PLATE I

LEGEND

- YOUNGER WATER-BEARING DEPOSITS
- OLDER WATER-BEARING DEPOSITS
- BOUNDARY OF INVESTIGATIONAL AREA
- BOUNDARY OF WATERSHED
- BOUNDARY OF DRAINAGE UNIT
- GEOLOGIC CONTACT

LIVERMORE

SUNOL UNIT

SOUTH BAY

SAN FRANCISCO BAY

PACIFIC OCEAN

OAKLAND
ALAMEDA
SAN LEANDRO
HAYWARD
LAKE CHABOT
NILES
ALVARADO
NEWARK
COYOTE HILLS
SAN JOSE
MORGAN HILL
SAN FRANCISCO
GOLDEN GATE
LAKE MERCED
DALY CITY
SAN BRUNO
SAN MATEO
BURLINGAME
SAN ANDREAS LAKE
CRYSTAL SPRINGS LAKE
REDWOOD CITY
PALO ALTO
MOUNTAIN VIEW
SANTA CLARA
LOS GATOS
SARATOGA
LEXINGTON RES.
CALAVERAS RES.
CONTRA COSTA
ALAMEDA
SAN JOAQUIN
STANISLAUS
SANTA CLARA
SAN MATEO
MARIN CO
SANTA CRUZ
MOUNT DIABLO BASE
MOUNT DIABLO MERIDIAN
W.P.R.R.
S.P.R.R.

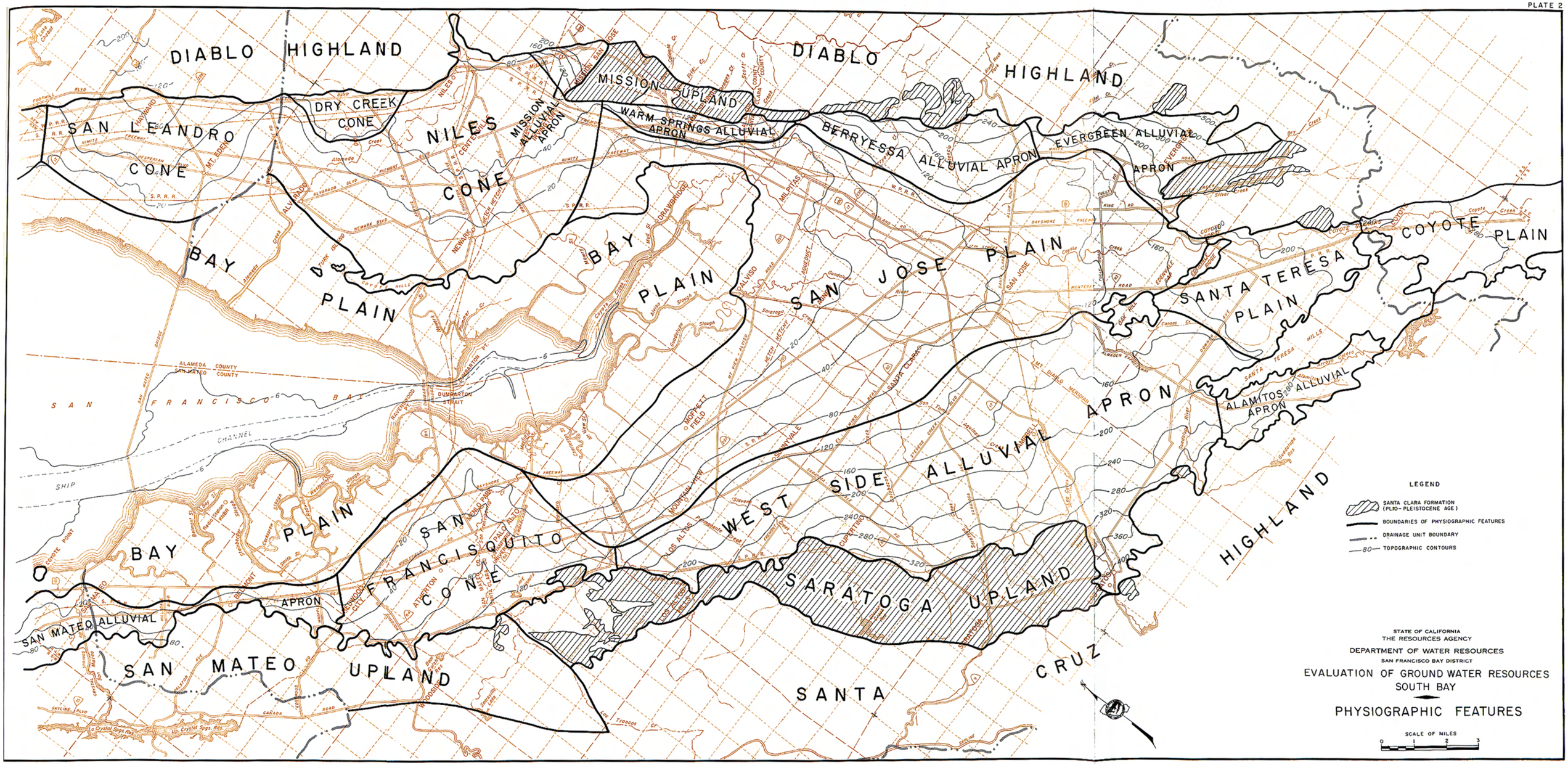
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT

EVALUATION OF GROUND WATER RESOURCES IN SOUTH BAY

AREA OF INVESTIGATION

SCALE OF FEET
2000 0 2000 4000 6000

PLATE 2



STATE OF CALIFORNIA
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DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT

EVALUATION OF GROUND WATER RESOURCES SOUTH BAY

PHYSIOGRAPHIC FEATURES

SCALE OF MILES
0 1 2 3

LEGEND

Age		Symbol	Description
QUATERNARY	RECENT	Qls	LANDSLIDES
		Qm	ALLUVIUM - MARSHLAND DEPOSITS: UNCONSOLIDATED, CONSISTING CHIEFLY OF CLAY WITH IRREGULAR LENSES OF SAND AND GRAVEL
		Qs	ALLUVIUM - STREAM DEPOSITS: UNCONSOLIDATED, CONSISTING OF GRAVEL, SAND, SILT, AND CLAY
	PLEISTOCENE	TQ	SANTA CLARA FORMATION: UNCONSOLIDATED TO SEMICONSOLIDATED CONTINENTAL DEPOSITS OF GRAVEL, SAND, SILT, AND CLAY. INCLUDES EXPOSURES OF PACKWOOD GRAVELS
TERTIARY	PLIOCENE	Tpr	LEONA AND ALUM ROCK RHYOLITE: FLOWS AND INTRUSIVE DOMES
		Tp	UNDIFFERENTIATED PLIOCENE FORMATIONS: CONTINENTAL AND MARINE SANDSTONE, SILTSTONE, AND CONGLOMERATE. SOME TUFF AND LIMESTONE.
	MIOCENE	Tm	UNDIFFERENTIATED MIOCENE FORMATIONS: MARINE SANDSTONE, SHALE, AND CONGLOMERATE. ALSO VOLCANIC ROCKS
	OLIGOCENE	To	UNDIFFERENTIATED OLIGOCENE FORMATIONS: MARINE SANDSTONE AND SILTSTONE
	EOCENE	Te	UNDIFFERENTIATED EOCENE FORMATIONS: MARINE SANDSTONE, CLAY, AND SHALE. SOME CONGLOMERATE BEDS
CRETACEOUS		K	UNDIFFERENTIATED CRETACEOUS FORMATIONS: MARINE SANDSTONE, SILTSTONE, SHALE, AND CONGLOMERATE
		sp	SERPENTINE AND ASSOCIATED SILICA CARBONATE ROCKS: ALTERED AND SHEARED ULTRABASIC ROCKS
JURASSIC		J	UNDIFFERENTIATED KNOXVILLE FORMATION AND FRANCISCAN GROUP: MARINE SANDSTONE, SHALE, AND CHERT WITH SOME CONGLOMERATE AND LIMESTONE LENTILS

SYMBOLS

- FAULT, DASHED WHERE APPROXIMATELY LOCATED. U - UPTHROWN SIDE, D - DOWNTHROWN SIDE. ARROWS SHOW RELATIVE DIRECTION OF HORIZONTAL MOVEMENT.
- CONCEALED FAULT
- BURIED FAULT IN FRANCISCAN GROUP ROCKS (U - UPTHROWN SIDE, D - DOWNTHROWN SIDE, QUERIED WHERE EXTENSION UNCERTAIN)
- AXIS OF ANTICLINE, (DASHED WHERE APPROXIMATELY LOCATED) SHOWING PLUNGE
- AXIS OF SYNCLINE, (DASHED WHERE APPROXIMATELY LOCATED) SHOWING PLUNGE
- AXIS OF OVERTURNED ANTICLINE, SHOWING PLUNGE
- AXIS OF OVERTURNED SYNCLINE, SHOWING PLUNGE
- LITHOLOGIC CONTACT, LOCATION APPROXIMATE
- -3500 — CONTOUR ON BURIED SURFACE OF FRANCISCAN GROUP ROCKS. ELEVATIONS ARE SUBSEA
- 600 ● — WELL SHOWING DEPTH TO NONWATER-BEARING ROCKS OF THE FRANCISCAN GROUP
- 400 ○ — WELL SHOWING DEPTH TO NONWATER-BEARING FORMATIONS RANGING IN AGE FROM CRETACEOUS TO PLIOCENE

WELL LOG DESCRIPTION OF NONWATER-BEARING MATERIALS ENCOUNTERED.

