4.7 HYDROLOGY AND WATER QUALITY

This section is based on information from the following documents:

- *Gateway South Office Building and Fire Station Draft Supplemental EIR, City of Scotts Valley, January 2004*
- *Gateway South Office Building and Fire Station Hydrology Technical Report, City of Scotts Valley , January 2004*
- *Polo Ranch Draft Recirculated EIR, City of Scotts Valley, December 2005*
- *2005 Urban Water Management Plan. Scotts Valley Water District.*
- *Groundwater Modeling Study of the Santa Margarita Groundwater Basin*
- *2007 Annual Report. Scotts Valley Water District. Groundwater Management Program. May 2008.*

4.7.1 Setting

a. Physical Setting.

Drainage. The City of Scotts Valley occupies the valley of Carbonera Creek and its main tributary to the north, Bean Creek. The project site is located within both the watershed of Carbonera Creek and Bean Creek (see Figure 4.7-1). Carbonera Creek is a tributary of the San Lorenzo River system, which drains south from the Santa Cruz Mountains into the Monterey Bay at the City of Santa Cruz. The San Lorenzo River watershed drains approximately 137 square miles, and its principal tributaries include Boulder Creek, Kings Creek, Bear Creek, Newell Creek, Zayante Creek, Bean Creek, and Branciforte Creek.

The Carbonera Creek watershed drains 3.6 square miles at United States Geological Survey (USGS) gauge near the Scotts Valley Water District (SVWD) southern boundary. Unlike Bean Creek, Carbonera Creek typically becomes dry or near dry during the summer months. The creek flows generally southwest from its headwaters in the Santa Cruz Mountains, and discharges to Branciforte Creek in the City of Santa Cruz. Branciforte Creek discharges into the San Lorenzo River near Soquel Avenue, approximately one mile downstream of the Carbonera Creek confluence. The Carbonera Creek watershed is primarily mountainous, being bounded on the north by the Santa Cruz Mountains, on the west by the Bean Creek Watershed, and on the east by the Branciforte Creek watershed, and encompasses elevations ranging from 30 to 3,200 feet above mean sea level. Bean Creek drains 8.8 square miles at its USGS gauge just beyond the western boundary of the SVWD.

Lower Bean Creek has a high average flow of 3.0 cubic feet per second. Carbonera Creek flows at an average 0.8 to 1.0 cubic feet per second (Scotts Valley, 1989). However, the flow in these creeks greatly depends on the season. The average annual precipitation ranges from 35 to 50 inches per year and 90 percent of this falls between November and April. Flows in these creeks can drop dramatically during the dry summer season (Scotts Valley, 1989). Bean Creek is the natural drain for groundwater in the Scotts Valley area and is perennial in its lower reaches. Both streams recharge the local aquifer along certain reaches.

The existing on-site development contains a complete storm drain system that carries runoff south to Mt. Hermon Road in a network of pipes and catch basins. Storm water is detained to some degree while on-site before being released into a 36-inch reinforced concrete culvert that runs west in Mt. Hermon Road. The undeveloped portion of the site drains in a southeast direction to the project boundary where it is collected in a 15-inch reinforced concrete culvert running along the edge of Mt. Hermon Road. Runoff is carried across the street in a 30-inch reinforced concrete culvert before being introduced into the larger storm drain system which runs south-east. The majority of existing drainage is carried to detention basins on the south-west side of town, though smaller detention exists throughout developments within the City.

Flooding. Flood Insurance Rate maps partition flood areas into three zones: Zone A for areas of 100-year flood, base flood elevations not determined; Zone B for areas of 500-year flood; and Zone C for areas of minimal flooding. The National Flood Insurance Program 100-year floodplain is considered the base flood condition. This is defined as a flood event of a magnitude that would be equaled or exceeded an average of once during a 100-year period. Floodways are defined as stream channels plus adjacent floodplains that must be kept free of encroachment as much as possible so that the 100-year floods can be carried without substantial increases (no more than one foot) in flood elevations.

The Specific Plan area is not within a Federal Emergency Management Agency mapped Flood Insurance Rate Map as no major waterways are on site or immediately adjacent to the area that could result in flood hazards. Future development that would result in increased impervious surfaces may result in on-site and off-site drainage issues if not properly designed and engineered. Storm drainage improvements need to be incorporated into the Specific Plan. These features would facilitate groundwater recharge and would minimize stormwater runoff and potential erosion.

Water Supply and Quality. The SVWD currently obtains 100 percent of its potable water supply from the Santa Margarita Groundwater Basin (the Basin). As a result, the Basin has been designated as a Sole Source Aquifer by the United States Environmental Protection Agency (USEPA). The SVWD does not sell or export water to any other water purveyor or water supplier.

The Tertiary Santa Margarita, Butano, and Lompico formations are the major water-bearing units in the area and their extent defines the Basin. The Basin includes portions of California Department of Water Resources (DWR) Basins 3-21, 3-27, and 3-50. The DWR has not classified these basins as overdrafted and these basins are not adjudicated as defined in DWR Bulletin 118.

Since 1983, the SVWD has actively managed the Basin through the establishment of an integrated climatic, surface water, and groundwater monitoring program; regular reporting of water conditions; a safe yield study; implementation of a recycled water program assessment of artificial recharge and water transfer options; ongoing groundwater exploration studies; and development and revision of a regional groundwater numerical model.

