HYDROLOGY & HYDRAULIC & REPORT

TPM 20842

LOG NO. 04-02-026

APN 129-291-05

REGISTERED PROFESSIONAL ENGINEER
HADLEY JOHNSON
No. 14870
EXP. 3-31-09
CIVIL
STATE OF CALIFORNIA

PREPARED BY: 11/23/04

HADLEY JOHNSON
RCE 14870
11/23/2004

LOG NO. 04-02-026
TPM 20842
DRAINAGE STUDY

SUMMARY & CONCLUSION

1. The table of Pre Development vs. Post Development show very little increase in runoff from Drainage Area A-1. The flow will increase from 20.2 cfs to 21.9 cfs during a 100 yr storm. This increase in flow will be mitigated by the post construction BMP of vegetated lined swales.

Drainage area A-2 flow will only increase from 25.4 cfs to 25.9 cfs during a 100 yr storm. Again, the increase in flow will be more than mitigated by the post constructed BMP of vegetated lined swale.

Drainage Area A-3 is offsite and only touches the property along its most westerly boundary. No change in the flow from this drainage area.

2. Only one small area exceeds 25 acs area and this is when Area A-2 and A-3 combined along the westerly boundary. This swale is deep with a downstream slope greater than 5%. A channel width of 20 ft. will be more than adequate to carry the project flow.

3. This swale onsite will be within the proposed 70 to 100 ft. wide open space easement. The existing swales onsite are more than adequate to handle the minor flows associated with this project.

4. Culverts should not be necessary as the only drainage area crossed is A-1 at approximately ½ the area above the road or 4.5 acs +/-. The proposed road with a minimum grade of 10% and a 6" berm 2% cross slope will have a capacity greater than 20 cfs. The proposed down drain standard drawing D-22 (at the end of the road drainage area 7.5 acs) with a 20% down slope has a capacity greater than 20 cfs. These capacity exceed the projected 100 yr flow.

5. The increase flows will be mitigated by the proposed bio filters and grass lined swale. The bio filter will reduce the velocity of the flow and increase the time of concentration. The rock rip rap placed at the drainage outlets will also decrease the velocity.

6. The existing drainage pattern will not be changed for areas A-2 and A-3. The small drainage area A-1, a portion of approximately 7.5 acs area will flow along the proposed road and discharge at the cul-de-sac into swale that will join the flow from area A-2 and A-3 onsite slightly upstream of the previous discharged point.

7. The increase in flow will not cause substantial erosion or substantial siltation on or offsite. Best Management Practices, some of which will be silt fences, slope protection, rip rap, stabilized construction entrance will be employed during construction and post construction requirements of grass swales and bio filters and rock rip rap will mitigate erosion and siltation.

8. The proposed project would not substantially alter the existing drainage pattern of the area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-or off-site. The drainage swales on site and offsite are well established and more than adequate to handle the flow without causing flooding on or offsite. The bio filters and grass lined swales will mitigate the increase flows.

TABLE

PRE CONSTRUCTION vs. POST CONSTRUCTION

DRAINAGE A-1

SOIL GROUP "B" 11.5 ACS.
C = 0.32
Q = CIA

PRE CONSTRUCTION

$Q_{100} = 0.32(5.5)(11.5)$
$Q_{100} = 20.2$ cfs

POST CONSTRUCTION

0.7 ACS IMPERVIOUS

$$C_R = \frac{0.7(.77)+10.8)(0.32)}{11.5}$$

$C_R = 0.347$
$Q_{100} = 0.347(5.5)(11.5)$
$Q_{100} = 21.9$ cfs

INCREASE FLOW
AREA A-1 = 1.7 cfs

DRAINAGE A-2

SOIL GROUP "B" 15 ACS.

PRE CONSTRUCTION
C = 0.32

$Q_{100} = 0.32(5.3)(15)$
$Q_{100} = 25.4$ cfs

POST CONSTRUCTION

0.2 ACS IMPERVIOUS

$$C_R = \frac{0.2(.77)+14.8)(0.32)}{15} = 0.326$$

$Q_{100} = 0.326(5.3)(15)$
$Q_{100} = 25.9$ cfs

INCREASE FLOW
AREA A-2 = 0.5 cfs

DRAINAGE A-3

SOIL GROUP "B" 22 ACS.

PRE CONSTRUCTION
$Q_{100} = 38$ cfs

POST CONSTRUCTION
$Q_{100} = 38$ cfs

NO PROPOSED DEVELOPMENT IN THIS AREA

HYDRAULIC CALCULATIONS
TPM 20842
THOMAS FITZPATRICK

THREE DRAINAGE AREAS, ALL LESS THAN 1 SQ. MILE.
USE RATIONAL METHOD

ALL DRAINAGE AREAS SOIL GROUP "B"

Q = CIA

A -1 = 11.5 ACS
SOIL GROUP "B" S=14.8%

WATERSHED L = 1650
WATERSHED H = 245

C = 0.32
Q_{10} = 0.32(3.9)(11.5)
Q_{10} = 14.3 cfs

Tc = 5 + 6.4
Tc = 11.4
I_{10} = 3.9

Q_{100} = 0.32(5.5)(11.5)
Q_{100} = 20.2 cfs

I_{100} = 5.5
$S_{channel}$ = 12%

CAPACTIY CHANNEL EXCEED 20.2 cfs .. OK

A -2 = 15 ACS
S=12.2%

WATERSHED L = 1800
WATERSHED H = 220

Tc = 5.5 + 6.4
Q_{10} = 0.32(3.7)(15)
Q_{10} = 17.8 cfs

Tc = 11.9
I_{10} = 3.7

Q_{100} = 0.32(5.3)(15)
Q_{100} = 25.4 cfs

I_{100} = 5.3
$S_{channel}$ = 12%

CAPACITY CHANNEL EXCEED 25.4 cfs .. OK

A -3 = 22 ACS
S=13%

WATERSHED L = 1700
WATERSHED H = 222

Tc = 5.25 + 6.4
Q_{10} = 0.32(3.8)(22)
Q_{10} = 26.8 cfs

Tc = 11.65
I_{10} = 3.8

Q_{100} = 0.32(5.4)(22)
Q_{100} = 38 cfs

I_{100} = 5.4
$S_{channel}$ = 7%

CAPACITY CHANNEL EXCEED 38 cfs .. OK

DRAINAGE A-2 & 3 37 ACS.

