3.1.3 Hydrology and Water Quality

This subchapter describes existing groundwater, surface water, water quality, storm water, and flooding conditions within the project area and evaluates potential impacts to hydrology and water quality that could result from implementation of the project. A Storm Water Management Plan (Major SWMP) for the Master TM (Landmark Consulting 2013a) and Implementing TM (Landmark Consulting 2013b), a Preliminary Drainage Study for the Master TM (Landmark Consulting 2013c) and Implementing TM (Landmark Consulting 2013d), and a Hydromodification Management Plan (HMP) (Landmark Consulting 2013e) were prepared for the project to evaluate hydrological and water quality issues. The studies are attached to the EIR as Appendices U-1, U-2, and U-3, respectively. Additionally, a Preliminary Hydrogeologic Assessment was prepared to evaluate groundwater production at on-site wells (Appendix P). This study is attached to the EIR as Appendix P. These studies, along with other applicable information, are summarized below.

3.1.3.1 Existing Conditions

Regulatory Setting

Federal Water Pollution Control Act (also known as Clean Water Act)

The Clean Water Act (CWA), enacted in 1972, is intended to restore and maintain the integrity of the nation's water through a system of water quality standards, discharge limitations, and permits. The fundamental purpose of the CWA is the protection of designated beneficial uses of water resources. The amendment of the CWA in 1987 includes a provision prohibiting discharges of pollutants contained in storm water runoff and requires many cities to obtain a NPDES permit to control urban and storm water runoff.

Section 303(d) of the CWA defines water quality standards as consisting of both the uses of surface waters (beneficial uses) and the water quality criteria applied to protect those uses (water quality objectives). State and regional water quality control boards have been charged with ensuring that beneficial uses and water quality objectives are established for all waters of the state.

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) is the primary agency in charge of administering programs and coordinating with communities to establish effective flood plain management standards. FEMA is responsible for delineating areas of flood hazards. It is then the responsibility of state and local agencies to implement the means of carrying out FEMA requirements. The project site is not located within a mapped flood hazard area.

Porter-Cologne Water Quality Control Act

This act, which is a portion of the State Water Code, establishes responsibilities and authorities of the state's RWQCB. Each RWQCB is directed to adopt water quality control plans for the waters of an area to include identification of beneficial uses,

objectives to protect those uses, and an implementation plan to accomplish the objectives.

San Diego Basin Plan

The Basin Plan for the San Diego Basin, most recently amended in 2007, sets forth water quality objectives. Specifically, the Basin Plan is designed to accomplish the following: (1) designate beneficial uses for surface and ground waters; (2) set the narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy; (3) describe mitigation measures to protect the beneficial uses of all waters within the region; and (4) describe surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan. The Basin Plan incorporates by reference all applicable State Water Resource Control Board (SWRCB) and RWQCB plans and policies.

Colorado River Basin Plan

Similar to the San Diego Region Basin Plan, the Colorado River Basin Plan (adopted in 2006) sets forth water quality objectives for constituents that could potentially cause an adverse effect or impact on the beneficial uses of water. Specifically, the Colorado River Basin Plan lists and defines the various beneficial water uses of water bodies within its boundaries, describes the water quality which must be maintained to support such uses, describes programs, projects and other actions which are necessary to achieve the standards established in the plan and summarizes the various plans and policies which protect water quality.

County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance

The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) contains discharge prohibitions and requirements that vary depending on type of land use activity proposed and location within the County. The intent of the WPO is to protect water resources and improve water quality through the uses of management practices aimed at reducing polluted runoff.

San Diego Groundwater Ordinance

The County currently manages anticipated future groundwater demand through the County Groundwater Ordinance. This Ordinance does not limit the number of wells or the amount of groundwater extraction from existing landowners. However, the ordinance does identify specific measures to mitigate potential groundwater impacts of projects requiring specified discretionary permits.

San Diego General Plan - Land Use Element

The Land Use Element provides a framework to accommodate future development in an efficient and sustainable manner that is compatible with the character of unincorporated communities and the protection of valuable and sensitive natural resources. The Land Use Element includes goals and implementing policies listed below that are generally relevant to hydrology and water quality.

GOAL LU-6

Developmental Balance. Balance of development with the natural environment, scarce resources, natural hazards, and the unique local character of individual communities.

Policies

LU-6.5 Sustainable Storm Water Management. Ensure sustainable storm water management through the minimization and the use of impervious surfaces. Require the incorporation of LID techniques, as well as a combination of site design, source control, and storm water BMPs where applicable, as additional means to manage storm water runoff.

San Diego General Plan - Conservation and Open Space Element

A primary focus of the Conservation and Open Space Element is to provide direction to future growth and development in the County with respect to the conservation, management, and utilization of natural resources.

GOAL COS-4

Long-Term Viability of Water Supply. Achievement of long-term viability of the County's water quality and supply through balanced and regionally integrated water management.

Policies

COS-4.3 Storm Water Filtration. Require maximizing storm water filtration through the use of natural drainage patterns.

GOAL COS-5

Maintaining of High Quality Water Resources. Protection of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage system in order to maintain high-quality water resources.

