CHAPTER 3.6 HYDROLOGY AND DRAINAGE
TABLE OF CONTENTS

3.6 HYDROLOGY AND DRAINAGE 3.6-1

3.6.1 EXISTING SETTING 3.6-1
3.6.2 POTENTIAL ENVIRONMENTAL EFFECTS 3.6-6
3.6.3 IMPACT ANALYSIS 3.6-8
3.6.4 MITIGATION MEASURES 3.6-15
3.6.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION 3.6-15

Exhibits

EXHIBIT 3.6-1 PHOTO OF THE PALO VERDE 3.6-3
EXHIBIT 3.6-2 FLOOD AND DAM INUNDATION AREAS 3.6-5

Tables

TABLE 3.6-1 BLYTHE, CALIFORNIA CLIMATE SUMMARY (7/1/1948 TO 9/30/2005) 3.6-2
TABLE 3.6-2 MINIMUM BUILDING PAD ELEVATIONS 3.6-13
TABLE 3.6-3 CONDITIONS AT BLYTHE (ELEVATION = ±270 FEET) IN THE EVENT OF DAM FAILURES 3.6-14

3.6 HYDROLOGY AND DRAINAGE

This section presents an assessment of potential environmental effects of the Proposed Project on hydrology, surface drainage and water quality.

3.6.1 EXISTING SETTING

REGIONAL AND LOCAL CONDITIONS

The City of Blythe is a desert community located west of the Colorado River, which forms the California-Arizona boundary. The region's landscape consists of old, generally flat, river terraces associated with the Colorado River. Urban land development is generally clustered along the I-10 freeway corridor.

The Palo Verde Irrigation District (PVID) provides water for irrigation use that is diverted from the Colorado River at the Palo Verde Diversion Dam (shown in Exhibit 3.6-1) and conveyed through 244 miles of main canals and laterals to serve up to 120,500 acres of land in the Palo Verde Valley. Irrigation return flows are collected in a 141 mile drainage system and returned to the Colorado River (PVID 2006). Regional surface drainage within the Palo Verde Valley flows east/southeast to the Colorado River.

The State Water Resources Control Board has jurisdiction over nine Regional Water Quality Control Boards (RWQCB), whose charge it is to identify and implement water quality objectives. The Planning Area falls under the authority of the Colorado River Basin Board (Region 7), and is located within the Colorado River Basin. The Water Quality Control Plan (Basin Plan) which affects this hydrologic sub-basin was most recently revised in 1993.

Declining water quality is a concern in the Blythe planning area because of potential public health effects and potential effects of polluted discharges on aquatic life. Although the Planning Area is not yet subject to the National Pollutant Discharge Elimination System permitting process because the Planning Area's existing population is less than 100,000, the General Plan incorporates both Guiding Policies and Implementation Policies to address water quality issues. Given current population growth projections, the City will not become subject to the permit requirements during this Plan's time frame.

Groundwater depth in the Blythe Planning area ranges from three feet to 18 feet below ground surface (bgs); (Landmark, 2005). Applied irrigation water and flows in the Colorado River are the dominant source of recharge of groundwater into the water table, and the primary direction of groundwater flow is to the south to southeast. Direct precipitation and seepage through unlined PVID canals are secondary sources of recharge.

Groundwater in the area is part of the Colorado Hydrologic Unit (HU 715.00) of the Colorado River Planning Area. Regional groundwater is generally contained in unconfined aquifers up to 700 feet bgs. Confined aquifer zones likely exist beyond 700 feet bgs in some areas of the planning area. Groundwater in the Colorado HU is listed as having existing beneficial uses for municipal and domestic supply, agricultural supply and industrial service supply uses.

Based on a review of available well drillers reports obtained from the City of Blythe and the California Department of Water Resources (DWR), shallow groundwater occurs in the Blythe planning area within poorly graded sand and gravelly sand, historically starting as shallow as three feet below ground surface. Groundwater pumping and variances in water levels within the Colorado River have likely caused a general reduction in the groundwater surface elevation in the project area. Groundwater gradient flows generally from the northwest to the southeast towards the Colorado River.

