# 4.4 HYDROLOGY AND WATER QUALITY

## 4.4.1 INTRODUCTION

The Hydrology and Water Quality section of the EIR evaluates potential impacts of the proposed project with respect to increases in stormwater runoff, on- and off-site flooding, and degradation of water quality. Information for this section was drawn primarily from the *Davis General Plan*[1] and associated EIR,[2] the City of Davis *Final 2015 Urban Water Management Plan (UWMP)*,[3] and the *Preliminary Utility Study* prepared for the proposed project by Cunningham Engineering.[4] It should be noted that impacts associated with water supply and conveyance are addressed in Section 4.8, Utilities and Service Systems, of this EIR.

## 4.4.2 EXISTING ENVIRONMENTAL SETTING

The section below describes regional and local hydrology and water quality.

**Regional Hydrology**

The proposed 7.19-acre project site is located in the City of Davis, within Yolo County at the southwestern end of the Sacramento Valley, approximately 30 miles north of the confluence of the San Joaquin and Sacramento Rivers. The Sacramento Valley is bordered by the Coast Ranges and Delta on the west and the foothills of the Sierra Nevada to the east. Water resources in this region include rivers, streams, sloughs, marshes, wetlands, channels, harbors, and underground aquifers.

Climate and Rainfall

Summers in the City of Davis are warm and dry, and winters are cool and mild. The region is subject to wide variations in annual precipitation, and also experiences dry periods and wild fires in the regional watershed and surrounding areas. The temperature range is approximately 30 to 100 degrees Fahrenheit (ºF), with an annual average of 61ºF.[5]

Watersheds

The City of Davis is located in the Sacramento River Hydrologic Region, which covers approximately 17.4 million acres (27,200 square miles) and all or large portions of Modoc,

1 City of Davis. *Davis General Plan.* Adopted May 2001. Amended through January 2007.
2 City of Davis. *Program EIR for the City of Davis General Plan Update and Project EIR for Establishment of a New Junior High School*. January 2000.
3 City of Davis. *Final 2015 Urban Water Management Plan.* June 2016.
4 Cunningham Engineering. *Preliminary Utility Study for 3820 Chiles Road, Davis, CA.* October 6, 2017.
5 City of Davis. *Program EIR for the City of Davis General Plan Update and Project EIR for Establishment of a New Junior High School [pg. 5G-1]*. January 2000.

Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa counties. Small areas of Alpine and Amador counties are also within the region.

Geographically, the region extends south from the Modoc Plateau and Cascade Range at the Oregon border, to the Sacramento–San Joaquin Delta. The Sacramento Valley, which forms the core of the region, is bounded to the east by the crest of the Sierra Nevada and southern Cascades and to the west by the crest of the Coast Range and Klamath Mountains. Other significant features include Mount Shasta and Lassen Peak in the southern Cascades, Sutter Buttes in the south-central portion of the valley, and the Sacramento River, which is the longest river system in the State of California, with major tributaries: the Pit, Feather, Yuba, Bear, and American Rivers.

*Valley Putah-Cache Hydrologic Unit*

The City of Davis is located within the Valley Putah-Cache Hydrologic Unit. For purposes of regional planning, hydrologic units are generally considered to be the appropriate watershed planning level. However, the hydrologic unit level is generally too large in terms of a planning scale for individual projects; and a hydrologic area or hydrologic subarea may be considered more appropriate.

Lower Putah Creek Hydrologic Area

Within the Valley Putah-Cache Hydrologic Unit, the City of Davis is located within the Lower Putah Creek Hydrologic Area. This watershed is approximately 225,301 acres and is bound by Putah Creek to the south and Cache Creek to the north. The headwaters of the watershed begin just west of Winters, near Lake Berryessa, and extend to the east, approximately 25 miles, to the Yolo Bypass. 17 water bodies within the Lower Putah Creek Hydrologic Area are on the 303(d) list (list of impaired and threatened waters), six of which have a Total Maximum Daily Load (TMDL) for various pollutants. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. None of the listed 303(d) water bodies are located in the vicinity of the project site.

**Local Hydrology**

The City's planning area, as defined by the City of Davis' General Plan, is drained by the Old North Fork of the Putah Creek and the Willow Slough Bypass. The old North Fork of Putah Creek, which flows through the UC Davis Arboretum, receives drainage from South Davis.

The California Department of Water Resources (DWR) maintains the Willow Slough Bypass, which directs water away from Willow Slough and Dry Slough, in the eastern section of the Davis planning area, and carries water eastward to the Yolo Bypass at the eastern boundary of the planning area. The Willow Slough Bypass consists predominately of runoff from agricultural lands to the north of the City. The Yolo Bypass, which runs north-south, is flooded when the Sacramento River carries high stormwater runoff levels. Water is released into the Yolo Bypass from the Fremont Weir located downstream from Knight's Landing.

The Lower Putah Creek Hydrologic Area comprises four principal watersheds totaling 198 square miles. The project site is located within the East Davis watershed of the Lower Putah Creek Hydrologic Area.[6]

The City's stormwater system collects stormwater from the 11 basins within the City and conveys the stormwater out of the City (see Figure 4.4-1). Rainfall runoff flows by gravity into the City's six detention basins and one retention basin (Stonegate). Pump stations lift water from these facilities into main drainage channels: the Covell Drainage Channel, Channel A, Mace Ranch Park Drainage Channel, and the El Macero Drainage Channel. These channels ultimately drain to the Yolo Bypass, east of the City. The Covell Channel and Channel A flow together north of the City to the Willow Slough Bypass, via a flapper gate. Only in high water events, when enough water is present in the channel, can water then be pumped to the south cell of the Davis Wetlands, and then to Yolo Bypass. Otherwise, stormwater in Channel A flows out through the Willow Slough Bypass to the Yolo Bypass. The Mace Ranch Park Drainage Channel flows east to the western levee of the Yolo Bypass, and then discharges via gravity into the Yolo Bypass. The El Macero Drainage Channel flows east to the western levee of the Yolo Bypass, where waters are pumped into the Yolo Bypass. The Yolo Bypass comprises multiple wetland areas, including the Yolo Basin Wetland. The City of Davis maintains the El Macero Drainage Channel and the Mace Ranch Park Channel. The project site is within the South Davis Basin. Figure 4.4-1 presents the basins and the flow paths of the stormwater system.