Concentrated pumping in the south Scotts Valley area in the last three decades has resulted in significant water level declines in municipal production wells, although more recent data

suggests that the rate of decline is tapering off with improved management practices, such as a recycled water program. ~~The sustainable yield of the Basin is estimated to be approximately 4,200 AFY (Todd, 1995). The numerical model was recently used to produce a sustainable yield volume given the current pumping scheme in the Basin and the revised hydrogeologic interpretation. This volume was determined to be 3,300 AFY. This volume represents that amount of water that is available to the water producers under the current pumping configuration without causing any overall change in storage.~~ The hydrogeologic characterization and numerical model development of the recent "*Groundwater Modeling Study of the Santa Margarita Basin*", prepared by ETIC Engineering, Inc. in May 2006 estimated the average annual sustainable yield of the Santa Margarita Groundwater Basin. It calculated the estimated volume of groundwater that can be extracted from existing pumping wells, such that there is no loss of storage in the Santa Margarita Groundwater Basin. Previous basin-wide safe yield estimates based on a water-balance approach have suggested an ultimate annual safe yield of approximately 4,200 acre-feet (Todd, 1998). These estimates are accurate within the limits of a water-balance approach, but do not account for such factors as localized effects on storage or the limits on groundwater extraction related to the actual locations and pumping capacities of extraction wells in the basin. Application of a newly developed numerical model of the Santa Margarita Groundwater Basin indicates an average annual sustainable yield of 3,320 acre-feet.

A summary of the current understanding of observed declines in groundwater levels (drawdown) includes the following:

- The Santa Margarita is "compartmentalized" with areas of significant groundwater level declines adjacent to areas where groundwater levels are sustained by active recharge
- The Lompico groundwater producing unit has undergone significant and widespread groundwater level declines due in part to restricted recharge to the Lompico
- The Butano formation is difficult to evaluate due to a lack of data
- The Lompico and Butano show potential for providing long-term storage capacity that may be useful for future groundwater augmentation strategies such as in-lieu recharge.

The groundwater produced in the SVWD is high in iron, manganese, and hydrogen sulfide and; therefore, requires treatment to meet the State water quality standards for aesthetics (i.e., Secondary MCLs). The SVWD monitors water quality at the groundwater production wells for constituents that meet requirements outlined in the Safe Drinking Water Act and under Title 22 of the California Code of Regulations. Groundwater is sampled from SVWD Wells #3B, #7A, #9, #10, #10A, #11A, and #11B for major cations, anions, trace metals, total dissolved solids (TDS), pH, and volatile organic compounds (VOCs). Results are reported to the California Department of Public Health.

The SVWD ~~operates~~treats groundwater at ~~three pressure filter~~four treatment plants ~~for the removal of iron and manganese and uses chemical treatment for hydrogen sulfide removal~~prior to distribution. SVWD applies treatment technologies to raw water extracted from wells to compensate for groundwater with concentration levels above or approaching primary and

secondary MCLs. These facilities and their operations are listed in Table 4.7-1. By applying the appropriate treatment technology, the SVWD is able to deliver tap water to customers that meets regulatory standards and is safe to drink. ~~Aeration equipment has recently been installed at the SVWD's largest treatment plant and at Well #10, to remove hydrogen sulfide. The aeration equipment has reduced the use of chemicals at both of these locations. In addition, Granular Activated Carbon (GAC) filtration vessels are part of the Well #9 treatment facility to ensure that Volatile Organic Compounds (VOCs) previously detected in the well do not reach potable water supplies. The SVWD also recently installed GAC filtration at Well #10 in response to the increasing tetrachlorothene (PCE) concentrations measured in nearby monitoring wells. These PCE concentrations have been identified as part of the Scotts Valley Dry Cleaners plume.~~

Table 4.7-1. Water Treatment Techniques Applied by SVWD to Treat Raw Groundwater

Water Treatment Plant	SVWD Wells	Aquifer Formation	Chemicals of Concerns	Treatment Type
Orchard Run	Well #3B and #7A	Butano and Lompico	Iron, manganese and hydrogen sulfide	Air stripper, dual media filtration, chlorination, and sequestering agent.
SVWD Well #9	Well #9	Santa Margarita and Monterey	Sulfate, MTBE, and VOCs	Chlorination and granular activated carbon (GAC) filtration
SVWD Well #10	Well #10 and #10A	Lompico	Iron, manganese, and hydrogen sulfide	Air stripper, dual media filtration, chlorination, sequestering agent, and standby GAC filtration.
El Pueblo	Well #11A and #11B	Lompico	Iron, manganese, arsenic and VOCs	pH adjustment, dual media filtration, chlorination, and sequestering agent

The SVWD implemented a recycled water program in 2002. The recycling program provides another resource as part of the production supplied to SVWD customers. The Water Recycling Program is the successful result of local operation between the SVWD and City. Recycled water is produced at the City's Wastewater Treatment Plant where is undergoes tertiary treatment including nitrate removal, ultra-violet disinfection, and chlorination. Recycled water is then distributed by SVWD to customers through a specially designed, purple pipeline system. The City has passed an ordinance mandating use of recycled water for new construction where economically feasible. The SVWD paid for construction of the plant, funds operation of the recycled water treatment facilities, and owns and operates the recycled water distribution system. Recycled water deliveries in Water Year 2007 increased to nearly 133 acre-feet serving 26 sites.

