PRELIMINARY
DRAINAGE STUDY
FOR
COUNTY OF SAN DIEGO TRACK NO. 5463
10004 CHANNEL ROAD, LAKESIDE CA

October, 2005
Revised December, 2006
Revised March, 2007

Prepared for:
COUNTY OF SAN DIEGO
5201 Ruffin Road
San Diego, CA 92123

Prepared by:
TERRA SURVEYING CONSULTANTS
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Job Number 2005-22

Prepared By: AR/JV
Reviewed By: JV

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Exhibit "A" – Existing Condition Hydrology Map

Exhibit "B" - Proposed Condition Hydrology Map

I. INTRODUCTION

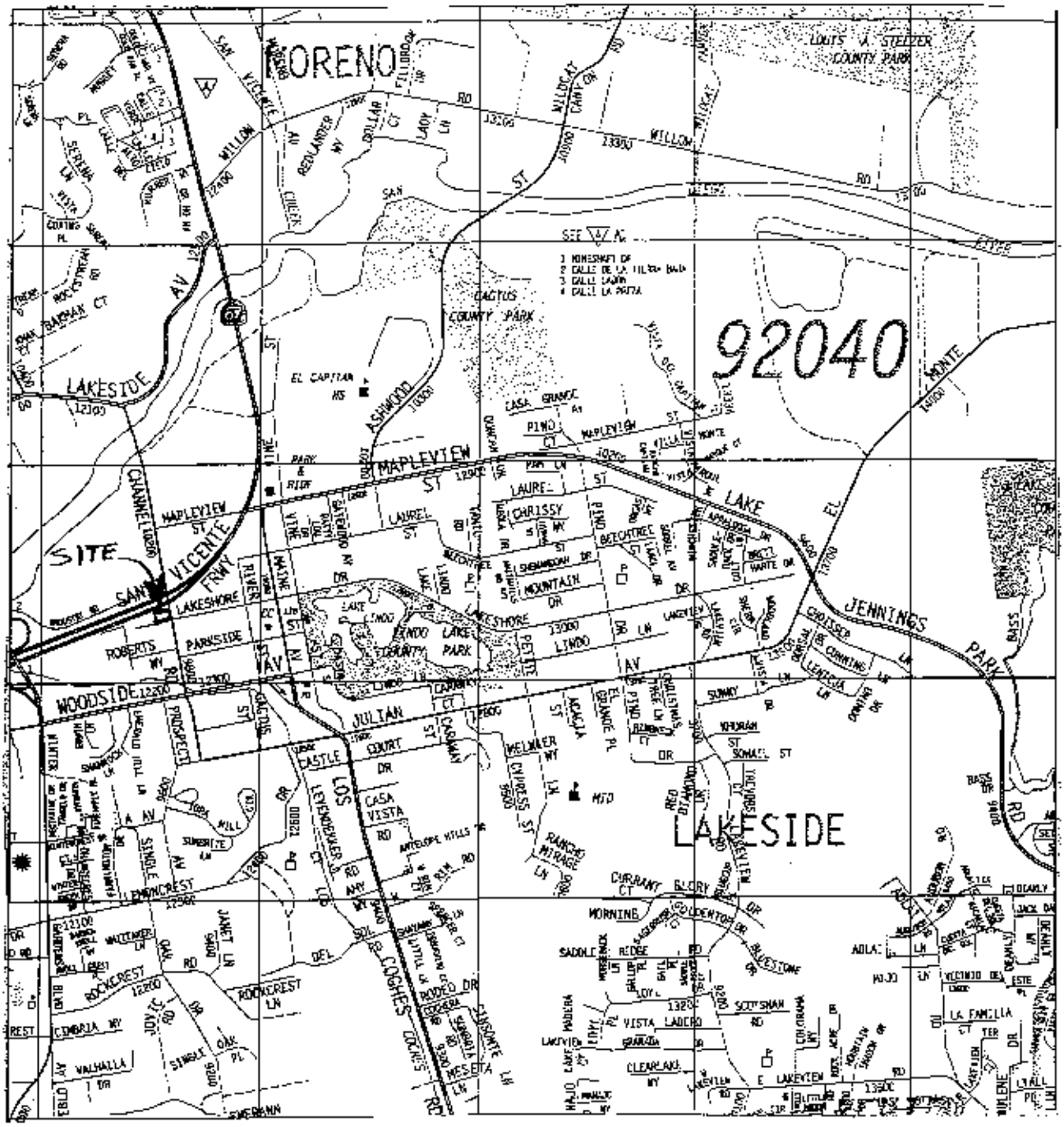
The 10004 Channel Road Condominium project site is located in the unincorporated community of Lakeside, in the County of San Diego. The proposed project will create 8 condominium units on the parcel. The parcel is located to the west of Channel Road and north of Lakeshore Drive. Highway 67 is located to the north of the parcel. (See Vicinity Map). The site is surrounded on all sides by development. Currently, the approximately 0.30 acre site is a developed lot with one mobile home unit, asphalt and stone parking spaces with an asphalt paved shared access driveway. The project site is located within the Lower San Diego Hydrologic Area. The site surface flows westerly/southwesterly onto the existing asphalt paved access driveway.

There are no major surface drainage changes proposed to the site. The proposed grading will be designed to mirror the existing drainage flow pattern. The intent of this drainage study is to examine the existing, and proposed storm drain surface flow within the project site.

II. PROJECT DESCRIPTION

This project currently conveys onsite storm runoff to surface flow southwesterly onto the existing asphalt access driveway. From there, the run off surface flows within the asphalt driveway in a westerly direction, and then surface flows northwesterly where the flow is discharged into an earthen swale that runs adjacent to Highway 67. Field observations were conducted to determine the existing conditions with respect to estimating the quantity of storm water actually captured. An analysis of the existing conditions indicated that there is no offsite contributing to the on-site flows.

10004 CHANNEL ROAD CONDOMINIUM PROJECT



VICINITY MAP

No Scale

EXISTING CONDITIONS

Currently the developed project site allows storm runoff to sheet flow across the property, and onto the existing asphalt access driveway.

