Drainage Study for 63RD & Montezuma

Prepared: October 16, 2018

PTS # ______DWG # ______D 6253, 6263 & 6273 Montezuma Road San Diego, CA APN: 467-171-33, 467-171-34, 467-171-35

> Prepared for: Zuma West 2108 Bottlebrush Pl Encinitas, CA 92024

Prepared by: Lundstrom Engineering & Surveying, Inc. 5333 Mission Center Road #115 San Diego, CA 92108 619-814-1220



Declaration of Responsible Charge

I hereby declare that I am the engineer of work for this project. That I have exercised responsible charge over the design of the project as defined in Section 6703 of the business and professions code, and that the design is consistent with current standards.

I understand that the check of project drawings and specifications by the City of San Diego is confined to a review only and does not relieve me, as engineer of work, of my responsibilities for project design.

10/16/18

William Lundstrom Registered Civil Engineer 61630 Exp. Date: 06/30/19

Date



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Introduction

Purpose and Scope

Development of permanent improved drainage facilities relies in part, on early identification of any adverse drainage conditions that are caused or worsened by new development projects. To avoid sub-standard drainage facilities, (difficult and costly to replace) sufficient information is needed early, when the project is being considered for approval. The City of San Diego application process requires a hydrology/ drainage study on all development projects at the time of application. This study provides the needed information to ensure that the proposed drainage facilities are located appropriately.

The study compares storm runoff under existing conditions versus proposed conditions (100 events) and identifies existing drainage problems that may be caused, or aggravated, by project development. The study is further used to determine impacts that might be caused downstream (erosion) and to identify proposed mitigation measures.

The Engineering Department shall review the hydrology/drainage study as a part of the overall project application.



Section 1. Project Information

1.1. Project Description

1.1.1 Project Location

The project is located in the City of San Diego, at 6253, 6263 & 6273 Montezuma Road, San Diego, CA 92115. **Exhibit A** provides a location map for the site.

1.1.2 Project Activities Description

The 18,755 square-foot property consisted of three residential lots with single family residential homes, detached garages, and concrete driveways. Front and rear yards are landscape with turf, crushed rocks, and shrubs. The project proposes to demolish all existing structures and construct a new multi-unit apartment building on one consolidated lot.

1.2. Hydrologic Setting

This section summarizes the project's size and location in the context of the larger watershed perspective, topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, and other relevant hydrologic and environmental factors to be protected specific to the project area's watershed.

1.2.1 Watershed

The project site is located in Mission San Diego HSA 907.11. Project runoff outfalls onto Montezuma Road and travels approximately 500 feet west along street gutter into an existing public curb inlet and storm drain. The existing public storm drain outfalls to Alvarado Creek which then confluences with the San Diego River and Pacific Ocean.



Topography

The 18,755 square-foot property consisted of three residential lots with single family residential homes, detached garages, and concrete driveways. Front and rear yards are landscape with turf, crushed rocks, and shrubs. The property is located on a 3% sloped sheet graded pad sloping north. Elevations range from 466.0 to 458.0 msl.

1.2.2 Current Land Use

The 18,755 square-foot property consisted of three residential lots with single family residential homes.

1.2.3 Soil and Vegetation Conditions

The project site consists of SCS Hydrologic Soil Type D. There is no vegetation currently in the disturbed graded area. The undisturbed areas of the site consist of permanent landscaped vegetation.

The project site being developed is categorized as having non-native vegetation.

1.2.4 Existing Drainage Patterns and Facilities

Runoff generated on-site surface sheet flow from south to north. There is no storm water run-off from off-site drainage basins.

1.2.5 Impervious Cover

The 18,755 square-foot property consisted of three residential lots with single family residential homes, detached garages, and concrete driveways. Front and rear yards are landscape with turf, crushed rocks, and shrubs. In the proposed condition the site will approximately be 73 percent impervious cover, 13,670 square-feet.

1.3. Proposed Runoff Management Facilities

The proposed facilities managing runoff from the site include:

- Appropriate grading of pads to direct runoff away from structures on the site.
- Private storm drain system.



Section 2. Design Criteria and Methodology

This section summarizes the design criteria and methodology applied during drainage analysis of the project site. The design criteria and methodology follow the City of San Diego Drainage Design Manual and Storm Water Standards as appropriate for the project site.

