3.3 Hydrology and Water Quality

The information in this section is based in part on two technical studies prepared by REC Consultants. The first report addresses drainage and is entitled "CEQA Preliminary Hydrology/ Drainage Study for Highlands Ranch" (August 2, 2006). The second study, entitled "Storm Water Management Plan for Highlands Ranch" (May 1, 2007), is required under the County of San Diego Watershed Protection, Storm Water Management and Discharge Control Ordinance (Section 67.817) and addresses water quality. Copies of these reports are provided as Appendices G1 and G2 to this SEIR.

3.3.1 Existing Conditions

The eastern portion of the project site is located within the Jamacha Hydrologic Subarea (9.21) of the Middle Sweetwater Hydrologic Area. The western portion of the project site lies within the La Nacion Hydrolic subarea (9.12) in the Lower Sweetwater Hydrologic area. The Sweetwater River watershed is undergoing a rapid change in land-use patterns as urbanization increases. The dominant land uses in the Sweetwater watershed are: urban (29%); open space/agriculture (22%); and undeveloped (49%). Approximately two-thirds of the land area categorized as "urban" is composed of residential communities. Average rainfall is approximately 12.5 inches per year. Approximately 90 percent of the rainfall in the middle basin is stored in the upper few feet of the normally unsaturated topsoil. Annual rainfall is typically insufficient to saturate more than the top few feet of soil. During the summer months, the water stored in the topsoil is transpired by native vegetation. As a result, a great portion of the rainfall is lost through transpiration. Thus, the groundwater does not receive significant recharge from rainfall percolating through the non-alluvial formations. A small amount of water does enter the groundwater basin from percolation of rainfall and stream-flow through the Sweetwater River alluvium. Much of this, however, is also lost through plant transpiration. Approximately five percent of the rainfall flows from the basin as surface runoff[1].

The Sweetwater Reservoir is a potable water reservoir located about 0.75-mile southeast of the project site. The Reservoir was constructed in 1888 and is owned and operated by the Sweetwater Authority (SWA) in Chula Vista. This reservoir is a major water retention facility in the area and supplies, on average, 40 percent of SWA water needs.

The project site is located at the high point of four local drainage basins in the center of the Spring Valley Community Plan area as shown on Figure 3-4, *Existing Hydrology.* The existing grade slopes away from the peak of Dictionary Hill in all directions. Runoff from the site travels into natural drainage channels then off the site to existing residential and commercial developments. Two of the four major drainage areas drain to the west and southwest toward Spring Valley and into the Sweetwater River immediately downstream of the Sweetwater Reservoir. One drainage area drains to the south toward the Sweetwater Reservoir and the remaining area drains to the southeast and discharges into the Sweetwater Reservoir at Whitestone Road. The closest hydrologic feature to the property is Bancroft Creek located in Whitehorse Canyon just east of the project site. A portion of the runoff from the site flows into the creek, where it then continues south through a preserved drainage basin in The Point San Diego development. From there, the drainage flows through 800 feet of various drain culverts in Whitehorse Street then into an open drainage channel, until it reaches Sweetwater River just east of the Sweetwater Reservoir.

1 Source: Project Clean Water, http://www.projectcleanwater.org/html/ws_sweetwater.html

3.3.2 Guidelines for the Determination of Significance

The Project would have a significant adverse effect on hydrology or water quality if any of the following would occur as a result of a Project-related component. Would the Project:

- Violate any waste discharge requirements.
- Result in an increase in any pollutant for which the water body is already impaired as listed on the Clean Water Act Section 303(d) list.
- Cause or contribute to an exceedance of applicable state or local surface or groundwater receiving water quality objectives or degradation of beneficial uses.
- Have an adverse effect on drainage patterns or the rate or amount of runoff which could result in flooding on- or off-site.
- Exceed the capacity of existing or planned storm water drainage systems.
- Significantly contribute to a cumulatively considerable increase in stormwater runoff.

