flood flows.

Pollutant Release Due to Inundation

Flood hazard and dam inundation zones are identified using data within the public domain such as maps and data from FEMA, the USACE, and DWR. Additionally, satellite imagery was utilized to determine the City's proximity to open waters, such as the Pacific Ocean, lakes, and ponds. This information was then used to analyze the ability of development pursuant to the proposed General Plan to release pollutants resultant of construction or operational practices when considering the temporary and permanent BMPs that would be implemented.

Obstruction of Applicable Plans

The analysis assesses whether the proposed General Plan might conflict with or obstruct water quality control or groundwater management plans by reviewing relevant laws, the Mojave Basin Area Adjudication court judgement, and the CWA § 303(d) list of water quality impairments.

Barstow International Gateway

Surface and Ground Water Quality

Concerning BIG's potential to violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality, the analysis was conducted through review of available water quality standards and from professional judgement from qualified individuals in accordance with the project design features and BMP implementation. Temporary (construction) and permanent (operational) BMP design was considered with regard to this analysis. Specifically, the characteristics and the means and methods of these BMPs.

Groundwater Supply and Recharge

Concerning BIG's potential to decrease groundwater supplies or interfere with groundwater recharge, the analysis was conducted through review of available groundwater data from the local water district and USGS as well as professional judgement from qualified individuals in accordance with project design features and BMP implementation. Temporary (construction) and permanent (operational) BMP design was considered with regard to this analysis. Additionally, project features such as impervious and pervious surface construction and infiltration capacity of BIG's features are analyzed. Specifically, the characteristics of and the means and methods of these BMPs are considered.

Alteration of Drainage Pattern

Effects related to hydrology and hydraulic variables are analyzed, based on alterations to existing drainage patterns, which could result in erosion or siltation, on-site or off-site flooding, exceedances of stormwater drainage system capacities, and impedance/redirection of flood flows; see **Appendix 5.10 BIG-1**. The analysis was conducted through the thorough review of published information for BIG, in-house engineering analysis, and professional judgment in accordance with the current standard of care for hydraulic engineering and the hydrology design manual for San Bernardino County. The analysis of impacts considers both temporary (construction) and permanent (operational) effects for each impact criteria. The impact conclusions consider the potential for changes in the environmental conditions and compliance with the federal, State, regional, and local regulatory framework.

Qualitative and quantitative analyses include review of primary and secondary hazard effects. Analysis includes review and assessment of published maps, professional publications, and reports pertaining to BIG hydrology and hydraulics to describe the affected environment and evaluate BIG's potential environmental effects on existing flood flows and the potential to alter said flows. Additionally, infiltration and flood control capacity of water courses to be improved were analyzed. The following summarizes the sources used in this analysis to evaluate potential effects:

- USGS 1/3 arc-second National Elevation Data
- FEMA NFIP Flood Insurance Study Volumes 1-4 for San Bernardino County California and Incorporated Areas
- Natural Resources Conservation Service (NRCS) soils maps and data
- 2017 San Bernardino County LiDAR

Pollutant Release due to Inundation

Analysis of BIG's location relative to flood hazards such as floodplains and dam inundation areas as well as features that could cause tsunami or seiche are analyzed. Data within the public domain, such as maps and data from FEMA and the USACE were utilized to determine inundation areas while satellite imagery was utilized to determine BIG's proximity to open waters, such as the Pacific Ocean, lakes, and ponds. This information was then used to analyze BIG's ability to release pollutants resultant of construction or operational practices when considering the temporary and permanent BMPs that would be implemented.

Obstruction of Applicable Plans

Concerning BIG's potential to conflict with or obstruct the implementation of a water quality control plan or sustainable groundwater management plan, the analysis was conducted through the thorough review of project plans, applicable laws, rules, and ordinances, and data available from public agencies. Specifically, project-specific construction document requirements are reviewed, and entitlement level design documents were considered when evaluating BIG's potential impacts.

5.10.4 ENVIRONMENTAL SETTING

The information provided within this Environmental Setting section is applicable to both the proposed General Plan and BIG. Subsequently, information that is unique to the environmental setting for the proposed General Plan and BIG has been provided under their respective headings.

Surface Water Quality

Surface Water Beneficial Uses. The water quality of surface water features within the surface water study area are regulated under the Basin Plan. To protect these features, the LRWQCB has established the beneficial uses supported by each feature, both present and potential. The LRWQCB has also established the Basin Plan's water quality objectives, which are the limits or levels of water quality constituents or characteristics that are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area. When beneficial uses are impaired by a pollutant that chronically exceeds its water quality objective, the RWQCBs place the waterbody and pollutant on the CWA § 303(d) list of water quality impairments. Once a waterbody is placed on the § 303(d) list, the RWQCBs must begin developing a TMDL program that provides a programmatic response to the impairment in order for the waterbody to meet the water quality objective and continue to support its beneficial uses.

The existing beneficial uses for the Middle Mojave Hydrologic Area identified in the Basin Plan are listed below (LRWQCB, 2021a):

- MUN: Waters used for community, military, or individual water supply systems
- AGR: Waters used for farming, horticulture, or ranching
- GWR: Waters used for natural or artificial recharge of groundwater
- FRSH: Waters used for natural or artificial maintenance of surface water quantity or quality
- POW: Waters used for hydroelectric power generation

- REC-1: Waters used for recreational activities involved body contact with water where ingestion of water is reasonably possible
- REC-2: Waters used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible
- COMM: Waters used for commercial or recreational collection of fish or other organisms
- WARM: Waters that support warm water ecosystems
- COLD: Waters that support cold water ecosystems
- WILD: Waters that support wildlife habitats
- RARE: Waters that support habitat necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered
- WQE: Waters that support natural enhancement or improvement of water quality in or downstream of a water body
- FLD: Riparian wetlands in flood plain areas and other wetlands that receive natural surface drainage and buffer its passage to receiving waters

Table 5.10-4: Beneficial Uses of Potentially Affected Waterbodies and Beneficial Use Definitions summarizes the types of beneficial uses of waterbodies in the Middle Mojave Hydrologic Area, in which the BIG footprint and the surface water study area are within. Minor surface waters include springs, streams, lakes, and ponds.

Water Quality Impairments. The SWRCB develops and updates a list of waterbodies (designated as 303(d) water quality limited waterbodies) that are impaired and do not meet water quality objectives. CWA § 303(d) specifies the requirements for listing impaired waterbodies. TMDLs are developed for listed waterbodies to provide pathways for restoration of waterbody quality. The Final 2024 California Integrated Report (Clean Water Act § 303(d) List/305(b) Report) includes § 303(d) stream listings and the impaired water bodies within the surface water study area and the BIG Specific Plan area, and included on the 303(d) list, are provided below.

- Deep Creek (below lake) for Chloride, Dissolved Oxygen, Phosphate, Sodium, Sulfates, Total Dissolved Solids;
- Holcomb Creek for Fluoride, Sulfates, Total Dissolved Solids;
- Crab Creek for Dissolved Oxygen, Total Dissolved Solids;
- Sheep Creek for Nitrogen, Nitrate, Dissolved Oxygen, Total Dissolved Solids;
- Mojave River (Mojave Forks Reservoir outlet to Upper Narrows) for Fluoride, Sodium, Sulfates;
- Mojave River (Upper Narrows to Lower Narrows) for Fluoride, Manganese, Dissolved Oxygen, Sodium, Sulfates, Total Dissolved Solids; and
- West Fork Mojave River below Silverwood Lake for Chloride, Sodium, Sulfates, Total Dissolved Solids

Table 5.10-4: Beneficial Uses of Potentially Affected Waterbodies and Beneficial Use Definitions

Beneficial Use	Definition	Mojave River (Middle Mojave Hydrologic Area)	Minor Surface Waters	Minor Wetlands
MUN	Municipal and Domestic Supply. Beneficial uses of waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply.	X	X	X
AGR	Agricultural Supply. Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.	X	X	X
PRO	Industrial Process Supply. Beneficial uses of waters used for industrial activities that depend primarily on water quality.			
IND	Industrial Service Supply. Beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.			
GWR	Groundwater Recharge. Beneficial uses of waters used for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.	X	X	X
FRSH	Freshwater Replenishment. Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).			X
NAV	Navigation. Beneficial uses of waters used for shipping, travel, or other transportation by private, military, or commercial vessels.			
POW	Hydropower Generation. Beneficial uses of waters used for hydroelectric power generation		X	
REC-1	Water Contact Recreation. Beneficial uses of waters used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, and use of natural hot springs	X	X	X
REC-2	Noncontact Water Recreation. Beneficial uses of waters used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.	X	X	X

Table 5.10-4: Beneficial Uses of Potentially Affected Waterbodies and Beneficial Use Definitions

Beneficial Use	Definition	Mojave River (Middle Mojave Hydrologic Area)	Minor Surface Waters	Minor Wetlands
COMM	Commercial and Sportfishing. Beneficial uses of waters used for commercial or recreational collection of fish or other organisms including, but not limited to, uses involving organisms intended for human consumption.	X		
AQUA	Aquaculture. Beneficial uses of waters used for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, and harvesting of aquatic plants and animals for human consumption or bait purposes.			
WARM	Warm Freshwater Habitat. Beneficial uses of waters that support warm water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.	X	X	X
COLD	Cold Freshwater Habitat. Beneficial uses of waters that support cold water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.	X	X	X
SAL	Inland Saline Water Habitat. Beneficial uses of waters that support inland saline water ecosystems including, but not limited to, preservation and enhancement of aquatic saline habitats, vegetation, fish, and wildlife, including invertebrates			
WILD	Wildlife Habitat. Beneficial uses of waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.	X	X	X
BIOL	Preservation of Biological Habitats of Special Significance. Beneficial uses of waters that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, and Areas of Special Biological Significance (ASBS), where the preservation and enhancement of natural resources requires special protection.			
RARE	Rare, Threatened, or Endangered Species. Beneficial uses of waters that support habitat necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened or endangered.			X
MIGR	Migration of Aquatic Organisms. Beneficial uses of waters that support habitats necessary for migration, acclimatization between fresh and salt water, or temporary activities by aquatic organisms, such as anadromous fish.			
SPWN	Spawning, Reproduction, and Development. Beneficial uses of waters that support high quality aquatic habitat			

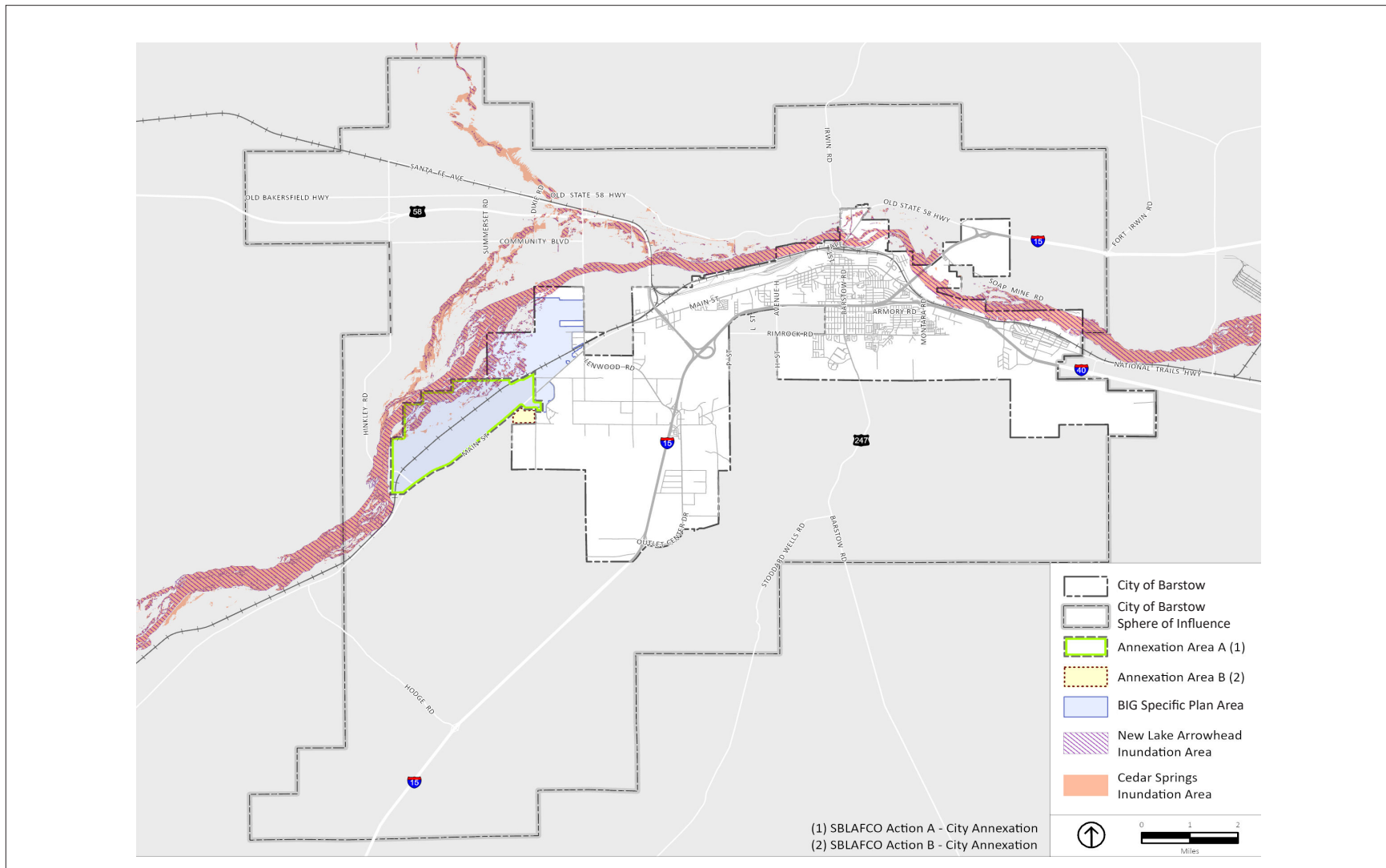
Table 5.10-4: Beneficial Uses of Potentially Affected Waterbodies and Beneficial Use Definitions				
Beneficial Use	Definition	Mojave River (Middle Mojave Hydrologic Area)	Minor Surface Waters	Minor Wetlands
	necessary for reproduction and early development of fish and wildlife.			
WQE	Water Quality Enhancement. Beneficial uses of waters that support natural enhancement or improvement of water quality in or downstream of a water body including, but not limited to, erosion control, filtration and purification of naturally occurring water pollutants, streambank stabilization, maintenance of channel integrity, and siltation control.			X
FLD	Flood Peak Attenuation/Flood Water Storage. Beneficial uses of riparian wetlands in flood plain areas and other wetlands that receive natural surface drainage and buffer its passage to receiving waters.			X
Source: Lahontan RWQCB. 2021b. <i>Water Quality Control Plan for Lahontan Region, Chapter 2 – Present and Potential Beneficial Uses</i> . Table 2-1. Beneficial Uses of Surface Waters of the Lahontan Region. https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/docs/2022/ch2-bu.pdf .				

Proposed General Plan

The City and its SOI are located within the Mojave River Basin and fall within the jurisdiction of the LRWQCB and is subject to its Basin Plan. Barstow is situated on alluvial deposits dissected by numerous small intermittent streams. The primary hydrologic feature within the plan area is the Mojave River which originates in the San Bernardino Mountains. The Mojave River flows in a northeasterly direction finally emptying into Soda Lake. The flow of the Mojave River is seasonal though it carries discharges from Lake Arrowhead, Silverwood Lake, and Mojave Forks Reservoir (Barstow, 2015).

Local hydrology consists of small intermittent streams draining the hills located to the north and south of the City and emptying into the Mojave River. Water reaching the Mojave River is carried eastward out of the City limits. The highest elevation within the City limits is approximately 2,720 feet and the lowest elevation is 2,069 feet (Barstow, 2015). The Mojave River is typical of major Southern California drainage courses. The drainage area is 1,290 square miles and has the potential of carrying large discharges, generated from major storms, although it is a dry sand wash most of the time. Because of Barstow's desert climate, strong winds are common and can result in dust storms and erosion and thereby potentially impact water quality and drainage patterns. As shown in **Figure 5.10-6: Dam Inundation Zones – Proposed General Plan**

, the New Lake Arrowhead Inundation Area and Cedar Springs Inundation Area are generally within the Mojave River area and extend northwest.



Source:
California Department of Water Resources, 2024; City of Barstow, 2025.

Figure 5.10-6
DAM Indundation Zones - Proposed General Plan

Figure 5.10-7: FEMA Flood Hazard Zones - Proposed General Plan

shows the flood zones within the plan area. The northern and southwestern portions of the proposed General Plan area, including the Mojave River Channel and Lenwood area, are within 100-year flood zones (FEMA, 2008).