Climate and Precipitation

Blythe is located in the Colorado Desert (a subdivision of the Sonoran Desert) and the climate is characterized by low annual precipitation, low relative humidity and high summer temperatures. Mean annual rainfall at the Blythe Airport is 3.61 inches (see **Table 3.6-1**). Precipitation is typically concentrated in the summer period (July-October). Summer storms originating in Baja California often release substantial amounts of rain in short periods (PVID 2002).

TABLE 3.6-1 BLYTHE, CALIFORNIA CLIMATE SUMMARY (7/1/1948 TO 9/30/2005)

Climate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max Temperature (°F)	66.7	71.9	78.4	86.4	95.1	104.4	108.4	106.6	101.4	89.8	75.7	66.7	87.6
Average Min Temperature (°F)	41.5	45.5	50.2	56.6	64.4	72.6	80.9	80.1	73.0	60.9	48.5	41.3	59.6
Average Total Precipitation (inches)	0.48	0.45	0.36	0.17	0.02	0.02	0.25	0.64	0.36	0.26	0.19	0.42	3.61

Source: Western Regional Climate Center

Surface Water Hydrology

The Blythe planning area is located on an alluvial terrace formed by deposition within the lower Colorado River basin. The Colorado River drainage basin includes portions of seven states, and a significant region of northern Mexico. A series of dams in both the Upper Colorado River Basin and the Lower Colorado River Basin control the Colorado River for the purposes of water supply, flood management, hydropower generation, recreation, and habitat uses. Water supply in the River is allocated by interstate compact and international treaty. Surface water in the Blythe region is depicted in **Exhibit 3.6-1**.

The PVID canals and drain system consists of about 244 miles of main and lateral canals that divert and route Colorado River water to a maximum of 120,500 acres of cultivated land in the Palo Verde Valley and adjacent Mesa. Another 141 miles of drainage system collect and return water to the River. Please refer to **Chapter 3.7** of this PEIR for a summary of the Palo Verde Irrigation District system.



EXHIBIT 3.6-1 PALO VERDE DIVERSION DAM ON THE COLORADO RIVER

Groundwater Conditions and Quality

The Proposed Project area is underlain by the Palo Verde Valley Groundwater Basin that covers approximately 200 square-miles. Irrigated agriculture was first initiated in the Blythe area in the late 1800s. As a result of widespread irrigation, the groundwater table level also increased (PVID 2002). Drainage networks were built to prevent groundwater levels from reaching the ground surface. Agricultural water supplies are primarily provided via surface canals from the Colorado River and are administered by the Palo Verde Irrigation District.

The groundwater basin underlying Blythe supplies the majority of municipal water demands of the Planning Area. The groundwater system is sustained by applied irrigation water, infiltration from the Colorado River, and to a much lesser degree by direct infiltration of precipitation and recharge from local surface water drainage washes. There is no evidence of overdraft in the Planning Area.

The Palo Verde groundwater basin ranges from the Colorado River on the east, the Palo Verde Diversion Dam and the Big Maria Mountains on the north, the Palo Verde Mesa on the west, and the Palo Verde Mountains to the south. The principal water-bearing deposits in the Palo Verde Valley Groundwater Basin are two units of Colorado River alluvium overlying the upper Bouse Formation limestone (the middle unit is composed of an interbeded clay aquatard), and a fanglomerate deposit of course older alluvium deposited under older (Miocene) high flow

regimes (Blythe 2006). Groundwater aquifer levels in the Palo Verde Valley have been observed ranging from 3.9 to 22.6 feet below the surface (PVID 2002).

Domestic water for the City of Blythe is obtained from 14 deep water wells and 5 storage tanks capable of storing 4.0 million gallons of water. The City supplies approximately 1.75 billion gallons of water per year to the City and Sphere of Influence area (Blythe 2006). Please refer to Chapter 3.10 for an overview of the City's water supply system.

The predominant chemical character of groundwater in the Colorado Desert is sodium sulfate or sodium chloride. Calcium and bicarbonate are also present in significant concentrations in some areas which is typical of the water chemistry of the Colorado River – Sonoran Desert area. With normal treatment, this water meets drinking water standards.