3.3.3 Analysis of Project Effects and Determination as to Significance

- ***Would the Project violate any waste discharge requirements?***

Because the Project proposes to disturb an area greater than one acre in size, it would be required to implement Best Management Practices (BMPs) during grading and construction in compliance with the State's National Pollution Discharge Elimination System (NPDES) Permit. Issued on February 21, 2001 by the San Diego Regional Water Quality Control Board (RWQCB), the NPDES Permit requires the development and implementation of storm water regulations addressing storm water pollution issues in development planning and construction associated with private and public development projects. Project design measures in the form of BMPs that address water quality impacts from construction activities have been incorporated into the Project, as detailed in the Highlands Ranch Storm Water Management Plan included as Appendix G2 to this SEIR. The Project would comply with the State General Construction Permit by first filing a Notice of Intent (NOI) to the State Water Resources Control Board (SWRCB), by implementing a Storm Water Pollution Prevention Plan (SWPPP) for site construction, and by implementing a monitoring program that includes a maintenance schedule with inspection of the construction BMPs before anticipated storm events and after actual storm evens. Also, a qualified person would be assigned responsibility to ensure full compliance with the permit and to implement the elements of the SWPPP. With NPDES Permit compliance, significant water quality impacts associated with construction activities would not occur.

Upon completion of construction, development associated with the Project would result in an increase in urban pollutants, including hydrocarbons from paved areas; nutrients from fertilizers; trash and debris deposited in drain inlets; sediment discharge from landscaped areas not fully established; and pesticides from landscaping and home use. All of these pollutants potentially could affect the quality of water runoff from the site. The greatest quantity of pollutants would accumulate

during the initial rainfall, commonly known as the first flush that would carry pollutants to off-site locations. Discharge of first flush pollutants could result in a potentially significant water quality impact. However, post-construction BMPs are proposed as outlined in the Highlands Ranch Storm Water Management Plan (refer to Appendix G2) which would be utilized to provide a long-term solution to ensuring the water quality of runoff from the site. BMPs that address water quality impacts associated with the proposed Project are required to be incorporated into the Project's design and refined during the Grading and Improvement Plan Engineering. With NPDES Permit compliance, significant post-development water quality impacts associated with development on the site would not occur and no waste discharge requirement would be violated.

In addition, the Project would be required to comply with the waste discharge requirements of the Spring Valley Sanitation District. The Spring Valley Sanitation District would review Project development plans to ensure compliance with their standards for wastewater discharge requirements.

- ***Would the Project result in an increase in any pollutant for which the water body is already impaired as listed on the Clean Water Act Section 303(d) list?***

Section 303(d) of the federal Clean Water Act (CWA, 33 USC 1250, et seq., at 1313(d)), requires States to identify waters that do not meet water quality standards ("impaired" water bodies). According to the California 303(d) list published by the San Diego Regional Water Quality Control Board in September 2003, the San Diego Bay Shoreline in the Chula Vista Marina is listed as an impaired water body due to bacterial indicators. However, as part of the proposed Project, a Storm Water Management Plan (SWMP) has been prepared which requires the Project to implement source control, site design, and treatment control BMPs which would reduce potential off-site water quality impacts to below a level of significance. Compliance with the SWMP requirements would be required as a standard condition of Project approval. Moreover, the proposed Project site is located approximately 10 miles from the Chula Vista Marina. With incorporation of the BMPs required by the SWMP, and given the distance from the Project site to the Chula Vista Marina, runoff from the Project would not result in an increase in pollutants for any impaired water body, and a significant impact would not occur.

- ***Would the Project cause or contribute to an exceedance of applicable state or local surface or groundwater receiving water quality objectives or degradation of beneficial uses?***

The eastern portion of the project site is located within the Jamacha Hydrologic Subarea (9.21) of the Middle Sweetwater Hydrologic Area. The western portion of the project site lies within the La Nacion Hydrologic subarea (9.12) in the Lower Sweetwater Hydrologic area. The site occupies less than 0.2% of the larger 38,800-acre Jamacha Hydrologic Subarea watershed, and less than 0.3% of the 26,685-acre La Nacion Hydrologic Subarea.

The beneficial uses of Subunit 9.12, as documented in the Water Quality Control Plan for the San Diego Basin, are as follows:

> Beneficial Uses for Inland Surface Waters: industrial services supply, contact recreation (potential only), non-contact recreation, warm freshwater habitat, and wildlife habitat.