Policies

COS-5.2 Minimizing Impervious Surfaces. Require development to minimize the use of impervious surfaces.

San Diego General Plan - Safety Element

The purpose of the Safety Element is to include safety considerations in the planning and decision-making process by establishing policies related to future development that will minimize the risk of personal injury, loss of life, property damage, and environmental damage associated with natural and man-made hazards.

GOAL S-9

Reduced Flood Hazards. Minimized personal injury and property damage from flood events.

Policies

S-9.1 Managing Development via Floodplain Maps. Manage development based on federal floodplain maps.

S-9.2 Minimizing Floodplain Development. Minimize new development in floodplains.

S-9.3 Siting Development to Minimize Flood Hazards. Require new development within mapped flood hazard areas to be sited and designed to minimize on-site and off-site flooding hazards.

GOAL S-10

Accommodation of Flood Events. Ensure that floodways and floodplains have acceptable capacity to accommodate flood events.

Policies

S-10.1 Limiting Land Uses Within Floodways. Limit new or expanded land uses within floodways. Support this goal by limiting new or expanded land uses within floodways.

S-10.2 Using Natural Channels. Require the use of natural channels for County flood control facilities.

S-10.3 Effectively Operating Flood Control Facilities. Require flood control facilities to be adequately sized, constructed, and maintained to operate effectively.

S-10.4 Minimizing Storm Water Impacts. Require new development to minimize storm water impacts.

S-10.5 Improving Drainage Facilities. Require new development to provide necessary on-site and off-site improvements to storm water runoff and drainage facilities.

S-10.6 Maintaining Existing Hydrology. Require new development to maintain existing area hydrology.

Project Site Conditions

The project site is located within the San Luis Rey River Hydrologic Area (903) and the San Luis Rey River Hydrologic Subarea (903.11). The site is located within a single watershed of approximately 1,373 acres. The local watershed elevations range from approximately 1,200 feet MSL east of the site to approximately 300 feet MSL downstream of the site. Surface water generally flows southward to Moosa Canyon. From Moosa Canyon, water generally flows northwestward approximately four miles to the San Luis Rey River.

Groundwater Geology

Pursuant to the County's 30-Year Annual Rainfall Map, average annual rainfall for the local watershed is between 15 and 18 inches per year (see Appendix P). Evapotranspiration is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an

indicator of how much water is needed for healthy plant growth and productivity. Estimates of evapotranspiration can be computed as part of assessments of groundwater resources.

According to the Preliminary Hydrogeologic Assessment, the project site falls within two evapotranspiration zones: Zone 6 and Zone 16. Annual reference evapotranspiration for Zone 6 and Zone 16 are 49.7 inches and 62.5 inches, respectively (see Appendix P).

The County overlies a complex groundwater resource that varies greatly throughout the region. The County has three general categories of aquifers that include fractured rock aquifers, alluvial and sedimentary aquifers, and desert basin aquifers. The project site is underlain by Mesozoic Era granitic rocks. Therefore, groundwater flow and storage is principally via the first of these categories, fractured rock aquifer.

Fractured rock aquifers typically have much less storage capacity than alluvial or sedimentary aquifers. As a result, pumping from wells completed in fractured rock typically produces a greater decline in water levels than a similar pumping rate for wells located in alluvium or sediments. Likewise, because less water is typically stored in fractured rock, seasonal variations in precipitation and drought conditions result in greater variations in water levels than in similar conditions in alluvial or sedimentary aquifers. However, overlying the fractured granitic rock is weathered granitic rock, also referred to as decomposed granite or residuum, which has some secondary porosity and therefore additional groundwater storage. Rock permeability within decomposed granite is typically relatively low. Overlying the granitic rocks, shallow alluvial sediment occurs within the drainages. The thickness and extent of the alluvial deposits have not been evaluated.

An on-site well inventory was developed by the Preliminary Hydrogeologic Assessment (Appendix P). Ten groundwater production wells currently exist on-site; nine are operational, with six main wells (described below) that serve four main agricultural areas identified as Zosa (Wells 1 and 2), Rahimi (Well 1), Flower Farm (Wells 1 and 2), and Dove Trail (Well 1).

The locations of the 10 groundwater production wells are identified on Figure 3.1-1. Six of the nine active wells have at least a five-year operational history, and the remaining active wells have a 16-month to two-year history of operation. Available flow meter data recorded over the past two to eight months, if extrapolated to an annual rate, suggests that the wells may produce on the order of 200 ac-ft of groundwater per year. This extrapolation should be relied upon only as an initial indication of the production capacity at the site and provides a point of comparison for the groundwater production estimate based on irrigation demand and VCMWD deliveries.

Groundwater production estimates were developed on-site at four areas that have been served for at least five years by water wells. This analysis suggests that the water wells with at least a five-year history of activity may have produced, on average, approximately 191 ac-ft per year.

Limited groundwater quality testing was included as part of the Hydrogeologic Assessment prepared for the project (see Appendix P). Groundwater samples were tested specifically for ionization, pH, electrical conductivity (to determine total dissolved solids [TDS]), and chloride levels. Results showed that TDS concentrations ranged from

1,408 to 1,857 milligrams per liter and chloride ranged from 312 to 511 milligrams per liter; a range considered high for irrigation, but not considered prohibitive for irrigation, especially if blended with potable water from VCMWD. Sodium was detected at 300 milligrams per liter.