Project Site Drainage

Currently, the proposed project site is developed with a two-story, 53,248-square foot (sf) office building and associated site improvements, including two surface parking lots located to the north and east of the building, respectively. An existing 24-inch storm drain main is located adjacent to the project site within Chiles Road. A second, 15- to 24-inch storm drain is located west of the site in La Vida Way. Drainage entering such facilities ultimately flows through the El Macero Drainage Channel and discharges at the Yolo Bypass.

**Water Supply**

Historically, groundwater was the sole potable water supply source for the City. However, in June 2016, the City began using treated wholesale surface water from the Woodland-Davis Clean Water Agency's (WDCWA) Regional Water Treatment Facility.[7] With operation of the WDCWA's Regional Water Treatment Facility, treated surface water is replacing groundwater as the main source of water supply. Nevertheless, the City will continue to rely as needed during high demand periods.[8]

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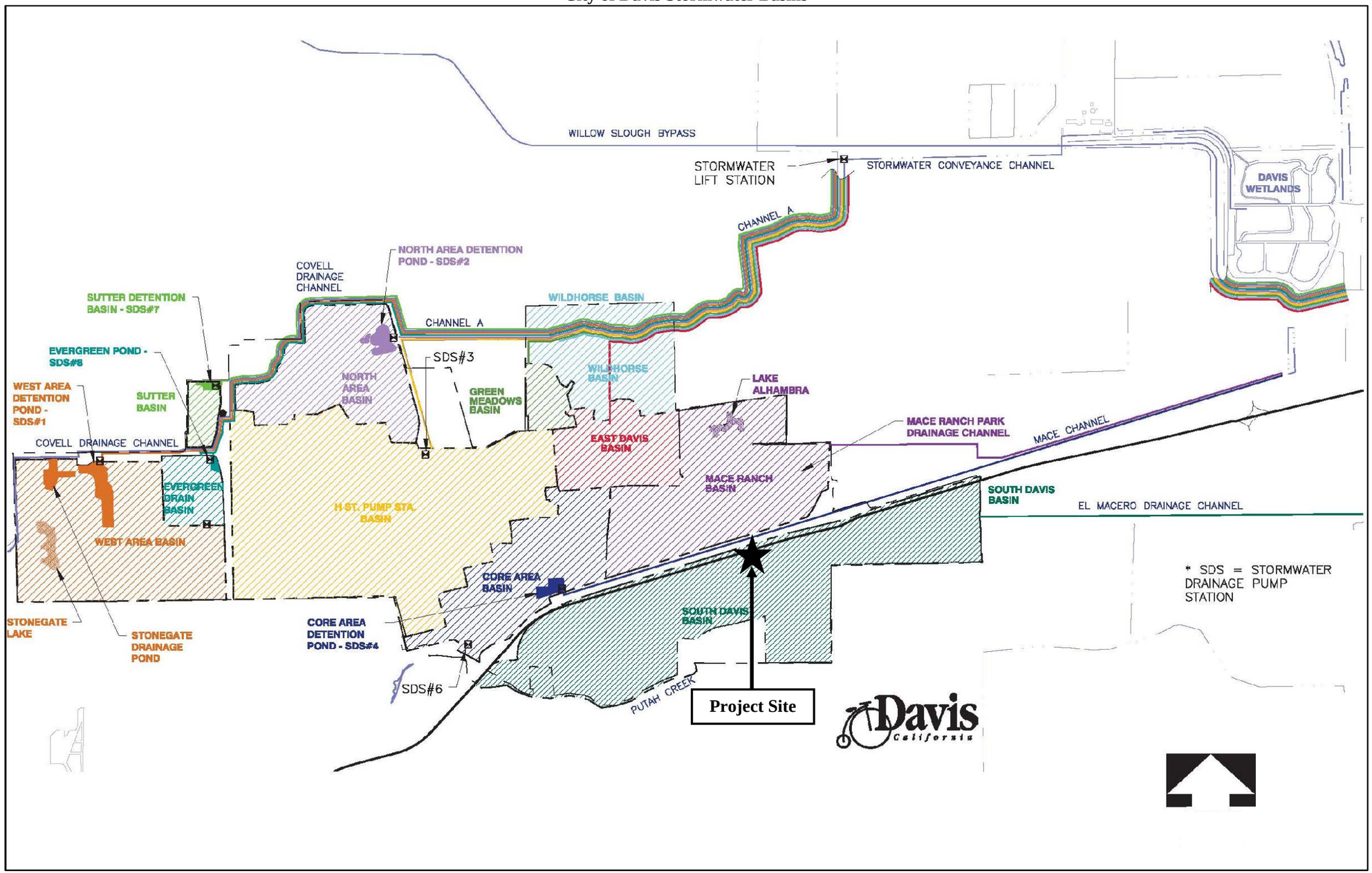
6 Yolo County Flood Control & Water Conservation District. *Covell Drainage System Comprehensive Drainage Plan* [Map 1]. September 1993.

7 Woodland-Davis Clean Water Agency. *Project Overview*. Available at: http://www.wdcwa.com/project-overview. Accessed January 2018.

8 Woodland-Davis Clean Water Agency. *Introduction to Surface Water*. March 2016.

**Figure 4.4-1**
**City of Davis Stormwater Basins**




*Source: Brown and Caldwell. Water Supply Assessment. February 2015.*

Groundwater Supply

The City has historically obtained groundwater from both the deep and intermediate depth aquifers of the Yolo Basin within the larger Sacramento Valley groundwater basin. Both the City and UC Davis primarily relied on the deep aquifer due to the generally better quality of the deep aquifer, in terms of hardness and total dissolved solids, compared to water produced from the intermediate depth aquifer. With the operation of the Regional Water Treatment Facility, intermediate groundwater wells will only be used as emergency supplies or as raw water for park irrigation.