Beneficial Uses for Groundwater: municipal and domestic supply, agricultural supply, and industrial services supply.

The beneficial uses of Subunit 9.21, as documented in the Water Quality Control Plan for the San Diego Basin, are as follows:

Beneficial Uses for Inland Surface Waters: municipal and domestic supply, agricultural supply, industrial services supply, industrial process supply, contact recreation, non-contact recreation, warm freshwater habitat, and wildlife habitat.

Beneficial Uses for Groundwater: municipal and domestic supply, agricultural supply, and industrial services supply.

Implementation of the proposed Project would result in the generation of urban pollutants, including hydrocarbons from paved areas; nutrients from fertilizers; trash and debris deposited in drain inlets; sediment discharge from landscaped areas not fully established; and pesticides from landscaping and home use. All of these pollutants could affect both the quality of the surface waters into which runoff drains. These pollutants of concern would be addressed through three types of BMPs: site design, source control, and treatment control.

The Project incorporates various site design BMPs, as shown on Figure 3-5, *BMP-Erosion Control Map*. The Project is designed to minimize the use of impervious surfaces. Only approximately 11.9% of the site would be impervious after construction, including streets, building pads, water tanks, and other paved surfaces such as parking areas, residential patios and walkways. Streets have been designed to meet minimum widths. Landscaping of slopes over 15 feet and all common areas with native and non-native plants would occur, and slopes under 15 feet would be hydro seeded in accordance with County standards. Plant establishment would occur expeditiously to reduce erosion. Also, the irrigation system is proposed to be monitored during plant establishment to reduce over irrigation. An extensive amount of riprap protection is proposed to be placed at storm drain outfalls to reduce flow velocities and prevent unstable channels and gullies. They would be designed with a well-graded mixture of stone sizes and provide a gradual reduction in rip rap size until the downstream end of the blanket blends with the natural material. Enough length and width would be provided to establish velocity gradients and turbulence levels at the end of the rip rap, approximating conditions in the natural ground.

Source control BMPs are proposed to prevent polluted runoff. This program includes an educational program for future homeowners regarding pollution prevention. In addition, all storm drain inlets are proposed to be stenciled with a message warning people not to dump pollutants into drains. Treatment control BMPs include the installation of permanent water quality filters and vegetated swales. The location of proposed treatment control BMPs are shown in the Highlands Ranch Storm Water Management Plan included as Appendix G2 of this SEIR. Appendix G2 also outlines performance standards for the BMPs and sets forth mechanisms to ensure permanent maintenance and funding.

With implementation of the BMPs proposed by the Highlands Ranch Storm Water Management Plan, the Project would not adversely affect water quality objectives or degradation of beneficial uses of the watershed. The Storm Water Management Plan provides specific recommendations for construction (temporary) and permanent BMPs that would reduce, to the maximum extent

practicable, the expected Project-generated pollutants, thereby preventing any significant adverse impacts to the beneficial uses of receiving waters. Because adherence to the recommendations made within the SWMP would be required as a condition of approval for the Project, a significant impact to surface or groundwater quality would not occur.

- ***Would the Project have an adverse effect on drainage patterns or the rate or amount of runoff which could result in flooding on- or off-site?***

New development proposed by the Project such as the construction of homes and roads, would increase the amount of impervious surface area on the site to approximately 11.9%. Therefore, Project implementation could potentially alter drainage patterns or increase the rate and amount of runoff, resulting in flooding on or off-site. As part of the Drainage Study for Highlands Ranch (see Appendix G1 to this SEIR), the quantity of storm water runoff from the proposed development of the property associated with a 100-year flood event was calculated. In order to determine the potential for an increase in runoff from the project site, the study compared run-off quantities from the site in its current, undeveloped condition to the runoff quantities associated with the proposed development.

