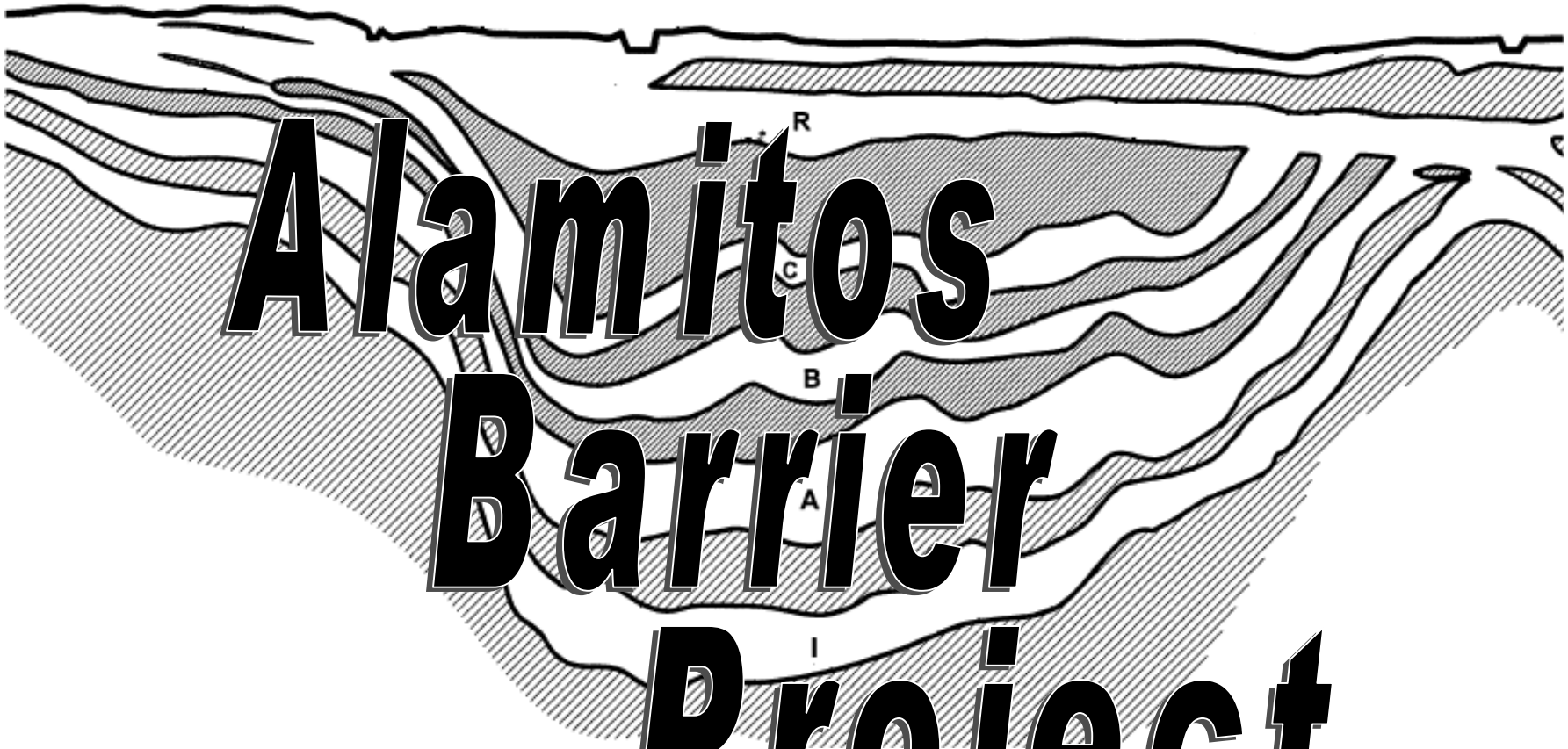

Alamitos Barrier Project

Alamitos Barrier Project

Annual report on the control of seawater intrusion

2006 - 2007

Member Agencies:

Orange County Water District

Water Replenishment District of Southern California

Long Beach Water Department

Golden State Water Company

Los Angeles County Flood Control District

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TABLE OF CONTENTS

Page

Introduction 1
Summary 2
Design and Construction 3
Injection Operations 5
Extraction Operations 10
Maintenance 10
Hydrologic Effects 13
Chlorides 21
Financing and Costs 30
Hydroelectric Revenues 33

FIGURES

1. Monthly Amount of Water Injected 9
2. Annual Amount of Water Injected 9
3. Injection and Extraction Well Operating Status 12

Groundwater Elevation Graphs

4a. Recent Zone West of San Gabriel River 16
4b. Recent Zone East of San Gabriel River 16
5a. C-Zone West of San Gabriel River 17
5b. C-Zone East of San Gabriel River 17
6a. B-Zone West of San Gabriel River 18
6b. B-Zone East of San Gabriel River 18
7a. A-Zone West of San Gabriel River 19
7b. A-Zone East of San Gabriel River 19
8a. I-Zone West of San Gabriel River 20
8b. I-Zone East of San Gabriel River 20

Chloride Concentration Graphs

9a. Recent Zone West of San Gabriel River 25
9b. Recent Zone East of San Gabriel River 25
10a. C-Zone West of San Gabriel River 26
10b. C-Zone East of San Gabriel River 26
11a. B-Zone West of San Gabriel River 27
11b. B-Zone East of San Gabriel River 27
12a. A-Zone West of San Gabriel River 28
12b. A-Zone East of San Gabriel River 28
13a. I-Zone West of San Gabriel River 29
13b. A-Zone East of San Gabriel River 29

TABLES

1. Injection Operations 8
2. Groundwater Elevation Summary 15
3. Chloride Concentration Summary 24
4. Quantity of Water Injected and Costs 30
5. Distribution of Services and Supplies Costs for Injection 31
6. Costs of Services and Supplies for Injection 32
7. Costs of Services and Supplies for Extraction 33

APPENDIX

Recent Aquifer Groundwater A-1
C-Zone Groundwater A-2
B-Zone Groundwater A-3
A-Zone Groundwater A-4
I-Zone Groundwater A-5
Recent Aquifer Chlorides A-6
C-Zone Chlorides A-7
B-Zone Chlorides A-8
A-Zone Chlorides A-9
I-Zone Chlorides A-10
Chloride Section Along Barrier A-11
Chloride Data Used for R Zone Contours & Cross-Section A-12
Chloride Data Used for C Zone Contours & Cross-Section A-13
Chloride Data Used for B Zone Contours & Cross-Section A-14
Chloride Data Used for A Zone Contours & Cross-Section A-15
Chloride Data Used for I Zone Contours & Cross-Section A-17
Groundwater Data Used for R Zone Contours & Cross-Section A-19
Groundwater Data Used for C Zone Contours & Cross-Section A-20
Groundwater Data Used for B Zone Contours & Cross-Section A-21
Groundwater Data Used for A Zone Contours & Cross-Section A-22
Groundwater Data Used for I Zone Contours & Cross-Section A-23
Alamitos Barrier Project Location Map A-24
West Leg Groundwater Elevations for C Zone A-25
West Leg Groundwater Elevations for B Zone A-26
West Leg Groundwater Elevations for A Zone A-27
West Leg Groundwater Elevations for I Zone A-28
East Leg Groundwater Elevations for C Zone A-29
East Leg Groundwater Elevations for B Zone A-30
East Leg Groundwater Elevations for A Zone A-31
East Leg Groundwater Elevations for I Zone A-32
Comparison of Annual Chloride Concentrations A-33

INTRODUCTION

The Alamitos Barrier Project (ABP) was designed and constructed to protect the groundwater supplies of the Central Basin of the County of Los Angeles and the southwest portion of the Coastal Plain area in Orange County from the intrusion of seawater through the Alamitos Gap area. The project facilities are located near the Los Angeles-Orange County line about two miles inland from the mouth of the San Gabriel River. The original facilities included injection wells to form a freshwater pressure ridge and extraction wells to form a saltwater trough. The freshwater ridge that was intended to block the landward gradient of intruding seawater has proven to be historically effective. However, the saltwater trough that was intended to reverse the landward gradient of intruding seawater has proven to be historically ineffective. As a result, the extraction wells are currently not in operation. A map showing the supply pipeline, injection wells, extraction wells, and observation wells is shown on page A-24.

The County of Los Angeles Department of Public Works (Public Works) operates and maintains the project and its physical facilities under the direction and approval of the Joint Management Committee (JMC), acting on behalf of the Los Angeles County Flood Control District (LACFCD) and the Orange County Water District (OCWD).

This report summarizes design and construction issues, operation and maintenance activities, hydrologic effects, groundwater chloride concentrations, and project costs for Fiscal Year (FY) 2006-07 (i.e., July 1, 2006 through June 30, 2007).

A meeting between LACFCD and OCWD was held prior to the generation of this report in order to address a few past applications of data. As a result, the chloride cross-section schematic (A-11) was slightly modified to better represent the aquifer locations and therefore ensure that measured data (particularly for wells 35H11, 35H12, and 35J1) is conveyed properly on the cross-section and contours. Additionally, the coordinates for well 36F'1 were corrected. The final significant change to note is the

updated depiction of the mergence zones and fault line on the background of the contour maps. The JMC is aware that the new depiction of the mergence zones conflicts with the labeled "Recent Zone Boundary," and has determined to resolve this conflict for the next reporting period.

SUMMARY

During this reporting period, a total of 1,265.1 acre-feet of water were injected at an average rate of 1.7 cubic feet per second and a total cost of $604,867. The OCWD purchased 516.5 acre-feet at a cost of $246,345. The Water Replenishment District of Southern California purchased 748.6 acre-feet at a cost of $358,522. The significant reduction in the quantity of water injected compared to past reporting periods is a result of the barrier being shut down during multiple repairs. During this reporting period, the west leg was shut down for about 10 of the 12 months (8 months for the blow off repair at Station 2+65 and concurrent reclaimed plant repairs, one month for the blow off repair at Station 224+97, and one month for the PRV replacement). The east leg was shut down for about 6 of the 12 months (1.5 months for repairs at reclaimed plant; 2.5 months for additional reclaimed plant repairs, isolation valve installation, and miscellaneous repairs by Public Works; one month for the blow off repair at Station 224+97; and one month for the PRV replacement). A timeline detailing the main dates and events of the shutdowns is presented in the Injection Operations Section.

The cost of services and supplies for injection, excluding the costs of water, was $1,825.39/acre-foot this year and significantly greater than the $464.30/acre-foot last year (FY05-06). The higher cost in FY06-07 is the result of managing multiple repair and improvement projects (PRV Replacement, Telemetry Implementation, and Cathodic Protection) during the year, the latest cycle of observation well cleanouts, new costs related to the reclaimed water program, and various fixed costs despite reduced injections due to the shutdowns for repairs. Only the reclaimed water program costs will continue to regularly impact the cost of services and supplies for injection. The project

management costs will vary from year to year depending on the need to repair or improve the barrier facilities. The observation well cleanout costs and injection well redevelopment costs will not be incurred each fiscal year because they are based on cyclical activities.

As expected, the reduced injections during the reporting period resulted in significant decreases to the average groundwater levels in all aquifers, especially at internodal wells. Similarly, chloride concentrations at many of the wells throughout the barrier system have increased. Details concerning the areas that recorded low groundwater elevations and/or increased chloride concentrations are discussed in detail later on.

DESIGN AND CONSTRUCTION

The current improvement projects and their status are briefly summarized below. The general location of each project is identified on the map on page A-24.

Barrier Water Supply Facilities Improvements Project Phase 1

This project involves bonding the pipe joints and installing sacrificial anodes along a portion of the water supply pipeline. It was originally anticipated that construction of this cathodic protection system (known as the Barrier Water Supply Facilities Improvements project) would begin in FY 2005-06. However, the project was postponed for budgetary reasons and final design plans and specifications were not completed. As a result, design plans and specifications were further modified throughout FY 2006-07 to identify specific joint locations and up-to-date utilities. Due to right of way complications and funding, portions of the project were left out to be completed at a later date as Phase 2. The contract for Phase 1 of this project was awarded near the end of FY 2006-07 and construction is expected to both begin and end during FY 2007-08.

Barrier Water Supply Facilities Improvements Project Phase 2

This project is identical in scope and history to that of Phase 1 but covers different portions of the same water supply pipeline. These portions were separated out during FY 2006-07 due to right of way complications and funding. Design plans and specifications were initiated near the end of FY 2006-07 and expected to be complete so that the project can be awarded during FY 2007-08. Construction is expected to both begin and end during FY 2008-09.

ABP Replacement of Valves at Pressure Reducing Station

The pressure reduction vault renovation project includes replacement of the aging pressure regulating valves and ball valves and removal of the hydroelectric generation plant. This project (advertised as the Alamitos Barrier Project and Dominguez Gap Barrier Project Replacement of Valves at Pressure Reducing Stations, and Miscellaneous Improvements) began construction in FY 2005-06, as scheduled, but was delayed due to other components of the contract not related to the ABP. Construction was completed, tested, and accepted at the end of FY 2006-07.

ABP Telemetry System Phase 1

Phase 1 of the ABP Telemetry System includes the installation of new conduits, pull boxes, observation well vaults, instrument housing, and antenna poles. Design plans and specifications were completed and the project was advertised and awarded near the end of FY 2005-06. Construction began and ended in FY 2006-07.

ABP Telemetry System Phase 2

Phase 2 of the ABP Telemetry System includes the installation of the communications cables, the instrumentation, and the software to monitor the well sites remotely. Design plans and specifications were completed during this FY 2006-07 reporting period, and the project was advertised but not awarded. It is anticipated the project will be awarded near the beginning of FY 2007-08 and that construction will begin and end during the same fiscal year.

INJECTION OPERATIONS

The total amount of water injected into the ABP during this reporting period was 1,265.1 acre-feet. Of this total, 24% (306.6 acre-feet) was reclaimed water and 76% (958.5 acre-feet) was imported water. The proportion of reclaimed injection was lower than typical because of the barrier shutdowns. There were multiple times when the barrier (or at least the east leg) was operational, but reclaimed water was not injected because either the total flow was lower than the reclaimed plant's minimum operational flow or the reclaimed plant was undergoing some maintenance.

According to the California Regional Water Quality Control Board (CRWQCB) permit, File No. 93-076 of Order No. R4-2005-0061, the running percentage of reclaimed water into the ABP for up to a 60-month period cannot exceed 50 percent. Since ABP reclaimed injections began in October 2005, the 60-month period includes injections prior to the delivery of reclaimed water into the barrier. Through this reporting period, the 60-month running percentage of reclaimed water into the barrier was 7.2% and therefore in compliance.

The maximum monthly injection of 381.0 acre-feet (381.0 acre-feet imported and 0.0 acre-feet reclaimed) occurred in May 2007. The minimum monthly injection of 0.0 acre-feet occurred in both July 2006 and October 2006 while the barrier was shutdown for repairs to the blow off at Station 2+65 and the reclaimed plant. The injection volumes and costs from July through June of both FY 2005-06 and FY 2006-07 are shown in Table 1. The Table shows a decrease in total injection amount from FY 2005-06 to FY 2006-07, which was expected due to the extensive shutdowns to the barrier throughout FY 2006-07.

Below is a summary of events regarding the ABP operational status from the end of FY 2005-06 through this reporting period. If necessary, further dates and details will be appropriately provided in future reports.

- April 14, 2006: Public Works shuts down ABP's PRV as requested. Shutdown is

due to maintenance on the Metropolitan Water District's South Coast Feeder, which will stop the water supply to LB-07A upstream of the PRV. Long Beach Water Department (LBWD) and WRD are allowed to continue delivery of reclaimed water to the ABP.

- April 24, 2006: LBWD shuts down the reclaim plant to allow Public Works to drain the supply pipeline and utilize the shutdown by performing video inspection for the cathodic protection project.
- June 22, 2006: Public Works completes video inspection and restoration.
- June 26, 2006: Public Works begins to recharge the barrier.
- June 27 and 28, 2006: Public Works identifies multiple leaks, including a leak near the blow-off vault at Station 2+65.00 along the west leg. Meanwhile, LBWD and WRD identify a leak within the reclaim plant. West leg is isolated to allow delivery to the east leg, but entire barrier is shut down to accommodate repairs at the reclaim plant.
- August 15, 2006: WRD completes immediate repairs and installation of temporary flange to allow operation.
- August 16, 2006: Public Works puts east leg of ABP back into operation. Since total flow through east leg alone is too low to accommodate reclaimed water, only imported water being injected.
- September 14, 2006: Public Works fully shuts down ABP again for WRD's installation of isolation valve and replacement gasket.
- October 27, 2006: WRD completes repairs and installation of isolation valve and gasket but ABP remains shut down for Public Works to complete needed repairs on the east leg (near well 34S).
- November 27, 2006: Public Works completes minor east leg repairs at well 34S.
- November 28, 2006: Public Works puts the east leg of ABP back into operation. Since total flow through east leg alone is too low to accommodate reclaimed water, only imported water being injected.
- December 14, 2006: Public Works allows LBWD and WRD to resume reclaimed water deliveries. East leg now in operation with both imported water and

reclaimed water while Public Works pursues contract for the last known repair along the west leg, the blow-off valve and vault at Station 2+65.00.

- January 25, 2007: Public Works issues contractor (New Creation Builders) the Notice to Proceed with the necessary repairs.
- February 28, 2007: Public Works' contractor completes the blow-off repair at Station 2+65.00. The line was charged and the wells were turned on the following day.
- March 8, 2007: Public Works shuts down entire barrier due to a new blow-off leak, this time at Station 224+97.00 (upstream of the T-vault). Public Works soon evaluates and determines this repair can be completed in-house.
- April 27 through May 1, 2007: Public Works completes the blow-off repair at Station 224+97 in-house, charges the line, and turns on the wells (with imported water only).
- June 4, 2007: Public works fully shuts down ABP for the PRV replacement.
- June 27 through July 6, 2007: ABP PRV replacement is completed. Public works charges the line and turns on wells (still with imported water only).

