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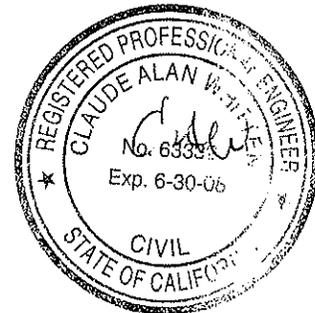
Preliminary Flood Study for Tract Map 6731

County of Kern
APN #: 510-010-06 & 07

March 29, 2007

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PURPOSE

Tentative Tract Map 6731 is a proposed residential subdivision of approximately 40.6 acres into 125 lots located to the south of Springer Avenue, between Norma Street and South Sierra View Street near Ridgecrest, California, in an unincorporated area of Kern County. The purpose of this study is to evaluate the proposed tentative tract design with respect to flood zone considerations.

DESCRIPTION OF EXISTING WATERSHED

The existing watershed that drains across the site consists of approximately 3285 acres of desert brush land and mountains. The flow in the area generally comes of the mountains to the south of the site, and drains from south to north across the site. The areas upstream of the site are generally undeveloped, and do not have flood control measures.

The site is located on FEMA Community Panel Number 0600750595B. The flood zone designation for the site is currently 'C' with one finger of flood zone 'A'.

METHODOLOGY

The preliminary flood analysis was performed using Flo-2d. This program is a FEMA approved program for delineating flood zones. The project site and its associated drainage area were modeled in a 100 foot grid. The topographic data used in the model was Type 2 DTM data obtained from Intermap, Inc. The Type 2 data consisted of data points taken on 5 meter intervals, with a vertical accuracy of one meter.

For the purposes of determining the effect of the development of the flood plain, two separate Flo-2d models were created. The first model was a pre-development model, and was used to determine the base flood elevations in the area prior to the site being developed. The second model included the proposed tentative tract map, and simulates the obstruction in the flood plain created by proposed map. A third 'Delta' project was also created strictly for displaying the difference in the water depths in the flood plain, and was not created in Flo-2d.

The flood plain modeled in Flo-2d is made up primarily of undeveloped desert scrub land. The topography of the area suggests that the site lies in an alluvial fan that drains from the mountains located to the south of the project site. Given these facts, the following assumptions were made in the Flo-2d model; the 'n' value for all cells was set at 0.070, based on table 2 on page 29 of the Flo-2d manual. A bulking factor of 0.2 was used to account for any sediment that might be carried with the flood flows, and the Froude number for the model was limited to 0.9.

The Flo-2d Variable WAVEMAX is used to control the numerical stability of the flood flow models. If this variable is set too high, the flows simulated in the flood flow model will produce waves, and will artificially increase the water depths in the model. In order to reduce the effects of waves in the model, the final value for WAVEMAX was set to .25 for the final production runs of the Flo-2d models.

For the purposes of developing the Flo-2d model it was assumed that all street were 36 feet wide, and had an 'n' value of .04. A curb height of .5 feet was used for all streets.

The on-site streets were modeled according to the street cross sections shown on the tract map, except for the southern border street where it was modeled as a fully developed street. That southern street needs to be fully developed in order to minimize backwater effects.

An aerial photograph from the County of Kern GIS site was used to determine the location of all the houses in the drainage area. The houses were modeled as grid obstructions in the Flo-2d model.

The drainage area was divided up into 30 sub areas, and 100 year hydrographs were developed for each sub-area using the Kern County hydrograph module of the Civil Design software suite. The hydrograph lag times were calculated from rational method analysis of each sub-area. Due to the fact that there is no hydrological soil information available for the site or the drainage area, it was assumed that all soil types were 'D', and an SCS curve number of 82 were used in all hydrographs. The resulting hydrographs are on the attached CD Rom in the '203 hydrology' directory.

All rainfall data used in the development of the unit hydrographs was taken from the NOAA Atlas Volume 14, and the rain fall data in the 1992 version of the Kern County Hydrology manual was not used.

The unit hydrographs for each sub-area were placed into the Flo-2d model at the centroid of each respective sub-area.

All input files and results files from the Flo-2d model can be found on the CD rom attached to this report.

FLOOD ANALYSIS

The predevelopment flow across the site is consistent with an alluvial fan. The predevelopment depths of flow across the site vary from 0.1 to 1.11 feet deep with velocities between 0.24 to 2.55 feet per second.

In post development conditions, lots were completely blocked out of the model. A backwater effect with a maximum depth less than 1.0 feet was observed along the south, west, and east boundaries of the project. The highest increase in water surface elevation observed was at grid element 12,497 at 0.86 feet.

SUMMARY

The predevelopment flow across the site is consistent with an alluvial fan area. The depths of flow across the site vary from 0.1 to 1.11 feet deep with velocities between 0.24 to 2.55 feet per second. The proposed development does not create a back water effect onto neighboring properties deeper than approximately 0.86 feet taking into consideration that the southern border street needs to be fully developed in order to minimize the backwater effects. A final flood analysis shall be done when a grading plan is developed for the project in order to verify compliance with County Flood Regulations.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP

KERN COUNTY, CALIFORNIA (UNINCORPORATED AREAS)

PANEL 595 OF 2075
(SEE MAP INDEX FOR PANELS NOT PRINTED)