The Project is designed so that all runoff would leave the property at the existing points of discharge, thereby retaining existing drainage patterns. Runoff flows from all but two basins would be greater than under existing conditions (see Table 3-13, *Drainage Basin Summary*, and Figure 3-4, *Proposed Hydrology*). As shown in Table 3-13, development of the site would result in increased peak runoff volumes for the following basins: Basin N1: 5.33 cfs; Basin N2: 7.84 cfs; Basin W1: 1.38 cfs; Basin W2: 1.34 cfs; Basin W3: 1.55 cfs; Basin S1: 14.66 cfs; Basin S2: 12.58 cfs; Basin S3: 13.09 cfs; Basin E1: 11.29 cfs; and Basin E2: 12.54 cfs. However, as part of the proposed Project, site design BMPs are proposed to preclude significant impacts associated with Project runoff. These BMP measures include the minimization of impervious areas, reduced street widths, permanent landscaping of slopes, and the use of riprap at storm drain outfalls to reduce flow velocities and prevent erosion.

Moreover, as required BMPs, each lot would be provided with a grass swale and storage trench to reduce runoff volumes from individual lots. Based on the analysis provided in the Project-specific Drainage Study (Appendix G1), it was determined that the typical lot within the Project would have an impervious surface area of approximately 2,500 s.f., or 42% of the lot area. Assuming a maximum intensity value of 4.9 inches of rain per hour, and based on a calculated stormwater capacity of 358.0 cubic feet per lot, the estimated storage capacity for each lot during peak storm events would be between 0.40 and 0.53 cfs. The anticipated peak runoff value (Q_{100}) for each lot is calculated at approximately 0.41 cfs. Therefore, and as shown in *Table 3-13*, with incorporation of grass swales and storage trenches on each lot, as required by the Project's Hydrology and Water Quality Technical Reports (refer to EIR Appendices H1 and H2), peak runoff flows from all but one basin would be the same as existing conditions or reduced as a result of Project implementation. Maintenance of the swales and trenches on each lot would be the responsibility of individual homeowners and would be required by the Project's CC&R's. However, a potentially significant impact to downstream drainage facilities or properties would occur if the final development plans for the site fail to include the grass swales and ponding trenches on individual lots (**Significant Direct and Cumulative Impact 3.3-A**).

In addition, because Project implementation would result in an increase in peak flows from Basin S3 by 5.29 cfs even with the incorporation of grass swales and ponding trenches, the increase in runoff has the potential to increase flooding hazards for downstream properties, and this is regarded as a significant impact (**Significant Direct and Cumulative Impact 3.3-A**).

Table 3-13 DRAINAGE BASIN SUMMARY (100-YEAR STORM)

Basin #	Pre-Dev Area Acres	Pre-Dev Q(cfs)	Post-Dev Area Acres	Post-Dev Q(cfs)	Increment to Detain On-Site Q(cfs)	Q(cfs) Retained Per Lot	No. of Lots in Basin	Q(cfs) Mitigated by Project BMPs	Remaining Q(cfs) to Detain
N1	7.4	20.4	8.08	25.73	5.33	0.52	13	6.76	0
N2	12.57	27.8	13.08	35.64	7.84	0.53	15	7.95	0
N3	3.2	7.88	3.2	7.88	0.00	0.00	0	0	0
W1	10.57	21.48	9.2	22.86	1.38	0.52	3	1.56	0
W2	12.04	24.66	11.59	26	1.34	0.52	3	1.56	0
W3	11.2	24.981	11.5	26.46	1.55	0.52	3	1.56	0
S1	17.8	36.2	18.77	50.86	14.66	0.4	36	14.4	0
S2	6.9	12.49	7.6	25.07	12.58	0.4	29	11.6	0
S3	13.7	26	13.7	39.09	13.09	0.52	15	7.8	5.29
E1	42.26	83.46	40.25	94.75	11.29	0.4	33	13.6	0
E2	41.13	87.34	41.8	99.88	12.54	0.4	61	24.4	0
E3	7.6	17.91	7.6	17.91	0.00	0.00	0	0	0

SOURCE: REC Consultants; August 2, 2006

- ***Would the Project exceed the capacity of existing or planned storm water drainage systems?***

