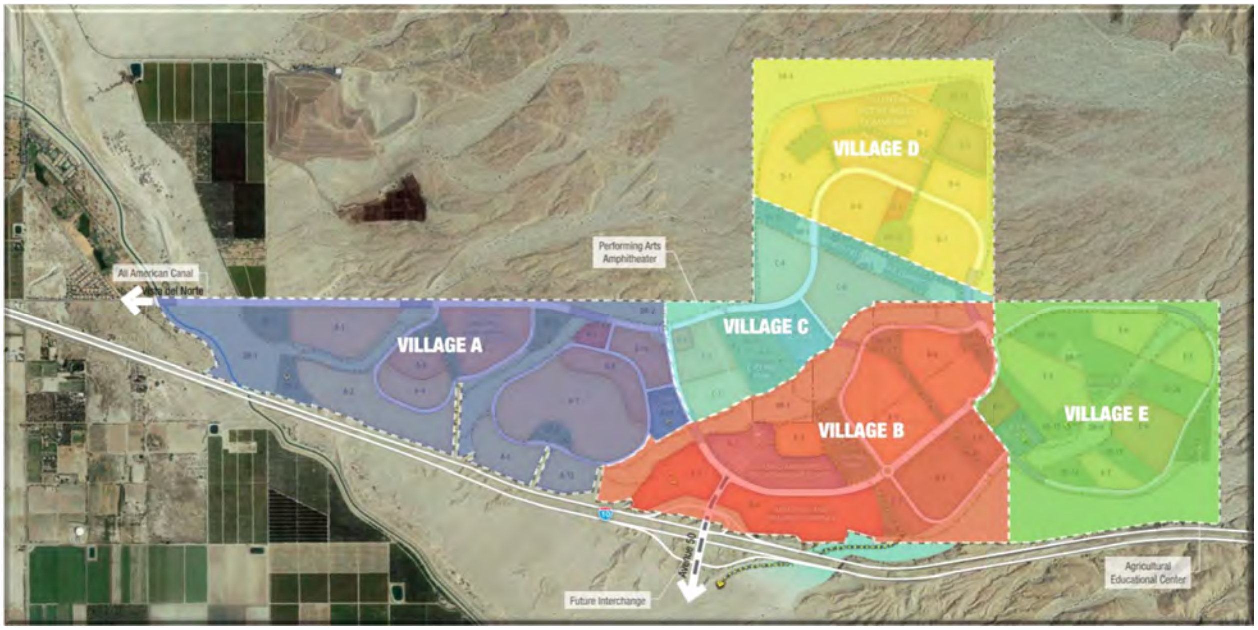
Appendix H1: Drainage Master Plan

KPC Coachella Specific Plan

DRAINAGE MASTER PLAN

City of Coachella and County of Riverside, California



Draft in Progress
R-3 Report: Flood Hazard Mitigation

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Appendix

A Excerpts from La Entrada Specific Plan Development: Drainage Master Plan Final Report, Sections 1 - 2.2, Geomorphic watershed assessment for the upper piedmont.

Exhibit

A Local Hydrology Map (24” x36” Map)

Electronic Technical Appendix

Provided electronically

AES Models
HEC-HMS Models
FLO-2D Models

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1 INTRODUCTION

1.1 Project overview

The KPC Coachella Specific Plan is a new master planned community located at the eastern entrance to the City of Coachella. The project site is located about three miles northeast of the City center in the foothills of the Little San Bernardino Mountains overlooking the City, with views across the Coachella Valley to the San Jacinto and Santa Rosa Mountains. The physical composition of the site is open hilly undeveloped desert land with little existing vegetation aside from small trees, shrubs, and grasses. Broad natural drainage corridors run diagonally through the site. This 2,800-acre project will provide a mixture of land uses intended to create a vibrant, cohesive entrance to the City, with villages and neighborhoods that are unique, yet compatible with, surrounding existing and planned neighboring areas. The Project will provide additional commercial, residential, educational, employment, and recreational opportunities for residents and visitors within the City.

The Specific Plan Area is situated on a piedmont bajada composed of steep-sloped active and relict alluvial fans at the base of the Little San Bernardino Mountains. The project site is bounded by Interstate 10 to the south and the Eastside Dike to the west, the development site is surrounded to the north and east by predominately undeveloped land. As runoff flows from the mountain canyons it reaches the alluvial fans and disperses into a poorly defined network of braided channels. The middle portions of the watershed areas are defined by active and relict alluvial fans with braided flow patterns. In some areas, the braided channels confluence in or near the project site to become better-defined ephemeral stream channels with banks and clearly defined terraces.

It is recognized that the existing flood hazards must be addressed with a comprehensive flood hazard management plan since it represents one of the primary constraints in ensuring the ability to develop the project site. The plan will be developed through the application of specific design criteria, evaluation of the watershed, and guidelines adapted for these conditions.

The purpose of this Drainage Master Plan is to determine the project-related impacts to existing hydrology, floodplains, and drainage/flood control features, and identify appropriate flood control and local drainage improvements necessary for the planned development. The Drainage Master Plan addresses both regional and local impacts, flood hazard mitigation requirements, and design constraints/features. The Drainage Master Plan is based on the requirements of the Coachella Valley Water District (CVWD), County of Riverside, and the City of Coachella.

KPC Coachella site is shown in Figure 1-1 (regional vicinity map), Figure 1-2 (local vicinity map), Figure 1-3 (conceptual land use plan), and Figure 1-4 (village organization plan).

1.2 Project description

The 2,800-acre project site includes a mixture of land uses in five (5) distinct villages. The plan proposes the following main land uses:

- A mix of approximately 9,200 residential units on 1,200 acres (including a portion of those units programmed as an active adult community);
- 62-acre Casino and Hotel Entertainment district, including a performing arts center;
- 136 acres of mixed-use commercial, office, and wellness uses;
- 60 acres of educational uses including two elementary schools and 1 middle school;
- 1,160 acres of open spaces, parks, trails, greenways, undisturbed natural open space, and
- agricultural production areas; and
- An interconnected multi-modal circulation system for vehicles, pedestrians, and bicycles.

The project proposes two connection points to the existing roadways within the City. The main entry into the project will be through sharing of a new interchange proposed by the La Entrada Specific Plan directly to the south. Additionally, the extension of Vista Del Norte from the west will provide access to Dillon Road and the rest of the City.

The plan area has approximately 1,170 acres of open space, including parks, greenways, amenity centers, agricultural production, and drainage. These spaces create opportunities for both active and passive recreation as well as programmed sport courts and fields to host local leagues and tournaments.

Several drainage channels needed to facilitate the movement of water throughout the site run at a diagonal from northeast to southwest as well as along the perimeter of the plan area. These are undisturbed open space areas that allow for hiking, walking, cycling and other activities such as nature photography or educating residents and visitors on the local ecosystem through signage programs.

1.3 Goals and objectives

The purpose of this document is to provide a detailed watershed assessment, including regional and local hydrology, flood hazard analysis, hydraulics, and sedimentation in order to develop a drainage master plan for the KPC Coachella development. The overall goal of this study is to provide the appropriate level of flood protection for the public, non-CVWD storm water facilities, and impacted CVWD storm water facilities that are consistent with the requirements and guidelines instituted by the City of Coachella, CVWD, and the U.S. Bureau of Reclamation (Eastside Dike).

The primary objectives of this study include the following:

- Develop baseline ("without" project) and project conditions hydrology to establish peak flow rates and flood volumes for use in the conceptual design of combined onsite/offsite flood conveyances and to evaluate project impacts
- Evaluate hydraulic, sedimentation, and erosion issues/design constraints associated with the major flood conveyances, which extend through or around the proposed development
- Formulate the conceptual design of regional and local storm water facilities
- Develop project conditions local hydrology for use in the conceptual design of on-site storm water facilities
- Identify and propose mitigation for any potentially significant development-related adverse flood hazard impacts, including the Eastside Dike, I-10 crossings, and local diversion/berm systems.

The drainage master plan includes the preparation of detailed technical studies for the regional watershed and local onsite drainage areas leading to the identification of flood hazards, which may impact site development. The technical studies included:

- Review of prior geomorphic assessments of the regional watershed, project site, and surrounding vicinity
- Regional hydrology, hydraulics, and sedimentation analysis for the on- and off-site watersheds
- Flood routing analysis and impact analysis
- Local hydrology analysis and preliminary pipe sizing

The intended use of the drainage master plan is to (1) identify flood hazards within and in the vicinity of the KPC Coachella Specific Planning Area, (2) develop a regional approach to mitigate the flood hazards, (3) identify local drainage facility requirements, and (4) evaluate development-related impacts to existing facilities, including Eastside Dike, the local diversion dikes, and the I-10 Freeway drainage crossings.

1.4 CVWD standards and policies

The standards and policies described in the CVWD Development Design Manual (last revised October 9, 2018) were applied herein. The relevant sections considered are as follows:

- Section 8 – Design Criteria Stormwater Facilities, last revised January 2020
- Guideline K-3 – Scour Calculation Guidance, last revised December 11, 2019
- Guideline K-6 – Framework for Hydrologic Modeling, last revised January 14, 2020
- Guideline K-7 – Ordinance 1234.2, last revised February 20, 2020

The standard requirements for hydrologic studies applicable to the KPC Coachella Development are as follows:

- Utilize and update previous hydrology studies completed by NHC (NHC, 2015 & 2017) for the baseline condition 1-percent annual chance (100-year) flood hydrographs
- NOAA Atlas 14 (NWS, 2014) precipitation depth spatial datasets will be used in the computation of the T-year storm and flood hydrographs
- CVWD recommends constructing a synthetic storm from T-year precipitation depths using selected durations ranging from 5 minutes to 6 hours
- CVWD recommends HEC-HMS for rainfall-runoff modeling
- CVWD recommends the Whitewater River dimensionless S-graph (USACE, 1980; RCFCWCD, 1978) for determining basin-specific unit hydrographs
- General advice on hydrologic loss rates is provided in Appendix K-5 of the Development Design Manual

Ordinance 1234.2 states that incised channels where the adjacent ground is higher than the design water surface elevation shall be designed to convey the 1-percent annual chance flood with a minimum of 3 feet of freeboard to the top of the channel banks. Leveed channels where the water surface is above the adjacent ground shall be designed with a minimum of 4 feet of freeboard from the levee crest elevation to the 1-percent annual chance maximum flood stage.

1.5 Document format

The document sections are set out to complete the primary objectives of this drainage master plan and include the detailed discussion and technical analysis used for the study. Methodologies, technical approaches, assumptions, design parameters, and result summaries used for the development of the analyses, and identification of flood protection requirements as well as mitigation measures are included. The detailed technical calculations, including spreadsheets and computer input/output files, are provided electronically.

Submittal and Approval Process

The report is being submitted in three phases to better facilitate the review and approval of the document. Each succeeding phase will expand on the previous submittal. The three phases are as follows:

1. Regional hydrology and hydraulics, Baseline conditions
2. Regional and local hydrology and hydraulics, Project conditions
3. Final report including impact analysis and mitigation

This document is the final submittal of the R-3 document of the project impacts and preliminary flood protection system.

Figure 1-1. Regional vicinity map

Figure 1-2. Local vicinity map

Figure 1-3. KPC Coachella conceptual land use plan

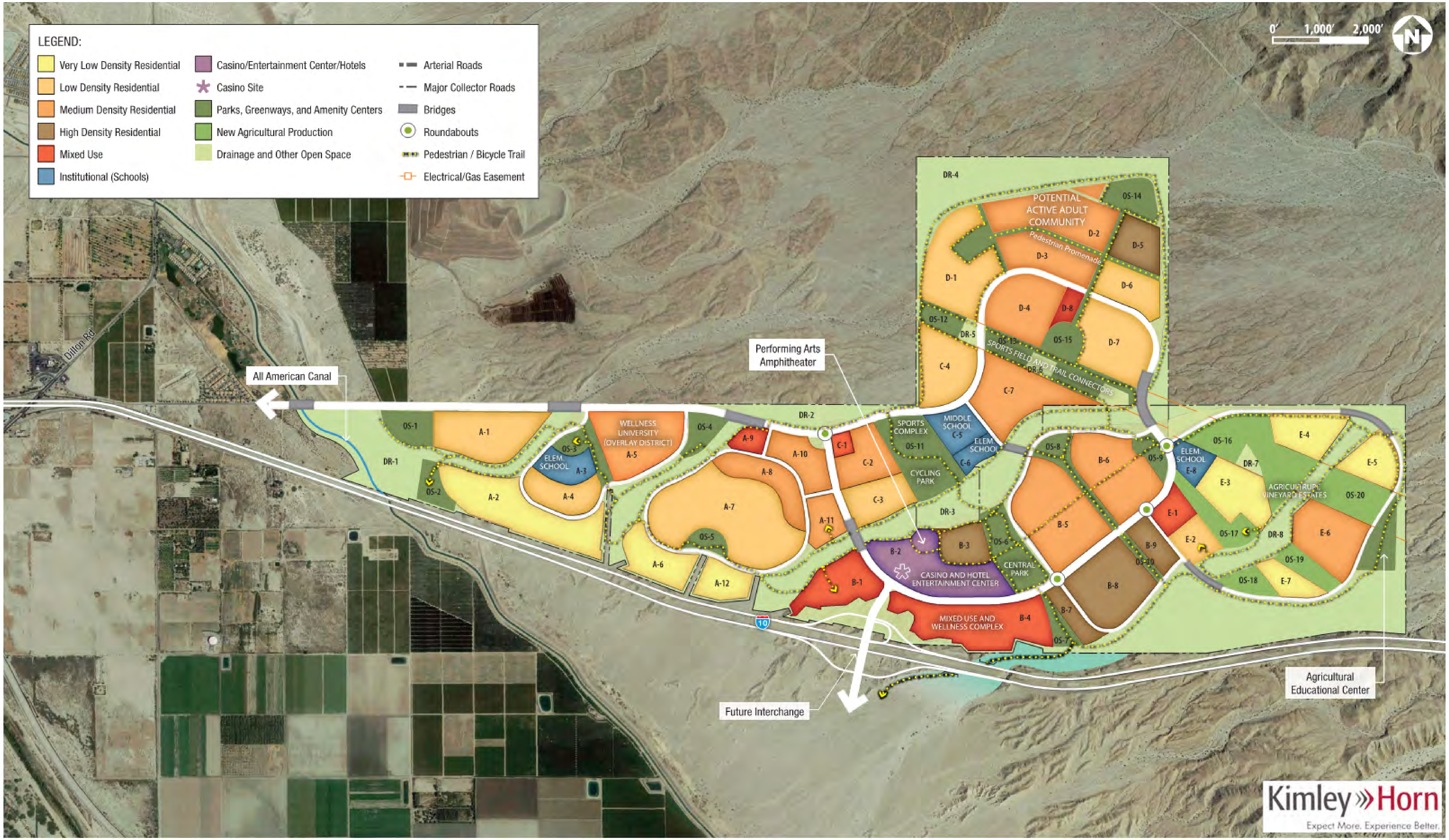

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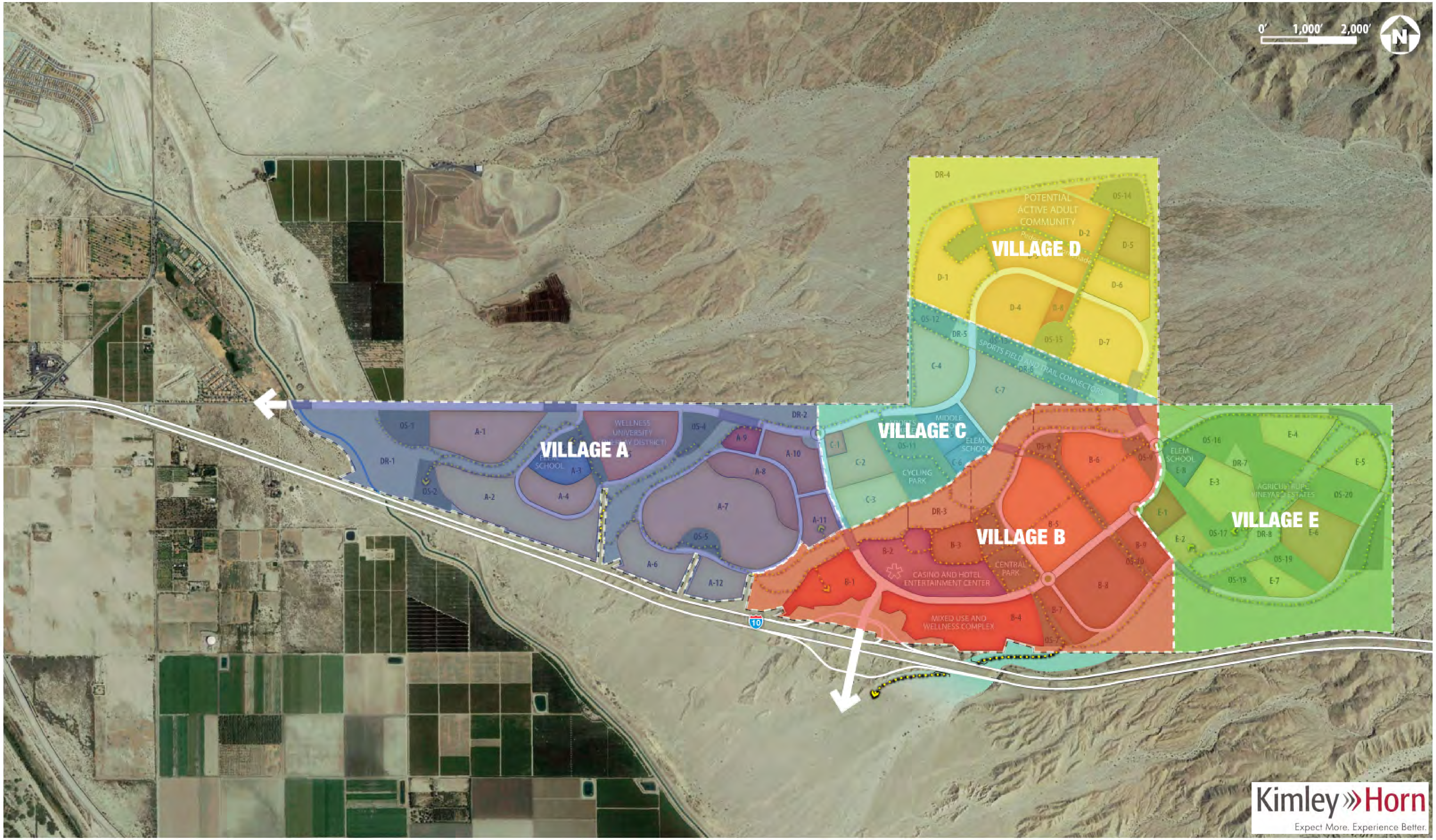
Figure 1-4. KPC Coachella village organization plan



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2 PREVIOUS STUDIES

2.1 Federal Emergency Management Agency Flood Insurance Rate Maps

Published Flood Insurance Rate Maps (FIRM) identifying flood hazard zones are available for The City of Coachella and unincorporated Riverside County. The City and County participate in the National Flood Insurance Program (NFIP) administered by the Federal Emergency Management Agency (FEMA). Communities participating in the NFIP must adopt and enforce minimum floodplain management standards, including identification of flood hazards and flooding risks. Participation in the NFIP allows the communities to purchase low cost insurance protection against losses from flooding.

The effective flood insurance maps indicate that the proposed development project is located within two flood hazard zones, X and D. The Zone D designation is applied for areas where there are possible but undetermined flood hazards. In areas designated Zone D, no analysis of flood hazards has been conducted. Mandatory flood insurance purchase requirements do not apply, but coverage is available. The flood insurance rates for properties in Zone D is commensurate with the uncertainty of the flood risk. Zone X is a flood insurance rate zone that corresponds with areas outside the 1-percent annual chance floodplain, areas of 1-percent annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1-percent annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1-percent annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones (www.fema.gov).

Proposed modification to the existing floodplain must follow the procedures outlined by FEMA for changing the flood insurance maps through the Conditional letter of Map Revision (CLOMR) process. The CLOMR is a belief letter from FEMA commenting on whether a proposed project would justify revising the maps. After completion of the flood control improvements, an actual Letter of Map Revision (LOMR) can be obtained. Current modifications to the existing floodplain mapping may alter some of the underlying assumptions of the original floodplain evaluation, particularly the design hydrology. Any encroachment or modification to the published floodplain for communities participating in the National Flood Insurance Program (NFIP) must be approved by FEMA. The overall process for developing the technical submittal requirements to FEMA regarding floodplain modifications is outlined in *Revision to National Flood Insurance Program Maps, Application/Certification Forms and Instruction for Conditional Letters of Map Revisions, Letter of Map Revision, and Physical Map Revisions*, published by FEMA (November 1992). The effective floodplain mapping for the project area is illustrated on Figure 2-1, Effective Floodplain Limits.

2.2 US Bureau of Reclamation Southern East Side Dike and North Shore Extension Hydrologic and Hydraulics Study, Draft Report (NHC, 2017)

This hydrology and hydraulics study is being completed by Northwest Hydraulic Consultants (NHC) for CVWD to support the levee certification for the East Side Dike. The study encompasses 301 square miles of the Mecca/North Shore watershed. The study area includes the entire drainage area tributary to and including the KPC Coachella Specific Plan area. The hydrology in the NHC study is based on the existing conditions of the watershed and was completed following Riverside County and CVWD guidelines using the NOAA Atlas 14 precipitation data.

The baseline models for watersheds tributary to the KPC Coachella project site are used for the base hydrology in this study. The models include watersheds; ESD_A, ESD_B, ESD_C, ESD-D, and Upper Double Canyon. The NHC watershed boundaries and KPC Coachella site location is shown on Figure 2-2, East Side Dike and North Shore watershed boundaries. Note that subbasins ESD_A and ESD_B are the same as basins ESD_3 and ESD_4 in the NHC 2015 hydrology study discussed below.

Figure 2-1. Effective floodplain limits (FEMA, 2018)

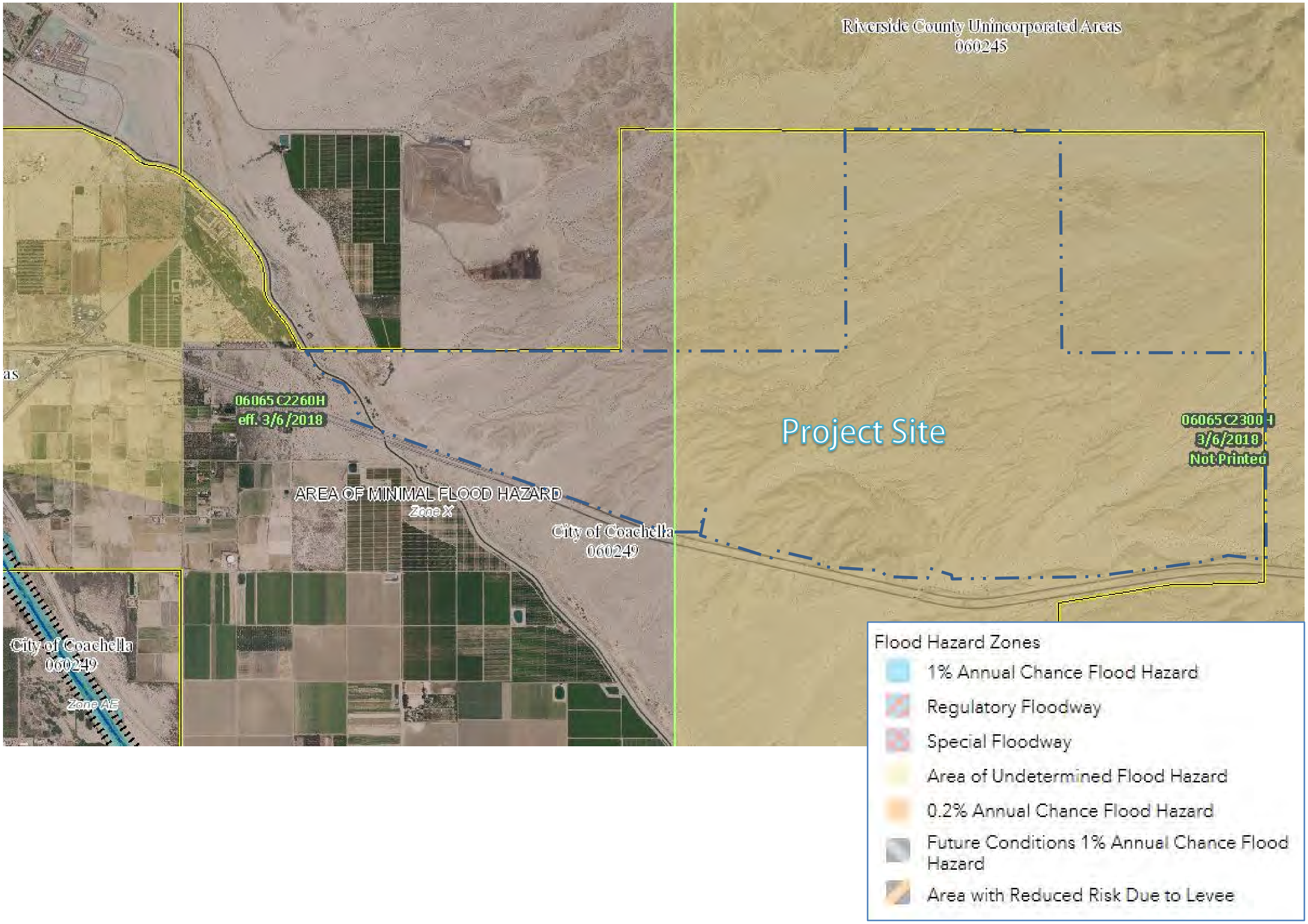
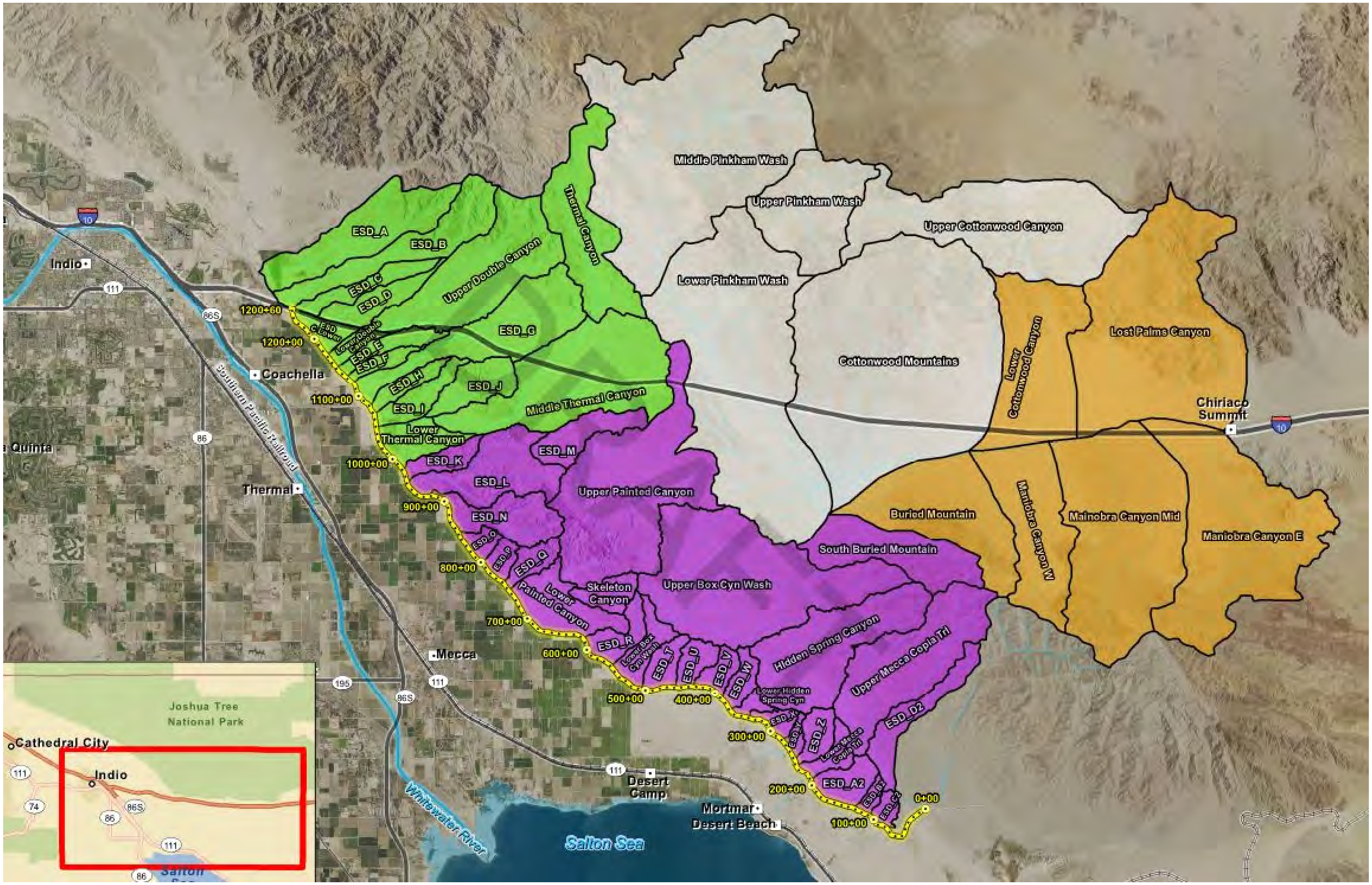


Figure 2-2. East Side Dike and North Shore watershed boundaries (NHC, 2017)



Reference: Northwest Hydraulic Consultants (NHC, 2017)

2.3 North Indio Study Area Stormwater Management Plan East Side Dike and North Indio Hydrology and Hydraulics (NHC, 2015)

This study was completed for CVWD to develop a hydrology and hydraulic analysis and regional stormwater master plan for the North Indio area. The study included the preparation of an HEC-HMS hydrology model for the watershed's tributary to the East Side Dike on the north side of Interstate 10. Two of the watersheds, ESD_3 and ESD_4 overlap with the KPC Coachella development area. These watersheds are the same as ESD_A and ESD_B included in the NHC 2017 study. Based on discussions with NHC, the watershed parameters from the NHC (2017) for ESD_A and ESD_B were used for this KPC Coachella drainage master plan study.

The study also included the preparation of a sediment yield analysis using the USACE (2000) Los Angeles Debris Method. An Area-Transportation Factor of 0.5 was used in the analysis based on studies completed by Bechtel in 1997. The 100-year debris yield was determined to be 33 acre-feet for subbasin ESD_3 and 24 acre-feet for ESD_4.

2.4 La Entrada Specific Plan Development, Drainage Master Plan (Michael Baker, 2013)

The La Entrada Specific Plan development is a mixed-use master planned community located south of the project site below the I-10 Freeway. A comprehensive watershed study and flood hazard mitigation plan was prepared for the project titled, *La Entrada Specific Plan Development: Drainage Master Plan, City of Coachella and County of Riverside, California, Final Report"* dated June 2013 (Michael Baker, 2013).

The La Entrada Drainage Master Plan included the preparation of detailed technical studies for the on- and off-site watershed areas for the identification of flood hazards and mitigation measures for the site development. The technical studies included:

- Geomorphic assessment of the project site and tributary watershed
- Regional hydrology, hydraulics, and sedimentation analysis for the off-site watersheds
- Eastside Dike flood routing and impact analysis
- Local hydrology analysis and preliminary pipe sizing

The study received conceptual approved for the recommended flood control scheme by CVWD in August 2013. The regional hydrology completed for the project has since been superseded by the hydrology in the NHC (2017) study and is no longer considered approved. However, the La Entrada study included a detailed geomorphic assessment of the tributary watersheds which is still considered valid. A portion of the geomorphic assessment evaluated some of the offsite watershed areas tributary to the KPC Coachella project site.

2.4.1 Geomorphic watershed assessment

The drainage master plan included a geomorphic analysis to identify regional watershed boundaries on the upper piedmont for use in developing offsite flow rates for design of the La Entrada Project. These geomorphic assessments are applicable to watersheds ESD_B and Upper Double Canyon from the NHC (2017) Study. Based on this assessment, the watershed boundaries for the ESD_B and Upper Double Canyon appear to reflect the flow patterns.

The following general findings were taken from the La Entrada study and can be considered to apply to the watershed tributary to the KPC Coachella development area:

- *None of the areas have large mountain watersheds, reach high elevations or have dense vegetative cover vulnerable to wildfire impacts.*
- *The active alluvial fans in the study area are subject only to fluvial processes. None of the alluvial fans are at risk of debris flows downstream of the mountain front.*

- *The active alluvial fan areas are limited in extent. The active portions of the piedmont are located adjacent the mountain front and do not extend downstream to the I-10 corridor.*
- *Large portions of the piedmont are inactive or are subject to shallow sheet flooding.*
- *The active alluvial fan areas are bounded by topographically higher, geomorphically older surfaces.*
- *The piedmont has been dominated by erosional/transport processes in recent geologic time and has very limited areas of net aggradation. Within engineering time scales, net aggradation will be minimal, as will the effect of sedimentation aggradation on drainage boundaries.*
- *No evidence of significant long-term scour was observed in the 1-10 bridge crossings where the natural canyon width was significantly narrowed by bridge construction, suggesting that the channel corridors in the study area may not be sensitive to man-made width changes.*
- *The channel morphology on the fan surface suggests that infiltration is an important process on the inundated portions of the active and inactive fan surface.*
- *Given the limited deposition on the bajada upstream of the project, and the dominance of erosion processes on the piedmont, the expected impact of such changes on the hydrology and sediment inflow to the project will be minimal and well within the normal range of error of estimate.*

Excerpts from the referenced section of the La Entrada Drainage Master Plan (Michael Baker, 2013) are included in Appendix A.

2.5 Desert Lakes Regional Watershed Flood Control Master Plan (PACE, 2006)

The project site was previously proposed for development under the name of Desert Lakes. A flood control master plan was prepared for the prior project titled, *"Preliminary Engineering Study, Desert Lakes, Regional Watershed Flood Control Master Plan."* The report was prepared for Lennar by PACE, dated March 2006 (PACE, 2006). The purpose of the report was to prepare a technical engineering investigation for the comprehensive design of flood control measures to provide the necessary flood protection for the site development. The study included the preparation of hydrology, 2-dimensional floodplain mapping, and debris yield calculations. Many of the design standards for the area have changed since the preparation of the plan in 2006 and are no longer valid. The general site layout and recommended improvements were reviewed for information and potential application of similar approaches to the current project.

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3 GEOMORPHIC ASSESSMENT

3.1 Objective

A geomorphic analysis was conducted to support the design of KPC Coachella (Project). The analysis was focused on answering the following questions:

1. Are the flow patterns upstream of the proposed development fixed or can they avulse to the degree where the flood hazard impacts along the Project boundary can significantly change? That is, are the piedmont surfaces upstream of the proposed development active or inactive with respect to flooding?
2. For areas with distributary flow patterns (i.e., channels branching in the downstream direction), are the flow splits relatively stable or are they actively evolving in a manner that impacts the downstream flood risk and design discharges?

3.2 Definitions

"Active" alluvial fans are subject to frequent flood inundation and net sediment deposition such that the surface aggrades over time. Active alluvial fans may also be subject to debris flows, hyper-concentrated flood flows, and channel avulsions, as well as more "normal" riverine flood processes like bed scour, bank erosion, and sediment transport. "Inactive" piedmont surfaces experience net erosion (degradation) over time and riverine flood processes but are relatively stable over engineering time scales.

3.3 Site description

The Project is located on a piedmont composed of steep-sloped active and inactive alluvial fan surfaces. The piedmont extends from the Little San Bernardino Mountains, cross the western extension of the Mecca Hills upstream of the Interstate 10 (I-10) corridor near Indio, California. After leaving the front range of Little San Bernardino Mountains, the off-site watersheds that drain to the Project cross a series of active and inactive alluvial fans on the upper piedmont near the mountain front. Further downstream, within the Project limits, the drainageways on the piedmont become confined in shallow canyons and are constrained by topographically higher, relict fan deposits with some volcanic bedrock units. The active fans in the upper piedmont do not have a strongly defined fan shape that would indicate rapid aggradation and/or frequent channel avulsions, but there is some evidence of the potential for flow path uncertainty and relatively high rates of sediment transport on some surfaces. This geomorphic analysis is intended to help evaluate the effects of potential flow path uncertainty on watershed delineation and peak flow rates.

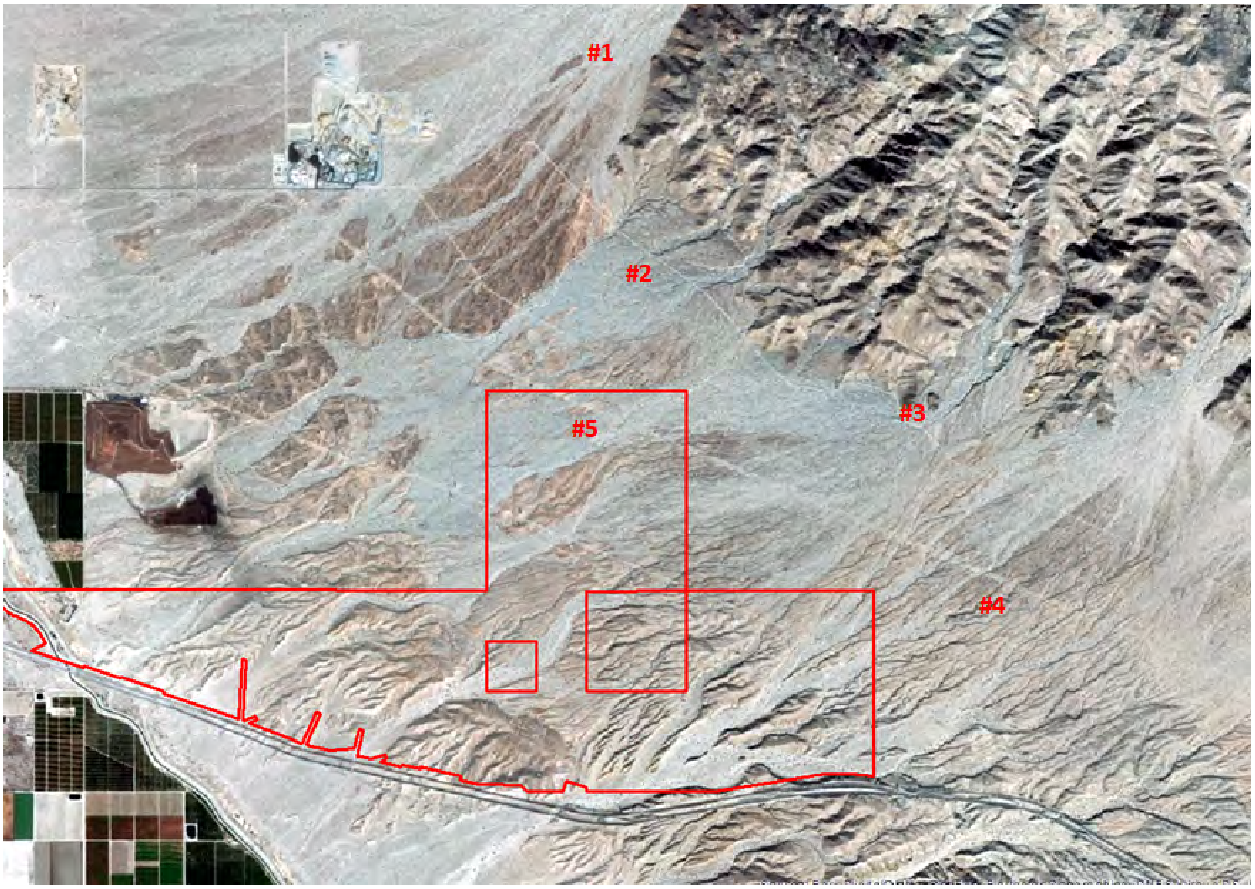
3.4 Methodology

This reconnaissance-level geomorphic analysis was based on aerial photographic interpretation, evaluation of topographic, geologic and soils maps, and field observations. Surficial characteristics such as development of desert varnish, desert pavement, weathering of surface rock, color, channel pattern, drainage network development, channel incision, topographic relief, and vegetative suites were examined to identify active and inactive fluvial processes. These characteristics are indicative of surface age, which in turn is indicative of the flood and erosional history of the surface. That is, old surfaces become "old" by not being subject to flood inundation or to widespread erosion and sediment deposition. Using this methodology, active and inactive areas on the piedmont were readily distinguished. Active areas are subject to potential flow path uncertainty. For inactive areas, flow path uncertainty can be set aside.

3.5 Findings

The study area was divided into specific areas of interest (Figure 3-1) that correspond to the watersheds draining onto the piedmont below the Little San Bernardino Mountains and toward the KPF Project.

Figure 3-1. Aerial imagery depicting the Project site and the five areas of interest



Note: areas of interest indicated with **red** numbers; Project boundary delineated in **red**

3.5.1 General

The following conclusions apply to the entire study area:

- None of the areas have large mountain watersheds, reach high elevations, or have dense vegetative cover vulnerable to wildfire impacts, and therefore have few, if any, of the characteristics common to highly active alluvial fans.
- The active alluvial fans in the study area are relatively small and are subject only to fluvial processes. None of the alluvial fans are at risk of debris flows downstream of the mountain front.
- The active alluvial fan areas are limited in extent. The active portions of the piedmont are located adjacent to the mountain front well outside of the Project limits.
- Most of the piedmont surfaces are inactive or are subject to shallow sheet flooding.
- The active alluvial fan areas are bounded by topographically higher, geomorphically older surfaces.
- Evidence of Stage III carbonate (> 100,000 years) was observed in cuts into the older, higher surfaces.
- The piedmont has been dominated by erosional/transport processes in recent geologic time and has very limited areas of net aggradation. Within engineering time scales, net aggradation will be minimal, as will the effect of sedimentation aggradation on drainage boundaries.
- The channel morphology and granitic composition of soils on the fan surface suggest that infiltration is an important process on the inundated portions of the active and inactive fan surface, and that flow attenuation will occur as flood waves cross the piedmont surface.

3.5.2 Specific areas of interest

The following conclusions apply to each of the five areas of interest.

Area #1 (Figure 3-2). Area #1 is the westernmost of the piedmont drainage systems considered in this analysis. The following conclusions were drawn from the geomorphic analysis:

- The active alluvial fan area is located well north of, and outside of the Project limits. Flooding on this active fan generally flows west and north of the Project.
- The Area #1 watershed is the largest of those in the vicinity of the Project and would likely have the highest flood peaks and sediment loads.
- Several relatively small, stable distributary flow corridors exit the active portion of the Area #1 fan and across a very old inactive surface and flow to the south-southwest in the general direction of the Project. However, these potential flow paths are intercepted by the Area #2 surface (discussed below) which generally flows west with only a portion of its flow potentially reaching the far western corner of the Project limits.
- The character of the very old surface between Area #1 and #2 indicates that this surface has become progressively more incised and perched (older, less active) in recent geologic time, and that flows along these corridors that originate in the Area #1 watershed are becoming rarer. Most of the flooding from Area #1 flows toward the west away from the Project. Detailed 2-dimensional hydraulic modeling will be helpful for determining the frequency of overtopping on to this old surface. However, any overtopping flow towards Area #2 would continue to bypass the project site and were therefore not modeled as part of this study.

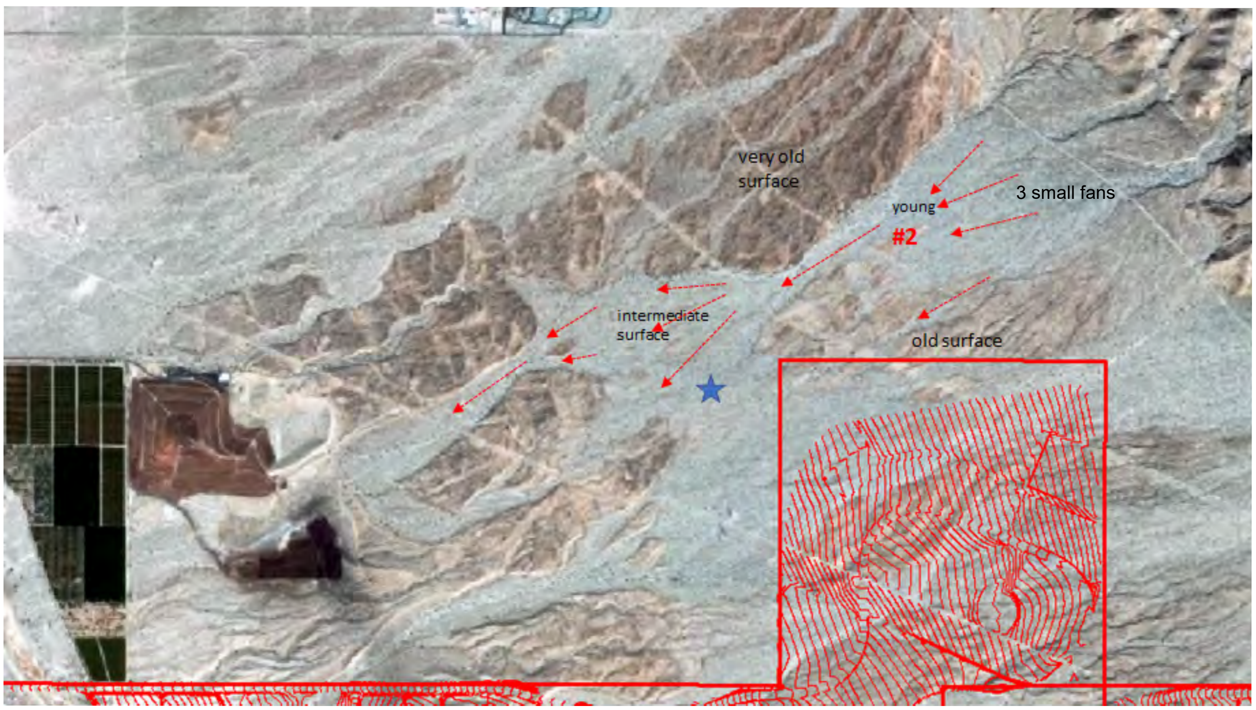
Figure 3-2. Area #1 aerial imagery of active and inactive portions of the piedmont

Note: Yellow arrow indicates potential overflow corridor toward Area #2; **Red** arrows indicate flow paths from Area #2 (see below)

Area #2 (Figure 3-3). Area #2 has only limited impact on the Project. The following conclusions were drawn from the geomorphic analysis:

- Area #2 consists of three very small fans that are constrained by old, inactive surfaces to the north and south. The marginally active areas for the three fans, which are located north of the Project limits, coalesce into a secondary hydrologic apex in the vicinity of the Old Aqueduct Road.
- This secondary hydrologic apex lies above a stable distributary area where numerous channels braid around stable "islands" of intermediate geologic age before recombining and flowing west within a broad, braided flow corridor that reaches the far northwest corner of the project.
- The channel pattern in the vicinity of the intermediate-aged surface below the secondary hydrologic apex (marked with a **blue** star on Figure 3-3) indicates that flooding is conveyed to the west, rather than to the south toward the Project limits. An emerging surface with some evidence of age appears to have formed in recent geologic time in this area, indicating that the surface is not highly active and that it may be a stable distributary surface. Two-dimensional hydraulic modeling of this area may inform on the degree of topographic containment of flow paths and whether any viable flow paths toward the Project exist.

Figure 3-3. Area #2 aerial imagery of active and inactive portions of the piedmont

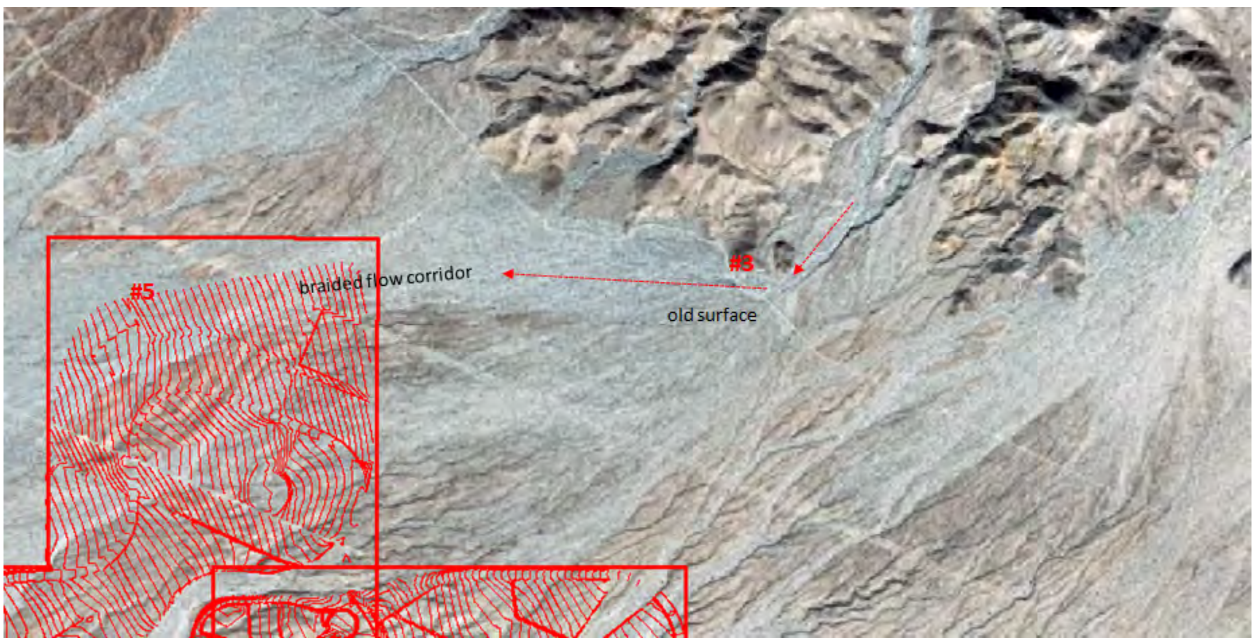


Note: young = active; intermediate/old = inactive; dominant flow directions indicated by **red** arrows

Area #3 (Figure 3-4). Area #3 was evaluated for geomorphic indications of whether there was potential for runoff to flow south across the old surface that bounds the flow corridor. The following conclusions were drawn from the geomorphic analysis:

- There are perched, relict channels visible on aerial photographs and in the field that trend away from the active flow corridor. However, closer inspection in the field indicate that these features have not been hydraulically connected to the upper watershed in recent geologic time. Flow containment by the older surface should be verified by 2-dimensional hydraulic modeling and some flow path uncertainty considered in the design if the design flow rates approach the crest of the old surface.
- Furthermore, the main stem of the Area #3 wash appears to be rapidly incising in the vicinity of these features, which will make them even more perched in the future than they are now or were in the recent geologic past.
- After being turned west by the confinement of the old, inactive surface, flows in Area #3 follow a braided corridor that intersects the northern extension of the Project (Area #5). This braided corridor is not an active alluvial fan, as discussed below.

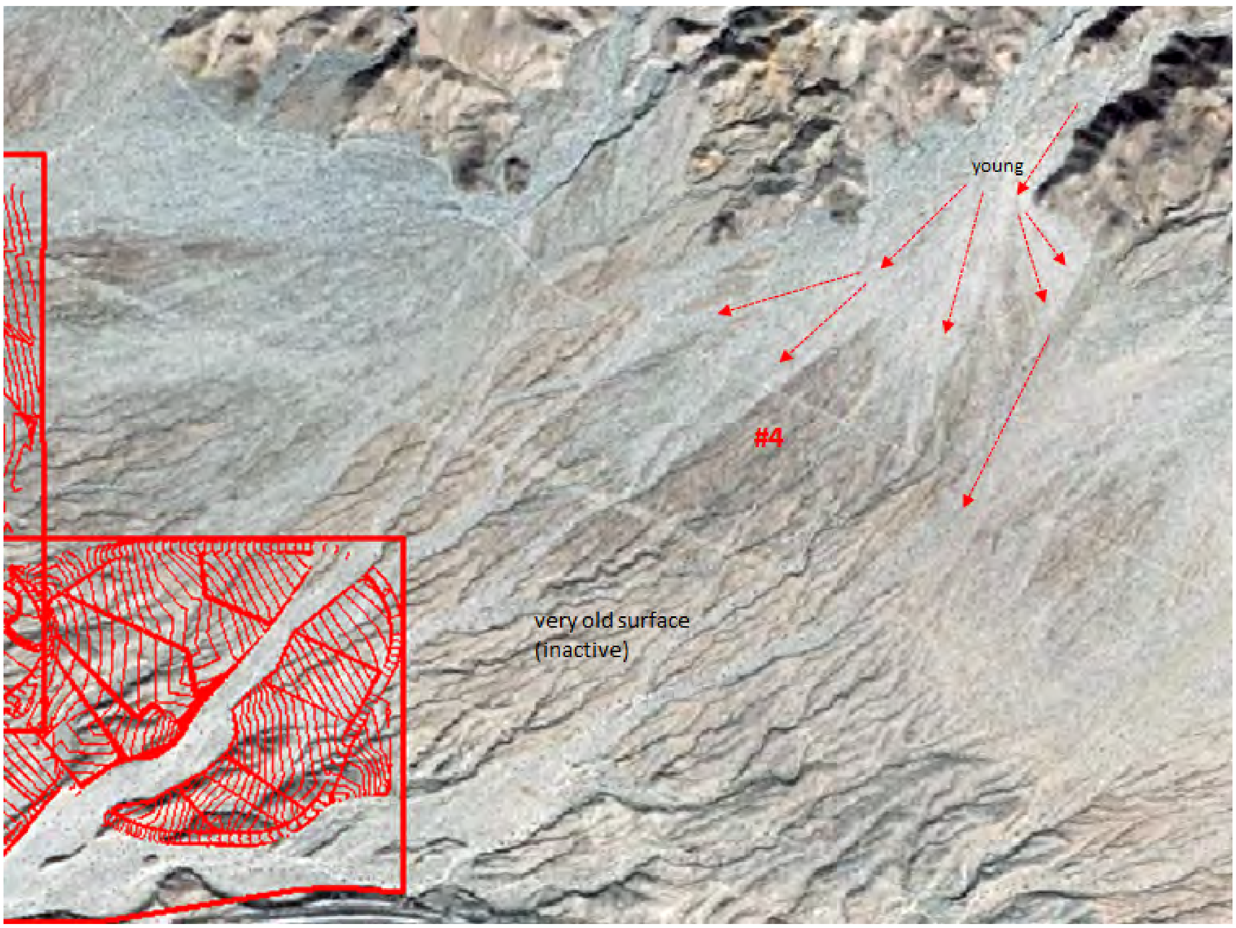
Figure 3-4. Area #3 aerial imagery dominant flow directions (red arrow)



Area #4 (Figure 3-5). Area #4 includes the easternmost of the piedmont drainage systems considered in this analysis. The following conclusions were drawn from the geomorphic analysis:

- Area #4 is an inactive alluvial fan, although there are small active fan areas adjacent to the mountain front northwest of the Project limits that will experience distributary flow during large floods.
- The mountain-front drainage systems entering the piedmont are conveyed through well-defined, stable flow corridors with tributary (not distributary) channel patterns for several miles before reaching the Project limits.

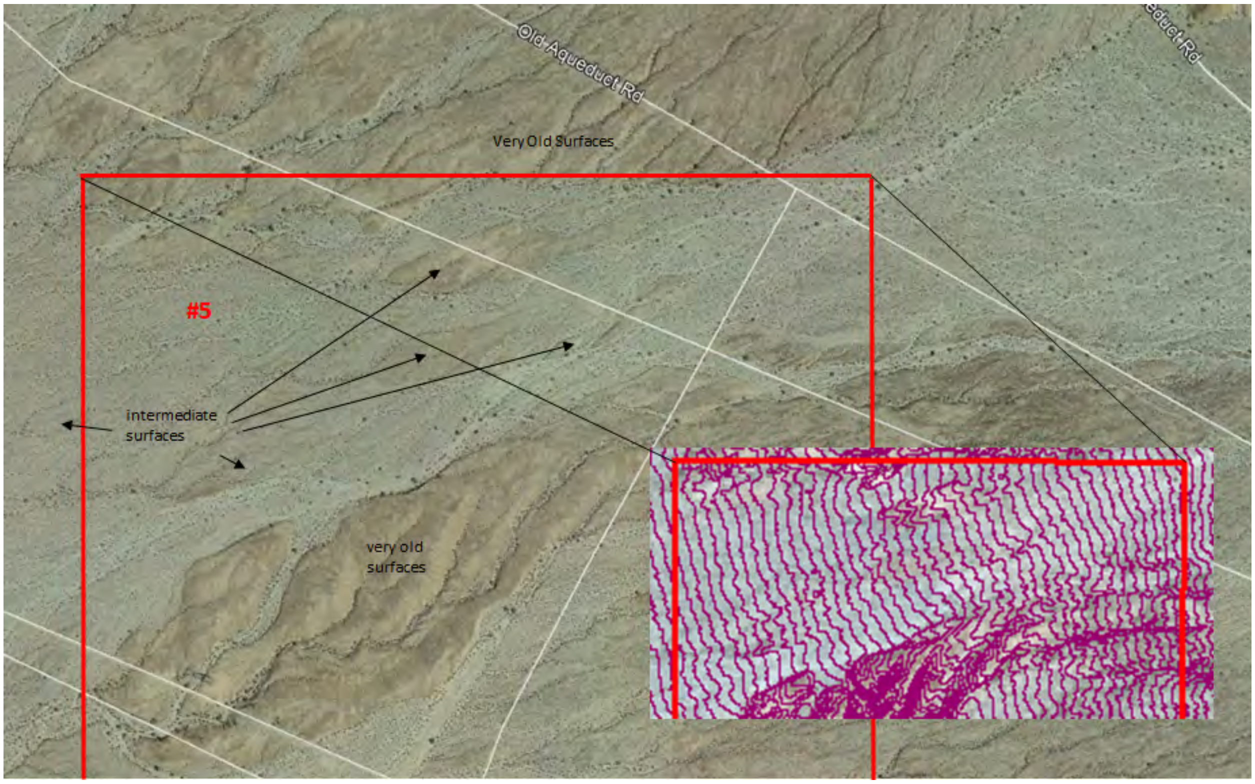
Figure 3-5. Area #4 active (none) and inactive areas portions of piedmont near Project



Note: young = active; intermediate/old = inactive; dominant flow directions indicated by **red** arrows

Area #5 (Figure 3-6). Area #5 is located within the KPC Project limits (Figure 6) and was added to clarify that it is not an active alluvial fan. Area #5 is an area of expanding distributary flow. The expanding flow limits of Area #5 bear some resemblance to the shape of an active alluvial fan, but it is not an active fan. That Area #5 is not an active fan is demonstrated by the intermediate and old surfaces within its boundaries, by the lack of radial contour patterns (see inset on Figure 6), and by field evidence of net degradation rather than aggradation. As a result, no flow path uncertainty will be evaluated in this area.

Figure 3-6. Area #5 aerial imagery with inset non-radial contours (purple)



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4 REGIONAL HYDROLOGY

4.1 Hydrologic goals and objectives

The regional hydrology tributary to the planned development (KPC Coachella) and affected facilities, which includes the East Side Dike, and the I-10 highway and associated dike systems, is intended to serve as the hydrologic basis for debris analysis and hydraulic modeling conducted for site planning and design as well as for the determination of impacts, mitigation requirements, and engineering constraints associated with the site development.

Two separate methods were used for the preparation of the hydrologic analysis. A Synthetic Unit Hydrograph analysis was prepared using the HEC-HMS Hydrologic Modeling System to determine peak flow rates and runoff volumes tributary to the downstream limits of the project site. These runoff flow rates and volumes will be used to identify project impacts at the Eastside Dike and the I-10 highway culverts and peak flow and volume mitigation requirements.

Due to the distributary nature of the flood patterns upstream and throughout the location of the project site, a second 2-dimensional, rain-on-grid hydrology/hydraulic analysis was prepared for the project. This flood routing model was prepared using FLO-2D PRO to evaluate the existing flood patterns and will be used to develop the site planning and design in terms of providing sustainable flood protection around and/or through the development footprint and mitigation of flood impacts (in terms of flow depth and velocity) to adjacent properties and facilities as a consequence of the planned development. The results will also be used to validate the watershed boundaries used for the Synthetic Unit Hydrograph analysis. A detailed discussion of the 2-dimensional approach and model development is provided in Section 5.

4.2 Synthetic Unit Hydrograph approach, methodologies and assumptions

The regional hydrology for the baseline (existing) condition was modified from the watershed models prepared in the NHC (2017) study. Flood hydrographs were developed for contributing drainages consisting of five (5) subbasins, based on the 50-percent, 10-percent, and 1-percent annual chance storm events. Precipitation areal effects were not considered since the contributing drainage for each of these subbasins is less than 10 square miles.

Hydrology was developed for the baseline (“without project”) and project conditions to support the determination of specific impacts, mitigation requirements, and design constraints related to the development.

The HEC-HMS Hydrologic Modeling System Version 4.3 (USACE, 2018) was used for all hydrologic model development and simulations performed herein.

The Riverside County Hydrology Manual (RCHM; RCFCWCD, 1978) Synthetic Unit Hydrograph Method (SUHM) served as the general framework for the development of flood hydrographs.

The storm scenarios that were analyzed herein include the following:

- 1-percent annual chance storm analysis (contributing drainages less than 10 square miles; no areal effects)
- 10-percent annual chance storm analysis (contributing drainages less than 10 square miles; no areal effects)
- 50-percent annual chance storm analysis (contributing drainages less than 10 square miles; no areal effects)

4.2.1 Precipitation

The annual chance storm events were synthesized over a 6-hour duration based on the hypothetical storm, which is constructed from nested area-weighted average maximum precipitation depths for 5-minute, 15-minute, 60-minute, 2-hour, 3-hour, and 6-hour durations. The 1-percent annual chance precipitation from the NHC (2015 and 2017) studies used weighted averages over large watershed areas and were therefore not used for this analysis.

The precipitation depths for the 50-, 10- and 1-percent annual chance storms were estimated from the NOAA Atlas 14 spatial datasets (NWS, 2014). The NOAA Atlas 14 data within each subbasin was area-averaged to get subbasin specific precipitation depths for each of the 5 watershed areas.

Depth-area-duration adjustments were not applied to individual drainage areas because they are less than 10 square miles nor were they applied to the combined drainages because volume and peak flow impacts are expected to be mitigated at the Project outfalls, thus eliminating the need to evaluate downstream regional impacts, which would have otherwise required the confluence of individual drainages to facilitate the evaluation of regional facilities such as the East Side Dike.

Precipitation data for the various storm events was represented as a hypothetical storm using the frequency storm method. No depth-areal reduction factors were applied since the watersheds are less than 10 square miles. The drainage area for the frequency storm method was assigned a value of 0.1 to prevent HEC-HMS from applying an additional depth-areal reduction factor. Also, the peak of the storm synthesized storm pattern was defined to occur two thirds into the storm period.

4.2.2 Precipitation losses

Constant and initial loss rates were estimated in the NHC studies for each of the subbasins from soil hydrologic group and land cover information. The study calculated loss rates based on the procedures in the RCHM.

4.2.3 Unit hydrograph transform

The HEC-HMS model used the Whitewater s-graph unit hydrograph transform with subbasin lag times calculated according to the procedures in the RCHM.

4.2.4 HEC-HMS model development summary

A summary of model development using HEC-HMS V4.3 (USACE, 2018) is as follows:

- Loss rates were calculated according to land uses and applying RCHM runoff index numbers and infiltration rates for pervious areas
- Lag times were calculated according to RCHM procedures
- Precipitation for the 1-percent annual chance storm was revised to eliminate the depth-areal reduction factors.
- The Whitewater S-graph was defined as a paired-data percentage curve and linked as a user-specified S-graph for the unit hydrograph transformation in conjunction with the lag parameters and coefficients

4.3 Hydrologic analysis – Baseline conditions

The watershed subbasin areas, loss rates, and lag times were taken from the NHC (2017) study. Parameter development for the Baseline conditions were obtained from the NHC (2017) study. The following watersheds were used in the analysis:

- ESD_A
- ESD_B

- ESD_C
- ESD_D
- Upper Double Canyon

The watershed boundaries are presented in Figure 4-1 (Baseline conditions hydrology map).

4.3.1 Precipitation

The annual-percent chance precipitation depths are presented in Table 4-1.

Table 4-1. Annual chance precipitation depths for selected frequencies and durations

	1-percent annual chance AMS precipitation depths, in *inches*							
subbasin	5m	15m	60m	2h	3h	6h	12h	24h
ESD_A	0.45	0.78	1.60	2.06	2.40	3.09	3.83	4.89
ESD_B	0.46	0.80	1.63	2.10	2.46	3.16	3.91	4.99
ESD_C	0.43	0.75	1.52	1.97	2.31	2.99	3.69	4.72
ESD_D	0.44	0.77	1.56	2.02	2.37	3.05	3.76	4.80
Upper Double Canyon	0.48	0.83	1.70	2.19	2.55	3.27	4.04	5.15
	10-percent annual chance PDS precipitation depths, in *inches*							
subbasin	5m	15m	60m	2h	3h	6h	12h	24h
ESD_A	0.23	0.40	0.82	1.04	1.19	1.53	1.90	2.45
ESD_B	0.24	0.41	0.84	1.06	1.23	1.56	1.93	2.50
ESD_C	0.22	0.39	0.78	0.99	1.13	1.47	1.82	2.36
ESD_D	0.23	0.40	0.81	1.02	1.14	1.50	1.85	2.39
Upper Double Canyon	0.25	0.43	0.88	1.11	1.26	1.61	2.00	2.58
	50-percent annual chance PDS precipitation depths, in *inches*							
subbasin	5m	15m	60m	2h	3h	6h	12h	24h
ESD_A	0.12	0.20	0.42	0.54	0.63	0.80	0.98	1.25
ESD_B	0.12	0.21	0.43	0.55	0.64	0.82	1.00	1.28
ESD_C	0.11	0.20	0.40	0.52	0.60	0.77	0.94	1.20
ESD_D	0.12	0.20	0.41	0.53	0.62	0.79	0.96	1.22
Upper Double Canyon	0.13	0.22	0.45	0.58	0.67	0.85	1.04	1.32

4.3.2 Precipitation losses

Constant and initial loss rates were estimated in the NHC studies for each of the subbasins from soil hydrologic group and land cover information. The study calculated loss rates based on the procedures in the RCHM. The hydrologic soils group and land cover information for each subbasin is shown in Tables 4-2 and 4-3.

The percent hydrologic soils group, percent land cover for ESD_A and ESD_B were obtained from the NHC 2015 study. The areas and average pervious infiltration rates of ESD_A and ESD_B were updated based on the available most current NHC Southern East Side Dike HEC-HMS model received in December 2018.

The percent hydrologic soils group, percent land cover, and average pervious infiltration rates obtained for ESD_C, ESD_D, and Upper Double Canyon were taken from the NHC 2017 study.

Table 4-2. Percent hydrologic soils group by subbasin (NHC, 2015 & 2017)

subbasin	percent hydrologic soil group distribution			
	A	B	C	D
ESD_A	71 (1)	15 (1)	0 (1)	13 (1)
ESD_B	62 (1)	16 (1)	0 (1)	21 (1)
ESD_C	19 (2)	26 (2)	0 (2)	55 (2)
ESD_D	12 (2)	14 (2)	0 (2)	74 (2)
Upper Double Canyon	64 (2)	6 (2)	0 (2)	30 (2)

(1) Data from NHC Northern East Side Dike 2015 Report, ESD 3 and ESD 4
(2) Data from NHC Southern East Side Dike 2017 Report

Table 4-3. Percent land cover and average pervious infiltration rate (F_p) by subbasin (NHC)

HMS Subbasin	area {sq mi}	percent land cover distribution				average F_p (in/h)	percent impervious
		mountain	hills	desert	agriculture		
ESD_A	5.44 (3)	0 (1)	70 (1)	28 (1)	2 (1)	0.25 (3)	0
ESD_B	4.41 (3)	0 (1)	30 (1)	68 (1)	2 (1)	0.27 (3)	0
ESD_C	1.42 (2)	0 (2)	0 (2)	100 (2)	0 (2)	0.15 (2)	0
ESD_D	1.65 (2)	0 (2)	30 (2)	70 (2)	0 (2)	0.15 (2)	0
Upper Double Canyon	7.82 (2)	0 (2)	40 (2)	60 (2)	0 (2)	0.27 (2)	0

(1) Data from NHC Northern East Side Dike 2015 Report, ESD 3 and ESD 4
(2) Data from NHC Southern East Side Dike 2017 Report
(3) Data from NHC Southern East Side Dike HEC-HMS Model Dec 2018

4.3.3 Unit hydrograph transform

The HEC-HMS model used the Whitewater s-graph unit hydrograph transform with subbasin lag times calculated according to the procedures in the RCHM.

4.3.4 Flowpath and lag time – revision to ESD_C

The Baseline condition lag parameters were revised for subbasin ESD_C. Based on the NHC 2017 study, the baseline flow path for ESD_C is located in the middle of the project development, as depicted in Figure 4-4. In order to better compare hydrologic results between Baseline and Project conditions, the Baseline flow path for ESD_C was extended to the very upstream end of the subbasin. Figure 4-4 shows the revised baseline flow path for ESD_C.

The lag times shown in Table 4-4 for ESD_A and ESD_B were taken from the available most current NHC Southern East Side Dike HEC-HMS model received in December 2018. The lag parameters for ESD_D and Upper Double Canyon were obtained from the NHC 2017 study.

Table 4-4. Lag parameters by subbasin

subbasin	area {sq mi}	basin N	longest flowpath {miles}	centroidal flowpath (miles)	flowpath slope {ft/mi}	lag time {hours}
ESD_A	5.44 (3)	0.04 (1)	7.05 (1)	3.86 (1)	394 (1)	0.98 (3)
ESD_B	4.41 (3)	0.04 (1)	6.71 (1)	3.59 (1)	320 (1)	1.10 (3)
ESD_C	1.42 (2)	0.04 (2)	4.05*	1.88*	221.65*	0.74*
ESD_D	1.65 (2)	0.04 (2)	3.65 (2)	1.83 (2)	250 (2)	0.69 (2)
Upper Double Canyon	7.82 (2)	0.04 (2)	6.19 (2)	3.1 (2)	343 (2)	0.97 (2)

(1) Data from NHC Northern East Side Dike 2015 Report, ESD 3 and ESD 4
(2) Data from NHC Southern East Side Dike 2017 Report
(3) Data from NHC Southern East Side Dike HEC-HMS Model Dec 2018
* Revised subbasin baseline condition lag parameters from NHC 2017 study

The HEC-HMS model is provided in the Electronic Technical Appendix.

4.4 Hydrology analysis results – Baseline conditions

All hydrologic models were analyzed for an 18-hour simulation time using a 5-minute time step to ensure the flood hydrograph recessions and total runoff volumes for the 6-hour storm are captured and reported. The resulting peak discharges and total runoff volume for each subbasin and storm event are summarized in Table 4-5.

Table 4-5. Annual chance storm event hydrology results – Baseline condition

CP	HMS subbasin	area {sq mi}	50-percent annual chance		10-percent annual chance		1-percent annual chance	
			Q_{peak} {cfs}	Volume {ac-ft}	Q_{peak} {cfs}	Volume {ac-ft}	Q_{peak} {cfs}	Volume {ac-ft}
1	ESD_A	5.44	583	53	1610	166	3780	483
2	ESD_B	4.41	429	43	1200	134	2855	389
3	ESD_C*	1.42	235	19	556	52	1208	154
4	ESD_D	1.65	293	23	694	63	1487	184
5	Upper Double Canyon	7.82	916	83	2498	255	5795	730

* Note: revised subbasin baseline condition lag parameters from NHC 2017 study

The subbasin watershed boundaries and concentration points (CPs) are illustrated on Figure 4-1, Baseline condition regional hydrology map.

4.4.1 Comparison with NHC 2015 & 2017 Studies

The NHC (2015 and 2017) studies modeled the watersheds as part of a larger evaluation of the East Side Dike and used three (3) different storm centering alternatives and associated depth area reduction factors (DARFs) in the hydrologic analysis. However, it would not be accurate to directly compare the results from the NHC 2015 and 2017 studies to this study for the following reasons:

- The NHC 2015 and 2017 studies modeled the watersheds using a different precipitation method compared to this study. For this study, the precipitation depths were area averaged for each subbasin. The precipitation from the NHC (2015 and 2017) studies used weighted averages over large watershed areas and applied DARFs.

- The NHC studies did not develop 50-percent or 10-percent annual change storm events and therefore cannot be accurately compared with the results from this study
- As discussed in Section 4.3.3, the Baseline condition flowpath was revised for ESD_C. The flowpath length was increased from the NHC 2017 study, thereby increasing the lag time and decreasing the peak flow

While the studies are not directly comparable. Information from the NHC studies is useful in evaluating the reasonableness of the rainfall and lag time parameters used in the hydrology complete as part of this report. Table 4-6 provides a comparison of the 6-hour rainfall depths used in this study and NHC 2017 study. Table 4-7 provides a comparison of the lag parameters between the two studies.

Table 4-6. Baseline condition 100-year 6h rainfall comparison to NHC (2017) study

subarea	area {sq mi}	6h rainfall {in}	total 6h rainfall {in}
ESD_A	5.44	3.09	3.16
ESD_B	4.41	3.16	
ESD_C	1.42	2.99	
ESD_D	1.65	3.05	
Upper Double Canyon	7.82	3.27	
I-10 (NHC,2016)	52.80	--	2.80

Table 4-7. Baseline condition lag parameters comparison between NHC (2017) and Q3

CP	HMS Subbasin	area {sq mi}		basin N		longest flowpath {miles}		centroidal flowpath {miles}		flowpath slope {ft/mi}		lag time {hrs}	
		NHC	Q3	NHC	Q3	NHC	Q3	NHC	Q3	NHC	Q3	NHC	Q3
1	ESD_A	5.44	5.44	0.04	0.04	7.05	7.05	3.86	3.86	394	394	0.98	0.98
2	ESD_B	4.41	4.41	0.04	0.04	6.71	6.71	3.59	3.59	320	320	1.08	1.08
3	ESD_C	1.42	1.42	0.04	0.04	**2.25**	**4.05**	**1.12**	**1.88**	**209**	**222**	**0.49**	**0.74**
4	ESD_D	1.65	1.65	0.04	0.04	3.65	3.65	1.83	1.83	250	250	0.69	0.69
5	Upper Double Canyon	7.82	7.82	0.04	0.04	6.19	6.19	3.10	3.10	343	343	0.97	0.97

The comparison illustrates that the rainfall used in both studies is relatively similar. The lag parameters are also similar except for ESD-C. As discussed in Section 4.3.3, the Baseline condition flowpath was revised for ESD_C which is the reason for the difference in the lag parameters and resulting lag time.

Figure 4-1. Baseline watershed conditions regional hydrology map

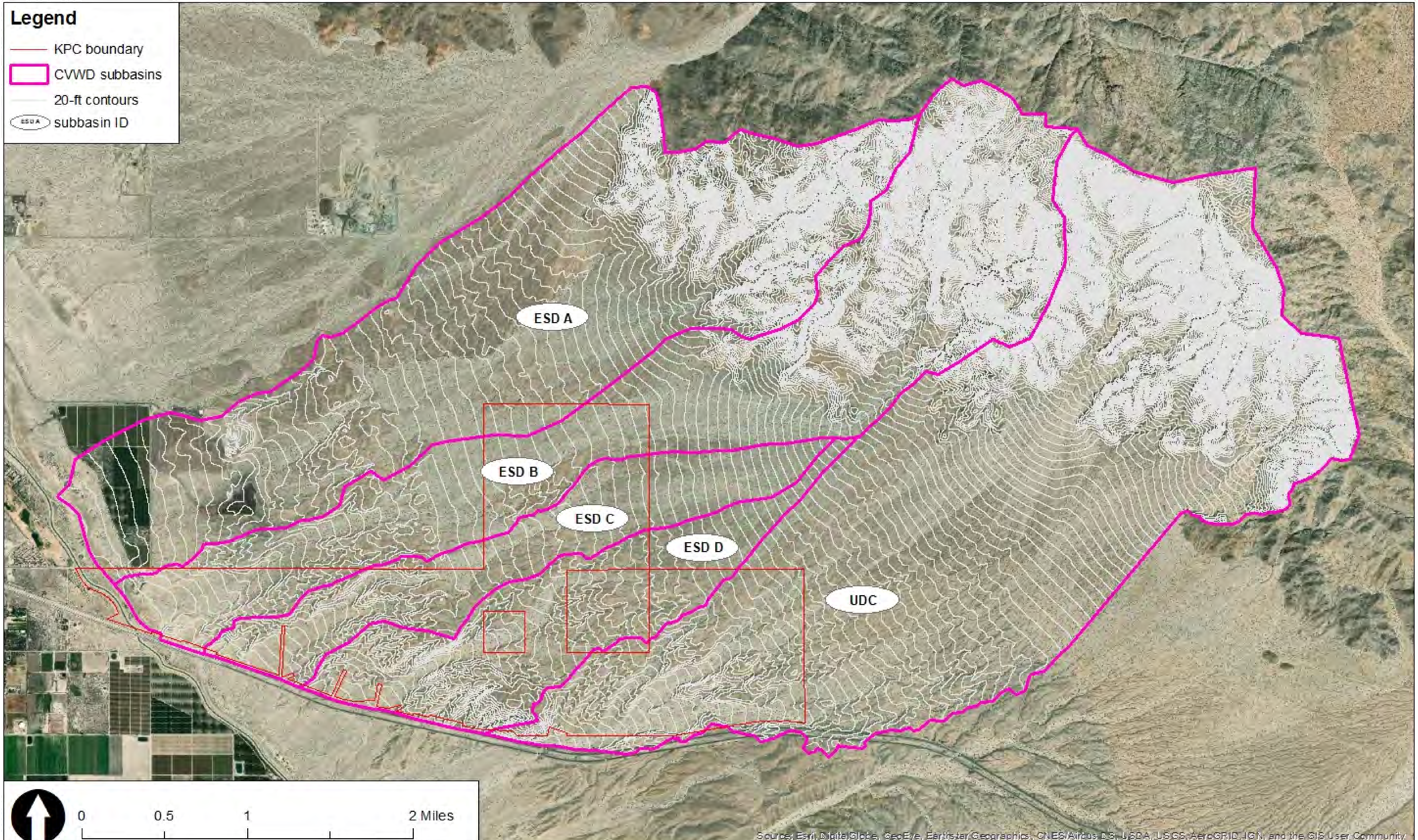

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Figure 4-2. Baseline watershed conditions regional soils map

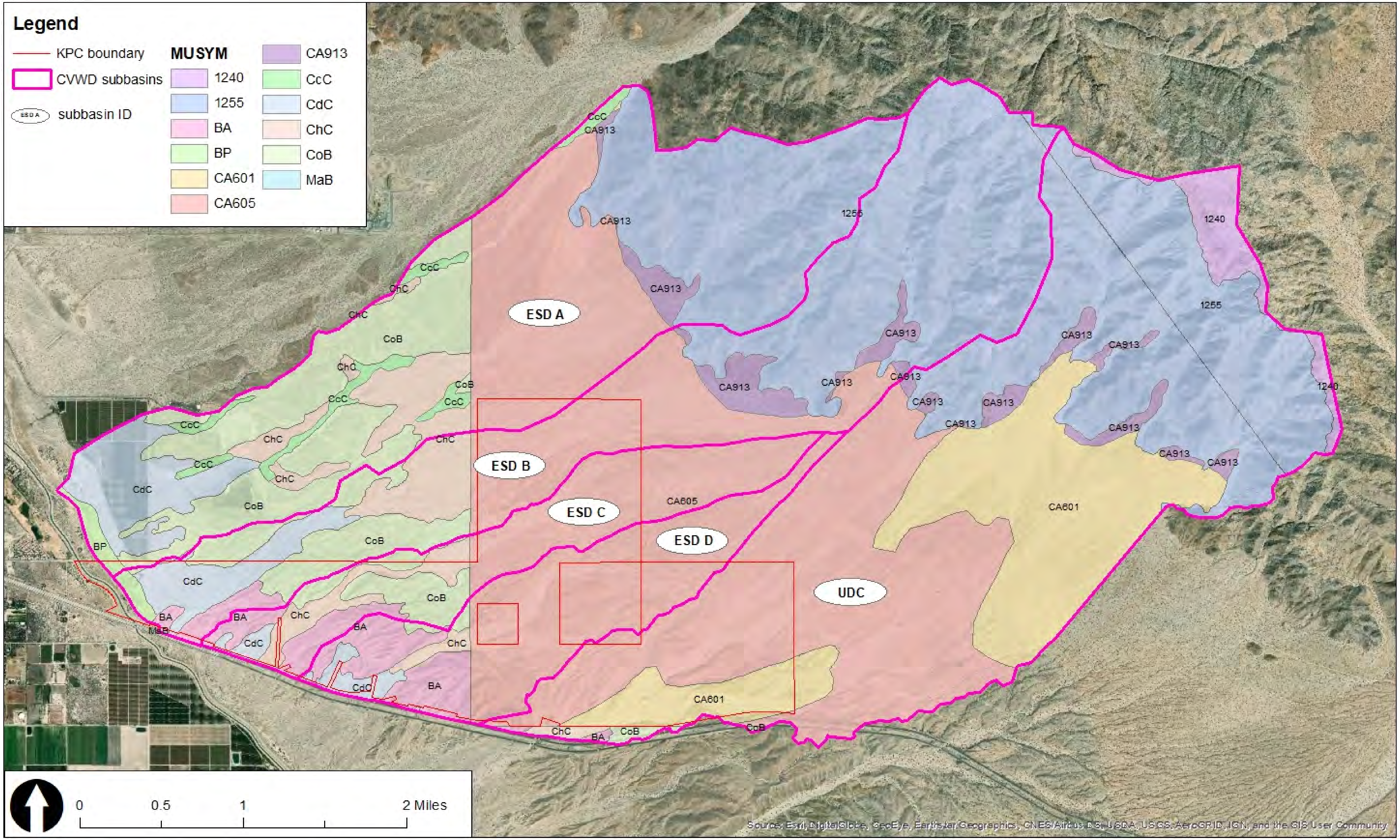

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Figure 4-3. Baseline watershed conditions regional land type map

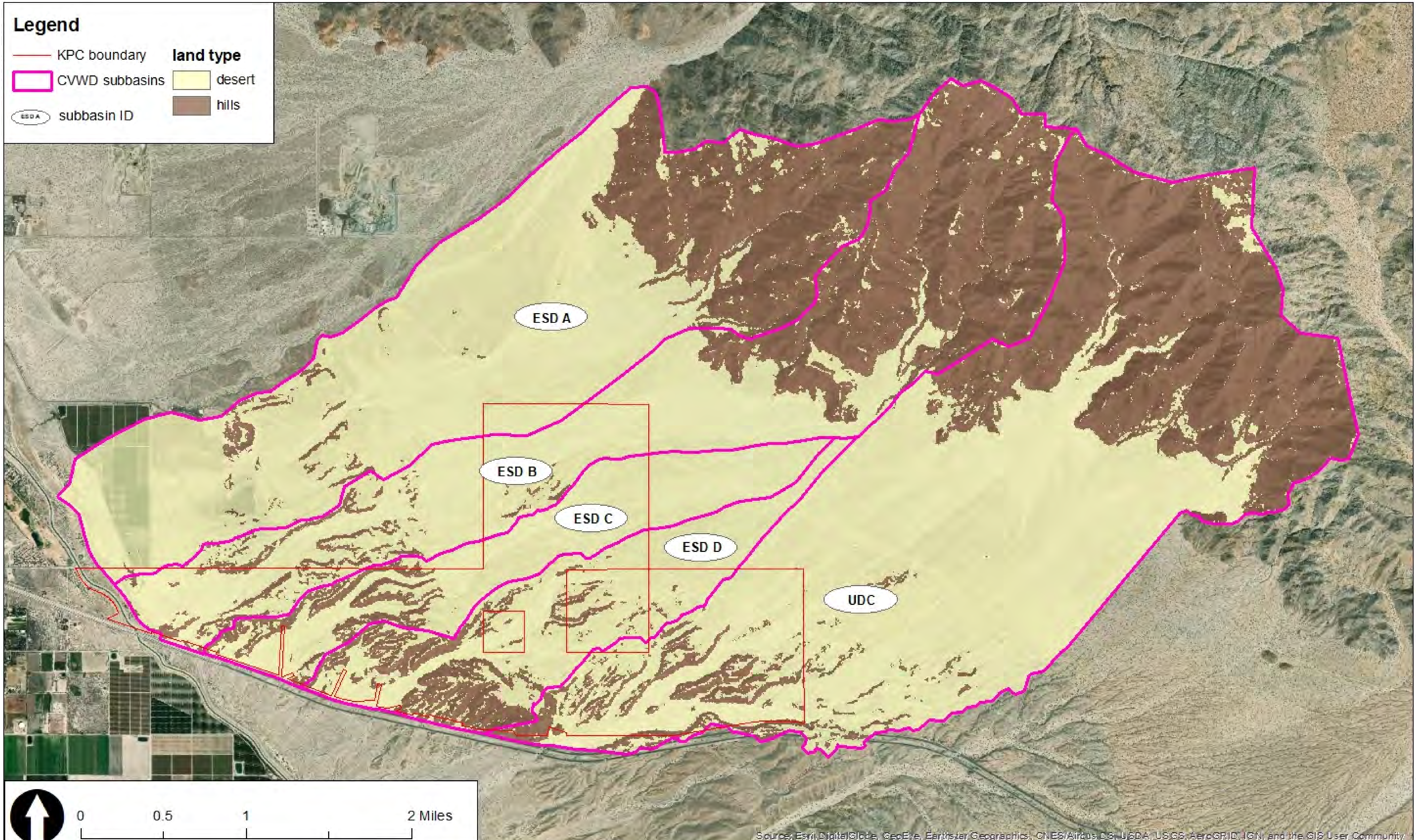

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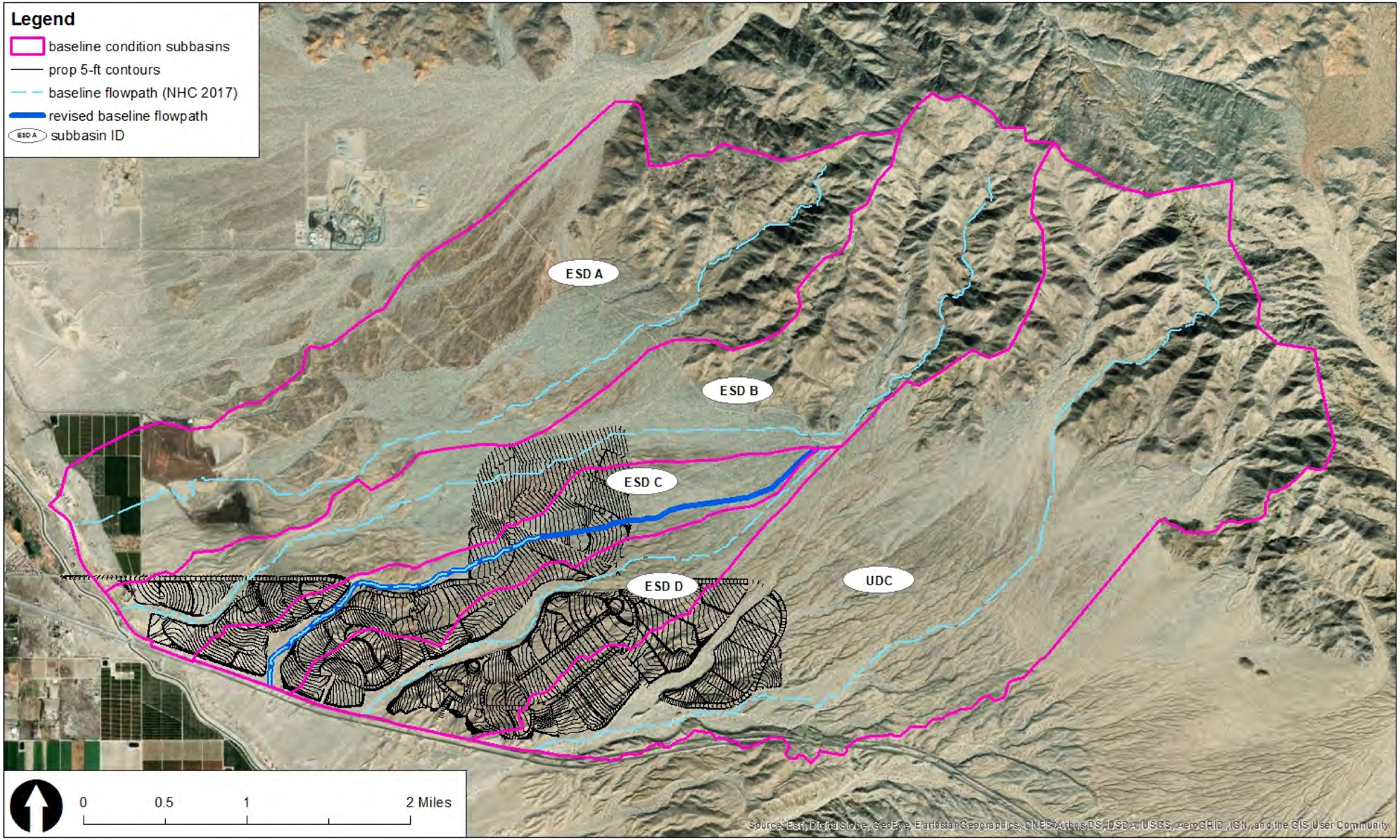
Figure 4-4. Revised Baseline condition subbasin ESD_C flowpath



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4.5 Hydrologic analysis– Project conditions

The HEC-HMS Hydrologic Modeling System Version 4.3 (USACE, 2018) was used for all hydrologic model development and simulations performed herein.

The Riverside County Hydrology Manual (RCHM; RCFCWCD, 1978) Synthetic Unit Hydrograph Method (SUHM) was used as the framework methodology for developing flood hydrographs.

Parameter development for the Project conditions were obtained and/or revised from the Baseline conditions. The following watersheds were used in the analysis:

- ESD_A
- ESD_B
- ESD_C
- ESD_D
- Upper Double Canyon

The watershed boundaries and concentration points are presented in Figure 4-5 Project conditions hydrology map.

4.5.1 Precipitation

The storm scenarios that were analyzed herein include the following:

- 1-percent annual chance storm analysis (contributing drainages less than 10 square miles; no areal effects)
- 10-percent annual chance storm analysis (contributing drainages less than 10 square miles; no areal effects)
- 50-percent annual chance storm analysis (contributing drainages less than 10 square miles; no areal effects)

4.5.1.1 Annual chance storm events

The same precipitation depths for the 50-, 10- and 1-percent annual chance storm that was used in the Baseline condition was applied in the Project condition. The precipitation depths are presented in Table 4-8.

Depth-area-duration adjustments were not applied to individual or combined drainage areas because they are less than 10 square miles.

The hypothetic storm pattern is balanced around the peak, with the maximum precipitation occurring two thirds of the way through the 6-hour storm period.

Table 4-8. NOAA Atlas 14 annual chance precipitation depths for selected durations

subbasin	1-percent annual chance AMS precipitation depths, in *inches*							
	5m	15m	60m	2h	3h	6h	12h	24h
ESD_A	0.45	0.78	1.60	2.06	2.40	3.09	3.83	4.89
ESD_B	0.46	0.80	1.63	2.10	2.46	3.16	3.91	4.99
ESD_C	0.43	0.75	1.52	1.97	2.31	2.99	3.69	4.72
ESD_D	0.44	0.77	1.56	2.02	2.37	3.05	3.76	4.80
Upper Double Canyon	0.48	0.83	1.70	2.19	2.55	3.27	4.04	5.15

subbasin	10-percent annual chance PDS precipitation depths, in *inches*							
	5m	15m	60m	2h	3h	6h	12h	24h
ESD_A	0.23	0.40	0.82	1.04	1.19	1.53	1.90	2.45
ESD_B	0.24	0.41	0.84	1.06	1.23	1.56	1.93	2.50
ESD_C	0.22	0.39	0.78	0.99	1.13	1.47	1.82	2.36
ESD_D	0.23	0.40	0.81	1.02	1.14	1.50	1.85	2.39
Upper Double Canyon	0.25	0.43	0.88	1.11	1.26	1.61	2.00	2.58

subbasin	50-percent annual chance PDS precipitation depths, in *inches*							
	5m	15m	60m	2h	3h	6h	12h	24h
ESD_A	0.12	0.20	0.42	0.54	0.63	0.80	0.98	1.25
ESD_B	0.12	0.21	0.43	0.55	0.64	0.82	1.00	1.28
ESD_C	0.11	0.20	0.40	0.52	0.60	0.77	0.94	1.20
ESD_D	0.12	0.20	0.41	0.53	0.62	0.79	0.96	1.22
Upper Double Canyon	0.13	0.22	0.45	0.58	0.67	0.85	1.04	1.32

4.5.2 Precipitation losses

Constant and initial loss rates were estimated for each of the subbasins from soil hydrologic group, land cover, and RCHM runoff index numbers and infiltration rates for pervious areas. In the developed areas, the loss rates were calculated to account for imperviousness according to land use. The land uses in the Project condition were provided by Kimley Horn, as shown in Figure 4-7.

The NRCS curve numbers defined for desert, hills, and agriculture land covers were based on NHC (2017) study and are summarized in Table 4-11.

Western desert urban area was defined as the pervious landscaping used in developed areas. The curve numbers were taken from the USDA Technical Release 55 (TR-55) Urban Hydrology for Small Watersheds as seen in Table 4-11.

A weighted loss rate accounting for impervious area was calculated for each subbasin that is impacted in the Project condition. The percent perviousness for each land use in the Project condition is shown in Table 4-12. The hydrologic soils group and land cover information for each subbasin in Project condition is shown in Table 4-10 and Table 4-14, respectively. The soils and land cover maps are presented in Figure 4-6 and Figure 4-7, respectively.

Table 4-9. Baseline conditions percent hydrologic soils group by subbasin (NHC, 2015 & 2017)

subbasin	percent hydrologic soil group distribution			
	A	B	C	D
ESD_A	71 (1)	15 (1)	0 (1)	13 (1)
ESD_B	62 (1)	16 (1)	0 (1)	21 (1)
ESD_C	19 (2)	26 (2)	0 (2)	55 (2)
ESD_D	12 (2)	14 (2)	0 (2)	74 (2)
Upper Double Canyon	64 (2)	6 (2)	0 (2)	30 (2)

(1) Data from NHC Northern East Side Dike 2015 Report, ESD 3 and ESD 4
(2) Data from NHC Southern East Side Dike 2017 Report

Table 4-10. Project conditions percent hydrologic soils group by subbasin

subbasin	percent hydrologic soil group distribution			
	A	B	C	D
ESD_A	71	15	0	13
ESD_B	63	13	0	24
ESD_C	17	28	0	56
ESD_D	12	15	0	73
Upper Double Canyon	64	6	0	30

Table 4-11. Pervious infiltration rate for land cover

land cover	parameter	HSG A	HSG B	HSG C	HSG D
desert	CN	78	86	91	93
	Fp (in/hr)	0.27	0.18	0.12	0.09
hills	CN	62	76	84	88
	Fp (in/hr)	0.45	0.29	0.2	0.15
agriculture	CN	67	78	85	89
	Fp (in/hr)	0.4	0.27	0.19	0.14
western desert urban area	CN	63	77	85	88
	Fp (in/hr)	0.44	0.28	0.19	0.15

Table 4-12. Land use percent perviousness

specific plan land use	RCFC&WCD hydrology manual land use	percent pervious
very low density residential	single family residential (1 ac lots)	80
low density residential	single family residential (7,200 - 10,000 sf lots)	50
medium density residential	condominiums	35
high density residential	apartments	20
mixed use	commercial (50%) and apartment (50%)	15
casino/entertainment center/hotels	commercial	10
roads	commercial	10
schools	single family residential (7,200 - 10,000 sf lots)	50
parks	single family residential (1 ac lots) (75%) and undeveloped (25%)	85
agricultural production	agriculture	100
drainage and open space	undeveloped	100
agricultural center	single family residential (1 ac lots)	80

Table 4-13. Baseline conditions infiltration characteristics by subbasin (NHC)

HMS Subbasin	area {sq mi}	percent land cover distribution				average F_p (in/h)	percent impervious
		mountain	hills	desert	agriculture		
ESD_A	5.44 (3)	0 (1)	70 (1)	28 (1)	2 (1)	0.25 (3)	0
ESD_B	4.41 (3)	0 (1)	30 (1)	68 (1)	2 (1)	0.27 (3)	0
ESD_C	1.42 (2)	0 (2)	0 (2)	100 (2)	0 (2)	0.15 (2)	0
ESD_D	1.65 (2)	0 (2)	30 (2)	70 (2)	0 (2)	0.15 (2)	0
Upper Double Canyon	7.82 (2)	0 (2)	40 (2)	60 (2)	0 (2)	0.27 (2)	0

(1) Data from NHC Northern East Side Dike 2015 Report, ESD 3 and ESD 4
(2) Data from NHC Southern East Side Dike 2017 Report
(3) Data from NHC Southern East Side Dike HEC-HMS Model Dec 2018

Table 4-14. Project conditions infiltration characteristics by subbasin

subbasin	area {sq mi}	percent land cover distribution					percent impervious	average F (in/h)
		mountain	hills	desert	agriculture	urban desert landscape		
ESD_A	5.44	0	70	28	2	0	0	0.25
ESD_B	4.41	0	30	55	0	8	7	0.25
ESD_C	1.40	0	0	41	0	26	33	0.12
ESD_D	1.67	0	4	35	0	26	35	0.11
Upper Double Canyon	7.81	0	36	55	2	3	4	0.26

4.5.3 Unit hydrograph transform

The HEC-HMS model for the Project condition used the same unit hydrograph transform method as in the Baseline condition.

4.5.4 Flowpath, lag time, and basin factor (n)

The flowpaths for ESD_A, ESD_D, and Upper Double Canyon did not change from Baseline condition and therefore have the same lag times as in Baseline condition.

The flowpaths for ESD_B and ESD_C were adjusted in the Project condition as seen in Figure 4-5. The flowpaths for these subbasins were adjusted according to the proposed grading for the project site. For both subbasins, the flowpath lengths increased in Project condition. As a result of the flowpath changes, the lag times also increased in the Project condition.

A weighted basin factor (n) was calculated for the subbasins impacted in the Project condition. The n value of 0.04 from the NHC 2017 study for undeveloped area was taken into consideration when determining the following assumptions:

- n = 0.015 for roads
- n = 0.02 for residential, commercial, school, and mixed use areas
- n = 0.04 for parks, agricultural, drainage and open space, undeveloped

After calculations, the n values for ESD_B and Upper Double Canyon were determined to be the same as in Baseline Condition. The n values for ESD_C and ESD_D reduced in Project condition as seen in Table 4-16.

Table 4-15. Baseline conditions lag parameters by subbasin

subbasin	area {sq mi}	basin N	longest flowpath {miles}	centroidal flowpath (miles)	flowpath slope {ft/mi}	lag time {hours}
ESD_A	5.44 (3)	0.04 (1)	7.05 (1)	3.86 (1)	394 (1)	0.98 (3)
ESD_B	4.41 (3)	0.04 (1)	6.71 (1)	3.59 (1)	320 (1)	1.10 (3)
ESD_C	1.42 (2)	0.04 (2)	4.05*	1.88*	221.65*	0.74*
ESD_D	1.65 (2)	0.04 (2)	3.65 (2)	1.83 (2)	250 (2)	0.69 (2)
Upper Double Canyon	7.82 (2)	0.04 (2)	6.19 (2)	3.1 (2)	343 (2)	0.97 (2)

(1) Data from NHC Northern East Side Dike 2015 Report, ESD 3 and ESD 4
(2) Data from NHC Southern East Side Dike 2017 Report
(3) Data from NHC Southern East Side Dike HEC-HMS Model Dec 2018
* Revised subbasin baseline condition lag parameters from NHC 2017 study

Table 4-16. Project conditions lag parameters by subbasin

subbasin	area {sq mi}	basin N	longest flowpath {miles}	centroidal flowpath (miles)	flowpath slope {ft/mi}	lag time {hours}
ESD_A	5.44	0.04	7.05	3.86	394	0.98
ESD_B	4.41	0.04	7.30	4.04	294	1.18
ESD_C	1.40	0.03	4.34	1.94	210	0.59
ESD_D	1.67	0.03	3.65	1.83	250	0.52
Upper Double Canyon	7.81	0.04	6.19	3.10	343	0.97

4.6 HEC-HMS model development summary

Baseline Condition:

A summary of the baseline condition model development using HEC-HMS V4.3 (USACE, 2018) is as follows:

- The percent hydrologic soil groups and percent land cover for ESD_A and ESD_B were taken from the NHC 2015 study.
- The subbasin areas, average infiltration rates for pervious area, and lag times for ESD_A and ESD_B were taken from NHC Southern East Side Dike HEC-HMS model from December 2018.
- The watershed subbasin areas, percent hydrologic soil groups, percent land cover, average pervious infiltration rate, loss rates, and lag times for ESD_ C, ESD_D and Upper Double Canyon were taken from the NHC 2017 study.
- Precipitation data for the various storm events was represented as a hypothetical storm using the frequency storm method. No depth-areal reduction factors were applied since the watersheds are less than 10 square miles. The drainage area for the frequency storm method was assigned a value of 0.1 to prevent HEC-HMS from applying an additional depth-areal reduction factor. Also, the peak of the storm synthesized storm pattern was defined to occur two thirds into the storm period.
- The Whitewater S-graph was defined as a paired-data percentage curve and linked as a user-specified S-graph for the unit hydrograph transformation in conjunction with the lag parameters and coefficients.

- Flowpath for ESD_C was revised and subsequently also the lag time, as discussed in Section 4.3.4.

Project Condition:

A summary of the project condition model development using HEC-HMS V4.3 (USACE, 2018) is as follows:

- The watershed subbasin areas were delineated based on Kimley Horn proposed grading plan.
- The loss rates were determined using Kimley Horn land use plan and calculated according to RCHM runoff index numbers and infiltration rates
- The lag times were calculated based on the above project condition parameters and according to RCHM procedures.
- Precipitation for the 1-percent annual chance storm was revised to eliminate the depth-areal reduction factors.
- Precipitation data for the various storm events was represented as a hypothetical storm using the frequency storm method. No depth-areal reduction factors were applied since the watersheds are less than 10 square miles. The drainage area for the frequency storm method was assigned a value of 0.1 to prevent HEC-HMS from applying an additional depth-areal reduction factor. Also, the peak of the storm synthesized storm pattern was defined to occur two thirds into the storm period.
- The Whitewater S-graph was defined as a paired-data percentage curve and linked as a user-specified S-graph for the unit hydrograph transformation in conjunction with the lag parameters and coefficients.
- Flowpaths for ESD_B and ESD_C differ from Baseline condition. Flowpaths for ESD_A, ESD_D, and Upper Double Canyon remained the same as Baseline condition for Project condition.

The HEC-HMS models for baseline and project conditions are provided in the Electronic Technical Appendix.

4.7 Hydrology analysis results – Project conditions

All hydrologic models were analyzed for an 18-hour simulation time using a 5-minute time step to ensure the flood hydrograph recessions and total runoff volumes for the 6-hour storm are captured and reported.

The resulting peak discharges and total runoff volume for each subbasin and storm event are summarized in Table 4-17 (impervious-weighted loss rates) and Table 4-18 (disconnected impervious loss rates). The governance of hydrology based on impervious-weighted or directly-connected impervious loss rates is mixed; however, the partially developed subwatersheds produce greater magnitude flows and volumes based on the impervious-weighted loss rates and therefore was adopted herein. The comparison between Baseline and Project conditions for the 50-, 10- and 1-percent annual change storms are summarized in Table 4-19 and Table 4-20.

Table 4-17. Project conditions hydrology results – impervious-weighted loss rates

			50-percent annual chance		10-percent annual chance		1-percent annual chance	
CP	HMS subbasin	area {sq mi}	Q_{peak} {cfs}	Volume {ac-ft}	Q_{peak} {cfs}	Volume {ac-ft}	Q_{peak} {cfs}	Volume {ac-ft}
1	ESD_A	5.44	583	53	1610	166	3780	483
2	ESD_B	4.41	425	46	1166	139	2764	407
3	ESD_C	1.40	284	21	645	58	1359	162
4	ESD_D	1.67	401	27	894	74	1844	203
5	Upper Double Canyon	7.81	937	85	2527	260	5832	745

Table 4-18. Project conditions hydrology results – directly-connected impervious loss rates

CP	HMS subbasin	area {sq mi}	50-percent annual chance Qpeak {cfs}	50-percent annual chance Volume {ac-ft}	10-percent annual chance Qpeak {cfs}	10-percent annual chance Volume {ac-ft}	1-percent annual chance Qpeak {cfs}	1-percent annual chance Volume {ac-ft}
1	ESD_A	5.44	583	53	1610	166	3780	483
2	ESD_B	4.41	438	53	1176	150	2767	414
3	ESD_C	1.40	262	31	572	71	1198	175
4	ESD_D	1.67	346	40	757	88	1562	216
5	Upper Double Canyon	7.81	953	93	2540	271	5840	754

Table 4-19. Annual chance storm event hydrology results comparison

CP	subbasin	exist area {sq mi}	prop area {sq mi}	exist % impervious	prop % impervious	50-percent annual chance exist Qpeak {cfs}	prop Qpeak {cfs}	△Qpeak {cfs}	exist vol {ac-ft}	prop vol {ac-ft}	△vol {ac-ft}
1	ESD_A	5.44	5.44	0	0	583	583	0	53	53	0
2	ESD_B	4.41	4.41	0	7	429	425	-4	43	46	3
3	ESD_C	1.42	1.40	0	33	235	284	49	19	21	2
4	ESD_D	1.65	1.67	0	35	293	401	108	23	27	4
5	Upper Double Canyon	7.82	7.81	0	4	916	937	21	83	85	2

CP	subbasin	exist area {sq mi}	prop area {sq mi}	exist % impervious	prop % impervious	10-percent annual chance exist Qpeak {cfs}	prop Qpeak {cfs}	△Qpeak {cfs}	exist vol {ac-ft}	prop vol {ac-ft}	△vol {ac-ft}
1	ESD_A	5.44	5.44	0	0	1610	1610	0	166	166	0
2	ESD_B	4.41	4.41	0	7	1200	1166	-34	134	139	5
3	ESD_C	1.42	1.40	0	33	556	645	89	52	58	6
4	ESD_D	1.65	1.67	0	35	694	894	200	63	74	11
5	Upper Double Canyon	7.82	7.81	0	4	2498	2527	29	255	260	5

CP	subbasin	exist area {sq mi}	prop area {sq mi}	exist % impervious	prop % impervious	1-percent annual chance exist Qpeak {cfs}	prop Qpeak {cfs}	△Qpeak {cfs}	exist vol {ac-ft}	prop vol {ac-ft}	△vol {ac-ft}
1	ESD_A	5.44	5.44	0	0	3780	3780	0	483	483	0
2	ESD_B	4.41	4.41	0	7	2855	2764	-91	389	407	18
3	ESD_C	1.42	1.40	0	33	1208	1359	151	154	162	9
4	ESD_D	1.65	1.67	0	35	1487	1844	357	184	203	19
5	Upper Double Canyon	7.82	7.81	0	4	5795	5832	37	730	745	15

Table 4-20. Loss rate and lag time comparison

subbasin	exist loss (in/hr)	prop loss (in/hr)	exist lag time (hrs)	prop lag time (hrs)
ESD_A	0.25	0.25	0.98	0.98
ESD_B	0.27	0.25	1.10	1.18
ESD_C	0.15	0.12	0.74	0.59
ESD_D	0.15	0.11	0.69	0.52
Upper Double Canyon	0.27	0.26	0.97	0.97

The decrease in peak flow for ESD_B is attributed to the increase in flow path length and subsequent increase in lag time in Project condition.

The loss rates and lag times decreased in Project condition for ESD_C and ESD_D, and as a result increased the peak runoff and volume. As anticipated, the most significant impact was observed in ESD_D. ESD_D had the largest reduction in loss rate, going from 0.15 in/hr to 0.11 in/hr. Also, ESD_D had the shortest lag time of 0.52 hrs based on lower n value of 0.03 in Project condition in comparison to n value of 0.04 in Baseline condition. With a shorter lag time and lower loss rate, it was expected for ESD_D to have a significant increase in peak flow and volume.

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Figure 4-5. Project watershed conditions regional hydrology map

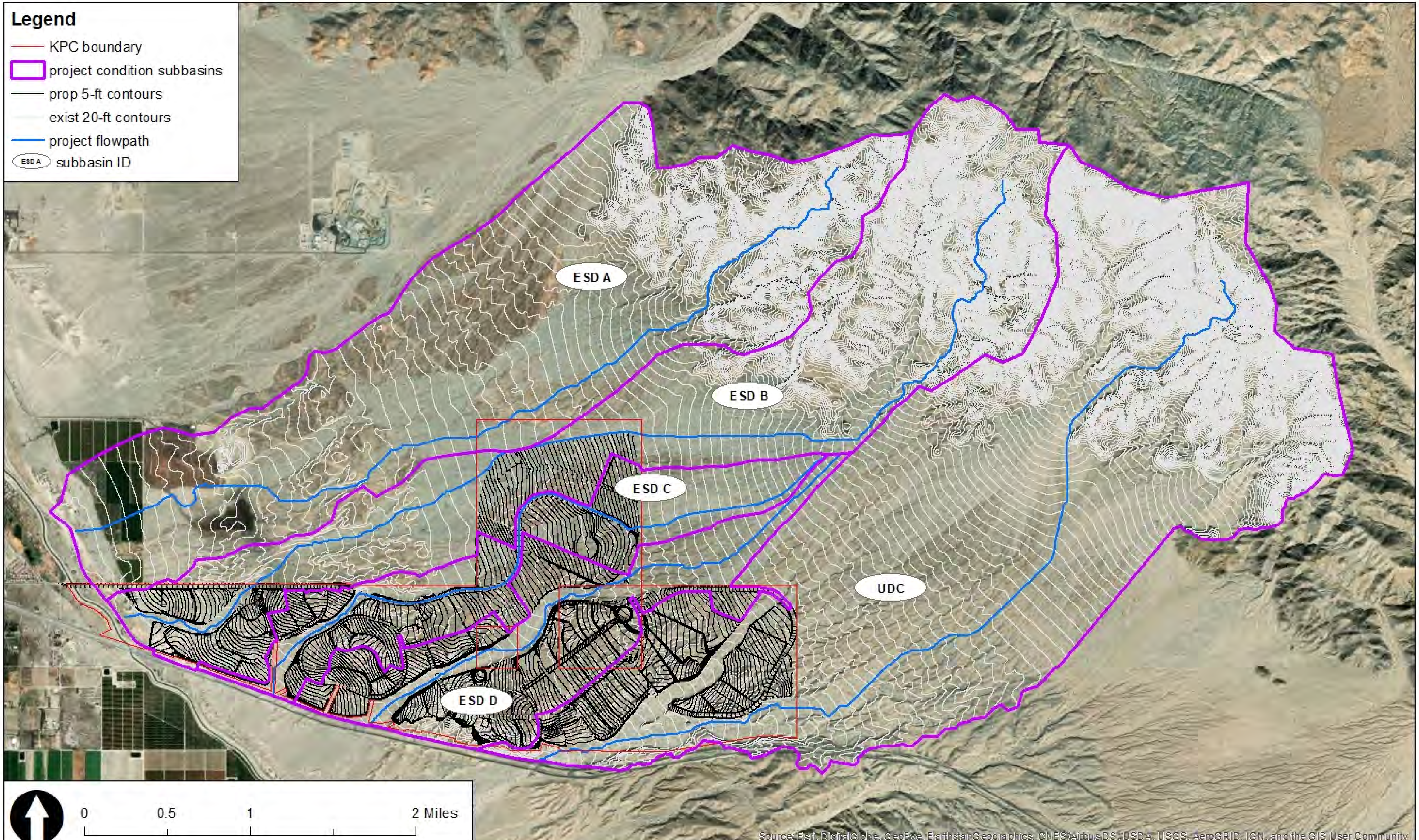

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Figure 4-6. Project watershed conditions regional soils map

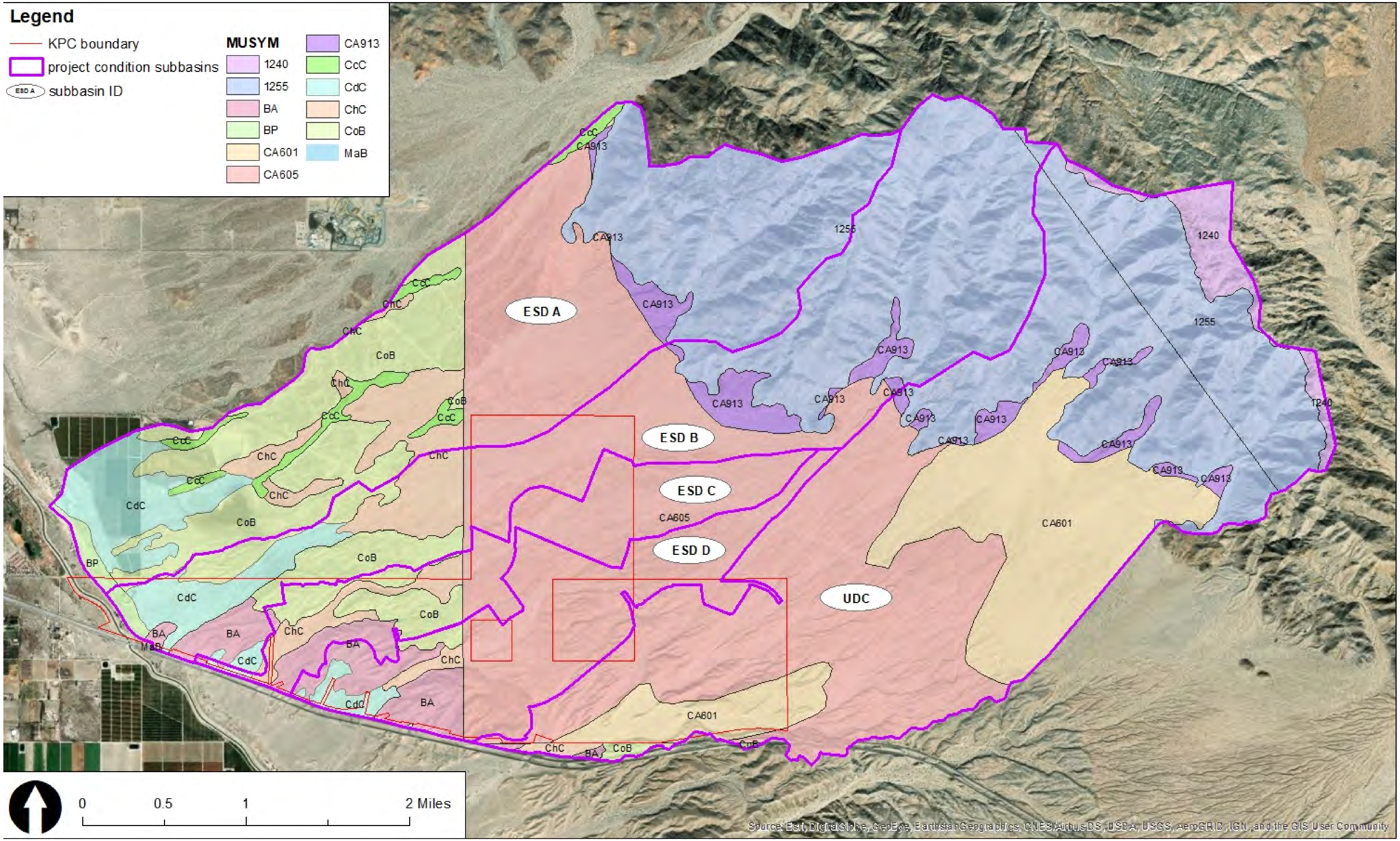

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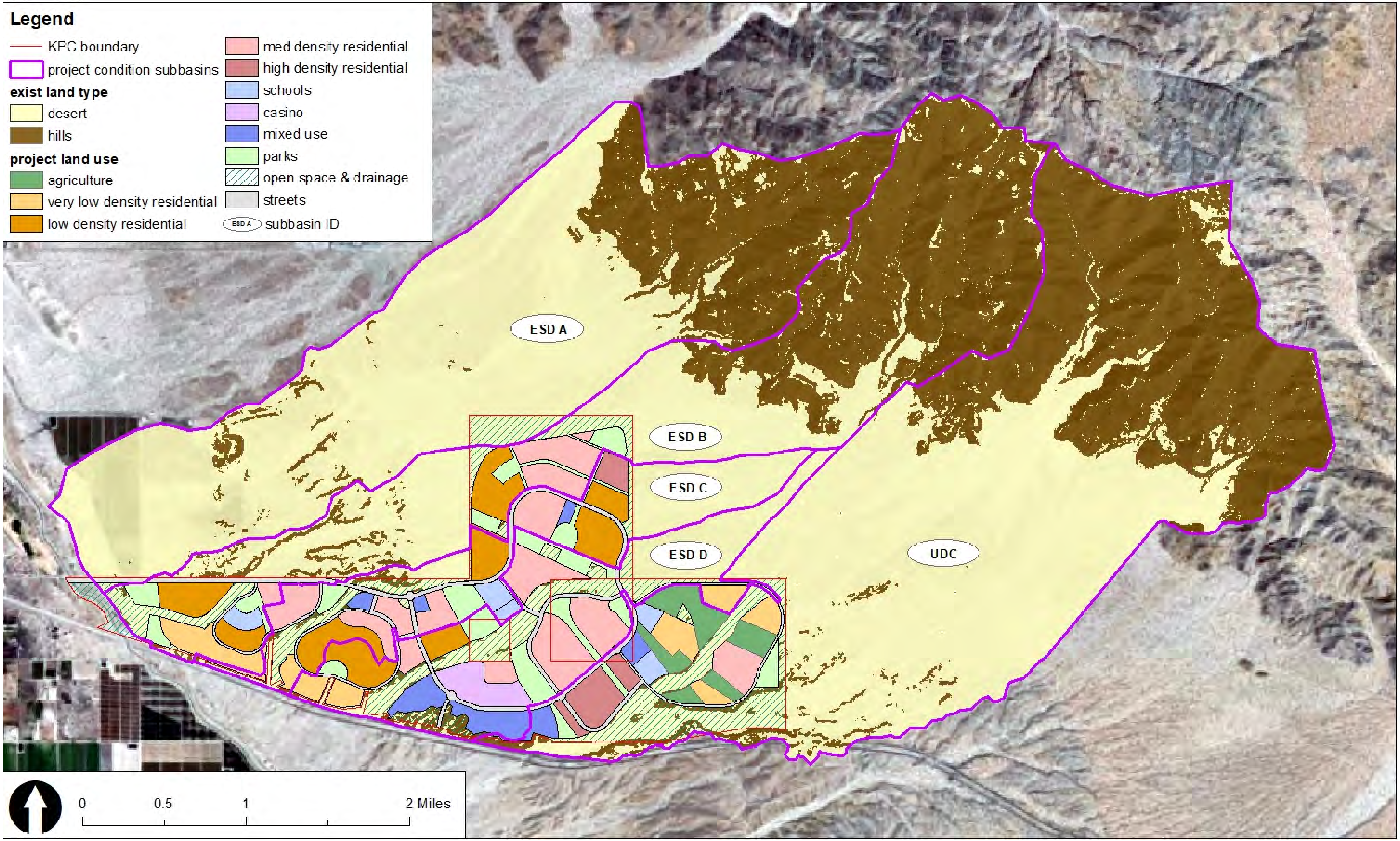
Figure 4-7. Project conditions watershed conditions regional land type map



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4.8 Debris yield

4.8.1 Approach, methodologies, and assumptions

The USACE Los Angeles District Debris Method (USACE, 2000) consists of a set of predictive equations expressing the single event unit debris yield of a watershed as a function of physiographic, hydrologic, and meteorologic parameters. These predictive equations were developed by multiple regression analyses of single event debris data observed in the San Gabriel Ranges of southern California.

As defined in this method, the "total debris yield" is the total debris outflow from a watershed measurable at a specific concentration point for a specified event. It may include clay, silt, sand, gravel, boulders, tree stumps, and other organic materials. The "debris production" is the gross erosion within a watershed while the "debris yield" is the quantity of debris actually delivered to a concentration point of interest. The entire debris production of the watershed may not necessarily reach its outlet because it is stored temporarily within the watershed due to the lack of transporting capacity of the conveyance system.

There are five empirical equations that were derived on the basis of watershed size ranging from 0.1 to 200 square miles. The multiple regression analyses indicated that the unit debris yield (DY) for a watershed is highly correlated with the following basin parameters: relief ratio (RR) analogous to watershed slope, drainage area (A), unit peak flow (Q), and the non-dimensional fire factor (FF).

Equation 2 is usually applied to drainages 3 to 10 square miles in area. Equation 1, which is a function of precipitation rather than runoff, is used for basins 0.1 to 3; however, if frequency discharge information is available, Equation 2 may be used for areas less than 3 square miles (USACE, 2002).

Equation 2 was applied herein to the drainages of interest less than 3 square miles in size since frequency discharge information was available; thus, Equation 2 was applied to every subbasin:

Equation 2: $\log DY = 0.85\log Q + 0.53\log RR + 0.04\log A + 0.22FF$

Where:

DY = unit debris yield (yd^3/mi^2),

RR = relief ratio (feet/mile),

A = drainage area (acres),

FF = non-dimensional fire factor, and

Q = unit peak flow (cfs/mi^2)

4.8.2 Limitations

The general limitations related to the applications of the USACE Los Angeles District Debris Method in the prediction of debris yield are as follows: (1) geographic constraints, (2) drainage area constraints, (3) topographic constraints, (4) frequency constraints, and (5) input constraints. The frequency and input constraints pertain to small events less than 20-percent annual chance and low runoff or precipitation. Since the recurrence interval in this study is 100-year, only the geographic, drainage area and topographic constraints remain. This method is intended to be used for the estimation of debris yield mainly from coastal-draining mountainous watersheds located in southern California. Since the predictive equations were derived from data observed in the San Gabriel Range, the use of these equations for watershed conditions different from those of the San Gabriel Range must be specifically addressed. The method is applicable only to watersheds with areas ranging from 0.1 to 200 square miles and with a high proportion of their total area in steep, mountainous terrain. The use of this method to compute debris yields for watersheds in mild-sloped valley areas with a high percentage of piedmonts and alluvial fans or valley fill areas may result in estimates that are higher than actual yield. If the sediment transport capacity is less than the statistical debris method results, the sediment transport capacity governs the debris yield.