CG	CONGLOMERATE
HF	HILL FORMATION
RK	ROCK
SH	SHALE
SL	SLATE
SP	SERPENTINE
SS	SANDSTONE

SOUTH BAY AREA
SOURCES OF GEOLOGY

1. AARONS, B.L., 1958
2. BAILEY, E. H. & EVERHART, D. L. 1964
3. BRANNER, J.C., NEWSOM, J. F. & ARNOLD, R., 1909
4. CRITTENDEN, M. D., 1951
5. DAVIS, F. F. & JENNINGS, C. W., 1954
6. DIBBLEE JR., T. W., 1947 - 49
7. DIBBLEE JR., T. W. 1964
8. DOBBS, R. D. & ATCHLEY, F. W., 1960
9. WATER RESOURCES BOARD BULL. NO. 7, 1955
10. HALL, C. A., 1956
11. LAWSON, A. C., 1914
12. ROBINSON, G. D., 1956
13. DEPARTMENT OF WATER RESOURCES BULL. NO. 81, 1960

SUBSURFACE FEATURES INTERPRETED FROM GRAVITY DATA OBTAINED BY CHAPMAN, R. H., 1965

STATE OF CALIFORNIA
THE RESOURCES AGENCY

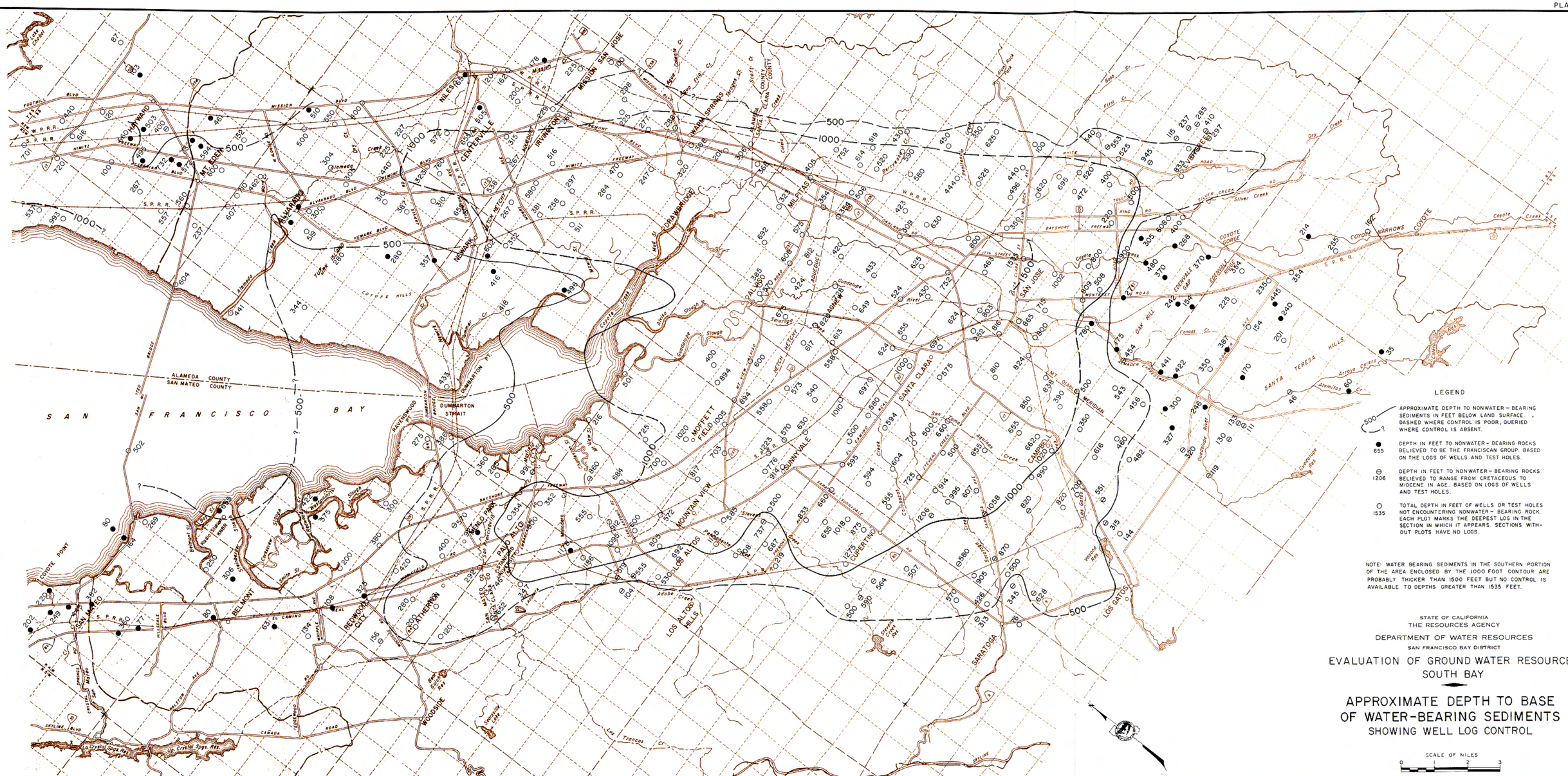
DEPARTMENT OF WATER RESOURCES

SAN FRANCISCO BAY DISTRICT

EVALUATION OF GROUND WATER RESOURCES — SOUTH BAY

AREAL GEOLOGY
SHOWING SUBSURFACE FEATURES

SCALE OF MILES
0 1 2 3



LEGEND

- 500 — APPROXIMATE DEPTH TO NONWATER – BEARING SEDIMENTS IN FEET BELOW LAND SURFACE. DASHED WHERE CONTROL IS POOR, QUERIED WHERE CONTROL IS ABSENT.
- 655 — DEPTH IN FEET TO NONWATER – BEARING ROCKS BELIEVED TO BE THE FRANCISCAN GROUP, BASED ON THE LOGS OF WELLS AND TEST HOLES.
- ⊖ 1206 — DEPTH IN FEET TO NONWATER – BEARING ROCKS BELIEVED TO RANGE FROM CRETACEOUS TO MIOCENE IN AGE, BASED ON LOGS OF WELLS AND TEST HOLES.
- ○ 1535 — TOTAL DEPTH IN FEET OF WELLS OR TEST HOLES NOT ENCOUNTERING NONWATER – BEARING ROCK. EACH PLOT MARKS THE DEEPEST LOG IN THE SECTION IN WHICH IT APPEARS. SECTIONS WITHOUT PLOTS HAVE NO LOGS.