PROPOSED CONDITIONS

There are no major surface drainage changes proposed to the site; therefore, the proposed storm drainage surface flow pattern will mirror the existing conditions.

III. METHODOLOGY

HYDROLOGY METHODOLOGY

A 100-year storm events analysis was conducted using the methodology described in the County of San Diego, Hydrology Manual for developed site. The rational method was used to determine the flow contributions from each basin. (See Exhibit "A", and Appendix A). It was determined that the developed site will convey approximately 1.02 CFS to the existing asphalt access driveway located at the southwest portion of the project site, for the 100-year storm event.

HYDRAULIC DESIGN

Further analysis of the onsite surface drainage flow will be conducted upon final design of the proposed project.

Summary of Pre-and Post-Development Conditions

(See Appendix 'A' for Calculations)

Area A		Area (Acres)	Q_{100} (CFS)	Tc (Minutes)
Existing Development	Basin A	0.30	1.02	8.1
Post-Development	Basin B	0.30	1.02	8.1

IV. CONCLUSION

The rational method was used to calculate the total flow (Q_{100}) at the downstream points for the developed basins. Based on topographic information obtained from the County of San Diego, the analysis of the developed basins determined that the proposed basins would convey a total of approximately 1.02 CFS.

Due to the development of the surrounding areas, there will be no additional contributing flows to the project site, and the runoff flows within the existing developed basin will not increase.

The existing, and proposed development of the site does not increase the basin area, or flows, introduced to the western earthen swale. Since no change is proposed for the proposed developed site, there will not be any diversion of existing flows that would adversely impact downstream conditions.

Terra Surveying Consultants
1179 Horsemill Rd.
El Cajon, CA 92021

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 professional code, and that the design is consistent with current design.

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.

Joel Valdovinos

3/30/07
DATE

REGISTERED PROFESSIONAL ENGINEER
JOEL VALDOVINOS
C 65256
EXP 9/30/07
CIVIL
STATE OF CALIFORNIA

APPENDIX A

Hydrologic Calculations (Existing & Proposed)

10004 CHANNEL RD.
3/21/07

"HYDROLOGY CALCULATIONS"

PER COUNTY OF SAN DIEGO DRAINAGE MANUAL DATED JUNE 2003'

RATIONAL METHOD (EXISTING CONDITIONS):

$Q = CIA \Rightarrow C = 0.71$ [FROM TABLE 3-1 FOR SOIL "D"]

$T_i = 6.1$ min

$T_T = \left(\frac{11.1 \times (0.23)^3}{1}\right)^{0.385} \times 60 \text{ min} \Rightarrow 2.0$ min

$T_c = 6.1 + 2.0 \Rightarrow 8.1$ min

$I_n = 4.8$ in/HR

$Q_E = (0.71)(4.8)(0.3) \Rightarrow 1.02$ CFS

STAEDTLER® No. 937 811E Engineer's Computation Pad

10004 CHANNEL RD.
3/21/07

"HYDROLOGY CALCULATIONS"

PER COUNTY OF SAN DIEGO DRAINAGE MANUAL DATED JUNE 2003

RATIONAL METHOD (PROPOSED CONDITIONS):

$Q = CIA \Rightarrow C = 0.71$ [FROM TABLE 3-1 FOR SOIL "D"]

$T_i = 6.1$ min

$T_T = \left(\frac{11.1 \times (0.23)^3}{1}\right)^{0.385} \times 60 \text{ min} \Rightarrow 2.0$ min

$T_c = 6.1 + 2.0 \Rightarrow 8.1$ min

$I_A = 4.8$ in/HR

$Q_P = (0.71)(4.8)(0.3) \Rightarrow 1.02$ CFS

$\Delta Q = Q_P - Q_E$

$= 1.02 - 1.02$

$\Delta Q = 0.0$ CFS

STAEDTLER® No. 937 811E Engineer's Computation Pad

APPENDIX B

Tables and Charts

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use			Runoff Coefficient "C"			
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

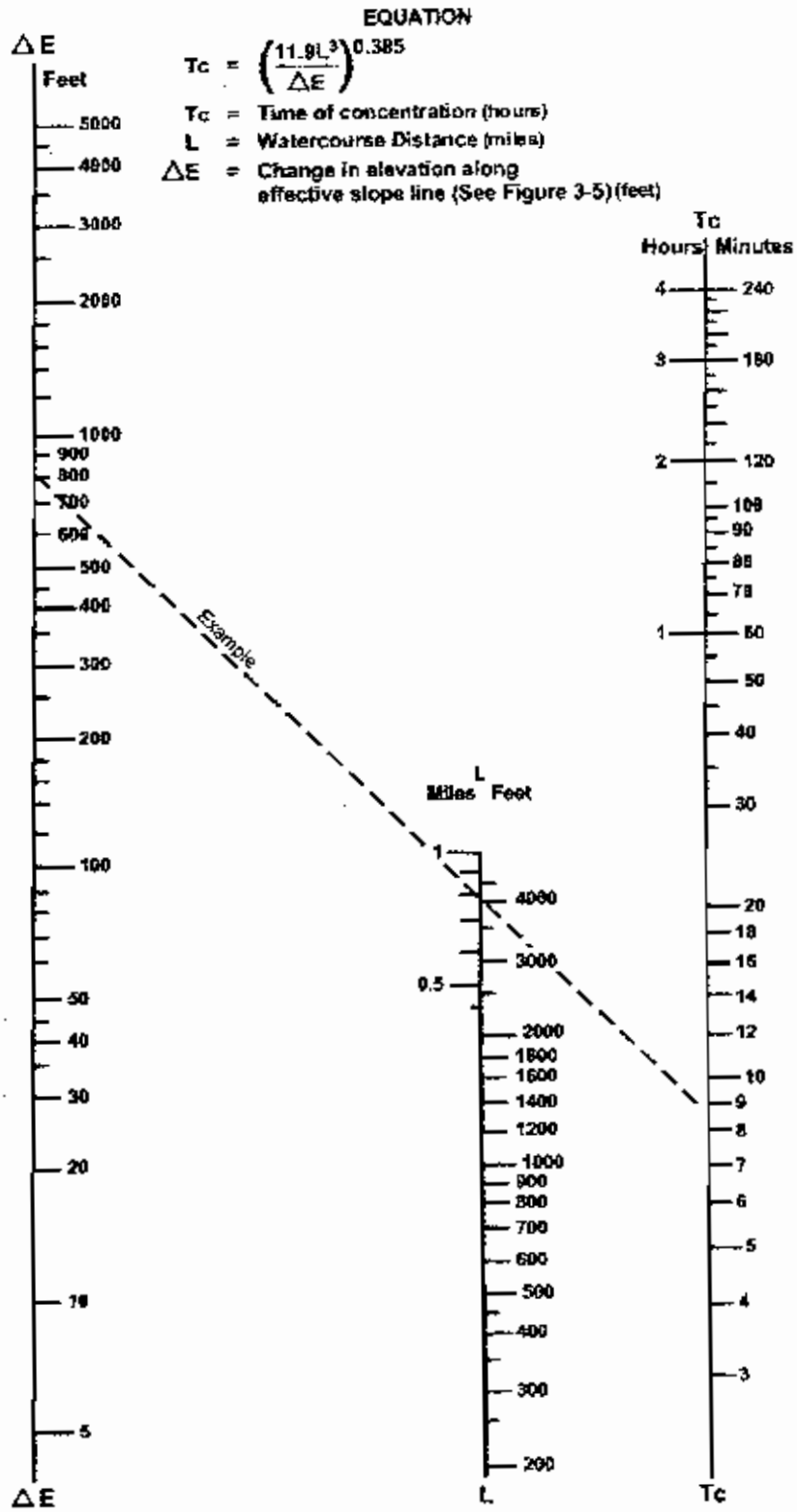
Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M)
& INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/	.5%		1%		2%		3%		5%		10%	
	Acre	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description