4.8.3 Adjustment-Transposition (A-T) factor

The use of predictive equations developed from data pertaining to watersheds, which historically demonstrate extremely high unit yields will result in overestimates of debris yields when applied to areas with less erosional activity. Recognizing this limitation, and the importance of uncertain geomorphic and geologic parameters, the USACE Los Angeles District developed an Adjustment-Transposition (A-T) factor.

4.8.4 Regional assumptions

The NHC (2015) Study identified the use of a A-T factor of 0.5 based on previous work completed by Bechtel. The factor of 0.5 was also use in this study.

Due to the low risk of wildfires occurring in this region due to sparse vegetation, the Fire Factor (FF) used in the analysis of each subbasin was assigned a minimum value of 3.0 based on fire factor (Tables A-1 and A-2; USACE, 2000).

4.8.5 Computational results

A summary of the debris yield calculations by subbasin and storm event are listed in Table 4-21 (Baseline conditions) and Table 4-22 (Project conditions).

The calculated bulked peak flow rates will be utilized for the future design of the project site regional flood conveyance system, which will include the open space conveyance areas through the project site and the proposed storm drain and basin for ESD_C and a portion of ESD_B.

In general, the proposed flood mitigation plan will pass offsite flow and sediment directly through the project site in the open space conveyance channels with no intended trapping of sediment. Except for the drainage system in ESD_C and a portion of ESD_B which will pass offsite flows through the site to a proposed mitigation basin on the west side of the development.

Some percentage of course sediment will fall out on the fan areas above the project site and will reduce the amount of the calculated debris production delivered to the project site. Open channels will be designed to pass sediment and debris through the site similar to the existing conditions. The mitigation basin will trap a portion of the remaining sediment delivered to the site. The sediment transport through the basin and the impacts on the downstream flow paths will need to be evaluated and considered in the final design configuration for the basin.

The final design of the recommended storm drain and basin improvements will need to consider debris trapping and deposition, sediment transport in the downstream channels considering pre- and post-development flow depths and velocities, and address potential impacts to downstream properties.

Table 4-21. Baseline conditions debris analysis results by subbasin and storm event

subbasin	drainage area {sq mi}	relief ratio {ft/mi}	fire factor	A-T factor	1-percent annual chance storm						
					Q_p {cfs}	q_p {cfs/mi^2}	flood volume {ac-ft}	debris yield {ac-ft}	bulked volume {ac-ft}	bulking factor	$Q_{p,bulked}$ {cfs}
ESD_A	5.44	394	3.0	0.50	3,780	695	483	66	549	1.14	4,297
ESD_B	4.41	320	3.0	0.50	2,855	647	389	45	434	1.12	3,184
ESD_C	1.42	222	3.0	0.50	1,208	851	154	14	168	1.09	1,320
ESD_D	1.65	250	3.0	0.50	1,487	901	184	19	203	1.10	1,638
Upper Double Canyon	7.82	343	3.0	0.50	5,795	741	730	95	825	1.13	6,545

subbasin	drainage area {sq mi}	relief ratio {ft/mi}	fire factor	A-T factor	10-percent annual chance storm						
					Q_p {cfs}	q_p {cfs/mi^2}	flood volume {ac-ft}	debris yield {ac-ft}	bulked volume {ac-ft}	bulking factor	$Q_{p,bulked}$ {cfs}
ESD_A	5.44	394	3.0	0.50	1,610	296	166	32	198	1.19	1,920
ESD_B	4.41	320	3.0	0.50	1,200	272	134	21	155	1.16	1,392
ESD_C	1.42	222	3.0	0.50	556	392	52	7	60	1.14	635
ESD_D	1.65	250	3.0	0.50	694	421	63	10	73	1.16	802
Upper Double Canyon	7.82	343	3.0	0.50	2,498	319	255	46	301	1.18	2,951

subbasin	drainage area {sq mi}	relief ratio {ft/mi}	fire factor	A-T factor	50-percent annual chance storm						
					Q_p {cfs}	q_p {cfs/mi^2}	flood volume {ac-ft}	debris yield {ac-ft}	bulked volume {ac-ft}	bulking factor	$Q_{p,bulked}$ {cfs}
ESD_A	5.44	394	3.0	0.50	583	107	53	13	66	1.25	731
ESD_B	4.41	320	3.0	0.50	429	97	43	9	52	1.21	518
ESD_C	1.42	222	3.0	0.50	235	165	19	4	22	1.19	279
ESD_D	1.65	250	3.0	0.50	293	178	23	5	28	1.20	353
Upper Double Canyon	7.82	343	3.0	0.50	916	117	83	20	103	1.24	1,133

Table 4-22. Project conditions debris analysis results by subbasin and storm event

subbasin	drainage area {sq mi}	relief ratio {ft/mi}	fire factor	A-T factor	1-percent annual chance storm Q_p {cfs}	q_p {cfs/mi^2}	flood volume {ac-ft}	debris yield {ac-ft}	bulked volume {ac-ft}	bulking factor	$Q_{p,bulked}$ {cfs}
ESD_A	5.44	394	3.0	0.50	3,780	695	483	66	549	1.14	4,297
ESD_B	4.41	294	3.0	0.50	2,764	627	407	42	448	1.10	3,047
ESD_C	1.40	210	3.0	0.50	1,359	971	162	15	177	1.09	1,488
ESD_D	1.67	250	3.0	0.50	1,844	1,104	203	23	225	1.11	2,049
Upper Double Canyon	7.81	343	3.0	0.50	5,832	747	745	95	840	1.13	6,576

subbasin	drainage area {sq mi}	relief ratio {ft/mi}	fire factor	A-T factor	10-percent annual chance storm Q_p {cfs}	q_p {cfs/mi^2}	flood volume {ac-ft}	debris yield {ac-ft}	bulked volume {ac-ft}	bulking factor	$Q_{p,bulked}$ {cfs}
ESD_A	5.44	394	3.0	0.50	1,610	296	166	32	198	1.19	1,920
ESD_B	4.41	294	3.0	0.50	1,166	264	139	20	159	1.14	1,333
ESD_C	1.40	210	3.0	0.50	645	461	58	8	66	1.14	735
ESD_D	1.67	250	3.0	0.50	894	536	74	12	86	1.16	1,041
Upper Double Canyon	7.81	343	3.0	0.50	2,527	324	260	47	306	1.18	2,981

subbasin	drainage area {sq mi}	relief ratio {ft/mi}	fire factor	A-T factor	50-percent annual chance storm Q_p {cfs}	q_p {cfs/mi^2}	flood volume {ac-ft}	debris yield {ac-ft}	bulked volume {ac-ft}	bulking factor	$Q_{p,bulked}$ {cfs}
ESD_A	5.44	394	3.0	0.50	583	107	53	13	66	1.25	731
ESD_B	4.41	294	3.0	0.50	425	96	46	8	54	1.19	504
ESD_C	1.40	210	3.0	0.50	284	203	21	4	25	1.19	339
ESD_D	1.67	250	3.0	0.50	401	240	27	6	33	1.23	492
Upper Double Canyon	7.81	343	3.0	0.50	937	120	85	20	105	1.24	1,158

5 FLOOD HYDRAULIC ANALYSIS

The proposed KPC Coachella project site is situated on the piedmont, which lies below the Little San Bernardino Mountains. The piedmont is comprised of several active and relict fan areas stemming from the upstream canyons. The piedmont experiences a complex mix of flood processes, which can be generally categorized as shallow "non-riverine" flooding. Shallow flooding is typically more confined at or near the canyon outfalls and transitions to flood processes of a distributary nature followed by sheet flooding on the more distal portions of the piedmont.

Evaluating flood conveyance on the piedmont surface at the project site is a key focal point of this study as this flood-related hazard will influence (1) site planning and design in terms of providing sustainable flood protection around and/or through the development footprint and (2) mitigation of flood hazard impacts to adjacent properties and facilities, including the East Side Dike and Interstate 10 drainage crossings, as a consequence of the planned development.

Given the nature of the flood environment on the piedmont, a two-dimensional flood routing model was selected to evaluate the existing flood hazards. The Project site is located from 1 to over 2 miles below the outlets from the canyons along the mountain front. Typically, the flood hydrograph at the canyon outlets would be routed over the piedmont surface to evaluate the flood hazard limits. Due to the distance from the project site, and the limited watershed area tributary to the canyons, this method would not adequately represent the flood hazard at the project boundaries. To address this issue, a direct rain-on-grid approach in the two-dimensional model will be used to generate runoff on the model surface. A detailed discussion of the approach and model development is provided in the following sections.

5.1 Goals and objectives

The primary goal of two-dimensional flood routing is to approximate existing (baseline) and project-influenced flood patterns to support future development planning and assessment of project impacts; it is not intended as a regulatory floodplain evaluation. A secondary goal of the analysis is to validate the geomorphic assessment and the watershed boundaries used in the Synthetic Unit Hydrograph analysis.

Objectives include the spatial mapping of 1-percent annual chance flood depths, velocities, and flow rate distributions above, around, within, and below the KPC Coachella property limits.

5.2 Two-dimensional flood routing

The 1-percent annual chance flood was used to evaluate the behavior of flood conveyance on the piedmont using FLO-2D PRO (FLO-2D, Inc., 2019), a two-dimensional, finite-difference scheme, flood routing model. The FLO-2D PRO model development includes the following aspects:

- General model definitions
- Effective precipitation on grid (spatially and temporally varied)
- Natural and anthropogenic features (e.g., flood control structures) captured by the resolution of available elevation data in conjunction with the selected grid cell size used to define the model domain
- Inflow and outflow boundary conditions

5.2.1 General model definitions

The model domain was defined to include the watershed tributary to and/or influenced by the planned development, limited downstream by the East Side Dike to the west (north of Interstate 10) and Interstate 10 crossing outfalls located immediately south of Interstate 10. The model is generally confined by the East Side Dike to the West, Interstate 10 to the south, and the Little San Bernardino Mountain Range to the north and east. The following information describes the general model definition:

- Model domain is comprised of 595,924 grid cells (upper domain) and 353,398 grid cells (lower domain)
- 24-hour simulation time
- 25' x 25' grid cell size
- Grid cell elevations were interpolated from topographic mapping
- A shallow n-value of 0.100 was assigned to the entire domain
- A limiting Froude number of 0.95 was assigned to the entire domain

5.2.2 Topographic features – Baseline condition

Three sources of topographic mapping were used to develop the dataset for the model. The IFSAR topographic dataset (Intermap Technologies, 2005) was used for the majority of the areas outside of the project limits, with the exception of a small portion to the northwest of the tributary drainage, which was supplemented with USGS 30-meter DEM. Within the boundaries of the Project site and immediate surrounding vicinity, 2-foot contour aerial topographic mapping (Digital Mapping, 2005) prepared for the planning and design of the proposed development was used. The horizontal and vertical datum for all topographic/elevation data is in CA NAD 83 State Plane Zone 6 and NAVD 88, respectively.

The model domain interpolated surface captures the influence of the following anthropogenic (human-made) features and disturbances, including Interstate 10 to the south and several training and diversion dikes either directing runoff to one of several Interstate 10 crossings or diverting runoff to the impoundment area along the East Side Dike to the west.

No significant man-made disturbances were observed (in the field or on aerial imagery) on the piedmont above the Project site that would potentially influence flood patterns. Available topography for the model domain extents and in the local vicinity of the Project site are shown in Figure 5-11 and Figure 5-13, respectively.

5.2.3 Topographic features – Project condition

The same topography used in the Baseline condition was applied in the Project condition in the areas where there is no planned development. The surface for the Project condition was generated as described in the following procedure:

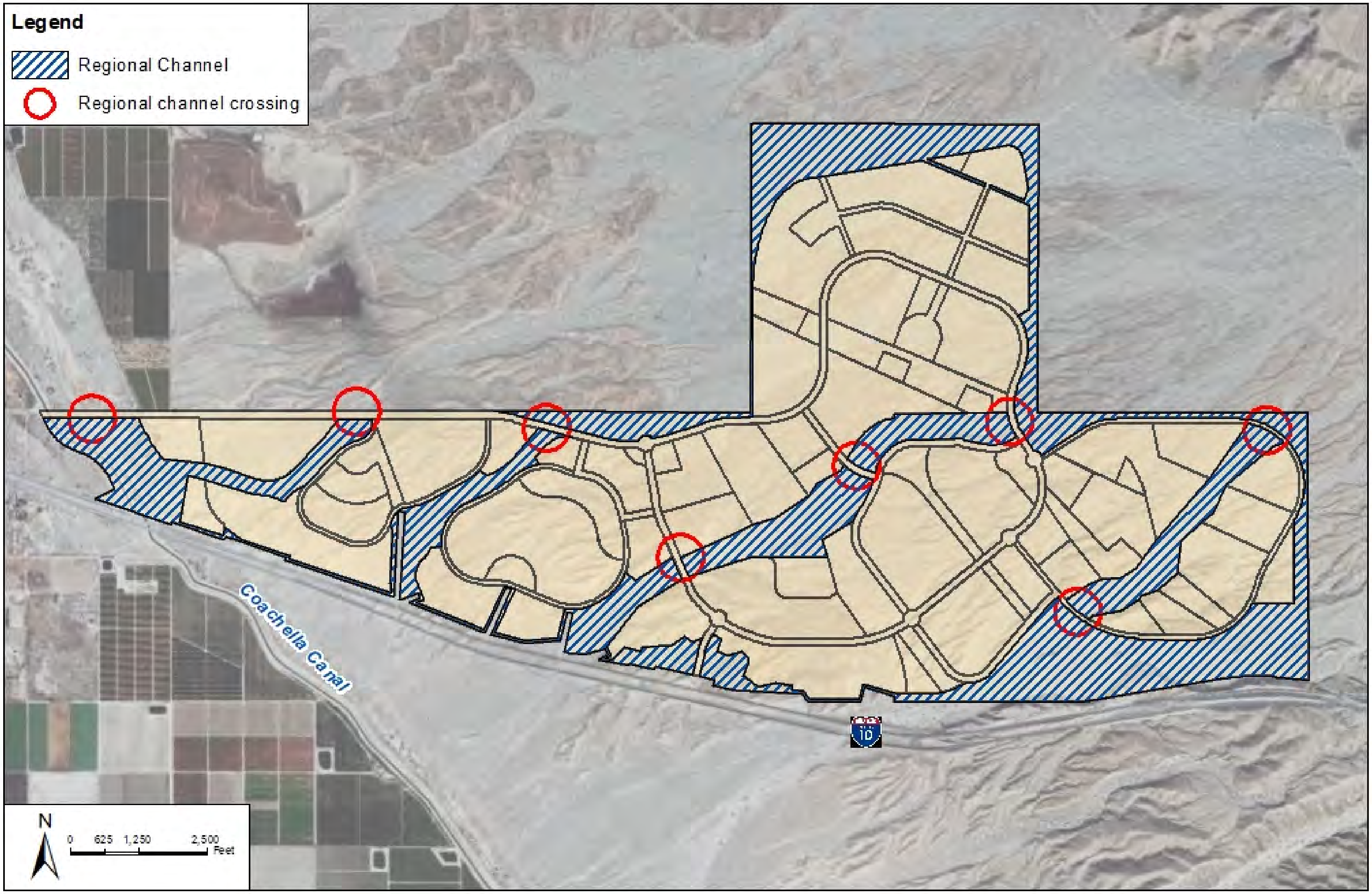
1) The proposed grading was provided by Kimley Horn, as depicted in Figure 5-12 and Figure 5-14, in AutoCAD 3D surface format
2) The existing topography used in the Baseline condition was converted into an AutoCAD 3D surface. The proposed 3D surface was pasted to the existing 3D surface in order to generate a composite 3D surface.
3) The composite 3D surface was exported to ArcGIS and converted into an ASCII grid file.
4) The ASCII grid file was interpolated using the FLO-2D PRO GDS to generate the ground elevations used in the Project condition FLO-2D model.

5.2.4 Proposed regional channel crossings

There are 8 proposed regional channel crossings, as depicted in Figure 5-1. Per the conceptual land use plan provided by Kimley Horn, these are proposed bridge locations. The following assumptions were made to represent these regional channel crossings in the FLO-2D model:

- *Topographic representation*. The bridge crossings are currently in preliminary design and therefore the channels crossings were not formally defined in the Project condition FLO-2D model. The topography was modified in these areas to existing ground elevations in order to allow flows to be conveyed through the regional channel.

Figure 5-1. Proposed regional channel crossings



5.2.5 Directional berms and local levees

The following existing berms and local levees are topographically represented in the model domain:

- *Subbasin ESD_B*. The levee defined near the downstream limits for the purpose of diverting flow from Interstate 10 to the East Side Dike impoundment area (Subbasin ESD_A). The levee is a constructed earthen system with riprap erosion protection along the upstream face.
- *Subbasin ESD_C*. Two small levee systems for the purpose of confining and directing runoff from the watershed to existing Interstate 10 drainage crossings.
- *Subbasin ESD_D*. Three small levees for the purpose of confining and directing runoff from the watershed to existing Interstate 10 drainage crossings.

The model representation of these berms/levees were compared to their topographic representation as well as the flood simulation results to verify that they are adequately defined by the assumed 25’ grid cell size.

Local edge condition and interior levees were defined in the project condition models to represent the proposed grading along the northern and eastern edge condition and for planned storm water conveyance through the proposed development. The edge condition levees were defined in the model to prevent offsite flows overtopping the grading along the north-east edge as the grading is preliminary and at a rough scale. Future grading will be designed to ensure that offsite flows do not exceed the proposed grading.

In the project condition models, interior levees were defined within the project site to direct local onsite runoff to match the proposed drainage boundaries shown in Figure 7-1. The onsite interior levees are shown in Figure 5-36. Interior virtual levees were used as a simplistic method to convey the onsite flows through the project site in a manner similar to the path that the proposed underground conduit would follow, capture, and discharge runoff to the western edge of the site. This allowed a better understanding of the potential project impacts. Also, a virtual levee along the southeastern edge of the project was defined to protect the site from offsite flows.

In the project mitigated condition models, virtual levees were modeled along the upper western edge of the basin where the bottom width is narrow. The levees varied in height to control how much flow could be released from the basin and to spread the discharge to match or be less than existing condition. Virtual levees were also modeled for a short distance along the lower western edge of the proposed detention/spreading basin. Due to the model grid size and elevation interpolation limitations, the basin design top elevation of 510 ft wasn’t fully captured in this area. Therefore, levees were defined with a crest elevation of 510 feet to more accurately represent the true elevation of the top of the basin.

Additional virtual levees were included along the southeastern edge of the project site along with two proposed channels. The levees and channels were included to capture offsite flows from the east and convey the flows back to the regional channel systems. Virtual levees were defined for short reaches along the southern channel to more accurately represent the top of channel.

5.2.6 Hydraulic structures

The following hydraulic structures are represented topographically within the model domain:

- *Interstate 10 bridge crossings*. Three existing bridges are located along the I-10 at the downstream end of subbasins ESD_C, ESD_D, and Upper Double Canyon. The bridge crossings show up as flow obstructions on the topographic mapping. The topography at these locations was modified to eliminate the obstruction and provide flow conveyance downstream of Interstate 10. These bridge crossings were modeled in the Baseline, Project, and Project with Mitigation conditions.

- *Interstate 10 storm drain culverts*. A total of 26 culverts were defined in the FLO-2D model. Rating curves were developed for each of the existing culvert crossing located along the I-10 based on as-built drawings, field inspection notes, and/or by inference from other structures with more. Figure 5-2 depicts the existing culvert locations. These culverts were modeled in the Baseline, Project, and Project with Mitigation conditions.

  The culvert locations have been divided in the 3 areas: Area 1, Area 2, and Area 3. The table below lists their location and approximate diameter sizes.

  Figures 5-3 to 5-5 depict any potential backwater effects to the project site. The flood depths depicted in these figures represent the worst-case scenario, where it is the maximum depth taken from all scenarios L-0, L-1, L-2, and L-3. The different levee scenarios are further discussed in Section 5.2.14.

- *Onsite proposed storm drain*. In the Project condition and Project with Mitigation condition models, offsite flows along the eastern boundary of the project site (within Watersheds ESD B and ESD C) were routed through hydraulic structures and discharged to the proposed basin on the western boundary of the project site. The hydraulic structure inlet and outlet locations (see Figure 7-2) correspond approximately to the proposed onsite storm drain system (see Figure 6-1). Based on the proposed onsite storm drain system, the southernmost hydraulic structure was modeled as a 54 inch reinforced concrete pipe and the other two structures were modeled as 8 ft wide x 6 ft high reinforced concrete box culverts. Consistent with the drainage boundary for ESD_C, as shown in Figure 7-1, street flow adjacent to the southern end of the proposed basin was routed into the basin via two inlets. Each inlet was assigned a rating curve for a 36 inch pipe. A rating curve for each hydraulic structure was generated using Federal Highway Administration (FHWA) Culvert Equations in the Dodson program.

Table 5-1. Existing culverts

area	culvert name	diameter {inches}
1	C1.1	18
	C1.2	36
	C1.2.1	36
	C1.3	36
	C1.4	36
	C1.5	48
	C1.6	48
2	C2.1	30
	C2.1.1	30
	C2.2	30
	C2.2.1	30
	C2.3	36
	C2.3.1	36
	C2.4	24
	C2.4.1	24
	C2.5	54
	C2.5.1	54
3	C3.1	24
	C3.1.1	24
	C3.2	30
	C3.2.1	30
	C3.3	24
	C3.4	48
	C3.4.1	48
	C3.5	36
	C3.6	24

Figure 5-2. Index map of existing culverts

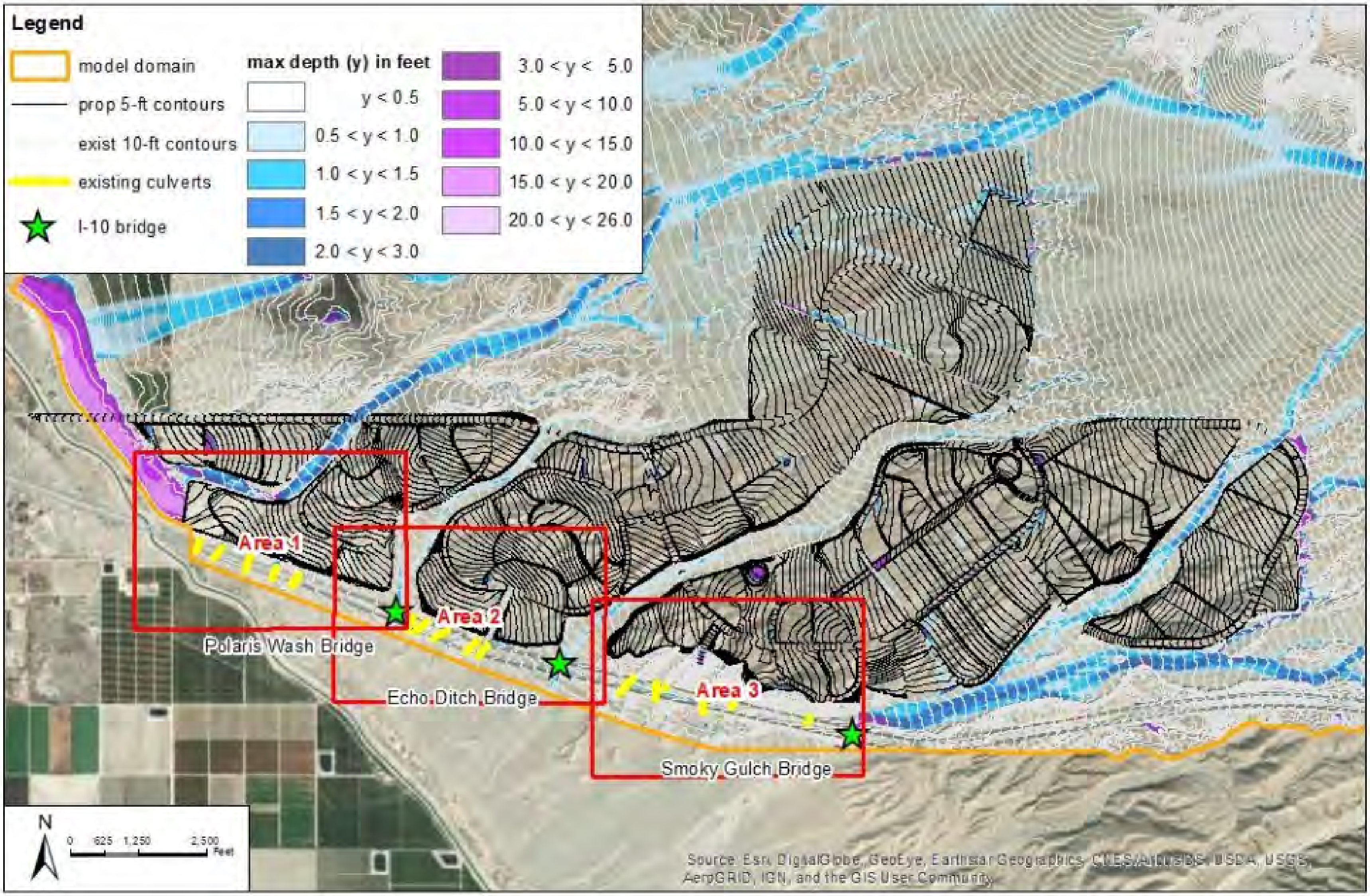


Figure 5-3. Area 1 existing culverts C1.1-C1.6

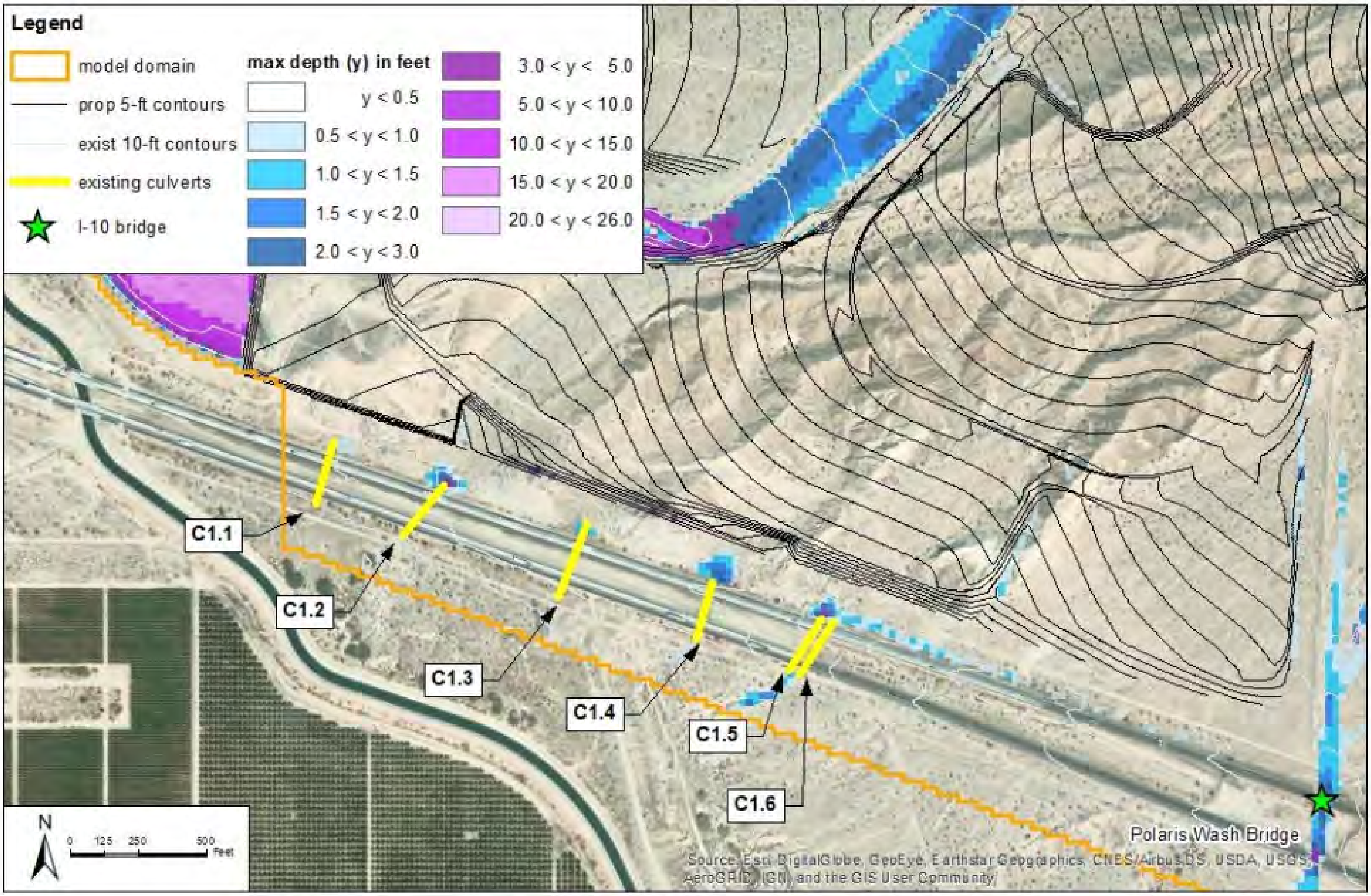


Figure 5-4. Area 2 existing culverts C2.1-C2.5

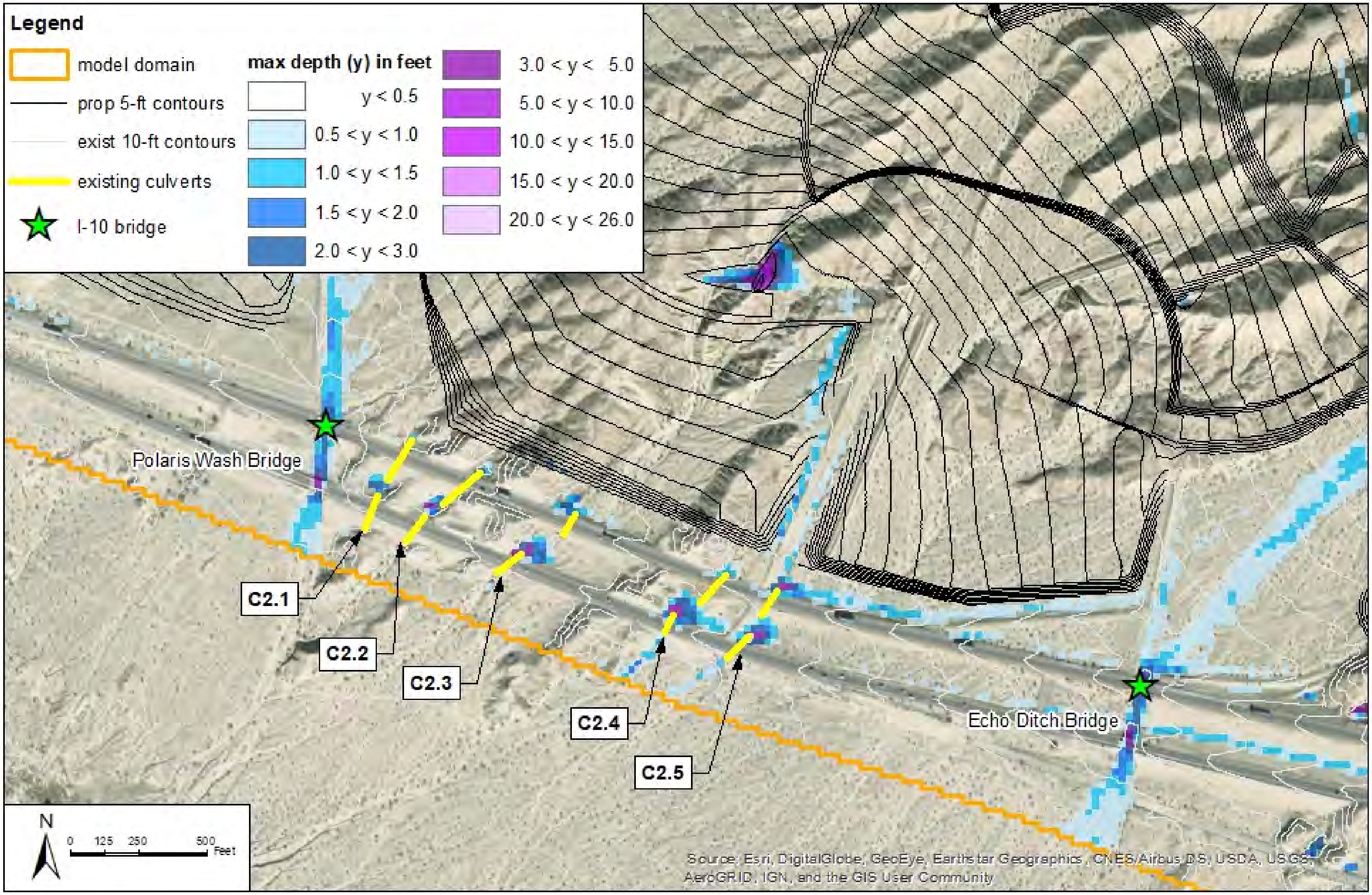
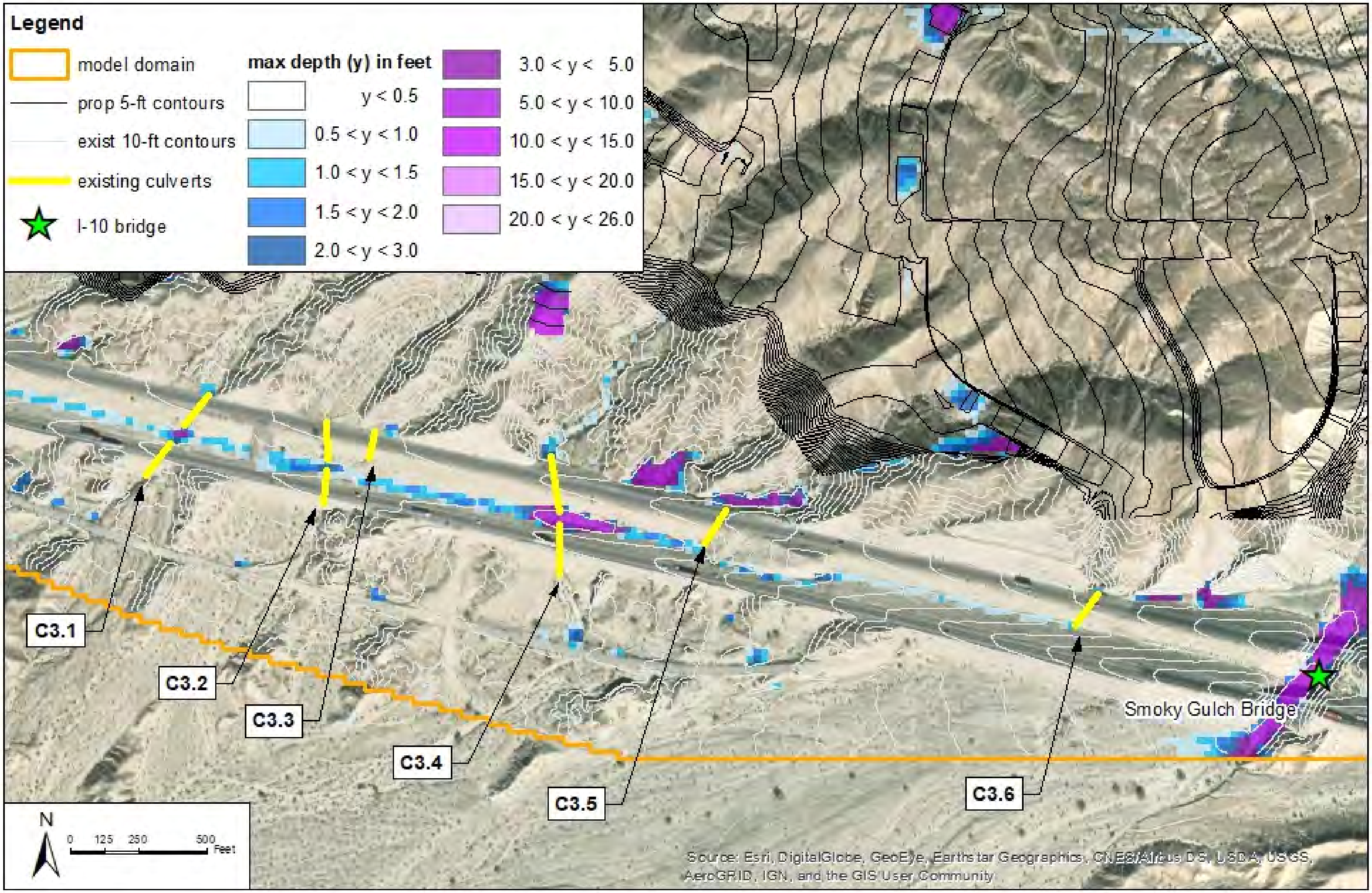


Figure 5-5. Area 3 existing culverts C3.1-C3.6



5.2.7 Precipitation on grid – Baseline condition

Spatially and temporally varied effective precipitation was emulated as described in the following procedure:

1) NOAA Atlas 14 Volume 6 (California) Version 2.3 (NWS, 2014) spatially interpolated precipitation frequency estimates were used to determine the 5-minute, 30-minute, 60-minute, 2-hour, 3-hour, and 6-hour precipitation depths, in inches, for each grid element within the defined model domains.
2) A unique synthetic storm pattern with the maximum intensity time-positioned at 67th percentile was computed for each grid element based on the frequency-duration precipitation depths specific to each grid element.
3) Grid cell loss rates were determined based on land type and hydrologic soil group distributions as follows:
   a) The distribution of hydrologic soils groups was determined from soil mapping (Figure 5-8) based on the following soil surveys and maps available online:
      i) Riverside County, Coachella Valley Area, California (CA680/SSURGO) (NRCS, 2018a)
      ii) Joshua Tree National Park, California (CA794/SSURGO) (NRCS, 2018b)
      iii) Colorado Desert Area, California (CA803/SSURGO) (NRCS, 2017)
      iv) U.S. Generalized Map (STATSGO2) (NRCS, 2016)
   b) The land type (Figure 5-9) was classified as desert (slopes less than 15 percent) or hills (slopes greater than 15 percent), which is generally consistent with the original assumptions presented in NHC (2017).
   c) Land type and hydrologic soil group distributions were determined for each grid cell within the model domain.
   d) The loss rate was determined based on the loss rates adopted in NHC (2017) for each land type and hydrologic soil group combination. An initial loss of 0.25 inches was applied to account for interception and depression storage as in NHC (2017). Map unit land type, soil, and loss characteristics are shown in Table 5-2.
4) The initial loss, loss rate, and synthesized storm pattern for each grid cell were used to derive a unique effective storm pattern for each grid cell.
5) The effective storm patterns determined for the grid cells of the model domain were used to generate the RAINCELL.DAT file required to support the simulation of spatially and temporally varied precipitation in FLO-2D PRO.

Table 5-2. Baseline conditions initial losses and loss rates by map unit

area symbol	musym	DA {acres}	land type, in *percent*		hydrologic soil group, in *percent*				initial loss {inches}	constant loss rate {inches}
			desert	hills	A	B	C	D		
CA680	BA	71	51	49	98	1	0	1	0.25	0.355
CA680	BA	413	45	55	5	14	0	81	0.25	0.152
CA680	BP	74	98	2	98	1	0	1	0.25	0.272
CA680	BP	6	72	28	5	14	0	81	0.25	0.132
CA680	CcC	95	98	2	100	0	0	0	0.25	0.273
CA680	CdC	649	98	2	100	0	0	0	0.25	0.274
CA680	ChC	593	96	4	100	0	0	0	0.25	0.277
CA680	CoB	1301	84	16	0	100	0	0	0.25	0.198
CA680	MaB	8	97	3	100	0	0	0	0.25	0.276
CA794	1240	77	10	90	100	0	0	0	0.25	0.433
CA794	1255	665	1	99	100	0	0	0	0.25	0.449
CA803	1255	3348	8	92	100	0	0	0	0.25	0.435
CA803	CcC	18	98	2	100	0	0	0	0.25	0.274
US	s1130	345	85	15	5	2	3	90	0.25	0.112
US	s991	1414	96	4	98	1	0	1	0.25	0.275
US	s995	4471	94	6	5	14	0	81	0.25	0.116
composite		13548	65	35	53	15	0	32	0.25	0.257

5.2.8 Precipitation on grid – Project condition

Spatially and temporally varied effective precipitation was emulated as described in the following procedure:

1) The synthetic storm pattern from the Baseline condition was used in the Project condition
2) The land type in the Baseline condition was used in the Project condition in areas where there is no planned development. In the project development area, the land type was defined based on Kimley Horn land use plan as seen in Figure 5-10.
3) The grid cell loss rates were determined based on Baseline condition hydrologic soil group and Project condition land use as follows:

   a) An initial loss rate of 0.25 inches was applied to account for interception and depression storage as in NHC (2017)

   b) Weighted adjusted loss rates were calculated for the project condition to account for percent imperviousness according to land use as shown in Table 5-3 below.

Table 5-3. Land use percent perviousness

specific plan land use	RCFC&WCD hydrology manual land use	percent pervious
very low density residential	single family residential (1 ac lots)	80
low density residential	single family residential (7,200 - 10,000 sf lots)	50
medium density residential	condominiums	35
high density residential	apartments	20
mixed use	commercial (50%) and apartment (50%)	15
casino/entertainment center/hotels	commercial	10
roads	commercial	10
schools	single family residential (7,200 - 10,000 sf lots)	50
parks	single family residential (1 ac lots) (75%) and undeveloped (25%)	85
agricultural production	agriculture	100
drainage and open space	undeveloped	100
agricultural center	single family residential (1 ac lots)	80

4) The initial loss, adjusted loss rate, and synthesized storm pattern for each grid cell were used to derive a unique effective storm pattern for each grid cell.
5) The effective storm patterns determined for the grid cells of the model domain were used to generate the RAINCELL.DAT file required to support the simulation of spatially and temporally varied precipitation in FLO-2D PRO.

5.2.9 Manning's roughness value – Baseline condition

A global n-value of 0.065 was applied to the Baseline conditions model domain. This value was determined to be generally representative of the natural uneven terrain and ground cover relative to the shallow nature of flooding that is expected over the majority of watershed, as seen in Table 5-7. In addition, sediment/debris laden flows are expected to occur near critical depth.

5.2.10 Manning's roughness value – Project condition

The manning's n values for Project condition land uses were determined based on calculating weighted average n values for similar land use areas within the city of Coachella. The same n value of 0.065 that was use in the Baseline condition was applied to all undisturbed areas in the Project condition model domain.

The table below summarizes the roughness coefficients applied to the project site according to land use.

Table 5-4. Manning's n values – Project condition

specific plan land use	manning's value
very low density residential	0.06
low density residential	0.08
medium density residential	0.09
high density residential	0.11
mixed use	0.08
casino/entertainment center/hotels	0.08
roads	0.015
schools	0.08
parks	0.04
agricultural production	0.055
drainage and open space	0.065

5.2.11 Model domain extents, grid cell size, and computational time step

The grid cell size of the model domain is an important consideration in two-dimensional modeling. A smaller grid cell size will potentially reflect a higher topographic resolution and subsequently, better model precision; however, the computational time of a model simulation is expected to increase as the grid cell size of the model domain is reduced. Also, the size of the model domain will influence the computational time of the model simulation where larger model domains will experience longer computational times. The potential maximum resolution of the model domain is limited by the resolution of the source elevation data used to interpolate the grid cell elevations.

The selection of the model domain grid cell size requires a trade-off to ensure reasonable simulation times without significantly compromising model precision. The overall model domain for the Project was subdivided into an upper and lower model domain (Figure 5-15) to improve model performance in conjunction with the selection of a grid cell size supported by the resolution of the available elevation data sources.

A sensitivity analysis of 25’x25’ and 30’x30’grid cell sizes through model simulation focused on a confined tributary located in the upper model domain was performed to demonstrate the adequacy of a 25’x25’ grid cell for application throughout the overall model domain. The 1-percent annual chance maximum flood depths resulting from the sensitivity analysis are presented in Figure 5-16 (25’x25’ grid cell size) and Figure 5-17 (30’x30’ grid cell size). A summary comparison of simulation results in depicted Table 5-5.

Table 5-5. FLO-2D model sensitivity analysis, 1-percent annual chance flood event

parameter	sensitivity model		units
	25'x25'	30'x30'	
domain area	2.109	2.103	sq mi
average grid cell effective rainfall	1.55	1.55	inches
rainfall volume	174	173	ac-ft
floodplain storage	14	14	ac-ft
floodplain outflow hydrograph	160	159	ac-ft
floodplain outflow, interception and storage	174	173	ac-ft
TOL floodplain storage	13	13	ac-ft
total outflow from grid system	160	159	ac-ft
total volume of outflow and storage	174	173	ac-ft
flow rate, west boundary floodplain cross section	2907	2802	cfs
volume, west boundary floodplain cross section	132	132	ac-ft

5.2.12 Infiltration and transmission losses

No infiltration or transmission losses were incorporated into the models for Baseline and Project conditions.

5.2.13 Model inflow boundary conditions

Both the Baseline and Project conditions were defined as follows:

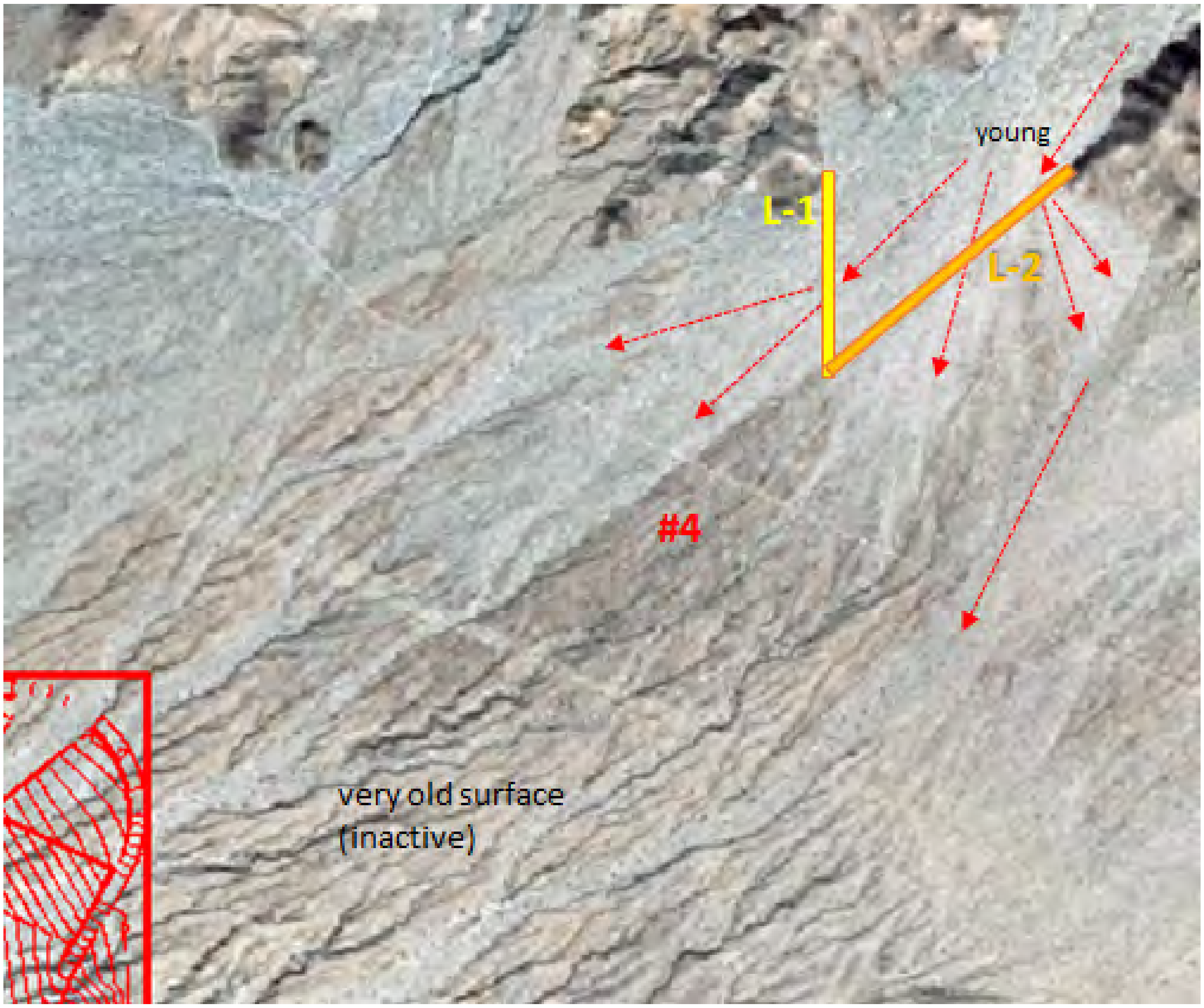
No inflow boundary conditions were assigned for the upper model domain. The inflow boundary conditions of the lower model domain were defined to reflect the outflow boundary conditions from the upper model domain.

5.2.14 Model variations for flood pattern uncertainty

In addition to analyzing the flow path scenario based on topography alone, three separate virtual levee scenarios (L-1, L-2, and L-3) were identified based on the findings from the geomorphic assessment presented in Section 3 to evaluate the potential flow path uncertainty in Area #4 (Figure 5-6) and Area #3 (Figure 5-7). Baseline (existing) and Project conditions were analyzed for all four scenarios:

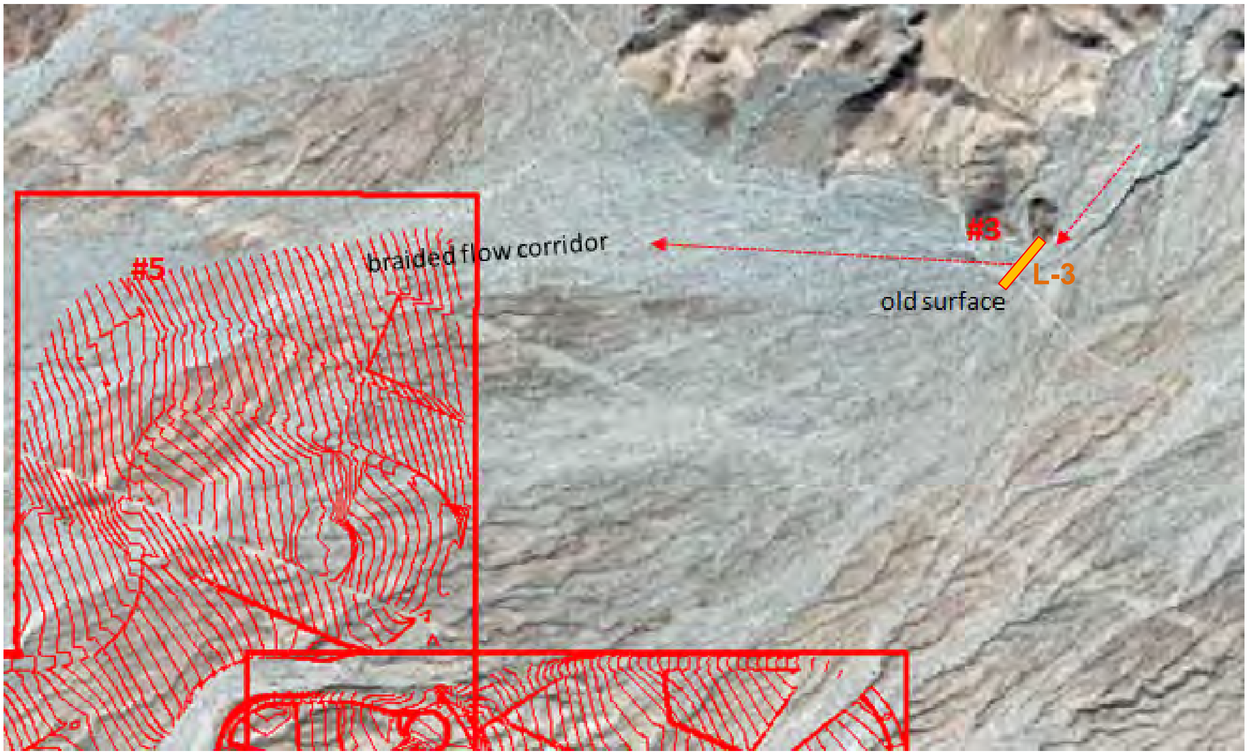
1. **Scenario L-0**. Flow paths are based on topography only
2. **Scenario L-1**. Virtual levee #1 (L-1) is defined as in Figure 5-6 to force floodwaters east and south beyond the upstream limits of the older surface where L-1 terminates downstream
3. **Scenario L-2**. Virtual levee #2 (L-2) is defined as in Figure 5-6 to force floodwaters west and north beyond the upstream limits of the older surface where L-2 terminates downstream
4. **Scenario L-3**. Virtual levee #3 (L-3) is defined in Figure 5-7 to force floodwaters out of the existing channel in a southwesterly direction

Figure 5-6. Proposed virtual levees for modeling flow path uncertainty scenarios



Note: L-1 and L-2 signify virtual levee uncertainty model scenarios 1 and 2, respectively

Figure 5-7. Proposed Area #3 virtual levee (L-3)



Note: L-3 signifies virtual levee uncertainty model scenario 3

5.2.15 Model simulation results

As it pertains to the graphical depiction of simulation results, a minimum threshold of 0.5 feet was assumed for maximum flood depths and a minimum threshold of 1 ft/s was assumed for maximum flood velocities. The Baseline simulation results are presented as follows:

- Figure 5-18. Baseline Scenario L-0 watershed conditions maximum flood depths
- Figure 5-19. Baseline Scenario L-1 watershed conditions maximum flood depths
- Figure 5-20. Baseline Scenario L-2 watershed conditions maximum flood depths
- Figure 5-21. Baseline Scenario L-3 watershed conditions maximum flood depths

The Project conditions simulation results are presented as follows:

- Figure 5-22. Project Scenario L-0 watershed conditions maximum flood depths
- Figure 5-23. Project Scenario L-1 watershed conditions maximum flood depths
- Figure 5-24. Project Scenario L-2 watershed conditions maximum flood depths
- Figure 5-25. Project Scenario L-3 watershed conditions maximum flood depths

The composite worst-case simulation results derived from the outcomes of model scenarios L-0, L-1, L-2, and L-3 are presented as follows:

- Figure 5-26. Baseline Composite Worst-Case watershed conditions maximum flood depths
- Figure 5-27. Baseline Composite Worst-Case watershed conditions maximum flood velocities
- Figure 5-28. Baseline Composite Worst-Case site conditions maximum flood depths
- Figure 5-29. Baseline Composite Worst-Case site conditions maximum flood velocities
- Figure 5-30. Project Composite Worst-Case watershed conditions maximum flood depths
- Figure 5-31. Project Composite Worst-Case watershed conditions maximum flood velocities
- Figure 5-32. Project Composite Worst-Case site conditions maximum flood depths

- Figure 5-33. Project Composite Worst-Case site conditions maximum flood velocities

The impacts to flood depths and velocities in the worst-case scenario are presented as follows:

- Figure 5-34. Project Worst Case impacts site condition change in flood depths
- Figure 5-35. Project Worst Case impacts site condition change in flood velocities

The FLO-2D model summary results for scenarios L-0, L-1, L-2, and L-3 are presented in Table 5-6. The performance comparison between HEC-HMS and FLO-2D is presented in Table 5-7.

The distribution of flood depths in the baseline watershed for the 1-percent annual chance event is depicted in Table 5-8, where 89 percent of the watershed is subject to flood depths less than 0.5 and 95 percent of the watershed is subject to flood depths less than one foot.

5.2.16 Comparison with HEC-HMS analysis and recommendations

The results of the Baseline Scenario (L-0) maximum flood depths were compared with the watershed boundaries used for the development of the HEC-HMS hydrology analysis. An overlay of the watershed boundaries and flood depths is shown on Figure 5-18. While the overall extent of the two-dimensional watershed area is slightly larger than the combined HEC-HMS watershed boundary, the individual watershed boundaries closely match with the two-dimensional watershed runoff patterns. Some areas in the ESD_A and ESD_B watersheds show some potential for overlapping of the watershed boundaries. However, these areas are north of the project site and will not affect the design of the regional flood protection system.

The results of the HEC-HMS and FLO-2D baseline and project condition analyses are summarized in Tables 5-7 and 5-9 for the overall watershed area and at the major concentration points. The peak flow rates in the FLO-2D analysis are significantly lower than the HEC-HMS results, but the total storm volume (runoff, interception, and storage) are similar. A deeper evaluation of the storm volume indicates that a significant portion of the storm volume in the FLO-2D analysis is contained as floodplain storage. This is reflective of the wide alluvial plains that dominate the watersheds tributary and through the project site. As shown in Table 5-8, over 89 percent of the watershed is subject to flood depths of less than 0.5 feet. This condition lends itself to the potential for significant floodplain storage and a corresponding reduction in peak flow rates. The HEC-HMS analysis does not take this condition into consideration as it limits initial and constant loss rates based on generalized land uses and soil types. As such the peak flow rates in the HEC-HMS analysis will be higher and more conservative than the results from the two-dimensional analysis. Also, the floodplain outflows increase with project conditions in HEC-HMS and floodplain outflows decrease with project conditions in FLO2D. In HEC-HMS, outflows increase with project condition due to the change in land use and loss rates. The same changes in project condition are considered in FLO2D, however FLO2D has the additional ability to account for floodplain storage. Therefore, in FLO2D outflows decrease with project condition because the onsite project includes more graded depressions and storage availability, thereby reducing peak outflows.

In additional, the FLO-2D analysis separately identifies runoff to the multiple smaller culverts that cross the I-10 freeway. In the HEC-HMS analysis the watersheds tributary to these small culverts were lumped into the larger drainage areas tributary to the main bridge crossings.

Based on the comparison of the results, it is recommended that the HEC-HMS watershed boundaries and peak flow rates be used for the future design of the regional flood control facilities. Except for the design of the storm drain system in watershed ESD_C. Due to the significant potential for an increase in runoff at this location in the L-3 scenario, the higher discharge between the HEC-HMS analysis and the two-dimensional L-3 scenario shall be used for the design.

The results of the two-dimension flood routing analysis shall be used to assess the project impacts related to flow depth and velocities to the adjacent properties. Impacts to peak flow rates at the bridge crossings will be identified and mitigated using the results of the HEC-HMS analysis.

Table 5-6. FLO-2D model summary results, 1-percent annual chance flood event

parameter		existing conditions - upper				existing conditions - lower				proposed conditions - lower			
		L0	L1	L2	L3	L0	L1	L2	L3	L0	L1	L2	L3
rainfall	maximum, in *inches*	2.69	2.69	2.69	2.69	2.32	2.32	2.32	2.32	2.70	2.70	2.70	2.70
	average, in *inches*	1.78	1.78	1.78	1.78	1.83	1.83	1.83	1.83	1.90	1.90	1.90	1.90
	volume, in *acre-feet*	1266	1266	1266	1266	771	771	771	770	803	803	803	803
surface water inflow, in *acre-feet*		0	0	0	0	1219	1220	1219	1222	1219	1220	1219	1222
combined volume, in *acre-feet*		1266	1266	1266	1266	1990	1991	1989	1992	2022	2023	2021	2024
rainfall interception, in *acre-feet*		0	0	0	0	0	0	0	0	0	0	0	0
floodplain	transmission losses, in *acre-feet*	0	0	0	0	0	0	0	0	0	0	0	0
	storage, *acre-feet*	48	48	47	48	889	889	889	839	1001	992	992	974
	outflow, in *acre-feet*	1219	1219	1219	1219	1101	1101	1100	1153	1022	1031	1029	1050
	total, in *acre-feet*	1266	1266	1266	1266	1990	1991	1989	1992	2022	2023	2021	2024
	TOL storage, *acre-feet*	42	42	42	42	25	25	25	25	25	25	25	25
maximum inundated area, in *acres*		8550	8550	8550	8550	5071	5071	5071	5071	5071	5071	5071	5071
maximum inundated area, in *acres* (depth > 0.5')		668	672	673	655	807	814	819	803	738	737	743	721

Table 5-7. HEC-HMS vs. FLO-2D – baseline (L-0) 1-percent annual chance flood

parameter	HEC-HMS	FLO-2D
drainage area, in *sq mi*	20.73	21.28
average effective precipitation, in *inches*	1.75	1.80
unit runoff volume, in *acre-feet per sq mi*	94	96
flood plain storage, in *acre-feet*	873	937
floodplain outflow, in *acre-feet*	1067	1101
floodplain outflow, interception and storage, in *acre-feet*	1940	2038
Polaris Wash Bridge peak flow rate, in *cfs*	1208	515
Polaris Wash Bridge runoff volume, in *acre-feet*	154	116
Echo Ditch Bridge peak flow rate, in *cfs*	1487	721
Echo Ditch Bridge runoff volume, in *acre-feet*	184	141
Smoky Gulch Bridge peak flow rate, in *cfs*	5796	4503
Smoky Gulch Bridge runoff volume, in *acre-feet*	730	738

Table 5-8. Baseline 1-percent annual chance maximum flood depth distribution

depth, y, in *feet*	percentage of model domain
$y < 0.1$	62
$0.1 < y < 0.5$	27
$0.5 < y < 1$	6
$1 < y$	5

Table 5-9. HEC-HMS vs. FLO-2D – project (L-0) 1-percent annual chance flood

parameter	HEC-HMS	FLO-2D
drainage area, in *sq mi*	20.74	21.28
average effective precipitation, in *inches*	1.81	1.90
unit runoff volume, in *acre-feet per sq mi*	97	97
flood plain storage, in *acre-feet*	890	1049
floodplain outflow, in *acre-feet*	1114	1022
floodplain outflow, interception and storage, in *acre-feet*	2004	2071
Polaris Wash Bridge peak flow rate, in *cfs*	1180	393
Polaris Wash Bridge runoff volume, in *acre-feet*	162	81
Echo Ditch Bridge peak flow rate, in *cfs*	1557	508
Echo Ditch Bridge runoff volume, in *acre-feet*	207	133
Smoky Gulch Bridge peak flow rate, in *cfs*	5832	4447
Smoky Gulch Bridge runoff volume, in *acre-feet*	745	703

Figure 5-8. Model domain soils map

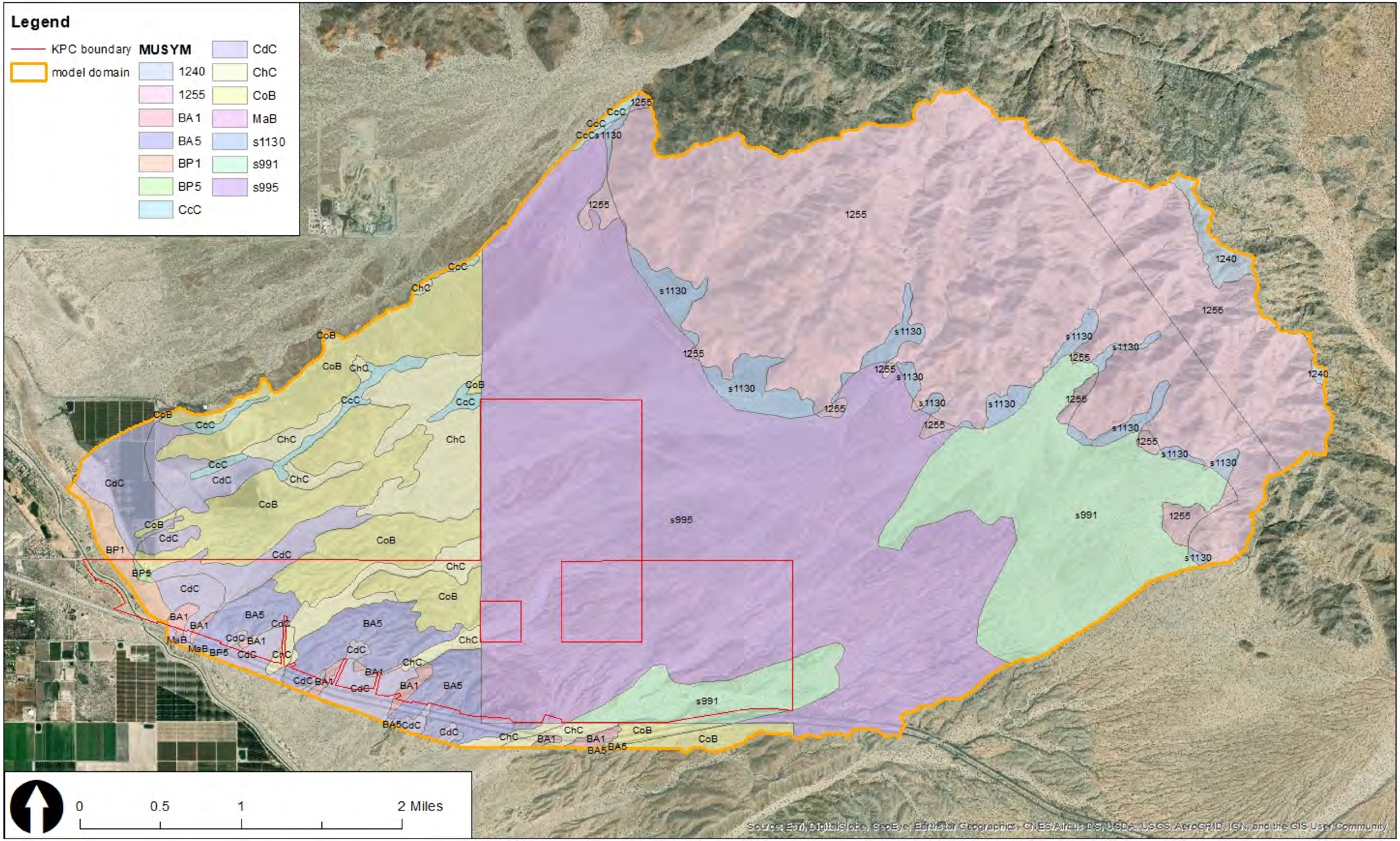


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Figure 5-9. Baseline watershed conditions model domain land type map

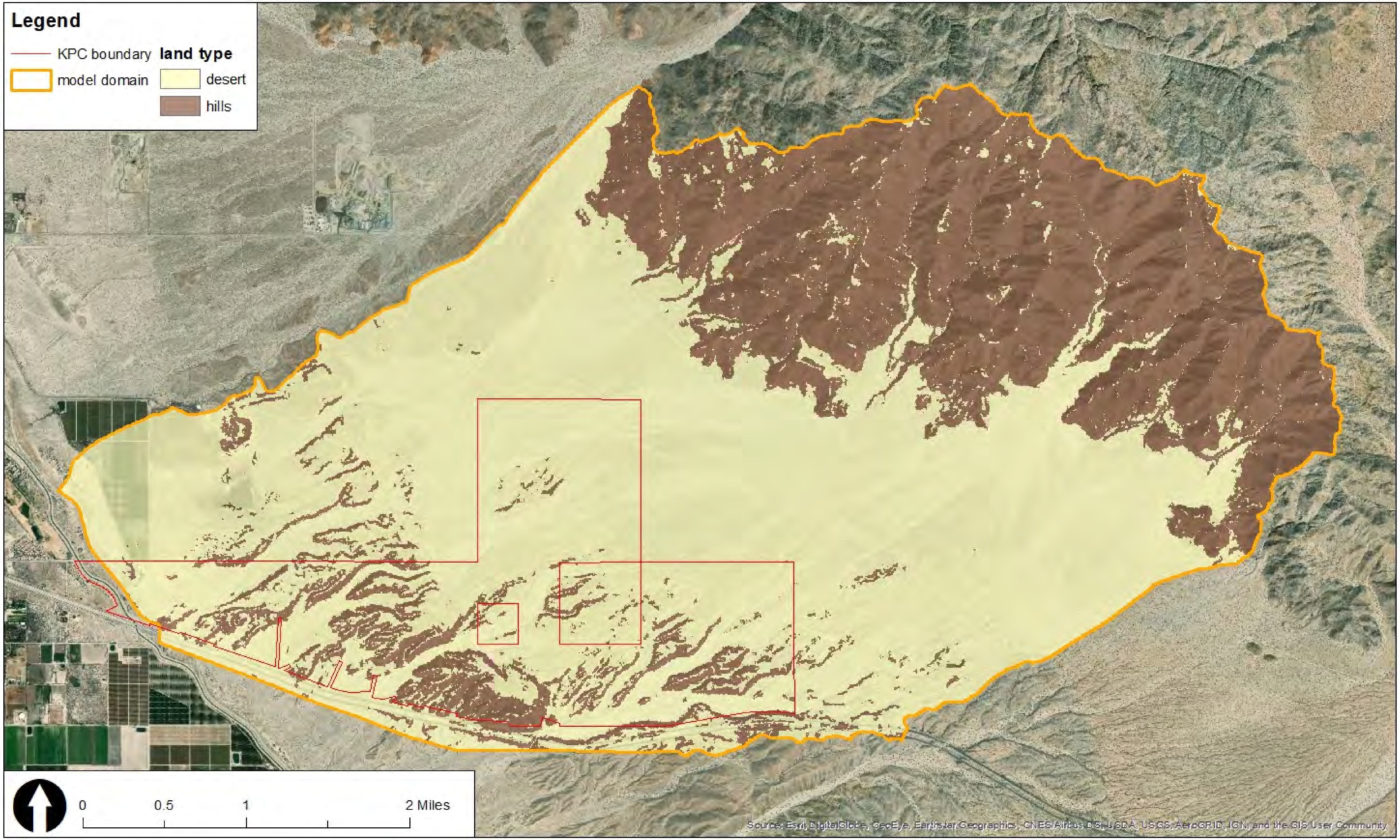

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Figure 5-10. Project watershed conditions model domain land type map

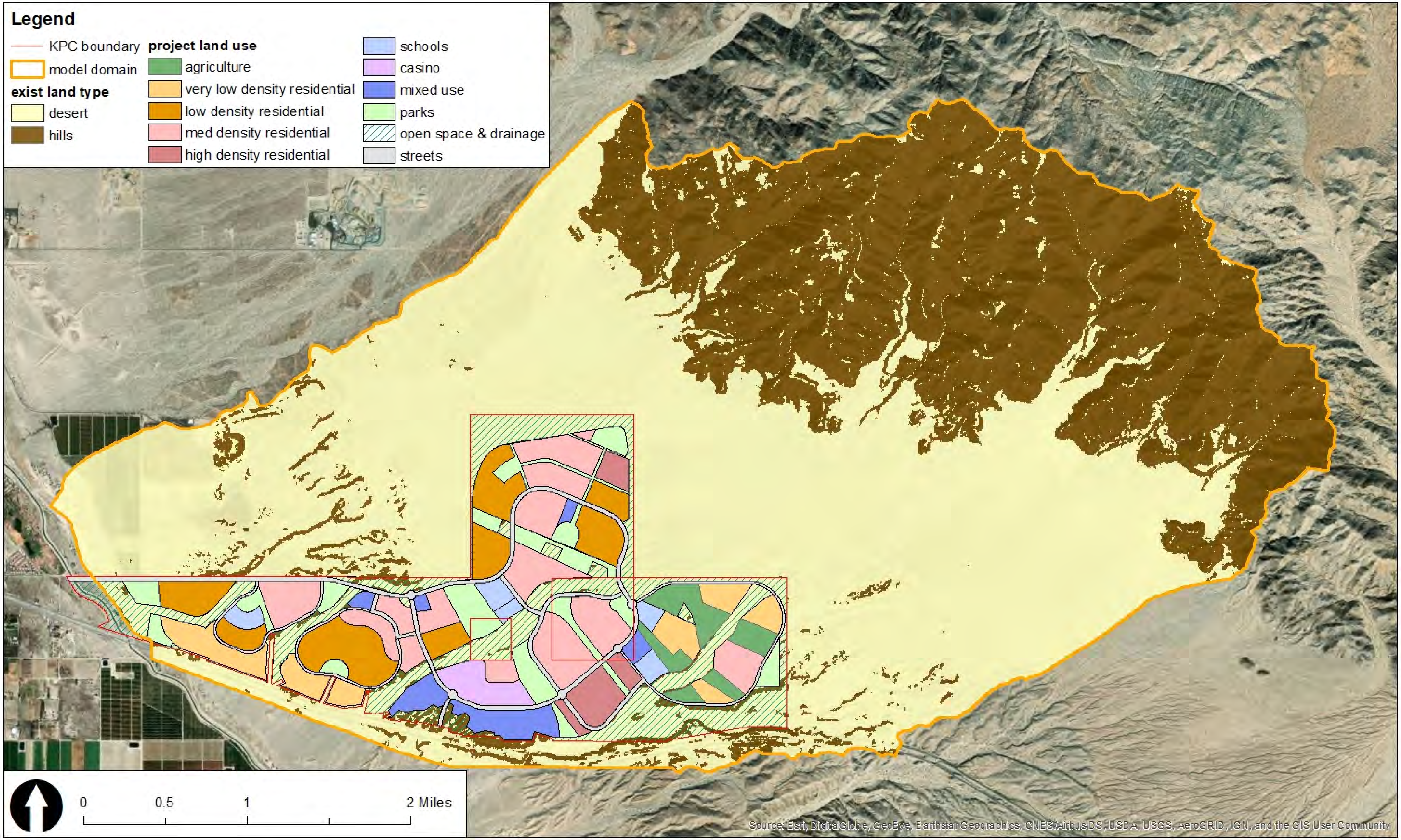

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Figure 5-11. Baseline watershed conditions model domain topography map

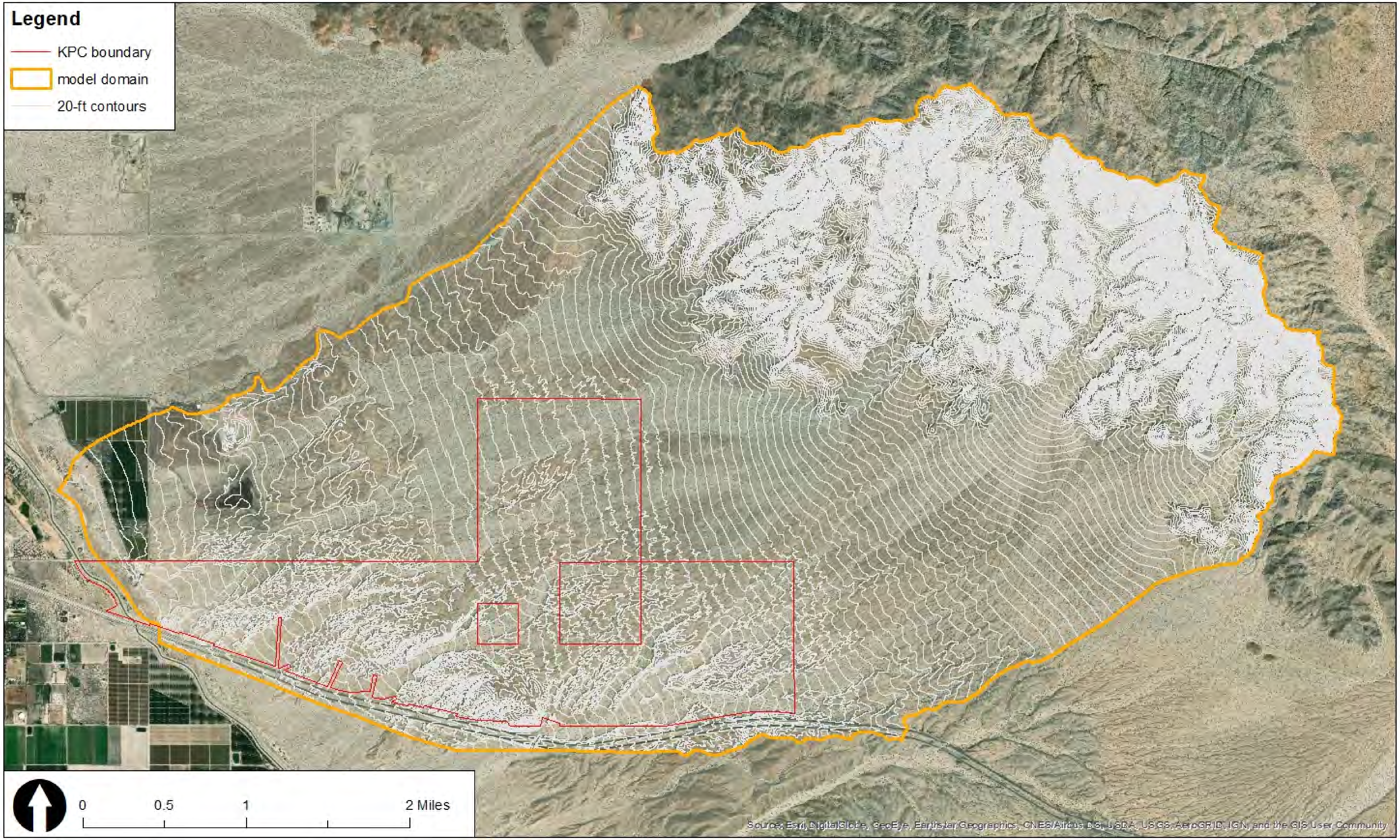

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Figure 5-12. Project watershed conditions model domain topography map

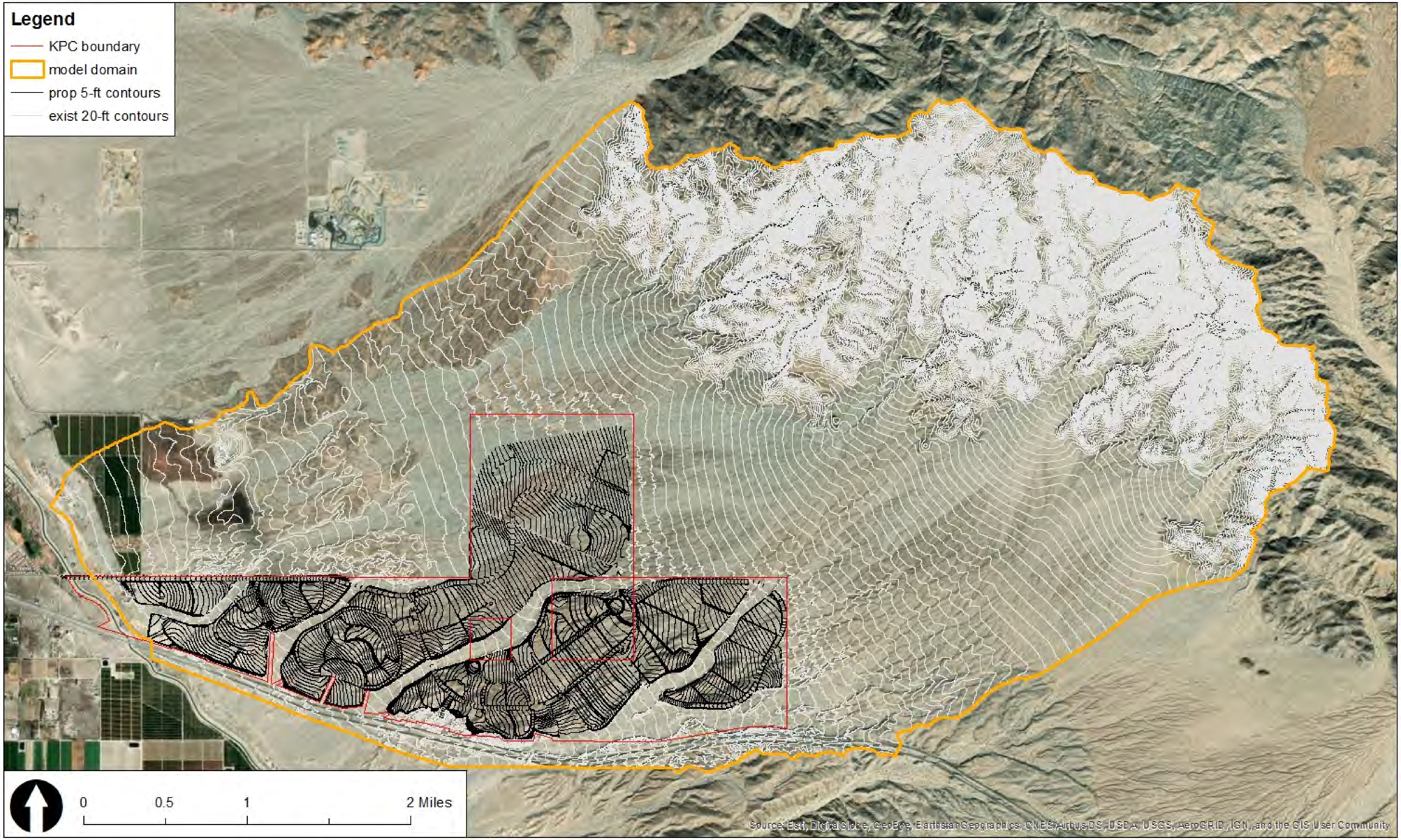

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Figure 5-13. Baseline site conditions model domain topography map

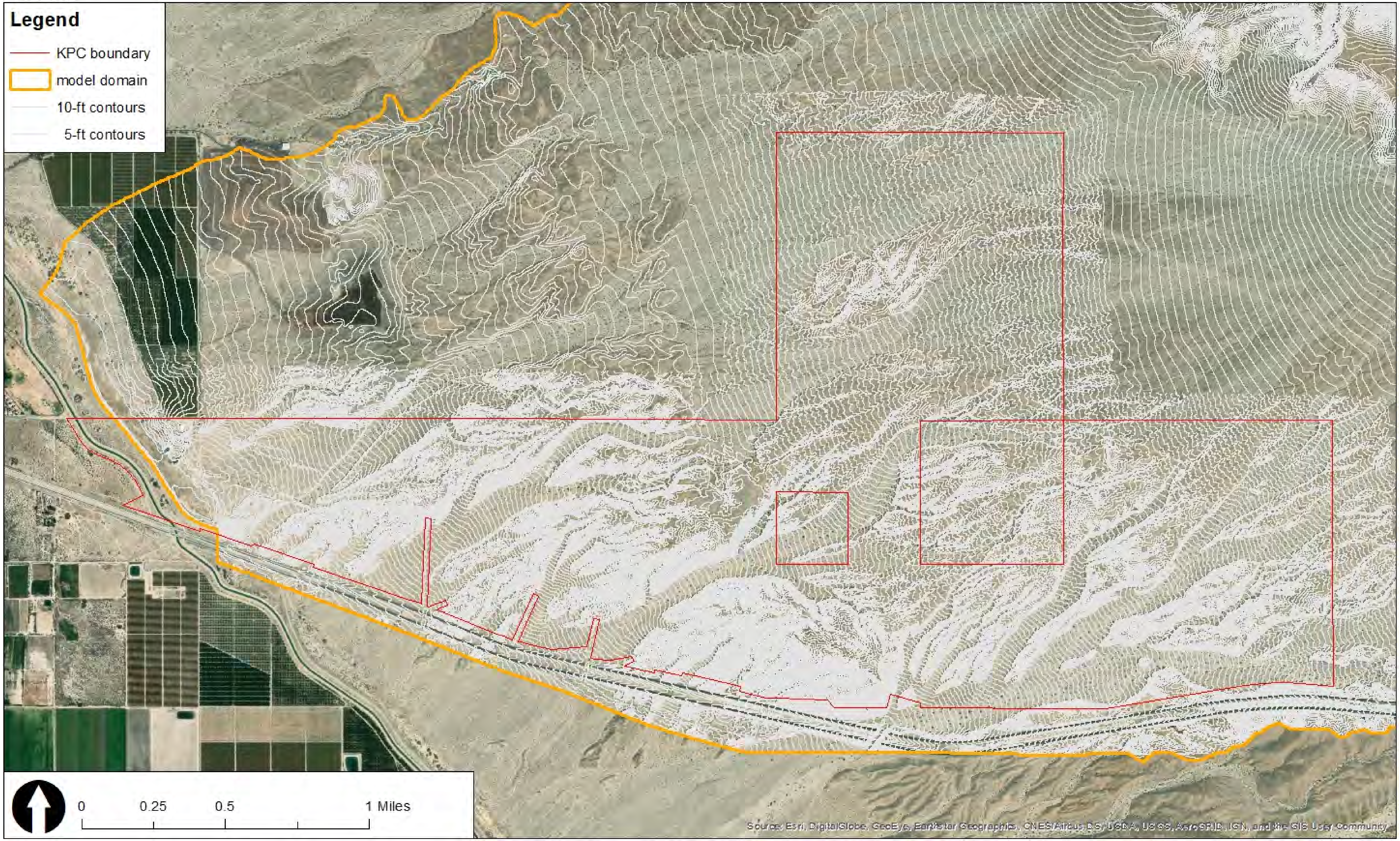

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Figure 5-14. Project site conditions model domain topography map

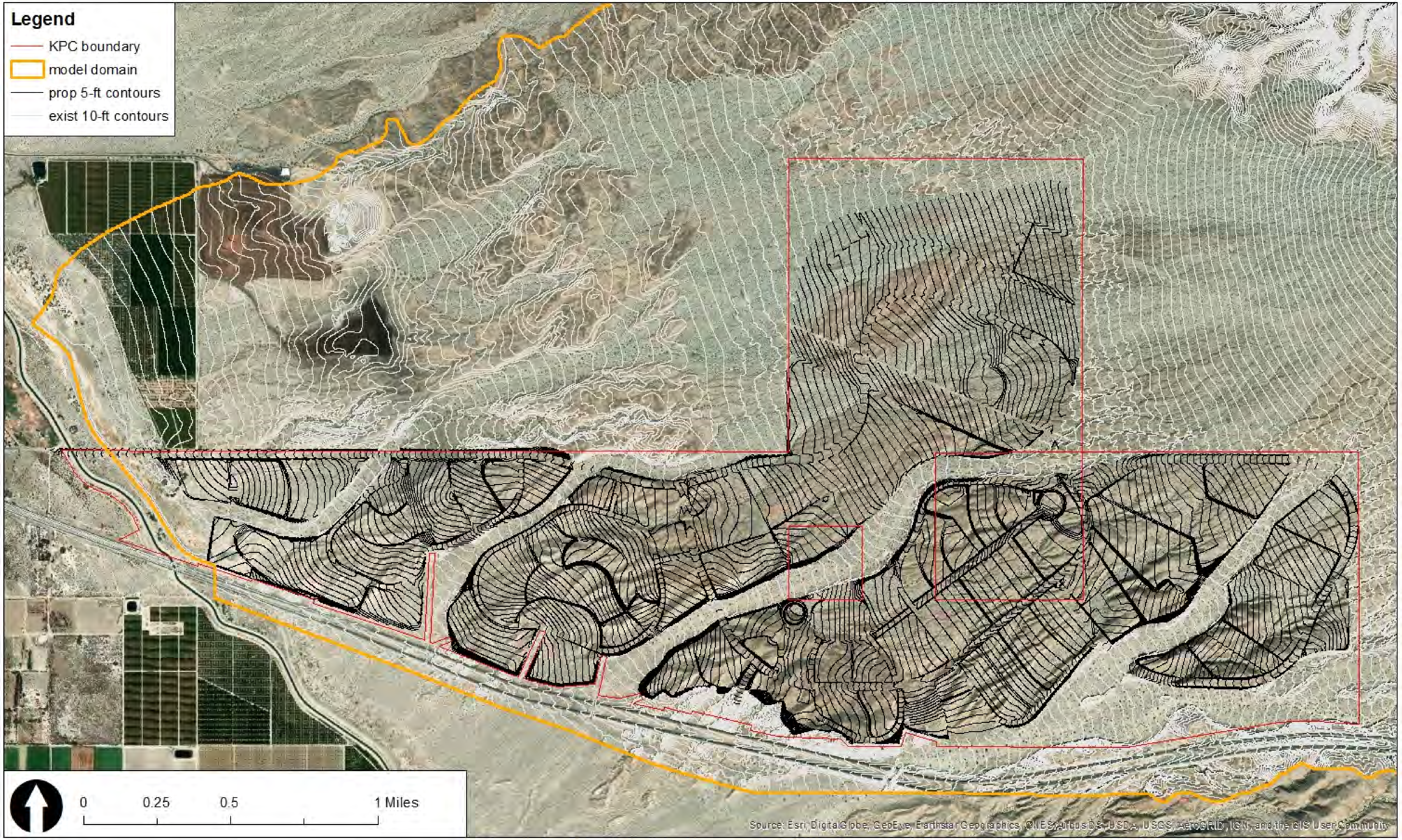

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Figure 5-15. Model domain subdivision

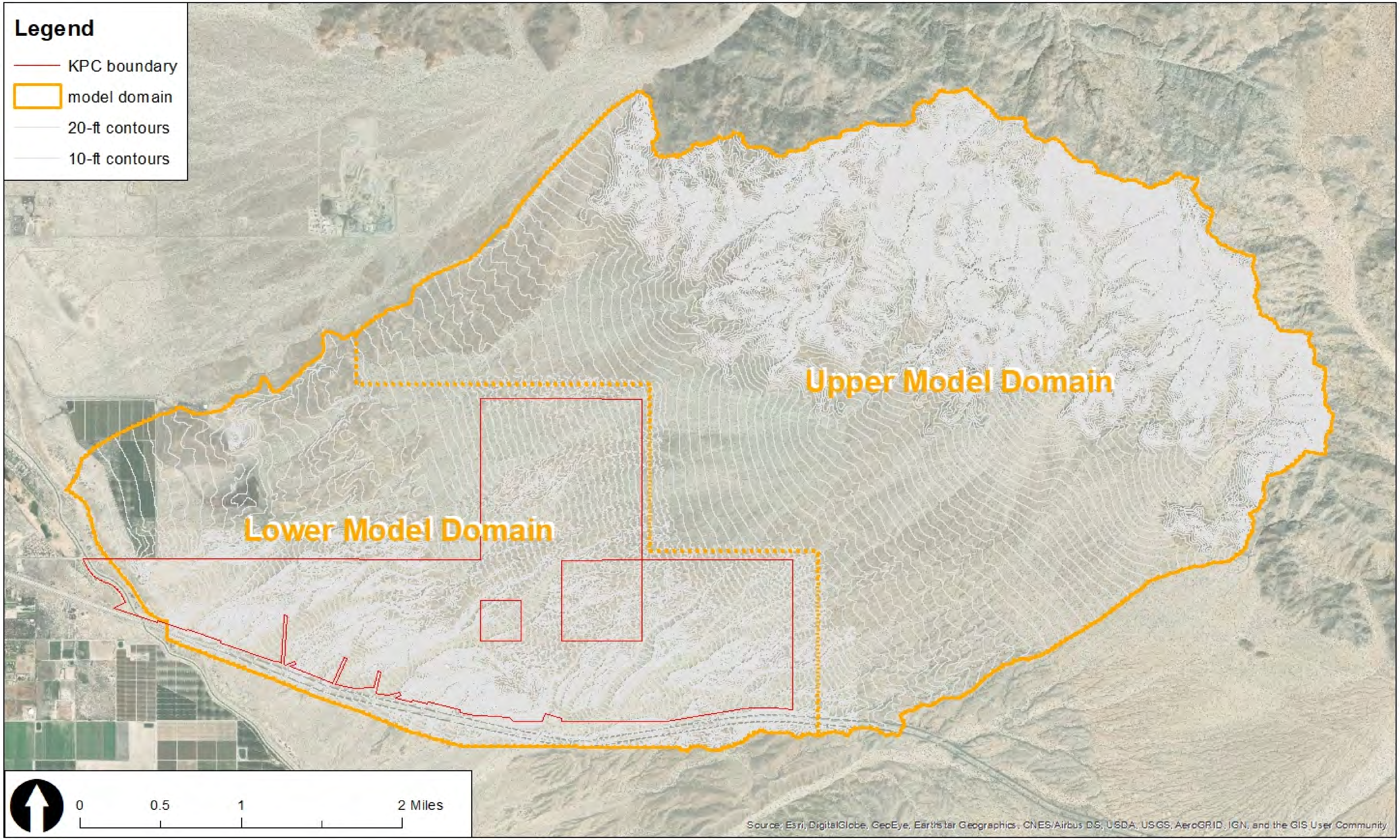

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Figure 5-16. Sensitivity 25' x 25' model 1%AC maximum flood depths

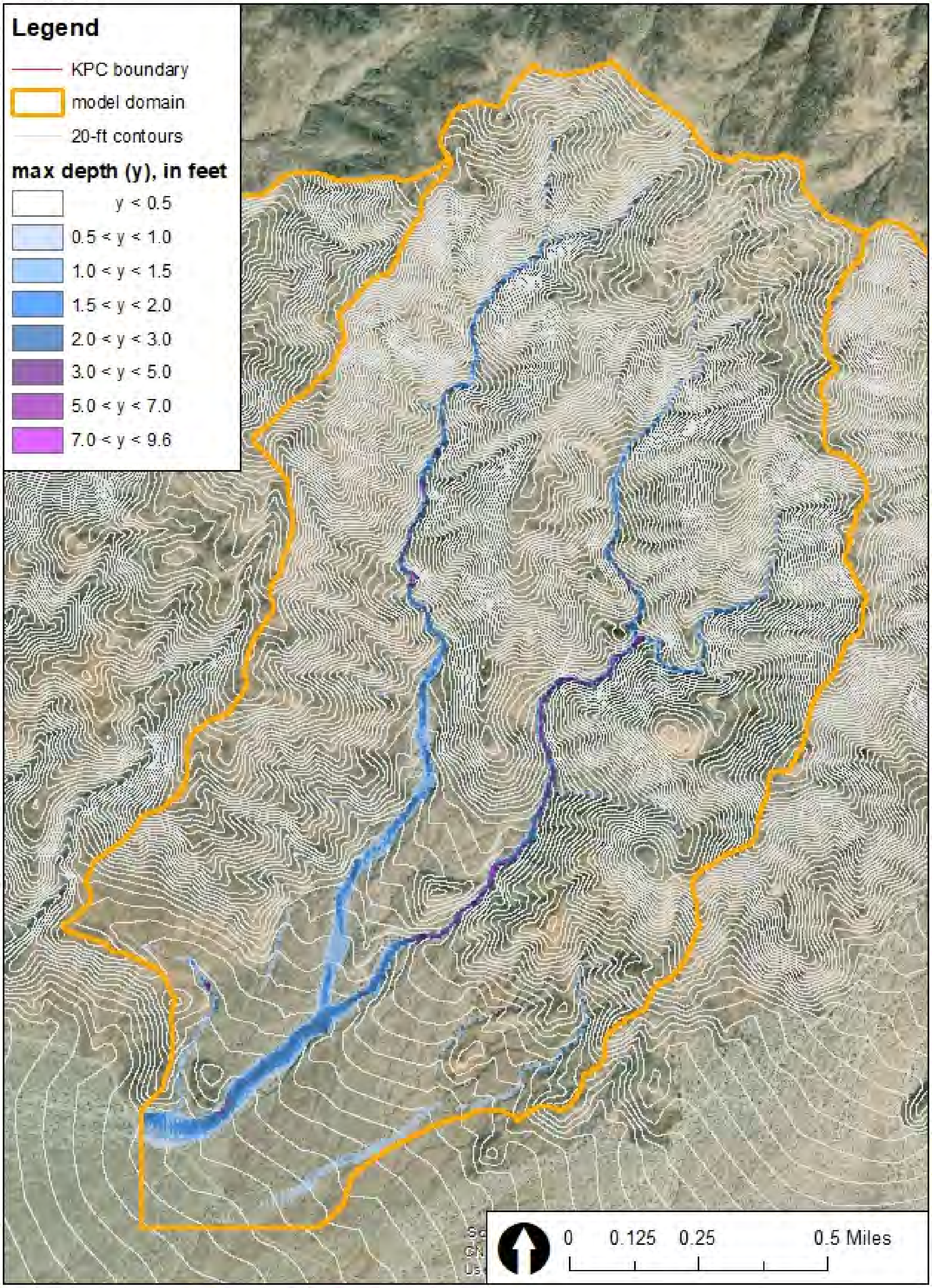

Figure 5-17. Sensitivity 30' x 30' model 1%AC maximum flood depths

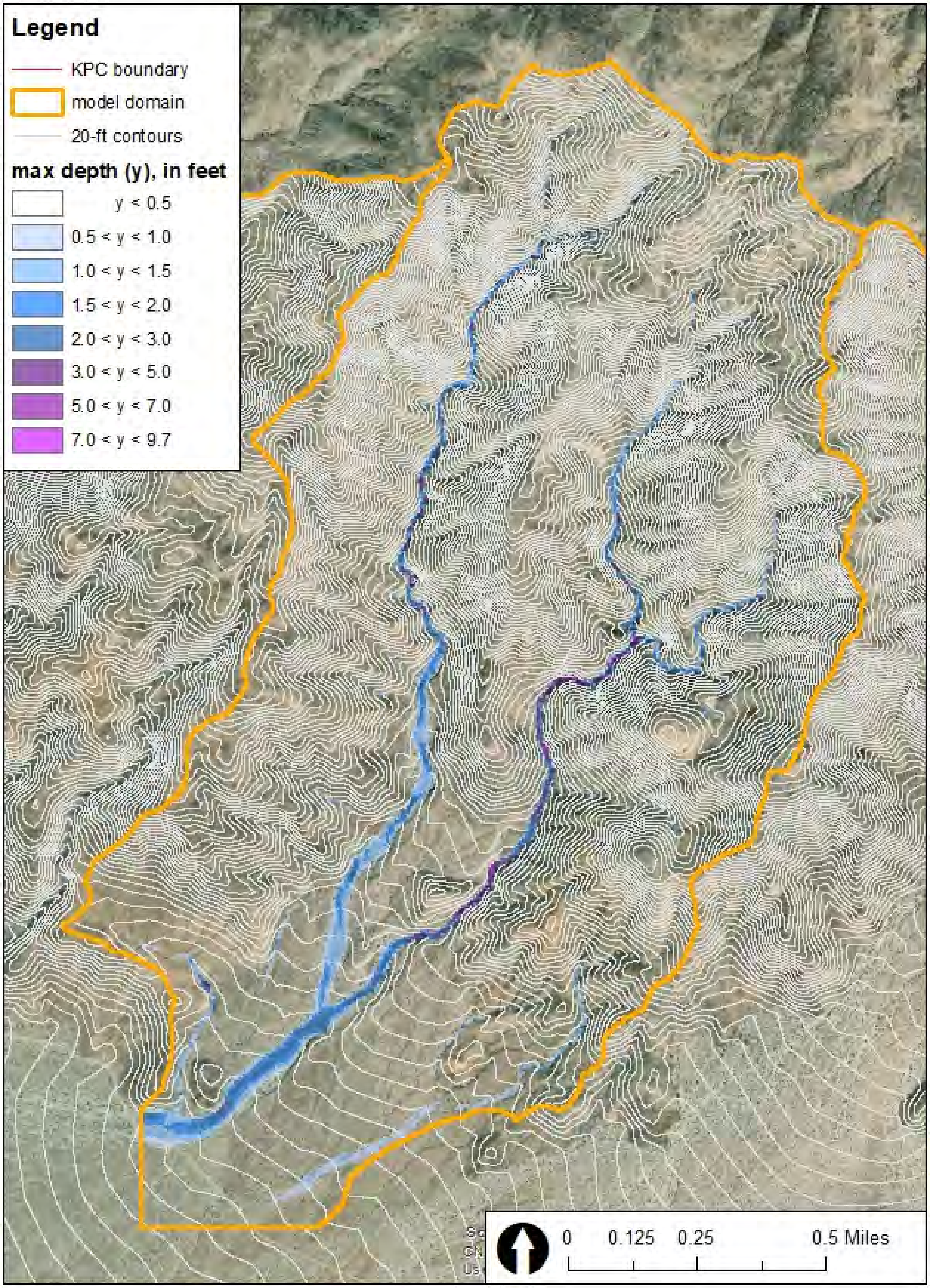

Figure 5-18. Baseline L-0 watershed conditions 1%AC maximum flood depths

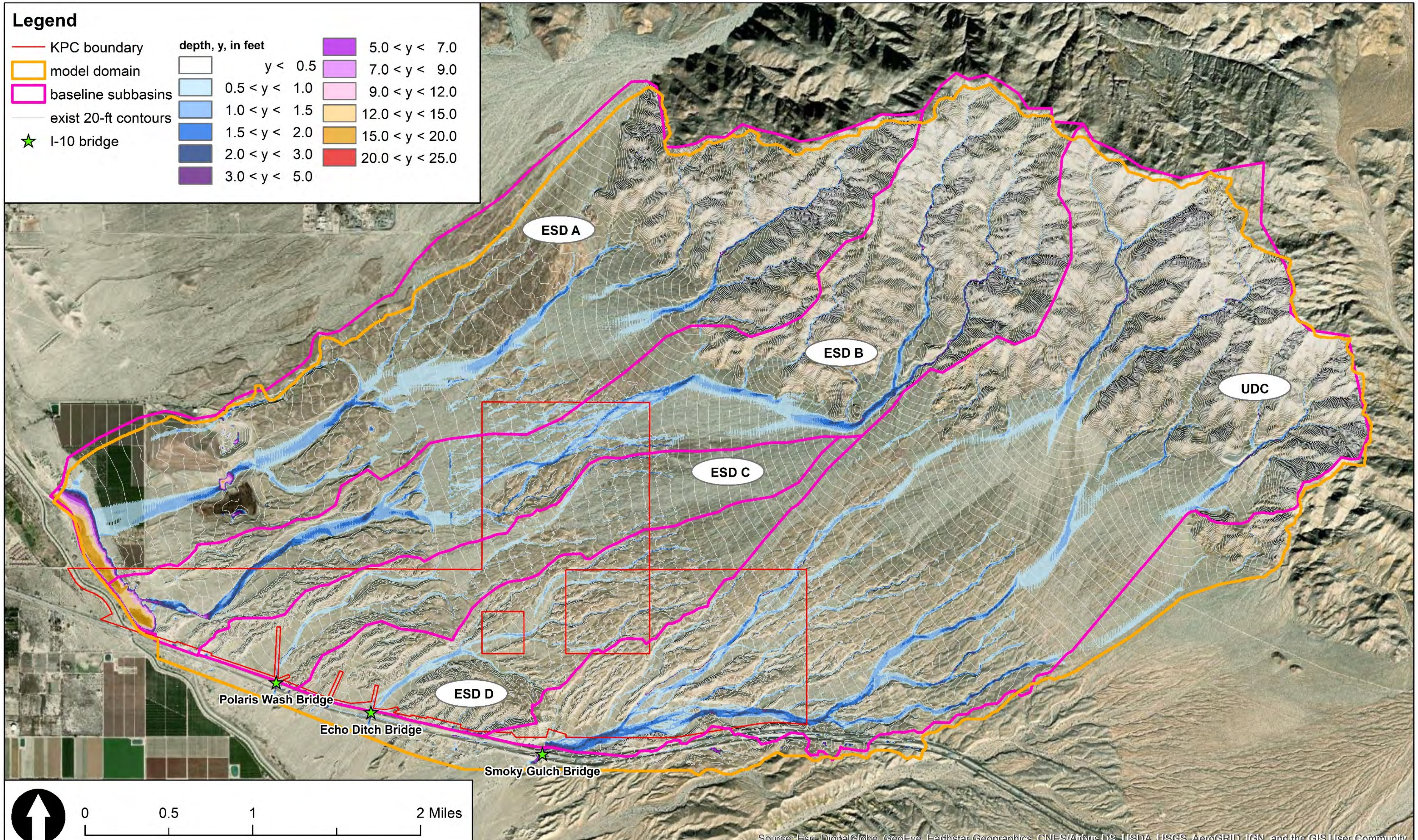

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Figure 5-19. Baseline L-1 watershed conditions 1%AC maximum flood depths

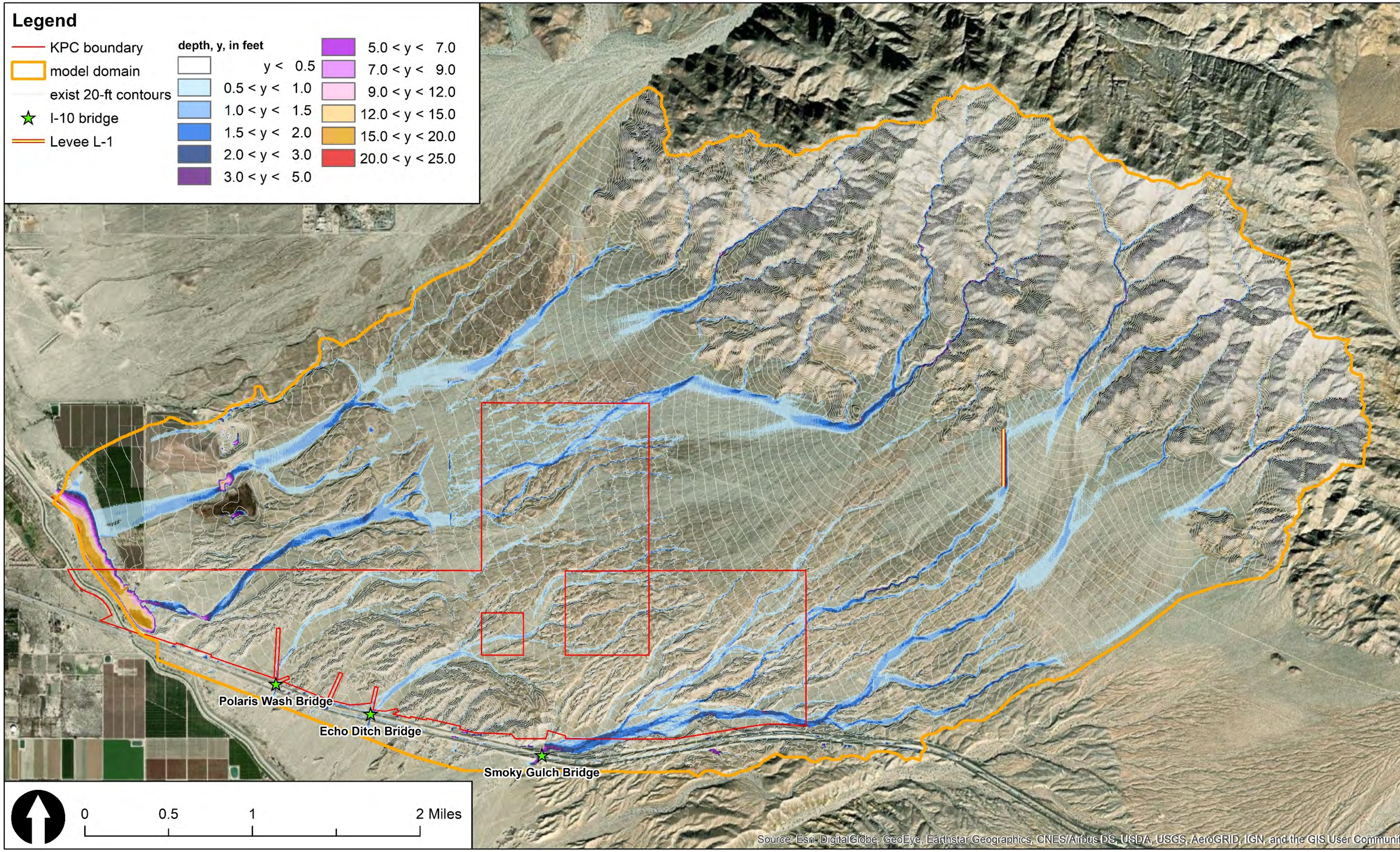

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Figure 5-20. Baseline L-2 watershed conditions 1%AC maximum flood depths

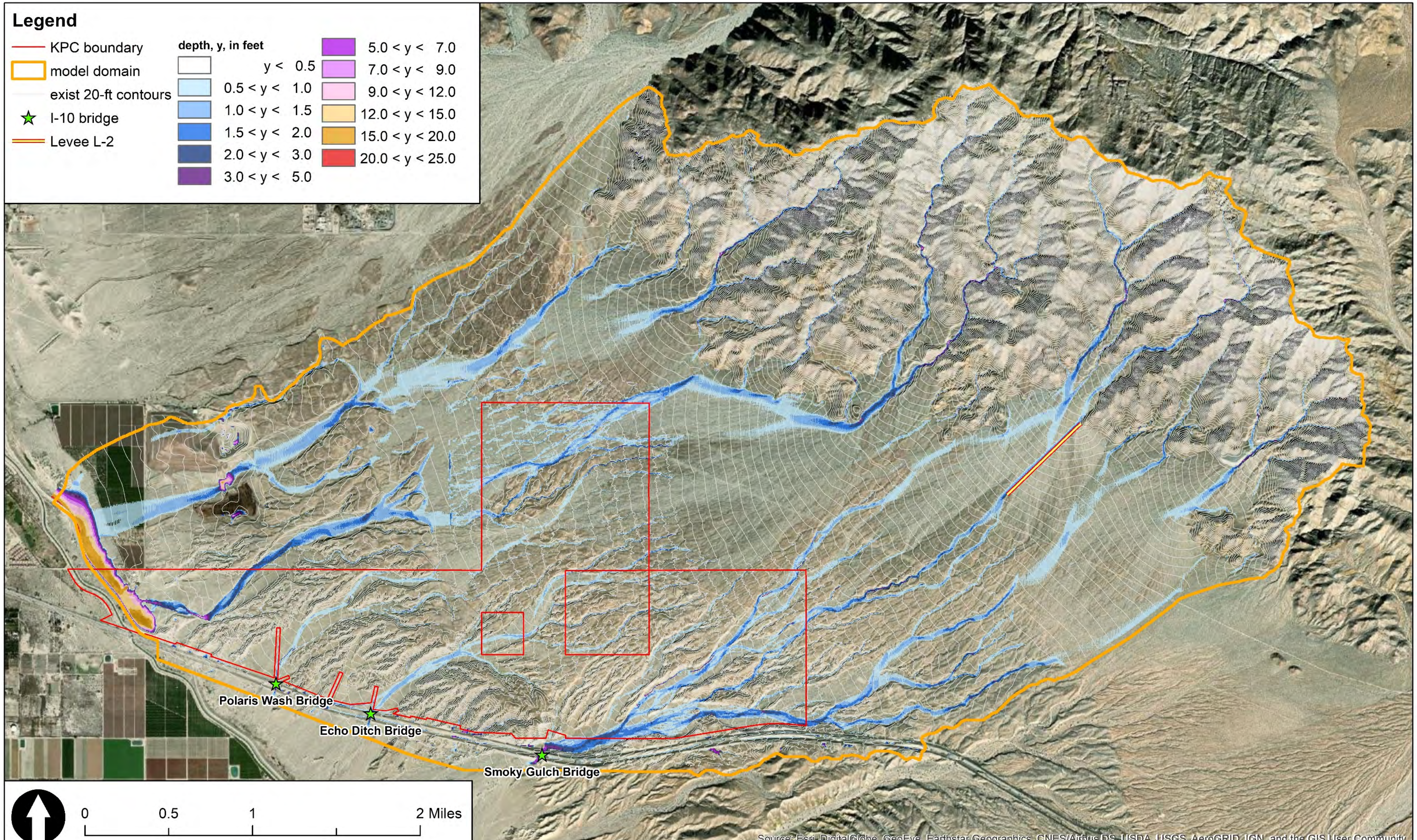

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Figure 5-21. Baseline L-3 watershed conditions 1%AC maximum flood depths

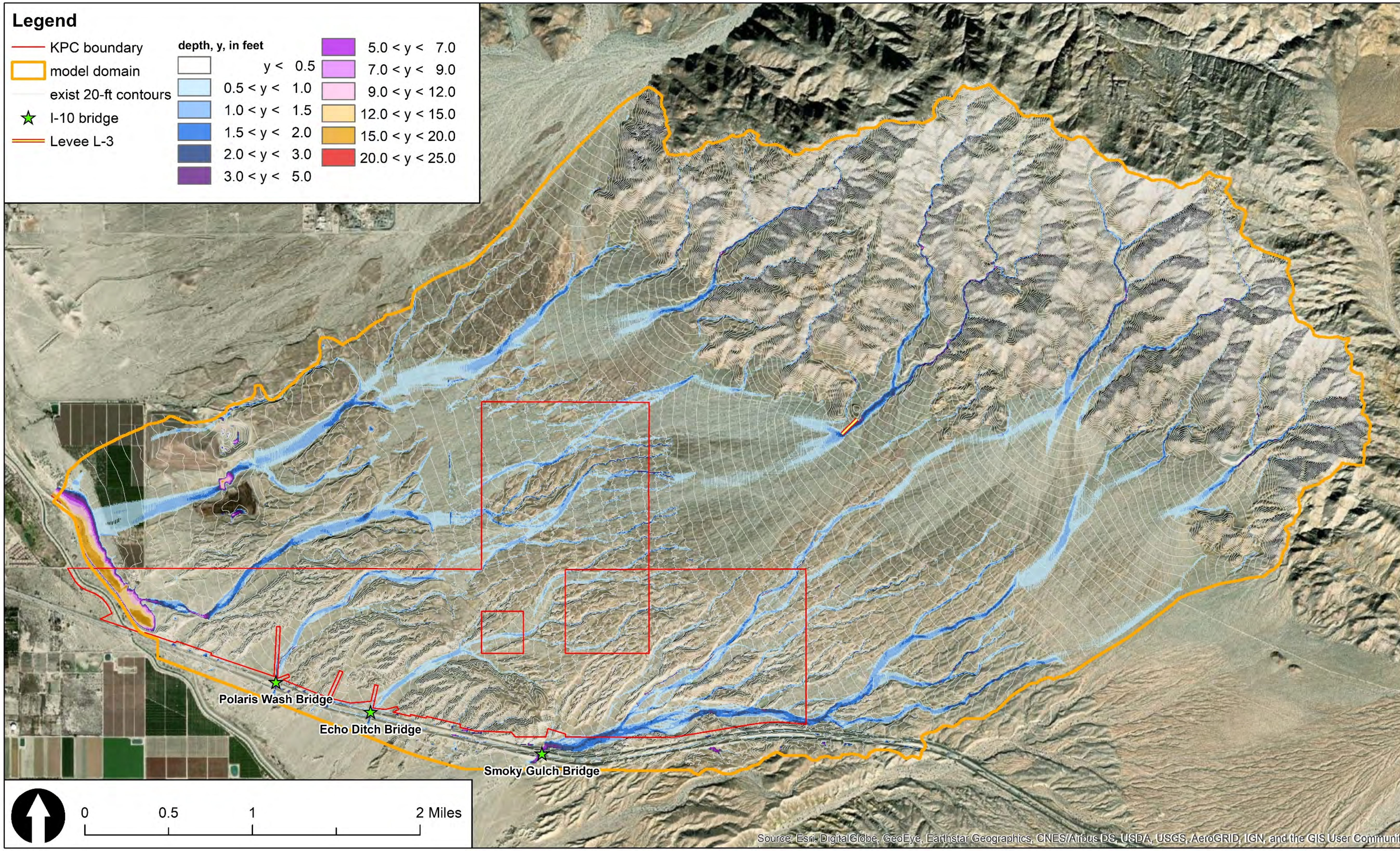

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Figure 5-22. Project L-0 watershed conditions 1%AC maximum flood depths

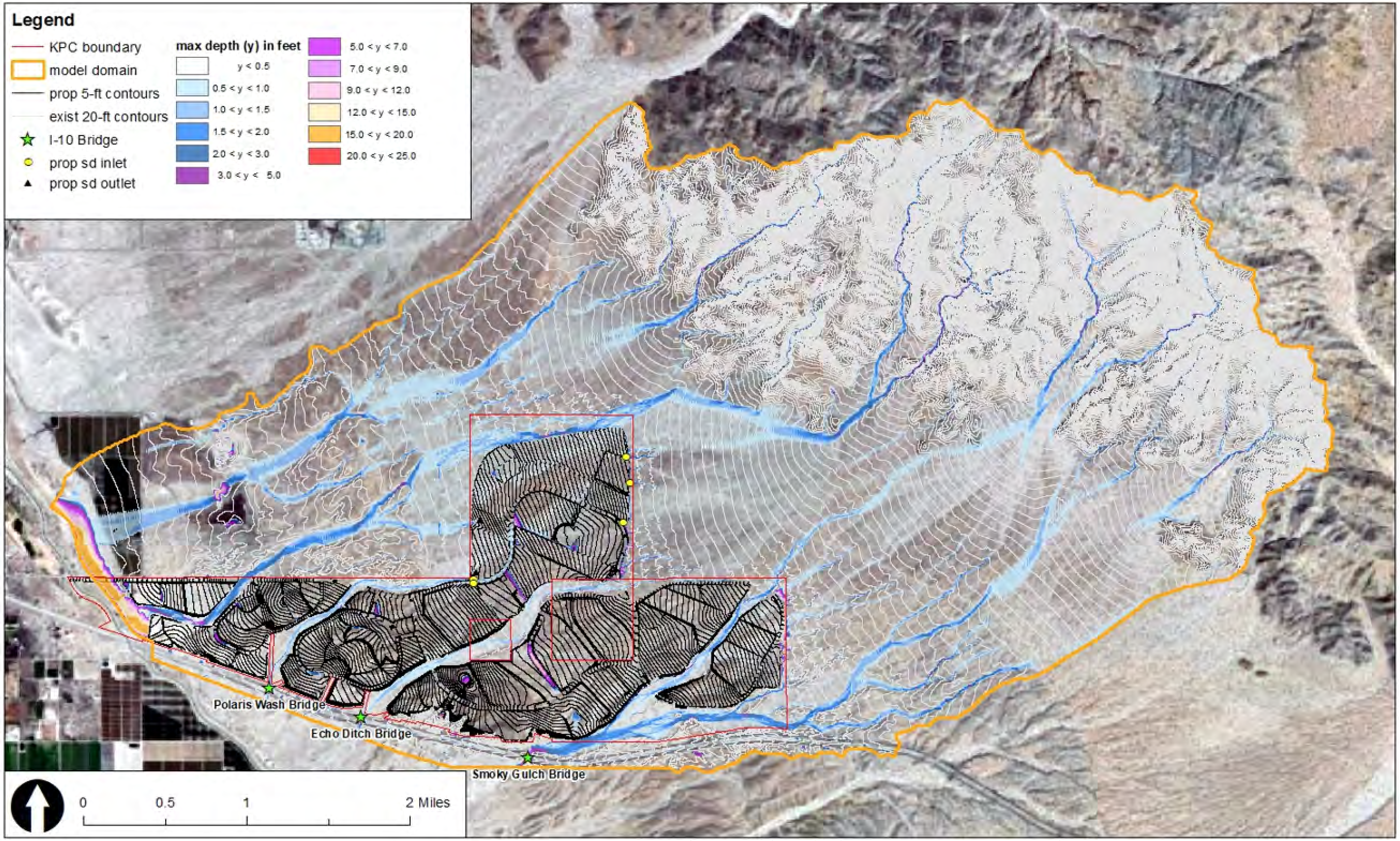

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Figure 5-23. Project L-1 watershed conditions 1%AC maximum flood depths

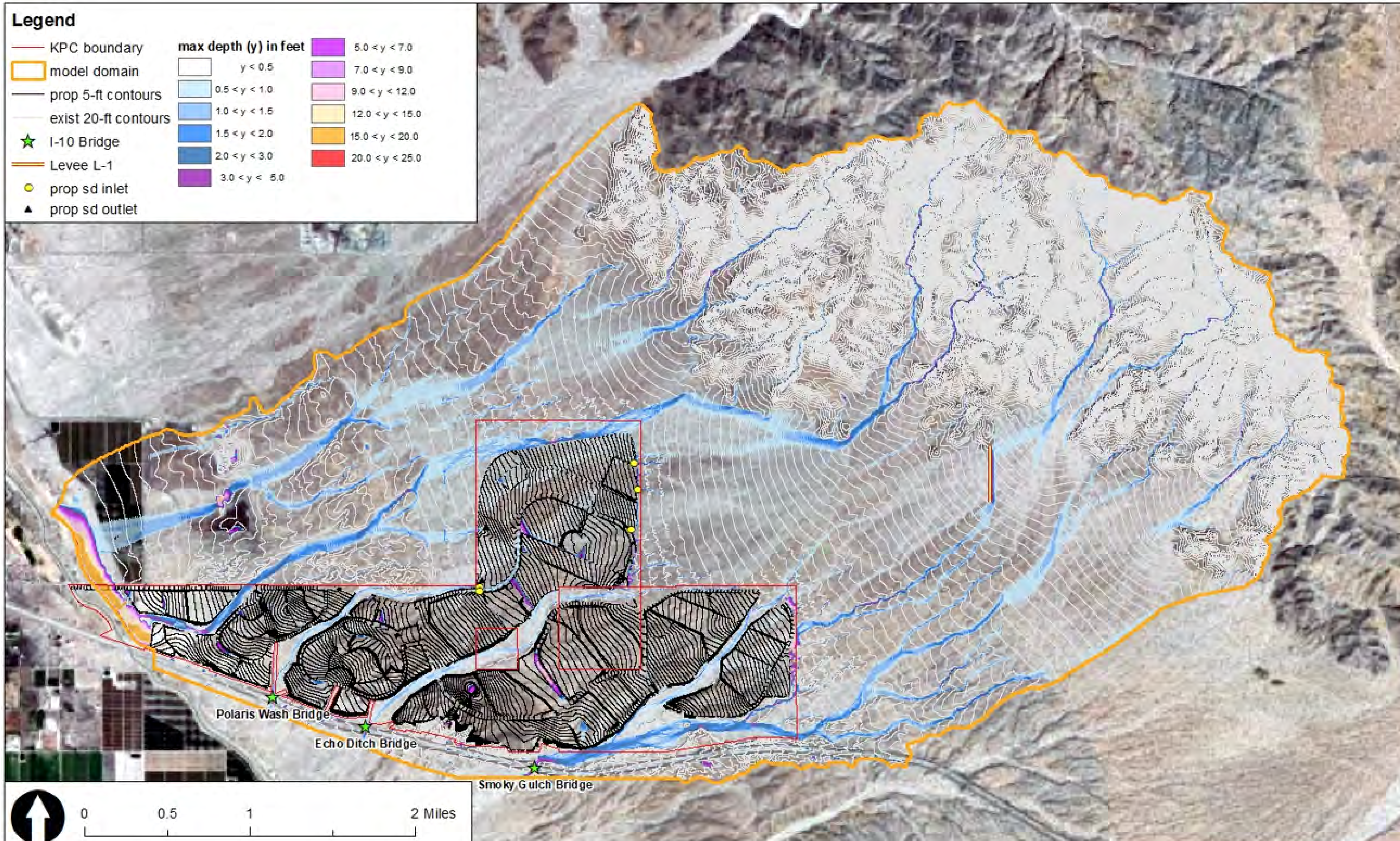

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Figure 5-24. Project L-2 watershed conditions 1%AC maximum flood depths

