

# Preliminary Hydrology Report

## For

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\*Refer to separate reports provided with submittal.

## 1.1 INTRODUCTION/ PURPOSE

The purpose of this document is to outline the existing drainage conditions of the project site and present a description of the proposed post-project drainage conditions, drainage impacts, and proposed drainage improvements. The existing site is a partially lot of approximately 5.34 acres located in Laguna Niguel, California, on the southerly corner of Crown Valley Parkway and La Plata Drive (Figure 1 below). The northerly half of the site is occupied by Grace Church; modular classrooms assisted with the church are situated on southeast of the parking lot. The proposed new development will add a new Assisted Living Facility with subterranean parking.

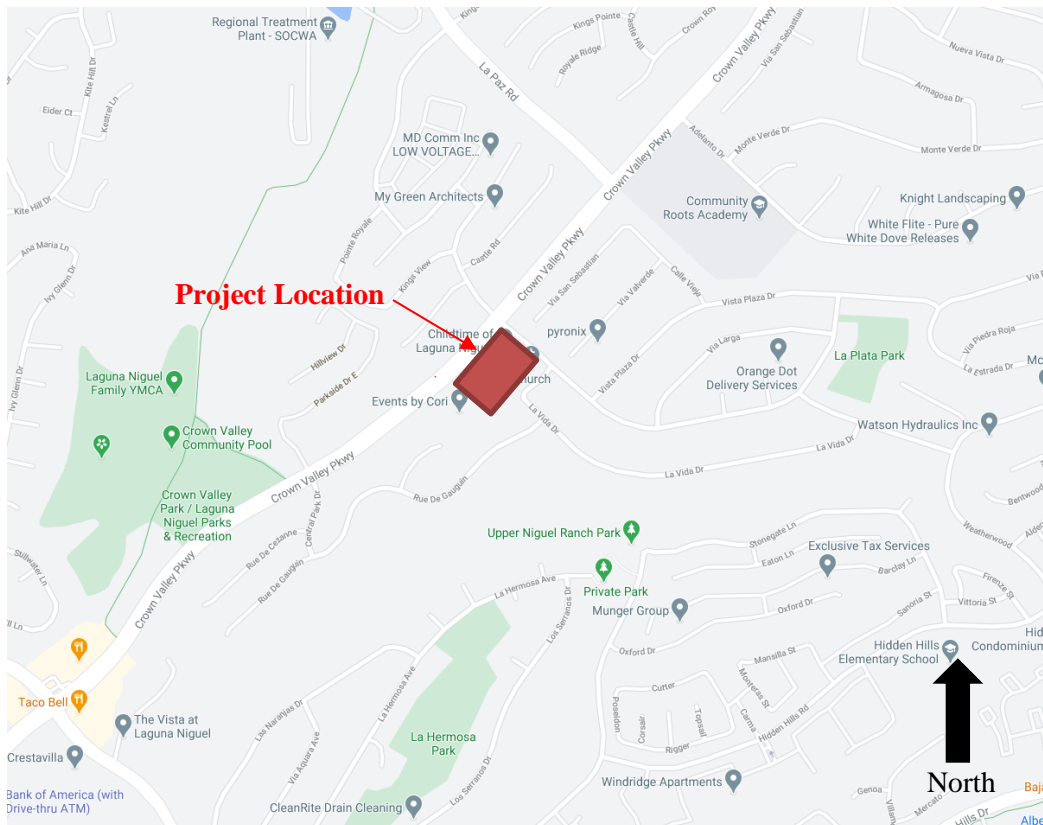


Figure 1: Location Map

## 1.2 EXISTING CONDITION

The roughly rectangular lot contains a gently sloping developed pad along with approximately 2:1 slopes to neighboring properties above and Crown Valley below. The project site occupies 5.34 acres; however, from a hydrology perspective, an additional 0.86 ac of off-site hillside above the graded pad is accepted presently and must be included in this report. The site contains three prominent drainage areas (See *Appendix A: Pre-Development Drainage Map – Drainage Map Areas* identified as DMA1, DMA 2, & DMA 3). DMA 1 includes 2.74-acres that is relatively flat with an average slope of 2.5% in the southeasterly direction (plus 2:1 slopes above the pad). The