Aquifers in the Davis area are recharged by percolation of rainfall and to a lesser extent irrigation water. Other significant sources include infiltration in streambeds, channels, and the Yolo Bypass. Relatively course-grained deposits line both Putah and Cache Creeks, allowing substantial infiltration. The deep aquifer has a much longer recharge period as compared to the intermediate depth aquifer, on the order of thousands of years versus hundreds of years, respectively.[9] Additional groundwater aquifer information is provided in Section 4.8, Utilities and Service Systems, of this EIR.

Wholesale Surface Water Supply

The City of Davis is now under contract to purchase wholesale surface water from the WDCWA to use in combination with groundwater from the deep wells. The WDCWA participants consist of the City of Davis, City of Woodland, and UC Davis. The Regional Water Treatment Facility began operation in June 2016. Per the WDCWA, the Regional Water Treatment Facility is capable of supplying up to 30 million gallons per day (mgd) of water, with an option for future expansion to 34 mgd. Of the 34 mgd of water supplied, the City of Davis is allocated approximately 10.2 mgd.[10] Additional information regarding surface water supplies is provided in Section 4.8, Utilities and Service Systems, of this EIR.

**Water Quality**

The following section provides a summary of groundwater and surface water quality within the City of Davis.

Groundwater Quality

The quality of groundwater in the Davis Planning Area affects the City's drinking water supply and wastewater quality. The intermediate depth aquifer in the City's Planning Area is affected by water quality issues related to dissolved solids. In particular, groundwater from intermediate wells can be affected by high concentrations of nitrates, iron, manganese, and selenium, which lead to taste and odor issues.

9 City of Davis. *Final 2015 Urban Water Management Plan.* June 2016.

10 Woodland-Davis Clean Water Agency. *Project Overview*. Available at: https://www.wdcwa.com/project-overview/. Accessed January 2018.

Groundwater from deep aquifers in the City's Planning Area tends to be less affected by dissolved solids and other water quality problems. In recent years, the City has constructed deeper wells to access the relatively higher quality groundwater from the deep aquifers. However, because the deep aquifer is hydrologically connected to the intermediate aquifer in the City's Planning Area, the potential exists for deep well pumping to allow vertical flow of lower quality groundwater from the intermediate aquifer, down into the deep aquifer. The extent to which the vertical flow of groundwater from intermediate level aquifers to deep aquifers could impact groundwater quality in the future is currently unknown.

Surface Water Quality

Water is essential to recreation, the viability of agriculture, and the development of housing, commerce, and industry, as well as the maintenance of high-quality fish and wildlife habitats. Potential hazards to surface water quality include but are not limited to, the following nonpoint pollution problems: high turbidity from sediment resulting from erosion activity on improperly graded construction projects; concentration of nitrates and dissolved solids from agriculture or pet wastes; contaminated street and lawn runoff from urban areas; and excessive chlorine, high biochemical oxygen demand (BOD), or too high or low pH from pool or spa water discharges. Urban runoff includes household chemicals (including pesticides, herbicides, and paints), pool water discharges (chlorine, acid, diatomaceous earth, and algae), pet wastes (fecal coliform), yard wastes (excessive BOD), residential projects (sediments, concrete and mortar), commercial drool from improperly stored garbage, food wastes and chemicals, as well as petroleum products from automobiles and landscaping equipment. Municipal sources of pollution include government yards where transportation, fueling, and maintenance activities take place.

A critical period of surface water quality is following a rainstorm which produces significant amounts of drainage runoff into streams at low flow, resulting in poor dilution of contaminants in the low flowing stream. Such conditions are most frequent during the fall at the beginning of the rainy season when stream flows are near their lowest annual levels and contaminants have accumulated on impervious surfaces over the drier summer months. Besides greases, oils, pesticides, litter, and organic matter associated with such runoff, heavy metals such as copper, zinc, and cadmium can cause considerable harm to aquatic organisms when introduced to streams in low flow conditions.

Surface water pollution is also caused by erosion. Excessive and improperly managed grading, vegetation removal, and agricultural practices can lead to increased erosion of exposed earth and sedimentation of watercourses during rainy periods. In slower moving water bodies, these same factors often cause a buildup of sediment, which ultimately reduces the capacity of the water system to percolate and recharge groundwater basins, as well as adversely affect both aquatic resources and flood control efforts.

### 4.4.3 REGULATORY CONTEXT

The following is a description of federal, State, and local environmental laws and policies that are relevant to the review of hydrology and water quality under the California Environmental Quality Act (CEQA) process.

**Federal Regulations**

The following are the federal environmental laws and policies relevant to hydrology and water quality.

Federal Emergency Management Agency

FEMA is responsible for determining flood elevations and floodplain boundaries and utilizing U.S. Army Corps of Engineers (USACE) levee information and other studies. FEMA is also responsible for distributing the Flood Insurance Rate Maps (FIRMS), which are used in the National Flood Insurance Program (NFIP). Such maps identify the locations of special flood hazard areas, including the 100-year floodplains.

FEMA allows non-residential development in the floodplain; however, construction activities are restricted within the flood hazard areas, depending upon the potential for flooding within each area. Federal regulations governing development in a floodplain are set forth in Title 44, Part 60 of the Code of Federal Regulations (CFR). These standards are implemented at the State level through construction codes and local ordinances; however, these regulations only apply to residential and non-residential structure improvements. CFR Section 60.3(c)(10) restricts cumulative development from increasing the water surface elevation of the base flood by more than one foot within the floodplain.

Federal Clean Water Act

The National Pollutant Discharge Elimination System (NPDES) permit system was established in the federal Clean Water Act (CWA) to regulate municipal and industrial discharges to surface waters of the U.S. Each NPDES permit contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits. Section 307 of the CWA describes the factors that EPA must consider in setting effluent limits for priority pollutants.

Nonpoint sources are diffuse and originate over a wide area rather than from a definable point. Nonpoint pollution often enters receiving water in the form of surface runoff, but is not conveyed by way of pipelines or discrete conveyances. As defined in the federal regulations, such nonpoint sources are generally exempt from federal NPDES permit program requirements. However, two types of nonpoint source discharges are controlled by the NPDES program – nonpoint source discharge caused by general construction activities, and the general quality of stormwater in municipal stormwater systems.

