



5.7 HYDROLOGY AND WATER QUALITY

This Section analyzes potential impacts on existing drainage patterns and flood control facilities in the Project area, as well as the potential effects on the groundwater and water quality in the vicinity of the subject site. Mitigation measures are recommended to avoid or lessen potential impacts to a less than significant level. Information in this Section is based on the *Hydrology and Water Quality Technical Appendix* prepared by RBF Consulting (July 26, 2007); refer to [Appendix 13.6, Hydrology and Water Quality Data](#). It is noted that the Project Applicant has provided a hydrologic analysis (*Preliminary Hydrology Report for Marymount College*, MAC Design Associates, July 6, 2006); refer to [Appendix 13.6, Hydrology and Water Quality Data](#). Notwithstanding, RBF has completed an independent hydrology analysis.

5.7.1 ENVIRONMENTAL SETTING

BACKGROUND

The *Master Plan of Drainage (Master Plan)* for the City of Rancho Palos Verdes was prepared in 1998 and updated in 2004 by AKM Consulting. For purposes of this hydrology analysis, the study area is defined as the watersheds in which the Marymount College Project site is located, as identified in the 2004 *Master Plan*. The information determined in the *Master Plan* for existing condition hydrology provides a basis for the existing condition hydrology for the Project. The watersheds are illustrated on [Exhibit 5.7-1, Existing Condition Hydrology Map](#).

All hydrologic analyses were performed in accordance with Los Angeles County Hydrology Method. The Los Angeles County MODRAT computer program was used to model both the existing and proposed conditions. MODRAT was implemented using the Watershed Modeling System (WMS) computer program as the user interface. The time of concentration was determined using the Los Angeles County Time of Concentration Calculator. The watershed subarea boundaries were delineated utilizing topographic mapping, a site visit to determine the existing drainage patterns and the *Master Plan of Drainage*. When comparing the *Master Plan* with site visit information, a discrepancy was apparent between watershed areas. Observations from the site visit to the College indicated that a portion of the existing tennis and basketball courts, and the majority of the athletic field, drain in the direction of Subarea 524A.¹ Hydrologic parameters used in this analysis, such as rainfall and soil classification, are presented in the *Los Angeles County Hydrology Manual*. [Exhibit 5.7-1](#) contains the hydrology map for the existing condition.

Existing Watershed Description

The historic drainage pattern for the area follows the natural topography, with the majority of the drainage flowing south and southwest towards Palos Verdes Drive East. The existing terrain and topographic conditions at the site were examined in the *Master Plan*. The *Master Plan* also identified the natural surface drainage patterns and delineated the watershed sub-basin boundaries. Hydrologic properties

¹ RBF Consulting, *Hydrology and Water Quality Technical Appendix*, June 30, 2007.



such as slope, drainage patterns, soil type and vegetation were characterized for each subarea. The watershed subareas are utilized in this analysis to develop a “link-node” model. The subareas ranged from 1 to 38 acres in size.

The project area is comprised of three watersheds: A, BC and D. Watershed A consists of two subareas that are included in this analysis: Subarea 1A and Subarea 3A. Subarea 1A is located north of Marymount College and encompasses Tract 26140, which includes residential streets and single-family residential housing. From Tract 26140, the stormwater runoff flows into the Marymount College campus through a culvert and into a large canyon on the Marymount property; refer to [Figure 3 of Appendix 13.6, *Canyon With Stormwater Flows*](#). Subarea 3A encompasses the west end of the campus and is currently comprised of a pre-school, art-building, bookstore and health center, photo lab, parking facility and open space. The onsite stormwater flows across Subarea 3A as sheet flow since there are no onsite drains. The runoff enters the parking lot, which directs runoff toward the canyon as illustrated on [Figure 4 of Appendix 13.6, *Parking Lot Curb Drains*](#). The onsite flow combines with the offsite flow in the canyon. The runoff then enters a culvert at Node 1, which runs beneath Palos Verdes Drive East, as illustrated on [Exhibit 5.7-1, *Existing Condition Hydrology Map*](#). The culvert then runs beneath Ganado Drive and Seaclaire Drive.

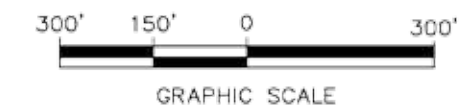
Downstream of Seaclaire Drive, runoff flows through a canyon until it reaches Palos Verdes Drive South, where it enters a culvert. At this point, the runoff crosses over open land until the runoff arrives at the cross culvert at Paseo Del Mar. Once the runoff has crossed the road it sheet flows over the Trump National Golf Course until it outlets to the Pacific Ocean. The culvert that crosses Palos Verdes Drive South is currently hydraulically deficient according to the 1998 Master Plan of Drainage.

Watershed BC consists of two subareas, Subarea 1B and Subarea 3C and does not consist of any offsite flows upstream of the College campus. Subarea 1B currently consists of two discharge points at the southern edge of the existing campus improvements. The first discharge point consists of the student union, view room, chapel, facility buildings, administrative buildings, auditorium, pool, academic buildings, parking facilities, a portion of the tennis courts and the hardball courts. The runoff for the first discharge point for Subarea 1B drains across the campus, as sheet flow, to the parking lots and enters a channel south of the improved campus area through two curb outlets that are illustrated in [Figure 7 of Appendix 13.6, *Curb Outlet Confluence*](#), prior to the natural channel. This flow continues down the natural channel until it reaches a V-ditch along Palos Verdes Drive East. The V-ditch directs runoff to a riser at Node 2; refer to [Exhibit 5.7-1](#). The second discharge point (most easterly) is the storm drain outlet for the Academic Building. The Academic Building contains roof drains and surrounding grate drains that connect to a storm drain, as illustrated in [Figure 9 of Appendix 13.6, *Roof Drain and Grass Drain*](#). The runoff from this discharge point runs down the hill into the riser at Node 2. Subarea 3C consists of the athletic field and open area. It drains down the hill and into a riser at Node 3. From Node 3, the runoff travels through a storm drain crossing Palos Verdes Drive East then combining with flow from Node 2 at Node 4. The combined storm drain then flows across Ganado Drive and Seaclaire Drive. The runoff then flows through a canyon until it reaches Palos Verdes Drive South, where it enters a culvert and crosses the road. At this point, runoff crosses over vacant land until the stormwater



LEGEND

	DRAINAGE BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
	SUBAREA DESIGNATION SUBAREA (ACRES)
	HYDROLOGY NODE
	EXISTING STORM DRAIN
	FLOW PATH



x 10-yr flows are clear water, 50-yr flows show both burned and clearwater.



This page intentionally left blank.



arrives at the cross culvert at Paseo Del Mar. Once the runoff crosses the road, it flows onto the Trump National Golf Course until it outlets to the Pacific Ocean. The culvert that crosses Palos Verdes Drive East and all culverts downstream are currently hydraulically deficient according to the 1998 Master Plan.²

Watershed D consists of 2 subareas: Subarea 1D and Subarea 3D. Subarea 1D consists of portions of the parking lot. The runoff sheet flows to a drain located on the edge of the tennis courts. A site visit by RBF revealed that the drain was tributary to Subarea 3D at the edge of the College property. Subarea 3D consists of the tennis courts and City-owned open space. The stormwater runoff sheet flows across this subarea and drains at Node 5. At Node 5, the runoff crosses under Palos Verdes Drive East through a cross culvert. From that point, the runoff then flows under Palos Verdes Drive East again. The runoff then continues downstream to the City of Los Angeles and crosses West 25th Street. All storm drain and cross culverts downstream of Node 5 are hydraulically deficient, according to the 1998 *Master Plan* for this watershed.³

Table 5.7-1, Existing Subwatershed Characteristics, summarizes the existing sub-watershed characteristics within the three watersheds. Exhibit 5.7-1 illustrates the drainage areas that were analyzed. The maximum elevation differential of the watershed is approximately 130 feet (from an elevation of 940-feet at the north portion of the Project site to an elevation of 810-feet at the discharge nodes at the south portion of the Project site). The south-facing portion of the Project site contains slopes of ten percent or greater. Due to limitations in the modeling software, the Project site was divided into three subareas: 1) Subarea 3A (Watershed A) involves the west portion of the campus; 2) Subarea 1B (Watershed BC) is centrally located; and 3) Subarea 18E (Watershed E) involves the east portion of the campus.