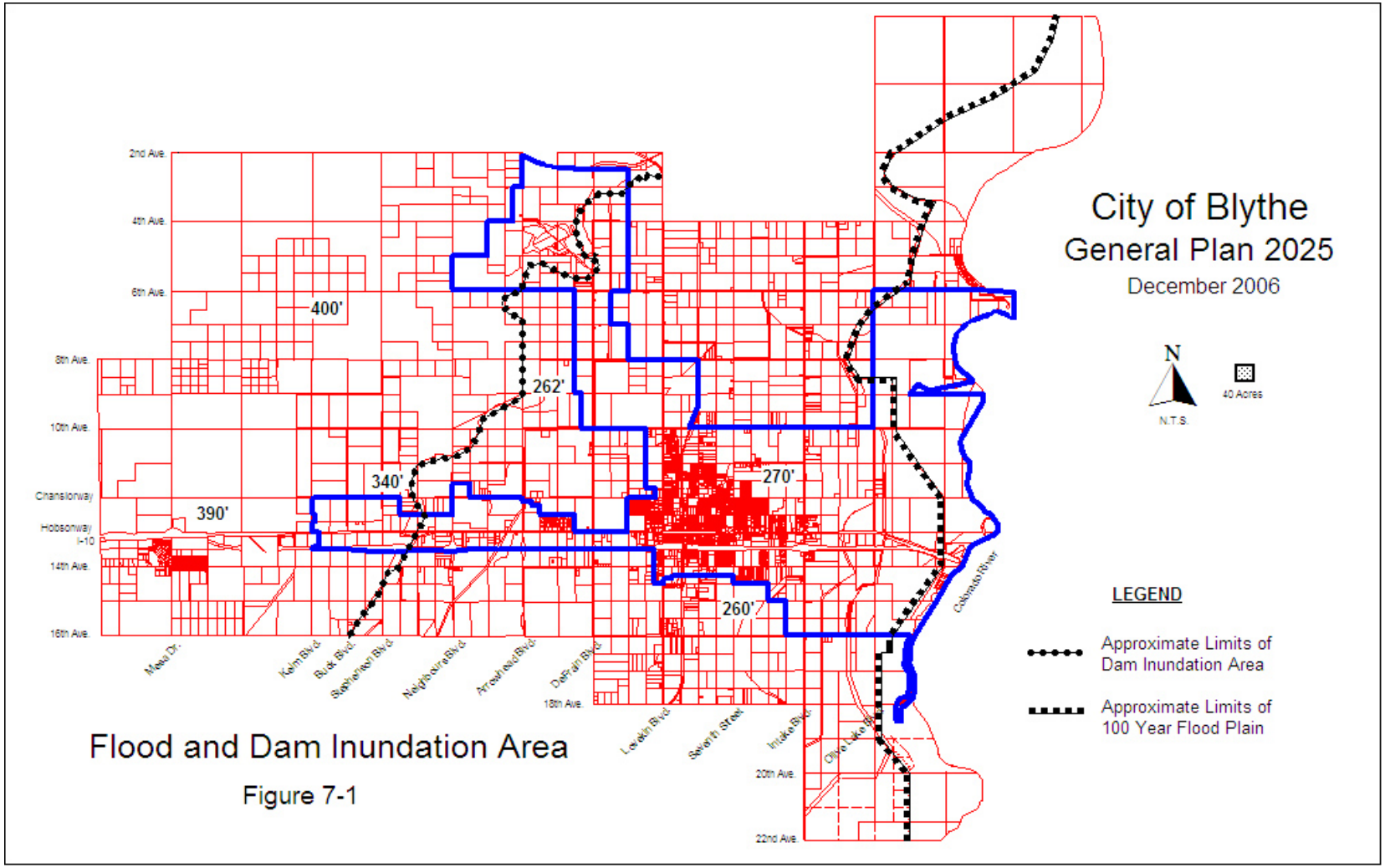
Extensive agricultural production offers the potential for high nitrate concentrations. However, this is not the case locally; (Don Park, Assistant Public Health Engineer, Riverside County Department of Environmental Health). Extensive testing of groundwater in the Planning Area by the Department of Environmental Health has not found nitrate levels that exceed the State's Maximum Contaminant Level (45 mgl). Park noted that this may be because the extensive irrigation system utilized in the Blythe area flushes the nitrates away. The eventual transition of residences from septic systems to wastewater treatment service and limitations on the issuance of new septic system permits may serve to further safeguard Blythe's groundwater from higher nitrate levels in the future.

