4.6 DRAINAGE AND FLOOD HAZARDS

This section addresses impacts related to drainage and flood hazards. This section is based on analysis in the initial study (see Appendix A) and information provided in the following reports. These reports are included in Appendix E.

- *Parklands Development TTM No. 5632 Detention Design*. December 28, 2006, Revised July 27, 2008. Hawks & Associates.
- *Memorandum – Notice of Intent to Adopt a Negative Declaration, Parklands Specific Plan, Responses to Ventura County Watershed Protection District Comments.* July 29, 2008. Hawks & Associates.
- *Parklands Specific Plan, March 7 2008. Section IV F*. Water and Hydrology.
- DTR Engineering Memorandum (October 7, 2005) containing Hawks & Associates Engineering Memorandum (October 7, 2005).
- *Brown Barranca Hydraulic Study (Henderson Road to Telegraph Road)*. December 2006. Omrun Engineering.

4.6.1 Setting

a. Hydrology. The City of Ventura's general drainage pattern begins in the hills above of the City and terminates in the Ventura River, Santa Clara River or the Pacific Ocean. Water is transported through overland flows or by Ventura County Watershed Protection District (VCWPD) natural and concrete-lined barrancas. Long Canyon, located to the north of the plan area in the hills drains to Brown Barranca, a drainage that is under the jurisdiction of the VCWPD. Brown Barranca is a heavily vegetated earthen ditch that crosses the plan area in a southeasterly direction from Telegraph Road on the north to Wells Road at Blackburn Road on the east.

b. Drainage. The Parklands Specific Plan area consists of approximately 66.7 acres southwest of the intersection of Telephone Road and Wells Road. The plan area is relatively flat, but slopes gently toward Brown Barranca. Brown Barranca is deficient in capacity at SR 126 for large storm flow events (100-year storm), but is adequate for lesser storm events (10-year storm) (DTR Engineering, 2005). Brown Barranca is the main drainage within the plan area and is the only defined regional drainage deficiency listed in the Wells and Saticoy Communities Capital Improvement Deficiency Study (CIDS). Brown Barranca eventually drains to the Santa Clara River. There are no public drainage facilities within the plan area other than Brown Barranca since the remainder of the plan area is currently under agricultural production. Undeveloped peak flows to Brown Barranca under 10-Yr (Q10), 25-Yr (Q25), 50-Yr (Q50) and 100-Yr (Q100) storm events are shown in Table 4.6-1. As indicated, the peak flows range from 93 cubic feet per second (cfs) for the Q10 storm to 192 cfs for the Q100 storm.

c. Flood Hazards. As discussed above under subsection b, Brown Barranca is deficient for the 100-year storm. Within the plan area, Brown Barranca becomes both shallower and narrower between Telegraph Road and Wells Road (DTR Engineering, 2005). It is at this location where the where large storms overtop the barranca and flow across Wells Road and Blackburn Road (DTR Engineering, 2005). Flooding also occurs along Blackburn Road, caused by runoff from the existing mobile home park (DTR Engineering, 2005).

Table 4.6-1
Existing Flows to Brown Barranca

	Storm Event			
	Q10	**Q25**	**Q50**	**Q100**
Peak Flow (cfs)	93	120	150	192

Source: Hawks and Associates, Parklands Development Detention Design, Revised July 27, 2008.

The Federal Emergency Management Agency (FEMA) has defined the 100- and 500-year flood hazard areas within the City of Ventura through the publication of the Flood Insurance Rate Maps (FIRM), which establish base flood heights and flood zones for 100-year and 500-year storm events. The 100-year storm event is defined as a storm that has a 1% probability of occurring in any given year, while a 500-year storm event has a 0.2% chance of occurring in any given year. A "floodplain", also called a flood zone, is the lowland adjacent to a river, lake or ocean and is designated by the frequency of the flood that is large enough to cover it. For example, a 100-year floodplain will be covered by a 100-year flood, while a 500-year floodplain will be covered by a 500-year flood. The "floodway" is the channel of a river or stream plus any adjacent floodplain that must be kept free of encroachment so that the 100-year flood can be conveyed without substantial (greater than one foot) increases in flood heights. Planning policies typically prohibit urban development, activities, and structures within the floodway that will alter the floodway's ability to convey the 100-year flood. However, development is not usually restricted within the 500-year flood zone because of the low probability of flood occurrence.