**Table 5.7-1
Existing Subwatershed Characteristics**

Subarea Designation	Area (acres)	Length (feet)	Proportion Impervious
Watershed A			
1A	11.6	1617	0.420
3A	8.4	885	0.260
Watershed BC			
1B	10.1	1097	0.39
3C	4.4	819	0.02
Watershed D			
1D	1.7	675	0.65
3D	14.8	1157	0.02
Source: RBF Consulting, <i>Hydrology and Water Quality Technical Appendix</i> , July 26, 2007.			

² Ibid.

³ Ibid.



Table 5.7-2, *Existing Drainage Facilities*, provides the results from the 1998 *Master Plan* for the existing drainage facilities that are relevant to development of the Project site.

**Table 5.7-2
Existing Drainage Facilities**

Watershed	Deficiencies Per the 1998 Master Plan of Drainage	Pipe Size and Material	Approximate Location	Comments and Action Requirements
B	M2-6 ¹	21" RCP ²	Palos Verdes Drive East and Ganado Drive	Per RBF site visit, the facility was apparently maintained.
B	M2-8 ¹	30" RCP	Cul-de-sac of Seaclaire Drive near Palos Verdes Drive East	Per RBF site visit, the facility was apparently maintained.
A	Not applicable	30" RCP	200 feet north of Ganado Drive at Palos Verdes Drive East. Crosses Ganado Drive and Seaclaire Drive.	Not applicable.
D	2-14 ³	18" CMP ⁴	2000 feet south of Ganado Road on Palos Verdes Drive East.	Undersized
D	2-15 (offsite) ³	18" CMP	Downstream of 2-14	Undersized
A & B	2-27, 2-25, 2-26 ³	18" CMP to 42" CMP	Downstream of Node 1 & Node 4.	All facilities are undersized
Source: RBF Consulting, <i>Hydrology and Water Quality Technical Appendix</i> , July 26, 2007.				
Notes: 1 Maintenance deficiency 2 RCP = Reinforced Concrete Pipe 3 Hydraulic deficiency 4 CMP = Corrugated Metal Pipe				

It is noted that in March 1999, the over 30-year old storm drain system that extended from Palos Verdes Drive East, down San Ramon Canyon, just east of Marymount College, overflowed into the yards of several properties off of Palos Verdes Drive East. The City determined that the system was undersized and needed to be replaced. Replacing the storm drain system required the installation of a new storm drain pipe and the placement of earth at the bottom of the canyon to provide a suitable base for the new drainpipe. In early 2001, the City discovered a large landslide on the east wall of San Ramon Canyon. The City determined that the annual stormwater flows had been steadily eroding away at the east wall of the canyon and this erosion had exposed a slide plane near the bottom. The installation of the new storm drain, landscaping and surface drainage structures on the new fill slope and repaving the road the City has been using to access the site, were completed in June 2003. The repaired drain performed as anticipated during the 2005 rains; no deficiencies were observed or reported.⁴

⁴ Electronic Correspondence: Ron Dragoo, City Engineer (c/o Ara Mihranian, Principal Planner), July 13, 2007.



Rational Method

The Rational Method and Modified Rational Method are empirical computation procedures for developing a peak runoff rate (discharge) for storms of a specific recurrence interval. Rational Method equations are based on the assumption that the peak flowrate is directly proportional to the drainage area, rainfall intensity and a loss coefficient, which describes the effects of land use and soil type. The design discharges were computed by generating a hydrologic “link-node” model, which divides the Project into drainage subareas. These subareas are tributary to concentration points or hydrologic “node” points determined by the existing terrain and street layout. The assumptions/guidelines applied for use of the Rational and Modified Rational Methods are outlined in Appendix 13.6, Hydrology and Water Quality Data.

Existing Condition Surface Water Hydrology

In order to establish the baseline hydrologic conditions for the proposed Project, both the 10-year and 50-year frequency storms were analyzed. The flows for the 10-year storm are used to determine local storm drain sizing, while the 50-year analysis is used for larger master plan facilities and floodplain mapping. The predominant hydrologic soil classification of the natural watershed is soil type 002.

The 10-year storm was analyzed using the clearwater method, which assumes that the runoff from the natural areas is free of debris. The 50-year storm was analyzed using the burn and bulking method. Burn and bulk factors are applied only to the natural watersheds. The burn and bulk analyzes increases in runoff from a natural area.

Appendix 13.6 provides the results of the 10-year clearwater flows and the 50-year burn and bulking flows. Results of the existing condition hydrology analysis are summarized in Table 5.7-3, Existing Conditions Peak Flowrates.

**Table 5.7-3
Existing Conditions Peak Flowrates**

Subarea	Area (Acres)	Total Area (Acres)	Tc	Subarea 10-Yr. Peak Q (cfs)	Total 10-Yr. Peak Q (cfs)	Subarea 50-Yr. Peak Q (cfs)	Total 50-Yr. Peak Q (cfs)
Watershed A							
1A	11.6	11.6	16	11.22	11.22	18.90	18.90
3A	8.4	20.0	10	9.84	19.23	17.33	33.07
Watershed BC							
1B	10.1	10.1	12	11.33	11.33	19.03	19.03
3C	4.4	14.5	10	5.17	16.47	9.08	27.99
Watershed D							
1D	1.7	1.7	10	2.17	2.17	3.44	3.44
3D	14.8	16.5	11	16.50	17.35	30.53	31.91

Source: RBF Consulting, *Hydrology and Water Quality Technical Appendix*, July 26, 2007.



FLOODPLAIN MAPPING

The City of Rancho Palos Verdes (Community Number 060454) is a participant in the National Flood Insurance Program (NFIP). Communities participating in the NFIP must adopt and enforce minimum floodplain management standards, including identification of flood hazards and flooding risks. Participation in the NFIP allows communities to purchase low cost insurance protection against losses from flooding. The panel containing the site is unmapped and is located in Zone D “Undetermined Flood Hazard.” The flood information provided by NFIP (Community Number: 60-0464, Zone “D” – Undetermined Zone) indicates that there is no flood hazard map for Rancho Palos Verdes.

STORMWATER QUALITY

Stormwater quality is a significant concern in Southern California. This section discusses typical pollutants found in stormwater runoff and discusses the types of contaminants that may be found in existing stormwater runoff.

Nonpoint Source Pollutants

A net effect of urbanization can be to increase pollutant export over naturally occurring conditions. The impact of the higher export can be on the adjacent streams and also on the downstream receiving waters. However, an important consideration in evaluating stormwater quality from a project is to assess if it impairs the beneficial use to the receiving waters. Receiving waters can assimilate a limited quantity of various constituent elements, however, there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable impact. The backgrounds of these standard water quality categories provide an understanding of typical urbanization impacts. Nonpoint source pollutants have been characterized by the following major categories in order to assist in determining the pertinent data and its use.

Sediment. Sediment is made up of tiny soil particles that are washed or blown into surface waters. It is the major pollutant by volume in surface water. Suspended soil particles can cause the water to look cloudy or turbid. The fine sediment particles also act as a vehicle to transport other pollutants including nutrients, trace metals and hydrocarbons. Construction sites are the largest source of sediment for urban areas under development. Another major source of sediment is streambank erosion, which may be accelerated by increases in peak rates and volumes of runoff due to urbanization.

Nutrients. Nutrients are a major concern for surface water quality, especially phosphorous and nitrogen, can cause algal blooms and excessive vegetative growth. Of the two, phosphorus is usually the limiting nutrient that controls the growth of algae in lakes. The orthophosphorous form of phosphorus is readily available for plant growth. The ammonium form of nitrogen can also have severe effects on surface water quality. The ammonium is converted to nitrate and nitrite forms of nitrogen in a process called nitrification. This process consumes large amounts of oxygen, which can impair the dissolved oxygen levels in water. The nitrate form of nitrogen is very soluble and is found naturally at low levels in water. When nitrogen



fertilizer is applied to lawns or other areas in excess of plant needs, nitrates can leach below the root zone, eventually reaching ground water. Orthophosphate from auto emissions also contributes phosphorus in areas with heavy automobile traffic. As a general rule of thumb, nutrient export is greatest from development sites with the most impervious areas. Other problems resulting from excess nutrients are: 1) surface algal scums; 2) water discolorations; 3) odors; 4) toxic releases; and 5) overgrowth of plants. Common measures for nutrients are total nitrogen, organic nitrogen, total Kjeldahl nitrogen (TKN), nitrate, ammonia, total phosphate and total organic carbon (TOC).