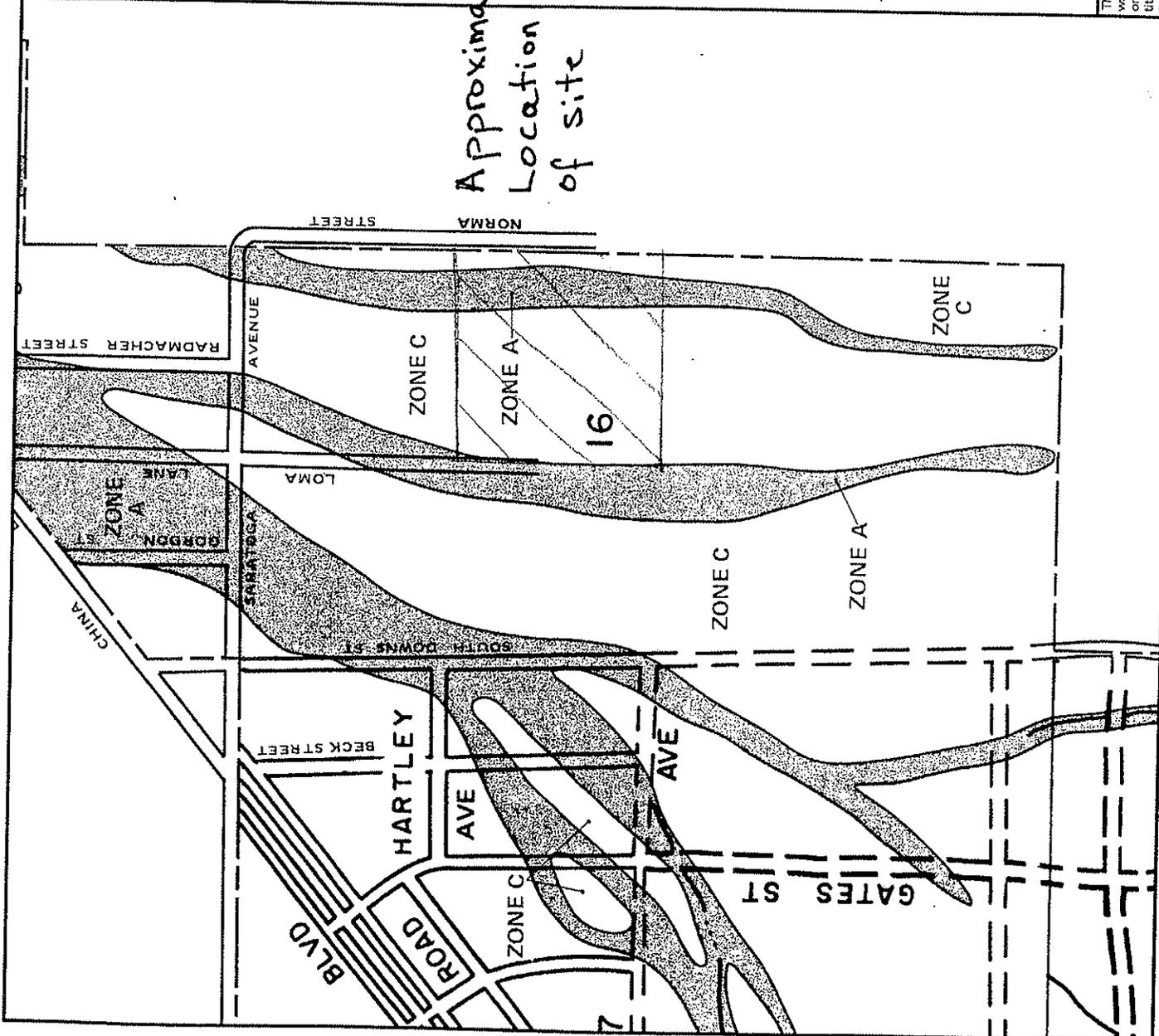
COMMUNITY-PANEL NUMBER 060075 0595 B

EFFECTIVE DATE: SEPTEMBER 29, 1986

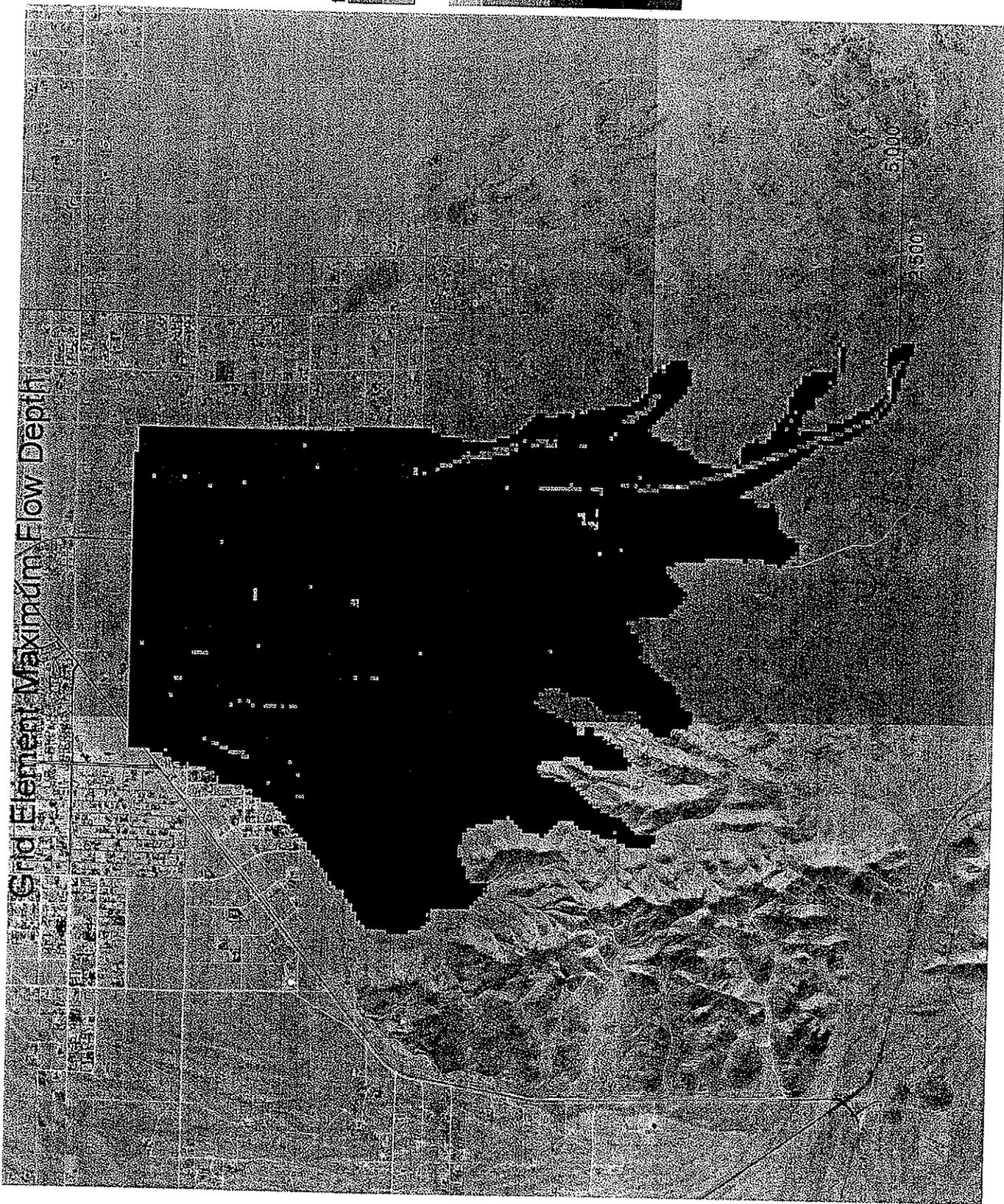


