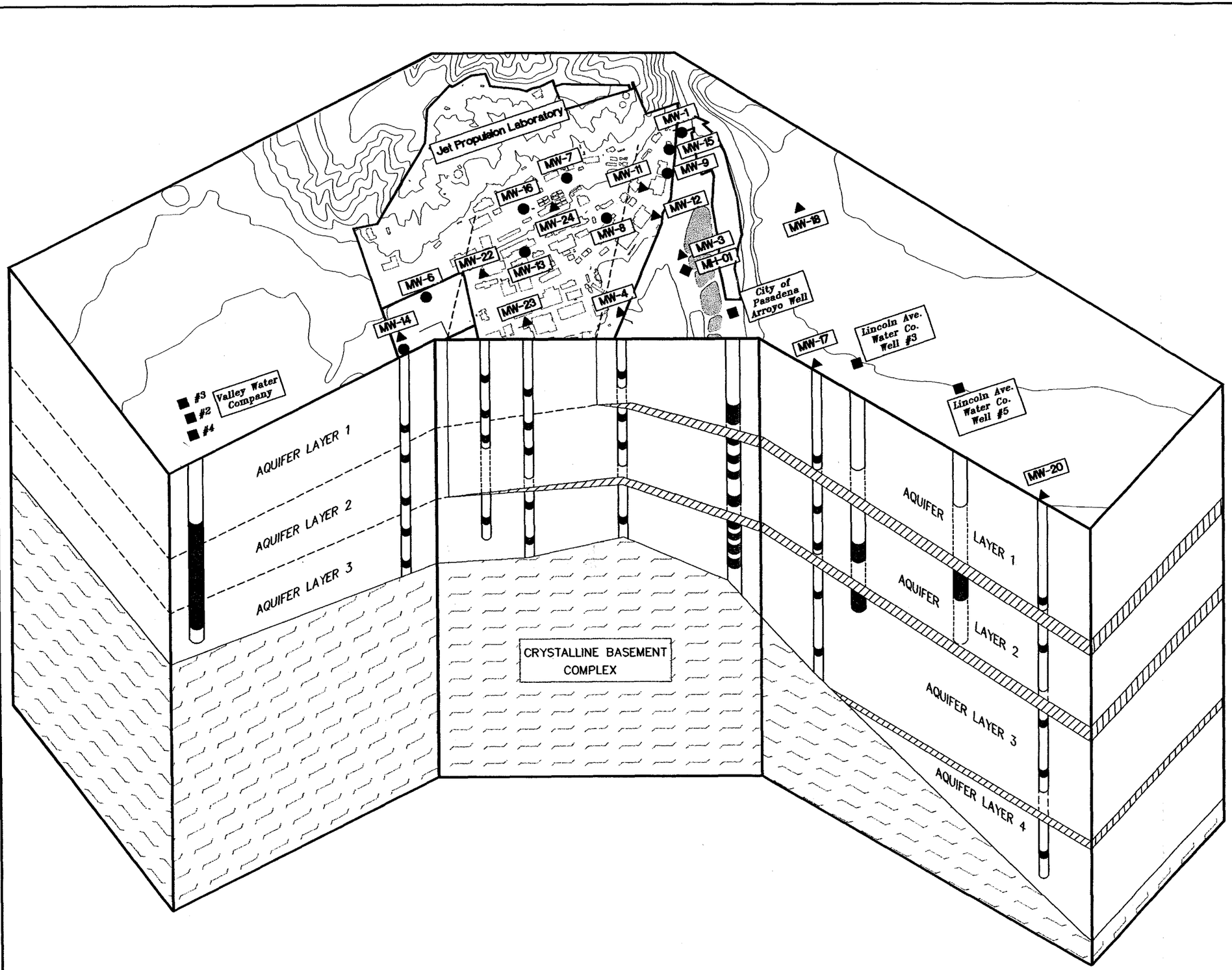
JPLF3-15.DWG



Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- Silt-Rich Interval
- Screened Interval

1000 500 0 1000

200 100 0 200

HORIZONTAL SCALE: 1" = 1000'
VERTICAL SCALE: 1" = 200'

Source: USGS, 7.5 Minute Topographic Map Pasadena, CA 1966, Revised 1988, 1994.