~~The SVWD continues to anticipate substituting approximately 350 AFY of recycled water use for potable water use by 2010, or 17 percent of the current groundwater production. The SVWD has also identified customers with the potential to convert from potable water to recycled water for landscaping uses. This potential has been estimated to be at least 500 AFY based on landscaping usage records, or approximately 25 percent of the current groundwater production.~~ Several efforts are underway in water year 2008 to expand the Recycled Water Program. The Vineyards Homeowners Association is planned to be added to the program in water year 2008 with an estimated usage of 20 AFY. With this and other additions, it is anticipated that recycled water usage will increase to approximately 150 acre-feet in2009.

The City's primary water supply source is the Scotts Valley groundwater basin. There are two principal groundwater aquifers, as discussed above. Developers are required to obtain water entitlements from the Scotts Valley Water District, in the form of a "will-serve" letter, prior to project approval.

b. Regulatory Setting.

State and Regional Regulatory Framework. The California State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs) have the authority in California to protect and enhance water quality, both through their designation as the lead agencies in implementing the Section 319 nonpoint source program of the federal Clean Water Act and from the state's primary water-pollution control legislation, the Porter-Cologne Act. The RWQCB Region 3 office guides and regulates water quality in streams and aquifers of the Santa Cruz Region through designation of beneficial uses, establishment of water-quality objectives, administration of the National Pollution Discharge Elimination System (NPDES) permit program for storm water and construction site runoff, and Section 401 water-quality certification where development results in fill of jurisdictional wetlands or waters of the U.S.

The 1987 amendments to the Clean Water Act [Section 402(p)] provided for U.S. Environmental Protection Agency (EPA) regulation of several new categories of non-point pollution sources within the existing NPDES program. Phase I of the stormwater runoff program relied on NPDES permit coverage to address urban runoff discharges from "medium" to "large" municipal separate storm systems (MS4s) located in cities or counties with populations of 100,000 or more, from plants in industries recognized by the EPA as being likely sources of storm water pollutants, and from construction activities that disturb more than five acres. The EPA has delegated management of California's NPDES permit program to the SWRCB and the RWQCB. The Phase II Final Rule, published on December 8, 1999 was the next step in the EPA effort to preserve, protect, and improve water quality by expanding the Phase I program to require certain regulated small MS4s and construction activities that disturb one to five acres to implement programs and practices to control polluted stormwater runoff through NPDES permits. On March 10, 2003, new regulations came into effect that extended permit coverage to construction sites that disturb one or more acres, including smaller sites that are part of a larger common plan of development or sale.

Because the proposed project would disturb more than one acre of land during construction, the project applicant would be required to submit a Notice of Intent to the State Board and apply for coverage under the NPDES Construction Activities general permit. Administration of these permits has not been delegated to cities, counties, or RWQCB but remains with the SWRCB. The applicant would also be required to prepare a Stormwater Pollution Prevention Plan (SWPPP), including an erosion control plan, and submit it for review prior to commencing construction. Once grading begins, the SWPPP must be kept on site and updated as needed while construction progresses. The SWPPP details the site-specific best management practices (BMPs) to control erosion and sedimentation and maintain water quality during the construction phase. In addition to the erosion and sediment-control measures, the SWPPP includes construction-phase housekeeping measures for control of contaminants such as petroleum products, paints and solvents, detergents, fertilizers, and pesticides. The SWPPP

also contains a summary of the structural and non-structural BMPs to be implemented during the post-construction period, pursuant to the nonpoint source practices and procedures encouraged by the City of Scotts Valley. It sets forth the BMP monitoring and maintenance schedule and responsible entities during both the construction and post-construction phases. The RWQCB would enforce compliance with the regulatory requirements of the NPDES General Construction and Municipal Stormwater Discharge permits.

In addition to the NPDES permitting program, the RWQCB regulates water quality in the Santa Cruz area in accordance with the Water Quality Control Plan or "Basin Plan." The Basin Plan presents the beneficial uses that the RWQCB has designated for significant surface waters, groundwater, marshes, and mudflats, as well as the water-quality objectives and criteria that must be met to protect these uses. The Basin Plan identifies Carbonera Creek as a significant surface water body that provides beneficial water uses. Specific beneficial uses designated for Carbonera Creek when water is present include wildlife habitat, fish spawning, and cold freshwater habitat. Wildlife habitat within the stream corridor, particularly waterfowl habitat, is the beneficial use most sensitive to water quality impacts. Pollution from pesticides, fertilizers, metals, and hydrocarbons in urban runoff can directly affect sensitive bird species and their offspring.