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runoff generated in DMA 1 is directed towards La Plata Drive and is conveyed via street curb gutters to a public storm drain via an inlet located near the southerly of La Plata Drive and Crown Valley Parkway. The runoff generated in DMA 2 includes 2.19-acres with a moderate slope that can range from 1.5% (plus 2:1 slopes above the pad and descending to Crown Valley), is generally directed in the northwesterly direction towards Crown Valley Parkway and is conveyed via street curb gutters in a southwesterly direction and into a public storm drain. DMA 3 contains 1.28-acres with an average slope of 1.5% in the northwesterly direction (plus 2:1 slopes above the pad and descending to Crown Valley), and is generally directed towards Crown Valley Parkway, where it is conveyed via street curb gutters in a southwesterly direction and into a public storm drain roughly 480-ft south of the property. All of these storm drains route the runoff to Sulphur Creek Channel (OCFCD Facility No. J301) on the opposite site of Crown Valley Parkway. Off-site drainage is accepted along the southerly and southeasterly sides, including the ascending slopes above the graded pad.

The project is located in the following Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM): Orange County, California and incorporated areas, Panel 437 of 539, on map number 06059C0437J, effective date 12/03/2009. Per these maps, the site is located entirely in Zone X “Area of Minimal Flood Hazard”. This area is determined to be outside the 0.2% annual chance floodplain (See *Appendix C: FEMA Flood Insurance Rate Map*)

### **1.3 PROPOSED CONDITION**

The proposed site will include the development of a 131,400 ft<sup>2</sup> Assisted Living Center with one level of below-grade parking. The proposed building will utilize the descending slope below the existing graded pad to embed the basement level/parking garage and expand the buildable pad through excavation. Additionally, the existing parking lot will be remodeled and expanded. The project area was divided into three drainage areas. The drainage condition of the proposed site is anticipated to follow the existing drainage conditions. (DMA 1) will direct approximately 32% of the watershed toward La Plata Drive; DMA 2 and DMA 3 will direct 41% and 27%, respectively, generally towards Crown Valley Parkway.

Prior to release from the site, all runoff will be treated using proprietary biotreatment devices, as outlined in the Preliminary Water Quality Management Plan. In addition to treatment, stormwater from DMA’s 2 and 3 will routed through underground detention chambers to achieve the required attenuated outflow. Once treated, runoff from DMA 1 will be conveyed through storm drains which will then outlet directly to La Plata Drive. After it’s treated and attenuated, runoff from DMA’s 2 and 3 will be routed through storm drains and then released to existing catch basins and parkway culverts along Crown Valley Parkway. Runoff will make its way to the next downstream catch basin (one midway along the project’s frontage and another about 480’ from the southerly Property Line) where it will be directed to the Sulphur Creek Channel (OCFCD Facility No. J301), just as it is presently. Refer to *Appendix B: Post-Development Drainage Map*.

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## 1.4 MITIGATION CRITERIA

The project is required by the OC Hydrology Manual to mitigate runoff so that post-development peak flows do not exceed pre-development peak flows.

Additionally, as the proposed Assisted Living Center and parking lot will add more than 10,000 square feet of impervious surface area the project will be required to mitigate stormwater as directed by the latest adopted San Diego Regional Water Quality Control Board (Water Board) MS4 Permits (See *Appendix J: MS4 requirement excerpts*), and the 2017 South Orange County Technical Guidance Document (SOC-TGD). Additionally, peak flow is subject to the requirements of the Orange County Hydrology Manual.

The proposed stormwater mitigation design under the project's preliminary Water Quality Management Plan (WQMP) will use Best Management Practices (BMPs) for the treatment, retention, and infiltration to;

- (1) Treat Stormwater Quality Design Volume (SQDV) based on a runoff produced from a 0.8-inch storm event. (Refer to Preliminary WQMP Report for water quality mitigation)
- (2) Detain proposed development flows rates as necessary to ensure the post-development flow rates do not exceed pre-development flow rates by more than 10%.

In this case, the hydromodification criteria from the OC Hydrology Manual will control determination of allowable peak flow. This report summarizes the peak flow reduction, while the separate preliminary WQMP report addresses water quality mitigation.

## 1.5 PEAK RUNOFF ANALYSIS

Using the Orange County Hydrology Manual, manual calculations were conducted to determine existing peak runoff for 2-year, 10-year and 100-year 24-hour storm events (see *Appendix D: Rainfall Data and Soil Maps*).