Trace Metals. Trace metals are primarily a concern because of their toxic effects on aquatic life and their potential to contaminate drinking water supplies. The most common trace metals found in urban runoff are lead, zinc and copper. Fallout from automobile emissions is also a major source of lead in urban areas. A large fraction of the trace metals in urban runoff are attached to sediment and this effectively reduces the level, which is immediately available for biological uptake and subsequent bioaccumulation. Metals associated with the sediment settle out rapidly and accumulate in the soils. Also, urban runoff events typically occur over a shorter duration, which reduces the amount of exposure, which could be toxic to the aquatic environment. The toxicity of trace metals in runoff varies with the hardness of the receiving water. As total hardness of the water increases, the threshold concentration levels for adverse effects increases.

Oxygen-Demanding Substances. Aquatic life is dependent on the dissolved oxygen (DO) in the water and when organic matter is consumed by microorganisms then DO is consumed in the process. A rainfall event can deposit large quantities of oxygen demanding substance in lakes and streams. The biochemical oxygen demand of typical urban runoff is on the same order of magnitude as the effluent from an effective secondary wastewater treatment plant. A problem from low dissolved oxygen results when the rate of oxygen-demanding material exceeds the rate of replenishment. Oxygen demand is estimated by direct measure of DO and indirect measures such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), oils and greases, and total organic carbon (TOC).

Bacteria. Bacteria levels in undiluted urban runoff exceed public health standards for water contact recreation almost without exception. Studies have found that total coliform counts exceeded Environmental Protection Agency (EPA) water quality criteria at almost every site and almost every time it rained. The coliform bacteria that are detected may not be a health risk in themselves, but are often associated with human pathogens.

Oil and Grease. Oil and grease contain a wide variety of hydrocarbons some of which could be toxic to aquatic life in low concentrations. These materials initially float on water and create the familiar rainbow-colored film. Hydrocarbons have a strong affinity for sediment and quickly become absorbed to it. The major source of hydrocarbons in urban runoff is through leakage of crankcase oil and other lubricating agents from automobiles. Hydrocarbon levels are highest in the runoff from parking lots, roads and service stations. Residential land uses generate less hydrocarbons export, although illegal disposal of waste oil into stormwaters can be a local problem.



Other Toxic Chemicals. Priority pollutants are generally related to hazardous wastes or toxic chemicals and can be sometimes detected in stormwater. Priority pollutant scans have been conducted in previous studies of urban runoff, which evaluated the presence of over 120 toxic chemicals and compounds. The scans rarely revealed toxins that exceeded the current safety criteria. The urban runoff scans were primarily conducted in suburban areas not expected to have many sources of toxic pollutants (with the possible exception of illegally disposed or applied household hazardous wastes). Measures of priority pollutants in stormwater include: 1) phthalate (plasticizer compound); 2) phenols and creosols (wood preservatives); 3) pesticides and herbicides; 4) oils and greases; and 5) metals.

Physical Characteristics of Surface Water Quality

Standard parameters, which assess the quality of stormwater, provide a method of measuring impairment. The backgrounds of these typical characteristics assist in understanding water quality requirements. The quantity of a material in the environment and its characteristics determine the degree of availability as a pollutant in surface runoff. In an urban environment, the quantity of certain pollutants in the environment is a function of the intensity of the land use. For instance, a high density of automobile traffic makes a number of potential pollutants (such as lead and hydrocarbons) more available. The availability of a material, such as a fertilizer, is a function of the quantity and the manner in which it is applied. Applying fertilizer in quantities that exceed plant needs leaves the excess nutrients available for loss to surface or ground water.

The physical properties and chemical constituents of water traditionally have served as the primary means for monitoring and evaluating water quality. Evaluating the condition of water through a water quality standard refers to its physical, chemical, or biological characteristics. Water quality parameters for stormwater comprise a long list and are classified in many ways. In many cases, the concentration of an urban pollutant, rather than the annual load of that pollutant, is needed to assess a water quality problem. Some of the physical, chemical or biological characteristics that evaluate the quality of the surface runoff are outlined below.

Dissolved Oxygen. Dissolved oxygen in the water has a pronounced effect on the aquatic organisms and the chemical reactions that occur. It is one of the most important biological water quality characteristics in the aquatic environment. The dissolved oxygen concentration of a water body is determined by the solubility of oxygen, which is inversely related to water temperature, pressure and biological activity. Dissolved oxygen is a transient property that can fluctuate rapidly in time and space. Dissolved oxygen represents the status of the water system at a particular point and time of sampling. The decomposition of organic debris in water is a slow process and the resulting changes in oxygen status also respond slowly. The oxygen demand is an indication of the pollutant load and includes measurements of biochemical oxygen demand or chemical oxygen demand.

Biochemical Oxygen Demand (BOD). The biochemical oxygen demand (BOD) is an index of the oxygen-demanding properties of the biodegradable material in the water. Samples are taken from the field and incubated in the laboratory at 20°C, after which the residual dissolved oxygen is measured. The BOD value commonly referenced is



the standard five-day values. These values are useful in assessing stream pollution loads and for comparison purposes.

Chemical Oxygen Demand. The chemical oxygen demand (COD) is a measure of the pollutant loading in terms of complete chemical oxidation using strong oxidizing agents. It can be determined quickly because it does not rely on bacteriological actions as with BOD. COD does not necessarily provide a good index of oxygen demanding properties in natural waters.

Total Dissolved Solids (TDS). TDS concentration is determined by evaporation of a filtered sample to obtain residue whose weight is divided by the sample volume. The TDS of natural waters varies widely. There are several reasons why TDS is an important indicator of water quality. Dissolved solids affect the ionic bonding strength related to other pollutants such as metals in the water. TDS are also a major determinant of aquatic habitat. TDS affects saturation concentration of dissolved oxygen and influences the ability of a water body to assimilate wastes. Eutrophication rates depend on total dissolved solids.

pH. The pH of water is the negative log, base 10, of the hydrogen ion (H^+) activity. A pH of seven is neutral; a pH greater than seven indicates alkaline water; a pH less than seven represents acidic water. In natural water, carbon dioxide reactions are some of the most important in establishing pH. The pH at any one time is an indication of the balance of chemical equilibrium in water and affects the availability of certain chemicals or nutrients in water for uptake by plants. The pH of water directly affects fish and other aquatic life and generally toxic limits are pH values less than 4.8 and greater than 9.2.

Alkalinity. Alkalinity is the opposite of acidity, representing the capacity of water to neutralize acid. Alkalinity is also linked to pH and is caused by the presence of carbonate, bicarbonate and hydroxide, which are formed when carbon dioxide is dissolved. A high alkalinity is associated with a high pH and excessive solids. Most streams have alkalinities less than 200 mg/l and ranges of alkalinity of 100-200mg/l seem to support well-diversified aquatic life.

Specific Conductance. The specific conductivity of water, or its ability to conduct an electric current, is related to the total dissolved ionic solids. Long-term monitoring of a project's waters can develop a relationship between specific conductivity and TDS. Its measurement is quick and inexpensive and can be used to approximate TDS. Specific conductivities in excess of 2000 μ ohms/cm indicate a TDS level too high for most freshwater fish.

Turbidity. The clarity of water is an important indicator of water quality that relates to the alkalinity of photosynthetic light to penetrate. Turbidity is an indicator of the property of water that causes light to become scattered or absorbed. Turbidity is caused by suspended clays and other organic particles. It can be used as an indicator of certain water quality constituents such as predicting the sediment concentrations.

Nitrogen (N). Sources of nitrogen in stormwater are from the additions of organic matter to water bodies or chemical additions. Ammonia and nitrate are important



nutrients for the growth of algae and other plants. Excessive nitrogen can lead to eutrophication since nitrification consumes dissolved oxygen in the water. Nitrogen occurs in many forms. Organic Nitrogen breaks down into ammonia, which eventually becomes oxidized to nitrate-nitrogen, a form available for plants. High concentrations of nitrate-nitrogen (N/N) in water can stimulate growth of algae and other aquatic plants, but if phosphorus (P) is present, only about 0.30 mg/l of nitrate-nitrogen is needed for algal blooms. Some fish life can be affected when nitrate-nitrogen exceeds 4.2 mg/l. There are a number of ways to measure the various forms of aquatic nitrogen. Typical measurements of nitrogen include Kjeldahl nitrogen (organic nitrogen plus ammonia); ammonia; nitrite plus nitrate; nitrite; and nitrogen in plants. The principal water quality criteria for nitrogen focus on nitrate and ammonia.