All storm water from the project site would eventually flow into the Sweetwater Reservoir. Water runoff from the western and southern basins would flow through various pipes and culverts before it reaches the reservoir. As noted in the discussion of the previous issue, runoff from all but two of the basins on the Project site is expected to increase as a result of Project Implementation, unless grass swales and ponding trenches are incorporated into the final designs for the site. In addition, within Basin S3, peak outflow volumes would increase by 5.29 cfs even with the incorporation of grass swales and ponding trenches (see Table 3-13). The projected increase in peak flow within all but two of the drainage basins has the potential to exceed the capacity of existing or planned stormwater drainage systems, and this is regarded as a significant impact (**Significant Direct and Cumulative Impact 3.3-A**)

- ***Would the Project significantly contribute to a cumulatively considerable increase in stormwater runoff?***

As discussed previously, implementation of the proposed Project would result in a net increase in runoff from all but two of the on-site drainage basins (see Table 3-13). When considered in conjunction with existing and planned developments in the area, the projected increase in runoff from the site would be regarded as a cumulatively considerable and significant impact (**Significant Direct and Cumulative Impact 3.3-A**).

3.3.4 Cumulative Impact Analysis

Incorporation of the BMPs required by the Highlands Ranch Storm Water Management Plan would ensure that flows do not substantially vary from existing conditions and that urban pollutants are substantially removed from the flows prior to discharge from the site. Cumulative projects that discharge into the same watershed would be required to implement similar BMPs that also would ensure that significant hydrology and water quality impacts do not occur. Based on the list of cumulative projects identified in Table 1-5, three projects (TM5107 (Mt. Miguel Commerce Community), TM4761 (Hidden Valley Estates), and SPA 88-001 and 003 (The Pointe San Diego)) were identified as having significant impacts to hydrology and water quality. Each of those projects mitigated their impacts through implementation of storm drain improvements, BMPs, erosion control plans, and SWPPPs.

All projects are required to implement BMPs during and after construction in compliance with San Diego County's NPDES Permit, issued on February 21, 2001 by the San Diego RWQCB. The NPDES Permit requires the development and implementation of storm water regulations addressing storm water pollution issues in development planning and construction associated with all private and public development projects. Mandatory compliance with the NPDES Permit would ensure that impacts are reduced to below a level of significance. However, as noted above, the projected increase in runoff from Basin S3, when combined with runoff from other developments in the area, has the potential to create significant flooding or erosion problems downstream and this is regarded as significant (**Significant Direct and Cumulative Impact 3.3-A**).