Federal Emergency Management Agency

Approximate Location of site



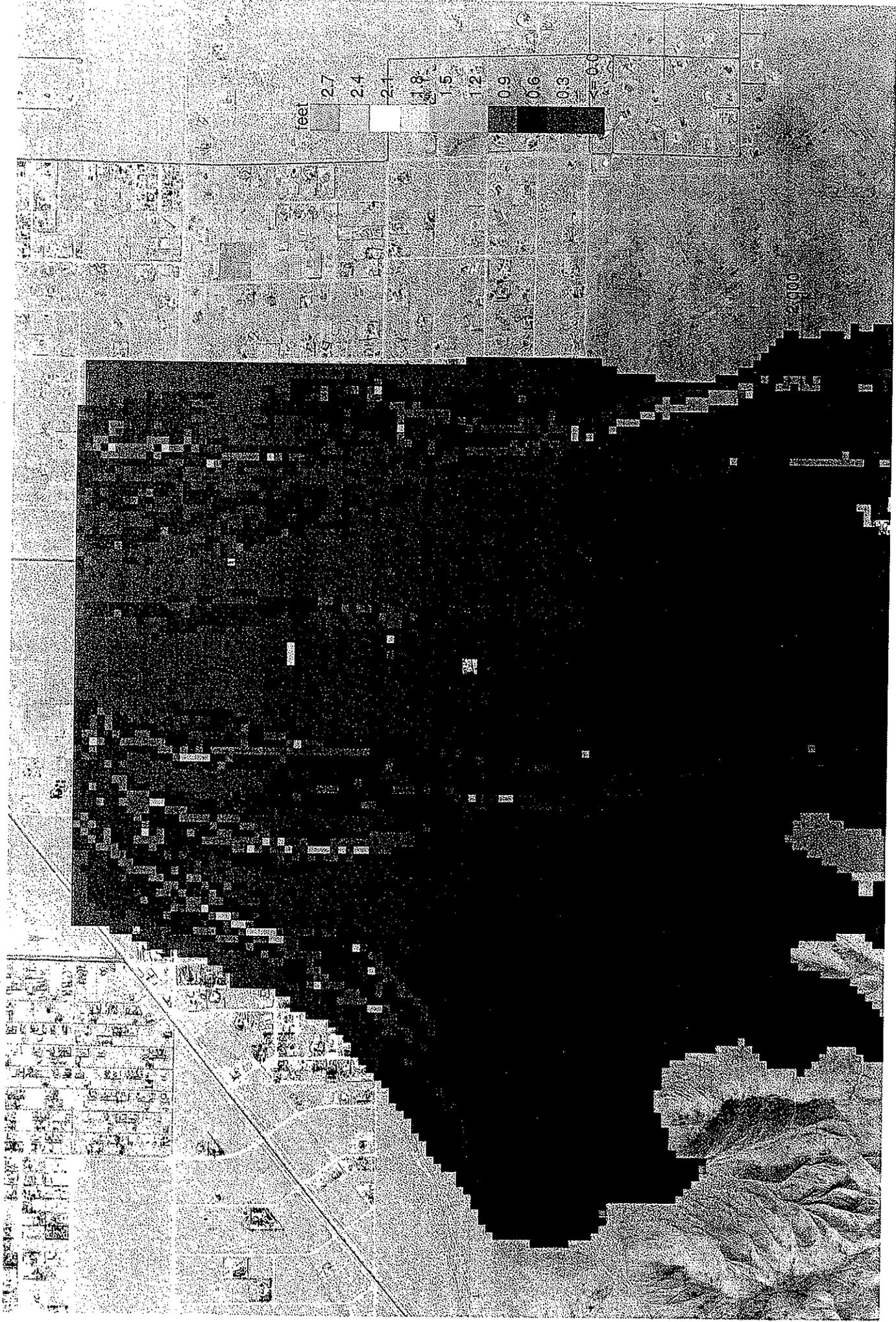
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAX. FLOW DEPTH