TABLE 1. INJECTION OPERATIONS

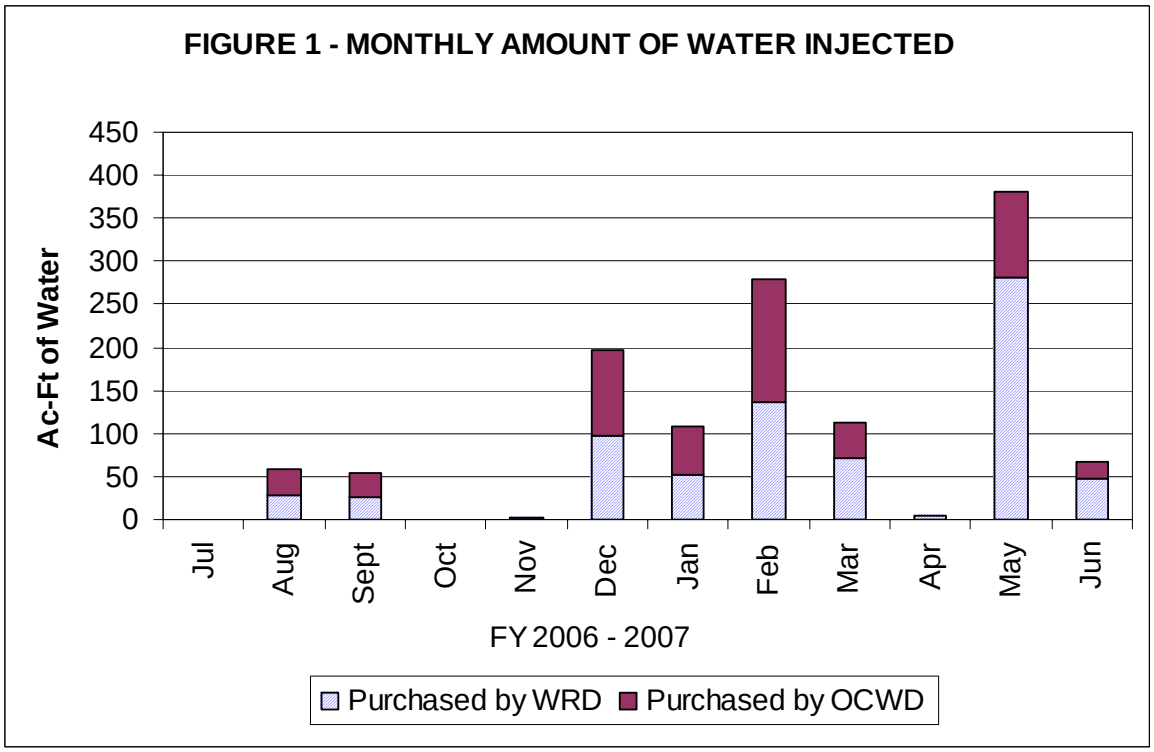
	Imported Water Injections			Reclaimed Water Injections			Total Injections		
	FY05-06	FY06-07	Percent Change From Previous Year	FY05-06	FY06-07	Percent Change From Previous Year	FY05-06	FY06-07	Percent Change From Previous Year
	VOLUME OF WATER INJECTED IN ACRE-FEET								
OCWD[1]	572.1	366.3	-36.0	254.6	150.2	-41.0	826.7	516.5	-37.5
WRD[2]	1,710.2	592.2	-65.4	920.9	156.4	-83.0	2,631.1	748.6	-71.5
TOTAL	2,282.3	958.5	-58.0	1,175.5	306.6	-73.9	3,457.8	1,265.1	-63.4
	UNIT COST OF WATER PER ACRE-FEET [3]								
JULY - DEC	$448.00	$458.00	2.2	$480.21	$499.77	4.1			
JAN - JUN	$458.00	$483.00	5.5	$492.98	$483.00	-2.0			
	COST OF WATER PURCHASED								
OCWD[1]	$257,613	$173,463	-32.7	$124,287	$72,882	-41.4	$381,900	$246,345	-35.5
WRD[2]	$770,646	$282,658	-63.3	$449,470	$75,865	-83.1	$1,220,116	$358,522	-70.6
TOTAL	$1,028,259	$456,121	-55.6	$573,757	$148,747	-74.1	$1,602,016	$604,867	-62.2
	AVERAGE INJECTION RATE IN CFS								
OCWD[1]	0.8	0.5	-36.0	0.4	0.2	-41.0	1.1	0.7	-37.5
WRD[2]	2.4	0.8	-65.4	1.3	0.2	-83.0	3.6	1.0	-71.5
TOTAL	3.2	1.3	-58.0	1.6	0.4	-73.9	4.8	1.7	-63.4

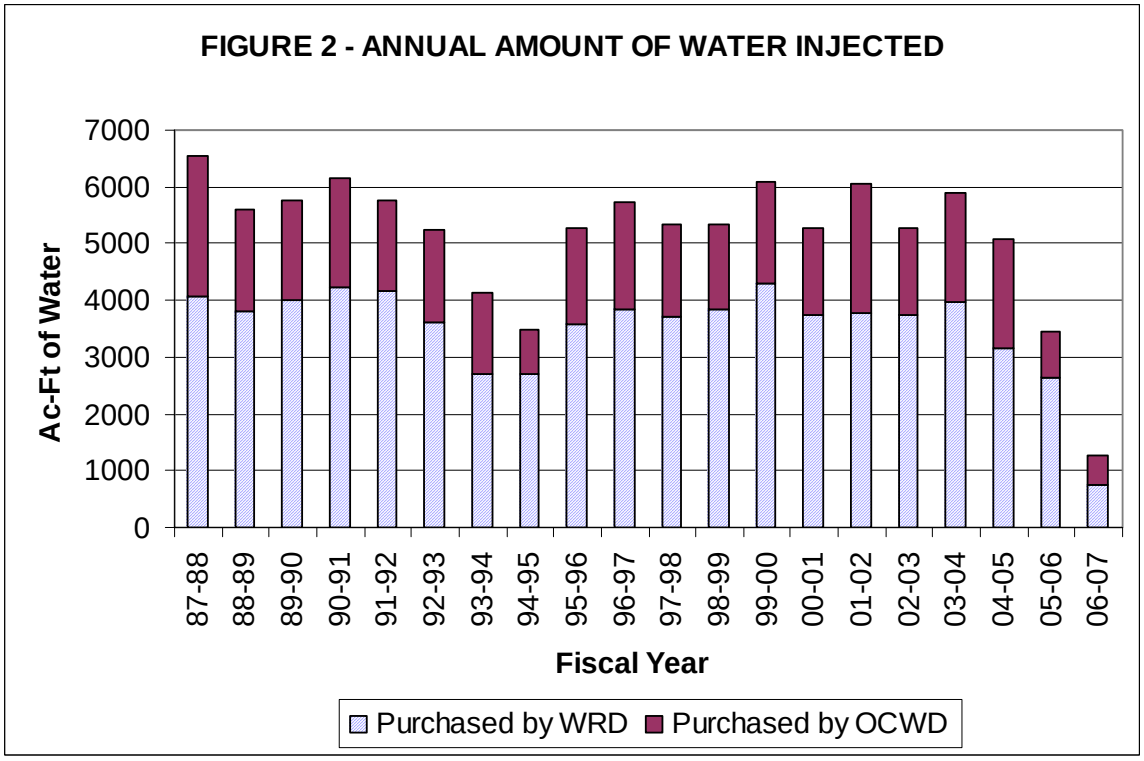
[1] Orange County Water District

[2] Water Replenishment District

[3] Note: The Unit Cost of Reclaimed Water Per Acre-Feet for July - December 2006 was previously reported as $498.50 in the July - December 2006 JMC Report. The corrected rate is $499.77 as shown.

Figure 1 presents the monthly amounts of water injected during FY 2006-07. Figure 2 illustrates the annual amounts of water injected over the last 20 years.





EXTRACTION OPERATIONS

There were no extraction activities during FY 2006-07. As recommended by the JMC Committee, these wells were taken out of operation in FY 2002-03. This decision was based on results of the one-year extraction well efficiency study, which demonstrated that the chloride levels in the area decreased when the extraction wells were turned off. The extraction wells will continue to receive minimal maintenance so that they can be turned back on if deemed necessary in the future. Since there has been no extraction activity since FY 2002-03, the traditional summary tables are no longer being included in the annual reports.

MAINTENANCE

The purpose of observation well cleanouts is to remove accumulated sediment at the bottom of the well screens to facilitate better chloride sampling of the wells. Observation well sediment accumulation is typically analyzed every two years for all 177 active observation wells. All wells determined to have obstructed perforations receive the necessary cleanout services. During this reporting period, 43 ABP observation well casings were cleaned out. These cleanouts completed the set of 91 that was initiated during FY 2005-06. The cleanout logs for each casing will be analyzed and any resulting recommendations will be detailed in appropriate reports.

The purpose of injection well redevelopments is to remove accumulated sediments and organic build-up from the well casings to enable each well to operate at its maximum injection capacity. Each of the 43 injection well casings is routinely developed once every two years. During FY 2006-07, Public Works completed the redevelopment of the following 3 injection well casings[1]: 34V(I), 34V(C,B), and 34V(A). These three casings were redeveloped in July 2006 and completed the latest ABP redevelopment cycle. The next cycle is expected to begin early in FY 2007-08.

[1] The capital letters in parenthesis represent the aquifer(s) receiving injections from that well casing. For example, (A) = A Zone aquifer, (A,I) = A and I Zone aquifers, and so forth.

Figure 3 depicts the operating status of each injection and extraction well during FY 2006-07. As indicated, most periods of nonoperation during this reporting period were due to either “Other Circumstances” (i.e., the blow-off repairs) or the PRV replacement. The transition time before and after repairs will continue to be reduced as much as possible.

FIGURE 3 - ABP INJECTION AND EXTRACTION WELL STATUS - FY06-07

Well No.	2006 JUL	2006 AUG	2006 SEP	2006 OCT	2006 NOV	2006 DEC	2007 JAN	2007 FEB	2007 MAR	2007 APR	2007 MAY	2007 JUN
33G (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O D	D D D	O O O
33J (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O D	D	O O O
33L (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33N (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33Q (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33Q1 (C,B)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33S (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33S1 (C,B)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	N N O O	O O O N	N N N	O O O
33T (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33U (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33U3 (C,B)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33V (A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33W (C,B,A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O O
33X (C,B,A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33Y (C,B,A,I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33Z (C,B,A,I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
33Z2 (A)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
33Z2 (I)	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O O O	O O	O O O		O O O
34D (C,B,A,I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34E (C,B)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34E (I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34F (A)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34F (A,I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34G (I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34G2 (C,B)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34G2 (A,I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34H (A)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34H (I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34J (A)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34J (I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34L (C,B,A,I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
34S (A)	O O O O	O O X X	X X O O	O O O O	O O O O	M M M M	M M M M	M M M	O O	O O O		O O O
34S (I)	O O O O	O O X X	X X O O	O O O O	O O O O	M M M M	M M M M	M M M	O O	O O O		O O O
34S (C,B)	O O O O	O O X X	X X O O	O O O O	O O O O	M M M M	M M M M	M M M	O O	O O O		O O O
34V (A)	O O O O	O O D	O O	O O O O	O O O O	D			O O	O O O		O O O
34V (I)	O O O O	O O D	O O	O O O O	O O O O	D			O O	O O O		O O O
34V (C,B)	O O O O	O O D	O O	O O O O	O O O O	D			O O	O O O		O O O
34Z (I)	O O O O	O O	O O	O O O O	O O O O	H			O O	O O O		O O O
35F (I)	O O O O	O O	O O	O O O O	O O O O				O O	O O O		O O O
35G (A,I)	O O O O	O O M	M M O O	O O O O	O O O O	D			O O	O O O		O O O
35H1 (A)	O O O O	O O M	M M O O	O O O O	O O O O	M			O O	O O O	S S S	O O O
35H1 (I)	O O O O	O O M	M M O O	O O O O	O O O O	M	S S S S	S S S S	S S O O	O O O S	S S S S	O O O
35H2 (A)	O O O O	O O	O O	O O O O	O O O O	O			O O	O O O		O O O
* 33V'15P	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
* 34H'17P	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
* 34H'18P	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
* 34S'22P	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N

*Extraction Well

- [ ] - Well in Operation
- H - Header Repair
- R - Redevelopment
- W - Water Quality Sampling
- C - Casing Repair
- M - Misc. Repair
- S - Surface Leakage
- X - Waiting for Repair
- D - Disassembled
- N - Not Needed
- T - Tremie Repair
- G - Grouted
- O - Other Circumstances
- U - Under Construction

HYDROLOGIC EFFECTS

Table 2 summarizes average groundwater elevations during the spring months of the last 10 years. As expected, the reduced injections during this reporting period resulted in significant decreases to all the groundwater levels in all aquifers, especially at the internodal wells. From spring 2006 to spring 2007, the average decrease in groundwater elevation within the upper aquifers (R, C, and B) was 6.1 feet and the average decrease in groundwater elevation within the lower aquifers (A and I) was 12.1 feet.

Figures 4 through 8 show the average monthly groundwater elevation against the 10-year average groundwater elevation in the vicinity of the barrier alignment in the R, C, B, A, and I Zones, respectively. The data includes semi-monthly, monthly, semi-annual, and annual values for wells within the barrier alignment and landward for approximately 2,000 feet from the barrier. Two graphs were created for each aquifer to account for changes in groundwater elevation trends along the barrier alignment: wells west of the San Gabriel River and wells east of the San Gabriel River.

In each figure, monthly average groundwater elevations during the FY 2006-07 are compared with the averages of the previous 10 years (Fiscal Years 1997-98 to 2005-06). As shown, groundwater levels this year were typically below historical values, more substantially on the west side of the San Gabriel River than the east because the west leg of the barrier was shut down for a longer duration. It is noted that the climb in groundwater levels beginning in November 2006 for all graphs (especially east of the San Gabriel River) is a result of starting up of the east leg of the barrier following the repairs to the east leg and the reclaimed plant. On the other hand, the one month of operation from August to September 2006 did not seem to impact the groundwater elevations, but could have countered what would have otherwise been a decrease due to increased summer pumping. Other consistent trends for each graph include a peak in February 2007 (perhaps due to heavy rainfall that month) and a peak

in May 2007 (resulting from the operation of the entire barrier between the completion of the second blow-off repair and the shutdown for the PRV replacement).

Groundwater elevation contours for the R, C, B, A, and I Zones have been prepared from data taken in March 2007 and are included in the Appendix (A-2 through A-6). A list of all data points used for these contours is also included in the Appendix (A-19 through A-23). As expected, the contours show that the groundwater levels typically decrease as you move either landward or northward of the barrier. The groundwater mounds regularly seen around injection wells are not present on these contours because the data set represents one of the periods during which the entire barrier was shut down. Also, in the last report, it was noted that areas typically higher in elevation were actually lower than their surroundings, especially near the bend at the San Gabriel River. Many of the wells in this area require larger volumes of water to maintain protective elevations, so are therefore more sensitive to a shutdown. However, this trend is not as noticeable in this reporting period, likely because the extended shutdowns allowed the sensitive wells substantial time to adjust to their surroundings.

For further graphical analyses of the shutdowns' impacts on the C, B, A, and I Zone groundwater elevations, please reference the Appendix (A-25 to A-32). The included graphs present the change in elevations at the internodal wells (measured semi-monthly) with reference to each well's targeted protective elevation (PE). The graphs are divided into the west and east legs of the ABP, cover this entire reporting period, and clearly show the correspondence between low groundwater elevations and the periods that the barrier was shutdown. Most of the internodal groundwater elevations respond quickly and significantly to the barrier shutdowns and startups, but there are a few that remain less sensitive. The only unexpected trend identified in these graphs is that well 33ST's January 2007 drop in groundwater elevation (in both the C and B Zones) appeared to occur one measuring cycle behind the rest of the wells. The data was verified, and can perhaps be explained by the fact that this well borders the Los Cerritos Channel and may have been subject to a unique factor at that time.