The proposed project uses the manual calculations from the Orange County Hydrology Manual to determine peak flow rates, along with Hydraflow calculations to mitigate increased peak flows from the proposed development (See *Appendix G: Hydrology Calculations*). For the purposes of this preliminary hydrology report, drainage areas were simplified to an initial area (peak flow determined via Nomograph) and a single downstream portion (peak flow determined using Manning's Equation for pipe flow); the peak flow for each drainage area was then pro-rated for the future subareas so that routing to detention basins and attenuation could be modeled with Hydraflow. This approximation is conservative as the more detailed calculations will add to the Tc for each drainage area and ultimately result in lower peak flows. **Table 1** below summarizes the results of this preliminary hydrology analysis.

Drainage Area	Existing Peak Flow (CFS)		Proposed Mitigated Peak Flow (CFS)*	
	Q <sub>10</sub>	Q <sub>100</sub>	Q <sub>10</sub>	Q <sub>100</sub>
DMA 1	8.28	12.76	<b>6.09</b>	<b>9.41</b>
DMA 2	5.33	8.32	<b>3.30</b>	<b>5.05</b>
DMA 3	3.36	5.20	<b>2.92</b>	<b>4.42</b>
<i>Total</i>	<i>16.97</i>	<i>26.28</i>	<i>12.31</i>	<i>18.88</i>

**Table 1: Summary of Hydrology Calculations**

\*Refer to *Appendix G: Hydrology Calculations* for preliminary calculations

Detailed calculations will be prepared as part of final engineering/final hydrology report, including the sizing of all drainage pipes, subarea routing and confluences, etc.

## 1.6 WATER QUALITY DESIGN

Per the South Orange County Technical Guidance Document and San Diego Regional Water Board MS4 permit, the 0.8-inch storm event was used as the design storm to size the biotreatment devices (refer to “Attachment E” in separate Preliminary WQMP Report). The Preliminary WQMP Report documents a total required Stormwater Quality Design volume (SWQDv) for the site to be 12,934 ft<sup>3</sup>, including 50% increase required when using a “treatment only” BMP. (See *Appendix F: Water Quality Plan*).

A geotechnical investigation was prepared by Stoney-Miller Consultants (see *Appendix I: Geotechnical Soils Report*) and found that the site is generally composed of Type C soils (silty clays) over bedrock (Capistrano siltstone). Additionally, much of the site has been disturbed previously and contains a large rough-graded pad composed of engineered fill dating from the 1970’s and 1980’s. Percolation testing found that over a 24-hour period, the water level dropped only 0.01, eliminating the possibility of utilizing infiltration as a stormwater quality mitigation measure.

The water quality treatment proposed is a proprietary Biotreatment Device per the South Orange County Technical Guidance Document for BIO-5 Proprietary Biotreatment BMP. The proposed biotreatment system consists of planter areas which are specially designed to infiltrate water at a high rate while filtering pollutants of concern from the runoff. Biotreatment devices will be installed in multiple locations throughout the site’s DMAs to treat the runoff from each subarea requiring treatment. Once treated, runoff from these DMAs will be conveyed via private storm drains to public streets and/or catch basins.

## 1.7 HYDROMODIFICATION

The South Orange County Technical Guidance Document requires that runoff be limited to no more than the existing peak flow. Treated stormwater from portions of DMA 2 and 3 will be routed to underground detention chambers, with attenuated outflows released to the public streets within

allowable limits (See *Appendix G: Hydrology Calculations*). Outflow from DMA subareas 2a and 2b will be routed to Tank 1; outflow from DMA subareas 2c and 2d will be routed to Tank 2; and outflow from 3a and 3b will be routed to Tank 3. **Table 2** below provides sizing details for these chambers.

<b>Detention Chamber</b>	<b>Volume Required (cu. ft.)</b>	<b>Volume Provided (cu. ft.)</b>	<b>Dimensions (ft)</b>
<b>Tank 1 (DMA 2)</b>	1,717	1,800	50L x 26W x 2D
<b>Tank 2 (DMA 2)</b>	647	700	35L x 16W x 2D
<b>Tank 3 (DMA 3)</b>	2,327	2,400	55L x 33W x 2D

**Table 2: Detention Chamber Sizing**

## **1.8 CEQA COMPLIANCE**

This project provides for treatment of stormwater from the 85<sup>th</sup> percentile storm in accordance with the South Orange County Technical Guidance Document and San Diego Regional Water Board MS4 permit, and thus will satisfy CEQA Guidelines Appendix G Environmental Checklist compliance to Section IX, Hydrology and Water Quality Items, (a), (c), and (f) – Refer to Water Quality Report for further discussion.