WATERSHED L = 1800
WATERSHED H = 220

ALONG WEST BOUNDARY
SOIL GROUP "B" C = 0.32

$Q_{10} = 0.32(3.7)(37)$
$Q_{10} = 43.8$ cfs

$Q_{100} = 0.32(5.3)(37)$
$Q_{100} = 62.8$ cfs

Tc = 5.5 + 6.4
Tc = 11.9
$I_{10} = 3.7$

$I_{100} = 5.3$
$S_{channel} = 7.5\%$

CHANNEL WIDTH 20 FT ±
CAPACITY CHANNEL EXCEED 62.8 cfs .. OK

DRAINAGE A-1, 2 & 3 48.5 ACS.
NORTHWEST CORER

WATERSHED L = 2300
WATERSHED H = 256
S = 11%

SOIL GROUP "B" C = 0.32

$Q_{10} = 0.32(3.5)(48.5)$
$Q_{10} = 54.3$ cfs

$Q_{100} = 0.32(5.1)(48.5)$
$Q_{100} = 79.2$ cfs

Tc = 6.5 + 6.4
Tc = 12.9
$I_{10} = 3.5$

$I_{100} = 5.1$
$S_{channel} = 7\%$

S ½ = 0.265

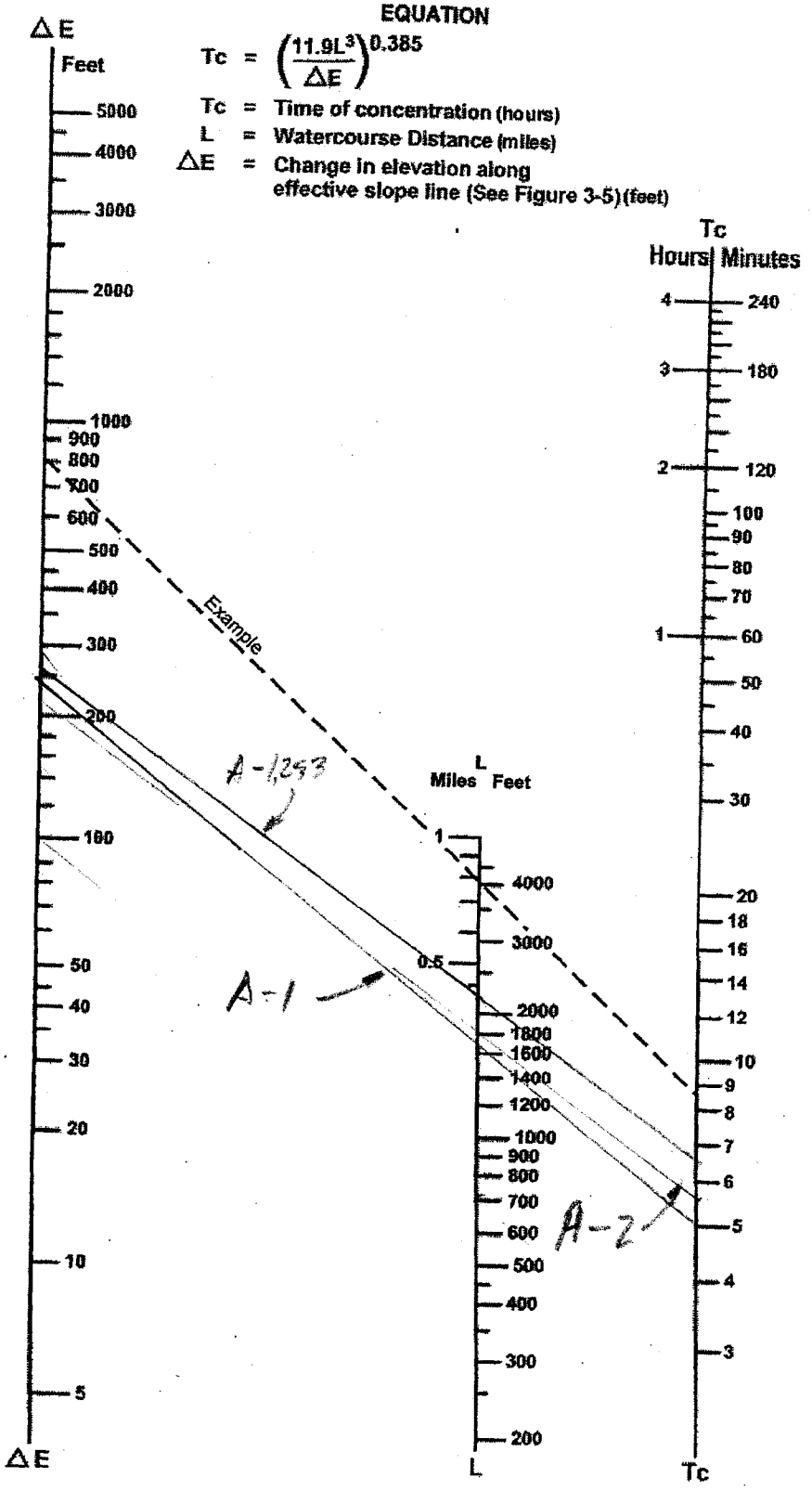
WIDTH 20' DEPTH = 2'

a = ½ bh = 20 SF
wp = 20
r = 1 r 2/3 = 1

$$Q = \frac{1.486}{n} \text{ a r 2/3 S ½}$$

$$Q = \frac{1.486}{0.075}(20)(1)(0.2365) = 105 \text{ cfs EXCEED } 79.2 \text{ cfs .. OK}$$

PREPARED BY:
Hadley Johnson 12/17/07
HADLEY JOHNSON
RCE 14870
11/24/2004



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

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)