Scotts Valley General Plan. The City of Scotts Valley has regulatory authority over development within the Specific Plan area. The City's General Plan Open Space and Conservation Element includes several policies related to hydrology and water quality:

- ***OSA-343***. *As part of the environmental review process, the City shall, in cooperation with the water District, require developers to study and mitigate any loss of recharge. Mitigations may take the form of on-site recharge, construction of recharge improvements, contributions to the program cited above, or a combination of any or all of these.*

- ***OSP-345***. *New development shall minimize the amount of impervious surfaces.*

- ***OSA-346***. *The Planning Department will encourage the use of pervious materials, such as turf block, in development projects.*

- ***OSA-353.*** *The City shall continue to require siltation ponds and erosion control measures which mitigate adverse impacts to surface water bodies and groundwater basins during and after construction.*

4.7.2 Impact Analysis

a. Methodology and Impact Criteria. The analysis was based on a field reconnaissance, a literature review, and discussions with City staff. The following impacts were determined in the City's Initial Study to be less than significant with respect to the proposed project:

- *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 which would impede or redirect flood flows.*
- *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.*
- *Expose people or structures to inundation by seiche, tsunami, or mudflow.*

Drainage facilities must be designed such that a project shall not increase runoff generated by a 10-year event. In addition, drainage facilities must be designed such that a 100-year event will not result in flood damage to any proposed structure. Drainage facilities that meet these requirements will result in less than significant impacts.

Pursuant to the *State CEQA Guidelines*, drainage and flooding impacts would be considered significant if the project would:

- *Violate any water quality standards or waste discharge requirements;*
- *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge;*
- *Substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on or off site;*
- *Create or contribute runoff water which would exceed the capacity of stormwater drainage systems or provide substantial additional sources of polluted runoff; or*
- *Otherwise substantially degrade water quality.*

For the purposes of this EIR, an increase in the runoff magnitude of a 10-year storm is considered to be significant. This criterion is based on the City requirement that projects shall not increase runoff generated by a 10-year event. For other types of impacts to hydrology and water quality, the criteria listed above were used. Water supply and groundwater levels are discussed in Section 4.12 *Water Supply and Wastewater*.

b. Project Impacts and Mitigation Measures.

Impact H-1 During construction, disrupted soil may be subject to erosion, sedimentation, and pollutant discharges. This is considered a Class II, *significant but mitigable* impact.

Construction pursuant to the Specific Plan could result in the pollution of natural watercourses or underground aquifers. Erosion would be a primary contributor to pollution from sediment discharge affecting downstream areas. Pollution could also occur from direct construction-related discharges. The types of pollutant discharges that could occur as a result of construction include accidental spillage of fuel and lubricants, and discharge of excess concrete. This is a potentially significant impact.

Regulations under the federal Clean Water Act and the State Water Resources Control Board require projects disturbing an aggregate project area greater than one acre during construction to comply with the State NPDES General Construction Permit. As grading activities are anticipated to occur on areas over one acre on the project site, this permit is applicable. The permit requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP) that

contains specific actions, termed Best Management Practices (BMPs), to control the discharge of pollutants, including sediment, into local surface water drainages. A Notice of Intent (NOI) to perform work under the permit must be filed with the State. Similarly, the countywide storm water NPDES permit requires the preparation and submittal of a Storm Water Pollution Control Plan (SWPCP) to the City prior to issuance of a grading permit for construction projects. The two plans cover similar requirements.

The preparation of a SWPPP and SWPCP requires developers to implement BMPs that are designed to specifically address the potential pollution risks associated with project construction. BMPs are selected from an approved list of documents that describe practices that have a proven track record of effectively preventing stormwater pollution from construction sites. BMPs appropriate for construction activities are organized into four major categories:

1. *Erosion Control: Measures that prevent erosion and keep soil particles from entering stormwater, lessening the eroded sediment that must be trapped, both during and at completion of construction*
2. *Sediment Control: Feasible methods of trapping eroded sediments so as to prevent a net increase in sediment load in stormwater discharges from the site*
3. *Site Management: Methods to manage the construction site and construction activities in a manner that prevents pollutants from entering stormwater, drainage systems or receiving waters*
4. *Materials and Waste Management: Methods to manage construction materials and wastes that prevent their entry into stormwater, drainage systems or receiving waters*

The BMPs to be implemented on-site during construction would be developed as part of the SWPPP and SWPCP. Implementation of these plans is the responsibility of the construction site contractor (ultimately the owner) with oversight and inspection by the City of Scotts Valley and the RWQCB. Full realization of the specific measures in these plans would comply with the state NPDES General Construction Permit and the countywide storm water NPDES requirements and therefore would comply with applicable waste discharge requirements.

Mitigation Measures. For future development within the Specific Plan area, compliance with an approved SWPPP and SWPCP would achieve compliance with applicable regulatory improvements. The following mitigation measures would provide minimum standards that ensure that temporary construction-related water quality impacts are reduced to a less than significant level:

H-1(a) **Notice of Intent**. Prior to beginning construction, any applicants pursuant to the Specific Plan shall file a Notice of Intent (NOI) for discharge from the proposed development site.

H-1(b) **Storm Water Pollution Prevention Plan (SWPPP)**. Any applicant shall submit a SWPPP to the City prior to issuance of a building permit, in compliance with National Pollutant Discharge Elimination System (NPDES). The contractor is responsible for understanding the State General Permit procedures and instituting the SWPPP during construction. The SWPPP must be prepared in accordance with the guidelines adopted by the State Water

Resources Control Board (SWRCB). The SWPPP shall be submitted to the City along with grading/development plans for review and approval.