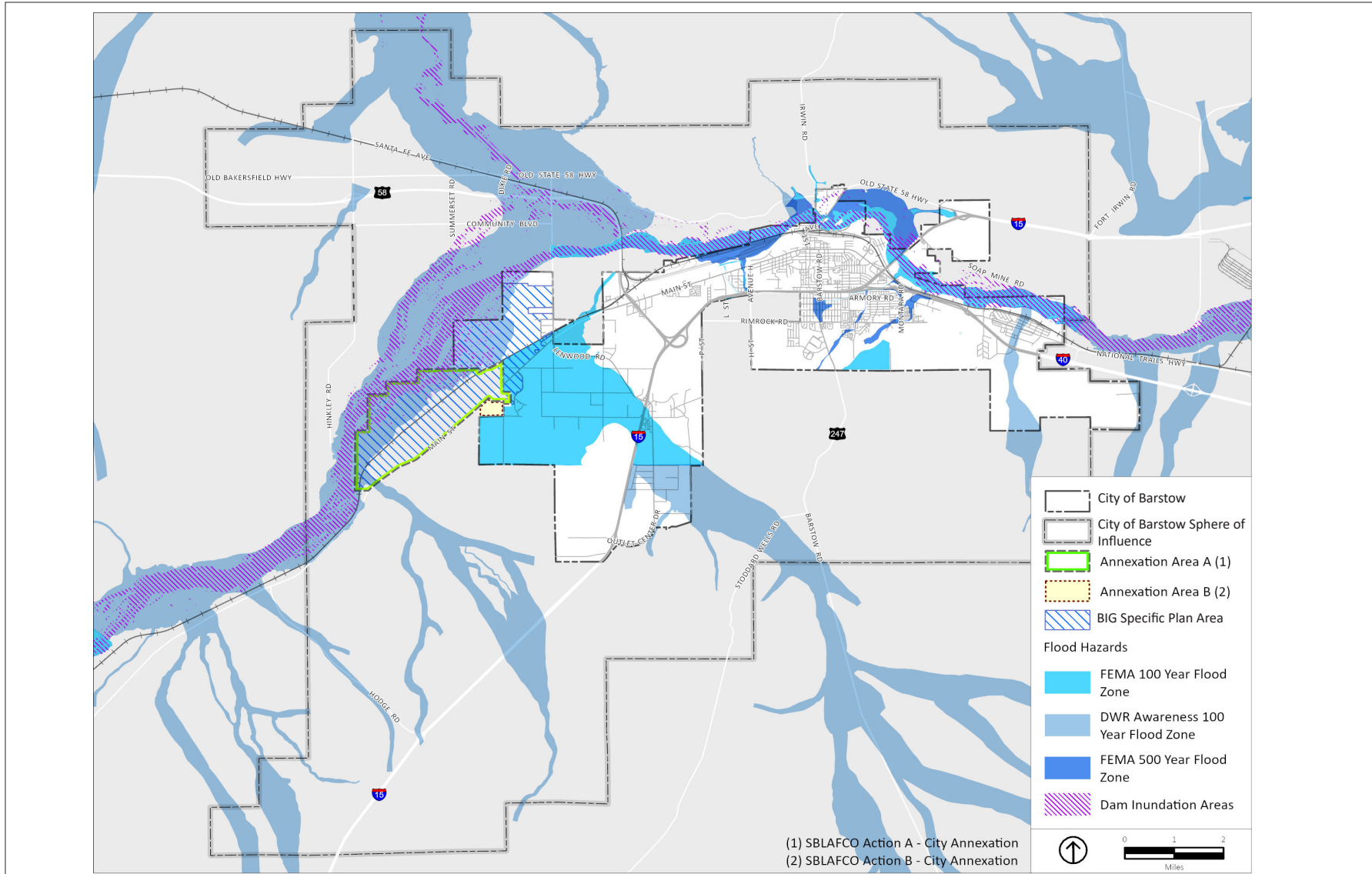
Tsunamis are a series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean or large lake, by an earthquake, landslide, or volcano. The proposed General Plan area is more than 85 miles northeast of the Pacific Ocean and is well outside the tsunami inundation zone. Similarly, a seiche is a series of standing waves in a fully or partially-enclosed water body such as a lake or bay. The waves of a seiche can also be triggered by a landslide or earthquake and have the potential to result in flooding or erosion. There are no large bodies of water within the proposed General Plan area so damage by seiche is unlikely.

Surface water features in the proposed General Plan area include the Mojave River, channels, and tributaries. Surface water from the Mojave River and its tributaries flow down from the San Bernardino Mountains. Local groundwater supply is naturally recharged by surface water from the Mojave River and its watershed. According to the 2020 Urban Water Management Plan (UWMP), two major pipelines bring water from the California Aqueduct. The Mojave River Pipeline is approximately 76 miles long and extends from the California Aqueduct to four groundwater recharge sites along the Mojave River at Hodge, Lenwood, Dagget/Yermo, and Newberry Springs. The second major pipeline, the Morongo Basin Pipeline, which is 71 miles long, delivers water to groundwater recharge sites in Hesperia, Landers, Yucca Valley, and Joshua Tree. Two of the four groundwater recharge sites along the Mojave River, Hodge and Lenwood, are within the SOI, as shown in **Figure 5.10-8: Groundwater Recharge Sites - Proposed General Plan**

Barstow International Gateway

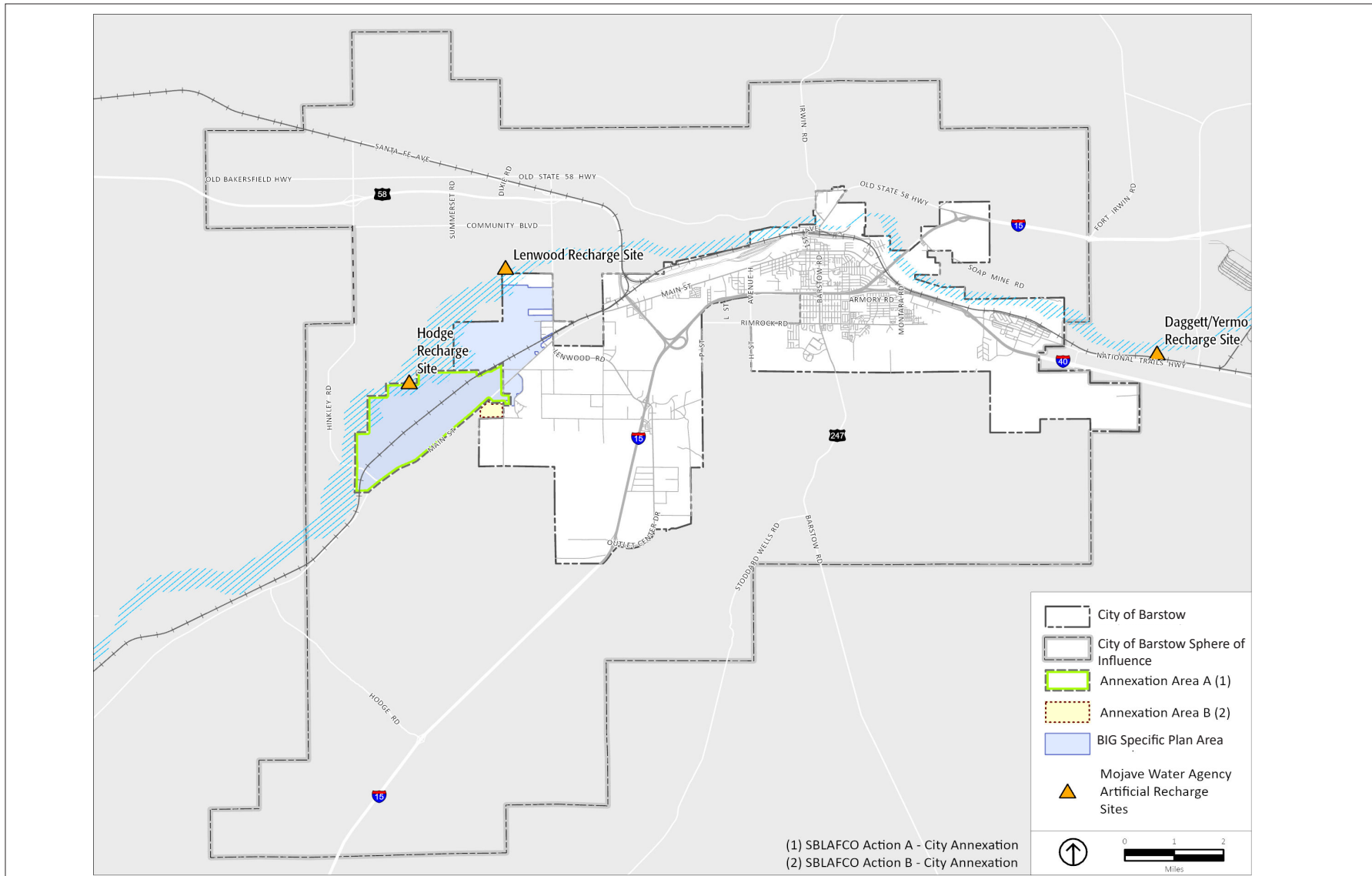
The approximately 5,000-acre BIG footprint is in the western part of the City and southwestern part of the County. The BIG footprint is generally bordered by the Mojave River on the north, historic Main Street (also referred to as National Trails Highway or Route 66) (hereinafter “Main Street”) on the south, Lenwood Road on the east, and Hinkley Road on the west; see **Figure 3-2: Local Vicinity Map - BIG** in **Section 3.0: Project Description**.

This section describes the affected environment concerning hydrology and water quality in BIG study areas, including watershed, surface water hydrology, surface water quality, groundwater, and floodplains; see **Table 5.10-3: Definition of Study Areas – BIG** for BIG study areas relevant to hydrology and water quality. This information provides the context for the environmental analysis and evaluation of impacts.



Source:
California Department of Water Resources, 2023; City of Barstow, 2025; FEMA, 2021.

Figure 5.10-7
FEMA Flood Hazard Zones - Proposed General Plan



Source:
California Department of Water Resources, 2023; City of Barstow, 2025; FEMA, 2021.

Figure 5.10-8
Groundwater Recharge Sites - Proposed General Plan

Watershed

The USGS delineates watersheds by using a nationwide hierarchical land area classification system based on surface hydrologic features in a standard, uniform geographical framework. This system delineates these watersheds with a hydrologic unit code (HUC) of various lengths (2-, 4-, 8-, 10-, and 12-digits long) identifying specific location and geographical information. The length of a HUC determines what information is conveyed, such as what region, subregion, basin, subbasin, or watershed and area of land is in. BIG is situated in the Mojave River Watershed's subbasin (HUC8: 18090208). The Mojave Subbasin is entirely within San Bernardino County and is approximately 4,600 square miles in area (U.S. EPA, ND). The Mojave River is the Mojave Subbasin's primary hydrologic feature.

Surface Water Hydrology

Surface water features are present within the BIG footprint and generally flow in a southeast to northwest direction toward the Mojave River. The Mojave River lies north of the BIG footprint but is outside the BIG footprint. Delineations identified water features in BIG that are potentially jurisdictional to the USACE, RWQCB, and CDFW. The BIG footprint supports approximately 142.79 acres (259,504 linear feet) of non-wetland waters of the U.S./State jurisdictional by the USACE and RWQCB, respectively, and approximately 58.98 acres of vegetated streambed, 594.42 acres of unvegetated streambed (259,504 linear feet of vegetated and unvegetated streambed combined), and 62.97 acres of watercourse jurisdictional to CDFW. No Section 10 navigable waters of the U.S. were identified within the BIG footprint; see the Rivers and Harbors Act in **Section 5.10.2.1: Federal (33 U.S. Code [USC] § 403)**. All features were described as non-wetland waters. Feature locations are depicted in **Appendix 5.4 BIG-1: Biological Resources Technical Report**.

The Mojave River lies north of BIG and transects the surface water study area from the west to the east. The Mojave River headwaters originate on the San Bernardino Mountains' northern slope; the river then continues via surface and subsurface flows through the Mojave Desert. The ultimate discharge point of the Mojave River is Soda Lake near Baker (LRWQCB, 2019).

The BIG footprint is approximately 5,000 acres. The existing drainage pattern for the BIG footprint and the general area is characterized by sheet flow, shallow concentrated flow, and open channel flow.² Under existing conditions, the BIG footprint naturally drains from the southeast to the northwest towards the Mojave River.

Existing Conditions over Footprint. The 2016 National Land Cover Database and aerial photography was used to assess the impervious area and land cover under the existing conditions. The land cover data was evaluated for BIG's footprint. The existing land cover within BIG footprint consists primarily of shrubs and unpaved access roads as identified in **Table 5.10-5: Existing Conditions – Impervious Area Assumptions**.

² Sheet flow is overland storm runoff that is a thin, even layer, not yet concentrated in a channel. Sheet flows typically only can last for a maximum of 300 feet before it turns into shallow concentrated flows. Shallow concentrated flows occur in swales that occur due to topography, at small and large scales. Open channel flow is the flow of water in natural streams and manmade channels that are not underground. Refer to USDA TR-55.

Table 5.10-5: Existing Conditions – Impervious Area Assumptions	
Land Cover	Impervious Percent
Shrub	0%
Asphalt Roadway	90%
Unpaved Roadway	0%
Mainline Track	70%

Lenwood Channel. Lenwood Channel is a relatively straight, levied channel, maintained by the San Bernardino County Flood Control District (SBCFCD). The main channel is trapezoidal with an average bottom width of 25 feet and depths ranging between 6 and 10 feet. The existing railroad bridge spanning Lenwood Channel at milepost (MP) 6.5 consists of a 4-span, 118-foot-long ballast deck prestressed concrete bridge. The bridge is supported by standard H-pile bents with concrete caps, aligned with flow and skewed to the track alignment. Lenwood Channel has a mapped FEMA floodplain (without floodway) that is wide, extending from approximately MP 4.0 to MP 7.1. The model received from FEMA consists of HEC-2 code and does not directly simulate the interconnected overflow structures (MP 7.0, MP 5.1, and MP 4.9) with the main channel at MP 6.5 and therefore is not well suited to evaluate the cumulative impacts for Lenwood Channel. Due to the floodplain complexity and interconnected nature of the structures, a 2-dimensional hydraulic model was created using SRH-2D software. SRH-2D software is well suited for scenarios with complex floodplains, flow diversion, multiple channel systems, and interconnected hydraulic structures. The 2-dimensional hydraulic model was developed based on available data, including a project survey supplemented with 2013 LiDAR obtained from the SBCFCD. Surface-water Modeling System version 13.0 software by Aquaveo was utilized to generate output data for the SRH-2D software.

Mojave River at Hinkley Road. Hinkley Road crosses the Mojave River just west of the BIG footprint. This reach of the Mojave River is designated by FEMA as a Zone D area. Zone D signifies areas where there are possible but undetermined flood hazards. No hydraulic models were available for this area from FEMA. San Bernardino County has indicated that the Hinkley Road bridge over the Mojave River has experienced structural issues in the past. The roadway approaches on both sides act as overflow banks during moderate flood events. The Mojave River channel beneath the existing bridge is approximately 120 feet wide. The Hinkley Road Bridge has an estimated less than ten-year remaining lifespan. This is due in part to the roadway northwest of the Hinkley Road Bridge having a lower elevation than at the bridge. In addition, the roadway northwest of the bridge is on grade and has no raised roadway embankment, so any overbank flow goes over the roadway. The existing Mojave River floodplain extends approximately 1,200 feet northwest of the bridge (measured along the road).

Unnamed Tributary to Mojave River at Milepost 10.9. Bridge 10.9 is located over an unnamed tributary to the Mojave River in a FEMA designated Zone D area. Zone D signifies areas where there are possible but undetermined flood hazards. No hydraulic models were available for this area from FEMA. The main channel near the BNSF mainline is trapezoidal with an average bottom width of 30 feet and depths ranging from 4 to 7 feet. The existing railroad bridge consists of a 4-span ballast deck prestressed concrete bridge approximately 114 feet long with vertical concrete spill slope abutments. Runoff from the basin flows over Main Street as shallow concentrated flow and that becomes well defined between Main Street and BNSF's

mainline track. A manmade berm channelizes flow and directs it more efficiently to the bridge at MP 10.9. During large flood events this berm is inundated and flow bypasses toward the mainline, these flows overtop the tracks near MP 10.7 where no hydraulic structure is present. The channel upstream of Main Street consists of shallow flow with multiple small channels draining high relief topography. A portion of the flow diverts to the south, by both overland flow and flow down Main Street, to BNSF Culvert 11.3.

Surface Water Quality

Existing Surface Water Quality. This section identifies existing water quality within the surface water study area that may be affected by BIG implementation. BIG is in a largely rural setting, with agricultural land uses within the BIG footprint and near the southern limit and commercial and residential land uses within the BIG footprint and near the northern limit in Barstow. Pollutant sources in BIG surface water study area include the following:

- Agricultural uses
- Runoff from parking lots and streets
- Existing development's operations
- Exposed earth at construction sites
- Petroleum-based vehicles on railroads, such as locomotives and maintenance vehicles

Additionally, the existing BNSF railroad corridor traverses the surface water study area. Diesel-fueled trains braking on the railroad release brake dust, which consists of fine metal particulates—primarily iron and zinc—but may also include copper, silicon, calcium, manganese, chromium, and barium. Brake dust from existing train operation consists primarily of particulate metals and some of these particulates could become dissolved in stormwater, increasing its ability to be transported through the region. Brake dust is generally found in locations where trains reduce travel speed, such as approaches to existing stations, turns, and elevation changes. This would occur on the BIG footprint on the far northern portions where trains would be slowing as they pass through the City, and on the far southern portions where smaller turn radii on the existing rail lines exist. Once dissolved in stormwater, some metals can be mobilized to a storm drain or waterbody or infiltrate into the ground. Transport of heavy metals can occur without the metals dissolving into solution and can be caused by flows that are fast enough to physically move larger, more dense particulates. Braking that occurs where the existing rail crosses a waterbody, such as the Lenwood Channel on the northern portion of the BIG footprint or other crossings on the southern portion of the BIG footprint, can lead to brake dust being directly discharged into the waterbody.

The BIG footprint is within jurisdiction of the LRWQCB and its Basin Plan. The Basin Plan has identified the beneficial uses, applicable TMDL, and § 303(d) listings, which were previously discussed in **Section 5.10.4: Environmental Setting**.

Groundwater

Main Subbasin. The BIG groundwater study area is in the Middle Mojave River Valley Groundwater Basin (No. 6-041) (Groundwater Basin). The Groundwater Basin is approximately 211,321 acres, of which, approximately 206,613 acres (97.77 percent) are adjudicated.

The Mojave River is unreliable for direct water supply along its 100-mile reach except for a short reach of perennial flow and periods of flow after intense storm events (USGS, 2001). Average precipitation varies across the Groundwater Basin from 4 to 11 inches with the average near 6 inches.

CWP Policy Map IU-2: Groundwater Basins depicts County areas with SGMA very low, low, medium, and high Groundwater Basin Prioritization. Map IU-2 indicates BIG is located within an area of the County that has a “Very Low” priority. Additionally, the map depicts BIG as part of an adjudicated basin.