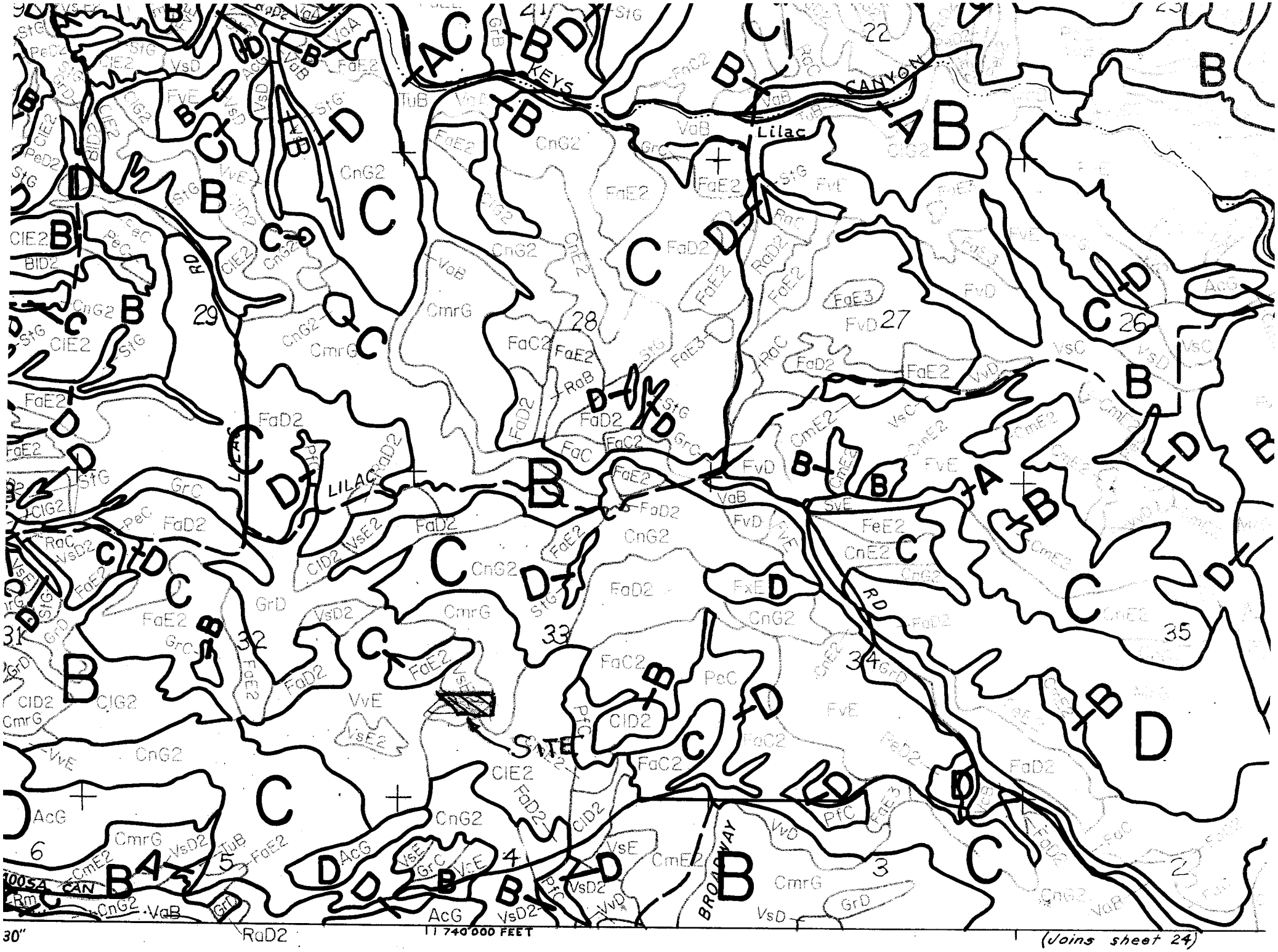
Element*	DU/	.5%		1%		2%		3%		5%		10%	
	Acre	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	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

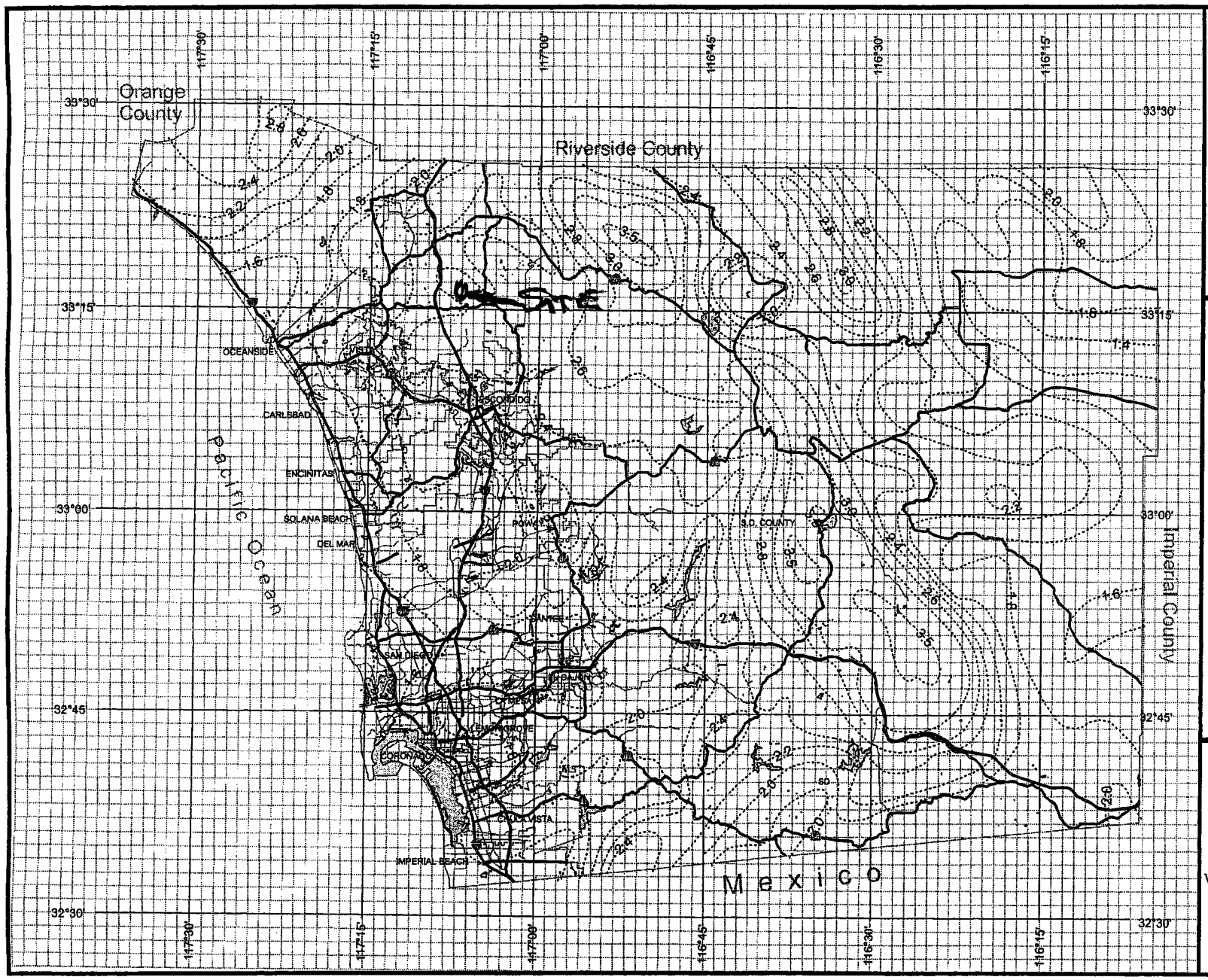
*See Table 3-1 for more detailed description