Section 402 of the CWA mandates that certain types of construction activities comply with the requirements of the NPDES stormwater program. The Phase II Rule, issued in 1999, requires that construction activities that disturb land equal to or greater than one acre require permitting under the NPDES program. In California, permitting occurs under the General Permit for Stormwater Discharges Associated with Construction Activity, issued to the State Water Resources Control Board (SWRCB), implemented and enforced by the nine Regional Water Quality Control Boards (RWQCBs).

All dischargers with projects that include clearing, grading or stockpiling activities expected to disturb one or more acres of soil are required to obtain compliance under the NPDES Construction General Permit Order 2009-0009-DWQ. This General Permit requires all dischargers, where construction activity disturbs one or more acres, to take the following measures:

1. Determine risk level of the site and file a Notice of Intent with the SWRCB electronically;
2. Keep records of all of the following: rainfall events, actions taken in response to monitoring, any samples taken, training of site employees and contractors, and provide these in an annual report to the RWQCB electronically;
3. Describe types and placement of Best Management Practices (BMPs) in the Stormwater Pollution Prevention Plan (SWPPP) that will be used to protect storm water quality;
4. Provide a visual and chemical (if non-visible pollutants are expected) monitoring program for implementation upon BMP failure; and
5. Provide a sediment monitoring plan if the area discharges directly to a water body listed on the 303(d) list for sediment.

To obtain coverage, a SWPPP must be submitted to the RWQCB electronically and a copy of the SWPPP must be submitted to the City of Davis. When project construction is completed, the landowner must file a Notice of Termination (NOT).

*Construction Site Runoff Management*

In accordance with NPDES regulations, in order to minimize the potential effects of construction runoff on receiving water quality, the State requires that any construction activity affecting one (1) acre or more must obtain a General Construction Activity Stormwater Permit. Permit applicants are required to prepare a SWPPP and implement BMPs to reduce construction effects on receiving water quality by implementing erosion and sediment control measures.

**State Regulations**

The following are the State environmental laws and policies relevant to hydrology and water quality.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, as revised in December, 2007, provides for protection of the quality of all waters of the State of California for use and enjoyment by the people of California. It further provides that all activities that may affect the quality of waters of the State shall be regulated to obtain the highest water quality that is reasonable, considering all demands being made and to be made on those waters. The Act also establishes provisions for a statewide program for the control of water quality, recognizing that waters of the State are increasingly influenced by interbasin water development projects and other statewide considerations, and that factors such as precipitation, topography, population, recreation, agriculture, industry, and economic development vary regionally within the state. The statewide program for water quality control is therefore administered most effectively on a local level, with statewide oversight. Within this framework, the Act authorizes the SWRCB and regional boards to oversee responsibility for

the coordination and control of water quality within California, including those responsibilities under the Federal Clean Water Act that have been delegated to the state.

State Water Resources Control Board

The SWRCB and the RWQCB are responsible for ensuring implementation and compliance with the provisions of the federal CWA and California's Porter-Cologne Water Quality Control Act. The project site is situated within the jurisdiction of the Central Valley Region of the RWQCB (Region 5). The CVRWQCB has the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within the CVRWQCB's jurisdiction.

Central Valley Regional Water Quality Control Board

As authorized by the Porter-Cologne Water Quality Control Act, the CVRWQCB primary function is to protect the quality of the waters within its jurisdiction for all beneficial uses. State law defines beneficial uses of California's waters that may be protected against quality degradation to include, but not be limited to: domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

The CVRWQCB implements water quality protection measures by formulating and adopting water quality control plans (referred to as basin plans, as discussed below) for specific groundwater and surface water basins, and by prescribing and enforcing requirements on all agricultural, domestic, and industrial waste discharges. The CVRWQCB oversees many programs to support and provide benefit to water quality, including the following major programs: Agricultural Regulatory; Above-Ground Tanks; Basin Planning; CALFED; Confined Animal Facilities; Landfills and Mining; Non-Point Source; Spills, Leaks, Investigations, and Cleanups (SLIC); Storm Water; TMDL; Underground Storage Tanks (UST); Wastewater Discharges (including the NPDES); Water Quality Certification; and Watershed Management.

**Local Regulations**

The following are the local environmental laws and policies relevant to hydrology and water quality.

City of Davis General Plan

The following City of Davis General Plan policies relating to hydrology and water quality are applicable to the proposed project.

Goal WATER 2 Ensure sufficient supply of high quality water for the Davis Planning Area.

Policy WATER 2.1 Provide for the current and long-range water needs of the Davis Planning Area, and for protection of the quality and quantity of groundwater resources.

Policy WATER 2.2 Manage groundwater resources so as to preserve both quantity and quality.

Policy WATER 2.3 Maintain surface water quality.

Goal WATER 3 Design stormwater drainage and detention facilities to maximize recreational, habitat and aesthetic benefits.

Policy WATER 3.1 Coordinate and integrate development of storm ponds and channels City-wide, to maximize recreational, habitat and aesthetic benefits.

Policy WATER 3.2 Coordinate and integrate design, construction, and operation of proposed stormwater retention and detention facilities City-wide, to minimize flood damage potential and improve water quality.

Goal HAZ 1 Provide flood protection which minimizes potential damage, while enhancing recreational opportunities and wildlife habitats and water quality.

Policy HAZ 1.1 Site and design developments to prevent flood damage.

Policy HAZ 1.2 Continue to provide flood control improvements that are sensitive to wildlife habitat and open space preservation.

South Davis Specific Plan

Goals, objectives, and policies from the Drainage section of the South Davis Specific Plan Community Facilities Element are provided below.

*Drainage*

Goal Ensure that the South Davis has adequate drainage facilities to prevent flooding.

Objective 1 Extend City Standards for drainage to new development in South Davis.

Objective 2 Prevent flooding and potential structural damage during peak rainfall conditions.

Policy 1 Provide on-site drainage system constructed to City standards.

Policy 2 Provide for the enlargement of the pump capacity at the Yolo bypass.

Policy 3 Provide for a drainage system that allows no significant flooding during the ten-year storm with all pipes and channels to be designed to carry this flow.

Policy 4 Development projects shall be designed to prevent flood damage to structures during a 100-year storm. The design shall include routing of the runoff from the event.