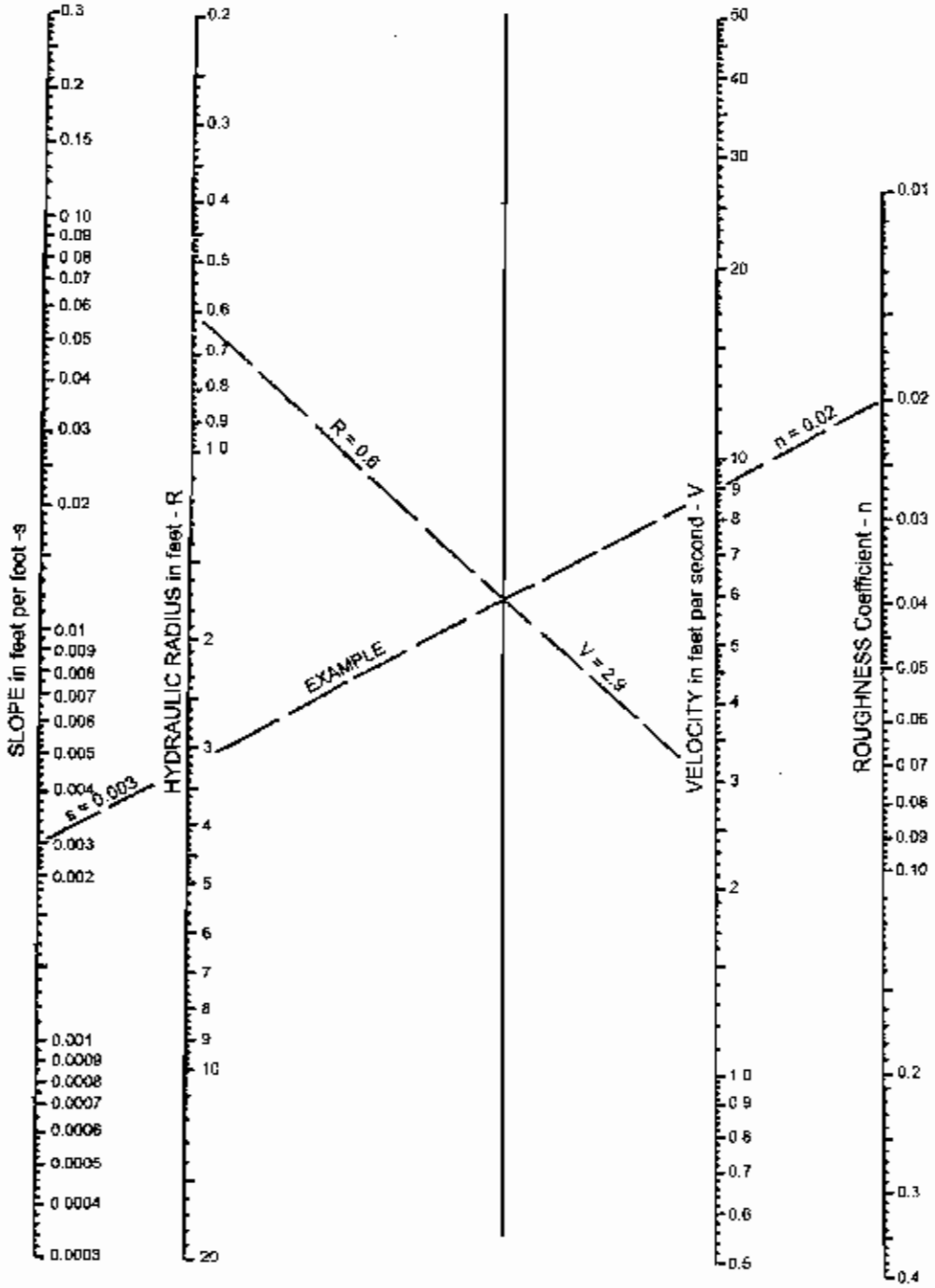
SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE

3-4

Nomograph for Determination of
Time of Concentration (Tc) or Travel Time (Tt) for Natural Watersheds