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


KEYS
CANYON
Lilac
LILAC
RD
SITE
BROADWAY
740 000 FEET
(Joins sheet 24)



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
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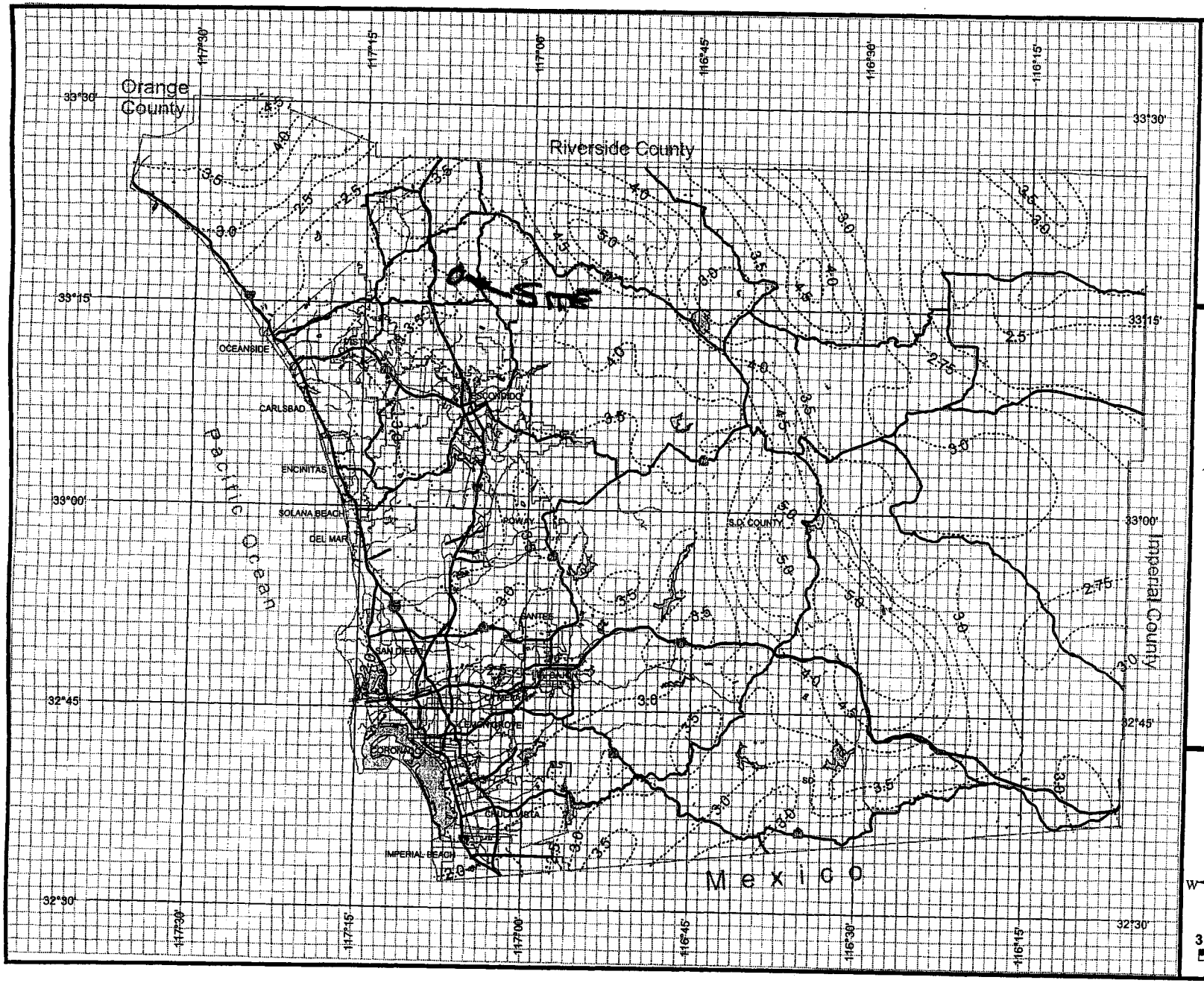