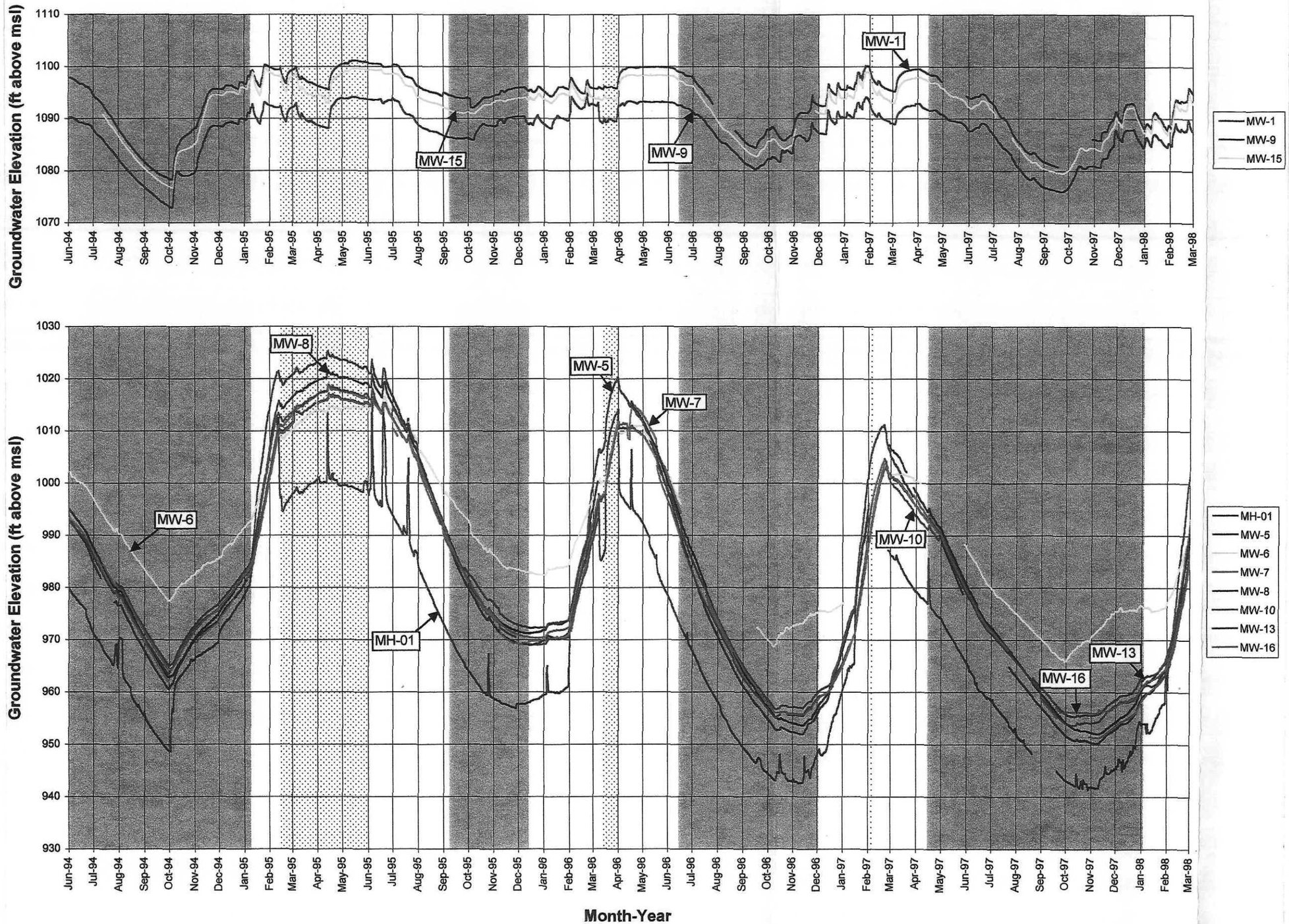
FIGURE 3-17

CONCEPTUAL MODEL OF JPL AQUIFER LAYERS

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

9-9-98



Explanation

Periods of "Normal" Groundwater Flow to the East Across JPL

Periods of "Transition" Between "Normal" and "Reverse" Groundwater Flow Across JPL

Periods of "Reverse" Groundwater Flow Across JPL

Note: Data from daily water-level measurements were recorded with dedicated pressure transducers