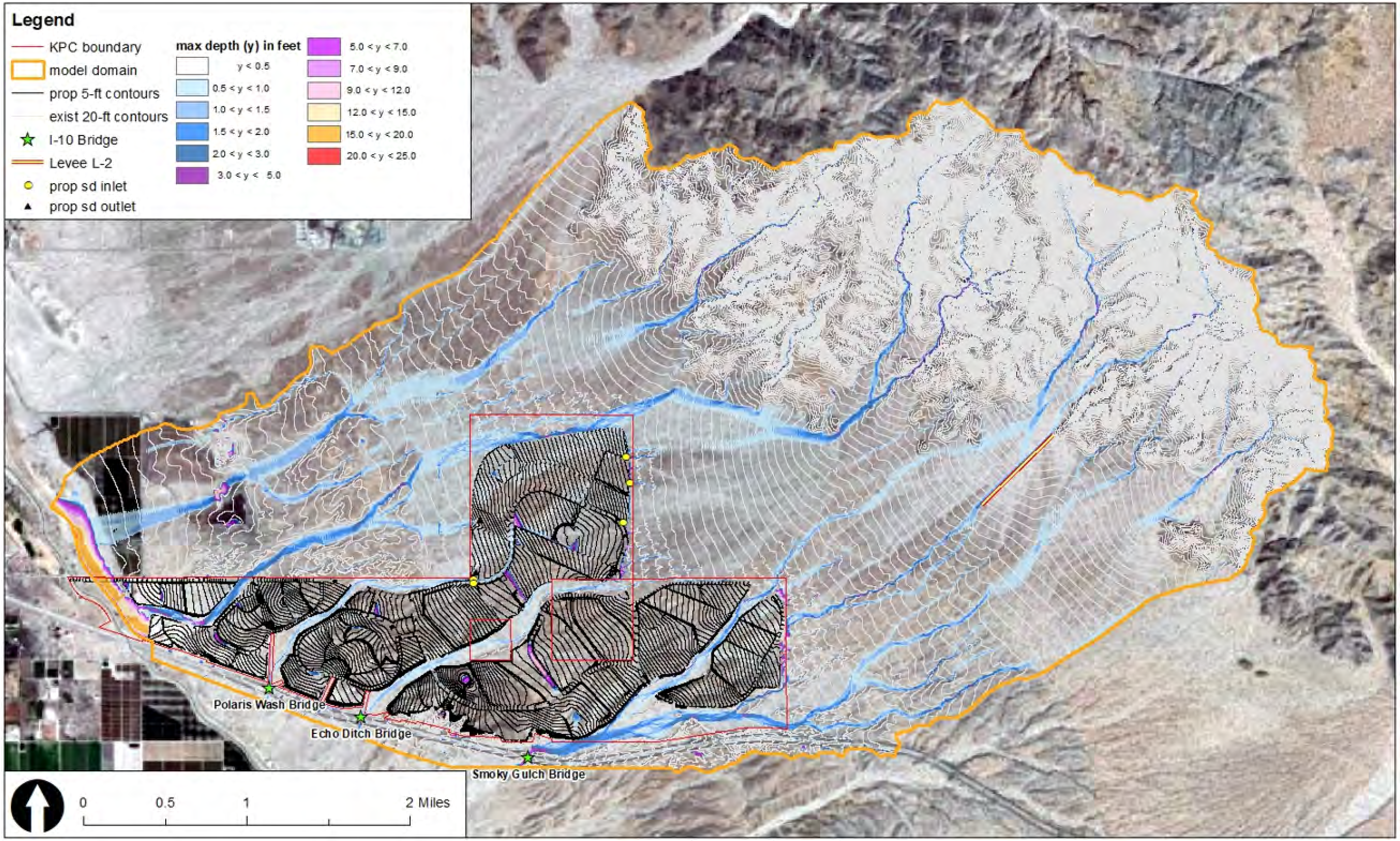

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Figure 5-25. Project L-3 watershed conditions 1%AC maximum flood depths

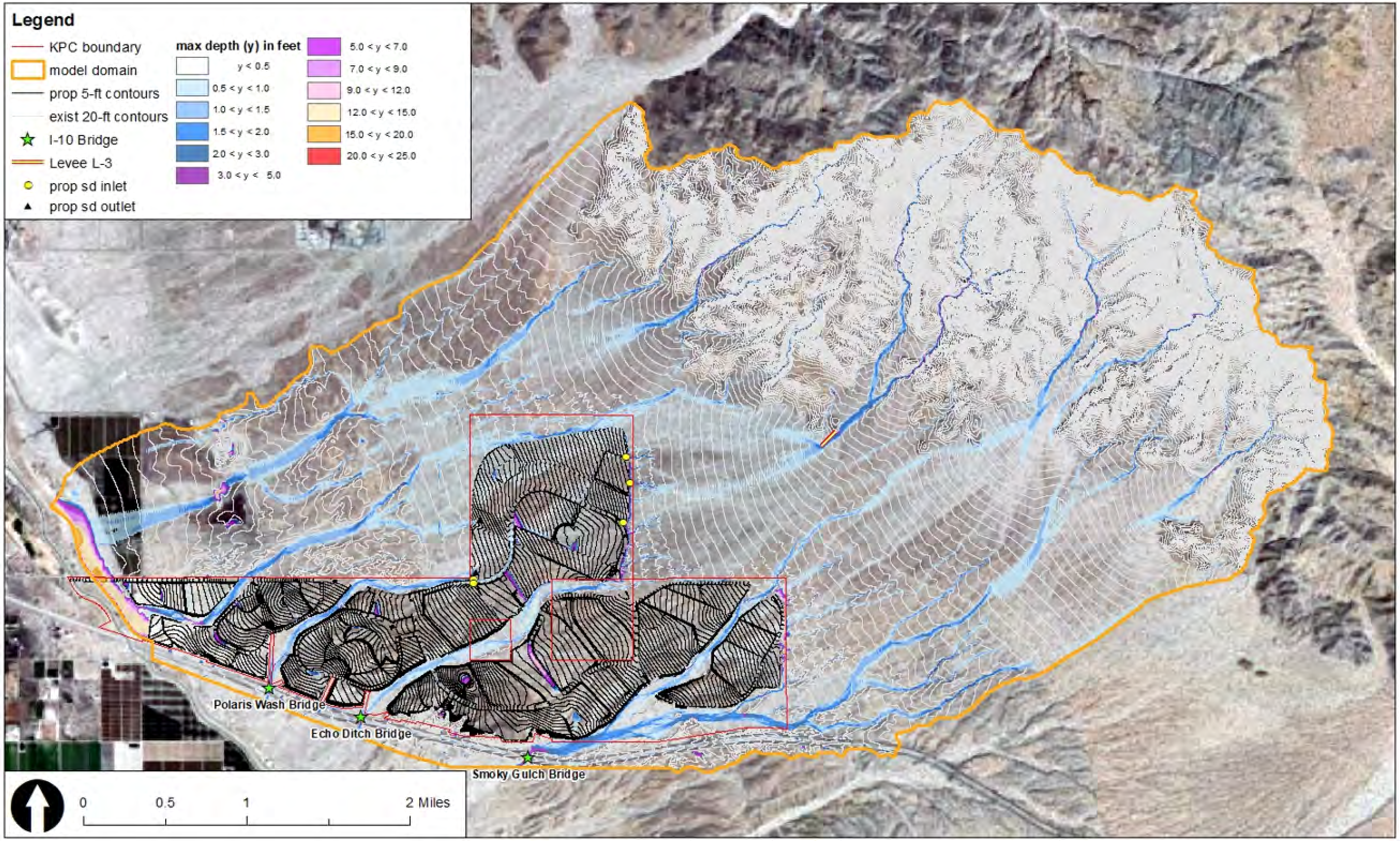

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Figure 5-26. Baseline worst-case watershed conditions 1%AC maximum flood depths

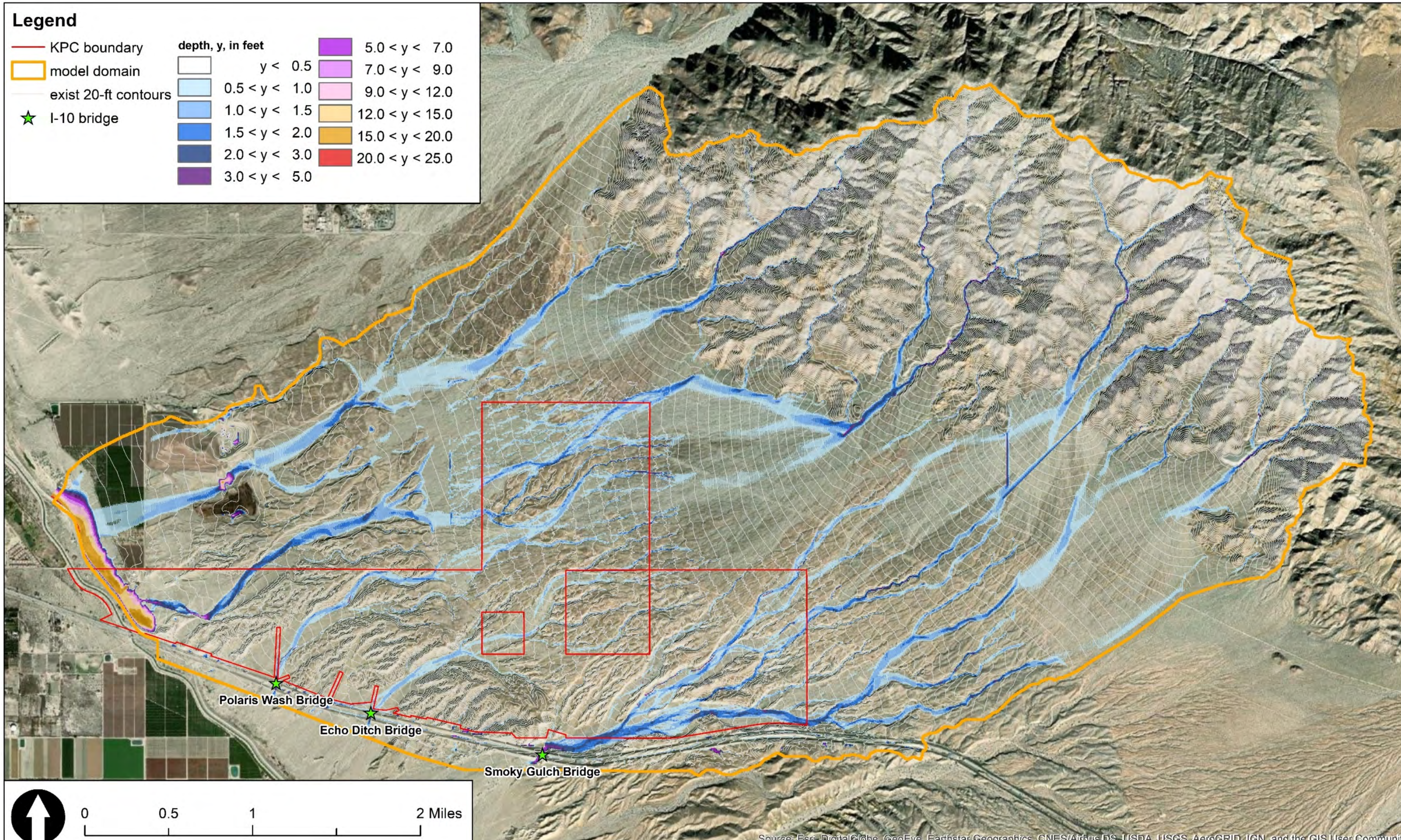

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Figure 5-27. Baseline worst-case watershed conditions 1%AC maximum flood velocities

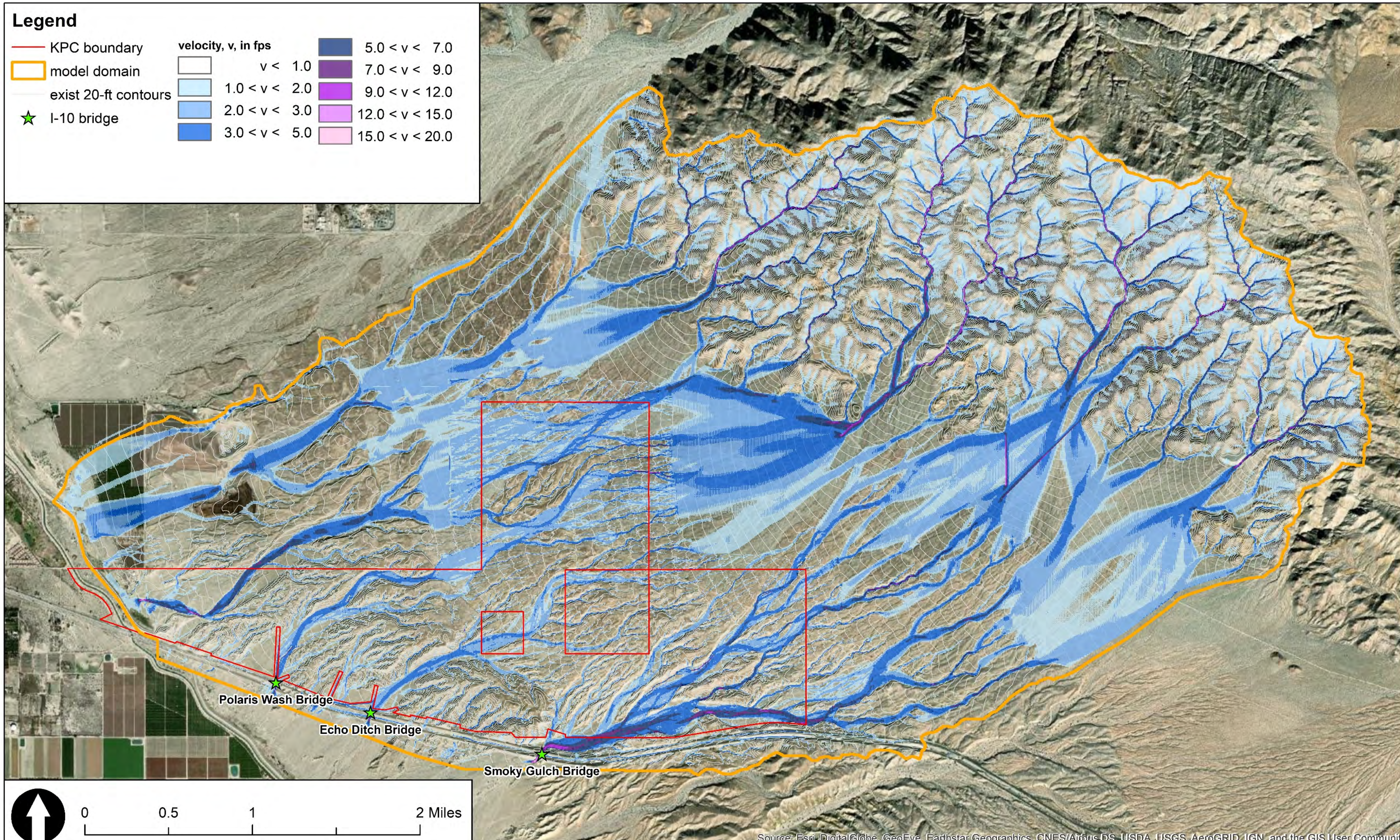

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Figure 5-28. Baseline worst-case site conditions 1%AC maximum flood depths

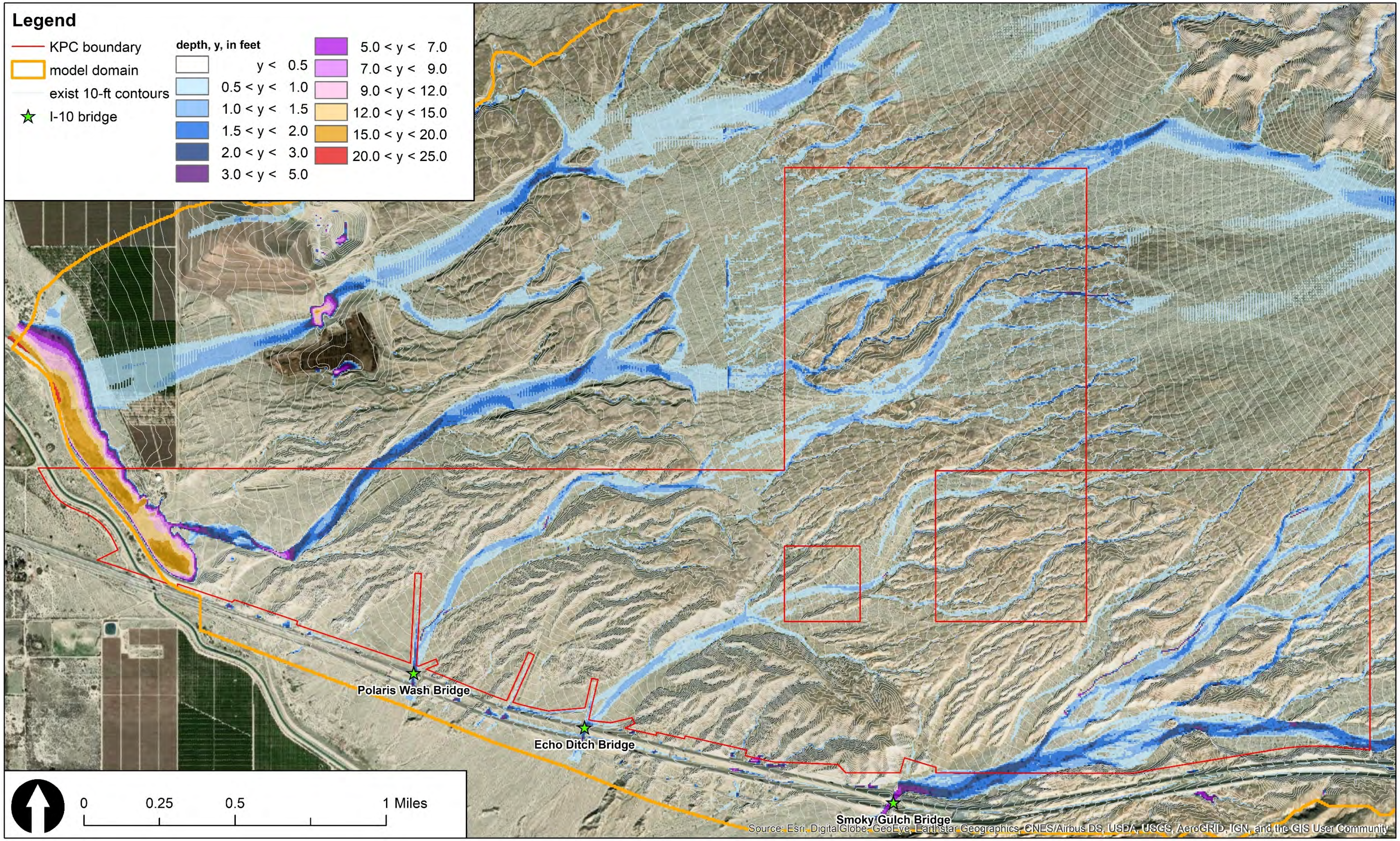

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Figure 5-29. Baseline worst-case site conditions 1%AC maximum flood velocities

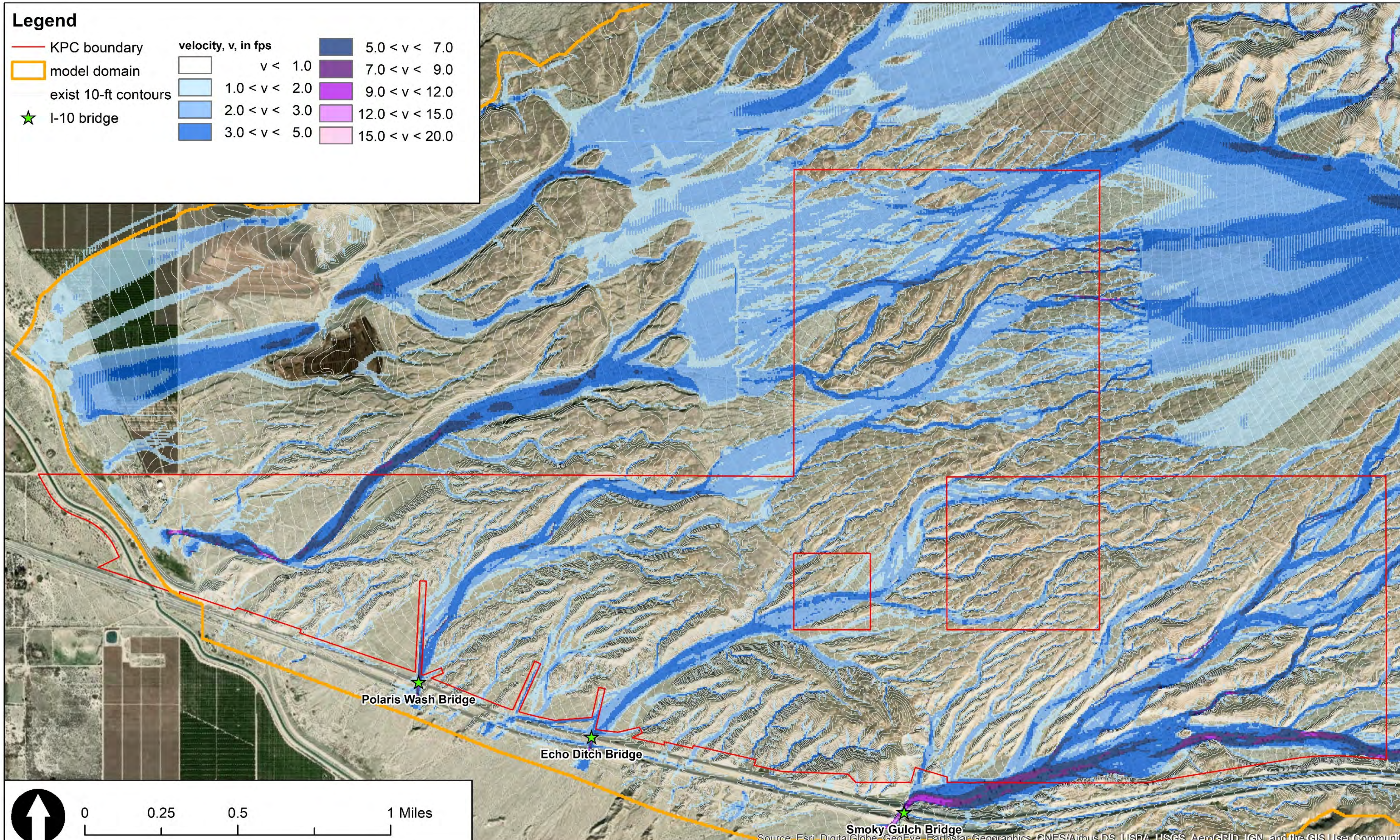

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Figure 5-30. Project worst-case watershed conditions 1%AC maximum flood depths

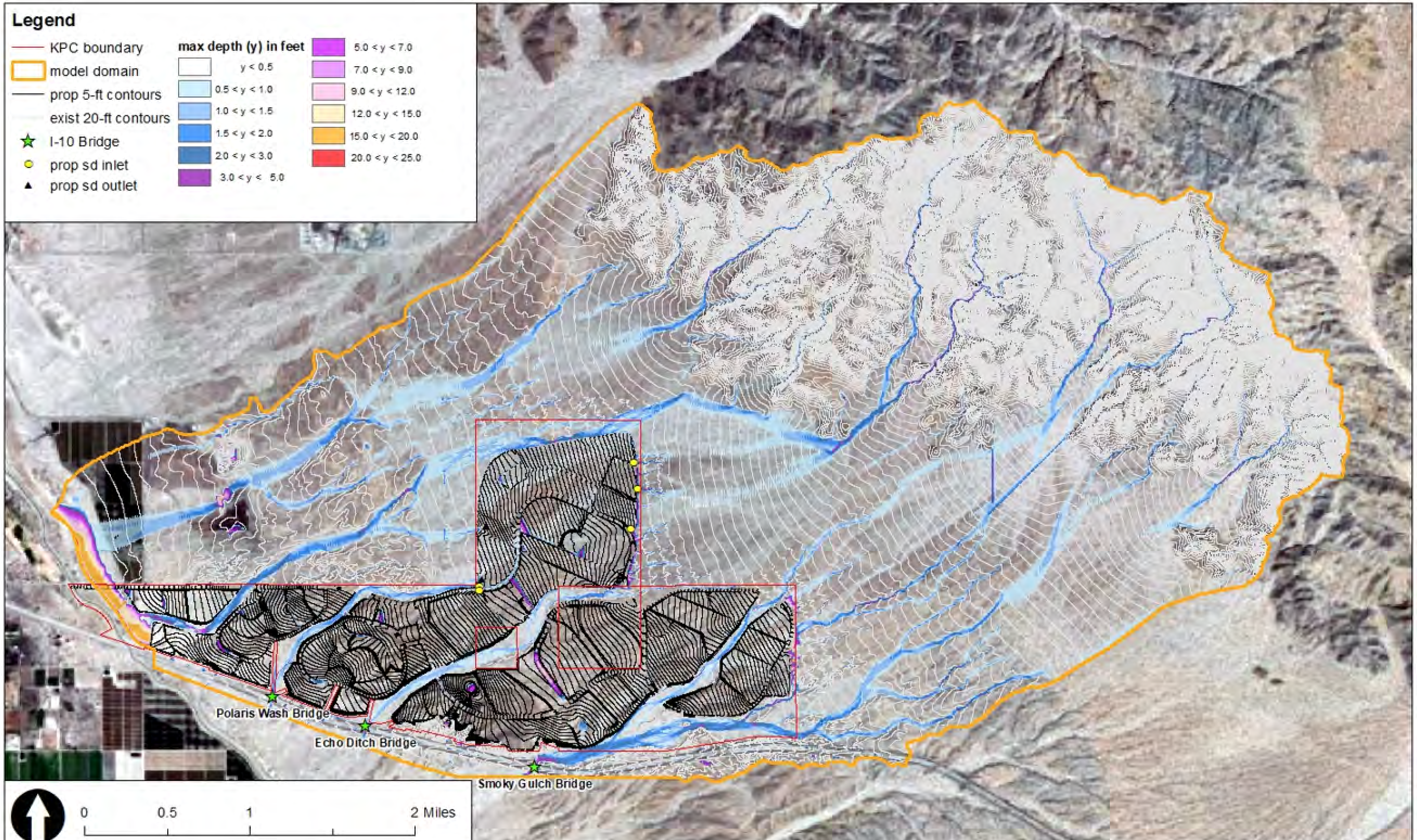

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Figure 5-31. Project worst-case watershed conditions 1%AC maximum flood velocities

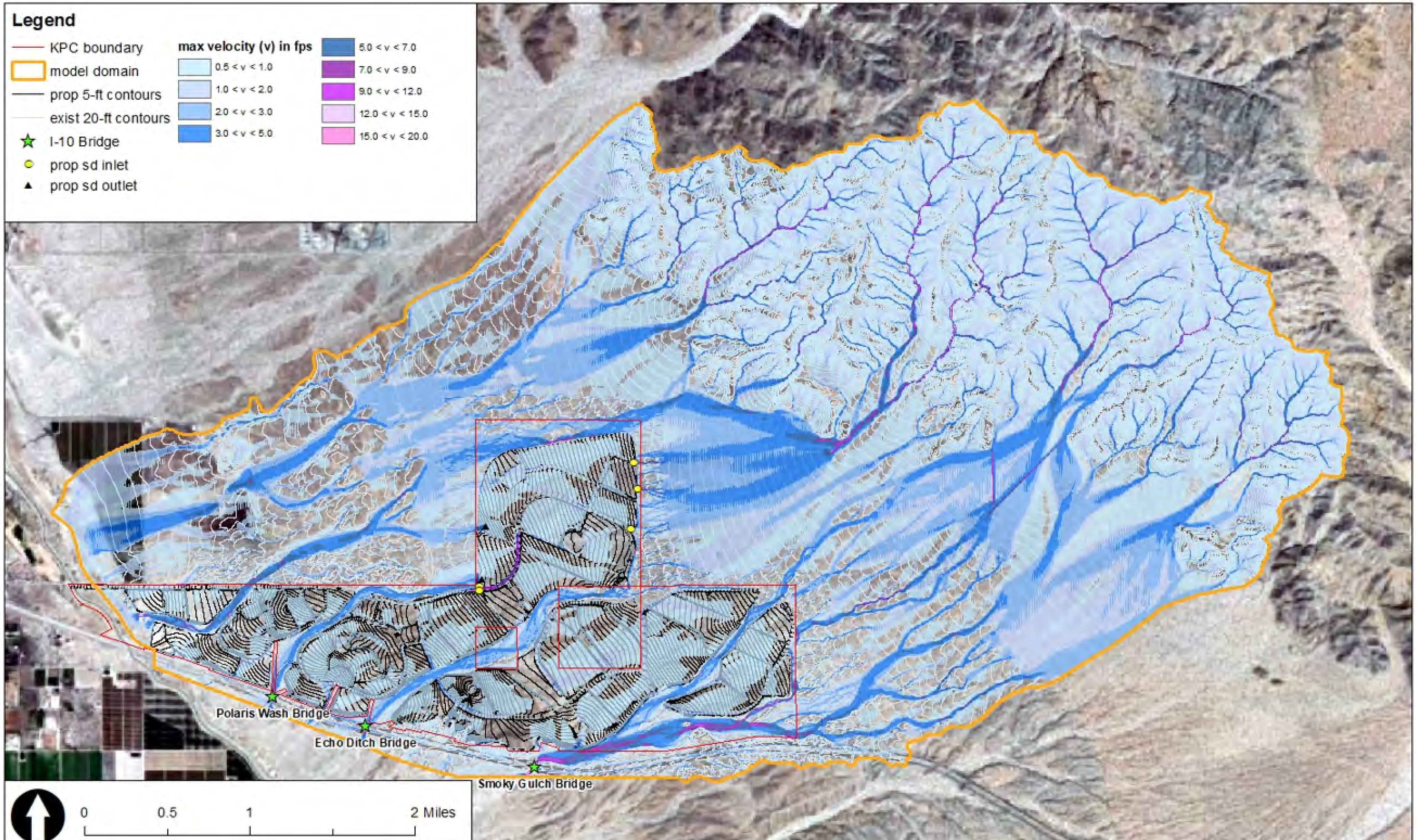

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Figure 5-32. Project worst-case site conditions 1%AC maximum flood depths

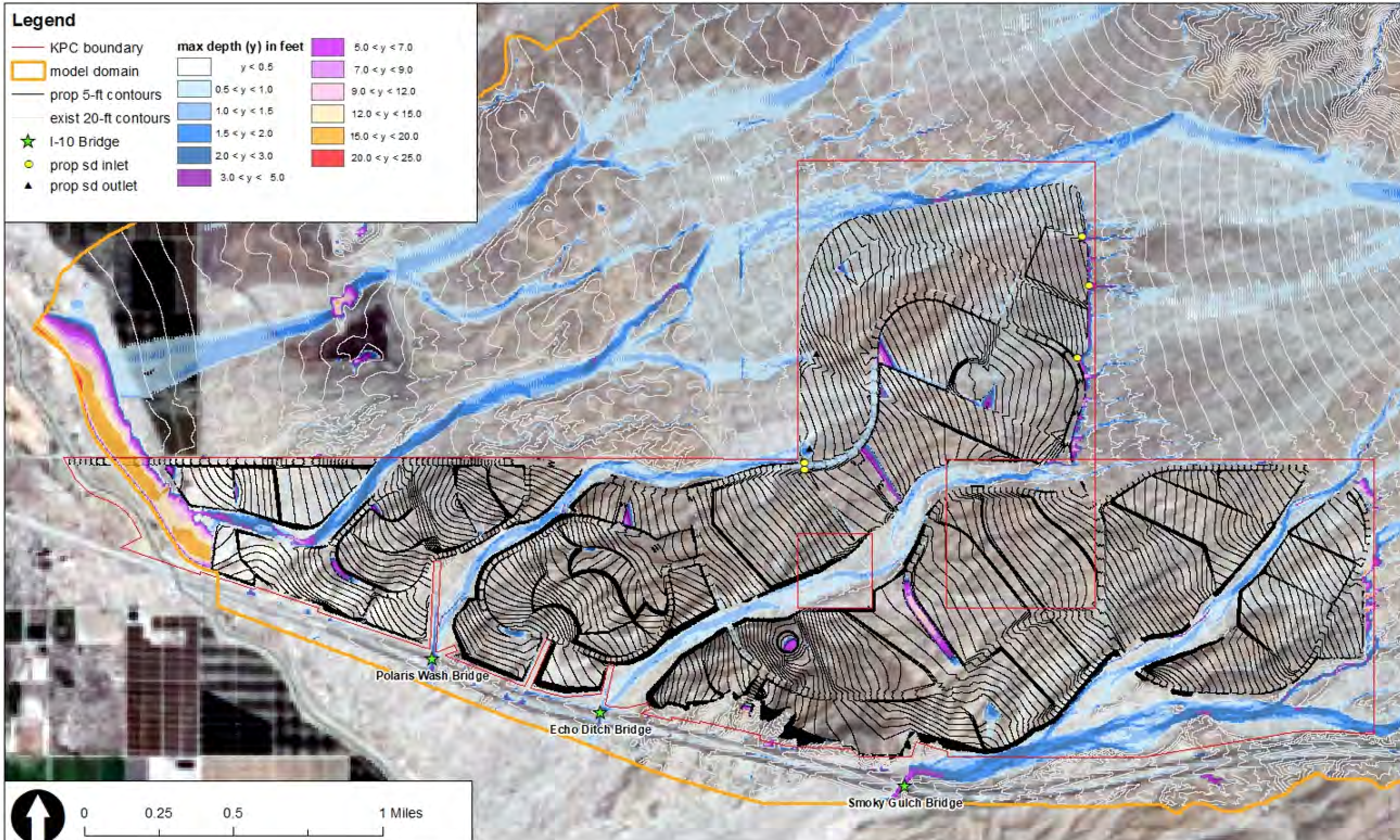

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Figure 5-33. Project worst-case site conditions 1%AC maximum flood velocities

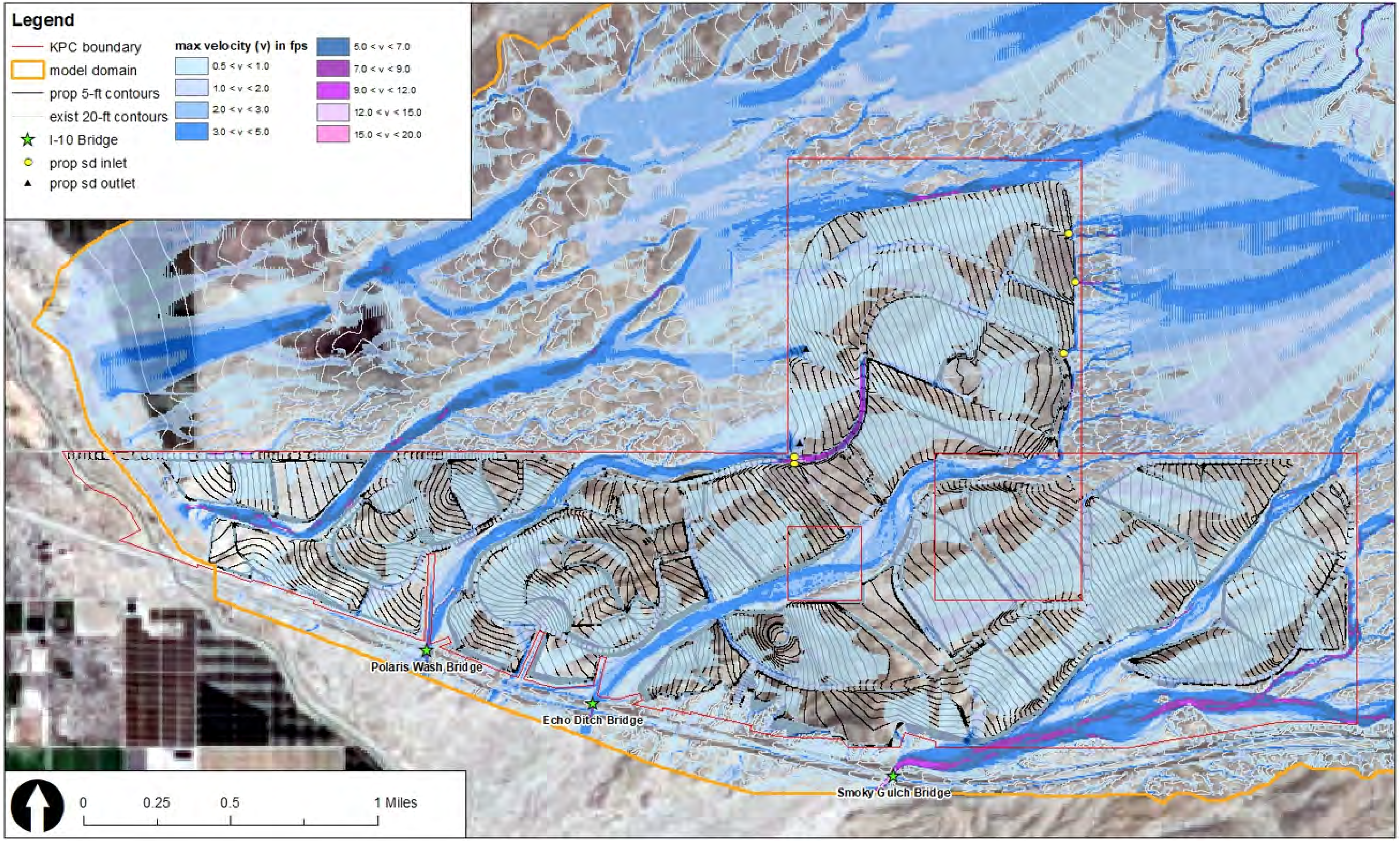

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Figure 5-34. Project worst-case impacts site conditions 1%AC change in flood depths

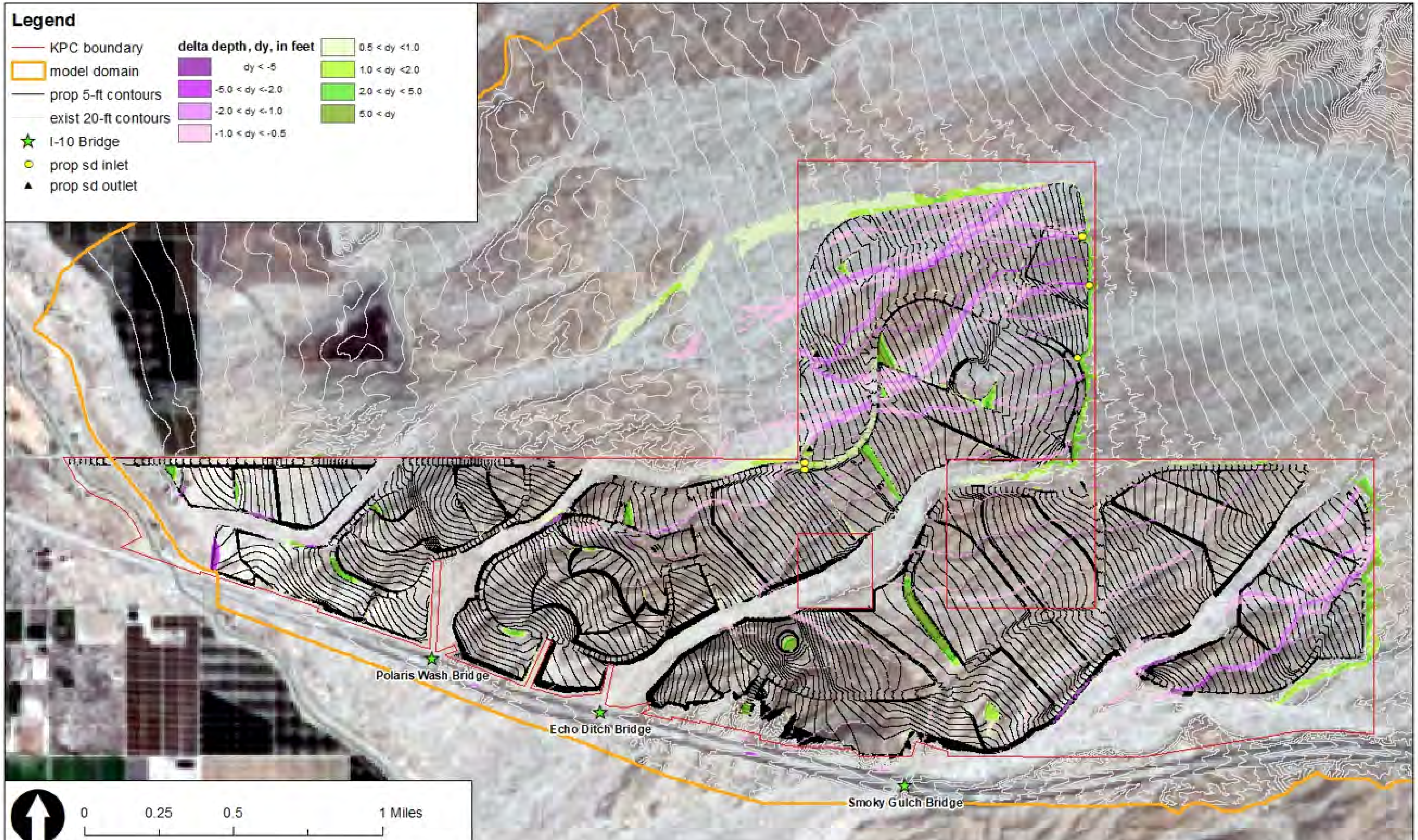

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Figure 5-35. Project worst-case impacts site conditions 1%AC change in flood velocities

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Figure 5-36. Interior virtual levees – project condition

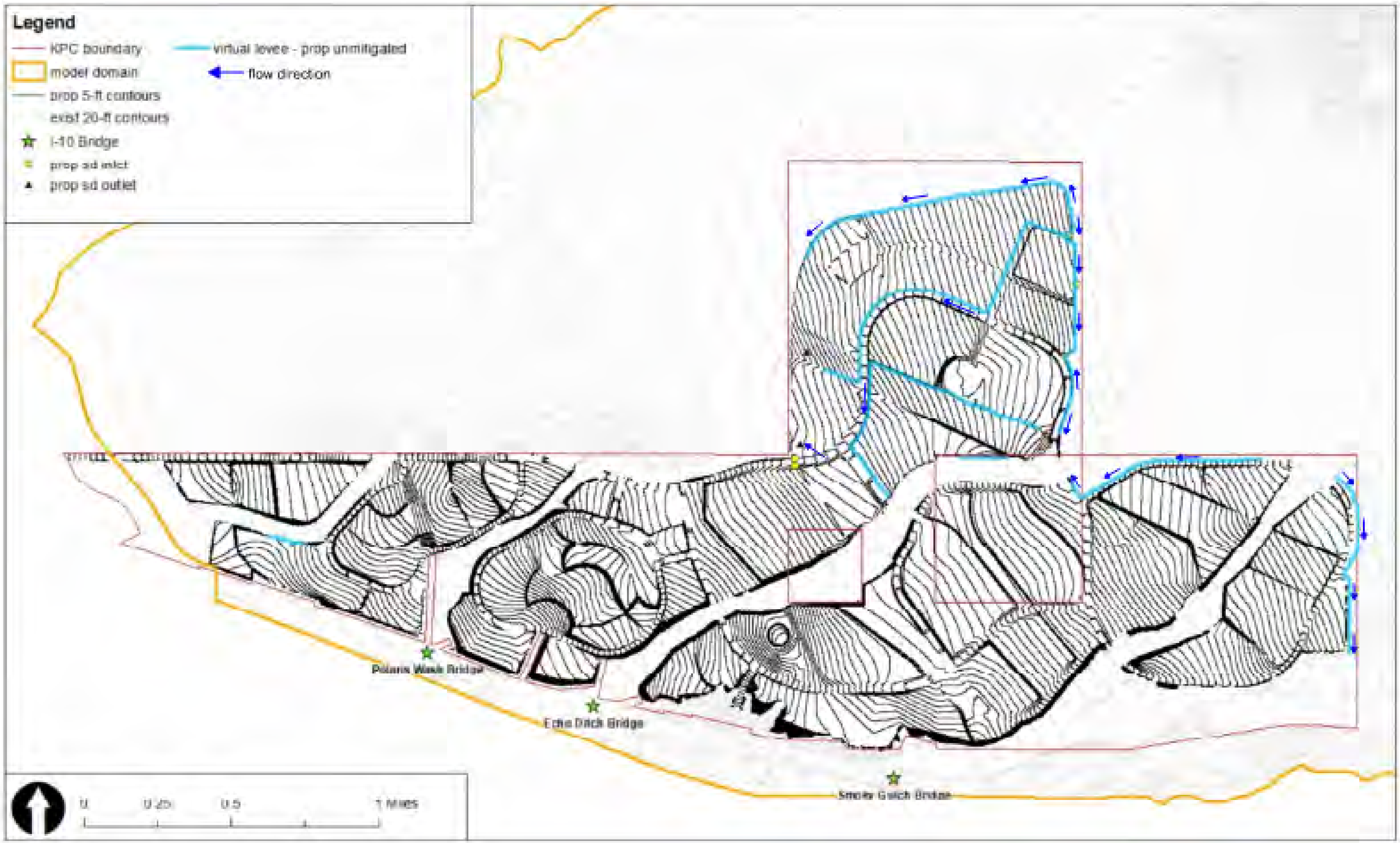

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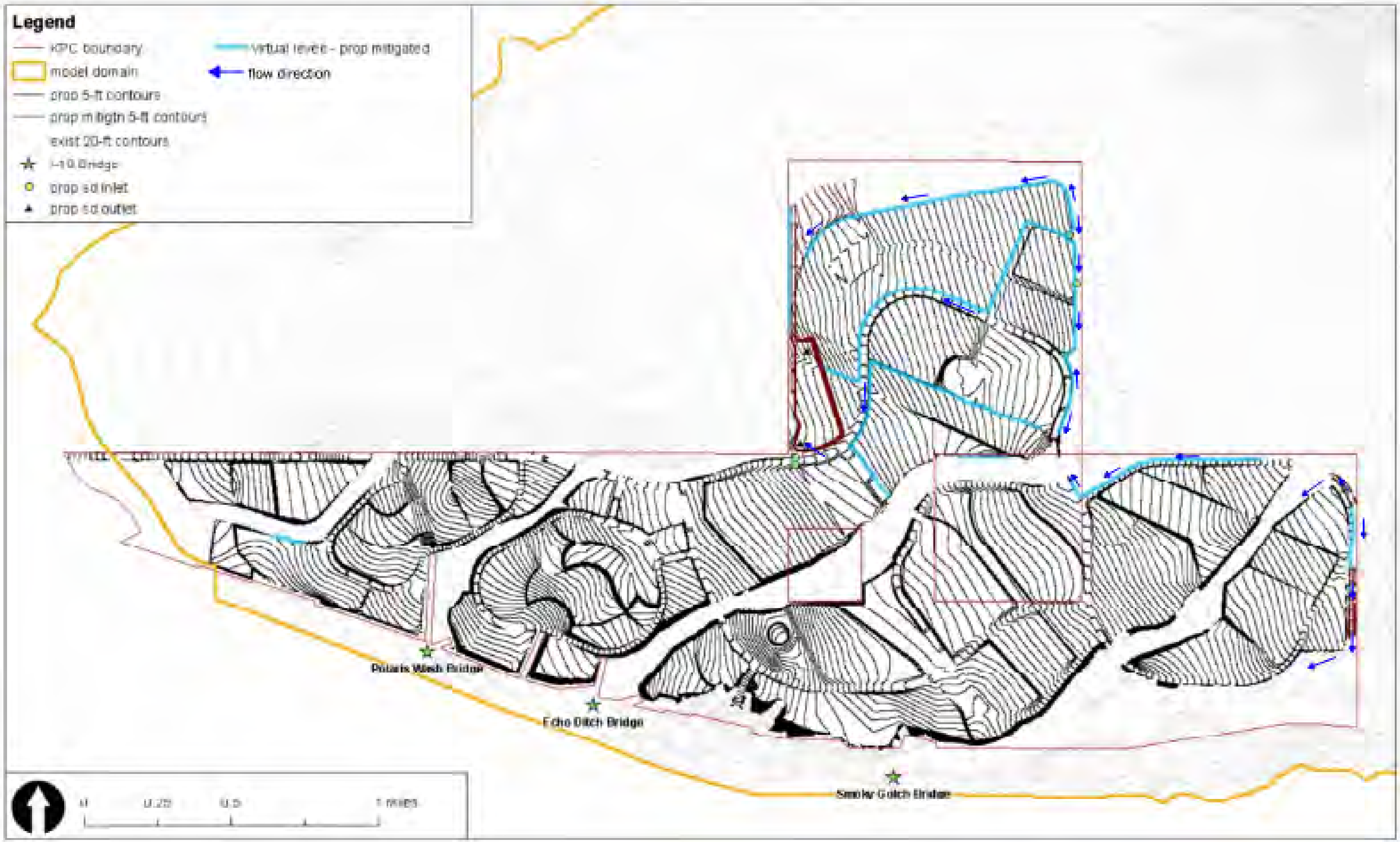
Figure 5-37. Interior virtual levees – project mitigated condition



6 LOCAL HYDROLOGY

The onsite hydrology analysis for the KPC Coachella project utilized the Riverside County Flood Control and Water Conservation District (RCFC&WCD) Hydrology Manual as a basis for calculating flowrates to each of the regional channels. Because all onsite subwatersheds are less than 640 acres, the Rational Method was used to calculate flowrates.

The Rational Method is an empirical computational procedure for developing a peak runoff/ discharge for storms of specified recurrence intervals in small watersheds. The Rational Method is used to compute peak flow rates for watersheds less than 640 acres. The formula is:

$$\mathbf{Q = CIA}$$

where:

Q = Peak runoff rate, in cfs.
C = Runoff coefficient, proportion of rainfall that runs off the surface
I = Average rainfall intensity corresponding to the time of concentration for the area, in in/hr.
A = Drainage area, in acres

The basic assumption for the Rational Method is that the precipitation rate is constant and uniform over the entire watershed for a time duration such that runoff could travel from the most remote point in the watershed to the concentration point; after which time the rate of runoff does not increase. This is the time defined as the "time of concentration (T_c)." The method is based on the assumption that the peak flow rate is directly proportional to drainage area, rainfall intensity, and a runoff coefficient "C," which is related to land use and soil type.

The 100-year hydrologic analysis has been performed based on the proposed grading plan, and using the procedures outlined in the RCFC&WCD Hydrology Manual, dated April 2004.

The hydrologic calculations were performed using a computer program developed by Advanced Engineering Software (AES, 2011) for the RCFCD&WCD Rational Method. The 100-year design discharges at intermediate points were computed by generating a hydrologic "link-node" model which divides the area into drainage subareas, each tributary to a concentration point or hydrologic "node" point determined by the existing terrain or proposed street layout.

The following assumptions/guidelines were applied for use of the Rational Method:

1. The Rational Method hydrology includes the effects of infiltration caused by soil surface characteristics. Hydrologic soil ratings are based on a scale of A through D, where D is the least pervious, providing the greatest runoff. The dominant soil group for each hydrologic subarea was selected as the soil type input for AES.
2. The type of vegetation or ground cover and percentage of impervious surfaces affects the infiltration rate. The runoff coefficients specified for various land uses in the Hydrology Manual (Plate D-5.6) were used to represent the hydrologic sub areas.
3. The Kirpich formula was used to determine the times of concentration (Tc) for initial upstream subareas. Initial subareas were drawn to be less than 10 acres in size and less than 1,000 feet in length per County guidelines.
4. Pipe travel times were computed based on preliminary pipe sizes; with a minimum pipe size of 18-inches for the mainline storm drain system. Local drainage areas are sized with smaller pipe sizes to convey flows to the mainline storm drain system.

The AES RATSCx Computer Program allows for the development of Rational Method models based on the Riverside County hydrology standard. The onsite land use was determined using the latest land planning and is shown in Figure 1-3. The percent imperviousness for various land use designations that can be used in the Rational Method analysis are indicated on Plate D-5.6 in the RCFC&WCD Hydrology Manual. The available land use designations in the hydrology manual are different than the KPC Coachella land use designations in the specific plan. Therefore, the specific plan designations were translated to the closest designation in the hydrology manual for use in the Rational Method calculations. Table 6-1 identifies the specific plan land use (column 1) and the closest designation in the hydrology manual (column 2). The percent impervious for the hydrology manual designation is shown in column 3.

The onsite soils data is consistent with the baseline conditions regional hydrology analysis (see Section 4). Average rainfall data for each subarea from NOAA Atlas 14 was used in accordance with the baseline conditions regional hydrology analysis as presented in Section 4. Onsite conveyances were assumed to be a combination of street and pipe flow with assumed drainage patterns because the interior street alignments are not available at this time.

To be consistent with the regional analysis, the local hydrology drainages are divided into 4 regional watersheds. The local hydrology was calculated for the 1-percent annul chance (100-year) storm event. The local hydrology map is shown in Exhibit A (large format plot at the back of the report). The drainage subareas were based on a combination of baseline topography and proposed mass grading as shown on the local hydrology map (Exhibit A). Local drainage subareas varied from 10 to 500 acres. The local hydrology analyses are included in the Electronic Technical Appendix as .res files (text files). A summary of the local hydrology results for each conveyance are presented in Exhibit 1. Peak flow rates for the 1-percent annual chance (100-year) storm event ranged from 40 cfs to 500 cfs.

The local hydrology was used to estimate onsite storm drain sizes using the 100-year storm peak flow rates and normal depth analysis assuming that the storm drain is not flowing at full capacity. The onsite storm drains range in size from 18 inches to as reported in the results of the Rational Method analysis. The storm drain pipe layout and facility sizing is shown on Figure 6-1.

Table 6-1. Assigned land use percent imperviousness

specific plan land use	RCFC&WCD hydrology manual land use	percent impervious
very low density residential	single family residential (1 ac lots)	20
low density residential	single family residential (7,200 - 10,000 sf lots)	50
medium density residential	condominiums	65
high density residential	apartments	80
mixed use	commercial (50%) and apartment (50%)	85
casino/entertainment center/hotels	commercial	90
roads	commercial	90
schools	single family residential (7,200 - 10,000 sf lots)	50
parks	single family residential (1 ac lots) (75%) and undeveloped (25%)	15
agricultural production	agriculture	0
drainage and open space	undeveloped	0
agricultural center	single family residential (1 ac lots)	20

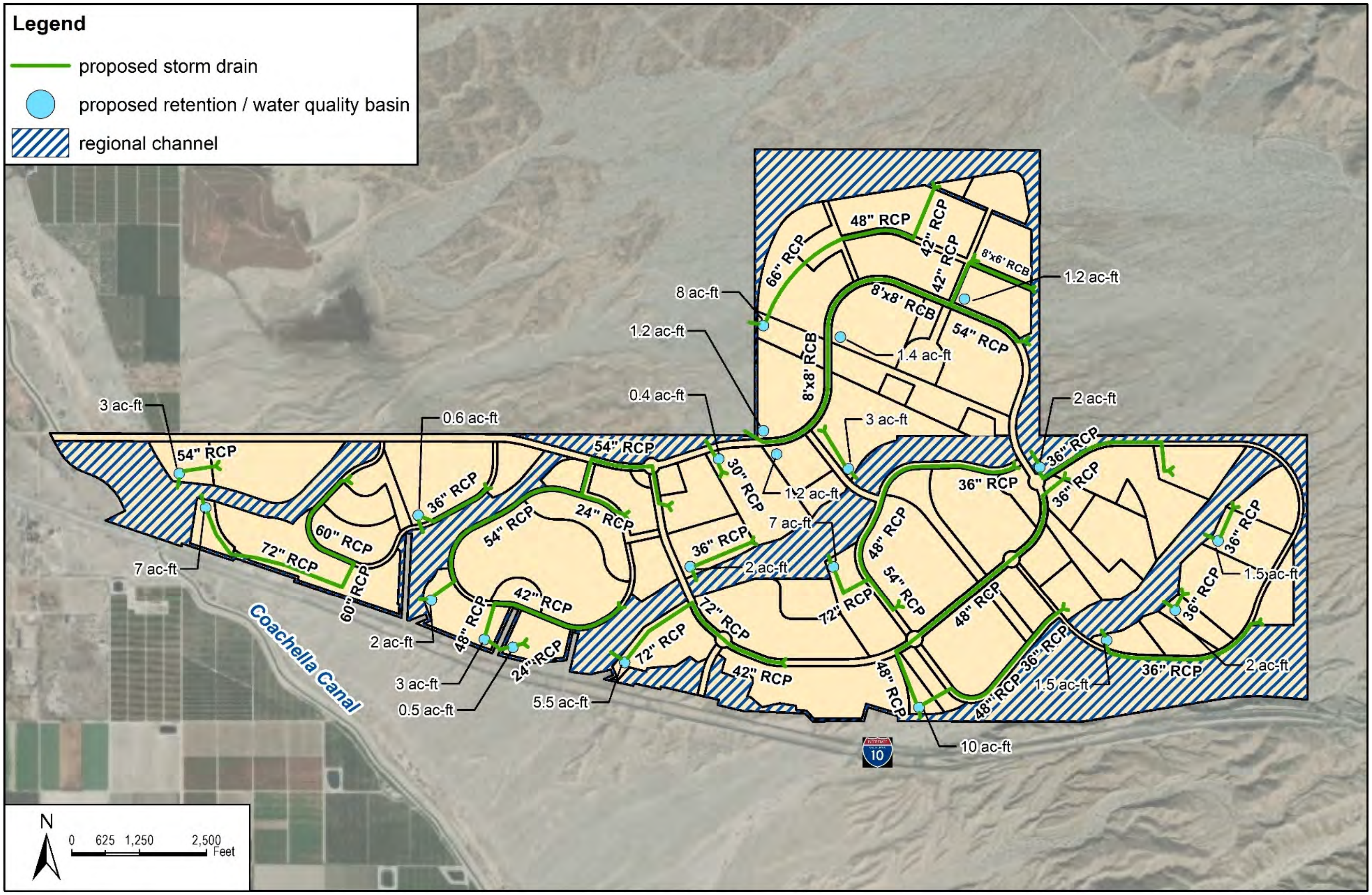
6.1 Water Quality Assessment

The project area is located within the City of Coachella and the unincorporated area of the County of Riverside. It is covered by the urban Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permitted area (NPDES Order R7-2008-0001, NPDES Number CAS617002), which was issued to the Riverside County Flood Control and Water Conservation District, the County of Riverside, and 10 incorporated cities (collectively called “permittees”). The City of Coachella and the County of Riverside are the co-permittees under this permit and developed the Whitewater River Region Stormwater Management Plan (SWMP) that describes activities, programs, procedures, financial responsibilities, and practices the permittees use to protect water quality by reducing or eliminating pollutants discharged from storm drainage systems they own or operate, including the selection and implementation of Best Management Practices (BMPs). All guidelines and procedures outlined in the SWMP, including the post-development Water Quality Management Plan (WQMP) requirements, will be adhered to during all phases of the project, as currently written or subsequent future regulations. All parties working on the project, or in the project area, will be required to implement pollution prevention, treatment controls, and construction BMPs consistent with the requirements outlined in the SWMP.

The project's runoff drains to the embankment wall of the All American Canal (Eastside Dike), where it pools, disperses, and is potentially discharged to the Coachella Valley Stormwater Channel/Whitewater River via Wasteway No. 2, a concrete-lined channel approximately 2.2 miles long. Wasteway Number 2 confluences with the Coachella Valley Stormwater Channel below Avenue 52 approximate 7.5 miles downstream from the Indio Boulevard Bridge and just over 11 miles upstream from the Salton Sea. The frequency peak flow rates are constant along this channel reach of the Coachella Valley Stormwater Channel, which implies that Wasteway No. 2 is not a significant tributary to the Coachella Valley Stormwater Channel. The regional hydrologic analysis indicates that the project will result in a slight increase in runoff volume as a result of the increase in impervious area proposed within the project site. The project area is a small percentage of the Whitewater River watershed (0.002 percent) and is unlikely to have a regional hydromodification effect. Based on the data available, the project is not expected to cause a hydrologic condition of concern to downstream channels.

The City of Coachella requires that development projects incorporate Best Management Practices (BMPs) into their design to address anticipated pollutants. Selection, design, and implementation of BMPs will be based on the Riverside County Whitewater River Region Stormwater Quality Best Management Practice Design Handbook guidance (Exhibit 3 in *Whitewater River Region Water Quality Management Plan for Urban Runoff*, January 2011), or equivalent. BMPs will be considered for implementation where feasible, and may include Site Design BMPs, Source Control BMPs (such as Non-Structural BMPs and Structural BMPs), and Treatment Control BMPs. The selection, sizing, and location of BMPs will be determined in future design phases. Conceptual locations for water quality features are identified on the project storm drain facilities layout map (Figure 6-1). All runoff from the site development will be treated prior to discharge to a regional channel or off-site facility

Figure 6-1. Project storm drain facilities



7 FLOOD HAZARD IMPACTS AND MITIGATION

7.1 General

This chapter includes a summary of the impacts associated with the planned project and a discussion of the mitigation measures proposed to address the project impacts and provide flood risk management to protect the project improvements. A flood hazard assessment has been prepared to identify the expected flood hazards at the project site and affected vicinity (adjacent properties and regional facilities), resulting from the 100-year storm events. The geomorphic conditions, expected flow rates, depths, and velocities for the assessment of the Project impacts have been identified in the previous chapters. The purpose of this chapter is to identify and discuss the project impacts and develop the necessary mitigation measures and conceptual flood protection systems for the Project to convey the floodwaters through and around the site and avoid significant flood hazard impacts to adjacent properties and downstream facilities. The general intention of the Project is to mitigate any increases in runoff volume and peak discharge at Project outfalls resulting from the planned development which will eliminate the need to future evaluate impacts to local and regional facilities downstream of the project site such as the East Side Dike and I-10 Freeway.

7.2 Flood Hazard Mitigation Plan

The following sections discuss potential alluvial fan flood protection measures and the proposed conceptual flood protection system.

7.2.1 Alluvial Fan Flood Protection Measures

Three general approaches are typically used for flood management on an alluvial fan. These approaches are:

1. Whole Fan Protection
2. Subdivision or Localized Protection
3. Single Lot/Structure Protection

Whole fan protection would generally be considered as a regional flood protection system undertaken by a government agency or collection of landowners. Whole fan protection can be achieved through the use of levees, channels, detention basins and/or dams. This method includes large-scale structural measures appropriate to use on extensively developed fans and are more cost-effective in high-density situations. Structures must be designed to intercept watershed flow and debris at the apex and transport the flow around the entire urbanized fan. These structures are most often financed through federal or state sources, but can also be financed through special regional districts, local governments, or developers.

Subdivision or localized protection can be provided to protect projects in the absence of whole fan protection. These measures may include local dikes, conveyance channels/swales, site plans to convey flow, streets design to convey flow, or elevation on armored fill. These are smaller scale measures that can be used for moderate density development on alluvial fans and are designed to convey water and debris around or through the individual development.

Single lot or structure protection measures are for protection of isolated lots or structures. These measures may include elevated or properly designed foundations, or floodwalls and berms. The measures are most effective when used for low-density developments.

The Project is located on active and inactive alluvial fan surfaces, and subject to the requirements to convey offsite flow through and around the site development. Therefore, alluvial fan flood protection measures need to be incorporated into the project to convey the anticipated flood flows, and prevent adverse floodplain impacts to adjacent properties and downstream facilities.

Localized subdivision protection is proposed to protect the project in the absence of any whole fan protection system. Mitigation measures for the site development will also be identified to address any project related impacts on the existing flood protection systems, including the East Side Dike.

7.2.2 Conceptual Flood Protection System

A conceptual flood protection system has been identified to intercept flood waters along the Project boundaries and convey the floodwaters through and around the site development area. The Project proposes to implement measures such as open-space flood conveyance channels, protected embankments, storm drain systems, graded swales, and regional spreading basins to collect and convey the unconfined alluvial fan flows.

The Conceptual drainage plan for the KPC Coachella development ensures that all residents of the community, as well as downstream facilities and properties, will be protected from periodic flooding that is experienced in the region. Figures 5-26 (composite 1-percent annual chance event maximum depth) and 5-27 (composite 1-percent annual chance event maximum velocities) depicted the existing flow conditions that come on to the project site and were used for the conceptual design of the flood protection system.

Four (4) regional channel systems are proposed to convey offsite flood waters through the project site. The location of the channels was based on the predominate flow patterns from the existing condition analysis. The channels include regional channels ESD_B, ESD_C, ESD_D, and ESD_UDC. A large open-space corridor is provided along the I-10 freeway in the Upper Double Canyon watershed to provide additional flood conveyance and account for the flow path uncertainty identified in the ESD_UDC watershed. A flood setback is also provided along the northern boundary of the project site to allow flood waters from the ESD_A watershed and the upper portion of the ESD_B watershed to bypass the proposed development areas.

The peak flow rates from the HEC-HMS analysis will be used for the future design of the channel systems. The location of the regional channels is shown on Figure 7-1.

7.2.3 On-Site Drainage and Storm Water Retention

The onsite drainage system is designed to capture, convey, and mitigate storm water runoff from within the site development. The system is designed to provide protection for the 1-perecent annual chance event through a combination of street flow and a storm drain pipe system. All runoff shall receive water quality treatment in accordance with the City ordinance and MS-4 permit requirements. Onsite storm water retention basins will be designed to reduce the project condition peak runoff flow rates and volume to meet existing conditions. The basins will also provide dead storage to retain the required stormwater quality and flood volume.

Table 7-1 lists the net 2-, 10-, and 100-year peak flow rates and volumes from the HEC-HMS analysis to be mitigated onsite in order to meet Baseline conditions. ESD_B peak flow rates are lower in the Project condition than in Baseline condition due to longer lag times in the Project condition (see Section 4), therefore no mitigation measures for peak flow rates in that regional watershed is needed. However, there are increases in runoff volume in all watersheds in the Project condition that will require mitigation, except for ESD_A which lies outside of the Project boundary.

The onsite drainage system of storm drain pipes and detention/retention basins are illustrated on Figure 7-1. Preliminary storm drain pipe sizes and basin storage volumes are identified on Figure 6-1. The combined basin volumes in each watershed were established to provide the necessary volume to mitigate the increases identified in Table 7-1 for the 1-percent annual chance storm event.

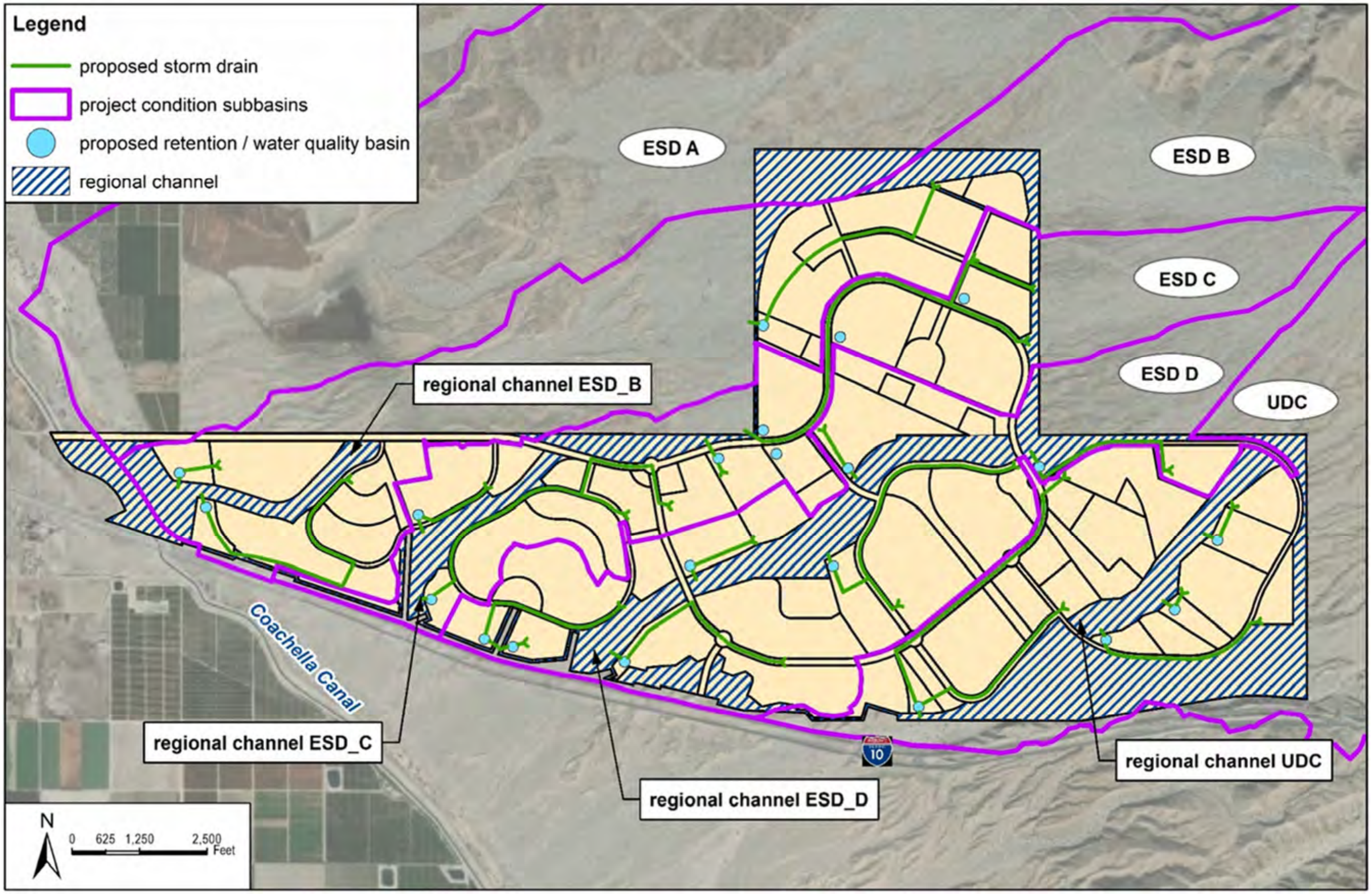
Table 7-1. Regional channel mitigation requirements for peak flow and volume

CP	subbasin	exist area {sq mi}	prop area {sq mi}	exist % impervious	prop % impervious	50-percent annual chance exist Q_{peak} {cfs}	prop Q_{peak} {cfs}	$\triangle Q_{peak}$ {cfs}	exist vol {ac-ft}	prop vol {ac-ft}	$\triangle$vol {ac-ft}
1	ESD_A	5.44	5.44	0	0	583	583	0	53	53	0
2	ESD_B	4.41	4.41	0	7	429	425	-4	43	46	3
3	ESD_C	1.42	1.40	0	33	235	284	49	19	21	2
4	ESD_D	1.65	1.67	0	35	293	401	108	23	27	4
5	Upper Double Canyon	7.82	7.81	0	4	916	937	21	83	85	2

CP	subbasin	exist area {sq mi}	prop area {sq mi}	exist % impervious	prop % impervious	10-percent annual chance exist Q_{peak} {cfs}	prop Q_{peak} {cfs}	$\triangle Q_{peak}$ {cfs}	exist vol {ac-ft}	prop vol {ac-ft}	$\triangle$vol {ac-ft}
1	ESD_A	5.44	5.44	0	0	1610	1610	0	166	166	0
2	ESD_B	4.41	4.41	0	7	1200	1166	-34	134	139	5
3	ESD_C	1.42	1.40	0	33	556	645	89	52	58	6
4	ESD_D	1.65	1.67	0	35	694	894	200	63	74	11
5	Upper Double Canyon	7.82	7.81	0	4	2498	2527	29	255	260	5

CP	subbasin	exist area {sq mi}	prop area {sq mi}	exist % impervious	prop % impervious	1-percent annual chance exist Q_{peak} {cfs}	prop Q_{peak} {cfs}	$\triangle Q_{peak}$ {cfs}	exist vol {ac-ft}	prop vol {ac-ft}	$\triangle$vol {ac-ft}
1	ESD_A	5.44	5.44	0	0	3780	3780	0	483	483	0
2	ESD_B	4.41	4.41	0	7	2855	2764	-91	389	407	18
3	ESD_C	1.42	1.40	0	33	1208	1359	151	154	162	9
4	ESD_D	1.65	1.67	0	35	1487	1844	357	184	203	19
5	Upper Double Canyon	7.82	7.81	0	4	5795	5832	37	730	745	15

Figure 7-1. Regional channels and onsite drainage system and basins



7.3 Project Impacts and Planned Mitigation

The proposed project improvements will impact the drainage patterns and runoff peak flow rates and volumes as compared to the baseline (pre-project) condition. Increases in the storm water peak flow rates and runoff volumes were identified at the Polaris Wash (ESD_C), Echo Ditch (ESD_D), and Smokey Gulch (ESD_UDC) bridge crossings based on the results of the HEC-HMS hydrologic analysis. The peak flow and runoff volume increases are summarized in Table 7-1. The increases are a result of the change in land use conditions associated with the proposed development. Onsite detention basins are proposed within each of these impacted watersheds and will be designed to reduce the peak flow rates and runoff volumes to less than the existing conditions.

The project site is located on an alluvial plain and impacts to the drainage patterns associated with the planned development were evaluated using the FLO-2D analysis. The 2-dimensional hydraulic analyses completed for this study were used to guide the overall design and grading of the project site and were used to evaluate the drainage impacts to the adjacent parcels. In general, the baseline condition analysis was prepared to identify flow paths and velocities for the regional drainages which were then used to layout the site development and establish flood flow corridors around and through the site to convey the regional drainage in a manner similar to the existing condition. The baseline (pre-project) flooding depths and velocities were compared with the project conditions to identify the change in flow depth and velocities as a result of the proposed improvements. An impact analysis of the 1-percent annual chance storm event was prepared using the results of the 2-dimensional hydraulic modeling. The project impacts are illustrated in Figures 5-34 (depth) and 5-35 (velocity).

The results of the analysis indicate that the proposed conceptual design produces flow patterns that are in significant conformance with the exiting flow depths and velocities. The primary impacts from the project on the adjacent parcels are located within the ESD_B and ESD_C watersheds on the west side of the project. Minor adjustments to the project grading and storm drain layout will be required in these areas during the detailed design phases to reduce these impacts to less than significant.

The results also indicate that the proposed project will lower the water surface elevation along the East Side Dike north of the I-10 freeway. While the study did not look at all of the watersheds tributary to the East Side Dike, it did evaluate the watersheds impacted by the project (ESD_A and ESD_B). The results of the FLO2D hydraulic analysis indicates that the project will reduce the runoff volume tributary to the East Side Dike north of the I-10 Freeway. This is predominately a result of the proposed spreading basin and onsite basins proposed within the site development. A graphical illustration of the results are shown on Figures 7-7 and 7-8.

7.3.1 Planned Mitigation Evaluation – Detention/Spreading Basin

As indicated above, the conceptual channel layout results in some impacts along the western boundary in watersheds ESD_B and ESD_C. While the results are based on a large-scale preliminary grading plan and more detailed studies will be required with future entitlements, a focused study was prepared for watersheds ESD_B and ESD_C to evaluate if mitigation measures could be provided to minimize the project impacts. A preliminary mitigation measure is grading improvements on the northwest corner of the project site to direct flows to a graded storm water detention/spreading basin located along the western edge of the project site. The purpose of the basin is to detain and spread flows to match existing conditions within these watersheds. The conceptual design for the proposed regional basin is illustrated in Figure 7-2.

The proposed regional basin is approximately 4,400 ft long and has a bottom width ranging from 50 ft to 700 ft wide. The basin provides roughly 416 acre-feet of storage. In the FLO2D models, levees were modeled along the upper western edge of the proposed basin to control how much flow could be released from the basin and to spread the discharge to better match or be less than existing condition runoff. Virtual levees along the bottom western edge of basin were modeled to more accurately represent the basin top elevation. A more detailed analysis of the detention/spreading basin will be required with the final design when more detailed grading plans are available.

In addition to the proposed regional basin, two channels are proposed along the southeastern edge of the project site. The goal of these channels is to minimize offsite flows impounding along the edge of the site and route flows to the regional channel system and match existing condition flow patterns. The conceptual design for the proposed channels is shown in Figure 7-3. The northern channel directs flow north to the regional channel UDC and the southern channel directs flows south around the project site where they ultimately confluence in the regional channel UDC. Each channel has a preliminary bottom width of 50ft with 2:1 side slopes. Virtual levees were used along the exterior edge of the site to protect the project site. Levees were also modeled for short reaches of the southern channel to more accurately represent the graded top of the channel. Maximum water depths within the proposed channels ranged from 2ft to 3.5ft. Along the levee used for site protection, most flow depths range from 1ft to 2.5ft, with a small area reaching a maximum of 6ft. The impacted area is minimal and can be further addressed and mitigated as part of the future submittals for the tentative and final tract maps when more detailed site design information will be available.

Figure 7-2. Proposed Detention/Spreading Basin

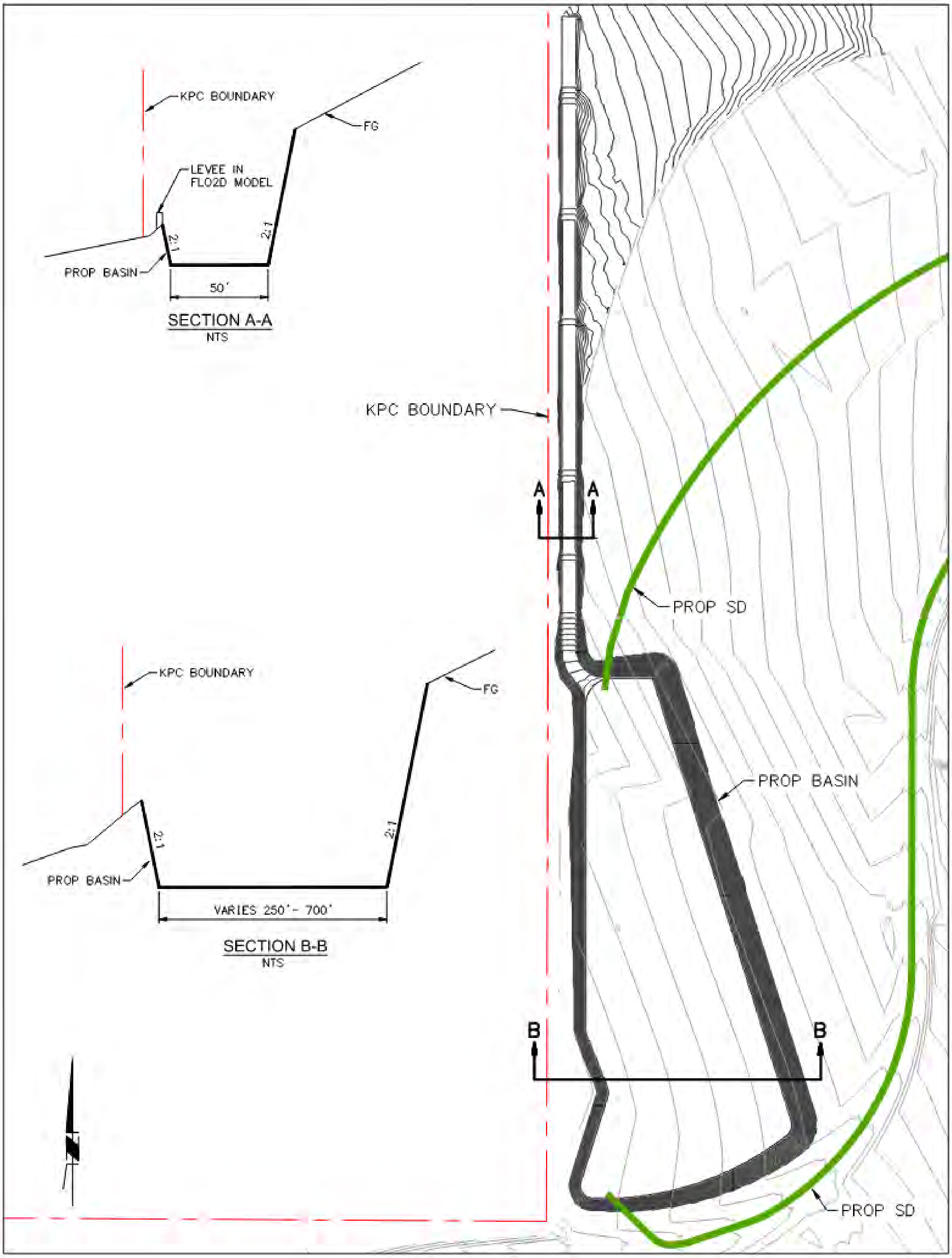
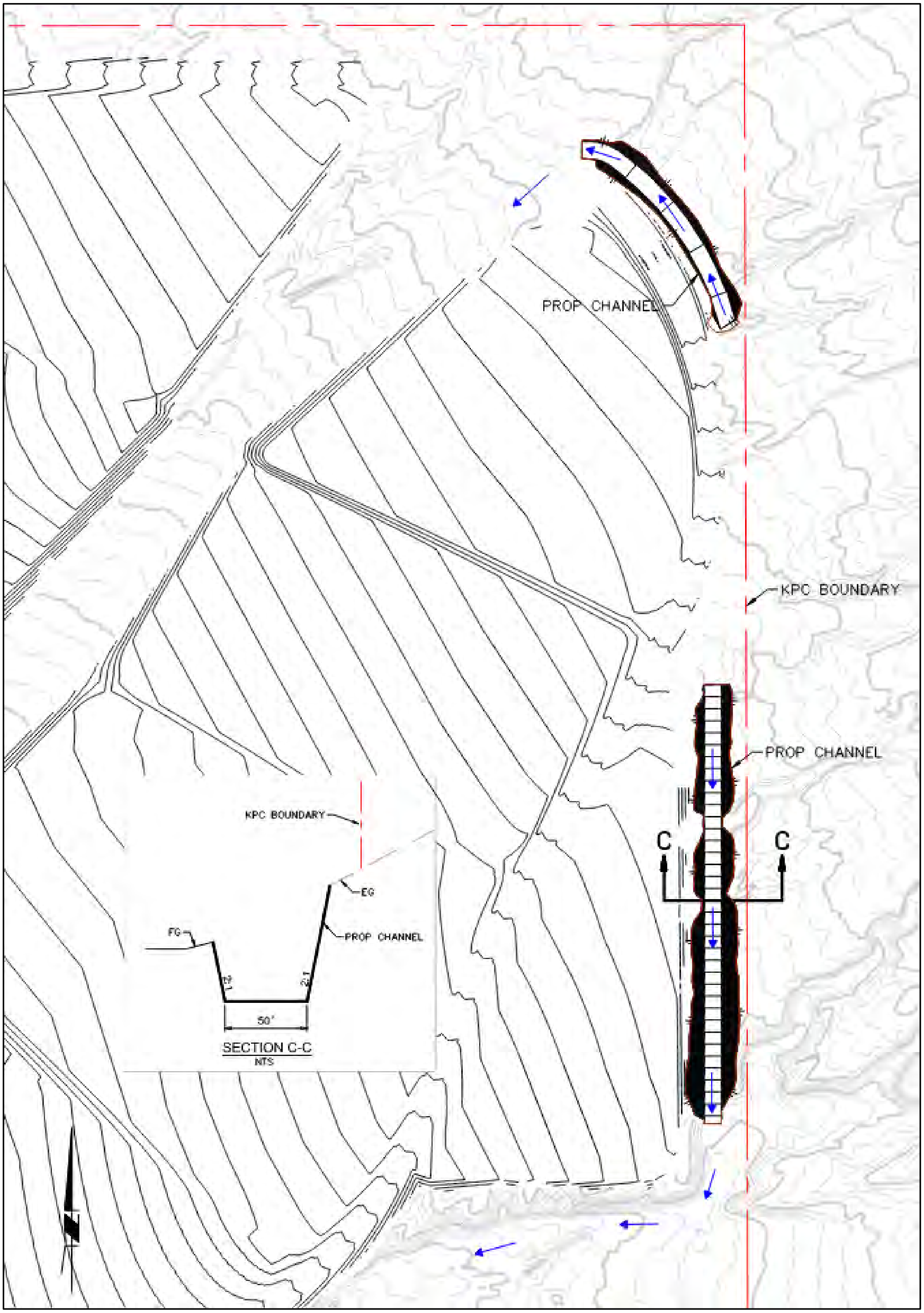


Figure 7-3. Proposed Channels



Levee conditions L-0 and L-3 were identified as the hydraulic scenarios where the project would have the most impact on the offsite flow conveyance through this northern part of the project. The FLO2D models were revised to include the proposed basin grading. In addition, offsite flows along the northeastern edge of the project site in watershed ESD_C were routed through underground conduits and discharged directly into the proposed spreading basin, similar to how the proposed storm drain system will work. The depth and velocity results are shown in Figures 7-5 through 7-8. Figures 7-9 through 7-12 show the difference in depth and velocity between proposed and existing conditions.

The results indicate that the proposed basin is effective in minimizing the project condition impacts on flow depth to less than 0.5ft as compared to Baseline conditions. For velocity, the project impacts are also reduced with the proposed basin. In the L-3 condition, velocity impacts are reduced to less than 0.5ft/s. In the current condition (L-0), there is a residual increase of primarily 0.5 ft/s to 1ft/s in a small area near where the bottom width of the basin transitions from narrow to wide. The average velocity of flows discharging from the basin in this area is about 2 ft/s as compared to 1 ft/s in the Baseline condition, which are generally considered as non-erosive. The impacted area is minimal and can be further addressed and mitigated as part of the future submittals for the tentative and final tract maps when more detailed site design information will be available.

While the results indicate that there are some impacts that will need to be mitigated with the more detailed design, they do demonstrate that a spreading basin can be effective in eliminating project impacts. Furthermore, the project mitigates for the L-3 condition. With the current condition (L-0), the impacts are almost entirely mitigated with some very minor residual impacts to velocities. The 2D modeling results demonstrate that the proposed spreading basin is effective in addressing the more significant potential impacts.

7.4 California Drainage Law

California Drainage Law states that property owners have the right to protect themselves from flooding as long as they do not unreasonably increase flood risk for adjacent property owners. To accomplish this, CVWD has identified that flows must be reasonably received and released in the historical flow paths at the historical flow depths and velocities (CVWD, 2020).

The HEC-HMS hydrology analysis was used to identify project impacts to the peak flow rates and runoff volumes associated with the planned development. Onsite retention/detention basins within each of the impacted watersheds are proposed to mitigate the project impacts.

The FLO-2D analysis was prepared to identify drainage impacts to adjacent properties in terms of flood depth and velocity resulting from the proposed development. The baseline (pre-project) condition was compared with the project condition to identify drainage impacts. The modeling results demonstrate the proposed basin is effective in mitigating project impacts in current watershed conditions (L-0). Minimal velocity impacts were identified within the ESD_A and ESD_B watersheds in the virtual levee L-3 condition. These impacts are considered minor and can be mitigated further as a part of future submittals for the tentative and final tract maps when more detailed site design information will be available. As stated in the previous section, L-3 condition is a hypothetical condition and there are an unlimited number of potential changes that could occur in the upper watershed. The 2D modeling results demonstrate that the proposed spreading basin is effective in addressing the more significant project impacts.

Additional detailed analyses will be required during the future development of the tentative tract map and final map phases of the project to document that these impacts have been addressed and that there are no further adverse impacts.

Figure 7-4. Regional channels and proposed mitigation spreading basin

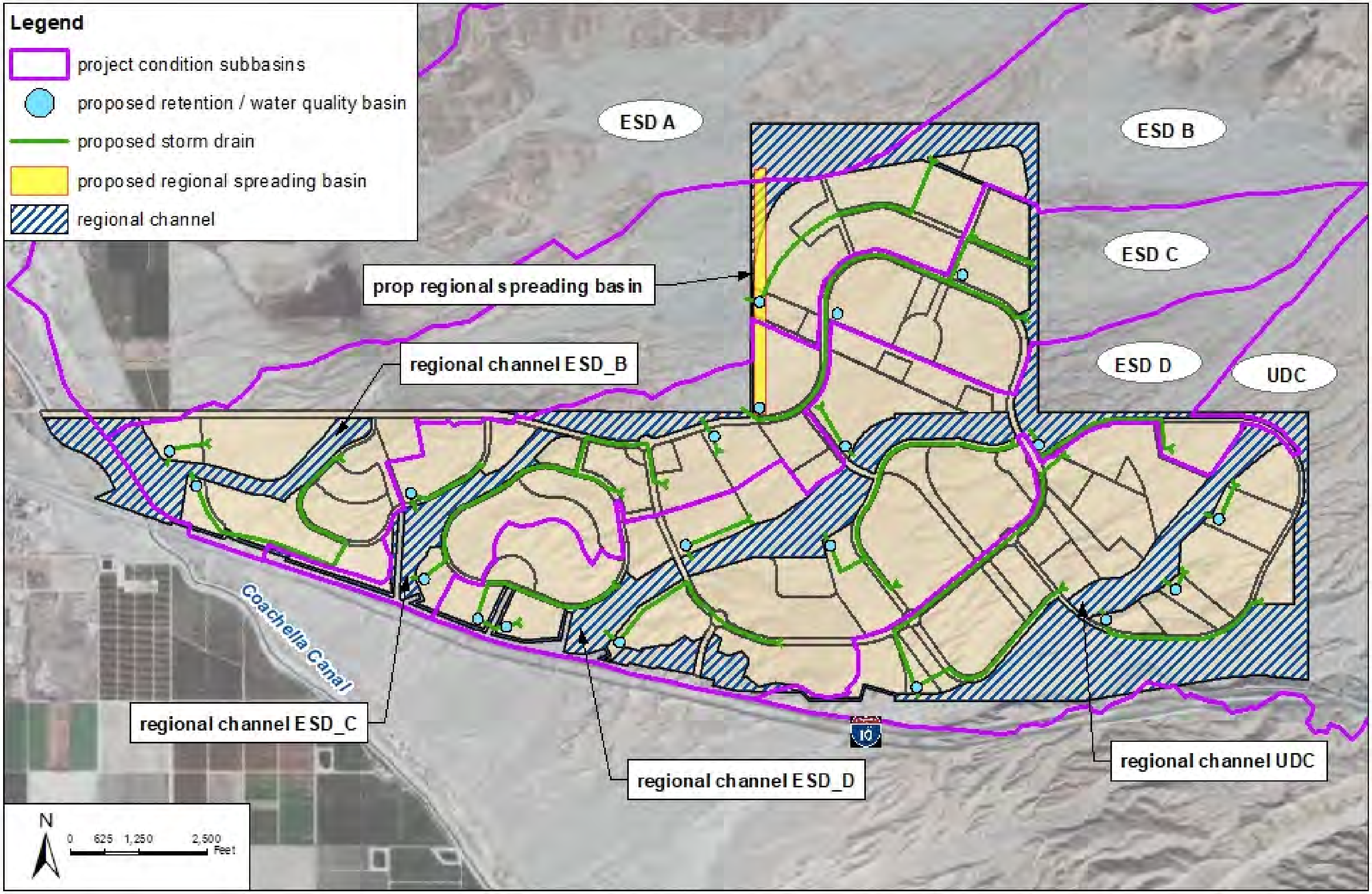


Figure 7-5. Project L-0 with Basin Mitigation watershed conditions 1%AC maximum flood depths

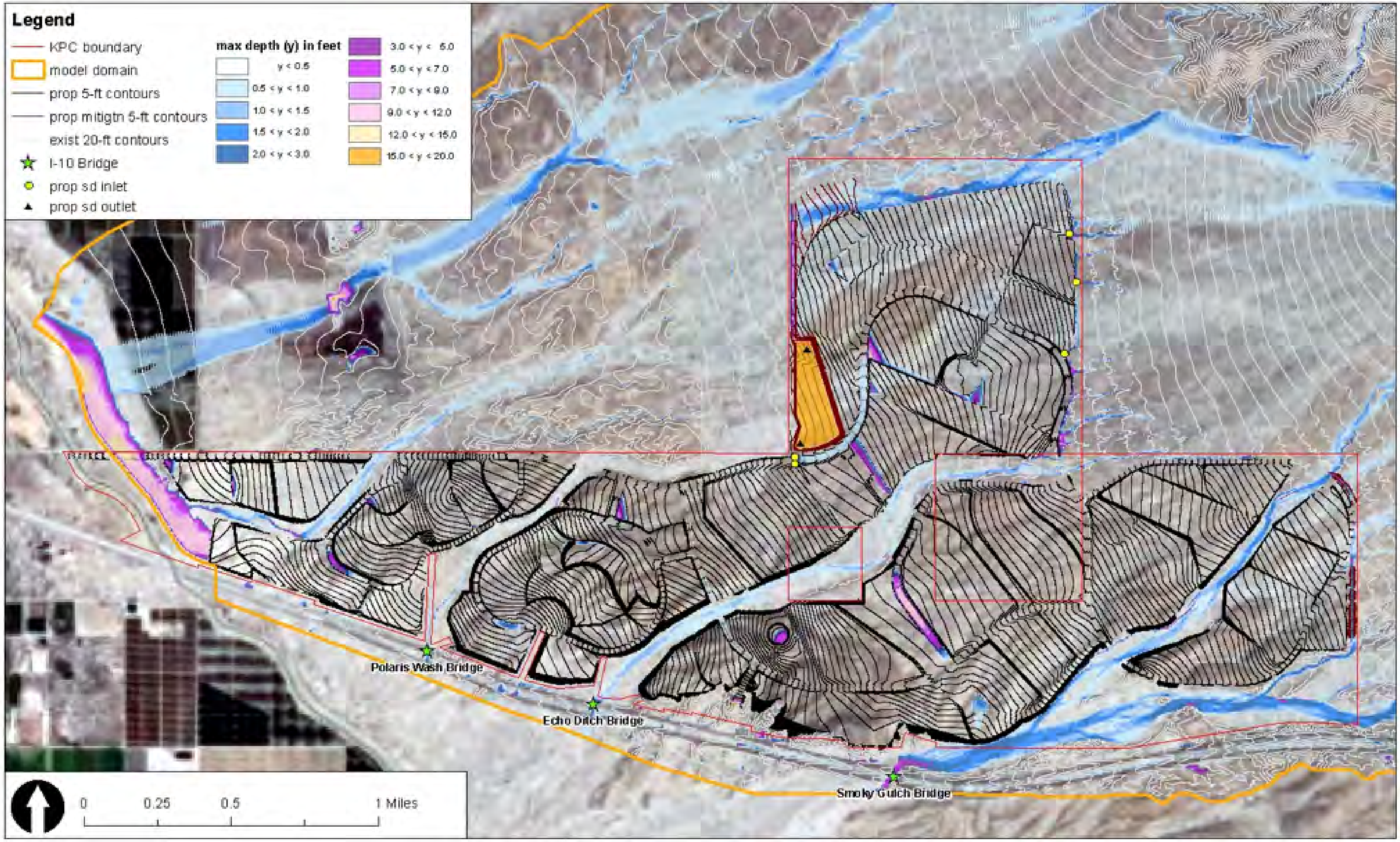


Figure 7-6. Project L-3 with Basin Mitigation watershed conditions 1%AC maximum flood depths

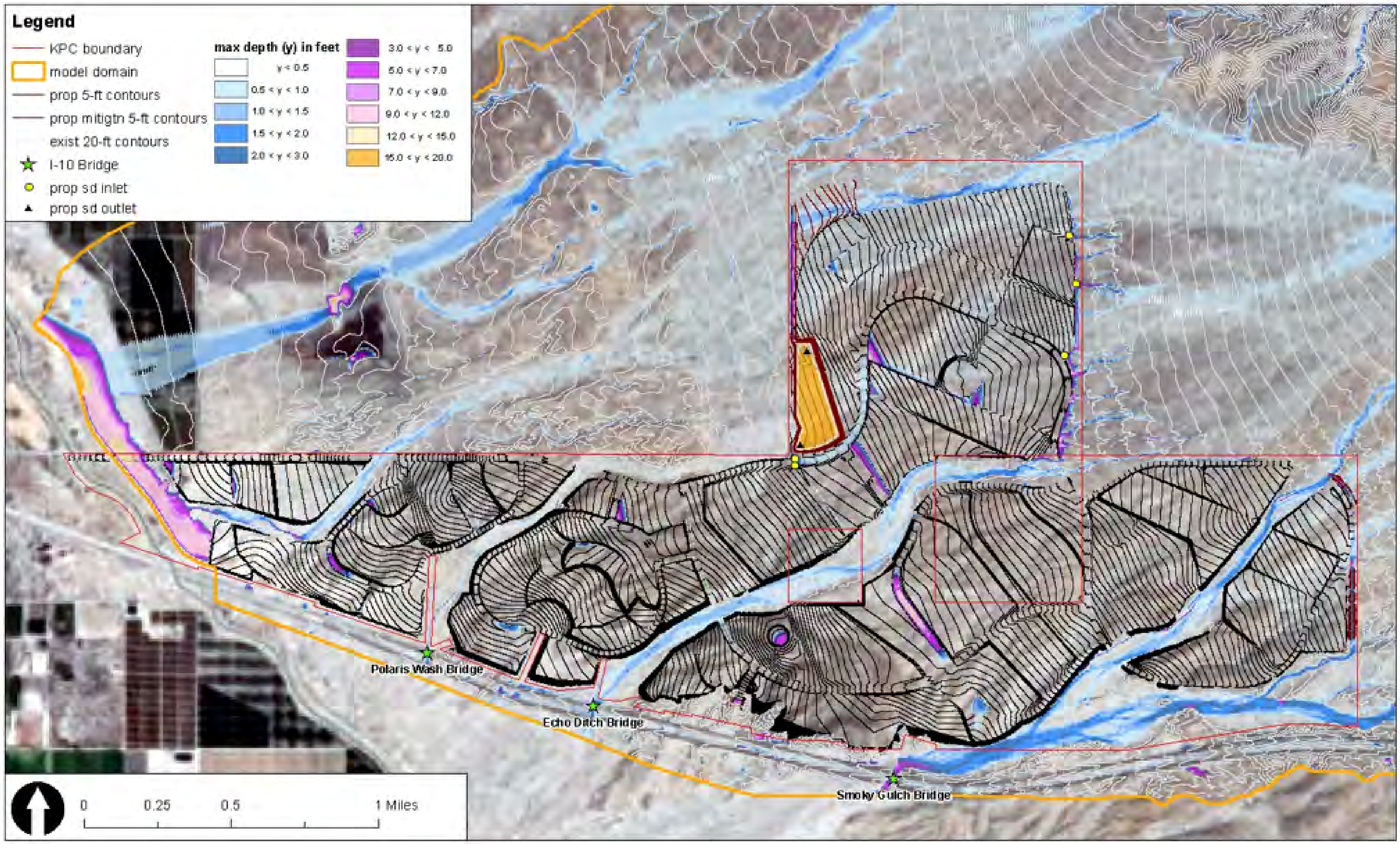


Figure 7-7. Project L-0 with Basin Mitigation watershed conditions 1%AC maximum flood velocities

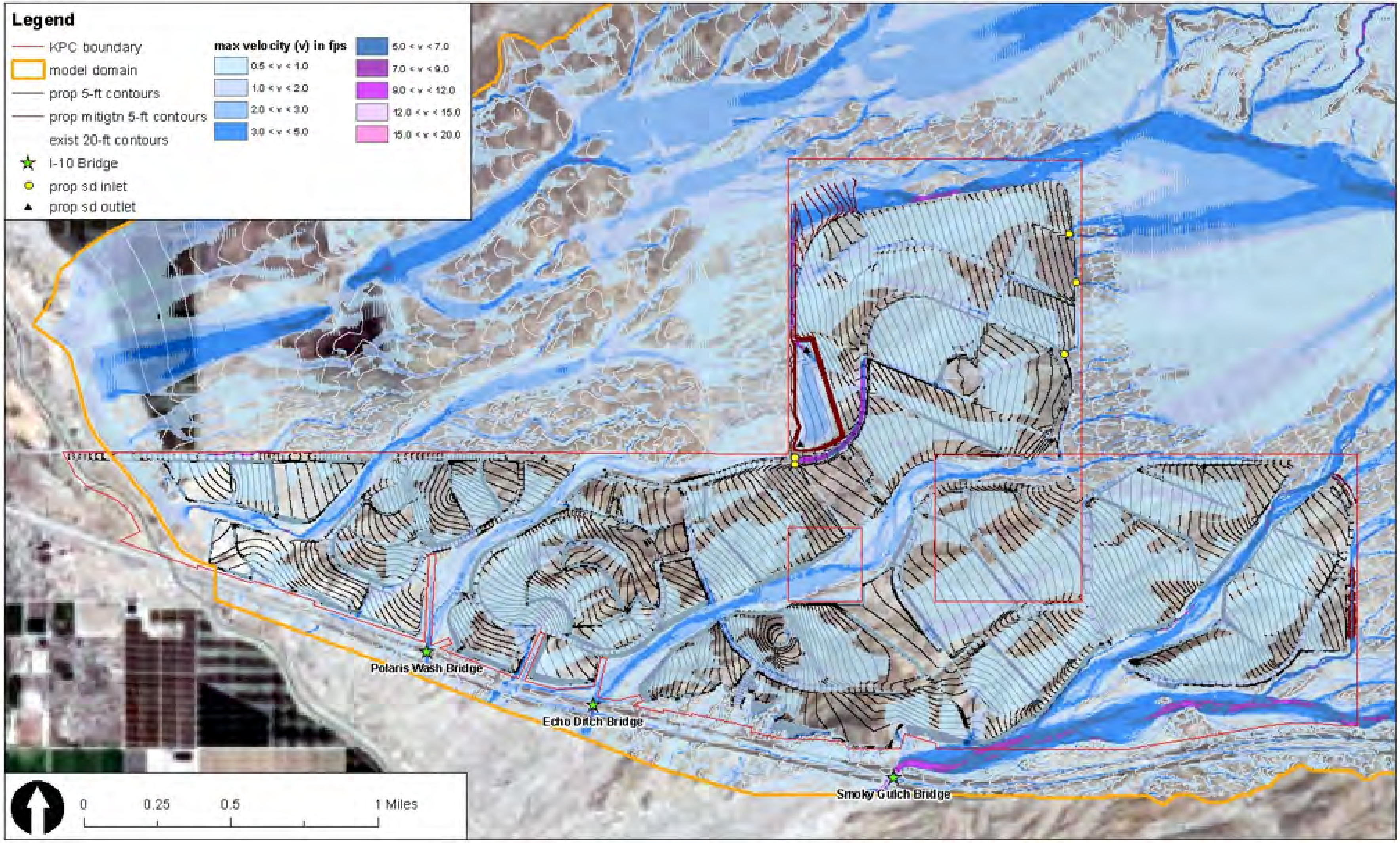


Figure 7-8. Project L-3 with Basin Mitigation watershed conditions 1%AC maximum flood velocities

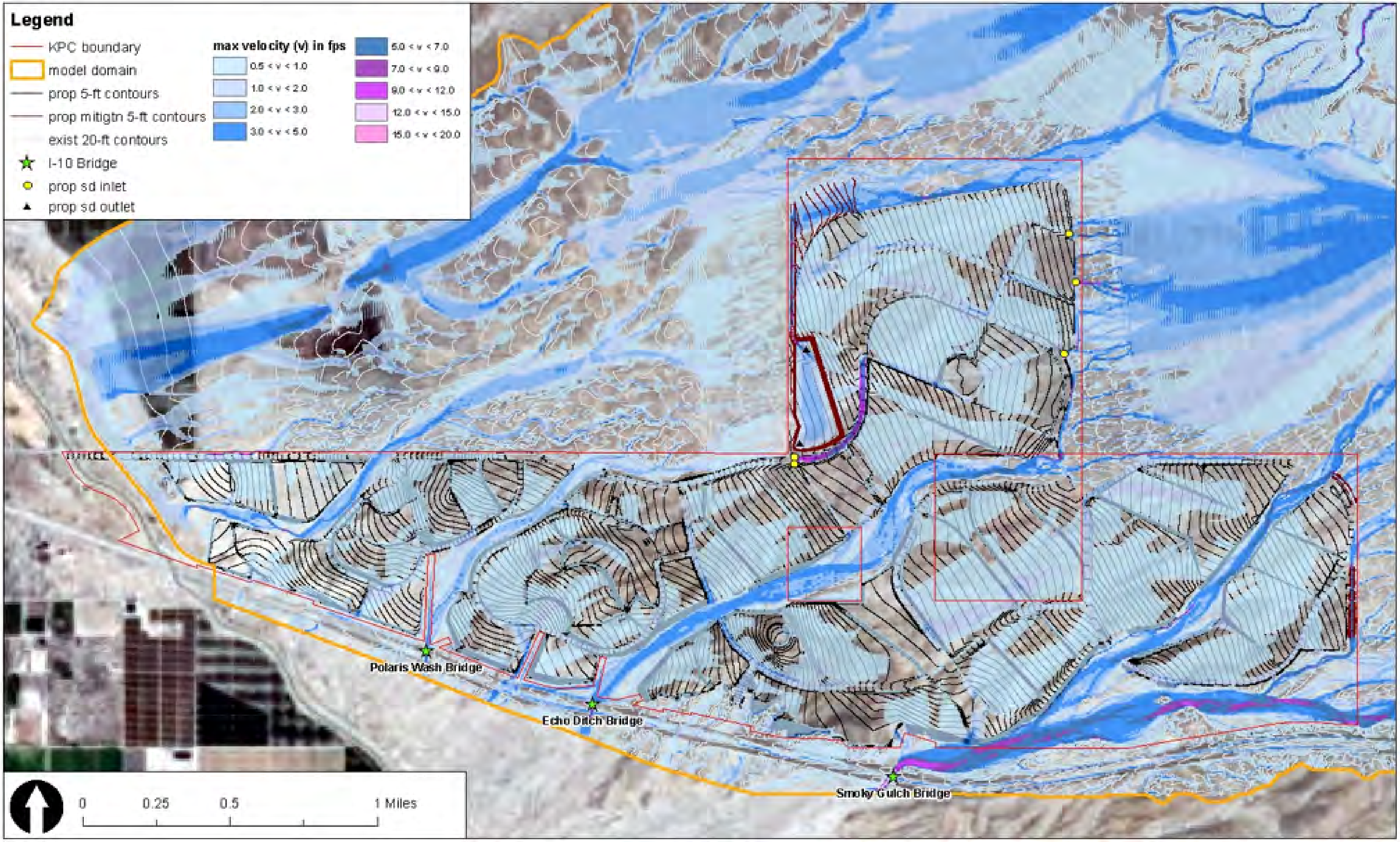


Figure 7-9. Project L-0 with Basin Mitigation watershed conditions 1%AC change in flood depths

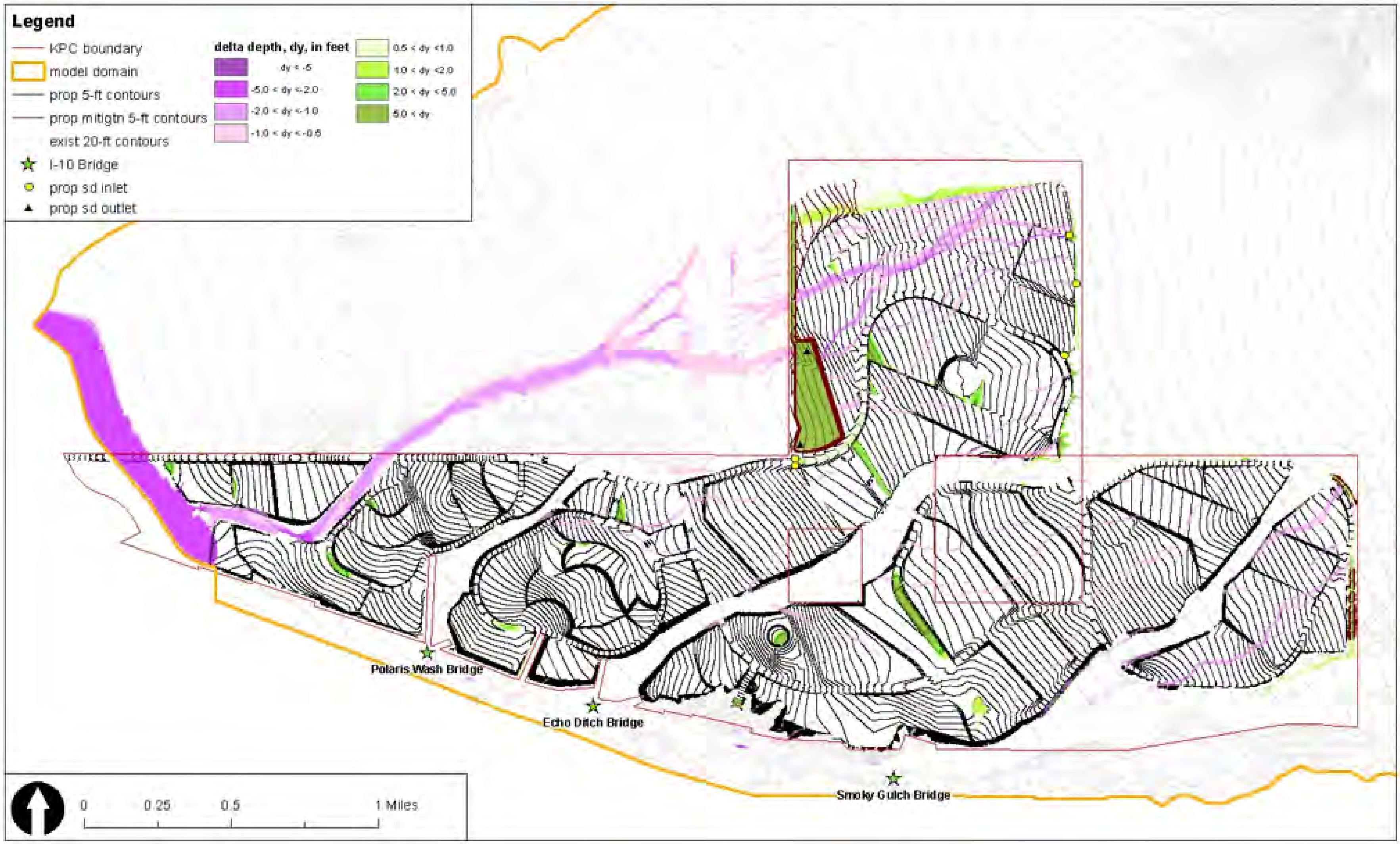


Figure 7-10. Project L-3 with Basin Mitigation watershed conditions 1%AC change in flood depths

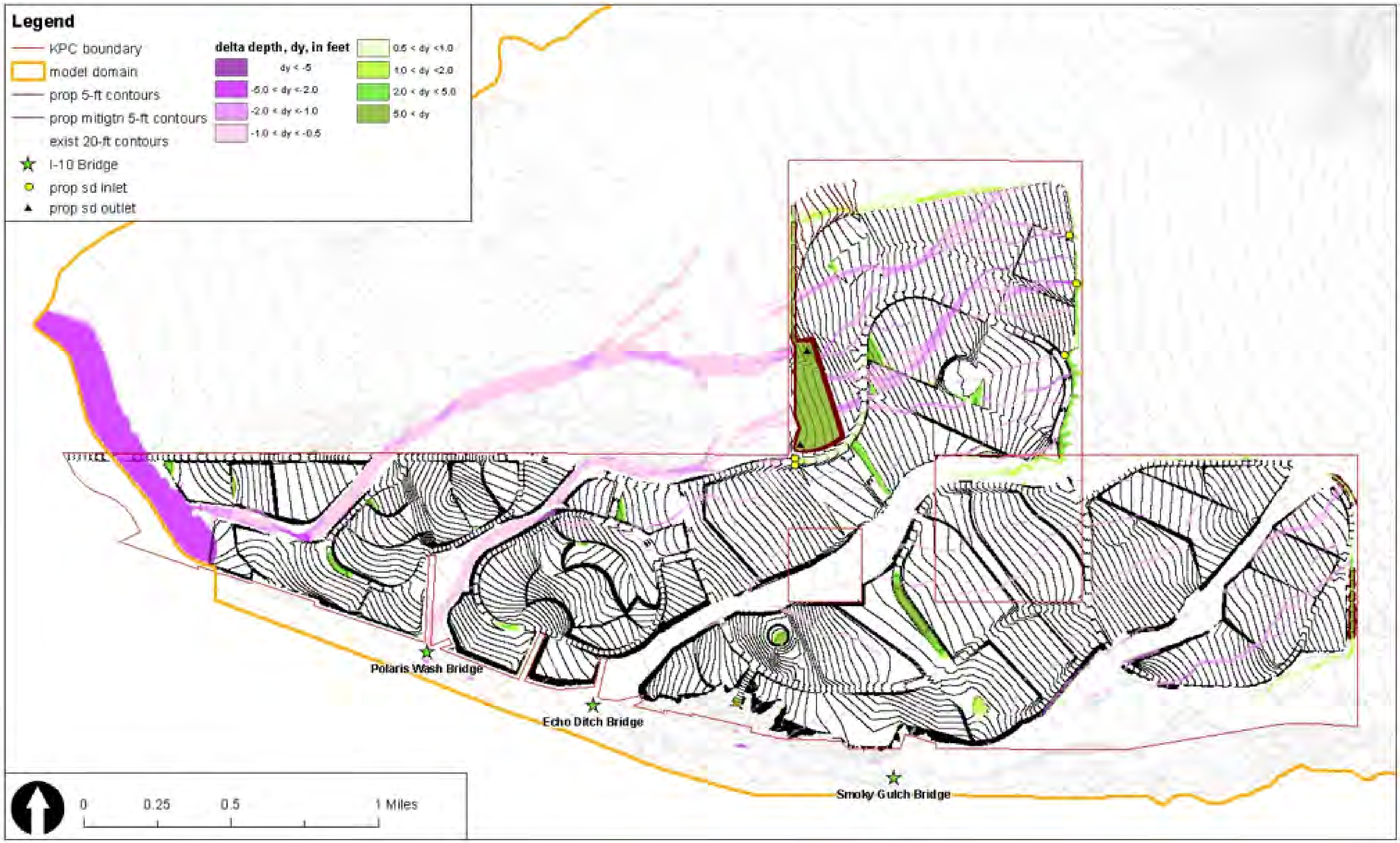


Figure 7-11. Project L-0 with Basin Mitigation watershed conditions 1%AC change in flood velocities

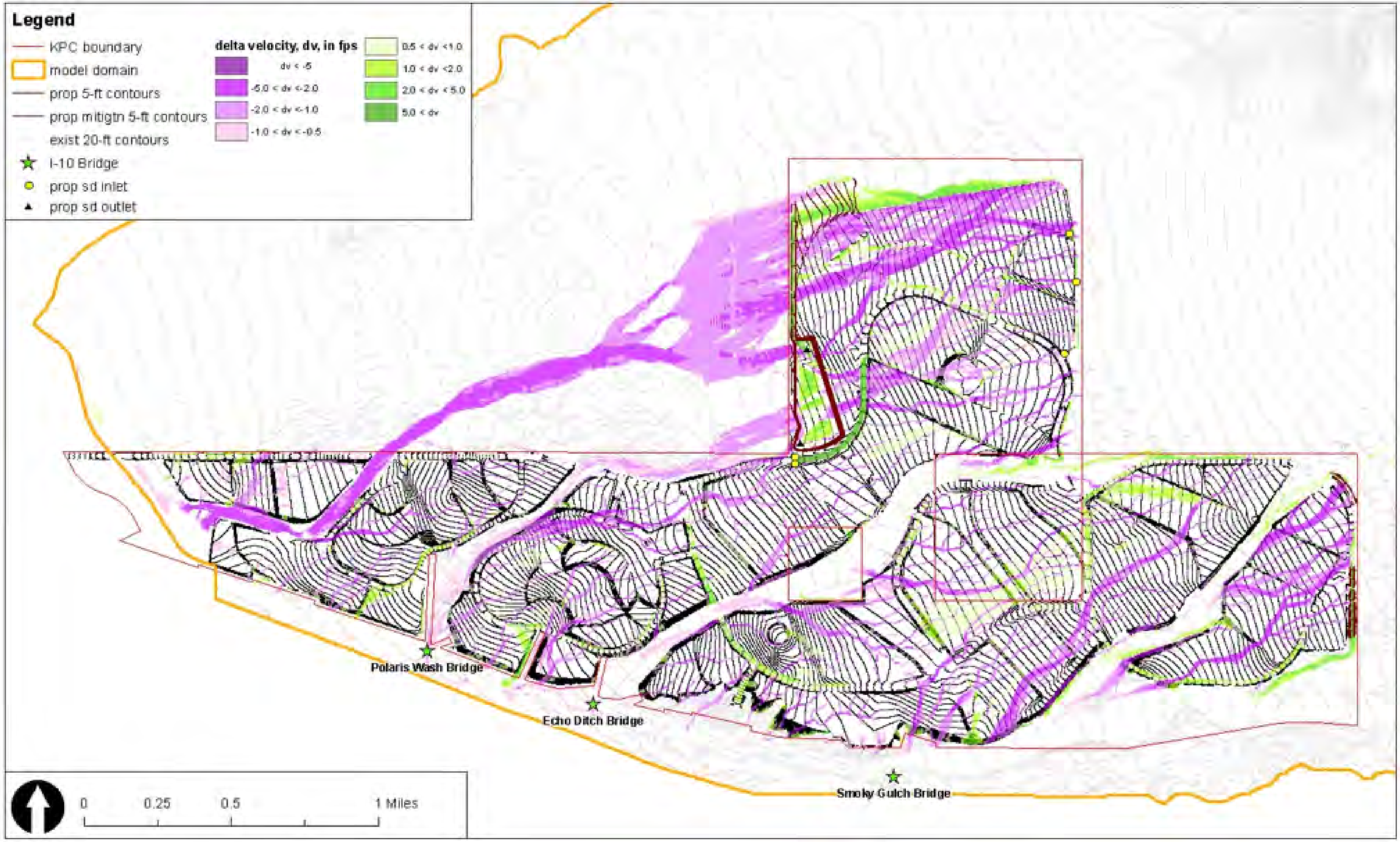
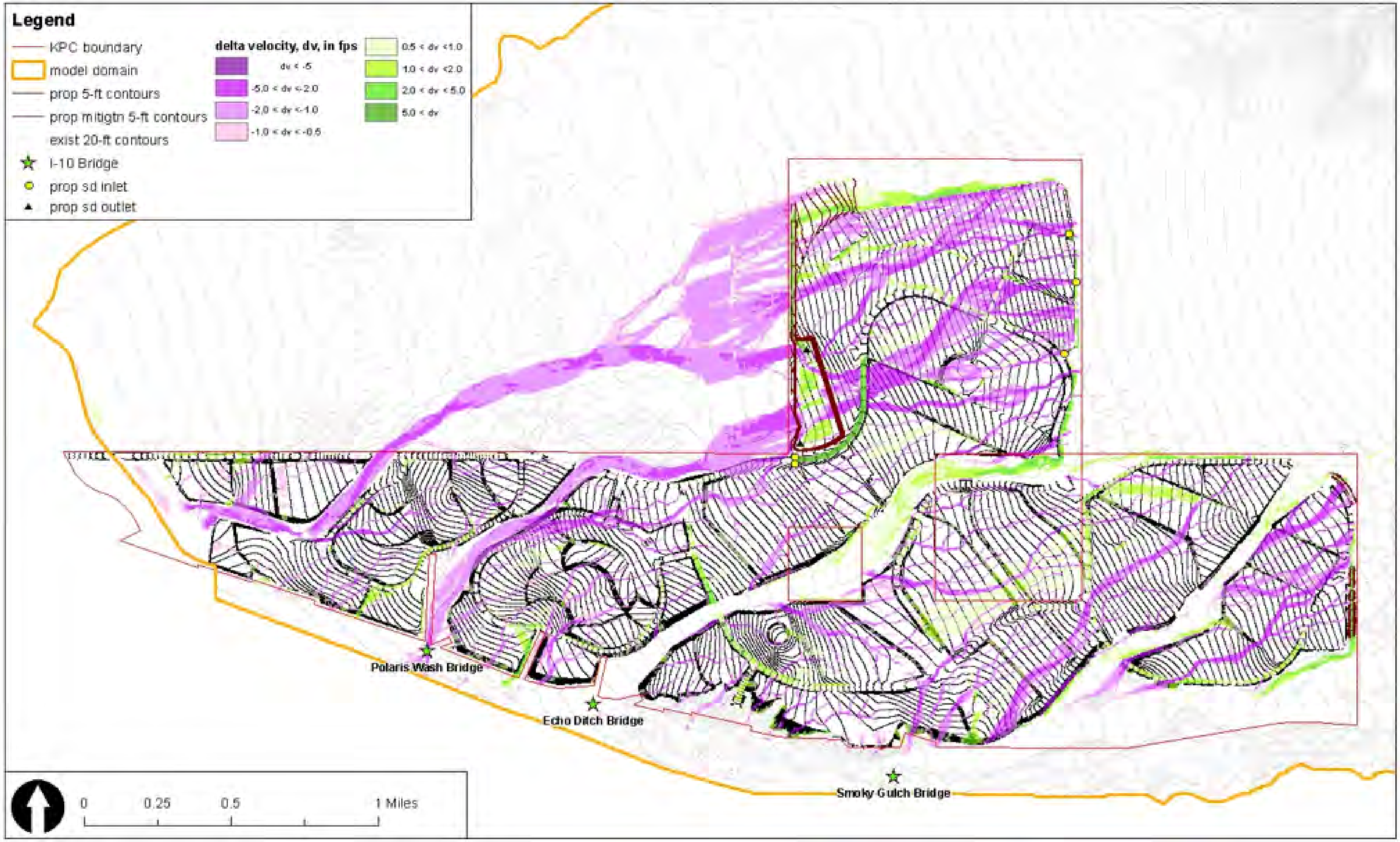


Figure 7-12. Project L-3 with Basin Mitigation watershed conditions 1%AC change in flood velocities



7.5 Design Requirements

The conceptual design and layout for the proposed flood protection for the project has been developed and evaluated as a part of this master plan. More detailed engineering and design, consistent with design standards established by the City and the Coachella Valley Water District, will be completed at the Tentative Tract Map and Final Map stages of development, resulting in the precise location, alignment, and sizing of all regional drainage facilities. The objectives for the flood control and drainage facilities throughout the KPC Coachella property are:

- Protect all buildings from damage from the 100-year storm in any of the drainage areas that cross or are within the property.
- Safely discharge all flows leaving the property.
- Control and manage runoff and sediment flow through and around the site.
- Mitigate adverse impacts to existing facilities.
- Assure the reliable operation of each drainage feature through a full range of flow events.
- Where channels, bridge, or embankments are used, provide adequate freeboard and scour protection.
- Assure that embankment and channel lining or stabilization is used to control scouring of channel side slopes or inverts.
- Proposed flood control improvements, such as a regional spreading basin can be used to mitigate project impact on offsite flows.