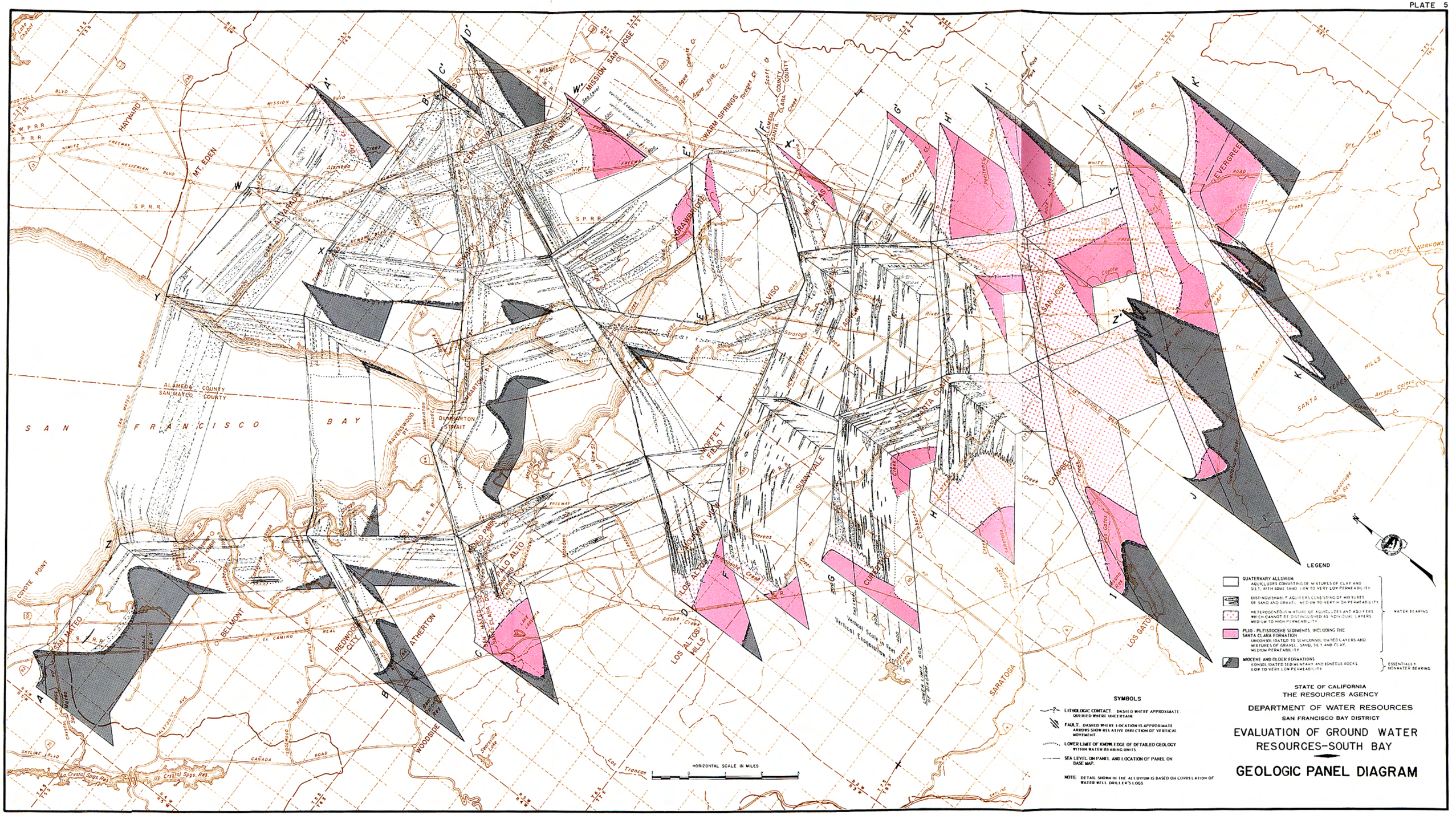
NOTE: WATER BEARING SEDIMENTS IN THE SOUTHERN PORTION OF THE AREA ENCLOSED BY THE 1000 FOOT CONTOUR ARE PROBABLY THICKER THAN 1500 FEET BUT NO CONTROL IS AVAILABLE TO DEPTHS GREATER THAN 1535 FEET.

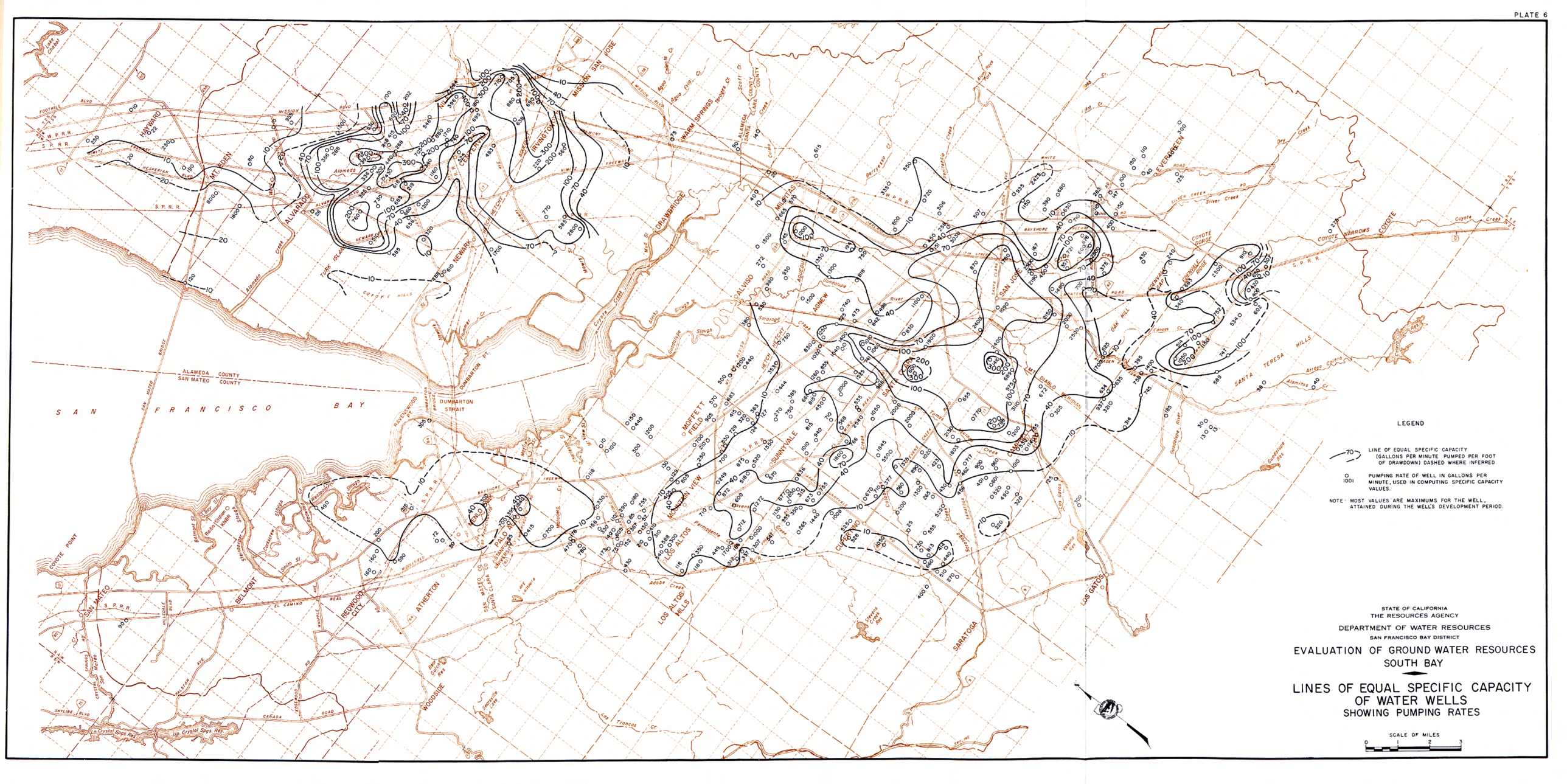
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT

EVALUATION OF GROUND WATER RESOURCES
SOUTH BAY

APPROXIMATE DEPTH TO BASE OF WATER-BEARING SEDIMENTS
SHOWING WELL LOG CONTROL

SCALE OF MILES
0 1 2 3

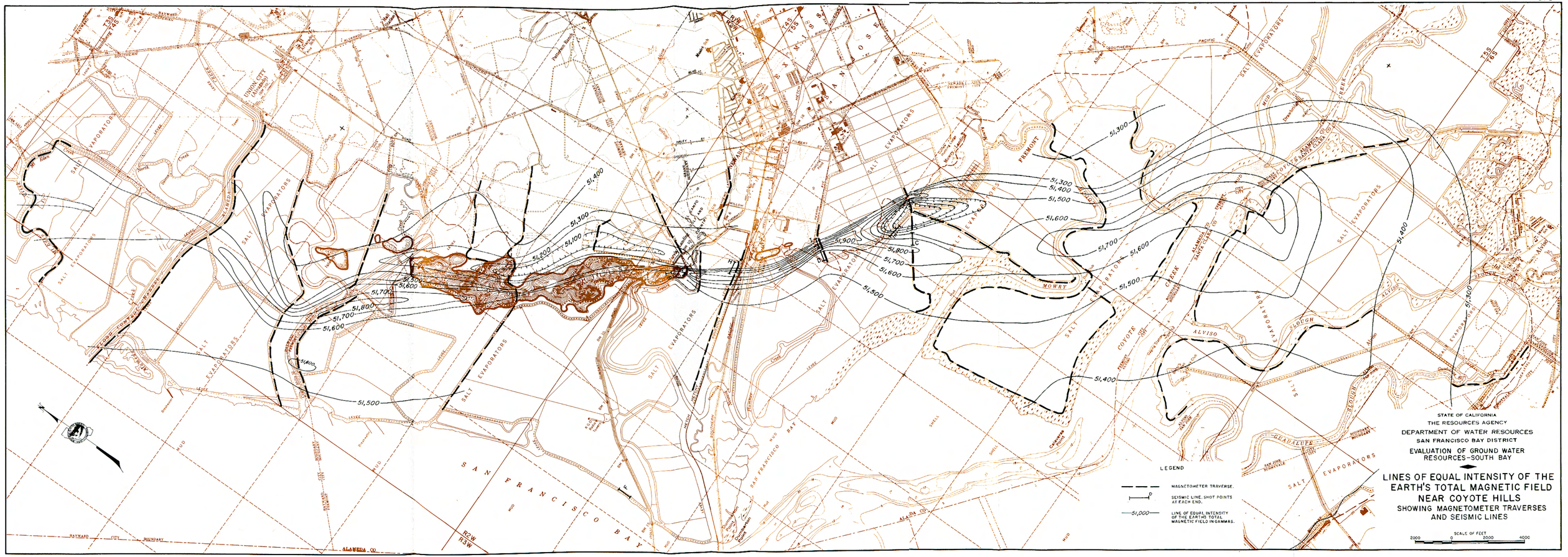

SAN FRANCISCO BAY
ALAMEDA COUNTY
SAN MATEO COUNTY
SANTA CLARA COUNTY
HAYWARD
MT. EDEN
ALVARADO
CENTERVILLE
MISSION SAN JOSE
WARM SPRINGS
MILPITAS
ALVISO
SAN JOSE
EVERGREEN
SANTA CLARA
MOFFETT FIELD
SUNNYVALE
CAMPBELL
LOS GATOS
SARATOGA
LOS ALTOS HILLS
LOS ALTOS
MENLO PARK
PALO ALTO
REDWOOD CITY
ATHERTON
WOODSIDE
BELMONT
SAN MATEO
COYOTE POINT
DUMBARTON STRAIT
RAVENSWOOD PT.
SANTA TERESA HILLS
COYOTE NARROWS
EDENVALE GAP
Vertical Scale in Feet
Vertical Exaggeration
HORIZONTAL SCALE IN MILES
LEGEND
QUATERNARY ALLUVIUM
AQUICLUDES CONSISTING OF MIXTURES OF CLAY AND SILT, WITH SOME SAND. LOW TO VERY LOW PERMEABILITY
DISTINGUISHABLE AQUIFERS CONSISTING OF MIXTURES OF SAND AND GRAVEL. MEDIUM TO VERY HIGH PERMEABILITY
HETEROGENEOUS MIXTURE OF AQUICLUDES AND AQUIFERS WHICH CANNOT BE DISTINGUISHED AS INDIVIDUAL LAYERS. MEDIUM TO HIGH PERMEABILITY
PLIO - PLEISTOCENE SEDIMENTS, INCLUDING THE SANTA CLARA FORMATION
UNCONSOLIDATED TO SEMICONSOLIDATED LAYERS AND MIXTURES OF GRAVEL, SAND, SILT AND CLAY. MEDIUM PERMEABILITY
WATER BEARING
MIOCENE AND OLDER FORMATIONS
CONSOLIDATED SEDIMENTARY AND IGNEOUS ROCKS. LOW TO VERY LOW PERMEABILITY
ESSENTIALLY NONWATER BEARING
SYMBOLS
LITHOLOGIC CONTACT. DASHED WHERE APPROXIMATE. QUERIED WHERE UNCERTAIN.
FAULT. DASHED WHERE LOCATION IS APPROXIMATE. ARROWS SHOW RELATIVE DIRECTION OF VERTICAL MOVEMENT.
LOWER LIMIT OF KNOWLEDGE OF DETAILED GEOLOGY WITHIN WATER BEARING UNITS.
SEA LEVEL ON PANEL AND LOCATION OF PANEL ON BASE MAP.
NOTE: DETAIL SHOWN IN THE ALLUVIUM IS BASED ON CORRELATION OF WATER WELL DRILLER'S LOGS.
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT
EVALUATION OF GROUND WATER RESOURCES-SOUTH BAY
GEOLOGIC PANEL DIAGRAM

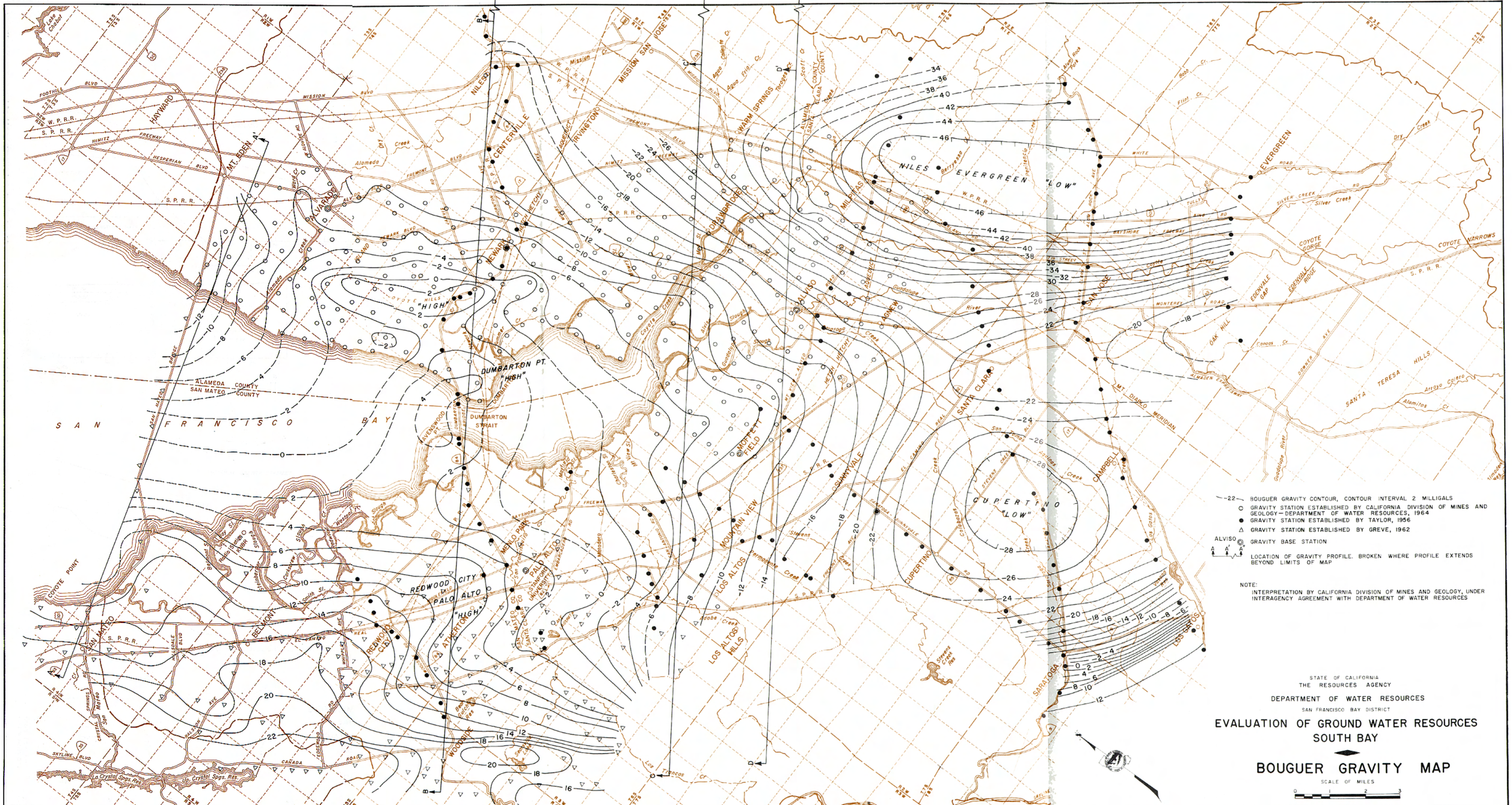


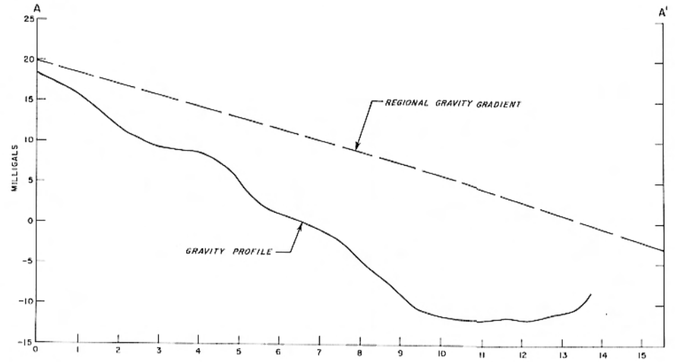
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT

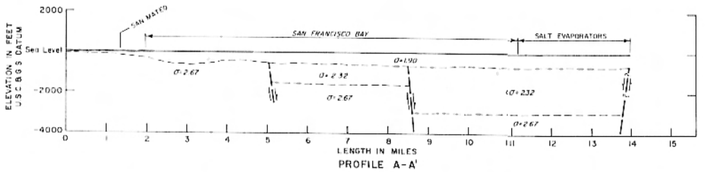
EVALUATION OF GROUND WATER RESOURCES SOUTH BAY

LINES OF EQUAL SPECIFIC CAPACITY OF WATER WELLS SHOWING PUMPING RATES


STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT
EVALUATION OF GROUND WATER RESOURCES–SOUTH BAY
LINES OF EQUAL INTENSITY OF THE EARTH'S TOTAL MAGNETIC FIELD NEAR COYOTE HILLS
SHOWING MAGNETOMETER TRAVERSES AND SEISMIC LINES
SCALE OF FEET
2000 0 2000 4000
LEGEND
MAGNETOMETER TRAVERSE.
SEISMIC LINE. SHOT POINTS AT EACH END.
51,000
LINE OF EQUAL INTENSITY OF THE EARTHS TOTAL MAGNETIC FIELD IN GAMMAS.
SAN FRANCISCO BAY
SALT EVAPORATORS
UNION CITY (Alameda)
FREMONT
MOWRY
COYOTE CREEK
ALVISO SLOUGH
GUADALUPE
ALAMEDA CO
SANTA CLARA CO
SAN JOSE
SOUTHERN PACIFIC
WAYWARD CITY BOUNDARY
51,300
51,400
51,500
51,600
51,700
51,800
51,900
51,100
51,200
T3S
T4S
T5S
T6S
R1W
R2W
R3W


A
A'
B
B'
C
C'
D
D'
SAN FRANCISCO BAY
ALAMEDA COUNTY
SAN MATEO COUNTY
SANTA CLARA COUNTY
"HIGH"
DUMBARTON PT. "HIGH"
ATHERTON "HIGH"
NILES EVERGREEN "LOW"
CUPERTINO "LOW"
DUMBARTON STRAIT
COYOTE POINT
SAN MATEO
BELMONT
REDWOOD CITY
PALO ALTO
MENLO PARK
ATHERTON
MOUNTAIN VIEW
LOS ALTOS
LOS ALTOS HILLS
SUNNYVALE
CUPERTINO
CAMPBELL
SARATOGA
LOS GATOS
SANTA CLARA
SAN JOSE
NILES
CENTERVILLE
IRVINGTON
WARM SPRINGS
MILPITAS
NEWARK
ALVISO
MT. EDEN
HAYWARD
EVERGREEN
COYOTE WARROWS
SANTA TERESA HILLS
OAK HILL
MOFFETT FIELD
-22 BOUGUER GRAVITY CONTOUR, CONTOUR INTERVAL 2 MILLIGALS
GRAVITY STATION ESTABLISHED BY CALIFORNIA DIVISION OF MINES AND GEOLOGY - DEPARTMENT OF WATER RESOURCES, 1964
GRAVITY STATION ESTABLISHED BY TAYLOR, 1956
GRAVITY STATION ESTABLISHED BY GREVE, 1962
ALVISO GRAVITY BASE STATION
LOCATION OF GRAVITY PROFILE. BROKEN WHERE PROFILE EXTENDS BEYOND LIMITS OF MAP
NOTE:
INTERPRETATION BY CALIFORNIA DIVISION OF MINES AND GEOLOGY, UNDER INTERAGENCY AGREEMENT WITH DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT
EVALUATION OF GROUND WATER RESOURCES
SOUTH BAY
BOUGUER GRAVITY MAP
SCALE OF MILES
0 1 2 3





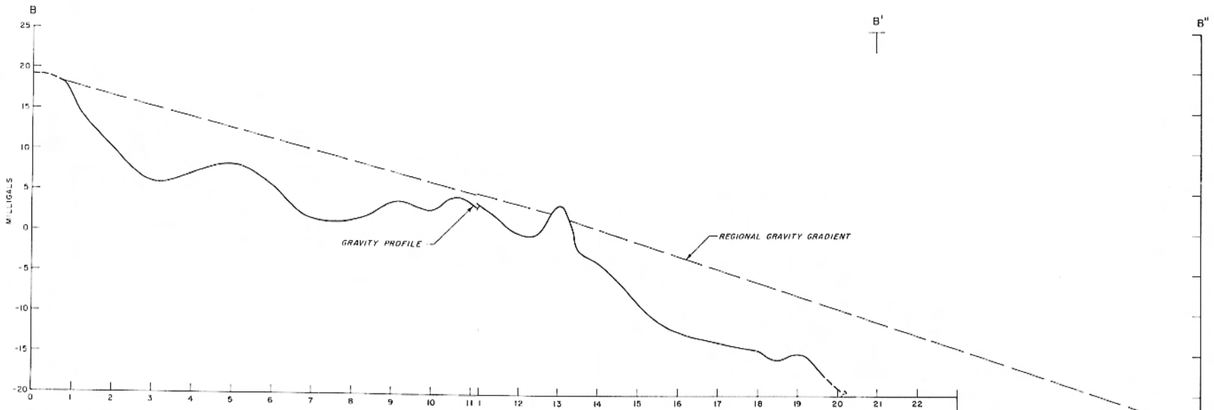
PROFILE A-A'

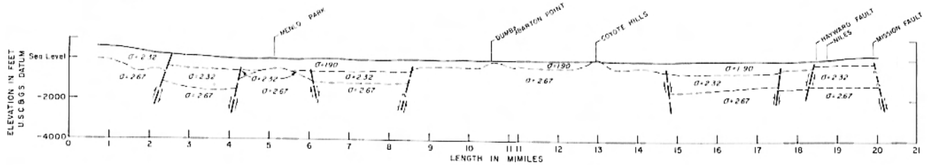
EXPLANATION OF DENSITY UNITS

σ+1.90 = UPPER PLEISTOCENE AND RECENT ALLUVIUM, COMPOSED OF GRAVEL, SAND, SILT AND CLAY.