FIGURE 3-18

HYDROGRAPHS OF DAILY WATER-TABLE ELEVATIONS IN SHALLOW ON-SITE MONITORING WELLS
August 1996 ~ January 1998

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

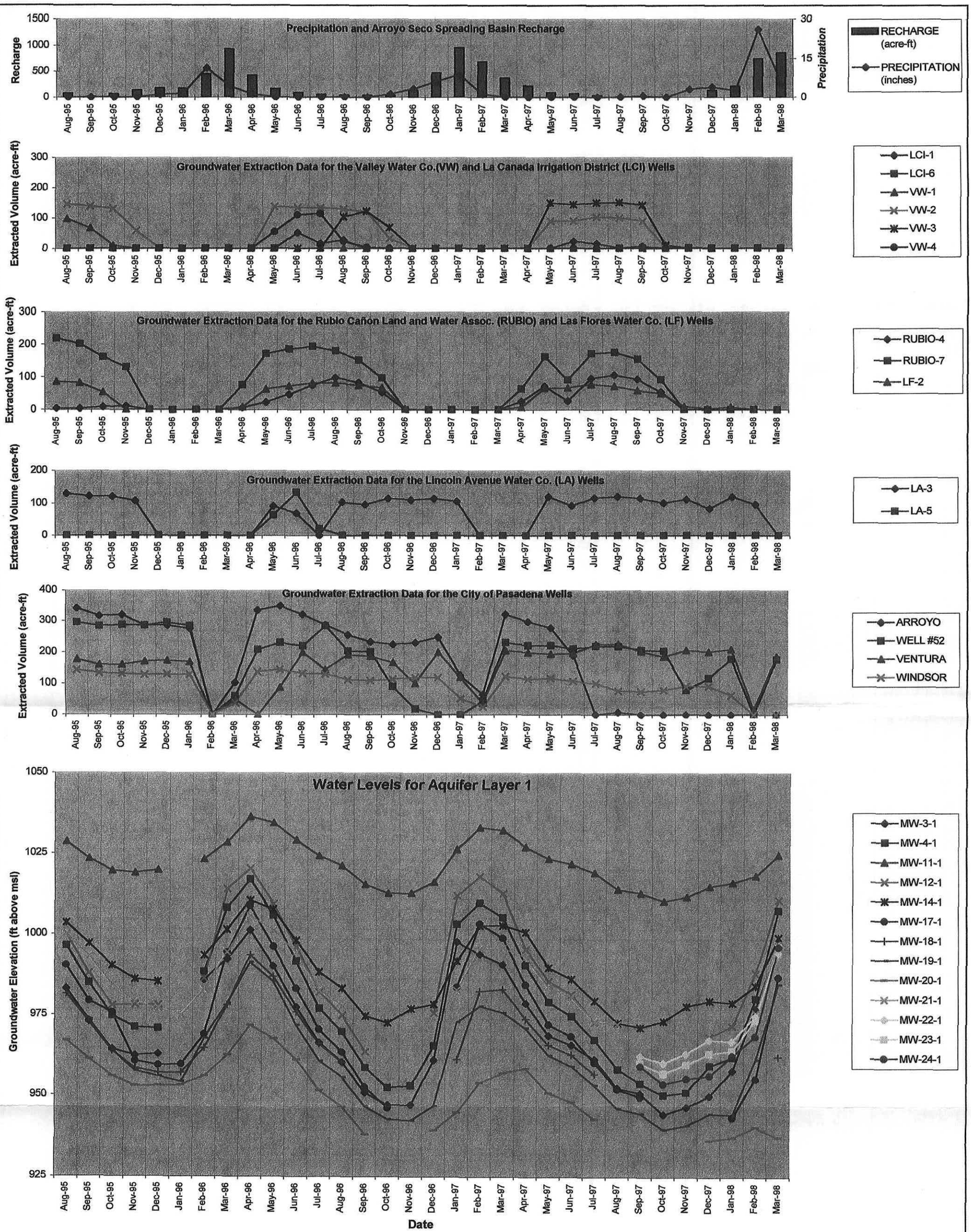


FIGURE 3-19

MUNICIPAL WELL PUMPING VOLUMES, PRECIPITATION DATA, SPREADING BASIN RECHARGE DATA AND WATER-LEVEL ELEVATIONS FROM MULTI-PORT WELLS IN AQUIFER LAYER 1

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Jet Propulsion Laboratory

MW-1 1099.57
MW-2
MW-3 1001.21
MW-4 1016.88
MW-5 1016.35
MW-6 1009.95
MW-7 1011.34
MW-8 —
MW-9 1092.99
MW-10 —
MW-11 1036.21
MW-12 1020.27
MW-13 1010.53
MW-14 1010.29
MW-15 1098.18
MW-16 1011.40
MW-17 1008.64
MW-18 993.50
MW-19 991.14
MW-20 971.82
MW-21 1005.59
MW-22 N/A
MW-23 N/A
MW-24 N/A
MH-01

La Canada Irrigation District
#6
#1
#3
#2
#4
#1
1024.10

Valley Water Company

City of Pasadena Arroyo Well

City of Pasadena Well 52

City of Pasadena Ventura Well

City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3

Lincoln Ave. Water Co. Well #5

Rubio Canon Land and Water Co.
957.00
#4
#7

Las Flores Water Co. Well #2

Oak Grove Ranger Station

Oak Grove Park

Devil's Gate Reservoir

Spreading Grounds

GOULD AVE
HAMPTON RD
CROWN
VIRO RD
OAK GROVE DR
ALTADENA DR
LINCOLN AVE
CASITAS AVE
HARRIET ST
MARIPOSA DR
VENTURA ST
OLIVE AVE
GLENROSE AVE
WINDSOR AVE
FIGEROA
CROSBY STREET

1030
1020
1010
1000
990
980
970
960
950
1050

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- N/A — Well not installed
- — — No Data (Equipment Failure)
- Direction of Groundwater Flow
- JPL Thrust Fault
- JPL Property Line
- —1000— Contour

Note: Contour Interval : 10 feet (Contours Represent Feet Above Mean Sea Level.)

N

800 400 0 800

SCALE IN FEET

Source: USGS, 7.5 Minute Topographic Map Pasadena, CA 1966, Revised 1988, 1994.