2.1. Hydrologic Design Methodology

2.1.1 Rational Method: Peak Flow

Runoff calculations for this study were accomplished using the Rational Method. The Rational Method is a physically-based numerical method where runoff is assumed to be directly proportional to rainfall and area, less losses for infiltration and depression storage. Flows were computed based on the Rational formula:

$$Q = CiA$$

where ... Q = Peak discharge (cfs); C = runoff coefficient, based on land use and soil type; i = rainfall intensity (in/hr); A = watershed area (acre)

The runoff coefficient represents the ratio of rainfall that runs off the watershed versus the portion that infiltrates to the soil or is held in depression storage. The runoff coefficient is dependent on the land use coverage and soil type.

For a typical drainage study, rainfall intensity varies with the watershed time of concentration. The watershed time of concentration at any given point is defined as the time it would theoretically take runoff to travel from the most upstream point in the watershed to a concentration point, as calculated by equations in the City of San Diego Drainage Design Manual .



2.1.2 Rational Method: Runoff Volume

For designs that are dependent on the total storm volume, a hydrograph must be generated to account for the entire volume of runoff from the 6-hour storm event. The hydrograph for the entire 6-hour storm event is generated by creating a rainfall distribution consisting of blocks of rain, creating an incremental hydrograph for each block of rain, and adding the hydrographs from each block of rain. This process creates a hydrograph that contains runoff from all the blocks of rain and accounts for the entire volume of runoff from the 6-hour storm event. The total volume under the resulting hydrograph is equal to the following equation:

	$VOL = CP_6A$
Where:	VOL = volume of runoff (acres-inches)
	$P_6 = 6$ -hour rainfall (inches)
	C = runoff coefficient
	A = area of the watershed (acres)



Section 3. Characterization of Project Runoff

This section characterizes the quantities and location of storm water runoff from the project site.

3.1. Hydrologic Effects of Project

The proposed project will not significantly alter drainage patterns on the site. There will be no increase in peak flows as a result from the proposed development. Exhibit C illustrates the proposed condition hydrology map. **Table 3-1** summarizes the hydrologic effects of the project.

Existing Condition Hydrology						
Area		Тс		50-year Intensity	100-year	
(acres) C (minutes)		2-year Intensity (in/hr)	(in/hr)	Intensity (in/hr)		
0.431	0.70	5.00	2.4	4.2	4.5	
			Q2 = 0.7 cfs	Q50 = 1.3 cfs	Q100 = 1.4 cfs	
	Proposed Condition Hydrology					
Area		Тс		50-year Intensity	100-year	
(acres) C (minutes) 2-year Intensity (in/hr)		(in/hr)	Intensity (in/hr)			
0.431	0.70	5.00	2.4	4.2	4.5	
			Q2 = 0.7 cfs	Q50 = 1.3 cfs	Q100 = 1.4 cfs	

Section 4. Summary and Conclusions

This drainage study has evaluated the potential effects on runoff of the proposed project. In addition, the report has addressed the methodology used to analyze the pre- and postconstruction condition. This section provides a summary discussion that evaluates the potential effects of the proposed project.

- The proposed project will not increase site runoff and not significantly alter drainage patterns on the site
- No adverse impacts will occur downstream to public drainage facilities, there will be no increase in runoff from the proposed grading and remodel on the property.
- This project is not located within 200 feet of sensitive habitat or discharge runoff directly into impacted downstream waterbodies. This project is not required to obtain approval from the Reginal Water Quality Control Board Under Federal Act (CWA) sction 401 or 404.



EXHIBITS





APPENDIX A: RATIONAL METHOD AND MODIFIED RATIONAL METHOD

Landling	Runoff Coefficient (C) Soil Type (1)	
Residential:		
Single Family	0.55	
Multi-Units 70% impervios before + after	0.70	
Mobile Homes	0.65	
Rural (lots greater than ½ acre)	0.45	
Commercial ⁽²⁾		
80% Impervious	0.85	
Industrial (2)		
90% Impervious	0.95	

Table A-1. Runoff Coefficients for Rational Method

Note:

⁽¹⁾ Type D soil to be used for all areas.

⁽²⁾ Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual impe	=	50%		
Tabulated i	mpei	viousness	=	80%
Revised C	Ξ	(50/80) x 0.85	Ξ	0.53

The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A.1.3. Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr.) for a duration equal to the T_c for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_c calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).