The following sections summarize the requirements and criteria to be evaluated as a part of the more detailed facility design to be submitted with future entitlement applications such as the Tentative and Final Tract Maps.

7.5.1 Regional Drainage System Design Requirements

The Regional Drainage System is assumed to include the ESD_B, ESD_C, ESD_D, and ESD_UDC channels and associated bridge crossings. The regional channels are intended to be incised channel systems. The following additional studies and design criteria shall be used for the design of the required improvements:

1. All facilities shall be designed in accordance with the latest version of the CVWD *Development Design Manual.*

2. The regional HEC-HMS hydrology analysis identified in Chapter 4 – Regional Hydrology of this report is acceptable for use in the final design. Regional facilities shall be designed using the bulked 1-percent annual chance event. Update the HEC-HMS hydrology models as necessary based on more detailed grading and drainage patterns and incorporating the onsite detention basins.

3. Updated 2-dimensional hydraulic analyses utilizing a refined grid-cell size and detailed topography, grading and facility alignments or a 1-dimensional HEC-RAS analysis shall be prepared to determine design water surface elevations and flow velocities along the regional channel systems. Prepare updated depth and flow velocity impacts maps to document that the project impacts are fully mitigated to the design requirements.

4. Update estimated debris loads and bulking factors to be used for final design. Evaluate impacts of proposed channel facilities and detention/spreading basins on sediment transport and impacts to downstream receiving waters.

5. Evaluate flow depths, velocities, and sedimentation/scour on a reach-by-reach basis to determine a) water surface elevations, b) freeboard requirements, c) lining requirements in terms of materials and lining thickness, d) scour depths, e) potential for deposition of sediments, and f) the need for channel stabilization to control degradation or bed incision.

6. Adjust flood protection system configuration (in terms of channel widths and embankment heights/scour depths, detentions/spreading basins, and bridge crossing configurations) based on the refined hydraulic analysis. Determine the optimum configuration of channels and embankments with necessary containment and erosion control structures which will provide the 100-year flood protection.

7. Bridges crossings shall be designed in accordance with the scour requirements in Section K-3.11 of the Development Design Manual.

8. Prepare detailed designs and specifications for facilities including channel embankment improvements, detention and spreading basins, erosion protection (natural appearing where possible), and channel stabilization structures for the required facilities.

9. Prepare an Operations and Maintenance (O&M) plan for the regional flood protection system facilities in conformance to the requirements in Section 8, *Design Criteria Stormwater Facility* of the Development Design Manual.

10. Obtain a Conditional Letter of Map Revision (CLOMR) from the FEMA for the areas of the site within the identified Zone D areas prior to the start of grading operations. Obtain a Letter of Map Revision (LOMR) to remove the areas of the site within the Special Flood Hazard Areas (SFHA) prior to occupancy.

Consideration of re-naturalization, preservation of natural features, and reduction of visual impacts will be made during the various stages of the final design. In addition, all drainage facilities for on-site drainage will be designed following the same process.

7.5.2 On-Site Drainage and Storm Water Retention

The onsite drainage system is designed to capture, convey, and mitigate storm water runoff from within the site development. The system is designed to provide protection for the 1-perecent annual chance event through a combination of street flow and a storm drain pipe system. All runoff shall receive water quality treatment in accordance with the City ordinance and MS-4 permit requirements. Numerous onsite storm water detention basins shall be designed to reduce the project condition peak runoff flow rates and volumes to less than the existing condition. The basins will also provide dead storage to retain and infiltrate the required stormwater quality volume.

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Technical Appendix

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Appendix A

Excerpts
from
La Entrada Specific Plan Drainage Master Plan

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La Entrada Specific Plan Development:

DRAINAGE MASTER PLAN

City of Coachella and County of Riverside, California

Final Report

June 2013

Prepared for:

PSAV, LLC
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Prepared by:

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RBF JN 20-101464

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Exhibit 2. Geotechnical Commentary on Potential for Certification of Portions of the Eastside Dike Adjacent to the La Entrada Project, City of Coachella, Riverside County, California Letter

Technical Appendix

DVD in sleeve on inside back cover

HEC-1 input and output files

FLO-2D input and output files

Excel spreadsheet – unit hydrograph development worksheets

Excel spreadsheet – representative slope analysis worksheets

Excel spreadsheet – Green-Ampt infiltration worksheets

Excel spreadsheet – lag basin factor worksheets

Excel spreadsheet – debris analysis worksheet

AES Rational Method input and output files

ArcGIS files

1 INTRODUCTION

1.1 Project overview

The La Entrada Specific Plan is a 2,200 acre master planned community in the eastern portion of the City of Coachella and unincorporated Riverside County, California. The Specific Plan area is comprised of a series of northeast-southwest trending ridges and canyons that drain towards the lower elevations of the Coachella Valley to the south and west. Bounded by the Interstate 10 freeway to the north and the Coachella Branch of the All American Canal to the west, the La Entrada Specific Plan is surrounded to the north and east by undeveloped land, sparsely developed agricultural land to the south, and existing agricultural land to the west.

The purpose of the Drainage Master Plan is to determine the projects' impacts to existing hydrology, floodplains, and drainage features, and identify appropriate flood control and local drainage facilities necessary for the development of the project site. The Master Plan addresses both local and regional impacts, flood hazard mitigation requirements, and design features. This Master Plan is based on the requirements of the Coachella Valley Water District (CVWD), County of Riverside, and the City of Coachella. See Figure 1-1 for a Regional Location Map and Figure 1-2 for a Project Location Map.

1.2 Project description and location

The proposed La Entrada Specific Plan is based on a comprehensive update of the previously approved 1989 McNaughton Specific Plan, which allows up to 8,000 residential dwelling units. The proposed La Entrada Specific Plan includes an additional 588 acres of new land within the Specific Plan area. As proposed, the new Specific Plan would allow up to a maximum of approximately 7,800 residential dwelling units within the 2,200 acre area, varying from Very Low Density (2.0 du/ac), Low Density (4.5 du/ac), Medium Density (8.0 du/ac), to High Density (20.0 du/ac) uses. In addition, the Plan proposes the development of Mixed Use areas that allow commercial retail and higher density residential uses; up to four elementary school sites, approximately 263 acres of parks, 553 acres of open space, and public/ community facilities. Development of the proposed uses would occur in a series of phases and be coordinated closely with the construction/ extension of the regional roadway network over the All American Canal and a new proposed interchange along the I-10 freeway. At buildout, it is anticipated that the La Entrada Specific Plan area could increase the population of the City by as much as 21,000 new residents. The land use map for the La Entrada Specific Plan is shown in Figure 1-3.

1.3 Study goals and objectives

The purpose of this study is to provide a detailed watershed assessment including regional and local hydrology, flood hazard analysis, hydraulics, and sedimentation to develop a drainage master plan for the La Entrada project site. The overall goal of this study is to provide the appropriate level of flood protection for the public, non-CVWD stormwater facilities, and impacted CVWD stormwater facilities that are consistent with the guidelines and requirements instituted by the City of Coachella, Coachella Valley Water District, and the Bureau of Reclamation (Coachella Canal).

The primary objectives of this study include the following:

- Develop baseline and project-based regional hydrology to establish peak flow rates and flood volumes for use in the conceptual design of combined onsite/offsite flood conveyances, which extend through the proposed development
- Develop project-based hydrology for use in the conceptual design of local onsite storm conveyance and retention facilities
- Identify and propose mitigation for any potentially significant development-related adverse flood hazard impacts, including the Coachella Canal and levee system

- Identify hydraulic, sedimentation, and erosion issues/design constraints associated with the major flood conveyances, which extend through the proposed development.
- Formulate the conceptual design of local and regional storm facilities

The project included the preparation of detailed technical studies for the on- and off-site watershed areas leading to the identification of flood hazards and mitigation measures for the site development. The technical studies included:

- Geomorphic assessment of the project site and tributary watershed
- Regional hydrology, hydraulics, and sedimentation analysis for the off-site watersheds
- Eastside Dike flood routing and impact analysis
- Local hydrology analysis and preliminary pipe sizing

The intended use of the master plan is to; identify flood hazards at the La Entrada Specific Plan development site; develop a regional approach to mitigate the flood hazards; identify local drainage facility requirements; and evaluate development related impacts to existing facilities such as the Eastside Dike along the Coachella Canal.

1.4 Report format

The chapters of the report are set out to complete the primary objectives of this drainage master plan and include the detailed discussion and technical analysis used for the study. The report includes the methodologies, technical approaches, assumptions, design parameters, and summaries of results used for the development of the analyses, and identification of flood protection requirements and mitigation measures. The detailed technical calculations including spreadsheets and computer input/output files are included on a DVD attached to the back cover of the report.

Submittal and Approval Process

The report is being submitted in 3 phases to facilitate the review and approval of the document. Each succeeding phase will expand on the previous submittal. The 3 phases include:

1. Regional Baseline Hydrology
2. Local and Regional Project Condition Hydrology
3. Final Report including impact analysis and mitigation

This document is a resubmittal of the ***3rd phase*** *submittal which includes the regional and local hydrology and draft final report including the determination of project-related increased runoff volume impacts and mitigation.*

Figure 1-1. Regional location map

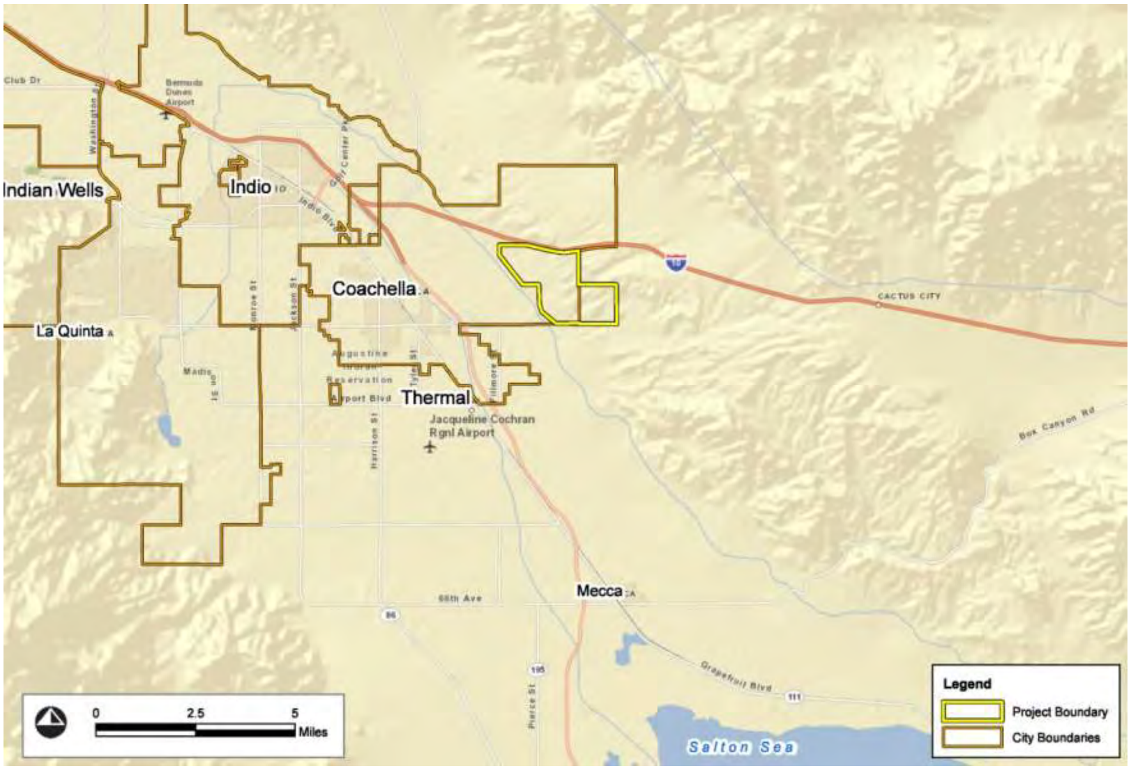

Figure 1-2. Project location map

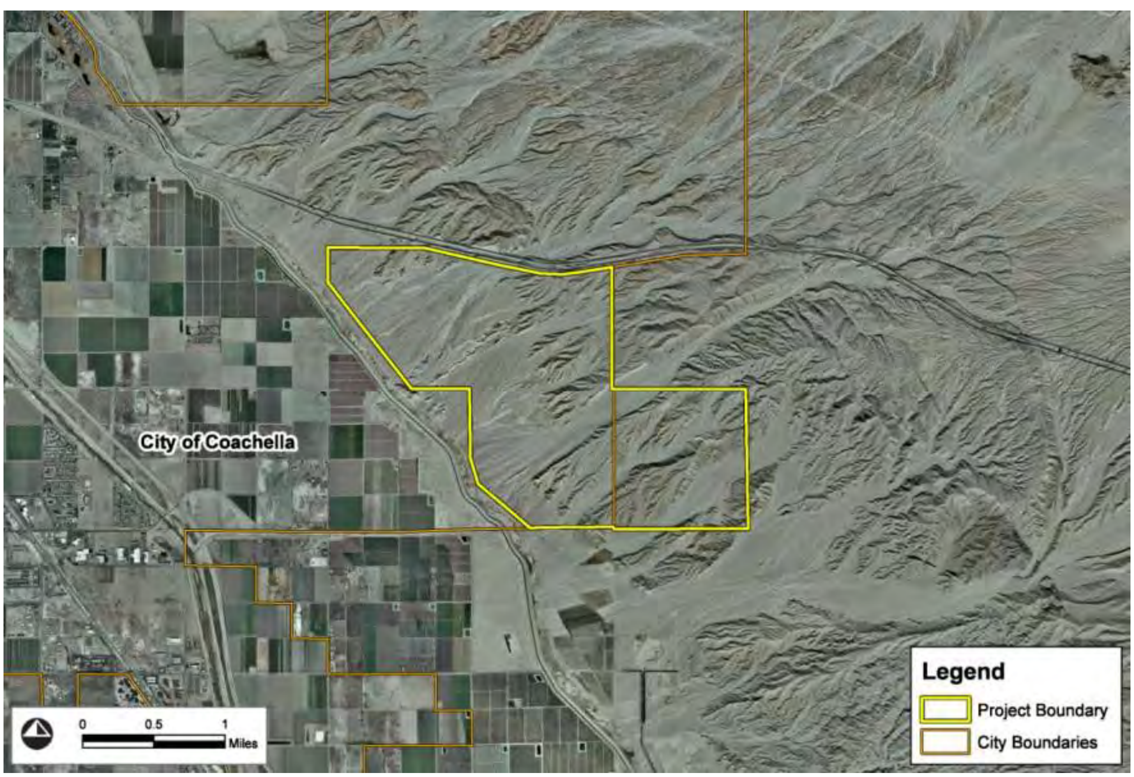

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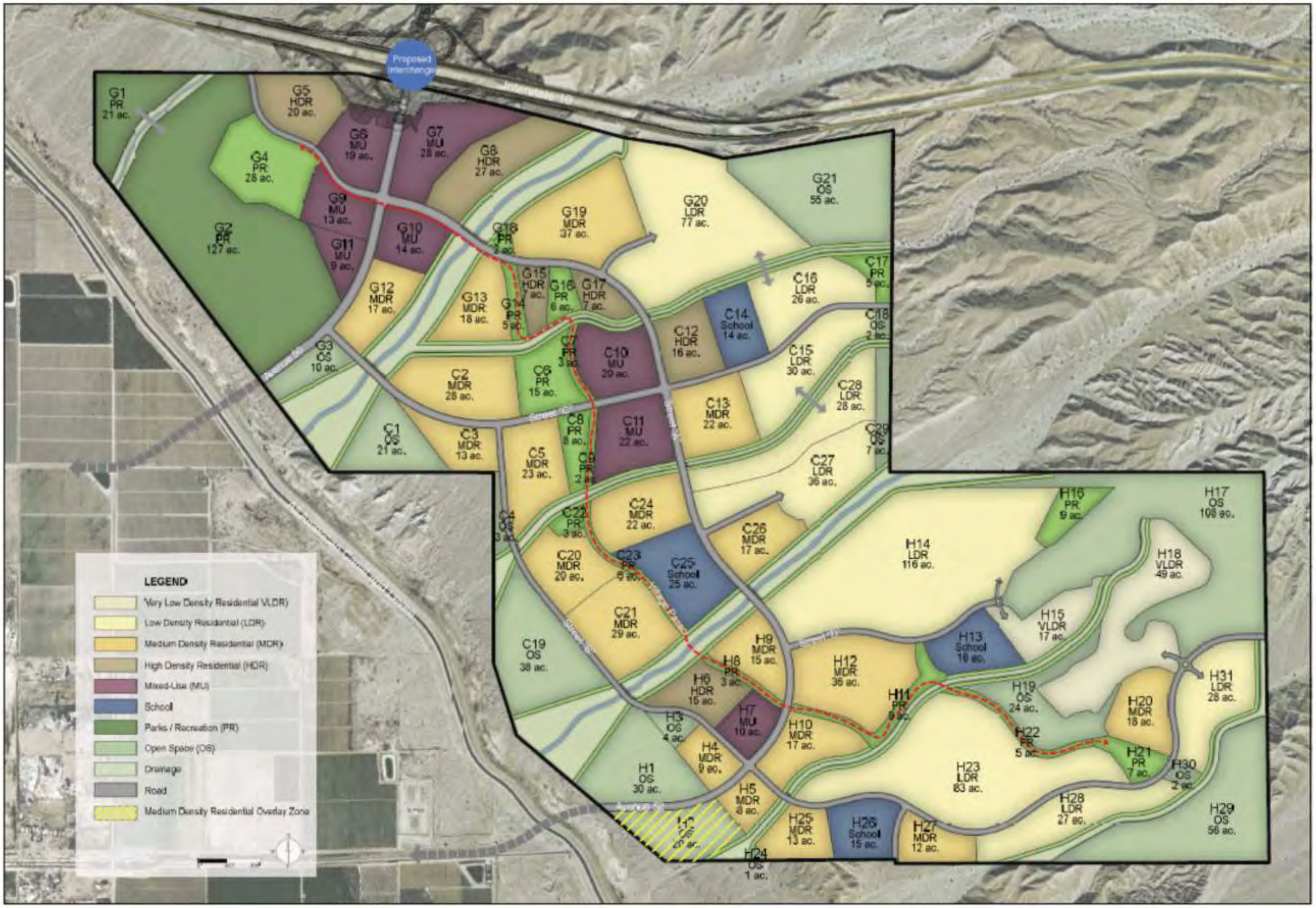
Figure 1-3. Project land use map



Note: Planning Area acreages have been rounded.

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2 GEOMORPHIC WATERSHED ASSESSMENT

The geomorphic assessments presented herein were conducted by JE Fuller/Hydrology & Geomorphology, Inc., 8400 South Kyrene Road, Suite 201, Tempe, Arizona. As part of the assessment, geology information in the report titled "Geotechnical Input for Preparation of Environmental Impact Report, Lomas del Sol Project, Coachella, Riverside County, California" (Petra, 2005) was reviewed.

2.1 Project site and immediate surroundings

The field assessment was conducted on December 29, 2011.

2.1.1 Description

The proposed La Entrada Community Development (Project) Site is located on a piedmont bajada composed of steep-sloped active and relict alluvial fans. In the upper piedmont, the active alluvial fan areas consist of wide, highly braided floodplains confined shallow canyons formed by topographically higher, relict fan deposits with some volcanic bedrock units. In the lower piedmont, the active fan areas consist of a series of overlapping, low relief, surfaces that comprise a broad bajada that spans the entire project limits. The active fans do not have a strongly defined fan shape, but there is ample evidence of the potential for flow path uncertainty, avulsion, and high rates of sediment transport. There is some surface differentiation within the active portions of the upper piedmont braided flow corridors, but all of the younger surfaces within the shallow canyon floors could be considered potentially flood-prone or at risk of lateral erosion, unless more detailed modeling is completed to justify a different conclusion. Similarly, any surface differentiation between late to mid-Holocene units (Qf1-Qf3) on the lower piedmont is of limited utility from a floodplain and drainage engineering perspective.

2.1.2 Review of project-related geologic studies

Based on field observations, the Petra Geologic Report appears to adequately characterize the site geomorphology for the purposes of flood hazard assessment. A Stage 1 and Stage 2 alluvial fan delineation could readily be prepared from the information derived from the Petra Geologic Report. However, given that the proposed development will significantly alter the existing alluvial fan and riverine floodplains on the site, there is no reason to delineate a baseline floodplain.

Key observations from the Petra Report include the following:

- The modern sedimentation rate is 1 foot per 1,000 years. This translates to an average aggradation rate of 0.1 feet/100 years, or 0.001 feet/year. Given this rate of long-term aggradation and the lack of potential for debris flows, it may be concluded that the alluvial fans on the Project site are fluvial fans. Therefore, the primary avulsion mechanisms will be stream capture (piracy), and gradual channel fill combined with overbank flow concentration.
- No evidence of debris flows was reported at the site. Watershed conditions and the distance from the mountain watershed make runout of debris flows past the I-10 corridor highly improbable.
- The Qf1 and Qf2 surfaces mapped by Petra may be considered to be active alluvial fans.
- The Qf3 surface was determined to be > 3,000 years old, but was included in the surfaces for which the modern sedimentation rate applies. Based on my field observations, I would include the Qf3 surface as subject to alluvial fan flooding, unless FLO2D modeling definitively indicates that the surface cannot be inundated.

2.2 Geomorphic watershed assessment of the upper piedmont

2.2.1 Description

A geomorphic analysis was conducted to identify regional watershed boundaries on the upper piedmont for use in developing offsite flow rates for design of the La Entrada Project.

The La Entrada Project is located on a piedmont bajada composed of steep-sloped active and relict alluvial fans. The bajada extends from the San Bernardino Mountains, across the western extension of the Mecca Hills to the floor of the Coachella Valley. After leaving the front range of eastern San Bernardino Mountains, the off-site watersheds that drain to the La Entrada Project cross a series of active and inactive alluvial fans on the upper piedmont near the mountain front. Further downstream, the piedmont becomes confined in shallow canyons formed by topographically higher, relict fan deposits with some volcanic bedrock units before entering the La Entrada project limits. The active fans in the upper piedmont do not have a strongly defined fan shape, but there is some evidence of the potential for flow path uncertainty and relatively high rates of sediment transport. This geomorphic analysis is intended to help evaluate the effects of potential flow path uncertainty on watershed delineation and peak flow estimates.

2.2.2 Methodology

The geomorphic analysis was based on aerial photographic interpretation, evaluation of topographic, geologic and soils maps, and field observations. Surficial characteristics such as development of desert varnish, desert pavement, weathering of surface rock, color, channel pattern, drainage network development, channel incision, topographic relief, and vegetative suites were examined to identify active and relict fluvial processes. These surficial characteristics are indicative of surface age, which in turn is indicative of the flood and erosional history of the surface. That is, old surfaces become "old" by not being subject to flood inundation or to widespread erosion and sediment deposition. Using this methodology, active and inactive areas on the piedmont were readily distinguished. Active areas are subject to potential flow path uncertainty. For inactive areas, flow path uncertainty can be set aside.

2.2.3 Results

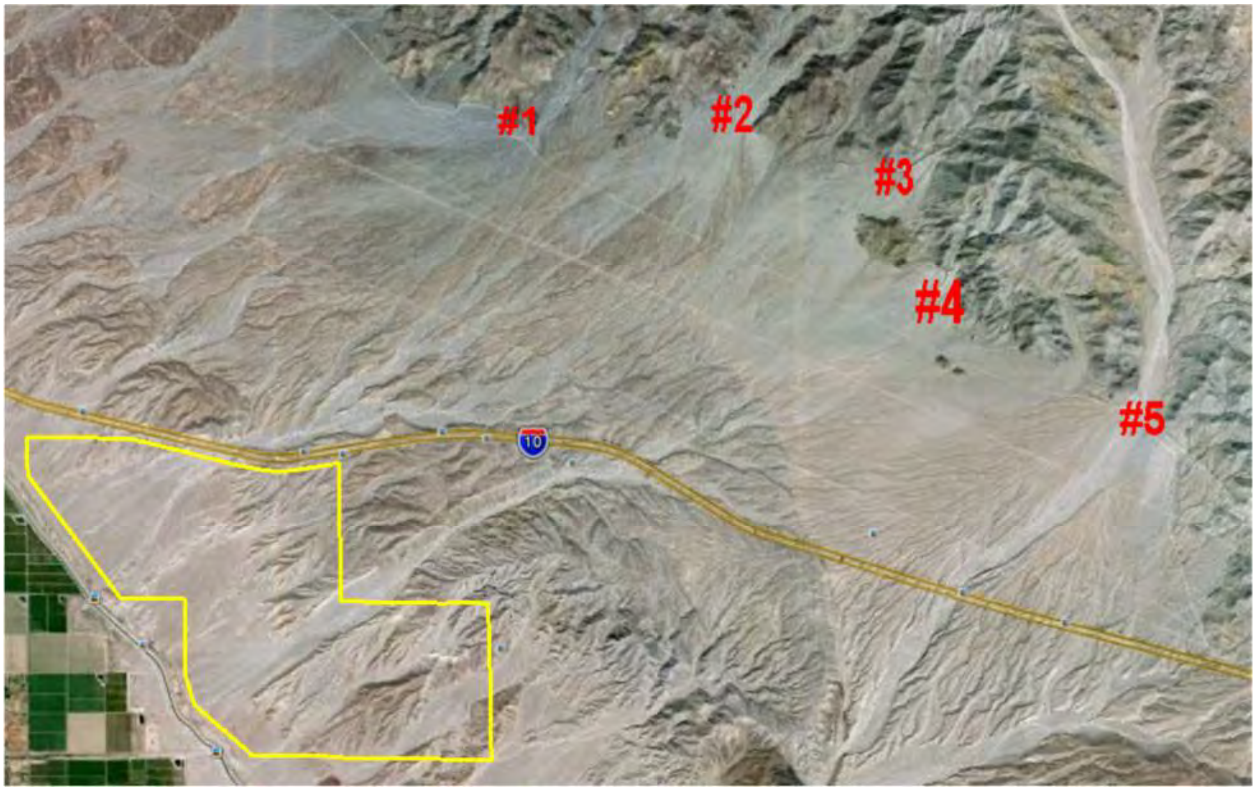
The study area was divided into five areas of interest, as indicated in Figure 2-1. The five areas of interest correspond to the five most significant watersheds draining onto the San Bernardino Mountain Piedmont toward the La Entrada Project.

The following general findings apply to the entire study area:

- None of the areas have large mountain watersheds, reach high elevations or have dense vegetative cover vulnerable to wildfire impacts.
- The active alluvial fans in the study area are subject only to fluvial processes. None of the alluvial fans are at risk of debris flows downstream of the mountain front.
- The active alluvial fan areas are limited in extent. The active portions of the piedmont are located adjacent the mountain front and do not extend downstream to the I-10 corridor. Secondary active apexes are located on some portions of the piedmont within the La Entrada Project limits downstream of I-10.
- Large portions of the piedmont are inactive or are subject to shallow sheet flooding.
- The active alluvial fan areas are bounded by topographically higher, geomorphically older surfaces.
- Evidence of Stage III carbonate (> 100,000 yrs.) was observed in cuts into the older, higher surfaces.
- The piedmont has been dominated by erosional/transport processes in recent geologic time, and has very limited areas of net aggradation. Within engineering time scales, net aggradation will be minimal, as will the effect of sedimentation aggradation on drainage boundaries.

- No evidence of significant long-term scour was observed in the 1-10 bridge crossings where the natural canyon width was significantly narrowed by bridge construction, suggesting that the channel corridors in the study area may not be sensitive to man-made width changes.
- The channel morphology on the fan surface suggests that infiltration is an important process on the inundated portions of the active and inactive fan surface.
- Given the limited deposition on the bajada upstream of the project, and the dominance of erosion processes on the piedmont, the expected impact of such changes on the hydrology and sediment inflow to the project will be minimal and well within the normal range of error of estimate.

Figure 2-1. Aerial photograph showing the five areas of interest (red)



Note: Project boundary is indicated in yellow

Specific findings related to Area #1 (Figure 2-2~~Figure 2-2Figure 2-2~~). Area #1 is the westernmost of the piedmont drainage systems considered in this analysis. The following conclusions were drawn from the geomorphic analysis:

- The active alluvial fan area trends due west after leaving the mountain front and does not impact the hydrology at the La Entrada Project.
- There is a well-defined topographic rise that directs flow to the west in the vicinity of the dirt road shown in Figure 2.
- If runoff enters the area labeled as "Possible Overflow" it occurs only during rare large floods and consists of shallow sheet flooding or stable distributary flow.
- There is very limited potential for runoff from Area #1 to intermingle with or break over and reach runoff from Area #2. Any flow intermingling outside of the active fan areas consists of shallow sheet flooding over watershed divides or flow between stable distributaries, not subject to avulsions connected to the fan apex.

- Initial field evidence indicates that the surfaces are much older (no recent overtopping) than they appear on the aerials.

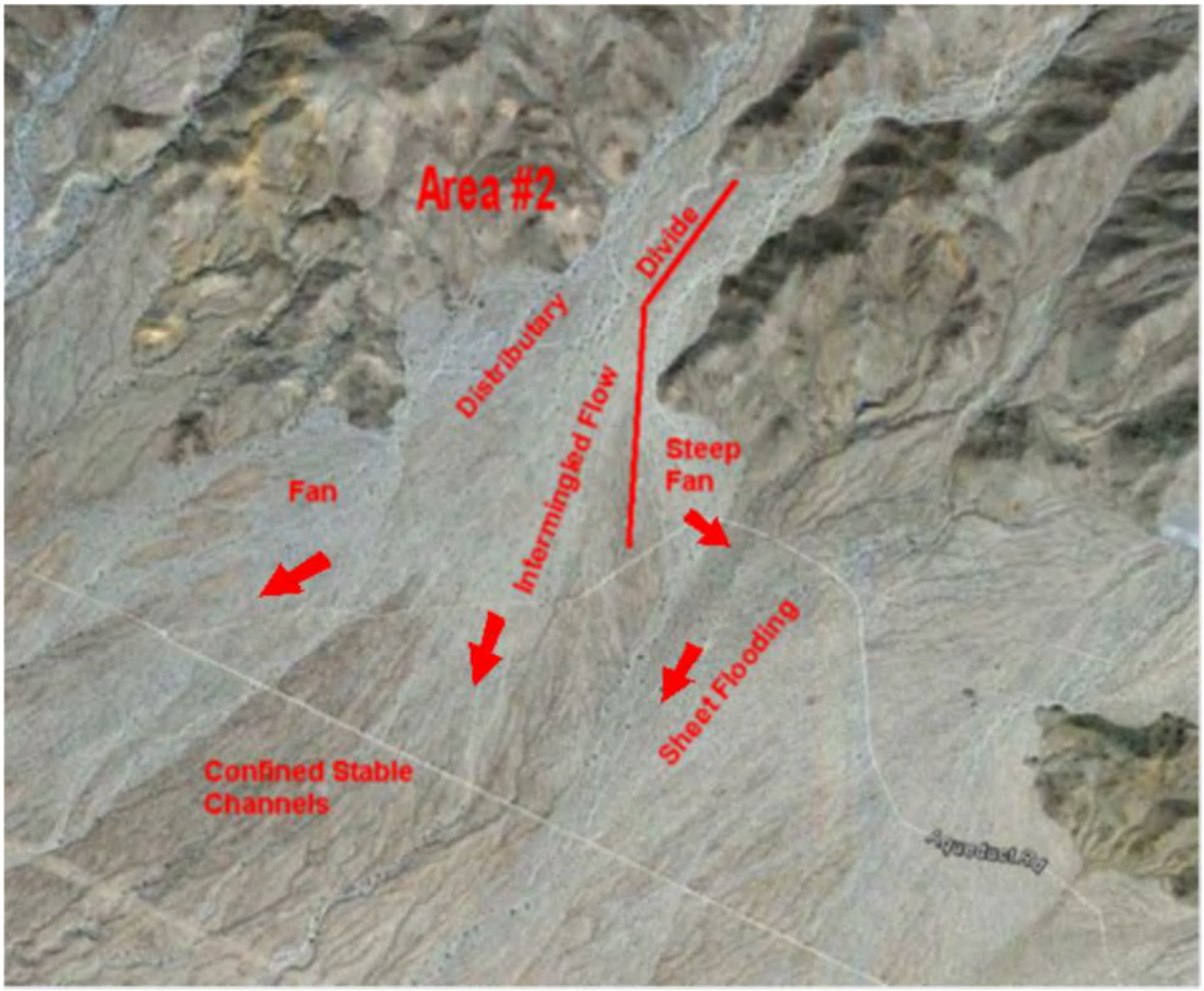
Figure 2-2. Aerial photograph of Area #1 showing active and inactive portions of the piedmont.

Note: red arrow indicates the dominant flow direction.

Specific findings related to Area #2 (Figure 2-3). Area #2 is the westernmost of the piedmont drainage systems that impacts the La Entrada Project. The following conclusions were drawn from the geomorphic analysis:

- Area #2 consists of two coalescing fans with an intermediate area that may accept flow from both sources.
- The active alluvial fan area is located primarily within the embayment upstream of the mountain front, but in places extends downstream to the Aqueduct Road. Below the Aqueduct Road, the piedmont consists of inactive alluvial fan surface, stable distributary flow areas, and sheet flooding areas.
- The western portion of the active alluvial fan area consists of fine textured surfaces with many low islands of older surfaces, indicating very slow net aggradation and rare avulsions. It is more likely to be a stable distributary or sheet flooding area.
- All of the flow bifurcations in the active alluvial fan area rejoin before crossing the I-10 corridor and entering the La Entrada Project. Any flow intermingling outside of the active fan areas consists of shallow sheet flooding over watershed divides or flow between stable distributaries, not subject to avulsions connected to the fan apex.

Figure 2-3. Aerial photograph of Area #2 showing active and inactive portions of the piedmont.

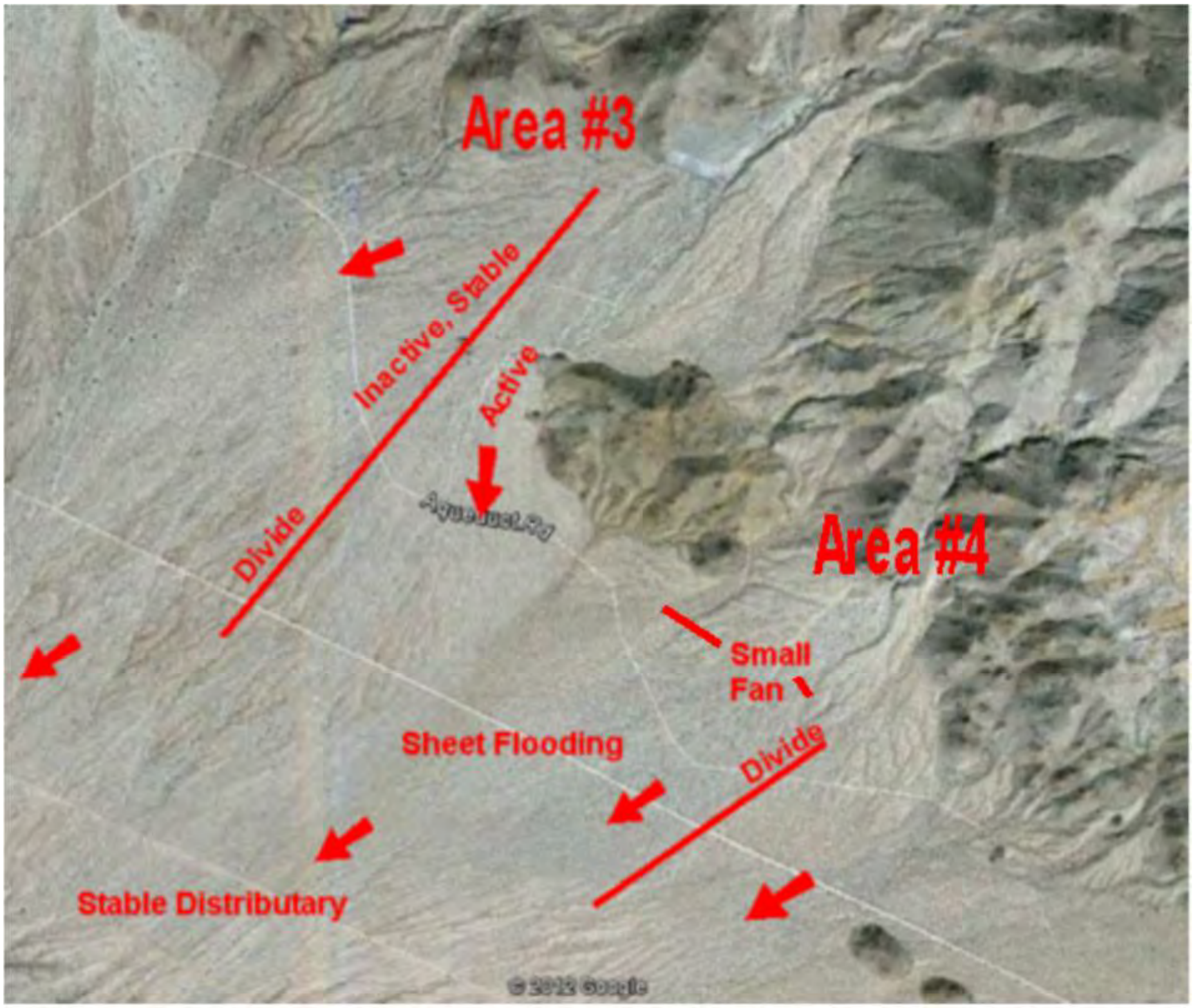


Note: red arrow indicates the dominant flow direction.

Specific findings related to Area #3 and Area #4 (Figure 2-4). Areas #3 and #4 have some potential for flow intermingling along their divide. Area #3 drains primary to the westernmost crossing of I-10 upstream of La Entrada. Area #4 drains primarily toward the south. The following conclusions were drawn from the geomorphic analysis:

- There is a very small, steep active alluvial fan in Area #3 near point of the prominent inselberg. Runoff on this fan drains toward the fosse that separates Area #3 and #4. Upon reaching the fosse, runoff is conveyed primarily as sheet flooding.
- The active alluvial fan areas do not extend past the Aqueduct Road.
- The remainder of this area is subject to sheet flooding or stable distributary flooding areas.
- Area #4 is not an active alluvial fan. It is possible that some of the sheet flooding in the mid-piedmont portion of Area #4 intermingles with sheet flooding from Area #3.

Figure 2-4. Aerial photograph of Areas #3/4 showing active and inactive portions of the piedmont.



Note: red arrow indicates the dominant flow direction.

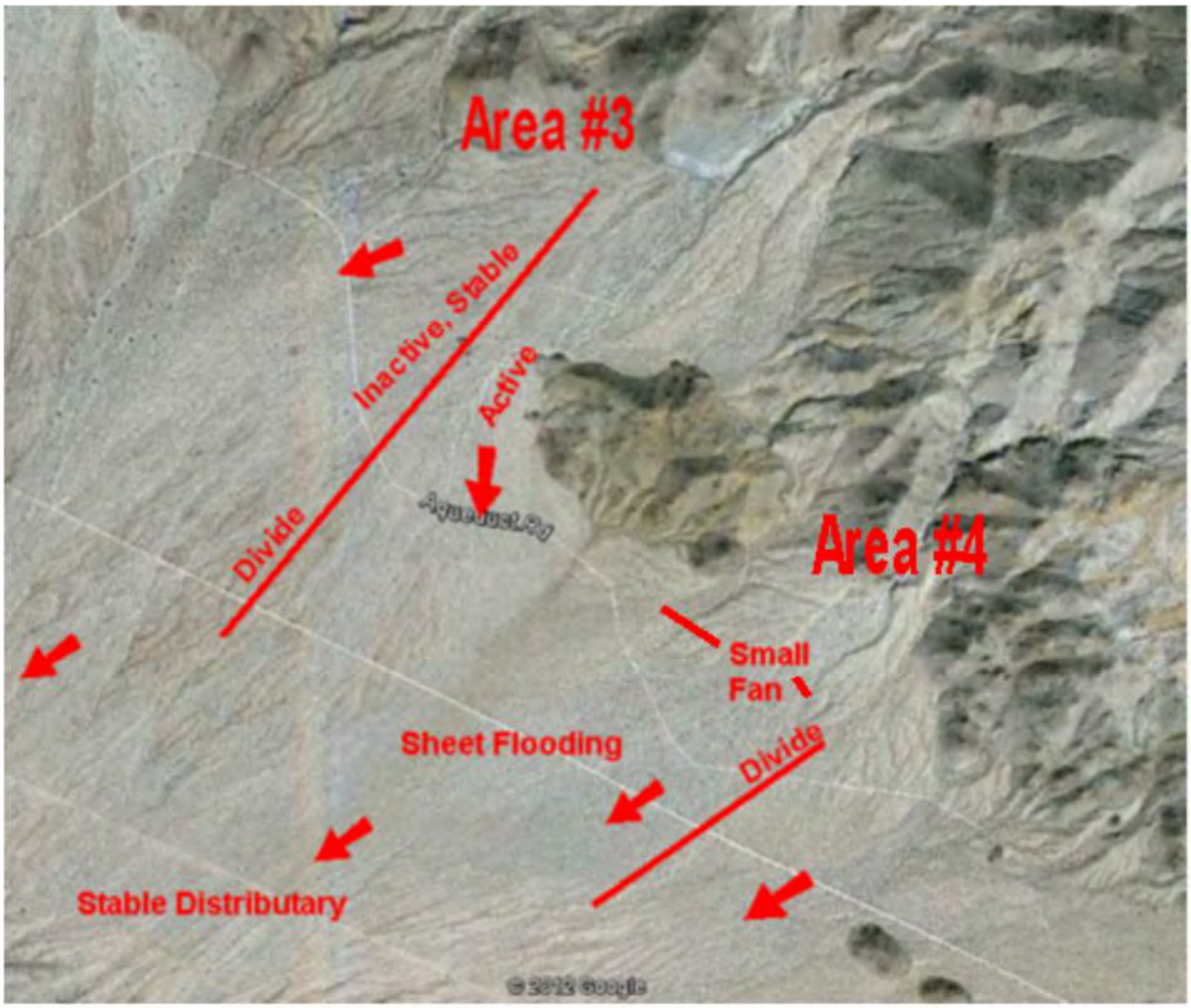
Discussion of flow intermingling between Area #3 and Area #4. If flow from Area #3 and #4 intermingle, they have the potential to affect peak discharge estimates at the Smoky Gulch (west) and Sunny Gulch (east) crossings of the I-10 corridor, as well as the areas downstream within La Entrada. From a geomorphic perspective, the drainage from the Area #3 fan flows directly at the fosse, before turning to the southwest and flowing along the "divide" with Area #4. It appears that most of the runoff from Area #3 tends to ultimately flow toward the Smoky crossing, with a small amount possibly breaking over the "divide" toward the Sunny crossing. Similarly, the westernmost drainage in Area #4 crosses it's upper piedmont, and drains obliquely toward the #3/#4 fosse before turning to the southwest and flowing along the "divide." All of the other drainage basins from Area #4 do not flow toward the fosse, and appear to have no potential of reaching, let alone for overflowing, the divide into the Smoky watershed. Therefore, the only subwatersheds that might contribute runoff to either the Smoky or Sunny crossings are those that flow directly at the fosse.

The fosse is not located on the active fans – by definition it defines the toes or lateral margins of those landforms. Therefore, the question of whether runoff crosses the "divide" after reaching the fosse, is not a question of channel avulsion on an active alluvial fan, it is a question of flow distribution in a shallow sheet flooding area.

Specific findings related to Area #5 (Figure 2-5). Area #5 is the easternmost of the piedmont drainage systems considered in this analysis. The following conclusions were drawn from the geomorphic analysis:

- Area #5 is not an active alluvial fan.
- No runoff from Area #5 breaks toward La Entrada, and hasn't for 100,000's of years.
- No runoff breaks into Area #5 from the west. The inactive fan is an effective divide.

Figure 2-5. Aerial photograph of Area #5 showing only inactive portions of the piedmont.



Note: red arrow indicates the dominant flow direction.

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REGIONAL WATERSHED ESD_B			
NODE	AREA (AC)	T_C (MIN)	Q_{100} (CFS)
103	21.0	13.8	57.0
104	47.6	15.0	124.1
105	114.3	16.1	287.3
106	199.1	17.7	478.1
109	37.3	9.1	117.6
110	87.6	11.9	260.3
111	101.5	12.2	286.3
112	154.9	15.7	402.5
116	57.3	15.8	123.9
117	73.5	16.8	148.4

REGIONAL WATERSHED ESD_C			
NODE	AREA (AC)	T_C (MIN)	Q_{100} (CFS)
202	24.8	9.8	82.4
208	235.5	29.9	388.3
203	289.7	30.8	488.0
209	424.3	32.8	713.1
210	498.9	34.4	833.6
213	24.1	14.6	60.2
211	27.2	14.9	68.4
216	34.7	12.9	94.2
219	8.9	11.8	25.0
217	81.4	16.5	206.5
220	110.6	17.2	276.0
221	165.8	18.6	399.7
222	176.3	18.8	421.9
225	23.2	16.1	50.6
226	55.9	17.4	124.4

REGIONAL WATERSHED ESD_D			
NODE	AREA (AC)	T_C (MIN)	Q_{100} (CFS)
302	23.7	14.9	58.2
303	48.7	18.0	113.7
307	92.9	19.2	213.5
308	92.9	20.2	213.5
310	8.8	17.8	20.5
311	38.6	22.6	79.5
312	55.4	23.5	111.6
316	69.8	13.0	206.9
313	169.3	14.0	316.6
317	200.5	15.1	391.0
320	37.4	10.2	122.7
321	60.4	11.1	193.2
322	136.9	12.1	414.9
323	164.5	13.1	493.0
326	20.7	14.4	51.2
327	49.3	15.8	116.6
330	25.7	11.4	77.5
331	83.6	13.4	223.7
332	99.1	13.9	262.5
335	18.0	11.8	40.8

REGIONAL WATERSHED UDC			
NODE	AREA (AC)	T_C (MIN)	Q_{100} (CFS)
402	24.2	13.0	64.5
403	51.6	13.5	132.7
406	40.2	11.7	119.6
407	52.5	11.9	152.2
410	16.3	15.5	38.8
411	47.6	19.0	104.7
414	56.9	30.2	89.5
415	102.4	30.5	163.8
416	143.8	31.6	232.3
420	18.1	12.6	50.4
421	51.3	13.6	139.8
422	100.5	14.8	268.9
417	291.0	34.2	489.9

LEGEND

REGIONAL WATERSHED BOUNDARY

SUBAREA BOUNDARY

FLOW PATH

PROPOSED MAIN STORM DRAIN LINE

PROPOSED BASIN

A11 13.9 — SUBAREA DESIGNATION, AREA (ACRES)

332 705.0 — HYDROLOGY NODE, ELEVATION (FT)

SUBAREAS WITHIN REGIONAL WATERSHED ESD_B

SUBAREAS WITHIN REGIONAL WATERSHED ESD_C

SUBAREAS WITHIN REGIONAL WATERSHED ESD_D

SUBAREAS WITHIN REGIONAL WATERSHED UDC

SEAL

REGISTERED PROFESSIONAL ENGINEER JOHN A. MCCARTHY No. 47583 Exp. 12/31/19 CIVIL STATE OF CALIFORNIA

PREPARED UNDER THE DIRECT SUPERVISION OF:

JOHN A. MCCARTHY DATE

R.C.E. No. 47583 EXP. DATE: 12/31/19

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SCALE:

ONE INCH ON ORIGINAL

KPC COACHELLA DRAINAGE MASTER PLAN

PROPOSED CONDITION HYDROLOGY MAP

FOR CITY OF COACHELLA

SHEET No. 1 OF 1 SHTS.

Exhibit A

N:\40.012.000\REPORTS\R-2 Report\Local Hydrology Map\KPC Local Hydrology Map PLOTTED: 8/2/2019 11:33:49 AM

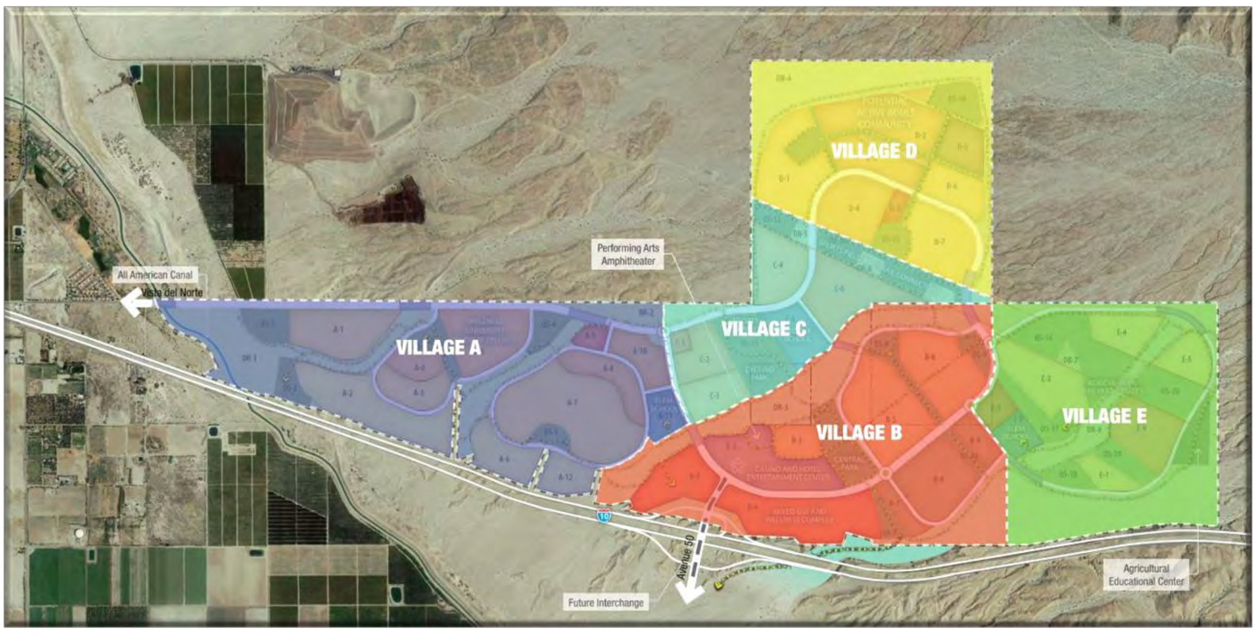
W.O.

Appendix H2: Conceptual Water Quality Analysis

KPC Coachella Specific Plan

CONCEPTUAL STORM WATER QUALITY ANALYSIS

City of Coachella and County of Riverside, California



November 17, 2022

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B. Water Quality Objectives for General Surface Waters
C. KPC Coachella Hydrology Map
D. Preliminary BMP Sizing and Design Parameters

1 INTRODUCTION

1.1 Project Description

The KPC Coachella Specific Plan is a new master planned community located at the eastern entrance to the City of Coachella. The project site is located about three miles northeast of the City center in the foothills of the Little San Bernardino Mountains overlooking the City, with views across the Coachella Valley to the San Jacinto and Santa Rosa Mountains. The physical composition of the site is open hilly undeveloped desert land with little existing vegetation aside from small trees, shrubs, and grasses. Broad natural drainage corridors run diagonally through the site. This 2,800-acre project will provide a mixture of land uses intended to create a vibrant, cohesive entrance to the City, with villages and neighborhoods that are unique, yet compatible with, surrounding existing and planned neighboring areas. The Project will provide additional commercial, residential, educational, employment, and recreational opportunities for residents and visitors within the City.

The Specific Plan Area is situated on a piedmont bajada composed of steep-sloped active and relict alluvial fans at the base of the Little San Bernardino Mountains. The project site is bounded by Interstate 10 to the south and the Eastside Dike to the west, the development site is surrounded to the north and east by predominately undeveloped land. As runoff flows from the mountain canyons it reaches the alluvial fans and disperses into a poorly defined network of braided channels. The middle portions of the watershed areas are defined by active and relict alluvial fans with braided flow patterns. In some areas, the braided channels confluence in or near the project site to become better-defined ephemeral stream channels with banks and clearly defined terraces.

The 2,800-acre project site includes a mixture of land uses in five (5) distinct villages. The plan proposes the following main land uses:

- A mix of approximately 9,200 residential units on 1,200 acres (including a portion of those units programmed as an active adult community);
- 62-acre Casino and Hotel Entertainment district, including a performing arts center;
- 136 acres of mixed-use commercial, office, and wellness uses;
- 60 acres of educational uses including two elementary schools and 1 middle school;
- 1,160 acres of open spaces, parks, trails, greenways, undisturbed natural open space, and agricultural production areas; and
- An interconnected multi-modal circulation system for vehicles, pedestrians, and bicycles.

The project proposes two connection points to the existing roadways within the City. The main entry into the project will be through sharing of a new interchange proposed by the La Entrada Specific Plan directly to the south. Additionally, the extension of Vista Del Norte from the west will provide access to Dillon Road and the rest of the City.

The plan area has approximately 1,170 acres of open space, including parks, greenways, amenity centers, agricultural production, and drainage. These spaces create opportunities for both active and passive recreation as well as programmed sport courts and fields to host local leagues and tournaments.

This report evaluates the potential impacts of the project on adjacent water resources and their beneficial uses. It will examine the existing surface and ground water resources, assess the potential effects the project may have on them, and support the project's Environmental Impact Report. This technical report describes the detailed analysis to evaluate all physical and regulatory aspects of the project, including:

- Stormwater regulatory framework;
- Water quality assessment; and

- Environmental impacts with respect to stormwater quality.

KPC Coachella site is shown in Figure 1-1 (regional vicinity map), Figure 1-2 (local vicinity map), and the proposed land use is presented in Figure 1-3 (conceptual land use plan).

Figure 1-1. Regional vicinity map

Figure 1-2. Local vicinity map

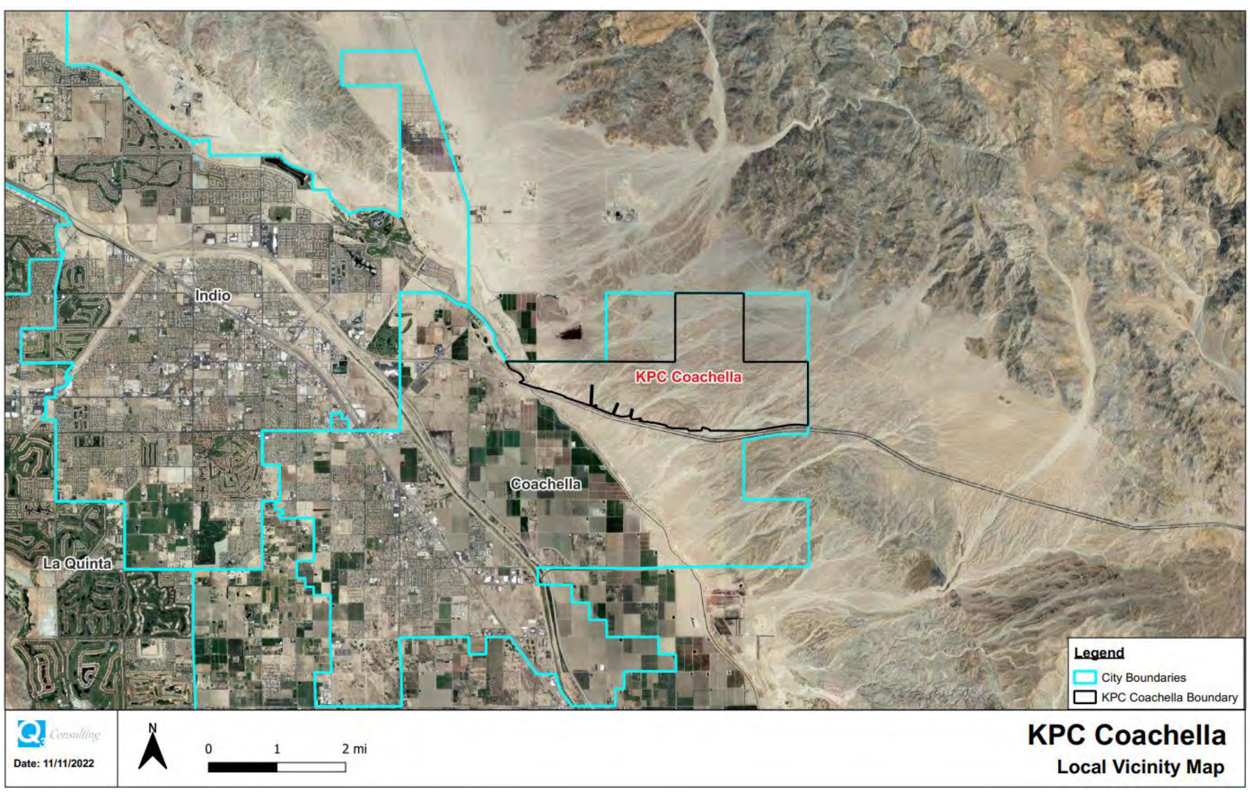
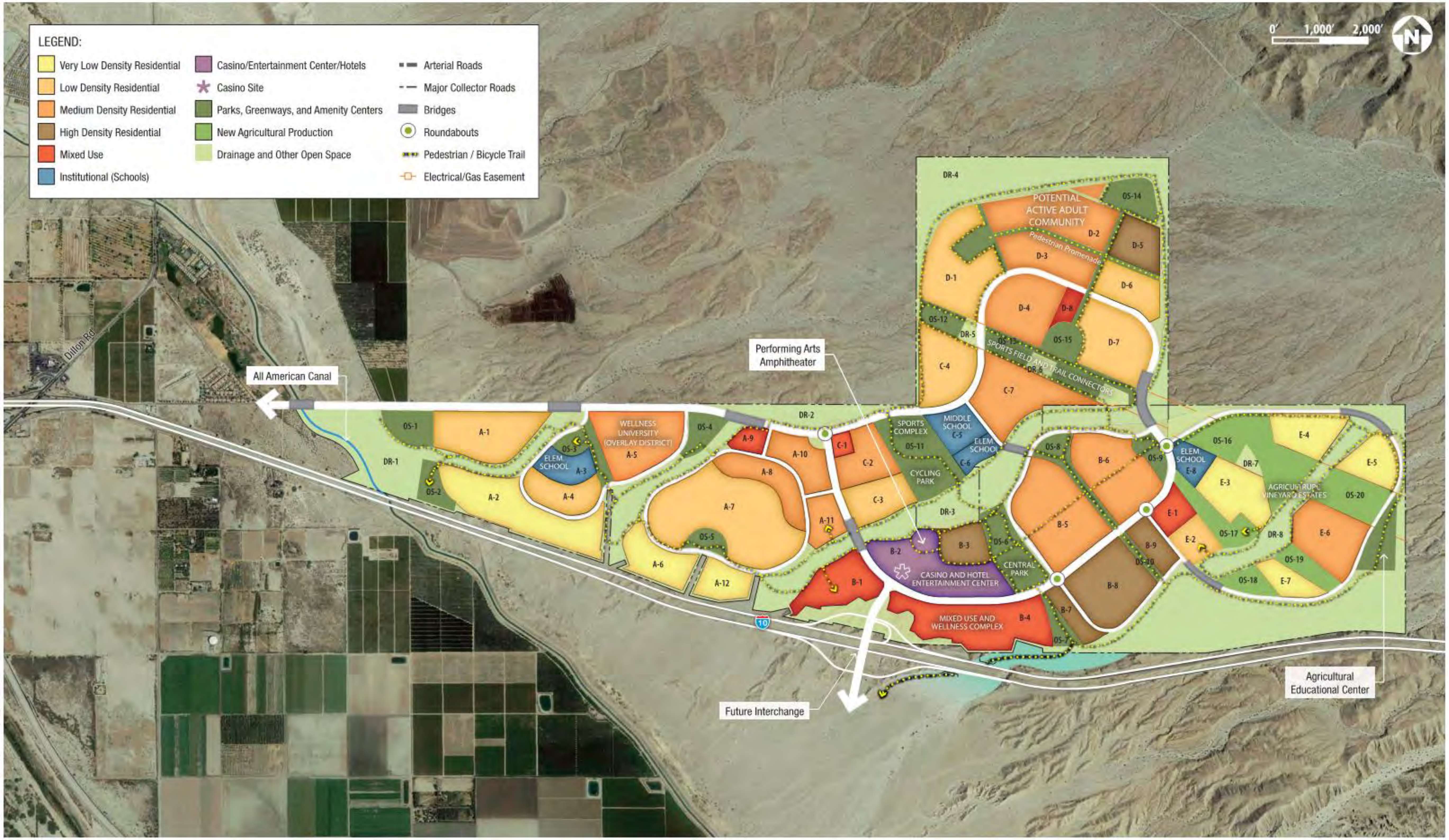


Figure 1-3. KPC Coachella conceptual land use plan



1.2 The Goals and Objectives

The goal of this water quality assessment is to define the water quality framework, identify the pollutants of concern, and recommend water quality Best Management Practices (BMPs) during the construction phase and for the life of the project (post-construction). The assessment will be performed consistent with the California Environmental Quality Act (CEQA) Guidelines. The potential for storm water runoff infiltration into the underlying native soils will be conceptually evaluated.

1.3 Hydrologic Setting

The project is situated on a piedmont composed of steep-sloped active and inactive alluvial fan surfaces below the Little San Bernardino Mountains in the Whitewater River Watershed. The piedmont extends from the Little San Bernardino Mountains, cross the western extension of the Mecca Hills upstream of the Interstate 10 (I-10) corridor near Indio, California. Whitewater River Watershed is approximately 1,500 square miles and conveys runoff to the Salton Sea in southern Riverside County. The Whitewater River's headwaters lie in the San Bernardino Mountains in San Bernardino County, north of Riverside County. Several mountain ranges from the Coachella Valley, such as the San Jacinto Mountains, the Santa Rosa Mountains, the Chocolate Mountains, the Mecca Hills, the Cottonwood Mountains, and the Orocopia Mountains. Runoff from these mountains drains through a network of surface streams and collects on the Coachella Valley floor and flows southeast via the Whitewater River toward the Salton Sea. The Salton Sea is a lake that has no outlet and does not discharge to the ocean.

The Whitewater River Watershed has water bodies within it that have Total Maximum Daily Loads (TMDL) approved by the Colorado River Basin Regional Water Quality Control Board (Colorado River Basin RWQCB) and are listed on the 2018 California 303(d) List of Water Quality Limited Segments. These water bodies include the Coachella Valley Stormwater Channel/Whitewater River and the Salton Sea, and the project and its location in the watershed are shown in Figure 1-4.

Stormwater Runoff

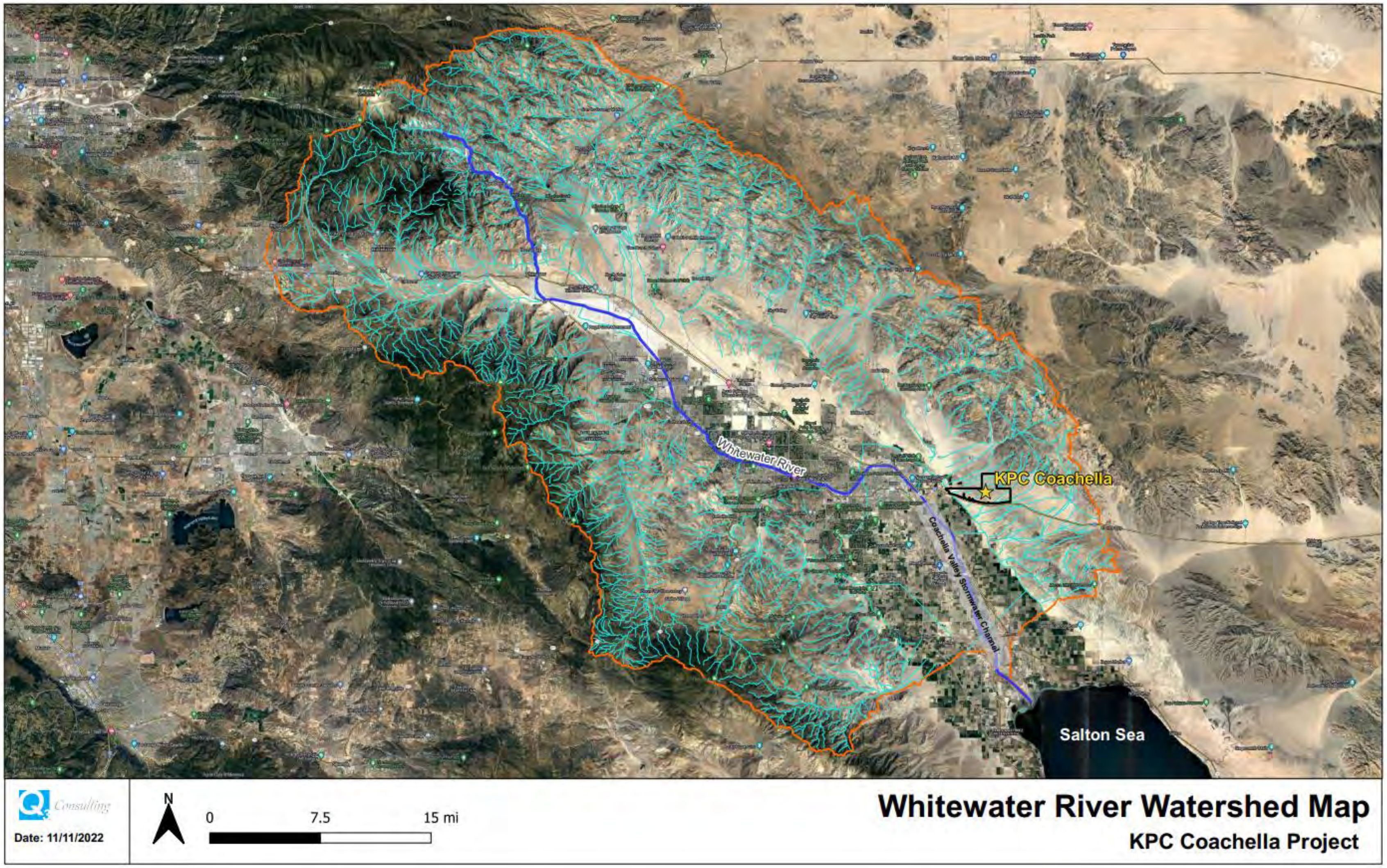
The project's runoff drains to the embankment wall of the All-American Canal (Eastside Dike), where it pools, disperses, and is potentially discharged to the Coachella Valley Stormwater Channel/Whitewater River via Wasteway No. 2, a concrete-lined channel approximately 2.2 miles long. Wasteway Number 2 confluences with the Coachella Valley Stormwater Channel below Avenue 52 approximate 7.5 miles downstream from the Indio Boulevard Bridge and just over 11 miles upstream from the Salton Sea. The frequency peak flow rates are constant along this channel reach of the Coachella Valley Stormwater Channel, which implies that Wasteway No. 2 is not a significant tributary to the Coachella Valley Stormwater Channel. The regional hydrologic analysis indicates that the project will result in a slight increase in runoff volume as a result of the increase in impervious area proposed within the project site. The project area is a small percentage of the Whitewater River watershed (0.002 percent) and is unlikely to have a regional hydromodification effect. Based on the data available, the project is not expected to cause a hydrologic condition of concern to downstream channels.

1.4 Water Supply

Geographically, the project site is located within the Coachella Valley Groundwater Basin. The Coachella Valley Groundwater basin is bounded on the east by the Sand Hills and on the west by the impermeable rocks of the Fish Creek and Coyote Mountains. To the north, the basin is bounded by the Salton Sea, which is the discharge point for groundwater in the basin. Major hydrologic features include the Alamo and New Rivers, which flow north towards the Salton Sea.

The 2019 Water Quality Control Plan for the Colorado River Basin identifies the following beneficial uses of groundwater within the Coachella Valley (Coachella hydrologic subunit): municipal, agricultural, and industrial supply. The City, and future residents and businesses within the KPC Coachella Specific Plan area, will rely on MUN beneficial use for groundwater provided by six active wells which provide a total firm capacity for the City of 8,454 gpm and supplied a total demand of 5,896 AF in 2016. On average each well provides approximately 1,000 AFY, ranging in design capacities of 1,371 gpm to 2,323 gpm. The City's 2017 Water Master Plan calls for six new wells to be developed for the 150+ Zones by the year 2035, based on the assumed phasing of major development projects proposed at or above approximate mean sea level elevation of 30 feet (KPC Coachella SPECIFIC PLAN August 2019; Appendix A). Protection of groundwater resources are discussed in a separate report.

Figure 1-4 Whitewater River Watershed Map



2 Storm Water Regulatory Framework

The Environmental Protection Agency (EPA) and the State Water Resources Control Board (SWRCB), in accordance with the CWA and its amendments, sets regional water quality standards. The Colorado River Basin RWQCB administers the regional and local implementation of the NPDES program, which regulates the discharge of contaminants into waterways and extends permitting for point- and non-point source discharges. Point source discharges are discharges generated by runoff from specific sources such as an auto repair shop, and non-point source discharges are, by contrast, from many diffuse sources such as a mixed-use residential development. During construction of the project, the state's current Construction General Permit requires measures to protect water quality during construction activities for construction sites of an acre or more. It should be noted that the U.S. Army Corps of Engineers (USACE) also has specific regulatory responsibilities associated with water quality, under the CWA, which are described in the following section.

2.1 Clean Water Act

The CWA, as amended by the Water Quality Act of 1987, is the federal legislation governing water quality, which was enacted "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." Important sections of the CWA include:

- Sections 303 and 304 – provide for water quality standards, criteria, and guidelines;
- Section 401 – requires an applicant for any project that proposes an activity that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the act;
- Section 402 – establishes the NPDES system, a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the United States. This permitting program is administered by the California State Water Resources Control Board and its Regional Boards; and
- Section 404 – establishes a permit program for the discharge of dredge or fill material into waters of the United States. This permit program is administered by the USCOE.
- Coordination with the respective agencies is ongoing to obtain the necessary permits for the project. The project will be required to comply with permit conditions during all phases of the project.

2.2 Porter-Cologne Water Quality Act

California's Porter-Cologne Water Quality Act is the basis for water quality regulation within the state. The act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of the water body. The project does not require a waste discharge permit, because any potential construction waste discharge that may impair a beneficial use of surface water will not be discharged to any land or surface waters. Stormwater discharges are expected to comply with and are regulated by the Riverside County Municipal Stormwater permit in the Whitewater River Watershed.

2.3 State Water Resources Control Board and Regional Water Quality Control Board

The Environmental Protection Agency (EPA) and the State Water Resources Control Board (SWRCB) administer water rights, water pollution control, and water quality functions throughout the state, while the Regional Water Quality Control Boards (RWQCBs) conduct planning, permitting, and enforcement activities. The project area lies within the jurisdiction of the Colorado River Basin RWQCB (Region 7). The Water Quality Control Plan, Colorado River Basin – Region 7 (Basin Plan) includes water quality standards to protect beneficial uses including maintaining aquatic ecosystems and the resources those systems provide to society. The Basin Plan also requires projects that drain to the Whitewater River Watershed to address any identified impairments in the river itself, or its tributaries.

2.3.1 Basin Plan's Beneficial Uses

A comprehensive review of the latest Water Quality Control Plan for the Colorado River Basin (Basin Plan) was conducted to identify the beneficial uses for the Project's Receiving Waters. The Colorado River Basin RWQCB is responsible for the protection of beneficial uses of water resources within its jurisdiction and uses planning, permitting, and enforcement authorities to meet this responsibility. Every water body within the jurisdiction of the Colorado River Basin RWQCB is designated a set of beneficial uses that are protected by appropriate water quality objectives. The Basin Plan describes the beneficial uses as the following:

- Municipal and Domestic Supply (MUN) – Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- Agriculture Supply (AGR) – Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
- Aquaculture (AQUA) – Uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.
- Freshwater Replenishment (FRSH) – Uses of water for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).
- Industrial Service Supply (IND) – Uses of water for industrial activities that do not depend primarily on water quality, including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
- Water Contact Recreation (REC-1) – Uses of water 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, whitewater activities, fishing, and use of natural hot springs.
- Non-Contact Water Recreation (REC 2) – Uses of water 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, tide pool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.
- Warm Freshwater Habitat (WARM) – Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- Wildlife Habitat (WILD) – Uses of water that support terrestrial ecosystems including, but not limited to, the preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
- Preservation of Rare, Threatened, or Endangered Species (RARE) – Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

Beneficial uses are summarized in **Error! Reference source not found.** below.

Table 1 – Beneficial Uses from 2019 Colorado River Basin Plan

Name	MUN	AGR	AQUA	FRSH	IND	REC I	REC II	WARM	WILD	RARE
Surface Water Beneficial Uses										
Coachella Valley Storm Water Channel	-	-	-	✓	-	✓	✓	✓	✓	✓
Salton Sea	-	-	✓	-	✓	✓	✓	✓	✓	✓
Ground Water Beneficial Uses										
Coachella Valley hydrologic subunit	✓	✓	-	-	✓	-	-	-	-	-

2.3.2 NPDES Program

The project area is located within the incorporated area of the City of Coachella within the County of Riverside. It is covered by the urban Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permitted area (NPDES Order R7-2013-0011, NPDES Number CAS617002), which was issued to the Riverside County Flood Control and Water Conservation District, the County of Riverside, in cooperation with the Coachella Valley Water District and 10 incorporated cities (collectively called "Permittees"). The City of Coachella and the County of Riverside are co-permittees under this Permit, and developed the Whitewater River Region Stormwater Management Plan (SWMP) that describes activities, programs, procedures, financial responsibilities, and practices the permittees use to protect water quality by reducing or eliminating pollutants discharged from storm drainage systems they own or operate, including the selection and implementation of Best Management Practices (BMPs). All guidelines and procedures outlined in the SWMP, including the post-development Water Quality Management Plan (WQMP) requirements, will be adhered to during all phases of the project, as currently written or subsequent future regulations. All parties working on the project, or in the project area, will be required to implement pollution prevention, treatment controls, and construction BMPs consistent with the requirements outlined in the SWMP.

2.4 Riverside County Water Quality Management Plan

Riverside County has a WQMP template for projects within the Whitewater River Watershed and guidance that identifies BMP design guidelines and criteria. The WQMP outlines recommended BMPs which must be incorporated into design plans for a project of this size, particularly because it will likely include the following Priority Development Project categories:

- Single-family hillside residences that create 10,000 square feet or more of impervious area where the natural slope is 25% or greater;
- Commercial and industrial developments of 100,000 square feet or more; and,
- Home subdivisions with 10 or more housing units.

The specific BMPs that may be considered for the project and evaluated for feasibility when it is designed are listed in Section 3 of this report.

2.4.1 Construction General Permit (CGP)

The Construction General Permit (CGP), (Order 2009-0009-DWQ as amended by Order 2010- 0014-DWQ and Order 2021-0006-DWQ), issued by the SWRCB, regulates storm water and non- storm water discharges associated with construction activities disturbing 1 acre or greater of soil. Construction sites that qualify must submit a Notice of Intent (NOI) with the SWRCB to gain permit coverage or otherwise be in violation of the CWA and California Water Code.

The CGP requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for each individual construction project greater than or equal to 1 acre of disturbed soil area. The SWPPP must list Best Management Practices (BMPs) that the discharger will use to control sediment and other pollutants in storm water and non-storm water runoff. The CGP requires that the SWPPP is prepared by a Qualified SWPPP Developer (QSD) and implemented at the site under the review/direction of a Qualified SWPPP Practitioner (QSP).

The project includes over 1 acre of grading within the County of Riverside and is therefore subject to the storm water discharge requirements of the CGP. The Project will submit a NOI and prepare a SWPPP prior to the commencement of soil disturbing activities. In the Colorado River Basin Region, where the project resides, the SWRCB is the permitting authority, while the County of Riverside and Colorado River Basin RWQCB provide local oversight and enforcement of the CGP.

2.4.1 Mitigation of Urban Runoff for New Development Projects

On October 5, 2000, the State Water Board adopted Order No. WQ-2000-11, Standard Urban Storm Water Mitigation Plans (SUSMPs), which is a precedential order. Order No. WQ-2000-11 determined that requiring Urban Runoff generated by the 85th percentile storm events from specific types of development categories be infiltrated, filtered or treated was consistent with Maximum Extent Practicable (MEP). In accordance with the requirements specified in the 2008 MS4 Permit, the Permittees developed a model Water Quality Management Plan (WQMP) and template. Since development of the Whitewater River Region WQMP, Permittees have implemented ordinances that require developments to retain Stormwater volumes or flows in excess of the 85th percentile storm event required by the WQMP.

Under ordinance #1014 Municipal Code Section 13.16.110, in order to minimize the discharge and transport of pollutants, the city of Coachella requires all new development and redevelopment projects identified as a Priority Project under the newly implemented NPDES permit No. CAS617002 to retain 100% of the stormwater from the 100 year, 24-hour duration storm in order to prevent any deterioration of the water quality which would impair the subsequent or competing uses of water. Projects that retain and infiltrate 100% of the rainfall conditions specified in Section F.1.c.v.4 of the NPDES permit are deemed to comply with the Treatment Control BMP requirements found in that section of the NPDES permit. The NPDES permit establishes acceptable methods and standards for controlling stormwater runoff volumes, rates, and pollutant loading including but not limited to the following:

A. *Increase Permeable Areas; avoid placing impervious surfaces in highly porous soil areas; incorporate landscaping and open space into the project design; use porous materials for or near driveways and walkways; incorporate retention basins that can infiltrate Stormwater onsite; and avoid placing pavement and other impervious surfaces in low lying areas.*

B. *Direct Runoff to Permeable Areas. Direct Stormwater runoff away from impermeable areas to swales, berms, green strip filters, gravel beds, and French drains; install rain gutters and orient them toward permeable areas; modify the grade of the property to divert flow to permeable areas and minimize the amount of stormwater runoff leaving the property and when designing curbs, berms and other structures, avoid designs which isolate permeable or landscaped areas.*

C. *Maximize Stormwater Storage for Reuse. Use retention structures, surface areas, cisterns, or other structures to store stormwater"*

3 WATER QUALITY ASSESSMENT

The Water Quality Assessment analyzed the project's effect on water quality and whether it will meet the applicable water quality standards of downstream surface receiving waters. This section reports the findings of this review, and identifies the following:

- Receiving surface water bodies and their impairments;
- The water quality objectives to maintain the beneficial uses the water body has been designated for by the RWQCB;
- The anticipated pollutants generated by the project; and
- The hydrologic conditions of concern.

3.1 303(d) Impaired Waterbodies

The California Regional Water Quality Control Board, Colorado Basin Region (Colorado River Basin Water Board) reviewed and received public comments to support the adoption of the 2018 California Integrated Report, which includes the 2018 303(d) list of impaired water bodies in the Colorado River Basin Region. Based on the 2018 303(d) list, the Project's receiving waters have the following identified impairments.

Table 2 – 303(d) Listed Impairments

Water Body Name	303 (d) List Constituents	TMDL Constituents
Coachella Valley Stormwater Channel	Ammonia DDT (Dichlorodiphenyltrichloroethane) Dieldrin PCBs (Polychlorinated biphenyls) Toxaphene Toxicity Pathogens	Pathogens
Salton Sea	Enterococcus Nutrients Salinity Toxicity Chloride Ammonia Arsenic Chlorpyrifos Low Dissolved Oxygen DDT (Dichlorodiphenyltrichloroethane)	-
Ref. 2019 Water Quality Control Plan; Colorado River Basin (Region 7)		

3.2 Established TMDL

Coachella Valley Stormwater Channel (CVSC) is on the California 303(d) List for impairment by pathogens of unknown sources. This listing applies to the 17-mile length of the CVSC from Indio to the

Salton Sea. The following Table summarizes Water Contact Recreation (REC I) bacteria indicator WQOs for all surface waters in the Colorado River Basin Region, excepting the Colorado River:

Table 3 – Bacterial Indicator Water Quality Objectives

Indicator Parameter	30-Day Geometric[a] Mean	Maximum Instantaneous
E. coli	126 MPN[b]/100 Milliliter (ml)	400 MPN/100 ml
Fecal coliform	200 MPN/100 ml	c
Enterococci	33 MPN/100 ml	100 MPN/100 ml
a- Based on a minimum of no less than 5 samples equally spaced over a 30-day period. b- Most probable number. c- No more than 10 % of total samples during any 30-day period exceed 400 MPN per 100 ml		
Ref. 2019 Water Quality Control Plan; Colorado River Basin (Region 7)		

3.3 Water Quality Objectives

The Porter-Cologne Water Quality Control Act defines water quality objectives as "...the limits or levels of water quality constituents or characteristics which are established for reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area."

There are two forms of water quality objectives:

- Narrative objectives present a general description of water quality that must be attained through pollutant control measures and watershed management. They also serve as the basis for the development of detailed numeric objectives. Narrative objectives apply to all water bodies and they are listed in Appendix B.
- Numeric objectives typically describe pollutant concentrations, physical and chemical conditions of the water, and toxicity of the water to aquatic organisms. Places where numeric limits are specified represent the maximum levels that will allow the beneficial use to continue unimpaired. In other cases, an objective may prohibit the discharge of specific substances, tolerate natural or "background" levels of certain substances or characteristics (but not increases over those values), or may express a limit, in terms of not impacting other beneficial uses. An adverse effect or impact on a beneficial use occurs where there is an actual or threatened loss or impairment of that beneficial use. No numeric objectives have been established for Wasteway 2, or the Coachella Valley Stormwater Channel/Whitewater River. The numeric objectives in Table 4 have been established for the Salton Sea.

Table 4 – Numeric Objectives for the Salton Sea

Constituent	Numeric Water Quality Objective
Total Dissolved Solids (Salinity)	The total dissolved solids concentration of the Salton Sea in 1992 was approximately 44,000 mg/l. The water quality objective for Salton Sea is to reduce the present level of salinity, and stabilize it at 35,000 mg/l unless it can be demonstrated that a different level of salinity is optimal for the sustenance of the Sea's wild and aquatic life (California Department of Fish and Game is attempting to make this determination). However, the achievement of this water quality objective shall be accomplished without adversely affecting the primary purpose of the Sea which is to receive and store agricultural drainage, seepage, and storm waters. Also, because of economic considerations, 35,000 mg/l may not be realistically achievable. In such case, any reduction in salinity

Constituent	Numeric Water Quality Objective
	which still allows for survival of the sea's aquatic life shall be deemed an acceptable alternative or interim objective. Because of the difficulty and predicted costliness of achieving salinity stabilization of Salton Sea, it is unreasonable for the Regional Board to assume responsibility for implementation of this objective. That responsibility must be shared jointly by all of the agencies which have direct influence on the sea's fate. Additionally, there must be considerable public support for achieving this objective, without which it is unlikely that the necessary funding for Salton Sea salinity control will ever be realized.
Selenium	The beneficial use of the Salton Sea for recreation has been impaired due to elevated levels of selenium in tissues of resident wildlife and aquatic life (See page 4-10 [of the Basin Plan] for a more detailed discussion of this). The following objectives apply to all surface waters that are tributaries to the Salton Sea: a. A four-day average value of selenium shall not exceed .005 mg/L; b. A one-hour average value of selenium shall not exceed .02 mg/L. These numeric limits are based on the United States Environmental Protection Agency's National Ambient Water Quality Criteria.

3.4 Anticipated Pollutants

When the project is ultimately developed per the conceptual land use plan, the residential, mixed use (commercial retail and high density residential), schools, parks/recreation, and open space development will replace the existing vacant land and open space in phases. Typical pollutants that are generated by project category are summarized in Table 5 **Error! Reference source not found.**. The project's c onceptual land use categories are anticipated to generate the following pollutants:

- Sediment/Turbidity
- Nutrients
- Organic Compounds
- Trash and Debris
- Oxygen Demanding Substances
- Bacteria and Viruses
- Oil and Grease
- Pesticides
- Heavy Metals

Table 5– Potential Pollutants Generated by Land Use Type

Type of Development (Land Use)	Sediment/ Turbidity	Nutrients	Organic Compounds	Trash and Debris	Oxygen Demanding Substances	Bacteria and Viruses	Oil and Grease	Pesticides	Metals
Detached Residential Development	P	P	N	P	P	P	P	P	N
Attached Residential Development	P	P	N	P	P(1)	P	P(2)	P	N
Commercial/Industrial Development	P(1)	P(1)	P(5)	P	P(1)	P(3)	P	P(1)	P
Automotive Repair Shops	N	N	P(4,5)	P	N	N	P	N	P
Restaurants	N	N	N	P	P	P	P	N	N
Hillside Development	P	P	N	P	P	P	P	P	N
Parking Lots	P	P(1)	P(4)	P	P(1)	P(6)	P	P(1)	P

<u>Abbreviations:</u>
P = Potential
N = Not potential
<u>Notes:</u>
(1) A potential pollutant if landscaping or open area exists on the project site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves animal waste.
(4) Specifically, petroleum hydrocarbons.
(5) Specifically, solvents.
(6) Bacterial indicators are routinely detected in pavement runoff.

Ref. 2015 Whitewater River Region WQMP Guidance

3.5 Construction BMPs

During the construction phase, sedimentation and erosion can occur because of tracking from earthmoving equipment, erosion and subsequent runoff of soil, and improperly designed stockpiles. Since the project site is moderately steep with slopes averaging 5%, the large amount of potential disturbed area results in the potential for erosion/sediment issues. The utilization of proper erosion and sediment control BMPs is critical in preventing discharge to surface waters/drains. The project will employ proper Best Management Practices (BMPs) to meet the criteria set forth in the Construction General Permit (CGP).

In addition to erosion and sedimentation, the use of materials such as fuels, solvents, and paints has the potential to affect surface water quality. Many different types of hazardous compounds will be used during the construction phase, with proper containment being of high importance. Poorly managed construction materials can lead to the possibility for exposure of potential contaminants to precipitation. When this occurs, these visible and/or non-visible constituents become entrained in storm water runoff. If they are not intercepted or are left uncontrolled, the polluted runoff would otherwise freely sheet flow from the project to the Salton Sea and could cause pollution accumulation in the receiving waters. A list of anticipated construction materials and their associated construction activity are provided in Table below.

Table 6 – Anticipated Pollutants from Construction Activities

Construction Activity	Construction Site Material	Visually Observable
Paving	Hot Asphalt	Yes - Rainbow Surface or Brown Suspension
	Asphalt Emulsion	
	Liquid Asphalt (tack coat)	
	Cold Mix	
	Crumb Rubber	Yes – Black, solid material
	Asphalt Concrete (Any Type)	Yes - Rainbow Surface or Brown Suspension
Substation and Transmission Line Construction	Gasoline/Diesel	No
	Mineral and Crankcase Oil	
	Lubricants	
	Cleaning Solvents	
Equipment Cleaning	Acids	No
	Bleaches	
	Detergents	Yes - Foam
	Solvents	No
Concrete Work	Portland Cement (PCC)	Yes - Milky Liquid
	Masonry products	No
	Sealant (Methyl Methacrylate - MMA)	No
	Incinerator Bottom Ash, Bottom Ash, Steel Slag, Foundry Sand, Fly Ash, Municipal Solid Waste	No

Construction Activity	Construction Site Material	Visually Observable
	Mortar	Yes - Milky Liquid
	Concrete Rinse Water	Yes - Milky Liquid
	Non-Pigmented Curing Compounds	No
	Lime	No
Painting	Paint	Yes
	Paint Strippers	No
	Resins	
	Sealants	
	Solvents	
	Lacquers, Varnish, Enamels, and Turpentine	
	Thinners	
Portable Toilet Facilities	Portable Toilet Waste	Yes
Adhesives	Adhesives	No
Dust Control	Water	No
	Liquid Polymer or Polymer Blend	
Vehicle Maintenance	Antifreeze and Other Vehicle Fluids	Yes - Colored Liquid
	Batteries	No
	Fuels, Oils, Lubricants	Yes - Rainbow Surface Sheen and Odor
Soil Amendment/Stabilization	Polymer/Copolymer	No
	Quicklime	No
	Herbicide, Pesticide	No
	Lignin Sulfonate	No
	Psyllium	
	Guar/Plant Gums	
	Gypsum	
Wood (Treated) Work	Ammoniacal-Copper- Zinc-Arsenate, Copper- Chromium-Arsenic, Ammoniacal-Copper- Arsenate, Copper Naphthenate	No
	Creosote	Yes - Rainbow Surface or Brown Suspension

Prior to the beginning of construction, the project Owner will be required to prepare the Permit Registration Documents (PRDs), including a complete Storm Water Pollution Prevention Plan (SWPPP), for upload on the State's SMARTS website. A Notice of Intent (NOI) for coverage of projects under the

CGP will be filed with the State Water Resources Control Board (SWRCB). The Waste Discharge Identification (WDID) Number will be issued to the project before any land disturbance may begin. If the project is constructed in multiple phases, a NOI will be filed for each phase of construction.

Accordingly, the Owner will be responsible for the implementation of the Stormwater Pollution Prevention Plan (SWPPP) at the project site, and revised as necessary, as administrative or physical conditions change. The Region 7 Colorado River Basin Regional Water Quality Control Board (RWQCB), upon request, must instruct the developer to make the SWPPP available for public review. The SWPPP will fully describe Best Management Practices (BMPs) that address pollutant source reduction and provide measures/controls necessary to mitigate potential pollutant sources. These include, but are not limited to: erosion controls, sediment controls, tracking controls, non-storm water management, materials & waste management, and good housekeeping practices. The above-mentioned BMPs for construction activities are discussed further below. The SWPPP will be prepared by a Qualified SWPPP Developer (QSD) and implemented at the site under the review/direction of a Qualified SWPPP Practitioner (QSP).

3.5.1 Erosion Control BMPs

Erosion Control, also referred to as soil stabilization, is a source control measure designed to prevent soil particles from detaching and becoming transported in storm water runoff. Erosion Control BMPs protect the soil surface by covering and/or binding the soil particles. The scheduling of soil disturbing activities should be minimized during the wet season, which extends from August through April.

If such activities occur in the wet season, all exposed slopes or areas with loose soil will be stabilized. This may involve the application of soil binders, or geotextiles and mats. Due to the moderately steep surface, creating temporary earth dikes or drainage swales consistent with the CASQA Construction BMP Handbook design guidelines may also be employed/installed prior to large, forecasted storm events to divert runoff away from exposed areas and into more suitable locations. If implemented correctly, erosion controls can effectively reduce the sediment loads entrained in storm water runoff from the construction site. Below is a list of anticipated erosion control BMPs that can be implemented for the proposed Project's SWPPP:

- EC-1 Scheduling
- EC-2 Preservation of Existing Vegetation
- EC-5 Soil Binders
- EC-6 Straw Mulch
- EC-7 Geotextiles and Mats
- EC-8 Wood Mulching
- EC-9 Earth Dikes and Swales
- EC-10 Velocity Dissipation Devices
- EC-11 Slope Drains

3.5.2 Sediment Control BMPs

Sediment control BMPs are structural measures that are intended to complement and enhance the soil stabilization/erosion control measures and reduce sediment discharges from construction areas. Sediment controls are designed to intercept and filter out soil particles that have been detached and transported by the force of water. In addition, silt fencing will be installed along the perimeter of work areas upstream of discharge points, and will also be placed around stockpiles, and areas of soil disturbance. Check dams or chevrons will be situated in areas where high velocity runoff is anticipated/potential (such as in drainage ditches/swales). Gravel bag berms or fiber rolls should be used to intercept sheet flows on streets or at the toe of slopes (such as along streets or canal and drain access roads) to minimize sediment mobilization.

Street sweeping will also be scheduled in areas where sediment can be tracked from the project site onto paved streets or roads. Below is a list of anticipated sediment control BMPs that can be implemented for the proposed Project's SWPPP:

- SE-1 Silt Fence
- SE-2 Desilting Basin
- SE-3 Sediment Trap
- SE-4 Check Dam
- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berms
- SE-7 Street Sweeping
- SE-8 Sandbag Barrier
- SE-9 Straw Bale Barrier
- SE-10 Storm Drain Inlet Protection
- SE-11 Active Treatment Systems

3.5.3 Tracking Control BMPs

The proposed project site will stabilize all construction entrance/exit points to reduce the tracking of sediments onto paved streets and roads by construction vehicles. Construction roadways should also be stabilized to minimize off-site tracking of mud and dirt. Wind erosion controls will be employed in conjunction with tracking controls. Below is a list of anticipated tracking control BMPs that can be implemented for the proposed Project's SWPPP.

- TC-1 Stabilized Construction Entrance / Exit
- TC-2 Stabilized Construction Roadway
- TC-3 Entrance / Outlet Tire Wash
- WE-1 Wind Erosion Control

3.5.4 Non-Stormwater BMPs

Non-storm water discharges consist of all discharges from a municipal storm water conveyance which do not originate from precipitation events (i.e., all discharges from a conveyance system other than storm water).

Paving and grinding operations on the project site, along with any operations which involve using water on landscape are classified as having potential for non-storm water pollutants. This also includes illegal connection and dumping on the construction site, vehicle equipment cleaning, fueling, and maintenance. The construction of project may involve the use of heavy equipment and hazardous materials. Adequate non stormwater BMPs will be implemented.

- NS-1 Water Conversation Practices
- NS-2 Dewatering Operations
- NS-3 Paving and Grinding Operations
- NS-4 Temporary Stream Crossing
- NS-5 Clear Water Diversion
- NS-6 IC/ID Detection and Reporting
- NS-7 Potable Water / Irrigation

- NS-8 Vehicle & Equipment Cleaning
- NS-9 Vehicle & Equipment Fueling
- NS-10 Vehicle & Equipment Maintenance
- NS-11 Pile Driving Operations
- NS-12 Concrete Curing
- NS-13 Concrete Finishing
- NS-14 Material Use Over Water
- NS-15 Demolition Over Water
- NS-16 Temporary Batch Plants

3.5.5 Materials and Waste Management BMPs

Waste management consists of implementing procedural and structural BMPs for collecting, handling, storing and disposing of wastes generated by a construction project to prevent the release of waste materials into storm water discharges. All materials with the potential to contaminate storm water runoff should be delivered and stored in designated areas with secondary containment measures (i.e., covered and bermed). Chemicals, drums, and bagged materials will not be stored directly on soil, but on pallets instead. Personnel will also be trained on the proper use of the materials.

Construction staging areas will be located on the site. These areas will include construction yards that serve as field offices, reporting locations for workers, parking space for vehicles and equipment, and sites for material storage. Facilities will be fenced as necessary. Security guards will be stationed where needed.

A temporary barrier around stockpiles should be installed and a cover provided during the rainy season. Spill cleanup procedures and kits should be made readily available near hazardous materials and waste. Solid wastes, such as trash and debris, should be collected on a regular basis and stored in designated areas. Concrete and paint washout areas should be installed and properly maintained in areas conducting the associated activities. Below is a list of anticipated materials and waste management BMPs that can be implemented for the proposed Project's SWPPP:

- WM-1 Material Delivery & Storage
- WM-2 Material Use
- WM-3 Stockpile Management
- WM-4 Spill Prevention and Control
- WM-5 Solid Waste Management
- WM-6 Hazardous Waste
- WM-7 Contaminated Soil
- WM-8 Concrete Waste
- WM-9 Sanitary / Septic Waste

3.5.6 Monitoring Program

A monitoring program will also be included in the SWPPP that outlines storm event inspections of the project site and a sampling plan in accordance with the CGP. The monitoring program will be prepared by a QSD and implemented at the site under the review/direction of a QSP. The goals of the program are:

1. to identify areas contributing to a storm water discharge;
2. to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate, properly installed, and functioning in accordance with the terms of the CGP; and
3. whether additional control practices or corrective maintenance activities are needed. If a discharge is observed during these inspections, a sampling and analysis of the discharge is required.

Any breach, malfunction, leakage, or spill observed which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water shall trigger the collection of a sample of discharge. The goal of the sampling and analysis is to determine whether the BMPs employed and maintained on site are effective in preventing the potential pollutants from coming in contact with storm water and causing or contributing to an exceedance of water quality objectives in the receiving waters. In any case of breakage and potential for non-visible pollution, sampling and analysis will be required to ensure that the beneficial uses of downstream receiving waters are protected. In addition, sampling is required for any site which directly discharges runoff into a receiving water listed in the CGP listed as impaired for sedimentation.

3.6 Post-Construction BMPs

Because the project will disturbs more than 1 acre of impervious area, the 2013 MS4 Permit requires the project-specific WQMP to demonstrate that runoff flow rates, velocities, durations, and volumes from a 2-year and 10-year, 24-hour rainfall event will not significantly impact downstream erosion or stream habitat. Urban Runoff and its associated impacts may be reduced by minimizing impervious surfaces through incorporating Site-Design BMP concepts and LID/Site Design BMPs that replicate or reduce impacts to the pre-development condition. The proposed Project will implement Site-Design BMP Concepts, Source Control BMPs, and LID/Site Design BMPs to meet the Permit criteria.

3.6.1 Measurable Goals for LID/Site Design BMPs

According to the Whitewater River Region WQWP Guidance, there are 2 concepts to be considered in Site Design BMPs: Concept 1: Minimize the volume of runoff produced by minimizing urban runoff, minimizing impervious footprint, and conserving natural areas; and Concept 2: Minimize directly connected impervious areas. The anticipated project site design measures within each of the above mentioned concepts are listed in Table 7.

Table 7 – Anticipated Project Site Design Measures

Concept 1	Site Design Measure	Project Implementation
(a)	*Conserve natural areas*	Will conserve natural area to the extent possible
(b)	*Maximize canopy interception and water conservation*	Where feasible, existing native trees and shrubs will be preserved or additional native/drought tolerant trees/shrubs will be planted specially in the park areas and open spaces
(c)	*Use natural drainage systems*	Natural canals within the project area will be preserved
(d)	*Self-Treating Areas*	Where applicable, runoff from the natural areas will be directed directly off-site or to the MS4 before contaminated by the project's impervious area

Concept 1	Site Design Measure	Project Implementation
(e)	*Self-Retaining Areas (areas designed to retain the design storm rainfall without producing any runoff).*	Not applicable
(f)	*Increase the building floor to area ratio*	The project will maximize (to the extent possible) the number of stories above the ground specially for the high residential and institutional areas t minimize the impervious area
(g)	*Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised.*	Will be considered
(h)	*Reduce widths of streets where off-street parking is available.*	Will be considered

Concept 2	Site Design Measure	
(a)	*Design residential and commercial sites to contain and infiltrate roof runoff, or direct roof runoff to landscaped swales or buffer areas.*	All stormwater runoff produced within the project boundaries will be directed to the 20 LIDs (5 Infiltration Basins and 15 Extended Detention Basins) that will be distributed across the project site. The design will involve the infiltration, where feasible, or detaining, up to 5 inches of the 100-year 24-hour storm event runoff.
(b)	*Drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping*	sidewalks, walkways, trails, and patios will be graded so that the runoff drain into adjacent landscaping
(c)	*Incorporate landscaped buffer areas between sidewalks and streets.*	Buffer areas between sidewalks and streets will be implemented within the project boundaries
(d)	*Use natural or landscaped drainage swales in lieu of underground piping or imperviously lined swales.*	Where feasible, drainage swale with amended soil will be implemented along the sidewalks, walkways, and trails
(e)	*Where soil conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration*	All stormwater runoff produced within the project boundaries will be directed to the 20 units of LIDs (5 Infiltration Basins and 15 Extended Detention Basins) that will be distributed across the project site. The design will involve the infiltration, where feasible, or

Concept 2	Site Design Measure	
		detaining, up to 5 inches of the 100-year 24-hour storm event runoff.
(f)	*Maximize the permeable area by constructing walkways, trails, patios, alleys, driveways, low-traffic streets and other low-traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials.*	Where feasible, drainage swale with amended soil will be implemented along the sidewalks, walkways, and trails
(g)	*Use one or more of the following:* *– Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs used at street corners, and culverts used under driveways and street crossings.* *– Urban curb/swale system: street slopes to curb; periodic swale inlets drain to landscaped swale or biofilter.* *– Dual drainage system: first flush captured in street catch basins and discharged to adjacent landscaped swale or gravel shoulder; high flows connect directly to MS4s.* *– Other design concepts that are comparable and equally effective as approved by the local land use authority.*	All stormwater runoff produced within the project boundaries will be directed to the 20 units of LIDs (5 Infiltration Basins and 15 Extended Detention Basins) that will be distributed across the project site. The design will involve the infiltration, where feasible, or detaining, up to 5 inches of the 100-year 24-hour storm event runoff.
(h)	*Use one or more of the following features for design of driveways and private residential parking areas:* *– Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping.* *– Uncovered temporary or guest parking on residential lots may be: paved with a permeable surface, or designed to drain into landscaping.* *– Other comparable and equally effective design characteristics as approved by the local land use authority.*	All stormwater runoff produced within the project boundaries will be directed to the 20 units of LIDs (5 Infiltration Basins and 15 Extended Detention Basins) that will be distributed across the project site. The design will involve the infiltration, where feasible, or detaining, up to 5 inches of the 100-year 24-hour storm event runoff.
(i)	*Use one or more of the following design concepts for the design of parking areas:* *– Where landscaping is proposed in parking areas, incorporate parking area landscaping into the drainage design.* *– Overflow parking (parking stalls provided in excess of the local land use authority's*	All stormwater runoff produced within the project boundaries will be directed to the 20 units of LIDs (5 Infiltration Basins and 15 Extended Detention Basins) that will be distributed across the project site. The design will involve the infiltration, where feasible, or

Concept 2	Site Design Measure	
	minimum parking requirements) may be constructed with permeable pavement. *– Other comparable and equally effective design characteristics as approved by the local land use authority.*	detaining, up to 5 inches of the 100-year 24-hour storm event runoff.

3.6.2 Source Control BMPs

Source Control BMPs reduce the potential for Urban Runoff and pollutants from coming into contact with one another. Source Control BMPs are defined in general as: Activities or programs to educate the public or provide low-cost non-physical solutions, as well as facility design or practices aimed to limit the contact between Pollutant sources and Stormwater or authorized non-Stormwater.

As a regulated project, the proposed project will implement the source control measures, as defined in **Error! Reference source not found.**. If any of the following Source Control BMPs are not included in t he project-specific WQMP, adequate justification must be provided before the project-specific WQMP will be approved.

Table 8 – Source Control BMP Measures

Non-Structural BMPs	*Education/Training for Property Owners, Operators, Tenants, Occupants, or Employees*	The proposed project will include more than fifty (50) dwelling units, so the HOA/POA will be required to provide annual environmental awareness education materials to all members. These materials will include general housekeeping practices that contribute to the protection of Urban Runoff quality and BMPs that eliminate or reduce pollution during subsequent property improvements.
	Activity Restrictions	At the discretion of the local land use authority, if an HOA/POA is formed, the developer will prepare CC&Rs for the purpose of Receiving Water quality protection. Alternatively, use restrictions may be developed by a building operator through lease terms, etc. These restrictions will be included in the project-specific WQMP. Examples of activity restrictions are: • Prohibiting the blowing, sweeping, or hosing of debris (leaf litter, grass clippings, litter, etc.) into streets, storm drain inlets, or other conveyances. • Require dumpster lids to be closed at all times. • Prohibit vehicle washing, maintenance, or repair on the premises or restrict those activities to designated areas (such as repair within maintenance bays and vehicle washing on properly designed wash racks).
	Irrigation System and Landscape Maintenance	Maintenance of irrigation systems and landscaping will be consistent with the local land use authority's water conservation ordinance.

		Fertilizer and pesticide usage will be consistent with the instructions contained on product labels and with regulations administered by California's Department of Pesticide Regulation. Additionally, landscape maintenance will address replacement of dead vegetation, repair of erosion rills, proper disposal of green waste, etc. Irrigation system maintenance will address periodic testing and observation of the irrigation system to detect overspray, broken sprinkler heads, and other system failures. The project-specific WQMP will describe the anticipated frequency of irrigation system and landscape maintenance activities and identify the responsible party.
	Common Area Litter Control	The project-specific WQMP will address the Litter Control for common areas: whether or not trash receptacles will be provided in common areas, emptying of trash receptacles, the frequency with which trash receptacles will be emptied, patrolling common areas and perimeter fences or walls to collect litter, noting trash disposal violations by tenants/home owners or businesses and reporting such observations to the owner, operator, manager, or HOA/POA for investigation, and identification of the party responsible for litter control.
	Street Sweeping Private Streets and Parking Lots	The frequency of sweeping privately owned streets will be described in the project-specific WQMP. The frequency will not be less than the frequency of street sweeping by the local land use authority on public streets. The parking lots will be swept at least quarterly, including just prior to the start of the rainy season (October 1st). The project-specific WQMP will identify the anticipated sweeping frequency, source of funding and the party responsible for conducting the periodic sweeping.
	Drainage Facility Inspection and Maintenance	At minimum, routine maintenance of privately owned drainage facilities will take place in the late summer or early fall prior to the start of the rainy season (October 1st). The drainage facilities will be cleaned if accumulated sediment/debris fills 25% or more of the sediment/debris storage capacity. Privately owned drainage facilities will be inspected annually and the cleaning frequency will be assessed.

<table>
<tr><td></td><td></td><td>The project-specific WQMP will identify the party responsible for conducting the drainage facility inspection and maintenance.</td></tr>
<tr><td rowspan="4">Structural BMPs</td><td>Storm Drain Inlet Stenciling and Signage</td><td>The project will provide stenciling/ labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language (such as: "NO DUMPING ONLY RAIN IN THE DRAIN") and/or graphical icons to discourage illegal dumping. Also, will post signs and prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

The project will identify the party responsible for maintaining the legibility of stencils and signs.</td></tr>
<tr><td>Landscape and Irrigation System Design</td><td>The proposed project will reduce irrigation runoff through:
• Employing rain shutoff devices to prevent irrigation during and after precipitation events.
• Designing irrigation systems to each landscape area's specific water requirements.
• Using flow reducers or shutoff valves triggered by a pressure drop to control water loss due to broken sprinkler heads or lines.
• The timing and application methods of irrigation water will be designed to minimize the runoff of excess irrigation water into the MS4.
• Preparation and implementation of a landscape plan consistent with the local land use authority's water conservation ordinance, which may include the use of water sensors, programmable irrigation times (for short cycles), etc.</td></tr>
<tr><td>Protection of Slopes and Channels</td><td>Project plans will include Source Control BMPs to decrease the potential for erosion of slopes and/or channels, consistent with local codes and ordinances and with the approval of all agencies with jurisdiction, e.g., the U.S. Army Corps of Engineers, the Regional Board and the California Department of Fish and Game.

The following design principles will be considered, incorporated and implemented where determined applicable and feasible by the local land use authority:
• Convey runoff safely from the tops of slopes.</td></tr>
</table>

		• Avoid disturbing steep or unstable slopes and natural channels. • Install permanent stabilization BMPs on disturbed slopes as quickly as possible. • Plant slopes with native or drought tolerant vegetation. Hillside areas that are disturbed will be landscaped with deep-rooted, drought tolerant plant species selected for erosion control. • Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems. • Install permanent stabilization BMPs in channel crossings as quickly as possible, and ensure that increases in runoff velocity and frequency caused by the project do not erode the channel. • Install energy dissipaters at the outlets of new MS4s, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters will be installed in such a way as to minimize impacts to Receiving Waters. • Onsite conveyance channels will be lined, where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings will be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are large enough to erode grass or other vegetative linings, riprap, concrete soil cement or geo-grid stabilization may be substituted or used in combination with grass or other vegetation stabilization.
	a- Community Car Wash Racks *b- – Wash Water Controls for Food Preparation Areas*	a- All vehicles will be serviced offsite whenever possible. If servicing is required onsite, it must be conducted in an area isolated from storm drain inlets or drainage ditch inlets. Any spillage must be fully contained and captured and disposed of per County of Imperial Hazardous Waste requirements. b- All wash water will be stored in the lined containment basin.

	Proper Design and Maintenance of: *a- Air/Water Supply Area Drainage* *b- Trash Storage Areas* *c- Loading Docks* *d- Outdoor Material Storage Areas* *Following items are* ***not applicable*** *in the proposed project:* *– Fueling Areas* *– Maintenance Bays* *– Outdoor Work Areas or Processing Areas*	a- Areas used for air/water supply be graded and constructed so as to contain spilled material for cleanup. b- All trash container areas will meet the following requirements: 1) Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, screened or walled to prevent off-site transport of trash. 2) Trash dumpsters (containers) will be leak proof and have attached covers or lids. 3) Connection of trash area drains to the MS4 is prohibited. 4) Trash compactors will be roofed and set on a concrete pad. The pad shall be a minimum of one foot larger all around than the trash compactor and graded to drain to a sanitary sewer line. c- Material handling will be conducted in a manner as to prevent any storm water pollution. d- Where feasible, outdoor storage will be covered and surrounded by a secondary containment area.

3.6.3 LID BMPs

A review of the NRCS web soil survey determined that the onsite soils are of Hydrologic Soil Groups A (22%), B (7%), and D (71%). Based on the locations of the catch basins within the HSG map, two types of BMPs are proposed: Infiltration Basin and Extended Detention Basin. 5 out of 20 proposed drainage basins (i.e., basins 112, 117, 211, 332, and 335), which are located in soil group A region, would be of type Infiltration Basin. The adequate drainage for these 5 basins will meet the county's drawdown time required of 48 hours. All other 15 proposed basins are located in soil group D region with minimal infiltration potential; thus, stormwater retention ponds would not be feasible. Instead, stormwater extended detention basins would be implemented. Proposed basin locations are presented in Figure 1.5.

Using the Urban Runoff Quality Management Approach (a) outlined in the California Stormwater BMP Handbook for New Development and Redevelopment, a runoff coefficient for the site is calculated using the following regression equation:

$$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

Where:

i is the impervious fraction of the Drainage Management Area

The depth of runoff, P_o, is then calculated as:

$$P_o = (a\,.\,C) \times P_6$$

Where:

a = regression constant = 1.963 for a 48-hour draw down time

P_6 = mean annual runoff-producing rainfall depth, in watershed inches

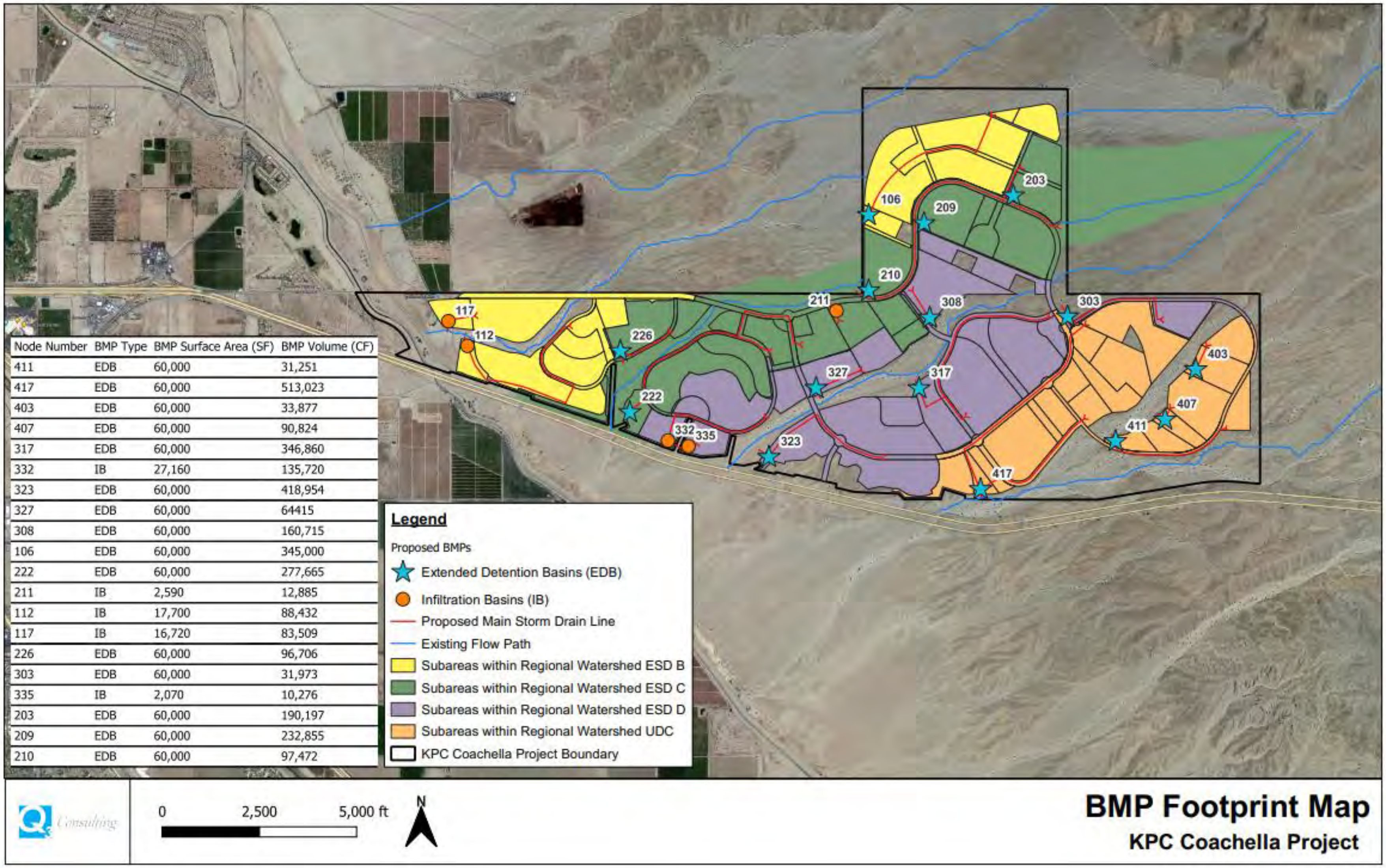
The value for P_6 is determined using tables provided in the California Stormwater BMP Handbook. Using the table provided for the Palm Springs Thermal Airport, the location which is most representative of conditions in Imperial Valley, the value of P_6 is approximately 0.47 inches.

To be consistent with the regional analysis, the local hydrology drainages are divided into 4 regional watersheds (ESD A, ESD B, ESD C, and Upper Double Canyon) including 20 water quality catch basins. The resulting Water Quality Capture Volume (WQCV) for each catch basin is summarized in Table 9. The on-site proposed catch basin is shown are presented in Figure 1-5. The detailed hydrology map (including drainage areas) for the proposed condition is presented in Appendix C.

Table 9 – WQCV Calculations per DMA

DMA	Proposed Basin Number	Area (ac)	Estimated % Imperviousness	Runoff Coeff. C	P_o (Depth of Runoff) (in)	WQCV (ac-ft)	HSG
ESD B	106	199.1	65	0.45	0.414	6.88	D
	112	154.9	20	0.17	0.157	2.03	A
	117	73.5	50	0.34	0.313	1.92	A
ESD C	203	289.7	20	0.17	0.157	3.80	D
	209	134.6	65	0.45	0.414	4.65	D
	210	74.6	50	0.34	0.313	1.92	D
	211	27.2	15	0.14	0.130	0.30	A/B
	222	176.3	60	0.41	0.377	5.54	D
	226	55.9	65	0.45	0.414	1.93	D
ESD D	303	48.7	20	0.17	0.157	0.64	D
	308	92.9	65	0.45	0.414	3.21	D
	317	200.5	65	0.45	0.414	6.92	D
	323	164.5	85	0.66	0.610	8.36	D
	327	49.3	50	0.34	0.313	1.29	D
	332	99.1	60	0.41	0.377	3.12	A
	335	18	20	0.17	0.157	0.24	A
Upper Double Canyon (UDC)	403	51.6	20	0.17	0.157	0.68	D
	407	52.5	65	0.45	0.414	1.81	D
	411	47.6	20	0.17	0.157	0.62	D
	417	291	66	0.46	0.422	10.24	D

Figure 3-1 Coachella Proposed BMP Catch Basins



Node Number	BMP Type	BMP Surface Area (SF)	BMP Volume (CF)
411	EDB	60,000	31,251
417	EDB	60,000	513,023
403	EDB	60,000	33,877
407	EDB	60,000	90,824
317	EDB	60,000	346,860
332	IB	27,160	135,720
323	EDB	60,000	418,954
327	EDB	60,000	64415
308	EDB	60,000	160,715
106	EDB	60,000	345,000
222	EDB	60,000	277,665
211	IB	2,590	12,885
112	IB	17,700	88,432
117	IB	16,720	83,509
226	EDB	60,000	96,706
303	EDB	60,000	31,973
335	IB	2,070	10,276
203	EDB	60,000	190,197
209	EDB	60,000	232,855
210	EDB	60,000	97,472

Preliminary BMP designs for all proposed Infiltration Basins and Extended Detention Basins are provided in Appendix D. We anticipate the WQCV will be well infiltrated in proposed Infiltration Basins (total 5 basins). For the Extended detention basins (total 15 basins), the volume up to 5 inches of detention, will be fully captured by the onsite drainage system and be detained, biotreated and slowly released to the adjacent storm drain system. It is anticipated that the drawdown time after a 100-year 24-hour storm event will not exceed 72 hours, thus according to the Coachella Valley Mosquito and Vector Control District Guidelines Mosquito, Abatement Plan will not be required to be approved by the Environmental Health Department prior to issuance of grading permit.

The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. Because the project will implement Infiltration and Extended Detention Basins, no increase of runoff rate, volume, or velocity is anticipated leaving the Project. The Hydromodification Management criteria would be fully met.

3.7 Long-Term BMP Maintenance

The project owner will maintain all onsite site design BMPs, source control measures, post-construction BMPs, Infiltration and Extended Detention Basins during the lifetime of the project. It shall be noted that preventative maintenance such as removal of trash and debris from the site will help ensure proper function of the BMPs.

The owners of the project are required to perform maintenance in perpetuity, keeping maintenance records for submittal to the County of Riverside and Regional Water Quality Control Board, if requested. In addition, the following maintenance activities will be conducted

- Continued education of staff responsible for hazardous material hauling, loading, and use.
- Periodic visual monitoring to ensure materials are not contaminating areas exposed to storm water.

If a transfer of ownership takes place, the owner will notify the County of Riverside, and the Region 7 Colorado River Basin Regional Water Quality Control Board. The new owner will assume all responsibilities for BMP maintenance

4 Environmental Impacts with Respect to Stormwater Quality

The Thresholds of Significance from Appendix G of the California Environmental Quality Act CEQA (CEQA) Guidelines, Section VIII. Hydrology and Water Quality, were reviewed based on the findings from this Conceptual Water Quality Assessment. Threshold of significance are discussed below.

Impact A - Would the Project violate any water quality standards or waste discharge requirements?

Impact Analysis - As a result of the recommended site design and source control measures, and the provision of full Infiltration Basins and Extended Detention Basins, water quality exceedances are not anticipated, and pollutants are not expected within project runoff that would adversely affect beneficial uses in downstream receiving waters. The project will comply with the requirements of the State Regional Water Quality Control Board concerning coverage under the Construction General Permit. If the project is phased, each phase of construction will be required to submit a Notice of Intent and SWPPP, and apply for coverage under the Construction General Permit. It is concluded that this issue is considered a less than significant impact.

Impact C - Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

Impact Analysis - Runoff from the project will be directed to Infiltration Basins, where feasible, or Extended Detention Basins that will prevent any discharge from the site. Due to the implementation of Infiltration/Extended Detention Basins, it is anticipated that the annual runoff from the proposed project site will decrease when compared to the existing condition. As such, it is concluded that this issue is considered no impact.

Impact E - Otherwise substantially degrade water quality

Impact Analysis - Refer to the water quality discussion included in the Impact A analysis above. It is concluded that this issue is considered a less than significant impact.

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Technical Appendix

Appendix A

KPC Coachella SPECIFIC PLAN

August 2019

The kpc Group

KPC COACHELLA SPECIFIC PLAN

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Prepared For:

CITY OF COACHELLA

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SECTION 1
Introduction

1.1 Executive Summary

The KPC Coachella Specific Plan serves as the guiding document for future development with the Specific Plan area, located in the City of Coachella within the Coachella Valley region of Riverside County. The plan sets the regulatory framework that provides design guidance, development regulations, and implementation measures for build-out of the Specific Plan area over the next 30+ years.

The KPC Coachella Specific Plan proposes a master planned residential community on approximately 2,800 acres of currently undeveloped land within the City of Coachella. The plan proposed the following land uses:

- A mixture of residential product types, including an active adult/senior-oriented village, totaling approximately 9,550 dwelling units;
- 188 acres of mixed-use areas, which include commercial retail, high-density residential, resort, and entertainment uses;
- A college/university overlay to allow for institutions of higher learning with an emphasis on healthcare;
- 59 acres of school (3 elementary schools and 1 middle school);
- 301 acres of parks, greenways, and amenity centers;
- 202 acres of circulation uses, including arterials, major, and secondary roadways;
- 121 acres of Agricultural Production areas; and
- 742 acres of natural open space, including drainage channels and trails.

The KPC Coachella community will include an extension of Vista Del Norte road from the west and a connection with the new Avenue 50 interchange at Interstate 10 which is proposed to be developed as part of the La Entrada community to the south.

1.2 Location

The Specific Plan area (plan area) is located along the foothills of the Little San Bernardino Mountains on the eastern flank of the Coachella Valley, north of the Salton Sea (see Figure 1-1, *Regional Location Map*). The site is located north of Interstate 10 (I-10) and east of the Coachella Branch of the All-American Canal (also known as the "Coachella Canal"). See Figure 1-2, *Project Vicinity Map* for the project's location within the region. A new interchange at Avenue 50 will provide regional access to the site from I-10. The plan area consists of approximately 2,800 gross acres within the City of Coachella.

1.3 Existing Conditions

1.3.1 Ownership/Assessor Parcel Information

The plan area is approximately 2,800 acres of vacant, undeveloped land owned primarily by The KPC Group. The plan area is comprised of 50 parcels, as shown in Figure 1-3, *Ownership and Parcel Information*. Figure 1-3 also shows the parcel line delineations, acreage, and assessor parcel numbers (APN) for each parcel.

1.3.2 Existing General Plan Land Uses/Existing Zoning

The KPC Coachella Specific Plan is located within the City of Coachella. The following are the respective existing general plan land use and zoning classifications for the plan area.

General Plan Land Use

The Specific Plan area is comprised of a Resort District designation as shown on Figure 4-23, *General Plan Designation Map*, of the Coachella General Plan Update 2035, adopted in 2015.