Existing Groundwater Quality. Natural recharge of the Groundwater Basin occurs from precipitation, streamflow, and Mojave River surface and subsurface flows. Human-influenced recharge includes percolation of wastewater and septic tank effluent, as well as irrigation water infiltration. The MWA estimated the 1997 to 1998 water year recharge totaled 45,000 acre-feet.

Volatile organic compounds, salts, and nitrates have leached into the local groundwater from the Lenwood Landfill. The local Groundwater Basin may also be affected by irrigation with effluent from the Barstow Wastewater Treatment Plant, along with naturally occurring nitrates and salt. Exceedance of TMDL for nitrate near the Community of Hodge and fluoride near the Community of Lenwood have been detected during readings.

Existing Groundwater Levels. Because the Groundwater Basin is over drafted from long-term groundwater production, efforts to manage water levels in the Basin were initiated in the 1990s. Basin groundwater levels are monitored by the USGS.

Data from the USGS provides current information on groundwater depths below the ground surface. The available data indicates depth to groundwater generally deepens to the northeast toward Lenwood Road at the BIG footprint’s eastern extent. **Table 5.10-6: USGS National Water Information System Groundwater Data – BIG** and **Figure 5.10-9: USGS NWIS Groundwater Well Locations - BIG** provide information regarding depths to groundwater within BIG.

Floodplains

CWP Policy Map IU-4: Regional Flood Control Facilities depicts County channels, basins, dams, and Flood Control District Zones. This map shows that BIG would be within the boundaries of Flood Control District 4. The Flood Control District is managed by the county Public Works Department. Flood Control District 4 consists of 1,783 square miles and includes the Mojave River Valley from the San Bernardino Mountains to Silver Lakes. This includes the cities/towns of Adelanto, Apple Valley, Barstow, Hesperia, and Victorville and all or portions of the communities of Baker, Baldy Mesa, Daggett, Desert Knolls, El Mirage, Helendale, Hinkley, Hodge, Lenwood, Oro Grande, Phelan, Pinon Hills, Silver Lakes, Spring Valley Lake, Wrightwood, and Yermo. Additionally, the BIG footprint is included on FEMA FIRM Panels 06071C4507H and 06071C4526H (August 28, 2022). These maps identify the BIG footprint existing within Zones AO, AE, and D.

- Zone AO is defined by FEMA as a river or stream flood hazard areas, and areas with a 1 percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage.

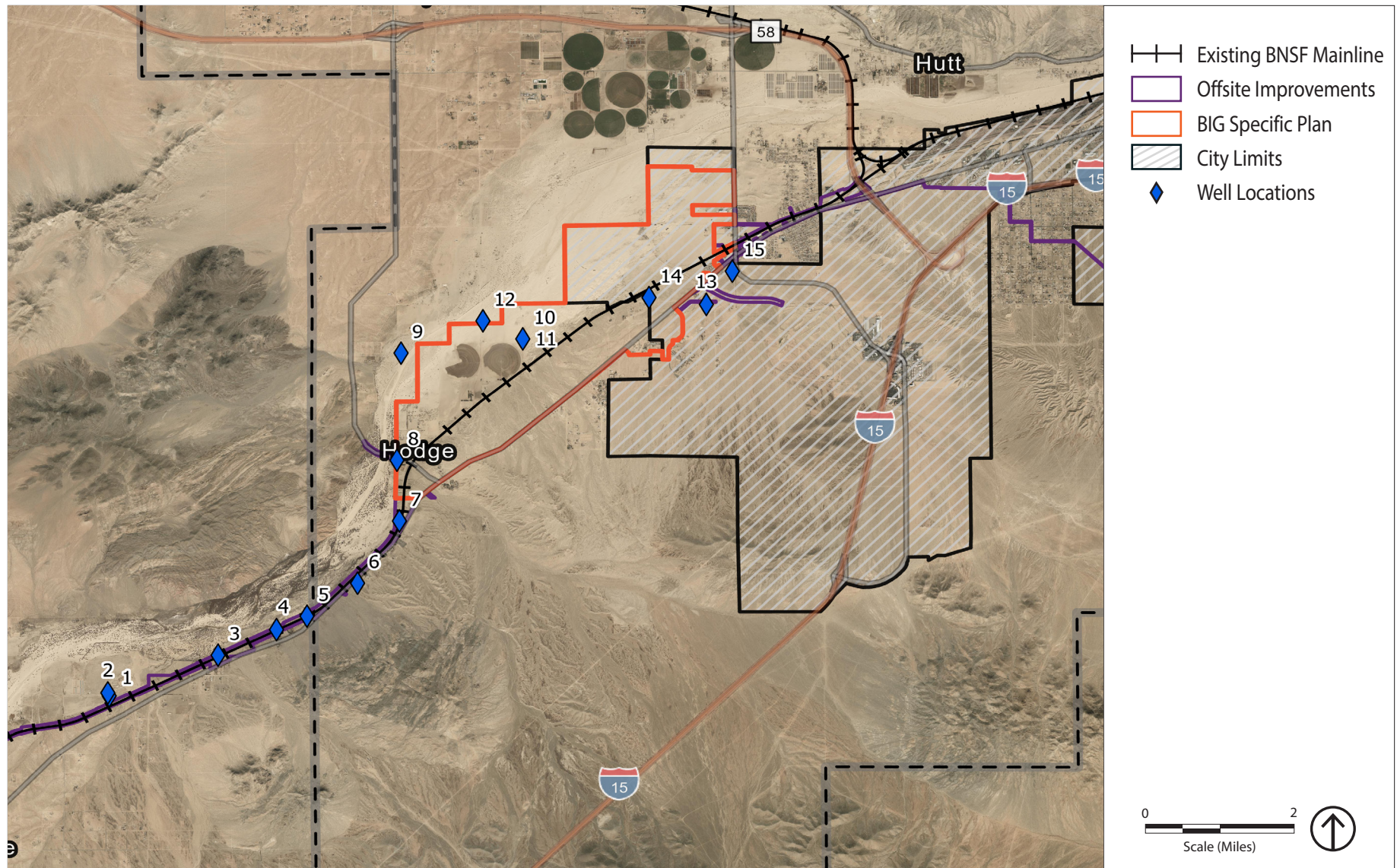
- Zone AE is defined by FEMA as the base floodplain where base flood elevations are provided on the FIRM.
- Zone D is defined by FEMA as an area with possible but undetermined flood hazards. No flood hazard analysis has been conducted for these areas.

The existing BNSF alignment parallels a bank of the Mojave River near Barstow through a Zone D floodplain (see **Figure 5.10-5: FEMA Flood Zones - BIG**). This figure identified floodplains located within the Flood Hazard and Groundwater Discharge Study Areas. Zone D is defined in the Flood Insurance Study as the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible. Hydraulic analyses were not performed for this area as part of the Flood Insurance Study; therefore, base flood elevations were not identified.

Lenwood Channel crosses the floodplain study area at the northeastern extent of the BIG footprint. Lenwood Channel at the location of the crossing is designated as a Zone AE flood zone without a defined floodway. Zone AE is defined in the Flood Insurance Study as an area that corresponds to the one percent annual chance floodplain determined using detailed methods. The FIRMs applicable to this area are included in **Appendix 5.10 BIG-1 – Appendix A**. Flood zone areas are shown in **Figure 5.10-1**.

Table 5.10-6: USGS National Water Information System Groundwater Data – BIG

Well No.	Site Number	Earliest Measurement	Latest Measurement	Depth to GW (ft)	Historic Range of Depths (ft)		Mean Depth (ft)	No. of Measurements
					Shallowest	Deepest		
1	344726117145501	5/25/2021	5/25/2021	18.38	18.38	18.38	18.38	1
2	344728117145601	4/3/1931	5/15/2023	11.09	7.16	40.28	15.75	213
3	344753117133301	4/21/1998	3/17/2023	21.4	19.73	25.37	22.08	10
4	344810117124901	4/21/1998	3/17/2023	11.66	10.44	15.06	12.29	10
5	344819117122601	4/21/1998	3/17/2023	12.08	10.31	14.88	12.25	9
6	344841117115101	5/29/1958	3/16/2023	29.55	28.4	32.37	30.11	7
7	344923117111601	4/21/1998	3/14/2023	8.77	3.58	11.06	7.95	9
8	345004117112001	3/30/2004	10/18/2023	19.89	15.28	32.22	26.23	47
9	345116117111601	7/1/2009	1/13/2023	72.9	2.46	72.9	51.47	54
10 ¹	345124117094301	12/6/1994	6/3/2021	88.17	39.37	88.17	59.44	318
11 ¹	345124117094302	12/6/1994	6/1/2021	47.9	28.49	78.37	49.55	317
12	345136117101201	7/8/1997	1/13/2023	86.84	10.89	86.84	51.94	281
13	345148117072401	10/22/1958	3/17/2023	119.03	78.4	119.03	108.68	11
14	345153117080701	4/20/1954	5/25/2023	110.31	60.6	110.31	89.89	109
15	345210117070701	3/18/2010	3/14/2023	123.32	106.34	123.32	112.47	7
Note: The depth to groundwater data provided is from the most recent measurement, at the time of data collection (October 2023).								
1 - Well sites 10 and 11 are physically the same well, however, there are two sensors within the well which provide separate readings.								
Source: U.S. Geological Survey. ND. <i>National Water Information System: USGS Groundwater Data for the Nation</i> . https://waterdata.uspndgs.gov/nwis/gw .								



Sources: County of San Bernardino, Y2023_PUA_Cache [aerial imagery], 2023.; County of San Bernardino, Cities and Towns [Data set], 2022.; County of San Bernardino, City Spheres of Influence [Data set], 2022.; United States Geological Survey, National Water Information System: Map View [Data set], ND.

Figure 5.10-9
USGS NWIS Groundwater Well Locations - BIG

Dam Inundation

The Mojave River Dam is in the San Bernardino Mountains, approximately 32 miles upstream of the BIG footprint. In 2019, the USACE performed a periodic assessment and found that during an extreme flood event, water could exceed the design capacity of the dam and overtop it. This could potentially result in dam failure, flooding the communities of Hesperia, Apple Valley, Victorville, Barstow, and BIG, adjacent to the Mojave River. As a result, the USACE changed the dam's risk characterization from low to high hazard. A high hazard potential dam is a dam whose failure or misoperation would cause loss of human life and significant property destruction. The USACE is evaluating interim risk-reducing measures; see **Appendix 5.10 BIG-1**.

Cedar Springs Dam is approximately 34 miles upstream of the BIG footprint. BIG is within the inundation boundary for the Cedar Springs Dam. Cedar Springs Dam is a high hazard potential dam constructed in 1971. The dam is an earth and rockfill type dam. Should dam failure occur, flooding of the communities of Hesperia, Victorville, Apple Valley, Barstow, and other communities adjacent to the Mojave River may occur; see **Appendix 5.10 BIG-1**.

New Lake Arrowhead Dam is approximately 52 miles upstream of the BIG footprint. BIG is within the inundation boundary for the New Lake Arrowhead Dam. The New Lake Arrowhead Dam is a high hazard potential dam constructed in 1976. The dam is an earthen dam. Should dam failure occur, flooding of the communities of Hesperia, Victorville, Apple Valley, Barstow, and other communities adjacent to the Mojave River may occur; see **Appendix 5.10 BIG-1**.

Figure 5.10-10: Dam Inundation Zones (A) – BIG

and **Figure 5.10-11: Dam Inundation Zones (B) - BIG** depicts the BIG footprint and areas which are in the dam inundation areas for the above-mentioned dams. CWP Policy Map HZ-3: Dams & Basin Hazards depicts the County's dam inundation areas, dam jurisdiction areas, and dams with low, significant, and high hazard potential. The map depicts BIG being within a dam inundation area of the Cedar Springs, Mojave River, and the New Lake Arrowhead dams; see **Appendix 5.10 BIG-1**.

5.10.5 IMPACT THRESHOLDS AND SIGNIFICANCE CRITERIA

State CEQA Guidelines **Appendix G: Environmental Checklist Form** includes questions concerning hydrology and water quality resources. The issues presented in the Environmental Checklist Form have been used as thresholds of significance in this section. Accordingly, the Project would have a significant effect on the environment if it would:

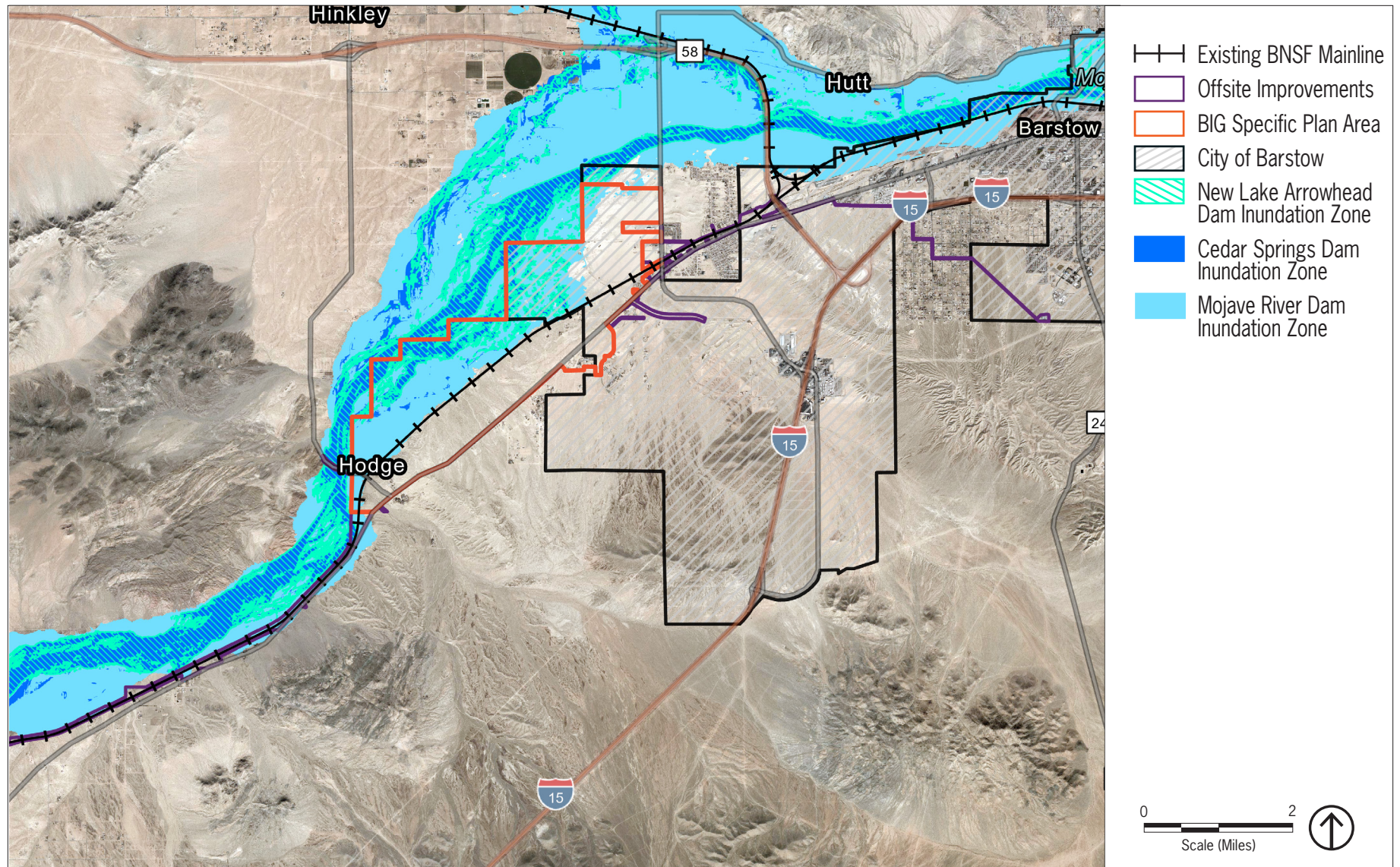
- **Impact 5.10-1:** Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.
- **Impact 5.10-2:** Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin.

- **Impact 5.10-3:** Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on- or off-site.
- **Impact 5.10-4:** Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.
- **Impact 5.10-5:** Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- **Impact 5.10-6:** Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would impede or redirect flood flows.
- **Impact 5.10-7:** In flood hazard, tsunami, or seiche zones, would the Project risk of release of pollutants due to Project inundation.
- **Impact 5.10-8:** Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.



Sources: County of San Bernardino, Y2023_PUA_Cache [aerial imagery], 2023.; County of San Bernardino, Cities and Towns [Data set], 2022.; County of San Bernardino, City Spheres of Influence [Data set], 2022.; California Department of Water Resources Division of Safety of Dams, Dam Breach Inundation Maps [Data set], 2023.; United States Army Corps of Engineers, National Inventory of Dams [Data set], ND.

Figure 5.10-10
Dam Inundation Zones (A) - BIG



Sources: County of San Bernardino, Y2023_PUA_Cache [aerial imagery], 2023.; County of San Bernardino, Cities and Towns [Data set], 2022.; County of San Bernardino, City Spheres of Influence [Data set], 2022.; California Department of Water Resources Division of Safety of Dams, Dam Breach Inundation Maps [Data set], 2023.

Figure 5.10-11
Dam Inundation Zones (B) - BIG

5.10.6 PROJECT IMPACTS AND MITIGATION MEASURES

Applicable Proposed General Plan Policies

The proposed General Plan goals and policies relevant to hydrology and water quality are listed below.