TABLE 2. GROUNDWATER ELEVATION SUMMARY FOR PREVIOUS YEARS

Zones	Description		Groundwater Elevations (ft) Spring 1998	Spring 1999	Spring 2000	Spring 2001	Spring 2002	Spring 2003	Spring 2004	Spring 2005	Spring 2006	Spring 2007
R	North of Westminster Ave except in the vicinity of the extraction wells	Maximum	4.3	5.0	5.9	5.0	1.0	-0.9	4.2	4.9	9.3	2.8
		Minimum	-5.4	0.0	-1.6	-2.2	-3.0	-7.6	-8.8	2.6	-1.7	-4.6
		Average	0.4	1.9	1.4	0.4	-0.9	-1.8	-0.4	3.6	2.7	-1.8
C & B	Internodal Wells West of San Gabriel River	Maximum	11.1	11.1	4.1	6.7	10.9	2.1	9.9	8.3	2.3	-0.5
		Minimum	1.7	2.7	2.5	2.0	0.5	-0.4	3.7	1.8	-0.2	-6.9
		Average	5.5	7.9	7.8	5.0	7.0	1.1	7.3	4.2	0.9	-4.5
	Internodal Wells East of San Gabriel River	Maximum	3.2	8.0	3.8	6.0	7.8	0.4	4.1	7.0	9.3	-2.0
		Minimum	-2.9	2.4	-0.9	-1.1	-2.3	-6.4	3.1	2.6	1.0	-5.8
		Average	1.5	4.4	0.6	1.1	1.1	-4.2	3.5	4.8	3.4	-4.6
	East of Los Alamitos Channel (landward)	Maximum	6.9	9.3	-3.2	-3.0	-2.4	-7.7	2.4	4.1	3.3	-1.7
		Minimum	-2.3	-2.3	-10.2	-8.0	-7.5	-13.2	-1.5	2.1	2.2	-4.8
		Average	2.9	2.3	-6.6	-5.0	-5.1	-11.8	0.2	3.2	2.6	-3.5
A	Internodal Wells	Maximum	11.1	8.8	5.4	3.9	6.0	2.6	2.5	7.5	10.8	-3.2
		Minimum	-1.9	-0.3	-2.5	-2.7	3.1	-6.6	-11.0	1.4	-3.3	-8.6
		Average	4.2	6.0	3.1	1.8	3.5	-3.1	-3.9	4.0	4.6	-6.4
I	Internodal Wells	Maximum	8.2	6.2	4.0	2.8	4.3	3.9	2.5	6.7	11.1	-3.3
		Minimum	-5.0	-1.0	-8.3	-6.7	-6.6	-12.9	-13.0	-4.3	-1.4	-13.2
		Average	4.2	1.9	-3.0	-2.2	-3.5	-7.3	-6.3	1.9	6.0	-10.0
MAIN	Main Unaffected by Injection Operations	Maximum	6.9	*	-6.9	-2.5	-5.6	-7.4	1.6	-1.0	11.7	4.0
		Minimum	-33.0	*	-30.7	-35.2	-39.6	-60.6	-34.9	-39.7	-16.6	-18.5
		Average	-17.1	*	-19.8	-19.6	-23.9	-34.9	-17.8	-23.1	-7.4	-11.8

*** NO DATA**

DATA FOR MAIN ZONE, SPRING 2005 TAKEN OCT 2005
DATA FOR MAIN ZONE, SPRING 2003 TAKEN JULY 2003

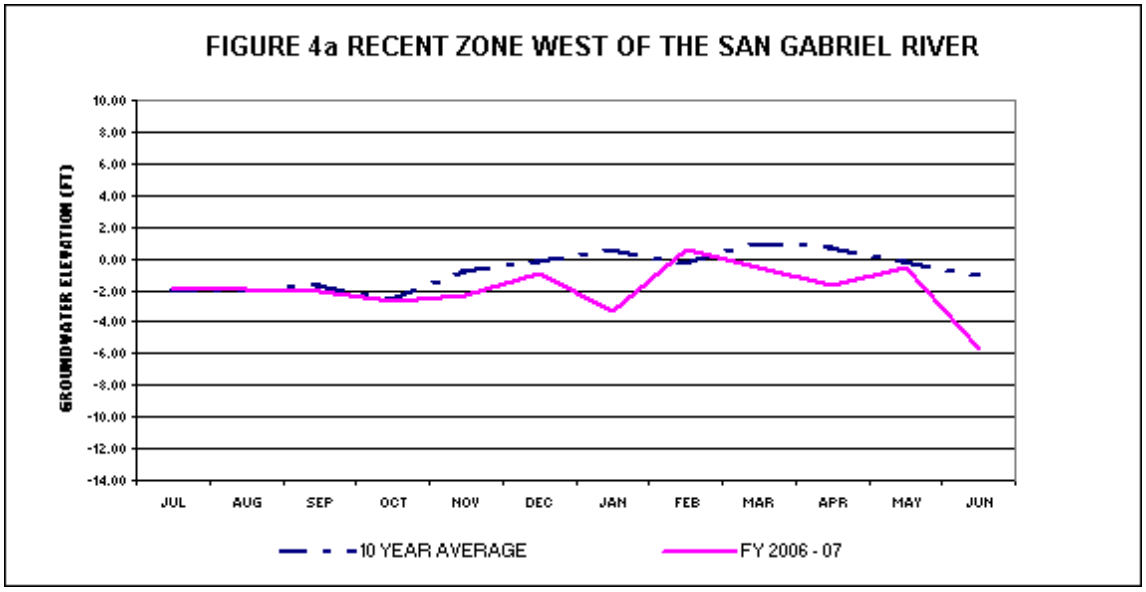


FIGURE 4a RECENT ZONE WEST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
-12.00
-14.00
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 2006 - 07

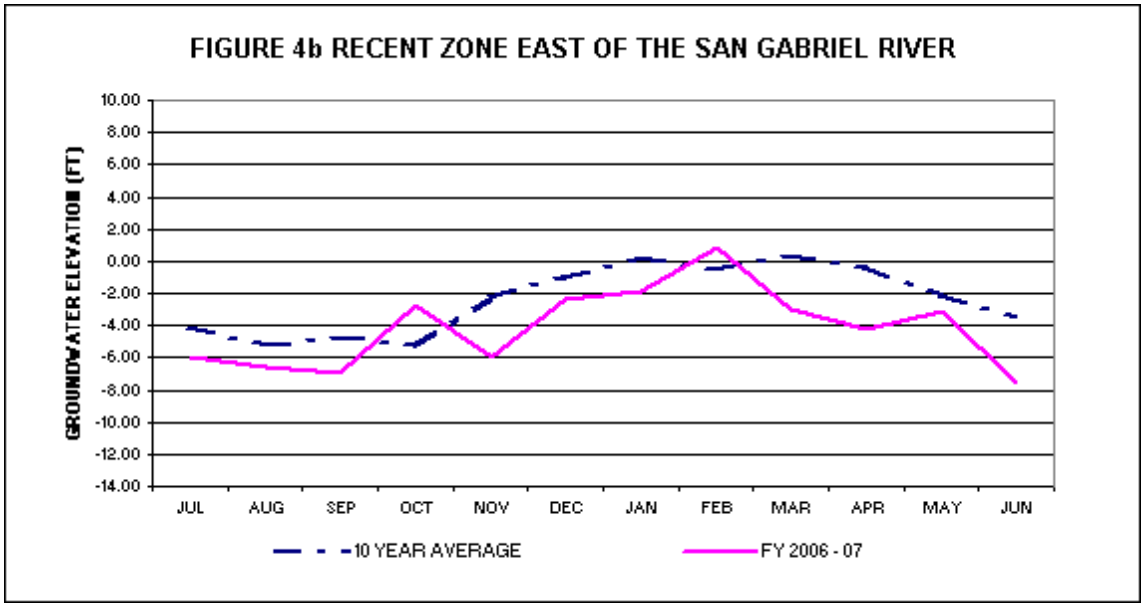


FIGURE 4b RECENT ZONE EAST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
-12.00
-14.00
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 2006 - 07

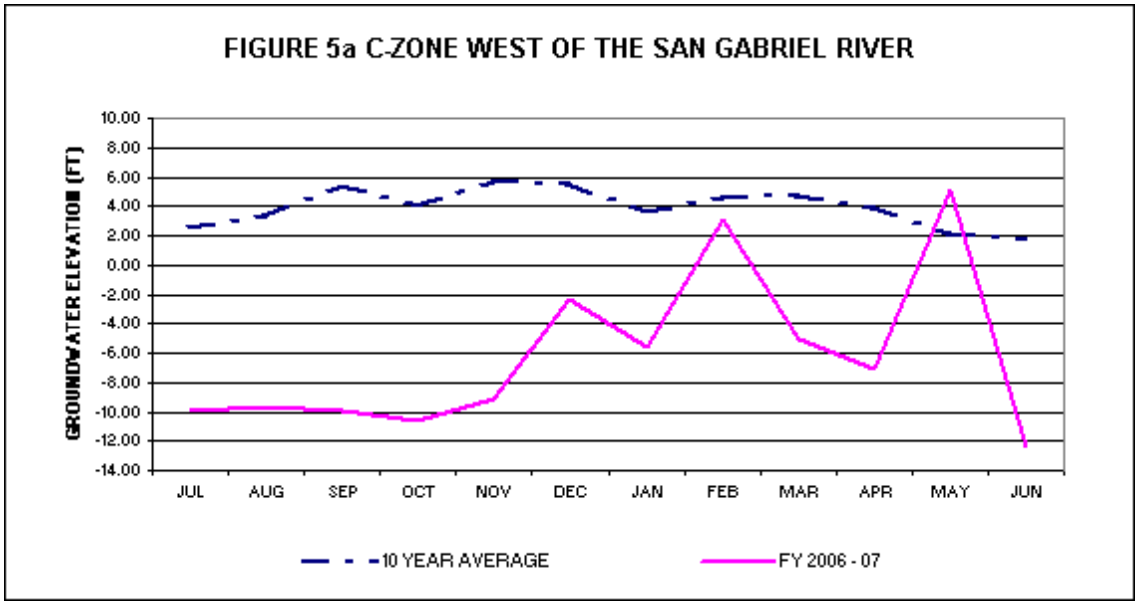


FIGURE 5a C-ZONE WEST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
-12.00
-14.00
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 2006 - 07

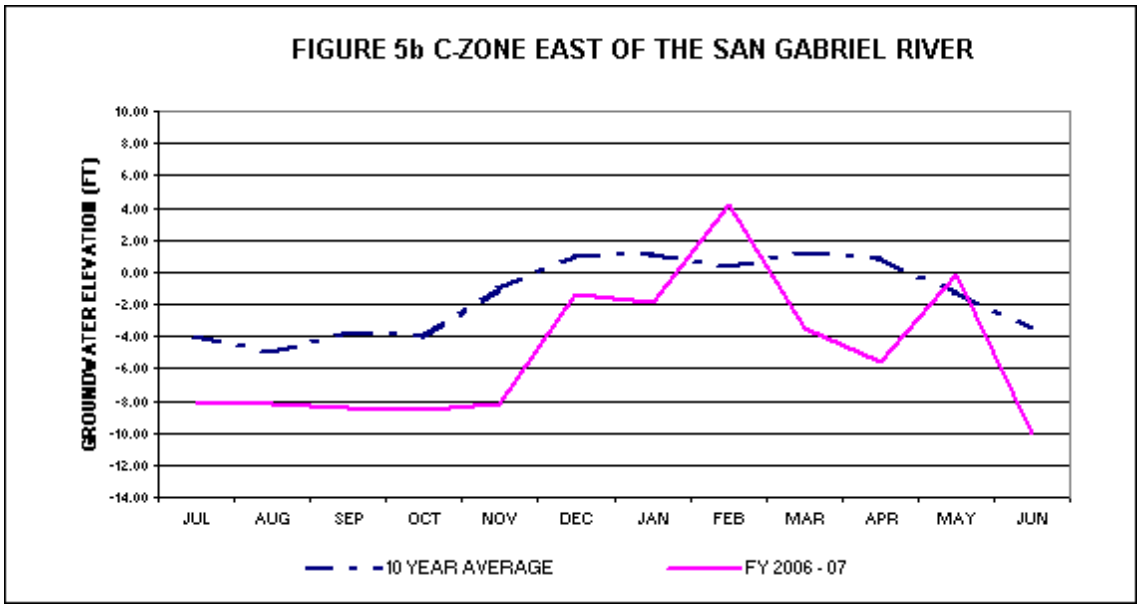


FIGURE 5b C-ZONE EAST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
-12.00
-14.00
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 2006 - 07

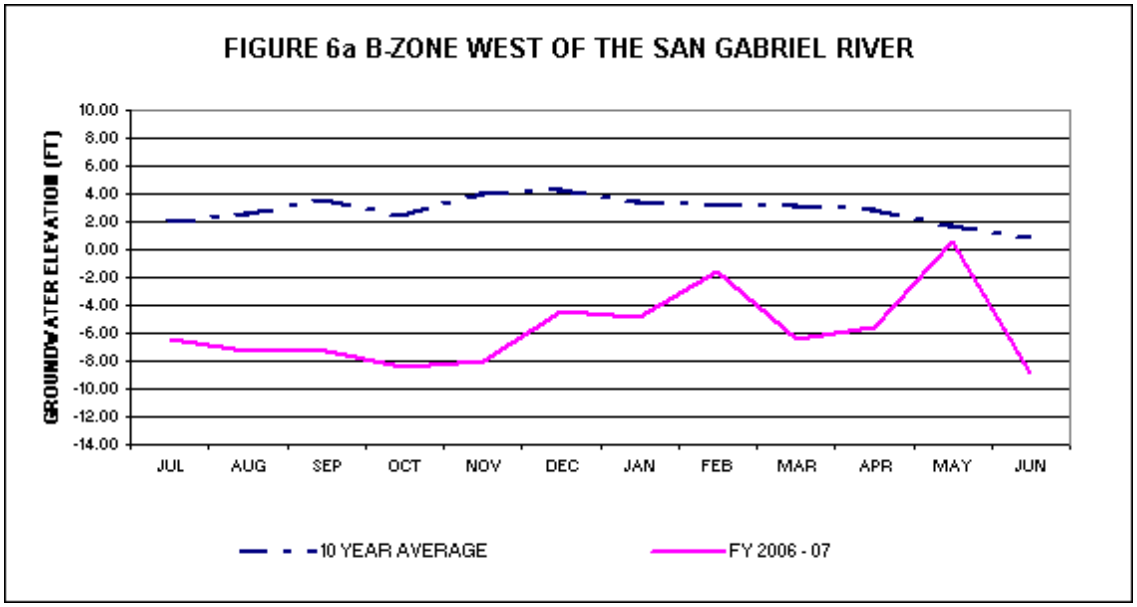


FIGURE 6a B-ZONE WEST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
-12.00
-14.00
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 2006 - 07

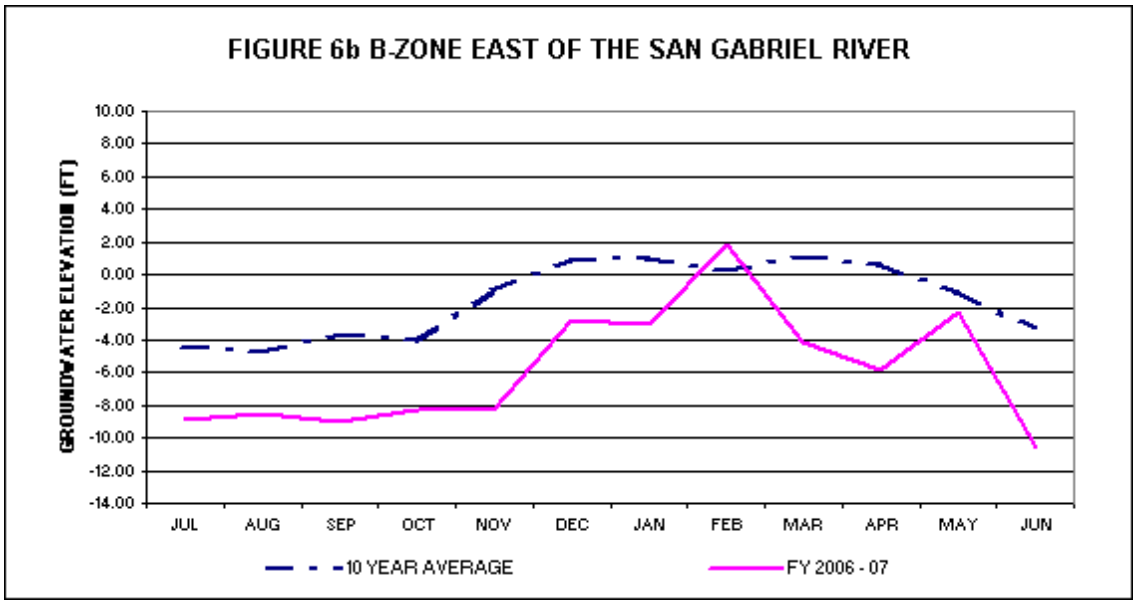


FIGURE 6b B-ZONE EAST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
-12.00
-14.00
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 2006 - 07

FIGURE 7a A-ZONE WEST OF THE SAN GABRIEL RIVER

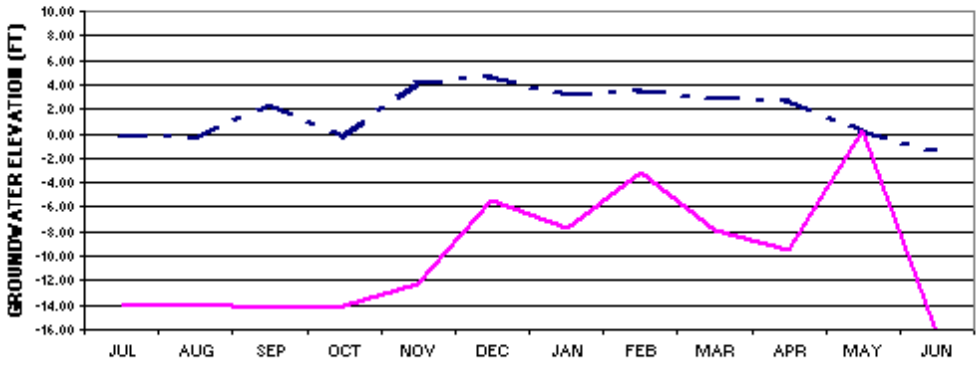
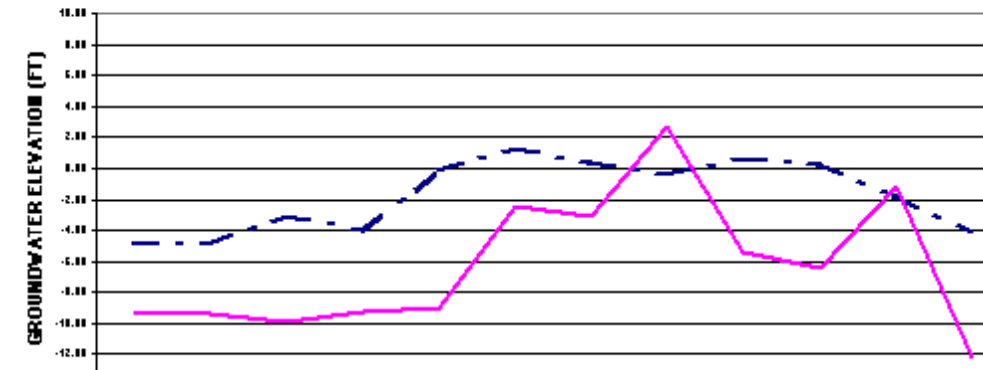