H-1(c) **Storm Water Pollution Control Plan.** Prior to issuance of a grading permit, each developer shall prepare a SWPCP for the site, to be submitted for review and approval by the City of Scotts Valley. This plan will be similar in nature to the SWPPP, but also must meet the applicable requirements of the countywide NPDES municipal permit (CAS004002). At a minimum, the following BMPs shall be required where feasible:

Pollutant Escape: Deterrence

- *Cover all storage areas, including soil piles, fuel and chemical depots. Protect from rain and wind with plastic sheets and temporary roofs.*

Pollutant Containment Areas

- *Locate all construction-related equipment and related processes that contain or generate pollutants (i.e. fuel, lubricant and solvents, cement dust and slurry) in isolated areas with proper protection from escape.*
- *Locate construction-related equipment and processes that contain or generate pollutants in secure areas, away from storm drains and gutters.*
- *Place construction-related equipment and processes that contain or generate pollutants in bermed, plastic-lined depressions to contain all materials within that site in the event of accidental release or spill.*
- *Park, fuel, and clean all vehicles and equipment in one designated, contained area.*

Pollutant Detainment Methods

- *Protect downstream drainages from escaping pollutants by capturing materials carried in runoff and preventing transport from the site. Examples of detainment methods that retard the movement of water and separate sediment and other contaminants are silt fences, hay bales, sand bags, berms, and silt and debris basins.*

Erosion Control

- *Schedule project grading into phases that allow for erosion control of smaller areas rather than a single, large exposed site. Vegetation or existing pavement should only be removed when necessary and immediately before grading.*
- *Conduct major excavation during dry months when feasible. These activities may be significantly limited during wet weather.*

- *Utilize slope stabilizers, including natural fiber erosion control blankets of varying densities according to specific slope/ site conditions.*
- *Expedite the restoration of natural vegetative erosion control and reduce the risk of slope failure by immediately re-vegetating and irrigating until the first one inch of accumulated rain falls during the rainy season.*
- *Reduce fugitive dust by wetting graded areas with an adequate yet conservative amount of water. Cease grading operations in high winds.*

Recycling/Disposal

- *Develop a protocol for maintaining a clean site. This includes proper capture and recycling of construction-related materials and equipment fluids (i.e., concrete dust, cutting slurry, motor oil and lubricants).*
- *Provide disposal facilities. Develop a protocol for cleanup and disposal of small construction wastes (e.g., dry concrete).*

Hazardous Materials Identification and Response

- *Develop a protocol for identifying risk operations and materials. Include protocol for identifying spilled-materials source, distribution, fate and transport of spilled materials.*
- *Provide a protocol for proper clean-up of equipment and construction materials, and disposal of spilled substances and associated cleanup materials.*
- *Provide an emergency response plan that includes contingencies for assembling response team and immediately notifying appropriate agencies.*

H-1(d) **Notice of Completion of Construction.** Any project applicant shall file a notice of completion of construction of the development, identifying that pollution sources were controlled during the construction of the project and implementing a closure SWPPP for the site.

Significance After Mitigation. With implementation of the mitigation identified above, impacts would be reduced to a less than significant level.

Impact H-2 **The proposed project would guide development that would alter drainage patterns onsite. Proposed storm drains and detention basins would need to meet City standards. Impacts relating to alteration of drainage patterns are considered Class III, *less than significant*.**

RRM Design Group conducted a site assessment to determine how the site handles storm water runoff/drainage. Runoff from the developed portions of the site is currently supported by existing storm drain systems. In the developed portion of the site known as the K-Mart center, there is currently a complete storm drain system that carries runoff south to Mt. Hermon Road in a network of pipes and catch basins. Stormwater from this area is detained underground before being released into a 36-inch reinforced concrete line that runs west in Mt. Hermon Road. The undeveloped central portion of the site drains in a southeast direction to the edge of Mr. Hermon Road and currently generates approximately 40 cubic feet per second (cfs) of runoff under 100-year conditions. Skypark Park is located upstream to the north, and generates 17 cfs under similar conditions. Both areas drain to a 24-inch storm drain line with a 32 cfs capacity that crosses Mt. Hermon Road and carries water into the City storm drain system, which runs southeast.

During times when the flow is greater than the pipe capacity, minor flooding may occur at this point, but some of the overflow water will run east along the north side of Mt. Hermon Road and be captured in the inlet west of the Kings Village Road intersection. The runoff generated by existing development on the eastern portion of the site is collected in either the 24-inch storm drain line running down Kings Village Road or the 27-inch line running along the far eastern site boundary. The 27-inch line increases to a 30-inch line where the tributary joins into it about a third of the way up Kings Village Road, and increases to a 36-inch line when it cuts west into the project area. At this point, runoff travels east along Mt. Hermon Road in a 42-inch line to the greater storm drain system. The City storm drain system drains to Carbonero Creek.

Increased runoff could impact water quality down-gradient of the Specific Plan area by increasing erosion/sedimentation and the quantity of flood water. Runoff from the developed portions of the Specific Plan area would be detained in on-site detention ponds. Properly designed detention ponds would allow for the settlement of suspended particles and reduce stormwater runoff rates.

Development within the Specific Plan area would alter the site's current topography, which would to some degree change existing drainage patterns. Development would produce new impermeable surfaces, thereby increasing peak storm event runoff from these developed areas. The increases in peak runoff would be mitigated with detention basins designed in accordance with City Standards and other current engineering practice. These detention basins would provide for post-development flows to equal pre-development flows for ~~the 10-year storm.~~a 24-hour 85th percentile rain event, or the flow of runoff produced from a rain event equal to at least two times the 85th percentile hourly rainfall intensity.