The Specific Plan area is identified in the General Plan as Subarea 13, The Uplands/Desert Lakes. The General Plan outlines a process for development in the various subareas of the City, starting with Due Diligence on the part of the landowner to identify existing conditions and site constraints. This is followed by a pre-application phase to identify connectivity with the citywide street network, identify a street network for the specific project, and identify a net development yield based on the mixture of development districts. Preparation of the KPC Coachella Specific Plan represents the required "Master Plan" for the property.

The policy direction for Subarea 13 is to:

- Maintain Resort and Open Space General Plan designations for this subarea.

  The Specific Plan land use includes both open space and resort uses within the subarea, as well as other complementary uses such as schools, agriculture, higher education, and medical uses.

- Facilitate good roadway connectivity to Dillon Road. The network illustrated by Figure 4-1 could be adjusted to account for topography and physical constraints as long as the envisioned connectivity is maintained.

  The Specific Plan circulation network provides two primary circulation access points: a connection to Avenue 50 and its future interchange with I-10, and an extension of Vista Del Norte, which connects to Dillon Road.

- Prior to development, prepare a single conceptual Specific Plan for the subarea that establishes a long-term vision, land uses and an implementation program. Separate implementing project level specific plans may be prepared for individual projects.

  Figure 2-2 illustrates a conceptual Specific Plan which includes all of Subarea 13. The primary land uses are shown within the property controlled by KPC. The two outparcels on the project's east and west are identified as Open Space, consistent with the Land Use diagram of the General Plan. Potential future points of access are also shown to these two areas.

- Minimize grading of the subarea and follow the natural topographic features during the planning and development process.

  The property includes areas of steep slope adjacent to the proposed points of access at the Avenue 50 interchange. The interchange will result in significant grading in this area to accommodate the proposed improvements, primarily accomplished through plans developed by others. The Specific Plan will utilize the County grading standards as the City has no adopted grading ordinance. The Design Guidelines in this document include Hillside Grading guidelines that encourage the use of landform grading where possible.

- Require that public facilities and services be provided concurrently with the development to ensure a high quality of life for residents.

The Specific Plan land uses are supported by local schools, residential, and commercial uses to create a cohesive community. A fire station will be provided in one of the proposed villages.

- Require rural and clustered development in steeper and topographically constrained areas.

  Upper more steeply sloped areas of the plan include low/very low-density development. The overall land use plan is clustered to avoid seismic zones, steep slopes, and drainage corridors.

- Require new developments be designed for, and provided with, adequate public services and infrastructure to be self-sufficient in the event of a large earthquake.

  The Specific Plan land uses are supported by local schools, residential, and commercial uses to create a cohesive community. An on-site fire station will be provided in one of the proposed villages.

- Require the primary boulevards to be designed, constructed and operated as multi-modal boulevards, not wide high-speed streets.

  All of the arterial and collector streets within the Specific Plan area are designed to incorporate either on-street/Class II bike lanes or off-street/Class I multipurpose trails connecting to an overall trails network throughout the site.

- Limit all resort development to a density of no more than 4 DU/AC.

  A total of 9,500 dwelling units is proposed within the Specific Plan area. Over the 2,800 acres, this results in an overall gross density of 3.4 du/acre.

- Final designation mix should be:
- 20 to 30 percent Open Space
- Up to 25 percent Agricultural Rancho and Open Space
- Up to 50 percent Rural Rancho
- Up to 10 percent General Neighborhood
- Up to 3 percent Suburban Retail District
- Up to five percent Neighborhood Center
- Up to 60 percent Resort

Zoning

The plan area is comprised of land with three different zoning designations, including:

- General Commercial (C-G)
- Residential Single Family (R-S)
- Open Space (OS)

The General Commercial zoning district is focused along Interstate 10 with Single Family Residential uses in the northeast portion of the plan area and narrow strips of Open Space permeating throughout. A change of zone will be processed for the project, with a resulting zoning designation of *Specific Plan*.

1.3.3 Surrounding Uses

The plan area is located in the northeast corner of the City of Coachella, surrounded entirely by undeveloped desert land and a small amount of agricultural use.

Interstate 10 runs east to west along the entire length of the southern border of the plan area. Further south is undeveloped land which is currently entitled as part of the La Entrada Specific Plan. Agricultural uses across the All-American Canal, which runs northwest/southeast and comes up to form the western boundary of the plan area.

The areas north of the plan area include a triangular swath of agricultural land, a landfill owned by Burrtec Waste Industries, and the foothills of the Little San Bernardino Mountains. A Southern California Edison (SCE) utility easement runs northwest to southeast through northeast portion of the plan area and continues in both directions. Additionally, two separate gas pipeline easements further north run roughly parallel to the SCE easement through the property. The eastern boundary of the plan area runs along the eastern boundary line for the city. The plan area is approximately three miles to the east of Coachella's downtown business district.

1.3.4 Topography

The KPC Coachella Specific Plan area lies in a relatively flat area at the base of the Little San Bernardino Mountains. On-site there are several northeast-southwest running ridges cut by adjacent flat alluvial drainage ways. The plan area is generally flatter towards the northeast portion of the site, with most slopes ranging between zero and ten percent. Steeper slopes are concentrated along the western and southern portions of the plan area.

Figure 1-4, *Slope Analysis*, shows the existing topography conditions for the plan area.

1.3.5 Vegetation

There is limited on-site vegetation currently as the site is currently vacant and undeveloped. The area is primarily rocky exposed soils with scattered small shrubs and trees, brush, and flowers.

1.3.6 Circulation and Access

The plan area is entirely undeveloped land with no current internal circulation. Primary access will be provided by an interchange on Interstate 10 to be constructed as part of the La Entrada project directly to the south of the plan area. Secondary access to the site will be provided from the west via Vista Del Norte, which will be expanded from the current two-lane configuration to handle the additional anticipated capacity.

1.3.7 Infrastructure and Utilities

The existing infrastructure facilities within the plan area include an IID transmission line and towers that run northwest from the southeast boundary of the plan area through the northern boundary. This includes a public utility easement. There are currently no other existing infrastructure facilities within the plan area.

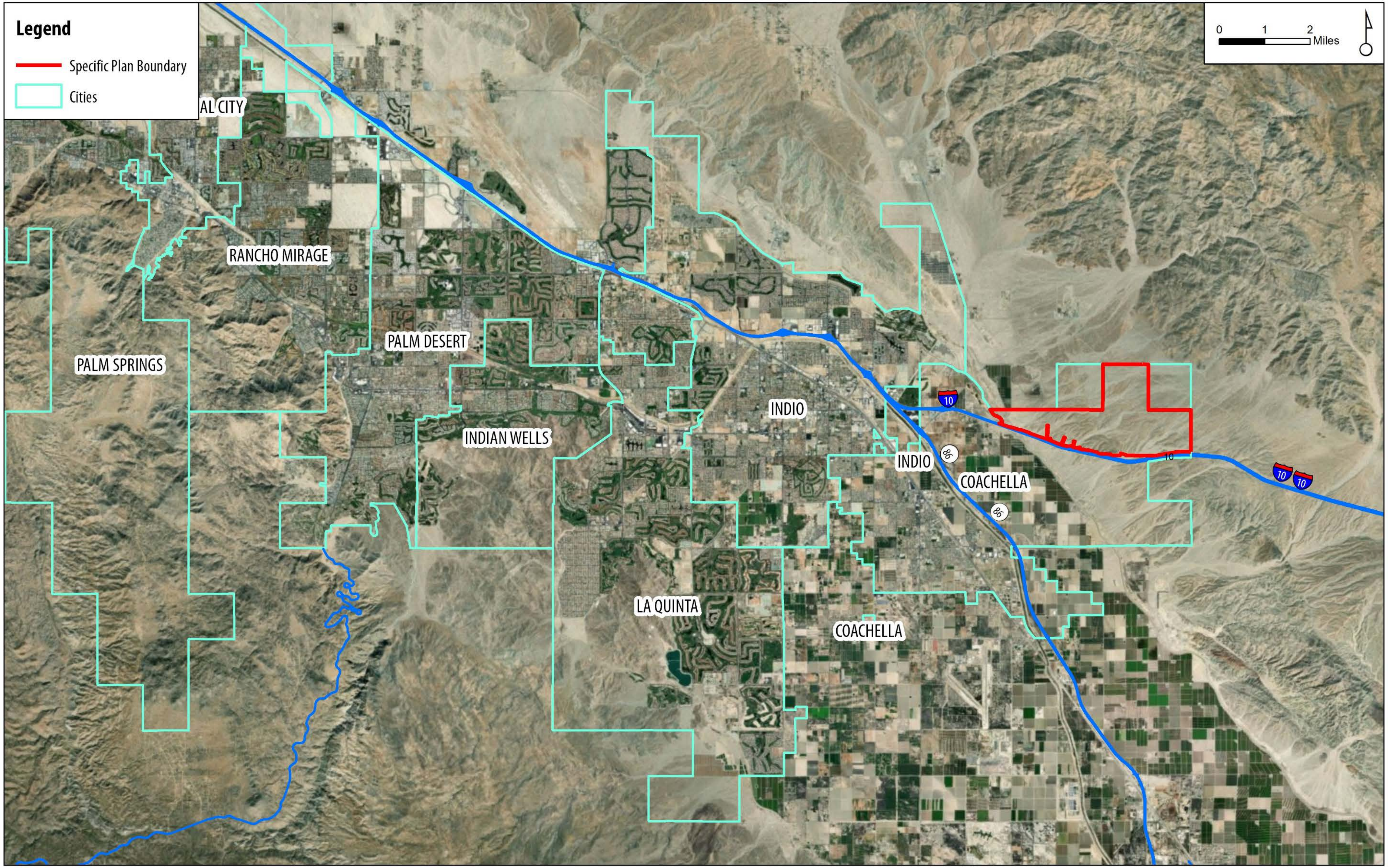

FIGURE 1-1: REGIONAL LOCATION MAP

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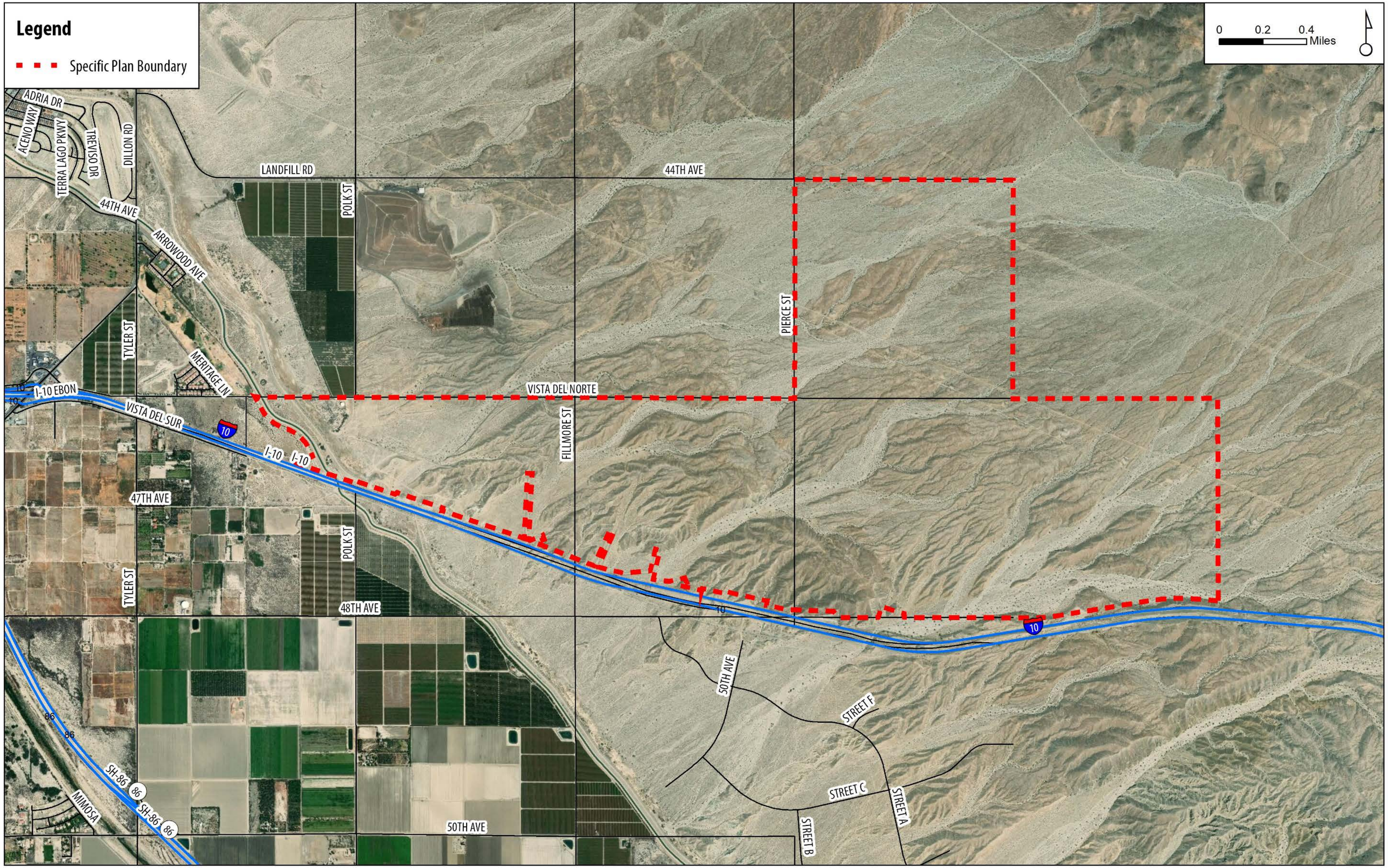

FIGURE 1-2: PROJECT VICINITY MAP

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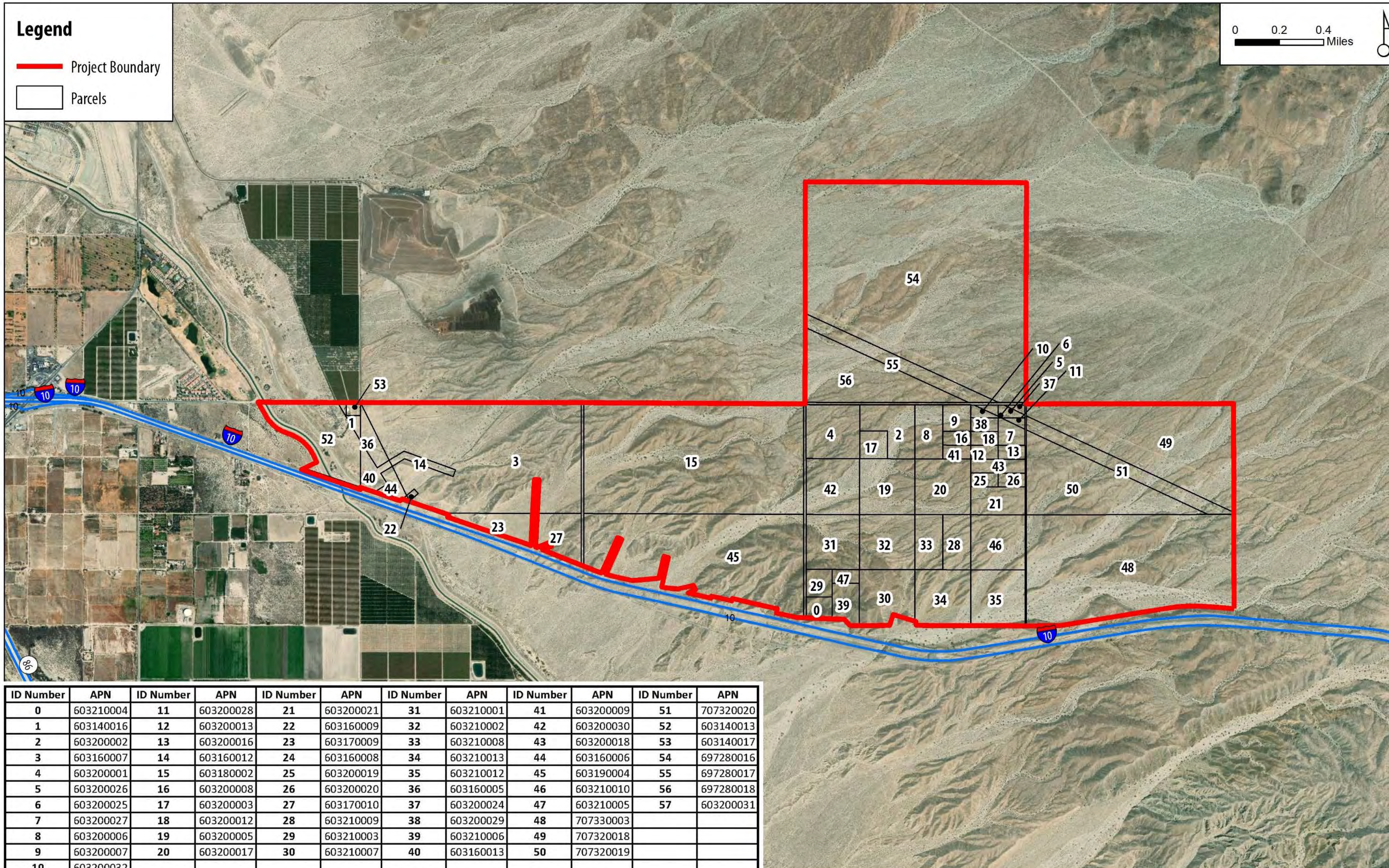

ID Number	APN	ID Number	APN	ID Number	APN	ID Number	APN	ID Number	APN	ID Number	APN
0	603210004	11	603200028	21	603200021	31	603210001	41	603200009	51	707320020
1	603140016	12	603200013	22	603160009	32	603210002	42	603200030	52	603140013
2	603200002	13	603200016	23	603170009	33	603210008	43	603200018	53	603140017
3	603160007	14	603160012	24	603160008	34	603210013	44	603160006	54	697280016
4	603200001	15	603180002	25	603200019	35	603210012	45	603190004	55	697280017
5	603200026	16	603200008	26	603200020	36	603160005	46	603210010	56	697280018
6	603200025	17	603200003	27	603170010	37	603200024	47	603210005	57	603200031
7	603200027	18	603200012	28	603210009	38	603200029	48	707330003		
8	603200006	19	603200005	29	603210003	39	603210006	49	707320018		
9	603200007	20	603200017	30	603210007	40	603160013	50	707320019		
10	603200032										

FIGURE 1-3: OWNERSHIP AND PARCEL INFORMATION

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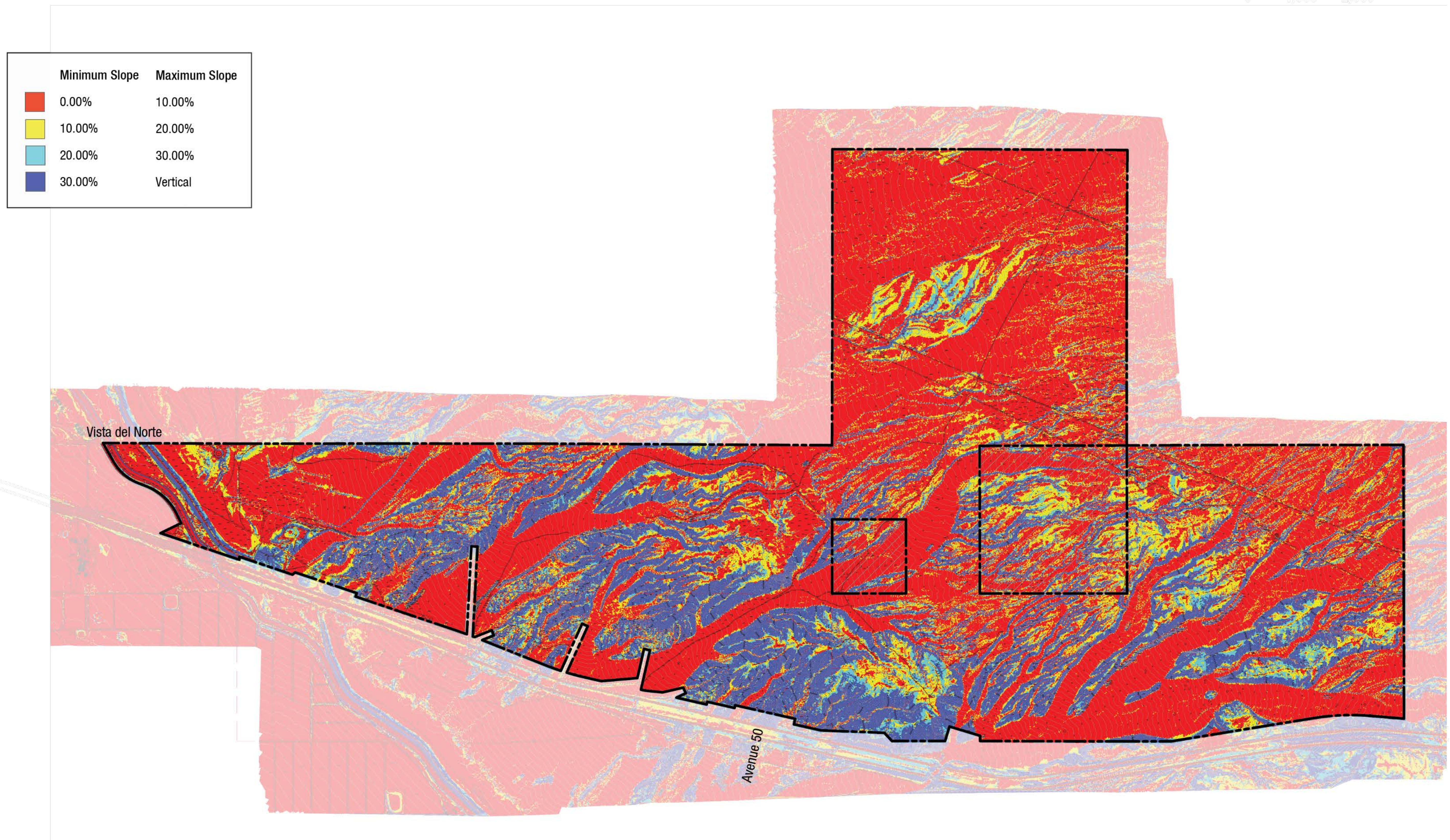

FIGURE 1-4: SLOPE ANALYSIS

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1.3.8 Geology and Soils

The Specific Plan area is located in the Salton Trough that comprises a portion of the Colorado Desert geomorphic province. The KPC Coachella Specific Plan area is underlain by mid- to late-Quaternary sedimentary units consisting of the (oldest to youngest) Canebrake, and Palm Spring Formation, and Ocotillo Conglomerate, as well as fluvial/alluvial deposits associated with the current drainages located on-site that primarily result in sand and gravel in the area.

The Specific Plan area is located in the Colorado Desert region of southern California, which has an arid climate. Temperatures range from 46 degrees to over 112 degrees Fahrenheit. Prevailing winds typically come from the south and east. Rainfall in the project area is seasonal, with the largest amounts of rainfall occurring during the months of November through January. In addition, thunderstorms occur during the summer months (typically August) that generate short-term rainstorms with occasional flooding.

1.3.9 Drainage/Hydrology

Drainage within the Plan Area is defined primarily by the series of northeast-southwest running ridges which shape the alluvial drainage channels that have the potential to carry large amounts of water runoff during large storm events. Water collects further to the northeast in the Little San Bernardino Mountains where it sheet flows into the Plan Area and funnels into the existing drainage channels. Due to the rocky, compacted nature of the soil along the ridges and minimal plant material, there is little opportunity for infiltration during large storm events. Surface water then flows in a southwesterly direction, under I-10 and through the La Entrada Specific Plan area, until it terminates at the Eastside Dike, then flowing southeasterly to Wasteway No. 2, which conveys the water to the Whitewater River and ultimately to the Salton Sea.

1.4 Purpose and Objectives

1.4.1 Vision

The vision of the KPC Coachella Specific Plan is to create a new multi-use community that provides entertainment and commercial shopping opportunities, a variety of housing types, schools, parks, and open space for the City of Coachella.

The plan area, in conjunction with the incoming La Entrada development directly to the south, form a vibrant and iconic eastern entrance to the City of Coachella that creates a strong sense of arrival.

1.4.2 Project Objectives

The project objectives for the KPC Coachella Specific Plan outline the structure for implementing the overall vision described in the previous section. These objectives are important in ensuring both the success of the project and the benefit to the City of Coachella.

The KPC Coachella Specific Plan project objectives include:

- Create a well-designed master planned community with a diverse mixture of uses, clear and efficient multi-modal transportation options, a regional commercial entertainment attraction, and expansive open programmed and natural open spaces opportunities;
- Establish a well-thought-out land use plan that places high-activity uses such as the Casino in a concentrated resort district to increase their attraction ability through mutual synergy of uses, and lower intensity uses such as residential and the planned active adult community in serene locations away from Interstate-10;

- Accommodate land uses which focus on wellness, including a wellness university overlay and a mixed-use medical area near the central core of the community;
- Accommodate a wide range of residential densities in strategic locations that provide future residents with options for different housing types and prices while maintaining a cohesive neighborhood identity;
- Provide a variety of open space opportunities, including planned and programmed neighborhood parks, passive recreation corridors, and a trail system that increases connectivity both within and outside of the plan area;
- Implement a circulation plan with roadways that are consistent with the established General Plan Roadway Classifications for the City and creates connections to Vista Del Norte Avenue to the west as well as the planned new Interstate-10 interchange proposed as part of the La Entrada project;
- Develop a site plan that works harmoniously with the on-site environmental elements, including existing topography and drainage channels;
- Promote the use of green building practices and sustainable development methods throughout the project; and
- Implement community design and landscaping elements that are cohesive with and complement the unique Coachella Valley environment.

1.5 Sustainability Community Design Strategies

Various constraints can impede development within California. Often these constraints are focused on limited or inadequate access to necessary resources upon which our communities rely. Given these constraints, many communities attempt to address these issues with the implementation of sustainable community design strategies. In the case of the KPC Coachella Specific Plan, sustainable community design strategies take into consideration the issues endemic to the City of Coachella and Coachella Valley, as well as specific constraints within the site itself (steep topography, existing drainages, and unique physical site characteristics). An important tenet of sustainable development is the efficient use of available resources coupled with maintaining a healthy balance between natural open space areas and developed areas; this approach was relied upon when establishing the proposed land use plan concept, roadway network, and trail system. In addition, many areas within the Specific Plan are identified for very low- or low-density development or preservation as open space. In many of these areas, development (or more intense use) would require a significant amount of resources to overcome the development constraints. As a result, a significant amount of development has been concentrated along the central portion of the Specific Plan.

1.5.1 Purpose and Approach

Given the location of the project site and its proximity to developed areas of the Coachella Valley, the KPC Coachella Specific Plan is making an effort to reduce its impact on the environment and create opportunities for establishment of a community that is focused on meeting residents' and businesses needs to the greatest extent. The sustainable community design strategies identified within the KPC Coachella Specific Plan are intended to reduce and/or minimize negative environmental impacts, as well as improve or enhance the economic and social conditions within this portion of the City.

The main purpose of these strategies is to:

- Provide guidance and feedback for future development of the KPC Coachella Specific Plan that promotes efficient and sensible use of the available resources at the time development occurs; and
- Allow future residents to enjoy a high-quality development that minimizes physical impacts to the natural environment and maximizes economic utility and social cohesion to the greatest extent practicable.

Based on this, the approach to sustainable community design within the KPC Coachella Specific Plan is focused on the following areas:

- Site Planning/Neighborhood Design (including mobility)
- Energy Efficiency
- Materials Efficiency
- Water Efficiency
- Occupant Health and Safety
- Landscape Design/ Low Impact Development

Individual builders or developers will be expected to demonstrate implementation of relevant strategies as part of the design/site plan review process. Each section provides a menu of strategies.

Detailed discussion of each of these topics is provided below.

1.5.2 Site Planning/Neighborhood Design

The KPC Coachella Specific Plan incorporates numerous sustainable community design site planning strategies that contribute towards the overall goals of the project. Many aspects of sustainability rely on the proper siting and layout of a proposed development/building. Optimizing a building's energy performance is dependent on building/site layout and how the areas of the site are used to maximize natural processes. If the site proposed for development does not allow for proper building placement to maximize solar orientation, then a greater amount of energy may be needed to heat/ cool and light the interior space of a building.

Sustainable Community Design Strategies for Site Planning within KPC Coachella include:

Land Use Pattern

- A land use pattern that promotes the concentration of uses/development within the lower portions of the site, which will require less grading and energy to supply infrastructure services and allow the higher elevations of the site to remain as open space and/or low intensity residential uses;
- Development of a mobility network that complements the topography of the site and provides numerous pathways for vehicular and non-vehicular travel using an interconnected bent grid street system, pedestrian trails and pathways, and neighborhood electric vehicle facilities;
- Prohibition of development within floodplains on-site and integrate appropriate setbacks/buffers and passive recreational amenities within these areas into the land use plan;
- Allow for multi-generational housing, higher density and mixed use, and second housing units within appropriate residential areas of the plan, producing fewer vehicle miles traveled and ensuring that jobs, shopping and housing are located proximate to each other.

Walkability/Mobility

- Promote walkable streets through the use of sidewalks at least 6 feet wide within residential areas, and 8 feet wide within mixed use areas;
- Promote walkability, design and build the internal (in-tract) circulation network to meet a high number of intersections per square mile, minimizing long uninterrupted streets. In addition, development of each Mixed-Use Planning Area should strive to incorporate features that promote pedestrian use by providing an attractive pedestrian environment, such as location of storefronts close to the street, use of activated facades with windows fronting the street, and provision of street furniture such as benches, awnings;
- Ease and increase pedestrian access of residential, commercial, and mixed-use developments by orienting off-street parking to the side or rear of buildings or utilizing on street parking instead;
- Provide access to civic and/or public use spaces (parks, trails, squares) within ¼ mile walking distance to the residential neighborhoods within the project through project-wide trail and paseo systems;
- Prioritize pedestrian and bicycle mobility as primary transportation modes, which will reduce transportation-related greenhouse gas emissions;
- Include bicycle storage facilities into new multi-family residential, commercial, and community uses, and integrate bicycle paths/trails into the non-vehicular circulation network;
- Encourage the use of alternative transportation modes such as public transit, by providing a well-rounded transportation system that creates increased access to the entire city;
- Integrate the land use plan with existing and proposed public transportation infrastructure (transit stops/routes) that connect the Specific Plan to other developed areas of the Coachella Valley. Identify transit stop locations within the project that are conveniently accessed and able to support a large proportion of the residents of the development;
- Improve physical and mental health and social capital by providing a variety of recreational facilities close to work and home to facilitate physical activity and social networking; and
- Promote community interaction and engagement by integrating schools into the neighborhoods of the plan. Support students' health by encouraging walking and bicycling to on-site elementary and middle schools.

Solar Orientation

- Maximize site layout at the Planning Area level to accommodate the greatest amount of solar orientation for each use proposed;
- Develop land uses that provide opportunities for a variety of building types, uses, and densities that accommodate a variety of populations and generations within the Coachella region;
- Promote building orientation that considers the following:
- Maximize northern and southern building exposure for daylighting purposes;
- Ensure south-facing windows are properly shaded to reduce heat gain into building interiors;
- Minimize east and west-facing windows unless shaded;
- Place landscaping within appropriate locations to provide adequate shading and wind protection (depending on prevailing wind conditions and solar orientation).

1.5.3 Energy Efficiency

Development within the KPC Coachella Specific Plan is to be a model of energy efficiency, using various energy conservation and generation practices including strategies and techniques that exceed the California Green Building Standards (CalGreen Code) and California Energy Code of Title 24. New electric, natural gas, and communication lines will be constructed to the most recent applicable codes and requirements, providing appropriate services to serve the new community. As part of the electrical system, the planning areas within the KPC Coachella Specific Plan will be designed to maximize the use and generation of renewable energy on-site to the extent desired through a commitment to the use of solar/photovoltaic systems as discussed below. A robust green building program for all new buildings will reduce reliance on traditional energy sources.

Sustainable Community Design Strategies for Energy Efficiency within KPC Coachella include the following elements:

- Design to USGBC LEED, GreenPoint Rated standards, or better will be a requirement for all new buildings constructed within the KPC Coachella Specific Plan, in addition to exceeding the most current Title 24 energy efficiency and CALGreen building standards;
- Installation of energy-efficient LED lighting and incorporation of solar photovoltaic lighting fixtures in all common areas of the site;
- Installation of energy-efficient appliances (Energy Star or equivalent), and high-efficiency HVAC systems within residences and businesses of the proposed development;
- Promote green building techniques that increase building energy efficiency above the minimum requirements of Title 24;
- Installation of solar photovoltaic panels on a minimum of 25% of the residences/businesses within the site to be tracked by the City by major development phase; and
- Utilize high reflectance materials for paving and roofing materials.

1.5.4 Materials Efficiency

A sustainable approach to materials selection typically includes the use of recycled or reused, and locally-produced or harvested materials. Although there are no existing structures on-site that may be re-used, the Specific Plan proposes the use of locally sourced materials for any construction that occurs on-site as a means of reducing transportation-related greenhouse gas emissions. Earthwork activities on-site will use onsite materials in a balanced manner that will minimize truck hauling and reduce the need for quarried materials, thereby reducing transportation-related emissions, and may also count towards sustainable building design credits (USGBC LEED, GreenPoint Rated, or equivalent).

Sustainable Community Design Strategies for Materials Efficiency within KPC Coachella include:

- Materials used for buildings, landscape, and infrastructure will be chosen with a preference for the following characteristics:
- Rapidly-renewable
- Increased recycled content (50% or greater)
- Locally-sourced materials (within South Coast Air Basin)
- Utilization of sustainable harvesting practices
- Materials with low or no volatile organic compounds (VOCs) or off-gassing.

- Materials that employ heat island reduction strategies, such as light-colored roofing, light-colored paving, and permeable paving
- New building construction practices will incorporate on-site and/or off-site separation of solid wastes, recyclable paper, plastic, glass and metal objects, and compostable organic materials, which will be compatible with municipal recycling services and are designed to achieve the goal of 75% diversion of solid waste to landfills; and
- Specify on-site infrastructure materials to include recycled content (from pre-consumer recycled materials, post-consumer recycled materials, and in place reclaimed materials) to the extent feasible and available locally.

1.5.5 Water Efficiency

The KPC Coachella Specific Plan employs a multi-faceted approach to water efficiency. The proposed land use plan identifies a variety of areas that are intended to accommodate stormwater conveyance facilities, bio-swales, and water quality treatment facilities designed to improve water quality on-site and limit downstream water quality impairments from the proposed development (see Figure 2-17 *Conceptual Drainage Plan* for location of stormwater facilities). Coupled with this, the KPC Coachella Specific Plan proposes the efficient use of potable water through mandated building and site design requirements. In addition, the site layout would be able to accommodate an on-site sewer/reclaimed water treatment facility if necessary, to create non-potable water supplies and utilize canal water for irrigation purposes.

Sustainable Community Design Strategies for Water Efficiency within KPC Coachella include:

- Reduce potable water demand throughout the KPC Coachella Specific Plan area by utilizing appropriate landscaping, non-potable reclaimed, well or canal water for irrigation purposes (when available), and high-efficiency plumbing fixtures and appliances;
- Utilize high-efficiency plumbing and fixtures that meet or exceed the CalGreen code (most current adopted version);
- Utilize efficient irrigation controls to reduce water demand on landscaped areas throughout the project;
- Reduce the amount of irrigated turf in parks to those uses dependent upon turf areas;
- Implement an integrated stormwater collection and conveyance system designed to treat and convey development-related runoff; provide 100-year flood protection to flood prone areas; increase groundwater recharge (where practical) through on-site retention basins, and improve water quality on-site and downstream through on-site water quality basins;
- Implement dual plumbing within the recreation, landscaped medians, common landscaped areas, mixed-use/commercial planning areas, and parks to allow for the use of reclaimed water when available; and
- Support the development of reclaimed water supplies in the City of Coachella and the La Entrada Specific Plan, which will achieve the goal of reducing the overall consumption of potable water from the municipal supply.

1.5.6 Occupant Health and Safety

According to the Whole Building Design Guide, modern buildings are generally considered safe and healthy working environments. However, the potential for indoor air quality problems, occupational illnesses and injuries, exposure to hazardous materials, and accidental falls require that building designs focus on eliminating or preventing hazards to personnel, rather than relying on personal protective equipment and administrative or process procedures to prevent mishaps[1]

Since an important aspect of building design is the interaction between the occupants and their environment, if the design of a building does not take occupant health, safety, and welfare into account, then their productivity and self-worth may become diminished. To combat this issue, design teams (architects, engineers, and designers) must engage in an integrated design approach that focuses on building healthy environments that are safe for occupants throughout a building's life cycle: planning, design, construction, operations and maintenance, renovation, and final disposal.

Sustainable Community Design Strategies for Occupant Health and Safety within KPC Coachella include the following strategies to be implemented at the builder level:

- Provide designs that eliminate or reduce hazards in the workplace (occupational injuries, illness, slips, trips, falls, etc.) to prevent mishaps and reduce reliance on personal protective equipment;
- Construct buildings on-site that eliminate exposure to hazardous materials (e.g., volatile organic compounds (VOCs) and formaldehyde, carcinogens, and endocrine disrupting chemicals);
- Require the use of building materials that use low VOC paints and coverings, flooring and cabinetry that does not contain formaldehyde or other hazardous chemicals;
- Provide good indoor air quality (IAQ) and adequate ventilation within commercial and residential buildings constructed on-site;
- Implement a green operations and maintenance program for all publicly accessible spaces (commercial development, public plazas, parks, etc.) that minimizes the use of hazardous/ toxic chemicals;
- Incorporate universal design techniques and strategies into each Planning Area, whereby the widest spectrum of people, regardless of age or ability can more easily participate in community life; and
- Promote the reduction of light pollution through the use of automatic controls on exterior lighting, shielding to prevent light spillover, and lighting technologies that reduce glare and light pollution affecting night sky access and impacts to wildlife environments.

1.5.7 Landscape Design/Low Impact Development

Landscaping within the KPC Coachella Specific Plan area will complement the surrounding desert environment as well as provide areas for outdoor enjoyment and activity. The plant palette proposed for the Specific Plan identifies appropriate plant types that have low water requirements, minimize turf, and provide shade, and which reduce the urban heat island effect. In conjunction with the proposed landscape design, the KPC Coachella Specific Plan proposes the use of Low Impact Development (LID) techniques to control stormwater flows on-site (see list below). LID is an ecologically friendly approach to site development and storm water management that aims to mitigate development impacts to land, water, and air. The approach emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site.

Sustainable Community Design Strategies for Landscape Design within KPC Coachella include:

- Increase access to fresh produce and through the promotion of community-based food production within the project. This can be achieved through CC&Rs that do not prohibit local

[1] http://www.wbdg.org/design/ensure_health.php

food production, establishment of neighborhood gardens, community supported agriculture, and/or promotion of a Farmer's Market within the project;

- Utilize native plant choices to the greatest extent possible throughout the development that complement the existing flora and fauna found on-site;
- Develop a plant palette that focuses on shading within the developed portions of the site and in those areas of pedestrian activity. An increase in shading within the development will promote greater walkability and reduce the urban heat island effect. Both will assist in the reduction of greenhouse gas emissions associated with the proposed development;
- Promote the development of tree-lined streets to encourage walking, biking, and transit use, and reduce urban heat island effects;
- Reduce the heat island effect through the minimization of impervious surfaces and incorporation of landscaping within the development that provides adequate shading of developed areas within five years of occupancy;
- Employ heat island reduction strategies such as vegetative cover and planting, substantial tree canopy, and south and west side tree planting; and
- Eliminate turf throughout the development to the greatest extent possible. Utilizing artificial turf and/or xeriscaping to reduce water demand and be responsive to existing climatic conditions within the project area.

Low Impact Development. Sustainable Community Design Strategies for Low Impact Development within KPC Coachella include:

- Preserve open space and minimize land disturbance within the Specific Plan, which reduces impacts to native terrestrial plants and animals and preserves the integrity of the ecological and biological systems on-site;
- Incorporate natural site elements (significant rock outcroppings, drainage corridors, bioswales) as design features; and protect natural systems and processes (drainage ways, vegetation, soils, sensitive areas);
- Reduce municipal infrastructure and utility maintenance costs (streets, curbs, gutters, sidewalks, storm sewer) by reexamining the use and sizing of traditional site infrastructure (lots, streets, curbs, gutters, sidewalks) and customizing infrastructure design to each planning area;
- Incorporate decentralized and micromanaged stormwater and/or water quality facilities close to the source within each planning area, protecting site and regional water quality by reducing sediment and nutrient loads to water bodies on-site and downstream;
- Construct bioswales within private development areas and street rights-of-way where grades permit;
- Mimic the predevelopment site hydrology by using site design techniques that store, infiltrate, evaporate, and retain runoff to reduce off-site runoff and facilitate groundwater recharge (where practical); and
- Ensure that receiving waters experience fewer negative impacts in the volume, frequency, and quality of runoff, by maintaining base flows and more closely approximating predevelopment runoff conditions.

1.6 Context

1.6.1 Authority and Requirements

The authority to prepare and adopt a Specific Plan and the requirements for its contents are set forth in California Government Code Sections 65450 through 65457.

Section 65451 states:

> *A Specific Plan shall include a text and a diagram or diagrams which specify all of the following in detail:*

- The distribution, location and intent of the uses, including open space, within the area covered by the plan.
- The proposed distribution, location, and extent and intensity of major components of public and private transportation, sewage, water, drainage, solid waste disposal, energy, and other essential faculties proposed to be located within the area covered by the plan and needed to support the land uses described by the plan.
- Standards and criteria by which the development will proceed, and standards for the conservation, development, and utilization of natural resources, where applicable.
- A program of implementation measures including programs, public works projects, and financing measures.
- The Specific Plan shall include a statement of the relationship of the Specific Plan to the General Plan.

Specific Plans may be adopted as policies by resolutions or by ordinance. The City of Coachella will adopt the KPC Coachella Specific Plan by ordinance, establishing the land use regulations and designations for the subject property. State Law requires public hearings by both the Planning Commission and City Council. The City Council must adopt the Specific Plan for it to take effect.

The KPC Coachella Specific Plan is a regulatory plan constituting the development concept and zoning for the property within its boundaries. Development plans or agreements, tract or parcel maps, precise development plans, or any action requiring ministerial or discretionary approval on this property must be consistent with the Specific Plan as approved by the City Council. This Specific Plan implements the goals and policies of the City of Coachella General Plan (the General Plan), serves as an extension of the General Plan, and can be used as both a policy and a regulatory document. The purpose of this Specific Plan is to implement the vision by providing goals, policies, programs, development standards, and design guidelines to direct future development within the Plan Area.

1.6.2 Tribal Authority

A 25-acre portion of the Specific Plan area is anticipated to be taken into trust by the Federal government for the benefit of the Torres-Martinez Desert Cahuilla Indians under a 1996 claims settlement. The authority of the Torres-Martinez is based upon the inundation of tribal lands under the Salton Sea as outlined by the US Code Title 25 related to Indian Land Claims Settlements. Once taken into trust, the proposed casino use is authorized by the Tribal-State Gaming Compact between the Torres-Martinez Desert Cahuilla Indians and the State of California. The Compact specifically notes that additional land may be acquired by the tribe adjacent to Interstate 10 for the purpose of building a gaming facility as a result of the inundation of the Tribe’s reservation land by the Salton Sea; and when that land is taken into trust, the tribe will be allowed to operate additional gaming devices beyond those permitted on the reservation lands. The property to be taken into trust will be placed under a management contract which governs tribal property.

1.6.3 Relationship to the General Plan and Zoning Code

The approval of the KPC Coachella Specific Plan would amend the City of Coachella's zoning for the property to allow the development of the proposed:

- 9,550 residential dwelling units;
- 188 acres of mixed commercial and entertainment uses;
- 59 acres of educational facilities;
- 1,163.7 acres of open space, park, and recreational facilities; and
- all planned roadways.

The General Plan designation of Resort District be amended to identify the property as "KPC Specific Plan." Map amendments to incorporate the proposed circulation network may be required to bring consistency between the Specific Plan and Circulation Element.

1.6.4 Specific Plan Background

The KPC Coachella Specific Plan area has been the subject of several studies and preliminary plans in the past, however, there has not been any formal development plans submitted for the area.

1.6.5 Initial Development Approvals

The entitlement process for Project includes the following discretionary approvals (see also Table 1-1, *Required Approvals*):

- Certification of an Environmental Impact Report (EIR) and adoption of a Mitigation Monitoring and Reporting Program.
- General Plan Amendment. General Plan Amendments (GPAs) will be required to implement the Specific Plan, including modifying the land use designation to a new designation of "KPC Coachella Specific Plan (SP 19-01) and modifying the mixture of general plan land uses within the Specific Plan Area.
- Zone Change. A Zoning map revision is required to change the zoning designation of the site from R-S (Residential Single Family), C-G (General Commercial), and Open Space to "Specific Plan." The Specific Plan includes the development regulations and standards that will become the zoning for the property, superseding the relevant sections of the City Municipal Code.
- Adoption of the Specific Plan by ordinance. Upon adoption, the Specific Plan will become the zoning for the site.
- Adoption of a Development Agreement. A Development Agreement will be executed with the City of Coachella in conjunction with the Specific Plan. The Development Agreement will vest the Project's entitlement approvals and obligate the developer to implement public benefit improvements.
- Finance and Conveyance Subdivision Map

Subsequent discretionary and ministerial approvals are anticipated to include the following:

- Subdivision Maps (Tentative and Final) for implementing projects
- Site Plan Review

- Building Permits

Implementation of the development project will also require a variety of approvals from local, State, and Federal Agencies, as demonstrated in Table 1-1, *Required Approvals*.

TABLE 1-1: REQUIRED APPROVALS

Requested Permit/Approval	Approving Agency
EIR Certification	City of Coachella
Specific Plan Adoption	City of Coachella
General Plan Amendment (if required)	City of Coachella
Zone Change	City of Coachella
Development Agreement	City of Coachella
Financing/Conveyance Tentative Tract Map Approval	City of Coachella
RCTC/CVAG Funding for Roads and Bridges	RCTC/CVAG
CVWD/Bureau of Reclamation Approvals for Coachella Canal Crossings	CVWD
Water Supply Assessment	City of Coachella – Water Department
1602 Permit	California Department of Fish and Game
404 Permit	U.S. Army Corps of Engineers
401 Permit	Regional Water Quality Control Board
NPDES	Regional Water Quality Control Board

1.7 California Environmental Quality Act Compliance

The California Environmental Quality Act (CEQA) classifies a specific plan as a “project” which is subject to environmental review. Certification of an Environmental Impact Report (EIR) is required prior to adoption of this Specific Plan to analyze potentially significant environmental impacts of the project, discuss feasible alternatives, and recommend feasible mitigation measures in compliance with the provision of CEQA. This EIR will analyze the entire Specific Plan and address potential impacts associated with the development of the Specific Plan area.

1.8 Specific Plan Organization

The KPC Coachella Specific Plan sets limits on the amount of development and allowable land uses, provides the standards for street dimensions, parking, landscaping, building types, and improvements and sets overall height and density limits for the neighborhoods and public uses with this new neighborhood of Coachella.

This Specific Plan creates a framework for design and development that will evolve over a period of years. To aid in understanding the requirements in this Specific Plan, illustrative graphics have been included to show the intent of various provisions. These illustrative graphics and photographs are simply a depiction of possible arrangements of development and should not be taken as requirements.

The KPC Coachella Specific Plan is organized into the following sections:

INTRODUCTION – This section includes an overview of the Specific Plan, an overview of the Development Plan, identifies the Specific Plan’s authority and Project objectives and also includes discussion of relevant plans. This section also identifies surrounding land uses, and existing site uses.

DEVELOPMENT PLAN – This section explains the conceptual land use plan for the Specific Plan Area; identifies land use policies and defines the land use designations unique to the Specific Plan. The mobility, drainage, water and sewer, grading, and public services plans are also described.

DEVELOPMENT REGULATIONS – Sets forth the general provisions, definitions, land use designations and regulations and describes the development plan of the Specific Plan area for residential and commercial uses. Parking, wall standards and signage standards are also included in this section.

DESIGN GUIDELINES -- This section explains design concepts and establishes design guidelines for development in the Specific Plan Area. This section also outlines the landscape program for the community.

ADMINISTRATION AND IMPLEMENTATION – Sets forth administrative procedures for implementing the mixed-use implementation mechanisms, modification, and procedures for amending the Specific Plan, and establishes the implementation, phasing, financing, improvement responsibilities, and subsequent submittal requirements.

APPENDICES – The appendices include elements of the Specific Plan that support its individual sections. Appendices include grading standards and a legal description of the property within the Specific Plan area.

SECTION 2
Development Plan

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The Development Plan section of the KPC Coachella Specific Plan details the structure of the Specific Plan, including:

- community vision
- land uses
- parks and open space
- utilities
- infrastructure
- grading and
- public services

Together, these features provide a detailed description for this proposed new community in Coachella.

2.1 Community Vision

The KPC Coachella Specific Plan will provide a mixture of land uses intended to create a vibrant, cohesive entrance to the City, with villages and neighborhoods that are unique, yet compatible with, surrounding planned neighboring areas. The Specific Plan area will integrate all of the components of a well-rounded community, including resort-style entertainment including a casino, medical and wellness uses, commercial retail and restaurants, housing, schools, open space, and senior housing opportunities into the natural desert landscape of the Coachella Valley. The Specific Plan area will function as an important addition to the City of Coachella by providing new opportunities to increase goods, services, and housing provided within the City and the region.

The KPC Coachella Specific Plan is comprised of five unique villages, each with a core defining purpose and integrated into one community through placemaking principles that rely on bringing people together and creating an atmosphere to live, work, play, and thrive. The design of the community respects the natural topography and landscape of the Coachella Valley and avoids heavy alterations to the existing landforms through strategic planning of land uses, roadways, bridges, and other necessary infrastructure. The five individual villages all include vital commercial, residential, and institutional uses in close proximity that decrease the reliance on vehicles and the lower vehicle miles traveled by promoting a walkable community atmosphere.

2.2 Village Organization

The KPC Coachella Specific Plan area is organized into five separate villages, each with the following primary characteristics:

- Village A: Wellness District
- Village B: Entertainment Center
- Village C: Active Recreation
- Village D: Active Adult Community
- Village E: Agricultural Estates

The villages collectively create a unique and cohesive community with a diversity of different uses that provide multiple types of housing, entertainment options, commercial shopping, open space and recreational opportunities, and educational facilities. Figure 2-1, *Village Organization,* shows the location and size of each of the five villages. Tables 2-2 through 2-6 identify the individual land use mix for each village.

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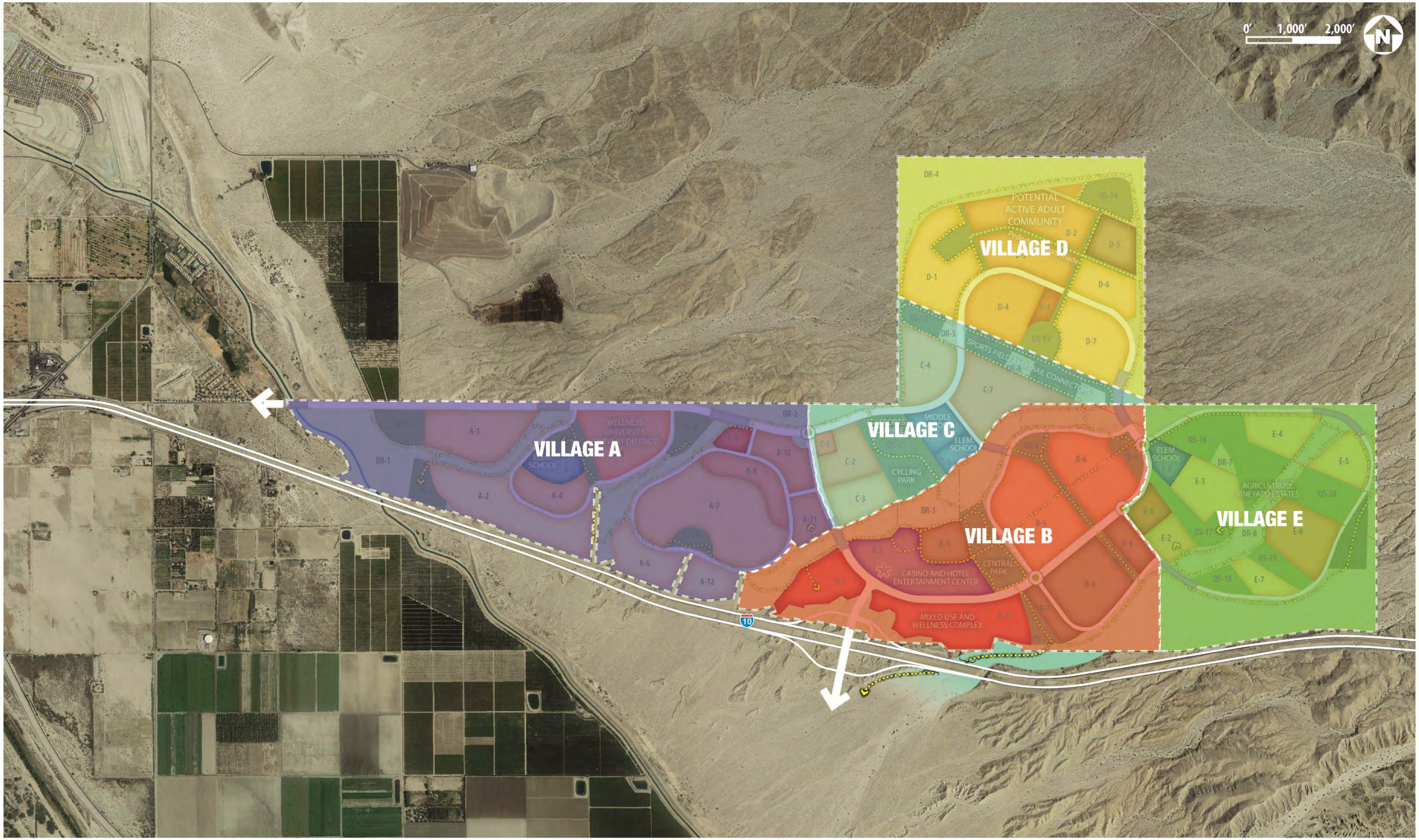

FIGURE 2-1: VILLAGE ORGANIZATION

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2.3 Land Use Plan

2.3.1 Conceptual Land Use Plan

The Coachella General Plan requires preparation of a Conceptual Specific Plan for the entirety of Subarea 13 as explained in Section 1 of this document. Figure 2-2, *Conceptual Specific Plan*, shows the two additional open space parcels within Subarea 13. The majority of the land use plan within Subarea 13 consists of the KPC Coachella Specific Plan area, shown in detail in Figure 2-3, *Land Use Plan*. Access to the adjacent open space parcels will be provided from within the KPC Coachella Community. Future development of these open space parcels will require additional entitlements.

2.3.2 KPC Coachella Land Use Plan

The Land Use Plan (shown on Figure 2-3, *Land Use Plan*) is organized to promote a mixture of residential, commercial, entertainment, wellness, education, and open space uses that together form a cohesive and well-balanced community.

The Land Use Plan identifies a series of land use mixes throughout the Specific Plan area. The accompanying tables further describe land uses, dwelling unit counts, commercial square footages, open space acreages, and school site acreages for the Specific Plan area as a whole and by individual village.

Table 2-1, *Land Use Summary*, shows how the dwelling units and commercial square footage is distributed throughout the Specific Plan area. A further breakdown by village is provided in the tables and maps on the following pages.

2.3.3 Residential Uses

Residential uses within the KPC Coachella Specific Plan area range in densities from very low in the outer sections to high density adjacent to the entertainment core. The four residential land use categories are:

- Very Low Density (VLDR)
- Low Density (LDR)
- Medium Density (MDR)
- High Density (HDR)

The residential uses shown in the Land Use Plan are organized to provide a range of housing opportunities for future residents of the planned community. Residential Planning Areas are strategically located adjacent to complementary uses to ensure that all areas have close access to open space, community resources, and entertainment options.

Very Low Density (VLDR)
The VLDR land use designation is proposed to encompass 218 gross acres across two villages (A & E). As proposed, this land use designation will allow a range of 0.4-1.0 dwelling units per acre. These planning areas are located away from the entertainment center and promote a rural lifestyle and connection to the surrounding open space areas, both planned and natural. VLDR planning areas within Village E are associated with agricultural production and urban farming.

Hillside grading guidelines and standards outlined in the Grading Plan and Design Guidelines sections of this document will apply to the VLDR planning areas.

Low Density (LDR)

The LDR land use designation is proposed to encompass 354 gross acres across three villages (A, C & D). As proposed, this land use designation will allow a range of 2.0-8.0 dwelling units per acre. Similar to VLDR, LDR planning areas are mostly located away from the primary entertainment and mixed-use areas and provide a transition from the rural and open space areas to the more urban parts of the community. These are primarily single-family detached housing communities on large lots with easy access to the natural drainage areas and passive recreation trails.

Medium Density (MDR)

The MDR land use designation is proposed to encompass 354 gross acres and can be found in all five villages within the community. As proposed, this land use designation will allow a range of 7.0-25.0 dwelling units per acre. MDR is planned to encompass the largest portion of the housing stock, creating a potential for approximately 4,700 dwelling units.

MDR planning areas are concentrated around mixed-use areas, open space, and community services such as schools. The Wellness University District Overlay sits within an MDR planning area in Village A and many of the proposed residential areas within the active adult community are MDR to provide for a range of housing densities. MDR planning areas are also located primarily adjacent to collector roads to facilitate the heavier traffic load.

High Density (HDR)

The HDR land use designation is proposed to encompass 97 gross acres across two villages (B & D). As proposed, this land use designation will allow a range of 15.0-40.0 dwelling units per acre. HDR planning areas are primarily located along major collector and arterial roads to handle the increased traffic demand. These dwelling units are a mixture of small lot single-family detached units, townhouses, and attached residential housing types. HDR planning areas are located in close proximity to the main entertainment, mixed-use, and recreational open space areas at the center of the community.

Additionally, HDR uses are anticipated within the Mixed-Use planning areas and would follow the same density range.

2.3.4 Village Characteristics

Each of the five villages within the KPC Coachella Specific Plan area has a unique composition of uses and purpose that defines the intention for that area. When considered in an overall context, the villages provide the housing, commercial and entertainment opportunities, public facilities, open space, and parks/sports facilities that form a well-rounded and complete community.

The Village Characteristics, shown in Figures 2-4 to 2-8, outline each village in detail and provide information for future builders and City staff by laying out the information such as the roadway types for adjacent roads, primary and secondary entry locations, location and type of parks, location and types of trails, water quality facilities, and streetscapes associated with them. The Village Framework Plans illustrate how each village functions successfully as an individual sub-community and within the overall context of the community.

TABLE 2-1: LAND USE SUMMARY

Land Use	Gross Acres (AC)	% Area	Density (DU/AC)[1]	Dwelling Units (DU)	FAR	Square Footage
Residential						
Very Low Density Residential	203	7.23%	0.4-1.0	200	--	--
Low Density Residential	369	13.17%	2.0-8.0	1,760	--	--
Medium Density Residential	504	17.98%	7.0-25.0	4,620	--	--
High Density Residential	114	4.08%	15.0-40.0	2,570	--	--
Subtotal Residential	*1,190*	*42.46%*	--	*9,150*	--	--
Commercial						
Mixed-Use	126	4.50%	15.0-40.0	410	0.25	918,000
Casino and Hotel Entertainment Center	62	2.20%	--	--	--	100,000
Entertainment Venue	--	--	--	--	--	75,000
Hotel Rooms	--	--	--	--	--	375 Keys
Subtotal Mixed-Use	*188*	*6.69%*	--	*410*	--	*1,093,000*
Institutional						
Elementary School	40	1.42%	--	--	--	--
Middle School	19	0.68%	--	--	--	--
Subtotal School	*59*	*2.10%*	--	--	--	--
Open Space						
Parks, Greenways, and Amenity Corridors	301	10.75%	--	--	--	--
New Agricultural Production	121	4.30%	--	--	--	--
Drainage and Other Open Space	742	26.47%	--	--	--	--
Subtotal Open Space	*1,164*	*41.53%*	--	--	--	--
Roadways						
Right-of-Way	202	7.21%	--	--	--	--
Interchange			--	--	--	--
Subtotal Roadways			--	--	--	--
Specific Plan Totals	**2,802**	**100.00%**		**9,560**		**1,093,000**

Notes:

1. Residential densities shown may vary by village or Planning Area (PA).

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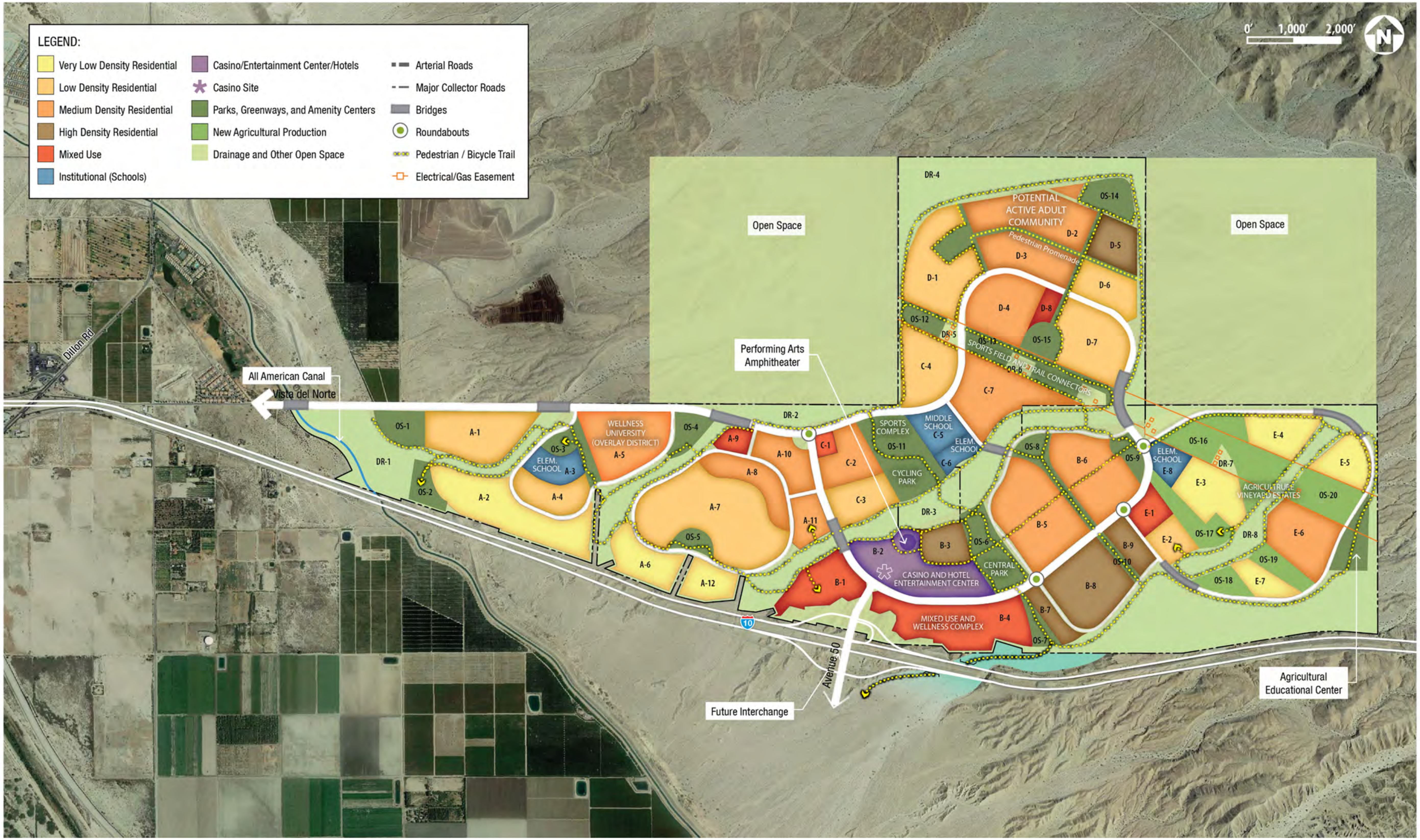

FIGURE 2-2: CONCEPTUAL SPECIFIC PLAN

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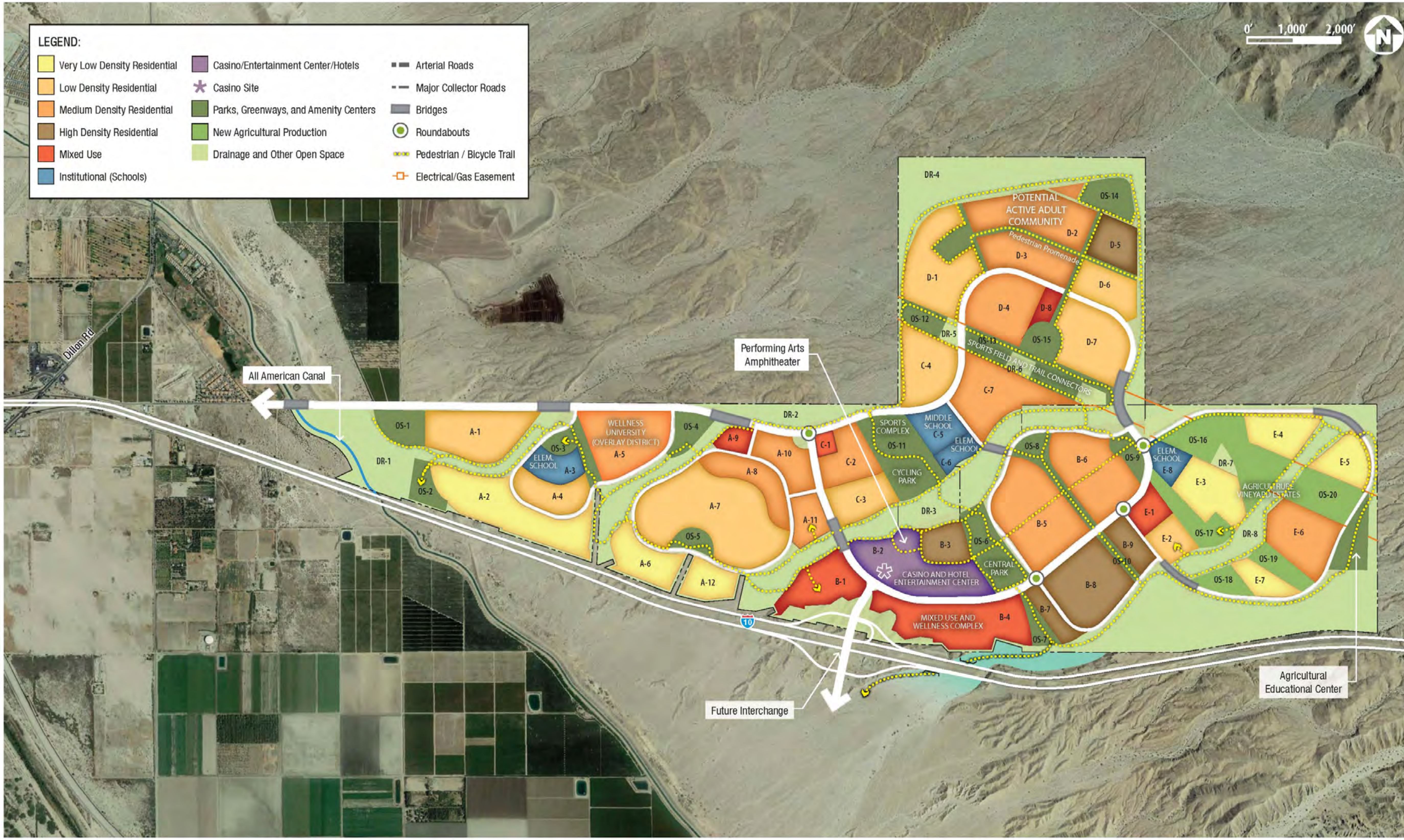

FIGURE 2-3: LAND USE PLAN

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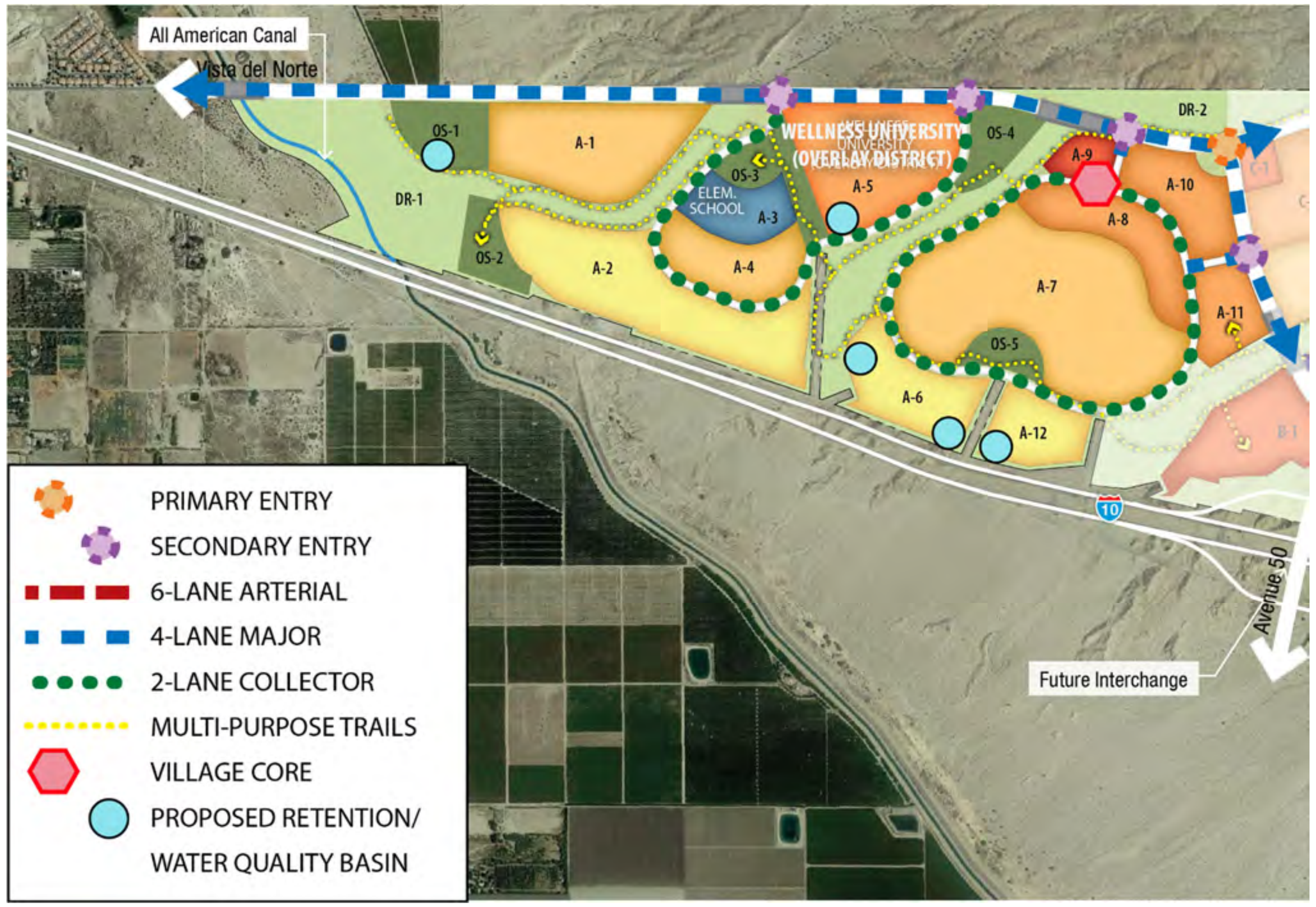

TABLE 2-2: LAND USE SUMMARY: VILLAGE A

Land Use	Gross Acres (AC)	% of Village Area	Density (DU/AC)[1]	Dwelling Units (DU)	FAR	Square Footage
Residential						
Very Low Density Residential	110	22.6%	1	110	--	--
Low Density Residential	172	35.3%	5	860	--	--
Medium Density Residential	118	24.2%	10	1,080	--	--
Subtotal Residential	*400*	*82.1%*	--	*2,050*	--	--
Commercial						
Mixed-Use[2]	8	1.7%	10	25	0.25	60,000
Subtotal Mixed-Use	*8*	*1.7%*	--	*25*	--	*60,000*
Institutional						
Elementary School	16	3.2%	--	--	--	--
Subtotal School	*16*	*3.2%*	--	--	--	--
Open Space						
Parks, Greenways, and Amenity Corridors	63	13.0%	--	--	--	--
Subtotal Open Space	*63*	*13.0%*	--	--	--	--
Village A Totals	**487**	**100%**	--	**2,075**	--	**60,000**

Notes:
1. Residential densities may vary depending on Planning Area (PA). Densities shown are targets
2. Mixed-Use calculated at 1/3 residential and 2/3 commercial.

Village A is the western entrance to the KPC Coachella community. It is a primarily residential portion of the community characterized by a centrally located Wellness University area. Village A provides a range of residential densities and multiple parks and trails for recreational opportunities.

FIGURE 2-4: VILLAGE A CHARACTERISTICS

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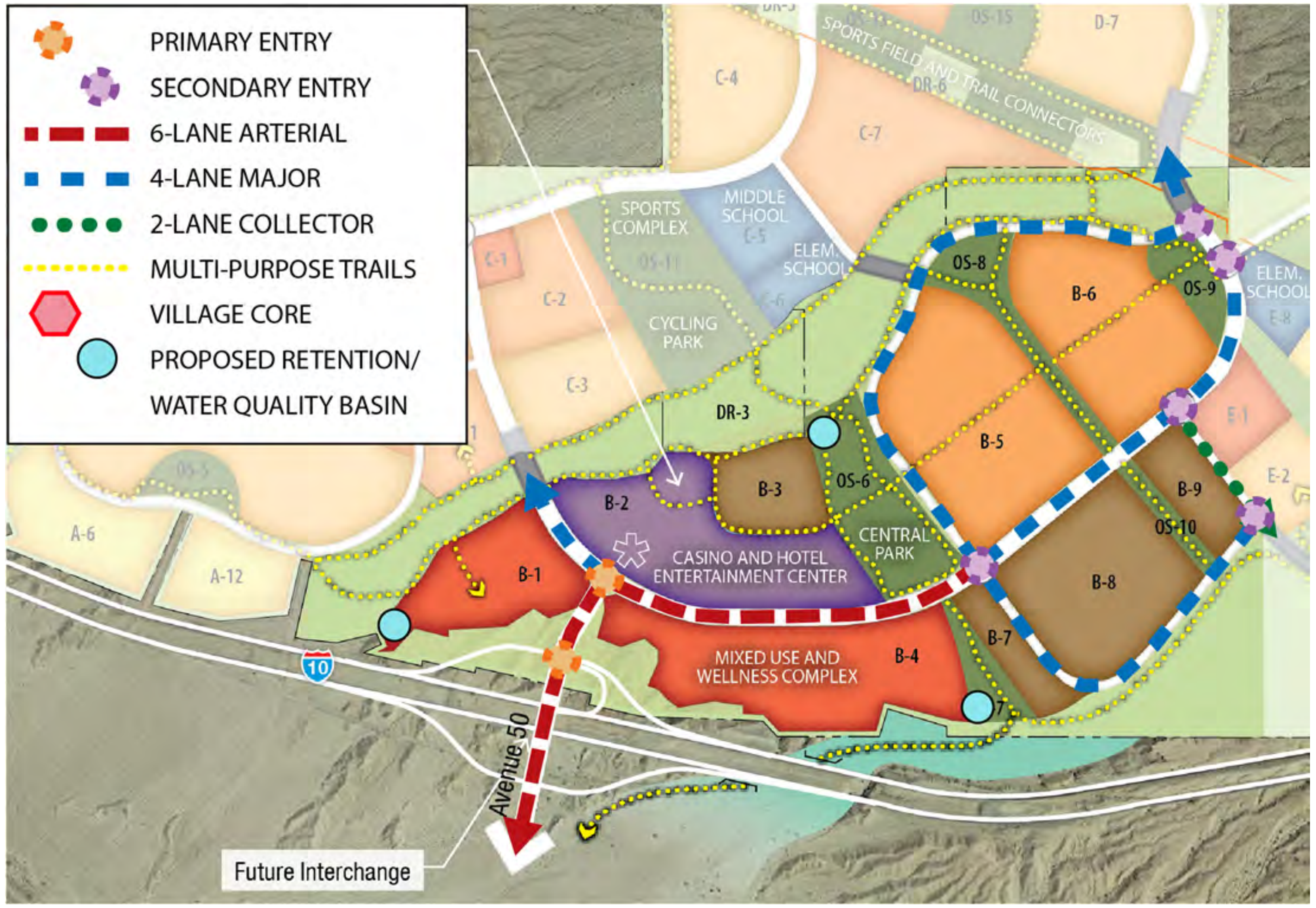
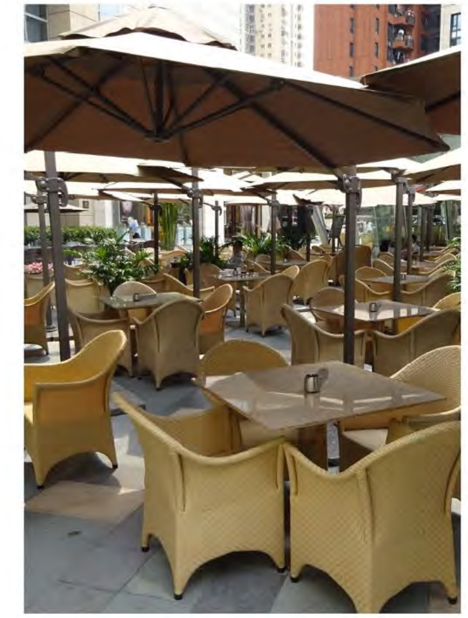


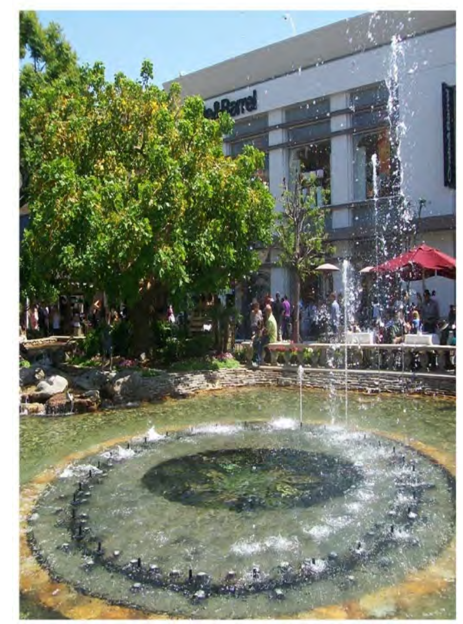
TABLE 2-3: LAND USE SUMMARY: VILLAGE B

Land Use	Gross Acres (AC)	% of Village Area	Density (DU/AC)[1]	Dwelling Units (DU)	FAR	Square Footage
Residential						
Medium Density Residential	123	27.4%	10	1,230	--	--
High Density Residential	93	20.7%	25	2,020	--	--
Subtotal Residential	*215*	*48.1%*	--	*3,250*	--	--
Commercial						
Mixed-Use[2]	95	21.1%	10	315	0.25	689,000
Casino and Hotel Entertainment Center	62	13.7%	--	--	--	140,000
Subtotal Mixed-Use	*156*	*34.9%*		*315*	--	*829,000*
Open Space						
Parks, Greenways, and Amenity Corridors	76	17.1%	--	--	--	--
Subtotal Open Space	*76*	*17.1%*	--	--	--	--
Village B Totals	**448**	**100%**	**--**	**3,565**	--	**829,000**

Notes:

1. Residential densities may vary depending on Planning Area (PA). Densities shown are targets
2. Mixed-Use calculated at 1/3 residential and 2/3 commercial.





Village B is the entertainment center and iconic entrance to the KPC Coachella Specific Plan area and the City of Coachella. Entry into the community is taken from the south on the Avenue 50 interchange off the Interstate 10 Freeway. Village B is envisioned to contain a casino, hotel uses, a wellness complex, and a mixture of commercial and residential uses. It also contains the highest residential densities of any of the community villages.

FIGURE 2-5: VILLAGE B CHARACTERISTICS

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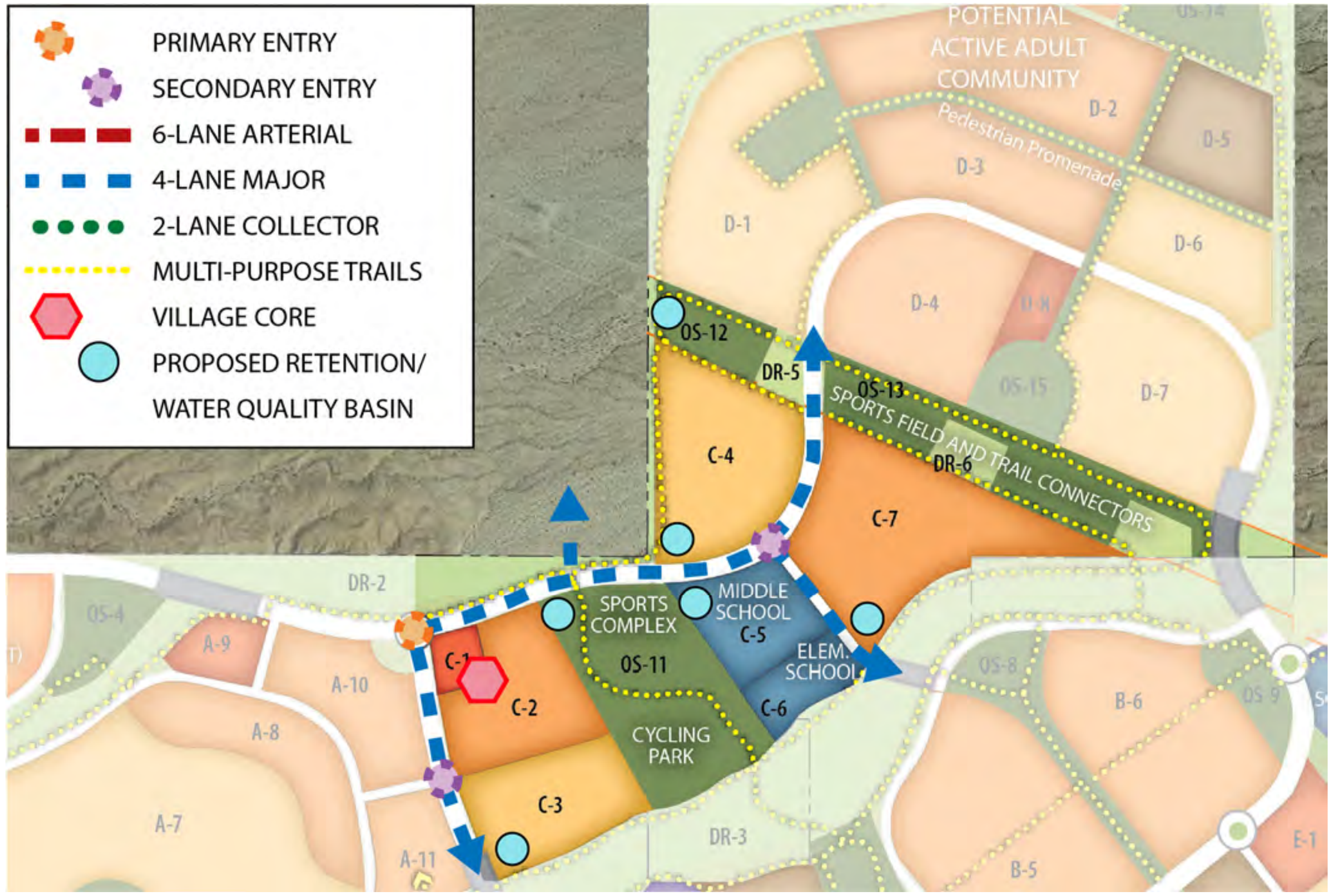

TABLE 2-4: LAND USE SUMMARY: VILLAGE C

Land Use	Gross Acres (AC)	% of Village Area	Density (DU/AC)[1]	Dwelling Units (DU)	FAR	Square Footage
Residential						
Low Density Residential	66	24.6%	5	250	--	--
Medium Density Residential	79	29.5%	10	640	--	--
Subtotal Residential	*145*	*54.1%*	--	*890*	--	--
Commercial						
Mixed-Use[2]	5	2.0%	10	15	0.25	39,000
Subtotal Mixed-Use	*5*	*2.0%*	--	*15*	--	*39,000*
Institutional						
Elementary School	9	3.5%	--	--	--	--
Middle School	19	7.1%				
Subtotal School	*28*	*10.6%*	--	--	--	--
Open Space						
Parks, Greenways, and Amenity Corridors	89	33.3%	--	--	--	--
Subtotal Open Space	*89*	*33.3%*	--	--	--	--
Village C Totals	**268**	**100%**	**--**	**905**	**--**	**39,000**

Notes:
1. Residential densities may vary depending on Planning Area (PA). Densities shown are targets
2. Mixed-Use calculated at 1/3 residential and 2/3 commercial.

Village C provides for many of the active and passive recreational opportunities within the KPC Coachella Specific Plan area. It is envisioned to include a sports complex, additional sports fields, trail connections, and a cycling park. Additionally, low and medium density residential uses and the middle school set to serve the whole community are located in Village C.

FIGURE 2-6: VILLAGE C CHARACTERISTICS

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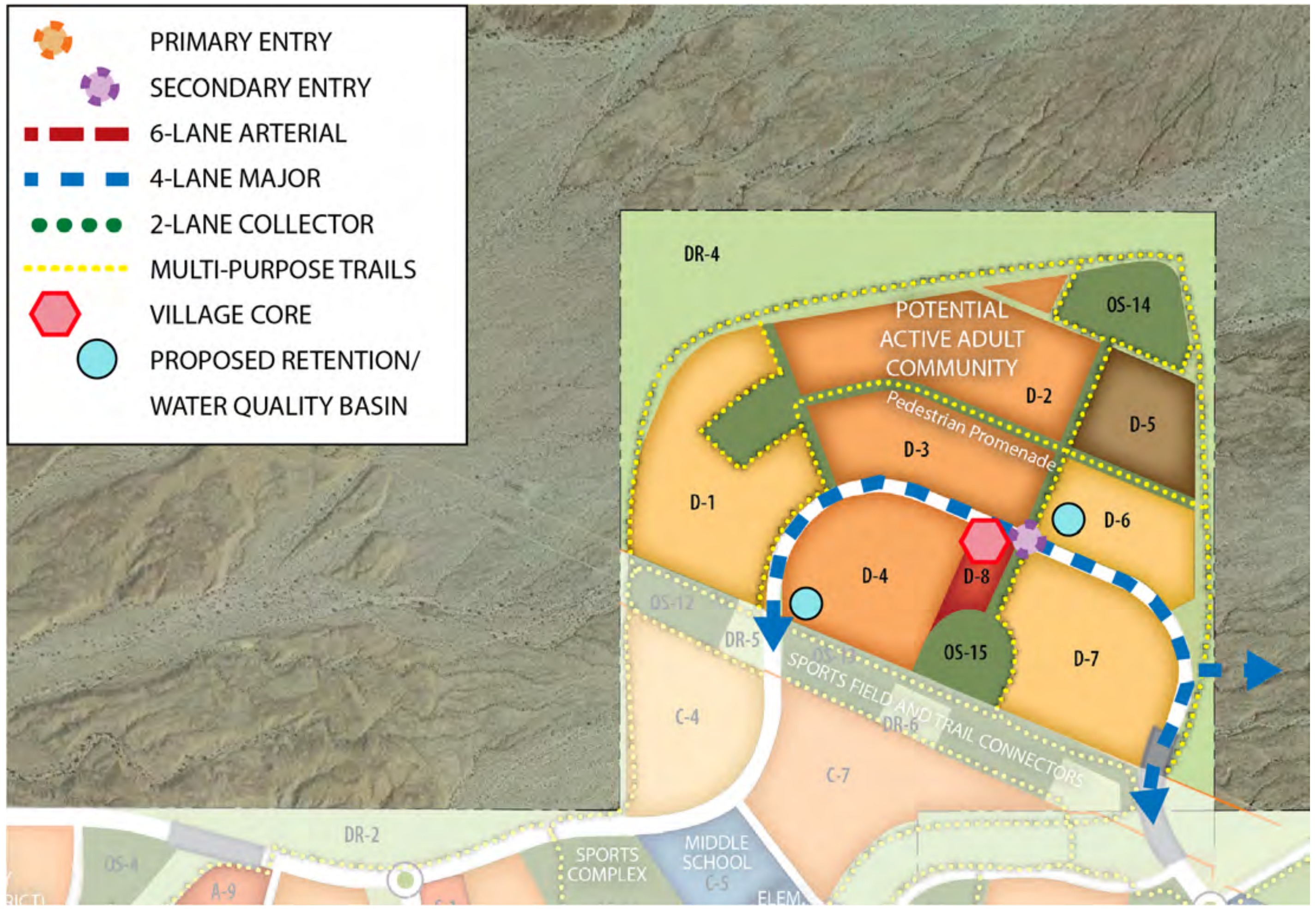

TABLE 2-5: LAND USE SUMMARY: VILLAGE D

Land Use	Gross Acres (AC)	% of Village Area	Density (DU/AC)[1]	Dwelling Units (DU)	FAR	Square Footage
Residential						
Low Density Residential	116	33.7%	5	580	--	--
Medium Density Residential	144	41.9%	10	1,280	--	--
High Density Residential	22	6.3%	25	550	--	--
Subtotal Residential	*283*	*82.0%*	--	*2,410*	--	--
Commercial						
Mixed-Use[2]	5	1.4%	10	15	0.25	36,000
Subtotal Mixed-Use	*5*	*1.4%*	--	*15*	--	*36,000*
Open Space						
Parks, Greenways, and Amenity Corridors	57	16.6%	--	--	--	--
Subtotal Open Space	57	16.6%	--	--	--	--
Village D Totals	**345**	**100%**	**--**	**2,425**	**--**	**36,000**

Notes:

1. Residential densities may vary depending on Planning Area (PA). Densities shown are targets
2. Mixed-Use calculated at 1/3 residential and 2/3 commercial.

Village D is the furthest north geographically and proposed as a community that caters to the needs of the active adult population. This includes a variety of housing densities, parks, parkway trail connections adjacent to major roadways, and a small commercial center.

FIGURE 2-7: VILLAGE D CHARACTERISTICS

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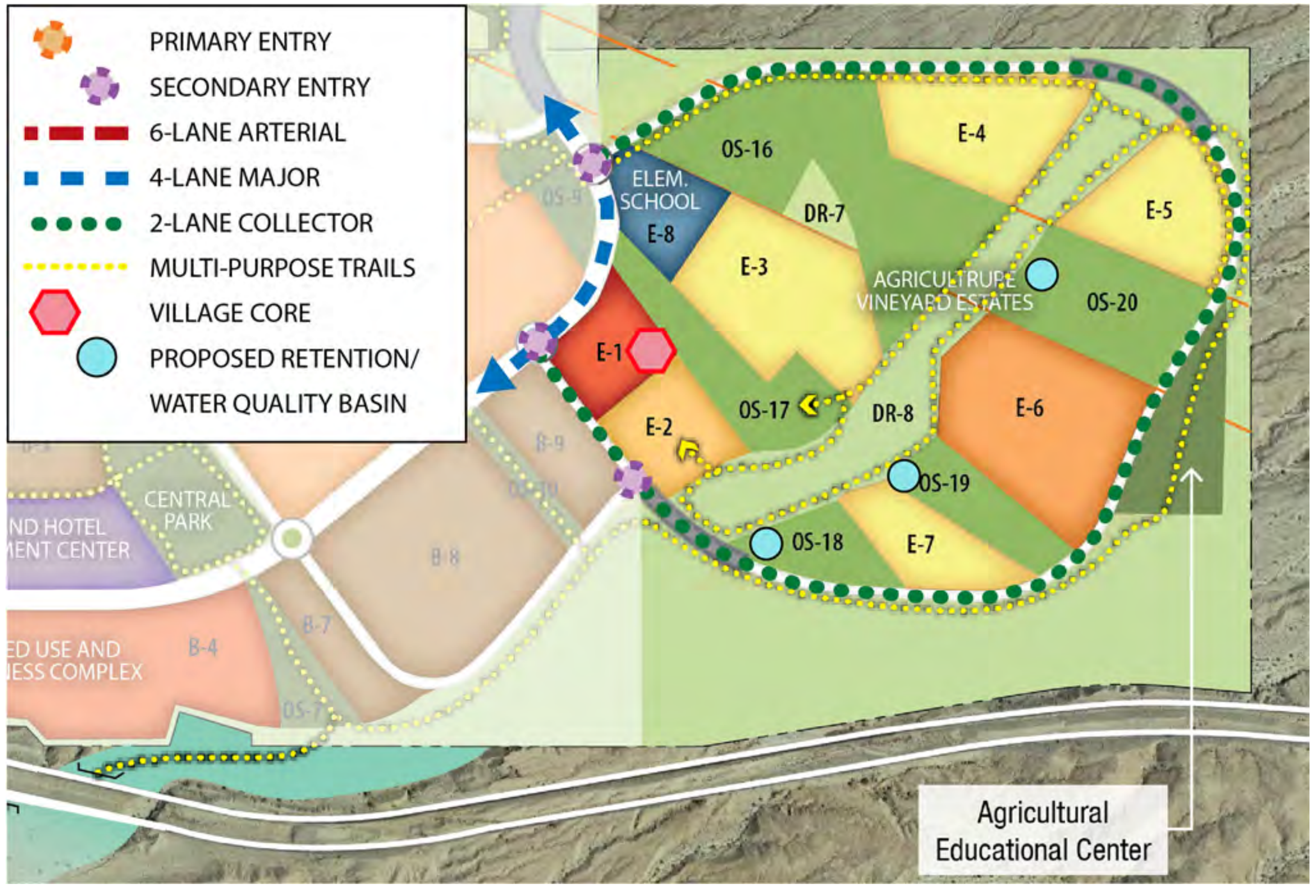
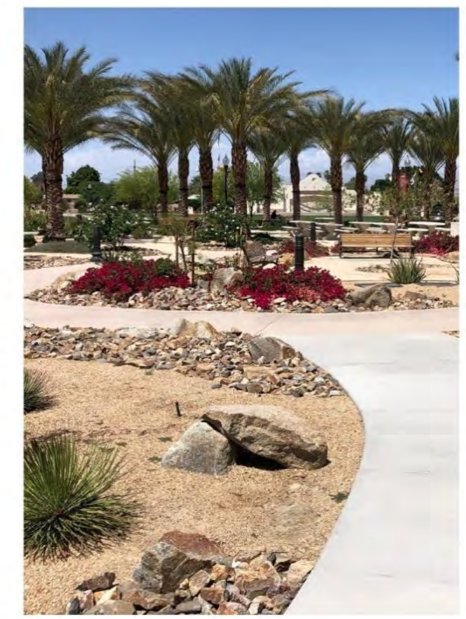


TABLE 2-6: LAND USE SUMMARY: VILLAGE E

Land Use	Gross Acres (AC)	% of Village Area	Density (DU/AC)[1]	Dwelling Units (DU)	FAR	Square Footage
Residential						
Very Low Density Residential	93	29.9%	1	90	--	--
Low Density Residential	15	4.8%	5	70		
Medium Density Residential	39	12.6%	10	390	--	--
Subtotal Residential	*147*	*47.3%*	--	*550*	--	--
Commercial						
Mixed-Use[2]	13	4.1%	10	40	0.25	94,000
Subtotal Mixed-Use	*13*	*4.1%*	--	*40*	--	*94,000*
Institutional						
Elementary School	15	4.8%	--	--	--	--
Subtotal School	*15*	*4.8%*	--	--	--	--
Open Space						
Parks, Greenways, and Amenity Corridors	15	4.9%	--	--	--	--
New Agricultural Production	121	38.8%	--	--	--	--
Subtotal Open Space	*136*	*43.7%*	--	--	--	--
Village E Totals	**311**	**100%**	**--**	**590**	**--**	**94,000**

Notes:

1. Residential densities may vary depending on Planning Area (PA). Densities shown are targets
2. Mixed-Use calculated at 1/3 residential and 2/3 commercial.



Village E is the furthest east and envisioned as a rural residential and agricultural community, with large lots, vineyards, and agricultural production and education areas.

FIGURE 2-8: VILLAGE E CHARACTERISTICS

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2.3.5 Commercial Uses

Mixed-Use

All five villages within the plan area contain at least one planning area designated as Mixed-Use. The KPC Coachella Specific Plan accommodates 136 acres of mixed-use areas. This land use designation allows for commercial retail, high-density residential, professional office, and public uses. The planning areas designated as mixed-use are located adjacent to higher density residential areas and major arterial and collector roads.

Additional information on land use flexibility is provided in the Mixture of Land Uses sub-section located below.

Casino and Hotel Entertainment Center

The KPC Coachella Specific Plan designates 62 acres within Village B (located north of the Avenue 50 interchange) as a casino and hotel entertainment center. This area is the primary activity hub and strategically located at the center of the community proximate to the Interstate 10 freeway.

Potential uses within this land use designation include an entertainment venue and hotel that are planned to complement the anticipated casino. This designation also permits all uses allowed within the Mixed-Use land use designation.

2.3.6 Institutional Uses

The increase in dwelling units to the area creates the need for additional school facilities. Two elementary schools located in Villages A and E and one middle school centrally located within Village Care provided for residents of the community. The three sites range from just under 15 acres to 28 acres in size and encompass a total of 59 acres. These sites are anticipated to accommodate institutional facilities and the potential for publicly accessible open space areas or shared park uses.

Section 2.7.10 provides more information on the local school districts and planned elementary and middle school uses.

2.3.7 Parks and Recreational Uses

Parks are a vital component of the KPC Coachella Specific Plan area. Approximately 301 acres of parks, greenways, and amenity corridors are provided within the plan area. Parks and other recreational uses provide programmed open space environments catered to meet the needs of the surrounding residents. There are several different types of parks within the Specific Plan area, including:

- A central park
- Sports complex
- Cycling park
- Sports fields
- Agricultural Education Center
- Neighborhood parks of various size and configuration

These parks connect to surrounding neighborhoods and the natural open space within the community through a series of pedestrian and bicycle trails that run through the plan area.

Parks and recreational areas are described in more detail in Section 2.4, Parks and Open Space Plan and Section 4.6 of the Design Guidelines (Landscape Guidelines).

2.3.8 Open Space

Apart from parks and amenity areas, the KPC Coachella Specific Plan also provides approximately 742 acres of drainage areas that provide passive recreation and other open space. This includes walking trails, an additional 121 acres of space within Village E is designated for agricultural production, including vineyards.

A pedestrian and bicycle trail is anticipated to traverse under the Interstate-10 Freeway and safely connect the KPC Coachella community with the newly approved La Entrada community to the south.

Open space areas are described in more detail in Section 2.4, Parks and Open Space Plan.

2.3.9 Land Use Flexibility

Land use flexibility is an important component that allows the KPC Coachella Specific Plan to adapt to changing market conditions and market demand over the course of development of the project. The KPC Coachella Specific Plan was developed as a flexible tool to anticipate a variety of conditions and minimize the number of amendments required after adoption.

Land use flexibility and implementation measures are described in more detail in Section 5, Administration and Implementation.

Mixture of Land Uses

Six planning areas totaling approximately 136 acres across all five villages are designated as Mixed-Use, allowing for development flexibility in the event that the development market and product demand changes. This will ensure these planning areas are responsive to the needs of the community and of the City of Coachella. The Specific Plan allows for:

- high-density residential uses up to 40 dwelling units/acre to accommodate a range of housing prices
- commercial, retail, and entertainments uses, and
- office or public/community uses.

Wellness University (District Overlay)

Planning Area A-5 (PA A-5) is designated as medium density residential with a Wellness University Overlay District intended to allow for medically-related educational facilities to be developed in this area should the market provide the opportunity for it. The Overlay District sets in place the structure for PA A-5 to develop as medium-density residential uses but provides flexibility for the area to adjust to meet the needs of the community in the future. Development in this area must comply with the provisions discussed in Section 5. of this Specific Plan. In the event that this area develops as a Wellness University use, the anticipated residential units will be reallocated to the rest of the community but not exceed the amount anticipated in Table 2-1, *Land Use Summary*, above.

2.4 Parks and Open Space Plan

KPC Coachella includes more than 1,150 acres of open space, approximately 41% of the entire plan area, comprised of active and passive parks, sports fields, and natural drainage and other open space areas. These parks and open space features are shown on Figure 2-9: *Parks, Trails, and Open Space Plan*.

2.4.1 Parks, Greenways, and Amenity Centers

KPC Coachella has several central park and recreation areas that are programmed to provide community gathering spaces, indoor and outdoor recreational opportunities, sports fields and courts, public art, playground areas, water features, gardens, trails, and natural spaces.

Park categories have been defined generally following the City's Parks Master Plan park types and are outlined below. Details of the proposed contents and design of the major project parks are included in the Landscape Plan section of the Specific Plan's Design Guidelines (Section 4.6 herein). Specific permitted and conditional uses are outlined in the Development Regulations of this Specific Plan (refer to Section 3). Maintenance and phasing of project parks is outlined in Section 5, Administration and Implementation.

Major Community Parks
The KPC Coachella has two primary Community Parks; the Central Park located in Village B and the Sports Complex & Cycling Park in Village C. These parks are centrally located in higher density areas and along transportation routes in order to provide the community with access to recreational facilities and open space areas.

The Central Park area is intended to be a combination of active and passive recreational areas that focus around the concept of creating a space for the community to come together, be it for events, celebrations, recreation, or otherwise.

The Sports Complex & Cycling Park are heavily programmed areas consisting of formal sports fields, courts, and other facilities. This area is envisioned as not only a valuable resource for the community, but a regional attractor for local sports tournaments or major events.

Sports Fields
Located within the Southern California Edison (SCE) and local gas easements between Villages C and D are additional sports fields and passive recreation trails. Due to the restricted use of land within the utility easements, there are limited structures that may be constructed in this area. These fields provide additional capacity for recreational leagues, practice space, and regional tournaments.

The sports fields also connect directly to the neighborhood park located within the Active Adult Community (Village D) and the paseo running from that park into Village D. This connection provides non-motorized transit connection with the local drainage ways and the rest of the KPC Coachella community.

Neighborhood Parks
Each village is comprised of unique neighborhoods with separate community open spaces. These spaces are anticipated to be largely passive in nature, with seating and viewing areas, limited turf, and tot lots. As new residential communities are developed by private builders, it will be required that small community amenity and open spaces are included in each community. These facilities will serve

residents with amenities such as tot lots, limited lawn space, barbecue stations, restrooms, and picnic areas. These parks are not included in the open space requirement met by the parks and open space established in the land use plan and are an added benefit to the community.

2.4.2 Open Space

Natural open space constitutes a large part of the overall open space and recreational opportunities within KPC Coachella. The majority of this space is located within the drainage/wash areas that permeate throughout the plan area as well as around the edges of KPC Coachella. Consistent with the Coachella Parks and Recreation Master Plan, these Open Space Areas are anticipated to generally be free from development except for uses specifically allowed in the Specific Plan Development Regulations. These areas are shaped by the natural drainage canals as part of the existing topography on-site and are proposed to remain as preserved desert wash landscape with interpretive signage, vista points, and pedestrian and bicycle trails.

Drainage/Wash

Drainage and other natural open space areas account for approximately 740 acres throughout the community. These areas are required drainage canals needed to facilitate water flow throughout the site and use of them is limited to those specifically allowed in the Development Regulations of the KPC Specific Plan.

There are four major drainage canal areas running from northeast to southwest diagonally across the site with additional large open space areas along the northern and southeast edges of the plan area. These areas will include hiking and other passive recreational opportunities and serve as pedestrian connections. Bridges are strategically located to provide both vehicular and pedestrian crossing of the drainage canals and circulation throughout all five KPC villages.

2.4.3 Agricultural Areas

Village E, located in the easternmost portion of the plan area, includes 121 acres of unique open space area designated for agricultural production. This may include vineyards for the production of table grapes, date palm groves for resale, or other agricultural products that are suitable for the region. Village E is also anticipated to include an Agricultural Education Center that can provide classes and programs on topics such as gardening, food production, and the local ecosystem.

FIGURE 2-9: PARKS, TRAILS, AND OPEN SPACE PLAN

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2.5 Circulation Plan

The Circulation Plan consists of approximately 200 acres of land dedicated to the roadway network necessary to serve the proposed project. In addition to this, a network of multi-use trails (promenades and paseos), bikeways and multi-purpose pathways will be developed within the project, to provide residents with additional mobility options throughout the development.

Traffic generated by the proposed project is planned to be accommodated by a street network that supports and meets City of Coachella Level of Service Criteria. Refer to Figure 2-10*, Circulation Plan*.

2.5.1 Regional Circulation

The City of Coachella is located in the Coachella Valley in eastern Riverside County, connected to the region by Interstate 10. Regional access for the KPC Coachella Specific Plan is provided via a planned interchange with Interstate 10 at Avenue 50, designed as part of the La Entrada Specific Plan, approved by the City in 2013. Approximately xx acres of grading and right of way for the proposed I-10/Avenue 50 interchange is present within the property boundaries.

2.5.2 Arterials

Major Arterials within the project are proposed as six-lane roadways and are planned to include a 14-foot wide raised landscaped median and incorporate a 12-foot wide improved off-street trail on both sides of the road which includes a 6-foot wide bicycle lane and 6-foot wide pedestrian path.

Major Arterials include Avenue 50 and a portion of C Loop fronting the proposed casino and hotel entertainment center.

Avenue 50. Avenue 50 is proposed as a six-lane Major Arterial roadway that will extend northward from the planned Avenue 50 Interchange with I-10, providing access into the Specific Plan area. Avenue 50 is anticipated to provide regional access from the proposed I-10 interchange into the City of Coachella and will also accommodate traffic generated by the KPC Coachella project and the previously approved La Entrada Specific Plan project south of the I-10. Refer to Figure 2-11a, *Typical Street Sections*.

Primary Arterials within the project are proposed as four-lane roadways with a raised 14-foot median and 12-foot multipurpose trail. Primary Arterials comprise the backbone of the circulation network, extending from Vista Del Norte to the west through a system of loops providing access within the Specific Plan area.

2.5.3 Major Roadways

Major roadways within the project are proposed as four-lane roadways and plan to include a 14-foot wide raised landscaped median. In addition, the major roadways are proposed to have a 12’ bike/NEV (Neighborhood Electric Vehicle) lane, separated from the road by a 5’ wide shoulder and a 5’ wide landscaped buffer in both directions. Major roadways include Vista del Norte, which will provide access to the site, connecting with Dillon Road.

Major roadways for canal crossing are proposed as four-lane roadways and include a four-foot-wide raised landscaped median. The Major roadways for canal crossing are also proposed to include an 8’ wide bike/NEV lane and 6’ wide pedestrian path in both directions.

Major Roadways are proposed to provide primary connectivity to other roadways and pedestrian and bike paths within the project; they provide north-south and east-west access.

2.5.4 Collectors

Collector roads within the plan area are proposed as two-lane roadways with a striped 12′ center turn lane and 8′ bike/NEV (Neighborhood Electric Vehicle) lanes in both directions. Collector roads are proposed to provide access to the interior planning areas and connect them with the larger circulation network. Collector roads are currently proposed in Village A and Village E where the proposed residential densities are lower. A large 8′ landscape buffer on both sides separates the pedestrian walkway from vehicular and bicycle traffic.

2.5.5 Local Roads

Local streets are proposed within each planning area to facilitate movement of vehicles and pedestrians and connect to Arterial and Collector roadways. Two types of local roads are proposed:

- A two-lane roadway with 10′ drive aisle and 7′ on-street parallel parking and no on-street bicycle facilities.
- A two-lane roadway with no on-street parking or bicycle facilities.

Gates

Gated projects are permitted within the Specific Plan. Gates may occur on collector or local roads. If provided, gates must include adequate stacking distance and an adequate turn-around area before the gate and meet Riverside County Fire Department standards.

Alleys

Alley-loaded residential products are allowed within the KPC Coachella community as detailed in the Design Guidelines and Development Regulations. Alleys are private roadways that provide access to rear-loaded homes and include a minimum 20-foot wide paved surface. Additional width may be provided for parking as part of a design review application.

2.5.6 Non-Motorized Circulation

The KPC Specific Plan area includes design elements to accommodate multiple forms of non-motorized circulation in order to increase walkability within the community and decrease the number of vehicle trips within the plan area. The transportation system includes:

- Twelve-foot multi-purpose trails for walking, biking, and the use of Neighborhood Electric Vehicles (NEVs) on all six-lane arterial and four-lane major roadways;
- Six-foot pedestrian walkways on all two-lane collector and local roadways;
- Eight-foot bike/NEV lanes on all two-lane collector roadways and canal crossings; and
- A large system of natural off-street trails and walkways that connect each of the planning areas.

Figures 2-11(a and b) show the typical configuration for all roadways within the plan area, including the location and sizing of all non-motorized transportation paths.

Trails locations are designed to connect to the City of Coachella and Coachella Valley Association of Governments (CVAG) regional trail system. The project is also anticipated to connect to the La Entrada community to the south by way of a pedestrian trail running underneath the I-10 Freeway.

Multi-Purpose Trails

Off-street multi-purpose trails are used to connect the five villages within the KPC Coachella community. All six-lane arterial and four-land major roadways contain separated twelve-foot multi-purpose trails on each side of the roadway that will provide connections from the west along Vista Del Norte to proposed regional Class I and Class II bike lanes shown in CVAG's Non-Motorized Transportation Plan.

KPC Coachella will also include 50- to 100-foot wide pedestrian paseos in strategic locations to further link the five villages. The paseos are comprised of bicycle/NEV travel lanes and pedestrian walkways separated from vehicular traffic by landscaping or other buffering methods.

Additionally, there is an expansive network of off-street pedestrian/bicycle trails that run throughout the community. Many of these off-street trails run along the desert wash areas and connect residential neighborhoods with commercial uses, employment opportunities, and parks, open space, and recreational opportunities. Figure 4-1: *Master Landscape Plan,* shows the full network of off-street trails along with the proposed active and passive recreational open space areas.

Neighborhood Electric Vehicle (NEV) Routes

Neighborhood Electric Vehicles (NEV) are low-speed electric vehicles with a maximum achievable speed of 25 miles per hour (mph) on a paved level surface. The State of California Vehicle Code defines NEVs in more detail and provides guidance to local municipalities on the governance of use for specific types of NEVs.

NEVs may utilize designated trails within KPC Coachella as well as roadways with a posted speed limit of less than 25 mph. NEV use is encouraged throughout the community as a quick and efficient way to make short trips and potentially decrease the number of vehicle miles traveled on roadways within the community. EV supportive technology, including charging stations, will be incorporated within mixed-use developments within the community.

The KPC Coachella Specific Plan allows, but does not mandate, the use of NEVs.

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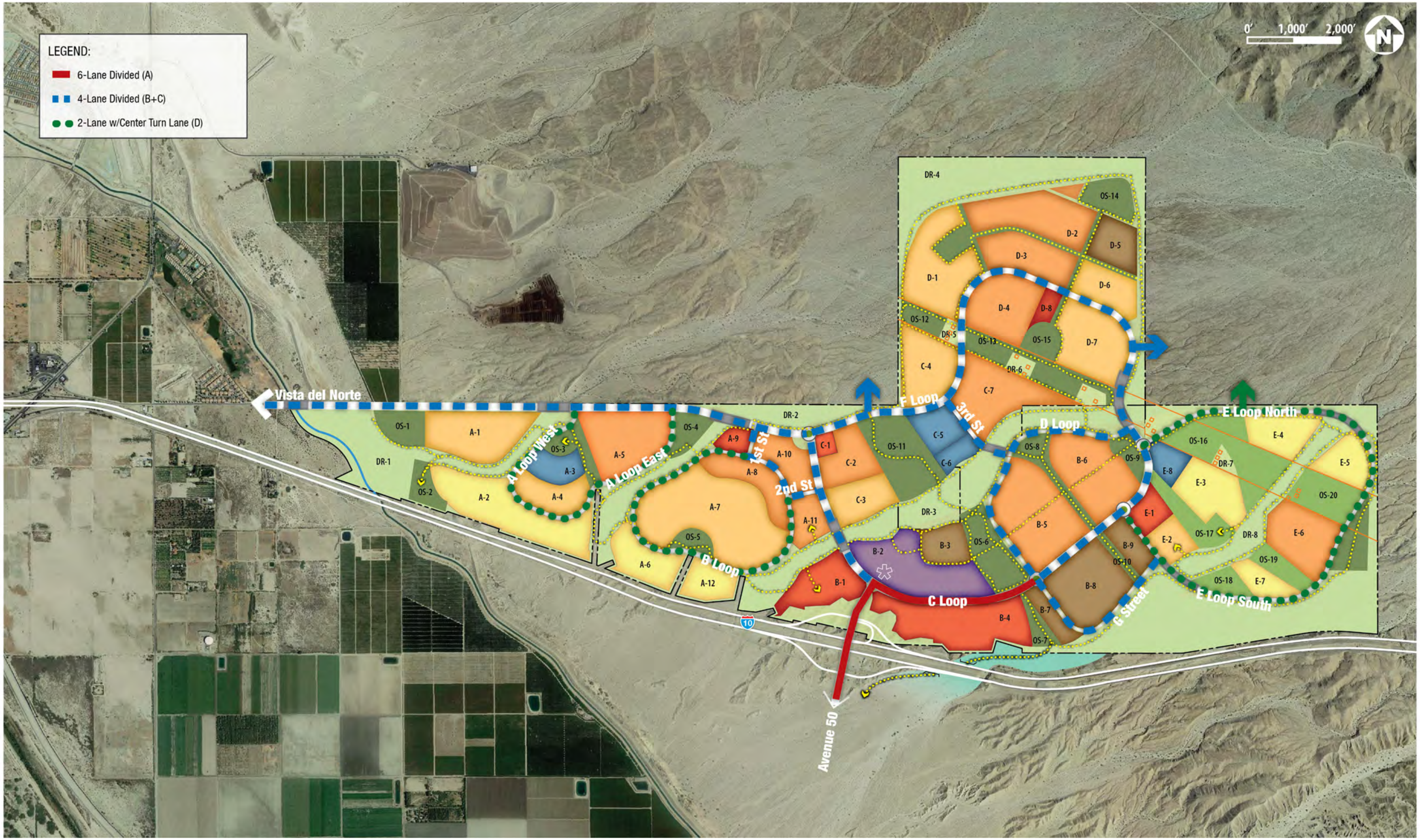

FIGURE 2-10: CIRCULATION PLAN

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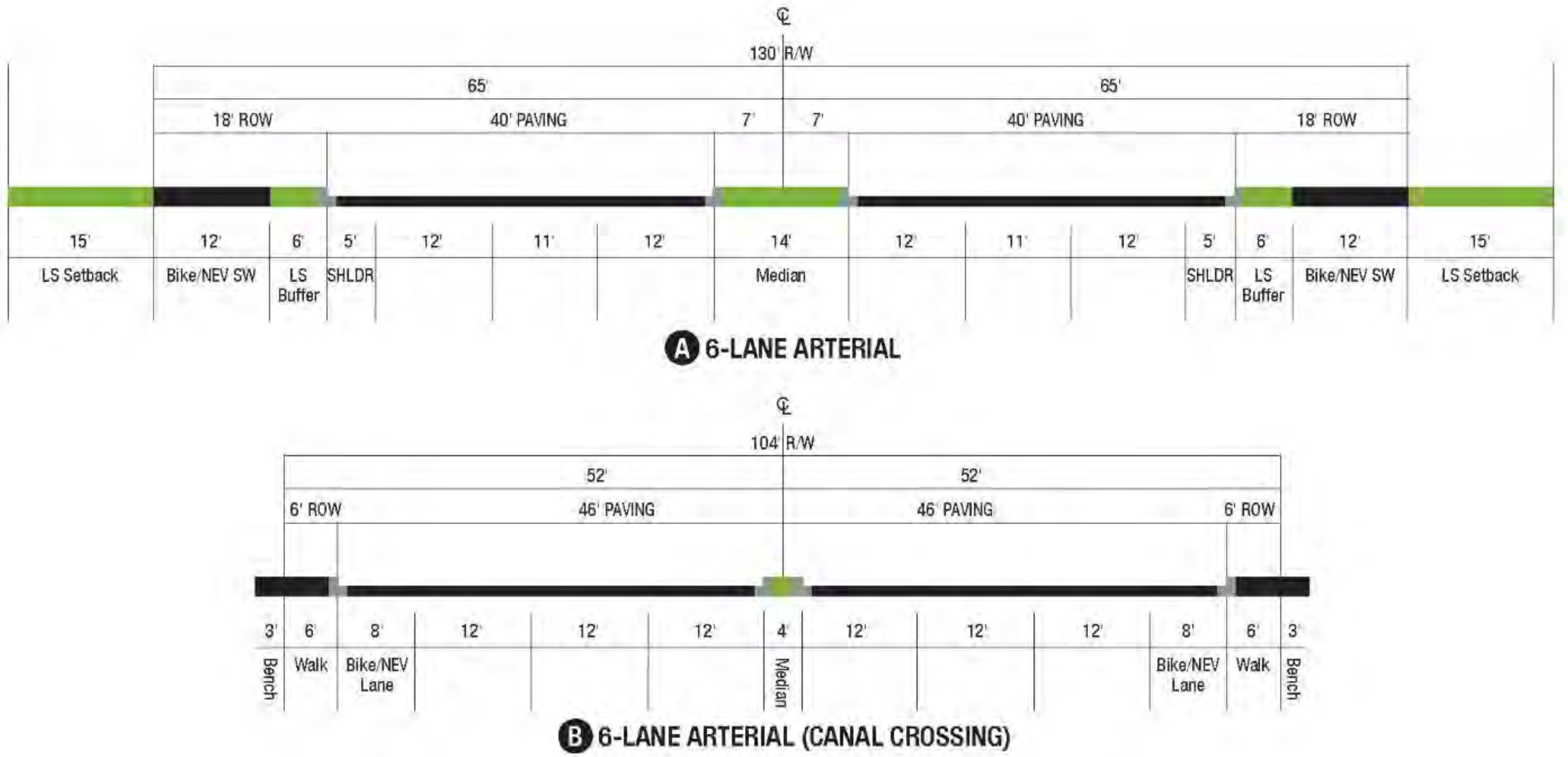
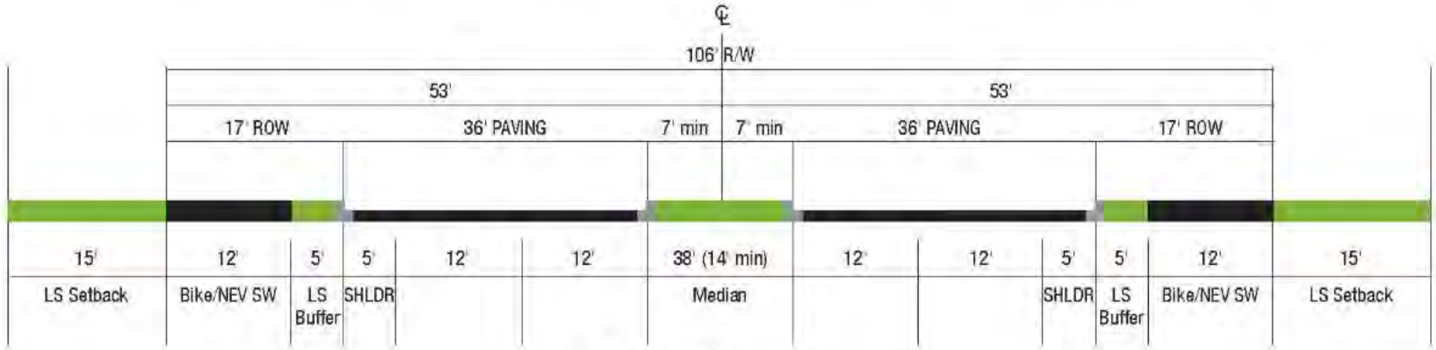
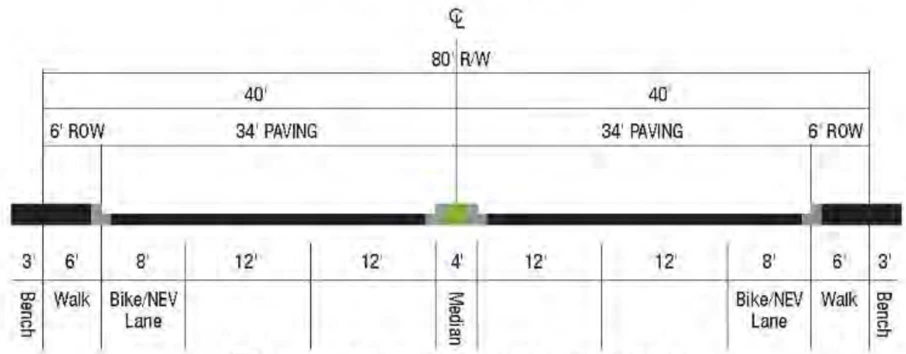


FIGURE 2-11A: TYPICAL STREET SECTIONS

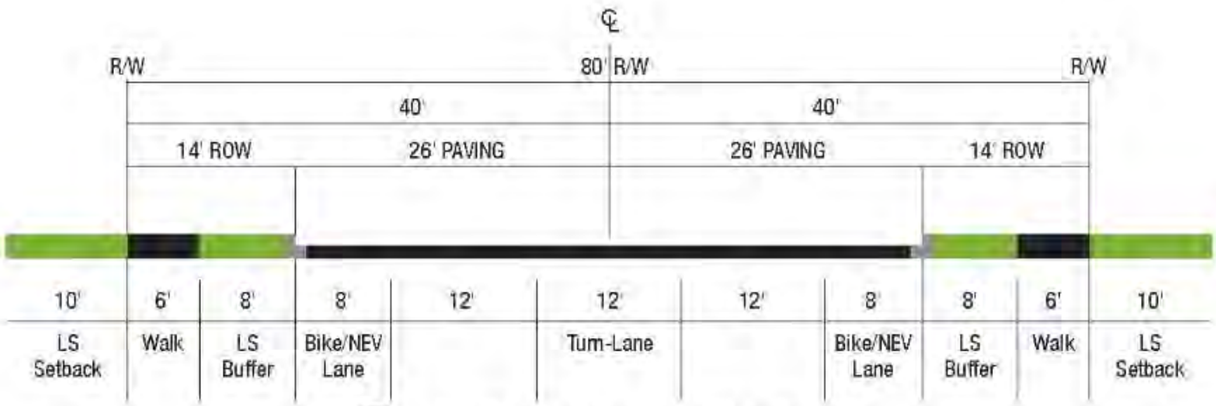


C 4-LANE MAJOR

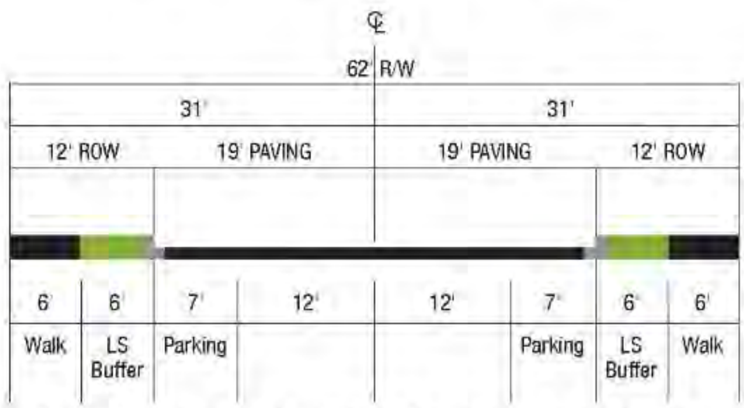


D 4-LANE MAJOR (CANAL CROSSING)

FIGURE 2-11B: TYPICAL STREET SECTIONS



E 2-LANE COLLECTOR (SECONDARY)



LOCAL STREET: W/ON-STREET PARKING (RESIDENTIAL)

LOCAL STREET: NO ON-STREET PARKING (RESIDENTIAL)

FIGURE 2-11C: TYPICAL STREET SECTIONS

2.5.7 Roundabouts

One-way roundabouts (see image at right for a typical roundabout feature) require traffic to circulate counterclockwise around a center island. Roundabouts should be used primarily on major and secondary streets, often substituting for traffic signals or all-way stop signs. They typically have raised islands to channel approaching traffic to the right.