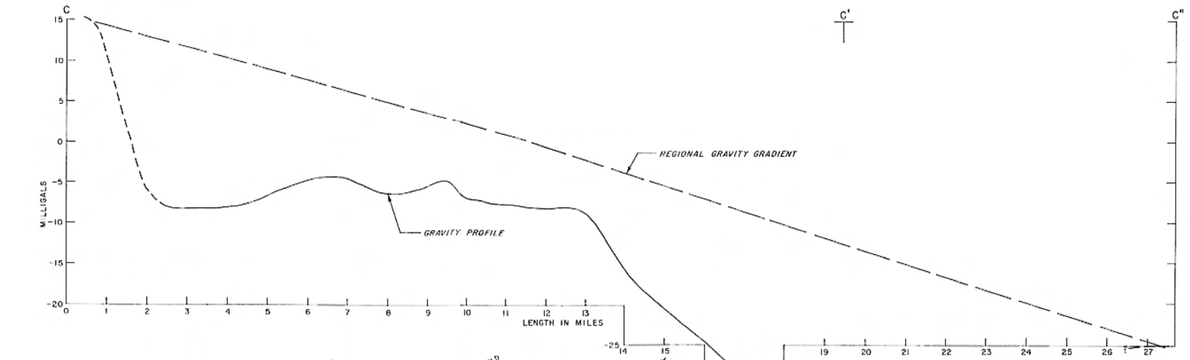
σ+2.32 = PLIO-PLEISTOCENE, TERTIARY, AND POSSIBLY CRETACEOUS SEDIMENTS

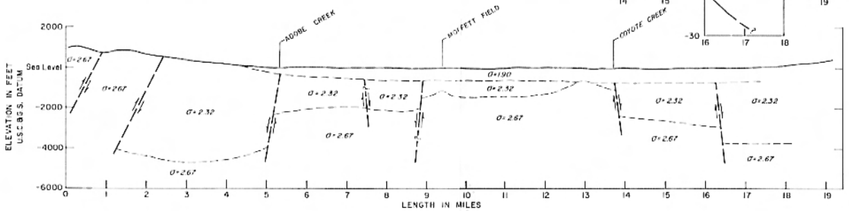
σ+2.67 = FRANCISCAN FORMATION



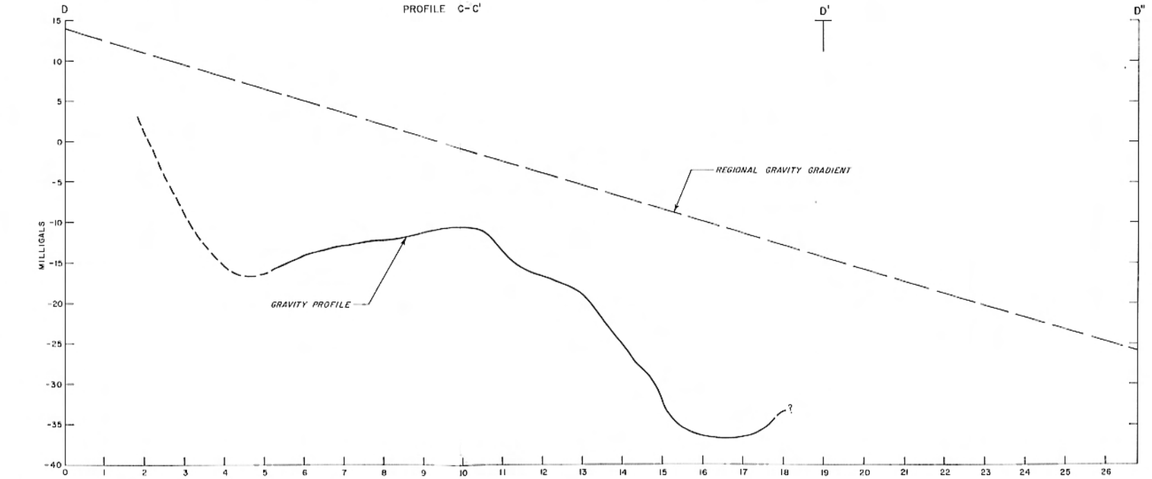


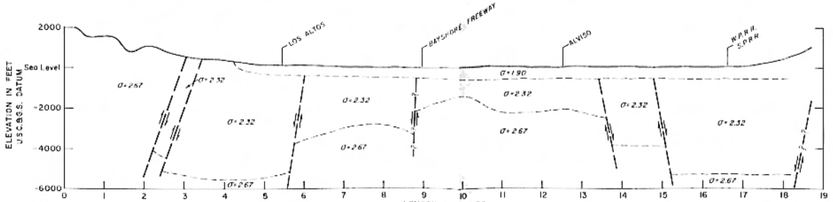
PROFILE B-B'





PROFILE C-C'



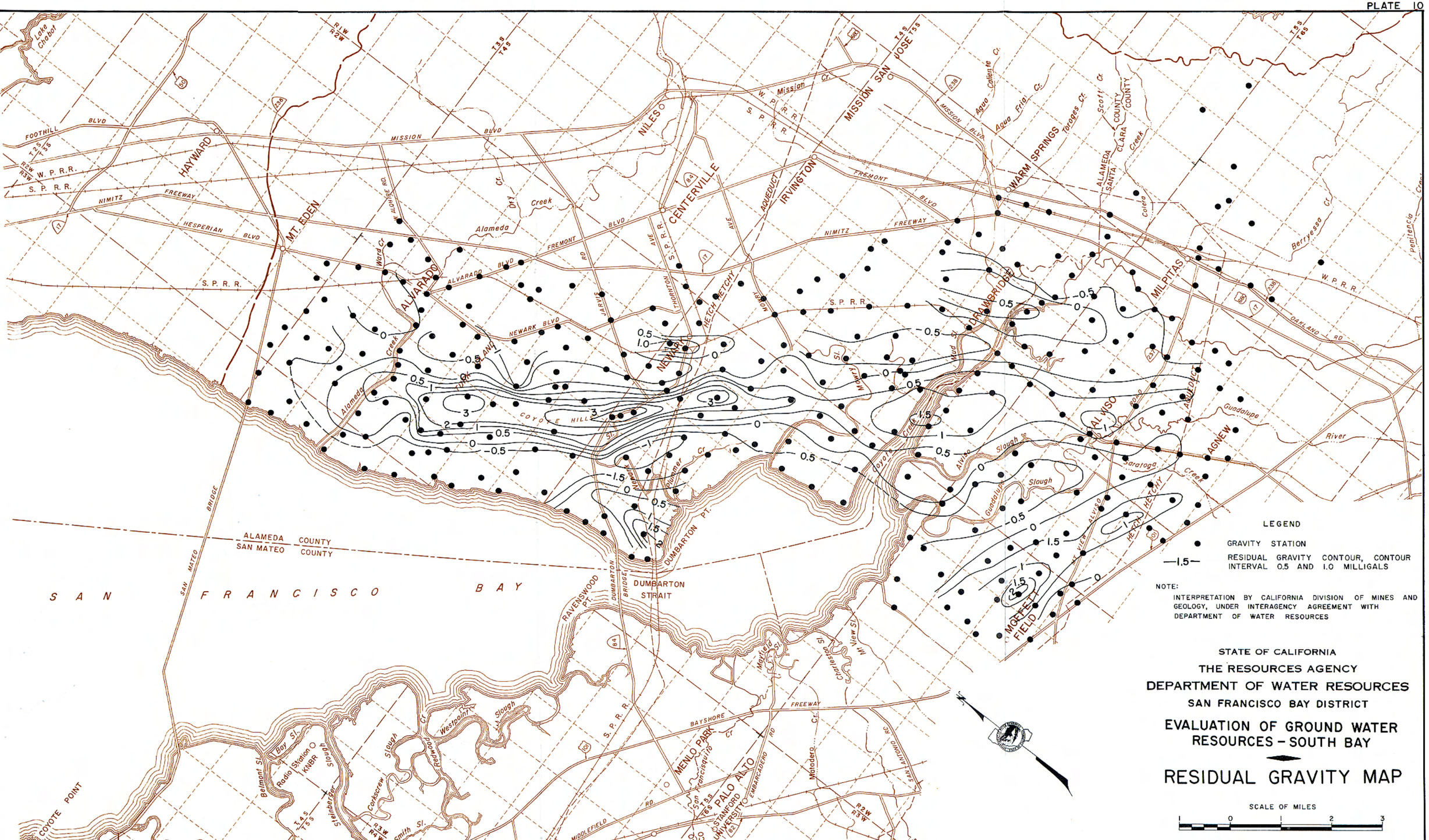


PROFILE D-D'

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT

EVALUATION OF GROUND WATER RESOURCES - SOUTH BAY

GRAVITY PROFILES



LEGEND

- GRAVITY STATION
- —1.5— RESIDUAL GRAVITY CONTOUR, CONTOUR INTERVAL 0.5 AND 1.0 MILLIGALS

NOTE:

INTERPRETATION BY CALIFORNIA DIVISION OF MINES AND GEOLOGY, UNDER INTERAGENCY AGREEMENT WITH DEPARTMENT OF WATER RESOURCES

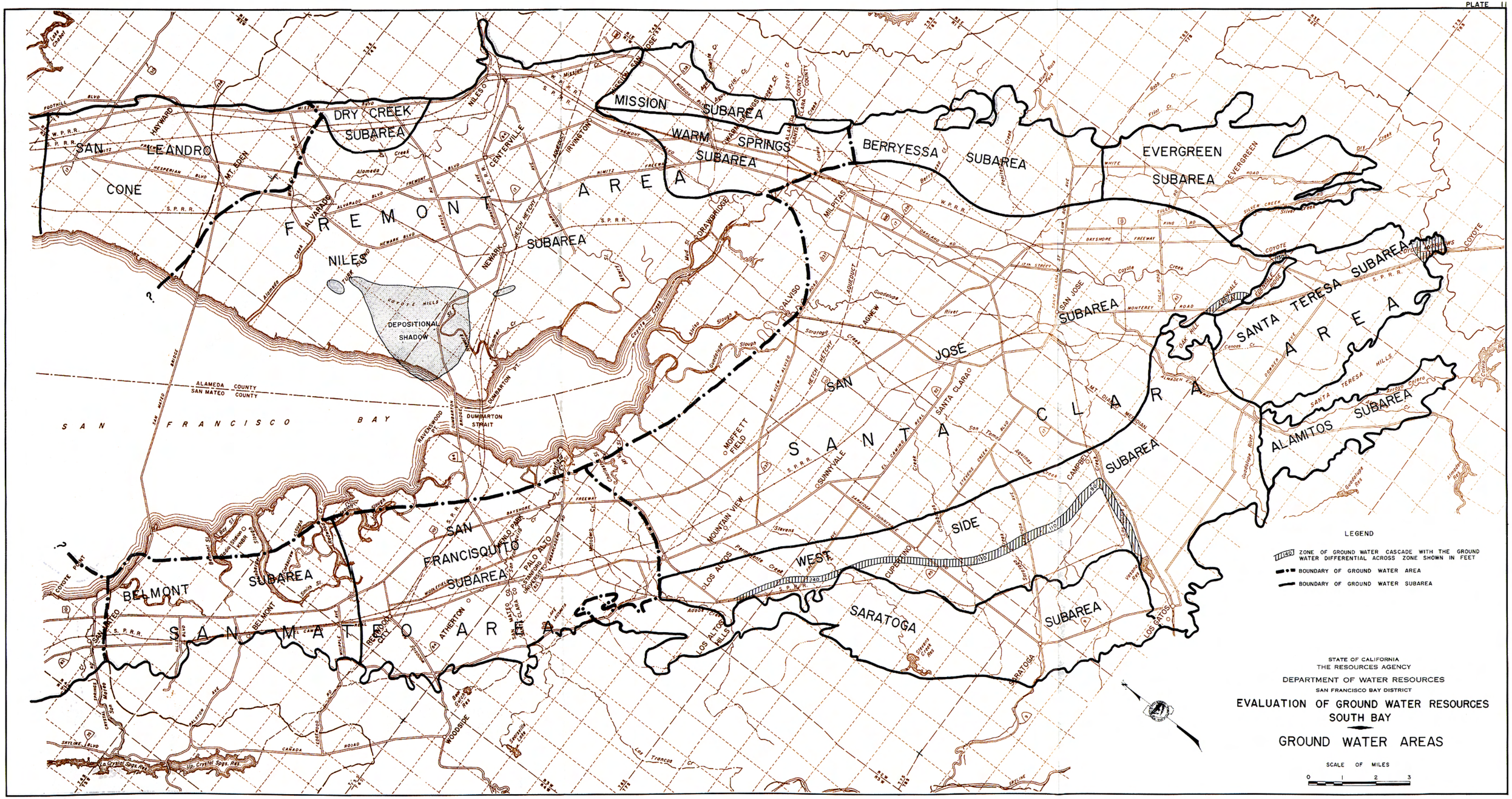
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT

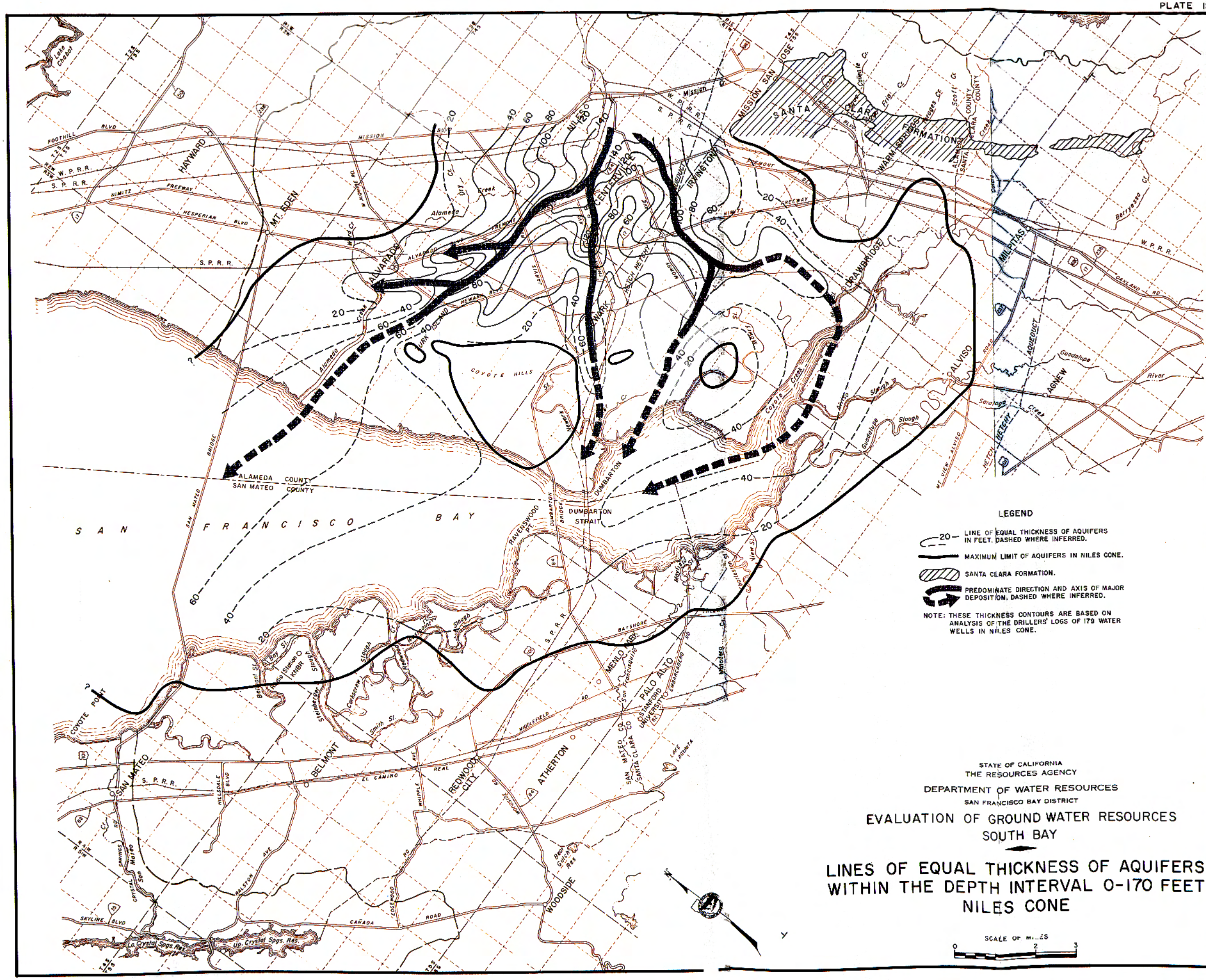
EVALUATION OF GROUND WATER RESOURCES – SOUTH BAY

RESIDUAL GRAVITY MAP

SCALE OF MILES

0 1 2 3


SAN LEANDRO CONE
DRY CREEK SUBAREA
MISSION SUBAREA
WARM SPRINGS SUBAREA
BERRYESSA SUBAREA
EVERGREEN SUBAREA
FREMONT AREA
NILES SUBAREA
DEPOSITIONAL SHADOW
SANTA TERESA SUBAREA
SANTA TERESA AREA
ALAMITOS SUBAREA
SAN JOSE SUBAREA
SANTA CLARA AREA
CAMPBELL SUBAREA
WEST SIDE
SARATOGA SUBAREA
SAN FRANCISQUITO SUBAREA
BELMONT SUBAREA
SAN MATEO AREA
ALAMEDA COUNTY
SAN MATEO COUNTY
SAN FRANCISCO BAY
DUMBARTON STRAIT
MOFFETT FIELD
LEGEND
ZONE OF GROUND WATER CASCADE WITH THE GROUND WATER DIFFERENTIAL ACROSS ZONE SHOWN IN FEET
BOUNDARY OF GROUND WATER AREA
BOUNDARY OF GROUND WATER SUBAREA
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT
EVALUATION OF GROUND WATER RESOURCES
SOUTH BAY
GROUND WATER AREAS
SCALE OF MILES
0 1 2 3



LEGEND

20 — LINE OF EQUAL THICKNESS OF AQUIFERS IN FEET. DASHED WHERE INFERRED.

MAXIMUM LIMIT OF AQUIFERS IN NILES CONE.

SANTA CLARA FORMATION.

PREDOMINATE DIRECTION AND AXIS OF MAJOR DEPOSITION. DASHED WHERE INFERRED.