Detention basin discharges would be designed to imitate the pre-development flow patterns to avoid additional erosion or other downstream damage. The City of Scotts Valley requires that projects not increase runoff generated by a 10-year storm event. The project would provide detention features to completely mitigate peak flows during a 24-hour 85th percentile rain event, or the flow of runoff produced from a rain event equal to at least two times the 85th percentile hourly rainfall intensity.
~~the 10-year storm.~~

A storm drainage system has been designed for the Specific Plan area in an effort to minimize the impact of development from Specific Plan implementation and to maintain sustainable concepts. Based on existing topography, the project site has been divided into two on site watershed areas and one upstream off-site tributary area.

The currently undeveloped portion of the site generates approximately 40 cfs of runoff during a 100-year storm event. Skypark Park, just north of the Specific Plan area, generates 17 cfs under similar conditions. The combined area drains approximately 57 cfs to a 24-inch storm drain line with a 32 cfs capacity that crosses Mt. Hermon Road and carries water away from the site. Proposed development of the site could increase the runoff from onsite to as much as 74 cfs. The quantity of runoff released to the City storm drain system would not exceed existing flows exiting the site. Additional flow generated by the development would need to be detained on site. Due to limited capacity of the down stream system, required detention may exceed City requirements to minimize flooding.

The majority of runoff generated by the site would be channeled to a low impact detention system that doubles as a Subsurface Irrigation system for the field in the town center. This storm water solution is based on green building design, and it filters, detains, and reuses runoff water as irrigation. Based on the size of the field, the upper layer of gravel-filled trays would detain approximately 7,200 cubic-feet of water and release around 2.2 cfs through percolation to the turf. The remaining volume of runoff water would be stored in underground pipes and pumped to trays, as irrigation water is needed. This would offset irrigation demand of the central green for a portion of the year.

The portion of the development downstream of the central green would implement various other low impact storm water solutions. "Urban bio-swales" would be installed in sidewalk parkway locations along the main street that leads into the Specific Plan area off Mt. Hermon Road. The urban bio-swales would detain moderate amounts of storm water runoff, which would be helpful in irrigating the landscape strips. Rooftops would be equipped with landscaping to help absorb rainwater. Any runoff water that exceeds the capacity of the downstream storm drain system and cannot be detained using low impact solutions would be stored and filtered using conventional methods.

Low impact stormwater solutions will not be used in locations that could result in increased mobilization of contaminants and groundwater.

Mitigation Measures. No mitigation measures are required.

Significance After Mitigation. Impacts would be less than significant without mitigation.

Impact H-3 The project area is within both the Bean Creek and Carbonera Creek watersheds. Impacts related to flood hazard exposure in this area are considered Class III, *less than significant*.

The Specific Plan area is not within the 100-year flood zone as identified by FEMA. However, development would increase the impermeable surface of the proposed Specific Plan area compared to current conditions. Future development would add impervious surfaces such as

commercial structures, parking lots, walkways, and other paved areas to the site. These surfaces would increase the amount of runoff following storm events.

In accordance with the Scotts Valley Storm Drain Master Plan, the Specific Plan does not include detention for the 100-year storm. The Master Plan states that such detention on individual project sites could actually cause an increase in downstream peak flows because of the potential lack of regional planning. Although the project would result in an increase in peak flows locally during the 100-year storm, development of the site has already been taken into account in regional flood planning efforts. Therefore, the project would not be a significant impact with respect to downstream flooding hazards.

Mitigation Measures. No mitigation measures are required.

Significance After Mitigation. Impacts would be less than significant without mitigation.

Impact H-4 Commercial and residential uses allowed under the proposed Specific Plan could generate runoff that could affect downstream water quality. Impacts related to water quality are considered Class II, *significant but mitigable*.

Mitigation to reduce erosion, sedimentation, and contaminated runoff during project construction would ensure that construction-related impacts to water quality would be less than significant. However, commercial and residential uses during long-term operations can generate runoff that could affect downstream water quality.

Such developments would be expected to increase the quantities of pollutants potentially entering stream courses with runoff from parking lots and landscaping. Receiving waters would assimilate a limited quantity of each constituent, but beyond certain thresholds, the measured amount of the constituent is considered a pollutant. Major non-point source pollutants include sediment, nutrients, trace metals, oxygen-demanding substances, bacteria, oil, and greases. The most abundant heavy metals in urban stormwater are lead, zinc, and copper, which together account for 90 percent of the dissolved heavy metals. Heavy metals are generally vehicle related and influenced by traffic volumes.

Urban uses also add soluble compounds from food preparation, cleaning agents, excreta, and industrial processes, as well as irrigation of commercial and residential landscaping.

Development of the project site with residential and commercial uses would be expected to increase the quantities of pollutants with runoff from streets and landscaped areas. Other activities that may increase pollutants due to site development include motor vehicle operations in the area, pesticide/herbicide/fertilizer uses, human littering, careless material storage and handling, and pavement disintegration.

Animal Droppings. Animal droppings contribute coliform bacteria, nitrates, and oxygen-demanding organisms (BOD) to water sources. It can be expected that domesticated animals residing on the project site would cause increased levels of these contaminants.