EQUATION: $V = \frac{1.49}{n} R^{2/3} s^{1/2}$



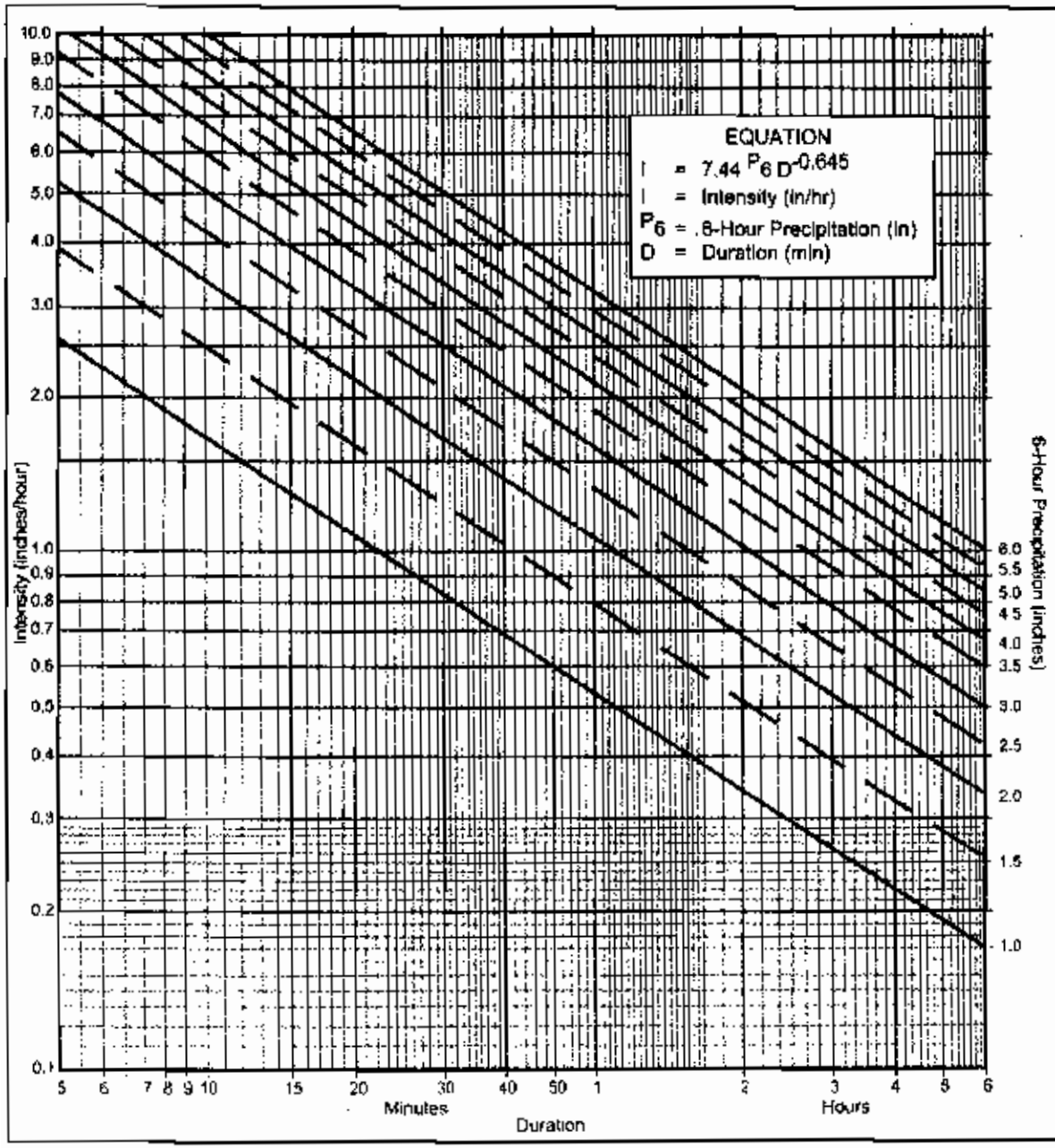
GENERAL SOLUTION

SOURCE: USDOT, FHWA, HDS-3 (1961)

FIGURE

Manning's Equation Nomograph

3-7



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.5 in., P_{24} = 5.0 $\frac{P_6}{P_{24}}$ = 50 %(2)

(c) Adjusted P_6(2) = 2.5 in.

(d) t_x = * min.

(e) I = * in./hr.

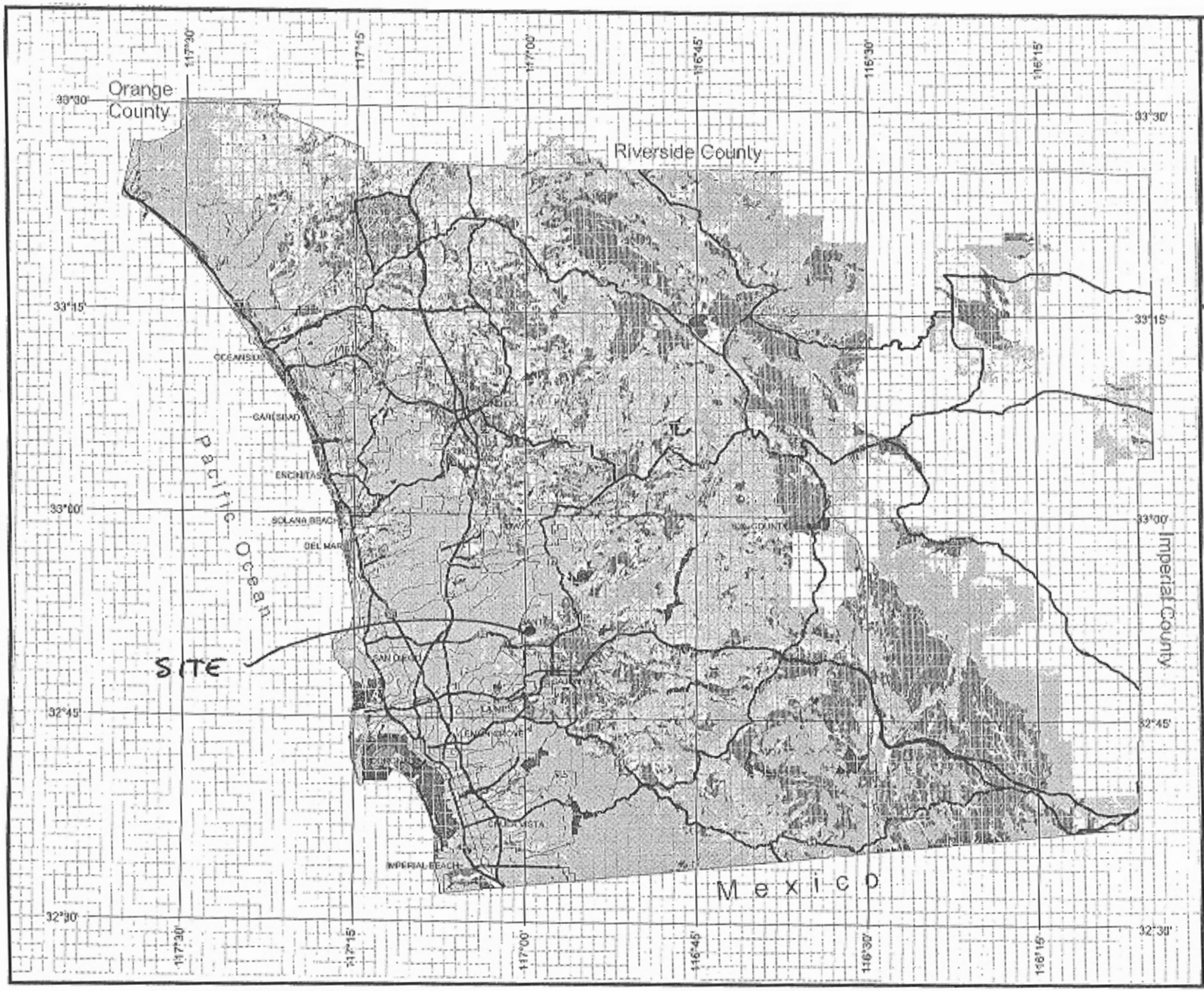
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6 / Duration	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
5	2.53	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.65	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1