FIGURE 7b A-ZONE EAST OF THE SAN GABRIEL RIVER



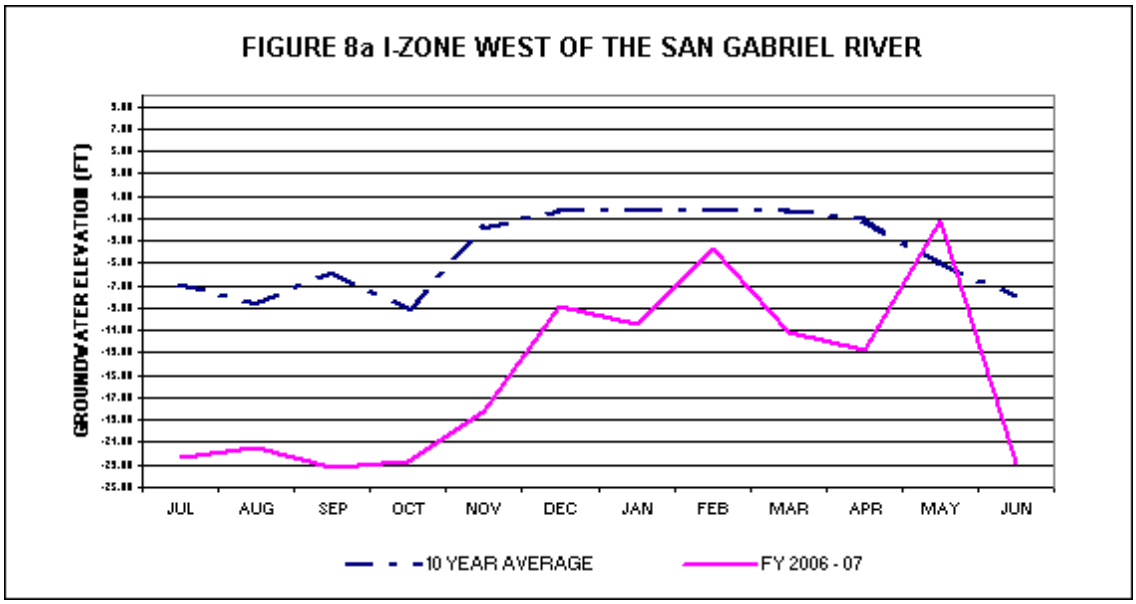


FIGURE 8a I-ZONE WEST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 2006 - 07

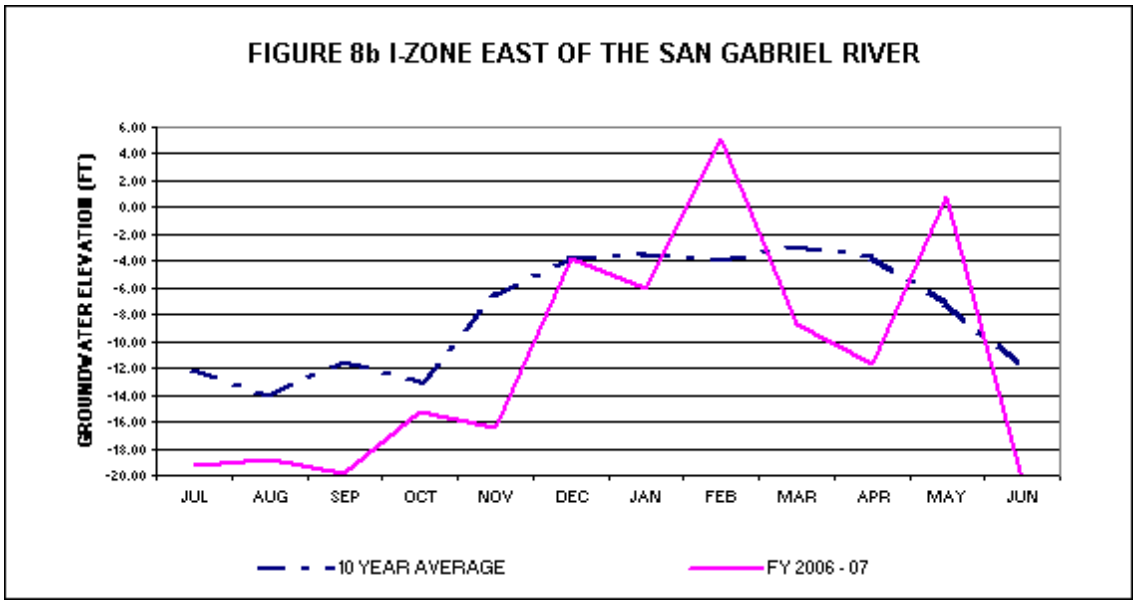


FIGURE 8b I-ZONE EAST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
-12.00
-14.00
-16.00
-18.00
-20.00
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 2006 - 07

CHLORIDES

Table 3 summarizes and compares the chloride concentrations by Zone and Location for FY 2005-06 and FY 2006-07. As shown, the majority of the average chloride concentrations, both internodal and inland, have increased from last fiscal year to this fiscal year. In general, this is likely due to the multiple barrier shutdowns. However, the average internodal chloride concentrations for the A and I Zones actually decreased, which may indicate that these aquifers have not yet been or will not be impacted by the shutdowns. It is important to note that the abnormally large increase in the C and B Zone internodal maximum values (and therefore average values) is due to only one well, 33ST. Such a high chloride concentration is historically inconsistent, but is supported by WRD's high conductivity measurements. All other internodal values for both C and B Zones were below 600 mg/L, so the jump appears to be an isolated event. Well 33ST will be monitored closely so that progress updates can be included in future reports.

Figures 9 through 13 show the historical amount of seawater intrusion (based on average annual chloride concentrations) in the individual aquifer zones. The data includes both annual and semi-annual values for wells within the barrier alignment and landward for approximately 2,000 feet from the barrier. Two sets of graphs were created for each aquifer to account for changes in chloride concentration trends in the areas west and east of the San Gabriel River, respectively.

In each figure, the average chloride concentration for the last 10 fiscal years is shown with respect to the freshwater condition (250 mg/L). As shown, chloride concentrations increased west of the San Gabriel River in all Zones except the A Zone. This general increase is likely due to the multiple barrier shutdowns that impacted the west leg of the barrier throughout this reporting period. East of the San Gabriel River, chloride concentrations remained relatively steady, potentially because the east leg of the barrier was not shutdown as much as the west leg.

Chloride contour maps for the R, C, B, A, and I Zones have been prepared as presented in the Appendix (Figures A-6, A-7, A-8, A-9, and A-10, respectively). The chloride contour maps for this reporting period are based on the highest chloride ion concentration (mg/L) measured at each observation well. Chloride data were gathered within the immediate vicinity of the barrier and do not represent basin-wide conditions for the groundwater basin protected by the barrier. Wells with chloride concentrations of 250 mg/L or less are considered fresh. The majority of chloride measurements reported this period were taken in November 2006 through March 2007. However, a few older data points as far back as the previous two fiscal years were included where necessary and applicable. The incorporation of these points allowed for a more accurate and more complete representation of the conditions around the barrier. A list of all data points used for these contours is included in the Appendix (A-12 through A-18).

The contours (A-6 through A-10) and cross-section (A-11) for this reporting period indicate that intrusion of seawater across the barrier continued to be controlled along most of the alignment. However, several areas continue to record high chloride concentrations. For all zones, the southeastern end of the barrier continued to be subject to seawater intrusion. In the shallower aquifers (the C and B Zones), there are simply no injection wells in this southeastern region. However, in the deeper aquifers (the A and I Zones), the possible causes may be the barrier shutdowns and the physical limit of our injection rates due to the very thin (and therefore very pressure-sensitive) aquitards in this region. Additional areas of high chloride concentrations are as follows:

- R Zone – North of ABP west leg along Los Cerritos Channel and along the barrier at the San Gabriel River.
- C Zone – ABP west leg along Los Cerritos Channel.
- B Zone – ABP west leg west of Los Cerritos Channel.
- A Zone – Northwest of ABP west leg.
- I Zone – ABP west leg at Los Cerritos Channel and ABP east leg around well 34LS.

There are three possible causes of the high chloride concentrations north of, northwest of, and along portions of the ABP west leg (in Zones R, C, B, and A). These include the transportation of seawater inland by the Los Cerritos Channel, insufficient protection on that end of the barrier, and remaining seawater from previous intrusions. This trend, as well as the general increase in chloride concentrations at many locations, is also a result of the multiple barrier shutdowns. The high chlorides remaining around 34LS (in Zone I) likely arose from the prolonged nonoperation of nearby injection well 34S.

For further details of the shutdown's impact on the R, C, B, A, and I Zone chloride concentrations, please reference the Appendix (A-33). The included table presents side-by-side data for the two most recent annual sampling events that occurred in Spring 2006 (previous fiscal year) and Spring 2007 (this fiscal year). There are more increases than decreases, which was expected following the multiple and prolonged shutdowns during this last reporting period. As the table shows, most of the increases are not substantial, but are indicative of the barrier's effectiveness during operation. It is imperative that the barrier operates consistently to best prevent seawater intrusion. Since all repairs have been completed and the ABP resumed normal operations at the end of this fiscal year, we expect our consistent operations during the next reporting period to produce a decline in most chloride concentrations.

TABLE 3. CHLORIDE CONCENTRATION SUMMARY

Zones	Description		June 2006 (mg/L)	March 2007 (mg/L)	% Change
R	North of Westminster Ave	Maximum	19,900	19,600	-1.5
		Minimum	62	35	-43.5
		Average	4,307	5,644	31.0
C	Internodal Wells[1]	Maximum	138	17,700	12,726
		Minimum	66	51	-22.7
		Average	86	1,685	1,855
	Inland Wells	Maximum	1,800	1,150	-36.1
		Minimum	76	82	7.9
		Average	331	251	-24.4
B	Internodal Wells[1]	Maximum	495	17,700	3,476
		Minimum	42	33	-21.4
		Average	152	1,308	760.4
	Inland Wells	Maximum	2,300	2,850	23.9
		Minimum	40	40	0.0
		Average	267	372	39.5
A	Internodal Wells	Maximum	4,750	4,900	3.2
		Minimum	38	35	-7.9
		Average	257	256	-0.5
	Inland Wells	Maximum	3,800	3,850	1.3
		Minimum	36	18	-50.0
		Average	259	319	23.3
I	Internodal Wells	Maximum	8,300	7,750	-6.6
		Minimum	38	37	-2.6
		Average	659	503	-23.7
	Inland Wells	Maximum	410	1,150	180.5
		Minimum	26	20	-23.1
		Average	131	198	50.9

[1] An abnormally high chloride concentration was measured at 33ST(C,B), but is supported by WRD conductivity data.

Figure 9a: R-Zone Chloride West of San Gabriel River

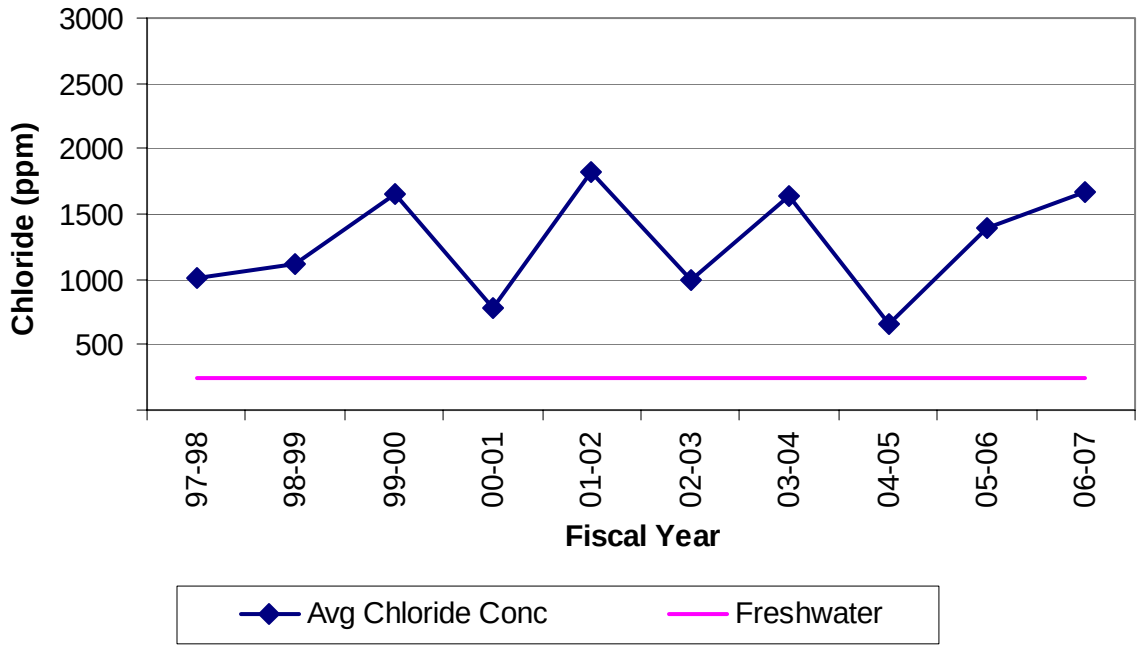
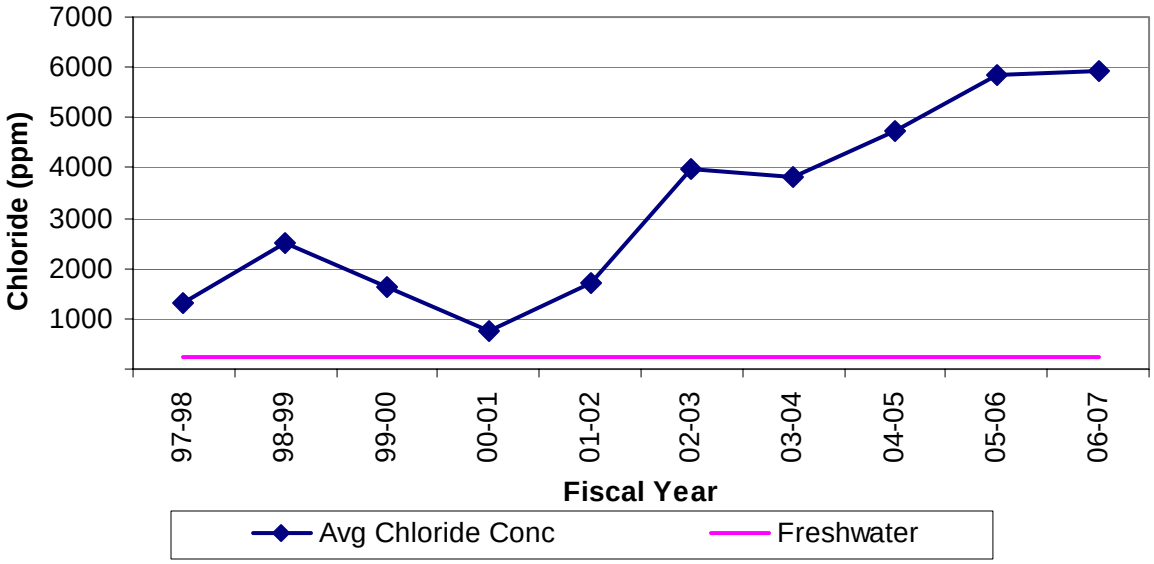


Figure 9b: R-Zone Chloride East of San Gabriel River



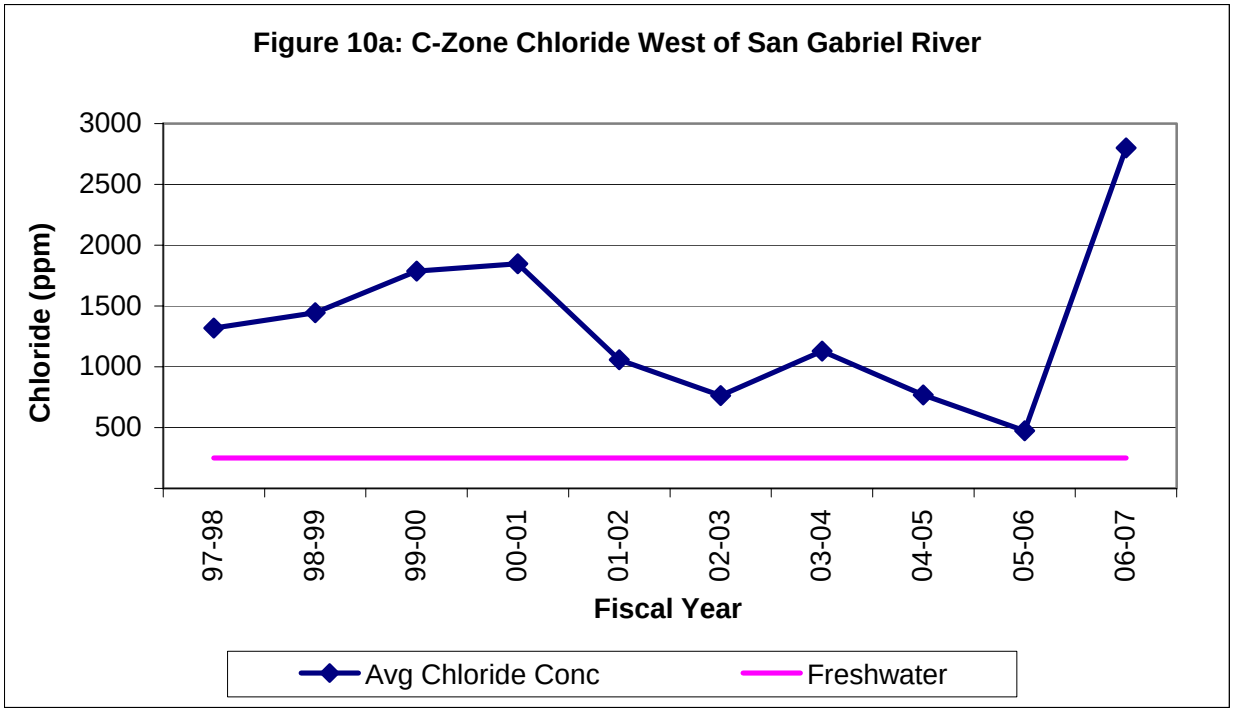


Figure 10a: C-Zone Chloride West of San Gabriel River
Chloride (ppm)
3000
2500
2000
1500
1000
500
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
Fiscal Year
Avg Chloride Conc
Freshwater