Surface Water Hydrology/Water Quality

The San Diego Basin Plan lists the Lower San Luis Rey Hydrologic Unit beneficial surface uses as: municipal and domestic supply, agricultural supply, industrial service supply, hydropower generation, freshwater replacement, contact water recreation, warm freshwater habitat, cold freshwater habitat, and rare, threatened, or endangered habitat.

In the existing conditions, there are three sub-basins on the project site—the northerly, central, and southerly sub-basins. The northerly sub-basin (Basin 100) drains southwesterly along a web of natural drainage channels and into a major natural channel along the westerly project boundary. The central sub-basin (Basin 200) also drains southwesterly and into the same westerly natural channel along the westerly project boundary, approximately 1,000 feet southerly of the discharge point from the northerly sub-basin. The southerly sub-basin (Basin 300) drains westerly across the project site and into a tributary of the westerly natural channel (see Appendix U-2).

Runoff from the project site drains into the San Luis Rey River, which ultimately outfalls into the Pacific Ocean. According to the 2006 CWA 303(d) List, the lower 19 miles of the San Luis Rey River is impaired for chloride and TDS. Chloride and TDS levels usually occur from urban runoff/storm sewers being introduced into water systems. The Pacific Ocean shoreline at the San Luis Rey River is impaired for bacteria, which usually occurs from animal wastes.

Storm Water Drainage Systems

The local storm water conveyance system is designed to prevent flooding by transporting water away from developed areas. Unfiltered and untreated storm water can contain a number of pollutants that may eventually flow to surface waters. The chief cause of urban storm water pollution is the discharge of inadequately treated waste or pollutants into the natural water system.

Pollutants discharged to surface water from an easily defined and identified single point are known as point source pollution. Point sources generally discharge predictable concentrations and volumes of pollutants. Non-point source pollution refers to diffuse, widespread cumulative sources of pollution that cannot be traced back to a single point or source and is the primary source of surface water and groundwater contamination. This kind of pollution is often a by-product of poor land use practices, which do not incorporate adequate BMPs, and could include runoff from urban, agricultural, or industrial areas; landscaping; roads; or improperly managed construction sites.

The project site is currently undeveloped. No storm drain systems, except for culverts currently in place to allow runoff to follow existing drainage channels, presently exist within the project site.

Flooding and Dam Inundation

Flooding is a general or temporary condition of partial or complete inundation of normally dry land areas. Flooding is commonly associated with the overflow of natural rivers or streams, but can also occur near storm water facilities, dams, or in low-lying areas not designed to carry water. Flooding can be induced by precipitation or as a result of increased rates and amounts of runoff and altered drainage patterns. Additionally, flooding could result from dam failure, seiches, or tsunamis. Dam inundation is flooding caused by the release of impounded water from structural failure or overtopping of a dam. Seiches or tsunamis can result from abrupt movements of large volumes of water due earthquakes, landslides, volcanic eruptions, meteoric impacts, or onshore slope failure. The project site is not located within a mapped floodplain or within a County Dam Inundation Zone.

3.1.3.2 Analysis of Project Effects and Determination of Significance

The project would result in a significant impact if it would:

1. *Water Quality Standards and Requirements*: Violate any water quality or wastewater discharge standards or requirements.

2. *Groundwater Supply and Recharge*: Deplete groundwater supplies or interfere with groundwater recharge.

3. *Erosion or Siltation/Flooding*: Alter drainage resulting in erosion or siltation.

4. *Exceed Capacity of Storm Water System*: Create or contribute runoff exceeding the capacity of storm water drainage systems

5. *Housing within 100-year Flood Hazard Area*: Place housing within a 100-year flood hazard area, or place structures within a 100-year flood hazard area impeding or redirecting flood flows.

6. *Dam Inundation*: Create a risk due to flooding as a result of the failure of a dam.

7. *Seiche, Tsunami and Mudflow*: Create a risk due to Seiche, Tsunami and/or Mudflow.

Issue 1: Water Quality Standards and Requirements

Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, a project would have a significant adverse environmental effect if the project would violate any water quality standards or waste discharge requirements.

Analysis

The following discussion of impacts is organized into two subsections: (1) short-term construction activities; and (2) long-term post-construction use.

Short-Term Construction Activities

Proposed grading, excavation, and construction activities associated with the project could create a substantial additional source of polluted runoff which could have short-term impacts on surface water quality. These activities could include demolition; clearing and grading; excavation; stockpiling of soils and materials; and other typical construction activities. Pollutants associated with construction would degrade water quality if they are washed into surface waters. Sediment is often the most common pollutant associated with construction sites because of the associated earth-moving activities and areas of exposed soil. Hydrocarbons such as fuels, asphalt materials, oils, and hazardous materials such as paints and concrete discharged from construction sites could also result in impacts downstream. Debris and trash could be washed into existing storm drainage channels to downstream surface waters. These activities could impact aquatic habitat, upland wildlife and aesthetic land values.