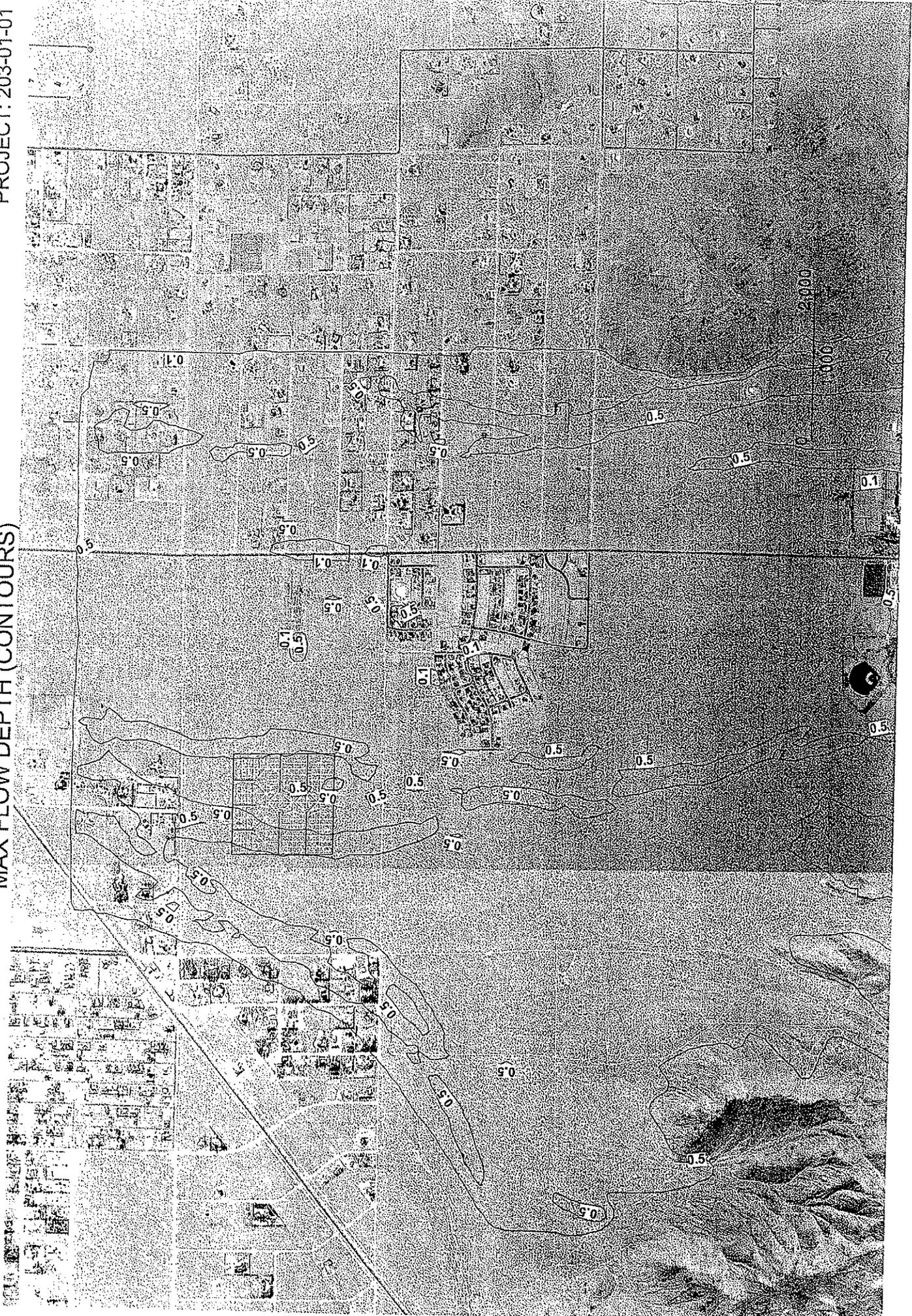
PROJECT: 203-01-01

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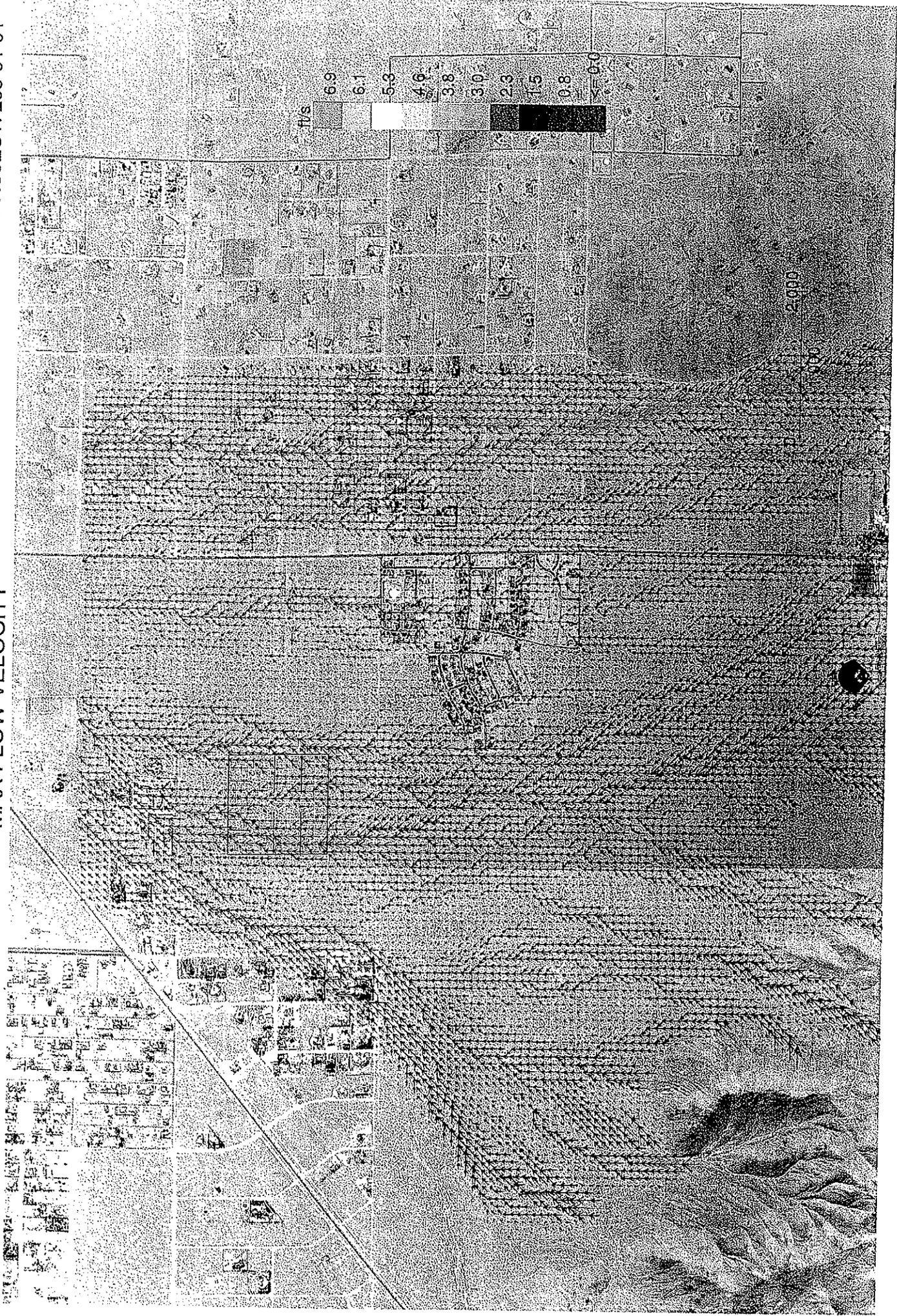


