

# CEQA Preliminary Hydrology/Drainage Study

for

TPM 20756

at

Hauser Creek Road  
Lake Morena, California

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## **Introduction**

The purpose of this report is to calculate the Peak Runoff Rates during the 100 year event that would flow through the subject property from the northeast and southeast along two natural creeks and the runoff generated onsite towards the same creeks as shown on the attached Hydrology Map.

The subject property is located in the Lake Morena area, a community within the unincorporated area of San Diego. The entire drainage basin is unimproved, consisting of native vegetation of low lying grass and chaparral. The offsite area flowing from the northeast is approximately 193 acres, and the offsite area flowing from the southeast is 227 acres. The onsite drainage area is 7.9 acres and is shown in the attached Hydrology Map for the site (Refer to the attached Hydrology Maps).

The peak runoff rates will be calculated using the Rational Method outlined in the San Diego County Hydrology Manual, June 2003 Edition and will be presented at the points of discharge shown on the respective hydrology maps.

The runoff coefficient of 0.41 will be used in all calculations, and type D soil will be assumed, giving the most conservative results. (Refer the County of San Diego, Table 3-1 for Low density Residential, 1DU/AC density).

The ultimate proposed development will not alter the natural drainage path or divert any drainage from the current existing natural condition or drainage boundaries.

### Runoff rate calculations

Runoff rate is calculated using the rational method as indicated in the County of San Diego Hydrology Manual and using the following formula:

$Q = CIA$  ( cubic feet per second, cfs )

C = Runoff coefficient

I = Intensity (inches/hour)

A = Area (acres)

#### Offsite Area A-1

A = 192 acres

$Q = .41 ( 3.08 ) ( 192 ) = 242 \text{ cfs (100 year)}$

#### Onsite Area A-2

A = 7.9 acres

$Q = .41 ( 4.74 ) ( 7.9 ) = 15.4 \text{ cfs (100 year)}$

#### Offsite Area B-1

A = 227 acres

$Q = .41 ( 3.31 ) ( 227 ) = 308 \text{ cfs (100 year)}$

## Sample Hydrology Calculations

$C = .41$  ( County of San Diego Hydrology Manual, Table 3-1, type D soil, Low Density Residential - 1 DU/acre)

Type D Soil per Soil Hydrology Group Map in Appendix A of the County of San Diego Hydrology Manual

### Time of Concentration calculations

#### Offsite Area A-1

To obtain Initial Time of Concentration, enter basin length of 100', Runoff coefficient of  $C = 0.41$  and slope of 3.0% on Table 3-2 (attached) and obtain  $T_i = 10.3$  minutes.

The remaining Time of concentration  $T_c$  was obtained by entering the basin length of 0.748 miles and difference in elevation of 252 feet into Figure 3-4 (attached) and obtain 12.4 minutes.

Total Time of Concentration  $T_c = 10.3 + 12.4 = 22.7$  minutes

#### Onsite Area A-2

Initial Length = 100 ft, Slope = 10 % ,  $T_i = 6.9$  minutes

Basin Length = 1300 ft , Elevation Difference =  $2873 - 2755 = 118$  ft ,  $T_c = 4.9$  minutes

Total Time of Concentration  $T_c = 6.9 + 4.9 = 11.6$  minutes

#### Offsite Area B-1

Initial Length = 100 ft, Slope = 10 % ,  $T_i = 6.9$  minutes

Basin Length = 5600 ft , Elevation Difference =  $3415 - 2715 = 700$  ft ,  $T_c = 13.4$  minutes

Total Time of Concentration  $T_c = 6.9 + 13.4 = 20.3$  minutes

### Intensity calculations

To obtain the intensity, the following formula is used in conjunction with the directions for application on Figure 3-3 of the County of San Diego's Hydrology Manual.

$$I = 7.44 P_6 D^{-.645}$$

Intensity, I ( inches/hour )

See attached Intensity-Duration Design Chart on Figure 3-3.

Precipitation (6-hour),  $P_6$  ( inches )

The precipitation rates for the 6-hour and 24-hour 100 year event were obtained from the isopluvial maps in Appendix B of the Hydrology Manual of San Diego County.

Duration, D ( minutes ) The obtained Time of concentration is used as the Duration.

$$P_6 = 3.1 \text{ inches/hour (100-yr)}$$

#### Offsite Area A-1

$$D = 22.7 \text{ minutes}$$

$$I = 7.44 ( 3.1 \text{ inches/hour} ) ( 22.7 \text{ minutes} )^{-.645} = 3.08 \text{ inches/hour (100-yr)}$$