City of Davis Municipal Code

Chapter 30, Stormwater Management and Discharge Control, contains standards related to stormwater facilities. In particular, Chapter 30 enforces the State's NPDES General Permit requirements for Stormwater Discharges Associated with Construction Activity (NPDES General Permit No. CAS000002), and the State of California NPDES Phase II Small Municipal Separate Storm Sewer System General Permit for applicable projects.

## 4.4.4 IMPACTS AND MITIGATION MEASURES

This section describes the standards of significance and methodology utilized to analyze and determine the proposed project's potential impacts related to hydrology and water quality. A discussion of the project's impacts, as well as mitigation measures where necessary, is also presented.

**Standards of Significance**

According to CEQA Guidelines, an impact is considered significant if the proposed project would result in any of the following:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);
- 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 that would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- 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;

- Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- Expose people or structures to significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Result in inundation by seiche, tsunami or mudflow.

Issues Not Discussed Further

The proposed project is not located within a 100-year flood hazard area.[11] The proposed project site is within Flood Hazard Zone X, which is described by FEMA as an area of minimal flood hazard. Therefore, development of the proposed project would not place housing within a 100-year flood hazard zone nor place structures within a 100-year floodplain that would impede or redirect flood flows, and restrictions on development or special requirements associated with flooding are not requisite for the project. Issues related to the placement of housing or structures within a 100-year flood hazard zone and providing the applicable urban level of flood protection, are not further discussed.

In addition, the project area is not located near any large bodies of water that would pose a seiche or tsunami hazard. The nearest large body of water, Lake Berryessa, is located approximately 27 miles west of the project site. The project site is relatively flat and is not located near any physical or geologic features that would produce a mudflow hazard. Therefore, no impact would occur related to inundation by seiche, tsunami, or mudflow. Issues related to seiche, tsunami, and mudflow hazards are not further discussed.

For the aforementioned reasons, the Initial Study prepared for the proposed project (see Appendix C) determined that development of the proposed project would result in no impact or a less-than-significant impact related to the following:

- 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;
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- Expose people or structures to significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Result in inundation by seiche, tsunami or mudflow.

**Method of Analysis**

The Preliminary Utility Study prepared for the proposed project includes detailed calculations quantifying the runoff that would be created by the proposed impervious and pervious surfaces. The rainfall/runoff analysis and detention routing was conducted using a Hydrologic Modeling System (HEC-HMS). Within HMS, the response of each sub-basin element was computed using a combination of the USBR (Sacramento region) unit hydrograph method and the initial/constant loss method. Both existing (pre-project) and the proposed (post-project) conditions were modeled.

[11] Federal Emergency Management Agency. *Flood Insurance Rate Map: 06095C0100E*. Effective May 4, 2009.

The Preliminary Utility Study focuses on the Preferred Site Plan. According to Cunningham Engineering, the drainage analysis for the Preferred Site Plan generally translates to the site plan for Alternative B as well.[12]

**Project-Specific Impacts and Mitigation Measures**

The following discussion of impacts is based on the implementation of the proposed project in comparison with the standards of significance identified above.

**4.4-1 Violate any water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality through erosion during construction. Based on the analysis below and with implementation of mitigation, the impact is *less than significant.***

Construction would require demolition, grading, excavation, and other construction-related activities that could cause soil erosion at an accelerated rate during storm events. All such activities have the potential to affect water quality and contribute to localized violations of water quality standards if stormwater runoff from construction activities enters receiving waters.

Construction activities such as grading, excavation, and trenching for site improvements would result in the disturbance of on-site soils. The exposed soils have the potential to affect water quality in two ways: 1) suspended soil particles and sediments transported through runoff; or 2) sediments transported as dust that eventually reach local water bodies. Spills or leaks from heavy equipment and machinery, staging areas, or building sites also have the potential to enter runoff. Typical pollutants include, but are not limited to, petroleum and heavy metals from equipment and products such as paints, solvents, and cleaning agents, which could contain hazardous constituents. Sediment from erosion of graded or excavated surface materials, leaks or spills from equipment, or inadvertent releases of building products could result in water quality degradation if runoff containing the sediment or contaminants should enter receiving waters in sufficient quantities. Impacts from construction-related activities would generally be short-term and of limited duration.

Because development of the site would require construction activities that would result in a land disturbance greater than one acre, the applicant would be required by the State to obtain a General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit), which pertains to pollution from grading and project construction. Compliance with the Permit requires the applicant to file a Notice of Intent (NOI) with the SWRCB and prepare a SWPPP prior to construction. The SWPPP would incorporate BMPs in order to prevent, or reduce to the greatest feasible extent, adverse impacts to water quality from point sources and erosion and sedimentation. Without the project's required compliance with the SWRCB standards, construction activities related to the proposed project could result in a ***significant*** impact related to the

[12] Panagopoulos, Andi, Project Planning Manager, Cunningham Engineering. Personal Communication [email] with Nick Pappani, Vice President, Raney Planning & Management, Inc. May 15, 2018.

violation of water quality standards, discharge requirements, or the creation of a substantial additional source of polluted runoff.

Mitigation Measure(s)
Implementation of the following mitigation measure for both the Preferred Site Plan and Alternative B would reduce the above impact to a *less-than-significant* level.

*4.4-1* *Prior to initiation of any ground disturbing activities, the project applicant shall prepare a SWPPP, and implement BMPs that comply with the Stormwater Construction General Permit from the RWQCB, to reduce water quality effects during construction. Such BMPs may include but not be limited to: temporary erosion control measures such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, watering down disturbed soil during grading activities, suspending grading or dirt disturbing activities during wind events in excess of 25 miles per hour, stabilized construction entrances, and temporary revegetation. Other BMPs may include, but be not limited to, good housekeeping practices such as concrete washout facilities, containerizing construction materials, keeping public street front clean of sediments, placing drainage inlet protection on any drainage inlets onsite or downstream of the project site, and having still response kits on-site. The SWPPP shall be kept on-site and implemented during construction activities and shall be made available upon request to representatives of the City of Davis and/or RWQCB.*

**4.4-2 Violate any water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality during operations. Based on the analysis below and with implementation of mitigation, the impact is *less than significant.***

The proposed project involves the demolition of the existing commercial structure and associated parking lot and subsequent construction of a residential development and associated improvements. All existing on-site stormwater drainage infrastructure would be removed. In total, the Preferred Site Plan would include the creation of approximately 207,800 sf (4.77 acres) of impervious areas, including roofs, asphalt, and concrete. Alternative B would result in a similar overall amount of impervious surface.