FIGURE 3–20

AQUIFER LAYER 1 WATER-TABLE ELEVATION CONTOUR MAP SHOWING ON-SITE FLOW REVERSAL

April 10, 1996

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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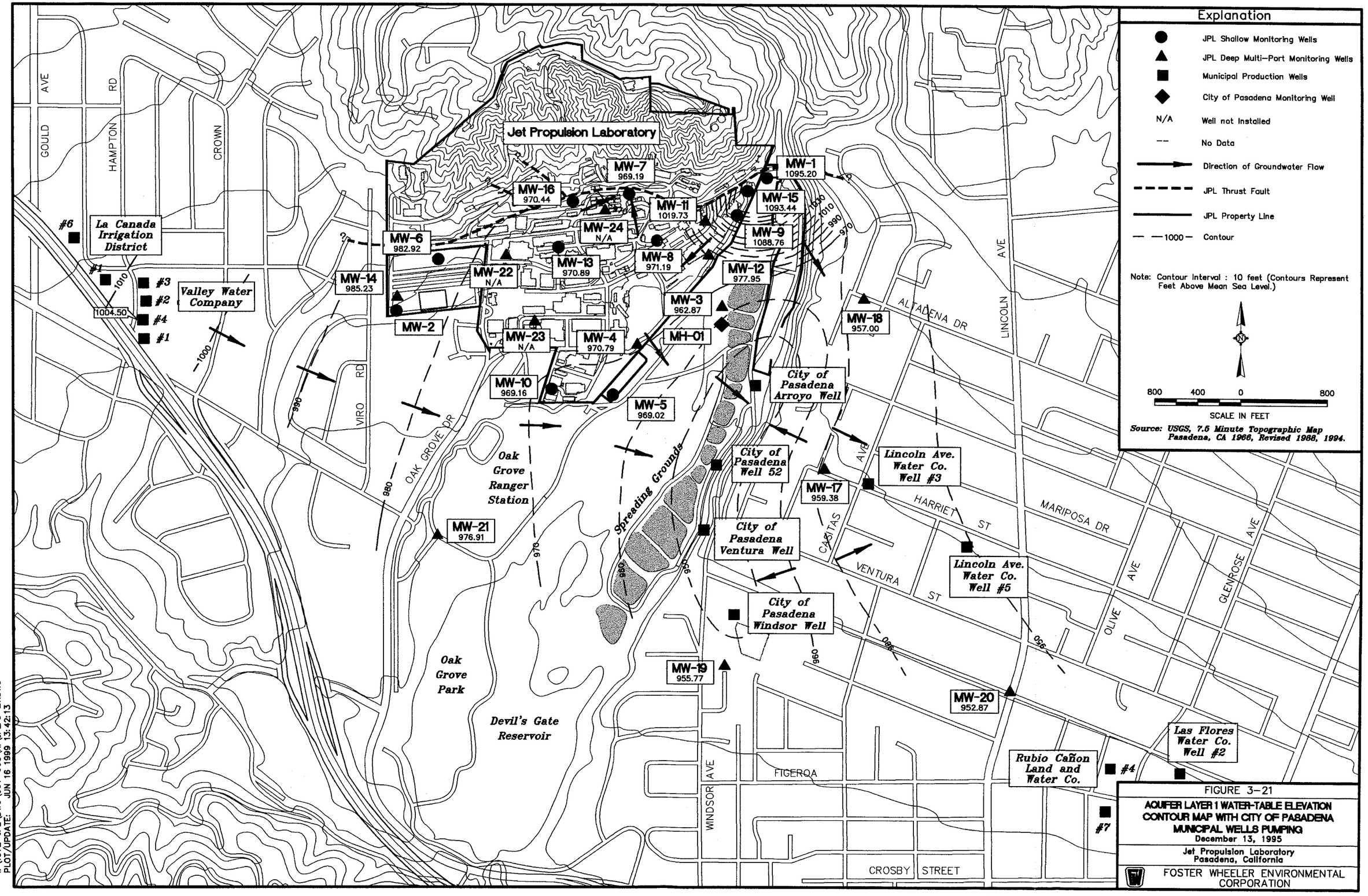

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- N/A — Well not Installed
- -- — No Data
- Direction of Groundwater Flow
- JPL Thrust Fault
- JPL Property Line
- —1000— Contour

Note: Contour Interval : 10 feet (Contours Represent Feet Above Mean Sea Level.)

800 400 0 800

SCALE IN FEET

Source: USGS, 7.5 Minute Topographic Map Pasadena, CA 1966, Revised 1988, 1994.

FIGURE 3-21

AQUIFER LAYER 1 WATER-TABLE ELEVATION CONTOUR MAP WITH CITY OF PASADENA MUNICIPAL WELLS PUMPING

December 13, 1995

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

I:\1572-JPL\DWG\OU1-OU3\RI\JPLF3-21.DWG
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Jet Propulsion Laboratory

MW-1 1084.45
MW-7 960.88
MW-16 962.13
MW-11 1015.33
MW-15 1082.92
MW-24 N/A
MW-9 1080.39
MW-6 --
MW-8 961.72
MW-22 N/A
MW-13 962.54
MW-12 963.57
MW-14 974.64
MW-3 950.76
MW-18 <955.34
MW-2
MW-23 N/A
MW-4 958.58
MH-01
MW-10 960.49
MW-5 958.66
MW-17 952.54
MW-21 966.12*
MW-19 946.45
MW-20 938.03