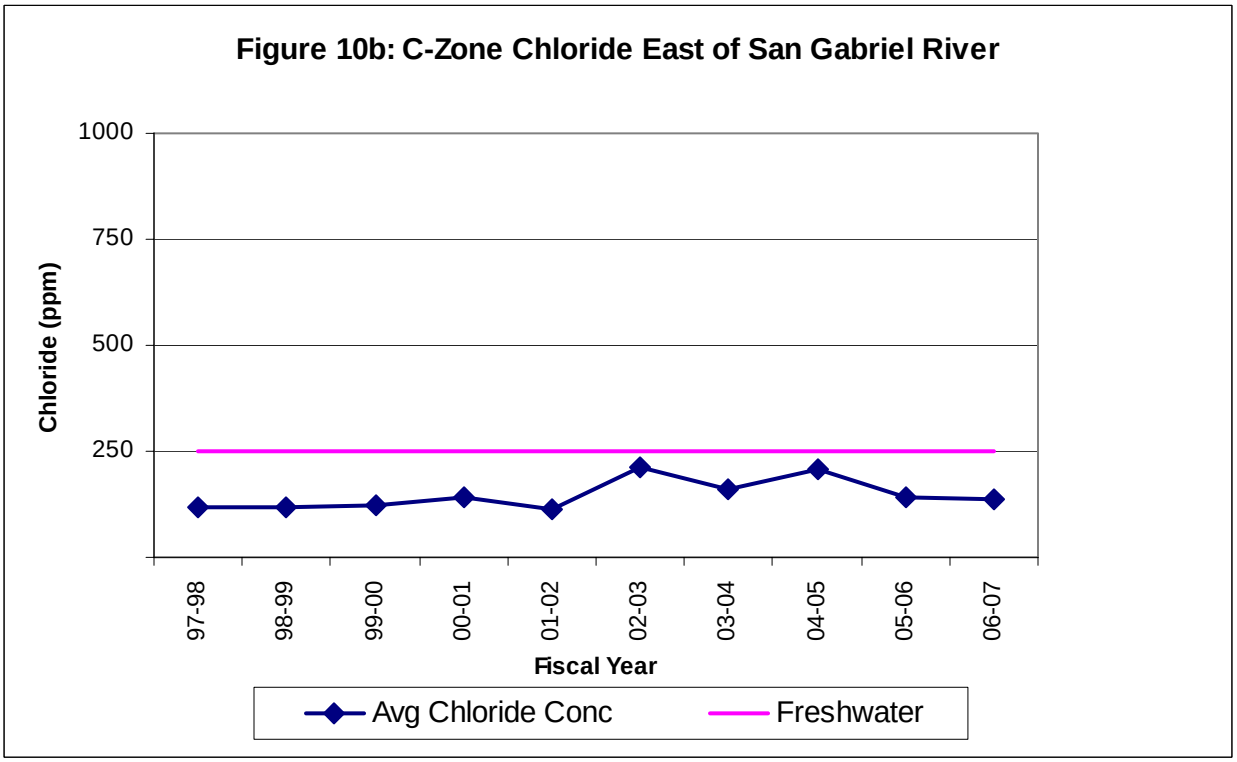


Figure 10b: C-Zone Chloride East of San Gabriel River
Chloride (ppm)
1000
750
500
250
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
Fiscal Year
Avg Chloride Conc
Freshwater

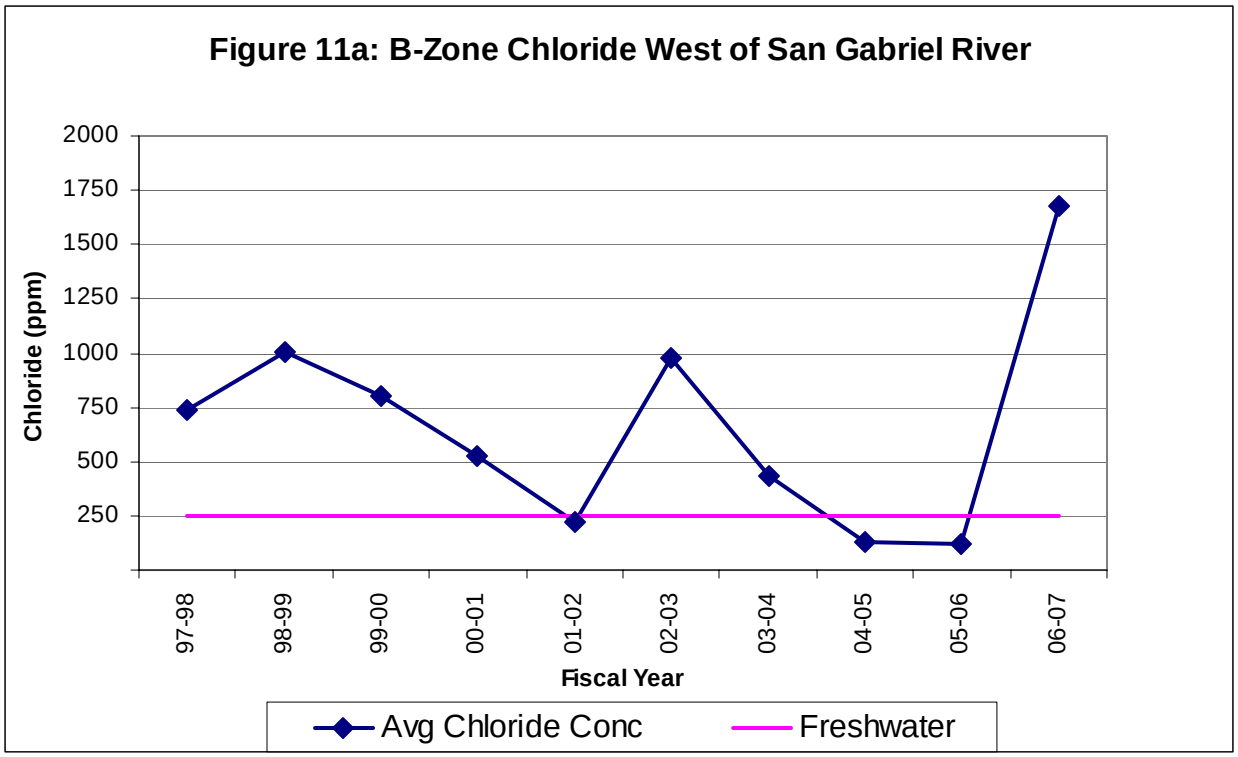


Figure 11a: B-Zone Chloride West of San Gabriel River
Chloride (ppm)
2000
1750
1500
1250
1000
750
500
250
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
Fiscal Year
Avg Chloride Conc
Freshwater

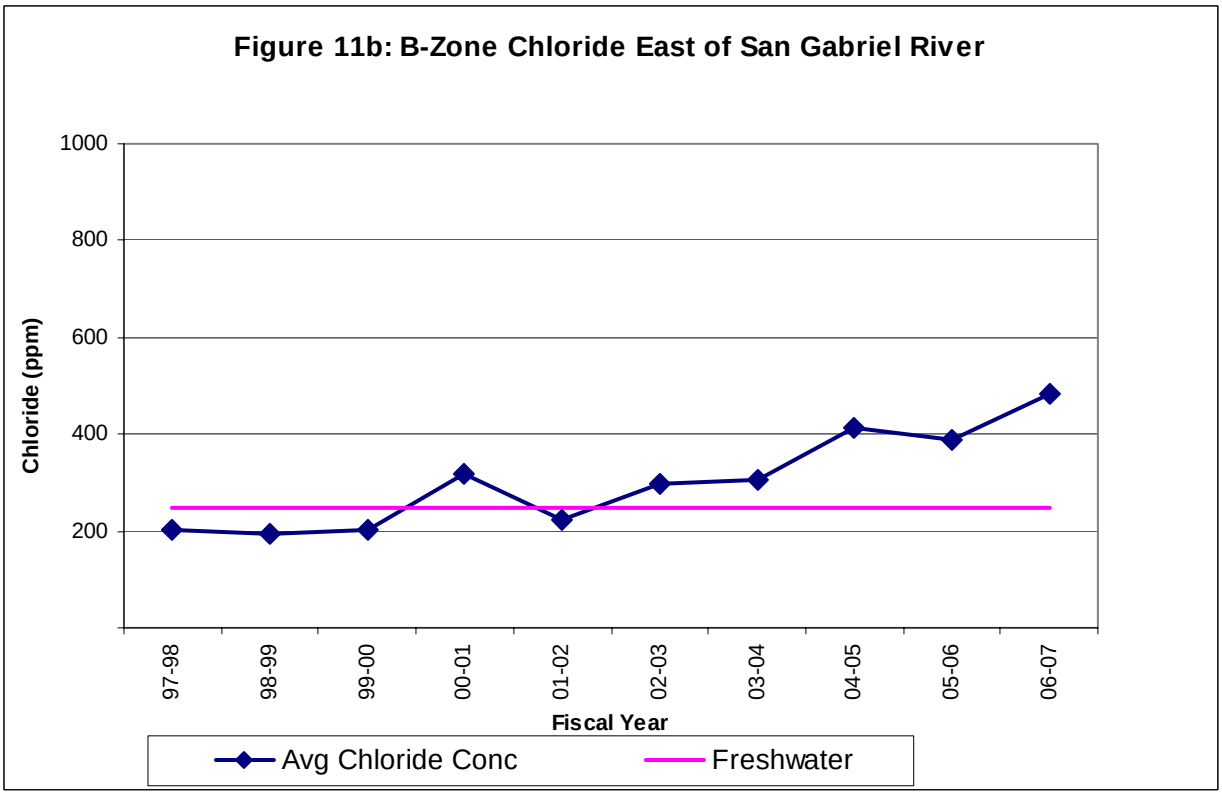


Figure 11b: B-Zone Chloride East of San Gabriel River
Chloride (ppm)
1000
800
600
400
200
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
Fiscal Year
Avg Chloride Conc
Freshwater

Figure 12a: A-Zone Chloride West of San Gabriel River

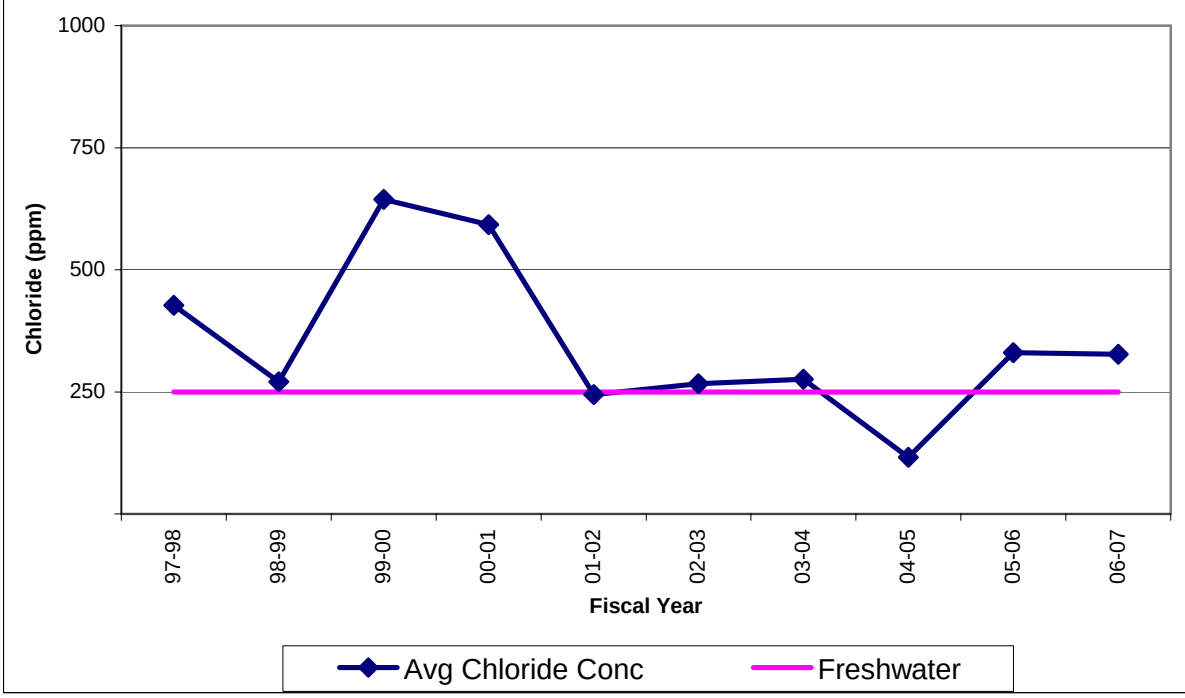


Figure 12b: A-Zone Chloride East of San Gabriel River

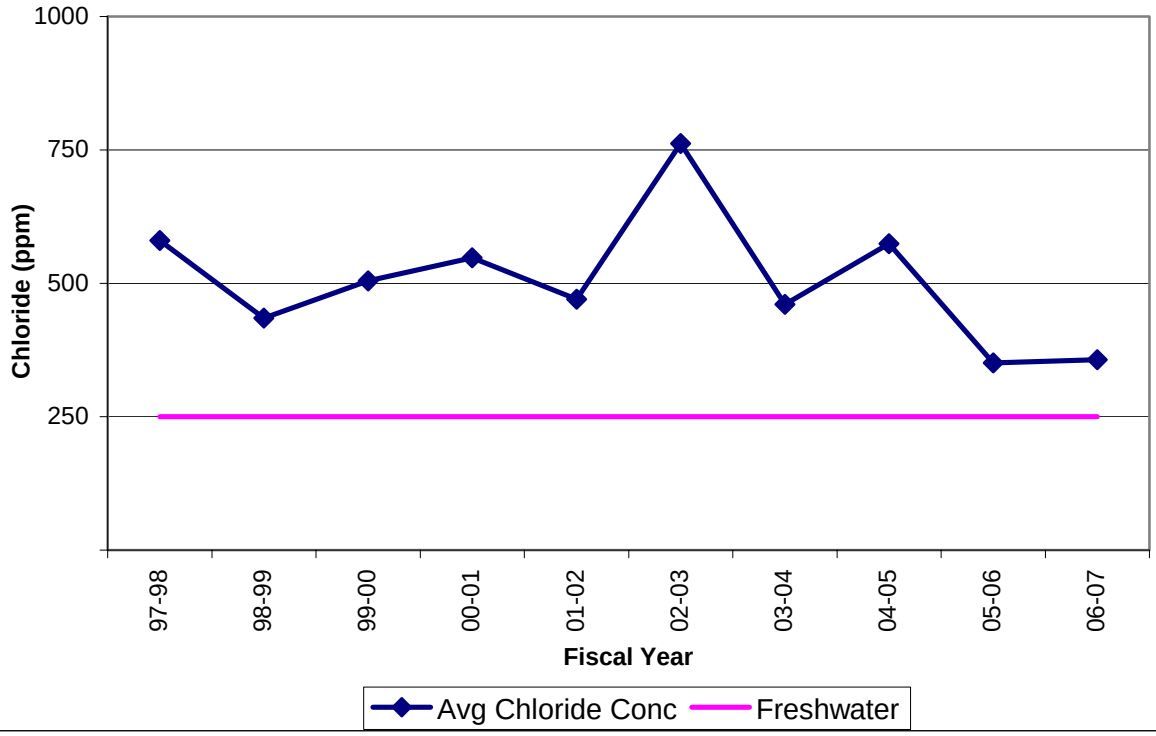


Figure 13a: I-Zone Chloride West of San Gabriel River

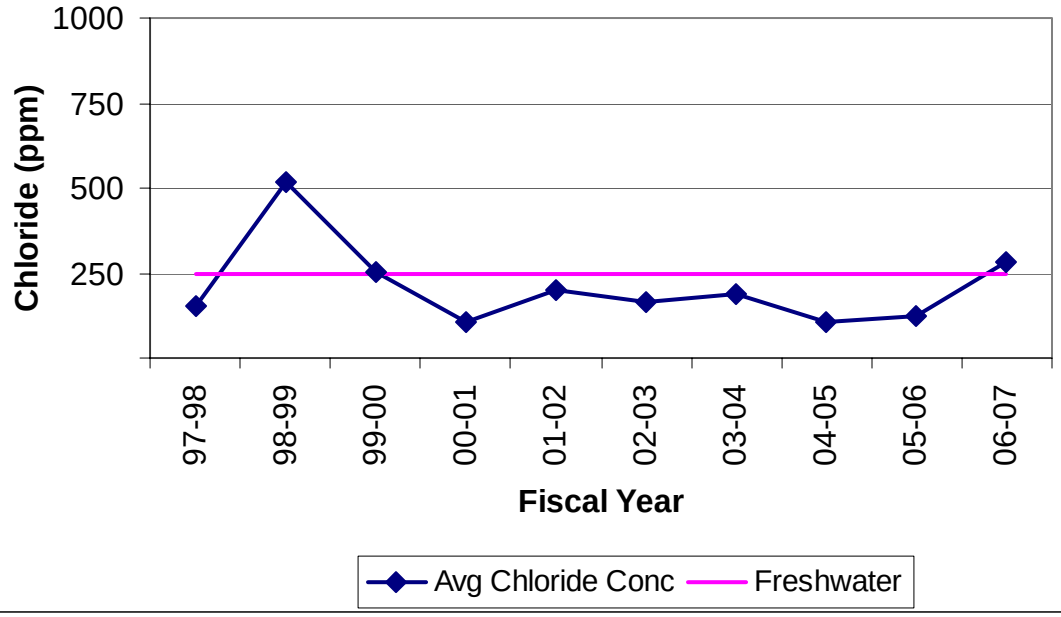
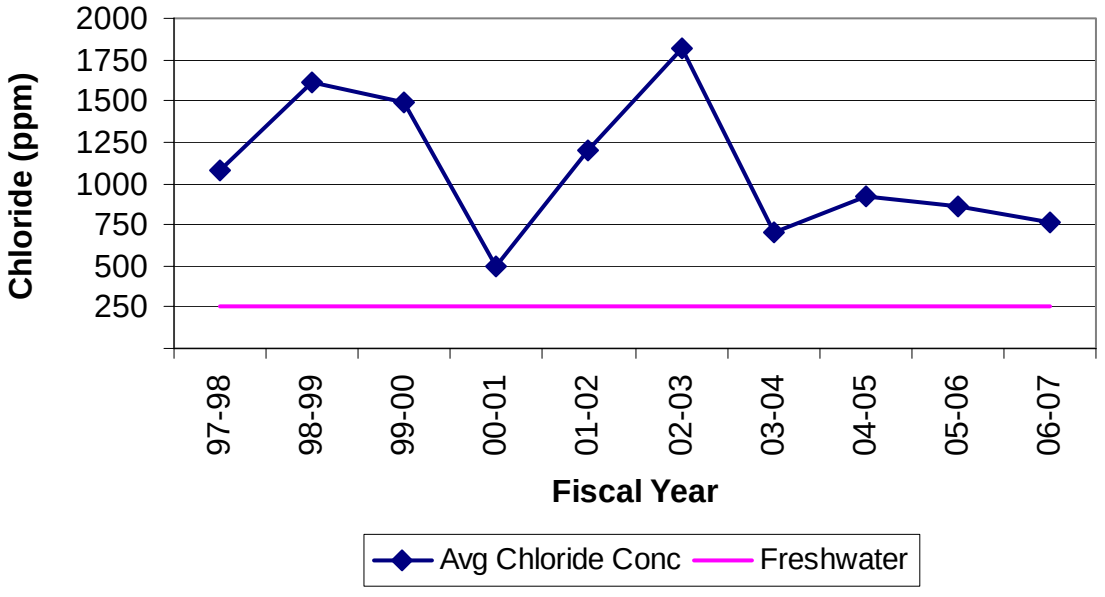


Figure 13b: I-Zone Chloride East of San Gabriel River



FINANCING AND COSTS

This section of the report is divided into three parts: Water Costs, Services and Supplies Costs (operation and maintenance), and Fixed Assets Costs (capital outlay). Under the terms of the Cooperative Agreement, fixed assets are divided into facilities paid for by the LACFCD, facilities paid for by the OCWD, and joint facilities paid for by both agencies. Under the same agreement, water costs are divided between the Water Replenishment District (on behalf of the LACFCD) and the OCWD.