3.3.5 Mitigation Measures

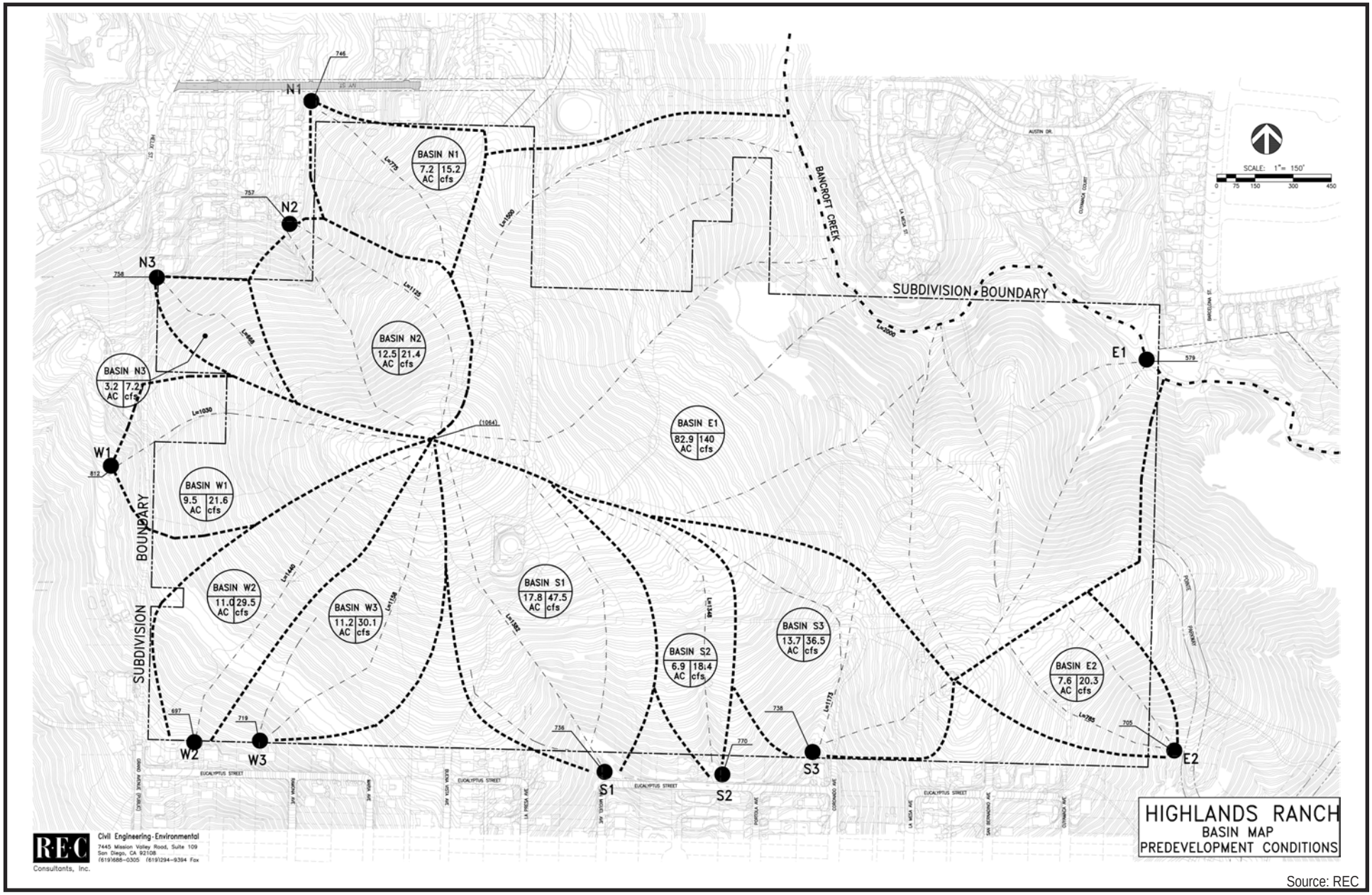
Significant Direct and Cumulative Impact 3.3-A: Project implementation would result in the increase of peak discharge from the site as follows: Basin N1: 5.33 cfs; Basin N2: 7.84 cfs; Basin W1: 1.38 cfs; Basin W2: 1.34 cfs; Basin W3: 1.55 cfs; Basin S1: 14.66 cfs; Basin S2: 12.58 cfs; Basin S3: 13.09 cfs; Basin E1: 11.29 cfs; and Basin E2: 12.54 cfs. These increases have the potential to increase flood hazards and/or overwhelm the capacity of planned or existing drainage facilities..

3.3-A: Prior to the recordation of the first Final Map for the Project, a Final Drainage Study shall be submitted to the Department of Public Works for review and approval. The Final Drainage Study shall depict the locations of proposed on-lot vegetated swales and ponding trenches and shall demonstrate that these features will attenuate anticipated increase of runoff within drainage basins N1, N2, W1, W2, W3, S1, S2, E1 and E2 to pre-development levels. In addition, the Final Drainage Study shall provide for a detention basin within the eastern park site, and shall further demonstrate that the combination of vegetated swales, ponding trenches, and a detention basin will reduce post-development peak runoff volumes within Basin S3 to below pre-development levels. The final design, configuration, and location of the detention basin within drainage basin S3 shall be depicted on the Final Map.