Portions of the plan area are located within the 100-year and 500-year floodplains. Currently, flooding in the plan area vicinity occurs along Blackburn Road caused by runoff from the existing mobile home park and Wells Road to the east and Blackburn Road to the south from barranca deficiencies (DTR Engineering, 2005). The Brown Barranca Hydraulic Study indicates that double and triple box culverts at Blackburn Road and SR 126 are inadequate to carry existing 100-year storm flows (Omrun, 2006). Three box culverts within this portion of the study area contribute a combined overflow of 1,503 cubic feet/second (see Table 2, Brown Barranca Hydraulic Study Appendix E). Figure 4.6-1 shows three different flood boundaries, which are described below.

1) The effective 100-year flood plain is the mapped flood plain on record with FEMA and FIRM, indicating that a 100-year flood not only affects Blackburn Road, but Wells Road and areas easterly, as well as SR 126 and a portion of the plan area (see Figure 4.6-1);

2) The updated 100-year flood plain is the flood plain as defined by updated mapping and hydraulic calculations, which indicates that flooding affects primarily Blackburn Road and the southeastern portion of the plan area (see Figure 4.6-1); and

3) The proposed 100-year flood plain is the flood plain with implementation of the project and associated modifications to drainage (see Figure 4.6-1).

The plan area is not located within a dam inundation zone, as indicated in the Saticoy Wells Community Plan Background Report (2006).

4.6.2 Impact Analysis

a. Methodology and Significance Thresholds. Potential impacts to drainage runoff quantity and quality are based on comparison of the proposed uses and their locations relative to the existing uses. Flood hazard analysis was conducted pursuant to engineered maps showing the effective, updated and proposed 100-year flood plain (DTR Engineering, August 2008). The proposed drainage facilities for these projects are to be designed to the acceptance and satisfaction of the City of Ventura, and the VCWPD. Hydrology and water quality effects of the proposed Specific Plan are considered significant if the project would:

- *Change absorption rates, drainage patterns or the rate and amount of surface runoff in a manner that would cause an exceedance of storm drain system capacity*
- *Be in a flood hazard area, based on the FIRM maps*
- *Cause a discharge into surface waters that would adversely alter surface water quality (e.g., temperature, turbidity)*
- *Place within a 100-year flood hazard area structures that would impede or redirect flood flows*

Water quality effects were considered in the initial study; however, significant effects were not identified. Please see the initial study in Appendix A for a discussion of water quality issue areas and compliance with the National Pollutant Discharge Elimination System (NPDES) and Stormwater Quality Urban Impact Mitigation Plan (SQUIMP).

b. Project Impacts and Mitigation Measures.

Impact HYD-1 Development under the Parklands Specific Plan would increase storm water flow from the plan area due to increased impervious surfaces. However, the project includes Low Impact Development (LID) stormwater treatment designs and a detention basin sized to ensure that post development flow rates to Brown Barranca do not exceed pre-development flow rates. The project would result in increased downstream velocities within an existing concrete channel; however, the velocity increases are confined to a concrete channel. Therefore, the impact relating to increased stormwater flows and channel velocities within Brown Barranca would be Class III, *less than significant*.

Increased Stormwater Flows. The plan area is an infill site surrounded by an established urban environment. Storm runoff is calculated for the 67-acre plan area as a whole and pro-rated by area to the 13-acre portion east of Brown Barranca and the 54-acre portion west of the barranca (Hawks & Associates, July 27 2008). Runoff from the 13-acre portion of the plan area

would be treated with Low Impact Development (LID) techniques as required under the City's MS-4 stormwater permit prior to discharge to Brown Barranca. LID Techniques are aimed at reducing runoff and improving the quality of stormwater runoff through natural systems as opposed to engineered structures. Infiltration through vegetation and soil allows for uptake and capture of urban pollutants such as mercury, selenium, TCE, PCE and radionuclides, similar to the way that wetlands serve to cleanse water. In addition, flowing water is collected and slowed within gravel trenches and vegetated swales to allow for infiltration of water, as well as sediment collection. Overflows are piped to larger detention systems where the water will be slowly released or infiltrate to the ground. Some of the features used in the Parklands Specific Plan include the following.

- Directing street runoff through perforated curbs to open grass swales.
- Depressed turf areas to collect street and building runoff functioning as mini-detention areas.
- Open vegetated swales and native plant restoration areas along the edges of Brown Barranca to intercept overland flows before they sheet flow to the barranca.
- Permeable pavers on sand, decomposed granite, and open cell pavers to provide infiltration, filtration and sediment dropout.

Runoff from this 13-acre portion of the site would not exceed the pre-development flow rates of the entire plan area as indicated in Table 4.6-2.