Open Space and Conservation Element

- **Policy OSC-1.4 Floodplain park planning.** Coordinate with public and private entities to design and use land in the 100-year and 500-year floodplain to serve as either active public park or passive public recreation spaces.
- **Policy OSC-4.1 Sustainable water supply.** Collaborate with the state, regional water quality control boards, watermasters, water purveyors, military, and other entities to ensure a safe and sustainable supply of drinking water.
- **Policy OSC-4.2 Groundwater management.** Collaborate with the Mojave Water Agency to ensure the sustainable management of groundwater basins.
- **Policy OSC-4.3 Groundwater recharge.** Encourage new development to install stormwater management facilities that facilitate groundwater recharge, particularly for properties in proximity to the Mojave River.
- **Policy OSC-4.4 Stormwater and urban runoff.** Require site design and operational procedures that reduce, treat, and capture stormwater and urban runoff comply with state and federal requirements to protect groundwater and the natural environment.
- **Policy OSC-4.5 Natural Features.** Encourage the use of existing natural features to serve as stormwater management and groundwater recharge facilities, particularly when the retention of such features would create meaningful open space for people, high-value habitat, and/or protected wildlife.
- **Policy OSC-4.6 Military coordination on water supply and quality.** Collaborate with the military to prevent groundwater contamination and stormwater runoff both from and onto military facilities. Coordinate long-term planning efforts to avoid or minimize impacts on military training and operations from inadequate groundwater supply.

Public Facilities and Services Element

- **Policy PFS-1.7 Flood control.** Maintain the local storm drain system to convey a 100-year storm and collaborate with the San Bernardino County Flood Control District and other state and federal agencies to maintain regional flood-control infrastructure to minimize flood damage.

Housing Element

- **Policy H-2.3** Pursue removal of abandoned substandard housing in flood-prone areas and limit and discourage housing development in areas subject to significant geologic, flooding, blow sand, noise, and fire hazards.

Safety Element

- **Policy S-1.1 Hazard planning.** Regularly update and incorporate by reference into the General Plan a Local Hazard Mitigation Plan and participate in regional and statewide emergency preparation efforts.

- **Policy S-1.2 Mutual aid.** Maintain mutual aid agreements with the County, MCLB, and Ft. Irwin fire departments to maximize the ability to respond to emergencies in Barstow and surrounding communities.
- **Policy S-1.3 Building design and location.** Require new development to design and build in accordance with current standards for seismic, landslide, fire, and flood safety. Encourage building designs and locations that reduce exposure of structures and occupants to natural hazards, including windblown sand, and enable occupants to shelter in place during disasters.
- **Policy S-1.4 Utility hardening.** Coordinate with service providers to ensure that new utilities are designed to accommodate ground settlement and to be resilient to risks associated with flood, high wind, blow sand, seismic, and fire events. Encourage retrofitting of existing utilities to improve resilience and ensure that utilities remain operational during emergencies.
- **Policy S-1.6 Critical facilities in flood and earthquake zones.** Prohibit the construction of new critical facilities and hazardous materials uses within mapped 100- or 200-year flood zones and Alquist-Priolo Fault Zones, unless a proposed location is otherwise necessary and alternative locations are infeasible. If new critical facilities must be constructed in these areas, require that they be designed to include structural and site design elements that go beyond current building code requirements that further harden the facilities/uses against flooding and seismic events.
- **Policy S-1.7 New development in flood zones.** Discourage new development in mapped 100-year flood zones unless proposed development incorporates floodproofing construction materials, techniques, and/or site designs. Encourage new development to employ site designs that elevate buildings out of mapped 200-year flood zones.
- **Policy S-1.8 Existing development in flood zones.** Encourage existing development in mapped 100-, 200-, and 500-year flood zones to implement retrofits that harden structures against flood damage through appropriate construction materials, techniques, and/or site designs.
- **Policy S-1.9. Flood zone mapping.** Require new development projects that are within 500 feet of a mapped 100-year flood zone and involve the subdivision of land to confirm or map new 100-year and 200-year flood zones for the proposed project area and surrounding 500 feet. This requirement shall also apply to new development east of Higgins Road and south of Rimrock Road.
- **Policy S-2.1 Resilient public facilities.** Require new critical and public facilities to be located and designed to operate during, minimize their exposure to, and susceptibility to damage from flooding, seismic and geological effects, and urban fires. Retrofit existing City facilities and encourage existing private facilities to be retrofitted to remain operational during an emergency.
- **Policy S-2.2 Emergency response operations plan.** Maintain and implement a comprehensive Emergency Operations Plan to ensure quick and effective response to natural and human-caused disasters and hazards, disasters, and other emergency situations.
- **Policy S-2.3 Cooperative hazard management and recovery.** Coordinate with community organizations and local, state, and federal agencies to reduce, manage, and respond to natural and human-generated hazards in order to reestablish and expedite public services, assist affected residents and businesses, and accelerate the short- and long-term recovery process after hazard events or emergency conditions.

- **Policy S-2.4 Community emergency preparation.** Engage the community in emergency planning through working with local community-based organizations, health care providers, and contractors to expand education about natural hazard preparation, emergency response, and recovery resources. Provide educational materials that reflect Barstow’s language diversity and in formats that are accessible to all community members.
- **Policy S-2.5 Emergency access and evacuation.** Require that new development have at least two ingress and egress routes that are designed to provide unencumbered access for emergency vehicles and remain accessible and functional in the event of a natural hazard event or emergency.
- **Policy S-2.6 Hazards and evacuation planning.** Incorporate information about flood, landslide, subsidence, and liquefaction hazard areas, and risks associated with cargo spills into local evacuation planning and identify potential alternative routes should key evacuation routes be blocked or damaged by these hazards.
- **Policy S-3.1 Hazardous materials siting.** Prohibit the development of new hazardous waste facilities within the mapped 100-, 200-, and 500-year flood hazard areas and Alquist-Priolo Fault Zones. Require uses within mapped 100- and 200-year floodplains that produce, contain, or store hazardous materials to employ building and site design features that go beyond current building code requirements that further harden the facilities/uses against flooding and seismic events.

Circulation and Mobility Element

- **Policy CM-1.7 Bridges and rail crossings.** Coordinate with regional, state, and federal agencies as well as BSNF to provide and maintain multiple options for vehicles to safely cross the Mojave River and railway facilities, even during 100-year flooding and seismic events.

Impact 5.10-1 *Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?*

Proposed General Plan

Construction

Urban runoff from storms or nuisance flows (runoff during dry periods such as from sprinklers or spills) from development projects can carry pollutants to receiving waters. Runoff can contain pollutants such as oil, fertilizers, pesticides, trash, soil, and animal waste. This runoff can flow directly into local streams or lakes or into storm drains and continue through pipes until it is released untreated into a local waterway and eventually the ocean. Untreated stormwater runoff degrades water quality in surface waters and groundwater and can affect drinking water, human health, and plant and animal habitats, if left unmitigated and unregulated.

Clearing, grading, excavation, and construction activities associated with future development under the proposed General Plan could impact water quality due to erosion of exposed soils and subsequent deposition of particulates in local drainages. Grading activities lead to exposed areas of loose soil and sediment stockpiles that are susceptible to uncontrolled sheet flow. Although erosion occurs naturally in

the environment, primarily from weathering by water and wind action, improperly managed construction activities can lead to accelerated rates of erosion that are considered detrimental to the environment.

Compliance with both State and local regulations would effectively mitigate construction stormwater runoff impacts from future development. Chapter 15.14, Stormwater and Urban Runoff Pollution Control, of the Barstow Code is intended to protect and enhance the quality of watercourses, water bodies, and wetlands within the City consistent with the CWA, California Porter-Cologne Water Quality Control Act, and Municipal NPDES Permit. Chapter 15.14 of the Barstow Code ensures optimal water quality by reducing pollutants in stormwater discharges to the maximum extent practicable, regulating illicit connections and illicit discharges and thereby reducing the level of contamination of stormwater and dry weather runoff into the MS4, and regulating non-stormwater discharges to the MS4. Projects in the SOI would be subject to the City's regulations upon incorporation.

Additionally, development of projects with one acre or greater of soil disturbance are required to comply with the Statewide Construction General Permit, associated local NPDES regulations to ensure that the potential for soil erosion is minimized on a project-by-project basis, and is subject to oversight by the Lahontan Regional Water Quality Control Board.

Construction sites would be required to prepare and implement SWPPPs in accordance with the site-specific risk analyses based on the grading plans. The SWPPP must describe structural and non-structural construction BMPs that address pollutant source reduction and provide measures/controls to mitigate potential pollutant sources. These include, but are not limited to:

- **Erosion controls and wind erosion controls.** Cover and/or bind soil surface to prevent soil particles from being detached and transported by water or wind. Erosion control BMPs include mulch, soil binders, and mats.
- **Sediment controls.** Filter out soil particles that have been detached and transported in water. Sediment control BMPs include barriers, and cleaning measures such as street sweeping.
- **Tracking controls.** Tracking control BMPs minimize the tracking of soil off-site by vehicles—for instance, by stabilizing construction roadways and entrances/exits.
- **Non-stormwater management.** Prohibit discharge of materials other than stormwater, such as discharges from the cleaning, maintenance, and fueling of vehicles and equipment. Non-stormwater management BMPs also prescribe conducting various construction operations, including paving, grinding, and concrete curing and finishing, in ways that minimize non-stormwater discharges and contamination of any such discharges.
- **Materials and waste management.** Materials and waste management BMPs include spill prevention and control, stockpile management, and management of solid wastes and hazardous wastes.

Implementation of BMPs, as well as compliance with local, State, and federal regulations would ensure that construction impacts associated with future development under the proposed General Plan would not substantially impact water quality. Therefore, impacts would be less than significant.

Operations

Development consistent with the General Plan may result in long-term impacts to the quality of stormwater and urban runoff, subsequently impacting downstream water quality. Development pursuant to the proposed General Plan could potentially create new sources for runoff contamination. Consequently, future development has the potential to increase the post-construction pollutant loadings of certain constituent pollutants associated with the proposed land uses and their associated features, such as landscaping and parking areas.

To help prevent long-term impacts, development would be required to comply with Barstow Code Chapter 15.14, Stormwater and Urban Runoff Pollution Control, which is intended to ensure water quality of receiving waters are healthy by reducing pollutants in stormwater discharges to the maximum extent practicable, regulating illicit connections and discharges and thereby reducing the level of contamination of stormwater and dry weather runoff into the MS4s. This chapter also seeks to protect water quality by ensuring compliance with the CWA, California Porter-Cologne Water Quality Control Act, and the Municipal NPDES Permit which would ensure optimal water quality by reducing pollutants in stormwater discharges to the maximum extent practicable, regulating illicit connections and illicit discharges and thereby reducing the level of contamination of stormwater and dry weather runoff into the MS4, and regulating non-stormwater discharges to the MS4. Additionally, the BMPs, LIDs, and water quality treatment solutions prescribed in future project-specific WQMPs would be designed to support or enhance the regional BMPs and efforts implemented by the City as part of its effort to improve water quality.

In accordance with the MS4 permit, the LID hierarchy requires new projects to first infiltrate, then harvest and reuse, then biofilter stormwater runoff from a project site. In areas where infiltration is determined infeasible, either through infiltration testing or groundwater concerns, harvest and reuse BMPs may prove feasible for projects that incorporate ample landscaping and/or have high indoor toilet flushing demands (e.g., hotels). For areas that cannot infiltrate or utilize harvest and reuse systems, projects may be able to biofilter stormwater through biofiltration BMPs such as vegetated swales and bioretention basins.

As part of the statewide mandate to reduce trash in receiving waters, the City is required to adhere to the requirements of the amended trash TMDL. The City meets these requirements through stringent trash mitigation measures, which include street sweeping, public awareness and inclusion in community clean-up activities, Public Works Department inspection, and abatement at outfalls.

New industrial uses (manufacturing and processing) are also required to file a General Industrial Permit with the State and prepare a SWPPP that addresses operational features to control stormwater pollutants and monitoring and reporting requirements.

With the implementation of federal, State, and local regulations, operational impacts associated with future development would not violate any water quality standards or waste discharge requirements, and impacts would be less than significant.

Impact 5.10-1: General Plan: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-1: General Plan: Mitigation Measures: No mitigation required.

Impact 5.10-1: General Plan: Level of Significance After Mitigation: No significant impact would occur.

Barstow International Gateway

Due to the nature of BIG, associated pollutant generation would consist primarily of sediment with other potential contaminants including heavy metals, organic compounds, trash and debris, oxygen demanding substances, and oil and grease from operation and processing equipment/activities. BIG would be subject to applicable NPDES water quality requirements of the CGP and the RWQCB Basin Plan. Conformance with these requirements would involve the use of appropriate BMPs during and after construction to address potential impacts associated with the described contaminants as outlined above. Additionally, the vehicle maintenance and vehicle cleaning areas of operation would be covered under the IGP.

Construction

BIG construction is anticipated to occur over approximately 34 months and would involve civil and site work, bridge and box culvert construction, intermodal infrastructure construction, solar farm construction, shoofly track construction to allow for continued operation of existing rail track, track and signal construction, off-site infrastructure construction, and road reconstruction; see **Section 3.0: Project Description** for more information about project construction activities and phasing.

BIG's construction-related activities would include demolition, excavation, grading/earth moving, and trenching, which would displace soils and temporarily increase the potential for soils to violate water quality standards or waste discharge requirements. Any exposed and stockpiled soils could be subject to wind and water erosion, and conveyance into nearby storm drains. On-site water activities for dust suppression could contribute to pollutant loading in runoff from the site. Additionally, BIG construction activities, such as construction equipment maintenance/operation and handling/storage/disposal of materials could contribute to pollutant loading in stormwater runoff from the construction site.

Construction controls to minimize potential water quality impacts would be implemented through compliance with the existing regulatory framework, including the CGP via the NPDES. BIG components not annexed to the City (i.e., remaining in the County) would be subject to County Code Title 3, Division 5, Chapter 1, Pollutant Discharge Elimination System Regulations, and areas to be annexed into the City would be subject to Barstow Code Chapter 15.14, Stormwater and Urban Pollution Control. These regulations provide guidance for construction operations and establish requirements to implement on-site BMPs that reduce contamination to surface waters by filtering and settling pollutants and by reducing erosion.

In accordance with NPDES requirements, BIG is required to obtain coverage under the CGP as it would disturb more than one acre of soil. To obtain coverage under the CGP, the BIG Applicant (Master Developer and/or Site Developer, as applicable) would be required to file with the State Water Board the Permit Registration Documents, which include a Notice of Intent (NOI) and other compliance-related documents. The CGP requires development (by a Qualified SWPPP Developer [QSD]) and implementation of a SWPPP and monitoring plan. These must include erosion-control and sediment-control BMPs that would meet or exceed measures required by the CGP to control potential construction-related pollutants. Erosion-control BMPs are designed to prevent erosion, whereas sediment control BMPs are designed to trap sediment once it has been mobilized. During normal construction operations, the SWPPP and

monitoring plan are enforced and inspected by a QSP to ensure that adequate protections are in place and maintained throughout construction.

The types of required BMPs would be based on the amount of soil disturbed, the types of pollutants used or stored at the construction site, and proximity to water bodies. The following structural BMPs would be implemented during construction to mitigate water quality degradation. Additional details pertaining to each of the structural BMPs is identified in **Appendix 5.10 BIG-1**.

- Silt fence
- Fiber rolls
- Gravel bag berm
- Sandbag barrier
- Tracking controls
- Storm drain/inlet protection
- Sediment basin
- Sediment trap
- Stockpile management
- Check dam
- Diversion berms and drainage swales
- Velocity dissipation devices

The following non-structural BMPs would be used during construction to mitigate water quality degradation. These BMPs would be incorporated into construction site operations and mostly consist of preventative measures that reduce the potential for harmful water quality impacts.

- Scheduling
- Material delivery and storage
- Material use
- Spill control
- Solid waste management
- Hazardous materials/waste management
- Contaminated soil management
- Sanitary/septic waste management
- Liquid waste/drilling fluid management
- Dewatering operations
- Paving operations
- Vehicle and equipment washing
- Vehicle and equipment fueling
- Concrete waste management
- Temporary stream crossing
- Preservation of existing vegetation
- Hydraulic mulch
- Hydroseeding
- Soil binders
- Straw mulch
- Geotextiles
- Dust control
- Soil preparation
- Street/parking lot sweeping

BIG components not annexed to the City (i.e., remaining in the County) would be subject to County Code Title 3, Division 5, Chapter 1, Pollutant Discharge Elimination System Regulations, which provides guidance for construction operations and establishes requirements to implement BMPs that reduce contamination to surface waters by filtering and settling pollutants and by reducing erosion. BIG components within City limits (existing and proposed annexation) would be subject to Barstow Code Chapter 15.14, Stormwater

and Urban Pollution Control, which protects and enhances the quality of receiving waters in a manner pursuant to and consistent with applicable federal, State, and local laws, regulations, and permits.

Additionally, construction would be required in areas which are jurisdictional to the USACE pursuant to § 404 of the CWA and the RWQCB pursuant to § 401 of the CWA. BIG's impacts to these jurisdictional features and measures to be implemented to manage these impacts are discussed in **Section 5.4: Biological Resources**. Further, should dewatering be required, BIG would be required to comply with the SWRCB General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality (Low-Threat Discharge General Permit).

Following compliance with the established regulatory framework, which includes compliance with NPDES and CGP requirements (i.e., implementation of a SWPPP with BMPs as required for construction or demolition activities resulting in land disturbance of equal to or greater than one acre), and includes compliance with County Code and Barstow Code requirements, BIG construction would not violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality during construction. Therefore, a less than significant impact would occur, and no mitigation is required.

Operations

BIG operations would involve the operation of a rail yard, new mainlines, an intermodal facility, a block swap yard, a solar farm, and other appurtenant uses. During normal operations of these uses there may be materials, fluids, or other pollutants which may be captured within stormwater runoff and transferred into surface water reaches.

Stormwater pollutants that would be produced during BIG operations would consist primarily of sediment with other potential contaminants including heavy metals, organic compounds, such as polycyclic aromatic hydrocarbons (PAHs) from diesel combustion and petroleum hydrocarbons from grease, trash and debris, oxygen demanding substances, and petroleum hydrocarbons, such as oil and grease from operation and processing equipment/activities and petroleum-based vehicles. New potential sources of pollutants may be introduced in the footprint for BIG through the addition of locomotives, railcars, and parked vehicles.