SD



SITE DESIGN BMPs

SD-2 SOIL COMPACTION CONSERVE EX. SOIL		SOIL COMPACTION SHALL BE MINIMIZED IN IN LANDSCAPE AREAS AND IN THE PERMEABLE PAVEMENT AREA.			
SD-3	MINIMIZE IMPERVIOUS AREA	MINIMUM DRIVEWAY WIDTH USED TO MINIMIZE IMPERVIOUS FOOTPRINT.			
(SD-4)	MINIMIZE SOIL COMPACTION	SOIL COMPACTION SHALL BE MINIMIZED IN IN LANDSCAPE AREAS AND IN THE PERMEABLE PAVEMENT AREA.			
SD-5	IMPERVIOUS AREA DISPERSION	RUNOFF FROM ROOFTOPS DISPERSE INTO LANDSCAPE AREA BEFORE ENTERING PRIVATE STORM DRAIN.			
SD-6	RUNOFF COLLECTION	RUNOFF ROUTED TO BIOFILTRATION BASIN AND UNDERGROUND DETENTION.			
(SD-7)	LANDSCAPING WITH DROUGHT TOLERANT SPECIES	LANDSCAPE HAS BEEN DESIGNED PER CITY OF SAN SAN DIEGO LANDSCAPE STANDARDS TO MINIMIZE IRRIGATION AND RUNOFF, AND TO MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES THAT CAN CONTRIBUTE TO STORMWATER POLLUTION. SEE APPLICABLE BMPS IN CASQA FACT SHEETS SC-41 "BUILDING AND GROUNDS MAINTENANCE"			

SOURCE CONTROL BMPs

SOURCE CONTROL BMPS	PROJECT IMPLEMENTATION
STORM DRAIN INLETS	MARK ALL INLETS WITH THE WORDS "NO DUMPING! DRAINS TO WATERWAYS" IN ENGLISH AND "NO CONTAMINE" IN SPANISH. MAINTAIN AND PERIODICALLY REPLACE INLET MARKINGS.
	SEE APPLICABLE OPERATIONAL BMPS IN CASQA FACT SHEET SC-44, "DRAINAGE SYSTEM MAINTENANCE."
2 LANDSCAPE/OUTDOOR PESTICIDE USE	LANDSCAPE HAS BEEN DESIGNED PER CITY OF SAN SAN DIEGO LANDSCAPE STANDARDS TO MINIMIZE IRRIGATION AND RUNOFF, AND TO MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES THAT CAN CONTRIBUTE TO STORMWATER POLLUTION. SEE APPLICABLE BMPS IN CASQA FACT SHEETS SC-41, "BUILDING AND GROUNDS MAINTENANCE."
₹ TRASH ENCLOSURES	STORAGE AREA IS PAVED WITH CONCRETE AND DESIGN NOT TO ALLOW RUN—ON FROM ADJOINING AREAS, WALLED AND CONTAINS A ROOF. SIGNS ON DUMPSTER WITH THE WORDS "DO NOT DUMP HAZARDOUS MATERIAL HERE" OR SIMILAR APPROVED BY CITY. SEE CASQA FACT SHEET SC—34, "WASTE HANDLING AND DISPOSAL."
(4) PLAZAS, SIDEWALKS, AND PARKING LOTS	PLAZAS, SIDEWALKS, AND PARKING LOTS SHALL BE SWEPT REGULARLY AND ONCE PRIOR TO OCTOBER 1ST TO PREVENT THE ACCUMULATION OF LITTER AND DEBRIS. SEE CASQA FACT SHEET SC-41, "BUILDING AND GROUNDS MAINTENANCE."





LEGEND: —— DMA #1 BOUNDARY (18,755 SF) $\langle 4 \rangle$ PCC PAVEMENT = 2,900 S.F. LANDSCAPE AREA = 4,660 S.F. $\langle 2 \rangle$ ROOF AREA = 10,770 S.F. BIOFILTRATION BASIN = 425 SF (BMP #1)

TOTAL PROJECT AREA/DMA #1 = 18,755 S.F. TOTAL IMPERVIOUS AREA = 13,670 S.F. HYDROLOGIC SOIL GROUP D DEPTH TO GROUNDWATER > 20 FEET

NO EXISTING NATURAL HYDROLOGIC FEATURES

NO CRITICAL COARSE SEDIMENT YIELD AREAS EXISTS ON SITE.