County of San Diego Hydrology Manual

Soil Hydrologic Groups

Legend

Soil Groups

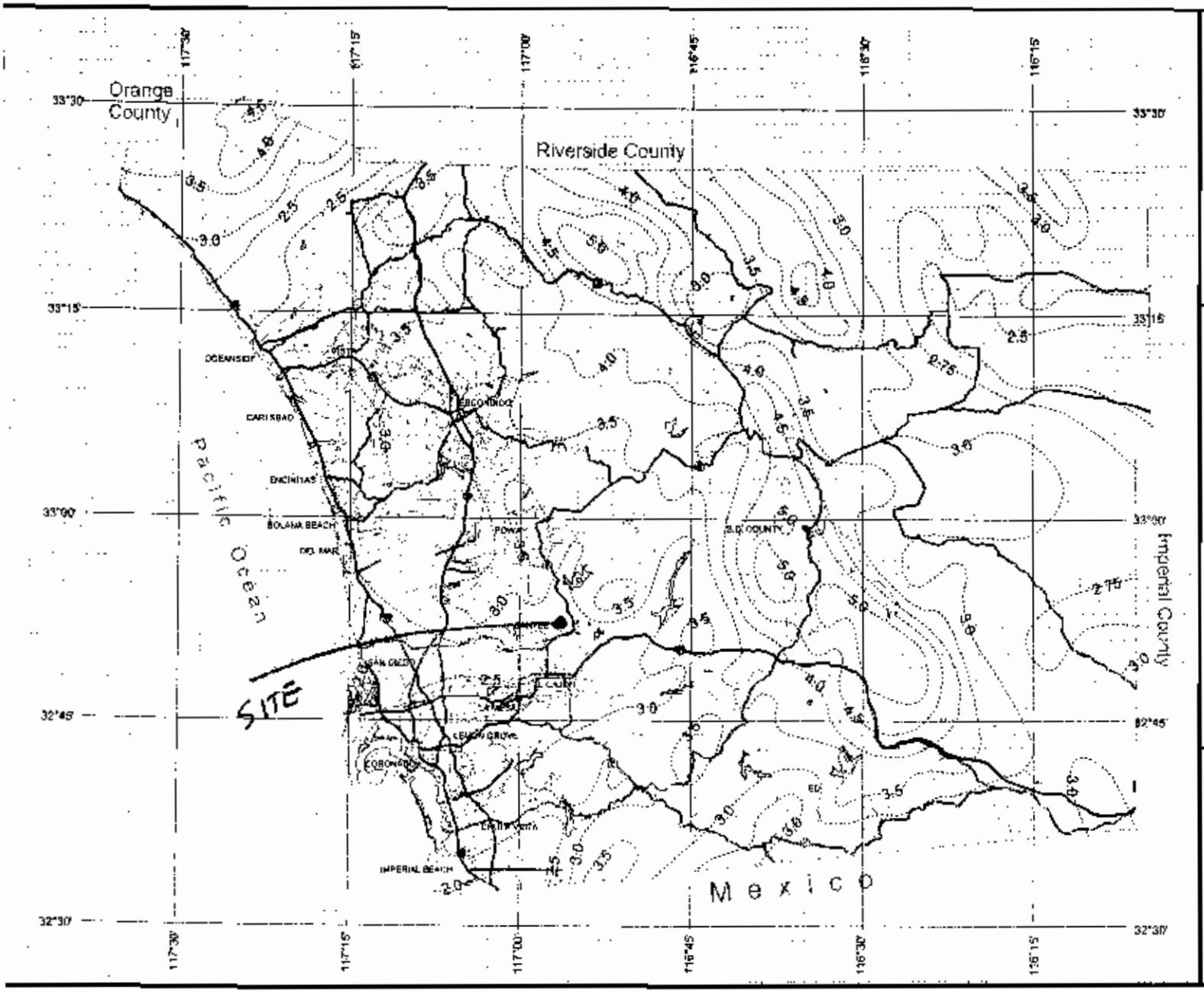
- Group A
- Group B
- Group C
- Group D
- Undetermined
- Data Unavailable