Because lands used for agricultural production are subject to surface water flows that carry particles away from the site, there is the potential for this to result in downstream sedimentation, which can impair drinking water, as well as adversely affect fisheries and water-related habitat. In addition, toxic substances may bind to soil particles, which serve as "taxis" to distribute and circulate contaminants throughout surface water systems.

Floodplains and Flooding Hazards

The Federal Emergency Management Agency (FEMA) has mapped special flood hazard areas, which includes lands subject to a 100-year flood, defined as an area that has a one percent (1%) chance of being flooded in any given year. According to FEMA, the planning area is not located within a 100-year flood hazard zone.

Flooding potential of the Colorado River has been substantially reduced in the last 100 years. However, localized flooding did occur in the 1980s as a result of water released from dams located upstream of the Palo Verde Valley. Other potential sources of flooding are tributary drainage below Parker Dam, including McCoy Wash. Floods are still a possibility, but the magnitude, frequency, and destructive potential have been greatly reduced as a result of flood control facilities and storm drainage systems. **Exhibit 3.6-2** shows flood and dam inundation areas.



Flood and Dam Inundation Area

Figure 7-1

General Plan 2025 Program EIR

Flood and Dam Inundation Area

Exhibit 3.6-2

General Plan 2025

The following policies in the General Plan provide for the protection or water quality, reduce impacts related to drainage, erosion, and siltation, and to control and reduce impacts related to run-off and flood hazards:

GUIDING POLICIES: Water Quality

19. Policy: Enhance the quality of surface water resources of the Planning Area and prevent their contamination.

20. Policy: Comply with the Regional Water Quality Control Board's regulations and standards to maintain and improve groundwater quality in the Planning Area.

21. Policy: Where feasible, given flood control requirements, maintain the natural condition of waterways and flood plains and protect watersheds to ensure adequate groundwater recharge and water quality.

GUIDING POLICIES: Flood Hazards and Storm Drainage

1. Policy: Coordinate with regional bodies to design storm drain improvements to accommodate storm water.

2. Policy: Locate and improve deficiencies in the storm drain system.

3. Policy: Require new developments to upgrade storm drains to handle the increased runoff generated from a developed site or mitigate the increase in stormwater through the use of detention and retention areas.

4. Policy: Protect the public's safety from flooding hazards.

General Plan 2025 also includes the following policies which would ensure that the water supply infrastructure is in place to serve future developments:

GUIDING POLICIES: Water Supply and Wastewater Service

10. Policy: Promote orderly and efficient expansion of public utilities to meet projected needs.

11. Policy: Encourage water conservation with incentives for decreased water use and active public education programs.

12. Policy: Coordinate capital improvements planning for all municipal service infrastructure with the direction, extent, and timing of growth.

13. Policy: Establish equitable methods for distributing costs associated with providing water and wastewater service to development, including impact mitigation fees where warranted.

3.6.2 POTENTIAL ENVIRONMENTAL EFFECTS

METHODOLOGY

This section evaluates the potential environmental impacts of the Proposed Project on hydrology and drainage. Adoption of the General Plan would not result in direct construction or other ground disturbing activities. Implementation of individual development projects within the Blythe area would have the potential for direct effects on hydrology and drainage and mitigation measures to substantially reduce or eliminate any significant adverse impacts.

THRESHOLDS OF SIGNIFICANCE

The significance threshold for potential impacts was determined based upon the CEQA Guidelines (CCR §§ 15000-15387, Appendix G) and other relevant considerations including the City of Blythe policies and requirements. The Proposed Project would be considered to have a potentially significant impact on hydrology and/or water quality if it would:

- ***Violate any water quality standards or waste discharge requirements;***
- ***Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);***
- ***Substantially alter the existing drainage pattern of the site, including through alteration of the course of a stream or river, or substantially increase the rate or volume of surface runoff in a manner that would:***
    - ***i) result in flooding on- or off-site;***
    - ***ii) create or contribute runoff water that would exceed the capacity of existing or planned stormwater discharge; or***
    - ***iii) provide substantial additional sources of polluted runoff;***
- ***Substantially alter the existing drainage pattern of the site, including through alteration of the course of a stream or river, or substantially increase the rate or volume of surface runoff in a manner that would result in substantial erosion or siltation on-or off-site;***
- ***Otherwise substantially degrade water quality;***
- ***Place housing or other structures which would impede or re-direct flood flows within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;***
- ***Expose people or structures to a significant risk of loss, injury, or death involving flooding:***
    - ***i) as a result of the failure of a dam or levee; or***
    - ***ii) from inundation by seiche, tsunami, or mudflow;***
- ***Change in the water volume and/or the pattern of seasonal flows in the affected watercourse result in:***
    - ***i) a significant cumulative reduction in the water supply downstream of the diversion;***
    - ***ii) a significant reduction in water supply, either on an annual or seasonal basis, to senior water rights holders downstream of the diversion;***
    - ***iii) a significant reduction in the available aquatic habitat or riparian habitat for native species of plants and animals;***
    - ***iv) a significant change in seasonal water temperatures due to changes in the patterns of water flow in the stream; or***

v) a substantial increase or threat from invasive, non-native plants and wildlife.

3.6.3 IMPACT ANALYSIS

The impact analysis section of this chapter is organized according to the thresholds of significance identified above.

Would the project violate any water quality standards or waste discharge requirements?

Adoption of the Proposed Project would not involve any construction or activities that would result in water quality or waste discharge. However, future land development projects may result in short term and long term changes to site drainage patterns and the quality of the surface runoff in the planning area. As recognized in water quality policy number 20, all future developments are required to conform to the water quality standards and waste discharge requirements as enforced by the RWQCB.

Implementation of guiding policies in *General Plan 2025* would also ensure that future developments do not violate water quality standards or waste discharge requirements. These include:

- Require that new residential development at a density greater than one unit per acre and commercial and industrial areas annexed to the City be connected to the City's wastewater collection system. Existing residential development and individual houses where septic systems have failed should also be connected to the system in those areas where systems exist.
- Require use of Best Management Practices to control runoff from all new development within the Planning Area.
- Require older houses to convert to low-flow water systems upon sale or as a condition of approval of a major alteration or addition.

Impacts to water quality standards and waste discharge requirements would be less than significant with the implementation of the *General Plan 2025* policies and adherence to City standard practices at the programmatic level. Specific mitigation measures may be required and will be identified on a project-specific basis.

Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Adoption of the Proposed Project would not result in depleting groundwater supplies or interfere substantially with groundwater recharge. Total water use for developed City lands is equivalent to the consumptive water use for irrigated agriculture on an acre for acre basis, so long term land

development as envisioned in the *General Plan 2025* will not increase regional water use. Future development projects will result in increased demand for City water supply services.

In addition to the General Plan policies, the resource-based standards in the General Plan for public facilities/services require residential developments over 10 units and commercial and industrial developments over two acres to conduct a water supply study to demonstrate that adequate water facilities are available and that the project design includes water conservation measures. Adherence to City standard practices and implementation of the policies above ensure that future development demands are supported by the water supply. Therefore, impacts would not be significant.

Would the project substantially alter the existing drainage pattern of the site, including through alteration of the course of a stream or river, or substantially increase the rate or volume of surface runoff in a manner that would:

- ***i) result in flooding on- or off-site;***
- ***ii) create or contribute runoff water that would exceed the capacity of existing or planned stormwater discharge; or***
- ***iii) provide substantial additional sources of polluted runoff?***

Adoption of the General Plan would not directly result in the alteration of existing drainage patterns throughout the project area or substantially increase the rate or volume of surface runoff. Future development guided by *General Plan 2025* will result in increased impervious surfaces, which may result in flooding on- or off-site at certain locations**.** The City's existing storm drain system and flood control facilities generally have sufficient capacity to provide developed areas with adequate protection from flooding. However, the *Master Plan of Stormwater* (October 1984) identifies localized areas of the City currently needing drainage improvements as well as areas which will require improvements in conjunction with future development. The City has recently initiated efforts to conduct a comprehensive update of the *Master Plan of Stormwater*, which should be completed in 2007.

Other areas of the City requiring drainage improvements, either currently or in conjunction with anticipated future development include the Hidden Beaches and Mesa Bluff Developments and East Blythe. *The Master Plan of Stormwater* provides further details on the specific improvements that are required, including cost estimates and a priority schedule to be included in the City's Capital Improvements Plan.