With modern roundabouts, approaching traffic must wait for a gap in the traffic flow before entering the intersection and always requires yield-at-entry (yield-to-left). Since they involve deflection at the entry points and counterclockwise circulation around the center-island, these devices will limit speed and calm traffic.

The Typical Roundabout Detail (see Figure 2-12 and 2-13), illustrates a schematic design, although final design may vary at the time of final engineering.

The Specific Plan proposes several potential roundabout locations around the major 4-lane roadway that makes up the internal loop road. These locations facilitate the movement of traffic off of the major roadway and onto secondary and local roadways.

2.5.8 Drainage Crossings

The KPC Coachella Specific Plan circulation network would require crossings over the Coachella Canal and Eastside Dike to connect with the remainder of the City of Coachella to the west. Crossings will also be required within the project area along the drainages that transect the Specific Plan Area. These crossings are explained in further detail below.

All-Weather Vehicular Crossings would be located at each of the roadway crossings of the alluvial drainages. However, crossing methods and approaches at these streets would vary slightly.

Vista Del Norte Crossing

At Vista Del Norte, there is a 30-foot-high earthen flood control levee (the Eastside Dike) that is parallel to the Coachella Canal located on the northeast side of the canal. The roadway will cross the Canal and the Dike and allow for drainage flows to pass under the roadway on the northeast side of the levee. There are two crossings required at this location; one will cross the irrigation canal (Coachella Canal) and the other will cross a flood control drainage area behind the existing levee. Crossings at these two locations will be accomplished by series of multi-cell arched concrete culverts.

For the Canal crossing at this location, one or more reinforced concrete box culverts (RCB) will be used. For the drainage facility behind the levee, a series of concrete arch culverts are proposed. The Canal crossing with RCBs have been successfully used by CVWD in the past for similar road crossings based on the ease of construction and performance considering their maintenance requirements for the irrigation canal.

Typical Box Culvert

The drainage culverts behind the levee will utilize precast concrete arch sections that offer longer spans than traditional rectangular RCB sections.

Road sections in bridge conditions are reduced in width as shown in Figure 2-10(a and b), *Typical Street Sections*.

Interior Street Crossing

Typical Arch Culvert

Drainage crossings for the interior street crossings would be concrete box or arch culverts. The number of cells in the culvert will be dependent upon the projected storm water flows for a particular crossing. In the event that the multi-cell precast arched culvert is less practical, the multi-cell reinforced concrete box culvert (RCB) may be used. The advantages such as aesthetics and number of spans will be evaluated for each alternative during final design. Where appropriate, low flow/"Arizona" crossings may be utilized for road crossings of smaller drainages, subject to City engineer review and approval as part of engineering plan review.

Paseo Crossings

Trail crossings of the Village Paseo would be designed as low flow/"Arizona" crossing set at grade. Trail maintenance would be required after storm events, provided by the Homeowners Association or a maintenance district.

2.5.9 Public Transportation

Public transit service within the City of Coachella is provided by Sunline Transit Agency. Lines 90, 91, 95, and 111 all serve portions of the City of Coachella. Route 90 currently runs from the downtown area north, ending on Dr. Carreon Blvd. Route 91 runs from the City of Indio south through Coachella, Thermal, and Mecca and ending in the One Hundred Palms area. Route 95 runs on the east side of Highway 111 from downtown Coachella to the North Shore area just north of the Salton Sea. Route 111 runs from downtown Coachella west through Palm Desert, Rancho Mirage, Cathedral City, and Palm Springs. The KPC Coachella Specific Plan, coupled with the proposed La Entrada Specific Plan area, provides the opportunity for the extension of the Sunline Transit Agency service area further east. Potential bus lines along Avenue 50 and Vista Del Norte will serve to increase connectivity between the plan area, La Entrada Specific Plan area, and the City of Coachella. An extension of service to the plan area will expand access to housing, commercial retail, entertainment, open space, and recreational opportunities to residents around the region.

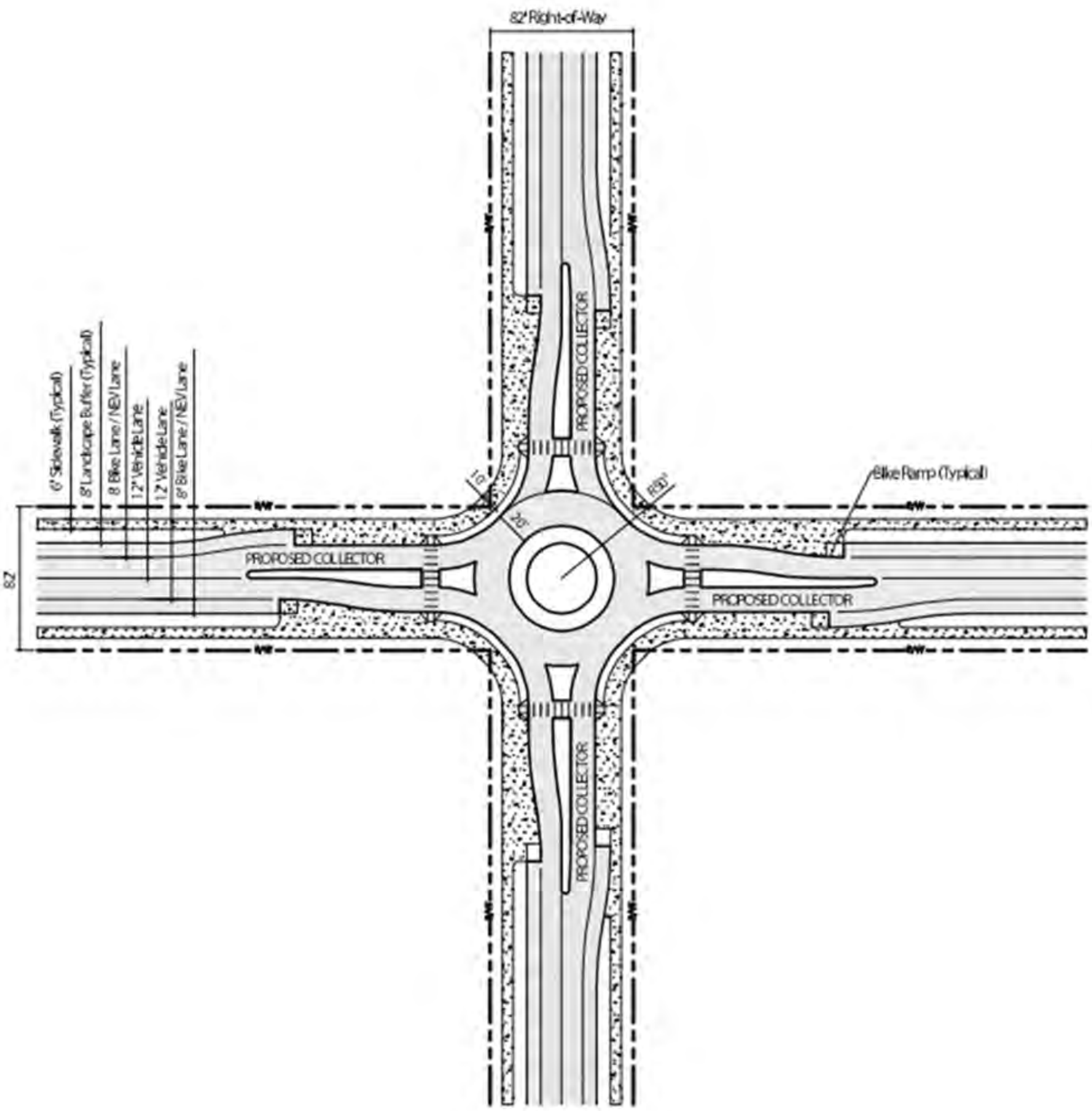


FIGURE 2-12: TYPICAL ROUNDABOUT – COLLECTOR TO COLLECTOR

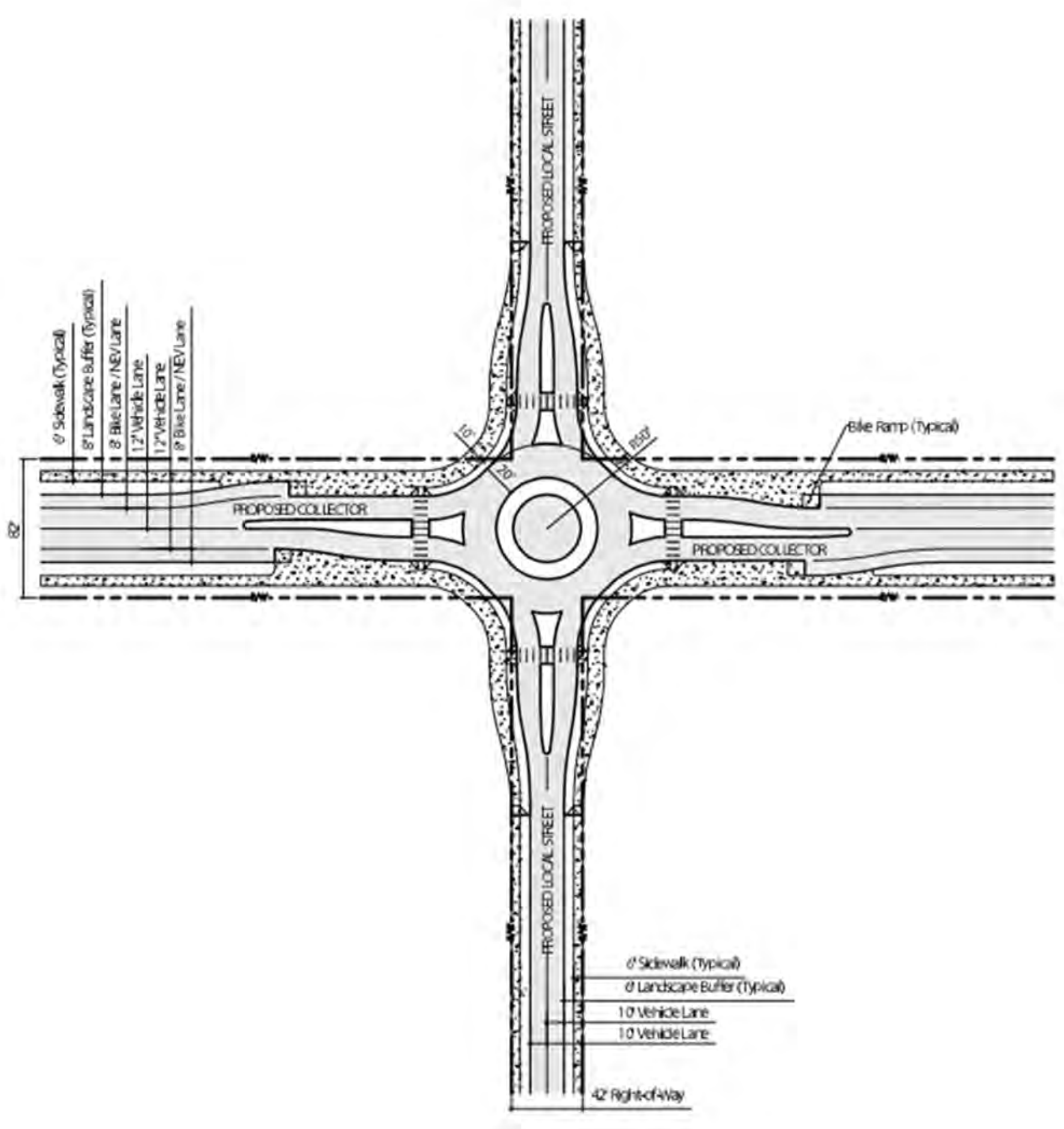


FIGURE 2-13: TYPICAL ROUNDABOUT – COLLECTOR TO LOCAL ROAD

2.6 Grading Plan

The grading plan is designed to accommodate the proposed development while taking development constraints such as existing topography, drainage patterns, and on-site fault zones into consideration.

2.6.1 Conceptual Grading Plan

For purposes of illustrating the proposed overall grading concept for the KPC Coachella Specific Plan area, a Conceptual Grading Plan has been prepared. Rough grading for the KPC Coachella Specific Plan Area is shown on Figure 2-14, *Conceptual Grading Plan*. The excavation of approximately 23,976,000 cubic feet of earthwork within the footprint of the project is assumed. This volume includes earthwork required for each of the eight canal crossings within the Specific Plan Area. Areas identified as natural open space will generally remain ungraded except in the instance where certain infrastructure needs to be constructed (water line, tank, etc.).

Grading plans will be designed so that no import or export from the site is required, and to conform and adhere to applicable County standards (see grading standards in the Appendix of this Specific Plan). Grading will be performed in phases to minimize export and grading quantities by phase. It is anticipated that grading will be contained within the project boundaries and only extend beyond the project boundaries in cases where off-site infrastructure improvements, such as road or utility improvements, are required.

Rough Grading is anticipated to be done prior to or during individual development of planning areas to create building sites for homes and commercial uses.

2.6.2 Grading Standards

The following standards shall apply to all development within the KPC Coachella Specific Plan area:

- Grading will conform to the requirements of the California Building Code and the County of Riverside grading standards, a copy of which is included in the KPC Coachella Specific Plan appendix as a reference. The grading standards from the County of Riverside in effect at the time a grading permit is applied for shall apply;
- All grading shall conform to the requirements of the project geotechnical and soils studies;
- All grading activities shall be in substantial conformance with the Conceptual Grading Plan, and shall implement any grading-related mitigation measures outlined in the KPC Coachella EIR and Mitigation Monitoring Program;
- The following specifications shall apply for retaining walls constructed within various areas of commercial or residential lots:
    - Typical retaining walls will be 6 feet in height
    - The minimum distance between any 2 retaining walls shall be equal to or greater than the height of the taller of the 2 retaining walls. The distance between the 2 walls shall be measured as the horizontal separation between the 2 closest wall faces; the back face of the downslope retaining wall and the front face of the up slope retaining wall;

- Cut and fill slopes shall be finished at a maximum 2:1 grade, consistent with Riverside County Grading Standards;
- Maximum distance between slopes shall be consistent with Riverside County Grading Standards;
- Best Management Practices (BMPs) used for slope stabilization shall be consistent with Riverside County, as well as rough grading plans to be filed upon project construction;
- Post-grading restoration (re-naturalization) of desert washes and natural areas disturbed during grading shall be required. Landscape plans for re-naturalization shall be included as part of grading plan submittal;
- All streets shall have a gradient not exceeding 15 percent;
- Slopes exceeding three feet in vertical height shall be protected per County standards prior to the beginning of the wet season (October to March) or as otherwise provided per the approved Erosion Control Plan;
- Prior to initial grading activities, a soils report and geotechnical study shall be performed with further analyses on-site soil conditions and appropriate measures to control erosion and dust;
- Detailed grading plans shall be prepared prior to any on-site grading for each project or group of projects;
- The applicant shall be responsible for maintenance and upkeep of all planting and irrigation systems until those operations become the responsibility of other parties; maintenance responsibility for landscaped areas will be determined at the time of subdivision maps and landscape construction documents;
- Potential brow ditches, terrace drains or other minor swales, determined necessary at future stages of project review, shall be lined with natural erosion control materials or concrete;
- Grading work shall be balanced on-site, wherever possible. Stockpiling of soil is permitted within the site to allow for balanced grading by phase;
- Graded, but undeveloped, land shall be maintained weed-free and planted with interim erosion control measures within 45 days of completion of grading, unless building permits are obtained;
- A grading permit shall be obtained from the City of Coachella prior to grading. Grading permits shall conform with project conditions of approval and EIR mitigation measures; and
- If any historic or prehistoric remains are discovered during grading, a qualified archeologist and paleontologist shall be consulted to ascertain their significance.

KPC DESERT LAKES
EARTHWORK ANALYSIS

EARTHWORK ANALYSIS			
PHASE	CUT (CY)	FILL (CY)	COMMENT
1	5,935,000	6,150,000 SHRINK @ 10% 615,000 5,535,000	400,000 EXPORT TO PHASE 3, 4 & 6
2	4,536,000	5,040,000 SHRINK @ 10% 504,000 4,536,000	
3	3,459,000	3,880,000 SHRINK @ 10% 388,000 3,492,000	33,000 IMPORT FROM PHASE 1
4	2,291,000	2,860,000 SHRINK @ 10% 286,000 2,574,000	283,000 IMPORT FROM PHASE 1
5	2,794,000	2,860,000 SHRINK @ 10% 286,000 2,574,000	220,000 EXPORT
6	1,288,000	1,780,000 SHRINK @ 10% 178,000 1,588,000	300,000 IMPORT FROM 80K PHASE 1 FROM 220K PHASE 5
7	3,673,000	4,070,000 SHRINK @ 10% 407,000 3,663,000	
TOTAL	23,976,000	26,640,000 SHRINK @ 10% 2,664,000 23,976,000	

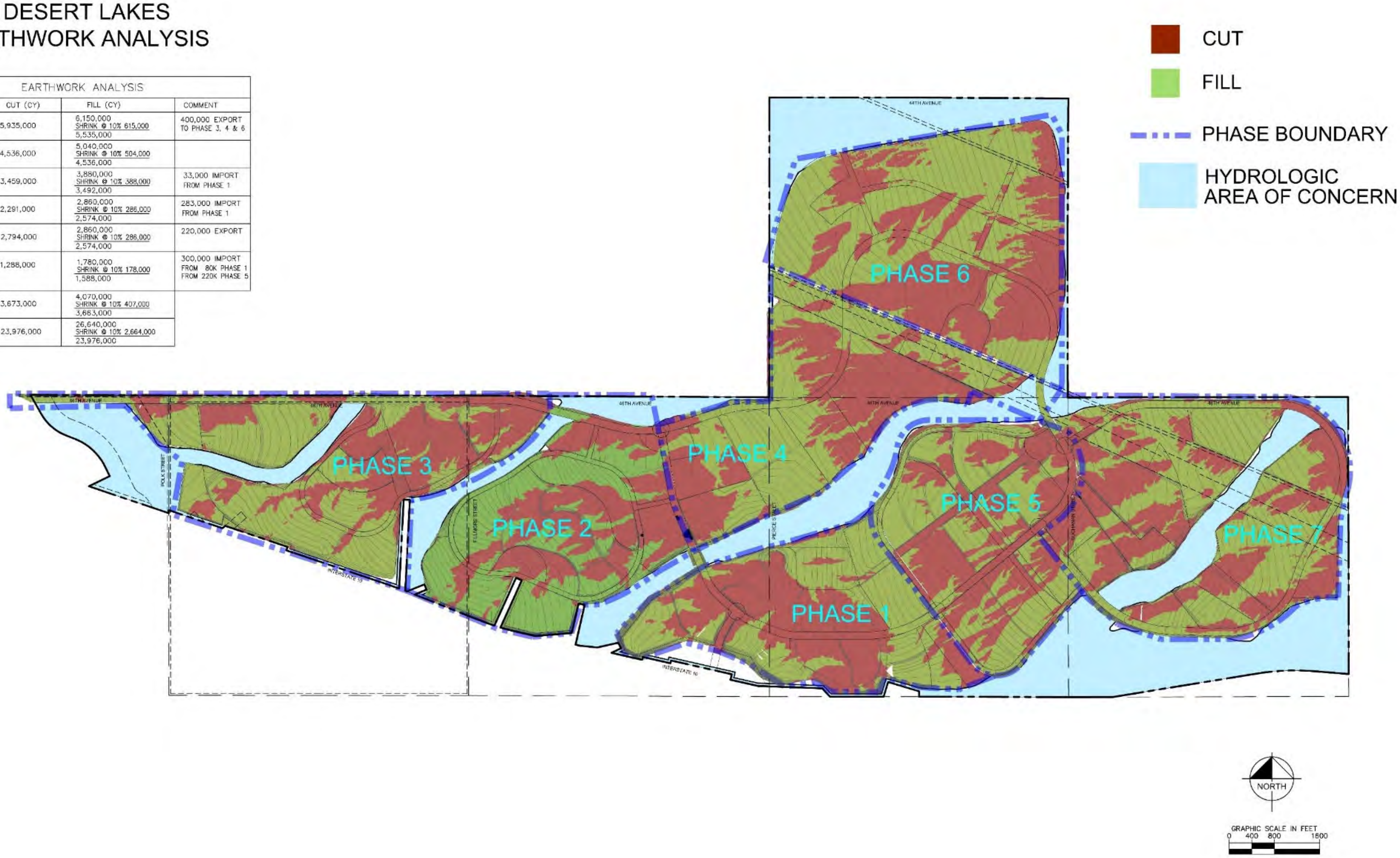


FIGURE 2-14: CONCEPTUAL GRADING PLAN

2.7 Infrastructure & Services

The KPC Coachella Specific Plan will require a variety of public facilities and services to support and serve the needs of its residents and businesses. The infrastructure system will seek to incorporate the highest level of sustainability achievable for a project of its kind and in its specific geographic location.

The various public facilities will be designed to enhance and complement the vision and design objectives of the Project and all facilities will be developed to meet or exceed the required industry standards of the respective service providers and as required by the applicable government standards

Services include water, sewer, storm drainage, solid waste disposal, fire and police protection, schools, and library services. Table 2-7: *Service Providers* lists the various service providers for the Project.

TABLE 2-7: SERVICE PROVIDERS

Service	Provider
Water	Coachella Valley Water District
Wastewater	City of Coachella
Electric Service	Imperial Irrigation District
Gas Service	Southern California Gas
Communications	Verizon/Time Warner
Fire Protection	Coachella Fire Department
Police Protection	Coachella Police Department
Schools	Desert Sands Unified School District Coachella Valley Unified School District
Library	County of Riverside
Solid Waste Disposal/Recycling	Burtec

2.7.1 Water Concept Plan

A domestic water system study was prepared for the KPC Coachella Specific Plan by Charles Marr Consulting, dated May 20, 2019, which contains the full analysis and technical detail of the project's water facilities.

Water Supply

The City, and future residents and businesses within the KPC Coachella Specific Plan area, will rely on groundwater provided by six active wells which provide a total firm capacity for the City of 8,454 gpm and supplied a total demand of 5,896 AF in 2016. On average each well provides approximately 1,000 AFY, ranging in design capacities of 1,371 gpm to 2,323 gpm. The City's 2017 Water Master Plan calls for six new wells to be developed for the 150+ Zones by the year 2035, based on the assumed phasing of major development projects proposed at or above approximate mean sea level elevation of 30 feet.

According to the City's Water Master Palm, KPCC lies within the Desert Hot Springs Subbasin and the Fargo canyon Subarea, which has recently been characterized as generally low-quality water with limited yield potential. Therefore, all groundwater pumping will likely be developed within the subbasin west of the San Andreas Fault to avoid these concerns. For the purposes of the Project, it is anticipated that the conceptual sites identified by the City's Water Master Plan would be used for developing additional groundwater supply for the remainder of KPCC. KPCC's average and maximum-day demands for both domestic and irrigation needs are approximately 2,890 and 5,492 gpm, respectively, with a total annual production need of 4,663 AF.

The following are measures that the city will maintain in order to assure the most efficient use of water resources and meet the CVWMP 2016 goals:

- Continued CVWMP program implementation may include treatment of Canal water for domestic use
- In the event recycled water becomes available to the Project, the potential use of tertiary treated water will be reviewed to determine feasibility of its use for on-site landscaped areas to reduce the use of groundwater for irrigation.

Potable Water Use

The source (or sources) of water will be confirmed through the preparation of a Water Supply Assessment (refer to section 2.7.1 above). These sources may include but are not limited to the following:

- Drill additional wells depending on water quality and quantity;
- Potential use of non-domestic water including:
    - Tertiary treated recycled water from the City's wastewater treatment plant,
    - Tertiary treated recycled water from a new on-site wastewater treatment plant,
    - Untreated well water, and
    - Canal water;

The proposed primary water supply connection for KPC Coachella is at existing water facilities operated by the City and the Coachella Water Authority (CWA), and is located adjacent to Polk Street and Vista Del Norte (Avenue 46). A 16-inch transmission pipeline supplies flow to the 'High' (146-foot) Zone 1.5 million-gallon reservoir at this location (Dillon Road Reservoir). The City also operates a "Low" pressure zone for the lower lying development generally located south of Avenue 48 and west of Highway 86. Supply facilities serving the High Zone reservoir at the proposed connection are located at Avenue 48 and Tyler Street, which includes Well 18, a 5 million gallon reservoir, and booster pumps to supply flows to both City pressure zones. The High Zone booster pump station supplies the High Zone tank at the proposed connection location.

Based on the City's current Water Master Plan, the City anticipates development of higher zones for new water distribution systems to serve development in the higher elevations north of Avenue 48 and east of the Coachella Canal. Because the KPCC Project area was included, higher gradients are required for the proposed distribution system. Therefore, additional wells are required to increase the City's water supply and production capacity for service to the Project. In addition, booster pumps, transmission and distribution piping, and reservoirs are planned within the KPCC project boundaries in a multiple pressure zone configuration in order to serve elevations ranging from approximately 100 feet above mean sea level (amsl) to approximately 850 feet amsl.

Non-Potable Water Use

Planning areas within KPCC designated for irrigation purposes, including open space, new agricultural production, parks, greenways and amenity centers could conceivably be served by a non-potable water supply, which would require a separate water system. However, for the purposes of the KPCC Water Master Plan, the irrigation flows for these areas were incorporated into the domestic water system in order to account for 100-percent of project demands served by the domestic water system.

Currently the City's wastewater treatment plant is capable of secondary treatment. Expansion of the plant to bring it to a tertiary level in order to provide recycled water for irrigation purposes would be required. The City currently has no plans to construct a recycled water system, which would require dual plumbing in many areas of the Project, including pumping and storage facilities strategically sited for efficient service of the irrigation demands.

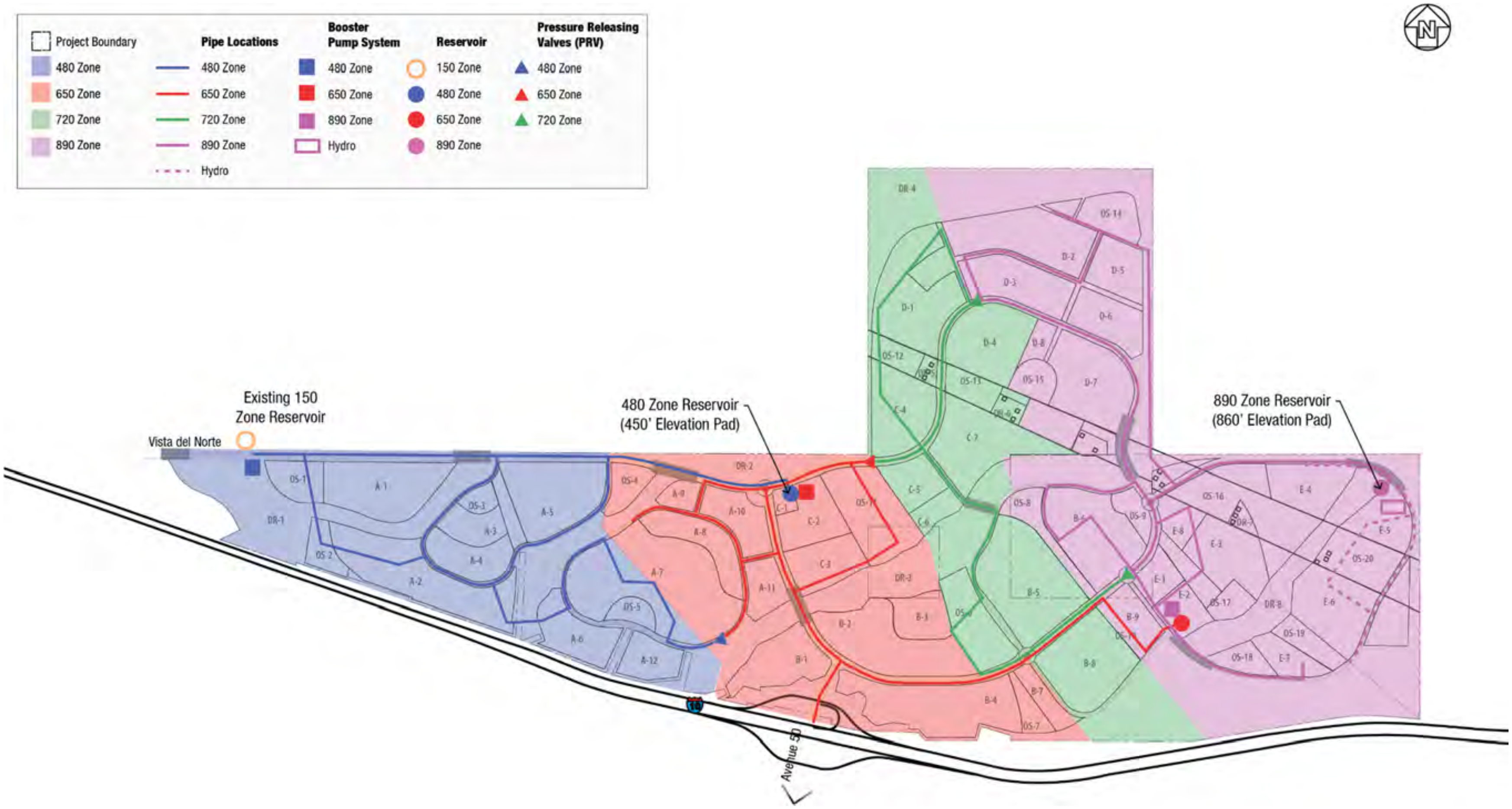


FIGURE 2-15: CONCEPTUAL WATER PLAN

2.7.2 Sewer Concept Plan

A sewer system study was prepared for the KPC Coachella Specific Plan by Charles Marr Consulting, dated May 13, 2019, which contains the full analysis and technical detail of the project's sewer facilities.

The study makes the recommendation that KPC Coachella develop a sewer system independent of other major development projects. Primary collection of on-site wastewater for 100 entirety of the plan area should be based on flowing through Village A to the west and Vista Del Norte (Avenue 46). The collection system is proposed to flow from east to west and north to south. Collection within KPC Coachella is naturally divided into four sewersheds (as shown on Figure 2-17) which drain to local low points determined by the proposed land use, concept grading, and natural site drainage. Sewersheds 1, 2, and 3 will likely require a lift station to pump flows to the next downstream sewershed.

A 24-inch gravity trunk main will run from a lift station located in the west portion of Village A along the north side of the I-10 Interstate and serve the majority of Village A, C and D. A second lift station located in the southwest portion of Village B will serve a portion of Villages B and C. Force main sewer lines will be used in limited areas where gravity sewer lines are not able to feed to the designated lift station due to topography constraints. A third lift station will collect wastewater from the remainder of Village B and the entirety of Village E.

Gravity sewer lines to service the planning areas will range from 8- to 18- inches in size and are located in the project's backbone streets.

Figure 2-17: *Conceptual Sewer Plan*, illustrates the sewershed configuration and proposed collection sewers and lift stations for the plan area.

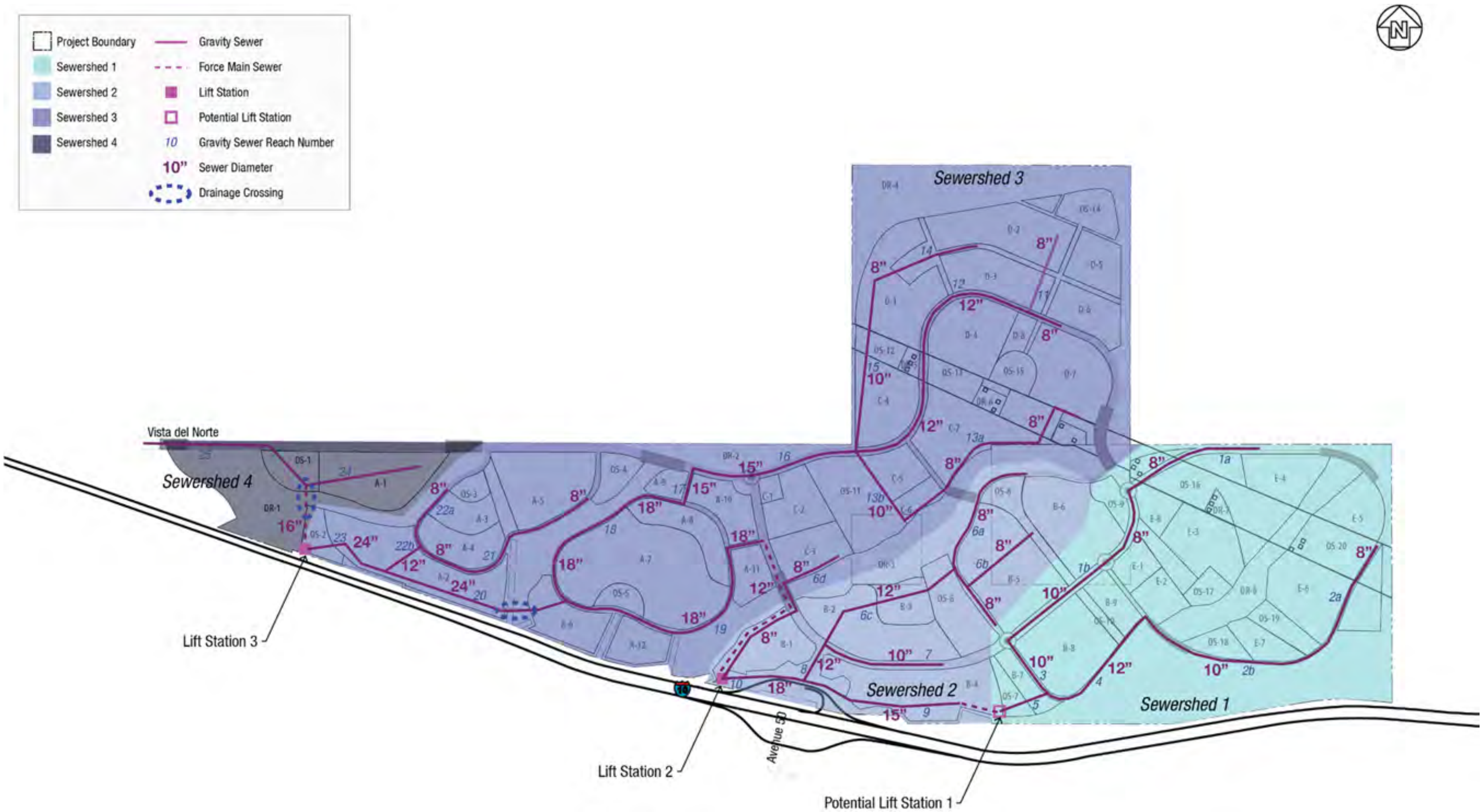


FIGURE 2-16: CONCEPTUAL SEWER PLAN

2.7.3 Drainage and Water Quality

Coachella Valley Water District (CVWD) provides regional flood protection within its stormwater service area (which includes the City of Coachella and the project site) by intercepting and conveying regional flood flows through the Coachella Valley to the Salton Sea. This regional stormwater conveyance system consists of the 50-mile Whitewater River/Coachella Valley Stormwater Channel (WWRSC/CVSC) and related tributary stormwater facilities. The Whitewater River, which originates on the southern slopes of the San Bernardino Mountains, flows southeast through the Coachella Valley to the Salton Sea.

A drainage study has been prepared for the project by Q3 Consulting, dated August 2019, which contains the full analysis and technical detail of the project's drainage facilities.

Storm water flows through the KPC Coachella site in several ways:

- Regional flows from north of the project will flow through the five on-site alluvial drainages. These flows will follow their historic course towards the Eastside Dike downstream from the project's southwestern edge. Two of the drainage will flow to the Dike north of the I-10 Freeway, and the remaining three drainage are conveyed under the freeway to the Dike south of the freeway (see discussion under Regional Drainage below).
- Project runoff from the developed areas will flow through storm drains or within streets and discharge to the alluvial drainages within the project limits. All of the project runoff will drain into one of the numerous on-site retention basins to be used to provide water quality treatment and mitigate increases in storm water runoff. A portion of the runoff will be held there until it percolates into the soil. Flows in excess of the required water quality and mitigation runoff volumes will be discharged through an overflow system into one of the five drainages. (see discussion under Retention/Water Quality Basins below).

Regional Drainage

The KPC Coachella site is traversed by five alluvial drainages which trend in a southwest direction and terminate at the Eastside Dike of the Coachella Canal on the project's southwestern edge. These drainages convey stormwater from a large area north of Interstate 10 through the project area and ultimately to the Whitewater River. The project will be set-back from the main conveyance areas of these drainages. Where encroachment does occur, the drainages will maintain the soft-bottom condition and included channelized banks with gently sloped 3:1 sidewalls. The open drainages and channelized banks will convey regional and local flows through the site and convey them to the Eastside Dike (north of the I-10 Freeway) or to the I-10 bridge and culvert crossings and from there to the Eastside Dike and further to the Whitewater River via Wasteway No. 2.

Backbone Drainage System Concept

The drainage system for KPC Coachella is designed not to exceed outflows under a predevelopment condition. Storm flows will sheet flow within the backbone streets to a network of storm drains ranging in size from 18 inches to XX inches. Within each drainage area, flows will be conveyed to the on-site drainage channels, ultimately draining into the existing drainage area at the southwesterly side of the project.

Retention/Water Quality Basins

On-site retention will be required to reduce post-development runoff volumes to pre-development levels. On-site retention basins will be located throughout the site adjacent to the regional drainages for this purpose. The retention basins, as described herein and depicted on Figure 2-18 are conceptual in nature. Final requirements for basin size, location and dimensions will be specified in the KPC Coachella hydrology report and associated conditions of approval. CVWD, as the area flood district, will make the final determination about whether the basins are necessary and how the basins will be constructed.

In addition, each of the basins will be configured for water quality purposes. Each water quality facility will treat water from a specific watershed area. The facilities may be designed as soft bottom earthen structures and sized to capture and infiltrate the required water quality volumes. These water quality facilities are designed to capture storm flows from the mixed use and residential development.

Prior to the issuance of a grading permit, a detailed management plan will be prepared that will include, but not be limited to: detailed landscaped design criteria, a detailed plan for the control of vectors indigenous to wetlands, and a plan to evaluate the overall health of the facility on a regular schedule and implement any corrective actions necessary to maintain the facilities ability to improve water quality.

Figure 2-18, *Conceptual Drainage Plan*, illustrates the project's drainage features.

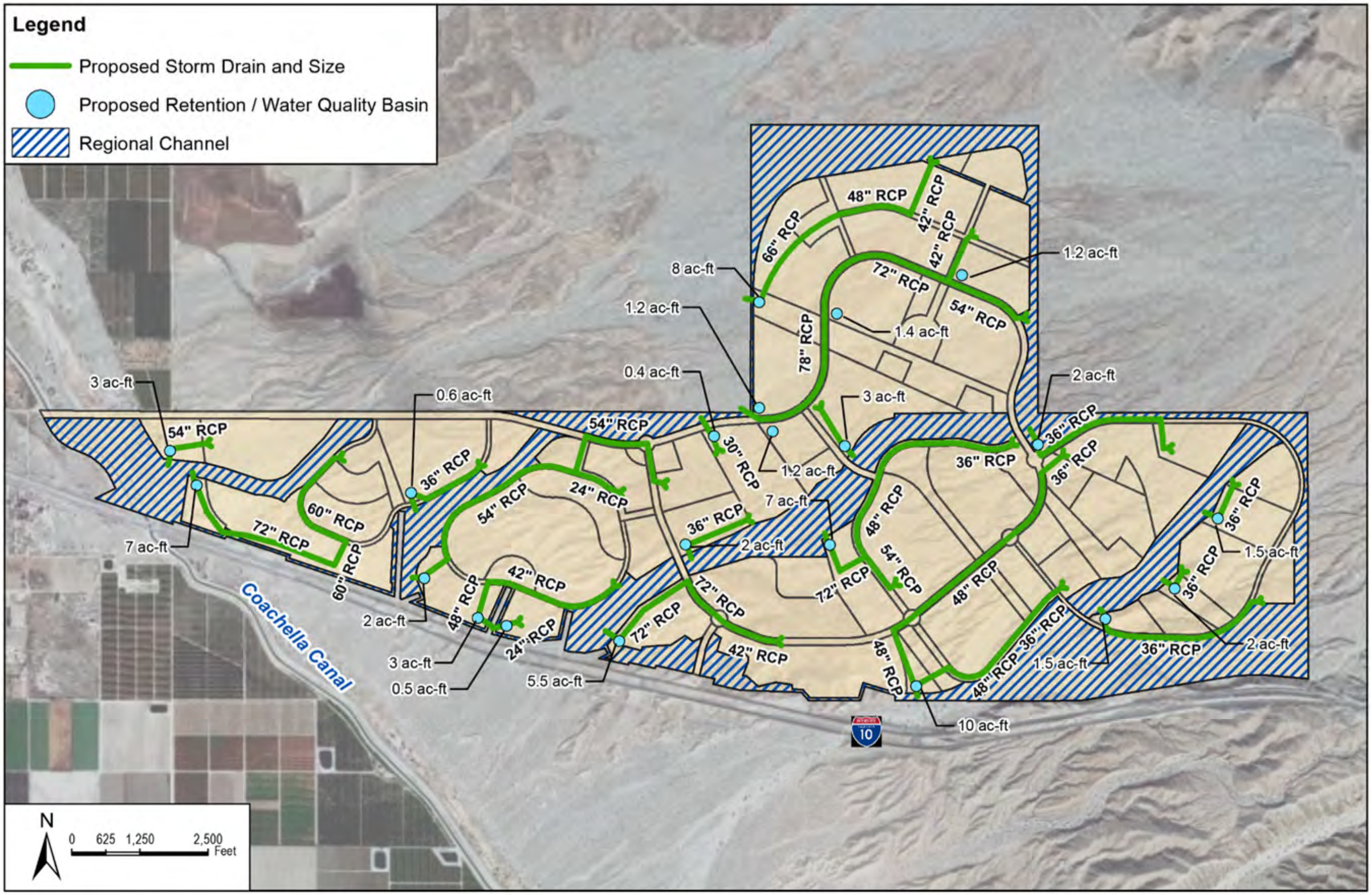


FIGURE 2-17: CONCEPTUAL DRAINAGE PLAN

2.7.4 Southern California Gas Company

Southern California Gas Company (SCG) operates a standard gas distribution facility (60 PSI MOP) westerly of the project in Coachella. Within the Specific Plan area, SCG operates two high pressure transmission mains. The existing transmission gas mains connect SCG's compressor station in Moreno Valley with SCG's Frontage Road monitoring station, which is located approximate 6 miles east of the Project area.

In addition to extending the gas distribution facilities within the Specific Plan area, SCG will likely need to build a gas regulator station near one of its existing transmission lines to provide an additional SCG source for the project. The regulator station will provide SCG with an additional feed point for its new gas distribution gas mains within the project.

2.7.5 Solid Waste

Burrtec Waste Industries currently provides solid waste disposal, green waste, and recycling services to residents within the City of Coachella. It is anticipated that Burrtec will also provide solid waste disposal service to the residents of the Specific Plan Area. Solid waste is typically disposed of at a variety of landfills, including the Badlands Sanitary Landfill.

It is anticipated that solid waste generated from residents in the Specific Plan will also be disposed of at these landfills. Materials efficiency and use of recycled materials within the project is discussed in Section 2.3, Sustainability Strategies, of this Specific Plan.

2.7.6 Verizon Communications (Vz)

Verizon phone will need to extend its facilities to the project. It is anticipated that Verizon will extend its copper and fiber optic facilities from the Coachella Central Office. Verizon has rolled out its FIOS program in Southern California which now provides high speed fiber optic communications and internet service to the home and business. It is anticipated that Verizon will roll out its FIOS technology within the Specific Plan area.

2.7.7 Time Warner (TW)

Time Warner Communications (TW) operates the cable television (CATV) network in the Specific Plan area. TW will be able to provide CATV along with high speed internet access. It is anticipated that TW will install its newest technology of fiber optic and coaxial facilities to serve the project.

2.7.8 Police Services

The Riverside County Sheriff's Department is contracted to provide law enforcement services through the Coachella Police Department. Currently, the Riverside County Thermal Sheriff Station serves the City of Coachella. The station is located on Carreon Boulevard in Indio. The Coachella Police Department Contract consists of 32 sworn officer positions. Nineteen (19) of these positions are dedicated to the patrol division with the remaining officers dedicated to special assignments such as the Community Action Team. Based on the 2010 Census Population, the current ratio of officers to residents is approximately 3.75 per 1,000 residents in the City. The City's preferred standard is 1 officer per 1,000 residents. Police service calls will incrementally increase as a result of the potential development of the Specific Plan area.

2.7.9 Fire Services

The City of Coachella has established a Fire Protection District with the City Manager acting as Manager of the District. Fire protection and suppression services are provided through a contract with the Riverside County Fire Department. These services include fire suppression, fire prevention, emergency medical response, hazardous materials response team, urban search and rescue response team and other related fire protection and emergency services. The Fire Department maintains a fire station within the City of Coachella.

Station 79, located at 1377 Sixth Street, is the primary station that will serve the Specific Plan Area. The Coachella Fire Station is staffed by 10 full-time career personnel, 1 reserve firefighter and 10 Explorer cadets. The station also has 1 City Paramedic and an Assessment Engine. Two other stations are close to Coachella, including Station No. 39 located at the Thermal Airport and Station No. 86 located at Jackson and 47th Street in Indio.

Areas within a mile radius of the station have a response time of two minutes; areas within a 2 to 5-mile radius have a response time of 3 to 5 minutes. Fire service calls will incrementally increase as a result of the future development of the Specific Plan area. A fire station will be required to serve the KPC Coachella community, with the location to be associated with one of the mixed-use planning areas. The location and size of the fire station parcel will be determined by the Fire Department as part of the first implementing projects within the Specific Plan area.

2.7.10 School Facilities

The Specific Plan area is located within two school districts: The Desert Sands Unified School District (DSUSD) and Coachella Valley Unified School District (CVUSD). The districts currently charge Developer fees on per-square-foot basis for new residential and commercial development.

The Specific Plan identifies two elementary school and one middle school sites. If the District(s) do not take the school site(s) upon project build-out or upon written communication from the School District that school site is not needed, the school sites will revert to an underlying low density residential land use.

School site location is dictated by both practice and law. Minimum highway setbacks from schools are not established by law. However, experience and practice indicate that distances of at least 2,500 feet are advisable when explosives are carried and at least 1,500 feet when gasoline, diesel, propane, chlorine, oxygen, pesticides, and other combustible or poisonous gases are transported. In the absence of specific, legally defined setback distances for schools, the Department reviews each case individually. The nearest freeway to the school sites is I-10, and the proposed school sites have been placed accordingly.

The California Department of Education Code Section 17212.5 states that "no school building shall be constructed, reconstructed, or relocated on the trace of a geological fault along which surface rupture can be reasonably expected to occur within the life of the school building." The project school sites have been located in accordance with this criterion.

The Specific Plan also includes an overlay for a potential institution of higher learning. Potential uses include a public or private community college, medical, dental, optometry, or chiropractic college, or other similar educational facility.

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SECTION 3
Development Regulations

The purpose of this section is to provide land use development standards that apply to each of the land use designations. These include standards regarding permitted uses, building height limits, parking requirements, and setbacks.

These development standards should be used in conjunction with Chapter 4: *Design Guidelines*, which describe and illustrate building designs, concepts, and features that will promote the high-quality development that is envisioned for the Specific Plan area.

Where development standards are not described, the standards as described in the City of Coachella Zoning Ordinance shall apply.

3.1 General Provisions

California Government Code (Title 7, Division 1, Chapter 3, Article 8, Sections 65450 et seq.) grants authority to cities to utilize Specific Plans for purposes of implementing the goals and policies of the City's General Plan.

This Specific Plan establishes regulations, standards, guidelines, and processes for the proposed development, and upon adoption, shall constitute the zoning for development within the Specific Plan area.

This section has been prepared in accordance with California Government Code Section 65450, et seq. and the City of Coachella Zoning Ordinance (Title 17 of the Coachella Municipal Code). Regulations are proposed for residential, commercial, Resort, park, and institutional uses. Individual development areas are defined by density, lot size and planning area and have been included in accordance with the goals and objectives of this document.

Application of these regulations is specifically intended to provide the most appropriate use of the land, create a harmonious relationship among land uses and protect the health, safety and welfare of the community.

The following General Development Standards apply to all uses within the Specific Plan, except those governed by the Tribal Council.

3.1.1 Applicability

The KPC Coachella Specific Plan has been developed as both a regulatory and a land use policy document, which, upon adoption by ordinance will constitute the zoning for the property. Development plans or agreements, tract or parcel maps, site plans or any other action requiring ministerial or discretionary approval of the subject property must be consistent with the Specific Plan. California Government Code, Section 65454 requires that a Specific Plan be consistent with the General Plan. Upon adoption, actions deemed to be consistent with the Specific Plan shall be judged to be consistent with the City of Coachella General Plan.

Where conflicts exist between the standards contained in this Specific Plan and those found in the City of Coachella Zoning Ordinance or Municipal Code, the regulations and standards in this Specific Plan shall take precedence. Any area of site development, administration, review procedures, environmental review, landscaping requirements, and regulations not expressly addressed by this Specific Plan document shall be subject to the provisions of the City of Coachella Zoning Code, Municipal Code or General Plan, using the context and objectives of this Specific Plan as a guide.

Tribal Land

Upon taking the Tribal property into Trust, the land use regulation of the Trust property will become the responsibility of the Tribal Council.

3.1.2 Severability

In the event that any regulation, condition, program, portion or policy of this Specific Plan or the application thereof to any person or circumstance is held to be invalid or unconstitutional by any court of competent jurisdiction, such portions shall be deemed separate, distinct and independent provisions and shall not affect the validity of the remaining provisions of this Specific Plan or applications thereof which can be implemented without the invalid provision or application.

3.1.3 Determination of Unlisted Use

Any land use proposal not specifically covered by the provisions contained herein shall be subject to determination by the Development Services Department, its Director or their designee in accordance with Section 17.02 of the City of Coachella Zoning Ordinance.

3.1.4 Interpretation

The development standards and regulations contained in this Specific Plan shall supersede the standards contained in the Coachella Municipal and Zoning Codes, except where specifically provided in this Specific Plan. Whenever the provisions contained in this Specific Plan conflict with the Municipal or Zoning Codes, the provisions of this Specific Plan shall take precedence. Any ambiguity concerning the content or application of the Specific Plan shall be resolved by the City's Development Services Department, its Director or their designee. Such interpretations shall take into account the stated goals and intent of this Specific Plan. If requested, the Planning Commission may review any administrative interpretation, subject to appeal to the City Council.

Modifications to Development Standards

Development standards may be modified by up to 20% in connection with Development Review in order to promote increased pedestrian activity, provide for unified street frontage, ensure privacy and light for residential uses, provide for public spaces, or promote compatibility with existing development and the goals of the Specific Plan.

3.1.5 Definitions

Unless otherwise specified below, terms used in this document shall have the same definitions provided in the City of Coachella Zoning Ordinance Chapter 17.06, "Definitions." The following definitions shall apply to the uses and standards within this Specific Plan:

1. "Alley-Loaded." Access to a structure or lot is made from an alley rather than a street.
2. "Common Open Space" areas may include, but are not limited to, turf areas, landscaped areas, hardscaped areas (excluding parking areas and public/private driveways), gardens, sitting areas, game courts, swimming pools, spas, pickleball courts, basketball courts, tot lots and playgrounds, bocce ball courts, outdoor cooking areas, lawn bowling, and other similar recreational facilities.
3. "Continuum of Care." Any facility, place, or building that is maintained and operated to provide for a range of senior care, including independent living, assisted living, congregate care, and

convalescent/skilled nursing care. Where/when provided, the development standards required by the California Department of Social Services, Community Care Licensing Division (2013), will apply.

4. "Live/Work." A live/work unit is defined as a single residential unit (e.g., studio, loft, or one bedroom) consisting of both a commercial/office and a residential component that is occupied by the same resident. The live/work unit shall be the primary dwelling of the occupant.

5. "Mixed Use." A mixed-use development is a development with planned integration of two or more primary uses in a single development project. Uses may be a combination of retail, office, residential, hotel, or other permitted uses. Uses may be arranged in separate structures throughout a development site (horizontal mixed use) or within a single structure (vertical mixed use).

6. "Wellness University Overlay." The Wellness University Overlay works in conjunction with underlying zoning to address the unique development issues associated with the potential for a University in the subject planning area.

3.1.6 Boundaries

The boundaries and acreage of the individual planning areas are approximate. Precise boundaries and acreages will be established in conjunction with the subdivision map for each planning area or portions thereof within the project. Minor boundary and acreage variations shall be permitted, subject to review by the Development Services Director or their designee for conformance with the intent of the Specific Plan, without an amendment to this Specific Plan. Section 5, *Administration and Implementation*, of this Specific Plan includes a listing of minor modifications and criteria for required amendments to the Specific Plan.

3.1.7 Location and Adjustment of Land Use Designations

The locations of the land use designations shown on the land use plan are approximate and generally follow streets. Adjustments to any of the land use designation boundaries are subject to review and approval by the Development Services Department, its Director or their designee and any such requests for adjustment must be made in conjunction with the submittal of a land use application.

Zoning for properties that are adjacent to a street extend to the centerline of the abutting street. No buildable lot shall be divided by a special district boundary line.

Minor changes in boundary alignment and location are permissible with approval by the Development Services Department, its Director or their designee. However, the intended character and overall location of the land use designations must be maintained. For example, adjusting a boundary to conform to a precise street alignment instead of a conceptual location would be a logical interpretation of this plan's intent.

3.1.8 Senior/Age Qualified Communities

Senior and age-qualified projects (including "continuum of care" communities that include a full range of independent living through skilled nursing) are specifically allowed within the Specific Plan. Such projects may include additional or different park facilities from that shown in the Specific Plan in keeping with the project's demographics; such changes shall be delineated in a site plan submittal concurrent with a subdivision map or site plan for the development. Senior/Age Qualified uses may include the following, generally consistent with the provisions of the Senior Housing Overlay:

- Active Retirement Community. A project in this category is specifically designed with the senior resident in mind and provides appropriate amenities and designs to accommodate the active senior lifestyle. Typical residents are healthy, active, and completely capable of independent living. Projects provide a common amenity package in return for smaller lots, unit sizes and other design incentives. Amenity packages may include a clubhouse, sport facilities, cultural facilities, and/or arts and crafts activity areas. Dwelling unit types may be single-family, attached or detached, or multiple-family attached including apartments, condominiums and townhomes.
- Independent Living Units. A project designed for the senior resident who needs specialized services and amenities to accommodate their special needs and prolong their ability to live independently. Such services may include meal preparation, common dining facilities, emergency call monitoring, housekeeping services, shuttle services, and delivery of groceries and pharmaceuticals. The project includes specially designed units and grounds to accommodate reduced mobility, sight, and hearing problems. Services to support the care of an ailing spouse such as adult day care services, limited nursing services may also be provided. Unit types may range from single-family detached to multiple-family clustered buildings.
- Congregate Housing Community. A project in this category is designed for the senior resident who needs significant care and services including nursing care and medical services. Unit types may include smaller apartments with small kitchenettes, but also common dining facilities and community activity centers. Specific services may include security, activity centers, housekeeping, emergency monitoring and transportation.

3.1.9 Gated Communities

Gated communities are permitted within the Specific Plan area subject to site plan/architectural review of the location, design, and rationale for such gating. Details of gate design must be included in the site plan submittal for any project which includes a gate, and must include adequate stacking distance to avoid backups onto surrounding collectors, adequate turn-around provisions, and adequate emergency access provisions. Gating is assumed, but not required, for the active adult planning areas of the Specific Plan (Village D).

3.1.10 Design Guidelines

Residential, commercial, and resort development shall be designed and built-in substantial conformance with the Design Guidelines contained in this document (Refer to Section 4.0, *Design Guidelines*). More detailed privately managed Level Two Design Guidelines may be prepared by the Master Developer to provide specific details regarding site plan design, architecture, and landscaping to guide individual builder submittals, subject to review and administration by the Master Developer. If prepared, these builder-level guidelines would be consistent with the guidelines herein but would be administered privately.

3.2 General Site Development Criteria

The following general site development criteria shall apply to all land development within the Specific Plan area.

3.2.1 Gross Acreage

Except as otherwise indicated, planning area acreages and densities are based upon gross acreages, which include the area for internal local streets and internal parks and open spaces.

3.2.2 Grading

Development within the project site shall utilize grading techniques as approved by the City of Coachella and based on the grading standards attached to this document as Appendix B, *Grading Standards*. All grading activity pursuant to this section shall be subject to a grading permit issued by the City.

3.2.3 Subsequent Building Modification

Subsequent building modification by homeowners, including additions and/or projections into setback areas permitted by the Specific Plan (subject to approval of standard city permits), shall match the architectural style of the primary unit and shall be constructed of the same materials and colors as the primary unit and/or in context with the overall Design Guidelines.

3.2.4 Utilities

All new public utility distribution lines of less than 69kv shall be placed underground throughout the Specific Plan area. Water, reclaimed water, sewer, and storm drain utilities may be designated as “public utilities” if located within public streets. Public utilities within private streets shall be designed to city/agency standards and contained within applicable easements.

3.2.5 Development Intensity

The KPC Coachella Specific Plan allocates a total number of dwelling units to each Planning Area and by residential category as indicated in Tables 2-1 through 2-3, included in Section 2, *Development Plan*. Variations in the number and type of dwelling units within each residential planning area may occur at the time of final design depending upon the residential project identified for development (i.e., multiple product types and densities may occur within a single planning area, with overall density averaged over the entire planning area. Increases in allocation of residential units up to a maximum of 15% are permitted among the residential planning areas within the Specific Plan provided the total number of units established in this Specific Plan is not exceeded unless a density bonus is applied under the provisions of Coachella code section 17.88 or new State of California provisions for density bonus which may apply.

Provisions for transfer of residential units between planning areas are outlined in Section 5, *Administration and Implementation*, of this Specific Plan.

The mix and ultimate intensity of the commercial components within the commercial planning areas of the Specific Plan are governed by the permitted uses, floor area ratios, and setbacks outlined in these Development Regulations.

3.2.6 Walls and Fences

Fence Heights – Residential Uses

Fences on lots with a single or attached one-family dwelling in any planning area shall conform to the development regulations established in the zoning code section 17.60 except as provided in this section.

- Within front yard setback: 36 inches maximum
- Within side or rear yard setback or along/behind corner lot size yard setback: 6 feet maximum
- Fences that exceed the height requirement in the municipal code require a variance, unless the height is required by a federal, state, or local requirement or for mitigation purposes.
- Fence height shall be measured from existing grade. When the difference in grade along a common property line exceeds two feet, any fence along the common property line shall not exceed more than six feet in height.
- Arbors, trellises, and other lightweight ornamental landscape elements are allowed within a required yard with a maximum height of 9 feet.
- Where fences or walls are located on retaining walls, the height of the retaining wall shall be considered as part of the overall height of the fence or wall. Walls or fences with a minimum spacing of five feet may be considered separate structures for purposes of measuring overall height. In a rear yard condition adjacent to a natural or manufactured slope the fences as measured from the uphill side may be erected or replaced on top of the retaining walls and the combined fence and retaining wall height shall not exceed nine feet from the lower side.
- The Director may grant exceptions to these standards subject to a finding that no public purpose would be served by strict compliance with these standards.

Posts and Gates

Support posts or columns, not exceeding 4 feet in height and 18 inches in width, and gates used for pedestrian purposes are permitted in the front yard. Wall columns or pilasters may exceed the height of the wall or fence by up to 6 inches.

Prohibited Fences

The following materials and fence types are prohibited from use on any parcel of property in the Specific Plan area that is used for residential purposes:

- Barbed wire
- Razor wire
- Electric fences
- Glass
- Other sharp materials

3.2.7 Interim and Temporary Uses

The following interim uses may be permitted in any planning area ultimately planned for development uses prior to its entitlement for its primary permitted use. Interim uses are not permitted in areas proposed as open space.

1. The growing of field crops, trees, vegetables, fruits, berries and nursery stock, including wholesaling of crops produced upon the premises subject to approval of a conditional use permit.
2. Stockpiling of soil for use in subsequent phases as part of a grading permit approval.
3. Festivals, including music festivals, or fairs subject to approval of a special use permit.
4. Construction staging, including materials storage lots for construction projects, temporary parking, and construction trailers, subject to administrative approval of a Construction Management Plan.
5. Farmers Markets subject to approval of a Special Event Permit.
6. Christmas tree lots, pumpkin patches and similar seasonal uses subject to the provisions of Section 17.48.120 of the Zoning Code.
7. Temporary parking lots pursuant to Section 17.48.100 of the Zoning Code.
8. Project information Centers/Sales Centers/Model Complex, subject to administrative review of a building permit and agreement letter.

3.3 Residential Uses

The development standards and product types included herein are intended to establish the minimum design parameters. An appropriate mix of building types shall be incorporated into planning areas to avoid a monotonous neighborhood. The City may allow different standards and product types proposed by a builder during architectural review of a Specific Development Plan and/or Tentative Map, provided that such alternative standards and product types are consistent with the intent of the Specific Plan.

There are 4 classifications of residential development in the project area:

- Very Low-Density Residential (VLDR): The density range is from 0.4 to 1 du/ac.
- Low-Density Residential (LDR): The density range is from 2.0 to 8 du/ac.
- Medium Density Residential (MDR): The density range is from 7.0 to 25 du/ac.
- High-Density Residential (HDR): The density range is from 15.0 to 40.0 du/ac.
- Mixed Use Residential (MU) Residential: The density range is from 15.0 to 40.0 du/ac.

Proposed product types are described below, although at the time of site plan/architectural review additional housing types may be proposed. Innovative product types are encouraged.

- Single Family detached are single homes on individual lots, which may be front- or alley-loaded.
- Duplex lots are two (2) single-family attached homes with primary entries and walks facing the street or community paseos. Private outdoor living space can occur in front, rear and/or side yards. Automobile access is via street or alley. Resident parking spaces are provided in garages

and guest parking spaces are provided in driveways, on local streets or in designated parking areas. This product type functions like a single-family unit.

- Row townhomes are single-family attached homes with primary entries facing street or common open space. The units have private outdoor living space. Automobile access is via an alley or private street. Resident parking spaces are provided in garages, and guest parking spaces are provided on public or private local streets or in designated parking areas.
- Motor court cluster units are single-family detached or attached dwellings clustered around a motor court or paseo. Primary entries and walks face either the motor court, paseo or the street. Private outdoor living space can occur in side and rear yards. Automobile access is via private motor courts or street. Resident parking spaces are provided in garages and guest parking spaces provided on private lanes, public or private local streets or designated on-site parking spaces.
- Multi-Family flats are attached multi-family homes with entries from common open space. Automobile access is via an alley or private drive. Resident parking spaces are provided in garages or designated on-site parking spaces, and guest parking spaces are provided on local streets or in designated parking areas.
- Alternative Housing. Housing types that encourage family living are encouraged within the Specific Plan. These include allowing for accessory dwelling units in accordance with State law; guest houses on larger lots in Low-Density Planning Areas; and multigenerational housing types which may include multiple master suites and kitchen areas as well as additional entries.

Residential Product Type Allocation					
Type	VLDR	LDR	MDR	HDR	MU
Single Family Detached	X	X	X		
Single Family Alley loaded	X	X	X		
Detached Motor Court/Cluster			X	X	
Townhome			X	X	X
Attached Motor Court Cluster			X	X	X
Multi-Family Flats			X	X	X
Flats over Commercial					X

3.3.1 Projections into Required Yards

The following encroachments into required yards shall be permitted in residential planning areas:

1. For Low-Density Residential uses, porches are strongly encouraged. Where provided, porches shall have a minimum size/dimension of 8 x 10 feet. Porches may encroach up to six feet into the front yard/setback.

2. Outside stairways, porches, or landing places, if unroofed and unenclosed, may extend into a required side yard for a distance not to exceed three feet or into the required rear yard a distance not to exceed five feet.

3. Cornices, canopies, eaves, fireplaces, bay windows, or other similar architectural features not providing additional floor space within the building may project two (2) feet into any required setback.

4. One pergola or one covered but unenclosed landing may extend into either side yard, provided that its other horizontal dimension shall not exceed 20 feet.

5. Attached patio covers and trellises or combination thereof may extend into half of the required rear yard setback and not less than five (5) feet from the rear property line or rear wall or fence.

3.3.2 Residential Uses

Permitted uses in the residential planning areas are identified in Table 3-1, *Permitted Uses, Residential Planning Areas*.

TABLE 3-1: PERMITTED USES, RESIDENTIAL PLANNING AREAS

P – Permitted C- Conditional Use Permit X-Not permitted A – Accessory Use

USE	VLDR	LDR	MDR	HDR
Single-family detached residences in a permanent location with a permanent foundation (front or rear/alley-loaded) on an individual lot	P	P	P	P
Detached motor court clusters	X	X	P	P
Duplexes or Multigenerational Housing	X	P	P	X
Attached housing, including Townhomes/Rowhouses/Attached Motor Court Cluster Units	X	X	P	P
Multifamily Flats	X	X	P	P
Live/Work Units in accordance with section 3.X herein	X	C	C	X
Active Retirement Community, Independent Living Units, Congregate Housing, Assisted living facility/residential care facility	C	C	C	C
Accessory structures appurtenant to the permitted use (gazebos, sheds, guest house, swimming pools/spas)	A	P	P	P
Accessory structures – private lighted tennis courts and similar uses	C	C	X	X
Public or private parks and playgrounds or community/recreation centers.	P	P	P	P
Animal keeping in accordance with the provisions of the zoning code.	P	P	P	P
Home occupations/Home office in accordance with Section 17.58 of the zoning code	A	A	A	A
Family day care homes as defined in the zoning code.	P	P	P	X
Commercial child daycare and pre-school as defined in the zoning code.	C	C	A	A
Licensed Daycare Centers (5 or fewer children) in accordance with the zoning code.	P	P	P	P
Adult Daycare or day healthcare	C	C	C	C

TABLE 3-1: PERMITTED USES, RESIDENTIAL PLANNING AREAS P – Permitted C- Conditional Use Permit X-Not permitted A – Accessory Use				
USE	**VLDR**	**LDR**	**MDR**	**HDR**
Private and quasi-public uses of an educational or religious type, including public and parochial elementary schools, junior high schools, high schools and colleges, nursery schools, licensed daycare facilities for more than five children, churches, parsonages and other religious institutions	C	C	C	C
Accessory Units in accordance with applicable State law	P	P	P	X
Public Safety Facilities	C	P	P	P
Wireless telecommunications facilities (stealth), in conjunction with a non-residential use Chapter 17.68 of the zoning code	P	P	P	P
Utilities including water quality basins, pump stations, utility vaults, etc.	P	P	P	P
Electric vehicle charging station, solar energy systems (non-commercial)	P	P	P	P
Non-commercial wind energy systems	C	C	C	C
Parks, Open Space, Conservation	P	P	P	P
Sign in accordance with Section 17.56.010 of the CMC	P	P	P	P
Mobile Homes	X	X	X	X
Home schools	A	A	A	A

TABLE 3-2: DEVELOPMENT STANDARDS, RESIDENTIAL PLANNING AREAS						
Item	**Dimension (see following pages)**	**VLDR**	**LDR**	**MDR**		**HDR**
				Detached	**Attached**	
Density Range	--	0.4-1.0	2-8	7-25		15-40
Minimum Lot Size	--	10,000 sf	4,500 sf	2,000 sf		--
Maximum Building Coverage	--	60%	55%	65%		65%
Percent Landscape	--	--	--	15%		15%
Private Open Space per unit (minimum dimension: 5 ft)	--	--	--	80 sf/du	80 sf/du	60 sf/du
Common Open Space per unit (includes paseos, amenity centers, landscape areas)	--	--	--	100 sf/du	100 sf/du	150 sf/du
Storage Area per unit	--	--	--	--	50 cf/du	50cf/du
Lot Width (min)						
Interior	A	80 ft	45 ft	35 ft	--	--
Frontage (Cul-de-sac/knuckle)	--	35 ft	35ft	--	--	--
Lot Depth	B	110 ft	90 ft	55 ft	--	--
Building Setbacks						
Living Space from public Street	C	20 ft	10 ft	10 ft	10 ft	10 ft

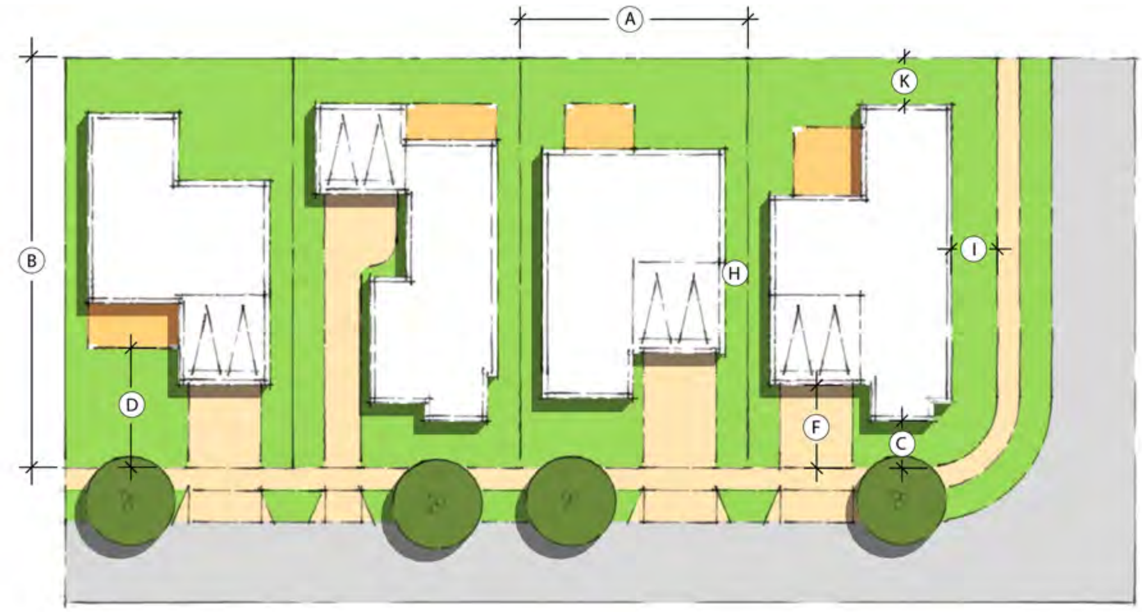
TABLE 3-2: DEVELOPMENT STANDARDS, RESIDENTIAL PLANNING AREAS						
Item	Dimension (see following pages)	VLDR	LDR	MDR		HDR
				Detached	Attached	
Living Space from motor court or private drive/alley	E	--	--	5 ft	5 ft	5 ft
Porch from Public Street	D	5 foot encroachment into setback permitted				
Garage Setback to public street (front entry)	F	20 ft	18 ft	18 ft	18 ft	--
Garage Setback to public street (Side entry)	F	15 ft	10 ft	15 ft	15 ft	--
Garage Setback to alley/private drive/motor court	G	5 ft	5 ft	5 or 18 ft	5 ft	5 ft
Side Yard						
Interior	H	5 ft	5 ft	5 ft	10 ft	10 ft
Corner	I	15 ft	10 ft	10 ft	10 ft	10 ft
Porch	J	5 foot encroachment into setback permitted				
Rear Yard (minimum)	K	20 ft	15 ft	10 ft	10 ft	10 ft
Porch, balcony, or Deck		5 foot encroachment into setback permitted				
Building Height (maximum)[1]	--	35 ft	35 ft	35 ft	35 ft	55 ft[2]
Accessory Structure Height	--	15 ft	15 ft	--	--	15 ft
Building Separation	L	10 ft	10 ft	10 ft	20 ft	20 ft
Alley Condition	M	30 ft	30 ft	30 ft	--	--
Motor Court or Private Drive - garage to garage	N	--	--	30 ft	30 ft	30 ft
Paseo/Green Court	O	--	--	20 ft	20 ft	--
Solar Provision	--	Code	Code	Code	Code	Code
Parking	--	See Table 3-6 below				

Notes:

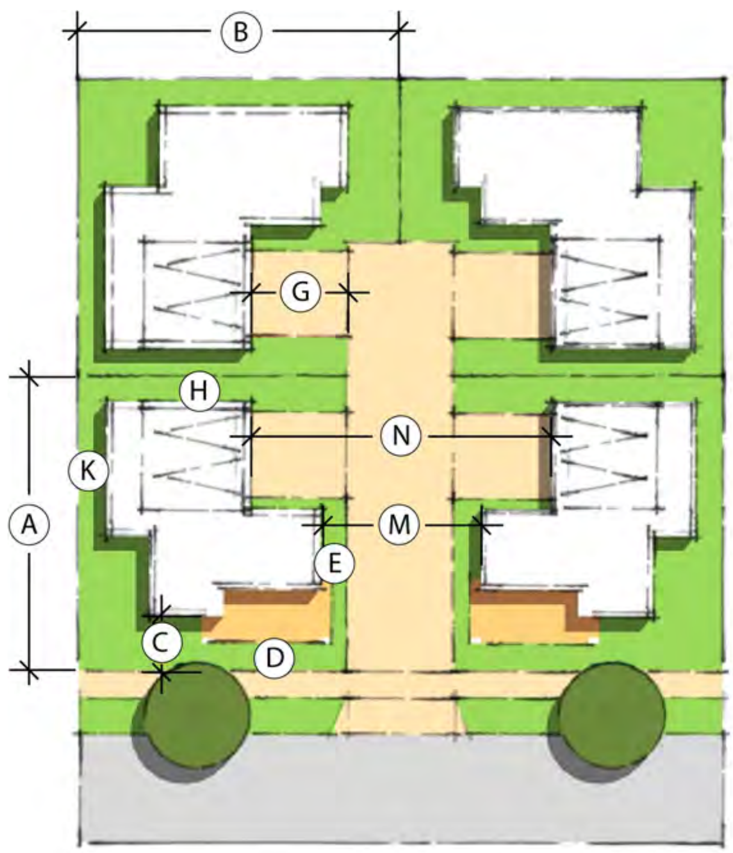
1. Height projections for chimneys or other architectural features for single family products: 6 feet, for High Density uses projects
2. There is no height restriction for residential structures within Planning Area B-3, subject to the City's design review process.

Dimensions

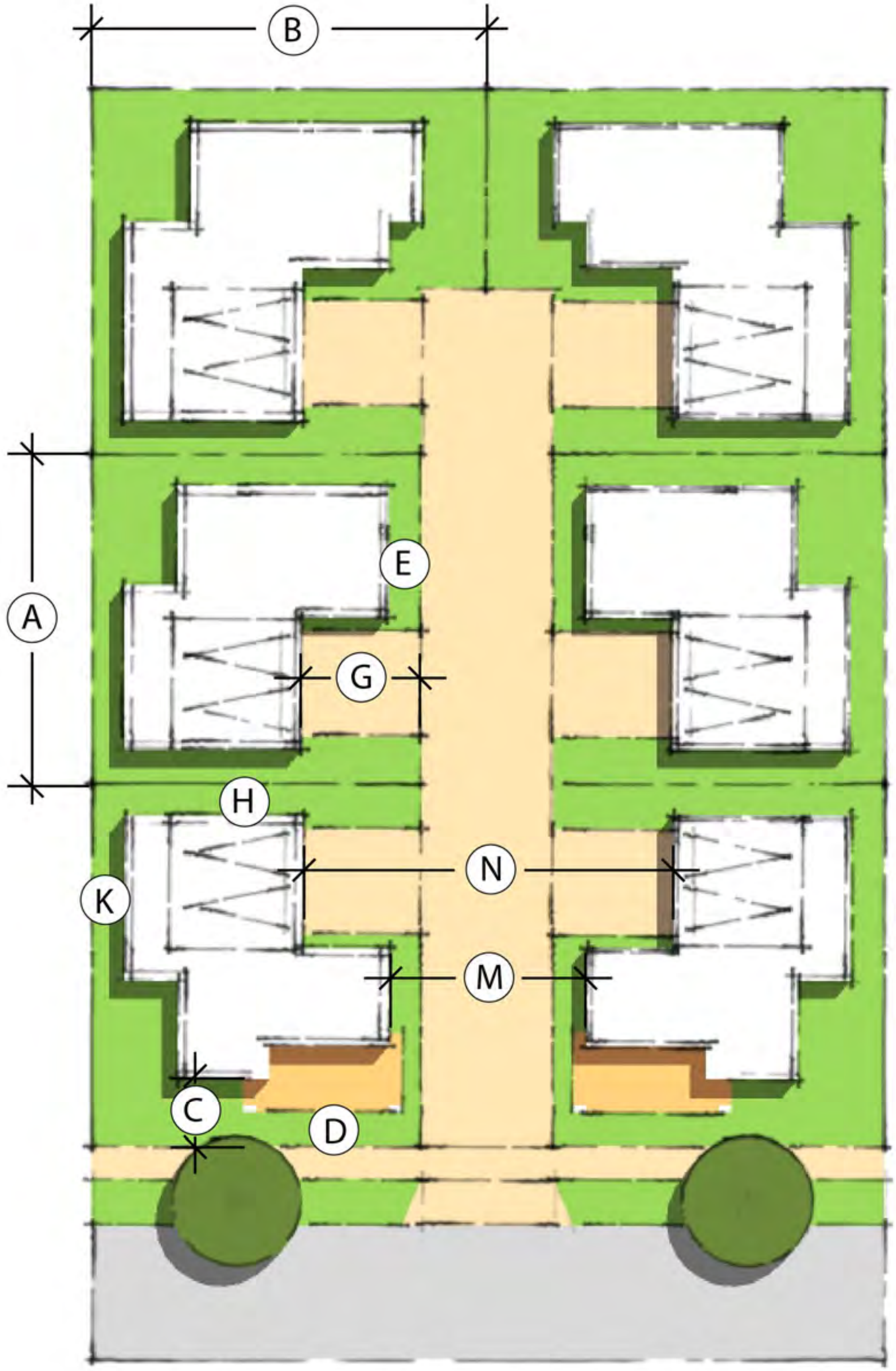
Below are example residential product examples with typical dimensions as referenced in Table 3-2, *Development Standards*, *Residential Planning Areas*. Note that these illustrations are for conceptual planning purposes only. Actual lot dimensions and product types may vary, and these illustrations are not intended to limit or preclude the use of new or different product types in each density category.



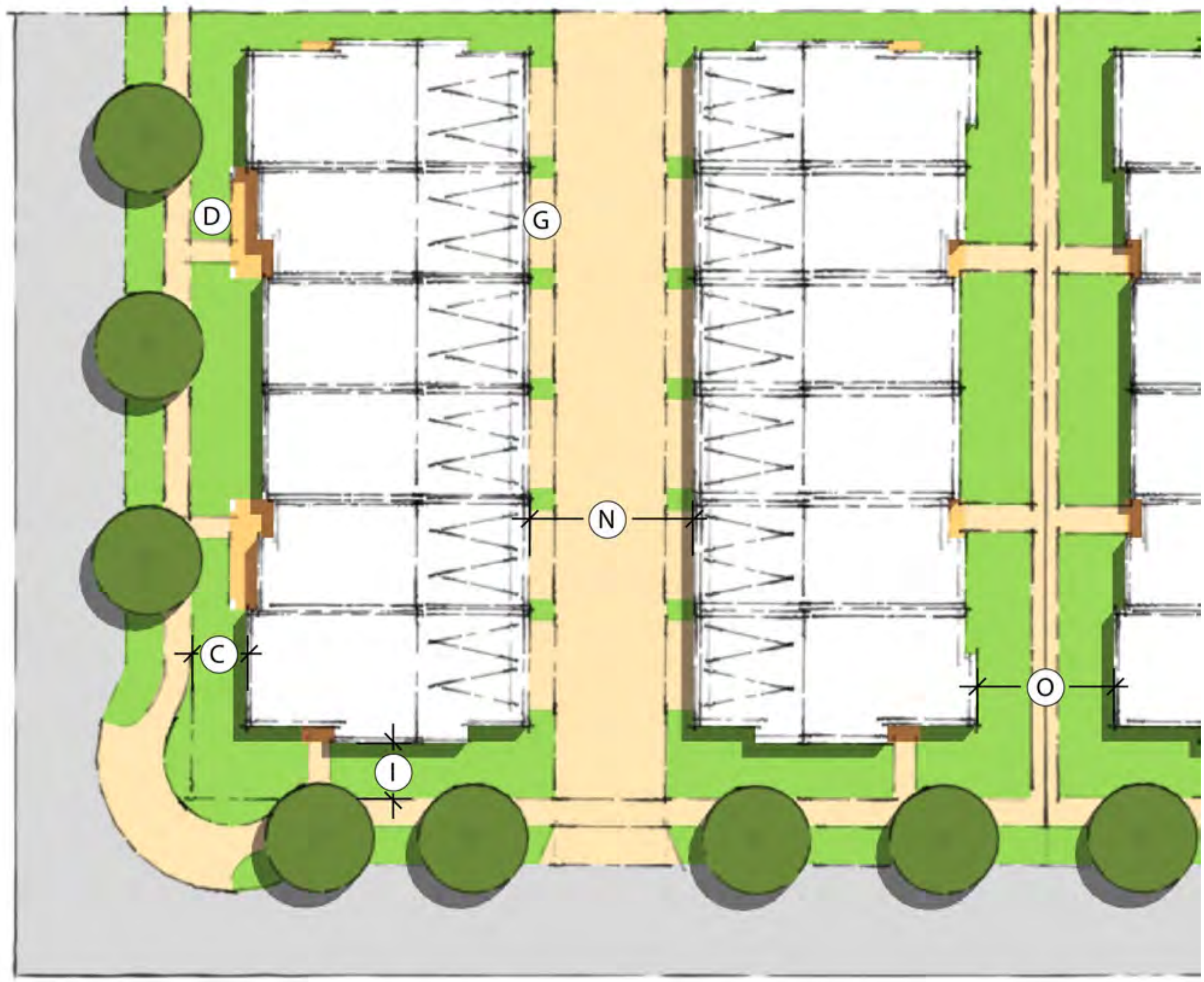
SETBACK DIAGRAM – SINGLE-FAMILY DETACHED



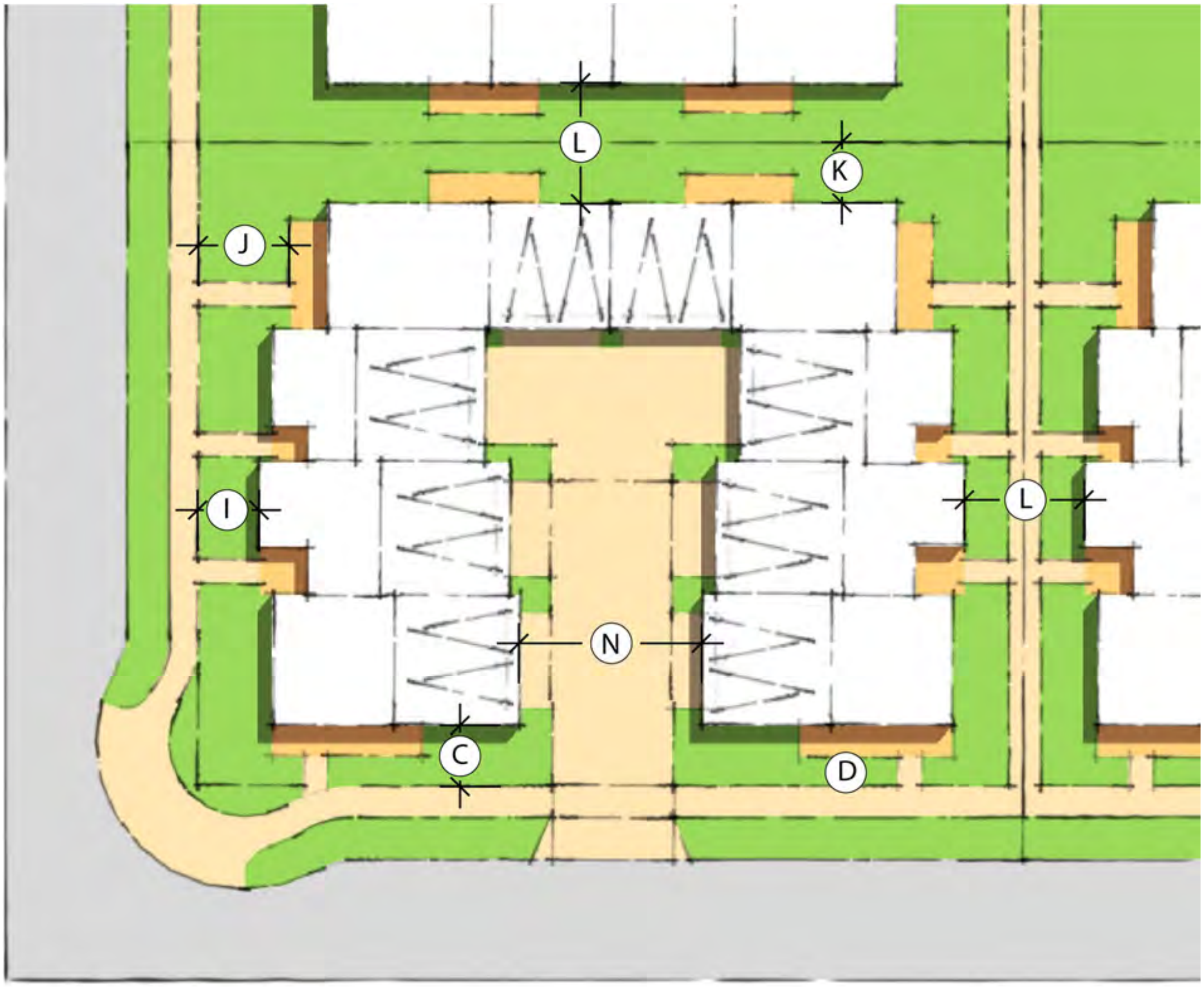
SETBACK DIAGRAM – DETACHED MOTOR COURT (4-PACK)



SETBACK DIAGRAM – DETACHED MOTOR COURT (6-PACK)



SETBACK DIAGRAM – ATTACHED TOWNHOUSE



SETBACK DIAGRAM – ATTACHED MOTOR COURT

3.3.3 Special Provisions for Residential Uses

Live/Work

"Live/Work" is a mixed-use building type that is designed to accommodate non-residential work areas in addition to, or combined with, living quarters. The residential and commercial spaces are clearly identified and separated, and all uses are in compliance with applicable government codes. Live/Work units, although suitable for home occupation uses, have specialized workspaces that can accommodate more intensive work activities than would be appropriate for an exclusive residential building. Live/Work opportunities shall be limited to Medium and High-Density Residential planning areas, in addition to the Mixed Use areas of the Specific Plan and may develop in one of two scenarios: 1) live/work may be included in a vertical mixed-use setting with residential units located over retail/commercial/office; or 2) live/work may also occur in multi-family live/work buildings such as townhomes and lofts, and would be a stand-alone multi-family workspace. A maximum of 2 employees are assumed for a live/work product. Refer to Section 4.4 of this chapter for performance standards related to Live/Work uses.

3.4 Commercial Development Standards

The Commercial designation provides for a variety of land uses such as retail commercial, entertainment, civic, senior continuum of care/assisted living, medical office, and office. These uses can be distributed vertically and horizontally. The Commercial land use provides locations for businesses that meet the day-to-day shopping and service needs of the residential uses. Commercial uses are typically anchored by a grocery store but may also provide an array of retail and service commercial uses. The commercial areas of the plan include Mixed Use (MU), and Entertainment Center (EC) uses. The Mixed Use areas are distributed throughout the Specific Plan area, providing commercial and support uses to each neighborhood. The largest of these is anticipated to include more intense uses adjacent to Avenue 50, with higher intensity retail and medical campus uses. The Entertainment Center area (Planning Area B-2) is located in the most intense Neighborhood B. Table 3-3, *Permitted Uses, Non-Residential Planning Areas*, identifies the permitted and conditional uses within these two land uses.

Senior-Oriented Commercial. Approximately xxx square feet of Commercial/Office is proposed on approximately 5 acres (Planning Area D-8) as part of a proposed active adult community in Village D. Uses will be primarily small-scale retail, food service, medical, and professional services meant to serve the daily convenience needs of the project's residents, however expanded commercial uses are also allowed in these planning areas. Such uses could include skilled nursing, assisted living, convalescent care and other similar uses in support of the active adult component of the plan.

3.4.1 General Commercial Standards:

- Main or multistory structures shall be located on the site in such a way as to facilitate internal circulation and to minimize visual impacts on adjacent residential units.
- All main or multistory buildings should generally be oriented to the interior of the site rather than to existing perimeter streets. Where possible, primary access to the buildings and parking areas shall be through an interior street circulation system.
- Principal activity areas, including but not limited to the primary entrances to buildings, shall be oriented away from existing residential uses with more passive activities such as plazas/gathering spaces being located nearer to those residential uses.
- Open and landscaped areas shall be provided around buildings and shall be employed to highlight primary entrances. A minimum of one plaza/gathering space shall be provided in each commercial center.
- Parking areas shall be located to provide efficient and convenient access to uses and to contribute to an overall circulation pattern.
- A landscaped area not less than fifteen (15) feet wide shall be maintained along any property line to the extent it abuts a street, except at approved driveways.
- Parking lot landscaping shall be provided, with a parking lot tree ratio of one tree for every six (6) parking spaces.

Patio Dining

Outdoor seating, in conjunction with business, is encouraged to enliven the street scene, especially along commercial edges. Patio dining areas may be either connected or separated from building face.

If separated, the space between seating area and building face must be a minimum of 8 feet to allow pedestrian traffic. A maximum 10-foot encroachment onto park/paseo or setback areas is permitted. Patio areas may be enclosed by the tenant by open rail compatible with the architecture of the building, hedges or other suitable separation.

Live/Work

Live/Work" is a mixed-use building type that is designed to accommodate non-residential work areas in addition to, or combined with, living quarters. The residential and commercial spaces are clearly identified and separated, and all uses are in compliance with applicable government codes. Live/Work units, although suitable for home occupation uses, have specialized workspaces that can accommodate more intensive work activities than would be appropriate for an exclusive residential building. Images of live/work architecture may be found in Section 4.3, Architectural Guidelines of this document.

Live/Work opportunities shall be limited to Medium and High-Density Residential planning areas and may develop in one of two scenarios: 1) live/work may be included in a vertical mixed-use setting with residential units located over retail/commercial/office (see Commercial list of permitted uses); or 2) live/work may also occur in multi-family live/work buildings such as townhomes and lofts, and would be a stand-alone multi-family workspace.

Live/Work is an appropriate transitional use between primarily commercial and primarily residential areas within the project.

TABLE 3-3: PERMITTED USES, NON-RESIDENTIAL PLANNING AREAS

P – Permitted C- Conditional Use Permit X-Not permitted

USE	EC	MU
Administrative Uses		
General, Governmental, or Executive Offices, including engineering, architectural, legal, and general offices	X	P
Clerical Services	X	P
Research & Development	P	P
Telecommute Centers/Business Centers	P	P
Retail Commercial and Food Services		
Apparel and Accessory Stores	P	P
Art Galleries	P	P
Alcoholic beverage sales for on-premises consumption	C	C
Alcoholic beverage sales for off-premises consumption	C	C
Brew-on Premises Facilities	C	C
Building materials and garden supplies (such as hardware stores, nurseries and garden stores, paint, glass, tile and wallpaper stores, plumbing, heating and electrical supply stores, etc).	X	P
Catering	P	P
Food service including restaurants, convenience foods, specialty foods, and catering	P	P
Food Service with Drive-thru	C	C

TABLE 3-3: PERMITTED USES, NON-RESIDENTIAL PLANNING AREAS P – Permitted C- Conditional Use Permit X-Not permitted		
USE	**EC**	**MU**
Food and Beverage Stores, including Bakeries, candy, nut and confectionery stores, Convenience Markets, Dairy products stores, meat, fish and produce markets.	P	P
General Merchandise, including large-format, discount, and wholesale/warehouse types stores, retail sales (no adult-oriented businesses)	X	P
Nightclubs, bars, and cocktail lounges	C	C
Hospitality and Resort Uses		
Lodging uses, with typical food service, conference rooms, ancillary retail, pools/spa, personal services	P	P
Nightclubs, bars, and cocktail lounges	C	C
Live entertainment venues	C	X
Gaming Facilities	C[2]	X
Residential Uses		
Uses in the High-Density Residential category per Section 3.3.2 of this Specific Plan	X	P
Live/Work subject to the performance standards in Section 3.6 herein	X	P
Residential and commercial or office uses in the same structure (Mixed Use)	C	P
Healthcare Uses		
Hospital, Medical Centers, Urgent Care	X	C
Medical Office, including medical, dental, chiropractic, optometrists	X	C
Health services, including health care offices and clinics, laboratories (medical and dental), medical supplies, physical therapy, specialty out-patient clinics	A	P
Nursing homes, convalescent care, long term care	X	C
Service Uses		
Assisted Living/Skilled Nursing/Memory Care, Congregate Care, long term care and similar uses	X	C
Business services such things as Accounting and Bookkeeping, Advertising and Public Relations Agencies, architectural and engineering firms, financial services, legal services, Commercial Photography, Art and Graphic Design, and Custodial Services.	P	P
Commercial Recreation including amusement devices (3 or less games of skill or science), sports facilities.	P	P
Community-scale worship facilities	X	C
Financial Services, including banks, savings and loans, credit union, escrow services, investment services, mortgage bankers and brokers.	P	P
Laundromat (coin-operated)	P	P
Pet stores and veterinary clinics	X	P
Insurance Agents and brokers, real estate agents and brokers, title services	X	P
Personal Services such as Barber/Beauty shop, Carpet and Upholstery Cleaning, Currency Exchange (check cashing), Laundry and Dry Cleaning Services, Linen Supply, Locksmith, Pet Grooming, Photographic, Studios,	P	P

TABLE 3-3: PERMITTED USES, NON-RESIDENTIAL PLANNING AREAS P – Permitted C- Conditional Use Permit X-Not permitted		
USE	**EC**	**MU**
Picture Framing, Shoe Repair and Shoeshine Parlors, Tailors/Dress Makers, Ticket Agencies, and Travel Agencies		
Social services, including individual and family services (counseling, family planning or other similar services) and tutorial services	X	P
Adult Day Care	X	P
Athletic and health clubs	C	C
Educational Services, including public and private preschools, elementary schools, secondary schools, colleges and universities and learning centers, vocational schools	X	C
Schools for personal enrichment, including art, music, martial arts, yoga and dance schools and studios	P	P
Parks, community centers, plazas, civic uses, open space	P	P
Civic, Cultural, Institutional	C	C
Day Care Centers including employer-provided on site	C	D[1]
Movie theaters, performing arts centers, commercial entertainment	P	C
Automobile Service Stations	X	C
Manufacturing and storage as an accessory use (no more than 25% of ground floor area)	X	X
Other		
Public Utilities	P	P
Electric Vehicle Charging Stations	P	P
Parking lots and park-and-ride areas.	P	P
Public Safety Facilities such as fire stations, police stations and similar facilities	P	P
Communications Facilities and services, subject to the zoning code	C	C
Mini Wireless Telecommunication Facilities per the zoning code	C	C
Small wind energy systems	P	P
Entertainment Uses including theaters, bowling Alleys and similar uses	C	C
Live entertainment, including large-scale festivals	C	C

Notes:
1. May be allowed by Director Review if processed as part of a site plan.
2. Gaming uses are subject to specific California and federal restrictions

TABLE 3-4: DEVELOPMENT STANDARDS, NON-RESIDENTIAL PLANNING AREAS		
Item	**EC**	**MU**
Lot area (minimum square feet)	10,000 sf	10,000 sf
Maximum Floor Area Ratio (FAR) --With Residential Mixed Use	2.0 1.25	0.5 1.25
Parking on-site spaces (minimum)	See Table 3-6	See Table 3-6
Mixed-use shared parking	Director Review Study Required	Director Review Study Required
Building Setback from Perimeter right-of-way Freeway	---	25 feet

TABLE 3-4: DEVELOPMENT STANDARDS, NON-RESIDENTIAL PLANNING AREAS		
Arterial Collector Local	20 feet 20 feet	20 feet 10 feet 10 feet
Interior Side and Rear building setback	20 feet	10 feet
Min. parking setback (right-of-way to parking)	10 feet	10 feet
Building height (maximum)	None	55 feet[1]
Allowable projects for architectural features	10 feet	10 feet
Minimum distance between buildings	20 feet	15 feet
Landscaping site coverage	15%	15%

Notes:
Setbacks shall be measured from right-of-way. Setback areas must be landscaped.

1. Architectural features such as clock towers, focal elements, cupolas, etc. may extend beyond the maximum height by up to 10 feet. Porte-cocheres for hotels if provided, may have a maximum height of 35 feet.

3.5 WELLNESS UNIVERSITY OVERLAY

The College and University Overlay works in conjunction with underlying zoning to address the unique development issues associated with a potential public or private institution of higher education within Planning Area A-5. The underlying land use for the overlay is Medium Density Residential, which may be implemented as a permitted use in accordance with the provisions of this Specific Plan. Should a public or private college or university be proposed for all or a portion of the Overlay district, the standards of this section would apply. In the event of a public institution, State of California requirements would supersede this section.

The purposed of the overlay is to create a core for college or university uses with supportive retail and housing to promote higher education, with special emphasis on healthcare. It will further facilitate development which complements the physical and social characteristics of a higher education institution and its surrounding neighborhoods.

Desirable new development would include projects which fully utilize the development potential of the property and incorporate education uses in a comprehensive campus setting. Uses such as food uses with seating, art galleries, bookstores and other culturally compatible and pedestrian-oriented uses will contribute to the area's economic vitality.

3.5.1 Application of Regulations

Within the College and University Overlay, the regulations of the base district shall continue to apply to property within the overlay, except as specifically modified by this section.

3.5.2 Permitted Uses

The following uses are allowed within Planning Areas A-5, designated as the College and University Overlay:

a. Colleges and Universities, public or private, including community colleges, technical schools, medical schools, optometry, chiropractic, dental, culinary, law, and similar facilities.

b. College uses, including classrooms, outdoor learning spaces, offices, laboratories, theaters, dormitories, athletic facilities, banquet hall, reception facility, maintenance and operations facilities, parking, and other associated uses.

c. Hospital facilities in conjunction with a college or university

d. Support retail, including food service, book stores, grocery, and similar uses

e. Adult and child daycare

f. Cultural institutions, museums, theaters for live performances

g. Use of facilities by community and other organizations for special events, workshops, seminars, conferences and similar uses

h. Offices for non-profit organizations

i. Places of assembly and/or worship, meeting halls, clubs

j. Student group quarters, dormitories and apartments, and other student housing facilities

k. Staff and/or faculty housing

l. Multi-family housing, not designated for students, faculty, or staff, maximum density of 30 du/acre.

m. Parking

n. Utilities and drainage facilities

o. Public or private parks as a shared-use

3.5.3 Master Plan Required

All institutions are required to prepare master plans and submit the plans to the City for approval. Master plans may provide for greater flexibility than would otherwise be permitted by strict development standards, provided master plans are consistent with the intent of this chapter and the Specific Plan. Provisions in an approved master plan shall take precedence over the provisions of the Specific Plan Development Regulations.

If the school is public, the planning will be processed through the Department of the State Architect or a campus architect for those campuses which are self-certifying.

The emphasis of master plans shall be to provide for cohesive institutional campuses and to address the interface between adjacent uses and development. A master plan should address issues such compatibility with existing or planned adjacent uses, sustainable building practices, conservation, streetscape design, vehicular and pedestrian circulation, building locations, landscaping concepts, sign programs, campus lighting, and other issue areas listed below

A. The intent of master plans is to encourage:

- A creative and imaginative approach to the design of institutional campuses;
- Appropriate interface between an institutional campus and surrounding neighborhoods; and
- A cohesive pattern of development, an efficient use of land, and increased commitment to principles of green building and sustainability.

B. Master plans should address the following:

1. Overall campus design;
2. Interface with adjacent existing or future development;
3. Building pattern, massing, physical characteristics of, and conceptual design guidelines for buildings;
4. General building location, height, orientation, and size;
5. Floor area ratio (FAR);
6. Open space;
7. Housing;
8. Campus parking layout;
9. Protection of existing or future adjacent residential properties from potential impacts of noise, glare, increased activity that reduces privacy, or safety;
10. External and internal campus streetscape; and
11. Pedestrian and bicycle circulation/connections within the campus and to the overall Specific Plan area.

C. Master plans shall also demonstrate the institution's commitment to minimize its consumption of energy and water, and to promote other principles of sustainability by addressing issues including, the following:

1. Design of energy-efficient buildings with appropriate site orientation, passive solar and ventilation techniques, and energy-efficient materials;
2. Implementation of sustainable building practices including reuse and recycling of construction and demolition material;
3. Use of fuel-efficient equipment and appliances;
4. Use of landscape practices that promote water conservation;
5. Implementation of strategies for reducing single-occupancy vehicle trips; and
6. Other principles and practices for sustainable design promulgated in General Plan, the City's Climate Action Plan, and this Specific Plan.

Master plans and amendments to approved master plans are subject to review and approval by the City Council. Administrative procedures for the Overlay are outlined in Section 5, *Implementation and Administration*.

3.6 LIVE/WORK

The “Live/Work” designation is a mixed-use building type that accommodates non-residential work areas adjacent to or below residential living areas, with specialized workspaces that can accommodate more intensive work activities than appropriate for an exclusive residential building under home occupancy uses. Live/Work is allowed and encouraged in single-family attached and alley-loaded products and multi-family attached, with orientation to streets at transitional locations between pure commercial and pure residential areas. Live/Work units shall be located adjacent to and fronting a street. The Live/Work standards for the Specific Plan area assume no more than two employees for Live/Work uses and assume no separate rental of the live or workspace to a second party. Live/Work is an appropriate transitional use between primarily commercial and primarily residential areas within the Mixed Use land use areas.

3.6.1 Applicability, Live/Work

The standards provided herein apply to single-family attached home type or alley-loaded single-family uses within the Mixed Use District or Medium Density Residential planning areas fronting a Mixed Use planning area. The following standards are intended to supplement the standards for Medium and High-Density Residential uses.

Live/Work units must be owner-occupied.

3.6.2 Permitted Uses

a. Home Occupations

b. Artist and Craft Activities (low impact media only such as jewelry making, graphic artists, etc.)

c. Cottage Production Activities Production of goods or services involving low impacts and no employees (e.g., jewelry making, garment making, small leather goods, printing, computer or small goods repair, media production and recording studios.)

d. Service Activities Office or service work with few or no impacts and no more than two employees, (e.g., software developers, analysts, writers, accountants, secretarial services, personal services such as hairstylists, music teachers, tutors, therapists, child daycare, contract workers, telecommuters, office bases for off-site services such as building and landscape contractors, sales representatives.)

e. Small businesses with frequent one-on-one interaction with clients who meet in home offices. Examples include:

    1. Architect/Landscape Architect/Engineer/Land Planner

    2. Interior Decorator or Designer

    3. Fine Arts Studio and Sales/Ceramics and Pottery Studio and Sales/Clothing Design Studio and Sales

    4. Graphic Design Studio and Sales

    5. Photography Studio/Portraiture and Sales

    6. Planning Consultant

7. Attorney/consultant

8. Income Tax Service/Escrow Service/Insurance Agency

9. Internet Service Provider/Webmaster

10. Tutor

11. Mobile Businesses

f. Notwithstanding the specific permitted uses outlined above, the Development Services Director may authorize other uses using reasonable discretion, as long as such other uses are not otherwise precluded by law. The Development Services Director will consider the effect on the project, and will not approve a use that has a materially adverse impact on other units in the project, or surrounding neighborhood. The Director's decision may be appealed to the Planning Commission or the Director may refer the request to the Planning Commission as a Conditional Use Permit.

3.6.3 Prohibited Uses

Prohibited uses are those uses that are not compatible with the permitted uses for the project, as well as all uses which are contrary to any city development code of other governmental condition of approval for the project. The following uses are expressly prohibited in a live/work project due to conflicts with residential uses, traffic generation, or high parking requirements:

a. Medical/Dental Office

b. Chiropractic/Acupuncture Service

c. Massage/Acupressure Service

d. Veterinarian/Kennel/Animal Care Facility

e. Tattoo or Body Piercing Service

f. Banquet Facility

g. Adult Business as defined by the Coachella Municipal Code

h. Recycling Center or storage

i. Sales, repair or maintenance of vehicles, including automobiles, boats, motorcycles, aircraft, trucks, or recreational vehicles, provided that light maintenance of resident-owned vehicles shall be allowed so long as such maintenance is conducted entirely within the interior of a garage.

j. Trade or Private School

k. Religious Institution

l. Any use that regularly or periodically generates vibrations, excessive noise, heat or smell, which affects any other condominium units within the project or surrounding properties, as determined by the City of Coachella Development Services Director.

m. Other uses that the Development Services Director reasonably determines would detract from the overall image of the project or which might adversely affect the value of the individual uses within the project.

3.6.4 Live/Work Standards

Live/Work is the blend of residential and working components within a single dwelling. The development standards for the base residential density set forth the basic building criteria. The following standards are written to give further standards on the commercial aspects of the building, and also the interaction between living and working areas.

Orientation

Most residential units are anticipated to be located above the main floor; however, if properly designed to mitigate conflicts concerning livability and privacy, ground floor or partial ground floor units are allowed.

Entries and Private Outdoor Space

There should be direct pedestrian access from the front street to each individual business. Direct pedestrian access from the business to the residential unit is also encouraged. Residential units may be accessed from the fronting street or from the rear or side of the building.

Living Area and Work Space

Living quarters are permitted above the work area, to the side or in back of the work area. A minimum square footage of living area shall be 400 sq. ft. A minimum square footage of workspace shall be 200 sq. ft., with an 800 sq. ft. maximum.

Parking and Storage

All tenant parking is to be provided for on-site, at the rear of the units or underground if subterranean parking is provided. Live/Work units are required to provide 0.25 visitor spaces/unit, which may be located on-street. This requirement is in addition to the parking requirements for residential use.

Garbage container storage areas, heating and mechanical equipment, and off-street parking and loading facilities must be located at the rear of the units. When a live/work unit has an attached garage, access from the work area to the rear of the building is required through the attached garage.

Loading

Mixed-use and Live/Work settings are encouraged to employ shared loading areas and on-street parallel parking as loading spaces. On-street loading spaces shall have appropriate loading, time/day signage for the space and shall be in addition to required parking for the mixed-use building/tenant. Otherwise, no loading or unloading is permitted in the public right-of-way. No loading or unloading activities shall interfere with parking or vehicular access. Loading areas, where provided, shall not be visible from the public street.

Signage

Signage is intended to promote and enhance on-site businesses, maintain a quality neighborhood, provide direction for pedestrian and vehicular circulation, support a residential living environment and retain the character of the local neighborhood. No freestanding or monument signage is allowed for live-work uses. A signage program shall be prepared by the merchant builder and submitted for review and approval by the City of Coachella.

Business License

A business license must be obtained for all live/work activities. Licenses will define:

a. Permitted number of employees

b. Business hours of operation

c. Potential public safety concerns, nuisances such as noise, vibrations, etc.

Review Procedures

All applications for live/work commercial activities shall be reviewed and approved by the Master Association. Prior approval shall be received by the developer of the parcel and Homeowner Association, before submittal to the City for a conditional use permit.

3.7 SCHOOLS

3.7.1 Permitted Uses

The following uses are allowed within Planning Areas A-11, C-5, and E-2, designated as school sites:

a. Elementary/Middle schools (public or private)

b. School-related uses such as auditoriums, cafeteria, lighted ball fields, playgrounds

c. Parking

d. Utilities and drainage facilities

e. Public parks as a shared use

f. Low-Density Residential Uses

The proposed school sites will be offered to the School Districts for elementary/middle school use for project-related school needs. At the time of project build-out, or upon written notification by the District that the school site is not needed for school uses, the use of the school site may revert to an underlying land use designation that allows Low-Density Residential uses as defined in the land use section of this Specific Plan. Development Regulations for Low-Density Residential uses shall apply.

Such reversion of land use shall not require an amendment to the Specific Plan provided that such reversion does not increase the total number of residential units within the Specific Plan. Should additional units above the maximum allowable residential unit count be requested, an amendment of the Specific Plan unit limitation shall be required.

Schools are parked as outlined in Table 3-X below.

3.8 PARKS/RECREATION

This zone includes the neighborhood and linear parks in the Specific Plan area. These parks are located throughout the project as shown on Figure 2-4, Parks and Open Space. Recreation in all parks may be active or passive in nature.

3.8.1 Permitted Uses

a. Active and passive recreational uses as described in the Parks and Recreation Plan and Guidelines by park type, including but not limited to play fields, courts, tot lots, picnic areas, fitness courses, pools/spas, dog parks, disc golf, etc.

b. Private clubhouses or community centers

c. Restrooms, shade structures, storage/maintenance sheds

d. Community Gardens

e. Botanic Gardens

f. Amphitheaters

g. Utilities

h. Roads, Driveways, Parking

i. Drainage features including water quality basins, bioswales, etc.

j. Water play features

k. Antennas subject to the requirements of the Coachella zoning code

l. Sporting and recreational camps

m. Child daycare centers

3.8.2 Temporary Uses

a. Construction activities, including materials and equipment storage and construction offices.
b. Seasonal sales such as Christmas trees, pumpkins, vegetables and related items.

3.8.3 Building Height

No park building may exceed one story in height except that a split-level or multi-level design may be approved as part of Director's design review.

3.9 Parking

3.9.1 Parking Requirements

Parking and loading within the Specific Plan area shall generally conform to the requirements of the Coachella Zoning Code Section 17.54 except as specified herein. Accessible parking shall be governed by government code. The following is a summary of the off-street parking requirements for the project:

TABLE 3-6: PARKING	
Use	Parking Requirement
Commercial/Office	1 Space/250 square feet of gross floor area
Hospitals, convalescent care, Nursing facilities and similar	1 space per 3 licensed beds
Acute Care Hospitals	1 space per licensed bed
Hotel	1 space per room plus 1 space per 3 employees plus 1 space per 3 persons for public meeting spaces, plus 50% of the spaces otherwise required for accessory uses (restaurants)
Single Family Residential	2 spaces per dwelling Unit within an enclosed garage
Attached/Duplex/Multi-family	
Studio/1 BR	1 space per dwelling unit covered or within a garage, plus 0.66 spaces per unit open parking
2+ BR	1 space per dwelling unit, covered or within a garage plus 1.33 spaces per unit of open parking
Schools - Private	
Elementary/Middle School	1 space per teacher/staff plus one space per 2 classrooms
High School	1 space per teacher/staff on the largest shift plus 5 spaces per classroom
College	One space per staff member plus 10 spaces per classroom or per master plan
Commercial or Trade School	1 space per two students plus 1 space per employee at capacity class attendance
Auditoriums, Churches, Theaters, performing arts venues	1 space per 3 seats or 1 space per 21 square feet with there are no fixed seats, or per a parking study.
Gaming Uses	Per a parking study
Bicycle Parking	Per code

Drive-Through Provisions

Queuing for drive-through restaurants shall provide a minimum storage of eight vehicles, or 160 linear feet. If a high volume use is proposed, the Development Services Director may require a queuing analysis. Drive-through lanes shall not interfere with the circulation of the parking lot and shall not encroach upon or block driveways or parking spaces and shall not be located in a way that may overflow onto public rights-of-way. A landscaped buffer five feet in width shall be provided between a drive-through lane and a street, driveway, or property lines.

Mixed-Use Parking Reduction

By approving an administrative use permit, the Director may reduce the parking requirement for projects sharing parking based on the findings of a shared parking study. This is expected to occur in mixed-use areas and the entertainment district of the plan. Required residential parking shall not be shared with commercial parking.

Rideshare Provisions

Commercial, private schools and universities, performing arts facilities, and mixed-use projects shall incorporate rideshare drop-off areas as part of site plan submittals. Drop-off areas shall be located in a central location and be signed and lighted and shall be of a size sufficient to accommodate the demand of the facility.

Charging Stations

Electric vehicle charging stations shall be provided as required by Title 24. Such stations may be counted towards required parking.

Mechanical Parking Lifts

In commercial zones and multi-family developments, by approving an administrative use permit, mechanical parking lifts may be used to satisfy all or a portion of vehicle parking requirements.

Applications submittals shall include any information deemed necessary by the Director to determine parking can adequately and feasibly be provided and that the following performance standards can be met and the following findings for approval can be made:

1. The use of mechanical lift parking results in superior design and implementation of Specific Plan goals and policies.
2. Mechanical lift parking shall comply with Specific Plan Design Guidelines and be compatible and appropriately considered with overall building and site design.
3. Mechanical lift parking systems shall comply with all development standards including but not limited to height and setback requirements, with the exception of minimum parking stall sizes which are established by lift specifications.
4. There exists adequate agreement running with the land that mechanical parking systems will be safely operated and maintained in continual operation with the exception of limited periods of maintenance.
5. There are no circumstances of the site or development, or particular model or type of mechanical lift system which could result in significant impacts to those living or working on the site or in the vicinity.

3.9.2 RV Parking

The Master Developer of the community may provide for RV parking (which may include boats, RVs, trailers for private use) through a variety of mechanisms, including:

- On an individual lot with a minimum of 7,200 square feet, by maintaining a minimum 12 feet unobstructed side yard setback area on select lots within the Low or Very Low Density Residential areas. The RV parking area must be gated, and the vehicle must be parked behind the front setback.
- Within an individual village with separate designated parking spaces for RVs in common areas, or as a conditional use associated with mini-storage within mixed use areas. Six-foot-high perimeter walls shall be required and will be screened with landscaping.

3.10 SIGNAGE

Signage within the Specific Plan area shall conform to the requirements of the Coachella Zoning Code except for those monument signs specifically identified in Section 4, *Design Guidelines*.

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SECTION 4
Design Guidelines

4.1 Introduction

This section contains the community design, landscape and architectural design guidelines for the KPC Coachella community. These guidelines, when implemented, will ensure that KPC Coachella develops as a high-quality master planned community with consistent design elements. The design guidelines here provide general direction to planners, builders, architects, landscape architects, and engineers on implementing the vision and community design framework for the community. The design guidelines should be used in conjunction with the development standards described in the project's Development Regulations (Section 3) and any other applicable City Design Guidelines.

As projects are implemented over time, future trends and conditions will impact the way communities are designed and constructed. These guidelines are purposefully intended to be flexible in nature to promote thoughtful and creative design when implementing the design goals and objectives. They are not intended to depict actual neighborhood, lot or building design.

4.2 General Guidelines

The villages of KPC Coachella will incorporate a variety of residential neighborhoods and commercial areas within a pedestrian-friendly environment, with a supporting framework of schools, parks and open spaces. The resulting development is encouraged to embrace comfortable human scale in both architecture and landscapes and well-proportioned spaces formed by appropriately positioned and articulated architecture.

The purpose of the design guidelines are as follows:

- To provide the City of Coachella with the necessary assurances that development within the master-planned community will attain the desired level of quality;
- To provide guidance to developers, planners, architects, landscape architects, engineers, builders and future property owners in order to maintain desired design quality.
- To provide guidance to City staff, City Council, and Planning Commission when reviewing future implementing projects within the Specific Plan area;
- To establish criteria for site design, grading, architecture, landscape design, streetscape design, lighting, and other distinguishing features that define the community;
- To create desirable neighborhoods that are an asset to the Specific Plan area and the City of Coachella; and
- To avoid unnecessary delays by providing a viable framework and clear direction without limiting the creativity of the designer.

KPC Coachella is envisioned as a master-planned community consisting of a collection of villages that will be compatible and connected with one another, and integrated with the area's setting. The community design embraces pedestrian-oriented development that incorporates a variety of land uses and a wide range of housing types, medical uses, and a resort area all anchored by easily accessible public spaces.

Community entries and residential neighborhood entries consist of a thematic blend of special landscape treatments, architectural features or lighting to serve as area landmarks. Refer to Section 4.6.4, Community Gateways and Entry Monumentation, for additional information.

In KPC Coachella, villages will be designed to connect to activity centers, services, shopping and employment areas, schools, and recreational facilities via streets, paseos, sidewalks and multipurpose trails.

The terms "shall," "should," and "may" are used within the design guidelines. The term "shall" is used to denote a design standard where compliance is required. The term "should" is used to denote a guideline that is recommended, but not required in all circumstances. The term "may" is used to denote a design treatment that is allowed or optional.

4.2.1 Sense of Place

Successful neighborhood design depends on a combination of integrated site planning, architecture, and landscaping. The project approach ensures that each neighborhood has a distinctive character and "sense of place." The promenades, interlinked parks, mixed-use areas and resort are four major elements that have been considered in KPC Coachella's community design.

Promenades

A significant series of interlinked promenades are one of the key placemaking elements within the community. The linked promenades give shape to the design and focuses on community connections and the pedestrian experience. The promenades will range in width from x to y feet and will incorporate shaded landscape, fitness course elements, and multipurpose trails. The entire promenade system will be designed to offer residents a place for strolling, playing, and resting.

Parks

Parks are important elements that help to establish the overall sense of community. An interconnected system of neighborhood parks will provide a continuous open space network through the project. These open spaces will greatly enhance opportunities for different levels of social and recreational functions.

Villages

Residential neighborhoods within the Specific Plan area will be designed with multiple points of trail access, central park areas, and high-quality architecture with a variety of compatible styles. They will be unique in character while containing unifying design elements that tie into the overall theme and vision for the community.

Mixed-Use Commercial Centers

The overall design concept for commercial centers will establish a focal area where people shop, dine, work and play. At key locations, plazas and courtyards will be designed to serve as gathering spaces where residents may stop to enjoy a cup of coffee, read the newspaper or socialize with their neighbors. The public space elements that will be incorporated into each commercial center will be based upon the ultimate uses proposed.

The following guiding principles set the general direction for planning and design of the mixed-use commercial centers:

- Create denser, compact development patterns that support a diverse mix of land uses, define public spaces and encourage pedestrian activity.
- Provide well-designed, attractive buildings that establish a high quality, distinctive character.
- Activate the streets with ground-level retail, dining and entertainment uses, outdoor public spaces and pedestrian-friendly streetscape amenities, where applicable.
- Provide convenient access to the promenades, paseos, multipurpose trails and community open space system, sidewalks, residential areas and recreational facilities.
- Encourage open-air plazas that are pedestrian-friendly and act as a focal point for surrounding development.

Resort

The resort area will present the primary entry focal point for the Specific Plan area, centered on the Avenue 50 extension into the site. This unique area will incorporate water features, a tribal gaming facility/casino, multiple hotels and support commercial, and a concert venue.

The following guiding principles set the general direction for planning and design of the resort area of the plan:

- Iconic, regionally-oriented architecture,
- Open-air plazas and gathering spaces
- Convenient and efficient parking

4.2.2 Walkable and Multi-Modal Network

Attractive, safe and walkable streets will be provided throughout the community. Street pattern and character may vary to reflect the surrounding land uses and development intensity. Streets in the mixed-use areas should be animated by active architecture with a diversity of activities, streetscapes, and plazas.

The connected series of multi-use trails promote walkability as well as alternative means of travel by bicycle and electric vehicle.

KPC Coachella is designed to promote a strong relationship between streets and homes. Homes will be designed to have a direct relationship to local streets. One way to enhance security is to orient rooms, doors, and windows toward streets and public areas and incorporate architectural elements such as front porches.

The design of the Landscape Master Plan discussed in the following section provides continuous parkways along streets, uniform street trees on each street, promenades and drainage ways, as well as sidewalks for pedestrian connectivity, where applicable. The goal is to create intimate, socially interactive and secure neighborhoods that encourage street activity, promote walking, and allow convenient access to parks, school, and shopping. Streets in the residential neighborhoods should have sidewalks separated from the curbs with street trees in the landscape parkway.

To create more livable streets, it is also necessary to control traffic and reduce speeds. On-street parking, use of roundabouts, and narrower street cross-sections will help to calm traffic in residential neighborhoods.

A well-connected community encourages residents to use multiple modes of transportation. Increased connectivity will be accomplished by linking community amenities like the commercial centers, school, open space and parks, through a network of promenades, paseos, trails, bike/NEV lanes, sidewalks and transit routes.

4.3 Hillside Design

The KPC Coachella Specific Plan area is located in the hillside area of the Coachella Valley, north of Interstate 10. The viewshed from the City of Coachella includes the low ridges of the site and the dominant backdrop of the Little San Bernardino Mountains and Orocopia Mountains beyond. The landform of the site consists of a gently sloping area on the site's northern edge, transitioning to a series of alluvial drainages and erodible sandstone ridges separating them, with an area of steeper slopes adjacent to the I-10 corridor. This results in a rolling pattern of ridges and drainage courses, as can be seen in the Slope Analysis provided in Section 2, Figure 2-15.