Under the NPDES permit program, BMPs are identified for construction sites greater than one acre, in order to reduce the occurrence of pollutants in surface water. In compliance with applicable construction permits and the County WPO, a Major SWMP has been developed for the project to identify a preliminary list of BMPs, which would be implemented as project design features, to minimize disturbance, protect slopes, reduce erosion, and limit or prevent various pollutants from entering surface water runoff. As detailed in the Major SWMP, the project's temporary construction BMPs could include the following: street sweeping, waste disposal, vehicle and equipment maintenance, concrete washout area, materials storage, minimization of hazardous materials and proper handling and storage of hazardous materials. Typical erosion and sediment control measures include: silt fences; fiber rolls; gravel bags; temporary desilting basins; velocity check dams; temporary ditches or swales; storm water inlet protection; and soil stabilization measures. Implementation of these measures, as project design features, would assure that short-term impacts from construction related activities would not violate any water quality standards or waste discharge requirements. Impacts would be **less than significant**.

Long-term Post Construction Uses

The potential to degrade surface water quality remains after the project is constructed, especially from non-point source pollutants. For example, sediment discharge due to post-construction areas left bare; nutrients from fertilizers; household hazardous waste that is improperly disposed of, including heavy metals and organic compounds; trash and debris deposited in drain inlets by new residents; oil and grease; by products resulting from vehicle use, including heavy metals; bacteria and viruses; and pesticides from landscaping, agriculture or home use. The NPDES permit program, as authorized by the CWA, controls water pollution by regulating point sources that discharge pollutants into waters of the U.S. Point sources which require a NPDES permit are discrete conveyances such as pipes or man-made ditches. The project's residential component would be connected to a municipal system, and would not need an NPDES permit; however, other project component parts such as WRF would be required to obtain permits if their discharges go directly to surface waters and would be subject to BMPs and other requirements as conditions of approval to such permits.

Implementation of the project could also have the potential to contribute non-point source pollutants to surface water bodies in quantities that could violate water quality

standards. The project's residential component could increase urban runoff containing oil, grease, metals, TDS, sediments, fertilizers, and pesticides. The project would comply with General Plan policies, including LU-6.5, requiring LID and BMPs to be included in the project's design. LID is an approach to land development that works with nature to manage storm water as close to its source as possible. Source Control BMPs are intended to avoid or minimize the introduction of pollutants into the storm drain and natural drainage systems by reducing the potential generation of the pollutant at the point of origin. Treatment Control BMPs infiltrate, treat, or filter runoff from developed areas.

Potential LID strategies, along with permanent source control BMPs and treatment BMPs that would reduce the potential adverse environmental impacts associated with non-point source pollution are detailed in the project's Major SWMP. A few examples are as follows:

- LID strategies include conservation of natural areas and preservation of significant trees.

- Source control BMPs include storm drain inlets identified and marked, "No Dumping"; landscaping design minimizes irrigation runoff and use of drought tolerant plants and trees.

- Treatment control BMPs include use of irrigation and bioretention in landscaped areas and detention basins designed to allow for maintenance of runoff increases due to the proposed development, throughout the project site.

In order to assure on-going operation of the storm water treatment BMPs, the Major SWMP provides a discussion of funding sources for long-term maintenance. Prior to the establishment of the assessment district, a Maintenance Agreement, consistent with County's Standard Urban Stormwater Mitigation Plan (SUSMP), would be executed for those BMPs for which it is required under the SUSMP. In addition, a developer fee would be paid to cover the initial maintenance period. Thereafter, the HOA would be responsible for the long-term maintenance of BMPs.

The project could contribute pollutants such as sediments, hydrocarbons and paints in quantities that have the potential to degrade surface water quality. While County policies and regulations are intended to protect water quality, specific measures that implement these policies and regulations are included in the project's Major SWMP to ensure that the intended protections are achieved. As defined by the County's WPO, a Storm Water Pollution Prevention Plan (SWPPP) is a site-specific plan that identifies sources of pollutants and provides site-specific BMPs to prevent and control the off-site discharge of contaminants in storm water runoff. Through these design features, the project would not result in the violation of any water quality standards or waste discharge requirements. Impacts associated with this issue would be **less than significant**.

Issue 2: Groundwater Supplies and Recharge

Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, a project would have a significant adverse environmental effect if the project would substantially deplete groundwater

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

In addition to the CEQA Appendix G guideline, above, the County identifies conditions that, if met, would be considered a significant impact to groundwater resources (San Diego County 2007i). These additional guidelines focus on groundwater quantity and the project's effect on groundwater storage, overdraft, and well interference. A significant impact would result if a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that any time groundwater in storage is reduced by 50 percent or more as a result of groundwater extraction.

Analysis

Groundwater Depletion

As discussed above, it is extrapolated that the water wells produce, on average, approximately 191 ac-ft per year. The project's anticipated use of groundwater would not exceed the current use of 191 ac-ft. Any additional water demands would be fulfilled through the use of recycled water and imported potable water sources. As detailed in the WSA, Appendix Q of the EIR, water supplies necessary to serve the proposed project's needs have been accounted for in the VCMWD 2010 Urban Water Management Plan (UWMP) and it has been demonstrated that there would be sufficient potable water supplies to meet the project's demands. Subchapter 3.1.7 provides an additional discussion of redundancy and storage associated with the proposed project. Additionally, the PFAF from VCMWD, included in Appendix R of the EIR, indicates that facilities to serve the project would be available. Therefore, the project would not substantially deplete groundwater table levels. Impacts would be **less than significant**.