La Canada Irrigation District
#6
#1
#3
#2
#4
#1
978.70
Valley Water Company
City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well
Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5
Rubio Cañon Land and Water Co.
#4
#7
Las Flores Water Co. Well #2

Oak Grove Ranger Station
Spreading Grounds
Oak Grove Park
Devil's Gate Reservoir

GOULD AVE
HAMPTON RD
CROWN RD
VIRO RD
OAK GROVE DR
WINDSOR AVE
CASITAS AVE
LINCOLN AVE
ALTADENA DR
HARRIET ST
MARIPOSA DR
VENTURA ST
OLIVE AVE
GLENROSE AVE
FIGEROA
CROSBY STREET

1070 1050 1030 1010 990 970 960
990 980 970 960 950 940 930 920

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- N/A — Well not Installed
- -- — No Data
- Direction of Groundwater Flow
- JPL Thrust Fault
- JPL Property Line
- —1000— Contour
- * DUE TO LOW WATER TABLE, DATA FROM SCREEN 2 USED.

Note: Contour Interval : 10 feet (Contours Represent Feet Above Mean Sea Level.)

N

800 400 0 800
SCALE IN FEET

Source: USGS, 7.5 Minute Topographic Map Pasadena, CA 1966, Revised 1988, 1994.

FIGURE 3-22

AQUIFER LAYER 1 WATER-TABLE ELEVATION CONTOUR MAP WITH ALL NEARBY MUNICIPAL PRODUCTION WELLS PUMPING
September 12, 1996

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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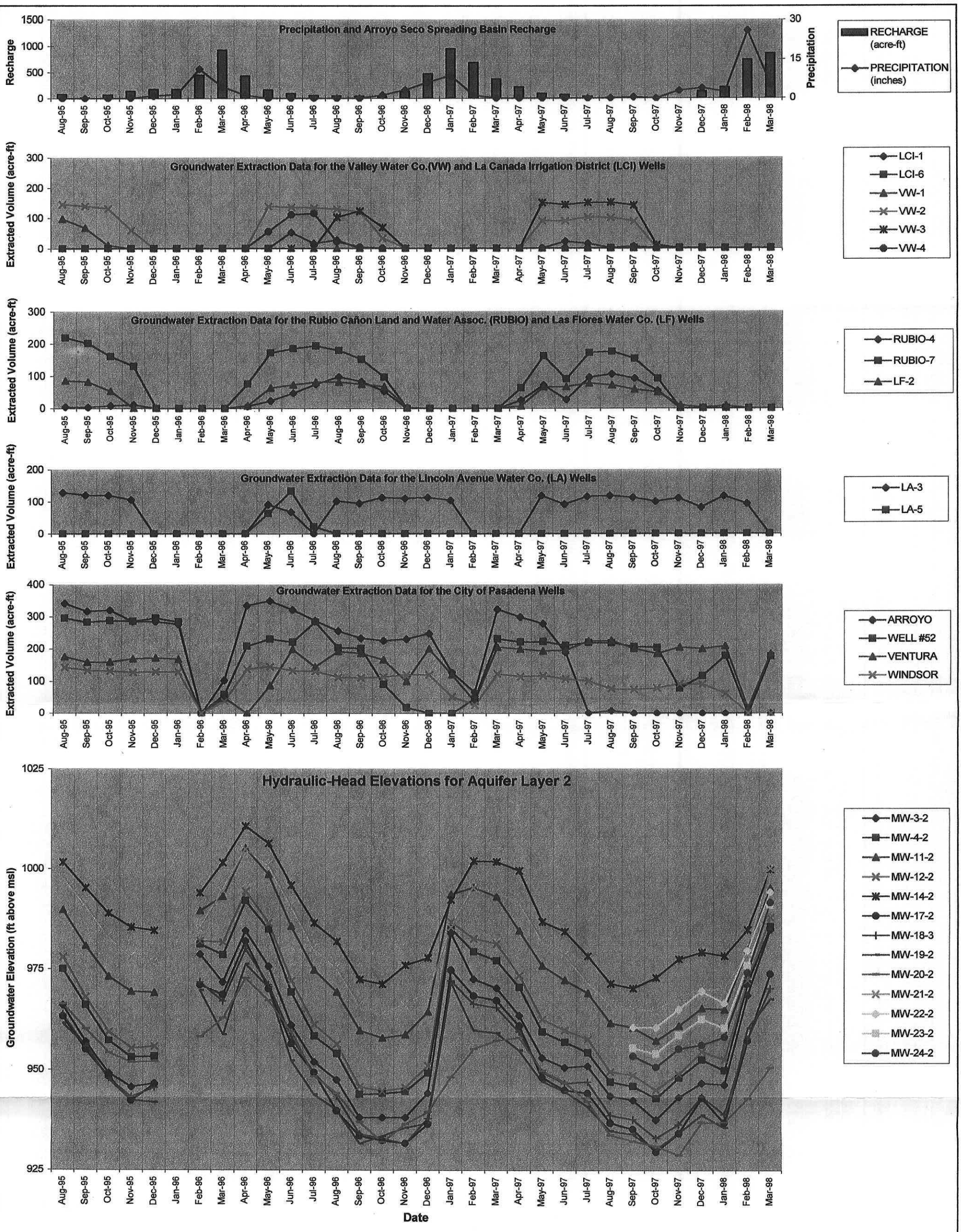