WATER COSTS

During the 2006-07 fiscal year, 1,265 acre-feet of water were injected at a total cost of $604,867. The monthly water rates from July 2006 to June 2007 varied periodically as shown in Table 1. The monthly quantity of water injected and the total water costs paid by the respective agencies are shown below in Table 4.

TABLE 4. QUANTITY OF WATER INJECTED AND COSTS

MONTH	AMT BY WATER REPLENISHMENT DISTRICT (AF)	AMT BY ORANGE COUNTY WATER DISTRICT (AF)	TOTAL AMT (AF)
Jul-06	0.0	0.0	0.0
Aug-06	29.2	29.5	58.7
Sep-06	26.8	27.4	54.2
Oct-06	0.0	0.0	0.0
Nov-06	1.3	1.3	2.6
Dec-06	97.0	100.2	197.2
Jan-07	52.9	55.7	108.6
Feb-07	136.2	142.8	279.0
Mar-07	72.2	40.3	112.5
Apr-07	3.4	0.5	3.9
May-07	281.0	100.0	381.0
Jun-07	48.6	18.8	67.4
TOTAL INJECTED (AF)	748.6	516.5	1265.1
TOTAL COST ($) [From Tbl. 1]	**$358,522**	**$246,345**	**$604,867**

SERVICES AND SUPPLIES COSTS

A total of $2,312,525 was expended on services and supplies during the 2006-07 fiscal year (not including liability insurance and water costs). Of this total, $3,224 was charged to extraction well maintenance. Pursuant to the Cooperative Agreement, the Orange County Water District pays a percentage of the services and supplies costs for injection operations proportional to the percentage of the total amount of injection water paid for by the District. The distribution of FY 2006-07 services and supplies costs is summarized in Table 5:

TABLE 5. DISTRIBUTION OF SERVICES AND SUPPLIES COSTS FOR INJECTION AND EXTRACTION ACTIVITIES

ITEM	LOS ANGELES COUNTY	ORANGE COUNTY	TOTAL
Operation and Maintenance of Injection Facilities (including Observation Wells)	$1,337,448	$901,419	$2,238,867
Operation and Maintenance of Extraction Facilities	$3,224	$0	$3,224
Special Programs	$70,434	$0	$70,434
SUBTOTAL	**$1,411,106**	**$901,419**	**$2,312,525**
Liability Insurance	$17,338	$17,338	$34,676
TOTAL	**$1,428,444**	**$918,757**	**$2,347,201**

The yearly costs of the services and supplies for the last 20 years of injection operations, excluding water costs, are shown in Table 6.

TABLE 6. COSTS OF SERVICES AND SUPPLIES FOR INJECTION

Fiscal Year	Volume of Water Injected (Ac-Ft)	Total Cost	Cost Per Ac-Ft Injected
1987-88	6,537.8	$441,706	$67.56
1988-89	5,599.3	$723,965	$129.30
1989-90	5,755.8	$515,964	$89.64
1990-91	6,167.7	$464,584	$75.33
1991-92	5,757.5	$865,016	$150.24
1992-93	5,240.8	$692,864	$132.21
1993-94	4,144.8	$584,975	$141.13
1994-95	3,495.7	$651,845	$186.47
1995-96	5,269.0	$509,377	$96.67
1996-97	5,739.4	$408,064	$71.10
1997-98	5,335.8	$923,342	$173.05
1998-99	5,330.4	$795,044	$149.15
1999-00	6,077.9	$589,168	$96.94
2000-01	5,398.8	$961,649	$178.12
2001-02	6,061.7	$713,299	$117.67
2002-03	5,012.3	$1,555,921	$310.42
2003-04	5,879.7	$730,652	$124.27
2004-05	5,066.1	$918,020	$181.21
2005-06	3,457.8	$1,605,456	$464.30
2006-07[1]	1,265.1	$2,309,300	$1,825.39

[1] The abnormally high cost in FY06-07 is the result of multiple repair and improvement projects (PRV Replacement, Telemetry Implementation, and Cathodic Protection), the latest cycle of observation well cleanouts, new costs related to the reclaimed water program, and various fixed costs despite reduced injections due to the shutdowns for repairs. Only the reclaimed water program costs will continue to regularly impact the cost of services and supplies for injection. The project management costs will vary from year to year depending on the need to repair or improve the barrier facilities. The observation well cleanout costs and injection well redevelopment costs will not be incurred each fiscal year because they are based on cyclical activities.

The costs of the services and supplies for extraction operations for the past 20 years, including electrical costs, are shown in Table 7.

TABLE 7. COSTS OF SERVICES AND SUPPLIES FOR EXTRACTION

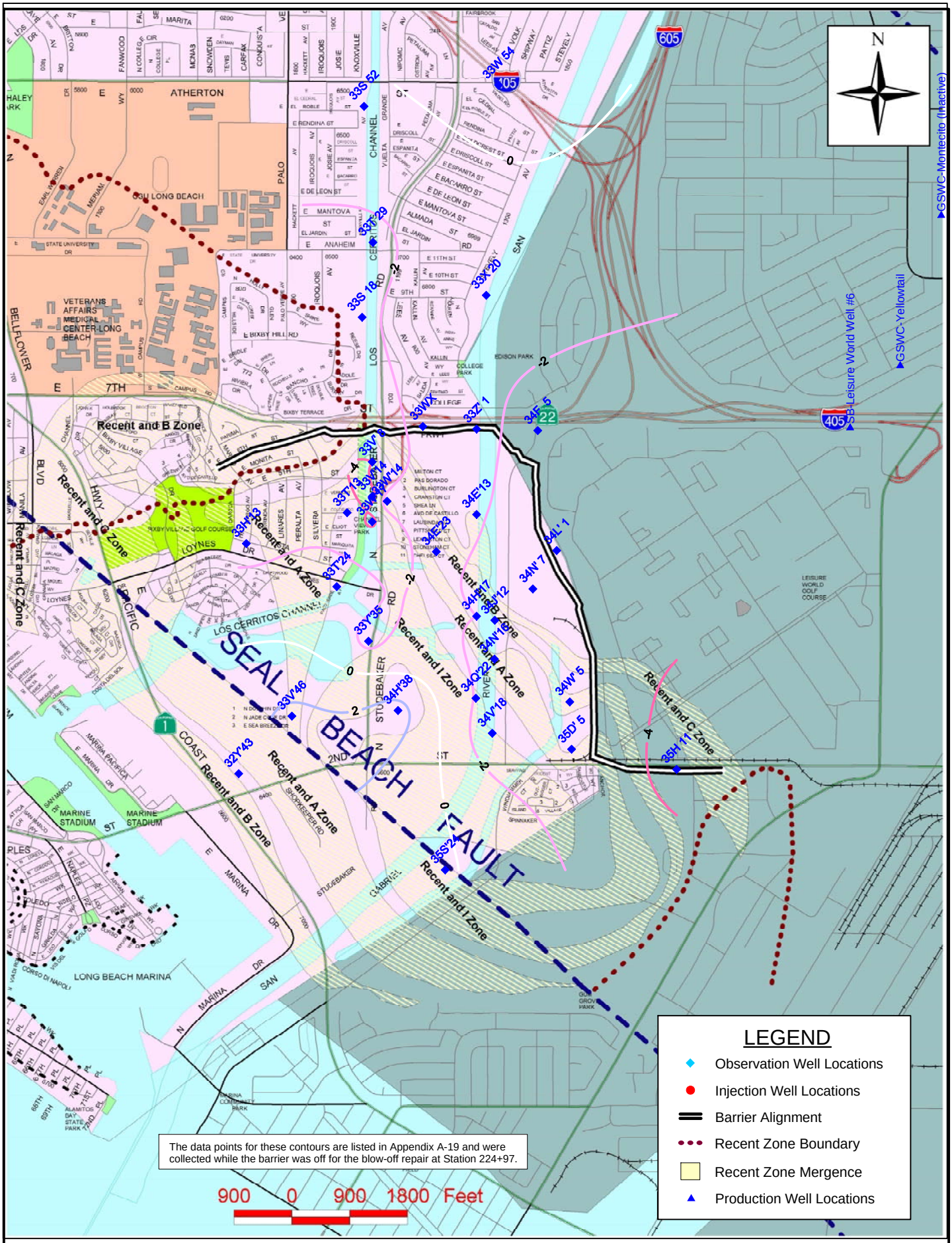
Fiscal Year	Volume of Water Extracted (Ac-Ft)	Total Cost	Cost Per Ac-Ft Extracted
1987-88	1,513.9	$71,700	$47.36
1988-89	1,522.4	$99,315	$65.24
1989-90	1,544.8	$66,717	$43.19
1990-91	1,278.0	$172,230	$134.77
1991-92	1,378.4	$151,520	$109.92
1992-93	1,136.1	$99,099	$87.23
1993-94	992.0	$169,621	$170.99
1994-95	940.7	$148,122	$157.46
1995-96	998.4	$130,901	$131.11
1996-97	1,200.9	$51,077	$42.53
1997-98	883.5	$64,774	$73.32
1998-99	775.6	$52,043	$67.10
1999-00	679.9	$41,320	$60.77
2000-01	404.8	$49,769	$122.95
2001-02	495.0	$53,153	$107.38
2002-03	262.7	$63,165	$240.45
2003-04	0.0	$6,068	N/A
2004-05	0.0	$3,043	N/A
2005-06	0.0	$2,857	N/A
2006-07	0.0	$3,224	N/A

HYDROELECTRIC REVENUES

No hydroelectric power was generated at the water supply pressure regulation station during the 2006-07 fiscal year.

The hydroelectric plant has long been out of service and was recently decommissioned and removed as part of the pressure regulation vault renovation project. This portion of the report will be excluded from future reports.