Runoff (Use of Tertiary Treated Water). The project would include a dual water system, which would provide reclaimed (recycled) water for landscaping irrigation purposes. Section 17.47 of the Scotts Valley Municipal Code requires that new projects be connected to the recycled water system if a cost-benefit analysis indicates that connection would be beneficial. The final details of the system have not been determined. Given the high treatment standards ("parks and playgrounds") that will be used for the water to be applied to the yards, there would be no significant public safety impacts related to the quality of the reclaimed water.

The use of reclaimed water on the project site would be regulated by the requirements of Title 22 of the California Administrative Code, the Regional Water Quality Control Board, the State Department of Health, and the County Health Department. The nutrients found in treated water, such as nitrogen and phosphorous, are generally beneficial to turf, but can increase eutrophication if the water reaches natural areas. (Eutrophication is the process of nutrient enrichment, where nutrients accumulate at a greater rate than can be recycled or used naturally.) However, the Scotts Valley Water District would use a de-nitrification filter to remove nitrogen from the effluent.

Over-irrigation of yards or other landscaped areas with treated water, especially when combined with the use of chemicals on landscaped areas, could lead to the surface flow of reclaimed wastewater and runoff that contains BOD, pesticides/herbicides/fungicides, and nitrates. Chemicals used on landscaped areas (if over-applied and/or coupled with over-irrigation) could make their way into surface and ground waters indirectly.

Runoff from yards would be directed into the project storm drainage system, which would carry the project drainage to proposed biofilter swales and oil and water separators before it goes into surface waters. The swales would be designed to absorb excess runoff as well as filter nutrients from it. However, the effectiveness of detention areas and swales depends to a great extent on their design, and the project does not include designs for the drainage features to demonstrate their effectiveness in removing pollutants. Given these factors, as well as the fact that the use of chemicals and extent of over-irrigation by project residents cannot be determined, impacts related to over-irrigation and chemical use are considered potentially significant.

The Scotts Valley Water District would require the project to adhere to Title 22 regulations for reclaimed water use, and all site-specific regulations of state and local agencies.

Pavement Runoff. Runoff from paved surfaces can contribute BOD, suspended solids, and heavy metals to water bodies. Oil and grease (hydrocarbons), in particular, represent a low level, chronic release of pollutants into water bodies, and may originate from a number of small, non-point sources: vehicle exhausts, crankcase oils, fuel oils, etc. Given that portions of the site would be devoted to roadways, and additional acreage would be used for driveways and parking, the quality of pavement runoff from the project site may significantly affect and degrade downstream surface and subsurface water resources. In addition, the effectiveness of the project drainage features in removing pollutants cannot be demonstrated at this time. This impact would be significant without mitigation.

~~*Groundwater Recharge*. The project site is not identified as a significant groundwater recharge area. Development of the site would therefore not interfere substantially with groundwater recharge, and there would be no significant impacts related to groundwater recharge. In addition, the project's use of recycled water would reduce the need for water supplies from groundwater. Groundwater supply is discussed in Section 4.12, *Water Supply and Wastewater*.~~

The Specific Plan includes several design elements that are inherently mitigative, and would reduce the potential water quality impacts discussed above. The mitigative design elements include the following:

- *Permeable paving, such as pavers, porous concrete, or pathway comprised of decomposed granite, that is effective in stormwater infiltration to help prevent excess runoff.*
- *Use of "urban bio-swales" to redirect stormwater into planter strips, rather than capturing runoff in pipes and diverting it to a remote location.*
- *Use of subsurface irrigation systems for the town green area.*
- *Use of water efficient irrigation (e.g., drip irrigation system) to water trees, shrub beds, and areas of groundcover to eliminate evaporation losses.*

Mitigation Measures. In addition to the proposed Specific Plan policies and guidelines listed above, the following mitigation measures are required of individual developers within the Specific Plan area to mitigate impacts from increased stormwater discharges to a less than significant level:

H-4(a) **Best Management Practices (BMPs)**. The applicant shall implement Best Management Practices (BMPs) to ensure that water quality is protected. The BMPs to be implemented shall be chosen by the City, in consultation with the Scotts Valley Water District, and Regional Water Quality Control Board, and shall be determined prior to approval of each future development project within the Specific Plan area, but shall include at a minimum those listed below:

- During project operation, the project developers shall implement actions and procedures established to reduce the pollutant loadings in storm drain systems. The two main categories of these BMPs are "source control" and "treatment control." Source control BMPs are usually the most effective and economical in preventing pollutants from entering storm and non-storm runoff. Source control BMPs that shall be implemented include:

  a) Public Education/Participation activities. Information to new project residents regarding pollution prevention;
  b) Materials Management activities. Implementation of the following measures within any common landscaping or other facilities on site:

- Material Use Controls, which include good housekeeping practices (storage, use and cleanup) when handling potentially harmful materials, such as cleaning materials, fertilizers, paint, and where possible using safer alternative products;
- Material Exposure Controls, which prevent and reduce pollutant discharge to storm water by minimizing the storage of hazardous materials (such as pesticides) on site, storing materials in a designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors; and
- Material Disposal and Recycling, which includes storm drain system signs and stenciling with language to discourage illegal dumping of unwanted materials. Project residents shall be notified of household hazardous waste and used oil recycling at collection centers and round-up activities conducted by local agencies.