Implementation policies contained in *General Plan 2025* would ensure future run-off and flood hazards impacts are reduced and are provided below:

- Require use of Best Management Practices to control runoff from all new development within the Planning Area.
- Identify and construct needed local and regional storm drain improvements to prevent local flooding problems in the city.
- Require stormwater mitigation measures as part of all new development approvals.

- Implement to the maximum extent possible actions outlined in the City of Blythe Master Plan of Stormwater to eliminate existing and potential flooding hazards in the City.
- Adopt the Master Plan of Drainage for the City of Blythe as a sub-element of the Public Facilities, Utilities, and Services Element.
- Land uses and flood control facilities shall be designed so that no structures of substantial value for human use or habitation exist in flood hazard areas.
- Land uses and flood control facilities shall be designed so that structures for human use or habitation are capable of surviving anticipated flood levels without major structural damage.
- Construction and preservation of flood retention/detention facilities shall be required as part of all development approval.

In addition to the *General Plan 2025* policies above, the resource-based standards in the General Plan for public facilities/services require all projects in the vicinity of McCoy wash and all projects over two acres in other drainage areas to prepare a detailed storm drainage study. Future developments would be required to incorporate run-off reduction methods, and pay a fee proportionate to the run-off produced.

Adherence to City standard practices and implementation of the policies above would reduce flooding, stormwater, and runoff impacts to less than significant. Therefore, impacts at the programmatic level are less than significant.

Would the project substantially alter the existing drainage pattern of the site, including through alteration of the course of a stream or river, or substantially increase the rate or volume of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site?

Adoption of the Proposed Project would not directly result in the alteration of existing drainage patterns or increase the rate or volume of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site. However, future developments may increase the rate or volume of surface runoff, which may result in increased erosion or siltation on- or off-site. The undeveloped hillsides and mesas within the City could experience substantial erosion from runoff if the vegetation cover is destroyed by fire or removed by grading operations. The General Plan recognizes the potential of slope erosion on lands with steep slopes and states that development on lands having a slope of 15% or greater should be avoided.

Implementation policies to control erosion and run-off include the following:

- Revise the City's grading ordinance, when appropriate, to reflect any modifications to the grading guidelines in the Uniform Building Code.
- Require use of Best Management Practices to control runoff from all new development within the Planning Area.
- Require developers to be responsible for supplying a preventive maintenance program for all major manufactured slopes.

In addition to the policies above, the resource-based standards in the General Plan for public facilities/services require all projects in the vicinity of McCoy wash and all projects over 2 acres in other drainage areas to prepare a detailed storm drainage study. Future developments would be required to incorporate run-off reduction standards, and payment of a fee proportionate to the run-off produced.

Implementation of the *General Plan 2025* policies, implementation policies, and adherence to City standard practices would reduce impacts related to erosion or siltation to less than significant at the programmatic level.

Would the project otherwise substantially degrade water quality?

Adoption of the Proposed Project would not result in degradation of water quality. Future developments guided by the General Plan may increase the rate or volume of surface runoff, erosion or siltation on- or off-site, which may ultimately degrade water quality. Implementation of *General Plan 2025* policies will minimize impacts to water quality.

The extensive agricultural use in the area offers the potential for high nitrate concentrations in groundwater. However, groundwater testing conducted by the Riverside County Department of Health has found that nitrate levels do not exceed the State's Maximum Contaminant Level (45 mgl) (Blythe 2006). This may be due to the extensive irrigation and agricultural drain system in the Blythe area which flushes the nitrates away. The following implementing policies will help minimize future potential impacts to water quality and maintain low nitrate levels in the groundwater in the future:

- Require that new residential development at a density greater than one unit per acre and commercial and industrial areas annexed to the City be connected to the City's wastewater collection system. Existing residential development and individual houses where septic systems have failed should also be connected to the system in those areas where systems exist.
- Maintain an inventory of known sources of groundwater and soil contamination within the Planning Area, including underground storage tanks, landfills, septic tanks, agricultural and industrial uses and prepare annual reports of groundwater quality and efforts being undertaken to eliminate groundwater and soil contamination.
- Require use of Best Management Practices to control runoff from all new development within the Planning Area.
- Require older houses to convert to low-flow water systems upon sale or as a condition of approval of a major alteration or addition.