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
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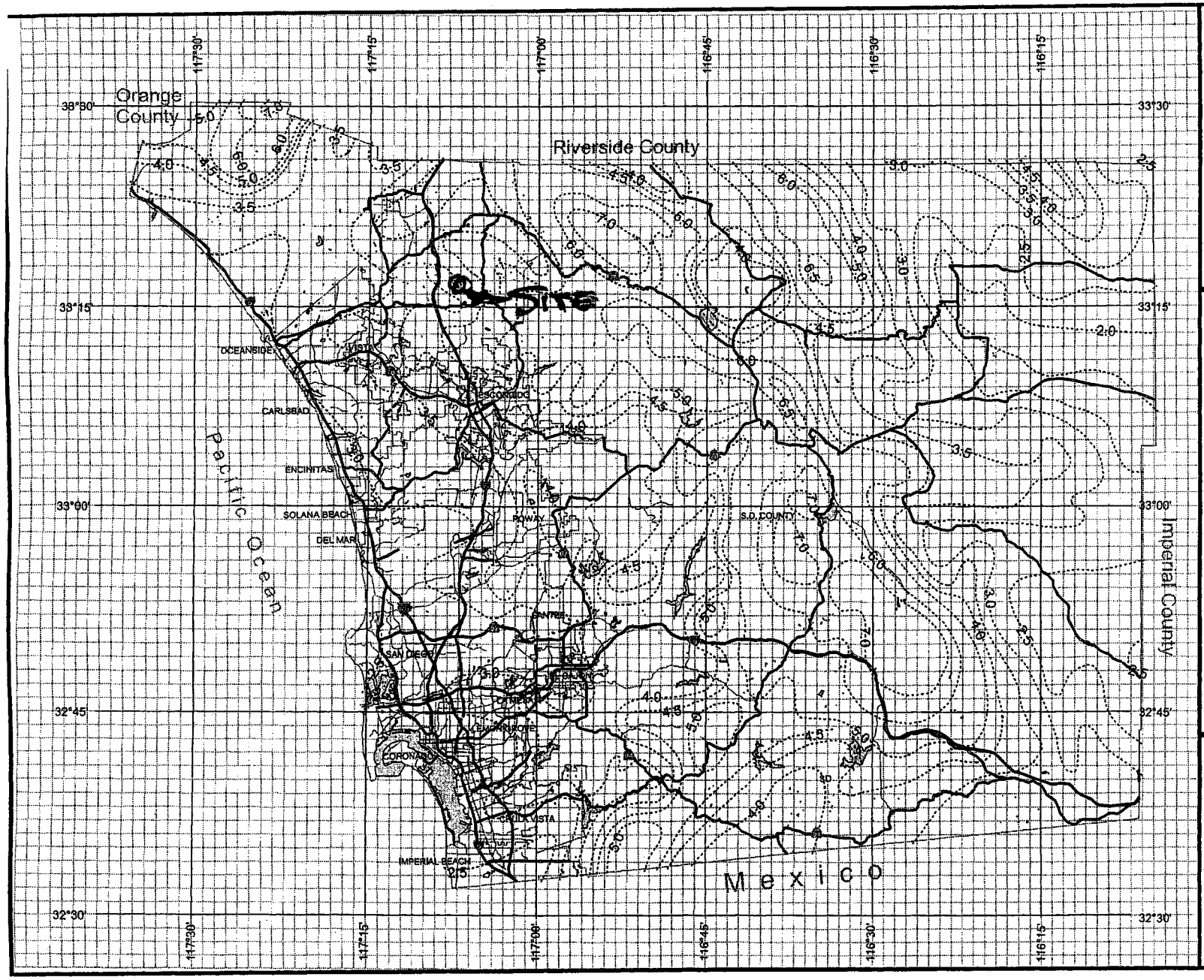

County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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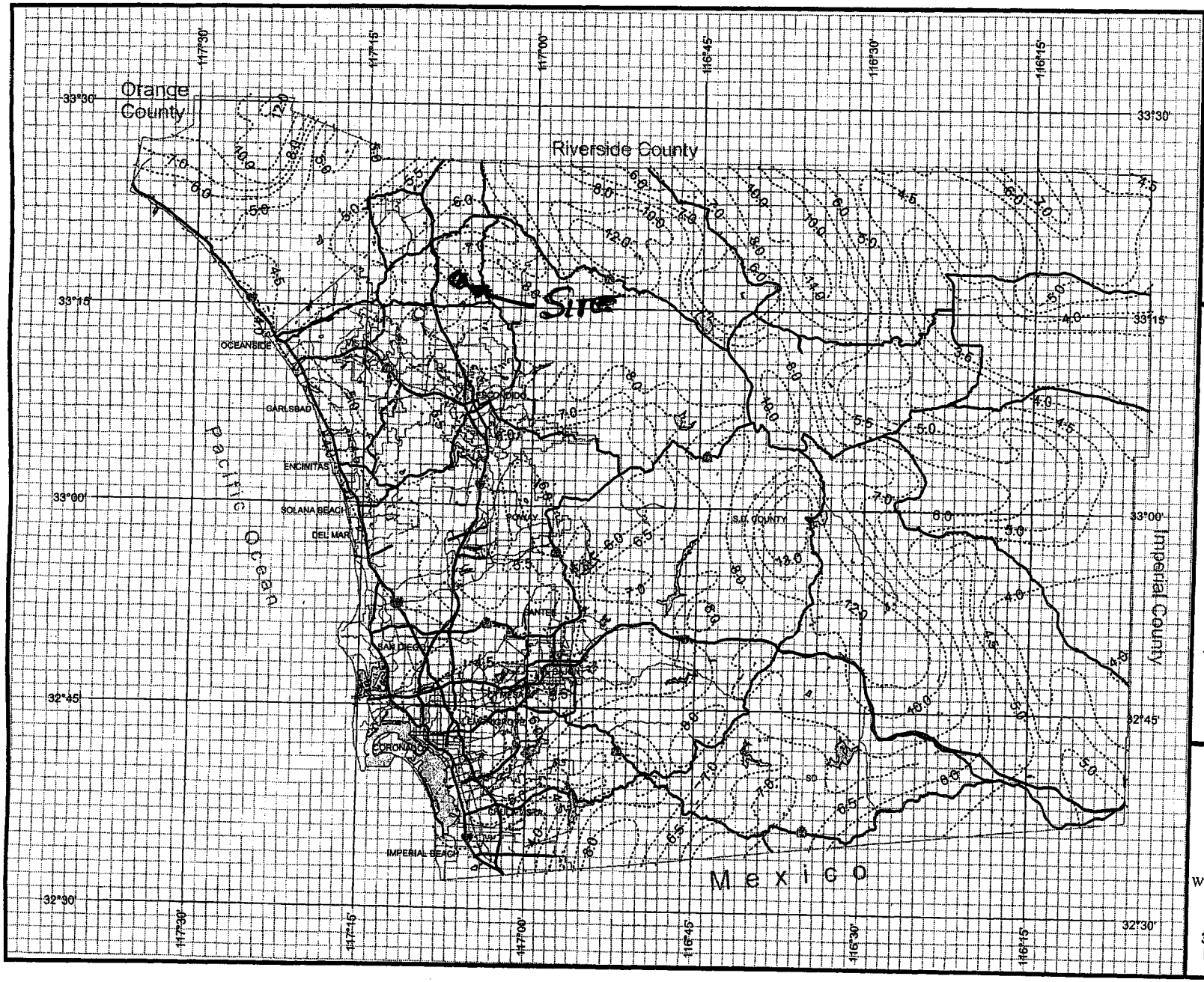