Groundwater Quality

A significant impact would result if groundwater resources proposed to be used as a potable water source exceeded state or federal maximum contaminant levels (MCLs).

The project proposes the use of groundwater, not to exceed 191 ac-ft per year, to supplement recycled water for irrigation during warm weather seasons. No use of groundwater to supplement potable water supplies is proposed. Therefore, **no impacts** associated with groundwater would occur.

Summary

The project would not result in significant impacts to groundwater levels or quality. The proposed use of groundwater for non-potable water use would not exceed that amount currently produced from on-site wells.

Issue 3: Erosion or Siltation/Flooding

Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, a project would have a significant adverse environmental effect if the project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

Analysis

The following discussion of impacts is organized into two subsections: (1) short-term construction activities and (2) long-term post construction use. Hydromodification refers to the changes in stream flows as a result of development such as increases in impervious areas, decreases in natural vegetation, and grading and compacting of soil, which could lead to impacts on the receiving waters in terms of erosion, sedimentation, and degradation of habitat.

Short-term Construction Activities

Project grading, excavation, and construction activities could increase the potential for erosion and sedimentation. Additionally, on-site use and storage of construction related hazardous materials could result in significant impacts to surface water quality if such materials reach downstream receiving waters.

As discussed above, a Major SWMP was prepared for the project providing a preliminary list of LIDs and BMPs as project design features to be employed during temporary construction activities. The implementation of these features would avoid erosion and water quality impacts by minimizing site disturbance during construction. Impacts would be **less than significant**.

Long-term Post Construction Uses

The project includes the construction of roadways, single-family residences, mixed-use residences, commercial uses, parks, a school, a WRF, and an on-site RF. These new uses could result in permanent alterations to existing drainage patterns by converting areas to impervious surfaces. Allowing the permanent development of impervious surfaces could increase runoff and potentially result in new or the worsening of existing erosion problems. State and local regulations including the NPDES which requires the development of a hydromodification management plan and a storm water management plan and the County WPO, assure that the project would account for such alterations in drainage. The project would be required to show conformance to the County's General Plan. Specifically, Policies LU-6.5 and COS 5.3 require new development to use LID techniques, and BMPs in project designs. Table 1-3, Hydrology and Water Quality, identifies all potential Site Design BMPs, LID requirements, Source Control BMPs, and Treatment Control BMPs as detailed in the Major SWMP prepared for the project. Additionally, Policy S-10.6 requires new development to maintain existing area hydrology. As detailed in the project's hydrology studies, the project has developed a comprehensive drainage plan (see below) as a means to reduce and slow increased

project runoff and maintain on-site hydrology. On-site riparian areas are further protected from long-term runoff on-site through dedicated buffers and open space easements intended to preserve the integrity of wetland vegetation (see subchapter 2.5, Biological Resources).

The project's drainage study provides calculations of anticipated increases of flow volumes and the HMP identifies the hydromodification measures to be employed by the project to reduce and eliminate potential impacts to receiving waters. Adding all grading limits and fire management buffer areas, the total disturbed area would be approximately 505.3 acres.

The proposed impervious areas are estimates based on the lot size, where the areas within each type's building envelop are assumed to be impervious. The roadway areas are calculated based on the measure length and width of the roads along with the length of proposed sidewalks. The impervious areas of mixed-use residences, Town Centers, and school is based on the lot size and projected impervious percentage – 70 percent impervious for mixed-use, 80 percent for Town Centers, and 90 percent for commercial and institutional areas. Pursuant to Appendix U-2 (Drainage Study), runoff volumes within each on-site sub-basin would be affected at the point of discharge as shown in Table 3.1-11~~9~~.

TABLE 3.1-11~~9~~
RUNOFF VOLUMES

	Basin 100	Basin 200	Basin 300
Pre-development	320.2 ac-ft	267.3 ac-ft	123 ac-ft
Post Development	345.3 ac-ft	249.4 ac-ft	132.9 ac-ft

ac-ft = acre-feet.

Under post-development conditions, the project design includes hydromodification mitigation ponds (also known as detention ponds) within each of the three sub-basins to mitigate the anticipated runoff volume increases as a result of the increase in impervious areas. The proposed ponds are designed for placement within each sub-basin and are adequately sized to store all the excessive runoff. The pond outlet structures, which would include an emergency outflow component and riprap at the discharge point, would be sized to restrict the peak runoff rate exiting these ponds at or below the pre-development conditions for both the ultimate 100-year storm event and the hydromodification compliant runoff from the 2-year to the 10-year events. Specifically, detention ponds with volumes of 26.0 ac-ft, 2.77 ac-ft (for hydromodification only), and 10.0 ac-ft would be provided for sub-basins 100, 200, and 300, respectively, (a total of 38.77 ac-ft). The location and required sizes of the detention basins are identified on the project's Land Use Plan, Figure 1-4. Through implementation of these design features, the proposed development would have a **less than significant impact** on downstream drainage facilities.