PRE DEVELOPMENT

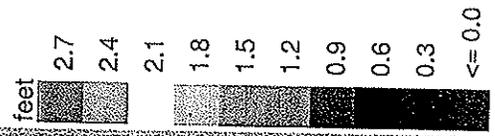
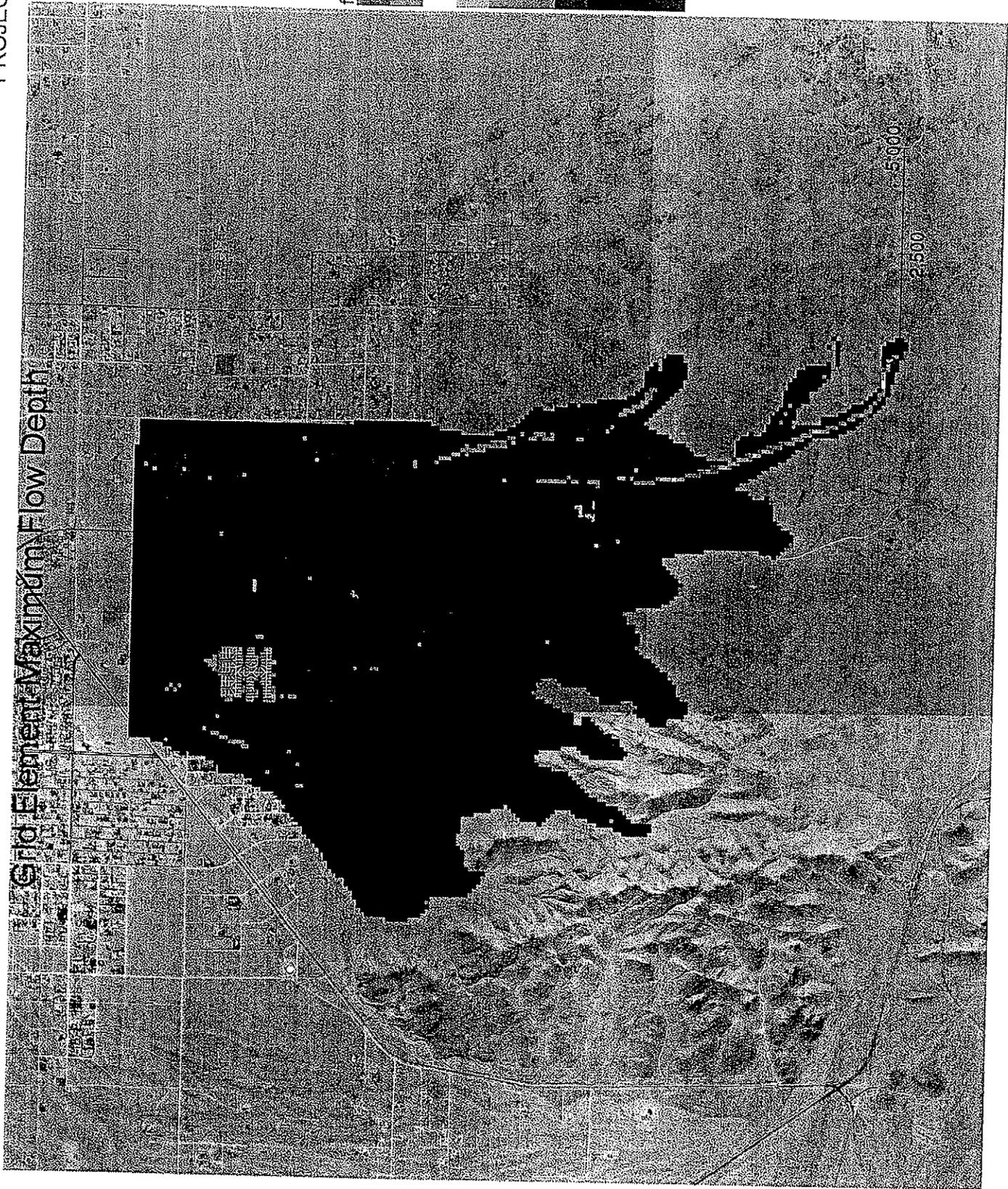
MAX FLOW DEPTH (CONTOURS)