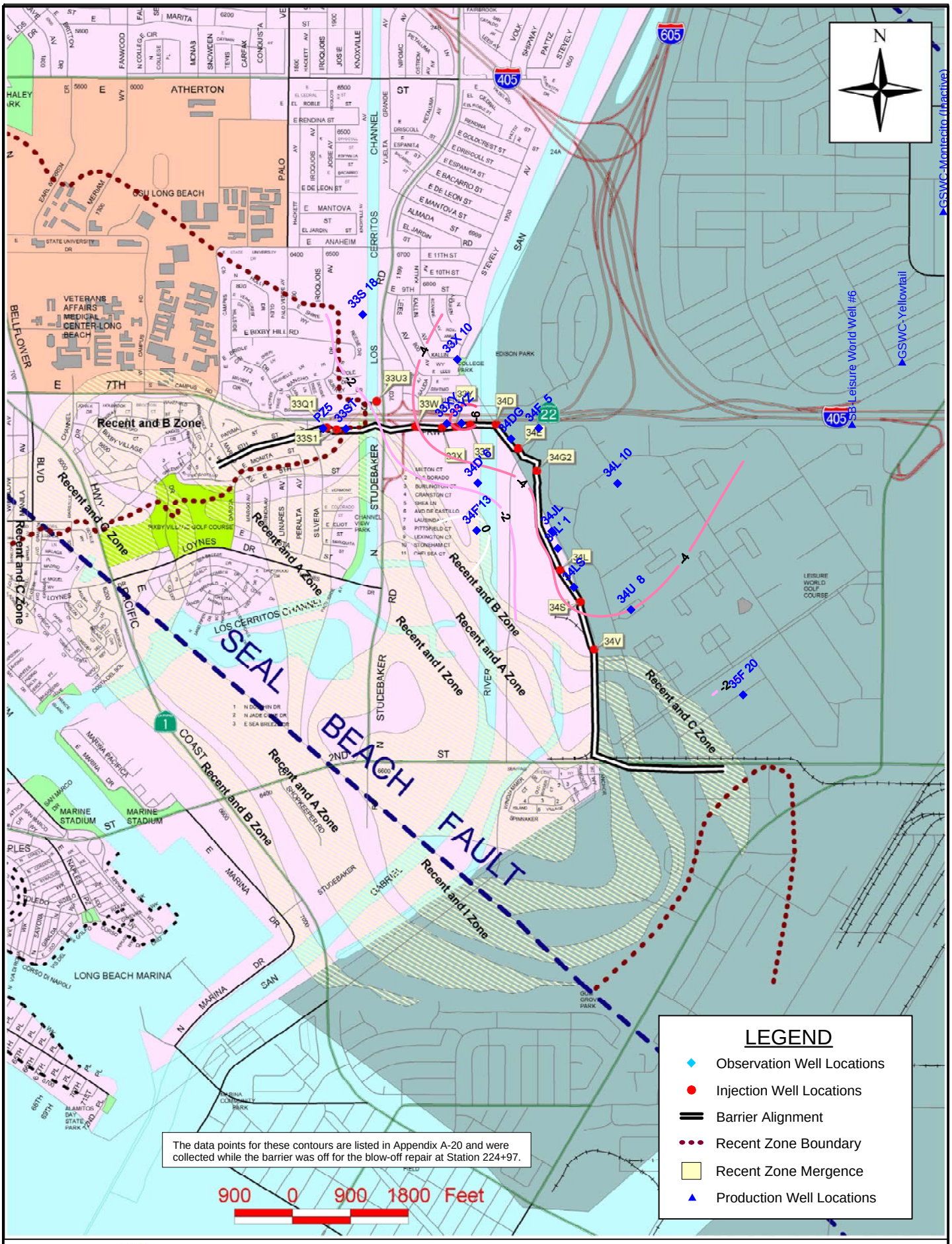
APPENDIX



Alamitos Barrier Project
R Zone Groundwater Elevation (ft) Contours - March 2007

A-1

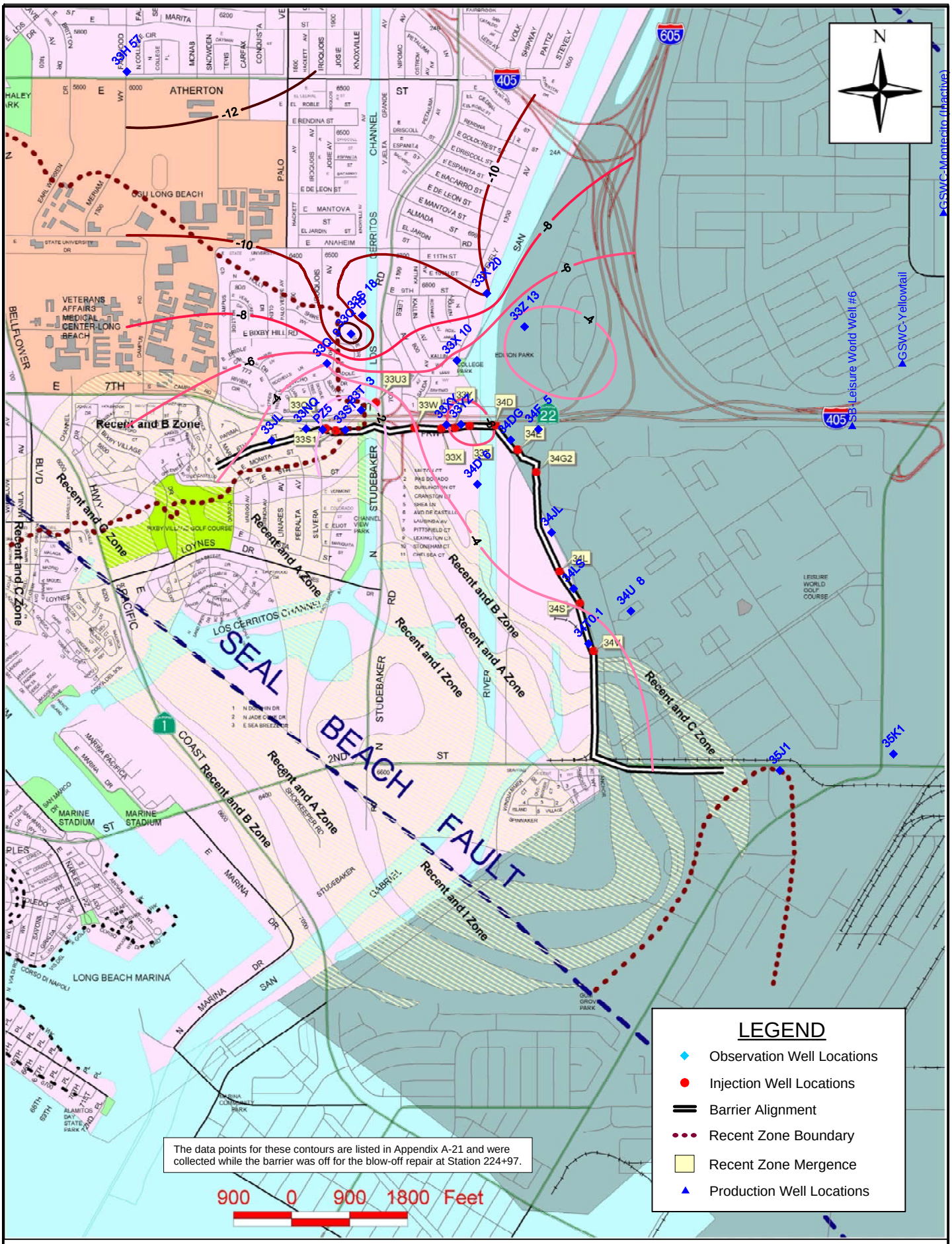
R zone GW.srf



Alamitos Barrier Project
C Zone Groundwater Elevation (ft) Contours - March 2007

A-2

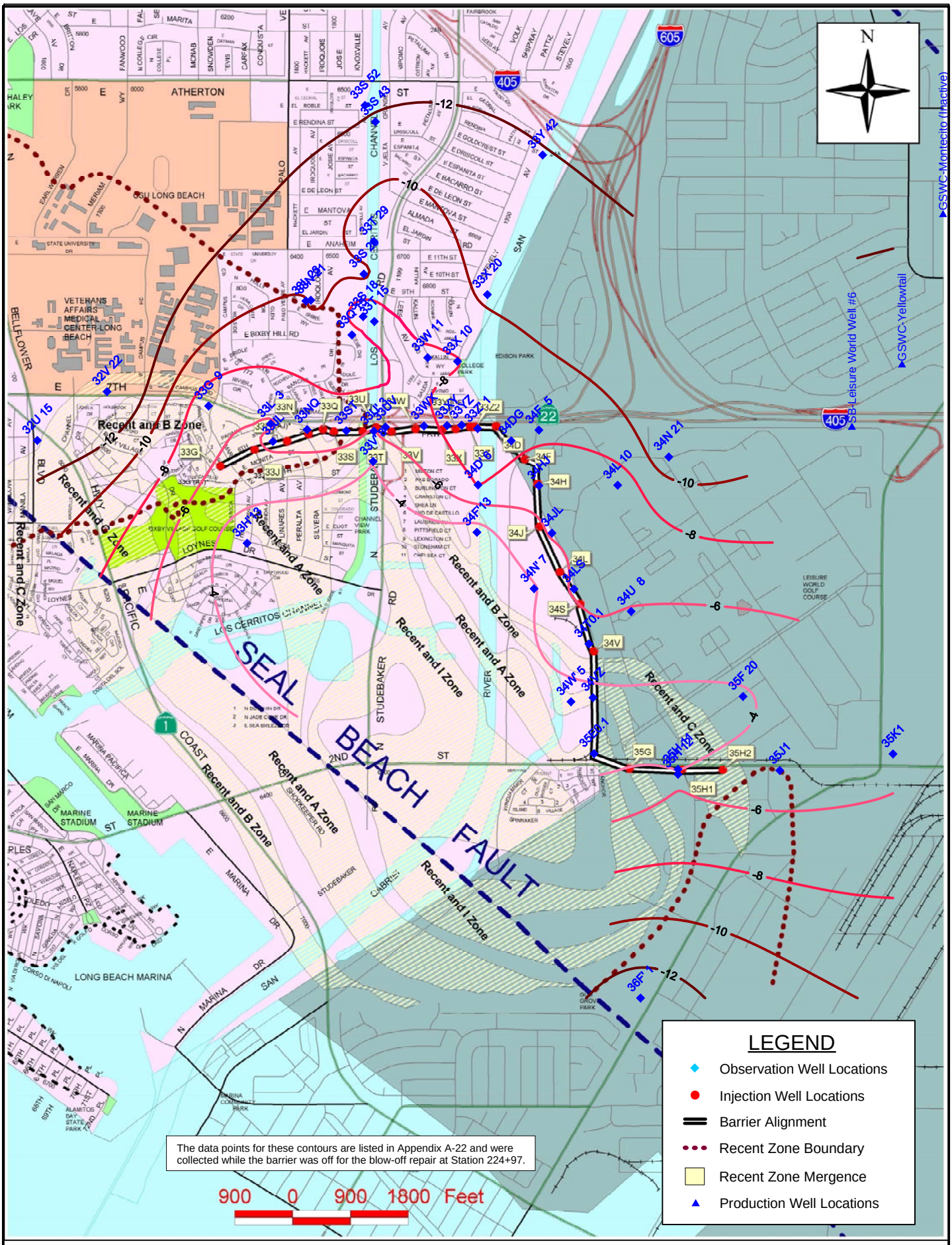
C zone GW.srf



Alamitos Barrier Project
B Zone Groundwater Elevation (ft) Contours - March 2007

A-3

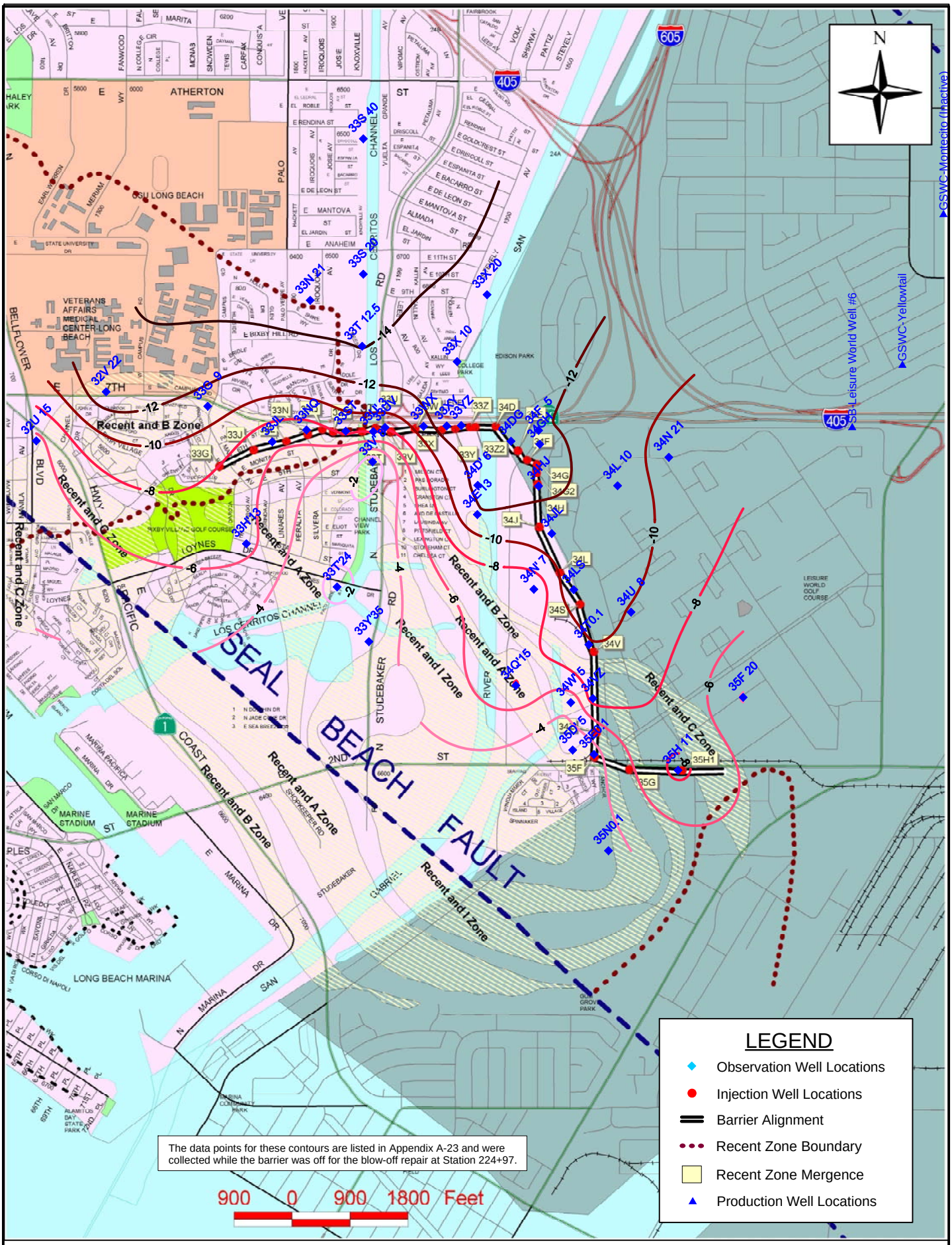
B zone GW.srf



Alamitos Barrier Project
A Zone Groundwater Elevation (ft) Contours - March 2007

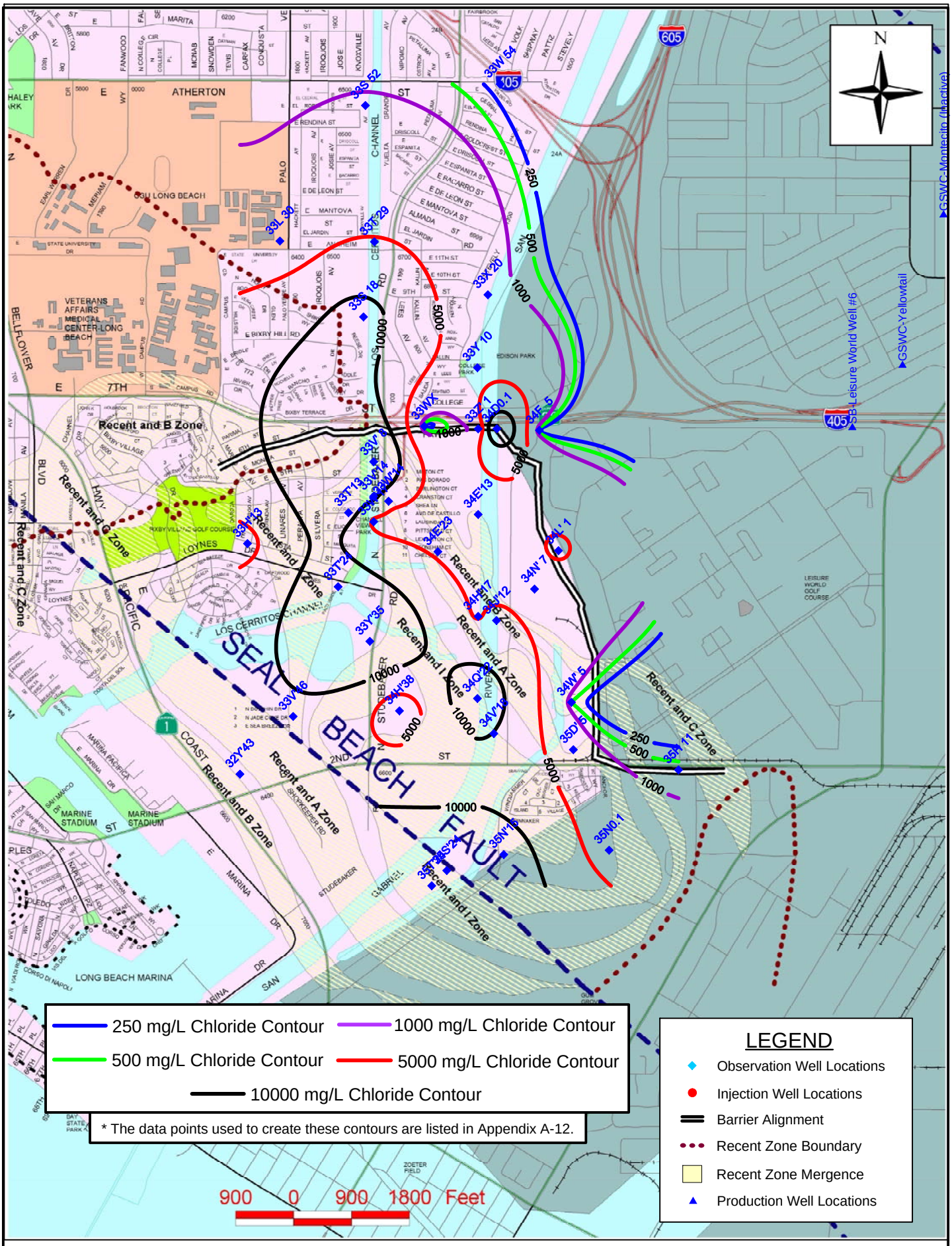
A-4

A zone GW.srf



Alamitos Barrier Project
I Zone Groundwater Elevation (ft) Contours - March 2007

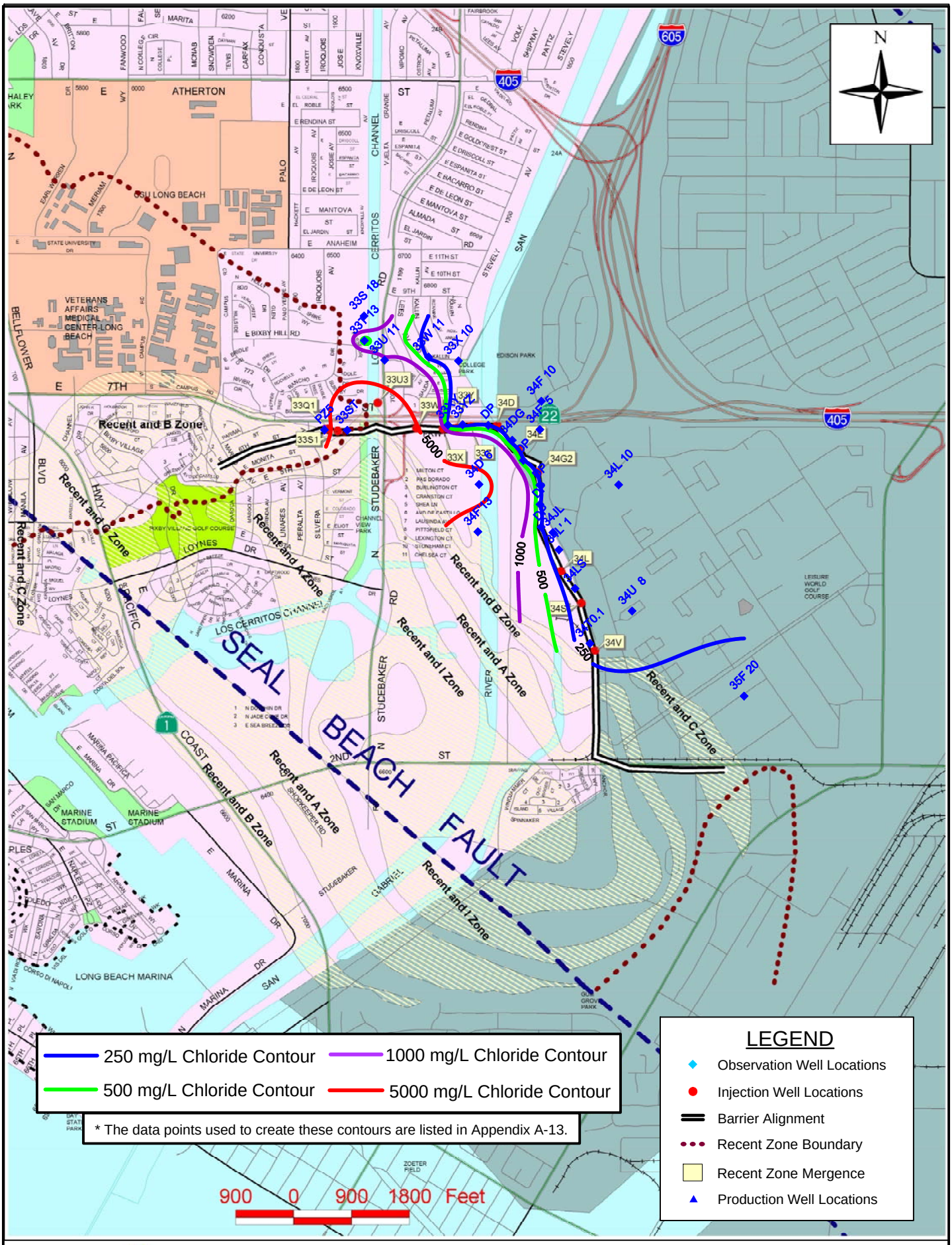
I zone GW.srf



Alamitos Barrier Project
R Zone Chloride Concentration (mg/L) Contours: March 2007