#### Onsite Area A-2

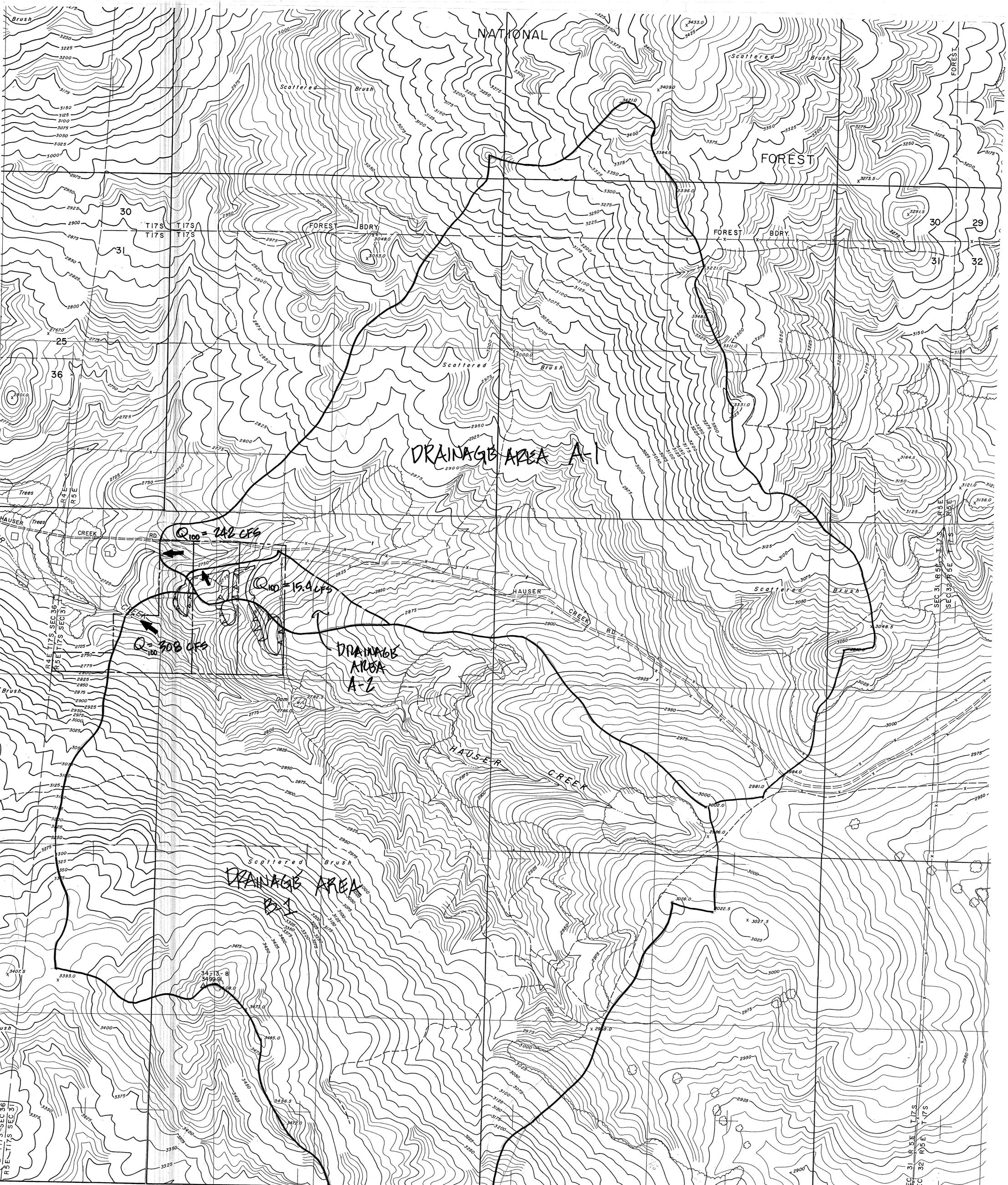
$$D = 11.6 \text{ minutes}$$

$$I = 7.44 ( 3.1 \text{ inches/hour} ) ( 11.6 \text{ minutes} )^{-.645} = 4.74 \text{ inches/hour (100-yr)}$$

#### Offsite Area B-1

$$D = 20.3 \text{ minutes}$$

$$I = 7.44 ( 3.1 \text{ inches/hour} ) ( 20.3 \text{ minutes} )^{-.645} = 3.31 \text{ inches/hour (100-yr)}$$



SAN DIEGO COUNTY  
CALIFORNIA

EDITION OF 1970

SHEET 174-1

PREPARED UNDER THE DIRECTION OF THE COUNTY ENGINEER OF THE COUNTY OF SAN DIEGO, CALIFORNIA, CONTROL BY U.S.C. & G.S., U.S.G.S. AND THE COUNTY OF SAN DIEGO, NORTH AMERICAN DATUM 1927.

COMPILED BY PHOTOGRAMMETRIC METHODS FROM PHOTOGRAPHY DATED 7-1-69 BY

WESTERN AERIAL SURVEYS  
A DIVISION OF HUGH M. GILLAMER, INC.  
RIVERSIDE, CALIFORNIA

DEEPER PORTIONS OF THIS MAP HAVE BEEN COMPILED AT 400 SCALE AND PHOTOGRAPHICALLY ENLARGED TO 200 SCALE.

SCALE 1:2400

CONTOUR INTERVAL 5 FEET  
U.S.C. & G.S. DATUM

ONE THOUSAND FOOT CALIFORNIA RECTANGULAR GRID (ZONE VI)  
THE LAST THREE DIGITS OF THE GRID NUMBERS ARE OMITTED  
THE RECTANGULAR COORDINATE VALUES ARE SHOWN ON THE SOUTH AND WEST MARGINS  
THE GEOGRAPHIC VALUES ARE SHOWN ON THE NORTH AND EAST MARGINS

HYDROLOGY MAP  
INDEX TO ADJOINING SHEETS

178-1911	178-1917	178-1923
174-1911	174-1917	174-1923
170-1911	170-1917	170-1923