Implementation of these Guiding policies, implementation policies, and adherence to City standard practices would reduce impacts related to water quality to less than significant at the programmatic level. Future projects are subject to impact analysis and specific water quality mitigation measures will be identified as applicable for each project.

Would the project place housing or other structures which would impede or re-direct flood flows within a 100-yr. flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

Adoption of the Proposed Project would not result in construction that places housing or other structures within a 100-year flood hazard area or other flood hazard delineation map. However, future development may be proposed within flood hazard zones. The Bureau of Reclamation has determined the 100-year flood hazard zone is 270 feet above mean sea level (msl). The 100-year flood zone area extends from the Colorado River to just west of Neighbours Boulevard (Riverside County 2006).

In Blythe, potential flood hazards may result from overflow of natural watercourses and man-made drainage systems due to excessive and unusual storm run-off. While the flooding potential of the Colorado River has been substantially reduced in the last century, flooding did occur in the 1980s as a result of water released from dams located upstream of the Palo Verde Valley. Other potential sources of flooding are tributary drainage below Parker dam including McCoy Wash. Significant floods are still a distinct possibility. However, the magnitude, frequency and destructive potential have been greatly reduced due to the number of dams and control structures along the Colorado River.

The following General Plan implementing policies will help minimize future flood hazards:

- Implement to the maximum extent possible actions outlined in the City of Blythe Master Plan of Stormwater to eliminate existing and potential flooding hazards in the City.
- Land uses and flood control facilities shall be designed so that no structures of substantial value for human use or habitation exist in flood hazard areas.
- Land uses and flood control facilities shall be designed so that structures for human use or habitation are capable of surviving anticipated flood levels without major structural damage.
- Construction and preservation of flood retention/detention facilities shall be required as part of all development approval.

Future developments proposed along the Colorado River would be at greater risk for flood hazards and would be subject to the policies in the CRCP. The CRCP has established an Open Space/Park designation which may include sensitive habitats such as riparian corridors and woodlands, wetlands, groundwater recharge areas, golf courses and other recreational facilities, power transmission line corridors, viewshed management areas, and areas subject to flooding.

In addition, the CRCP has the following implementing policies to reduce potential impacts from flooding:

- Require geotechnical and flooding studies as a mandatory submittal requirement for all new development projects within the CRCP area.
- Require the incorporation of best available technology and recommendations from geotechnical and hydrology studies into the project design, prior to project approval, to

ensure structural stability for foundations and to minimize potential flooding impacts to new development.

Minimum building pad elevations required for future developments within the Colorado River Corridor Plan are shown in **Table 3.6-2**.

TABLE 3.6-2 MINIMUM BUILDING PAD ELEVATIONS

From Second Avenue to Hidden Beaches	+ 275.0‘ mean sea level
From Hidden Beaches to the Colorado River 500	+ 271.5’ mean sea level
From the Colorado River 500 to Quechan Park	+ 267.5’ mean sea level
From Quechan Park to 16th Avenue on Riviera Drive	+ 265.5’ mean sea level
From 16th Avenue/Riviera Drive to Goose Flats	+ 264.5’ mean sea level

Strict adherence to these elevations will ensure that no structures are located within a 100-year flood hazard zone. Implementation of *General Plan 2025 policies*, CRCP policies, implementation policies, and adherence to City standard practices would reduce impacts related to flood hazards to less than significant at the programmatic level. Future developments may be required to incorporate site specific mitigation measures on a project-by-project basis.

Would the project expose people or structures to a significant risk of loss, injury, or death involving flooding:

i) as a result of the failure of a dam or levee?

ii) from inundation by seiche, tsunami, or mudflow?

Adoption of *General Plan 2025* would not directly result in construction which would expose people or structures to significant loss, injury, or death involving flooding as a result of a dam or levee failure or from inundation by seiche, tsunami, or mudflow. The Blythe planning area is not adjacent to a large body of water, such as the ocean or a lake subject to tsunami events. The Proposed Project area is fairly flat and is not subject to mudflows.

Future development along the Colorado River is subject to the failure of numerous dams and water control facilities that exist upstream of the City of Blythe. The Colorado River is damned approximately 60 miles upstream of the City at Parker Dam, and the Palo Verde Diversion Dam is located approximately 9 miles north of Blythe. It would take a catastrophic event such as a total dam failure to compromise the integrity of Parker Dam and the Palo Verde Diversion Dam. The likelihood of this event to occur is considered extremely remote according to the Bureau of Reclamation, (ECI, 2000).