Table 4.6-2
Existing and Post-Project Discharges to Brown Barranca

	Storm Event			
	Q10	**Q25**	**Q50**	**Q100**
Existing Brown Barranca Storm Flows (cfs)				
Peak Flow (all 67 acres)	93	120	150	192
Proposed Conditions (cfs)				
13-acre peak flow (cfs) LID treated with discharge direct to Brown Barranca	29	33	39	48
54-acre peak flow LID treated with discharge direct to Brown Barranca	25	25	25	25
54-acre peak flow LID treated and detained with metered discharge to Brown Barranca	38	56	86	117
Total Proposed Peak Flow (cfs)	**92**	**114**	**150**	**190**

Source: Hawks and Associates, Parklands Development Detention Design, Revised July 27, 2008.

The southwestern portion of the plan area (west of Brown Barranca) is comprised of 54 acres. Runoff from this portion of the plan area would likewise be treated with LID design features

designed to reduce sediment transport and eliminate urban pollutants prior to discharge to both Brown Barranca and a detention system that is designed to hold some runoff within the plan area such that peak post-development discharges would not exceed peak pre-development discharges. The basin would be designed to mitigate increased runoff from the entire site (all 67 acres) and would capture all flows greater than a Q10 by implementing metered discharge at pre-development flow rates.

Up to 25 cfs would flow from the southwestern 54-acre portion of the plan area to Brown Barranca, bypassing the detention basin as delivered through the LID stormwater treatment system. The LID stormwater treatment system consists of a network of open vegetated swales with infiltration trenches at parkways, depressed turf areas, gravel trenches and permeable pavers within service ways, allowing for percolation of stormwater into the ground. These systems also contain an overflow pipe such that during saturated conditions, overflow water is conveyed through an underground system to Brown Barranca (up to 25 cfs) or to the detention basin. The LID system would serve to slow the water, increase infiltration to the ground, remove sediment, and biofilter urban pollutants such as petroleum hydrocarbons.

Within Ventura County, developments are required to detain water on-site to ensure that post-project discharge rates do not exceed pre-project discharge rates. The reason for detention is to reduce the potential for downstream flooding by releasing flows slowly as the peak water runoff subsides elsewhere in the vicinity. Table 4.6-2 shows how the discharges from the northeast 13-acre portion of the plan area and the southeast 54-acre portion of the plan area would be discharged under each of the four storm scenarios. Post development discharge rates would not exceed pre-development discharge rates under any of the four scenarios. Therefore, because proposed post-development discharge rates will not exceed pre-development discharge rates, the potential for adverse effects from increased stormwater flows would be less than significant.

Increased Downstream Velocities. The proposed project includes culverting of a 725 linear foot segment of Brown Barranca upstream of the Blackburn Road undercrossing. The culvert section is being installed for two purposes. The first is to alleviate existing flooding in the vicinity of Blackburn Road due to a 304 cfs flow deficiency at Blackburn Road during a 100-year storm, which results in flooding along Blackburn Road. The second is to allow for extension of Carlos Street within the plan area, eventually continuing westward through the existing neighborhood and through the Hansen Property to fulfill the objective of connecting Wells Road and Saticoy Avenue pursuant to Figure 4.3 of the 2005 General Plan Chapter "Our Accessible Community."

The existing double box culvert at Blackburn Road is deficient during a 100-year storm event. Currently, a 100-year storm event generates flows of 304 cfs more than the 1,300 cfs capacity of the existing double box culvert (Omrun Engineering, 2006). Expanding the culvert at this location to provide a triple box culvert will increase the velocity within the concrete channel south of Blackburn Road and north of Henderson Road by 0.18 feet per second to 1.44 feet per second (see Table 4.6-3).

Table 4.6-3
Post Project Brown Barranca Hydraulic Change

Existing Condition			Post Project Change		
Station		Overflow (cubic feet/second)	Water surface Elevation (feet)	Channel Velocity (feet/second)	Top Width (feet)
8228	S. side of Blackburn Rd.	304.00	0.00	0.00	0.00
8107	N. side of WB SR 126 on-ramp	549.00	0.00	0.01	-0.20
8083	WB SR 126 on-ramp	549.00	0.06	-0.32	6.05
7871	N. side of WB SR 126 off-ramp	549.00	0.58	0.38	-134.33
7826	WB SR 126 off-ramp	549.00	0.46	1.44	-54.07
7771	WB SR 126 off-ramp	650.00	-0.04	0.18	-50.73
7691	N. side WB SR 126	650.00	0.00	0.00	0.00
7667	N. side WB SR 126	650.00	0.00	0.00	0.00
6848	Natural Bottom Channel at Henderson Road outlet *	n/a	n/a	0.00	n/a