Brake dust would be generated by rail braking in the BIG footprint which would result in heavy metals being introduced to the BIG footprint and surrounding area. The amount of brake dust generated by BIG would be a function of the amount of train/locomotive braking activity that would occur within the BIG footprint. However, it is important to note that all environmental site assessments completed within the BIG footprint did not find groundwater or surface water contamination despite existing rail activity; refer to **Section 5.9: Hazards, Hazardous Materials, and Wildfire** of this EIR. Additional impervious surfaces could lead to runoff of these pollutants into the surrounding environment, including waterbodies in the vicinity, specifically the Mojave River. The Mojave River is the primary source for the natural recharge of approximately 57,349 acre-feet per year (AFY) of water into the Mojave Groundwater Basin, allowing it to be a vector for pollutants to enter the groundwater basin. However, a majority of the total recharge occurs near the San Bernardino Mountains, where precipitation is more common (MWA, 2023a).

Soils within the BIG footprint and throughout the basin are characterized as coarse-grained soils such as sands, gravels, and alluvial deposits. Coarse-grained soils have low sorption rates and are excessively drained soils that allow for high rates of infiltration. Additionally, the Mojave Groundwater Basin is characterized as an unconfined aquifer, where the water table is at atmospheric pressure and not constrained by a confining layer such as bedrock or dense clay soils. Runoff from the BIG footprint during operations would sheet-flow across the BIG footprint prior to interception by constructed and permanent BMPs. A location within the BIG footprint that would allow for a significant amount of sheet-flow would be the rail yard component where a high volume of trains would be breaking and utilizing diesel engines for power. As a result, contaminants such as brake dust from rail breaking, PAHs from diesel exhaust, and other typical contaminants produced as a result of BIG operation would have a pathway into existing groundwater. As previously noted in **Table 5.10-6: USGS National Water Information System Groundwater Data – BIG**, the depth to groundwater within the BIG footprint ranges between 8 and 123 feet below ground surface.

The presence and use of petroleum-based vehicles, such as locomotives, maintenance vehicles, and heavy-duty trucks, would also increase the potential for associated hydrocarbon contaminants to occur on the site. BIG would construct hazardous waste pits, which would be incorporated into loading dock designs, to temporarily store and dispose of associated THP waste from heavy-duty diesel trucks. The trucks would enter the loading dock onto a leaky container pit at a downward slope so that any leaks would drain into the drain and valve feature of the hazardous waste pit. The hazardous waste pit would also include a leaky container pit retaining wall to further protect THP waste from being released on-site. Refer to **Section 5.9: Hazards, Hazardous Materials, and Wildfire** for discussion of hazardous waste disposal. Specifically related to the refueling of switcher locomotives, a direct-to-locomotive (DTL) fueling process would occur. DTL fueling would occur within two designated locations in the BIG rail yard and would include design features such as drainage liners and sluice gates with shut-off valves to minimize potential impacts in the event of a fuel spill. DTL fueling being restricted to specific locations within the rail yard would ensure that BMPs are in place to capture, treat, and manage any pollutants resultant of fueling that may be captured by stormwater runoff.

For the purpose of this analysis, it is assumed that the total concentration of pollutants produced as a result of braking and diesel combustion and operation and maintenance of petroleum-based vehicles which could be discharged into surface and ground waterbodies would be significant; however, with the implementation of use-specific BMPs, as prescribed by the WQMP to be prepared in accordance with the San Bernardino Technical Guidance Document for Water Quality Management Plans all pollutants captured would be treated prior to discharge so that concentrations would be within acceptable limits and would not violate applicable water quality standards. The total amount of brake dust, PAHs, and petroleum hydrocarbons generated by BIG would be a function of the total train/locomotive activity within the BIG footprint. Additional train activity (including braking) would occur on the rail mainlines as a result of BIG, in addition to train activity (including braking) within the proposed rail yard and intermodal facility. However, the actual generation of pollutants would be determined by multiple factors including but not limited to the number of times a train moves throughout the site, maintenance regularity of train cars and locomotives and petroleum-based vehicles, and environmental conditions, among others. However, once a project-specific WQMP is prepared for BIG, target pollutant loads would be determined

and use-specific BMPs would be developed to treat these pollutant loads on-site. The factor of removal of pollutants from surface water runoff is dependent on the concentrations of the contaminants in the contaminated waters and on the efficacy and type of the BMPs implemented at BIG.

Heavy metals that bioaccumulate within aquatic environments result in acute toxicity within aquatic plant and animal species, which results in adverse effects on aquatic life, such as reproductive and genetic damage. Considering that BIG would use treatment BMPs to reduce the concentration of pollutants and improve the quality of runoff generated on all new impervious surfaces, BIG would minimize potential water quality effects from brake dust to the maximum extent feasible using the best available technology. Further, BIG would include BMPs to treat and regulate on-site petroleum hydrocarbons generated during operations. For a WQMP to be approved, the BMPs must adequately mitigate potentially significant impacts of on-site pollutants on water quality to less than significant levels. BIG would be required to implement BMPs as part of the WQMP that source-control and stormwater treatment BMPs that specifically treat and maintain petroleum hydrocarbon pollutants from entering runoff. With the incorporation of BMPs to regulate on-site pollutants resulting from brake dust, diesel combustion, and operations of petroleum-based vehicles, the pollutants would not substantially degrade surface or groundwater quality. On-site stormwater and runoff from operations covered under the industrial general permit (discussed below) (e.g., washdown, maintenance, etc.) would be required to implement treatment BMPs to treat runoff prior to infiltration or discharge. The following structural BMPs may be used during operations of BIG. These would be a permanent part of the facilities and would be maintained by BNSF; see **Appendix 5.10 BIG-1**.

- Surface infiltration basin
- Subsurface infiltration system
- Seasonal dry detention pond
- Sand and media filter
- Rain barrel
- Infiltration trench
- Hydrodynamic separation device

The implementation of these permanent BMPs would reduce the discharge of sediment and sediment-bound pollutants into surface and groundwaters and minimize the exposure of toxic materials (e.g., metals, petroleum hydrocarbons) to surface waters.

BIG may implement other forms of LID, which is a sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional stormwater management, which collects and conveys stormwater runoff through storm drains, pipes, or other conveyances to a centralized stormwater facility, LID takes a different approach by using site design and stormwater management to maintain the site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall. The exact types of LIDs to be implemented by BIG would be determined as part of BIG design, specifically through the design and development of the WQMP. The WQMP would be required to show how BIG would treat stormwater during operations.

BIG would be required to obtain and maintain an IGP under the SWRCB. Specifically, the areas of operations that include vehicle maintenance and vehicle cleaning operations would be covered under the

IGP. The IGP would identify BMPs and other measures that would need to be implemented and which types of pollutants would need to be controlled to prevent polluted stormwater runoff. Specific operations that would be controlled include vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication. Other uses could be covered under the permit and would be determined at the time of the issuance of the permit. Adherence to the conditions of the permit would ensure that operational activities would not be a violation of water quality standards or otherwise cause a degradation of surface waters via the discharge of polluted stormwater from BIG. The IGP would require BIG to sample and test stormwater flows from industrial activity areas to determine compliance with the maximum contaminant levels (MCLs) of specific pollutants that may be produced during BIG operations. Further, the IGP requires that stormwater flows from industrial activity areas must be treated prior to infiltration into the soil or discharge into watercourses. Currently, BIG proposes to construct an earthen stormwater conveyance ditch to convey stormwater from the large industrial activity areas (rail yard, vehicle maintenance facility, etc.) to the treatment basins. Contaminant laden waters would be allowed to infiltrate through the bottom of this earthen ditch prior to treatment of the stormwater, and as previously stated, it is currently not known what concentration these pollutants could be. However, it is important to note that under existing operations of the rail corridor there has been no documented contamination of ground or surface waters without the use of BMPs, refer to **Section 5.9: Hazard, Hazardous Materials and Wildfire** of this EIR. It is reasonable to assume that the concentration of rail activities to a generalized location and the implementation of use-specific and designed BMPs, as required by the IGP and WQMP, that the MCLs would not be exceeded and a less than significant impact would occur.

Additionally, BIG maintenance activities may require the use of herbicides or pesticides to control weeds and vermin within the BIG footprint and railroad right-of-way. This use would be periodic and ongoing and would be considered a permanent intermittent impact. Applications of pesticides would adhere to label directions for application rates and methods, storage, transportation, mixing, and container disposal. The owner would use contracted applicators appropriately licensed by the State. Where necessary, staff would coordinate with the San Bernardino County Agricultural Commissioners and obtain any required licenses and permits prior to herbicide application.

BIG is located in proximity to the Hinkley community, which was affected by well-known and high-profile groundwater contamination by hexavalent chromium (Cr[VI]) from Pacific Gas and Electric (PG&E). The PG&E contamination plume is not located within the BIG footprint and BIG would not construct wells within this contamination plume and would otherwise not interact with this site. Further, the contamination plume flows to the north (away from BIG) and has been shrinking as a result of existing remediation efforts by PG&E; see **Section 5.9**. BIG and this contamination plume are not hydraulically connected with respect to surface water or groundwater flows as the Mojave River is located between BIG and the contamination site. As such, any potential pollutants generated by BIG would not interact with or worsen the conditions/degrade the water quality of the PG&E contamination plume.

BIG would be subject to applicable NPDES water quality requirements of the IGP and the LRWQCB Basin Plan. Conformance with these requirements would involve the use of appropriate BMPs during operations to address potential impacts associated with the described contaminants as outlined in **Appendix 5.10 BIG-1**. Specifically, conformance with the IGP would entail preparing and implementing an approved

WQMP to address potential issues including erosion/sedimentation and the discharge of operational contaminants. BIG would be required to comply with the IGP and implement use-specific BMPs and treatment infrastructure to accommodate pollutants and contamination that would be generated as a result of BIG. Further, as BIG proposes rail uses similar to the existing rail operations and would implement BMPs on-site, it is assumed that water quality impacts associated with operational activities would be less than significant and no mitigation is necessary.

Impact 5.10-1: BIG: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-1: BIG Mitigation Measures: No mitigation required.

Impact 5.10-1: BIG Level of Significance After Mitigation: No significant impact would occur.

Impact 5.10-2 *Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?*

Proposed General Plan

According to the 2020 Urban Water Management Plan (UWMP) for MWA, water supply for MWA's service area is sourced almost entirely from pumped groundwater from the various basins, subbasins, and aquifers in the area (MWA, 2021). Increases in population would generate a higher demand for groundwater resources. The 2020 UWMP indicates that MWA and regional retail agencies can meet the regional water demands through 2065 during normal, single dry, and five consecutive dry years through 2065 (MWA, 2021). Additionally, the MWA maintains a comprehensive groundwater monitoring program consisting of approximately 850 wells; water production within the Mojave Basin Area is tracked in order to investigate conditions and provide recommendations on groundwater pumping amounts (MWA, 2021). This monitoring program, along with production records, are used to make recommendations regarding sustainability of groundwater within the Mojave Basin Area (MWA, 2021).

Two of the four groundwater recharge sites along the Mojave River, Hodge and Lenwood, are within the SOI, and are designated Rural Living (see **Figure 5.10-9: USGS NWIS Groundwater Well Locations - BIG**

). The County land use designation for the areas adjacent to the recharge sites is Rural Living which allows one dwelling unit per 2.5 acres. While future development of the sites could diminish their recharge potential, Policy OSC-4.5 encourages the use of existing natural features to serve as stormwater management and groundwater recharge facilities, particularly when the retention of such features would create meaningful open space for people, high-value habitat, and/or protected wildlife. The recharge sites and surrounding areas are currently undeveloped. Because the Rural Living designation is a low-density use (i.e., one dwelling unit per 2.5 acres) with a maximum coverage of 20 percent, proposed development in and adjacent to these sites would not result in a significant amount of impervious surfaces that would inhibit recharge, and therefore, approximately 80 percent of undeveloped/pervious land would still be available for recharge.

The Mojave River Basin is an adjudicated system and is overseen by MWA, which is the Basin's water master (MWA, 2023b, 2025). As the Watermaster, the MWA is responsible for monitoring and verifying water production and protecting groundwater supplies. Every year, the MWA evaluates water supply conditions and projected demand across the Mojave Basin Area and prepares an annual report to determine water allocations for each water producer in addition to transfers of water rights and special provisions to protect the environment. Collaborative efforts with MWA are essential to enhancing the groundwater basin reserves and complying with regulations outlined in the Mojave Basin Adjudication, which governs the water rights. Under the Mojave Basin Adjudication program, each subarea received a Base Annual Production (BAP) value, alongside subsequent Free Production Allowance calculations based on a percentage of the BAP.

There are five subareas within the Mojave River Basin: Centro, Baja, Este, Alto, and Oeste. The majority of the City and SOI are in the Centro subarea (MWA, 2023b). According to the Twenty-Ninth Annual Report of the Mojave Basin Area Watermaster, the Centro Subarea water levels have been stable, showing seasonal variability and declines during the dry years, but generally recover during wet years. Water levels near Harper Lake, over six miles northwest of the SOI, have slowly recovered due to the halting of pumping. However, the water levels near Hodge and Lenwood have shown the effects of pumping and limited recharge for the past 10 years (MWA, 2023b).

In 2022, the MWA authorized the development of a drought resiliency program for importation of supplemental water into the Basin for drought management purposes; the MWA authorized up to 5,000 acre-feet of water to be delivered to the Centro Subarea for supply augmentation (MWA, 2023b). Based on the compliance with the Mojave Basin Adjudication program, implementation of the proposed General Plan would have a less than significant impact on groundwater, and no mitigation is required.

Impact 5.10-2: General Plan: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-2: General Plan: Mitigation Measures: No mitigation required.

Impact 5.10-2: General Plan: Level of Significance After Mitigation: No significant impact would occur.

Barstow International Gateway

Groundwater depths across BIG range from 8 feet below grade and 112 feet below grade. However, where excavation and grading would occur within the BIG footprint, it is unlikely that groundwater would be encountered; refer to **Table 5.10-6: USGS National Water Information System Groundwater Data – BIG**, Figure 2, and Figure 3 in **Appendix 5.10 BIG-1**. While unlikely, it is still possible that groundwater will be encountered due to variations in precipitation and natural supply of water to the area. Depending on the occurrence of local groundwater and the amount of associated inflow to the Mojave River, significant impacts could potentially result in association with groundwater accumulation (flooding) and related hazards to people or structures. These potential impacts would be avoided through proposed BIG design measures and BMP implementation as outlined in **Appendix 5.10 BIG-1**.

Refer to the Water Supply Assessment prepared for BIG for a discussion and information regarding the available water supply that would support BIG in **Appendix 5.17 BIG-1: Utility Assessment Technical Report** and **Section 5.17: Utilities and Service Systems** of this EIR.

Construction

Please note that the data presented in this analysis is provided within the *Water Supply Assessment for Barstow International Gateway* (WSA) prepared by EKI Environment & Water (EKI, 2023); see **Appendix 5.17 BIG-2: Water Supply Assessment**. The existing BIG footprint is largely undeveloped with agricultural land use near the central limit and minimal commercial and residential land uses near the northern limit in Barstow; as such, existing impervious surface is limited; see **Appendix 5.10 BIG-1 – Table 5**. Existing impervious surfaces generally consist of roadways and small residential/commercial buildings. Areas of pervious surface are widespread throughout the BIG footprint. Construction of BIG would increase the amount of impervious surface area in the BIG footprint by a significant degree. Currently, storm or surface waters percolate through the soil to enter the groundwater supply as it sheet-flows across the BIG footprint to Lenwood Channel or the Mojave River. Alternatively, localized low points would hold water and allow for percolation.

BIG's construction workers would generate demand for potable water during the construction phase. BIG construction would generate a potable water demand of approximately 311 AFY; see **Table 5.17-18** in **Section 5.17: Utilities and Service Systems**. Additionally, BIG would require non-potable water for other construction needs (concrete mixing, dust control, site cleaning, etc.). BIG would construct temporary wells for use during construction, which would be removed once construction water demands have been met. BIG is located within the Mojave Basin which is an adjudicated basin. Refer to the discussion in **Impact 5.17-2** of **Section 5.17** of this EIR for more information. As noted in **Section 5.17**, BIG would not significantly decrease groundwater supplies during construction. Therefore, BIG construction-related impacts would be less than significant and would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that BIG may impede sustainable groundwater management of the basin, and no mitigation is required.

Operations

As previously stated, temporary wells would be constructed for construction use only and would be decommissioned prior to BIG operations. As such, there would not be a direct draw of groundwater resources during BIG operations. According to the WSA, there are enough water resources to serve BIG; see **Appendix 5.17 BIG-2**. The WSA identified that during operations, BIG would require approximately 404 AFY while the GSWC Barstow's water supplies for 2025 are 15,128 AFY; see **Section 5.17: Utilities and Service Systems** and **Appendix 5.17 BIG-1**. There is adequate supply within the GSWC Barstow's supply to support BIG.

Regarding groundwater recharge, as previously stated, the BIG footprint is generally undeveloped and contains large amounts of pervious surfaces; (**Appendix 5.10 BIG-1 - Table 9**). A drilled well near the BIG footprint encountered groundwater at depths between 15 and 50 feet below ground surface. Data available from the USGS National Water Information System indicate that groundwater is as shallow as 8 feet and as deep as 123 feet below grade within the BIG footprint; refer to **Table 5.10-6: USGS National**

Water Information System Groundwater Data – BIG. Generally, groundwater at these depths would follow the flow path of the Mojave River and inflow to the Mojave River downstream. BIG would construct infiltrating stormwater basins to capture and retain the 100-year storm events and allow stormwater and runoff from operations (e.g., washdown, maintenance, etc.) to infiltrate into the groundwater such that a significant portion of the BIG footprint would not be removed from the possible areas of groundwater recharge.