In particular the southern portions of the site contain areas of steep erodible slopes. A portion of this area is intended to be graded to accommodate the new Avenue 50 interchange with I-10 under a separate project processed through Caltrans.

The project's grading plan retains the site's pattern of ridges and drainages throughout the site, as shown on the project's Conceptual Grading Plan provided in Section 2, Figure 2-14. The grading plan shapses areas for development, parks and open space, and drainage areas.

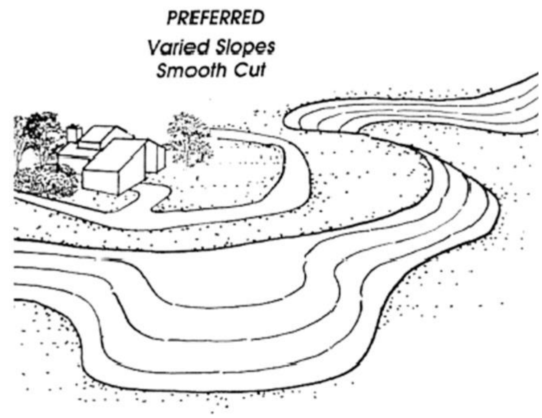
The following factors are of critical importance to the visual image of the ultimate project:

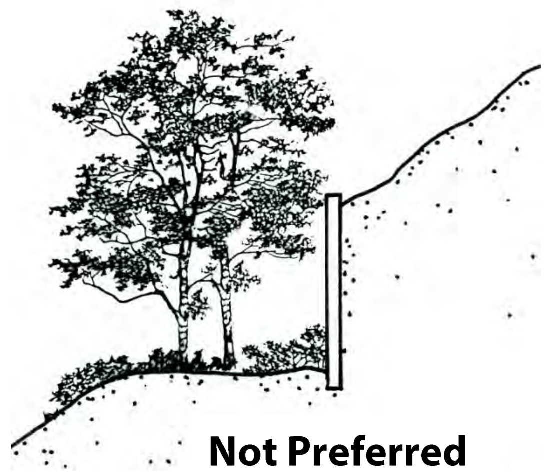
- Use of landform grading techniques
- Use of revegetation
- Appropriate retaining wall design
- Remediation of soil conditions

The following grading and hillside development guidelines will apply to all development within the Specific Plan.

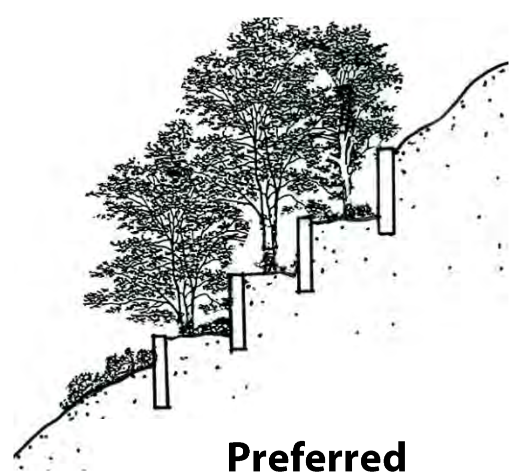
- Incorporate existing landforms, natural features, vegetation, rock formations, and the prevailing ridgeline pattern to the fullest extent feasible.
- Natural features, such as significant rock outcroppings, should be protected to the extent feasible in the siting of individual lots and building pads in very low-density areas.

- Provide movement and undulation to avoid long stretches of slopes. Where possible, utilize slopes flatter than 2:1.
- The overall slope, height and grade of any cut and fill slope should be developed in concert with the existing natural contours and scale of the natural terrain of a particular site.
- Landform grading techniques such as varying slope height, rounding tops and toes of slopes, and incorporating variable gradients should be used to ensure that manufactured slopes have a more natural appearance. The toes and tops of all slopes higher than ten feet should be rounded, where possible, with curve radii designed in proportion to the total height of the slope, where drainage and stability permit such rounding.
- Angular forms are discouraged. The graded form should reflect natural terrain, where possible.
- Add supplemental natural landscaping to compensate for vegetation losses. Vegetation, irrigation, and continuing maintenance programs should be used to stabilize manufactured slopes, with trees and shrubs used to soften their appearance.
- Landscaped berms should be encouraged to help screen utilitarian features such as, but not limited to, water tanks and detention basins.
- Opportunities for slope design with planting pockets and stepped designs are encouraged.
- The use of Mechanical Stabilized Earth (MSE) walls, terraced retaining walls and other similar living wall systems that allow for landscaping are permitted. Such walls should be planted with landscape material suitable for the climate, wall exposure relative to the sun, and taking into consideration the landscape aesthetic effect to be achieved by the overall development.





Not Preferred
Single Retaining Wall



Preferred
Off-set Retaining Walls

Grading strategies to be implemented within the plan area.

4.4 Residential Guidelines

The following sections detail criteria related to the architectural styles, design elements, materials, and other applicable architectural features appropriate for residential development within the KPC Specific Plan area. Residential development may take many forms due to the wide range of densities allowed within each of the different villages. From the more dense townhouses and apartments found in the urban core to large-lot single-family residences associated with agricultural development in Village E, it is important that future development within the plan area is unique and reflective of the surrounding environment while still containing cohesive elements that bind the community together aesthetically.

The intent of these guidelines are to provide the framework for high-quality architectural development within the plan area. These guidelines intentionally provide flexibility so as not to limit the creativity of future development and allow the intent of the guidelines to remain relevant and responsive to future residential development trends.

4.4.1 Architecture

Home Types

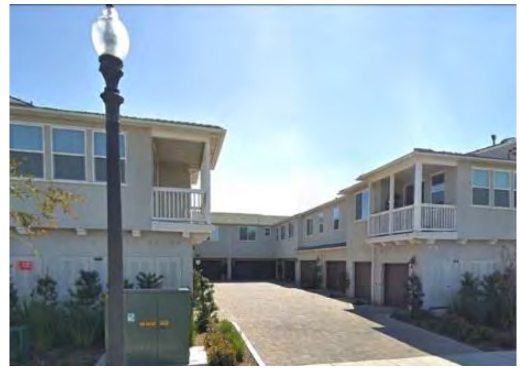
The land use plan for KPC Coachella includes neighborhoods with a variety of home types, ranging from single family homes to multi-family townhouses and apartments. This section describes the different home types found within the plan area and their defining characteristics.

- Front-Loaded Single Family Detached. This home type is an individual, freestanding, unattached dwelling unit on an individual lot. Homes are typically set back from the street with primary entries which face the street, with private rear and side yards. Garages are typically in the front or side and face the street with driveways.

- Alley-Loaded Single Family. This home type is typically set back from the street with building orientation towards the street, where primary entries and walkways face the street, and have private rear and side yards. Vehicle access to the home is via rear-facing garages accessed via a private alley.

- Single Family Detached Cluster. This home type is comprised of single-family detached dwelling units clustered around an auto or green court and typically includes four to six units in a cluster (often referred to as "four-pack" or "six-pack" development). Primary entries and walkways face the private alley, greenway, or the street. Private outdoor living spaces can occur in the side and rear yards. Auto access is via private alleyway within the motor courts or street. Resident parking is provided in garages, and guest parking is provided on private driveways, public or private local streets, or designated parking.

- Attached Motor Court Cluster. This home type are attached homes with living spaces oriented toward a linear open space/paseo. Homes enter from either a motor court or green space and have private outdoor living space. Auto access is via the private alleyway within the motor court. Resident parking is provided in garages, and guest parking spaces are provided on local streets or in designated parking areas.



- Row Townhomes. This home type is single-family attached homes with primary entries facing street or common open space, typically attached side-by-side in a row creating the illusion of a single building. The units have private outdoor living space (balcony or patio). Automobile access is via an alley or private street. Resident parking spaces are provided in garages, and guest parking spaces are provided on public or private local streets or in designated parking areas. Common open space is often provided in the form of an amenity area.

- Flats/Multi-family. Multi-Family flats are attached multi-family homes, either as a rental product or ownership condominium. Automobile access is via an alley or private drive generally associated with a surface parking lot or structure. Resident parking spaces are provided in garages or designated on-site parking spaces, and guest parking spaces are provided on local streets or in designated parking areas. Common open space is often provided in the form of an amenity area.

Residential Architectural Styles

KPC Coachella is envisioned as a community with a variety of architectural styles where architectural massing, roof forms, detailing, walls and landscape are integrated to reflect regional and climate-appropriate styles and provide cohesive design elements across all architectual styles and forms of development.

The following styles should be utilized as a basis for residential development, however, other compatible styles typical of the California architectural vernacular may also be considered at the time of architectural review:

- Monterey
- Spanish Eclectic
- Cottage/Farmhouse
- California Ranch
- Craftsman/Bungalow
- Italianate/Tuscan

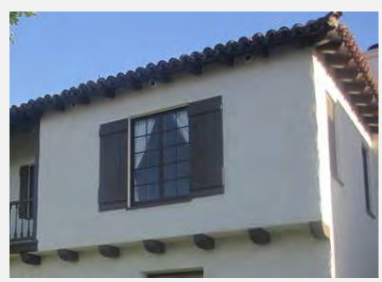
On the following pages, each architectural style is defined by elements that are typical characteristics of that style. Suggested elements are those that help to further define the character of each style. A representative number of these elements will be required for each homebuilder. These style elements apply only to the front and publicly visible side and rear elevations. The photographs are intended to illustrate some of the typical characteristics of each style and are not intended as inflexible requirements or standards.

In Very Low-, Low- and Medium-Density neighborhoods, the use of multiple themes with a range of styles is required. This approach creates variety in the massing, scale, proportions and materials, which is appropriate to the scale of the street scene. It also reflects the diversity found in Coachella's existing neighborhoods.

High-Density areas may utilize only one architectural theme of compatible architectural styles and character. This approach creates the compatibility necessary to address the intensity, scale, and massing associated with high-density homes in these neighborhoods.

Monterey

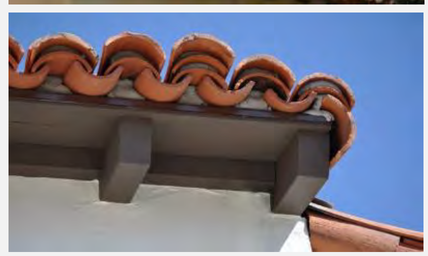
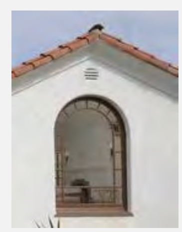
With influences from both the Spanish and New England Colonial homes, the Monterey style includes Spanish detailing with the Colonial style form. Buildings of this style include stucco or masonry walls with "S" or flat concrete shake roofs and may include many elements of historical Spanish homes, including simple building form and mass, rusticated corbels (structural elements jutting from the wall), head trim, posts and balconies (if used), and gable roof forms. Monterey style buildings often have porches and second-floor balconies or verandas; however, these are not essential. Successful adaptations of this style focus on careful massing, detail, and the natural beauty inspired by a blend of rich Spanish and Colonial heritage and influences.

Elements	Typical Characteristics	Images
Massing	▪ Typically two stories ▪ Simple posts on balconies	
Roofs	▪ Low pitched gable roofs (3.5:12 to 5:12 pitch) ▪ Second story balcony often cantilevered and covered by roof or inset ▪ Overhangs at eaves ▪ Tight to 12" overhangs at rakes ▪ Flat or "S" concrete tiles in variegated colors (red clay is predominant) ▪ Exposed rafter tails	
Walls	▪ Stucco, smooth to light sand finish ▪ Rusticated brick on first floor or wood ▪ Painted brick ▪ Board and batt at upper level ▪ First and second stories often have different finish materials	
Windows	▪ Shutters on feature windows ▪ Vertically proportioned window configurations ▪ Windows with divided lites ▪ Decorative shutter hardware and pot shelves	
Details	▪ Covered porch or entry ▪ Simple columns with base trim ▪ Shaped wood corbels ▪ Head and sill trim ▪ Appropriately styled door and hardware ▪ Spanish inspired lighting ▪ Roll-up or carriage style garage door	

Spanish Eclectic

The Spanish Eclectic style takes its cues from the early Spanish missions and is an adaptation of Mission Revival, with additional Latin American details and elements. The style became widely popular after the 1915 Panama-California Exposition. This style may be a compatible blending of Spanish elements and may include Santa Barbara style, Spanish Colonial, and Mission Revival.

The use of tile roofs, smooth stucco walls, heavily textured wooden doors, and highly articulated ornamental ironwork create strong contrasts of materials and textures. Plans can be designed around a courtyard with a simple articulated front facade. Other design treatments may include scalloped windows and balconies with elaborate grillwork, decorative tiles around doorways and windows, and a bell tower.

Elements	Typical Characteristics	Images
Roofs	▪ Main gable roof (front to back) ▪ 3.5:12 to 5:12 roof pitch ▪ Tight to 12" overhangs at rakes ▪ 8" to 12" overhangs at eaves ▪ "S" concrete or clay tile ▪ Cross gable at front ▪ Shaped, stucco eaves or rafter tails	 
Walls	▪ Stucco	
Windows	▪ Trim around front and visible windows ▪ Grid patterned ▪ Plank shutters on accent windows	 
Details	▪ Decorative gable treatment ▪ Front porch with wood-like or stucco columns ▪ Corbels at wood-like columns ▪ Decorative metal grille work, pot shelf, balcony railing, etc. ▪ Round top arched openings	

Italianate/Tuscan

The Tuscan style is inspired by the informality of the rural farmhouse and settlement buildings typical in traditional villages in Tuscany. These structures often included traditional square towers and were created with indigenous materials and colors to blend with the surroundings. Landscape is seen as an extension of the living space, so courtyards and gardens were common features.

Tuscan is characterized by low-pitch irregular roof lines which may be punctuated by a tower or campanile. Exterior walls are stucco with stone or adobe accents, often on the front entry.

Elements	Typical Characteristics	Images
Roofs	▪ Main hip roof with gable ancillary roofs ▪ 3.5:12 to 5:12 roof pitch ▪ Tight overhangs at rakes and eaves ▪ "S" concrete tile or clay tile ▪ Secondary shed or gable roofs over 1-story element ▪ Shaped Rafter tails	
Walls	▪ Stucco ▪ Stone or adobe block accent at front elevation ▪ Large expanses of stone or brick veneer from base of wall to roof overhang	
Windows	▪ Grid pattern on front and visible windows ▪ Trim around front and visible windows ▪ Paneled shutters at accent windows ▪ Precast or simulated pre-cast window trim ▪ Recessed windows ▪ Decorative shutter hardware	
Details	▪ Decorative metal elements ▪ Arch or flat soffit arch above entry ▪ Tower elements ▪ Covered entry or porch	

Craftsman/Bungalow

The Craftsman architectural style has influences from the English Arts and Crafts movement of the late 19th century and was stylized by California architects such as Bernard Maybeck in Berkeley and the Greene brothers in Pasadena. Craftsman combines hip and gable roof forms with wide, livable porches, and broad overhanging eaves.

Built-in elements define this style with details such as windows and porches treated as furniture. The horizontal nature is often emphasized by exposed rafter tails and knee braces below broad overhanging eaves and rustic texture building materials. Together, these treatments create a natural, warm, and livable home with artful and creative character. Variations and divergences in expression are common, especially between the Northern and Southern California influences.

Elements	Typical Characteristics	Images
Mass	▪ One- and two-story massing with covered porches	
Roofs	▪ Main gable roof ▪ 3.5:12 to 5:12 roof pitch ▪ 12" to 24" overhangs at rakes ▪ Flat concrete tile or other material with shingle appearance ▪ Shaped outlookers ▪ Exposed rafter tails ▪ Intersecting gable element	
Walls	▪ Stucco ▪ Lap or shingle siding with stucco accents	
Windows	▪ Grid patterned upper half at front and visible windows ▪ Trim around front and visible windows ▪ No shutters ▪ Lap or shingle siding	
Details	▪ Decorative use of cross beams, braces, and rafter tails; ▪ Porches often feature tapered columns and pilasters; ▪ Brick or stone elements visually anchor the building mass to the ground plane. ▪ Garage door with Craftsman style windows	

California Ranch

The Ranch architectural style originated in the United States and is generally noted for a long, close-to-the-ground profile, and minimal use of exterior and interior decoration. Ranch combines modernist ideas and styles with the American Western period working ranches to create casual, informal living style.

First built in the 1920s, Ranch was popular with the post-war middle class from the 1940s to 1970s. Mostly built as single story homes, there are two story variations.

Common features include simple and open floor plans, attached garages, large windows and sliding glass doors that open to a patio, large overhang eaves, vaulted ceilings with exposed beams, cross- or side-gabled and hip roofs, and simple, rustic trim. They often incorporate board and batten siding, dovecotes, large eaves, and extensive porches.

Elements	Typical Characteristics	Images
Roofs	▪ Gable or hip roof ▪ 3.5:12 to 5:12 roof pitch ▪ Asphalt/composite shingles	
Walls	▪ Wood, stucco, or plaster exterior walls ▪ Stone, brick, or other accent materials especially along the front facade at the base and near the entrance	
Windows	▪ Trim around front and visible windows ▪ Grid patterned ▪ Shutters as accent ▪ Dormer windows	
Details	▪ Front porch or patio ▪ Roll-up style garage door ▪ Wood corbels ▪ Wood detailing ▪ Use of horizontal or vertical siding ▪ Use of shingled siding	

American Cottage/Farmhouse

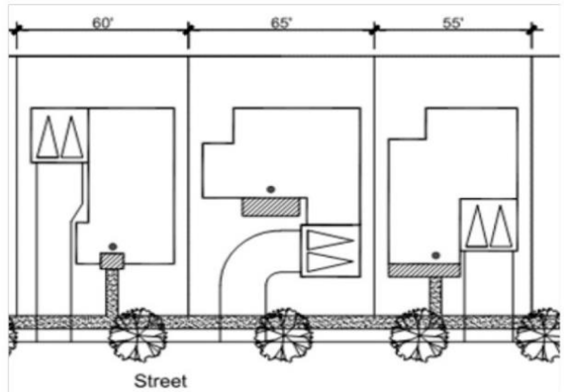
Cottage is a picturesque style that evolved from the Tudor and Norman domestic architectural styles. The cottage style became extremely popular after the adoption of stone and brick veneer techniques. Overall shapes and forms include variation of one and two story asymmetrical facades. Most recognizable and distinct features of this style are the stucco and wood or half-timber accents in the gable end.

American Traditional is a combination of several themes including styles such as Georgian Revival, Cape Cod, New England Colonial and Farmhouse. Characteristic elements of this style are windows with wood shutters, the use of brick veneer and/or wood siding and heavy trim above doors and windows. Combined one and two-story massing with single story elements and gabled roofs with dormered windows are classic variations of this style.

Elements	Typical Characteristics	Images
Massing	▪ Rectangular or asymmetrical massing with some recessed second floor ▪ Breaks in massing	
Roofs	▪ Main hip or gable roof with at least one intersecting forward gable or hip roof ▪ 5:12 to 12:12 roof pitch except min. 3.5:12 at 1-story roofs ▪ Tight to 6-inch overhangs at rakes ▪ 6" to 12" overhangs at eaves ▪ Flat concrete tile or composition shingles ▪ Distinctive roof over entry ▪ Use of Dormers.	
Walls	▪ Stucco or wood siding ▪ Stone accents on front elevation	
Windows	▪ Grid patterned at front and visible windows ▪ Trim around front and visible windows ▪ Plank shutters at accent windows ▪ Wood shelves at window sills	
Details	▪ Covered entry/porch ▪ Front porch with wood-like or stucco columns ▪ Braces at wood-like columns ▪ Wood or wrought iron balcony railings	

4.4.2 Architectural Design Criteria

The plotting of homes should be designed to achieve visual diversity and interest in the street scene through varying setbacks, articulated building massing, or enhanced elevations on residences plotted on corner lots. To help achieve dynamic street scenes the following architectural style, plan and color scheme requirements shall be met:



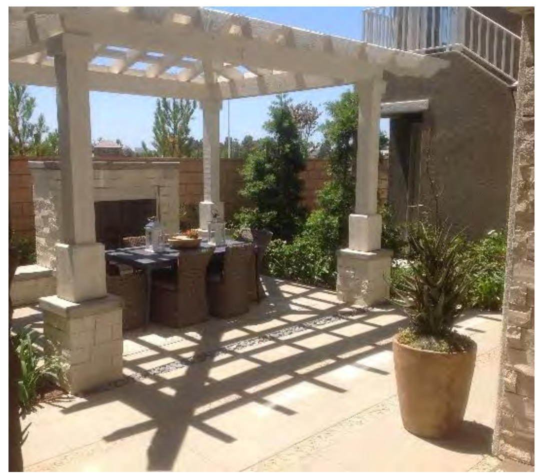
Example of variable setbacks and lot width within a single-family detached product.

- A minimum of two (2) plans, three (3) elevations and three (3) color schemes for neighborhoods up to 70 homes.
- A minimum of three (3) plans and three (3) elevations and four (4) color schemes for neighborhoods up to 150 homes.
- No identical single-family detached plans and elevations are permitted side by side or directly facing each other across (except in a motorcourt development scenario.)
- Reverse footprints of identical plans are allowed adjacent to one another, provided each has a different elevation and color scheme.
- The two houses on either side of a specific lot must all use different color schemes than that specific lot.

4.4.3 Site Planning and Orientation

- Building setbacks should vary depending on product type and location. In general, a variable front yard setback is encouraged along the street within a block.
- Variable lot width provides a more interesting street scene and efficient use of the land. Therefore, variable lot widths within an individual product line are encouraged, but not required. This allows large units to be plotted on wider lots and smaller units on narrower lots.
- Buildings should be designed so that living activities are oriented towards the street and architectural detail and interactive architecture, including porches, courtyards, entries, and windows, are emphasized.
- Architecture and site design shall respond to the regional climate by providing indoor-outdoor transitional spaces. Deeply covered, shaded, and protected areas create visual depth and interest while providing shelter and appropriate pedestrian scaled spaces for the public. A selection of the following features shall be utilized to provide meaningful outdoor spaces:
- Porches, patios, verandas, courtyards, and gardens that accommodate outdoor seating areas or enhance entries.
- Trellises that create a covered walkway to protect pedestrians from the sun, and provide aesthetic relief and a pedestrian scale to larger buildings.

- Deep overhangs that provide shade and protection, but only used when appropriate to the architectural style and character of the structure.
- Awnings that cover entries or windows. Awnings shall be no longer than a single window and shall be of a style and color complementary to the architectural style and character of the building.
- Loggias that provide covered seating/gathering areas.
- Garages should be plotted next to garages and living space next to living space where feasible to undulate the street pattern and improve opportunities for on-street parking.
- Orient homes adjacent to perimeter streets to avoid long expanses of block walls adjacent to the rights-of-way. Unrelieved walls should not be the primary street view.



4.4.4 Massing and Architectural Enhancements

- Varied building setbacks should be used when possible to provide articulation and functional features such as entrances, courtyards, outdoor dining or seating areas, etc.
- Bay windows, stepped buildings, height changes, and setback variations are encouraged between buildings to break up large buildings and create attractive, interesting entries and facades.
- Architectural elements such as windows, gables, arcades, awnings, and other similar features should be used to break up the massing of large buildings.

Architectural features, detailing, and streescape scene.

- Corner lot homes and those that are visible from streets, trails, outdoor gathering spaces, parks and open spaces, and parking areas shall be articulated to improve the design quality. Publicly visible facades shall include many of the following elements/treatments:
    - o Wrap-around porches or courtyards
    - o Change in plane for roofs and walls;
    - o Change in colors, textures, materials, or masonry patterns;
    - o Stylized and/or recessed face, windows, or doors;
    - o Upper floor step-back;

- o Overhanding roof eaves, porticos, awnings, canopies, lattice, or grates;
- o Columns, posts, or tower elements;
- o Three-dimensional expression lines, cornices, or roof parapets;
- o Ribs or pilasters;
- o Piers and fenestration pattern;
- o A tree or other prominent and decorative landscaping features; and
- o An equivalent element that subdivides the wall into human scale proportions.

- Completely blank side and rear building facades are not permitted. These facades should include articulating elements such as windows, columns, changes in wall texture or color, change in wall plane, or other design feature that breaks up the mass of the building. The level of articulation of side and rear facades, especially those with limited public visibility, may be less than that of the front facade, but they shall not be devoid of articulating elements altogether. Four-sided architecture is encouraged.

Windows and Doors

- Windows should be proportional to the facade and reflect the architectural style and character of the building.
- Window size and shape should provide a balanced relationship with the surrounding roof and walls.
- Accent shutters are encouraged (as appropriate to the architectural style of the building). Accent shutters shall be proportional to the window opening to appear functional. Shutters should be placed adjacent to the window frame in a manner that doesn't look "tacked on" or fake.
- Windows should further enhance, not dominate, the overall architectural character. Large unbroken expanses of glazing should be avoided.
- Energy-efficient windows are required.
- Operable windows are strongly encouraged, to provide natural ventilation and to enhance the indoor-outdoor relationship.
- Accent entry doors, traditional French doors, arched windows/doorways, shutters, pot shelves and window boxes, accent trim, and glass sliding doors are strongly encouraged, as appropriate to the architectural style.
- Windows with clear glazing are strongly encouraged. Dark tinted or reflective glass should be avoided.
- Architecturally compatible relief detailing is encouraged on entry doors.
- Upper story windows that are visible from streets, walkways, parks, and common open spaces shall be designed with window trims and grids that match the front elevations of the structure.

Materials, Colors, and Finishes

- A variety of high-quality, durable colors must be provided to create interesting and attractive building designs and avoid monotony.

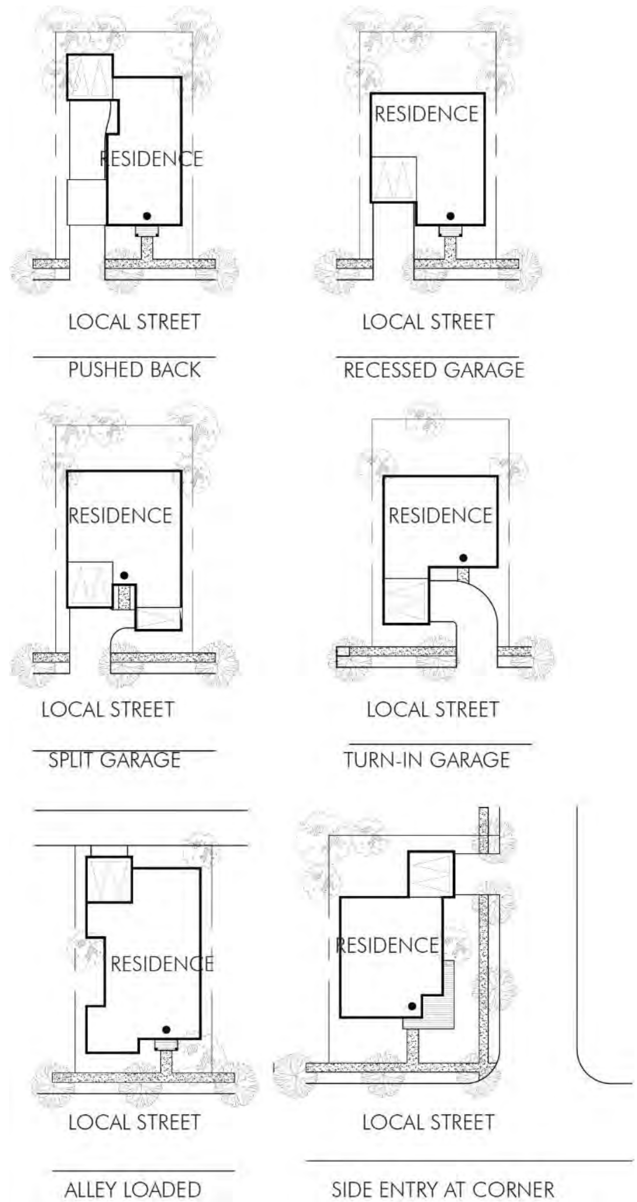
- Exterior colors and materials should be used to define the building form, details, and massing.
- When plotting the same floor plan immediately adjacent to and/or across the street from one another, a different elevation style should be used. Exterior color schemes should be varied for adjacent units with the same elevation style.
- When multiple buildings proposed, a minimum of two color schemes should be provided for each architectural style. In general, each color scheme should have 1 or 2 complementary main colors and up to three (3) complementary accent colors that are appropriate for the architectural style and character of the building.
- Materials and colors used on the front facade shall be wrapped along the side facade to an inside plane or to an appropriate transition point several feet beyond the front elevation to avoid the appearance of false facades.
- Decorative elements shall be used to break up the plane of the facade and create visual interest. Encouraged decorative elements include shutters, exposed rafter ends, crossbeams, decorative grille work, decorative stucco, clay pipe vents, decorative ceramic tile, and other similar features that are appropriate for the architectural style and character of the building.
- Building details such as flashing, pipes, and metal vents may be used as an enhancement with complementary colors/materials or painted to match the building or roof surface so as to virtually disappear.
- The natural color of brick, stone, and tile should be utilized.
- Green materials that withstand local environmental conditions are strongly encouraged, including recycled-content carpet, cellulose insulation, engineered lumber, certified wood, natural floor coverings, and recycled-content interior finishes.
- Low and no volatile organic compound (VOC) paint and finishes are required.

Roofs

- Roofs must be constructed of high-quality, durable roofing materials and colors that are consistent with the architectural style of the building. Acceptable roofing materials include clay tile, and concrete tile. Unacceptable materials include pressed wood, corrugated fiberglass, and asphalt roll roofing or shingles.
- A variety of roofing forms, pitches, slopes, details, and high-quality, durable materials should be used on buildings, and shall be compatible with the overall style and character of the building.
- The front elevation for each plan should have a unique secondary roof framing appropriate to the architectural style of the plan.
- Roof heights shall be varied to create visual interest and avoid monotony.
- Gable ends should be separated so they are not located adjacent to each other.
- Roof colors and materials that meet or exceed Title 24 requirements shall be used to reduce the heat island effect.
- Rooftop solar panels, solar films, small-scale wind turbines, and other similar features may be used to generate energy.

Garages

- Garages may be attached or detached to provide variety between floor plans.
- Garage placement shall be varied to avoid monotony. Architecture design shall vary the placement and orientation of garages. Variations include:
  - o Rear-loaded garages accessed via a rear alley;
  - o Garages recessed behind the front home facade;
  - o Side-entry/Swing-in garage; and
  - o Side drive garage (attached or detached).
- Garages must be recessed into the wall plane to provide shadowed relief.
- Multi-paneled roll-up style garage doors are strongly encouraged.
- Garage door patterns and colors should be varied between units.
- A combination of single and double car garage doors are encouraged to provide variety.



Typical garage location configurations.

4.5 Commercial Guidelines

The following sections detail criteria related to the architectural styles, design elements, materials, and other applicable architectural features appropriate for commercial development within the KPC Specific Plan area. Commercial development within the plan area will include a different commercial settings, including traditional shopping and entertainment centers and both vertical and horizontal mixed-use associated with residential development.

The intent of these guidelines are to provide the framework for high-quality architectural development within the plan area. Commercial development trends will continue to change as the increase in technology and accessibility to goods via the internet and delivery effects buying habits of consumers. These guidelines intentionally provide flexibility so as not to limit the creativity of future development and allow the intent of the guidelines to remain relevant and responsive to future commercial development trends.

4.5.1 General

- The placement and design of retail/commercial buildings should convey a physical and visual link to the streets, sidewalks and plazas. Primary entries and windows should front onto these spaces, be easily identifiable and inviting.
- In conditions where retail/commercial and office uses are within the same building, office uses shall be primarily on the second floor with retail/commercial on the first floor. In conditions where residential uses are included in the same building as the other uses referenced above, residential uses shall be on the top most floors.
- Buildings should frame plaza spaces. Decorative awnings, covered walkways and other appropriate façade elements that add variety and interest should be incorporated onto the front façade of buildings facing onto commercial plaza spaces.

Building edges should create open space areas that complement the building use with outdoor seating, landscaping, and other amenities.

- Commercial site planning should provide passive open space with flexibility and opportunities for café tables, seating, social gatherings, special events, street performances, etc. Fountains, sculptural elements, banners and thematic signage/lighting and/or public art are encouraged.
- Parking lots should be to the rear of the buildings with strong pedestrian links to the storefronts and public plazas.
- Pedestrian paseos extending between buildings linking parking lots to sidewalks, plazas and public spaces should be a minimum of ten (10) feet wide, partially covered (trellis-like) or open, well lighted and treatments and landscape. Such areas may also be app

Separated sidewalks within parking lots increase safety for pedestrians.

- Pedestrian paseos should be straight with clear "through visibility." Store entries and shop windows are encouraged along paseos.
- Strong pedestrian links/paseos should be provided from the commercial areas to adjacent residential neighborhoods.
- Live/work residential opportunities should be incorporated into edges facing retail or office areas. Residence space shall be located on the top floor. Retail/commercial/office uses should be located on the ground floor level with frontage onto public sidewalks and plazas. Private enclosed garage space for the residents should be located away from the "public" side, either to the rear or underground. The live/work units may be incorporated into a larger project, or may be separate from other uses.

4.5.2 Architectural Character

- Consistency of architectural character, form, detail and scale should be clearly evident in the design and execution of all buildings in the retail/commercial portion of the commercial centers.
- Prominent and/or unique architectural elements should be positioned as the terminal focal points as viewed from roundabouts and the approaches along all streets leading to the roundabout.
- One- and two-story building massing should occur. False second-story elements may be incorporated to provide for the variation in building massing and reinforce the enclosure of public spaces and plazas.
- Tower elements or other monumental features (within the allowed building heights specified in Section 3, Development Regulations) are strongly encouraged at focal points such as corners, plazas, major entrances, or where walkways meet sidewalks. All elevations of a tower element or monument feature shall be completely constructed, with no blank walls or partially finished sides.

Prominent architectural features can help with massing, wayfinding, and increase aesthetic interest.

- Consideration should be given to locating the second floor façade behind the setback from the first floor façade to provide relief in the building plane and provide for outdoor covered walkways, balconies, etc.
- Large storefront windows are encouraged for neighborhood commercial uses to encourage pedestrian activity.
- Accent materials such as stone and brick, accent colors, door and window details, and other architectural enhancements should occur along the first floor/pedestrian level and along all publicly visible facades.
- Retail/commercial buildings fronting arterial streets, should have a high level of architectural detail and enhancement. A strong building base should be created through the use of cornices and ground floor massing.
- Rear facades facing onto parking lots should be enhanced to address the retail use within. Rear entrances to shops, where provided, and pedestrian paseos passing through buildings from the rear parking lots should be architecturally enhanced, easily visible and inviting.
- Storefront signage is required along rear facades facing onto parking lots and/or public spaces (as well as front facades facing streets and plazas).

4.5.3 Commercial Building Orientation

- Building orientation for commercial and mixed-use land uses can take multiple forms depending upon the adjacent or facing land use. Where commercial uses abut residential uses, this may take the form of a driveway or local street, or directly abutting low or higher density residential properties.
- Commercial spaces should be oriented for maximum visibility from streets to attract potential customers and support long-term viability.
- Buildings should be located adjacent to walkways, sidewalks, plazas, and other pedestrian spaces, while maintaining adequate visibility at vehicle driveways for motorists to see pedestrians.
- Parking setback in conjunction with streetscape plantings will create a landscaped edge and enhance the pedestrian experience.
- Windows and entries should face the street or other public space to encourage pedestrian activity.

Landscaping and outdoor features should complement building architecture and and massing.

- Walkways and landscaping shall be designed along buildings without direct street frontage to create a "street scene" where there is no street.
- Massing elements (e.g., tower features) are strongly encouraged to anchor corners or entries.
- Architectural details shall be applied to rear and side facades facing streets and other public spaces to avoid blank walls that could dominate public views.
- Restaurants
- Location and design should create or take advantage of gathering areas.
- Outdoor seating areas with tables, chairs, umbrellas, potted plants, trellises and other design features are strongly encouraged.
- Outdoor seating areas should be located and designed to be publicly visible.

- Franchise or chain restaurants should be designed to reflect the overall architectural style and character of the building or commercial area.

4.5.4 Drive-through and Drive-up Uses

- The design of drive-up or drive-through facilities, whether attached or freestanding, shall reflect the architectural style and character of the building or commercial area, including colors, materials, and architectural design elements.
- The location and orientation of such facilities shall not detract from the building aesthetic, but shall be located to minimize view from sidewalks, walkways, and other public views.
- Sufficient aisle lengths shall be provided to prevent interference with street traffic and onsite circulation routes, based on a queuing analysis prepared at the time of design review.

Drive-through lanes shall accommodate appropriate vehicle stacking based on the specific use

- Outdoor ordering systems shall be located to direct sound away from residential uses and common areas, or otherwise minimize noise impacts to these uses.
- Outdoor eating areas are encouraged. Outdoor eating areas should provide details such as low walls, trellis elements, furniture, umbrellas/awnings, refuse area placement, etc.

4.5.5 Resort and Entertainment Venues

Buildings will have visual pedestrian and vehicular identity and connectivity. Design of these features may include the use of:

- Focal points, including water features, art pieces, and/or lighting
- Iconic architectural structures
- Signature landscape planting
- Buildings visible from the public street shall integrate the architectural design and vocabulary with the character of non-residential development within KPC Coachella.
- Additional guidelines for hotel and casino buildings include:
- Windows, where applicable, shall be integrated as design elements including placement, size and/or trim elements.
- Exterior materials, windows and details shall be consistent with the scale and proportion of the building.
- Elements shall be proportional to the building mass and design vocabulary.


Windows and other architectural details should complement the desired architectural style.

- Color, materials, texture and detail palettes shall be integrated in a cohesive manner to elevate, not complicate, building design.
- Building orientation, parking and walkways should be designed to foster and serve intuitive access and circulation.
- Building and site entries should be designed to have intuitive and direct travel routes.
- Pedestrian routes shall be provided and clearly marked providing travel paths from parking areas to buildings.
- Appropriate loading and service areas shall be provided for each building/tenant.
- Service and loading areas should be positioned away from primary circulation and street frontage.
- Service and loading areas should be shielded with architecture or landscape, where possible.

4.5.6 Assisted Living and Medical Uses

Modern medical offices and larger medical campuses provide green, clean, peaceful, and safe environments. To achieve this balance, a variety of site planning factors must be considered, including building setbacks and orientation; building entries; and service areas.

Office building should match the existing character of the surrounding uses.

- Orient buildings toward a primary street frontage or central open common area.
- Create a proper scale and character that avoids an "institutional" environment, with articulated forms, varying roof heights and wall planes and/or material/color variation.
- Incorporate peaceful open space areas, pathways and seating areas into the site design.
- Incorporate considerable landscaping, particularly in parking lots to promote pleasant views from inside the building(s)
- Buildings should have a clearly identified base midsection, and top. The base should be designed to be pedestrian in scale.
- Parking structures should be architecturally compatible with the building(s) served.
- The facade of a parking structure facing a public street, driveway, open space, or other public space shall Figure a high level of architectural detail such as decorative grill work, overhead trellises, planters, pedestrian scaled lighting, and the use of materials and textures that complement the campus character and create a comfortable and friendly environment.

Usable open space is an important element of assisted living facilities.

- Provide convenient, covered drop-off/pick-up space at primary building entrances.
- Where possible locate these uses near transit stops and service commercial uses.
- Provide weather protection from rain, sun, and wind through architecture and landscaping.

Porte cocheres and covered entrances enhance the primary entrance of the building and provide covered waiting areas for pick-up/drop off.

4.6 Landscape Guidelines

4.6.1 Landscape Master Plan

Purpose and Approach

The KPC Coachella Specific Plan includes a generous network of parks, paseos, multi-use trails, and promenades. In addition, the project includes a variety of recreational facilities that provide outdoor opportunities for exercise, community gathering, and play. These are all major components of the overall community design and form the heart of the community. They provide an important aesthetic element, enhance community gathering places, encourage passive and active recreation, and enable the use of alternative transportation including biking, walking, and horseback riding.

Landscaping throughout the project site will be compatible with the character of the Coachella Valley, with specific goals to include:

- A planting and irrigation program that employs water conservation measures through use of drought-tolerant plant material, water-conserving irrigation systems and practices, and the use of reclaimed water if and when it becomes available.
- A landscape program that reinforces the principles of Low Impact Development (LID) for storm drainage, water infiltration and groundwater recharge for the project.
- A well-maintained landscape program that defines and projects a quality community image and attracts new residents and visitors.
- A landscape program that appropriately screens parking lots, trash enclosures, delivery areas, equipment buildings, and other similar elements from public views.
- A landscape plan for parks and recreation areas that provides appropriate activities and facilities provides shade, and adds color and texture.
- A vibrant streetscape plan that reinforces the sense of place and creates transportation corridors that are aesthetically pleasing and provide a comfortable environment for alternate modes of transportation to connect and co-exist.
- Encourage the use of edible plant materials in common open spaces.

Figure 4-1, Landscape Master Plan, illustrates the streetscape, greenspace, and community monumentation for KPC Coachella.

4.6.2 General Landscape Guidelines

The project's landscaped open spaces will be the backbone of the community and will establish KPC Coachella as an active community for people of all ages.

Final landscape concept plans and construction plans for community entry treatments, streetscapes, park and open spaces and edge/buffer treatments shall be prepared by a licensed landscape architect and are subject to review and approval by the City.

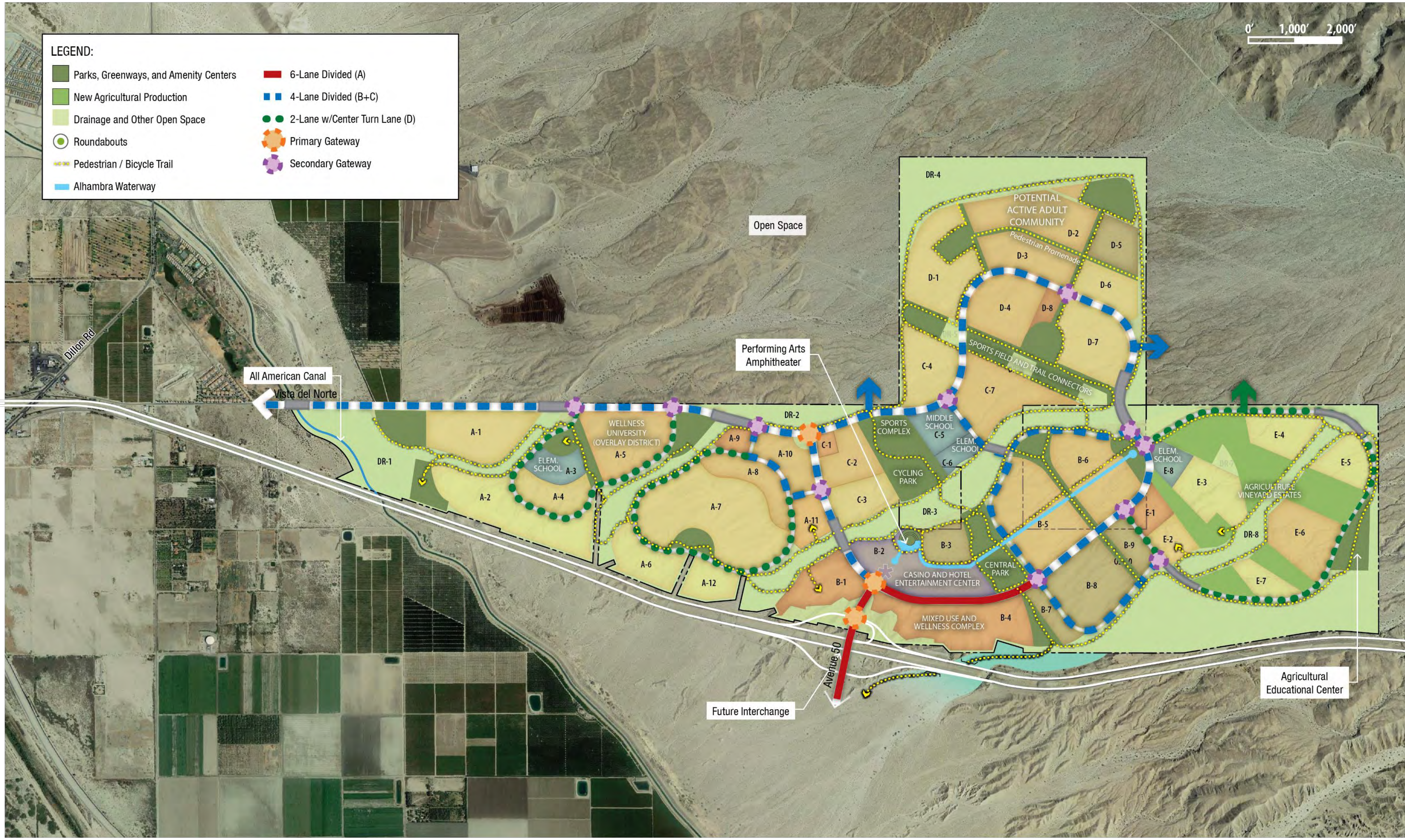


FIGURE 4-1: LANDSCAPE MASTER PLAN

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The following guiding principles set the general direction for design of landscaped spaces within the KPC Coachella Specific Plan area.

- The recommended plant palette includes both native and adaptive species of trees, shrubs, and ground cover. "Low" to "very low" water demand, hardiness, functionality, and aesthetics are all important factors when specifying plant materials by species (spp) (i.e. allowing a variety of types of that general plant). Selection of native varieties should be prioritized within the plan area.
- Plants with similar water use needs shall be grouped together in distinct hydrozones, and where irrigation is required, shall be irrigated in separate zones to decrease unnecessary water use.

Drought tolerant plant material should be used in all open spaces. Use of turf should be minimized.

- High water use plants shall be discouraged and, where use is necessary, shall not be mixed with low or moderate water use plants.
- All non-turf plants shall be selected and planted appropriately based upon their adaptability to the climatic, soils, and topographical conditions within the project site.
- Specimen trees and shrubs with unique form and color are encouraged in prominent locations to create focal points throughout the community.
- Known invasive plants are prohibited within the project area, and in particular in areas adjacent to natural open space and drainage corridors.
- Where trees are planted adjacent to paving (sidewalks, parking areas), consideration shall be given to selection of trees with non-invasive surface roots, and for trees that are selected, provisions shall be made to install root barriers or equivalent devices to protect paving.

Limited Turf Areas

Turf areas shall be limited and should not be planted in the following conditions:

- Slopes exceeding 10%.
- Planting areas four (4) feet wide or less.
- Street medians, traffic islands, planter strips, bulb-outs of any size, or other areas where foot traffic is not expected.
- Turf areas shall be limited to areas of lawn that are necessary for certain active recreational purposes and active pedestrian use, such as parks and recreation centers. In areas that will not receive active foot traffic, such as along major streets or other common planting areas within the project, landscaping should rely primarily on native or adaptive grasses or drought-tolerant trees, groundcovers, and/or shrubs.

Grasses should be kept to specific recreational areas.

- Within individual residential lots and other landscaped areas (such as the recreation area), use of turf shall be limited to an aggregate area no greater than 25% of the total planted area within each lot or parcel.

Water Conservation

- Streetscapes will utilize desert-adapted and native plant materials to minimize irrigation needs. Landscape concepts will utilize permeable materials such as decomposed granite and rocks/cobble to reduce irrigation demands.
- All planting areas will be irrigated with a high-efficiency automatic irrigation system.

Utility Placement

- Utility boxes should be grouped where possible and placed in landscape easements and shrub/groundcover areas. Boxes should not be placed in lawn areas unless absolutely necessary.
- Above grade utility boxes should be screened and planted to the extent possible while allowing required access and clearance, and providing for adequate sight distance if located near intersections.

Slopes

- Slopes should be irrigated separately from level areas on dedicated valves.
- 2:1 slopes must be covered with jute mesh or other soils stabilizing materials.
- Turf should not be used on slopes in excess of (steeper than) 3:1.
- The community shall be irrigated with reclaimed or recycled water wherever possible.

Plant Materials

- The project's plant palette incorporates native and adapted trees, shrubs, and groundcovers to provide a pleasing landscape character. These plant palettes are in Table 4-2, Plant Palette.
- All plantings within the community will be selected from the palette of plants listed in this document or as modified in subsequent private builder level Design Guidelines (if provided) with final landscaping plans subject to approval by the City of Coachella as part of design/site plan review.
- Landscaping within KPC Coachella must be designed in substantial conformance with this Specific Plan.
- Non-toxic, non-invasive, drought tolerant vegetation will be utilized adjacent to all public open space areas except for limited turf areas within active parks.

Native plant material should be combined with decomposed granite and gravel materials.

- The master Developer or individual builders will install all entry improvements concurrently with the street on which they front.

4.6.3 Streetscape

Streetscape design is an integral component for creating community identity. The overall streetscape design goal for the KPC Coachella community is to create a healthy, efficient, and walkable community that promotes sustainable landscaping practices, strong pedestrian, bicycle and NEV connections, and an exceptional quality of life. The primary elements associated with streetscapes within the plan area consist of:

- Pedestrian and multi-use walkways/sidewalks,
- street trees,
- landscaped buffer areas adjacent to the sidewalk,
- landscape setbacks, and
- median islands where they occur.

The intent of the following streetscape design guidelines and plant lists is to provide flexibility and diversity in plant material selection while still maintaining an overall community theme. Final plant material selections will be determined and reviewed as part of the design review process.

Streets within the Specific Plan area will be more than just circulation routes; they will also serve as community amenities, gateway and neighborhood identifiers, and a source of shade and recreation. Street landscaping will maximize shade with trees, thereby reducing heat island effect and increasing the overall aesthetic appeal and comfort for bicyclists and pedestrians.

- Streetscape design will reflect the circulation hierarchy, while enhancing the overall sense of place. Proposed landscape design should reflect the local setting and the desired community character while using native and drought-tolerant species. To the extent feasible, native species should be used.
- The proper use of trees, shrubs, and groundcovers along the collector and arterial streets is critical to the success of the Specific Plan area. Landscape planting will define the overall community character for many years to come. Streetscapes shall be designed to enhance the vistas throughout the community, while creating parkways for the enjoyment of residents and visitors.
- Trees should be planted to maximize shade along trails within the project.
- Planting themes are based on local and regional standards for streetscape design and local climate. The proper mix of palms, evergreen and deciduous trees, shrubs, and groundcovers shall provide quality environments for all seasons.

Below are general descriptions of the various landscape treatments for streets within the Specific Plan area.

6-Lane Arterial

Avenue 50 Streetscape

Avenue 50 is a 6-lane arterial roadway that will serve as the primary entry point to the community. Avenue 50 will provide access to the community from Interstate 10 freeway as well as from the future La Entrada community to the south. The streetscape landscape design along the Avenue 50 corridor will establish a consistent and strong visual identity for the project, continuing the established design theme along Avenue 50.

C Loop (between Avenue 50 and G Street)

A portion of C Loop from Avenue 50 to G Street is also designated as a 6-lane arterial and will move traffic from the primary entrance along Avenue 50 through the primary mixed used and entertainment center and into to eastern portion of the plan area.

The following guidelines illustrate the future character of both Avenue 50 and the designated portion of C Loop:

- The design approach for the parkways will present a grand entrance through the uses of a mixture of palms, flowering canopy trees, and smaller accent trees and shrub material. To illustrate the desert environment, plant material may be combined with rock outcroppings, rolling mounds, and massed native plantings within the medians.
- Adjacent to the pedestrian walkway, canopy trees will provide shade for pedestrians and create an pleasant, walkable condition. Where appropriate, a variety of drought tolerant and native shrubs, grasses, groundcovers, and vines should be used to soften the community theme walls, where present, and to deter graffiti.
- For streets with 4% gradient or less: construct bioswales with native grasses and street trees if feasible. For streets greater than 4% gradient: construct raised curb and gutter on street side with landscape planter and street trees if feasible.
- The design for the parkways and medians will look as one design and incorporate decomposed granite and native, or equal, angular cobbles and boulders.

Refer to Figure 4-1, *6-Lane Arterial Streetscape*, for typical streetscape concepts associated with arterial roadways. Table 4-1, *Arterial Streetscape Plant Palette*, lists the typical plant materials associated with 6-lane arterial roadways within the plan area.

TABLE 4-1: ARTERIAL STREETSCAPE PLANT PALETTE	
Canopy Trees (24” box sizes)	
Tipuana tipu	Tipu Tree
Palms (minimum 15 gallon)	
Phoenix dactylifera	Date Palm
Shrubs (5 and 1 gallon sizes)	
Agave americana	Agave
Agave ‘Blue Flame’	Agave
Agave parryi	Agave
Agave vilmonana	Agave

TABLE 4-1: ARTERIAL STREETSCAPE PLANT PALETTE	
Acacia 'Desert Carpet'	Desert Carpet
Bougainvillea 'Purple Queen'	Bougainvillea
Caesalpinia pulcherima	Dwarf Poinciana
Carissa macrocarpa	Natal Plum
Juniperous 'Blue Chip'	Trailing Juniper
Lantana camera 'New Gold'	Shrub Lantana
Muhlenbergia species	Deer Grass
Pennisetum species	Fountain Grass
Oenothera speciosa	Mexican Evening Primrose
Rosa 'Flower Carpet'	Shrub Lantana
Yucca whipplei	Yucca

4-Lane Major Roadways

Vista Del Norte

Vista Del Norte provides access to the plan area from the west and an alternative outlet to the Interstate 10 freeway and the city center area via Dillon Road.

The following guidelines illustrate the future character of Vista Del Norte:

- The design approach for the parkways will create a sense of arrival through a mixture of flowering canopy trees, smaller accent trees, and shrub material. To illustrate the desert environment, plant material may be combined with rock outcroppings, rolling mounds, and massed native plantings within the medians.
- Adjacent to the pedestrian walkway, canopy trees will provide shade for pedestrians and create an pleasant, walkable condition. Where appropriate, a variety of drought tolerant and native shrubs, grasses, groundcovers, and vines should be used to soften the community theme walls, where present, and to deter graffiti.
- For streets with 4% gradient or less: construct bioswales with native grasses and street trees if feasible. For streets greater than 4% gradient: construct raised curb and gutter on street side with landscape planter and street trees if feasible.
- The design for the parkways and medians will look as one design and incorporate decomposed granite and native, or equal, angular cobbles and boulders.

F Loop and C Loop (excluding the section between Avenue 50 and G Street)

F Loop and C Loop (excluding the section noted above) make up the primary interior circulation loop within the plan area. These roadways pass through or run adjacent to each of the villages and work in tandem with internal multi-purpose trails, open space, and paseos to move people throughout the entirety of the plan area.

The following guidelines illustrate the future character of F Loop and the above designated portion of C Loop:

- Street trees and accent plant material will be consistent throughout the streetscape for these two streets to create a unifying appearance throughout the plan area. Unique accent trees or other architectural features may be used to distinguish the character of individual villages along both F and C Loop but should not detract from the overall consistent design aesthetic.
- Adjacent to the pedestrian walkway, canopy trees will provide shade for pedestrians and create an pleasant, walkable condition. Where appropriate, a variety of drought tolerant and native shrubs, grasses, groundcovers, and vines should be used to soften the community theme walls, where present, and to deter graffiti.
- For streets with 4% gradient or less: construct bioswales with native grasses and street trees if feasible. For streets greater than 4% gradient: construct raised curb and gutter on street side with landscape planter and street trees if feasible.
- The design for the parkways and medians will look as one design and incorporate decomposed granite and native, or equal, angular cobbles and boulders.

D Loop/G Street/B Loop (Between 1st and 2nd Street)/1st/2nd/3rd Streets

The remaining 4-lane major roadways listed above are all connector roads meant to facilitate the movement of vehicles and people further into the plan area.

The following guidelines illustrate the future character of D Loop, G Street, B Loop (Between 1st and 2nd Street), and 1st/2nd/3rd Streets:

- Where these roadways are used primarily to enter a residential village, the plant material shall be enhanced to denote the transition into an individual village area. These areas may utilize smaller palms or other ornamental plant material to accomplish that effect.
- These streetscapes will include formal rows of broadly spreading canopy trees to provide a continuous shade canopy for pedestrians and to instill an urban landscape character. A simple ground plane of low growing and flowering shrubs, grasses and ground covers adjacent to the pedestrian paths, and shrub masses should be used to soften the community theme walls, where present, and to deter graffiti.
- For streets with 4% gradient or less: construct bioswales with native grasses and street trees if feasible. For streets greater than 4% gradient: construct raised curb and gutter on street side with landscape planter and street trees if feasible.

Refer to Figure 4-3, *4-Lane Major Streetscape*, for typical streetscape concepts associated with major roadways. Table 4-2, *Major Roadway Streetscape Plant Palette*, lists the typical plant materials associated with 4-lane major roadways within the plan area.

TABLE 4-2: MAJOR ROADWAY STREETSCAPE PALETTE	
Canopy Trees (24" box sizes)	
Albizia julibrissin	Mimosa Tree
Chorisia speciosa	Floss Silk Tree
Ficus microcarpa	Indian Laurel Fig
Jacaranda mimosifolia	Jacaranda
Quercus virginiana	Southern Live Oak
Parkinsonia aculeata	Palo Verde
Prosopis alba	Thornless Mesquite
Cercidium Spp.	Palo Verde
Palms (minimum 15 gallon)	
Butia capitata	Pindo Palm
Phoenix dactylifera	Date Palm
Syagrus romanzoffiana	Queen Palm
Washingtonia filifera	California Fan Palm
Shrubs/Grasses/Accents/Groundcovers	
Agave Spp.	Agave
Acacia 'Desert Carpet'	Desert Carpet Acacia
Artemesia Spp.	Artemesia
Baccharis 'Pigeon Point'	Coyote Brush
Caesalpinia pulcherima	Dwarf Poinciana
Calliandra californica	Fairy Duster
Callistemon 'Little John'	Dwarf Bottle Brush
Carex Spp.	Carex
Carissa macrocarpa	Natal Plum
Cassia Spp.	Cassia
Dalea pulchra	Indigo Bush
Dasylirion wheeleri	Desert Spoon
Dodonea viscosa	Hopbush
Lantana Spp.	Lantana
Muhlenbergia Spp.	Deer Grass
Opuntia engelmannii	Prickly Pear
Penstemon eatonii	Penstemon
Senna Spp.	Senna

2-Lane Collector (Secondary)

Collector streets facilitiate movement of vehicles to the individual neighborhoods and planning areas. Outside of travel lanes, collector streets are comprised of 8' landscape buffers/parkways, 6' sidewalks, and an additional 10' landscape setback on each side. Additionally, Class II on-street bicycle lanes connect multi-purpose trails with the overall transportation network.

A Loop (East and West)

A Loop (East and West) provide access from Vista Del Norte to the individual residential neighborhoods and single elementary school within the western portion of Village A. Design emphasis for this streetscape will include continuous broad canopy street trees to provide shade and ornamental specimen trees at various points associated with special uses such as schools, parks, and community spaces.

B Loop (Not between 1st and 2nd Street)

B loop provides access to the eastern portion of Village A, which is primarily comprised of very low- to medium- residential uses and open space. Similarly to A Loop, the design emphasis along this section of B Loop will be to provide shade with continuous broad canopy street trees that promote a comfortable walking environment within the desert environment. The following guidelines illustrate the future character of A Loop and the above designated portion of B Loop:

- These streetscapes will include formal rows of broadly spreading canopy trees to provide a continuous shade canopy for pedestrians and to instill an urban landscape character. A simple ground plane of low growing and flowering shrubs, grasses and ground covers adjacent to the pedestrian paths, and shrub masses should be used to soften the community theme walls, where present, and to deter graffiti.
- For streets with 4% gradient or less: construct bioswales with native grasses and street trees if feasible. For streets greater than 4% gradient: construct raised curb and gutter on street side with landscape planter and street trees if feasible.

E Loop (North and South)

E Loop provides access to the primarily very low-density residential and agricultural production areas within Village E. This village is rural in nature, with larger lot single-family houses and large areas of agricultural groves creating more separation and a more natural character. The following guidelines illustrate the future character of E Loop:

- These streetscapes will have informal groves of broadly spreading canopy trees to provide a continuous shade for pedestrians and plant material that instills a more natural hillside landscape character. A simple ground plane of low growing and flowering shrubs, grasses and ground covers adjacent to the pedestrian paths, and shrub masses should be used to soften the community theme walls, where present, and to deter graffiti.
- Plant varieties are more transitional to desert varieties with quieter coloration, and should be placed in natural arrangements and include with the use of rock mulches, cobbles and boulders.
- For streets with 4% gradient or less: construct bioswales with native grasses and street trees if feasible. For streets greater than 4% gradient: construct raised curb and gutter on street side with landscape planter and street trees if feasible.

Refer to Figure 4-4, *2-Lane Collector Streetscape*, for typical streetscape concepts associated with collector streets. Table 4-3, *Collector Streetscape Plant Palette*, lists the typical plant materials associated with 2-lane collector streets within the plan area.

TABLE 4-3: COLLECTOR STREETSCAPE PALETTE	
Trees (24" box sizes)	
Ficus microcarpa	Indian Laurel Fig
Jacaranda mimosifolia	Jacaranda
Prosopis alba	Thornless Mesquite
Quercus virginiana	Southern Live Oak
Palms (minimum 15 gallon)	
Phoenix dactylifera	Date Palm
Washingtonia filifera	California Fan Palm
Shrubs/Grasses/Accents/Groundcovers	
Agave Spp.	Agave
Artemesia Spp.	Artemesia
Acacia 'Desert Carpet'	Desert Carpet
Bougainvillia Spp.	Bougainvillia
Caesalpinia pulcherima	Dwarf Poinciana
Calliandra californica	Fairy Duster
Callistemon 'Little John'	Dwarf Bottle Brush
Carex Spp.	Carex
Cassia Spp.	Cassia
Dasylirion wheeleri	Desert Spoon
Lantana 'New Gold'	Lantana
Muhlenbergia Spp.	Deer Grass
Penstemon eatonii	Penstemon

Local roads provide access throughout residential neighborhoods. Refer to Figure 4-5 and 4-6, *Local Street Streetscape*. Streetscapes along local roads within the KPC Specific Plan area consist of a landscape parkway and pedestrian walkway that provides a physical barrier between pedestrians and vehicles and defines the street through the use of established trees, shrubs, and groundcover elements. Refer to Figure 4-5 and 4-6, *Local Street Streetscape*. Street trees with a minimum size of 15 gallons will be planted within all residential projects as follows:

- Cul-de-sac Lot – One tree per street frontage.
- Interior Lot – Two trees per street frontage.
- Corner Lot – Three trees per street frontage.

A detailed landscape plan will be required for each development as part of design/site plan review that includes a comprehensive local streetscape concept and plant palette. Plant selection is at the discretion of the Developer. Developers should reference the City's landscape guidelines and Coachella Valley Water District's approved plant list when determining plant material for local streets. Street trees and other plant material selected should vary from street to street when possible and create a unique sense of place for each local street within a residential neighborhood.

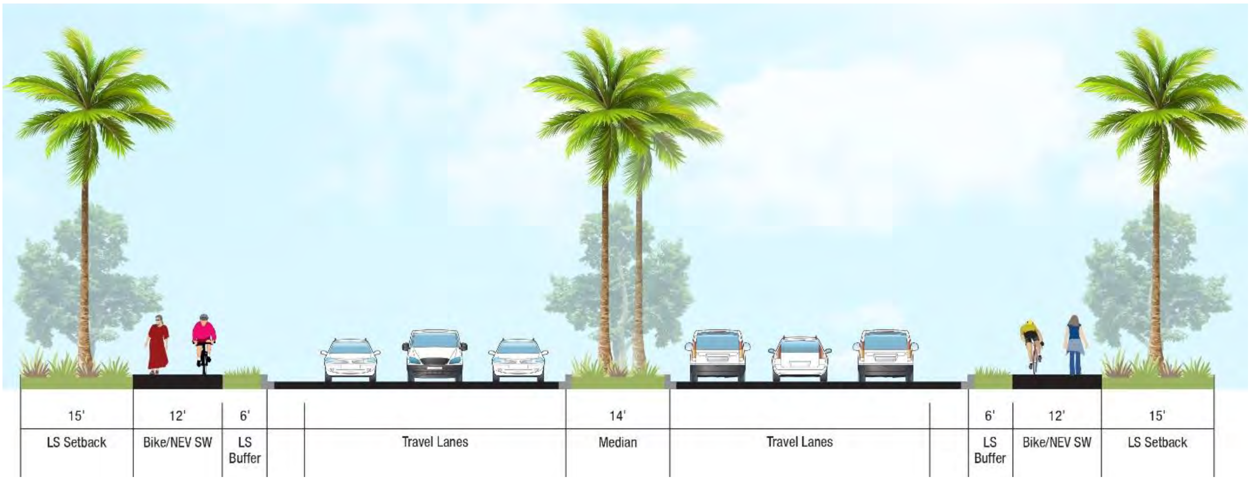


FIGURE 4-2: 6-LANE ARTERIAL STREETSCAPE

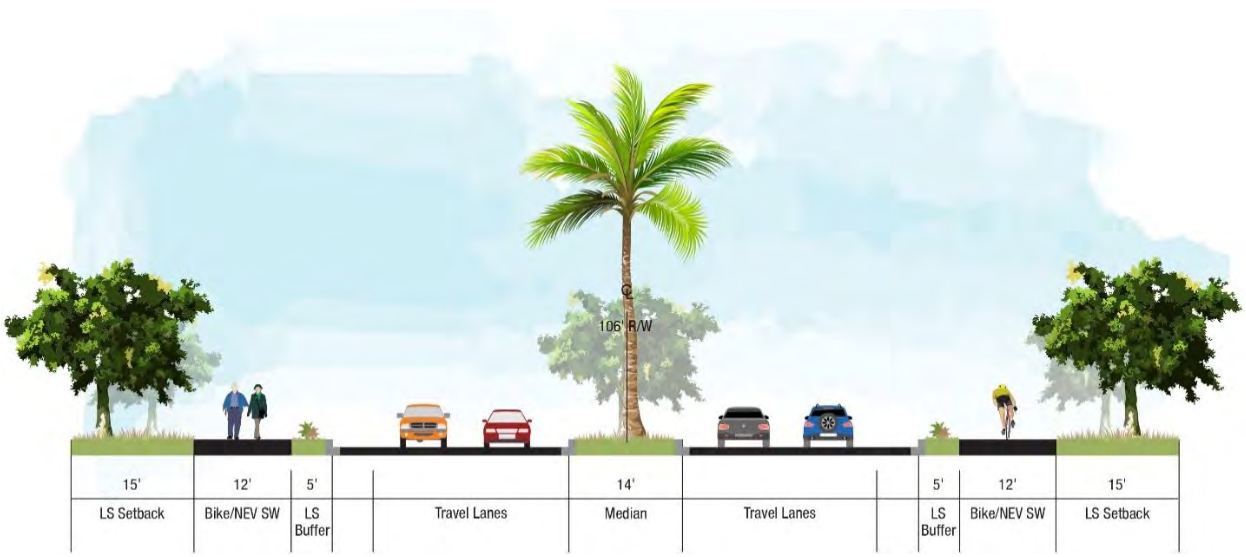


FIGURE 4-3: 4-LANE MAJOR STREETSCAPE

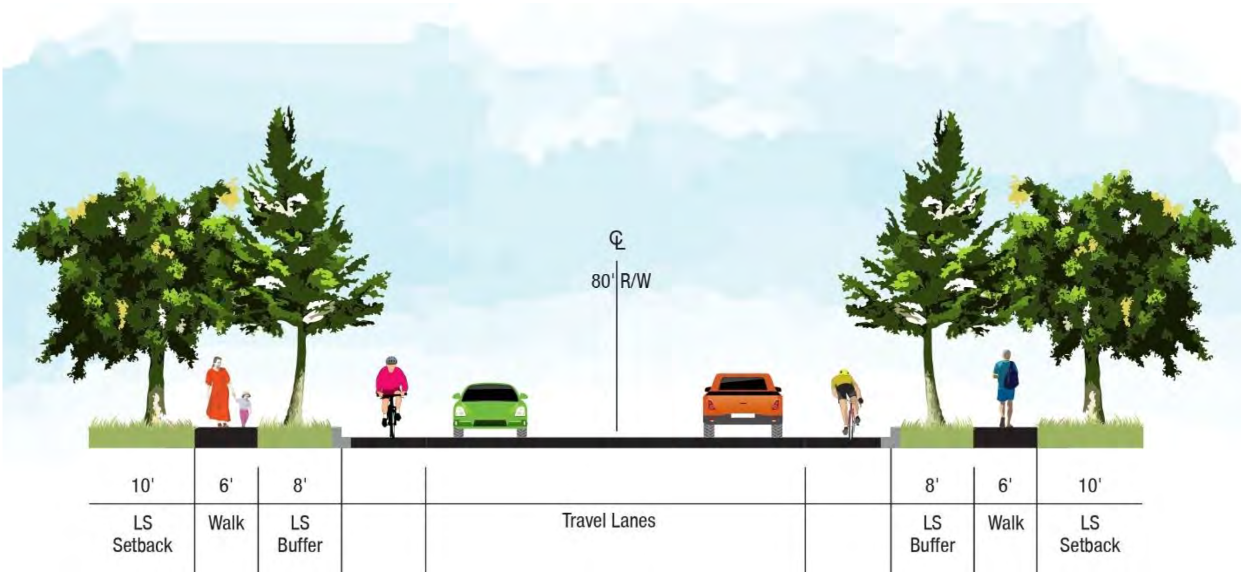


FIGURE 4-4: 2-LANE COLLECTOR STREETSCAPE

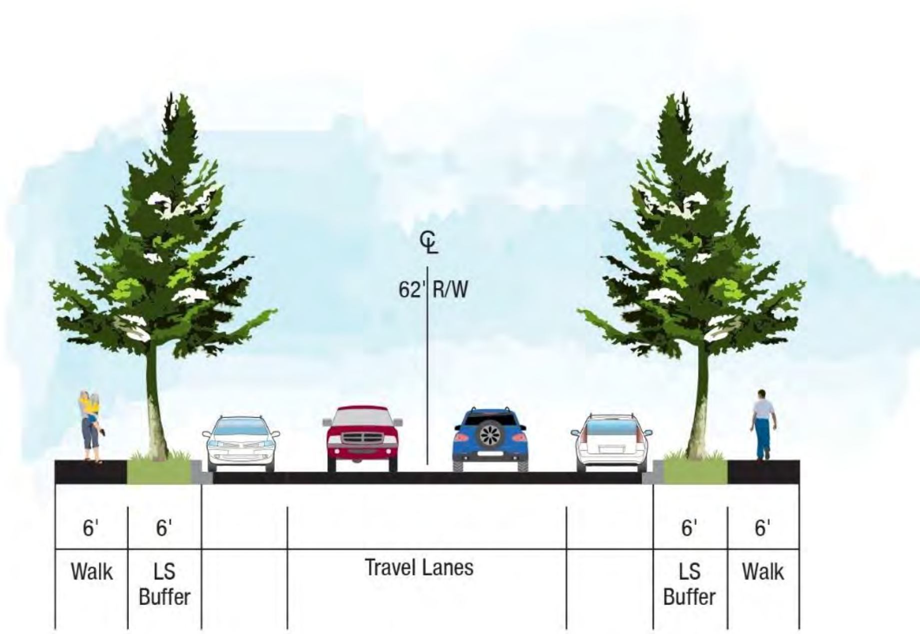


FIGURE 4-5: LOCAL STREET STREETSCAPE – ON-STREET PARKING

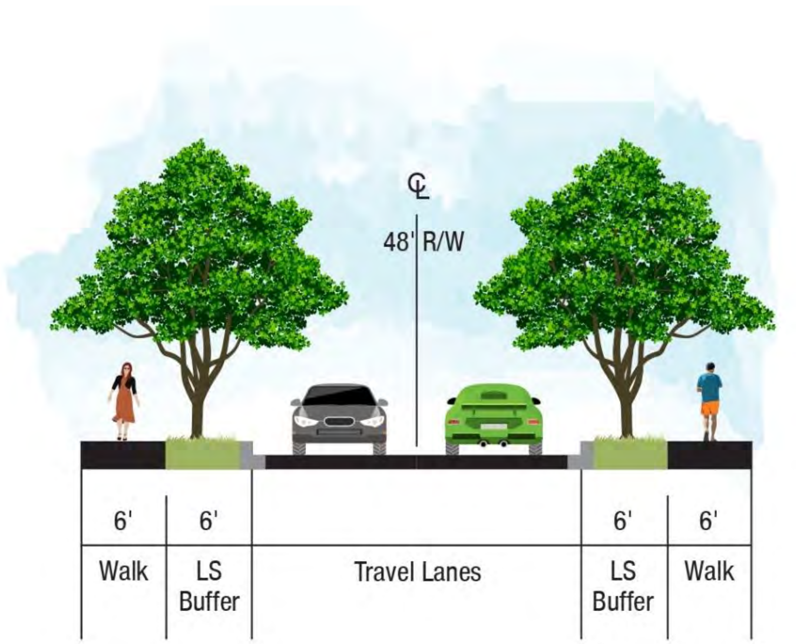


FIGURE 4-6: LOCAL STREET STREETSCAPE – NO ON-STREET PARKING

4.6.4 Community Gateways and Entry Monumentation

Entry monumentation within the KPC Coachella Specific Plan area serves to define the primary and secondary entrances to individual communities and neighborhoods. They are an important wayfinding measure that guide visitors and residents and create a sense of arrival while establishing architectural themes through the design, colors, and materials.

Primary Community Gateways

Primary Community Gateways are located at prominent intersections within the community. Primary gateways are grand entries that establish a sense of place and clearly convey the message that residents and visitors have arrived at the KPC Community

As shown on Figure 4-1, *Landscape Master Plan*, primary community gateways are planned at the intersection of Avenue 50 and the Interstate 10 off-ramp and at the intersection of Avenue 50 and "A" Street as a way of establishing entrance to the plan area from the south. An additionally primary community entry is planned at the intersection of Vista Del Norte and "A" Street to define entry into the community from the west. Primary Community Gateways are as follows:

- Entry monuments and signage will be designed and constructed to complement and enhance prominent architectural themes consistent with the vision for the KPC Coachella community.
- Primary Community Gateways will be iconic architectural elements that establish a sense of arrival within the community through unique design, colors, and materials.
- Public art installations may be included to complement the signage and wayfinding aspect of the Primary Community Gateway monuments.
- Plant material that complements the color and scale of the entry monument may be included. Landscaping may include flowering accent trees, shrubs and groundcover that visually enhance the design aesthetic of the monumentation.
- The project name and any associated marketing logos or images will be prominently displayed and easily understood at all times of day. Lighting will be included as part of the overall design.
- In addition, the landscaping will incorporate permeable pavers, decomposed granite ground cover, angular cobbles and boulders to match the rock found on, or within the vicinity of the site, or generated during site grading from local on-site sources if feasible.

Figure 4-7, *Primary Community Gateway*, shows sample imagery of the types of monumentation that may be implemented in the designated areas. Final design may differ based on market trends or as part of more refined design studies.

Secondary Community Gateway

Secondary Community Gateways help to define the entrance to important areas within the community. They are used to complement and reinforce architectural themes and provide wayfinding signage for residents and visitors.

Secondary community gateways are planned where Vista Del Norte, C Loop, and F Loop intersect with all 4-lane major roadways and 2-lane collector streets. Additionally, a secondary community gateway is planned where G Street and E Loop South meet in Village E.

Secondary Community Entries are as follows:

- Secondary Community Gateways will be designed to complement the architecture and design theme of the Primary Community Gateways and the surrounding community. They will be designed to be smaller in scale while still conveying the vision for the KPC Coachella Community.
- Plant material that complements the color and scale of the entry monument may be included. Landscaping may include flowering accent trees, shrubs and groundcover that visually enhance the design aesthetic of the monumentation.
- The project name and any associated marketing logos or images will be prominently displayed and easily understood at all times of day. Lighting will be included as part of the overall design.
- The landscaping will incorporate permeable pavers, decomposed granite ground cover, angular cobbles and boulders to match the rock found on, or within the vicinity of the site, or generated during site grading from local on-site sources if feasible.
- Entry monuments will be maintained by the Homeowner's Association or a Lighting and Landscape District (or other maintenance district) if one is formed.

Figure 4-8, *Secondary Community Gateway*, shows sample imagery of the types of monumentation that may be implemented in the designated secondary community gateway areas.

Neighborhood Entrances

Neighborhood Entrances will generally be located at the intersection of collector and local streets or at the entries to individual neighborhoods. Entry monumentation and signage will be designed to complement and enhance the vision for each neighborhood through unique architecture and materials. Neighborhood Entry features are as follows:

- Neighborhood entry monuments are smaller in scale than Secondary Community Gateways and will be designed to reflect the vision and character of each individual neighborhood within the plan area.
- Neighborhood entries will be designed to be unique from other neighborhood signage and monumentation while still complementing the Secondary and Primary Community Gateways and overall design aesthetic of the community.
- Plant material that complements the color and scale of the entry monument may be included. Landscaping may include flowering accent trees, shrubs and groundcover that visually enhance the design aesthetic of the monumentation.
- The landscaping will incorporate permeable pavers, decomposed granite ground cover, angular cobbles and boulders to match the rock found on, or within the vicinity of the site, or generated during site grading from local on-site sources if feasible.
- Entry monuments will be maintained by the Homeowner's Association or a Lighting and Landscape District (or other maintenance district) if one is formed.

Figure 4-9, *Neighborhood Entrances*, shows sample imagery of the types of monumentation that may be implemented in the designated Neighborhood entry areas.

FIGURE 4-7: PRIMARY COMMUNITY GATEWAY IMAGERY

FIGURE 4-8: SECONDARY COMMUNITY GATEWAY IMAGERY

FIGURE 4-9: NEIGHBORHOOD ENTRY IMAGERY

4.6.5 Performing Arts Amphitheater

The Performing Arts Amphitheater is envisioned as a primary community gathering space for residents and a major attraction for visitors within the region. Incorporated as part of the Alhambra waterway system, the amphitheater provides opportunities for outdoor concerts and shows that complement the adjacent entertainment uses. The facility is intended to include seating for XX people and be comprised of traditional bowl seating or benches and flexible lawn spaces.

The amphitheater will be owned and operated by a private company who will be responsible for all aspects relating to events using the facility, including event management, parking, food and beverage sales, retail sales, and visitor safety.

Figure 4-7, Performing Arts Amphitheater Concept, depicts the potential uses within the park. A detailed site plan will be submitted and reviewed by the City as part of the site plan and design review process.

4.6.6 Parks, Paseos, and Open Space

The following recreation and open space goals shall apply to the development of parks, paseos and recreation facilities and the provision of open space within the Specific Plan area:

- Create flexible use spaces that can serve a number of community functions and act as community gathering spaces for residents and visitors.
- Provide a combination of passive and active recreation opportunities that meets the needs of residents and guests.
- Design neighborhood parks, pocket parks, the amenity center, and open space system to create and reinforce a sense of community identity and character.
- Create active, efficient, and inviting recreation facilities and open space areas.
- Create a network of accessible connections via streets, sidewalks, bike paths, promenades, paseos and natural systems to provide greater opportunities for convenient non-vehicular circulation.

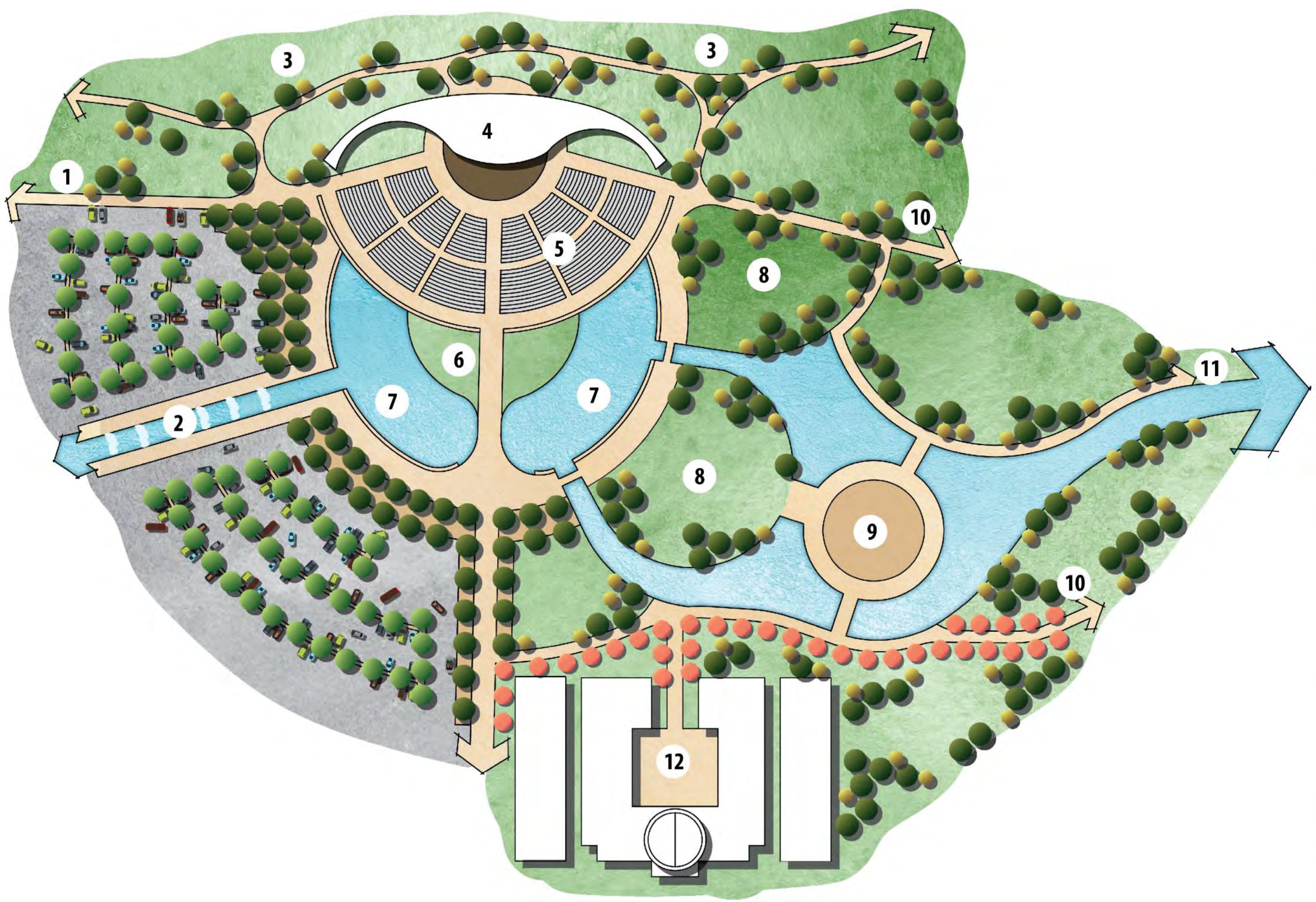
The KPC Coachella Specific Plan includes a connected network of neighborhood parks, trails, paseos, and drainage areas, Illustrated above on Figure 4-1, Landscape Master Plan above.

All parks shall meet ADA requirements in terms of accessibility and shall be irrigated with reclaimed water if it is available.

Parks will be designed in association with the adjacent planning area and the design of each park may vary from the programming discussed in this Specific Plan, subject to City design review. The following descriptions provide an outline for the theming and intent of the open space and park facilities within the KPC Coachella Community.

TABLE 4-4: PARKS AND PASEOS PLANT PALETTE	
Canopy Trees (24" box size)	
Acacia Spp.	Acacia
Albizia julibrissin	Silk Tree
Caesalpinia cacalaco	Cascalote
Cercidium Spp.	Palo Verde
Chilopsis linearis	Desert Willow
Chorisia speciosa	Floss Silk Tree
Dalbergia Sissoo	Sissoo Tree
Ficus microcarpa	Indian Laurel Fig
Fraxinus velutina	Arizona Ash
Jacaranda mimosifolia	Jacaranda
Lagerstroemia indica	Crape Myrtle
Olea Europaea	Swan Hill Olive
Parkinsonia Spp.	Palo Verde
Pinus Elderica	Model Pine
Pinus halepensis	Aleppo Pine
Pistacia chinensis	Chinese Pistache
Pithecellobium flexicaule	Texas Ebony
Prosopis Spp.	Mesquite
Quercus agrifolia	Coast Live Oak
Quercus virginiana	Southern Live Oak
Tipuana tipu	Tipu Tree
Ulmus Parvifolia	Evergreen Elm
Palms (Minimum 15 gallon)	
Phoenix canariensis	Canary Island Date Palm
Phoenix dactylifera	Date Palm
Syagrus romanzoffiana	Queen Palm
Washingtonia filifera	California Fan Palm
Washingtonia robusta	Mexican Fan Palm
Shrubs/Grasses/Accents/Groundcovers	
Agapanthus Spp.	Lily of the Nile
Agave Spp.	Agave
Acacia Spp.	Acacia
Aloe Spp.	Aloe
Artemesia Spp.	Artemesia
Baileya multiradiata	Desert Marigold
Baccharis Spp.	Baccharis
Bougainvillea Spp.	Bougainvillea
Caesalpinia pulcherima	Dwarf Poinciana

TABLE 4-4: PARKS AND PASEOS PLANT PALETTE	
Calliandra californica	Fairy Duster
Callistemon 'Little John'	Dwarf Bottle Brush
Carissa macrocarpa	Natal Plum
Cassia Spp.	Cassia
Ceanothus Spp.	California Wild Lilac
Chamaerops humilis	Mediterranean Fan Palm
Cistus Spp.	Rockrose
Convolvulus Spp.	Morning Glory
Cordia Spp.	Cordia
Cycas revoluta	Sago Palm
Dalea Spp.	Dalea
Dasylirion wheeleri	Desert Spoon
Dietes bicolor	Fortnight Lily
Dodonea viscosa	Hopbush
Eremophila maculata	Red Eremophila
Fouquieria splendens	Ocotillo
Hesperaloe parviflora	Yucca
Ilex Vomitoria	Yaupon
Justicia Spp.	Mexican Honeysuckle
Lantana Spp.	Lantana
Leucophyllum Spp.	Sage
Ligustrum japonicum 'Texanum'	Texas Privet
Muhlenbergia Spp.	Deer Grass
Myoporum Spp	Myoporum
Nerium olenader	Oleander
Opuntia Spp	Prickly Pear
Penstemon eatonii	Penstemon
Photinia Spp.	Photinia
Rhus Spp.	Sumac
Rosa banksiae	Lady Bank's Rose
Rosmarinus officinalis	Rosemary
Ruellia Spp.	Ruellia
Salvia Spp.	Salvia
Senna Spp.	Cassia
Tecoma Spp.	Yellow Bells
Verbena Spp	Verbena
Xylosma congestum	Shiny Xylosma
Yucca Spp.	Yucca



1. WALKWAY TO CASINO
2. CASCADING WATERWAY FROM CASINO PLAZA
3. FLOOD PLAIN TRAIL
4. OVERHEAD TRELLIS
5. AMPHITHEATRE SEATING
6. LAWN SEATING
7. REFLECTING POOL
8. GRASSY PICNIC AREA
9. ART & SCULPTURE ISLAND
10. TRAIL TO CENTRAL PARK
11. WATERWAY THROUGH CENTRAL PARK
12. HOTEL COMPLEX

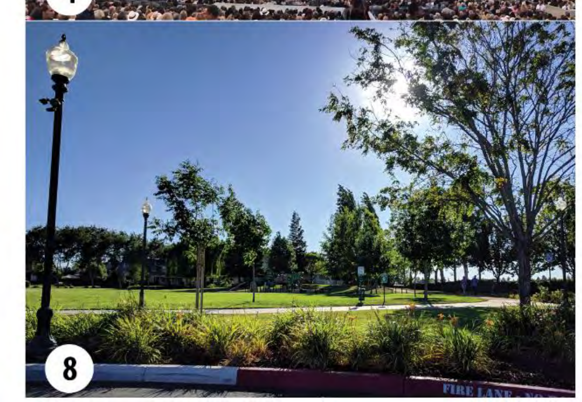


FIGURE 4-10: PERFORMING ARTS AMPHITHEATER CONCEPT

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Central Park

The Central Park is approximately 34 acres of community open space centrally located within the KPC Coachella Community. The park is directly east of the Casino and Hotel Entertainment area and consists of passive and active recreational opportunities for residents, employees, and visitors. The Central Park is the one of the largest formal open space areas in the community, consisting of:

- athletic fields/courts,
- a community center,
- interactive water features that connect multiple planning areas and uses,
- flexible amenity lawn spaces,
- educational opportunities,
- skate parks,
- botanical gardens
- tot lots
- natural desert flora and fauna, and
- hiking, walking, and biking trails that bring in users from all over the community.

The Central Park is envisioned to be a primary community gathering space with a focus on highlighting the natural landscape of the surrounding desert while providing a plethora of amenities for all who visit the park.

Figure 4-11, Central Park Concept, depicts the potential uses within the park. Detailed landscape design and programing site plans will be submitted and reviewed by the City as part of the site plan and design review process.

Alhambra

The Alhambra water feature is a grand system of cascading waterfalls and pools that takes advantage of the natural topography, running through the residential areas of Village B and leading to an iconic water feature integrated into the amphitheater, casino, and hotel entertainment complex. The Alhambra provides opportunities for residential, commercial, entertainment, and open spaces uses to interact with a large water feature that acts as the spine of the KPC Coachella community. The water feature connects to the extensive systems of pedestrian trails that bind the surrounding neighborhoods together, providing a unique experience for residents and visitors within a desert climate.

The Alhambra water feature will be a publicly accessible community asset that includes cascading waterfalls, reflecting pools, pedestrian walkways and bridges, fountains, and mature landscaping. The Alhambra may be designed as separate water systems that aesthetically appear to be one continuous waterway. Portions of the water feature may be designed to allow for body contact or recreational uses including pools, lakes, lagoons, or a "lazy river."

Figure 4-12, Alhambra Concept, shows a potential segment of the waterway and surrounding residential uses. Detailed landscape design and programing site plans will be submitted and reviewed by the City as part of the site plan and design review process.

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1. SOCCER FIELDS
2. FULL-SIZE BASEBALL FIELD
3. LITTLE LEAGUE FIELDS
4. GRAND LAWN AREA
5. SAND BEACH
6. POND AND STREAM
7. DESERT NATURE AREA
8. NATURE AREA
9. DESERT SCULPTURE GARDEN
10. SMALL DOG PARK
11. FENCED BIG DOG PARK
12. SKATE PARK
13. ORCHARD AREA
14. TOT LOT
15. MULTI-PURPOSE BUILDING
16. LAZY RIVER AND SWIM AREA/DECK
17. COMMUNITY CENTER
18. SOUTH PARKING LOT

FIGURE 4-11: CENTRAL PARK CONCEPT

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1 POND/WATER FEATURE
2 CASCADING WATERWAY
3 CONDOMINIUMS
4 PLAZA SPACE
5 CLUBHOUSE
6 TOWNHOMES
7 WATERFALL FEATURE
8 APARTMENTS
9 OVERLOOK CLUBHOUSE/ RECREATION CENTER

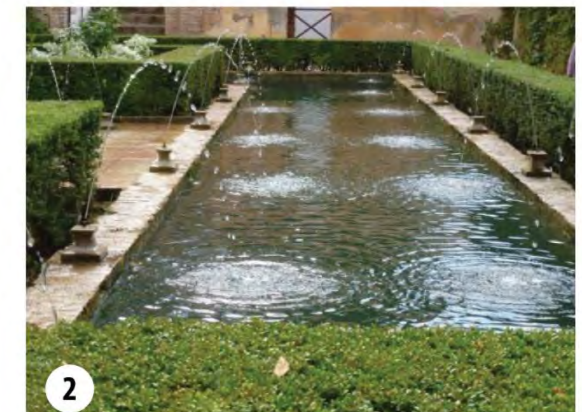

FIGURE 4-12: ALHAMBRA CONCEPT

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Sports Complex & Cycling Park

The Sports Complex and Cycling Park is a 45 acre active recreation area located within Village C. Unlike the Central Park, which focused heavily on a range of community uses and passive, natural open space areas, the Sports Complex is envisioned as a heavily programmed facility that caters to a range of sports organizations, from local youth leagues to adult leagues and regional tournaments. This area emphasizes the importance of physical activity across the spectrum of residents and designates a space for organized sports that supports the needs of the community and the City of Coachella. The park will be designed to include a range of facilities that allow it to host regional sports tournaments. The creates the ability to attract thousands of visitors to the community annually. Potential uses include:

- soccer, football, and baseball fields,
- tennis and basketball courts,
- a swimming complex, and
- a cycling track or bicycle-exclusive routes.

Additionally, supplemental uses such as community centers, gyms, food stands, bathrooms, and storage facilities could be included within this area. Management of the Sports Complex and Cycling Park may take the form of a public/private partnership, with private companies and City departments managing different aspects of the facilities and local leagues.

Figure 4-13, *Sports Complex & Cycling Park Concept*, depicts the potential uses within the park. Detailed landscape design and programing site plans will be submitted and reviewed by the City as part of the site plan and design review process.

Active Adult Community Facilities

Village D is envisioned as a community designed to promote an active adult lifestyle through an emphasis on outdoor recreation and pedestrian connectivity. At the core of the community are several recreational areas anticipated to include sport facilities, community centers, pools, and community gardens. Active adult facilities also include a system of on-street and off-street multi-use pathways oriented towards providing alternative methods of transportation, including walking, biking, and NEVs.

Active adult community facilities are operated by the Master Homeowners Association for the area and are accessible to anyone who is a member of that association.

Figure 4-14, *Active Adult Community Trail Concept*, depicts the potential uses within the park. Detailed landscape design and programing site plans will be submitted and reviewed by the City as part of the site plan and design review process.

Typical Neighborhood Parks

Neighborhood parks are planned for each community and will be designed and constructed by developers as new residential neighborhoods are established. These parks will be designed and located to ensure that all residents have nearby usable open space and recreational opportunities. Potential uses include tot lots, basketball courts, lawn space, bathrooms, and picnic areas.

Figure 4-15, *Typical Neighborhood Park Concept*, depicts the potential uses within the park. Detailed landscape design and programing site plans for all Neighborhood parks will be submitted and reviewed by the City as part of the site plan and design review process.

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1. PARKING LOT
2. SOCCER FIELDS
3. WIDENED PEDESTRIAN WALKWAY/ENTRY FEATURE
4. BASEBALL/SOFTBALL FIELDS
5. RECREATION CENTER/ CONCESSIONS STAND
6. TENNIS COMPLEX
7. BASKETBALL COURTS
8. MULTI-PURPOSE BICYCLE TRACK
9. FLEXIBLE PLAY AREA/ RECREATIONAL FIELD WARM-UP SPACE

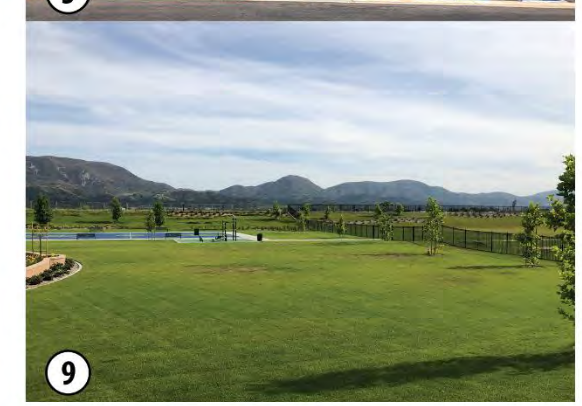

FIGURE 4-13: SPORTS COMPLEX AND CYCLING PARK CONCEPT

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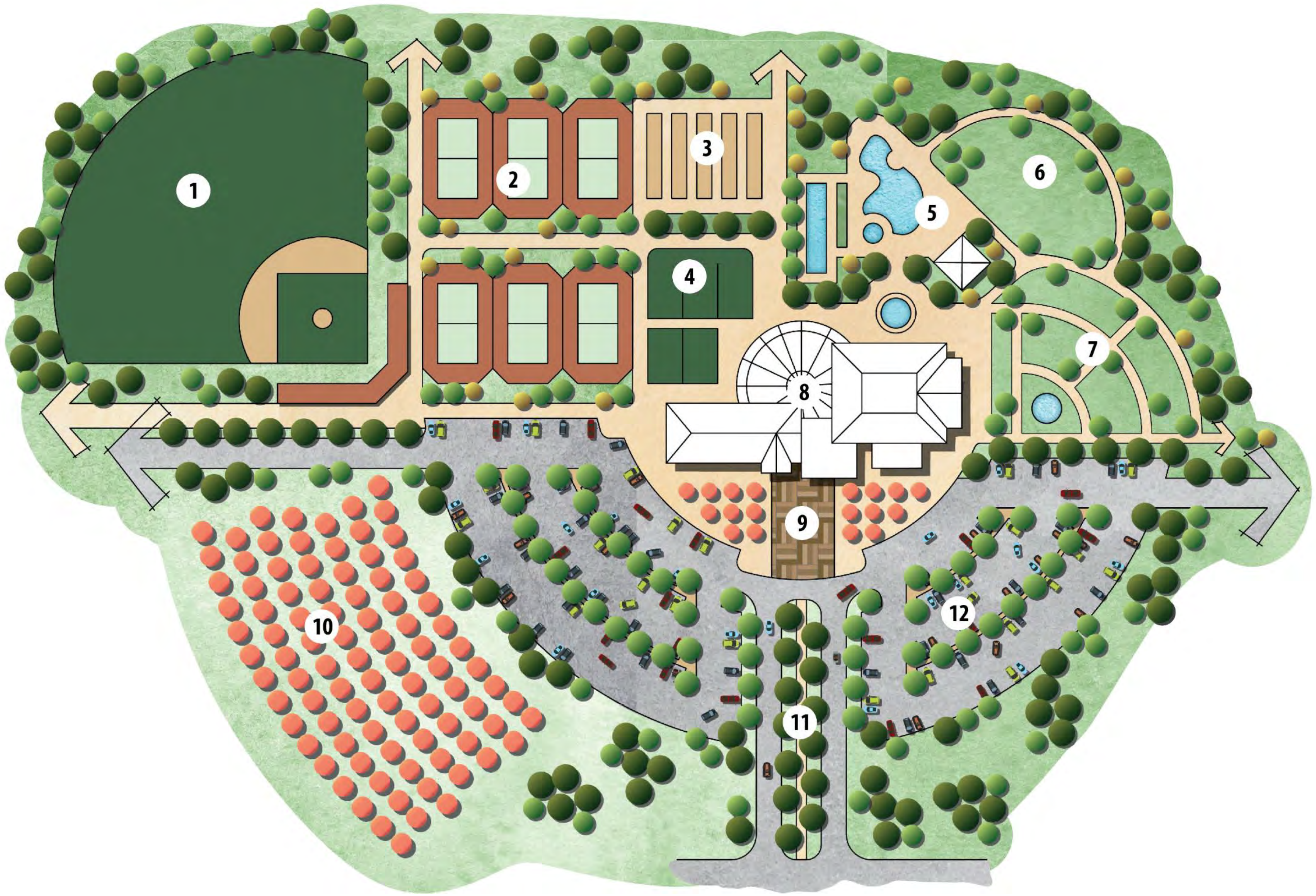

1. SOFTBALL/BASEBALL FIELD
2. TENNIS COURTS
3. BOCCE BALL/HORSE-SHOES
4. PICKLEBALL COURTS
5. COMMUNITY POOL
6. PICNIC/OPEN AREA
7. GARDEN WALK
8. COMMUNITY CENTER BUILDING
9. ENTRY PLAZA
10. ORCHARD AREA
11. ENTRY DRIVE WITH CENTER PROMENADE
12. PARKING LOT

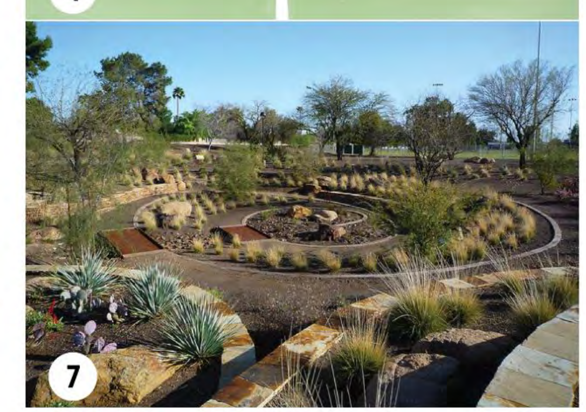

FIGURE 4-14: ACTIVE ADULT COMMUNITY FACILITIES CONCEPT

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1 COMMUNITY GARDEN
2 OPEN SPACE
3 BASKETBALL COURTS
4 PLAZA
5 BATHROOM/ CONCESSIONS
6 PARKING LOT
7 SMALL KIDS PLAY AREA
8 OLDER KIDS PLAY AREA

FIGURE 4-15: TYPICAL NEIGHBORHOOD PARK CONCEPT

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Agricultural Estates

Village E, located in the eastern portion of the plan area, is envisioned as an agricultural area with predominantly large-lot homes and areas reserved for agricultural production of goods such as table grapes and dates. The level of agricultural production may range from smaller community gardens and individual property owners to commercial-scale production. The unique weather conditions and land characteristics within the Coachella Valley will dictate the types of agricultural production possible within the plan area.

Figure 4-16, *Agricultural Estates Imagery*, depicts potential agricultural uses allowed within Village E. Operations and management of agricultural areas will be the responsibility of private property owners. Measures to ensure the responsible and efficient use of water within the plan area will follow the guidelines and standards put in place by the Coachella Valley Water District (CVWD)

FIGURE 4-16: AGRICULTURAL ESTATES IMAGERY

Desert Wash Paseo

Desert wash paseos are multi-purpose walkways planned along the various drainage ways found within the plan area. They consist of public parks and pathways located along the upper edges of the numerous soft bottom storm water channels that traverse the site. These linear parks will provide for passive and active recreational pursuits, including hiking and cycling, by incorporating a multi-purpose path on both sides, where possible, to accommodate pedestrians, and bicyclists with shade trees and shrubs and ground covers to control erosion and at other key areas along the route as needed for emphasis, where final grading plans permit. It is the intent of the landscape concept for these areas to be integrated and nestled into natural storm water channels with the focus on the use of native species and naturalistic arrangements, to retain the look and feel of the adjacent desert.

- Broad-canopied trees provide ample shade, native and indigenous shrubbery and ground covers provide color, texture and interest.
- All desert wash paseos will include vista points and numerous opportunities for sitting, resting, shade, and water. Furnishings will include signage, interpretive signs, shade structures, benches, trash receptacles, bike racks, and drinking fountains.

Refer to Exhibit 4-17, *Desert Wash Paseo Section*, for an illustration of a typical design for this paseo. Table 4-5, *Desert Wash Paseo Plant Palette,* illustrates the typical plant material for the desert wash paseo areas.

TABLE 4-5: DESERT WASH PASEO PLANT PALETTE	
Canopy Trees (24" box sizes)	
Acacia Spp.	Acacia
Chilopsis linearis	Desert Willow
Olneya tesota	Ironwood
Parkinsonia Spp.	Palo Verde
Platanus Spp.	Sycamore
Populus Spp	Cottonwood
Prosopis Spp.	Mesquite
Platanus Spp.	Sycamore
Quercus Spp.	Oak
Shrubs/Grasses/Accents/Groundcovers	
Acacia Spp.	Acacia
Agave Spp.	Agave
Ambrosia Spp.	Bursage
Anisacanthus Spp.	Honeysuckle
Artemisia Spp.	Sage
Baileya multiradiata	Desert Marigold
Baccharis Spp.	Baccharis
Buddleia marrubiifolia	Butterfly Bush
Calliandra Spp.	Fairy Duster
Carex Spp.	Native Carex
Dalea Spp.	Morning Glory

TABLE 4-5: DESERT WASH PASEO PLANT PALETTE	
Dasylirion Spp.	Desert Spoon
Dodonaea viscosa	Hopbush
Echinocactus Spp.	Barrel Cactus
Encelia Spp.	Brittle Bush
Ephedra viridis	Mormon Tea
Euphorbia rigida	Gopher Plant
Ferocactus Spp.	Barrel Cactus
Fouquieria splendens	Ocotillo
Hesperaloe Spp.	Yucca
Justicia Spp.	Chuparosa
Larrea tridentata	Creosote Bush
Leucophyllum Spp.	Sage
Muhlenbergia Spp.	Muhly Grass
Oenothera Spp.	Primrose
Optunia Spp.	Prickly Pear
Penstemon Spp.	Penstemon
Salvia Spp.	Sage
Senna Spp.	Cassia
Simmondsia chinensis	Jojoba
Verbena Spp.	Verbena
Yucca Spp.	Yucca

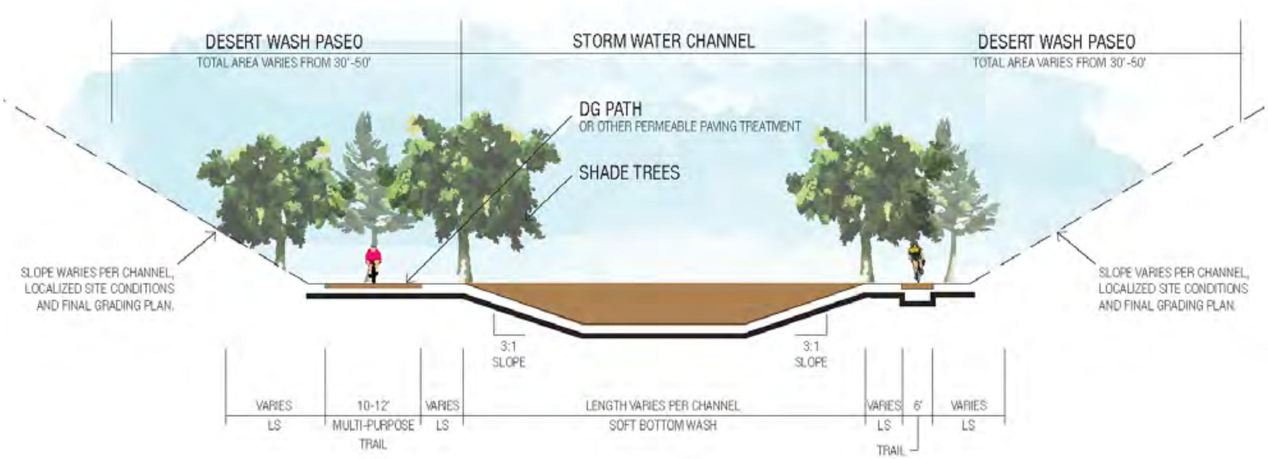


FIGURE 4-17: DESERT WASH PASEO SECTION

4.6.7 Stormwater Facilities

In addition to functioning as storm water conveyance and treatment facilities, the proposed drainage facilities within the project will also serve as landscape features. These areas will take the form of swales or basins and will include bike paths meandering along their edges, as well as landscaping that will consist of riparian trees, grasses and groundcover. These areas may also serve as educational opportunities to promote an understanding of stormwater management through the use of informational signage which depicts the function of the swale and the types of landscape plantings that have been selected for their ability to survive periodic inundation.

In this desert environment, basins are typically unvegetated as their primary function is to maximize infiltration. The upper edges of basins are to be planted consistent with the open space and park palette as noted below. These facilities should have the appearance of a landscaped area and include decorative fences and gates for those areas visible to the public.

The following guidelines should be followed for the aesthetic design of stormwater facilities:

Biofiltration Strips

The public roads can and will incorporate bioswales for treatment of storm water runoff where grades are acceptable.

Bioswales will only be located on streets that have a gradient not exceeding 4%. Steeper slope gradients would increase erosion due to high water velocity and reduce the potential for beneficial infiltration and water quality treatment. Roads that have a gradient greater than 4% will incorporate a landscape strip but will not include a biofiltration element. These landscape strip areas will include a curb and gutter on the street side and all storm water runoff from the street will be collected and routed to an underground storm water system via curb and gutter system.

- Bioswales will generally be located in landscape areas between the roadway surface and sidewalk/bike/NEV path and will allow storm water runoff to flow directly from the paved street into the biofiltration strip and then into the storm water system.

Bioswales and other filtration methods should appear as naturally landscaped areas.

- The bioswales can incorporate a combination of low growing grasses, 6-8" cobbles and ¾" crushed rock. The plant materials for these areas will be complementary of the overall parkway and median landscape design, be capable of fulfilling the requirements of the biofiltration system where required and be sufficiently irrigated between storm events.
- Grasses used shall be native or ornamental; turf species are discouraged. See Table 4-6, *Bioretention Plant List*, for plants appropriate in drainage basins and bioretention areas. Final plant selection shall be by a licensed landscape architect.
- The application of fertilizers and pesticides should be minimal.

TABLE 4-6: BIORETENTION PLANT LIST SOURCES: CASQA LID HANDBOOK, UC DAVIS LID INITIATIVE

Latin Name	Common Name	WUCOLS
Trees and Shrubs		
Achilea millefoilum	Yarrow	L
Amorpha fruticosa	False Indigobush	M
Artemisia douglasiana	Mugwort	M
Baccharis pilularis	'Pigeon Point' or 'Twin Peaks' Dwarf Coyote Bush	M
Calycanthus occidentalis	Spice Bush	L
Chilopsis linearis	Desert Willow	M
Umbellularia californica	California Bay Laurel	L
Justicia californica	Chuparosa	L
Mahonia spp	Chinese Holly Grape	M
Rosa californica	California Wild Rose	M
Sambucus mexicana	Mexican Elderberry	M
Grasses and Perennials		
Aristida purpurea	Purple Three-Awn	L
Carex praegracilis	Field Sedge	M
Carex spissa	San Diego Sedge	M
Carex divulsa	Berkeley Sedge	M
Festuca rubra	Red Fescue	M
Heuchera spp. (native varieties preferred)	Coral Bells	M
Iris douglasiana	Pacific Coast Iris	L
Iris germanica	Bearded Iris	M
Juncus occidentalis	Western rush	M
Muhlenbergia rigens	Deergrass	M
Sporobolus airoides	Alkali Sacaton	L

4.6.8 Residential Landscaping

Developer-provided single-family residential front yard landscaping is optional and only required when selected by a homeowner as an "optional" development feature. However, each home is required to install at least one tree per street frontage, whether provided by the builder or the homeowner. In addition, a parkway street tree will be required, generally located adjacent to the curb. Typically, a parkway tree is a medium to larger scale, low water use tree that is sized and planted appropriately for the location (see streetscape figures for local streets). Front yards are required to be landscaped.

- Front yards shall incorporate low water use plants.
- No less than 50% of the front yard landscaping shall be planted with shrubs and groundcover. Provide at least 1-shrub for every 50 square feet of planting area. Limit the use of turfgrass and other high water use plants to no more than 25% of the total plantable area.
- At maximum, groundcover should be spaced to cover 80% of designated planting areas within one (1) year after installation.

- Shrubs must be planted at one (1) gallon size minimum. Groundcovers may be planted from one (1) gallon size materials or flats.
- Front yards must include at least one 24-inch box sized tree per street frontage.
- Other yard materials such as gravel, boulders, or river rock or patio/courtyard areas may be utilized but may only comprise a maximum of 50% of the front yard area.

4.7 Fences and Walls

Fences and walls may be necessary to provide separation between the various planning areas and adjacent commercial development, or between secure gated neighborhoods and others. Where utilized, the following general guidelines should be taken into consideration (refer to Section 3.2.6 for development regulations related to walls and fences):

- Fences and walls used throughout the Specific Plan area shall be constructed using high-quality materials and consistent with the aesthetic of adjacent architecture and landscape.
- Street-adjacent and perimeter wall and fence design, location, and height shall reflect the character and overall aesthetic of the project and shall be consistent in quality and color palette.

- Fences and walls along collector streets and project perimeters shall not exceed six feet in height unless required for noise attenuation based on acoustical analysis.
- Perimeter and street-adjacent walls and fences shall be constructed of attractive, durable, and low maintenance materials, including but not limited to precast concrete with textured or stone finishes, wrought iron, or tubular steel.
- Fences and walls along streets should include three levels of landscaping: groundcover, shrubs and low plantings, and trees.
- Residential rear and side yard fences and walls shall not exceed six feet in height, except as required for sound attenuation. Residential fences may be constructed of masonry, vinyl coatings, tubular steel, or a combination of these materials.
- Front yard walls and fences shall be constructed using high-quality materials such as tubular steel or masonry. Front yard walls and fences may vary for visual interest but shall be complementary and retain a harmonious overall aesthetic.
- Landscaping shall be required along walls and fences to break up the massing and provide greenery throughout the project. Long walls and fences (generally greater than 30 feet) uninterrupted by trees or other landscaping are not allowed along streets and adjacencies with parks, trails, and other common spaces.

4.8 Support Facilities

Service areas and above-ground equipment such as residential air conditioners, trash enclosures, and electrical vaults are understood to be a requirement of development. Their treatment is important to the overall quality of the community.

- With the exception of solar panels and small-scale wind turbines, roof-mounted mechanical equipment should be avoided on the roof of single-family dwelling units.
- Small-scale wind turbines and solar heating and energy production panels and films are encouraged. These items do not need to be screened, since screening may limit productivity.
- Roof-mounted mechanical equipment (excluding solar panels, solar films, and small-scale wind turbines) on non-residential buildings shall be screened from views from streets, walkways, common areas, parks, and open space areas with parapets and other architectural features that are compatible with the architectural style and character of the building.
- Equipment should be located to maximize energy efficiency, such as locating cooling equipment in shaded areas that are protected from the hot sun, thus reducing energy needs.
- Storage, refuse and equipment areas shall be screened from publicly accessible spaces and/or neighboring residential uses. Landscaping and/or architectural enclosures can be used to screen these areas.
- Ground-mounted mechanical equipment shall be located behind privacy walls/fences, inside utility cabinets, and/or behind landscaping to screen this equipment from streets, walkways, parks, and common areas. Items to be screened include, but are not limited to, power transformers, electrical equipment, backflow preventers, antennas, HVAC (heating, ventilation, and air conditioning) equipment, and other similar mechanical equipment and utilities.

- Trash enclosures for multifamily homes or commercial centers must be screened by a solid wall or fence with landscaped buffers and located so that doors do not interfere with landscaping and pedestrian and vehicular circulation.
- Trash areas for single-family residential uses should be located in the side yard or garage area with access to curb or alley pick-up.
- Energy and water-efficient appliances, fixtures, lighting, and windows shall meet or exceed state energy performance standards. Energy Star qualified (or equivalent) models of mechanical equipment are strongly encouraged.

4.9 Exterior Lighting

Lighting shall be provided throughout the community's parks and open spaces, consistent with streetscape furnishings. Quality lighting enhances the nighttime vehicular and pedestrian experience and safety. Lighting design will help differentiate between land uses, highlight public and pedestrian-scaled spaces, provide continuity and aesthetic appeal along corridors, and encourage pedestrian and vehicular efficiency. Lighting along multi-use paths, walkways, and other areas used by pedestrians and bicyclists should be provided except in natural open space areas.

Lighting should minimize uncontrolled nighttime light and glare, light trespass, and night sky pollution with low brightness lighting fixtures utilizing warm, color corrected light sources and appropriate beam cut-off. Energy-efficient lamp technologies such as LED should be utilized along with photovoltaic sensors to turn lights off when adequate daylight is available.

Light standard styles should be consistent throughout the project, yet designed to meet City standards. Alternative street light designs may be allowed, subject to approval as part of site plan review. No specific alternative street light design is proposed.

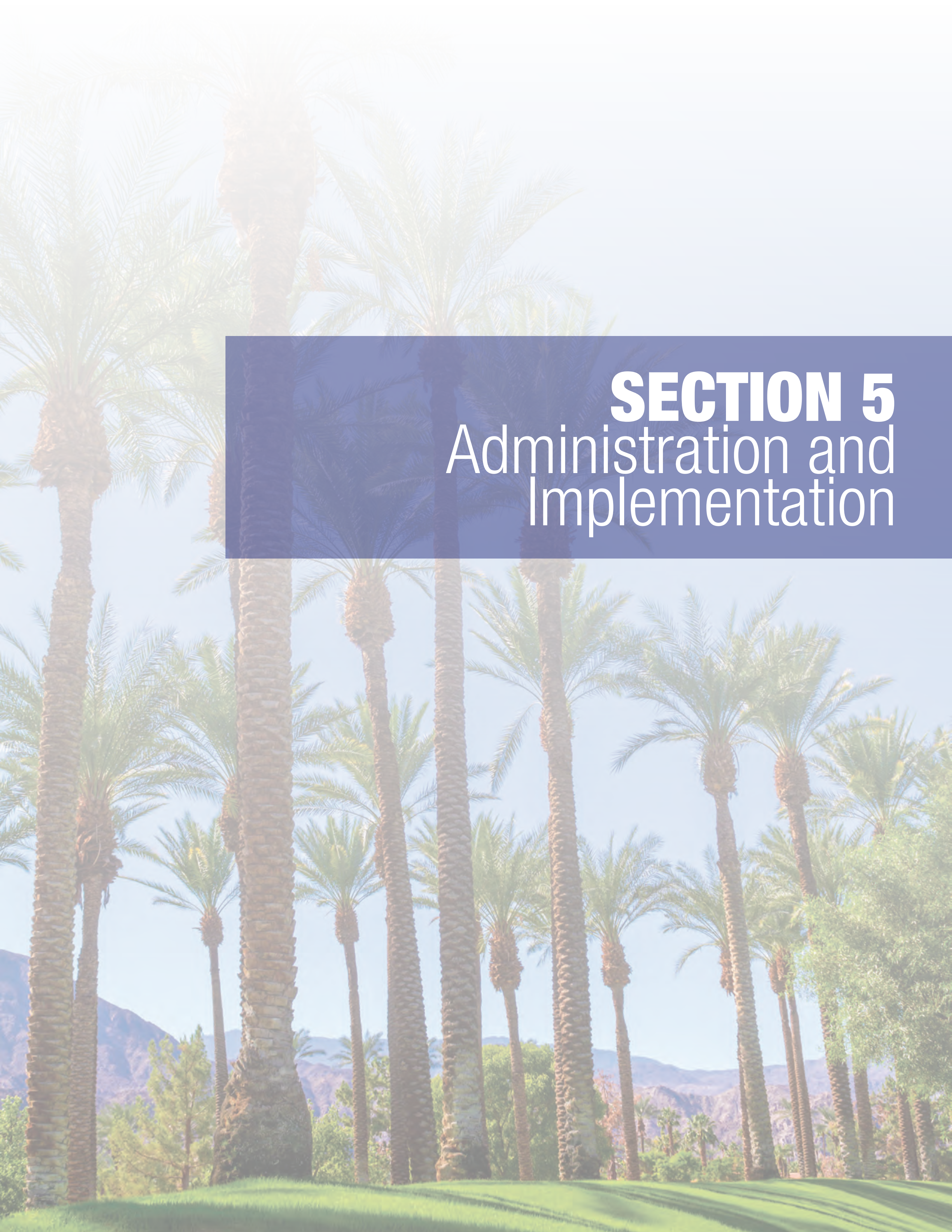
- Exterior lighting should be unobtrusive and not cause glare or spillover into neighboring properties, especially when within 100 feet of open spaces. Lighting fixtures should direct illumination downward to minimize light pollution impacts.

- Up-lighting, spot-lighting, and decorative color lighting may be appropriate for prominent buildings and features, such as hotels or entertainment venues, but illumination shall not adversely impact neighboring properties with sensitive uses, such as residential or open space areas.
- Lighting shall be provided throughout the site to create an inviting and non-threatening environment. Night lighting of public spaces shall be kept to the minimum necessary for safety and security purposes.
- The scale, materials, colors, and design detail of light posts and fixtures should reflect the desired character of the project and the architectural style of the surrounding buildings.
- Light posts shall be appropriately scaled to pedestrians near sidewalks and other areas of pedestrian circulation. Extremely tall light posts and fixtures shall be avoided. Bollard lighting is encouraged to illuminate walkways without providing spillover.
- Energy-efficient, low voltage lighting is strongly encouraged. Decorative lighting shall be low intensity.
- If security lighting is required, fixtures shall be hooded, recessed, and/or located in such a manner to only illuminate the intended area.
- Lighting shall be provided, at a minimum, in the following locations for safety and for crime prevention:
    - Parking Lots and Structures;
    - Plazas or outdoor seating areas;
    - All building entries;
    - Refuse disposal areas (may be provided as part of parking lot lighting); and
    - Walkways.
- Addresses shall be visible from streets and illuminated at night.

Lighting should be designed to be compatible and integral with the architecture.

Lighting should be designed to accommodate the scale of the user

Parking lots should have sufficient lighting to provide security and safety



SECTION 5
Administration and Implementation

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The purpose of this chapter is to provide an outline of the steps necessary to implement the KPC Coachella Specific Plan and applicable conditions, mitigation measures and regulations in coordination with the City of Coachella and other governing public agencies. This chapter is intended to address each of these elements for the benefit of the future developers and builders, the City of Coachella and other approving agencies, and interested citizens. The approval of this Specific Plan, certification of an Environmental Impact Report, and adoption of a Mitigation Monitoring and Reporting Program (MMRP) will assure that timely mitigation of project impacts take place at the appropriate milestones and in accordance with project implementation.

5.1 Administration

The California Government Code (Title 7, Division 1, Chapter 3, Article 8, Sections 65450 et seq.) grants authority to cities to adopt Specific Plans for purposes of implementing the goals and policies of the City's General Plan. As with general plans, the Planning Commission must hold a public hearing to consider and provide a recommendation on the Specific Plan to the City Council, which is the ultimate approval body.

5.1.1 Responsibility

The City of Coachella's Development Services Department, its Director or their designee shall be responsible for administering the provisions of the KPC Coachella Specific Plan in accordance with the provisions of this Specific Plan document, all governing and applicable state and federal laws, the City of Coachella's General Plan, including all amendments or updates thereto, and the City of Coachella Municipal Code.

For any casino property in the resort district that is governed by the Torres Martinez tribe of Indians, the Tribal council will be responsible for the administration of the land use regulations.

5.1.2 Applicability

All development within the KPC Coachella Specific Plan area shall comply with the requirements and standards set forth in this Specific Plan document and the accompanying EIR, conditions of approval and Mitigation and Monitoring Report. Where conflicts exist between the standards contained in this Specific Plan and those found in the City of Coachella Zoning Ordinance or Municipal Code, the regulations and standards in the Specific Plan shall take precedence. Any area of site development, administration, review procedures, environmental review, landscaping requirements, and regulations not expressly addressed by this Specific Plan document shall be subject to the provisions of the City of Coachella Zoning Code, Municipal Code or General Plan, using the context and objectives of the Specific Plan as a guide.