3.3.6 Conclusions

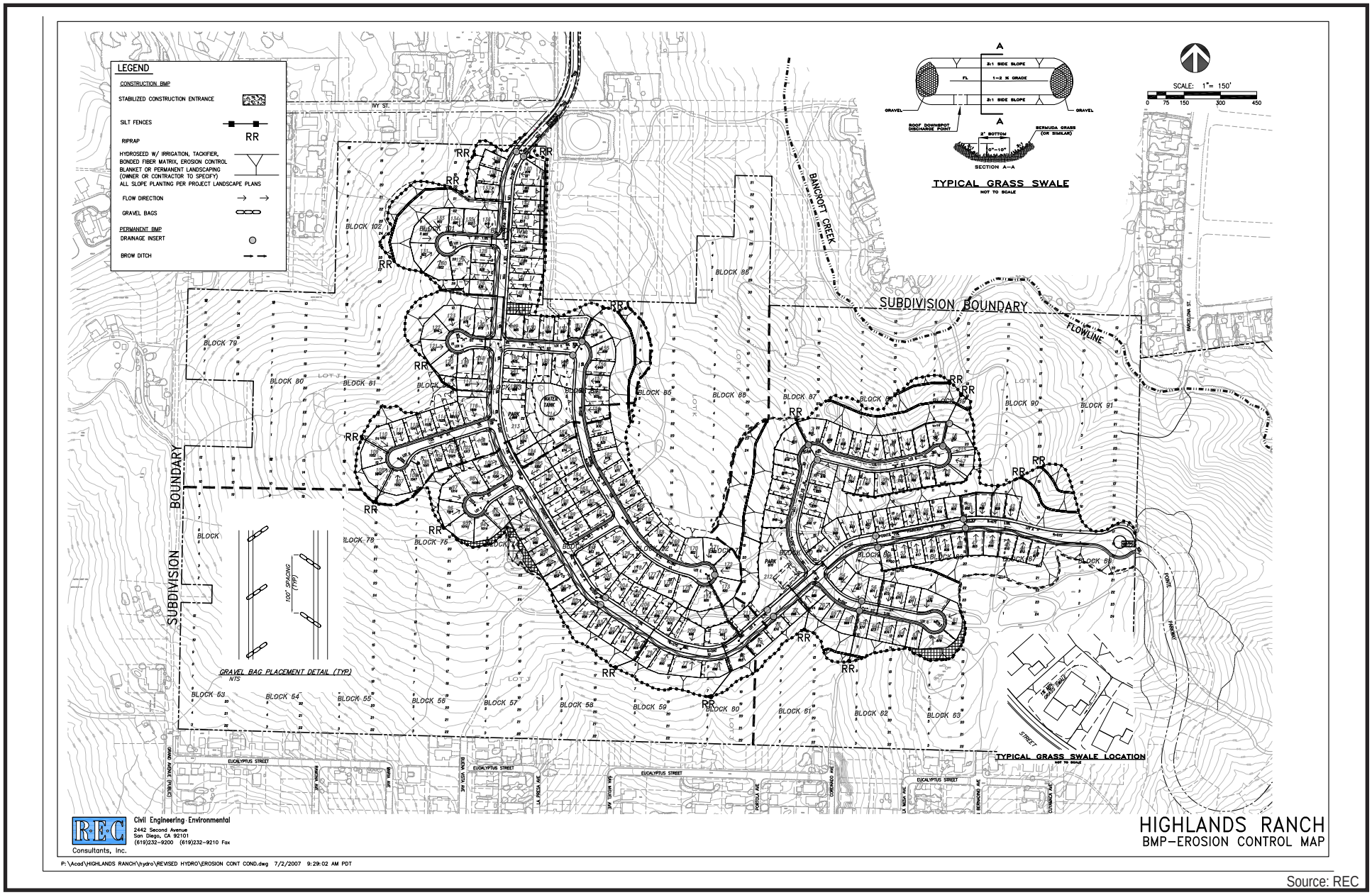
Significant Direct and Cumulative Impact 3.3-A: A preliminary study of the required detention basin, proposed vegetated swales, and ponding trenches has been prepared and is included as EIR

Technical Appendix G1. According to this preliminary study, and as shown above in Table 3-13, the incorporation of vegetated swales and ponding trenches on individual lots would reduce the post-development peak runoff volumes to at or below the pre-development conditions within drainage basins N1, N2, W1, W2, W3, S1, S2, E1 and E2. For drainage basin S3, a detention basin would be constructed within the eastern park site. The dimensions of the required detention basin have been calculated at 100 feet x 70 feet, with a depth of 2.5 feet. Based on these dimensions, it is calculated that the detention basin would detain 5.66 cfs. Therefore, with incorporation of a detention basin within drainage basin S3, and with the provision of vegetated swales and ponding trenches on individual lots, as would be required by Mitigation Measure No. 3.3-A, significant impacts would be reduced to a level below significance.