According to Figure IU-4: Regional Flood Control Facilities of the CWP, there are two flood control facilities near the BIG footprint: the Lenwood Spreading Grounds to the south and the Waterman Road Basin to the northeast (San Bernardino, 2020b). However, drainage from BIG would not be conveyed to these facilities. Drainage from BIG would be conveyed to various on-site basins located on the western boundary and adjacent to the transload warehouse center and to on-site basins located at the solar farm site. Overflows from these basins would be directed toward Lenwood Channel (to be improved by BIG) and the Mojave River. With the installation of these on-site basins, all stormwater and surface flows (including operational runoff [e.g., washdown, maintenance, etc.]) up to the 100-year storm events would be captured on site and allowed to infiltrate into the ground or flow into the Mojave River. Detention of water in the ground would allow for groundwater recharge. As previously stated, once the water has percolated into the ground, it would generally flow underground toward the Mojave River. Additionally, the solar farm portion of the BIG footprint would generally remain as pervious soils and would allow for percolation during sheet flow and shallow concentrated flow toward the on-site basins that would then allow runoff to percolate into the groundwater reservoirs. As such, operational impacts would be less than significant, and no mitigation is required.

Impact 5.10-2: BIG: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-2: BIG Mitigation Measures: No mitigation required.

Impact 5.10-2: BIG Level of Significance After Mitigation: No significant impact would occur.

Impact 5.10-3	<i>Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:</i> <i>i) Result in substantial erosion or siltation on- or off-site?</i>
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Proposed General Plan

Development within the General Plan study area would increase impervious surfaces. This could increase erosion or sedimentation in drainage swales and streams. Also, because of Barstow's desert climate, strong winds could increase erosion and dust on exposed soils, which could impact drainage patterns and cause an increase in sedimentation and siltation in waterways throughout the plan area, such as the Mojave River.

Future development under the proposed General Plan would involve construction activities that could increase the potential for erosion and/or siltation. Additionally, strong winds can increase erosion,

sedimentation, and siltation; dust storms that may occur during construction would exacerbate these conditions due to the generally undeveloped nature of most construction sites. Increases in erosion/siltation could impact water quality and can also cause changes in drainage patterns which may contribute to an increase in the capacity of stormwater drainage systems. Standard erosion and wind control measures and BMPs would be implemented as part of the SWPPP for any proposed project to minimize the risk of erosion or sedimentation during construction. The SWPPP must include an erosion control plan that prescribes measures such as phased grading, limiting areas of disturbance, designating restricted-entry zones, diverting runoff from disturbed areas, protective measures for sensitive areas, outlet protection, and provisions for revegetation or mulching. The erosion control plan would also include treatment measures to trap sediment, including inlet protection, straw bale barriers, straw mulching, straw wattles, silt fencing, check dams, terracing, and siltation or sediment ponds. Additionally, for areas of the plan area that are tributaries that may be susceptible to scour, hydromodification requirements as part of the regional MS4 permit will ensure that impacts are minimized.

With the implementation of applicable measures during the construction and operational phases of future development; and with the implementation of federal, State, and local regulations, any erosion or siltation impacts would be less than significant.

Impact 5.10-3: General Plan: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-3: General Plan: Mitigation Measures: No mitigation required.

Impact 5.10-3: General Plan: Level of Significance After Mitigation: No significant impact would occur.

Barstow International Gateway

Construction

BIG construction would not result in alterations to the existing overall surface drainage patterns. Runoff would continue to flow generally from south to north toward the Mojave River and increases in runoff associated with new impervious surfaces would be mitigated with multiple detention facilities as described in **Appendix 5.10 BIG-1**. The discharge point into the Mojave River would be limited to one outfall location identified as Point of Interest D in the drainage exhibit provided in **Appendix 5.10 BIG-1 – Appendix F**. BIG construction activities would not alter the course of a stream or river or add impervious surfaces, such that they would substantially alter the BIG footprint's existing drainage pattern. Additionally, **Appendix 5.7 BIG-1: Geology, Soils, and Seismicity Technical Report** concluded BIG construction activities would involve excavation of surface and near surface soils during grading in areas of cut or where over-excavation and re-compaction with engineered fill may be required which would cause additional operations that may cause erosion or siltation. Grading, excavations, and trenching required for BIG construction could result in soil erosion and siltation if exposed to heavy rainfall events. The potential for more surface water runoff exists during construction when existing vegetation is removed and the unprotected soils are exposed water erosion. Increased surface water runoff and siltation could also result from temporary, impermeable work surfaces. If exposed soils are not protected from water erosion, such as when vegetation is cleared for work areas and material stockpiles, both the exposed work areas and any stockpiles could erode and result in decreased water quality and increased

erosion and siltation. However, as concluded in **Impact 5.10-1: BIG**, BIG construction activities would comply with all measures identified in the BIG SWPPP and all requirements of the relevant RWQCB permits for construction. The effects associated with soil erosion would be minimized with design measures in the erosion control plan and that include the use of BMPs and adherence to the relevant transportation and building agency guidelines and standards that would take into account soil properties and minimize soil erosion and siltation hazards.

Construction of BIG would generally begin with site preparation and grading. Once grading operations are complete, the drainage areas for BIG would be established and would not generally change significantly once construction has completed, with the exception of the permanent structural BMPs and stormwater infrastructure being in place. BIG would construct temporary BMPs which may include swales with check dams and other diversionary trenches as identified in the SWPPP. These temporary BMPs would be constructed in the location that permanent features would be located and would not generally disrupt the overall drainage pattern that exists on site.

As construction progresses, more impervious surface area would be constructed which would increase the peak flow of stormwater runoff and shorten the time of concentration of surface water runoff flows. However, as more impervious surface area is constructed, the associated permanent storm drain infrastructure, on-site basins, and other stormwater infrastructure would be constructed concurrently to accommodate the increased runoff resultant of construction of BIG. Furthermore, the implementation of the BMPs, as required by the SWPPP and WQMP (e.g., rock check dams, rip rap pads, straw wattles, silt fence, etc.) would be implemented concurrently to provide temporary benefits while permanent stormwater infrastructure is developed. The overall drainage pattern of the BIG footprint would not be altered significantly; water would generally continue to flow from the southeast to the northwest across the BIG footprint toward the Mojave River.

Standard construction practices would be followed to reduce the potential for erosion and siltation. These could include soil stabilization, perimeter silt fences, check dams within the flow path of aboveground drainage swales, and sediment basins. As previously stated, implementation of local and State regulations would be followed in the design and construction of BIG. These measures would reduce runoff and siltation from the site and hold topsoil in place during grading activities.

Design methods would minimize water erosion through adoption of BMPs prescribed by the SWPPP and WQMP including the use of stabilizers, mulches, revegetation, and covering areas with biodegradable geotextiles. In addition, BNSF would document the incorporation of specific guidelines and standards, as identified by relevant transportation and building agencies and codes, into design and construction in accordance with the best available practices. In complying with these guidelines and standards, BNSF would take soil properties into account for design and construction and reduce the potential for effects associated with water erosion and siltation during construction.

The BMPs included in the SWPPP prepared for BIG would also minimize potential impacts from erosion and siltation. The types of required BMPs would be based on the amount of soil disturbed, the types of pollutants used or stored at the construction site, and proximity to water bodies. Further, a soils engineering report and engineering geology report required as part of the City's grading requirements

(Barstow Code Chapter 15.12) would also be implemented to further minimize potential siltation and erosion effects. Standard construction practices in addition to implementation of dust control measures along with other BMPs included in the SWPPP would reduce potential environmental effects from erosion or siltation, and impacts would be less than significant, and no mitigation is required.

Operations

As previously discussed, BIG would construct and operate various on-site basins for handling surface water. These basins would be located on the western boundaries between the transload warehouses and the Mojave River, and other basins would be located within the solar farm site. No drainages, ephemeral or permanent, exist on the solar field site, as such, stormwater and other flows would sheet flow across the solar fields into the various basins. These basins would be designed to accommodate the 100-year storm events and collect runoff for storage. As there would be no channelization of stormwater and other runoff, the overall hydraulic energy of the stormwater sheet flowing across the site would not be substantial and could not contribute to significant amounts of erosion or siltation. For the transload warehouse center, stormwater flows and operational runoff (e.g., washdown, maintenance, etc.) from the buildings, parking lots, heavy-duty truck maneuvering courts, and other impervious areas would be conveyed into an on-site stormwater network; see **Section 3.0: Project Description**. The majority of the surfaces and stormwater infrastructure in these areas would be reinforced impervious areas (e.g., concrete, asphaltic concrete, non-pervious pipes). As these flows would be across and through paved or other impervious surfaces, they would not interact with unpaved areas to facilitate erosion or siltation. As such, operational impacts related to erosion or siltation would be less than significant, and no mitigation is required.

Impact 5.10-3: BIG: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-3: BIG Mitigation Measures: No mitigation required.

Impact 5.10-3: BIG Level of Significance After Mitigation: No significant impact would occur.

Impact 5.10-4	<i>Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:</i> <i>ii) Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?</i>
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Proposed General Plan

The northern and southwestern portions of the plan area, including the Mojave River Channel and Lenwood area, are within 100-year flood zones (FEMA, 2008); see **Figure 5.10-7: FEMA Flood Hazard Zones - Proposed General Plan**

. Flood hazard areas identified on the FIRMs are identified as a Special Flood Hazard Area, which are defined as the area that would be inundated by the flood event having a one percent chance of being

equaled or exceeded in any given year. As such, flooding hazards have the potential to occur in these areas of the proposed General Plan area, which predominantly contain industrial, public facilities, and residential uses, under both existing conditions and at buildout of the proposed General Plan. While an increase of impervious surfaces at buildout of the proposed General Plan could increase flood rates, compliance with the Barstow Code Chapter 15.16, Floodplain Management, which is intended to promote public health and safety and minimize losses due to flood conditions by enforcing regulations within flood prone or flood-related erosion areas, would reduce impacts. Chapter 15.16 includes regulations aimed at reducing flood losses, such as restricting or prohibiting uses which are dangerous or which result in damaging increases in erosion or flood heights or velocities; preventing or regulating the construction of flood barriers which will unnaturally diver floodwaters or increase flood hazards in other areas; and controlling the alteration of natural floodplains, stream channels, and natural protective barriers which help accommodate or channel floodwaters. Development within flood hazard zones would be required to comply with Chapter 15.16 of the Barstow Code.

Additionally, any development that would encroach on SBCFCD's rights-of-way and/or facilities would be required to apply for an encroachment permit prior to construction. Development that meets the requirements of the MS4 Permit would trigger the implementation of site design, source control, and stormwater treatment measures to reduce stormwater runoff. Prior to the issuance of grading permits, the City would require completion and submittal of a WQMP for review and approval to ensure that these requirements are met. WQMPS would adhere to the San Bernardino County Areawide Storm Water Program's Technical Guidance Document. Adherence to these regulatory requirements would minimize the amount of stormwater runoff from new development and redevelopment in the City.

With the implementation of applicable measures during the construction and operational phases of future development; with the implementation of federal, State, and local regulations, flooding impacts would be less than significant.

Impact 5.10-4: General Plan: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-4: General Plan: Mitigation Measures: No mitigation required.

Impact 5.10-4: General Plan: Level of Significance After Mitigation: No significant impact would occur.

Barstow International Gateway

Construction

BIG would include the development of approximately 5,000 acres. The existing drainage pattern for the BIG footprint and the general area is characterized by sheet flow and shallow concentrated flow. Under existing conditions, the BIG footprint naturally drains from the southeast to the northwest towards the Mojave River, which is located on the north side of the BIG footprint.

Construction of BIG would generally begin with site preparation and grading. Once grading operations are complete, the drainage areas for BIG would be established and would not generally change significantly once construction has completed, with the exception of the permanent structural BMPs and stormwater

infrastructure being in place. BIG would construct temporary BMPs which may include swales with check dams and other diversionary trenches as identified in the SWPPP. These temporary BMPs would be constructed in the location that permanent features would be located and would not generally disrupt the overall drainage pattern that exists on site; see **Impact 5.10-3: BIG**.

As construction progresses, more impervious surface area would be constructed which would increase the peak flow of stormwater runoff and shorten the time of concentration of surface water runoff flows. However, as more impervious surface area is constructed, the associated permanent storm drain infrastructure, on-site basins, and other stormwater infrastructure would be constructed simultaneously to accommodate the increased runoff resultant of construction of BIG. Furthermore, the implementation of the BMPs, as required by the SWPPP (e.g., rock check dams, rip rap pads, straw wattles, silt fence etc.) would be implemented concurrently to provide temporary benefits while permanent stormwater infrastructure is developed. The overall drainage pattern of the BIG footprint would not be altered significantly; water would generally continue to flow from the southeast to the northwest across the BIG footprint toward the Mojave River.

BIG would construct bridges and channel improvements to the Lenwood Channel, an unnamed tributary to the Mojave River at MP 10.9, and at a bridge over the Mojave River at Hinkley Road (BR 10.5). Specifically, BIG would realign the unnamed tributary to accommodate track mains, sidings, and support tracks, and improved with a combination of bridges and box culverts spanning the Lenwood Channel at Bridge 10.9a and Bridge 11.2. During construction, impacts to existing flows may occur should a rain event occur during construction. Widening of Lenwood Channel and the tributary would occur as part of the improvements. The widening and vertical alignment adjustments that would occur to Lenwood Channel would improve the flood flow capacity of the channel and would occur prior to the construction of the bridge and box culvert construction. As a result, the construction operations that would occur within these water courses would not be significantly impacted as the overall flood flow capacity of these waterways would be improved prior to bridge and culvert construction. For all the above reasons, a less than significant impact would occur, and no mitigation is required.

Operations

BIG proposes the construction of new public roads that would be constructed with appropriate stormwater conveyance facilities such as curbs and gutters. Flows from 10-year storm events would be contained within the street curb to curb width, and 100-year storm events would be contained within the rights-of-way. These public roads would add new shallow channelized flow paths for runoff. Runoff contained within the public rights-of-way, including curb and gutter, would flow into underground public storm drain facilities that in turn would flow to the on-site basins across the BIG footprint. Stormwater runoff from property outside the public rights-of-way would be collected on the site (e.g., rail yard and transload warehouse center, etc.), conveyed by underground storm drainpipes to on-site basins where stormwater quality volumes are detained and infiltrated into the ground. Larger storm events would pass through these basins, be conveyed by storm drain facilities through the basin and discharged into the Lenwood Channel or the Mojave River.

Additionally, and as previously discussed, improvements to Lenwood Channel, the unnamed tributary to the Mojave River at MP 10.9, and to the bridge over the Mojave River at Hinkley Road would occur resulting in improved drainage when compared to existing conditions. These improvements would increase drainage capacities of these features and would aid in conveying flood flows through the BIG footprint while maintaining regional drainage patterns.

Lenwood Channel

Lenwood Channel was constructed in 1977 to aid with flooding in the area. BNSF Bridge 6.5 was initially constructed to convey the newly constructed channel. Prior to construction of the channel and bridge, flood flows in the area were primarily conveyed through the structures at MP 7.0 and MP 5.1. The channel and bridge provided benefit but did not completely eliminate flood hazards associated with the 100-year flood event; refer to Appendix B of **Appendix 5.10-BIG-1** for figures showing pre- and post-construction conditions. With construction of BIG, improvements to the channel and Bridge 6.5 would be needed to ensure that BNSF infrastructure would remain accessible and not be damaged during a 100-year flood event. The intent of this design is to keep flood waters contained in Lenwood Channel to the extent possible and convey the flow to the Mojave River under the bridge at MP 6.5, avoiding the allowance of significant overbank flow to occur in an uncontrolled manner. As such, channel grading and additional bridge capacity is required to convey flood flows through BIG extents and into the Mojave River north of BIG.

New bridge crossings would be constructed over Lenwood Channel upstream (south) of the existing mainline to accommodate new tracks required in supporting BIG as well as roadways for vehicle access to BIG; see **Section 3.0: Project Description**. The roadway bridges would carry a new road providing access to the facility from Lenwood Road that would cross Lenwood Channel upstream of Main Street. Main Street's existing low water crossing would also be replaced with a bridge that provides 100-year level of service for overtopping. The intent of this design is to keep flood waters contained in Lenwood Channel and convey the flow to the Mojave River under the bridge at MP 6.5, avoiding the allowance of significant overbank flow to occur.

Lenwood Channel would be graded to have a variable width, 100- to 150-foot bottom with 3:1 side slopes that would provide the capacity in the channel necessary to accommodate the 100-year FEMA published discharge with freeboard and the unbulked discharge with no freeboard.³ This channel cross-section would be carried from the downstream confluence with the Mojave River (approximately 4,200 feet downstream of the existing BNSF mainline) and terminate immediately downstream of the existing spreading fields (approximately 6,800 feet upstream of the existing BNSF mainline). Bridge crossings over Lenwood Channel were sized to accommodate the approved unbulked discharge calculated for the channel and are listed below and summarized in **Appendix 5.10-BIG 1**:

³ Bulked discharges refer to the discharge of water when considering sediment-laden waters. Unbulked discharge considers clear water. Discharges estimated using standard rainfall-runoff procedures typically do not account for the presence of sediment in the flow. At high sediment loads, the total volume of the water/sediment mixture, and thus, the peak design discharges, can be substantially higher than the corresponding clear-water values.