Phosphorus (P). Phosphorus is an important component of organic matter. In many water bodies, phosphorus is the limiting nutrient that prevents additional biological activity from occurring. The origin of this constituent in urban stormwater discharge is generally from fertilizers and other industrial products. Orthophosphate is soluble and is considered to be the only biologically available form of phosphorus. Since phosphorus strongly associates with solid particles and is a significant part of organic material, sediments influence concentration in water and are an important component of the phosphorus cycle in streams. The primary methods of measurement include detecting orthophosphate and total phosphorus.

Existing Stormwater Quality

The Project site lacks any measured data on stormwater runoff quality. In the absence of site-specific data, expected stormwater quality can be qualitatively discussed by relating typical pollutants to specific land uses.

Currently, the Project site contains buildings, an athletic field, tennis courts and parking. The only onsite storm drain facility is for the Academic Building, which is a classroom building located at the eastern portion of the campus. This building contains roof drains and surrounding drains. On the remainder of the campus, the water flows across the site via sheet flow. The existing pollutants expected in the existing condition stormwater runoff from the developed areas of the Marymount College campus are oil and grease from automobile use (i.e., parking lots), trash, and pesticides and fertilizer from the athletic field and landscaping. The natural areas are likely to produce suspended solids.

It is likely that offsite runoff that flows onto the campus at the intersection of Casilina Drive and Palos Verdes Drive East contains pollutants from upstream residential areas. Pollutants associated with residential development can include trash, nutrients, bacteria, oil and grease, and household hazardous wastes.

Currently, the site does not contain any structural Best Management Practices (BMP), which would potentially decrease the amount of pollutants in stormwater runoff. It is likely that portions of potential pollutants are currently removed through the use of natural conveyance rather than a storm drain system. Conveying flows overland through vegetation affords some infiltration and biofiltration of runoff and thus, potential pollutant removal. A disadvantage to conveying flows overland is that



it is likely to create erosion problems and thus, increases suspended solids in the runoff. Problems associated with erosion are evident at the Marymount site as illustrated on [Figure 9 of Appendix 13.6, *Hay Bails for Erosion*](#), which depicts the usage of hay bails to reduce erosion as the water flows into the canyon below.

5.7.2 REGULATORY SETTING

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM PERMIT

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal and other facilities must obtain permits if their discharges go directly to surface waters.

Enacted in 1990, Phase I of the Stormwater Rule applied to municipal separate storm sewer systems (MS4s) with a service population of 100,000 or more, to construction projects affecting 5.0 acres or more of land disturbance, and to certain industrial activities. The NPDES Phase II Final Rule was adopted in December 1999 and requires operators of small municipal separate storm sewer systems (MS4s) located in designated urbanized areas (UAs) and in areas meeting certain regulatory criteria to develop and implement Stormwater Management Programs (SWMPs).

Under the NPDES Phase II Rule and the MS4 General Permit, Small MS4s that meet specific criteria must obtain MS4 General Permit coverage for stormwater discharges. The Los Angeles Regional Water Quality Control Board (RWQCB) issues MS4 General Permit coverage for the County of Los Angeles (County). The County was required to comply with Federal NPDES Phase II requirements and submitted a Notice of Intent (NOI) to comply with the State's MS4 General Permit to the RWQCB. To comply with the State's MS4 General Permit, the MS4 operator (in this case, the County) must implement a Stormwater Management Program (SWMP) that reduces the discharge of pollutants to the "Maximum Extent Practicable" (MEP), that protects water quality and that satisfies the requirements of the Clean Water Act according to California's MS4 General Permit.

STATE WATER RESOURCES CONTROL BOARD STORMWATER GENERAL CONSTRUCTION PERMIT

In 1999, the State Water Resources Control Board (SWRCB) adopted Order No. 99-08-DWQ, NPDES General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Construction Activity (General Construction Permit). This permit was subsequently amended to include smaller construction sites. The General Construction Permit requires that construction sites with 1.0 acre or greater of soil disturbance or less than 1.0 acre, but part of a greater common plan of development, apply for coverage for discharges under the General Construction Permit by submitting a Notice of Intent (NOI) for coverage, developing a Stormwater Pollution Prevention Plan (SWPPP), and



implementing Best Management Practices (BMPs) to address construction site pollutants.

The SWRCB has identified the City of Rancho Palos Verdes, as being subject to NPDES Phase II requirements under the MS4 General Permit.

COUNTY OF LOS ANGELES

The Los Angeles RWQCB increased its requirements for the Municipal NPDES Permit. The new requirements of the Municipal NPDES permit require the development of a Standard Urban Stormwater Mitigation Plan (SUSMP). Guidelines for the requirements associated with the SUSMP are described in detail in the Development Planning for Stormwater Management - A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP) (2002) prepared by the Los Angeles County Department of Public Works.

5.7.3 IMPACT THRESHOLDS AND SIGNIFICANCE CRITERIA

Appendix G, *Initial Study Environmental Checklist Form*, of the California Environmental Quality Act Guidelines (*CEQA Guidelines*) was used during preparation of the Initial Study for the proposed Project; refer to [Appendix 13.1, *Initial Study/Notice of Preparation*](#). The Initial Study includes questions relating to hydrology, drainage and water quality. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this Section. Accordingly, a project may create a significant environmental impact if it would:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or substantially interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- 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 offsite.
- 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 offsite.
- Create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provision of 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; refer to Section 8.0, *Effects Found Not To be Significant*.
- Place within a 100-year flood hazard area structures, which would impede or redirect flood flows; refer to Section 8.0, *Effects Found Not To be Significant*.
- 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.
- Inundate by seiche, tsunami or mudflow; refer to Section 8.0, *Effects Found Not To be Significant*.

Definition of Level of Significance

The purpose of this technical evaluation is to determine the impact of the proposed Project on surface water drainage and stormwater quality within the City of Rancho Palos Verdes and the Pacific Ocean. If the analysis determines that the proposed Project has the potential to significantly impact surface water drainage or stormwater quality, appropriate mitigation is identified to avoid or reduce impacts to less than significant levels.

Federal, State and local drainage laws and regulations govern the evaluation of impacts to surface water drainage. For this evaluation, impacts to surface water drainage would be considered significant if the Project alters the drainage patterns of the site, which would result in substantial erosion, siltation, or increase runoff that would result in increased flooding. An increase in the amount of runoff could be considered significant if flows are not contained or are allowed to flow onto Palos Verdes Drive East or to impact downstream storm drain facilities.

As previously noted, the primary objectives of the municipal stormwater program requirements are to effectively prohibit non-stormwater discharges and to reduce the discharge of pollutants from the stormwater conveyance system to the “Maximum Extent Practicable”. For this evaluation, impacts to stormwater quality would be considered significant if the Project did not attempt to address stormwater pollution to the “maximum extent practicable”. Currently, there are no definitive water quality standards that require stormwater quality leaving a project site to meet standards for individual pollutants. Therefore, impacts to stormwater quality would be considered less than significant if they meet the requirements of the SUSMP. The SUSMP requirements for commercial/institutional developments include the following:

- Post development peak storm discharge rates shall not exceed the estimated pre-development rate for developments where increased peak storm water discharge rate will result in increased potential for downstream erosion.
- Conserve natural areas by using cluster development, limiting clearing and grading of native vegetation, maximize trees and other vegetation, promote natural vegetation, and preserve riparian area and wetlands.



- Minimize storm water pollutants of concern by incorporating BMPs or combinations of BMPs best suited to maximize the reduction of pollutant loadings in runoff to the maximum extent practicable.
- Protect slopes and channels to decrease the potential of slopes and channels from eroding and impacting storm water runoff.
- Provide storm drain system stenciling and signage.
- Properly design outdoor material storage areas.
- Properly design trash storage areas.
- Provide proof of ongoing BMP maintenance.
- Comply with SUSMP standards for design of structural or treatment control BMPs.
- Properly design loading/unloading dock areas.
- Properly design repair/maintenance bays.
- Properly design vehicle/equipment wash areas.
- Design parking areas to reduce impervious land coverage, infiltrate runoff, and treat runoff before it enters the storm drain system.