FIGURE 3-23

MUNICIPAL WELL PUMPING VOLUMES, PRECIPITATION DATA, SPREADING BASIN RECHARGE DATA AND HYDRAULIC-HEAD ELEVATIONS FOR AQUIFER LAYER 2

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Jet Propulsion Laboratory

MW-7 —
MW-16 —
MW-1 —
MW-15 —
MW-11 989.55
MW-24 N/A
MW-9 —
MW-6 —
MW-8 —
MW-14 993.95
MW-22 N/A
MW-13 —
MW-12 981.93
MW-3 978.67
MW-2
MW-23 N/A
MW-4 981.21
MH-01
MW-18 971.75
MW-10 —
MW-5 —
MW-17 971.04
MW-21 985.21
MW-19 969.63
MW-20 958.34

#6 #1 #3 #2 #4 #1

La Canada Irrigation District

Valley Water Company

City of Pasadena Arroyo Well

City of Pasadena Well 52

City of Pasadena Ventura Well

City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3

Lincoln Ave. Water Co. Well #5

Las Flores Water Co. Well #2

Rubio Cañon Land and Water Co. #4 #7

Oak Grove Ranger Station

Oak Grove Park

Devil's Gate Reservoir

Spreading Grounds

GOULD AVE
HAMPTON RD
CROWN
VRO RD
OAK GROVE DR
ALTADENA DR
LINCOLN AVE
CASTANA AVE
HARRIET ST
MARIPOSA DR
VENTURA ST
OLIVE AVE
GLENROSE AVE
WINDSOR AVE
FIGEROA
CROSBY STREET

1000 990 980 970 960

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- N/A — Well not Installed
- — — Well not in Aquifer Layer 2
- Direction of Groundwater Flow
- JPL Thrust Fault
- JPL Property Line
- —1000— Contour

Note: Contour Interval : 10 feet (Contours Represent Feet Above Mean Sea Level.)

N

800 400 0 800

SCALE IN FEET

Source: USGS, 7.5 Minute Topographic Map Pasadena, CA 1966, Revised 1988, 1994.

FIGURE 3-24

AQUIFER LAYER 2 POTENTIOMETRIC SURFACE CONTOUR MAP WHEN NEARBY MUNICIPAL PRODUCTION WELLS ARE NOT PUMPING

February 1998

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

I: \1572-JPL\DWG\OU1-OU3\RI\JPLF3-24.DWG
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Jet Propulsion Laboratory

MW-1 —
MW-2 —
MW-3 968.61
MW-4 971.42
MW-5 —
MW-6 —
MW-7 —
MW-8 —
MW-9 —
MW-10 —
MW-11 979.89
MW-12 972.18
MW-13 —
MW-14 984.78
MW-15 —
MW-16 —
MW-17 957.34
MW-18 957.78
MW-19 960.44
MW-20 942.85
MW-21 978.73
MW-22 979.62
MW-23 975.89
MW-24 974.08
MH-01

La Canada Irrigation District
#6
#1
Valley Water Company
#3
#2
#4
#1

City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5
Rubio Cañon Land and Water Co.
#4
#7
Las Flores Water Co. Well #2

Oak Grove Ranger Station
Oak Grove Park
Devil's Gate Reservoir
Spreading Grounds

GOULD AVE
HAMPTON RD
CROWN
VIRO RD
OAK GROVE DR
ALTADENA DR
LINCOLN AVE
CASITAS AVE
HARRIET ST
MARIPOSA DR
VENTURA ST
OLIVE AVE
GLENROSE AVE
WINDSOR AVE
FIGEROA
CROSBY STREET

990
980
970
960
950
940

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- N/A — Well not Installed
- — — Well not in Aquifer Layer 2
- Direction of Groundwater Flow
- JPL Thrust Fault
- JPL Property Line
- — —1000— — Contour

Note: Contour Interval : 10 feet (Contours Represent Feet Above Mean Sea Level.)

N

800 400 0 800

SCALE IN FEET

Source: USGS, 7.5 Minute Topographic Map Pasadena, CA 1966, Revised 1988, 1994.