The proposed residential uses could result in new stormwater pollutants being introduced to the project area. Pollutants associated with the operational phase of the proposed project could include nutrients, oil and grease, metals, organics, pesticides, bacteria, sediment, trash, and other debris. Nutrients that could be present in post-construction stormwater include nitrogen and phosphorous resulting from fertilizers applied to landscaping. Excess nutrients could affect water quality by promoting excessive and/or a rapid growth of aquatic vegetation, which reduces water clarity and results in oxygen depletion. Oil and grease could enter stormwater from vehicle leaks, traffic, and maintenance activities.

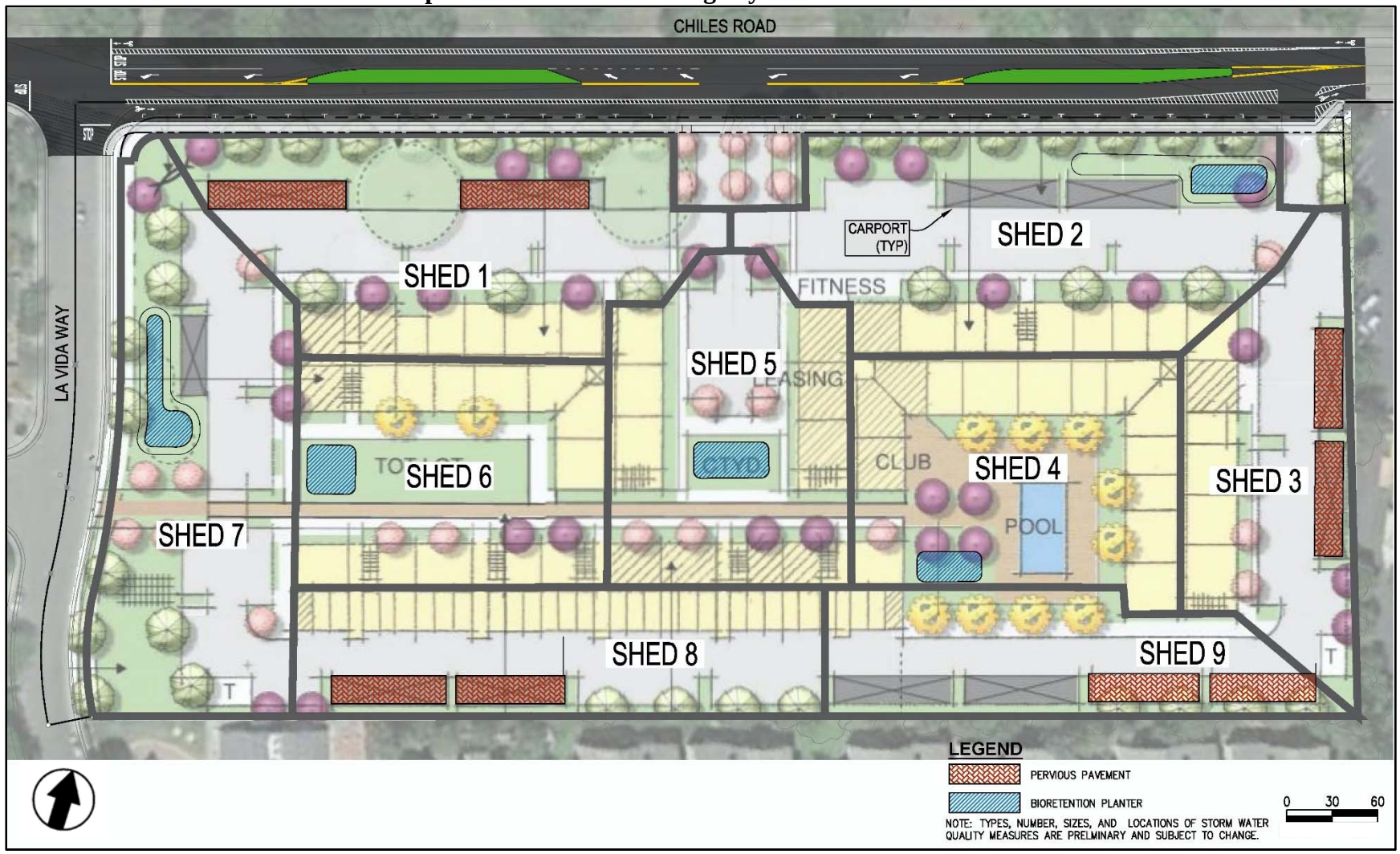
In order to properly treat stormwater runoff, the proposed project would include a series of flow-based and volume-based Low Impact Development (LID) features such as bio-retention basins and pervious pavement areas (see Figure 4.4-2). Stormwater directed to the LID features would be filtered through the underlying soil, allowing for removal of pollutants. After treatment, runoff from the bio-retention basins would be discharged, by way of a series of new underground storm drains, to the City's existing storm drains in Chiles Road and La Vida Way.