DPW GIS

SanGIS
We Have San Diego Covered

N
W E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

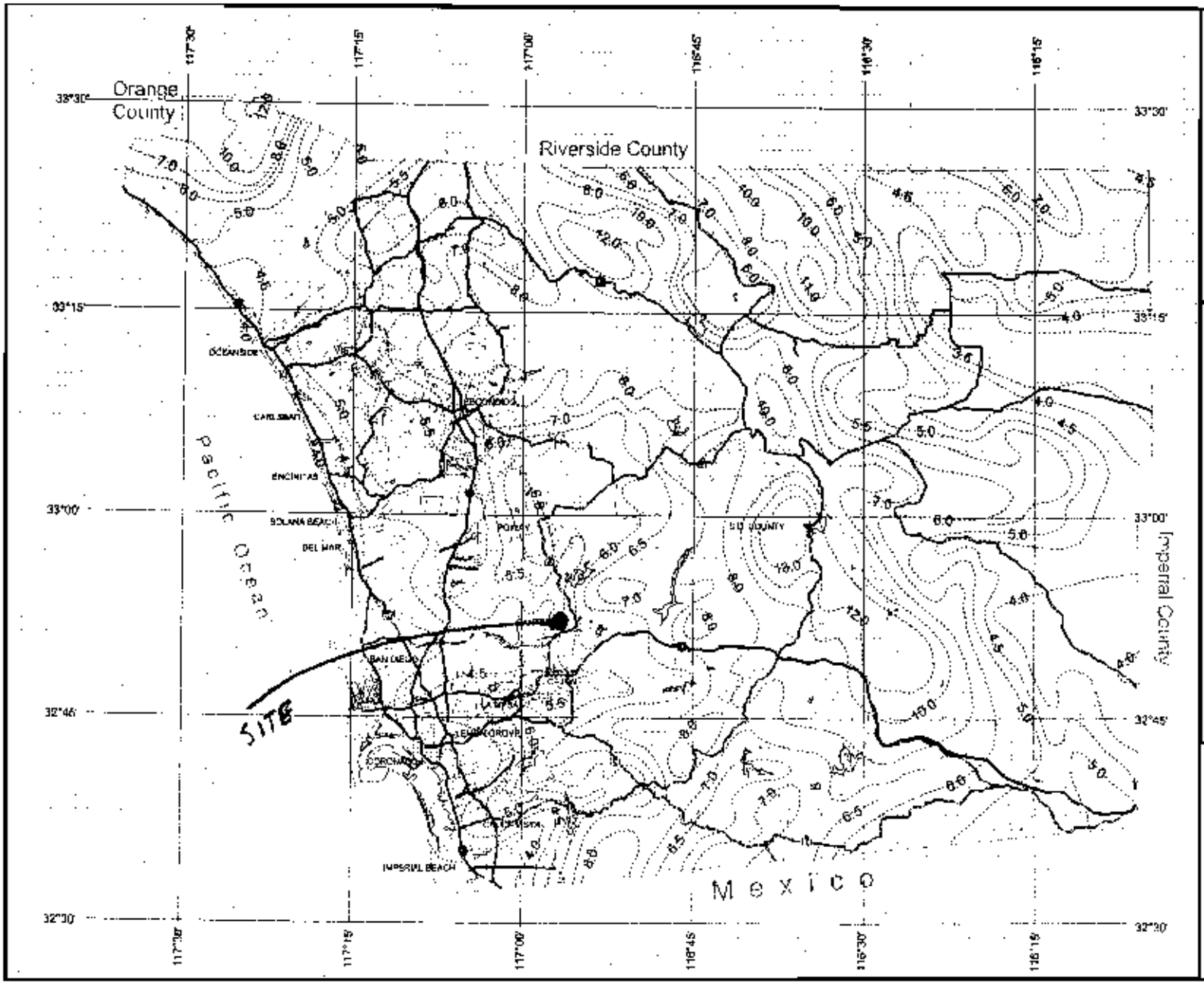
100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS

SDGIS

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS

SanGIS

N
W E
S

3 0 3 Miles

MAP POCKETS

Exhibit "A"- Existing Condition Hydrology Map
Exhibit "B"- Proposed Condition Hydrology Map