The U.S. Bureau of Reclamation conducted a study in 1993 of inundation potential along the Colorado River by modeling failure of combinations of Hoover, Davis, and Parker Dams as follows (ECI 2000):

1) Failure of Hoover Dam resulting in the subsequent failure of Davis Dam and Parker Dam *(peak flow=24.2 million cubic feet per second (cfs)).*

2) Failure of Davis Dam resulting in the subsequent failure of Parker Dam *(peak flow=3.4 million cfs))*.
3) Failure of Parker Dam *(peak flow=600,000 cfs).*
4) A major storm inflow routed through Hoover Dam *(peak flow=341,000 cfs).*

The following table shows the conditions at Blythe in the event of the dam failures:

TABLE 3.6-3 CONDITIONS AT BLYTHE (ELEVATION = ±270 FEET) IN THE EVENT OF DAM FAILURES

Scenario	Peak Flow (cfs)	Max. Water Surface Elevation	Travel Time (hours)
Failure of Hoover, Davis and Parker	6.1 million	331	33
Failure of Davis and Parker	500,000	283	43
Failure of Parker	360,000	280	23
Major storm release from Hoover	313,000	279	

Source: Earth Consultants International, 2000.

Adoption of the Proposed Project neither increases nor decreases the likelihood of a flood event related to a dam failure on the Colorado River. Requiring minimum building pad elevations to be developed several feet above the 100-year flood plain substantially minimizes the risk of flooding and inundation in the event of an upstream dam failure. However, while this risk is reduced it is not entirely avoided. In the unlikely event of an upstream dam failure, there is a minimum of 23 hours estimated before the waters reach the Blythe area. The City of Blythe also has an Emergency Operations Plan in place which designates the proper procedures to follow in the case of a major emergency or disaster.

Flooding along PVID's irrigation canals could potentially occur as a result of a break or failure in the irrigation canals and drains. The potential severity of this effect increases to the extent the elevation of adjacent property is lower than the elevation of water in the canals or drains. A mitigation measure to reduce potential impacts is identified in the following section.

Would the change in the water volume and/or the pattern of seasonal flows in the affected watercourse result in:

i) a significant cumulative reduction in the water supply downstream of the diversion?

ii) a significant reduction in water supply, either on an annual or seasonal basis, to senior water rights holders downstream of the diversion?

iii) a significant reduction in the available aquatic habitat or riparian habitat for native species of plants and animals?

iv) a significant change in seasonal water temperatures due to changes in the patterns of water flow in the stream?

v) a substantial increase or threat from invasive, non-native plants and wildlife

Adoption of the Proposed Project would not directly result in any of the above effects. The sole source of municipal water to the Planning Area is City supplied groundwater. The City's groundwater does not measurably affect downstream Colorado River flows, change the water supply downstream, or reduce water supply to users downstream, nor will it result in seasonal water temperature changes. On an average per acre basis, water demand for developed land uses is equal to or slightly less than agricultural-related water demand, and future developments guided by *General Plan 2025* would result in increased demand from the City's groundwater system, and reduced demand for irrigation water from PVID's surface water system. For additional information on water supply and use, please refer to the Water Supply Assessment contained in **Appendix E** of this PEIR.

Resource-based standards in the General Plan for public facilities/services require residential developments over 10 units and commercial and industrial developments over two acres to conduct a detailed water supply assessment to assess whether adequate water system facilities are available based on basin-wide studies. Individual projects are also encouraged to incorporate water conservation measures into overall project design.

Adherence to City standard practices and implementation of the General Plan guiding and implementation policies will ensure that future development demands are fully supported by the existing water supply, and development envisioned in *General Plan 2025* does not pose potentially significant impacts to local or regional water supplies.

3.6.4 MITIGATION MEASURES

1. Hydrology studies shall be required for development projects and shall include calculations of 10-year and 100-year storm events, provide for the retention of 10 year storm flows on-site, and determine pad elevations required to protect structures from inundation from a 100-year storm.

3.6.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impacts related to hydrology and drainage would be significant with implementation of the mitigation measure listed above.