Source: Brown Barranca Hydraulic Study (Henderson Road to Telegraph Road, Omrun Engineering, December 2006 (see Appendix E)

** Personal communication Bill Franks, Hawks and Associates, August 2008.*

The velocity increases would occur within the concrete channel and would be slowed by downstream capacity deficiencies, which cause flooding at SR 126 (see Table 2 and Table 6 of the Brown Barranca Hydraulic Study (Henderson Road to Telegraph Road), Omrun Engineering, December 2006 – see Appendix E). Velocities within the concrete channel show no net increase (see Station 7691 and 7667 above in Table 4.6-3) prior to discharge in the natural bottom channel south of Henderson Road.

The velocity increase to 1.44 feet/second slows to no net increase in velocity prior to discharge into the natural bottom channel south of Henderson Road. Therefore, the proposed project would not have the potential to cause erosion or sedimentation downstream due to increased velocities and erosion/sedimentation impacts would be less than significant.

Mitigation Measures. None required. Project design and existing project features would result in no-net increase of discharge rates to Brown Barranca (see Table 4.6-2). Moreover, increased velocities within the concrete channel south of the plan area would have a less than significant impact with respect to increased erosion and sedimentation because the velocity of water would be slowed prior to discharge into the natural bottom channel south of Henderson Road (see Table 4.6-3).

Significance After Mitigation. The impacts to Brown Barranca with respect to increased flows would be less than significant without mitigation due to project design considerations.

Impact HYD-2 Portions of the plan area are located within the 100- year flood plain. The specific plan includes improvements that would alleviate existing flooding within the plan area and would change the boundaries of the existing flood plain. This is a Class II, significant but mitigable, impact.

Portions of the Specific Plan area are currently within the 100-year flood plain (see Figure 4.6-1). Specific plan implementation would place residential development in an area that is currently classified as a 100-year flood zone. The applicant is working with the Ventura County Watershed Protection District to ensure that project drainage improvements in association with VCWPD planned capital improvements alleviate existing deficiencies as well as account for input to the conveyance system from surrounding developments. The proposed improvements would alleviate existing flooding in the vicinity of the plan area caused by deficiencies in Brown Barranca, on Linden Drive to the west and Blackburn road south of the plan area in the vicinity of the mobile home park (DTR Engineering, October 2005). However, because the applicant is proposing to place residences in what is currently designated as a 100-year floodplain (see Figure 4.6-1 effective floodplain), a Letter of Map Revision (LOMR) must be obtained from FEMA indicating the revised 100-year flood plain. The final design of the improvements for the Barranca would be coordinated with the VCWPD and submitted to FEMA. If the design is acceptable to FEMA, a conditional LOMR can typically be granted during the design phase. The final map revision occurs when the physical improvements have been completed to the barranca and accepted for map revision.

Mitigation Measures. The following mitigation measure would reduce the potential for adverse effects from construction of housing in an area that is currently designated as a 100-year flood plain.

HYD-1 Letter of Map Revision. Prior to issuance of building permits, a Letter of Map Revision (LOMR) from FEMA shall be obtained and the final development shall be sited to assure that no structures are placed within the redefined 100-year Flood Zone.

Significance after Mitigation. Implementation of the above mentioned mitigation in accompaniment of project design features would reduce potential impacts due to flood hazards to less than significant.

c. Cumulative Impacts. Development of the proposed Parklands Specific Plan, in conjunction with other development in the Ventura area, would continue to disturb areas with the potential to affect hydrology and drainage. As discussed in Section 3.0, *Environmental Setting*, planned cumulative development associated with buildout of the 2005 General Plan in the City of Ventura would add more than 8,300 dwelling units, as well as about 1.2 million square feet of retail development, 1.2 million square feet of office development, 2.2 million square feet of industrial development, and more than 500,000 square feet of hotel development.

Hydrological impacts related to cumulative development would be controlled through compliance with national and local programs that protect water quality, in addition to regulations of local authorities such as the City of Ventura and the Ventura County Watershed Protection District. This project is being designed to alleviate existing flooding hazards and to

accommodate flows from existing [Mobile Home Park and Linden Drive Terminus (Hawks and Associates, 2005)] and proposed neighboring developments (UC Hansen Trust) such that the combined effect during a storm does not cause exacerbated flooding hazards. In this manner, cumulative effects of this project and other future developments will have a less than significant impact with respect to hydrology and drainage.