5.7.4 IMPACTS AND MITIGATION MEASURES

5.7.4.1 DRAINAGE AND HYDROLOGY

- ❑ **THE PROPOSED PROJECT WOULD ALTER DRAINAGE PATTERNS, WHICH COULD RESULT IN INCREASED EROSION POTENTIAL AND RUNOFF AMOUNTS.**

Impact Analysis: The following is an analysis of the proposed Project, which is then compared to the existing conditions analysis to determine impacts associated with development of the property. Proposed conditions investigated include land use, assumed storm drain configuration, hydrology, watershed, floodplain mapping and stormwater quality. The Preliminary Hydrology Report for Marymount College prepared by MAC Design Associates (July 6, 2006) is the hydrologic analysis, which has been provided by the Applicant; refer to Appendix 13.6, Hydrology and Water Quality Data. Notwithstanding, RBF has completed an independent hydrology analysis. The Preliminary Grading and Drainage Plan (Revised March 13, 2007) is available for review at the City of Rancho Palos Verdes City Hall. These were utilized to determine drainage patterns and storm drain locations in order to assess Project impacts.



It is noted that this analysis is conceptual and is intended to provide direction to the Applicant on the final design that would be reviewed and approved by the City prior to issuance of any Grading or Building Permit.

HYDROLOGY

The proposed Project involves an extensive renovation to the Marymount College campus consisting of the modernization and expansion of existing buildings, the construction of new academic, library, athletic facility and student housing buildings, and the relocation and reconfiguration of recreational facilities, athletic field and parking facilities; refer to Exhibit 3-5, Proposed Site Plan, Table 3-2, Proposed College Campus and Table 5.7-4, Land Use Summary.

Project hydrology (based on proposed flow paths and storm drain locations) was completed by RBF Consulting to determine the impacts that the new development would have on runoff. Hydrologic analyses were performed in June 2007 in accordance with Los Angeles County Hydrology Method. The Los Angeles County MODRAT computer program was used to model both the existing and proposed conditions. MODRAT was implemented using the WMS computer program as the user interface.

The watershed subarea boundaries were delineated utilizing topographic mapping, the *Master Plan*, a site visit and proposed Project maps. Exhibit 5.7-2, Proposed Condition Hydrology Map, illustrates the Project conditions hydrology. In the Project condition, it is assumed that the library and art/maintenance buildings would be piped and drained into Subarea 3B (refer to Table 5.7-4), not Subarea 18E, as indicated in the *Master Plan*. Hydrologic parameters used in the analysis, such as rainfall and soil classification, are as presented in the *Los Angeles County Hydrology Manual (January 2006)*.

Proposed Watershed Description

Exhibit 5.7-3, Proposed Storm Drain Layout, illustrates the conceptual drainage plan to convey stormwater flow offsite. This proposed plan utilizes the same discharge points used in the existing condition and accounts for changes to the watershed areas and the percentage of impervious surfaces.

Similar to the existing condition, the proposed drainage area has been divided into three watersheds: Watershed A, Watershed BC and Watershed D. Hydrologic properties such as slope, assumed drainage patterns, soil type and vegetation were characterized for each subarea. The watershed subareas were utilized to develop a "link-node" model. The subareas range from 1 to 38 acres in size. Table 5.7-5, Proposed Subwatershed Characteristics, summarizes the Project sub-watershed characteristics.

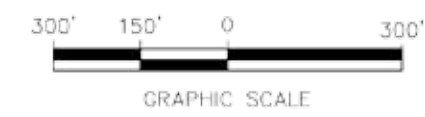
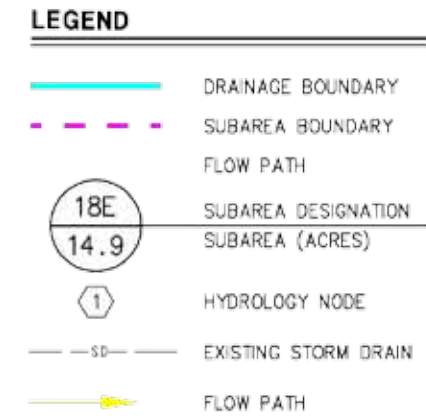
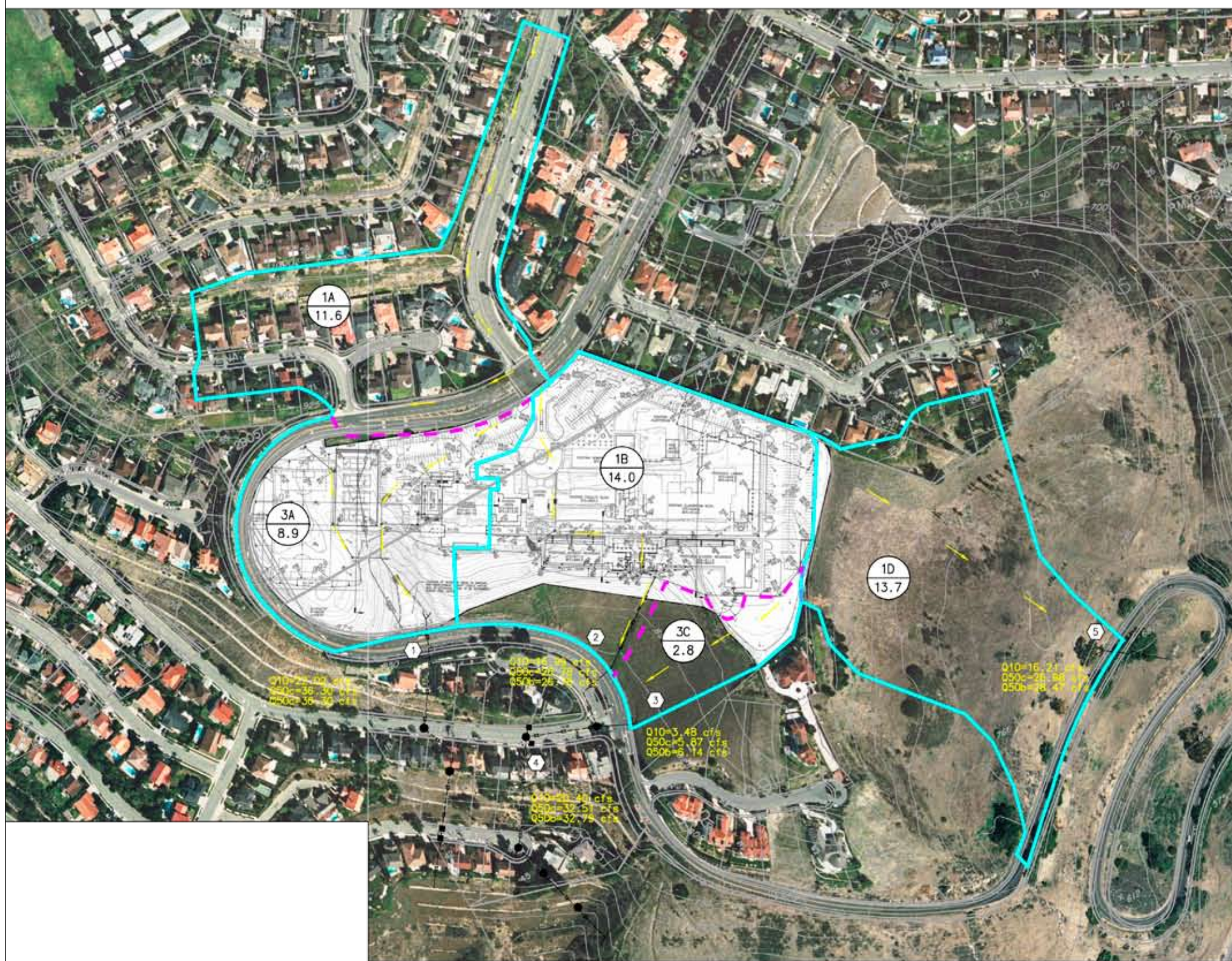


**Table 5.7-4
Land Use Summary**

Description	Watershed Subarea Designation
Existing Structures	
Classroom/Academics	1B
Auditorium (Fine Arts Studio)	1B
Faculty	1B
Church	1B
Student Union (Bookstore/Faculty Dining)	1B
Administration/Admissions	1B
Buildings to be Removed	
View Room	3A
Maintenance/Photo Lab	3A
Bookstore/Health Center	3A
Arts	3A
Preschool	1B
Library	1B
Pool Equipment	3A
Buildings to be Added	
Library	1B
Maintenance	3A
Athletic Facility	3A
Residence Hall 1	1B
Residence Hall 2	1B
Gallery	1B
Source: RBF Consulting, <i>Hydrology and Water Quality Technical Appendix</i> , July 26, 2007.	