FIGURE 3-25

AQUIFER LAYER 2 POTENTIOMETRIC SURFACE CONTOUR MAP WITH ONLY THE LINCOLN AVE. WATER COMPANY WELL PUMPING

February 1998

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

I:\1572--JPL\DWG\OU1-OU3\RI\JPLF3-25.DWG
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Jet Propulsion Laboratory

MW-7 —
MW-16 —
MW-11 969.09
MW-24 N/A
MW-6 —
MW-14 984.55
MW-22 N/A
MW-13 —
MW-2
MW-23 N/A
MW-4 953.50
MW-10 —
MW-5 —
MW-1 —
MW-15 —
MW-9 —
MW-8 —
MW-12 955.84
MW-3 946.59
MH-01
MW-18 945.45
MW-17 946.40
MW-21 976.63
MW-19 941.77
MW-20 952.17

#6 La Canada Irrigation District
#1
#3
#2
#4
#1 Valley Water Company

City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5

Oak Grove Ranger Station
Oak Grove Park
Devil's Gate Reservoir
Spreading Grounds

Las Flores Water Co. Well #2
Rubio Cañon Land and Water Co.
#4
#7

GOULD AVE
HAMPTON RD
CROWN
VIRO RD
OAK GROVE DR
ALTADENA DR
LINCOLN AVE
CASITAS AVE
HARRIET ST
MARIPOSA DR
VENTURA ST
OLIVE AVE
GLENROSE AVE
WINDSOR AVE
FIGEROA
CROSBY STREET

990
980
970
960
950
940

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- N/A — Well not Installed
- -- — Well not in Aquifer Layer 2
- Direction of Groundwater Flow
- JPL Thrust Fault
- JPL Property Line
- —1000— Contour

Note: Contour Interval : 10 feet (Contours Represent Feet Above Mean Sea Level.)

N

800 400 0 800

SCALE IN FEET

Source: USGS, 7.5 Minute Topographic Map Pasadena, CA 1966, Revised 1988, 1994.

FIGURE 3-26

AQUIFER LAYER 2 POTENTIOMETRIC SURFACE CONTOUR MAP WITH CITY OF PASADENA WELLS PUMPING

December 1995

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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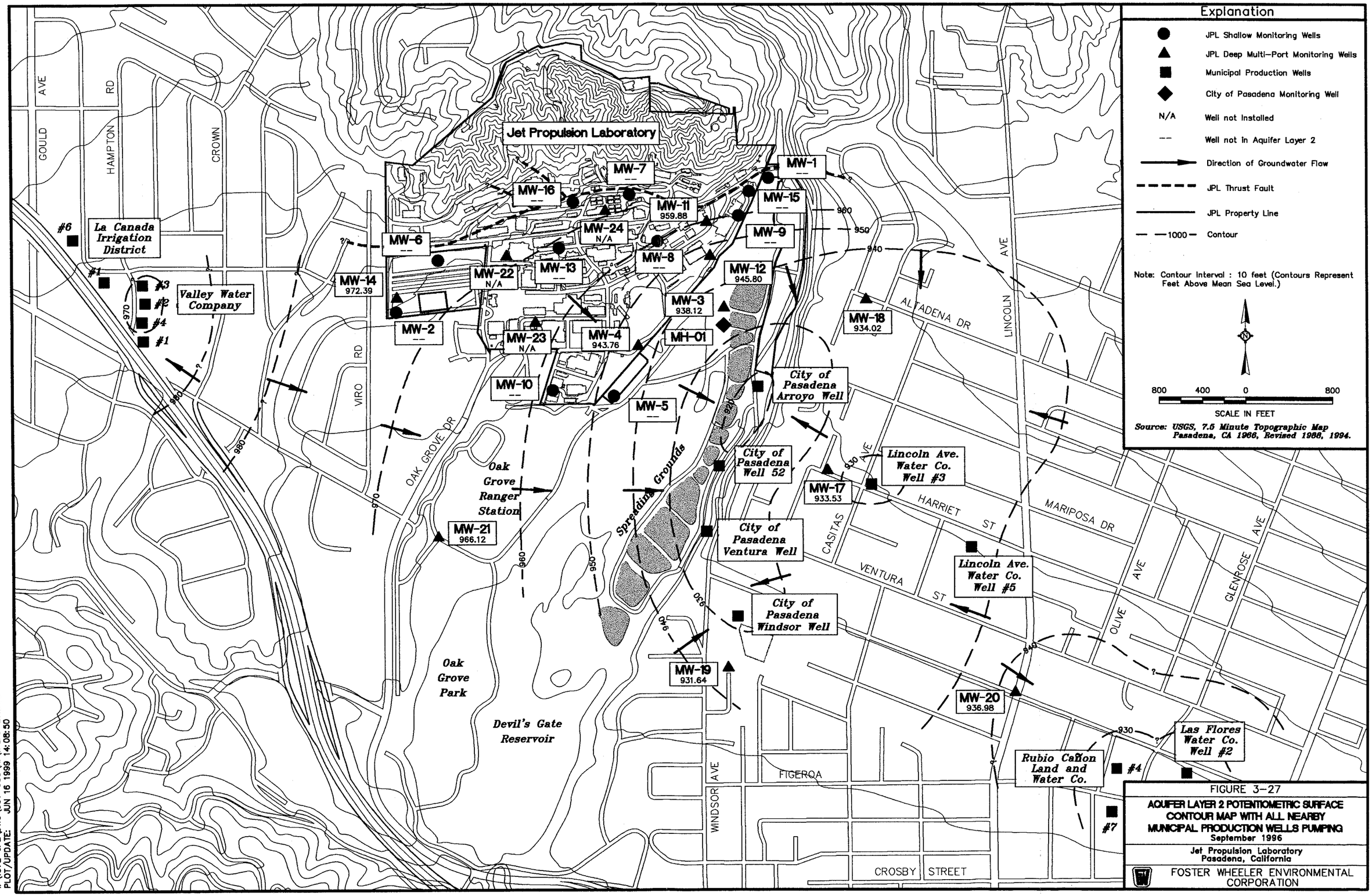