The name "KPC Coachella Specific Plan 19-01" refers to this Specific Plan document and its supporting information. The final marketing name of the project may differ and will be determined by the project's Master Developer.

5.1.3 Severability

If any section, subsection sentence, clause, or phrase of this Specific Plan, or future amendments or additions hereto, is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this plan.

5.1.4 Interpretation

The development standards and regulations contained in this Specific Plan shall supersede the standards contained in the Coachella Municipal and Zoning Codes, except where specifically provided in the Specific Plan. Whenever the provisions contained in the Specific Plan conflict with the Municipal or Zoning Codes, the provisions of the Specific Plan shall take precedence. Any ambiguity concerning the content or application of the KPC Coachella Specific Plan shall be resolved by the City's Development Services Department, its Director or their designee. Such interpretations shall take into account the stated goals and intent of the Specific Plan. If requested, the Planning Commission may review any administrative interpretation, subject to appeal to the City Council.

5.1.5 Substantial Conformance and Minor Modifications/Technical Adjustments

Final development plans for each planning area of the project may be adjusted or modified based on final design and engineering and the precise development plans of the planning area developer.

Documentation of the proposed project, as modified, to support an implementing map, plot plan, or use permit must be submitted for the review and approval of the Development Services Department, its Director or their designee. The Development Services Director or their designee shall have the authority to identify and approve, on behalf of the City, minor adjustments or modifications, as defined herein, which substantially conform to the approved Specific Plan.

Minor Modification

The Development Services Director or their designee may allow minor modifications or adjustments to the Specific Plan through an administrative review process, so long as those minor modification and adjustments are consistent with the intent of the Specific Plan.

Minor modifications may be warranted to accommodate changes resulting from final design and engineering that cause adjustments in roadway alignments, location of utilities or other infrastructure, development of innovative product design, distribution of permitted uses within the Specific Plan, development of Final Design Guidelines, density transfers or other similar modifications deemed to be minor. Minor modifications or technical adjustments may include, but are not limited to the following:

a. Modifications necessary to comply with final Conditions of Approval or mitigation measures;

b. Addition of information to the Specific Plan (including maps or text) for purposes of clarification that does not change the intent of any plan or regulation, as well as correction of any clerical or grammatical errors;

c. Adjustments to the alignment, location and sizing of utilities and facilities or a change in utility and/or public service provider may be approved by the City's Engineering or Public Works Department so long as the adjustments or changes are found to be in compliance with applicable plans and standards of the agency responsible for such utilities and facilities;

d. Change in roadway alignment, width, or improvements through the final engineering/improvement plan process so long as minimum rights-of-way meet the standards outlined in the Specific Plan;

e. An adjustment of any neighborhood or zone boundary not to exceed 20% of the acreage within that planning area boundary;

f. Variation in the number and type of dwelling units within each planning area or lifestyle village boundary may occur at the time of design depending on the residential product identified for development with the village;

g. Minor adjustments to any of the development standards or regulations such as modification of wall heights for noise attenuation purposes, modification of allowable encroachments into setbacks, etc. that are specifically allowed under the Development Regulations of this Specific Plan;

h. Minor changes to landscape materials, wall materials, entry design, and streetscape design which are consistent with the design criteria set forth in the Design Guidelines of the Specific Plan;

i. Minor changes to the architectural or landscape design guidelines, which guidelines are intended to be conceptual in nature and flexible in implementation;

j. Modification of any design element in this Specific Plan that improves circulation, reduces grading, improves drainage, improves infrastructure, or provides similar utility and reduces operations and maintenance costs;

k. Residential unit transfers between planning areas in accordance with Section 5.2.6 of this Specific Plan; and

l. Increases or decreases in lot sizes, so long as any change meets the minimum lot size requirements of the Specific Plan.

The minor modifications described and listed above are not comprehensive. Any modification that is deemed by the Development Services Director to be in substantial conformance with the purpose and intent of the Specific Plan shall be permitted.

The documentation of substantial conformance may include text and/or maps which describe the nature of all proposed modifications or adjustments to the Specific Plan. This application of substantial conformance with the adopted Specific Plan shall undergo any necessary technical review by City agencies as the Development Services Director or their designee deems necessary to provide for updated conditions of project approval.

5.1.6 Amendments to the Specific Plan

If a project applicant seeks a modification or adjustment to the Specific Plan which is deemed by the Development Services Department to be a substantial modification, the Development Services Director shall have the discretion to refer any such requests to the City's Planning Commission for review and consideration. Substantial amendments to the Specific Plan require a public hearing before the City's Planning Commission which will make a recommendation to the City Council for action. The Planning Commission and City Council may approve, deny, or conditionally approve amendments to the Specific Plan. Minor modifications and adjustments to the Specific Plan may be approved by the City's Development Services Director or their designee as stated below.

A minor modification or adjustment to the KPC Coachella Specific Plan listed in the section above would not require a Specific Plan Amendment. An amendment to the Specific Plan is required if the following occur:

a. Changes to the overall Specific Plan boundaries (changes to planning area boundaries within the Specific Plan boundaries are deemed minor as noted above and would not require an amendment);

b. A change in any other provision, purpose, or standard of the Specific Plan, which would significantly alter the basic intent, identity, or concepts of the Specific Plan; or

c. An increase in the overall development density thresholds within the Specific Plan.

An applicant may request amendments to the KPC Coachella Specific Plan at any time pursuant to Section 65453(a) of the Government Code.

An amendment to the Specific Plan requires public hearings, a recommendation by the City's Planning Commission and approval by the City Council. Specific Plan amendments are governed by California Government Code, Section 65456, and require an application and fee to be submitted to the City's Development Services Department. The application shall state in detail the reasons for the proposed amendment.

The KPC Coachella Specific Plan shall not be approved or amended unless the following findings are made by the Planning Commission and City Council:

- The Specific Plan or amendment systematically implements and is consistent with the General Plan;
- The Specific Plan allows for a more coordinated and cohesive development compared to what is allowed under traditional zoning classifications; and
- The Specific Plan or amendment provides for the construction, improvement, or extension of transportation facilities, public utilities and public services required for the long term needs of the project and/or other area residents, and complement the orderly development of the City of Coachella.

If the proposed amendment requires additional environmental analysis pursuant to the California Environmental Quality Act (CEQA), the applicant(s) for the proposed amendment are responsible for all fees and costs associated with the preparation of any necessary CEQA documentation.

5.1.7 Appeals

An appeal of any determination, decision, or requirement of City staff or the Planning Commission shall be made in conformance to the appeal procedures established by the Coachella Municipal Code.

5.2 Implementation

5.2.1 Specific Plan Adoption

The KPC Coachella Specific Plan will be prepared, submitted, and approved in a manner consistent with California Government Section 65451, as well as all applicable and pertinent sections of the City's Municipal Code. The KPC Coachella Specific Plan Development Regulations shall be adopted by ordinance and shall serve as the zoning for the KPC Coachella project area; the balance of the Specific Plan document will be adopted by Resolution. The approved Specific Plan project site will be designated on the City's General Plan Land Use Diagram and Zoning Map as the KPC Coachella Specific Plan. The land use and development standards identified in this Specific Plan document supersede all zoning regulations to the extent that they would be in conflict with the sections of this Specific Plan.

5.2.2 Lead Agency Certification of Environmental Impact Report

A Program Environmental Impact Report (EIR) has been prepared for the KPC Coachella Specific Plan to analyze significant environmental impacts of the project, discuss feasible alternatives, and recommend feasible mitigation measures in compliance with the provisions of the California Environmental Quality Act (CEQA). The EIR analyzes the entire Specific Plan area and addresses potential impacts associated with development of the Specific Plan area. The EIR includes a recommended mitigation and monitoring program and analyzes implementing actions for development. Preparation of the EIR was done in conformance with the requirements for environmental documentation for many of the subsequent discretionary and ministerial development applications for the Specific Plan.

5.2.3 Subsequent Approvals and Plans

Following the City Council actions on the initial entitlements, subsequent entitlement steps must occur to implement the Specific Plan, including without limitation, Tentative and Final Subdivision Maps, Conditional Use Permits, Design Review, Building Permits, Grading Permits, and approval of Subdivision Improvement Agreements. The map review and approval process and the design review are described in the following sections.

The City of Coachella shall not issue any entitlement, permit, or approval in connection with a development project within the Specific Plan area unless said entitlement, permit, or approval is in substantial conformance with all applicable aspects of this Specific Plan.

Several levels of subsequent or concurrent approvals are required to implement the project.

- A Tentative Tract Map for finance/conveyance purposes will be considered concurrently with the Specific Plan to create large parcels consistent with the various Planning Areas of the project's Land Use Plan. As the City of Coachella and Subdivision Map Act have no standards for conveyance maps, the KPC Coachella project will follow provisions provided in Appendix B of this Specific Plan.
- Tentative Tract Maps will be prepared and processed through the City for individual planning areas in accordance with the Subdivision Map Act and City Municipal Code. Tentative Maps shall be consistent with the vision and sustainable community design standards of this Specific Plan. These maps will create buildable parcels and road rights-of-way and/or private streets. Engineered improvement plans will be prepared to implement required facilities.
- A Master Signage Program will be prepared to provide for design continuity within the new community.

5.2.4 Architectural/Site Plan Review

Future developers within the Specific Plan are required to submit complete development and architectural plans for all projects to a Master Developer Design Review Committee ("Committee") or successor entity prior to the submittal of plans to the City of Coachella for Architectural/Site Plan review. Review by the Committee is limited to making a determination of initial consistency of the proposed project with the Specific Plan. Upon review and approval by the Committee, the Master Developer shall provide builders or their authorized agents with a letter of approval that must be submitted with any development application for the reviewed planning area to the City (see process below).

5.2.5 Architectural/Site Plan Review Process

Coachella Municipal Code (Chapter 17.72) requires Site Plan/Architectural Review of development projects. All implementing projects within the KPC Coachella Specific Plan will be required to obtain Architectural Review approval prior to issuance of a building permit. The architectural review process requires submittal of a site plan, landscape plan, Wall/Fence Plan, and conceptual architectural elevations. Project parks are also subject to design review.

Basis for Approval. The basis for approval of Architectural/Site Plan Review of projects within the Specific Plan shall be as follows:

- Adherence to the land use and development standards as outlined in the Development Regulations section of this Specific Plan.
- Conformance with the landscape, site planning, and architectural guidelines of this Specific Plan.
- Conformance with the City's General Plan.

Approving Authority. Architectural and/or Site Plan Review requests for projects within the Specific Plan area shall be reviewed for substantial conformance with the Specific Plan and approved by the Director. All architectural review approvals are subject to appeal to the City Council.

Development Status Tracking. A Development Status Table shall be submitted to the City's Development Services Director as part of the site plan review process. This table shall specify the development status for the relevant planning area(s) in relation to the Specific Plan land use totals, and shall include the following information:

a. Specific Plan parcel area and the allocation of dwelling units for each planning area submitted as part of the site plan.

b. Calculation of the remaining development allowed in the Specific Plan by density (Very Low Density, Low Density, etc.).

5.2.6 Density Transfers

The project's Land Use Plan and Table 2-1, *Land Use Summary,* set forth the land use designations, acreage, density range, commercial intensity, and total target units for each land use category. Tables 2-2 through 2-4, *Land Use by Village*, detail the land use statistics by village and planning area. As used throughout this document, the term "Density Transfer" means the redistribution of residential units from one planning area to another within a village. For example, if a number of residential units developed within a planning area is planned to be below the designated target, then all or a portion of the remainder of those units may be transferred to another planning area within the same village.

Procedures

A Specific Plan density transfer may be initiated at any time by the project applicant, master developer or planning area developer. A request for a density transfer shall be accompanied by a tentative subdivision map application for the planning area or parcel in question and a Development Transfer Status Table.

A "Development Transfer Status Table" shall be submitted to the City's Development Services Director for review by the Planning Commission prior to transfer of any dwelling units within the boundaries of the KPC Coachella Specific Plan. This review will be part of the Planning Commission approvals for the related tentative subdivision map. This table shall specify the entitlement and development status for each planning area including the following information:

a. Specific Plan parcel areas and the allocation of dwelling units for each planning area;

b. Number of dwelling units entitled under an implementing subdivision by planning area; and

c. Number of dwelling units transferred to or from each Planning Area that is already entitled or proposed to be entitled by the implementing subdivision.

A density transfer request will be reviewed by the Planning Commission as part of the related tentative subdivision map application pursuant to a Substantial Conformance application, based upon a determination that the transfer meets the following conditions:

a. The overall total number of approved residential dwelling units shall not exceed the allowable Specific Plan dwelling unit maximum as outlined in Table 2-1, *Land Use Summary*.

b. The transfer of units does not cause the maximum density allowed within a receiving planning area to be exceeded.

c. There would be no significant adverse effects on projected demand infrastructure in the receiving area from the addition of units.

d. Grading would remain in substantial conformance with the approved Specific Plan.

e. No new significant environmental impacts that were not previously assessed in the KPC Coachella EIR would result from the transfer.

Adjustments to Planning Area boundaries would also qualify for processing under a Substantial Conformance application provided the total acreage of the affected Planning Area does not increase or decrease by more than 20 percent of the total for that area as stated in the approved Specific Plan.

5.3 Phasing

5.3.1 Project Phasing

Construction of the proposed project, including recordation of final subdivision map(s), and design review may be progressively done in stages, provided vehicular access, public facilities, and infrastructure are constructed to adequately service the development, or as needed for public health and safety. Five large scale phases are assumed (see figure below); subsequent sub-phases will likely occur. The project will be phased to:

- Provide an orderly build-out of the community based upon market demand; and
- Provide adequate infrastructure to service the project.

The project will be constructed in phases based on market demand and available infrastructure improvements needed to support development. Phases may occur concurrently so long as the associated infrastructure is provided.

The anticipated development phases, as generally shown in Figure 5-1, *Phasing Plan*, include the following estimated dwelling unit counts and commercial development numbers shown in Table 5-1, *Phasing*.

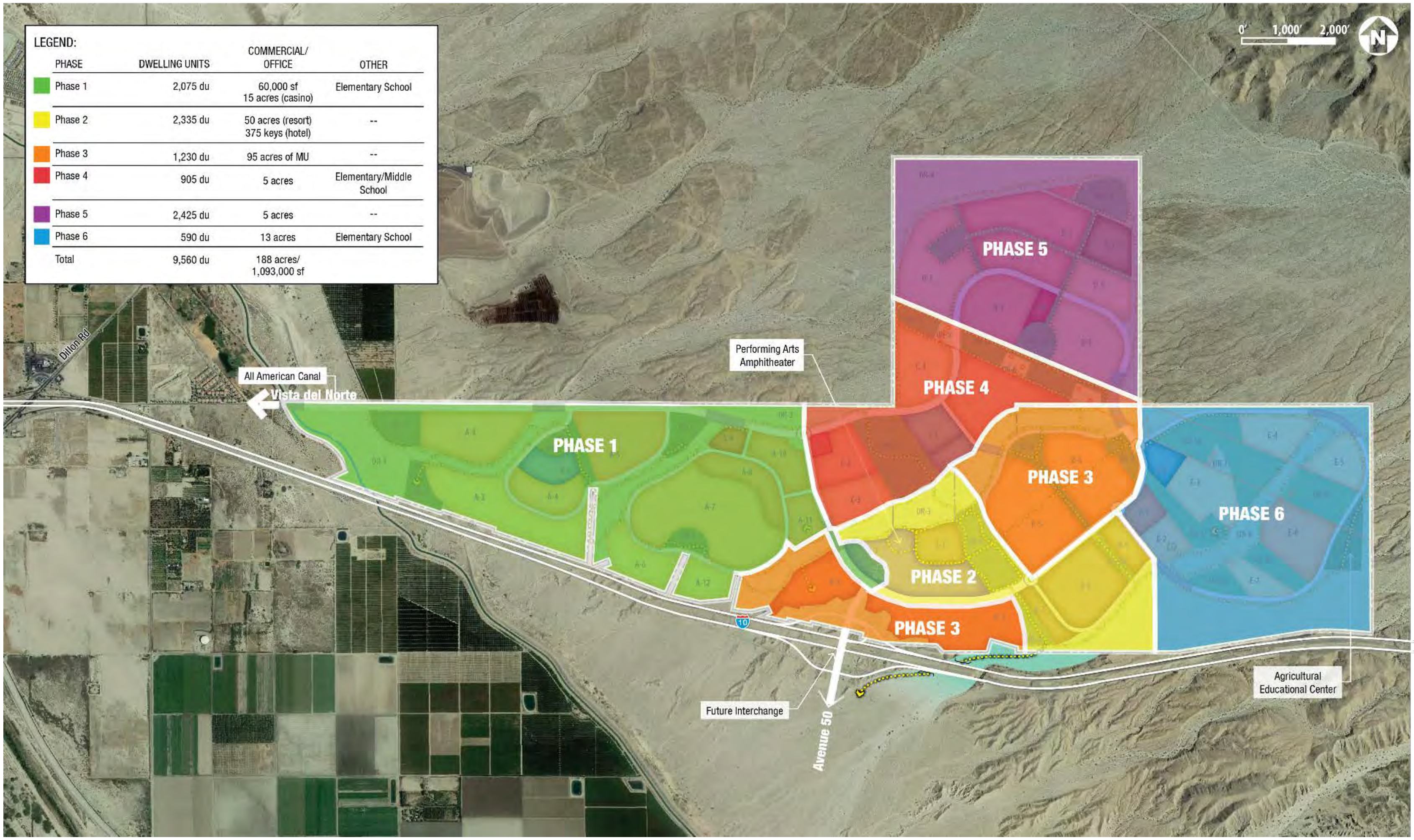

FIGURE 5-1: PROJECT PHASING PLAN

TABLE 5-1: PHASING

Phase		Dwelling Units	Commercial/Office	Other
1	Village A Village B	2,075 du --	60,000 sf 15 acres (casino)	Elementary school
2	Village B	2335 du	50 acres (resort) 375 keys (hotel)	
3	Village B	1230 du	95 acres MU	
4	Village C	905 du	5 acres	Middle School Elementary School
5	Village D	2,425 du	5 acres	
6	Village E	590 du	13 acres	Elementary School
Total		9,560 du	188 acres/1,093,000 sf	

The ultimate pace and phasing of the development is dependent on a number of internal and external factors. As other projects and improvements in the area progress various adjustments and revisions to the project phasing may occur. Revisions to the phasing plan shall be reviewed by the City's Development Services Department and approved administratively so long as the proposed revisions meet the intent of the Specific Plan and adequately provide for the needs of the community. Any revision to the phasing deemed consistent with the Specific Plan shall not require a specific plan amendment.

5.3.2 Park Phasing

Parks will generally be constructed in the associated development phase.

5.4 Project Financing and Maintenance

Maintenance within the KPC Coachella community will be accomplished through a combination of private and public mechanisms. In general, community facilities dedicated to public agencies will be maintained by the relevant agency, while private facilities will be maintained by a combination of funding sources, including the potential formation of lighting and landscape districts or other similarly authorized maintenance districts.

Table 5-2, *Financing, Ownership, and Maintenance,* outlines the entities expected to maintain and finance the individual improvements.

5.4.1 Master Homeowners Association

A Master Homeowners Association (MHOA) will be formed for the maintenance of community-wide common areas identified in the Specific Plan. Areas of responsibility shall include, but are not limited to, community-wide facilities including community signage, private parks, the Village Paseo and private recreation areas shared by the entire community.

The exception to this is the casino development, which is under Tribal control and maintenance once the project goes into Trust.

5.4.2 Residential Neighborhood Homeowners Association

In certain areas of the project, a residential second tier or Sub-Homeowners Association (HOA) may be formed for the maintenance of private facilities held in common ownership, such as project landscaping and maintenance, lanes, private parks, entries, community facilities and lighting within individual subdivisions.

CC&Rs will be developed as part of the Project's Homeowners Association. The CC&Rs for the project shall incorporate the following elements:

1. Private garages within the Specific Plan area shall be utilized for vehicle storage and be kept open for such use.
2. Long term storage of operable or inoperable vehicles in the front or rear yard of homes is not permitted.
3. Maintenance guidelines for trails within the project including the requirement that all trails be maintained in an open an unobstructed condition.

5.4.3 Business Association

A Business Association and/or multiple associations may be formed to address private roads, shared driveways, landscaping, signage, and maintenance within the Commercial/Mixed Use areas of the Plan, inclusive of commercial or office uses.

The financing and maintenance of improvements of the KPC Coachella Specific Plan includes both public and private sources. Table 5-2, *Financing, Ownership, and Maintenance*, outlines the anticipated responsibilities for financing and maintenance of improvements within the KPC Coachella Specific Plan.

TABLE 5-2: FINANCING, OWNERSHIP, AND MAINTENANCE

Improvement	Financing	Ownership	Long-term Maintenance
Water System	Developer/CFD	Public/CWA	Coachella Water Authority (CWA)
Sewer System	Developer/CFD	Public/Coachella Sanitary District	Coachella Sanitary District
Drainage System	Developer/CFD	Private	Homeowners Association (HOA)/LLMD with CVWD oversight
Master Drainage System (channels and 18" + RCP)	Developer/CFD	City of Coachella	City of Coachella
Desert Wash Paseos	Developer	City of Coachella	HOA/Maintenance District
Interchange	State of California	Caltrans	Caltrans
Public Streets	Developer/CFD	Public/City of Coachella	City of Coachella
Village Paseo	Developer/Builder	Private	Master HOA
Private Internal Streets and Alleys	Developer	Private	HOA
Landscaping within Public Right-of-Way	Developer	Public/City of Coachella	Landscape Lighting and Maintenance District (LLMD), or other maintenance district, with City of Coachella oversight
Private Common Slopes	Developer	Private/HOA	HOA
Open Space	Developer	Private/HOA	Master HOA
Public Parks	Developer	City of Coachella	City of Coachella or maintenance district
Private Parks	Developer	Master HOA	HOA

5.5 Fiscal Impacts

A Fiscal Impact Analysis was prepared to analyze the fiscal impact from development of the Specific Plan on the City of Coachella's General Fund.

The purpose of the fiscal analysis is to estimate the net fiscal impacts of the Project's proposed development and construction on the City General Fund. The fiscal impacts identified in the Report include recurring municipal revenues and costs to the City General Fund that result from the land use scenario presented by the Specific Plan. City General Fund revenues are generated from a variety of revenue sources, including property taxes, sales taxes, fees, and fines. Costs to the City General Fund are associated with a variety of services, such as public safety, parks, recreation and arts, and general government services.

5.6 CEQA Compliance and Mitigation Monitoring

The California Environmental Quality Act (CEQA) classifies a specific plan as a "project" which is subject to environmental review. An Environmental Impact Report (EIR) is required prior to adoption of this Specific Plan to analyze potentially significant environmental impacts of the project, discuss feasible alternatives, and recommend feasible mitigation measures in compliance with the provision of CEQA. This EIR will analyze the entire Specific Plan and address potential impacts associated with the development of the Specific Plan area. The EIR includes recommended mitigation measures and analyzes implementing actions for the development. The EIR will fulfill the requirements for environmental documentation for most subsequent discretionary and ministerial applications for development within the Specific Plan area.

An approved Mitigation Monitoring Program shall insure that the Specific Plan complies with all applicable environmental mitigation and permit requirements. The final Mitigation Monitoring and Reporting Program shall be adopted with EIR certification.

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APPENDICES

Appendix A

Grading Standards

Grading Standards for KPC Coachella

Grading for KPC Coachella will utilize the standards contained in the County of Riverside Grading Ordinance, (Ordinance 457) as it may be amended. Standards shall be those in effect at the time of grading permit.

DEPARTMENT OF BUILDING AND SAFETY
COUNTY OF RIVERSIDE
GRADING NOTES (2010 CBC)

GENERAL

1. All grading shall conform to the 2010 California Building Code Chapters 17, 18 & Appendix Chapter- J as amended by Ord. 457.
2. All property corners shall be clearly delineated in the field prior to commencement of any construction/grading.
3. All work under this grading permit shall be limited to work within the property lines. All work within the road Right-of-Way will require separate plans and a separate review/approval (permit) from the Transportation Department.
4. Grading shall be done under the supervision of a soils engineer in conformance with recommendations of the preliminary soils investigation by ________________ dated ________________ .
5. Compacted fill to support any structures shall comply with section 1803.5. Projects without preliminary soils report shall have detailed specifications satisfying the requirements in section 1803.5 prepared by the EOR.
6. The contractor shall notify the Building and Safety Department at least 24 hours in advance to request finish lot grade and drainage inspection. This inspection must be approved prior to building permit final inspection for each lot.
7. The contractor shall notify Underground Service Alert, two days before digging at 1-800-422-4133.

CUT / FILL

8. Maximum cut and fill slope = 2:1.
9. No fill shall be placed on existing ground until the ground has been cleared of weeds, debris, topsoil and other deleterious material. Fills should be placed in thin lifts (8-inch max or as recommended in soils report), compacted and tested as grading process until final grades are attained. All fills on slopes steeper than 5 to 1 (H/V) and a height greater than 5 feet shall be keyed and benched into firm natural soil for full support. The bench under the toe must be 10 feet wide min.
10. The slope stability for cut and fill slopes over 30' in vertical height, or slopes steeper than 2:1 must be verified with a factor of safety of at least 1.5.
11. No rock or similar irreducible material with a maximum dimension greater than 12 inches shall be buried or placed in fills closer than 10 feet to the finished grade.

DRAINAGE and EROSION/ DUST CONTROL

12. Drainage across the property line shall not exceed that which existed prior to grading. Excess or concentrated drainage shall be contained on site or directed to an approved drainage facility.
13. Provide a slope interceptor drain along the top of cut slopes where the drainage path is greater than 40 feet towards the cut slope.
14. Provide 5 ' wide by 1' high berm along the top of all fill slopes steeper than 3:1.
15. The ground immediately adjacent to the building foundation shall be sloped away with 5% min for a min distance of 10 horizontal feet. Swales within 10 feet from building shall have 2% minimum slope.
16. No obstruction of natural water courses shall be permitted.
17. During rough grading operations and prior to construction of permanent drainage structures, temporary drainage control (Best Management Practices, BMPs) shall be provided to prevent ponding water and damage to adjacent properties.
18. Dust shall be controlled by watering or other approved methods.
19. All existing drainage courses on the project site must continue to function. Protective measures and temporary drainage provisions must be used to protect adjoining properties during grading operations.
20. For slopes 3 to 1 (H/V) or steeper:
    All slopes equal to or greater than 3 ' in vertical height, are required to be planted with grass or rosea ice plant (or equal) ground cover at a maximum spacing of 12" on center. Slopes exceeding 15 ' in vertical height shall be planted with approved shrubs not to exceed 10' on center, or trees spaced not to exceed 20 ' on center or shrubs not to exceed 10 ', or a combination of shrubs and trees not to exceed 15 ' in addition to the grass or ground cover. Slopes that require planting shall be provided with an in-ground irrigation system equipped with an appropriate backflow device per U.P.C., Chapter 10. The slope planting and irrigation system shall be installed prior to precise grading final.

COMPLETION OF WORK

21. A registered Civil Engineer shall prepare final compaction report/ grading report and it shall be submitted for review and approval. The report shall also provide building foundation design parameters including allowable soil pressures, expansion index and remedial measures if EI > 20, water soluble sulfate content, corrosivity and remedial measures if necessary.

22. Except for non-tract single residential lot grading, the compaction report shall include the special inspection verifications listed in Table 1704.7 of 2010 CBC.
23. A registered Civil Engineer shall submit to the Building and Safety Department written certification of completion of grading in accordance with the approved grading plan prior to requesting inspection and issuance of the building permit. Certification shall include line grade, surface drainage, elevation, and location of permitted grading on the lot.

NPDES: When one acre or more is being disturbed:

1. Construction site Best Management Practices (BMPs) for the management of storm water and non-storm water discharges shall be documented on the grading plan which thereby becomes the site Storm Water Pollution Prevention Plan (SWPPP). Arrangements shall be made by the developer to retain the SWPPP on the jobsite throughout the time of construction. The implementation and maintenance of site BMPs is required to minimize jobsite erosion and sedimentation. Certain BMPs may be required to remain in place throughout the year to minimize erosion and sedimentation. Arrangements shall be made by the developer to maintain those BMPs throughout the time of construction.
2. Erosion control BMPs shall be implemented and maintained to minimize the entrainment of soil in runoff from disturbed soil areas on construction sites.
3. Sediment control BMPs shall be implemented and maintained to minimize the transport of soil from the construction site.
4. Grading shall be phased to limit the amount of disturbed areas exposed to the extent feasible.
5. Areas that are cleared and graded shall be limited to only the portion of the site that is necessary for construction. The construction site shall be managed to minimize the exposure time of disturbed soil areas through phasing and scheduling of grading and the use of temporary and permanent soil stabilization.
6. Once disturbed, slopes (temporary or permanent) shall be stabilized if they will not be worked within 21 days. During the storm season, all slopes shall be stabilized prior to a predicted storm event. Construction sites shall be re-vegetated as early as feasible after soil disturbance.
7. Stockpiles of soil shall be properly contained to eliminate or reduce sediment transport from the site to streets, drainage facilities or adjacent properties via runoff, vehicle tracking, or wind.
8. Construction sites shall be maintained in such a condition that a storm does not carry wastes or pollutants off the site. Discharges other than storm water (non-storm water discharges) are prohibited, except as authorized by an individual NPDES permit, the statewide General Permit-Construction Activity. Potential pollutants include but are not limited to: solid or liquid chemical spills; wastes from paints, stains, sealants, solvents, detergents, glues, lime, pesticides, herbicides, fertilizers, wood preservatives, and asbestos fibers, paint flakes or stucco fragments; fuels, oils lubricants, and hydraulic, radiator or battery fluids; concrete and related cutting or curing residues; floatable wastes; wastes from engine/equipment steam cleaning or chemical degreasing; wastes from street cleaning; and super-chlorinated potable water from line flushing and testing. During construction, disposal of such materials should occur in a specified and controlled temporary area on-site physically separated from potential storm water runoff, with ultimate disposal in accordance with local, state and federal requirements.
9. Runoff from equipment and vehicle washing shall be contained at construction site and must not be discharged to receiving waters or the local storm drain system.
10. Appropriate BMPs for construction-related materials, wastes, spills or residues shall be implemented to eliminate or reduce transport from the site to streets, drainage facilities, or adjoining properties by wind or runoff.
11. All construction contactors and subcontractor personnel are to be made aware of the required BMPs and good housekeeping measures for the project site and any associated construction staging areas.
12. Discharging contaminated groundwater produced by dewatering groundwater that has infiltrated into the construction site is prohibited. Discharging of contaminated soils via surface erosion is also prohibited. Discharging non-contaminated groundwater produced by dewatering activities may require a National Pollutant Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board.
13. BMPs shall be maintained at all times. In addition, BMPs shall be inspected prior to predicted storm events and following storm events.
14. At the end of each day of construction activity, all construction debris and waste materials shall be collected and properly disposed of in trash or recycle bins.

Appendix B

Land Use Summary

Coachella (Village A)						
Planning Area	Land Use	Parcel Area (AC)	Density (DU/AC)	Dwelling Units (DU)	FAR	Square Footage (SF)
	Residential					
A-1	Low Density Residential	47.69	5	238		
A-2	Very Low Density Residential	63.09	1	63		
A-4	Low Density Residential	24.45	5	122		
A-5	Medium Density Residential	51.57	10	516		
A-6	Very Low Density Residential	28.63	1	29		
A-7	Low Density Residential	99.77	5	499		
A-8	Medium Density Residential	26.82	9	241		
A-10	Medium Density Residential	23.42	8	187		
A-11	Medium Density Residential	16.01	8	128		
A-12	Very Low Density Residential	18.01	1	18		
	Total Acreage =	***399.46***	***Total Units =***	***2,042***		
	Commercial					
A-9	Mixed-Use	8.20	10	27	0.25	59,830
	Total Acreage =	***8.20***	***Total SF =***			***59,830***
	Open Space / Parks / Promenades					
OS-1	Parks, Greenways, and Amenity Centers	16.80				
OS-2	Parks, Greenways, and Amenity Centers	11.24				
OS-3	Parks, Greenways, and Amenity Centers	13.50				
OS-4	Parks, Greenways, and Amenity Centers	12.92				
OS-5	Parks, Greenways, and Amenity Centers	8.83				
	Total Acreage =	***63.29***				
	Public Use					
A-3	Elementary School	15.62				
	Total Acreage =	***15.62***				
	Village A Total Acreage =	***486.57***				

Coachella (Village B)						
Planning Area	Land Use	Parcel Area (AC)	Density (DU/AC)	Dwelling Units (DU)	FAR	Square Footage (SF)
	Residential					
B-3	High Density Residential	17.46	25	437		
B-5	Medium Density Residential	70.00	10	700		
B-6	Medium Density Residential	52.85	10	529		
B-7	High Density Residential	10.85	25	271		
B-8	High Density Residential	50.48	20	1,010		
B-9	High Density Residential	13.71	22	302		
	Total Acreage =	***215.35***	***Total Units =***	***3,247***		
	Commercial					
B-1	Mixed-Use	32.23	10	106	0.25	235,160
B-2	Casino and Hotel Entertainment Center	61.58				175,000
B-4	Mixed-Use	62.28	10	206	0.25	454,414
	Total Acreage =	***156.09***	***Total SF =***			***864,573***
	Open Space / Parks / Promenades					
OS-6	Parks, Greenways, and Amenity Centers	33.63				
OS-7	Parks, Greenways, and Amenity Centers	8.86				

OS-8	Parks, Greenways, and Amenity Centers	17.96
OS-9	Parks, Greenways, and Amenity Centers	10.11
OS-10	Parks, Greenways, and Amenity Centers	5.89
	Total Acreage =	***76.45***
	Village B Total Acreage =	***447.89***

Coachella (Village C)

Planning Area	Land Use	Parcel Area (AC)	Density (DU/AC)	Dwelling Units (DU)	FAR	Square Footage (SF)
	Residential					
C-2	Medium Density Residential	27.35	8	219		
C-3	Low Density Residential	25.97	5	130		
C-4	Low Density Residential	39.84	3	120		
C-7	Medium Density Residential	51.95	8	416		
	Total Acreage =	***145.11***	***Total Units =***	***884***		
	Commercial					
C-1	Mixed-Use	5.40	10	18	0.25	39,400
	Total Acreage =	***5.40***	***Total SF =***			***39,400***
	Open Space / Parks / Promenades					
OS-11	Parks, Greenways, and Amenity Centers	44.97				
OS-12	Parks, Greenways, and Amenity Centers	10.55				
OS-13	Parks, Greenways, and Amenity Centers	33.58				
	Total Acreage =	***89.10***				
	Public Use					
C-5	Middle School	18.95				
C-6	Elementary School	9.34				
	Total Acreage =	***28.29***				
	Village C Total Acreage =	***267.90***				

Coachella (Village D)

Planning Area	Land Use	Parcel Area (AC)	Density (DU/AC)	Dwelling Units (DU)	FAR	Square Footage (SF)
	Residential					
D-1	Low Density Residential	56.55	5	283		
D-2	Medium Density Residential	51.08	8	409		
D-3	Medium Density Residential	35.75	8	286		
D-4	Medium Density Residential	57.62	10	576		
D-5	High Density Residential	21.86	25	547		
D-6	Low Density Residential	24.82	5	124		
D-7	Low Density Residential	35.03	5	175		
	Total Acreage =	***282.71***	***Total Units =***	***2,399***		***0***
	Commercial					
D-8	Mixed-Use	5.00	10	17	0.25	36,482
	Total Acreage =	***5.00***	***Total SF =***			***36,482***
	Open Space / Parks / Promenades					
OS-14	Parks, Greenways, and Amenity Centers	42.50				
OS-15	Parks, Greenways, and Amenity Centers	14.68				
	Total Acreage =	***57.18***				
	Village D Total Acreage =	***339.89***				

Coachella (Village E)							
Planning Area	Land Use	Parcel Area (AC)	Density (DU/AC)	Dwelling Units (DU)	FAR	Square Footage (SF)
Residential						
E-2	Low Density Residential	14.95	5	75		
E-3	Very Low Density Residential	30.86	1	31		
E-4	Very Low Density Residential	25.89	1	26		
E-5	Very Low Density Residential	22.09	1	22		
E-6	Medium Density Residential	39.29	10	393		
E-7	Very Low Density Residential	14.08	1	14		
	Total Acreage =	***147.16***	***Total Units =***	***561***		
Commercial						
E-1	Mixed-Use	12.88	10	43	0.25	93,976
	Total Acreage =	***12.88***	***Total SF =***			***93,976***
Open Space / Parks / Promenades						
OS-16	New Agricultural Production	51.83				
OS-17	New Agricultural Production	20.76				
OS-18	New Agricultural Production	10.68				
OS-19	New Agricultural Production	12.30				
OS-20	New Agricultural Production	25.01				
OS-21	Parks, Greenways, and Amenity Centers	15.31				
	Total Acreage =	***135.89***				
Public Use						
E-8	Elementary School	14.95				
	Total Acreage =	***14.95***				
	Village E Total Acreage =	***310.88***				

Coachella (Drainage and Other Open Space)

Planning Area	Parcel Area (AC)
DR-1	188.40
DR-2	1.87
DR-3	106.70
DR-4	373.80
DR-5	4.20
DR-6	5.06
DR-7	4.13
DR-8	57.59
Total Acreage	**741.75**

Appendix B

Water Quality Objectives for General Surface Waters[1]

Aesthetic Qualities

All waters shall be free from substances attributable to wastewater of domestic or industrial origin or other discharges which adversely affect beneficial uses not limited to:

- Settling to form objectionable deposits;
- Floating as debris, scum, grease, oil, wax, or other matter that may cause nuisances; and
- Producing objectionable color, odor, taste, or turbidity.

Tainting Substances

Water shall be free of unnatural materials which individually or in combination produce undesirable flavors in the edible portions of aquatic organisms.

Toxicity

All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in human, plant, animal, or indigenous aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, 96-hour bioassay or bioassays of appropriate duration or other appropriate methods as specified by the Regional Board. Effluent limits based upon bioassays of effluent will be prescribed where appropriate, additional numerical receiving water objectives for specific toxicants will be established as sufficient data become available, and source control of toxic substances will be encouraged.

The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or other control water which is consistent with the requirements for "experimental water" as described in Standards Methods for the Examination of Water and Wastewater, 18th Edition. As a minimum, compliance with this objective as stated in the previous sentence shall be evaluated with a 96-hour bioassay.

As described in Chapter 6 (of the Basin Plan), the Regional Board will conduct toxic monitoring of the appropriate surface waters to gather baseline data as time and resources allow.

Temperature

The natural receiving water temperature of surface waters shall not be altered by discharges of waste unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.

[1]*Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*, California Regional Water Quality Control Board Los Angeles Region, June 13, 1994.

pH

Since the regional waters are somewhat alkaline, pH shall range from 6.0-9.0. Discharges shall not cause any changes in pH detrimental to beneficial water uses.

Dissolved Oxygen

The dissolved oxygen concentration shall not be reduced below the following minimum levels at any time:

Waters designated:

WARM ....5.0 mg/l

COLD.. 8.0 mg/l

WARM and COLD........................8.0 mg/l

Suspended Solids and Settleable Solids

Discharges of wastes or wastewater shall not contain suspended or settleable solids in concentrations which increase the turbidity of receiving waters, unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in turbidity does not adversely affect beneficial uses.

Total Dissolved Solids

Discharges of wastes or wastewater shall not increase the total dissolved solids content of receiving waters, unless it can be demonstrated to the satisfaction of the Regional Board that such an increase in total dissolved solids does not adversely affect beneficial uses of receiving waters.

Additionally, any discharge, excepting discharges from agricultural sources, shall not cause concentration of total dissolved solids (TDS) in surface waters to exceed the following limits:

	TDS (mg/L)	
	Annual Ave.	Maximum
New River	4000	4500
Alamo River	4000	4500
Imperial Valley Drains	4000	4500
Coachella Valley Drains	2000	2500
Palo Verde Valley Drains	2000	2500

Bacteria

In waters designated for water contact recreation (REC I) or noncontact water recreation (REC II), the following bacterial objectives apply. Although the objectives are expressed as fecal coliforms, E. coli, and enterococci bacteria, they address pathogenic microorganisms in general[1] (e.g., bacteria, viruses, and fungi).

Based on a statistically sufficient number of samples (generally not less than five samples equally spaced over a 30-day period), the geometric mean of the indicated bacterial densities should not exceed one or the other of the following:

	REC I	REC II
E. coli	126 per 100 mL	630 per 100 mL
enterococci	33 per 100 mL	165 per 100 mL

nor shall any sample exceed the following maximum allowables:

	REC I	REC II
E. coli	400 per 100 mL	2,000 per 100 mL
enterococci	100 per 100 mL	500 per 100 mL

except that for the Colorado River, the following maximum allowables shall apply:

	REC I	REC II
E. coli	235 per 100 mL	1,175 per 100 mL
enterococci	61 per 100 mL	305 per 100 mL

In addition to the objectives above, in waters designated for water contact recreation (REC I), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200 MPN per 100 mL, nor shall more than ten percent of total samples during any 30-day period exceed 400 MPN per 100 mL.

Biostimulatory Substances

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. Nitrate and phosphate limitations will be placed on industrial discharges to New and Alamo Rivers and irrigation basins on a case-by-case basis, taking into consideration the beneficial uses of these streams.

Sediment

The suspended sediment load and suspended sediment discharge rate to surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Turbidity

[1] Fecal coliforms and E. coli bacteria are being used as the indicator microorganisms in the Region until better and similarly practical tests become readily available in the region to more specifically target pathogens.

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses.

Radioactivity

Radionuclides shall not be present in waters in concentrations which are deleterious to human, plant, animal or aquatic life or that result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal or aquatic life. Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the limits specified in the California Code of Regulations, Title 22, Chapter 15, Article 5, Section 64443, as listed below:

Constituent	Maximum Contaminant Level, pci/L
Combined Radium-226 and Radium-228	5
Gross Alpha particle activity (including Radium-226 but excluding Radon and Uranium)	15
Tritium	20,000
Strontium-90	8
Gross Beta particle activity	50
Uranium	20

Chemical Constituents

No individual chemical or combination of chemicals shall be present in concentrations that adversely affect beneficial uses. There shall be no increase in hazardous chemical concentrations found in bottom sediments or aquatic life. Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the limits specified below:

Maximum Contaminant Levels (MCLs) for Organic and Inorganic Chemicals

Inorganic Chemical Constituents:	MCL, mg/L
Arsenic	0.05
Barium	1.0
Cadmium	0.010
Chromium	0.05
Lead	0.005
Mercury	0.002
Nitrate (as Nitrogen)	10.0
Selenium	0.01
Silver	0.05

Maximum Contaminant Levels (MCLs) for Organic and Inorganic Chemicals

Organic Chemical Constituents:	MCL, mg/L
(a) Chlorinated Hydrocarbons	
Endrin	0.002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
(b) Chlorophenoxys	
2,4-D	0.1
2,4,5-TP Silvex	0.01

Limiting Concentrations of Fluoride

Annual Average of Maximum Daily Air Temperature		Fluoride Concentrations mg/L			
Degrees Fahrenheit	Degrees Celsius	Lower	Optimum	Upper	MCL
below 53.8	below 12.1	0.9	1.2	1.7	2.4
53.8 to 58.3	12.1 to 14.6	0.8	1.1	1.5	2.2
58.4 to 63.8	14.7 to 17.6	0.8	1.0	1.3	2.0
63.9 to 70.6	17.7 to 21.4	0.7	0.9	1.2	1.8
70.7 to 79.2	21.5 to 26.2	0.7	0.8	1.0	1.6
79.3 to 90.5	26.3 to 32.5	0.6	0.7	0.8	1.4

Pesticide Wastes

The discharge of pesticidal wastes from pesticide manufacturing processing or cleaning operations to any surface water is prohibited.

Appendix C

REGIONAL WATERSHED ESD_B			
NODE	AREA (AC)	T_C (MIN)	Q_{100} (CFS)
103	21.0	13.8	57.0
104	47.6	15.0	124.1
105	114.3	16.1	287.3
106	199.1	17.7	478.1
109	37.3	9.1	117.6
110	87.6	11.9	260.3
111	101.5	12.2	286.3
112	154.9	15.7	402.5
116	57.3	15.8	123.9
117	73.5	16.8	148.4

REGIONAL WATERSHED ESD_C			
NODE	AREA (AC)	T_C (MIN)	Q_{100} (CFS)
202	24.8	9.8	82.4
208	235.5	29.9	388.3
203	289.7	30.8	488.0
209	424.3	32.8	713.1
210	498.9	34.4	833.6
213	24.1	14.6	60.2
211	27.2	14.9	68.4
216	34.7	12.9	94.2
219	8.9	11.8	25.0
217	81.4	16.5	206.5
220	110.6	17.2	276.0
221	165.8	18.6	399.7
222	176.3	18.8	421.9
225	23.2	16.1	50.6
226	55.9	17.4	124.4

REGIONAL WATERSHED ESD_D			
NODE	AREA (AC)	T_C (MIN)	Q_{100} (CFS)
302	23.7	14.9	58.2
303	48.7	18.0	113.7
307	92.9	19.2	213.5
308	92.9	20.2	213.5
310	8.8	17.8	20.5
311	38.6	22.6	79.5
312	55.4	23.5	111.6
316	69.8	13.0	206.9
313	169.3	14.0	316.6
317	200.5	15.1	391.0
320	37.4	10.2	122.7
321	60.4	11.1	193.2
322	136.9	12.1	414.9
323	164.5	13.1	493.0
326	20.7	14.4	51.2
327	49.3	15.8	116.6
330	25.7	11.4	77.5
331	83.6	13.4	223.7
332	99.1	13.9	262.5
335	18.0	11.8	40.8

REGIONAL WATERSHED UDC			
NODE	AREA (AC)	T_C (MIN)	Q_{100} (CFS)
402	24.2	13.0	64.5
403	51.6	13.5	132.7
406	40.2	11.7	119.6
407	52.5	11.9	152.2
410	16.3	15.5	38.8
411	47.6	19.0	104.7
414	56.9	30.2	89.5
415	102.4	30.5	163.8
416	143.8	31.6	232.3
420	18.1	12.6	50.4
421	51.3	13.6	139.8
422	100.5	14.8	268.9
417	291.0	34.2	489.9

LEGEND

- REGIONAL WATERSHED BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- PROPOSED MAIN STORM DRAIN LINE
- PROPOSED BASIN
- A11 / 13.9 — SUBAREA DESIGNATION, AREA (ACRES)
- 332 / 705.0 — HYDROLOGY NODE, ELEVATION (FT)
- SUBAREAS WITHIN REGIONAL WATERSHED ESD_B
- SUBAREAS WITHIN REGIONAL WATERSHED ESD_C
- SUBAREAS WITHIN REGIONAL WATERSHED ESD_D
- SUBAREAS WITHIN REGIONAL WATERSHED UDC

SEAL: REGISTERED PROFESSIONAL ENGINEER JOHN A. McCARTHY No. 47583 Exp. 12/31/19 CIVIL STATE OF CALIFORNIA

PREPARED UNDER THE DIRECT SUPERVISION OF:
JOHN A. McCARTHY DATE
R.C.E. No. 47583 EXP. DATE: 12/31/19

Q3 Consulting
27042 Towne Centre Drive, Suite 110
Foothill Ranch, CA 92610
949.259.6770

SCALE:
ONE INCH ON ORIGINAL

KPC COACHELLA DRAINAGE MASTER PLAN

PROPOSED CONDITION HYDROLOGY MAP

FOR CITY OF COACHELLA

SHEET No. 1 OF 1 SHTS.

Exhibit A

N:\40.012.000\REPORTS\R-2 Report\Local Hydrology Map\KPC Local Hydrology Map PLOTTED: 8/2/2019 11:33:49 AM

W.O.

Appendix D

Extended Detention Basin Design Procedure	BMP Subarea No. 106	Legend:	Required Entries / Calculated Cells

Company Name: Q3 — Date:

Designed by: AH — County/City Case No.:

Design Volume

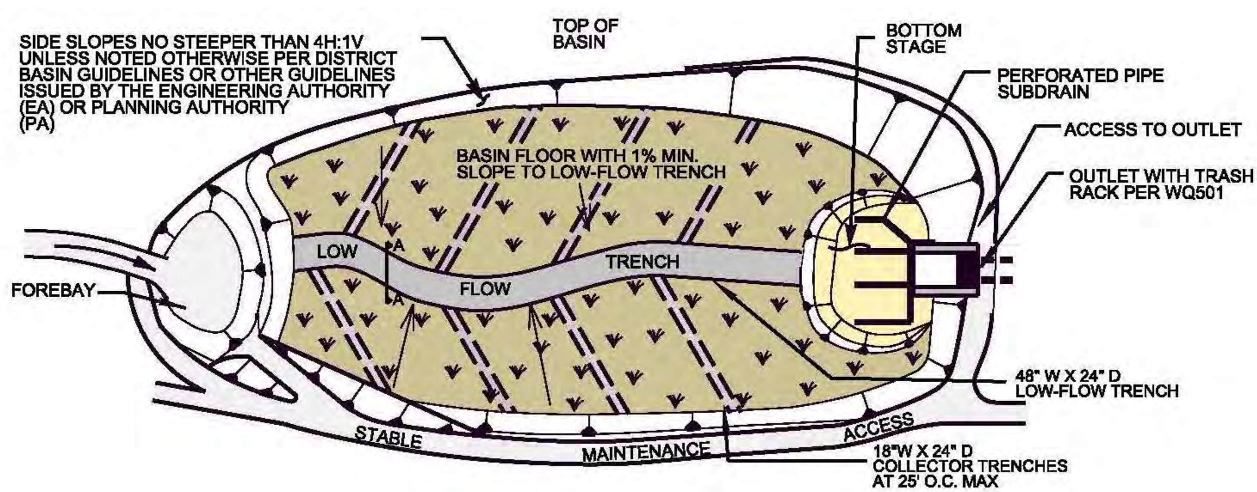
Tributary Area (BMP Subarea) — A_T = 199.1 acres

Enter V_{BMP}, determined from Section 2.1 of this Handbook — V_{BMP} = 299,512 ft^3

Basin Footprint

Overall Geometry

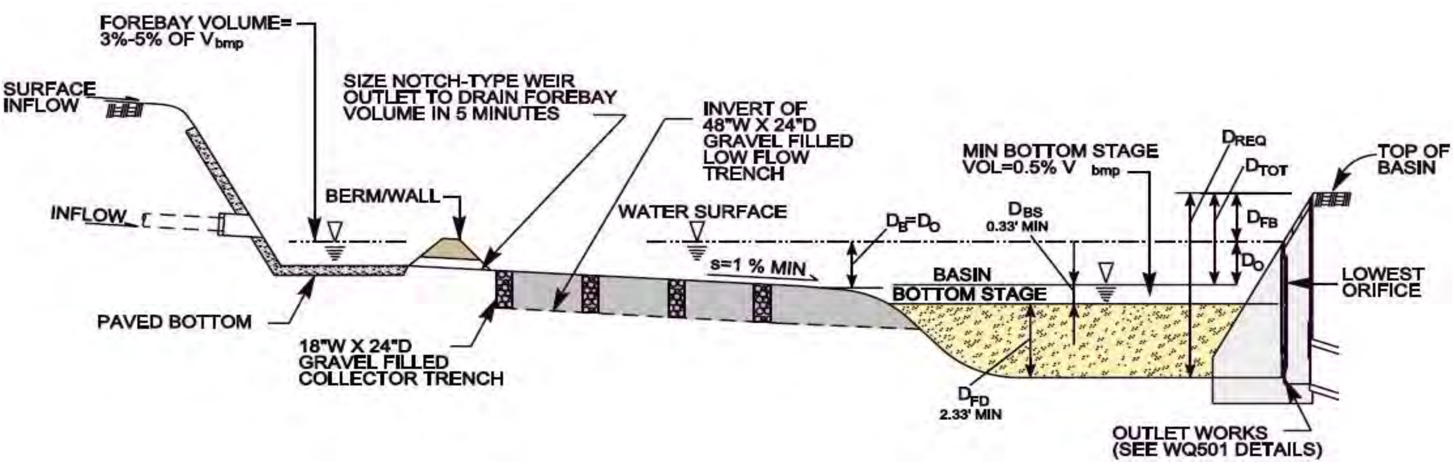
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	345000	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	9000	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	4500	ft^2
Rectangular weir (notch)	W =	12.00	in

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID 112	Legend:	Required Entries / Calculated Cells
Company Name: Q3		Date:	
Designed by: AH		County/City Case No.:	

Design Volume

a) Tributary area (BMP subarea)	Tributary area may not exceed 50 acres	A_T =	154.9	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook		V_{BMP}=	88,432	ft^3

Maximum Depth

a) Infiltration rate	I =	2.5	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $\quad D_1 = \dfrac{I\text{ (in/hr) x 72 hrs}}{12\text{ (in/ft) x FS}}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		50	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		50	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	39.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	5.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	5	ft
c) Minimum bottom surface area of basin (A_S= V_{BMP}/d_B)	A_S =	17686	ft^2
d) Proposed Design Surface Area	A_D =	17700	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	442	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	2	ft
c) Forebay surface area (minimum)	Area =	221	ft^2
d) Full height notch-type weir	Width (W) =	12.0	in

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID	Legend:	Required Entries
	117		Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

Design Volume

a) Tributary area (BMP subarea) — Tributary area may not exceed 50 acres — A_T = 73.5 acres

b) Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP}= 83,509 ft^3

Maximum Depth

a) Infiltration rate — I = 2.5 in/hr

b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook) — FS = 3

c) Calculate D_1 $D_1 = \dfrac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$ — D_1 = 5.0 ft

d) Enter the depth of freeboard (at least 1 ft) — 1 ft

e) Enter depth to historic high ground water (measured from **top** of basin) — 50 ft

f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin) — 50 ft

g) D_2 is the smaller of:

Depth to groundwater - (10 ft + freeboard) and
Depth to impermeable layer - (5 ft + freeboard) — D_2 = 39.0 ft

h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet — D_{MAX} = 5.0 ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1) — z = 4 :1

b) Proposed basin depth (excluding freeboard) — d_B = 5 ft

c) Minimum bottom surface area of basin (A_S= V_{BMP}/d_B) — A_S = 16702 ft^2

d) Proposed Design Surface Area — A_D = 16720 ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP}) — Volume = 418 ft^3

b) Forebay depth (height of berm/splashwall. 1 foot min.) — Depth = 2 ft

c) Forebay surface area (minimum) — Area = 209 ft^2

d) Full height notch-type weir — Width (W) = 12.0 in

Notes:

Extended Detention Basin Design Procedure	BMP Subarea No. 203	Legend:	Required Entries / Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

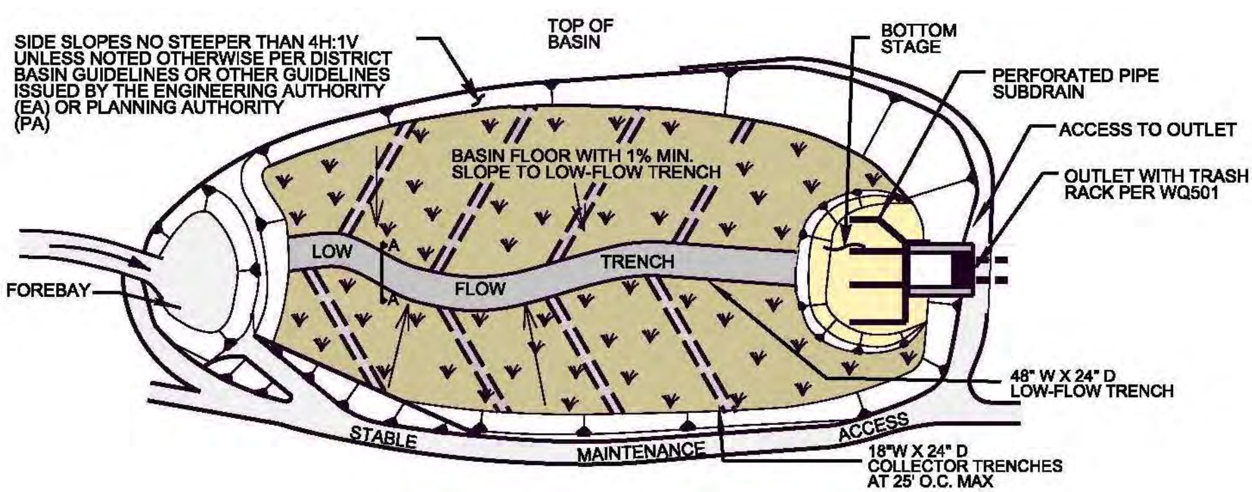
Design Volume

Tributary Area (BMP Subarea)	A_T =	289.7	acres
Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook	V_{BMP}=	165,388	ft^3

Basin Footprint

Overall Geometry

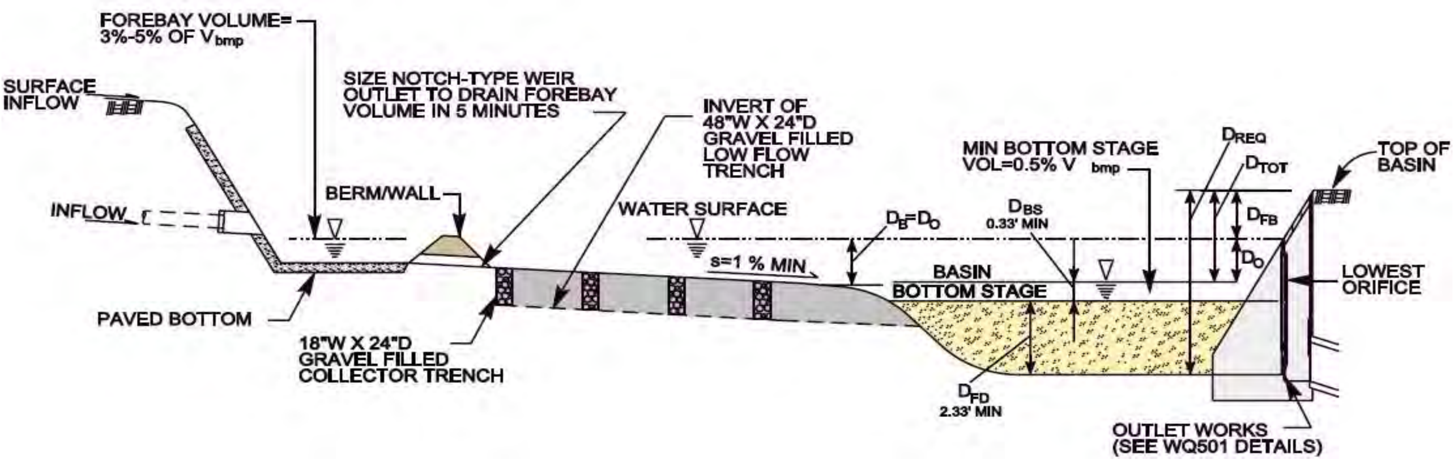
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	190197	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	5000	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	2500	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 209	Legend:	Required Entries / Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

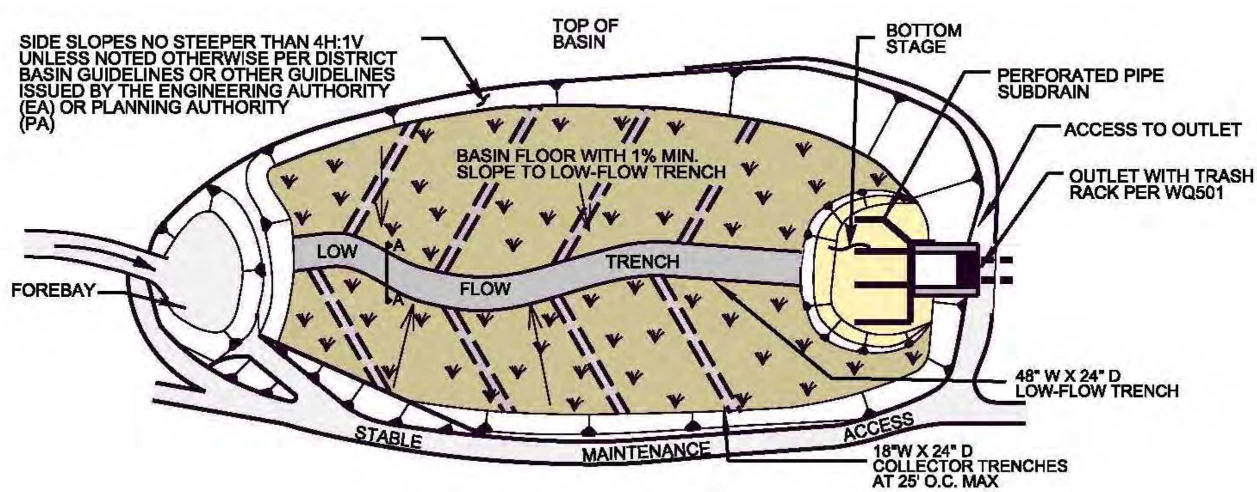
Design Volume

Tributary Area (BMP Subarea)	A_T =	134.6	acres
Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook	V_{BMP}=	202,483	ft^3

Basin Footprint

Overall Geometry

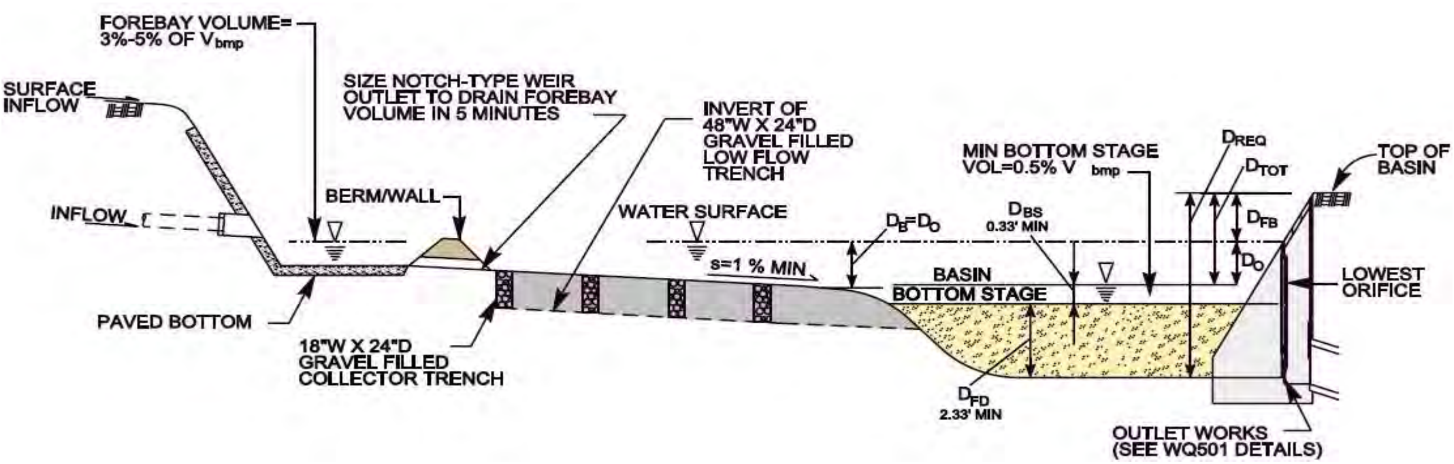
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	232855	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	6100	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	3050	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 210	Legend:	Required Entries / Calculated Cells

Company Name: Q3 — Date:

Designed by: AH — County/City Case No.:

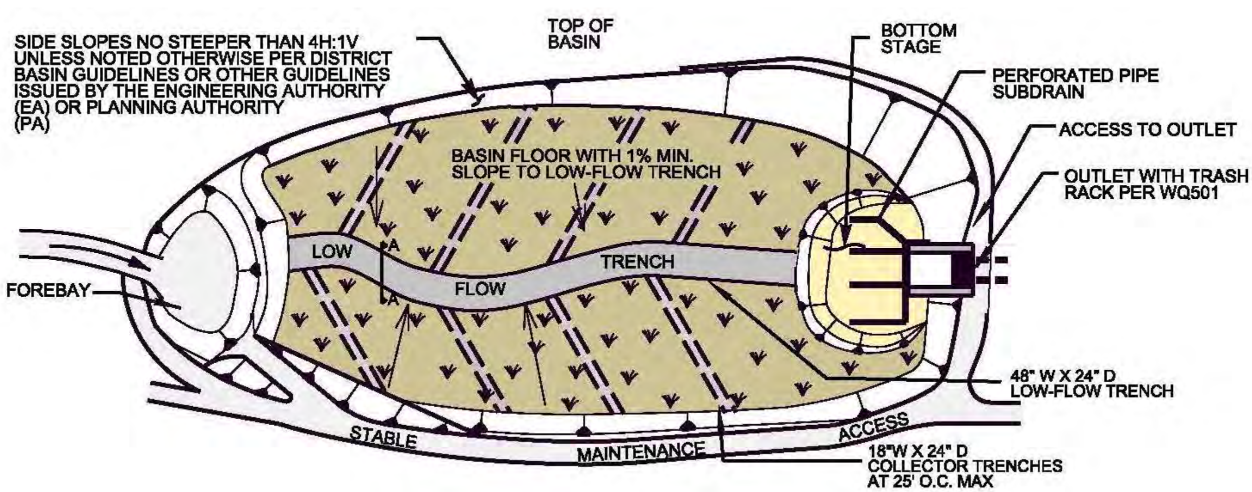
Design Volume

Tributary Area (BMP Subarea)	A_T =	74.6	acres
Enter V_{BMP}, determined from Section 2.1 of this Handbook	V_{BMP}=	84,758	ft^3

Basin Footprint

Overall Geometry

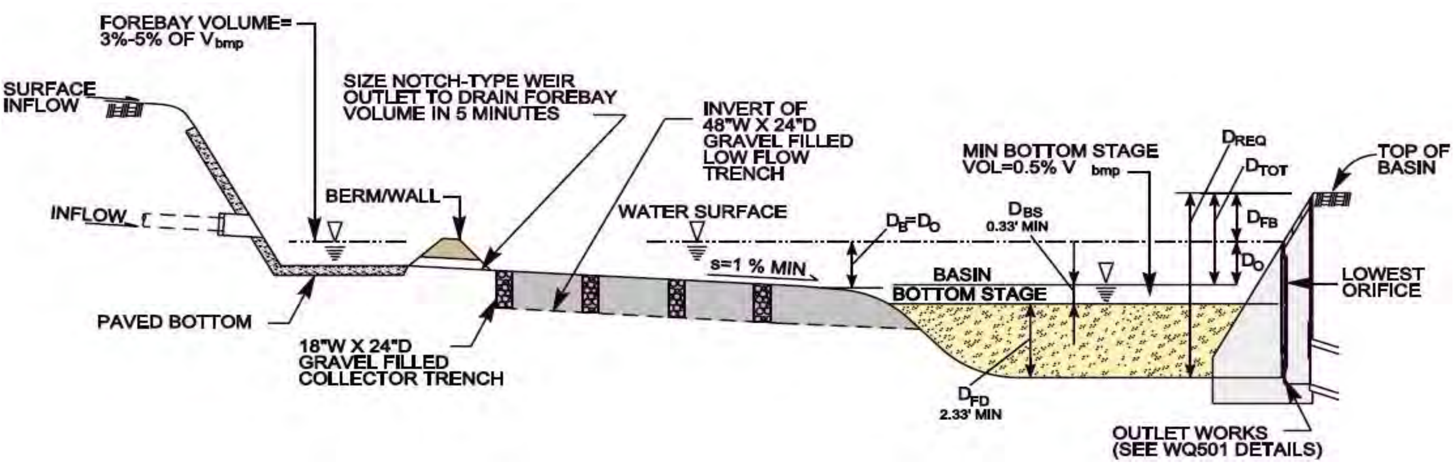
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	97472	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	2600	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	1300	ft^2
Rectangular weir (notch)	W =	12.00	in

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID	Legend:	Required Entries
	211		Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

Design Volume

a) Tributary area (BMP subarea) — $A_T =$ 27.2 acres

b) Enter V_{BMP} determined from Section 2.1 of this Handbook — $V_{BMP} =$ 12,885 ft^3

Maximum Depth

a) Infiltration rate — $I =$ 2.5 in/hr

b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook) — $FS =$ 3

c) Calculate D_1

$$D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$$

$D_1 =$ 5.0 ft

d) Enter the depth of freeboard (at least 1 ft) — 1 ft

e) Enter depth to historic high ground water (measured from **top** of basin) — 50 ft

f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin) — 50 ft

g) D_2 is the smaller of:

Depth to groundwater - (10 ft + freeboard) and
Depth to impermeable layer - (5 ft + freeboard)

$D_2 =$ 39.0 ft

h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet — $D_{MAX} =$ 5.0 ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1) — $z =$ 4 :1

b) Proposed basin depth (excluding freeboard) — $d_B =$ 5 ft

c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$) — $A_S =$ 2577 ft^2

d) Proposed Design Surface Area — $A_D =$ 2590 ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP}) — Volume = 64 ft^3

b) Forebay depth (height of berm/splashwall. 1 foot min.) — Depth = 2 ft

c) Forebay surface area (minimum) — Area = 32 ft^2

d) Full height notch-type weir — Width (W) = 12.0 in

Notes:

Extended Detention Basin Design Procedure	BMP Subarea No. 222	Legend:	Required Entries / Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

Design Volume

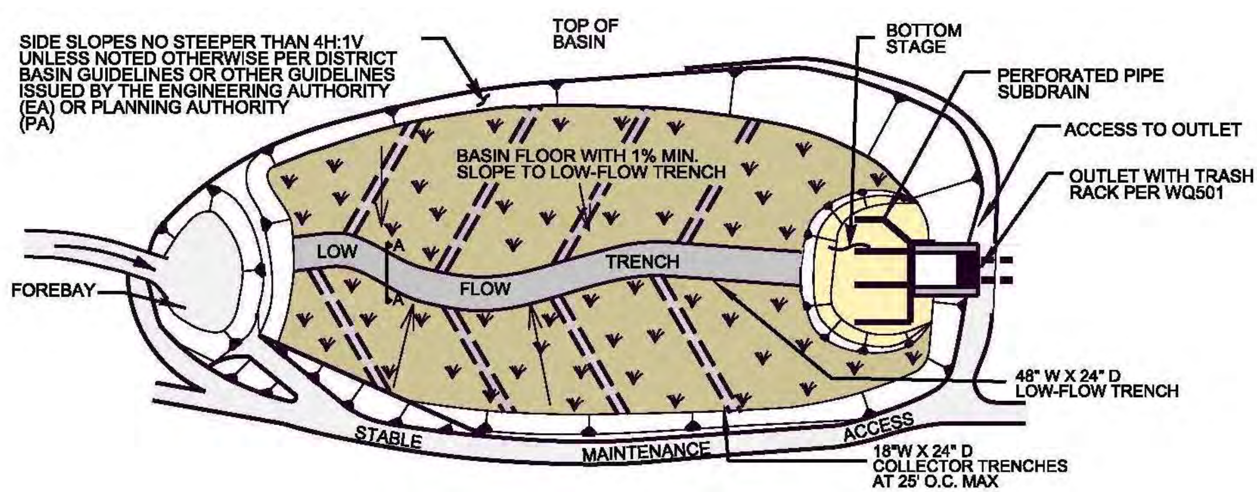
Tributary Area (BMP Subarea) $A_T =$ 176.3 acres

Enter V_{BMP}, determined from Section 2.1 of this Handbook $V_{BMP} =$ 241,448 ft^3

Basin Footprint

Overall Geometry

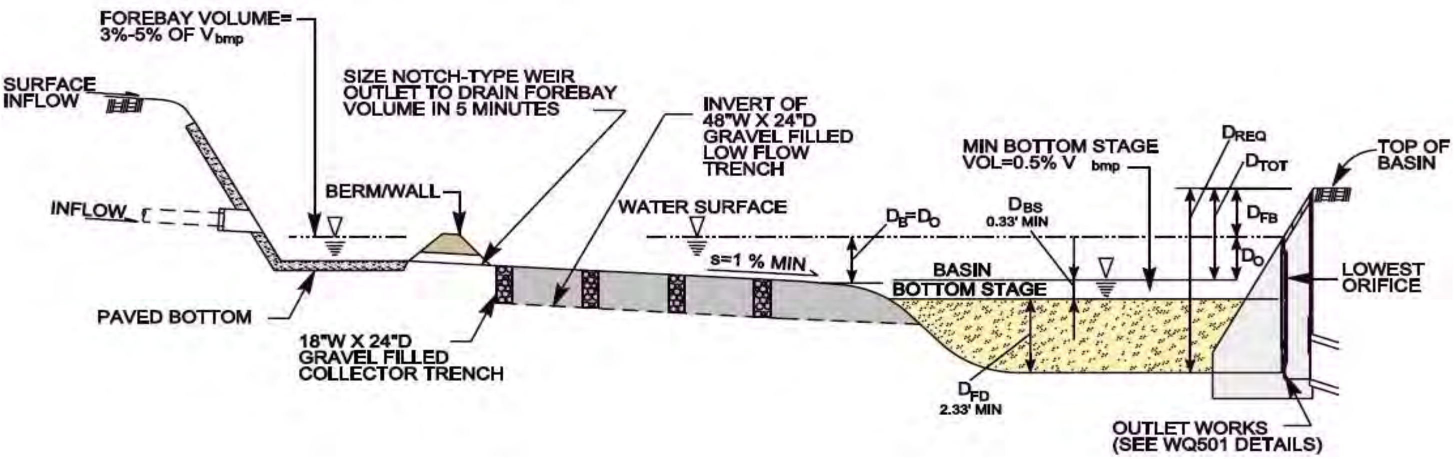
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	277665	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	7300	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	3650	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 226	Legend:	Required Entries / Calculated Cells

Company Name: Q3 — Date:

Designed by: AH — County/City Case No.:

Design Volume

Tributary Area (BMP Subarea) — A_T = 55.9 acres

Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook — V_{BMP}= 84,092 ft^3

Basin Footprint

Overall Geometry

Length at Basin Bottom Surface — Length = 300 ft

Width at Basin Bottom Surface — Width = 200 ft

Meets 1.5 : 1 requirement? ✓

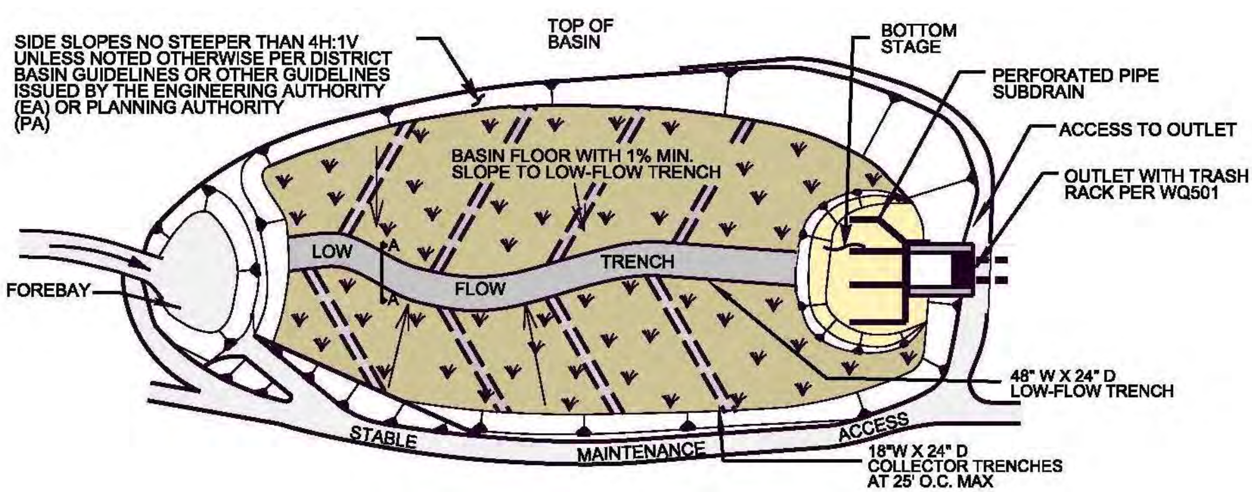
Side Slopes per "Basin Guidelines", Sect. 1.2 — z = 4 :1

Proposed Basin Depth (with no freeboard) — D_B = 5.00 ft

Depth of freeboard (if used) — D_{FB} = 1.00 ft

Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33')) — D_{REQ} = 8.7 ft

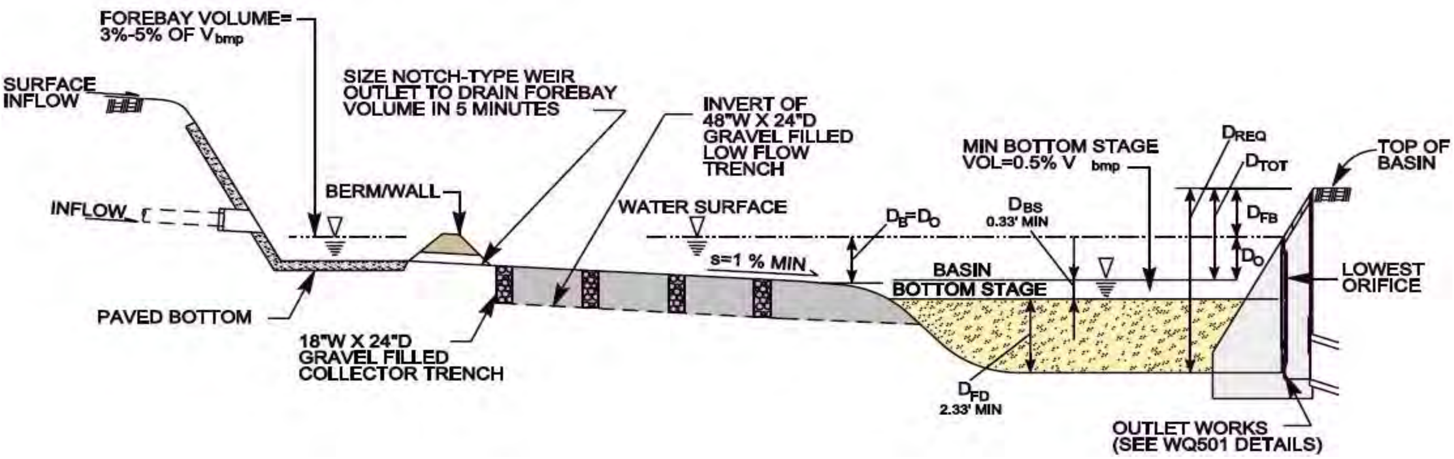
Depth from design water surface elevation to lowest orifice — D_O = 5.0 ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	96706	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	2600	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	1300	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 303	Legend:	Required Entries / Calculated Cells

Company Name: Q3 | Date:

Designed by: AH | County/City Case No.:

Design Volume

Tributary Area (BMP Subarea) $A_T =$ 48.7 acres

Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook $V_{BMP}=$ 27,803 ft^3

Basin Footprint

Overall Geometry

Length at Basin Bottom Surface Length = 300 ft

Width at Basin Bottom Surface Width = 200 ft

Meets 1.5 : 1 requirement? ✓

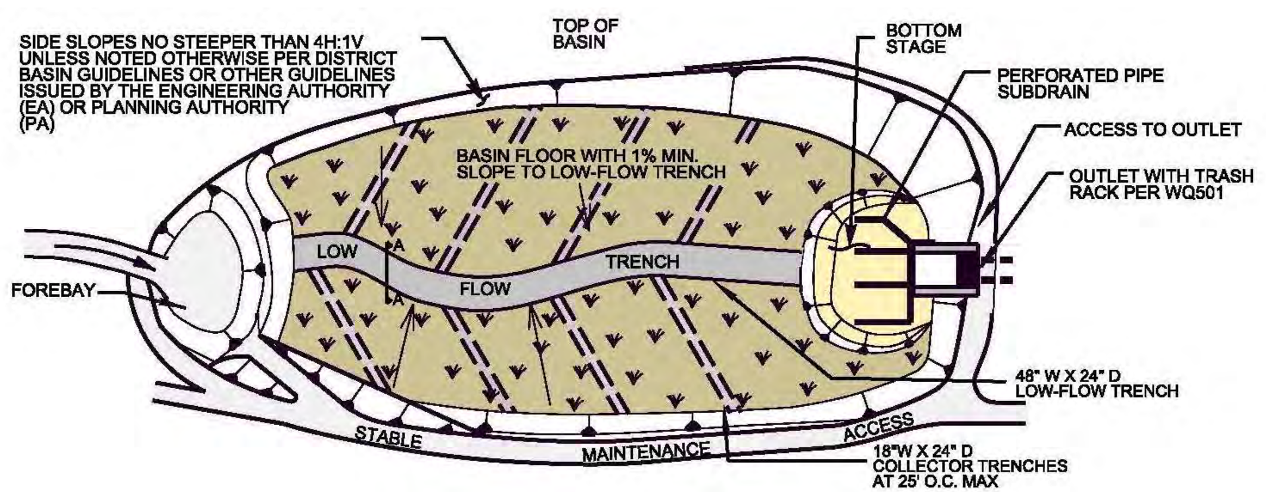
Side Slopes per "Basin Guidelines", Sect. 1.2 z = 4 :1

Proposed Basin Depth (with no freeboard) $D_B =$ 5.00 ft

Depth of freeboard (if used) $D_{FB} =$ 1.00 ft

Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33')) $D_{REQ} =$ 8.7 ft

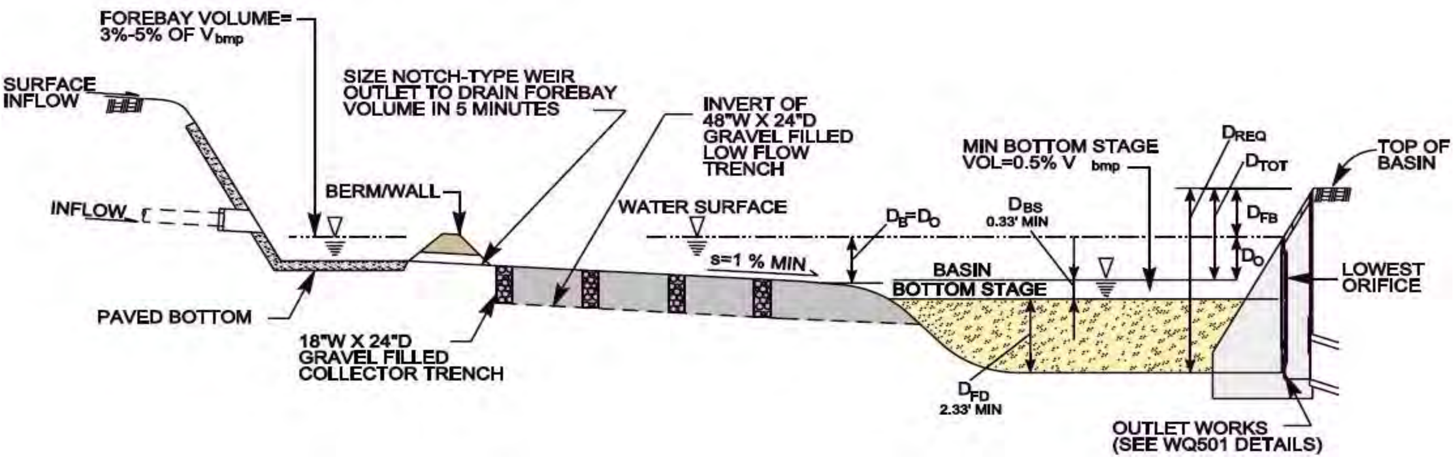
Depth from design water surface elevation to lowest orifice $D_O =$ 5.0 ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} = 6.00	ft
Basin Invert Longitudinal Slope	Slope = 1.00	%
Basin Invert Transverse Slope (1% min)	Slope = 1	%
Basin Volume	V_{Basin} = 31973	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} = 900	ft^3
Forebay Depth (height of berm)	D_{FBY} = 2	ft
Minimum Forebay Surface Area	A_{FB} = 450	ft^2
Rectangular weir (notch)	W = 12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 308	Legend:	Required Entries / Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

Design Volume

Tributary Area (BMP Subarea) A_T = 92.9 acres

Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook V_{BMP}= 139,752 ft^3

Basin Footprint

Overall Geometry

Length at Basin Bottom Surface Length = 300 ft

Width at Basin Bottom Surface Width = 200 ft

Meets 1.5 : 1 requirement? ✓

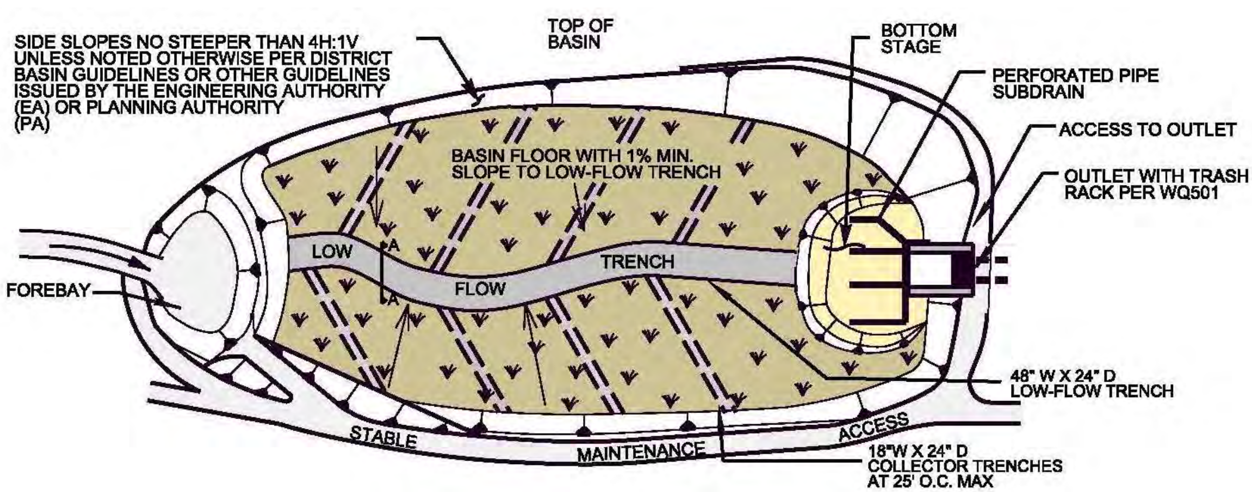
Side Slopes per "Basin Guidelines", Sect. 1.2 z = 4 :1

Proposed Basin Depth (with no freeboard) D_B = 5.00 ft

Depth of freeboard (if used) D_{FB} = 1.00 ft

Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33')) D_{REQ} = 8.7 ft

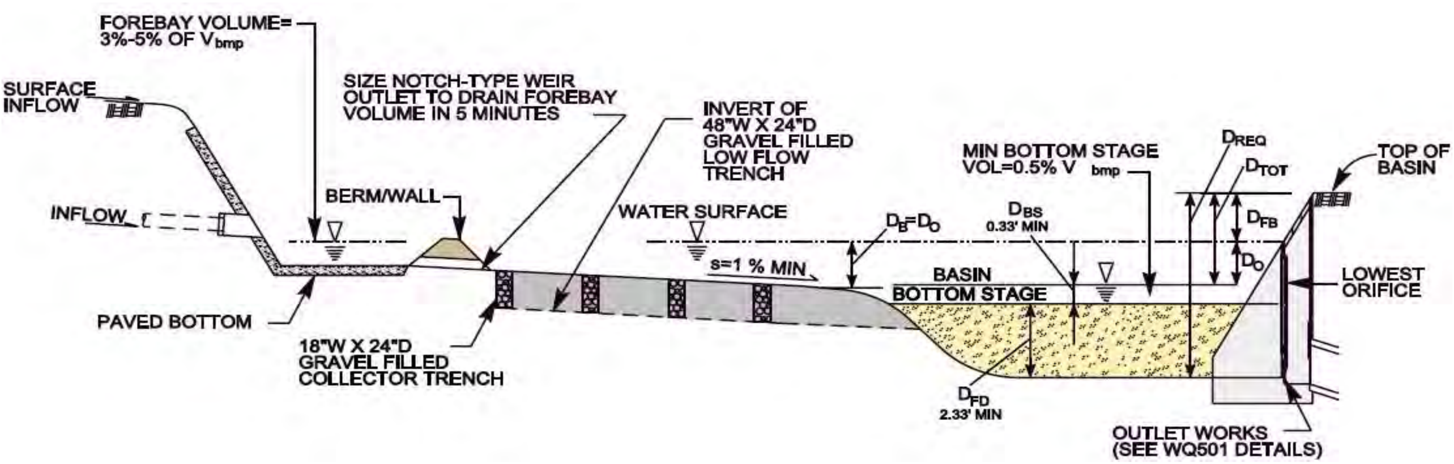
Depth from design water surface elevation to lowest orifice D_O = 5.0 ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	160715	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	4200	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	2100	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 317	Legend:	Required Entries / Calculated Cells

Company Name: Q3 — Date:
Designed by: AH — County/City Case No.:

Design Volume

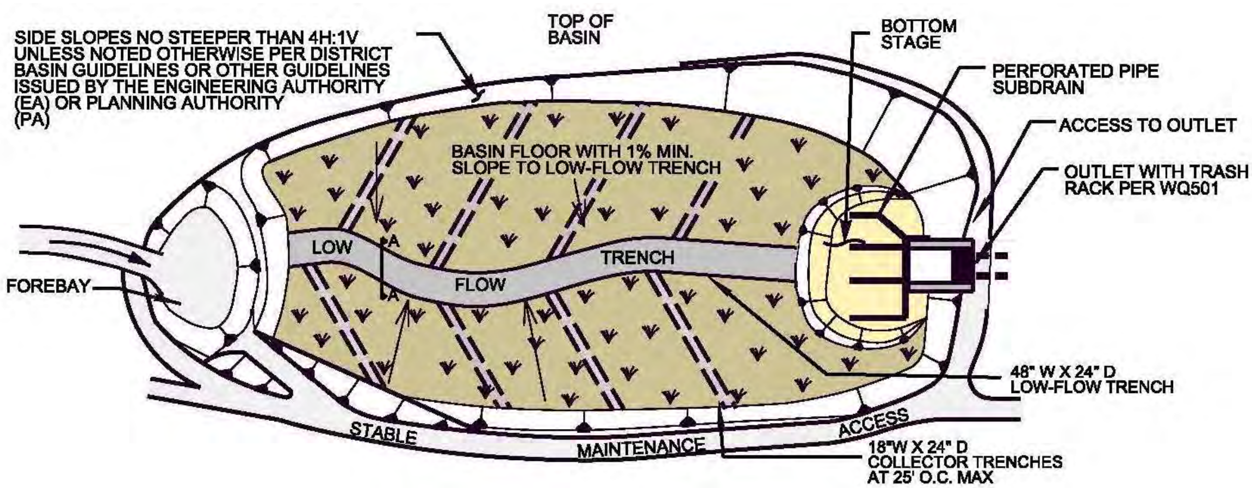
Tributary Area (BMP Subarea) — A_T = 200.5 acres

Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook — V_{BMP}= 301,618 ft^3

Basin Footprint

Overall Geometry

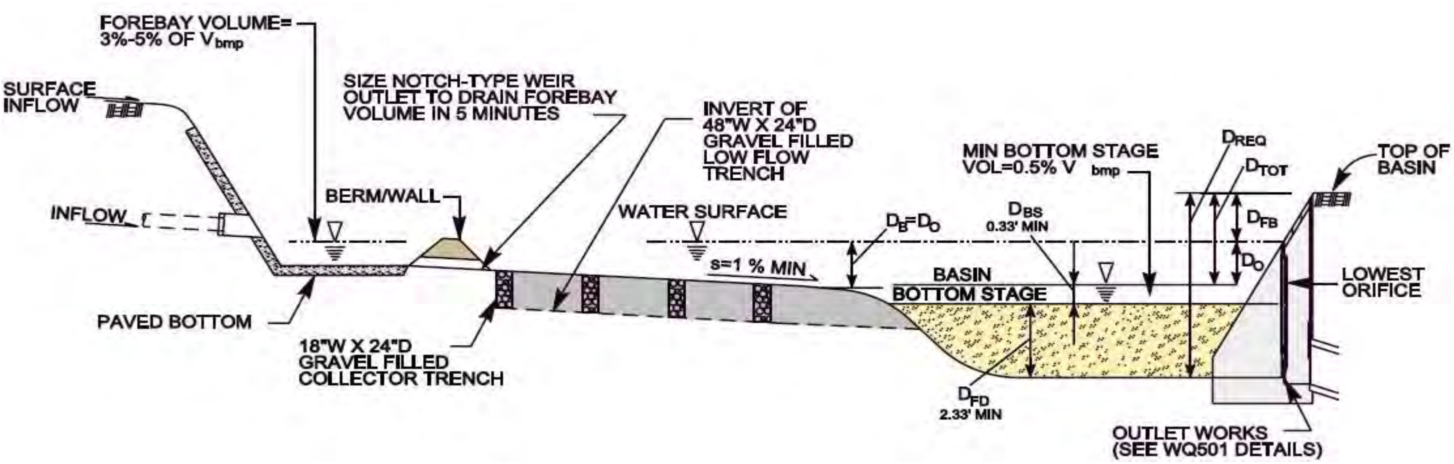
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	346860	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	9100	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	4550	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 323	Legend:	Required Entries / Calculated Cells

Company Name: Q3 | Date:

Designed by: AH | County/City Case No.:

Design Volume

Tributary Area (BMP Subarea) A_T = 164.5 acres

Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook V_{BMP}= 364,307 ft^3

Basin Footprint

Overall Geometry

Length at Basin Bottom Surface Length = 300 ft

Width at Basin Bottom Surface Width = 200 ft

Meets 1.5 : 1 requirement? ✓

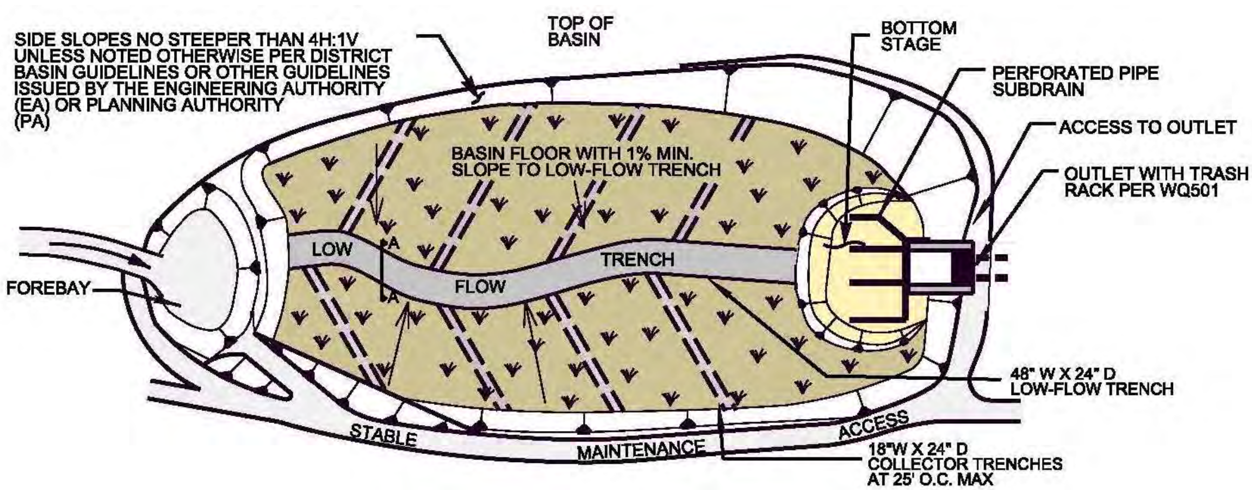
Side Slopes per "Basin Guidelines", Sect. 1.2 z = 4 :1

Proposed Basin Depth (with no freeboard) D_B = 5.00 ft

Depth of freeboard (if used) D_{FB} = 1.00 ft

Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33')) D_{REQ} = 8.7 ft

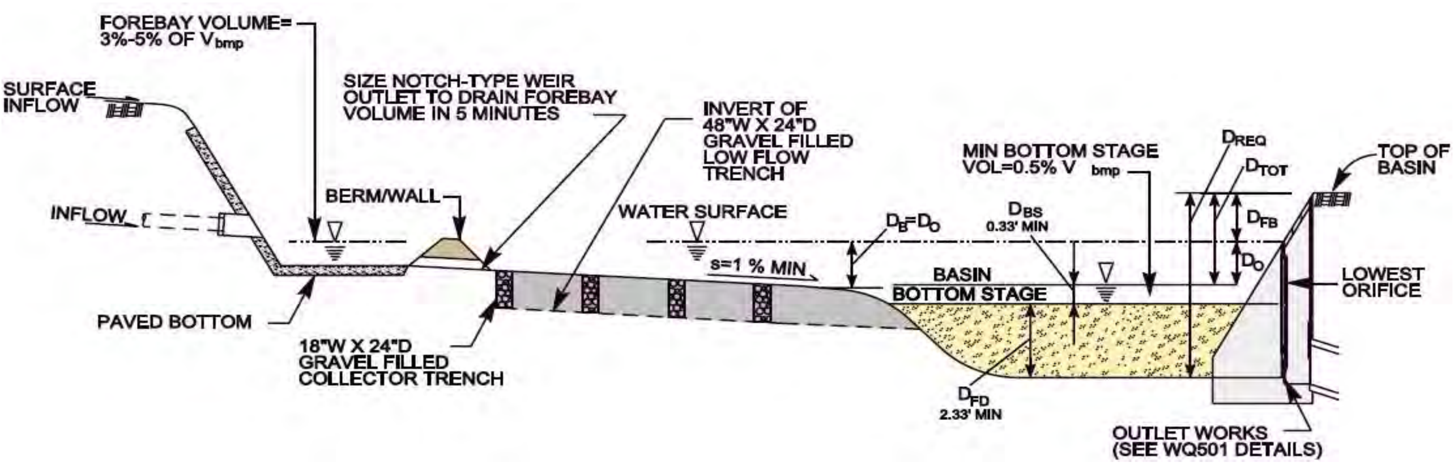
Depth from design water surface elevation to lowest orifice D_O = 5.0 ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	418954	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	11000	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	5500	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 327	Legend:	Required Entries / Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

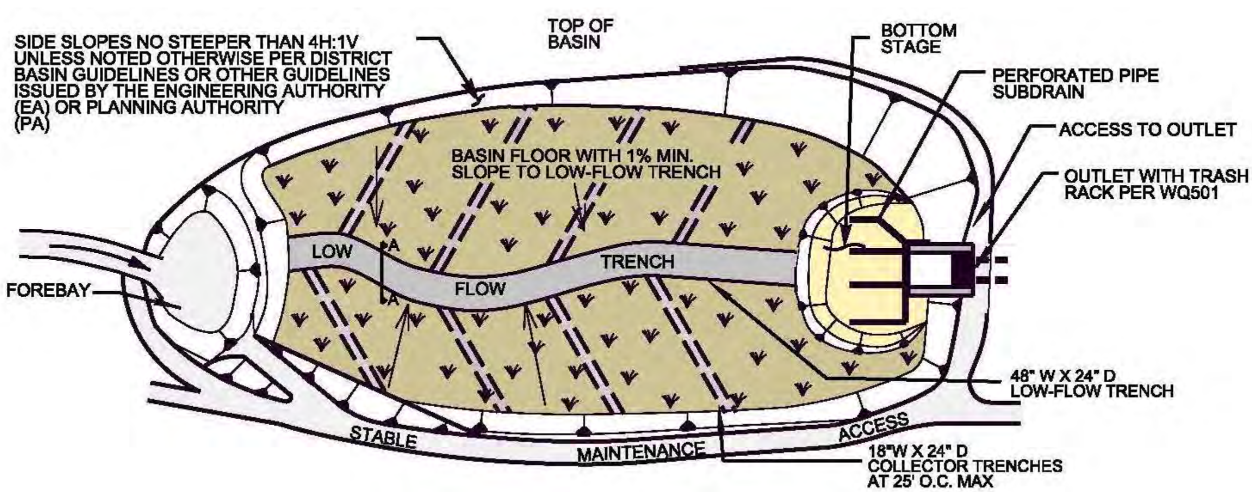
Design Volume

Tributary Area (BMP Subarea)	A_T =	49.3	acres
Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook	V_{BMP}=	56,013	ft^3

Basin Footprint

Overall Geometry

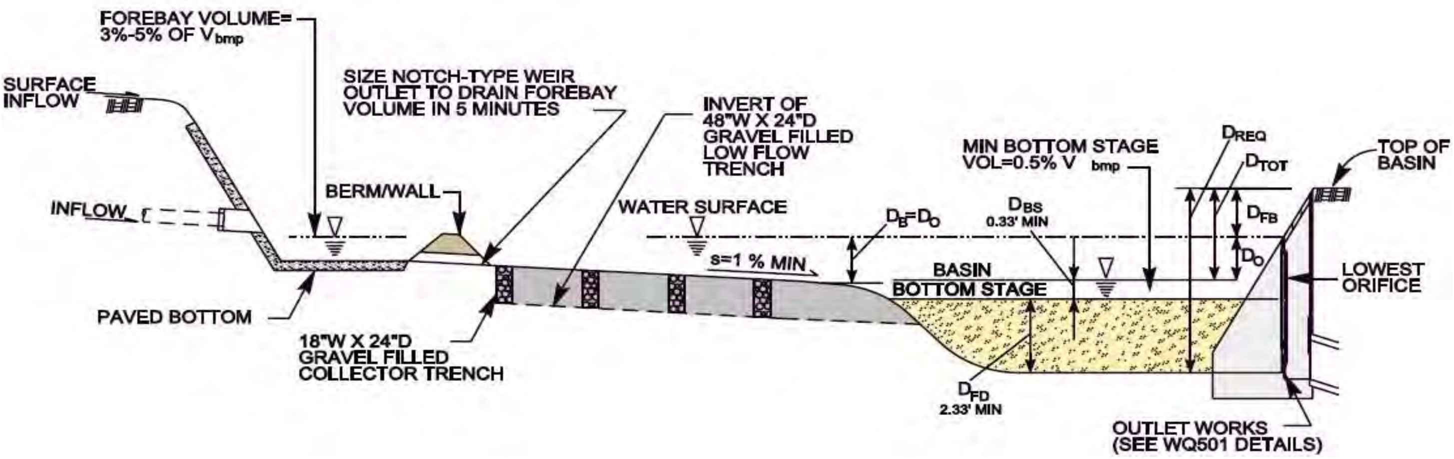
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?		
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	64415	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	1700	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	850	ft^2
Rectangular weir (notch)	W =	12.00	in

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID	Legend:	Required Entries
	332		Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

Design Volume

a) Tributary area (BMP subarea) Tributary area may not exceed 50 acres	A_T =	99.1	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	135,720	ft^3

Maximum Depth

a) Infiltration rate	I =	2.5	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \dfrac{I\text{ (in/hr)} \times 72\text{ hrs}}{12\text{ (in/ft)} \times FS}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		50	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		50	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	39.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	5.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	5	ft
c) Minimum bottom surface area of basin (A_S= V_{BMP}/d_B)	A_S =	27144	ft^2
d) Proposed Design Surface Area	A_D =	27160	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	679	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	2	ft
c) Forebay surface area (minimum)	Area =	339	ft^2
d) Full height notch-type weir	Width (W) =	12.0	in

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID	Legend:	Required Entries
	335		Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

Design Volume

a) Tributary area (BMP subarea)	A_T =	18	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	10,276	ft^3

Maximum Depth

a) Infiltration rate	I =	2.5	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $\quad D_1 = \dfrac{\text{I (in/hr) x 72 hrs}}{\text{12 (in/ft) x FS}}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		50	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		50	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	39.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	5.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	5	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	2055	ft^2
d) Proposed Design Surface Area	A_D =	2070	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	51	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	2	ft
c) Forebay surface area (minimum)	Area =	26	ft^2
d) Full height notch-type weir	Width (W) =	12.0	in

Notes:

Extended Detention Basin Design Procedure	BMP Subarea No. 403	Legend:	Required Entries Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

Design Volume

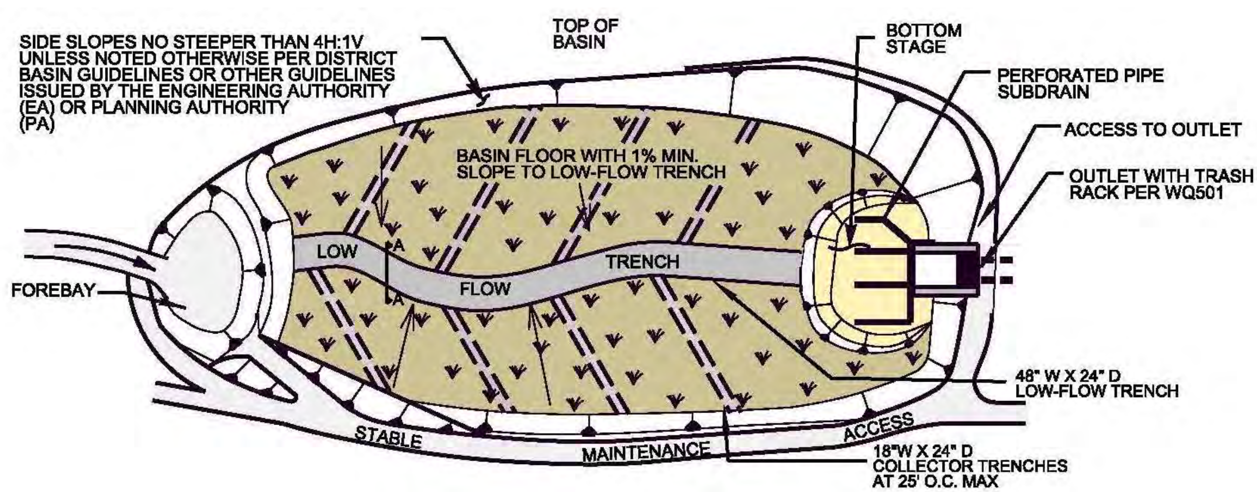
Tributary Area (BMP Subarea) $A_T =$ 51.6 acres

Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook $V_{BMP}=$ 29,458 ft^3

Basin Footprint

Overall Geometry

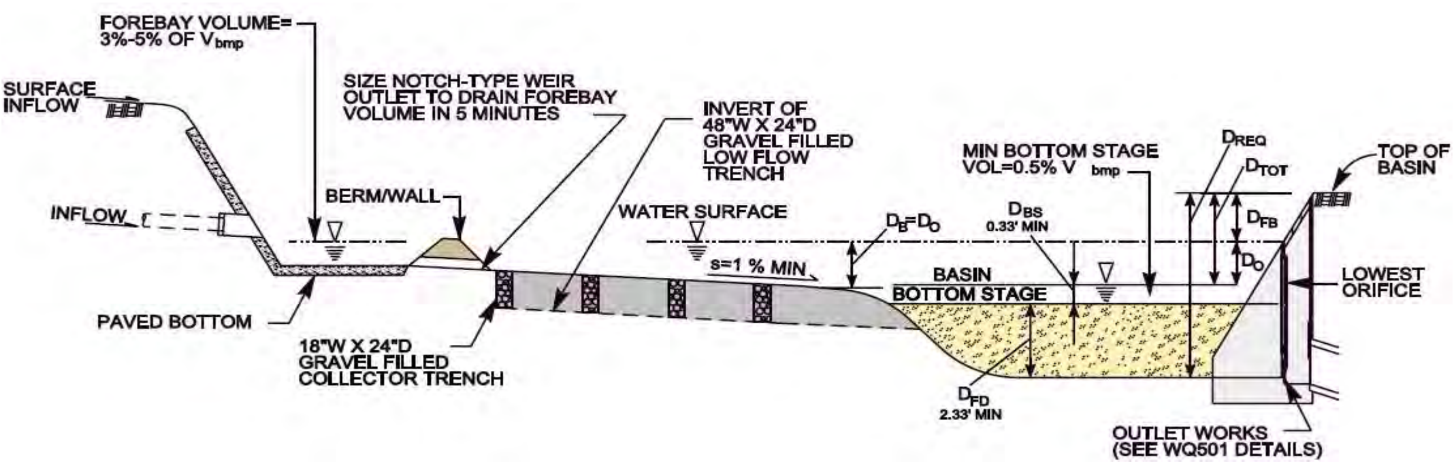
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	$D_B =$	5.00	ft
Depth of freeboard (if used)	$D_{FB} =$	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	$D_{REQ} =$	8.7	ft
Depth from design water surface elevation to lowest orifice	$D_O =$	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	33877	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	900	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	450	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 407	Legend:	Required Entries / Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

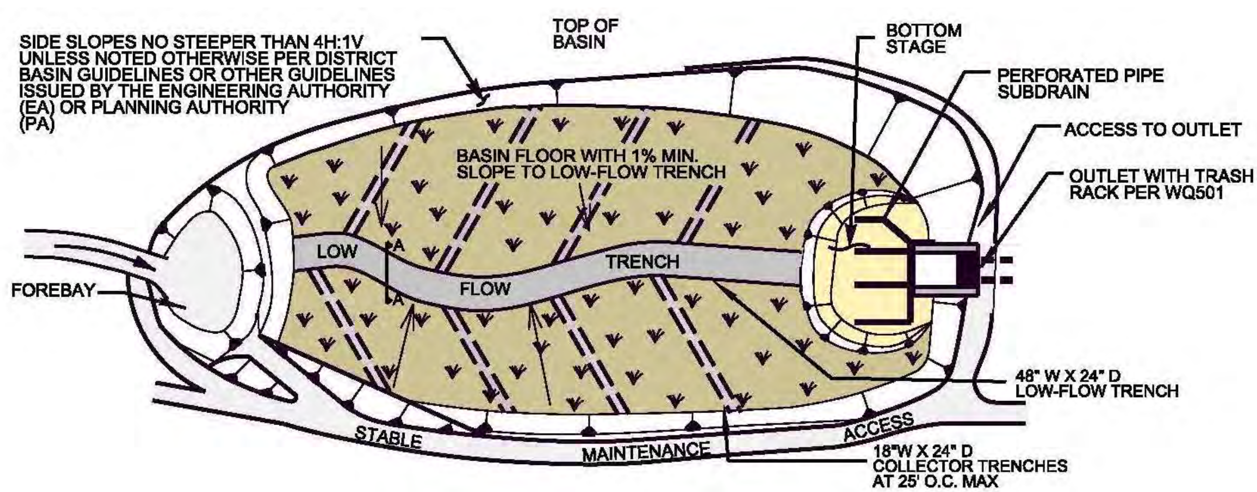
Design Volume

Tributary Area (BMP Subarea)	A_T =	52.5	acres
Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook	V_{BMP}=	78,977	ft^3

Basin Footprint

Overall Geometry

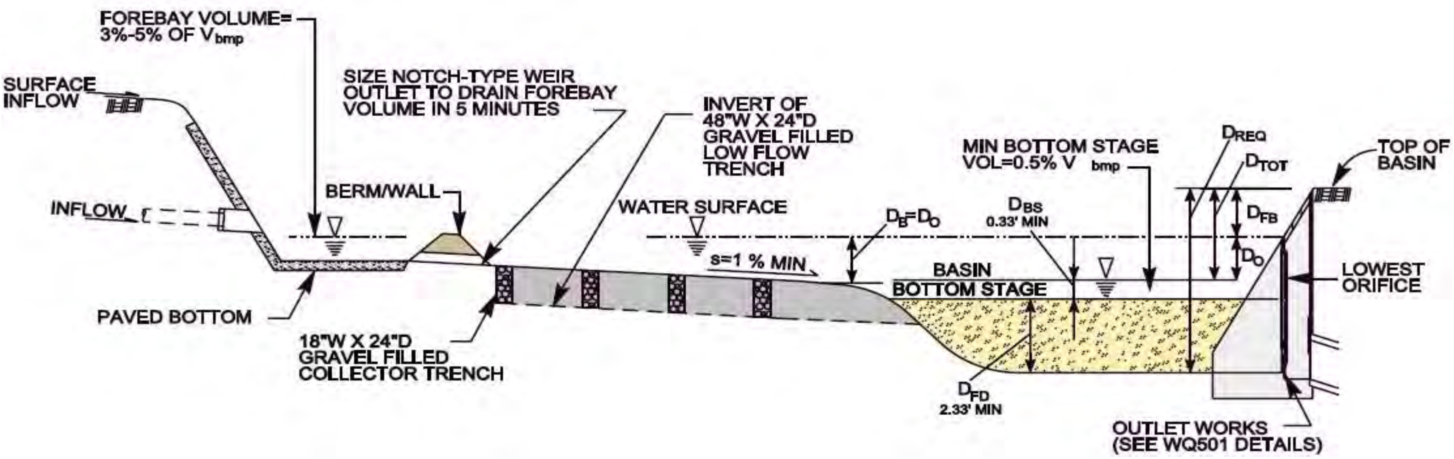
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
Meets 1.5 : 1 requirement?		✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	90824	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	2400	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	1200	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 411	Legend:	Required Entries / Calculated Cells

Company Name: Q3 — Date:

Designed by: AH — County/City Case No.:

Design Volume

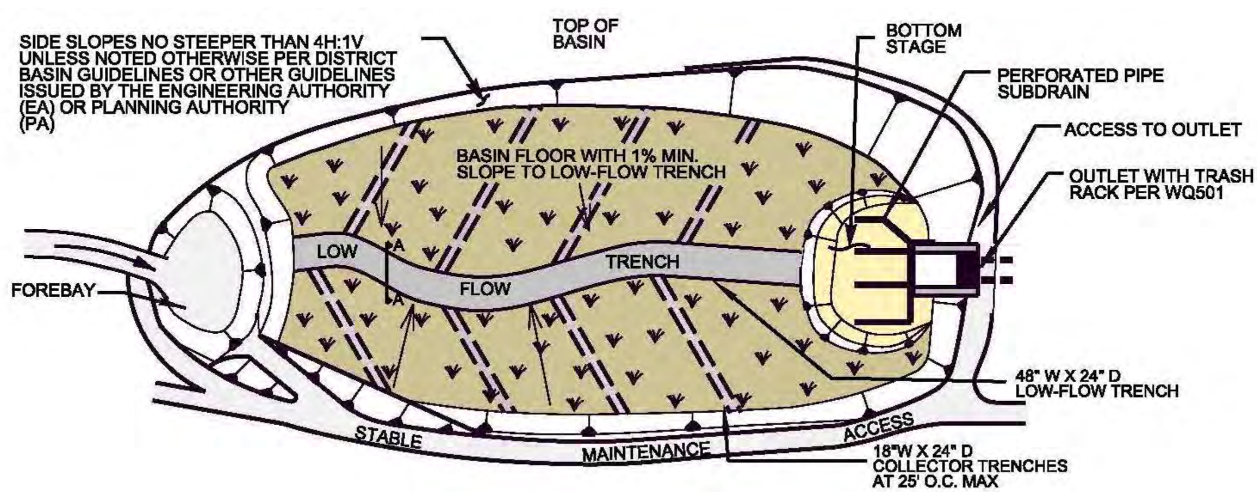
Tributary Area (BMP Subarea) A_T = 47.6 acres

Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook V_{BMP}= 27,175 ft^3

Basin Footprint

Overall Geometry

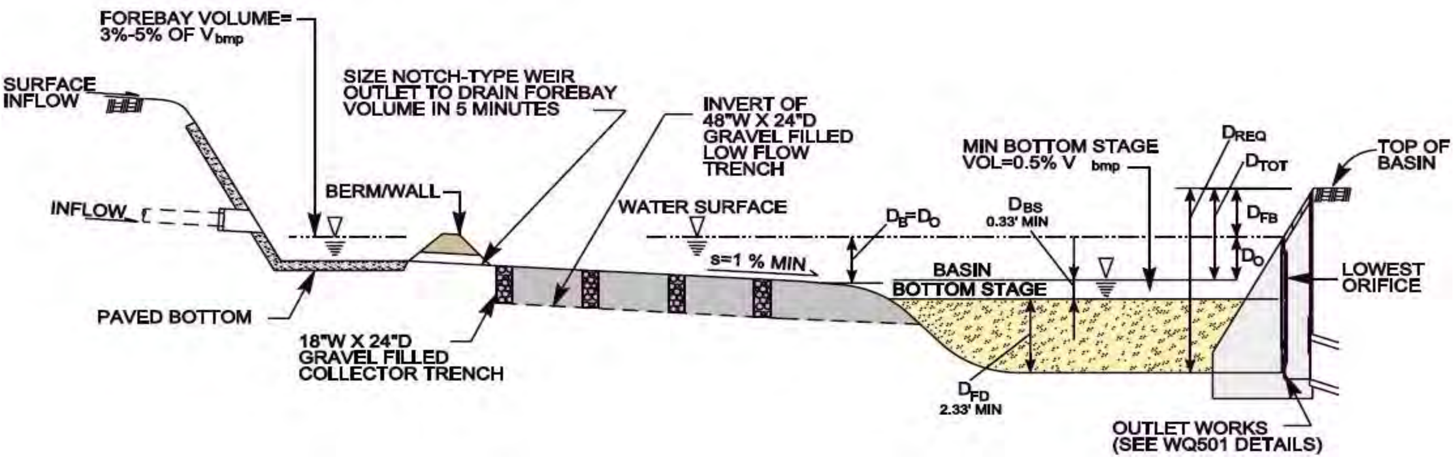
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	31251	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	900	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	450	ft^2
Rectangular weir (notch)	W =	12.00	in

Extended Detention Basin Design Procedure	BMP Subarea No. 417	Legend:	Required Entries / Calculated Cells

Company Name:	Q3	Date:	
Designed by:	AH	County/City Case No.:	

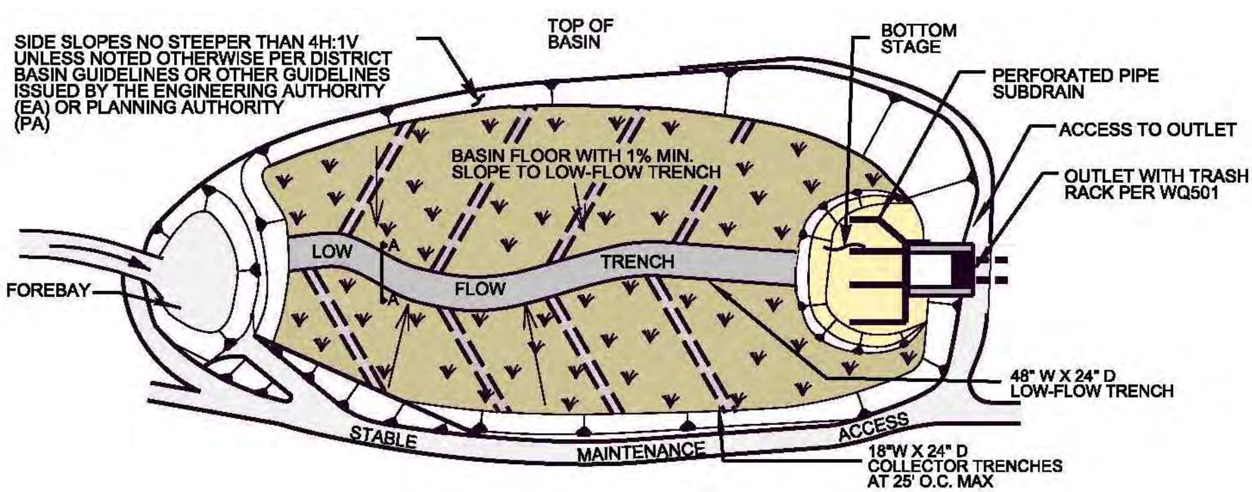
Design Volume

Tributary Area (BMP Subarea)	A_T =	291	acres
Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook	V_{BMP}=	446,107	ft^3

Basin Footprint

Overall Geometry

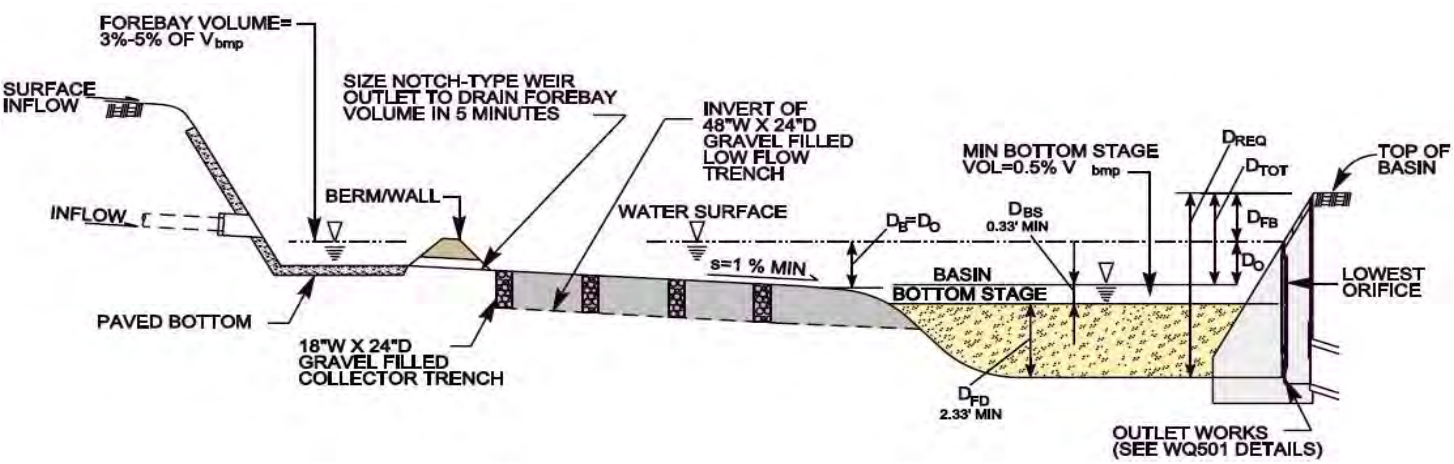
Length at Basin Bottom Surface	Length =	300	ft
Width at Basin Bottom Surface	Width =	200	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} = 6.00	ft
Basin Invert Longitudinal Slope	Slope = 1.00	%
Basin Invert Transverse Slope (1% min)	Slope = 1	%
Basin Volume	V_{Basin} = 513023	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} = 13400	ft^3
Forebay Depth (height of berm)	D_{FBY} = 2	ft
Minimum Forebay Surface Area	A_{FB} = 6700	ft^2
Rectangular weir (notch)	W = 12.00	in