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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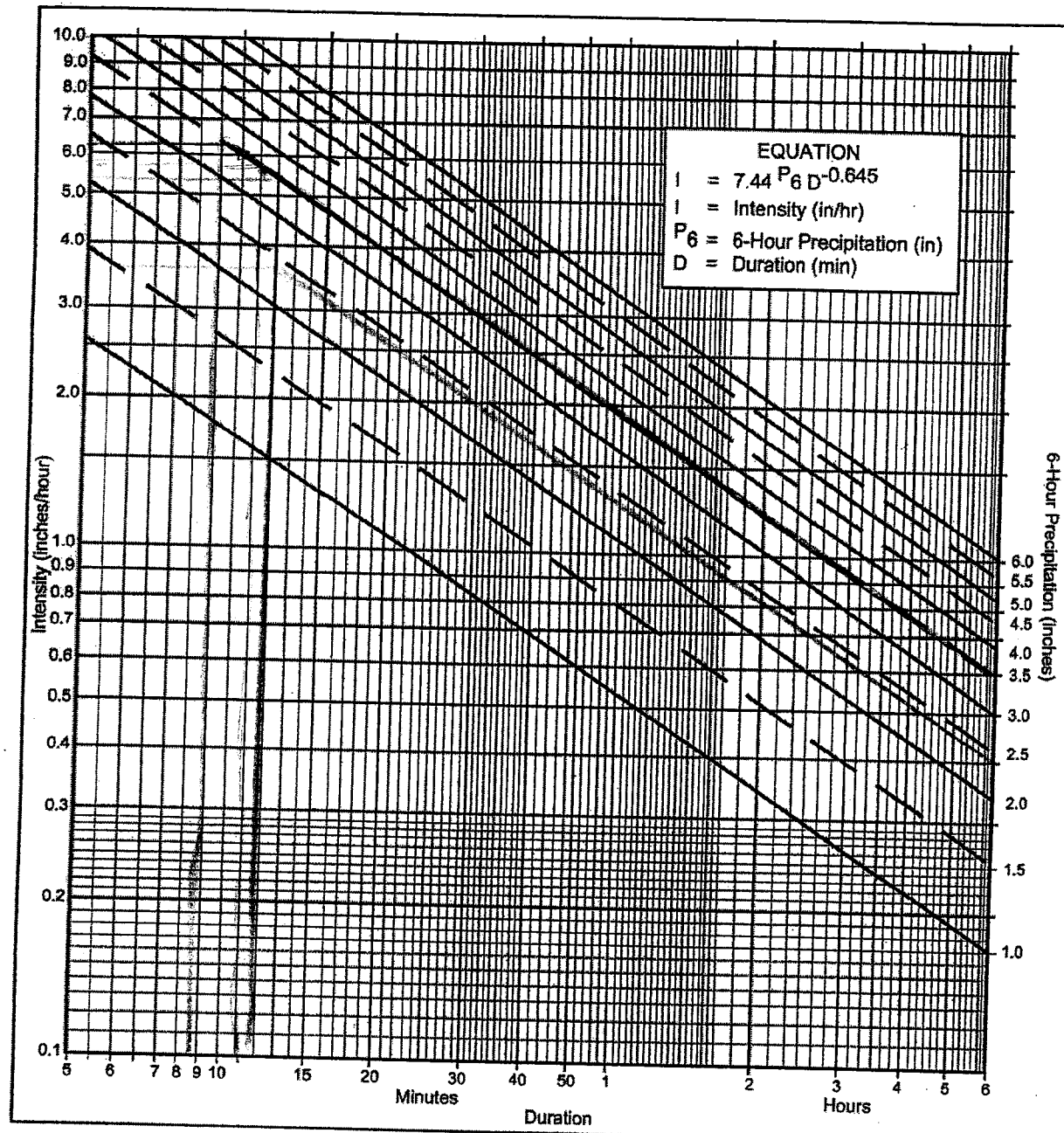


Directions for Application:

(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 10/100 year

(b) P_6 = 2.4/3.5 in., P_{24} = 4.0/6.0, $\frac{P_6}{P_{24}}$ = 60/58 %(2)

(c) Adjusted P_6(2) = 2.4/3.2 in.

(d) t_x = 11 min.

(e) I = _____ in./hr.

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

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	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	0.66	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

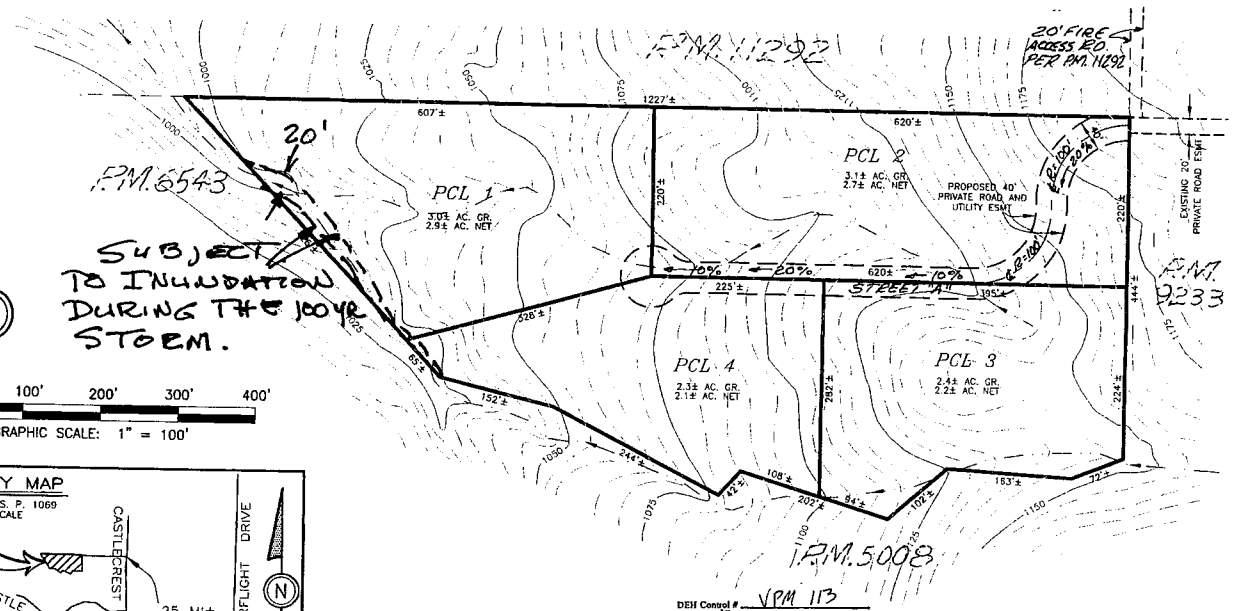
Intensity-Duration Design Chart - Template

FIGURE

3-1

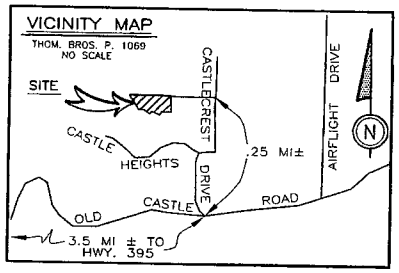
H.D.P.M. NO.