As discussed in Attachment 1 of Appendices U-1, U-2, and U-3 of the EIR, advancements in technology have created new choices in the enhancement of storm water treatment capabilities and facilities. Specifically, both rainwater capturing and the use of permeable pavers could result in the further reduction of a project's hydrologic footprint. Capturing rainwater before it becomes storm water not only decreases the

amount of storm water that needs to be treated, it also decreases the amount of water that would otherwise run off the land into local streams. Permeable pavers are a concrete pavement alternative that is comprised of bricks separated by joints filled with small stones. Water enters joints between solid concrete pavers and flows through an "open-graded" base allowing storm water capture and a reduction of runoff.

The project's Specific Plan would allow the use of rainwater capturing and permeable pavers as design elements for construction in both commercial and residential development areas. These design elements would be implemented in addition to those already considered in the analysis discussed above as an option to reduce the sizes of the proposed detention basins. As proposed, the three detention basins would provide adequate storm water storage. According to the Conceptual Rain Water Retention and Permeable Paver Analysis dated March 28, 2013 (Attachment 1 of Appendices U-1, U-2 and U-3 of the EIR), the use of rain barrels bioretention areas around each home could offer approximately 23.1 ac-ft of storage volume for runoff. The placement of 23 acres of permeable pavers would offer an additional 23.0 ac-ft of storage volume. If all three methods were used, a total potential storage volume could be up to 46.1 ac-ft. This could allow a reduction or removal of the detention basins for storm water retention purposes.

Summary

The project could result in the alteration of drainage patterns in a manner which could result in substantial erosion or siltation, or flooding due to excess runoff, on or off-site. County policies and regulations are intended to reduce adverse effects associated with excessive erosion or siltation. Specific project features that implement these policies and regulations are included in the project design to ensure that the intended environmental protections are achieved. These include the features identified in the Major SWMP, Drainage Study, and HMP discussed above and detailed in Appendices U-1, U-2 and U-3, respectively. The Drainage Study, Major SWMP and HMP concluded that the incorporation of the requisite LIDs, BMPs and hydromodification design features, including detention basins and sediment traps, would reduce impacts associated with excessive erosion or siltation, and flooding, on- or off-site flooding to less than significant. The future use of rainwater capturing and permeable pavers as design elements could provide additional or alternative measures to the use of the proposed detention basins.

Issue 4: Exceed Capacity of Storm Water System

Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, a project would have a significant impact if it would 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.

Analysis

Drainage facilities including storm drains, culverts, inlets, channels, curbs, roads, or other such structures are designed to prevent flooding by collecting storm water runoff and directing flows to either the natural drainage course and/or away from urban

development. If drainage facilities are not adequately designed, built, or properly maintained, the capacity of the existing facilities can be exceeded and result in flooding and increased sources of polluted runoff. As discussed above, implementation of the project could have the potential to substantially alter drainages and hydrology, during construction and post-construction activities, which would potentially increase runoff in volumes that could exceed the existing storm water drainage systems. Additionally, build-out of the project would increase the amount of impermeable surfaces throughout and potentially result in an excess of polluted runoff that would exceed the capacity of existing drainage facilities.

Compliance with General Plan policies assures that new developments reduce their potential to exceed storm water drainage systems. Specifically, Policies S-10.4 and S-10.5 require new development to minimize storm water impacts and provide necessary on-site and off-site improvements to storm water runoff and drainage facilities. Table 1-3, Hydrology and Water Quality, identifies all potential Site Design BMPs, LID requirements, Source Control BMPs and Treatment Control BMPs as detailed in the Major SWMP prepared for the project.

In conformance with these policies the project has developed a comprehensive drainage plan. As shown in Figure 1-13, runoff is directed from natural channels through development areas, collected at specified points, and released into existing drainage courses as it exits the development footprint. As discussed above, the placement of detention basins as a means to reduce and slow increased runoff would ensure that impacts associated with the exceedance of storm water drainage system capacity would be **less than significant**.

Issue 5: Housing within 100-year Flood Hazard Area

Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, a project would have a significant adverse environmental effect if the project would place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, or place within a 100-year flood hazard area structures which would impede or redirect flood flows.

Analysis

Flooding can inundate and cause water damage to structures, bury structures, knock them off their foundations, or completely destroy them by the impact of high velocity water and debris, which can include sizable boulders. Additionally, development along stream channels and floodplains can alter the capacity of a channel to convey water resulting in the inundation of a larger area upstream. Impacts resulting from flooding include the loss of life and/or property; health and safety hazards; disruption of commerce, water, power, and telecommunications services; loss of agricultural lands; and infrastructure damage.

The project site is not within a mapped flood hazard area. Therefore, development of the project would not result in the placement of housing within flood hazard area. Project impacts associated with housing in flood hazard areas would be **less than significant**.

Issue 6: Dam Inundation

Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, the project would have a significant impact if it would expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

Analysis

There are approximately 31 dams throughout the County that pose potential inundation risk in the event of a breach or failure. The project site is located near Keyes Creek; however, it is outside the mapped inundation zone. Therefore, project impacts associated with housing in flood hazard areas would be **less than significant**.