**Table 5.7-5
Proposed Subwatershed Characteristics**

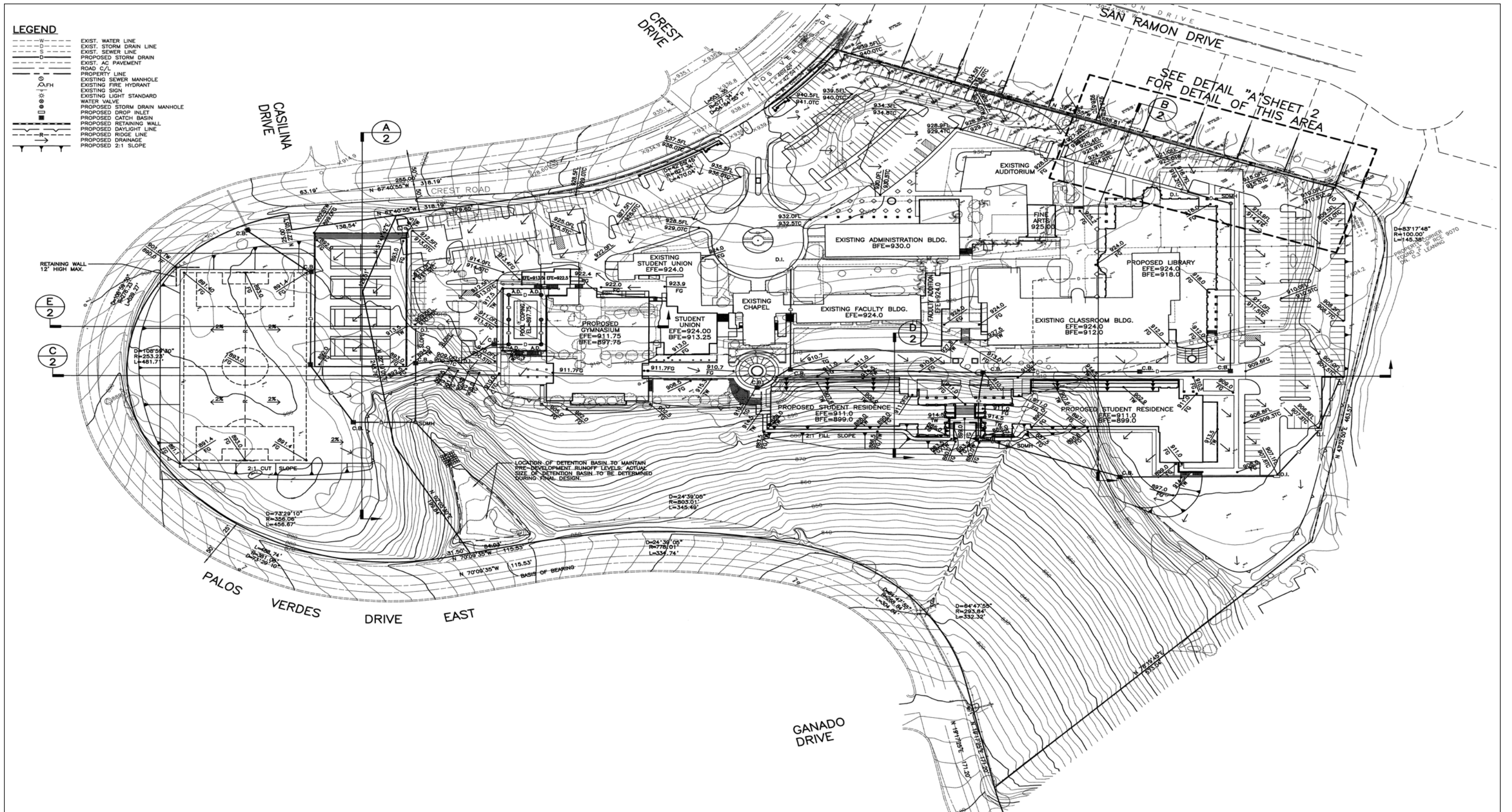
Subarea Designation	Area (acres)	Length (feet)	Proportion Impervious
Watershed A			
1A	11.6	1,617	0.42
3A	8.9	870	0.40
Watershed BC			
1B	14	1,109	0.64
3C	2.8	728	0.02
Watershed D			
1D	13.8	1031	0.02
Source: RBF Consulting, <i>Hydrology and Water Quality Technical Appendix</i> , July 26, 2007.			



x 10-yr flows are clear water, 50-yr flows show both burned and clearwater.



This page intentionally left blank.



Source: MAC Design Associates; March 13, 2007.



This page intentionally left blank.



Table 5.7-6, *Total Local Watershed Area Comparison*, compares the changes to the watershed areas for the existing and proposed conditions.

**Table 5.7-6
Total Local Watershed Area Comparison**

Watershed Drainage	Existing Condition (Acres)	Project Condition (Acres)	Difference (Acres)
Watershed A	20.0	20.5	0.5
Watershed BC	14.5	16.8	2.3
Watershed D	16.5	13.7	2.8
Total	51.0	51.0	0.0

Source: RBF Consulting, Hydrology and Water Quality Technical Appendix, July 26, 2007.

In Watershed A, the size of the watershed and the amount of impervious area would change in the proposed Project condition by 0.5 acres from Watershed BC. This is because the Project proposes the demolition of four buildings and the parking lot that exists in this area and proposes new development consisting of an athletic building, pool, reconfigured parking area and tennis courts; refer to Section 3.0, Project Description. Also, a portion of the undeveloped vacant land that exists at the western extent of the campus would be developed with a new athletic field, reconfigured parking and portions of the tennis courts. The proportion impervious would stay the same for Subarea 1A; however, Subarea 3A would have an increase of 0.14 acre, 53 percent, over the existing condition.

In Watershed BC (including Subarea 3C), the proportion impervious area would change in the Project condition by 0.25 acre in Subarea 1B, a 64 percent increase over the existing condition. This is because the Project proposes the demolition of the existing view room and the existing parking area located along the property's south-facing slope and proposes new development consisting of two residence halls, academic/library building and maintenance/art studio. Additionally, floor area would be added to three of the buildings existing within this area. Additionally, there is an assumed change to the size of the Watershed, because 2.3 acres of parking that was in Watershed D in the existing condition was added to Watershed BC in the Project condition.

In Watershed D, there would be no construction under the Project conditions. Based on the proposed Site Plan, the parking lot and associated grading would be diverted to Watershed BC. It is assumed that this area would be diverted to the proposed onsite detention basin to address water quality concerns. However, the analysis assumes that Subarea 1D would lose 2.8 acres to Watershed BC from the existing parking and tennis court area. This would reduce the runoff tributary to Node 5. There would be no increase in percent impervious for this watershed.

As previously stated, in the proposed condition, the watershed delineation changes slightly from the subareas defined by the *Master Plan (Existing Condition)* due to Project-related grading, the construction of new buildings and increases of impervious areas (parking lots, walkways and buildings). As a result, the proposed



Project would alter the existing drainage patterns. Changes in tributary area would also influence flowrate. An increase in flowrate could result in increased flooding offsite. The impacts are considered potentially significant if not mitigated.