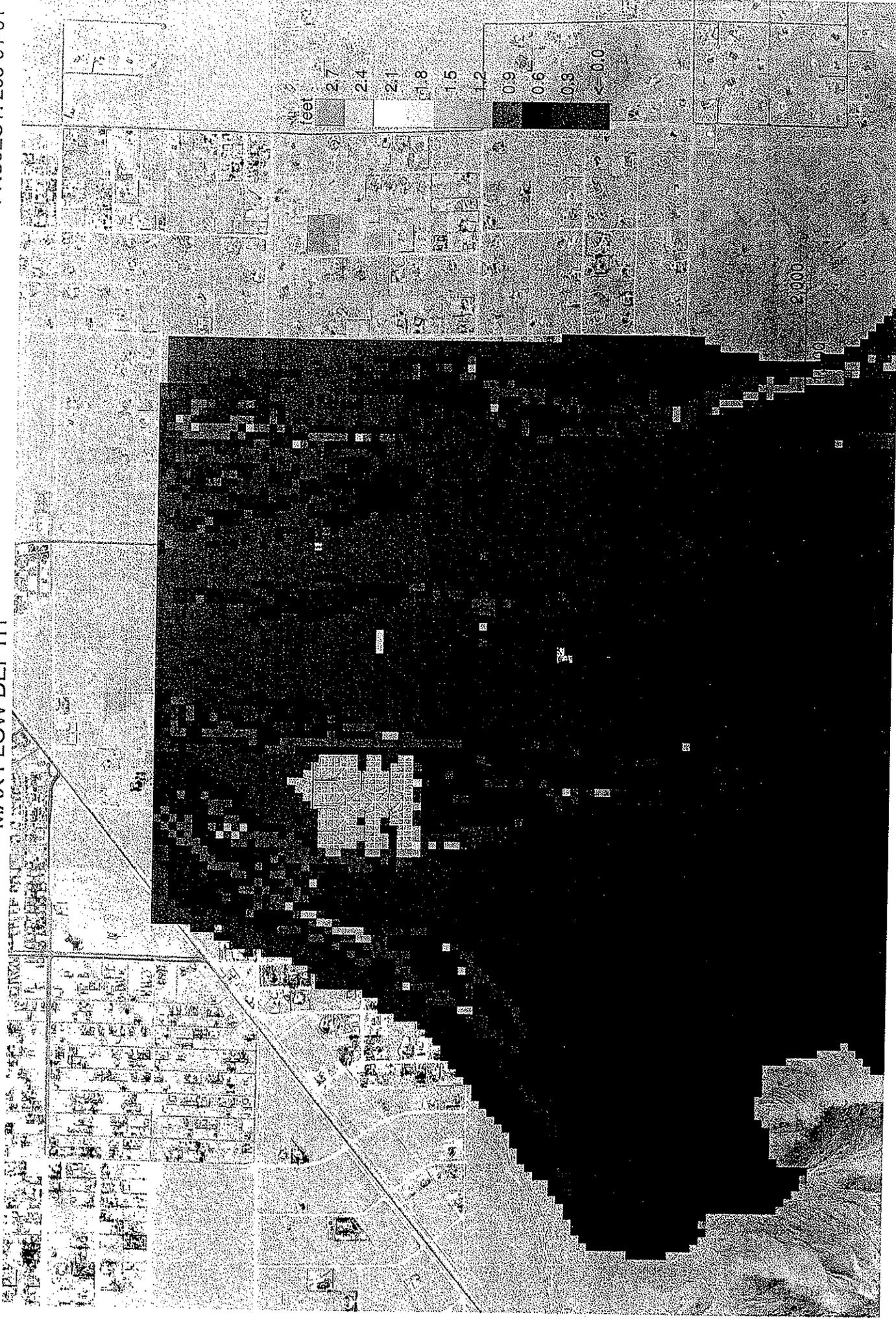
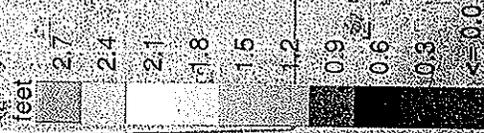
MAX FLOW VELOCITY