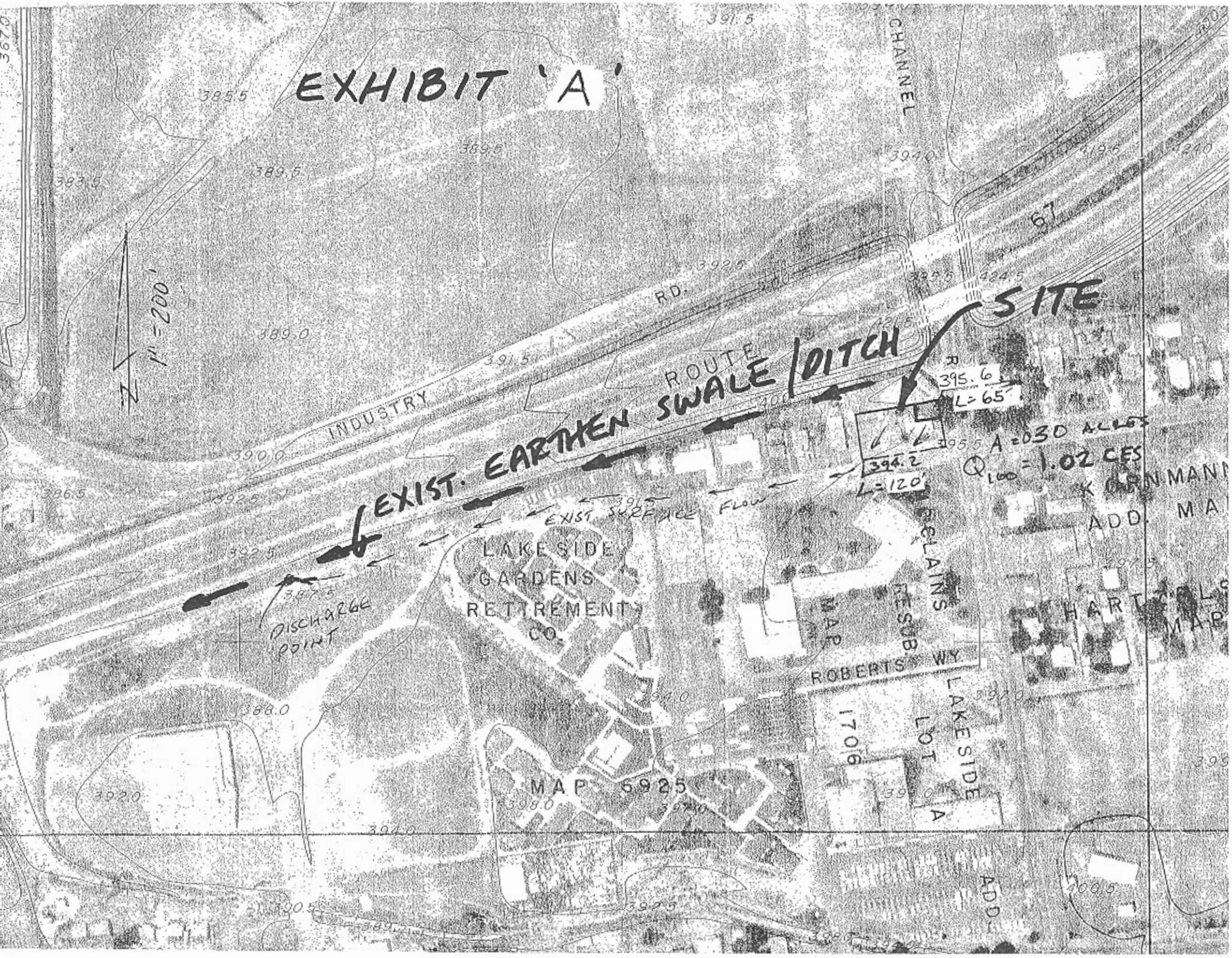


EXHIBIT 'A'
SITE
EXIST. EARTHEN SWALE/DITCH
EXIST. SURFACE FLOW
DISCHARGE POINT
1" = 200'
N
INDUSTRY RD.
ROUTE
CHANNEL
395.6
L=65'
394.2
L=120'
A=.030 ACRES
Q100 = 1.02 CFS
LAKESIDE GARDENS RETIREMENT CO.
MAP 5925
ROBERTS WY
LAKESIDE
LOT A
1706
ADD.
KORNMAN
ADD. MA
HART
MAP
RESUB.
MAP
CLAINS
367.0
385.5
389.5
389.0
391.5
390.0
392.5
388.0
392.0
394.0
398.0
397.0
400.5
424.5
395.5
394.0
419.5
424.0
391.5
387.5
386.5
393.5
390.5
392.5
400.5

REPLACEMENT TENTATIVE MAP FOR COUNTY OF SAN DIEGO TRACT NO. 5463
10004 CHANNEL ROAD

SPECIAL ASSESSMENT ACT

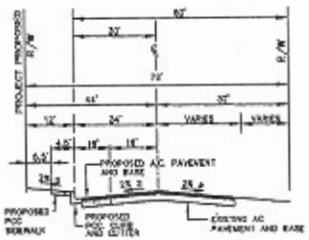
OWNER WILL REQUEST THE BOARD OF SUPERVISORS PERMISSION TO INITIATE PROCEEDINGS UNDER A SPECIAL ASSESSMENT ACT FOR CONSTRUCTION OF THE IMPROVEMENTS FOR WIDENING OF CHANNEL ROAD. IMPROVEMENTS ARE AS FOLLOWS, HOWEVER THEY ARE NOT LIMITED TO: CURB & GUTTER, P.C.C. SIDEWALK, A.C. PAVEMENT & BASE, STREET LIGHTS, AND STORM DRAINAGE FACILITIES

OPEN SPACE SUMMARY

TYPE	REQUIRED	PROVIDED
GROUP USEABLE OPEN SPACE	800 S.F.	1,185 S.F.
PRIVATE USEABLE OPEN SPACE	400 S.F.	400 S.F.
CHILDREN'S PLAY AREA	400 S.F.	400 S.F.
TOTALS:	1,600 S.F.	1,985 S.F.

DWELLING UNIT & PARKING DATA

DWELLING UNITS	OFF-STREET PARKING SPACES
8 (SIX) 2 (TWO) BEDROOM UNITS 2 @ 1,342 S.F.=2682 S.F. 3 @ 1,181 S.F.=3543 S.F. 3 @ 1,366 S.F.=4172 S.F. 5 (TWO) 3 (THREE) BEDROOM UNITS 2 @ 1,343 S.F.=2682 S.F. TOTAL = 10,069 S.F.	(ALL WILL BE ASSIGNED TO UNITS) 14 EA. GARAGE SPACES 3 EA. OPEN SPACES 1 EA. HANDI-CAP SPACE 18 EA. TOTAL SPACES