Stormwater quality treatment control measures (TCMs) for development in the City of Davis must be designed in accordance with the State's Phase II Small MS4 General Permit. The Phase II Small MS4 General Permit requires that permanent stormwater control measures be incorporated into the proposed project to ensure that new development does not result in the discharge of polluted water or the increase in sources of polluted runoff. Regulated Projects, under the Phase II Small MS4 General Permit, are required to divide the project area into Drainage Management Areas (DMAs) and implement and direct water to appropriately-sized TCMs consistent with the sizing standards in Section E.12.e.(ii)(c). TCMs are designed after the inclusion of Site Design Measures (SDMs) consistent with the standards of Section E.12.b. and E.12.e.(ii)(d). Baseline Hydromodification Measures are implemented consistent with the prescriptive standards of Section E.12.e.(ii)(f) only in the event the project develops more impervious surfacing than the existing project and creates or replaces less than one acre of impervious surfacing. Because the proposed project would create more than one acre of impervious surfacing, each DMA must be shown via calculations that all stormwater is treated consistent with the standards of Section E.12.e.(ii)(c) and retained consistent with Section E.12.e.(ii)(f) and detained for the 2-year, 24-hour storm event consistent with Section E.12.f.. Regulated Projects must additionally include Source Control Best Management Practices (BMPs) where possible. SDMs and Baseline Hydromodifcation Measures include, but are not limited to:

- Rooftop and impervious area disconnection;
- Porous pavement;
- Rain barrels and cisterns;
- Vegetated swales;
- Bio-retention facilities;
- Green roofs; or
- Other equivalent measures, as approved by the City and consistent with Sections E.12.b and E.12.e.(ii)(d) of the Phase II Small MS4 General Permit.

The applicant is proposing bio-retention basins, detention facilities, and pervious pavement features to meet the stormwater quality requirements of Section E.12. of the State of California's Phase II Small MS4 General Permit and Chapter 30 of the City's Municipal Code. Final design and sizing of the stormwater control features would be required during improvement plan review to ensure that a ***significant*** impact would not occur related to the creation of additional sources of polluted runoff or a substantial degradation of water quality during project operations.

**Figure 4.4-2**
**Conceptual Stormwater Drainage System: Preferred Site Plan**




*Source: Cunningham Engineering, 2017.*

Mitigation Measure(s)
Implementation of the following mitigation measure for both the Preferred Site Plan and Alternative B would reduce the above impact to a *less-than-significant* level.

*4.4-2* *Prior to issuance of grading permits, the applicant shall submit to the City a final plan, identifying permanent stormwater TCMs, SDMs, and Hydromodification Measures, for each DMA to be implemented on the project, as well as a signed stormwater maintenance agreement and corresponding maintenance plan. The plan shall include LID measures consistent with the Preliminary Utility Study prepared for the project and shall be subject to review and approval by the Public Works Department.*

**4.4-3 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 preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted). Based on the analysis below, the impact is *less than significant.***

Historically the City relied solely on groundwater from the Yolo subbasin to provide water; however, in June 2016, the City began receiving treated surface water through the WDCWA Regional Water Treatment Facility. As discussed in further depth in Section 4.8, Utilities and Service Systems, of this EIR, the City plans to maximize surface water use by routinely using the surface water supply as a base load and using the deep aquifer wells as a supplemental supply during the summer when demands would exceed the surface water supply capacity. Given that a majority of the City's water supplies are provided by surface water sources, increases in demand for water supplies associated with the proposed project would not be anticipated to substantially deplete groundwater supplies.

The proposed project would involve further development of the site, including overlay of additional areas of the project site with impermeable surfaces such as roofing and pavement. Because the proposed project would result in an increase in the amount of impermeable surfaces existing on the project site, the proposed project would have the potential to decrease the amount of water percolating into the on-site soil. However, considering that portions of the project site are currently developed with impervious surfaces, and the dominant soil type within the site is characterized by relatively low permeability,[13] the amount of groundwater recharge currently occurring at the site is relatively small as compared to recharge over the entire groundwater subbasin area. In addition, the proposed bio-retention basins and pervious pavement areas would allow for a limited amount of groundwater recharge to occur. As such, the proposed project's further reduction in on-site stormwater percolation would result in a relatively small change in groundwater recharge.

[13] Natural Resources Conservation Service. *Web Soil Survey*. Available at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed May 2018.

Based on the above, the proposed project would not 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 preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted), and a ***less-than-significant*** impact would occur.

Mitigation Measure(s)
*None required.*

**4.4-4 Substantially alter the existing drainage pattern of the site or area, or create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.**

The proposed project site is currently developed with a commercial building and two associated parking lots. Runoff from existing impervious areas is directed to the City's existing storm drainage system. The Preferred Site Plan would involve the demolition of existing impervious surfaces and subsequent construction of a 225-unit multi-family residential building with associated parking and outdoor amenity areas. Project components such as the roofs, paved parking areas, paved sidewalks, and paved pedestrian areas would inhibit stormwater infiltration on-site, thus contributing to increased stormwater runoff. The use of the proposed porous paving materials would reduce the amount of overland runoff that would otherwise be anticipated from the use of traditional, impervious materials. However, some runoff from the areas overlain with porous pavement would still be anticipated. Thus, the proposed project has the potential to substantially alter the drainage pattern of the site and increase runoff water. Development of the project site per Alternative B would result in similar drainage patterns and runoff rates as the Preferred Site Plan.

Per the State's Phase II MS4 General Permit Section E.12.f., hydromodification management projects, such as the proposed project, are required to demonstrate hydromodification management of stormwater such that post-project runoff is maintained to equal or below pre-project flow rates for the 2-year, 24-hour storm event, generally by way of infiltration, rooftop, and impervious area disconnection, bio-retention, or other LID measures that result in post-project flows that mimic pre-project conditions.

Proposed Drainage System

As shown in Figure 4.4-2, consistent with MS4 permit requirements, the proposed project site would be divided into nine DMAs. Each DMA would include either a bio-retention planter or a permeable pavement area to management stormwater runoff from the DMA. Specifically, DMA 2 and DMA 7 would include a combined detention basin/bio-retention planter. Runoff would be routed to the proposed LID features by a series of new drain inlets and underground storm piping throughout the project site. Runoff entering the pervious

pavement areas would percolate through the underlying soils in a manner similar to what currently occurs within the vegetated areas of the project site.

Stormwater directed to the bio-retention planters would interact with an active soil layer. Stormwater interaction with the active vegetated soil layer would retain the stormwater to allow for infiltration, transpiration, and evaporation to partially reduce the volume of stormwater runoff.

Proposed site detention storage would occur within the detention basins at the northeast portion of the project site, adjacent to Chiles Road, and the western portion of the site adjacent to La Vida Way. The Preliminary Utility Study recognizes that the proposed LID features/water quality BMPs (pervious pavement and stormwater planters) may contribute incidental storage (and potentially some peak flow attenuation) during storm events in excess of the stormwater quality storm. However, for the purposes of evaluating the 2-year or 10-year storms, Cunningham Engineering assumed that any additional storage associated with upland BMPs would be zero.