Issue 7: Seiche, Tsunami, and Mudflow

Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, a project would have a significant adverse environmental effect if the project would expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, or inundation by seiche, tsunami, or mudflow.

Analysis

A tsunami is a very large ocean wave caused by an underwater earthquake or volcanic eruption. Tsunamis can cause flooding to coastlines and inland areas less than 50 feet above sea level and within one mile of the shoreline. The project site is not located within an area subject to tsunami, and **no** impacts associated with this type of event would occur.

A seiche is a standing wave in a completely or partially enclosed body of water. Areas located along the shoreline of a lake or reservoir are susceptible to inundation by a seiche. The project site is not located within an area subject to sieche, and no impacts associated with this type of event would occur.

Debris flows, also known as mudflows, are shallow water-saturated landslides that travel rapidly down slopes carrying rocks, brush, and other debris. A mudflow occurs naturally as a result of heavy rainfall on a slope that contains loose soil or debris. Compliance with County General Plan Policies S-8.1 and S-8.2 prohibits development from contributing or causing slope instability. The project includes design measures, detailed in Table 1-3, Geology and Soils, that would reduce soil erosion. The application of these measures especially during construction and landscaping would assure the project's adherence to the General Plan policies. Therefore, land uses and development would not occur in areas considered susceptible to mudflows. Impacts would be **less than significant.**

3.1.3.3 Cumulative Impact Analysis

The geographic scope of the cumulative impact analysis for hydrology and water quality generally includes drainage basins, watersheds, water bodies or groundwater basins,

depending on the location of the potential impact and its tributary area. The project's cumulative study area is the sub-basin of the San Luis Rey River Hydrologic Area within which the project is located.

Water Quality Standards and Requirements

Construction and development associated with cumulative projects, such as those identified in subchapter 1.8 could contribute both point and non-point source pollutants to downstream receiving waters resulting in violations of water quality standards. However, development and construction proposed under most cumulative projects would be subject to regulations that require the inclusion of project design features ensuring compliance with water quality standards, including the CWA, Porter-Cologne Water Quality Control Act, NPDES, applicable basin plans, and local regulations and policies.

As discussed above, the project would have a less than significant impact to water quality standards or waste discharge requirement violations due to its inclusion of project design features such as LID strategies and storm water BMPs. Therefore, the project, in combination with the identified cumulative projects, would have a **less than significant cumulative impact** associated with water quality standards and requirements.

Groundwater Supplies and Recharge

Groundwater extraction, proposed by the project to supplement potable and recycled water use for irrigation, is not anticipated to exceed the current amount of withdrawal from active on-site wells (191 ac-ft/year). The project would not result in any impact to either groundwater depletion or withdrawal, and therefore, **would not contribute to a cumulatively considerable impact**.

Erosion or Siltation/Flooding

Cumulative projects identified in this analysis would result in multiple developments that could potentially alter existing drainage patterns in a manner that could result in substantial erosion, siltation or on or off-site flooding. It is reasonably foreseeable that some cumulative projects would occur simultaneously, which would compound the impacts. Cumulative projects could be expected to increase impervious surfaces within the area; however, like the project, each project within the cumulative project area would be required to conform to the same regulations and policies including the County's General Plan and WPO, resulting in each project's reduction of potentially polluted runoff during and after construction. Additionally, each project would be required to prepare a SWMP, hydrology report, and HMP report to show how each would maintain pre-development discharge rates and volumes of runoff.

The project includes design features, including construction BMPs, storm water LID and BMPs, and hydromodification/detention basins that would eliminate potential erosion, siltation and flooding impacts or reduce such impacts to less than significant levels. Therefore, the project, in combination with the identified cumulative projects, would have a **less than significant cumulative impact** associated with erosion, siltation, and flooding on- and off-site.

Exceed Capacity of Storm Water System

Impermeable surfaces, constructed with cumulative projects, could contribute substantial quantities of runoff which could exceed the capacity of existing storm water drainage systems, while contributing to substantial additional sources of polluted runoff. However, the majority of cumulative projects would be subject to CEQA review, and local regulations, including the County's General Plan and WPO, that require development to construct storm water drainage systems so that they would not cause flooding. Therefore, the project, in combination with the identified cumulative projects, **would not contribute to a significant cumulative impact** associated with the capacity of storm water systems.

Housing within 100-year Flood Hazard Area

It is expected that cumulative projects would be required to comply with applicable regulations that would prevent the construction of structures in floodways and floodplains. Therefore, through regulation, a cumulative impact would not occur. The project would not place any structures within a 100-year floodplain; therefore, in combination with the identified cumulative projects, **would not result in a cumulatively considerable impact** associated with impeding or redirecting flood flows.

Dam Inundation

Multiple regulations exist, including local regulatory policies that would be expected to avoid any potential impacts. A cumulative impact would not occur. Therefore, the project, in combination with the identified cumulative projects, **would not contribute to a significant cumulative impact** associated with dam inundation.