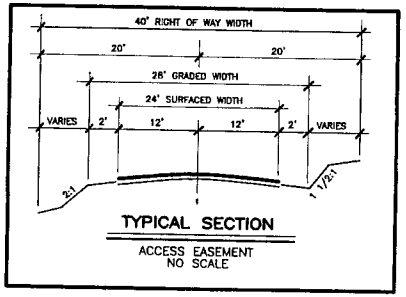
TENTATIVE PARCEL MAP



0' 100' 200' 300' 400'

GRAPHIC SCALE: 1" = 100'





TYPICAL SECTION

ACCESS EASEMENT
NO SCALE

NOTES

1) NO GRADING PROPOSED
2) CONTOURS FROM COUNTY TOPO 398-1737

SOLAR NOTE

ALL PARCELS WITHIN THIS SUBDIVISION HAVE A MINIMUM OF ONE HUNDRED (100) SQUARE FEET OF SOLAR ACCESS FOR EACH FUTURE DWELLING UNIT ALLOWED BY THIS SUBDIVISION AS REQUIRED BY SECTION 81.401(n) OF THE SUBDIVISION ORDINANCE.

DEH Control # VPM 113
Parcels K shall have a layout of the sewage disposal system approved by the S.D. Dept. of Environmental Health prior to the approval of a Bldg. Permit and/or issuance of a Septic Tank Permit. Cuts and fills for driveways and building sites shall be made prior to approval of the layouts. An Additional expansion area of 100% of the initial tile line area shall be provided for potential expansion in the event of failure, by gravity flow.

EACH PARCEL, IS APPROVED FOR A STANDARD SEPTIC TANK CONNECTED TO K FEET OF TILE DRAIN FIELD TO SERVE A THREE-BEDROOM DWELLING: PROVIDED THE ORIGINAL SOIL IS NOT DISTURBED IN ANY WAY, SUCH AS CUTTING, FILLING OR RIPPING. THIS DOES NOT CONSTITUTE APPROVAL FOR COMMERCIAL ESTABLISHMENTS.

K DATA AND RECOMMENDATION IN THE NAME OF Thomas Fitzpatrick
BY Hadley Johnson

PARCEL NUMBER	LEACH LINE FOOTAGE	TRENCH DEPTH FOOTAGE	ROCK UNDER PIPE FOOTAGE	
1	430	5	3	
2	350	3	1	
3	370	3	1	
4	430	5	3	

GARY ERBECK, DIRECTOR, DEPARTMENT OF ENVIRONMENTAL HEALTH
BY Eric Allen DATE 11/1/04

This certification does not imply all conditions pursuant to the Resource Protection Ordinance and the Groundwater Ordinance have been met. The Department of Planning and Land Use should be consulted regarding the application of these ordinances relative to this project. Any resultant changes to the septic system design(s) must be re-evaluated by the Department of Environmental Health.

LAND DIVISION STATEMENT – OWNER'S CERTIFICATE

I HEREBY CERTIFY THAT I AM THE RECORD OWNER, AS SHOWN ON THE LATEST EQUALIZED COUNTY ASSESSMENT OF THE PROPERTY SHOWN ON THE TENTATIVE PARCEL MAP ALL OF MY CONTIGUOUS OWNERSHIP WITHIN AND BEYOND THE BOUNDARIES OF THE TENTATIVE PARCEL MAP IS SHOWN. THE BASIS OF CREATION OF THE LOTS IN MY OWNERSHIP (E.G. PARCEL MAP, FINAL MAP, CERTIFICATE OF COMPLIANCE, RECORDED DEED BEFORE 2/1/72) AS INDICATED ON THE TENTATIVE. I UNDERSTAND THAT PROPERTY IS CONSIDERED CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREETS, UTILITY EASEMENTS OR RAILROAD RIGHTS-OF-WAY. "FREEWAY" AS DEFINED IN SECTION 23.5 OF THE STREETS AND HIGHWAY CODES, SHALL NOT BE CONSIDERED AS ROADS OR STREETS.

I FURTHER CERTIFY THAT I WILL NOT, BY THIS APPLICATION, CREATE OR CAUSE TO BE CREATED, OR WILL NOT HAVE PARTICIPATED IN THE CREATION OF MORE THAN FOUR PARCELS ON CONTIGUOUS PROPERTY UNLESS SUCH PARCELS WERE CREATED BY MAJOR SUBDIVISION. FOR PURPOSES OF THIS CERTIFICATION, THE TERM "PARTICIPATED" MEANS HAVING COOPERATED WITH OR ACTED IN A PLANNING, COORDINATE OR DECISION-MAKING CAPACITY IN ANY FORMAL OR INFORMAL ASSOCIATION OR PARTNERSHIP FOR THE PURPOSE OF DIVIDING REAL PROPERTY.

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT. EXECUTED THIS 23 DAY OF JULY, 2004, AT FALLBROOK, CALIFORNIA.