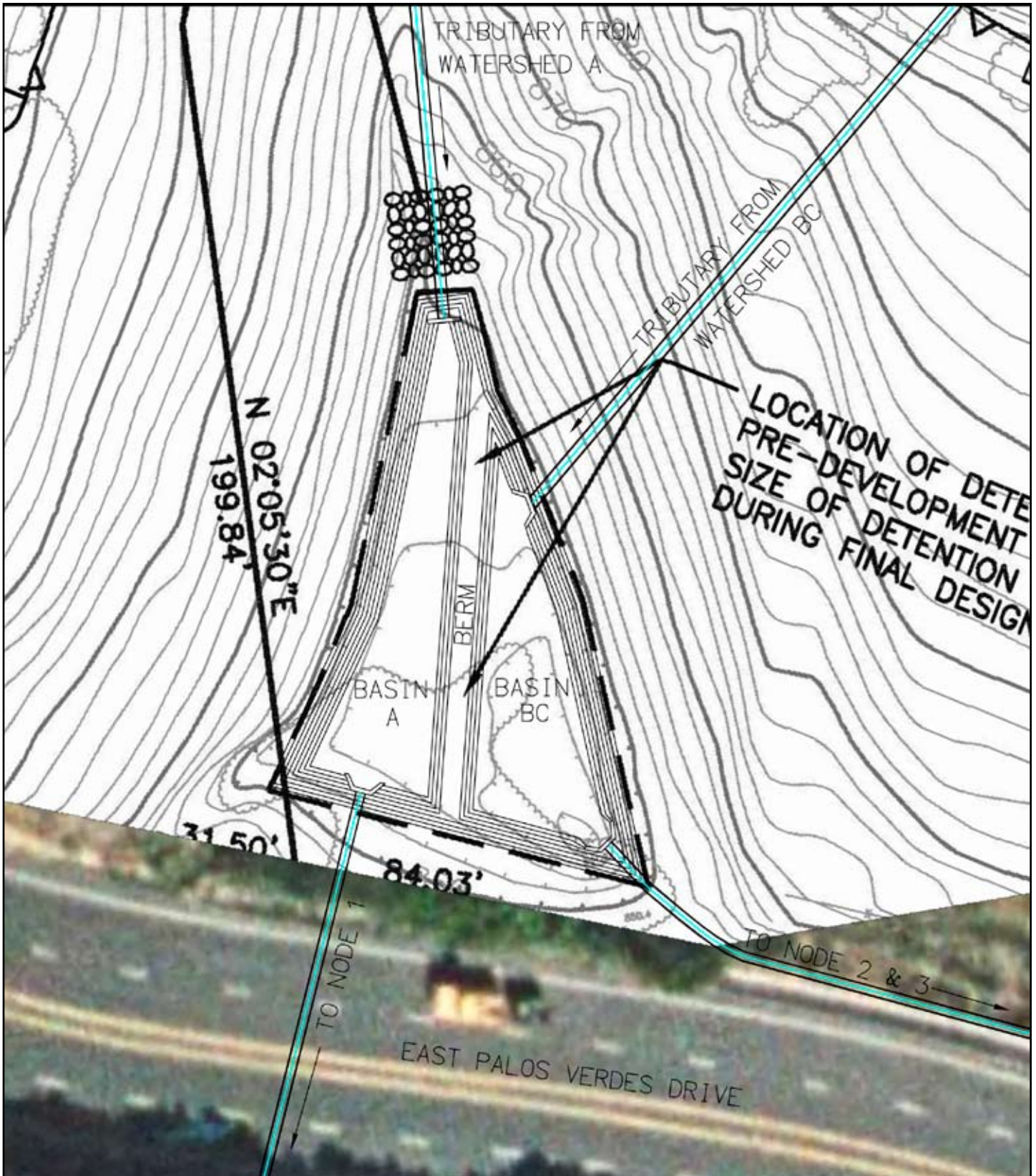
In addition, without mitigation to reduce the flow downstream, the increased runoff can contribute to onsite erosion of the hillside; refer to Section 5.6, *Geology and Soils*. A detention basin, storm drains and catch basins would be required to mitigate erosion downstream of the redevelopment.

The schematic for the Project's proposed drainage layout is illustrated on Exhibit 5.7-3, *Proposed Storm Drain Layout*, and indicates the following proposed improvements: onsite storm drain, catchbasins and one detention basin.

With increased and potential concentrated flows, significant erosion may occur. The area of particular concern is south of the existing athletic field, because the South Shores Landslide occupies the area further south. Mitigation is recommended to prevent the further erosion of the natural hillsides downstream of the Project site and to direct flows away from the South Shores Landslide. Specifically, the recommended mitigation requires preparation of a Revised Drainage Plan, which includes a storm water collection system to prevent the flow (sheet or concentrated) from eroding the natural hillside. A system of storm drainpipes would be required to divert the flow to the proposed storm drain system.

The proposed detention basin, which involves Watershed A and BC Sub-Basins, is proposed at the bottom of the south-facing slope adjacent to Node 1; refer to Exhibit 5.7-3, *Proposed Storm Drain Layout*, and Exhibit 5.7-4, *Detention Basin Layout*. The proposed location of the detention basin is considered a potentially significant impact to slope stability unless mitigated; refer to Section 5.6, *Geology and Soils*. Therefore, mitigation has been recommended requiring that the detention basin be lined to eliminate saturation of soil in the vicinity and to eliminate the concerns of locating a detention basin on a slope.

The detention basin would be designed as a storm water and water quality detention basin to satisfy required hydraulic and water quality mitigation. The basin would detain water a maximum of 96 hours, pursuant to Vector Control District requirements. The detention basin would be required to mitigate the 2- through 100-year storm events. An acceptable water quality mitigation is an extended detention basin. These facilities are commonly paired with a flood control detention basin. Maintenance of any detention basin associated with the Project would be the responsibility of the College. Underground pipes would direct flows from the proposed site to their respective sub-basins. The Watershed A Sub-basin would require an outlet that ties into the storm drain system at Node 1. The Watershed BC Sub-basin would require an outlet that drains to the storm drain system at Nodes 2 and 3. The pipe outlets that would drain the detention basin (i.e., both sub-basins) are required to be sized to allow no more than the existing condition flow out of the sub-basins at any given time.





Stormwater mitigation would be required to reduce the Project's drainage impacts to a less than significant level. Specifically, the recommended mitigation involves requirements for onsite storm drains to be designed to convey flows per Los Angeles County Standards and for detention basin calculations regarding the diversion area to be provided. With implementation of these drainage mitigation measures, drainage impacts would be reduced to a less than significant level.

Project Condition Surface Water Hydrology

The Rational Method and Modified Rational Method were used for developing the peak runoff rates (discharge) for the Project condition 10-year and 50-year storms. The assumptions/guidelines applied for use of the Rational and Modified Rational Methods are outlined in Appendix 13.6, Hydrology and Water Quality Data. Appendix 13.6 also provides the results of the 10-year clearwater flows and the 50-year burn and bulk flows. Results of the Project condition hydrologic analysis are summarized in Table 5.7-7, Project Conditions Peak Flowrates.

**Table 5.7-7
Project Conditions Peak Flowrates**

Subarea	Area (Acres)	Total Area (Acres)	Tc Calc ¹	Subarea 10-Year Peak Q ² (cfs) ³	Total 10-Year Peak Q (cfs)	Subarea 50-Year Peak Q (cfs)	Total 50-Year Peak Q (cfs)
Watershed A							
1A	11.6	11.6	16	11.22	11.22	18.90	18.90
3A	8.9	20.5	10	10.99	22.02	17.77	36.30
Watershed BC							
1B	14.0	14.0	11	16.99	16.99	26.78	26.78
3C	2.8	16.8		3.48	20.40	6.14	32.79
Watershed D							
1D	13.7	13.7	10	16.21	16.21	28.47	28.47
Tc = Time of concentration; Q = Flow rate; cfs = Cubic Feet Per Second.							
Source: RBF Consulting, <i>Hydrology and Water Quality Technical Appendix</i> , July 26, 2007.							

Flow is assumed to cross the campus via storm drain. The Project condition would increase the amount of impervious surface, as compared to the existing condition. The change in impervious area has the potential to cause significant downstream impacts, particularly since many of the cross culverts downstream of the Project site are hydraulically deficient; refer to the *Existing Conditions* discussion above.

The proposed Project would alter hydrology due to onsite grading and increases in impervious area. This could result in existing storm drains being undersized due to the increased flows onsite. Thus, the impacts are considered potentially significant if not mitigated.

Table 5.7-8, Flow Comparison, compares the flowrate for the three watersheds that have been analyzed. The increased flows in Watersheds A, BC and D are



considered a significant impact, since the facilities downstream of Watersheds A, BC and D are all hydraulically or maintenance deficient. The increase would cause a greater amount of flooding on Palos Verdes Drive East cross-culvert No. 2-27, 2-25 and 25th Street cross-culvert No. 2-26, as denoted in the 1998 Master Plan.