HYDROLOGY:

EXISTING: A=0.4310 ACRES TC=5.0 MINUTES TC=5.0 MINUTES C=0.70 l(2)=2.4 IN/HR Q(2)=0.7 CFS I(50)=4.2 IN/HR Q(50)=1.3 CFS

<u>PROPOSED:</u> A=0.4310 ACRES C=0.70 l(2)=2.4 IN/HR Q(2)=0.7 CFS l(50)=4.2 IN/HR Q(50)=1.3 CFS

BIOFILTRATION NOT TO SCALE



PRIVATE CONTRACT

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ORIGINAL	LES				
					NAD83 COORDINATES
AS-BUILTS					LAMBERT COORDINATES
CONTRACTOR		DATE STARTE	D		
INSPECTOR DATE COMPLETED					

LEGEND

	FIRE HYDRANT
\otimes	WATER VALVE
M	WATER METER
SCOO	SEWER CLEANOUT
S 🛛	MANHOLES (SS/SD)
-0-	POWER/UTILITY POLE
\leftarrow	GUY ANCHOR
\bigtriangleup	POWER TRANSFORMER
ΡT	POWER/TELEPHONE VAULT
	POWER METER
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TENTATIVE MAP NO. 6139 & 6147 MONTEZUMA ROAD, SAN DIEGO, CA

EASEMENT LEGEND

- (A) INDICATES 8.0' WIDE UN-NAMED EASEMENT AS PER MAP NO. 2495.
- (B) INDICATES 6.0' STREET VACATION AS PER CITY OF SAN DIEGO RESOLUTION NO. 184453, RECORDED AUGUST 6, 1965 AS INSTRUMENT NO. 141427. EASEMENT FOR UTILITIES TO THE CITY OF SAN DIEGO RESERVED OVER SAID VACATION.

THE EXACT LOCATION OF THE FOLLOWING EASEMENTS IS NOT DISCLOSED AND THEREFORE CANNOT BE PLOTTED HEREON: EASEMENT IN FAVOR OF SDG&E RECORDED FEBURARY 13, 1930 IN BOOK 1740, PAGE 206 OF DEEDS.

NOTES

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CCS '83, ZONE 6, GRID BEARING BETWEEN SURVEY CONTROL STATION NO. 3098 AND STATION NO. 3104, AS DESCRIBED ON RECORD OF SURVEY MAP NO. 14492, RECORDS OF SAN DIEGO COUNTY. HAVING A BEARING OF S58'48'52"E

BENCHMARK:

ELEVATIONS FOR THIS SURVEY DERIVED FROM RTK GPS OBSERVATIONS TO CITY OF SAN DIEGO SURVEY CONTROL BENCHMARK LOCATED AT THE NW CORNER OF 67TH STREET AND MARY LANE DRIVE. BRASS PLUG IN TOP OF CURB WEST SIDE 67TH STREET.

ELEVATION=463.36' MSL

THE LOCATION AND DESCRIPTION OF ALL SURVEY MARKERS SHOWN HEREON ARE BASED ON FIELD OBSERVATIONS TAKEN IN NOVEMBER 2017, UNLESS OTHERWISE INDICATED.

WORK PERFORMED IN CONJUNCTION WITH THIS SURVEY UTILIZED THE FOLLOWING EQUIPMENT AND PROCEDURES: (A) 3" SPECTRA PRECISION FOCUS 30 SERIES ELECTRONIC TOTAL STATION; (B) SPECTRA PRECISION EPOCH 50 SERIES GPS, DATA COLLECTED IN RTK MODE. ALL EQUIPMENT MAINTAINED TO THE MANUFACTURER'S SPECIFICATIONS.

THIS TOPOGRAPHIC SURVEY DRAWING ACCURATELY REPRESENTS SURFACE FEATURES LOCATED DURING THE COURSE OF THIS SURVEY. UNDERGROUND UTILITIES SHOWN HEREON ARE BASED SOLELY UPON INFORMATION PROVIDED BY OTHERS AND LUNDSTROM ENGINEERING & SURVEYING, INC. DOES NOT ACCEPT RESPONSIBILITY OR ASSUME LIABILITY FOR THEIR ACCURACY OR COMPLETENESS. CONTRACTOR AND/OR ENGINEERS SHALL VERIFY EXACT SIZE AND LOCATION PRIOR TO CONSTRUCTION.

ENGINEER

WILLIAM LUNDSTROM

EXPIRES ON 06/30/19

R.C.E. 61630

LUNDSTROM ENGINEERING AND SURVEYING, INC. 5333 MISSION CENTER ROAD, SUITE 115 SAN DIEGO, CALIFORNIA, 92108 (619) 814–1220



Project Address: 6139 & 6147 MONTEZUMA ROAD			
SAN DIEGO, CA 92115			
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ZUMA WEST		Revision	1:
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