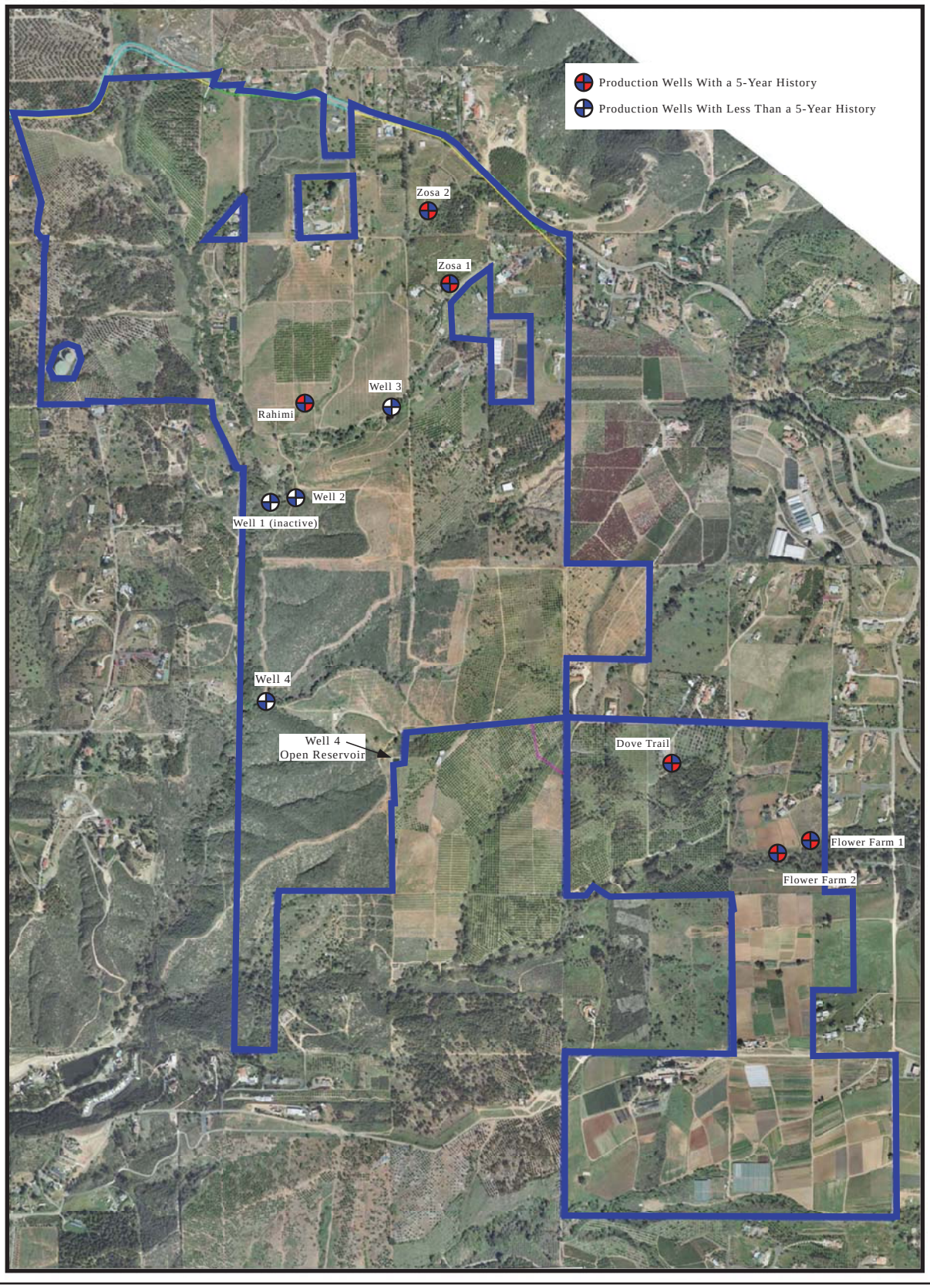
Seiche, Tsunami and Mudflow

Cumulative projects would be subject to CEQA review, in addition to compliance with applicable regulations and impacts would be avoided or reduced to a level below significant. A cumulative impact would not occur. Therefore, the project, in combination with the identified cumulative projects, **would not contribute to a significant cumulative impact** associated with mudflow hazards.

3.1.3.4 Conclusion

The SWMP, Drainage Study, and HMP have all been prepared in accordance with the WPO and other relevant regulations. These studies conclude that the project would not significantly alter overall drainage patterns associated with the surrounding area. Sediment discharge would be reduced or eliminated through storm water BMPs and the long-term incorporation of on-site detention facilities. Construction and post-construction LIDs and BMPs would be implemented as part of the project design to protect water quality and to ensure the use of water for beneficial uses to the maximum extent possible. The project would not exceed current groundwater usage and would increase groundwater recharge due to its proposed use of imported potable water to supplement irrigation. With design measures, BMPs, and conformance with regulations and General Plan policies, direct and cumulative impacts to hydrology and water quality would be less than significant.

Map Source: Wiedlin and Associates 2012



0 Feet 700

FIGURE 3.1-1
Location of Existing Wells on Project Site

RECON

M:\JOBS4\6153\env\graphics\fig3.1-1.ai 06/12/13