The following are the responses to the 2021 CEQA Guidelines Appendix G Environmental Checklist Section IX. Hydrology and Water Quality Items:

**a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality? *Less Than Significant with Mitigation Incorporated***

**SIGNIFICANCE ANALYSIS:**

As described within the Project’s Preliminary Hydrology Report and Preliminary WQMP the proposed development project will adequately mitigate stormwater treatment, detention and comply with the current San Diego Regional Water Board MS4 Permit, SOC-TGD and the City of Laguna Niguel requirements. Proprietary biotreatment systems spread throughout the site will provide adequate pass-through treatment of runoff for maintaining stormwater quality, and underground detention structures will detain stormwater onsite to meet the allowable mitigated peak flow rate at each Point of Compliance. Therefore, the preliminary design of the onsite drainage system will satisfy the requirements of the EIA, SWQDv and hydromodification. ***Less Than Significant With Mitigation Incorporated.***

**b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?**

***No Impact.***

**SIGNIFICANCE ANALYSIS:**

As described herein, the project does not propose to directly infiltrate stormwater and release the stormwater onsite through percolation, nor does it propose any pumping of groundwater. Further, the Proposed project will be connected to the City Sewer System and will not utilize any onsite

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septic systems. Therefore, there is no decrease to the groundwater supplies nor interference with groundwater recharge and thus ***“No Impact”***.

**c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:**

**i) result in substantial erosion or siltation on or off-site; *Less Than Significant With Mitigation Incorporated***

**ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite; *Less Than Significant With Mitigation Incorporated***

**iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; *Less Than Significant With Mitigation Incorporated***

**or**

**iv) impede or redirect flood flows? *No Impact.***

**SIGNIFICANCE ANALYSIS:**

- i) This project includes hillside construction, which has the potential to result in erosion/siltation during and after construction. Proposed improvements, including landscaped and installation of terrace drains will mitigate these potential impacts. Furthermore, biotreatment devices and catch basin filters will assist in removing sediment from stormwater runoff. Therefore, the project is not expected to result in erosion or siltation either on- or off-site.
- ii) The project will increase the amount of impervious surfaces and therefore has the potential to increase surface runoff. To mitigate this potential impact to less than significant, underground detention facilities will be provided that will reduce peak stormwater runoff.
- iii) Stormwater runoff will drain in a similar fashion as existing condition, to La Plata or Crown Valley, and be directed via public storm drains to Sulphur Creek Channel (OCFCD Facility No. J301). As stated in ii) above, detention facilities will be provided, reducing peak stormwater runoff. Therefore, with the proposed mitigation, impacts will be less than significant.
- iv) There are no flood flows traversing the site; therefore the project will not impede or redirect flood flows and there is no impact.

**d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to inundation. *No Impact***

**SIGNIFICANCE ANALYSIS:**

Based on the geographical location of the site and existing topographical pad elevation of 290 feet above mean sea level (amsl) according to the Geotechnical Report prepared by Stoney-Miller Consultants, Inc. there is no risk of tsunami nor seiche nor mudflow risks and consequently no risk of pollutants due to inundation.



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The project is outside of the 100-year flood hazard area. *Therefore, there is No Impact.*

*e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? Less Than Significant With Mitigation Incorporated.*

**SIGNIFICANCE ANALYSIS:**

As described within the Project's Preliminary Hydrology Report and Preliminary WQMP the proposed development project will adequately mitigate stormwater treatment, detention and comply with the current San Diego Regional Water Board MS4 Permit, SOC-TGD and the City of Laguna Niguel requirements. Proprietary biotreatment systems spread throughout the site will provide adequate pass-through treatment of runoff for maintaining stormwater quality, and underground detention structures will detain stormwater onsite to meet the allowable mitigated peak flow rate at each Point of Compliance. Therefore, the preliminary design of the onsite drainage system will satisfy the requirements of the EIA, SWQDv and hydromodification. *Less Than Significant With Mitigation Incorporated.*

## **1.9 CONCLUSION**

The proposed development project will adequately mitigate stormwater treatment, detention and comply with the current San Diego Regional Water Board MS4 Permit, SOC-TGD and the City of Laguna Niguel requirements. Proprietary biotreatment systems spread throughout the site will provide adequate pass-through treatment of runoff for maintaining stormwater quality, and underground detention structures will detain stormwater onsite to meet the allowable mitigated peak flow rate at each Point of Compliance. Therefore, the preliminary design of the onsite drainage system will satisfy the requirements of the EIA, SWQDv and hydromodification.