The Preliminary Utility Study prepared for the proposed project modeled two sub-basins (PROP-E and PROP-W) and two detention basins (POND-E and POND-W). The eastern sub-basin represents the portion of the project site which would drain to Chiles Road, and the western sub-basin represents the portion of the site that would drain to La Vida Way. Per the Preliminary Utility Study, with implementation of the proposed LID features, the peak runoff associated with both subbasins would be reduced relative to existing conditions for the modeled 2- and 10-year 24-hour storm events. The results of the hydrologic analysis are summarized in Table 4.4-1 below.

**Table 4.4-1**
**Peak Flow Characteristics**

| | Peak Discharge (cfs) | |
|---|---|---|
| | **2-Year, 24-Hour Storm** | **10-Year, 24-Hour Storm** |
| POND E | 4.05 | 7.54 |
| POND W | 1.74 | 3.46 |
| **Total Proposed** | **5.77** | **10.98** |
| **Total Existing** | **6.14** | **11.23** |

*Source: Cunningham Engineering, 2017.*

Design and Maintenance of Stormwater Control Features

In accordance with the City's Municipal Code, Chapter 30 Stormwater Management and Discharge Control, the stormwater control features that would be included in the proposed project must be properly maintained by the property owner. Verification of such maintenance would be, at a minimum, guaranteed by a signed stormwater maintenance agreement and stormwater maintenance plan. A fully executed and recorded version of the agreement and maintenance plan would be filed with the County of Yolo Clerk's Office and a copy with the City of Davis Public Works Department. As specified in Article 30.04 of the City's Municipal Code, the stormwater maintenance agreement shall ensure that the

proposed detention basins and stormwater features included in the proposed project would be maintained in good condition and proper repair. Furthermore, Chapter 30 of the City's Municipal Code includes provisions related to inspection and sampling of such stormwater features, which would allow for enforcement of the stormwater maintenance plan if violations were to occur.

Conclusion

The stormwater control features included in the proposed project have been preliminarily designed in accordance with the State's Phase II Small MS4 General Permit and the City of Davis Municipal Code, which requires that post-development peak flows associated with the 2-year 24-hour storm event are equal to or less than existing conditions. Final sizing of the storm drain system would be required during improvement plan review to ensure that a ***significant*** impact would not occur in relation to altering existing site drainage patterns in such a way as to exceed the capacity of existing infrastructure or lead to flooding on- or off-site.

Mitigation Measure(s)
Implementation of the following mitigation measure for both the Preferred Site Plan and Alternative B would reduce the above impact to a *less-than-significant* level.

*4.4-4 Implement Mitigation Measure 4.4-2.*

**Cumulative Impacts and Mitigation Measures**

The following discussion of impacts is based on the implementation of the proposed project in combination with other proposed and pending projects in the region. Other proposed and pending projects in the region under the cumulative context would include buildout of the City's General Plan, as well as development of the most recent planned land uses within the vicinity of the project area. Refer to Chapter 5, Statutorily Required Sections, of this EIR for more detail.

**4.4-5 Cumulative impacts related to hydrology and water quality within the City of Davis. Based on the analysis below, the project's incremental contribution to this significant cumulative impact is *less than cumulatively considerable*.**

Hydrology

Concurrent implementation of the proposed project and other cumulative projects could result in a significant cumulative impact related to increases in storm water runoff from increased impervious areas. As discussed above, all new development in the City of Davis is required to comply with Phase II Small MS4 General Permit requirements and Chapter 30 of the City's Municipal Code. The combined effect of these regulations is that new development in the City would not result in cumulatively considerable incremental increases in stormwater flow or increased pollutant discharge. While the proposed project has the potential to increase stormwater discharge, and degrade water quality, the incorporation of on-site stormwater control features, and the implementation of Mitigation Measure 4.4-2, would

ensure that the proposed project meets the requirements of the State of California's Phase II Small MS4 General Permit and Chapter 30 of the City's Municipal Code. Such requirements would be met through the incorporation of the stormwater control features discussed above. The design of the stormwater control features is required to maintain post-development flows equal to or less than pre-project flows, thus ensuring that the project would not contribute to increased stormwater flows.

Water Quality

As noted under Impact 4.4-1, construction activities associated with the proposed project would have the potential to affect water quality and contribute to localized violations of water quality standards if stormwater runoff from construction activities enters receiving waters. Additional runoff from the construction site, in combination with the other reasonably foreseeable projects in the Davis area, could carry sediment from erosion of graded or excavated surface materials, leaks or spills from equipment, or inadvertent releases of building products. Thus, cumulative development could result in water quality degradation if runoff containing construction-related sediment or contaminants enter receiving waters in sufficient quantities.

While continued development within the City of Davis could result in additional stormwater runoff and entry of pollutants into receiving waters via construction, each project is required to comply with the State and City's regulatory stormwater documents, standards, and requirements. Mitigation Measure 4.4-1 would ensure that the project applicant prepares a SWPPP and provides adequate storage capacity for the potentially polluted stormwater runoff generated by the construction activities of the proposed project.

In addition, as noted under Impact 4.4-2, the applicant proposes to integrate LID measures throughout the project to provide stormwater quality treatment. The LID measures would include both volume- and flow-based management in accordance with the City's Manual of Stormwater Quality Control Standards and Phase II Small MS4 General Permit requirements. Therefore, impacts related to operational water quality would be reduced to a less-than-significant level with implementation of mitigation.

Conclusion

Based on the above, the proposed project would not result in any significant impacts related to water quality or stormwater quality. Overall, the combined water quality effects of potentially increased amounts of pollutants and volume of runoff flows resulting from construction and operation of cumulative projects could be considered significant. However, given that the project would comply with all applicable regulations related to hydrology and water quality, including Phase II Small MS4 General Permit requirements, the incremental contribution to cumulative hydrology and water quality impacts resulting from the proposed project would be considered ***less than cumulatively considerable***.

Mitigation Measure(s)
*None required.*