- Improved BNSF Mainline Bridge 6.5
- New BNSF Lead Track Bridge on south side of existing main line
- New BNSF Mainline 3 & 4 Bridge on south side of existing main line
- Improved Main Street Bridge on south side of existing main line
- Private Road Extension on north side of existing main line
- Hinkley Road on north side of existing main line
- Transload warehouse access road on north side of existing mainline

Unnamed Tributary to the Mojave River at MP 10.9

The Unnamed Tributary to the Mojave River at Bridge 10.9 enters the Mojave River immediately downstream of the existing mainline. Under current conditions, flow overwhelms the manmade berm intended to direct flow to Bridge 10.9 and floods the area adjacent to MP 10.7 where no structure exists and in extreme events may overtop the tracks. This feature would be realigned to accommodate track mains, sidings, and support tracks and improved with a combination of bridges and box culverts spanning the channel at Bridge 10.9a and Bridge 11.2. Additionally, a new bridge would be constructed to carry additional mainline capacity across the Unnamed Tributary. Riprap would be placed along the channel banks through each of the bridges and extend 100 feet upstream and downstream. Lastly, riprap channel lining would be placed along the channel reach adjacent to Main Street to prevent the shallow concentrated flow overtopping the highway at this location from eroding the channel banks as it enters. The increase in channel capacity and bridge capacity at this location is important to eliminate the potential for flood flow to inundate BIG near MP 10.7; refer to Appendix C of **Appendix 5.10 BIG 1** for figures showing pre- and post-construction flood conditions.

Hinkley Road Bridge at Mojave River

The existing Hinkley Road Bridge is at a narrowed section of the Mojave River and crosses via a concrete pier structure. Based on discussions with the County, the existing Hinkley Road Bridge over the Mojave River is experiencing structural issues and is at risk of being over-topped from seasonal flooding. Hydrology and hydraulic analyses have indicated the existing bridge is undersized. To maintain a roadway connection to Hinkley Road from the transload warehouse center, BIG would reconstruct the existing bridge to span the entire channel width of the Mojave River at that location. The channel beneath, and immediately adjacent to, the existing bridge would be excavated and widened to more closely match the natural channel width. Portions of Hinkley Road immediately east and west of the bridge would be raised to reduce exposure to Mojave River flood events. These proposed improvements at Hinkley Road Bridge would reduce flooding compared to existing conditions; refer to Appendix D of **Appendix 5.10 BIG-1** for figures showing pre- and post-construction flood conditions. As the bridge would follow the existing roadway alignment of Hinkley Road, there would not be a significant increase of impervious surfaces which would increase surface runoff of stormwater. However, with the improvement of the bridge, the surface elevation of backwater at the bridge would be reduced, and the redesigned bridge would result in a net-positive impact on flood flows and inundation.

Based on the above discussion pertaining to drainage and flood flows at Lenwood Channel, Unnamed Tributary to the Mojave River at MP 10.9, and the Mojave River at Hinkley Road, BIG would not

substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site. A less than significant impact would occur, and no mitigation is required.

Rail Yard and Transload Warehouse Center

Implementation of BIG would result in the inclusion of a substantial amount of impervious surface area within the BIG footprint. This increased amount of impervious surface area would increase the flow rate of stormwater runoff and runoff from operations (e.g., washdown, maintenance, etc.) within the BIG footprint. As such, permanent stormwater infrastructure would be required for BIG. This infrastructure is required under existing building code and would be implemented regardless of the amount of additional impervious surface area that would be constructed as part of BIG. Permanent stormwater infrastructure that would be constructed and operated include curb and gutter in roadways, underground stormwater conveyance infrastructure, inlets, and on-site basins. On-site stormwater basins would have in-basin treatment systems to capture and retain oils which may be discharged into the stormwater system. These BMPs could be hydrodynamic separators or other equivalent systems; refer to **Section 6.6 of Appendix 5.10 BIG-1**. This stormwater conveyance infrastructure would be designed according to the 100-year storm event. As BIG would be designed to accommodate these flood flows and would be required to maintain this infrastructure, impacts would be less than significant, and no mitigation is required.

Impact 5.10-4: BIG: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-4: BIG Mitigation Measures: No mitigation required.

Impact 5.10-4: BIG Level of Significance After Mitigation: No significant impact would occur.

Impact 5.10-5 ***Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:***

iii) Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Proposed General Plan

With new development, drainage patterns would largely be maintained; new development would use the existing drainage facilities within the public rights-of-way. Current runoff is captured and conveyed by existing storm drain infrastructure in the City and SOI. Projects would be responsible for the design of storm drain facilities in accordance with the SBCFCD requirements and would be required to comply applicable regulations, such as Chapter 15.14, Stormwater and Urban Runoff Pollutant Control, of the Barstow Code. Standard flood control requirements, such as the implementation of on-site basins to control on-site and off-site flooding and debris, would minimize the impacts of increased flows and volumes on downstream receiving waters. On-site storm drain systems would likely change with the individual project components but would still use the existing facilities within the public rights-of-way.

Implementation of proposed land uses in future redevelopment areas would not result in substantial increases in surface water peak flows or volumes over the existing conditions and would likely result in reduced discharges due to on-site water quality and LID features and BMPs. Development that meets the requirements of the MS4 Permit would trigger the implementation of site design, source control, and stormwater treatment measures to reduce stormwater runoff. Prior to the issuance of grading permits, the City would require completion and submittal of a WQMP for review and approval to ensure that these requirements are met. Implementation of the LID requirements and BMPs required by the MS4 Permit and the Technical Guidance Document would reduce the amount of stormwater runoff that is ultimately discharged to the receiving waters.

New development could result in an increase in stormwater runoff and higher peak discharges to storm drain systems. For proposed development pursuant to the proposed General Plan, hydrology studies would be prepared, reviewed, and approved by the City. San Bernardino County's Hydrology Manual presents the design criteria to be used for such studies.

With the implementation of applicable measures during the construction and operational phases of future development, and with the implementation of federal, State, and local regulations, any stormwater drainage or runoff impacts would be less than significant.

Impact 5.10-5: General Plan: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-5: General Plan: Mitigation Measures: No mitigation required.

Impact 5.10-5: General Plan: Level of Significance After Mitigation: No significant impact would occur.

Barstow International Gateway

Construction and Operations

See Impact 5.10-1: BIG and Impact 5.10-4: BIG. BIG would cross several surface water features within the study area using different types of structures. The waterbodies potentially affected by BIG, along with other surface water resources in the surface water study area, are subject to degradation from agricultural runoff and pollutants discharged from transportation sources such as streets, highways, and railroads. The specific waterbody crossings are identified on Figure 5.10-4a: Proposed Bridge and Culvert Improvements - BIG Figure 5.10-4a: Proposed Bridge and Culvert Improvements - BIG

through **Figure 5.10-4c**, and details on surface water quality, including sources of surface water pollutants, are provided the Surface Water Quality discussion of **Section 5.10.4: Environmental Setting**.

BIG construction would generally begin with site preparation and grading. Once grading operations are complete, the drainage areas for BIG would be established and would not generally change significantly once construction has completed, with the exception of the permanent structural BMPs and stormwater infrastructure being in place. BIG would construct temporary BMPs which may include swales with check dams and other diversionary trenches as identified in the SWPPP and WQMP. These temporary BMPs would be constructed in the location that permanent features would be located and would not generally disrupt the overall drainage pattern that exists on site; see **Impact 5.10-3: BIG**.

BIG construction would require excavation and grading. Grading is anticipated across much of the 5,000-acre BIG footprint, except for approximately 680 acres within the Mojave River which would remain ungraded. BIG would not require any import or export of soil; all required cut and fill would be provided from within the site. Approximately 26 million cubic yards of grading would occur. Construction activities that remove vegetation and expose soil to erosion (such as grading) could contribute to accelerated erosion rates, which could result in runoff containing sediment and pollutants that ultimately flow into surface waters. Pollutants in runoff could include sediment, oil and grease, hydrocarbons (e.g., fuels, solvents), heavy metals, organic fertilizers and pesticides, pathogens, nutrients, and debris. These effects on runoff quality would be greatest when stormwater runoff volumes are highest and in areas most susceptible to soil erosion. BIG would incorporate erosion and sedimentation control BMPs in the SWPPP and WQMP to stabilize disturbed soils and prevent erosion from occurring along slopes and to prevent sediments from entering nearby waterbodies. Effects on surface water quality would be minimized because construction would not result in changes to surface water quality that would contribute to a violation of regulatory standards or waste discharge requirements. Substantial additional sources of polluted runoff would be avoided, and so water quality degradation would be avoided through the implementation of stormwater management practices and BMPs; see **Impact 5.10-1: BIG**.

BIG would introduce new features into the surface water study area including a rail yard with an intermodal facility and block swap yard, and a transload warehouse center. Additionally, to serve the proposed rail yard and transload warehouse center, off-site rail improvements including lead track extensions and off-site non-rail improvements including roadways and infrastructure are proposed. New and replaced impervious surfaces would collect pollutants from BIG operations, including sediment, oil and grease, hydrocarbons (e.g., fuels, solvents), heavy metals, organic fertilizers and pesticides, pathogens, nutrients, and debris. These pollutants are mobilized by runoff during storm events and conveyed into surface water either directly or through drainage systems. Therefore, BIG could result in permanent effects on surface water quality. Erosion and sedimentation controls would be implemented to stabilize disturbed soils and prevent erosion from occurring along slopes or sediments from entering nearby storm drainage. See **Impact 5.10-1: BIG** for BIG BMPs.

New potential sources of pollutants may be introduced in the BIG footprint through the addition of locomotives, railcars, and parked vehicles; see **Impact 5.10-1: BIG**. Specifically, dust generated by braking would be continuously generated and released by trains. Brake dust consists of particulate metals (primarily iron) but may also include copper, silicon, calcium, manganese, chromium, and barium. Although brake dust consists primarily of particulate metals, some of these metals could become dissolved in rainwater. As brake dust is generated by rail braking, it would be produced within BIG Footprint by BIG operations. The amount of brake dust that could be produced by BIG operations is not quantifiable at this time. Brake dust would not be generated in equal amounts throughout the BIG footprint. The primary locations where brake dust would be generated are areas where the trains must reduce their travel speed, such as approaches to loading and unloading areas, turns, and elevation changes (primarily descents), of which there are few. Long stretches of flat terrain with a straight rail alignment would generate less brake dust than other areas. In addition, brake dust is generally anticipated to be retained in track ballast and would be susceptible to release of pollutants during inundation. Heavy metals and other sediment (non-dissolved pollutants) would be captured by on-site basins and by other use specific BMPs on the site as

identified in a WQMP. However, there is an existing rail corridor through the BIG footprint and as such, this would not constitute an additional source of polluted runoff.

Heavy metals that bioaccumulate within aquatic environments result in acute toxicity within aquatic plant and animal species resulting in adverse effects on aquatic life, such as reproductive and genetic damage. It is assumed that the discharge of metals into surface waterbodies would be of sufficient quantities to cause a violation of the water quality standards governing the Mojave Basin. However, as previously discussed in **Impact 5.10-1: BIG**, BIG would install permanent post-construction BMPs which would capture and treat stormwater runoff and runoff from operations (e.g., washdown, maintenance, etc.) that would be laden with contaminants such as heavy metals, sediments, oils, greases, etc. These BMPs would be regularly maintained by BNSF and would improve the quality of stormwater runoff prior to discharge from BIG. Considering that BIG would use treatment BMPs to reduce the quantity and improve the quality of runoff generated on all new and replaced impervious surfaces, BIG would minimize potential water quality effects from brake dust to the maximum extent feasible using the best available technology. The BMPs would be required to be designed and constructed such that BIG would comply and conform to the NPDES requirements of the IGP and LRWQCB Basin Plan. As such, BIG would not result in an additional source of polluted runoff.

On-site stormwater and runoff from operations covered under the IGP would be required to implement treatment BMPs to treat runoff prior to infiltration or discharge. The implementation of these permanent BMPs would reduce the discharge of sediment and sediment-bound pollutants into surface waters and minimize the exposure of toxic materials (e.g., metals, petroleum hydrocarbons) to surface waters. As a result, the operation of BIG would not contribute to a violation of regulatory standards or waste discharge requirements, create, or contribute substantial runoff water that would provide substantial sources of polluted runoff, or otherwise substantially degrade water quality.

As discussed previously, BIG would comply with the requirements of the NPDES General Permit for both construction and industrial uses, which helps control water pollution by regulating point and non-point sources that discharge pollutants into receiving waters. BIG construction and operations would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality through the use of BMPs and LID practices. Additionally, all development and construction documents would be required to be reviewed by the appropriate plan check agencies to ensure compliance and conformance with the City, County, and State standards and regulations governing water quality.

Regarding groundwater recharge and supply, BIG would route stormwater runoff to on-site basins that would allow up to 100-year storm events to infiltrate into the soils allowing the waters to recharge the groundwater aquifers. Additionally, BIG would not require water supplies greater than that available in the Centro Subbasin.

BIG would be required to acquire and comply with a General Construction Stormwater Permit that provides measures to reduce erosion and siltation as a result of surface water runoffs from the BIG footprint during construction. BIG would also be required to acquire and maintain an Industrial General Permit for vehicle maintenance operations which would manage the runoff from operational vehicle

maintenance. Additionally, the BIG footprint is generally undeveloped and provides no stabilization for soils. BIG would generally improve the BIG footprint with xeriscaping and other stabilizing features to reduce erosion and runoff to the maximum extent possible.

BIG would alter the site's existing drainage pattern through addition of impervious surfaces thus increasing surface runoff but would not result in on- or off-site flooding since BIG would be designed and constructed to accommodate the 100-year storm events and storm flows would be directed into on-site basins. Additionally, the general existing drainage pattern, including flood flows, for the BIG footprint would be maintained during construction and operations. Furthermore, the BIG footprint is not located close enough to the ocean such that tsunami would be a risk, nor is it located adjacent to standing bodies of water such that seiche would be a concern. Lastly, BIG would not conflict or obstruct implementation of any planning documents pertaining to water quality or groundwater management. BIG would affect the area's hydrology and water quality during construction and through ongoing operations. BIG's construction and operational activities would introduce changes to the drainage patterns and increase impervious surfaces, which could affect both surface and groundwater resources. During construction, activities like grading and excavation would temporarily disrupt soils, potentially increasing erosion and pollutant runoff. To address these effects, BIG would implement best management practices, such as silt fences, fiber rolls, and sediment basins.

Operationally, BIG would involve facilities like a rail yard and transload warehouse center that would generate pollutants, including heavy metals, organic compounds, and hydrocarbons. These pollutants could be carried by stormwater runoff into nearby water bodies, including the Mojave River. BIG would incorporate permanent stormwater management features, such as detention basins and separators, to treat and manage runoff and maintain water quality standards. These design measures have been prepared per local, state and federal requirements and BNSF standards.

BIG also includes improvements to local watercourses, such as the Lenwood Channel, to handle increased flood flows and reduce flood risks. These enhancements would help manage stormwater and reduce the potential for on-site and off-site flooding while ensuring the area complies with relevant water quality regulations. Overall, BIG would reduce its environmental impacts related to hydrology to less than significant levels through implementation of both temporary and permanent mitigation measures.

BIG would include the development of new stormwater conveyance facilities, to include surface drainage swales, underground storm drain, on-site basins, among others, and would be designed to account for the 100-year storm events as required by the Barstow Code and the County Development Code. Flows in excess of the 100-year storm events would overflow into the Mojave River and Lenwood Channel.

As discussed above, BIG would construct and install various stormwater infrastructures that would accommodate the 100-year storm events; see **Section 3.0: Project Description**. These would be constructed in a location of the City and County where very limited stormwater infrastructure currently exists. Currently, stormwater runoff generally sheet flows across the BIG footprint and drains into the Mojave River, Lenwood Channel, or into unnamed tributaries of either feature. BIG's proposed stormwater infrastructure would generally maintain these drainage patterns and would be able to accommodate the 100-year storm events. Stormwater infrastructure that may be implemented on-site

includes storm drains, curb and gutter, on-site basins, vegetative swales, and concrete swales, among others. This infrastructure would be designed to accommodate the 100-year design storm event. All stormwater flows not captured in on-site basins would be discharged to the Mojave River. While BIG would require the construction and operation of a large amount of stormwater infrastructure, it would not require the construction and operation of substantial off-site infrastructure to facilitate the implementation of BIG.

Where BIG would remove and replace existing culverts upstream of Lenwood Channel, flows through these areas may be reduced due to the improvements made at Lenwood Channel. Overtopping of tracks would be eliminated due to the increased capacity of the channel, backflow of storm flows would be reduced or eliminated, and total flows in other areas may be reduced.

For all the above reasons, BIG would not create or contribute runoff water during construction or operations that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff and therefore impacts would be less than significant.

Impact 5.10-5: BIG: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-5: BIG Mitigation Measures: No mitigation required.

Impact 5.10-5: BIG Level of Significance After Mitigation: No significant impact would occur.

Impact 5.10-6 ***Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:***

iv) Impede or redirect flood flows?

Proposed General Plan

Since new development projects are required to comply with MS4 permit requirements, any flood flows would also be retained for a period on a site, which would minimize the potential for flooding impacts.

Impact 5.10-4: General Plan discusses the potential for impeding or redirecting flood flows with development in areas within the 100-year floodplain. Flooding hazards could affect areas with industrial, public facilities, and residential uses under both current conditions and the proposed General Plan buildout. Increased impervious surfaces may elevate flood risks; however, adherence to Barstow Code Chapter 15.16, which aims to enhance public safety and minimize flood damage, would mitigate these impacts. This chapter includes regulations to prevent dangerous uses, control flood barriers, and manage natural floodplains and stream channels. Development in flood hazard zones must comply with these regulations, and any encroachment on SBCFCD facilities requires an encroachment permit. Based on these discussions, impacts related to impeding or redirecting flood flows would be less than significant. Compliance with State and local requirements would not result in substantially impede or redirect flood flows. Impacts would be less than significant, and no mitigation is required.

Impact 5.10-6: General Plan: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-6: General Plan: Mitigation Measures: No mitigation required.

Impact 5.10-6: General Plan: Level of Significance After Mitigation: No significant impact would occur.