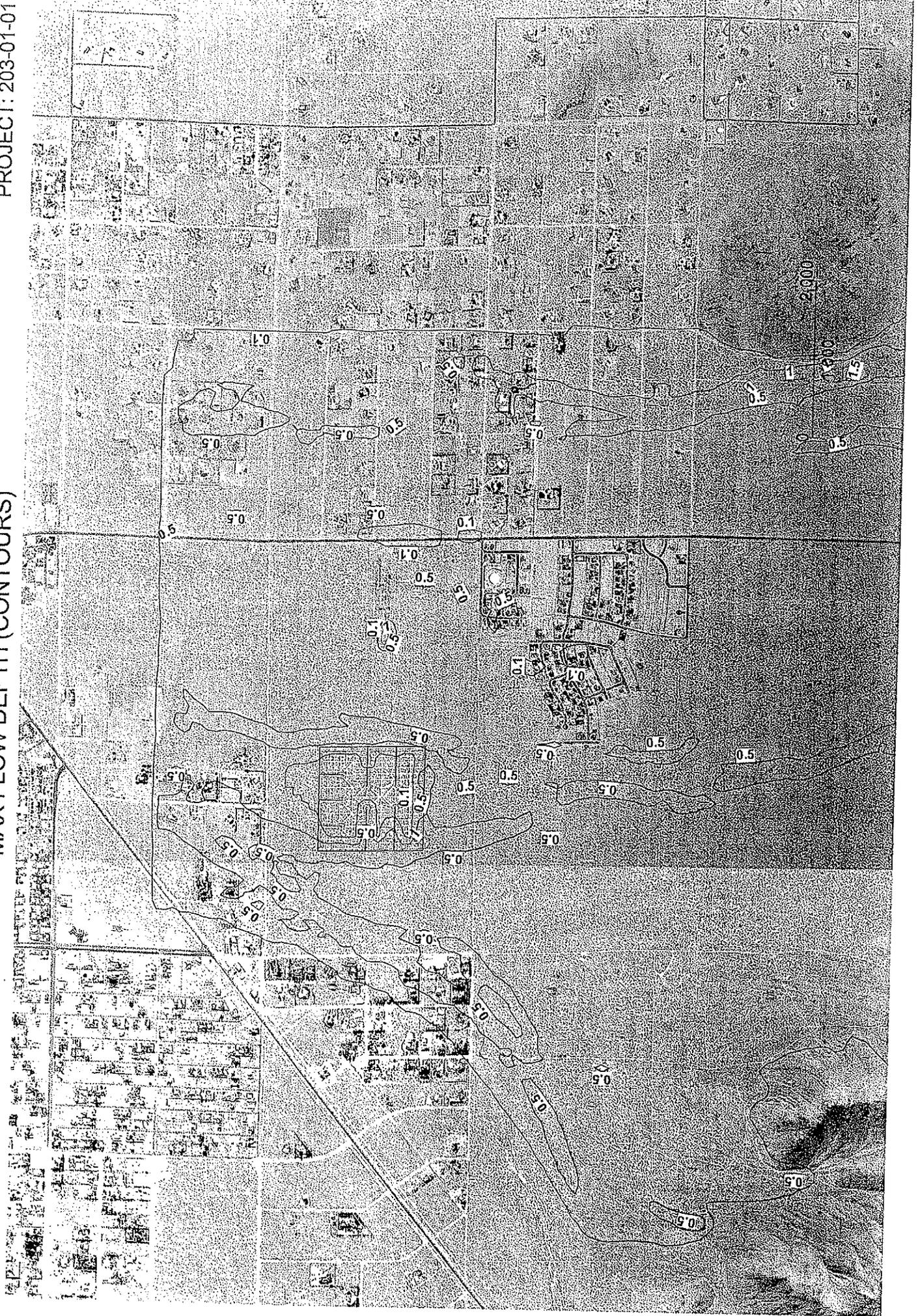
Grid Element Maximum Flow Depth



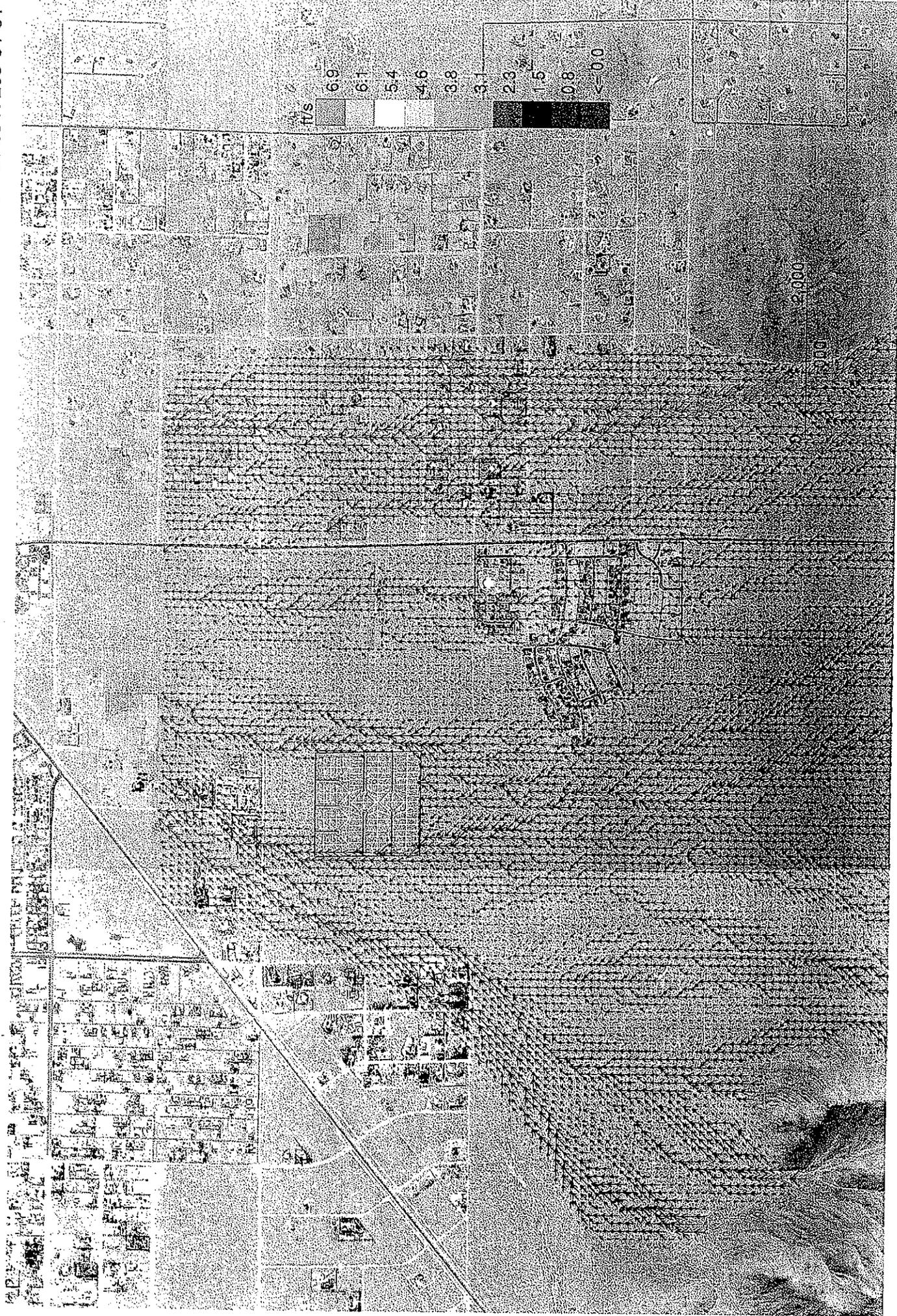
MAX FLOW DEPTH



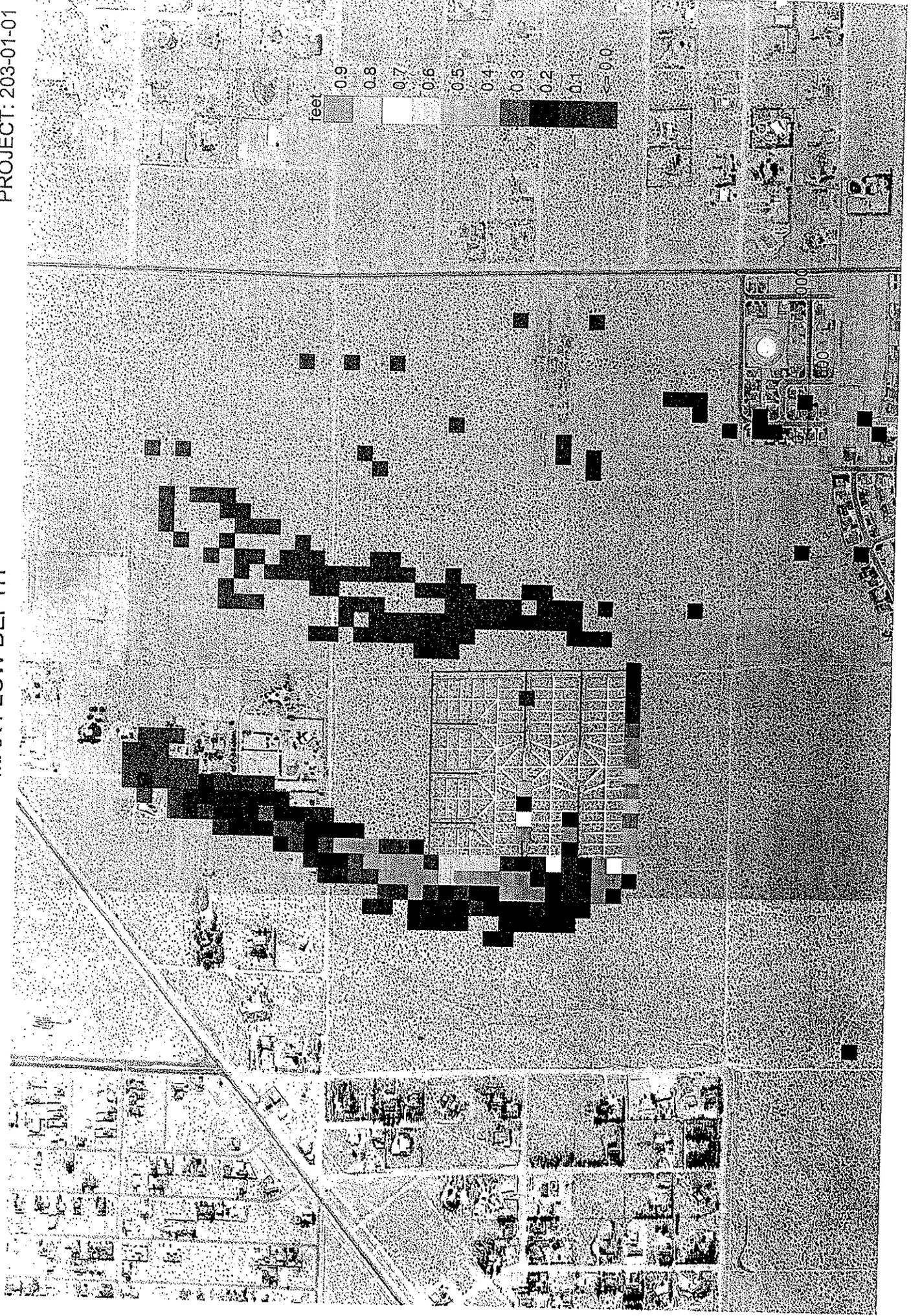
MAX FLOW DEPT (CONTOURS)