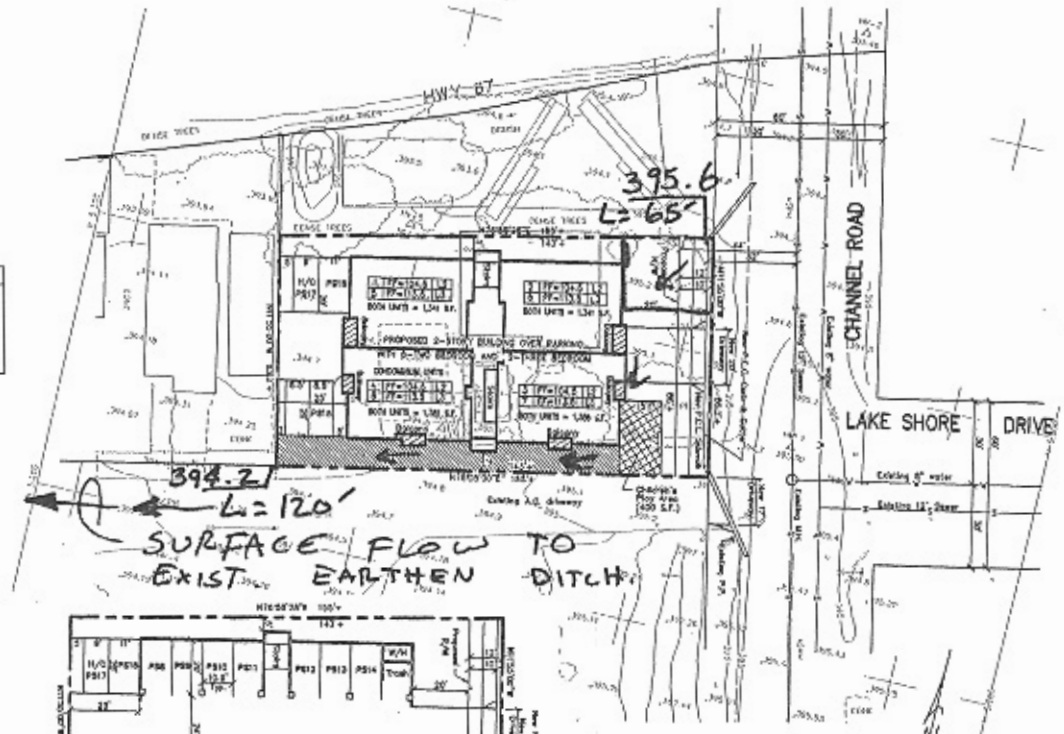
SECTION CHANNEL ROAD
NOT TO SCALE

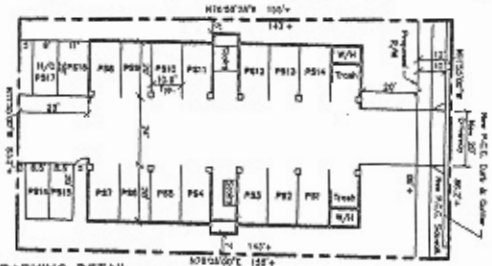
LEGEND

INDICATES GROUP USEABLE OPEN SPACE
INDICATES CHILDREN'S PLAY AREA
INDICATES PRIVATE USEABLE OPEN SPACE

SOURCE OF TOPO:

AERIAL TOPO PROVIDED BY DRI.
DATE OF FLIGHT AUGUST, 2002.





PARKING DETAIL
SCALE 1"=20'

A = 0.30 ACRES

Q_{100} = 1.02 CFS

EXISTING ZONING:

ZONE		
USE REGULATIONS		RU29
ANIMAL REGULATIONS		G
DEVELOPMENT REGULATIONS	DENSITY	29
	LOT SIZE	6,000
	BUILDING TYPE	L
	MAXIMUM FLOOR AREA	-
	FLOOR AREA RATIO	-
	HEIGHT	G
	LOT COVERAGE	-
	SETBACK	K
	OPEN SPACE	A
SPECIAL AREA REGS.		B

GENERAL NOTES:

1. TAX ASSESSORS NUMBER (APN): 394-121-08
   TAX RATE AREA: 82199
2. THIS IS A MAP OF A CONDOMINIUM PROJECT AS DEFINED IN SECTION 1350 OF THE STATE OF CALIFORNIA CIVIL CODE. THE MAXIMUM NUMBER OF DWELLING UNITS IS 8.
3. GENERAL PLAN REGIONAL CATEGORY: CWA
4. COMMUNITY PLAN AREA: LAKESIDE
5. LAND USE DESIGNATION: (8) RESIDENTIAL
6. ASSOCIATED PERMITS: N/A
7. GRADING IS PROPOSED
8. PARK DEDICATION: IN LIEU FEES TO BE PAID.
9. REQUESTED VARIANCE: N/A
10. EXISTING STREET LIGHTING PER CO. OF SAN DIEGO STANDARDS.
11. THE PARCEL IS NOT SUBJECT TO THE GROUND WATER ORDINANCE
12. THE UNDERGROUNDING OF THE EXISTING OVERHEAD FACILITIES HAS BEEN WAIVED BY THE BOARD OF SUPERVISORS PER DOCUMENT NO. _____
13. THERE WILL BE INDIVIDUAL GAS AND OR ELECTRIC METERING PROVIDED FOR EACH UNIT AS SPECIFIED BY SECTION 81.1102b. OF THE COUNTY OF SAN DIEGO SUBDIVISION ORDINANCE.

LOCATION AND STATUS OF EXISTING LEGAL ACCESS TO SUBJECT PROPERTY FROM A PUBLICALLY MAINTAINED ROAD: CHANNEL ROAD

WATER DISTRICT: PADRE DAM MUNICIPAL WATER DISTRICT, PADRE DAM MUN WATER DIST & LAKESIDE WATER DISTRICT LAND

SEWER DISTRICT: LAKESIDE SANITATION MAINTAINANCE DISTRICT LAN

FIRE DISTRICT: LAKESIDE FIRE PROTECTION DISTRICT

SCHOOL DISTRICT: GROSSMONT UNION HIGH SCHOOL DISTRICT, LAKESIDE UNION SCH ELEMENTARY SCHOOL DISTRICT

VICINITY MAP
NO SCALE

LEGAL DESCRIPTION:

PORTION OF LOT 24 OF EL CAJON VALLEY COMPANY'S LANDS, IN COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 396, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DECEMBER 30, 1896 AND THAT PORTION OF SYCAMORE STREET AS CLOSED TO PUBLIC USE NOVEMBER 8, 1902, BY ORDER OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SAN DIEGO.

ALL PARCELS WITHIN THIS SUBDIVISION SHALL HAVE A MINIMUM OF ONE HUNDRED SQUARE FEET OF SOLAR ACCESS FOR EACH FUTURE DWELLING UNIT ALLOWED BY THIS SUBDIVISION AS REQUIRED BY SECTION X OF THE SUBDIVISION ORDINANCE.

OWNER:

JACK WASSOM
5480 BALTIMORE LANE
SUITE 204
LA MESA, CA. 91942
(619) 464-8700, FAX (619) 464-9725

BY: _____
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(2006 - 23)

REPLACEMENT TENTATIVE MAP FOR
COUNTY OF SAN DIEGO TRACT NO. 5463
10004 CHANNEL ROAD

OCTOBER 3, 2005
REVISED DECEMBER 18, 2006

EXHIBIT "B"