c) Spill Prevention and Cleanup activities that are directed toward reducing the risk of spills during the outdoor handling and transport of chemicals, and toward developing plans and programs to contain and rapidly clean up spills before they get into a storm drain system. This BMP also deals with the prevention and reduction of pollution from vehicle leaks and spills from vehicles during transport, as well as aboveground storage tanks;

d) Illegal Dumping controls. The project shall include a prohibition on the dumping of waste products (solid waste/liquid waste and yard trash) into storm drain systems, open space areas, and creeks;

e) Street and storm drain maintenance activities. These activities control the movement of pollutants and remove them from pavement through catch basin cleaning, storm drain flushing, street sweeping, and by regularly removing illegally dumped material from storm channels and creeks. The City would be responsible for regular storm drain maintenance within the public right of way; grease traps and other stormwater quality control devices would be required to be on private property, and shall be properly maintained.

- Treatment Control BMPs involve physical treatment of the runoff, usually through structural means. A variety of treatment control measures have been utilized for storm water

quality. However, the effectiveness of these controls is highly dependent on local conditions, such as climate, hydrology, soils, groundwater conditions, and extent of urbanization. As mentioned previously, the project would include biofiltration systems, swales, and oil/water separators (designed to remove petroleum compounds and grease, but which will also remove floatable debris and settleable solids); these features are all types of treatment controls. The drainage system shall route all runoff through biofilter swales (or equally effective treatment) before it goes into any existing wetlands or Carbonera Creek, or vernally moist grassland habitat mitigation area.

- The developer of any future project shall predominately (75 percent) use native plants and drought-tolerant landscaping wherever possible. The developer shall also install efficient irrigation systems, such as drip irrigation and automatic irrigation systems, that would minimize runoff.

- The project developer shall incorporate, where feasible, alternatives to impervious surfaces for project driveways, such as turf block. The developer shall submit plans for alternative driveway surfaces for review and approval by the City prior to approval of the Final Map.

c. Cumulative Impacts. Cumulative development under the General Plan would alter the existing topography and drainage patterns within the City, and would expose new residents and property to hazards from erosion and sedimentation that exist in the area. Development under the Specific Plan would contribute to these cumulative impacts. However, grading and associated erosion issues would be addressed on a case-by-case basis to mitigate impacts resulting from individual projects.

Cumulative development would increase overall activity levels in the area, with potential increases in sedimentation and concentration of contaminants, such as oil, grease, and solvents, in surface runoff that are discharged to local waterways, and local groundwater. However, all development would be subject to NPDES permit requirements pertaining to construction activity while all development in the City would be subject to various City requirements pertaining to controlling erosion and preserving water quality. These standard requirements would be expected to reduce cumulative impacts to water quality to a less than significant level.

All development would have the potential to result in an increase in impervious surface area, thereby increasing peak storm runoff in the area. The proposed project may incrementally contribute to this increase. However, the installation of properly designed retention/siltation basins would reduce peak storm flows. Because the detention features included as part of the project would maintain peak flows at or below existing levels a 24-hour 85th percentile rain event, or the flow of runoff produced from a rain event equal to at least two times the 85th percentile hourly rainfall intensity. ~~(for the 10-year storm, in accordance with City standards)~~,

there would be no increase in runoff from the project site, and the project would not contribute to any cumulative runoff impacts. The project would contribute to significant cumulative water quality impacts in that other projects in the area would also be sources of non-point-source pollution.

Project-specific mitigation would reduce the project-specific water quality impacts to a less than significant level by minimizing storm runoff and implementing BMPs to minimize pollutants and sediment in runoff. These measures would also reduce the project's contribution to cumulative impacts to a less than significant level.

With regard to water quality, the Basin Plan states that "property owners…may implement 'Best Management Practices to protect water quality," and that BMPs are analogous to the Best Available Technology/Best Control Technology used for control of point source pollutants. The EPA defines BMPs as "methods, measures or practices selected by an agency to meet its nonpoint source control needs." EPA regulations provide that basin plans shall describe the activities (including BMPs) that the agency has selected "to protect or achieve approved water uses." BMPs are considered a major part of the Basin's Nonpoint Source Program.

The Basin Plan notes that "the use of [BMPs] does not necessarily ensure compliance with effluent limitations or with receiving water objectives," and that the long-term effectiveness of some BMPs has not yet been documented. There is currently some controversy at the regional, state, and federal levels regarding the effectiveness of BMPs, and the extent to which agencies can rely on BMPs to meet their water quality objectives.

With mitigation, the project would implement a number of BMPs. One of the BMPs considered effective is the use of "concave vegetated surfaces" designed to filter out pollutants; such areas would be a feature of the project. Studies indicate that biofilter swales can provide comparable performance to wet ponds and constructed wetlands, and that poor performance appears to be related to poor design.

Although it appears that the measures to be implemented would not remove 100 percent of the pollutants generated by the project, the measures would remove a substantial portion of the pollutants. For these reasons, and the fact that the mitigation will require the developer to work with the RWQCB to remove pollutants to the maximum extent practicable, the water quality impacts of the project, including those from storm runoff, would be considered less than significant with mitigation.