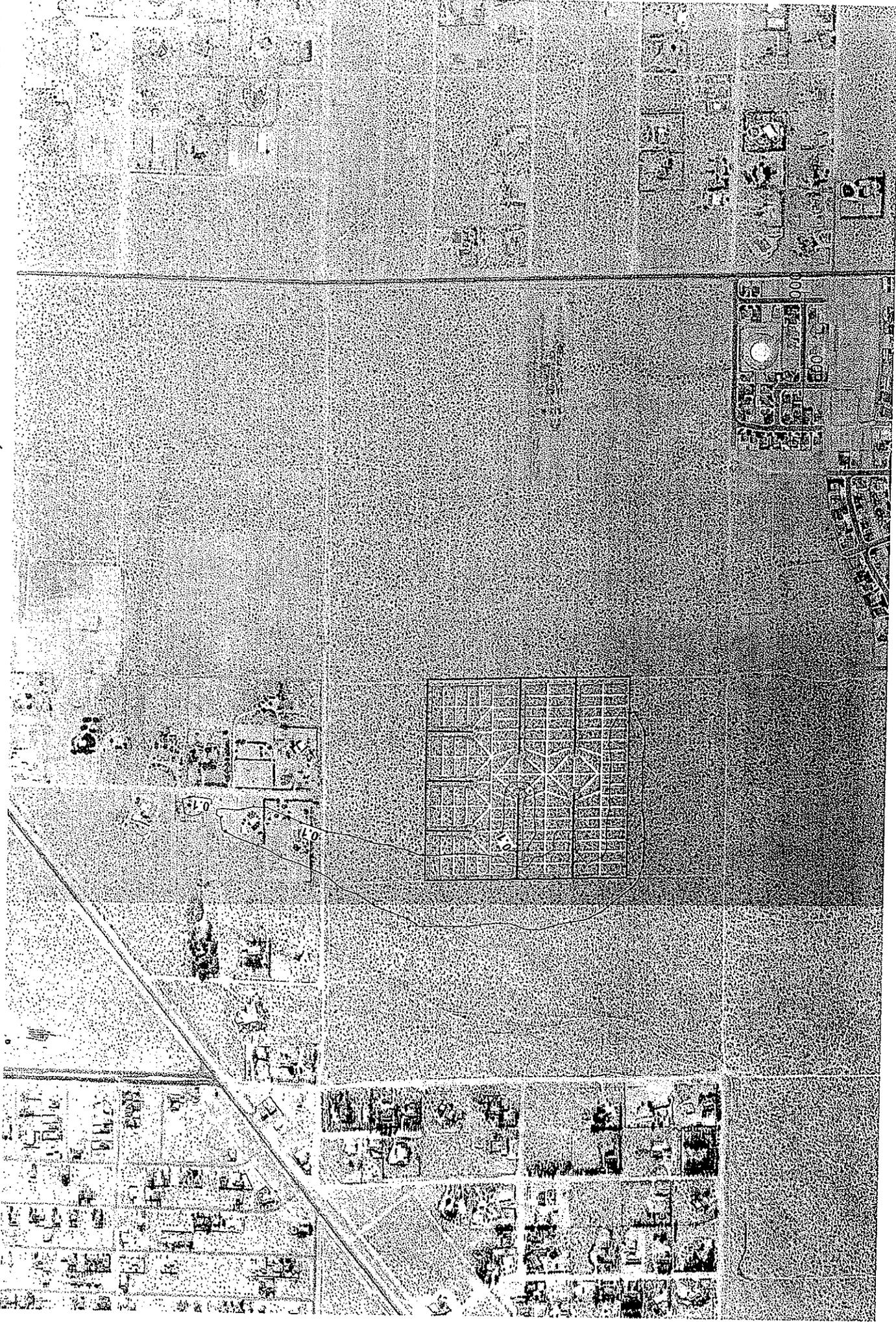
MAX FLOW VELOCITY



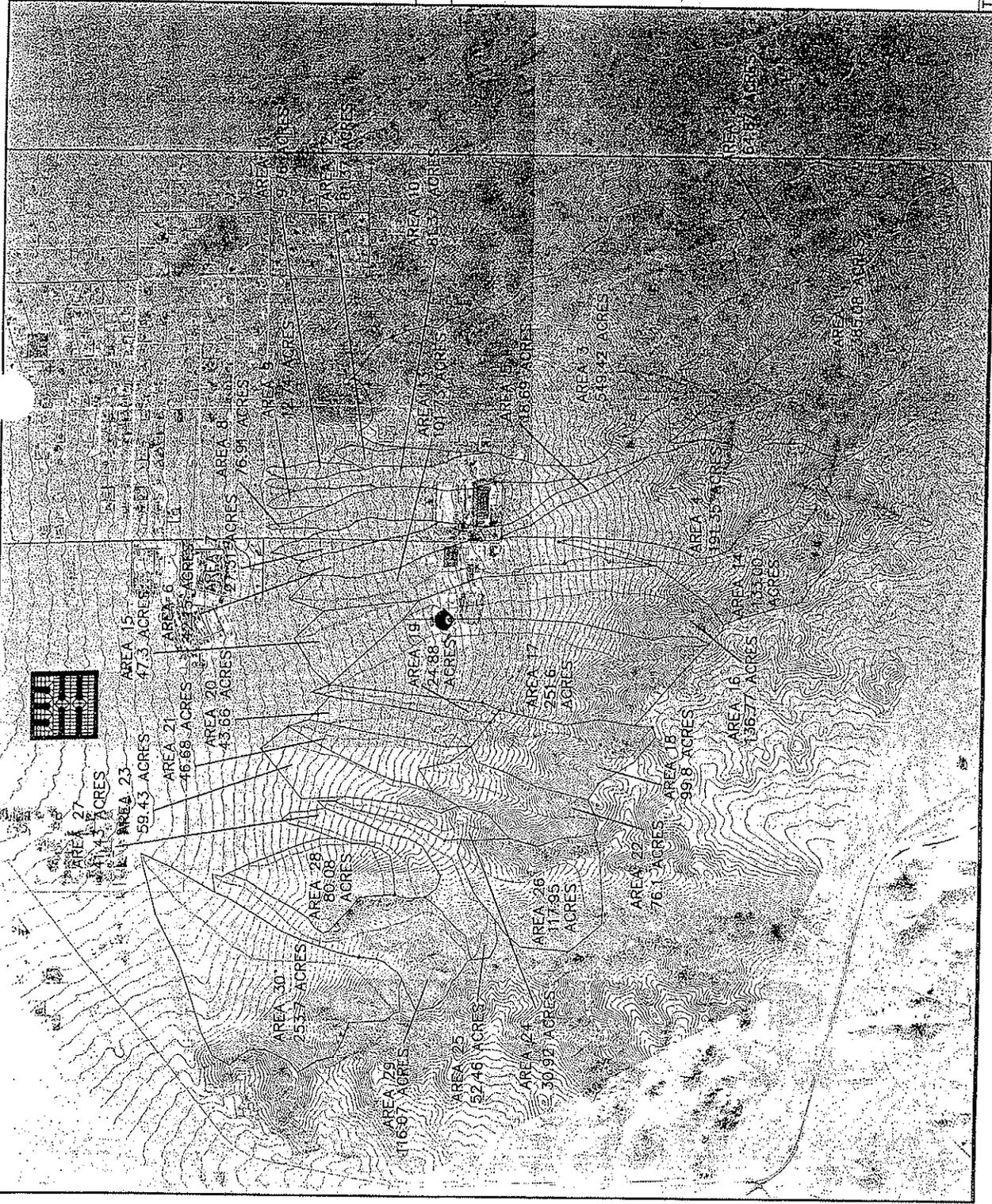
MAX FLOW DEPTH



MAX FLOW DEPTH (CONTOURS)



HYDROLOGY AREAS



Area #	Size (acres)	Lag Time	Soil Type	SCS #	Peak Flowrate (CFS)
1	385.14	0.37	D	82	520.48
2	164.87	0.31	D	82	287.15
3	548.42	0.35	D	82	809.80
4	191.35	0.39	D	82	284.72
5	18.69	0.38	D	82	28.05
6	42.15	0.37	D	82	61.27
7	27.31	0.35	D	82	42.07
8	76.91	0.45	D	82	108.66
9	12.74	0.30	D	82	22.05
10	81.37	0.45	D	82	115.23
11	9.76	0.31	D	82	16.69
12	18.48	0.36	D	82	27.29
13	101.73	0.46	D	82	117.80
14	133.00	0.31	D	82	228.49
15	47.31	0.31	D	82	79.88
16	136.77	0.31	D	82	231.20
17	251.60	0.34	D	82	396.02
18	93.23	0.27	D	82	170.98
19	24.88	0.35	D	82	38.61
20	43.66	0.28	D	82	78.51
21	46.66	0.30	D	82	80.55
22	76.10	0.36	D	82	139.47
23	59.43	0.32	D	82	97.48
24	30.92	0.28	D	82	55.91
25	52.46	0.30	D	82	91.23
26	117.95	0.25	D	82	217.21
27	41.48	0.22	D	82	75.45
28	79.99	0.25	D	82	146.74
29	115.63	0.29	D	82	202.76
30	253.69	0.27	D	82	369.29
Total	3284.7				