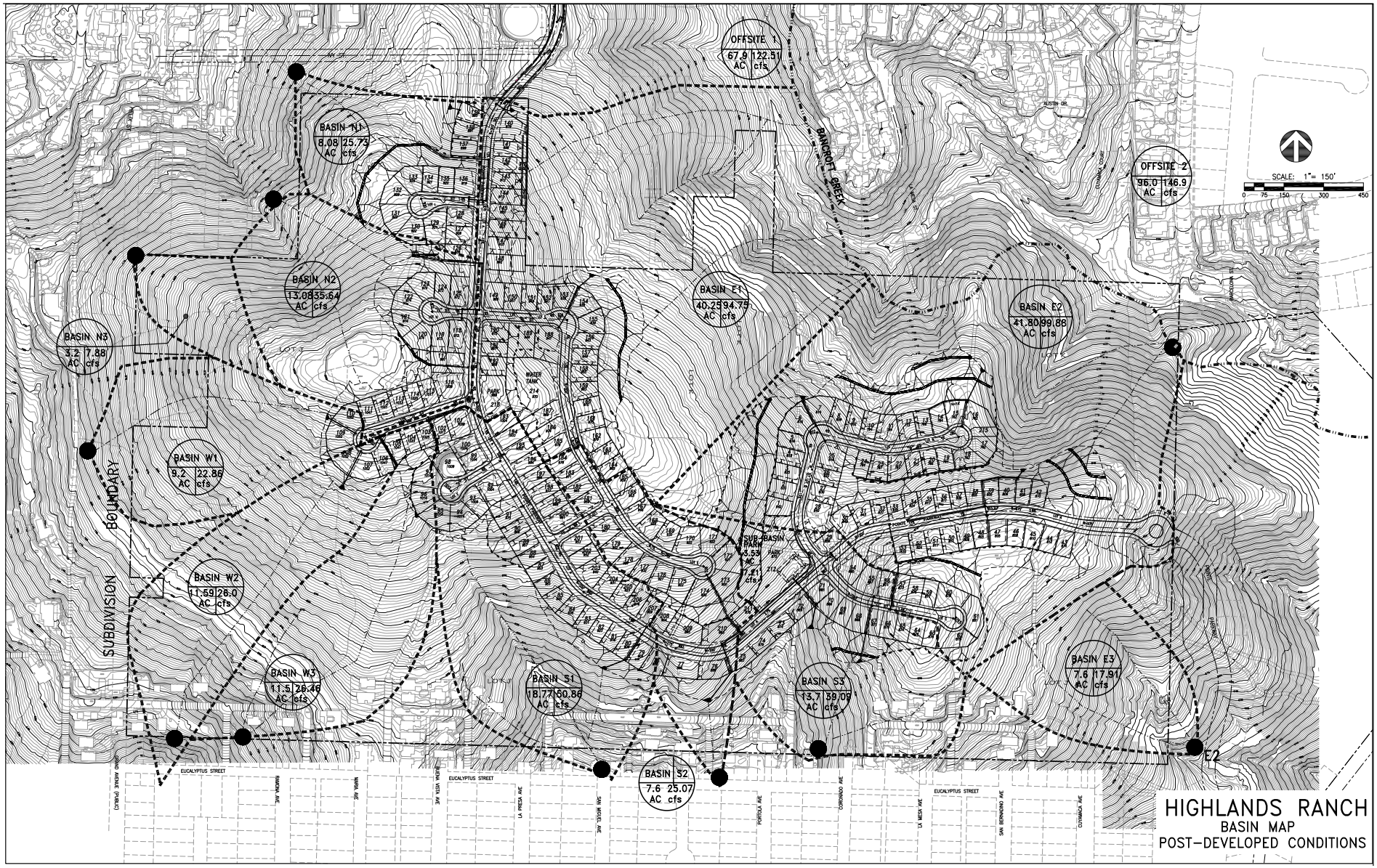
Source: REC

Figure 3-4
EXISTING HYDROLOGY



Source: REC

Figure 3-5
BMP - EROSION CONTROL MAP



Source: REC

Figure 3-6
PROPOSED HYDROLOGY