(ALL OWNERS MUST SIGN)

FITZPATRICK FAMILY TRUST 01-06-00

Thomas K. Fitzpatrick, Trustee — THOMAS K. FITZPATRICK TRUSTEE
Sylvia F. Fitzpatrick Trustee — SYLVIA F. FITZPATRICK TRUSTEE

ADDRESS: 4111 PASEO DE LAS TORTUGAS
TORRANCE, CA 90505

PHONE: (310) 378-5511

1. COMPLETE TAX ASSESSOR'S NUMBER: 129-291-05
2. ABBREVIATED LEGAL DESCRIPTION: PARCEL 2 OF PM 5008
3. GENERAL PLAN REGIONAL CATEGORY: E.D.A.
4. COMMUNITY/SUBREGIONAL PLAN AREA: VALLEY CENTER
5. LAND USE DESIGNATION(S): (17) ESTATES
6. EXISTING ZONING: A-70 2 AC.
7. TAX RATE AREA: 94023

USE REGULATIONS	A-70
ANIMAL REGS	L
DENSITY	.5
LOT SIZE	2 AC.
BUILDING TYPE	C
MAX FIR AREA	--
FIR AREA RATIO	--
HEIGHT	G
COVERAGE	--
SETBACK	C
OPEN SPACE	--
SPECIAL AREA REGS	--

8. ASSOCIATED PERMITS: N/A
9. LOCATION AND STATUS OF EXISTING LEGAL ACCESS TO SUBJECT PROPERTY FROM A PUBLICLY MAINTAINED ROAD, (i.e. RECORDED EASEMENT, UNRECORDED IDENTIFY AND SPECIFY WIDTH): PROPOSED 40' PRIVATE ROAD & UTILITY ESMT. & EXISTING 20' PRIVATE ROAD & UTILITY ESMT. CREATED PRIOR TO FEB. 1972 AND 40' & 60' PRIVATE ROAD AND UTILITY ESMT.(CASTLECREST DR.) TO OLD CASTLE ROAD A PUBLIC ROAD
10. WATER SOURCE/ WATER DISTRICT: VALLEY CENTER MUNICIPAL WATER DISTRICT
11. SEPTIC/ SEWER DISTRICT: SEPTIC – SUBSURFACE DISPOSAL
12. FIRE DISTRICT: VALLEY CENTER FIRE DISTRICT
13. SCHOOL DISTRICT: VALLEY CENTER ELEMENTARY AND VALLEY CENTER HIGH SCHOOL

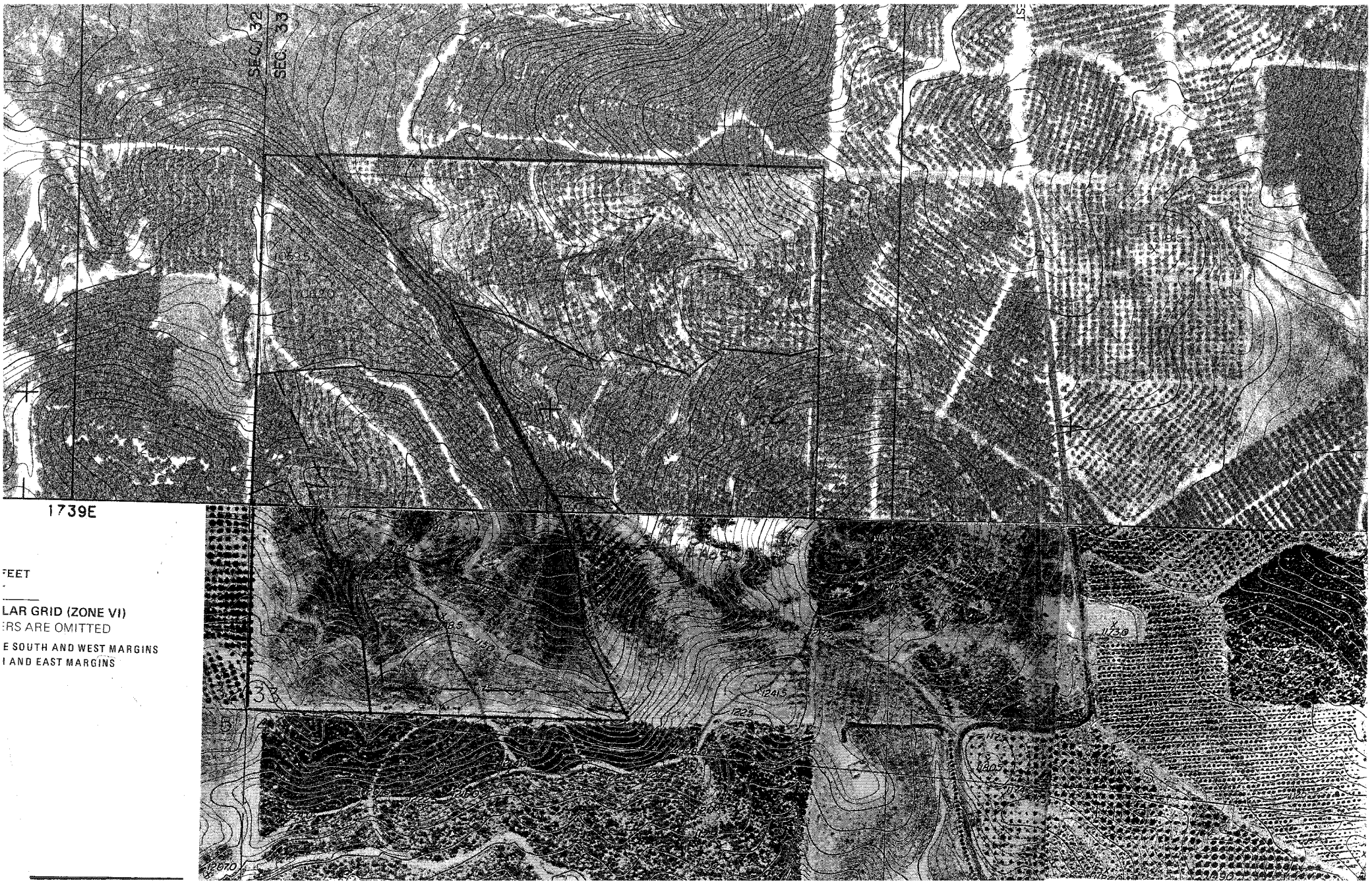
SIGNATURE OF APPLICANT

NAME: SAME AS ABOVE
ADDRESS:
PHONE:

6/23/04
HADLEY JOHNSON RCE 14870

PREPARED BY:
WM. KARN SURVEYING INC.
129 WEST FIG ST.
FALLBROOK, CA 92028
760-728-1134
LS 2961/RCE 14870

I:\8288\JAS_TPM



FEET

LAR GRID (ZONE VI)
RS ARE OMITTED
E SOUTH AND WEST MARGINS
I AND EAST MARGINS