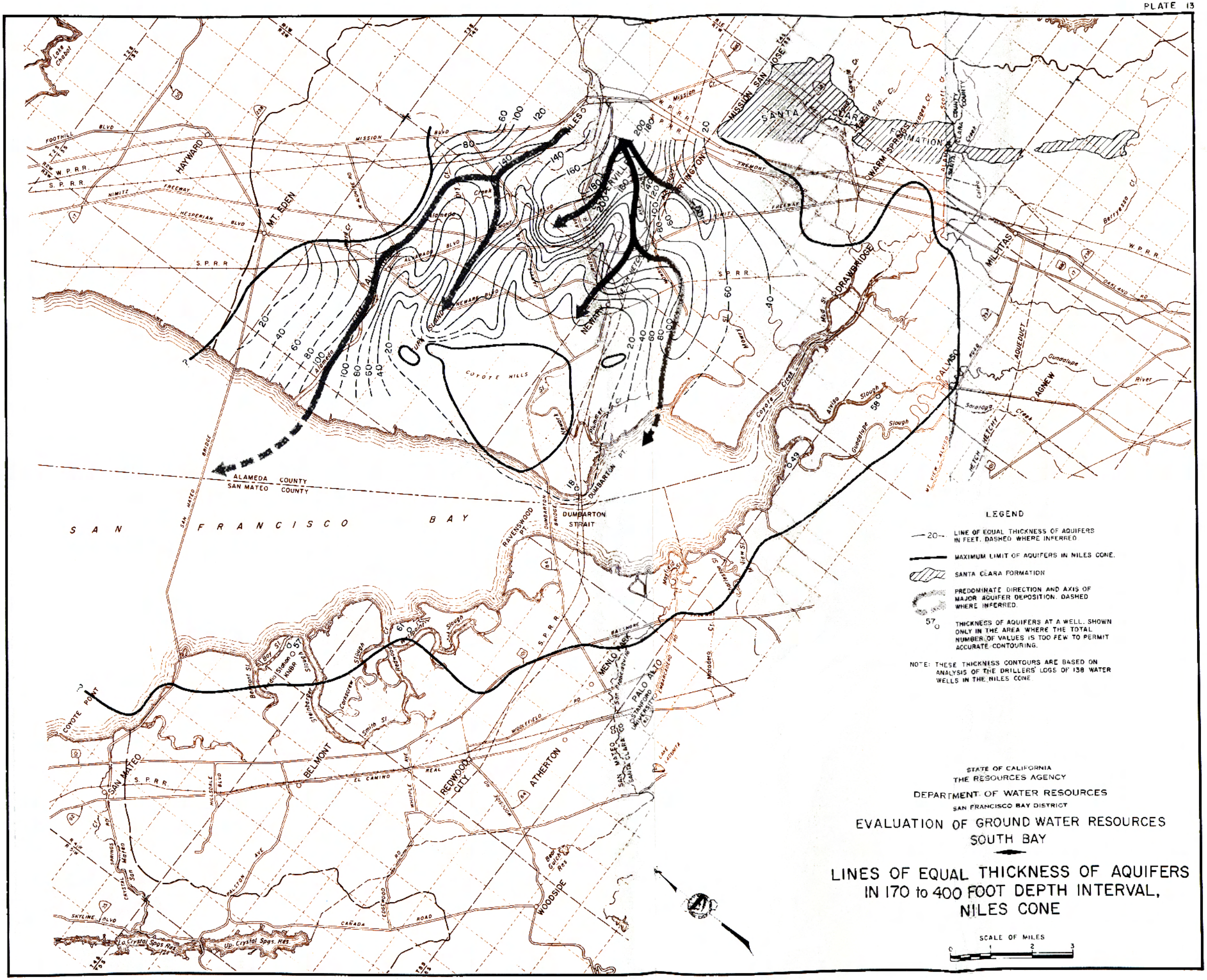
NOTE: THESE THICKNESS CONTOURS ARE BASED ON ANALYSIS OF THE DRILLERS' LOGS OF 179 WATER WELLS IN NILES CONE.

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT

EVALUATION OF GROUND WATER RESOURCES
SOUTH BAY

LINES OF EQUAL THICKNESS OF AQUIFERS WITHIN THE DEPTH INTERVAL 0-170 FEET NILES CONE

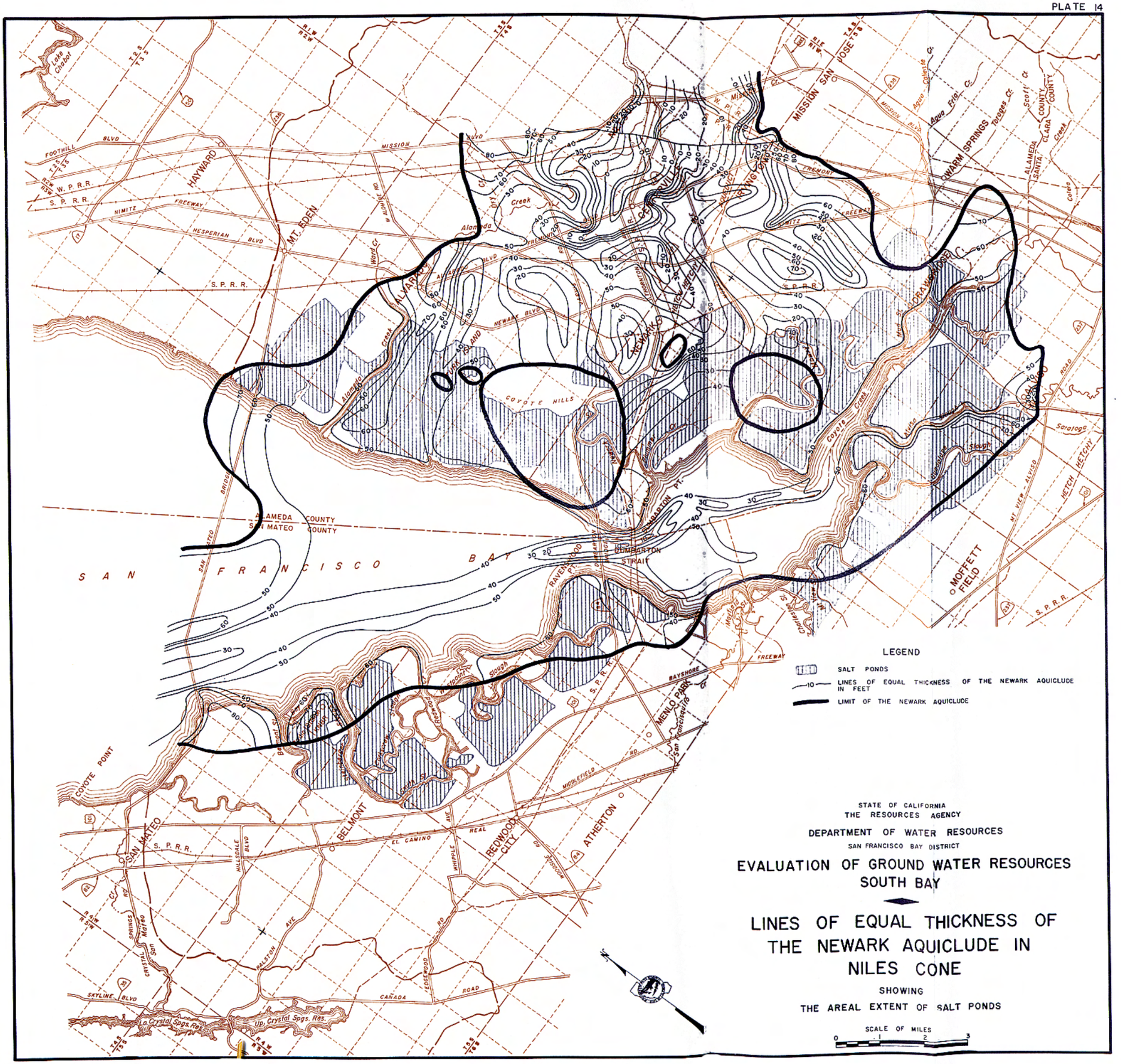
SCALE OF MILES
0 1 2 3



STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT

EVALUATION OF GROUND WATER RESOURCES SOUTH BAY

LINES OF EQUAL THICKNESS OF AQUIFERS IN 170 to 400 FOOT DEPTH INTERVAL, NILES CONE


LEGEND
SALT PONDS
LINES OF EQUAL THICKNESS OF THE NEWARK AQUICLUDE IN FEET
LIMIT OF THE NEWARK AQUICLUDE
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN FRANCISCO BAY DISTRICT
EVALUATION OF GROUND WATER RESOURCES
SOUTH BAY
LINES OF EQUAL THICKNESS OF THE NEWARK AQUICLUDE IN NILES CONE
SHOWING
THE AREAL EXTENT OF SALT PONDS
SCALE OF MILES
0 1 2 3
SAN FRANCISCO BAY
ALAMEDA COUNTY
SAN MATEO COUNTY
SANTA CLARA COUNTY
HAYWARD
MT. EDEN
ALVARADO
NEWARK
CENTERVILLE
MISSION SAN JOSE
WARM SPRINGS
DRAWBRIDGE
MOFFETT FIELD
MENLO PARK
ATHERTON
REDWOOD CITY
BELMONT
SAN MATEO
COYOTE POINT
COYOTE HILLS
DUMBARTON STRAIT
DUMBARTON PT.
RAVENSWOOD PT.
TURK ISLAND
Lake Chabot
Alameda Creek
Coyote Creek
Mud Slough
Newark Slough
Redwood Slough
Scott Cr.
Toroges Cr.
Agua Caliente Cr.
Agua Fria Cr.
Coleta Creek
Saratoga
HETCH HETCHY
MT VIEW - ALVISO
FOOTHILL BLVD
MISSION BLVD
NIMITZ FREEWAY
HESPERIAN BLVD
FREMONT BLVD
NEWARK BLVD
ALVARADO BLVD
S. P. R. R.
W. P. R. R.
BAYSHORE FREEWAY
EL CAMINO REAL
MIDDLEFIELD RD
WOODSIDE RD
WHIPPLE AVE
HILLSDALE BLVD
PALSTON AVE
EDGEWOOD RD
CAÑADA ROAD
SKYLINE BLVD
CRESTAL SPRINGS RD
SAN MATEO BRIDGE
DUMBARTON BRIDGE
DRAWBRIDGE ROAD
La. Crystal Spgs. Res.
Up. Crystal Spgs. Res.