Barstow International Gateway

Construction

Construction of BIG would require temporary fill inside of 100-year floodplains regulated by FEMA, which could result in temporary effects on the vertical profile and horizontal extent of existing 100-year floodplains. Construction activity could also result in temporary effects on the existing beneficial floodplain values. Temporary fill within floodplains during construction could include temporary structures such as formworks (temporary molds for new concrete structures), falseworks (temporary supports for new structures), trestles (temporary elevated working surfaces), and cofferdams (temporary structures to isolate work from receiving waters); construction equipment, including excavators and pumps; and construction materials, as well as construction contractor personnel. Temporary fill could reduce the storage capacity of the floodplain, resulting in localized changes in waters surface elevation, flow velocity, or extents of the floodplain to areas that may not have previously experienced flooding. The severity of the effect would be directly related to the volume of temporary fill because the volume of temporary fill would displace an equal volume of floodwaters and how much rain BIG's disturbance area receives.

Construction of BIG would generally begin with site preparation and grading. Once grading operations are complete, the drainage areas for BIG would be established and would not generally change significantly once construction has completed, with the exception of the permanent structural BMPs and stormwater infrastructure being in place. BIG would construct temporary BMPs which may include swales with check dams and other diversionary trenches, which would be identified in the SWPPP and WQMP. These temporary BMPs would be constructed in the location that permanent features would be located and would not generally disrupt the overall drainage pattern that exists on site; see **Impact 5.10-3: BIG**.

The proposed design may include temporary construction staging areas in the floodplains that BIG would cross. Although construction activities would be temporary, a construction staging area may be active for several months. Structures stored within staging areas would be small compared to the surrounding areas and would not result in a large obstruction to surface flows. Consistent with typical SWPPP requirements, the person or persons responsible for water quality monitoring or the stormwater monitoring plan (specifically a Qualified SWPPP Practitioner [QSP], or appropriate designee [QSD]) are required to monitor forecasted weather conditions for heavy storms. Under the requirements of the permit, the QSD would be involved throughout the life of the project, there would be additional inspections and visual observations to ensure compliance with the plan, and there is an increased requirement to document and implement site corrective actions when conditions are not compliant with the plan or permit.

Construction could result in a short-term increase in the potential for flooding because materials or structures could temporarily impede or obstruct waters during a storm event. Implementing flood

protection measures during construction, such as storm monitoring and efficiently moving construction equipment out of the floodplain prior to heavy storms would prevent BIG from placing construction equipment and staged materials within the 100-year flood hazard area that would impede or redirect flood flows during a storm event during the construction phase. Flood flows and floodplain conditions during construction of BIG would be similar to existing conditions of the BIG footprint and therefore impacts are less than significant and no mitigation is required.

Operations

The floodplain study area includes the FEMA-mapped floodplain crossed by BIG. The northern portion of the BIG footprint is in FEMA Zones AO and AE (see

Figure 5.10-5: FEMA Flood Zones - BIG

). The central and southern portions are in FEMA Zone D, where flood hazards are undetermined, but possible. Much of BIG lies outside of the FEMA-designated 100-year floodplain.

BIG operations could require periodic in-water bridge maintenance activities; however, BIG operations would occur in different parts of the 100-year floodplain (see

Figure 5.10-5: FEMA Flood Zones - BIG

). These activities could require the temporary placement of vehicles and other equipment for the maintenance of bridge and drainage structures; however, operations and maintenance would not typically require excavation, cut-and-fill construction, or obstruction within the floodplain during the wet season. In addition, the person or persons responsible for water quality monitoring or the stormwater monitoring plan, usually a Qualified SWPPP Practitioner, would monitor weather conditions for heavy storms (and potential flood flows) during maintenance activities. This would allow the maintenance crew to relocate construction equipment that could impede flows and increase flood risks, to minimize the potential flood risk. Lenwood Channel would be improved and widened for approximately 11,000 linear feet from the confluence with the Mojave River to the spreading fields to the east. This new channel improvements would contain FEMA discharges within the bank and dramatically improve existing floor conditions for the Lenwood Community and the City. These alterations would be captured in a Conditional Letter of Map Revision (CLOMR)/Letter of Map Revision (LOMR) submittal to FEMA. Therefore, BIG design would avoid effects of operations on floodplains and flood risk.

Flood planning and protection measures and stormwater management, which would avoid impeding or redirecting flood flows, would be implemented during BIG operations. Therefore, impact would be less than significant, and no mitigation is required.

Impact 5.10-6: BIG: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-6: BIG Mitigation Measures: No mitigation required.

Impact 5.10-6: BIG Level of Significance After Mitigation: No significant impact would occur.

Impact 5.10-7 *In flood hazard, tsunami, or seiche zones, would the Project risk the release of pollutants due to project inundation?*

Proposed General Plan

Flood Hazards

The proposed General Plan would include policies that would mitigate flood hazard impacts and subsequently the release of pollutants due to project inundation. For example, Policy PFS-1.7 focuses on maintaining the local storm drain system for 100-year storms and collaborating with agencies to uphold regional flood-control infrastructure. Policy S-1.3 mandates that new developments adhere to current flood safety standards, while Policy S-1.4 ensures that new utilities are flood-resilient. Policy S-2.1 requires that new critical and public facilities be designed to operate during floods and reduce flood damage.

Additionally, Policies S-1.6, S-1.7, S-3.1, and H-2.3 prohibit new critical facilities, hazardous materials use, and structures for human habitation in the 100-year floodplain, with exceptions allowed only if these facilities are designed to withstand flood impacts. In addition, the Barstow Code Chapter 15.16, Floodplain Management, aims to promote public health and safety by enforcing regulations in flood-prone or erosion areas. The chapter includes restrictions on dangerous uses, construction of flood barriers, and alteration of natural floodplains. Compliance with Chapter 15.16 requires development within flood hazard zones, which can result in increased flood hazards and unnatural divergence of floodwaters. The code aims to minimize losses due to flood conditions and protect public health. For discussion on the proposed General Plan measures with handling and management of hazardous and hazardous waste and materials, refer to **Section 5.9** of this EIR.

Implementation of the proposed General Plan policies and local regulations, future development under the proposed General Plan would not increase flood hazards associated with flood zones nor would such hazards increase the risk of pollutant release, and impacts would be less than significant.

Tsunami

As the general plan area is over 85 miles northeast of the Pacific Ocean, no impacts would occur from tsunamis.

Seiches

Seiches are waves that oscillate in enclosed water bodies, such as reservoirs, lakes, and ponds, or semi-enclosed bodies of water. Seiches are triggered by moderate or large submarine earthquakes or sometimes by large onshore earthquakes. Inundation from a seiche can occur if the wave overflows a containment of an artificial body of water. Flooding due to a seiche would occupy less area than the dam inundation zones. Dam inundation areas exist along the Mojave River and in the northwestern portion of the SOI (see **Figure 5.10-6: Dam Inundation Zones – Proposed General Plan**

). The Division of Safety of Dams inspects and monitors all jurisdictional dams through the Dam Safety Program. The dams are inspected twice a year and continually monitored for seepage and settlement.

The San Bernardino County Office of Emergency Services coordinates preparedness efforts to mitigate against, plan for, respond to, and recover from natural hazards, including the possibility of dam failure. There are no State or local restrictions for development in dam inundation zones; however, each dam owner is required to prepare an Emergency Action Plan (EAP) and coordinate its response to a dam incident with local authorities. The EAP is required to include warning and notification procedures that would involve San Bernardino County's emergency notification system, San Bernardino County Office of Emergency Services, San Bernardino County Sheriff's Department, San Bernardino County Flood Control District, and the City's emergency services. In addition, Policy CM-1.7 requires coordination with agencies to ensure multiple safe crossing options for vehicles across the Mojave River and railway facilities, even during 100-year flooding and seismic events. This policy would help reduce impacts from seiches, as flooding from a seiche would affect dam inundation zones, which are present along the Mojave River. With respect to the risk of release of pollutants in the case of a seiche, the proposed General Plan would not result in a significant impact because of the distance of the Plan area from dam inundation zones and other known large bodies of water. For discussion on the proposed General Plan measures with handling and management of hazardous and hazardous waste and materials, refer to **Section 5.9** of this EIR.

Dam Inundation

Due to the downstream effect of dam failure, inundation due to dam failure is discussed separately. The New Lake Arrowhead Inundation Area and Cedar Springs Inundation Area are located in the Mojave River area and extend northwest (see **Figure 5.10-6: Dam Inundation Zones – Proposed General Plan**

). The proposed General Plan is subject to Chapter 15.16, Floodplain Management, of the Barstow Code. Flood hazard areas in the City can result in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base. The chapter aims to promote public health, safety, and general welfare by minimizing losses due to flood conditions in specific areas. Compliance with this chapter and its provisions can help reduce impacts related to all forms of inundation, including dam inundation. In addition, each dam owner is required to prepare an EAP and coordinate its response to a dam incident with local authorities required by Code of Federal Regulations (CFR) Title 18, Section 12.20c.

Therefore, with the implementation of the proposed General Plan policies, as well as federal, State, and local regulations, such as California Health and Safety Code § 25290.2(c)(2) which states that underground storage tanks shall be product-tight and constructed to prevent weakening, future development pursuant to the proposed General Plan would not increase the risk of pollutant release due to inundation, and impacts would be less than significant.

Impact 5.10-7: General Plan: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-7: General Plan: Mitigation Measures: No mitigation required.

Impact 5.10-7: General Plan: Level of Significance After Mitigation: No significant impact would occur.

Barstow International Gateway

Construction and Operations

The floodplain study area is not susceptible to inundation by a tsunami from the Pacific Ocean because of distance, in addition various topographical features exist between BIG and the Pacific Ocean that would serve as physical barriers (San Gabriel Mountains, San Bernardino Mountains, etc.). There are no large, enclosed waterbodies immediately adjacent to BIG, and there is no immediate risk of seiche in the floodplain study area.

BIG would be susceptible to potential flooding from dam failure during construction and operations. BIG would not exacerbate this existing condition or potential for flooding as a result of dam failure. Portions of the BIG footprint are within the flood inundation boundary of the Mojave River Dam, the Cedar Springs Dam, and the New Lake Arrowhead Dam. In the unlikely event of a catastrophic failure of any of these dams, water would be released downstream into the Mojave River. Depending on the volume of water released, there could be flooding effects at the river crossing that could result in inundation of portions of the BIG footprint. In the event of maximum dam release from any of the previously mentioned dams, portions of the BIG footprint could be inundated, specifically at the transload warehouses center. However, the water would take several hours to arrive, so there would be sufficient warning available to the public by the dam owner in coordination with emergency service providers. Inundation of BIG would result in the release of pollutants that are unable to be treated and captured by the on-site BMPs. However, considering the distance, overall time, and advance notification that BIG would have in the event of dam breach, there would be adequate time to ensure that any materials or contaminants are able to be separated or contained prior to inundation of BIG, thereby reducing impacts.

Furthermore, the final floor elevation (FFE) and overall foundation pad for buildings and structures to be developed by BIG within the BIG footprint would be on fill pads, placing them above potential flood paths. This would significantly reduce the risks of BIG inundation and would minimize the possibility of the release of pollutants during such events. It is worth noting that these FFEs may raise BIG out of the dam inundation zones, however, flood depths in the event of dam failure are not known and it is not possible to say for certain whether this would be the case. In addition to the grading operations raising the FFE, BIG would improve bridge crossing over the Mojave River and Lenwood Channel. These improvements to the bridges and roadways would also improve the hydrologic characteristics of the Mojave River under these bridges. In its existing condition, the Hinkley Bridge narrows the Mojave River, increasing flow velocities. BIG would widen the span of the Hinkley Bridge and allow for a slower velocity of flow which would reduce Mojave River flow's capability for scouring and further abate flood flows in this area; see **Section 3.0: Project Description**.

Building within the FEMA floodplain as well as the grading operations would raise the FFE of all construction structures above the FEMA floodplain and above the dam inundation areas, requiring a CLOMR/LOMR action. This would cause a revision to the FEMA FIRMs and would demonstrate that the risk of flooding and inundation at the affected areas of the BIG footprint would be minimized. The CLOMR/LOMR process is not required for Project approval. A CLOMR is required prior to the issuance of grading permits for specific developments within the floodplain that would alter the floodplain, while a LOMR is required prior to the issuance of certificates of occupancy to verify the alterations to the floodplain. As such, a less than significant impact would occur, and no mitigation is required.

Impact 5.10-7: BIG: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-7: BIG Mitigation Measures: No mitigation required.

Impact 5.10-7: BIG Level of Significance After Mitigation: No significant impact would occur.

Impact 5.10-8	<i>Would the Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?</i>
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Proposed General Plan

Impact 5.10-1: General Plan details measures that are in place to ensure future development has a less than significant impact on surface and ground water quality. These measures also ensure that future development does not obstruct or conflict with the implementation of the Lahontan Basin Plan or UWMP.

Impact 5.10-2: General Plan indicates that the MWA would have reliable supplies for the region through 2065, and the MWA implements monitoring and recommendations to ensure sustainability of groundwater supplies within the Mojave Basin Area. The Mojave Area Basin is adjudicated and does not require a groundwater management plan pursuant to the SGMA. Therefore, there would be no conflict with a sustainable groundwater management plan. Impacts would be less than significant, and no mitigation is required.

Impact 5.10-8: General Plan: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-8: General Plan: Mitigation Measures: No mitigation required.

Impact 5.10-8: General Plan: Level of Significance After Mitigation: No significant impact would occur.

Barstow International Gateway

Construction and Operations

The BIG footprint is within the Mojave subbasin. The site's related construction and operational activities would be required to comply with the Basin Plan for the Lahontan Region, North and South Basins by preparing and adhering to a SWPPP and WQMP. BIG would be required to show conformance prior to any approval. Implementation of BIG would not conflict with or obstruct the Basin Plan, North and South Basins and impacts would be less than significant. The BIG footprint is within the Mojave Basin – Centro Subarea, which is an adjudicated groundwater basin. Adjudicated basins, like the Mojave Basin – Centro Subarea, are exempt from SGMA because such basins already operate under a court-ordered management plan to ensure the long-term sustainability of the subbasin; see **Section 5.10.2.3**. Therefore, none of BIG's components would obstruct or prevent implementation of the management plan for the Mojave Groundwater Basin. As such, construction, and operation of the BIG footprint, would not conflict with any sustainable groundwater management plan. Impacts would be less than significant, and no mitigation is required.

Impact 5.10-8: BIG: Level of Significance Before Mitigation: Less than Significant Impact.

Impact 5.10-8: BIG Mitigation Measures: No mitigation required.

Impact 5.10-8: BIG Level of Significance After Mitigation: No significant impact would occur.

5.10.7 SIGNIFICANT UNAVOIDABLE IMPACTS

Proposed General Plan

The proposed General Plan would result in no significant unavoidable impacts concerning hydrology and water quality.

Barstow International Gateway

BIG would result in no significant unavoidable impacts concerning hydrology and water quality. As demonstrated throughout this section, all impacts would be less than significant.

5.10.8 REFERENCES

- Barstow, City of. 2015. *2015-2020 General Plan*. <https://www.barstowca.org/departments/community-development-department/planning/general-plan-and-master-environmental-impact-report>.
- California, State of, Department of Water Resources (DWR). ND. *Dam Breach Inundation Map Web Publisher*. https://fmds.water.ca.gov/webgis/?appid=dam_prototype_v2.
- EKI Environmental and Water. 2023. *Water Supply Assessment for Barstow International Gateway*.
- Federal Emergency Management Agency (FEMA). 2008 (August 28). FEMA Flood Map Service Center. <https://msc.fema.gov/portal/search?AddressQuery=barstow%2C%20ca>.
- Lahontan Regional Water Quality Control Board (LRWQCB). 2019. *Draft Technical Staff Report/ Environmental Document for Proposed Amendments to the Water Quality Control Plan*. p 14. https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/docs/mojave_river/drft_rpt_mjve.pdf.
- _____. 2021a. Lahontan Basin Plan – Chapter 1. https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/docs/2022/ch1-intro.pdf.
- _____. 2021b. *Water Quality Control Plan for Lahontan Region, Chapter 2 – Present and Potential Beneficial Uses*. Table 2-1. Beneficial Uses of Surface Waters of the Lahontan Region. https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/docs/2022/ch2-bu.pdf.
- Mojave Water Agency. 2021. *2020 Urban Water Management Plan*. pp 3-13 and 3-21 and *Figure 2.1: Water Service Area Map*. <https://www.mojavewater.org/wp-content/uploads/2022/06/MWA2020UWMPFinal061621.pdf>.
- _____. 2023a. Local Sources. <https://www.mojavewater.org/basin-management/water-supply/local-sources/>.

_____. 2023b (May 1). *Twenty-Ninth Annual Report of the Mojave Basin Area Watermaster Water Year 2021-2022*. https://www.mojavewater.org/wp-content/uploads/2023/10/29AR2122_Revised.pdf.

_____. 2025. History. <https://www.mojavewater.org/basin-management/watermaster/history/>.

San Bernardino, County of (San Bernardino). 2020a. *Countywide Plan*.
<https://countywideplan.com/policy-plan>.

_____. 2020b. *Figure IU-4 Regional Flood Control Facilities*.
<https://www.arcgis.com/apps/webappviewer/index.html?id=dd83d0a0ab4941048f16ea787d60d381>.

U.S. Army Corps of Engineers (USACE). 2019. *Army Corps reclassifies Mojave River Dam risk characterization*. <https://www.spl.usace.army.mil/Media/News-Releases/Article/2006597/army-corps-reclassifies-mojave-river-dam-risk-characterization/#:~:text=The%20U.S.%20Army%20Corps%20of,the%20dam%20and%20overtop%20it>.

U.S. Environmental Protection Agency (U.S. EPA). ND. *Waters GeoViewer*.
<https://www.arcgis.com/apps/mapviewer/index.html?webmap=e08dc9c98dde4e1c9c98c0b8d92a5302>.

U.S. Geological Survey. 2001. *Water Supply in the Mojave River Ground-Water Basin, 1931-99, and the Benefits of Artificial Recharge*. <https://pubs.usgs.gov/fs/fs-122-01/pdf/fs-122-01.pdf>.

_____. ND. National Water Information System: USGS Groundwater Data for the Nation.
<https://waterdata.uspndgs.gov/nwis/gw>.