**Table 5.7-8
Flow Comparison**

Subarea	Existing				Proposed Project			
	Area (Acre)	Total Area (Acre)	Subarea 50-Year Peak Q (cfs)	Total 50-Year Peak Q (cfs)	Area (Acre)	Total Area (Acre)	Subarea 50-Year Peak Q (cfs)	Total 50-Year Peak Q (cfs)
Watershed A								
1A	11.6	11.6	18.90	18.9	11.6	11.6	18.9	18.9
3A	8.4	20	17.33	33.07	8.9	20.5	17.77	36.30
Watershed BC								
1B	10.1	10.1	19.0	19.03	14	14	26.78	26.78
3C	4.4	14.5	9.08	27.99	2.8	16.8	6.14	32.79
Watershed D								
1D	1.7	1.7	3.44	3.44	13.7	13.7	28.47	28.47
3D	14.8	16.5	30.53	31.91	0	13.7	0	28.47
Source: RBF Consulting, <i>Hydrology and Water Quality Technical Appendix</i> , July 26, 2007.								

Stormwater mitigation would be required to reduce the Project's hydrology impacts to a less than significant level. Specifically, the recommended mitigation involves requirements for the provision of an onsite detention basin for increased flows if the existing storm drains are undersized. The detention basin would be required for Watershed A and BC. With implementation of this hydrology mitigation measure, hydrology impacts would be reduced to a less than significant level.

Mitigation Measures:

HYD-1 Prior to issuance of any Grading Permit, the Director of Public Works and the City Engineer shall review and approve a Revised Storm Drain Plan. Such Plan shall:

- Include an on-site storm water collection system designed to prevent the flow (sheet or concentrated) from eroding the natural hillside.
- Identify how storm drains and catch basins are designed to control stormwater leaving the campus;
- Control erosion downstream of the development.



- Include storm drains designed to convey flows per Los Angeles County Standards.
- Includes a system of storm drain pipes that would divert the flow to the proposed storm drain system.

Calculations shall be provided to the Director of Public Works and the City Engineer indicating that the diversion area does not impact the existing storm drains.

HYD-2 Increased flows from Watersheds A and BC shall be mitigated with the installation of a detention basin (i.e., Watershed A Sub-Basin and Watershed BC Sub-Basin), as illustrated on Exhibit 5.7-4, *Detention Basin Layout*, or where determined by the Director of Public Works and the City Engineer, to reduce the peak flow. The detention basin shall be designed such that:

- The 2- through 100-year storm events are mitigated.
- Water would be detained a minimum of 24 hours, but not greater than 96 hours, pursuant to Vector Control District standards.
- Berms shall be provided at Palos Verdes Drive East to allow adequate free board. The flow leaving the detention basin shall be maintained equal to the existing condition.
- Watershed A Sub-Basin shall include an outlet that ties into the storm drain system at Node 1.
- Watershed BC Sub-Basin shall include an outlet that drains to the storm drain system at Nodes 2 and 3
- The pipe outlets that would drain the sub-basin shall be sized to allow no more than the existing condition flow out of the detention basin at any given time.
- Water quality requirements shall be satisfied through detention basin design. The extended detention basin shall serve also as a flood control detention basin.
- Adequate secondary overflow shall be provided.
- An impermeable liner shall be provided to eliminate saturation of soil in the vicinity; and
- Maintenance of the detention basin shall be the responsibility of the College.

Level of Significance: Less Than Significant With Mitigation Incorporated.



5.7.4.2 WATER QUALITY – CONSTRUCTION

- ❑ GRADING, EXCAVATION AND CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE PROPOSED PROJECT COULD IMPACT WATER QUALITY DUE TO SHEET EROSION RESULTING FROM EXPOSED SOILS AND SUBSEQUENT DEPOSITION OF PARTICLES AND POLLUTANTS IN DRAINAGE AREAS.

Impact Analysis: Construction controls are separated from other water quality management because the measures are temporary and specific to the type of construction. Construction of the proposed Project has the potential to produce typical pollutants such as nutrients, heavy metals, pesticides and herbicides, toxic chemicals related to construction and cleaning, waste materials including wash water, paints, wood, paper, concrete, food containers and sanitary wastes, fuel and lubricants.

As part of its compliance the NPDES requirements, a Notice of Intent (NOI) would need to be prepared and submitted to the Los Angeles RWQCB providing notification and intent to comply with the State of California general permit. Prior to grading or construction, a Stormwater Pollution Prevention Plan (SWPPP) is required for the construction activities onsite. Implementation of recommended mitigation (i.e., compliance with the NPDES requirements) would reduce construction-related impacts to water quality to a less than significant level.

Mitigation Measures:

- HYD-3 Prior to issuance of any Grading or Building Permit, and as part of the Project's compliance with the NPDES requirements, a Notice of Intent shall be prepared and submitted to the Los Angeles RWQCB providing notification and intent to comply with the State of California general permit. Also, a Stormwater Pollution Prevention Plan (SWPPP) shall be reviewed and approved by the Director of Public Works and the City Engineer for water quality construction activities onsite. A copy of the SWPPP shall be available and implemented at the construction site at all times. The SWPPP shall outline the source control and/or treatment control BMPs to avoid or mitigate runoff pollutants at the construction site to the "maximum extent practicable." The SWPPP shall contain, at a minimum, the BMPs outlined in Appendix 13.6, Hydrology and Water Quality Data.

Level of Significance: Less Than Significant With Mitigation Incorporated.

5.7.4.3 WATER QUALITY – LONG-TERM

- ❑ IMPLEMENTATION OF THE PROPOSED PROJECT COULD RESULT IN LONG-TERM IMPACTS TO THE QUALITY OF STORMWATER AND URBAN RUNOFF, SUBSEQUENTLY IMPACTING WATER QUALITY.

Impact Analysis: At the time of RBF's analysis, a stormwater Quality Management Plan (WQMP) for the proposed Project had not been prepared. A Water Quality



Management Plan is required prior to issuance of any Grading Permit for the proposed Project under the guidelines in *Development Planning for Stormwater Management- A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP)* prepared by Los Angeles County Department of Public Works 2002). The SUSMP conforms to the new NPDES permit requirement for Los Angeles County.

Project implementation would increase impervious areas and would increase the level of activity at the Marymount College campus. As a result, impacts to stormwater quality would occur. The Project would increase pollutant loadings immediately offsite and would potentially violate water quality standards. The pollutants that would be expected with implementation of the proposed Project include typical pollutants found in stormwater runoff; refer to the *Existing Setting* Section. Without mitigation, the Project would be expected to increase pollutant loadings, including hydrocarbons, fertilizers, pesticides, trash and sediment.

The specified mitigation requires preparation of a comprehensive WQMP that includes both Structural and Non-Structural BMPs and complies with the SUSMP, as required by the Los Angeles RWQCB and NPDES permits. With mitigation, potential impacts in this regard would be reduced to a less than significant level.

Mitigation Measures:

HYD-4 Prior to issuance of any Grading Permit, the Applicant shall prepare, to the satisfaction of the Director of Public Works and the City Engineer, a Water Quality Management Plan, which includes Best Management Practices (BMPs), Structural Measures and Adaptive Management, under the guidelines in *Development Planning for Stormwater Management - A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP)* prepared by Los Angeles County Department of Public Works (2002) or the most current/updated version. The WQMP shall contain, at a minimum, the BMPs outlined in Appendix 13.6, *Hydrology and Water Quality Data*.

Level of Significance: Less Than Significant With Mitigation Incorporated.

5.7.5 CUMULATIVE IMPACTS

- THE PROPOSED PROJECT, ALONG WITH OTHER FUTURE DEVELOPMENT, WOULD RESULT IN INCREASED HYDROLOGY AND DRAINAGE IMPACTS IN THE AREA.**

Impact Analysis: The basis for the cumulative analysis is presented in Section 4.0, *Basis For Cumulative Analysis*. For purposes of drainage and water quality analysis, cumulative impacts are considered for projects in the same watershed as Marymount College. Only the Trump National Golf Course is within the same watershed as the Project. This cumulative project would be subject to the same requirements as the College. Impacts are evaluated on a project-by-project basis in order to mitigate impacts to a less than significant level. This cumulative project drains into the Pacific Ocean and is required to comply with the standards outlined in the Los Angeles



County NPDES Permit and Stormwater Mitigation Plan. There are no cumulative impacts associated with the proposed Project.

Mitigation Measures: No mitigation measures are recommended.

Level of Significance: Less Than Significant Impact.

5.7.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant impacts related to hydrology, drainage and water quality have been identified following implementation of mitigation measures and/or compliance with the established regulatory framework.