FIGURE 3-27

AQUIFER LAYER 2 POTENTIOMETRIC SURFACE CONTOUR MAP WITH ALL NEARBY MUNICIPAL PRODUCTION WELLS PUMPING

September 1996

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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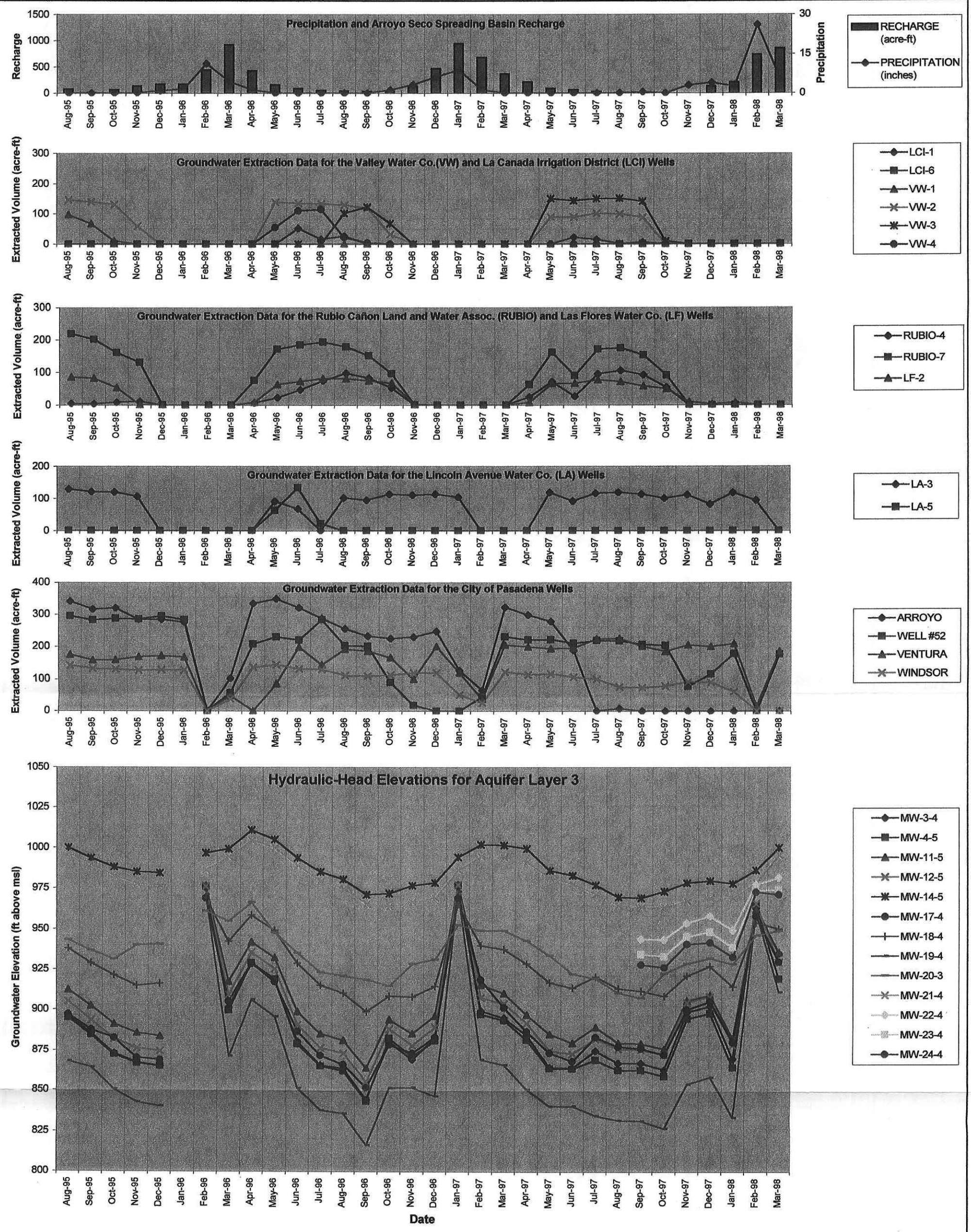

FIGURE 3-28

MUNICIPAL WELL PUMPING VOLUMES, PRECIPITATION DATA, SPREADING BASIN RECHARGE DATA AND HYDRAULIC-HEAD ELEVATIONS FOR AQUIFER LAYER 3

Jet Propulsion Laboratory
Pasadena, California

FOSTER WHEELER ENVIRONMENTAL CORPORATION