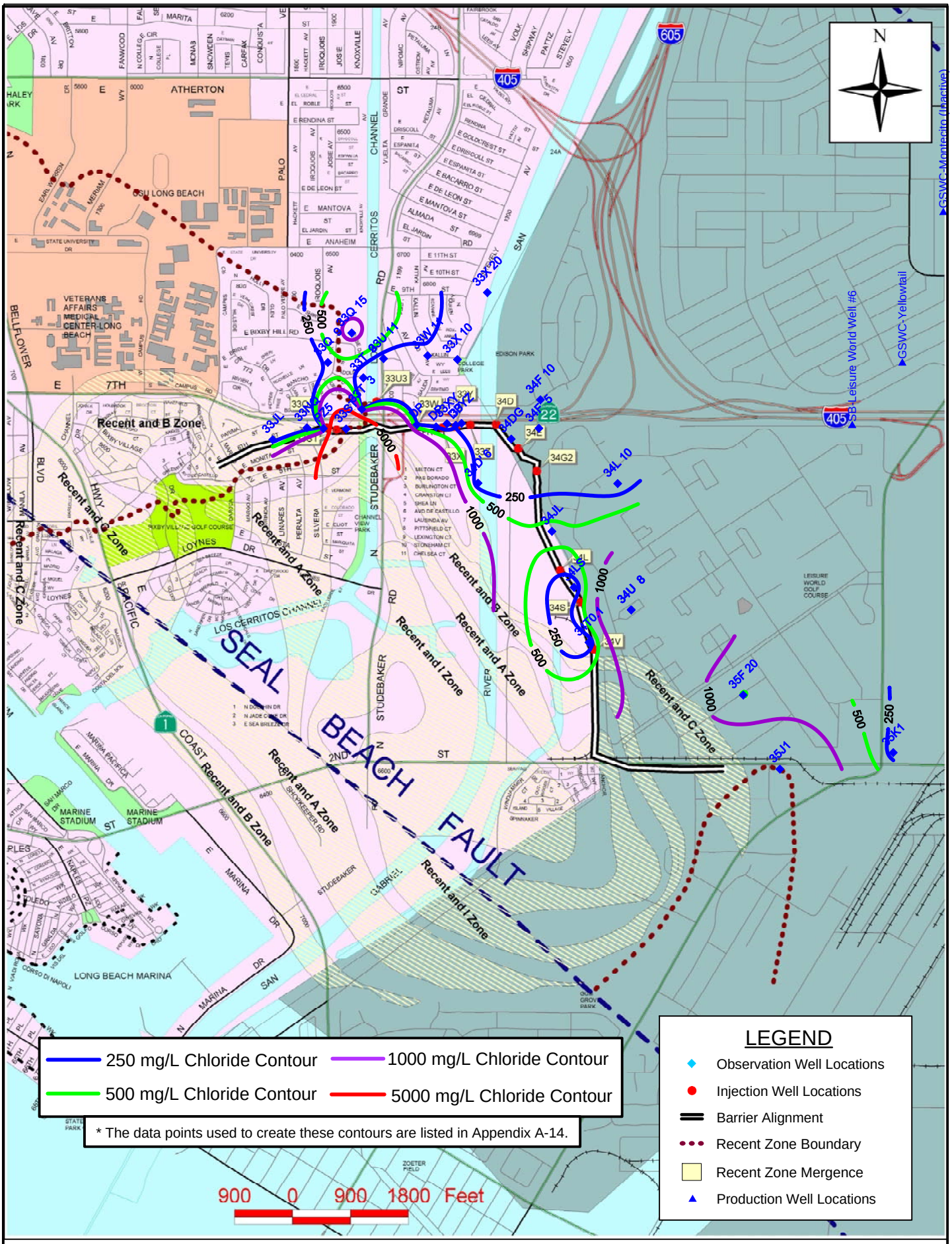
A-6

R zone CL.srf



Alamitos Barrier Project
C Zone Chloride Concentration (mg/L) Contours: March 2007

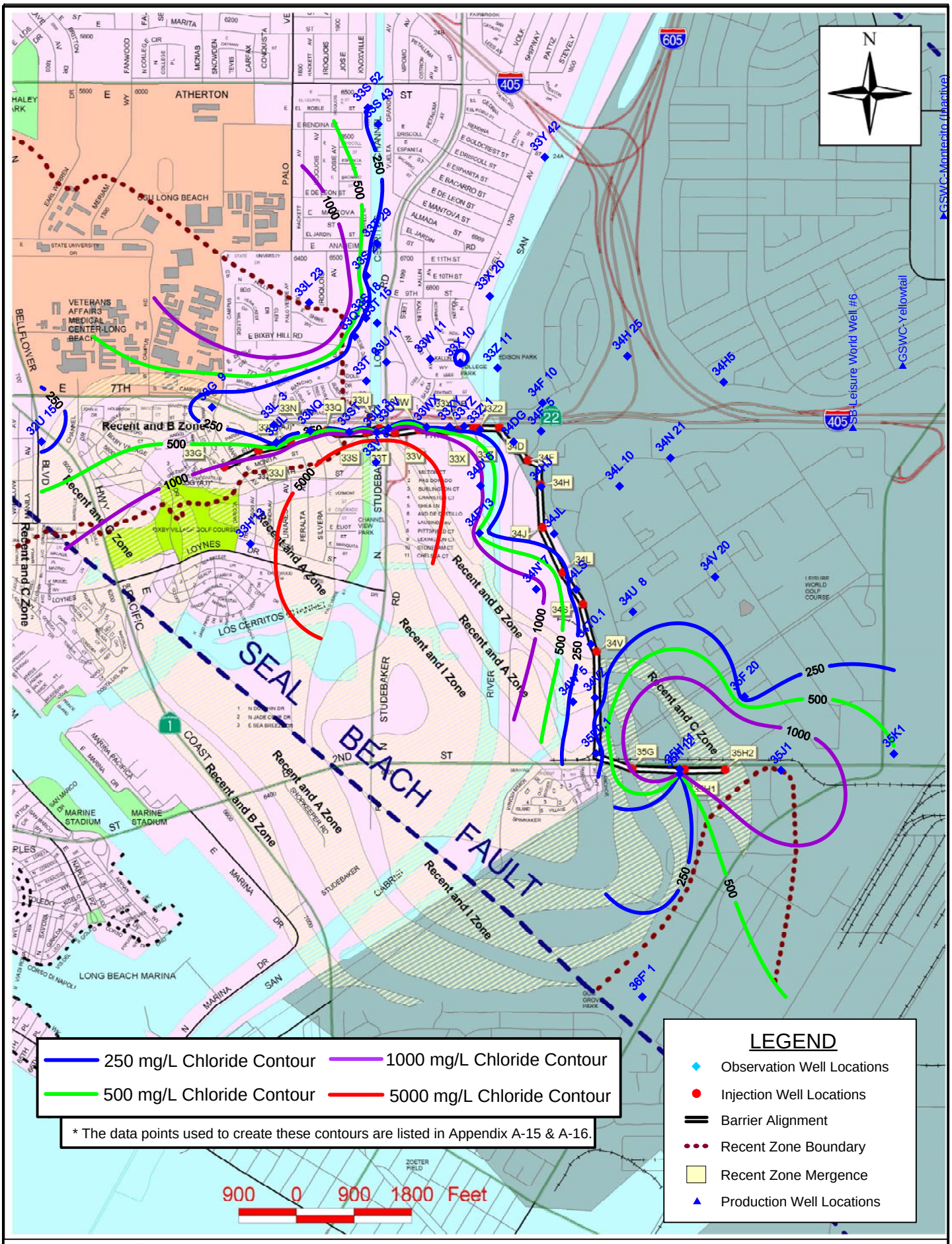
C zone CL.srf



Alamitos Barrier Project
B Zone Chloride Concentration (mg/L) Contours: March 2007

A-8

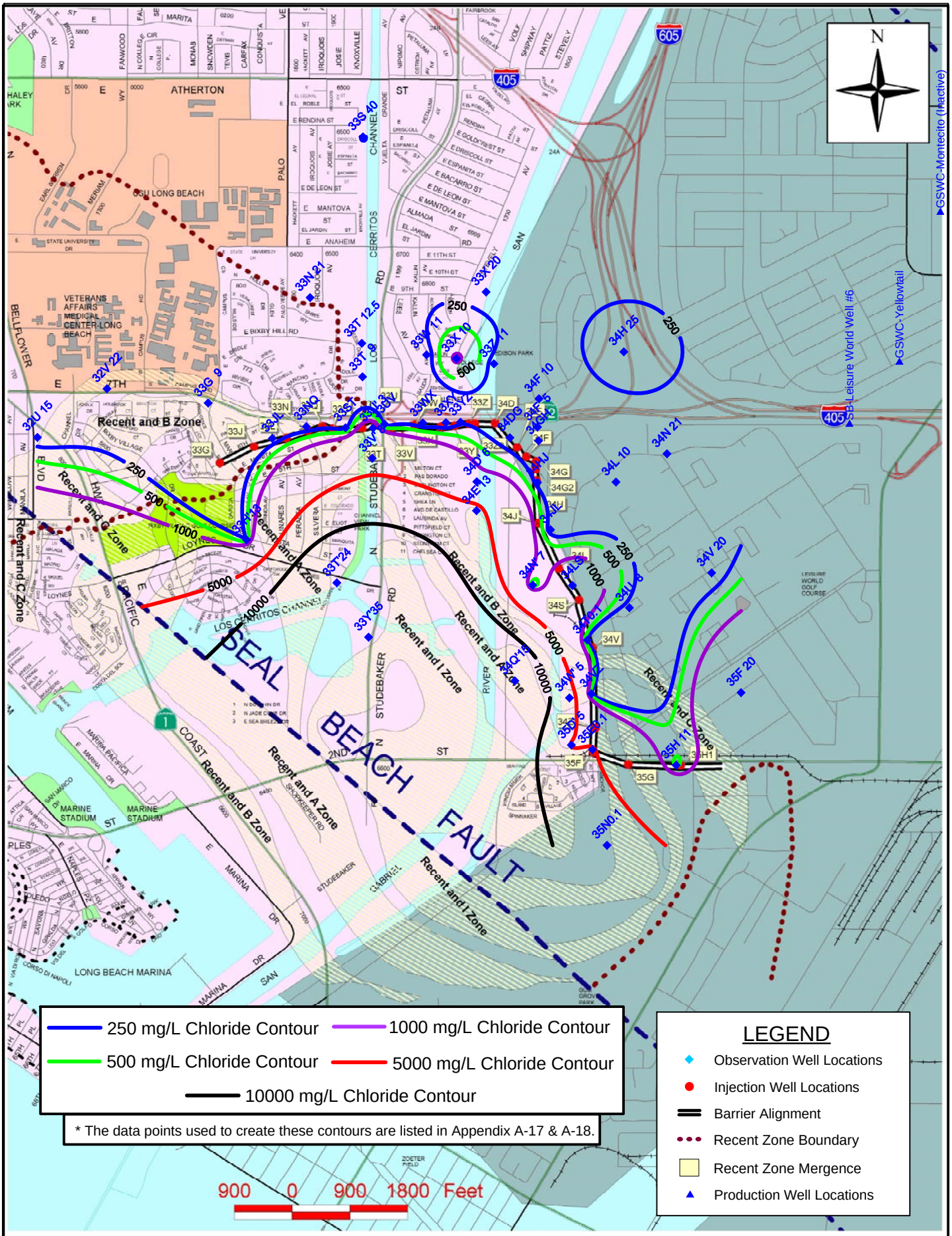
B zone CL.srf



Alamitos Barrier Project
A Zone Chloride Concentration (mg/L) Contours: March 2007

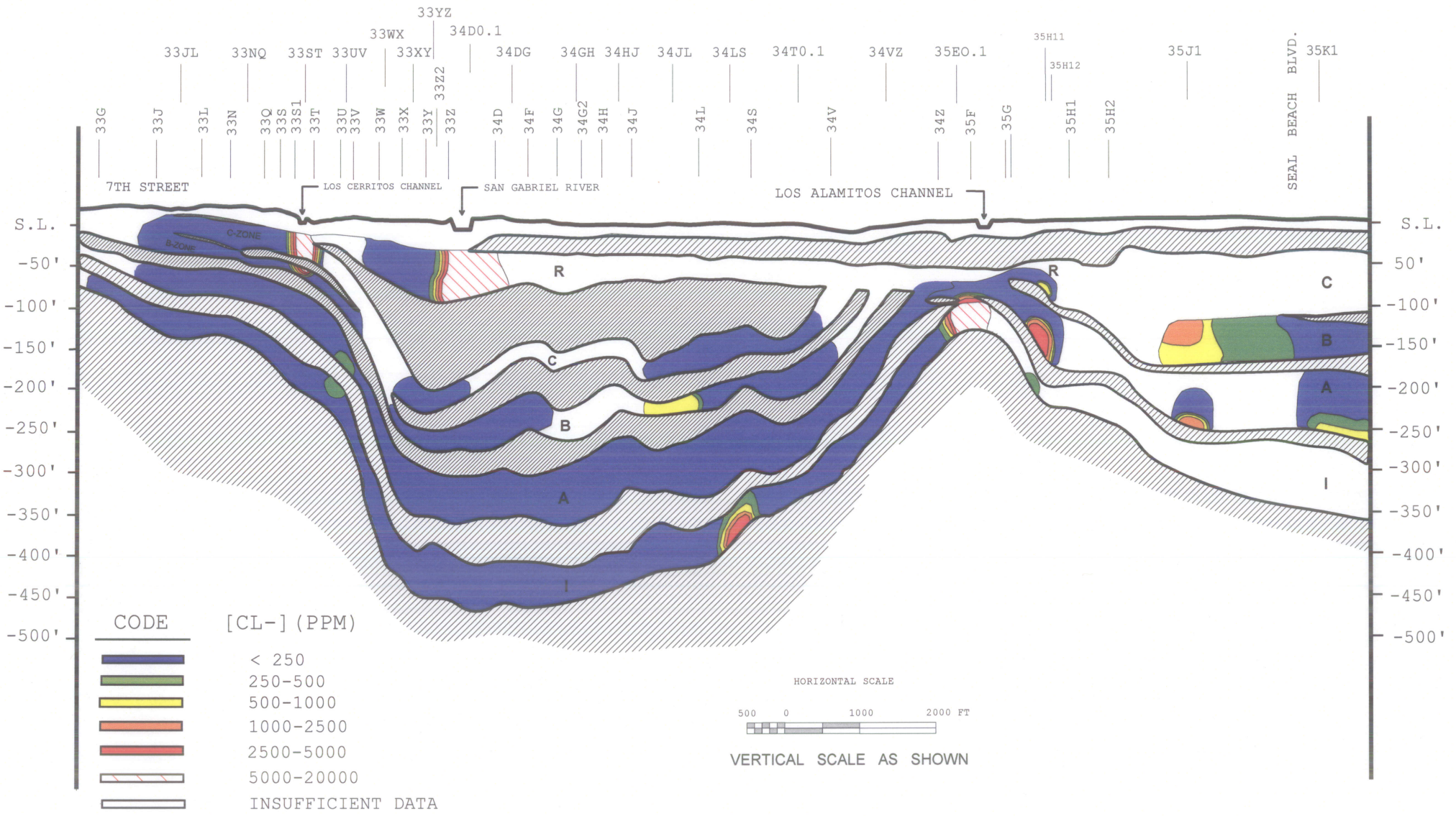
A-9

A zone CL.srf



Alamitos Barrier Project
I Zone Chloride Concentration (mg/L) Contours: March 2007

I zone CL.srf



CHLORIDE SECTION ALONG THE BARRIER

March 2007

NOTE: The data points used to create this cross section are listed in the Appendix (A-12 through A-18).

ALAMITOS BARRIER PROJECT
RECENT-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

PROJ	FCD	DATE	REF PT EL.	AQUIFER	For Cross-Section **(Internodal Wells in Bold)**						For Contours
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHLORIDE
32Y'43	493WW	20070215	4.10	R	-43	8300					8300
33H'13	493YY	20070213	9.20	(R,A)	-18	3625	-38	2250	-58	850	3625
33L 30	491G	20070214	10.00	R	-50	1725					1725
33S 18	*492AH*	*20040107*	*10.80*	*R*	*-67*	*12200*					*12200*
33S 52	491J	20070215	12.50	R	-54	1200					1200
33T 29	491D	20070329	10.70	R	-56	5300					5300
33T'13	492AU	20070301	10.00	R	-41	11050	-51	11800			11800
33T'24	493SS	20070208	8.00	R	-29	13250					13250
33V' 8	492BY	20070301	10.00	(R,A)	-24	17100	-54	19100			19100
33V'14	492JJ	20070301	9.60	R	-71	11150					11150
33V'46	493UU	20070215	5.40	R	-61	9250					9250
33W 54	501C	20070220	13.50	R	-33	108	-53	100			108
33W'14	492AT	20070220	15.70	R	-46	1800	-66	6100			6100
33W'17	493PP	20070220	9.30	R	-41	4200	-51				4200
33WX	**502AZ**	**20061221**	**10.00**	**R**	**-45**	**90**					**90**
33X 20	502L	20061221	23.40	R	-62	1500					1500
33Y 10	502BA	20070313	23.00	R	-58	800	-87	3750			3750
33Y'35	493AB	20070222	12.50	R	-36	17600					17600
33Z' 1	502AU	20061226	20.90	R	-46	1225	-56	1350			1350
34D0.1	**502AX**	**20070109**	**21.00**	**R**	**-57**	**17000**					**17000**
34E'13	503AU	20070206	21.00	R	-19	2350	-57	2600			2600
34E'23	503X	20070305	10.10	R	-43	4600					4600
34F 5	502BT	20070104	9.10	R	-136	92	-146	92	-156	92	92
34H'17	503Y	20070206	19.60	R	-46	4550					4550
34H'38	493QQ	20070313	9.40	R	-33	1200					1200
34J'12	503U	20070308	19.80	R	-28	6000	-36	7000			7000
34L' 1	503P	20070109	10.10	R	-62	5850					5850
34N' 7	503AE	20070215	7.00	R	-51	1370	-61	1180	-71	2000	2000
34Q'22	503T	20070206	18.30	R	-42	10800	-57	13900			13900
34V'18	503V	20070308	18.30	R	-48	9900					9900
34W' 5	503AH	20070306	13.60	R	-51	480					480
35D' 5	503AL	20070313	13.20	R	-57	2200					2200
35H 11	**514F**	**20061227**	**7.00**	**R**	**-42**	**35**	**-65**	**660**			**660**
35N'15	504P	20070313	7.40	R	-33	1800	-58	12900			12900
35S'24	*504K*	*20040127*	*7.30*	*R*	*-55*	*11650*					*11650*
35T'24	504A	20070312	7.90	(R,M)	-67	19600	-134	18600	-201		19600

Italicized purple wells are old values, but included because they're reasonably recent and their historical values are consistantly in this range

ALAMITOS BARRIER PROJECT
C-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

PROJ	FCD	DATE	REF PT EL.	AQUIFER	For Cross-Section **(Internodal Wells in Bold)**						For Contours
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHLORIDE
33ST	**492BK**	**20061128**	**14.90**	**(C,B)**	**-25**	**17700**					**17700**
33T 13	492AC	20061219	11.40	C	-199	285					285
33U 11	492AL	20061220	13.30	C	-186	1150					1150
33W 11	502R	20061220	8.90	C	-183	185	-216	185			185
33X 10	502BB	20070212	10.00	C	-190	142	-215	154			154
33XY	**502BL**	**20061129**	**10.00**	**C**	**-195**	**51**	**-210**	**53**			**53**
33YZ	**502AB**	**20061129**	**10.60**	**C**	**-195**	**76**	**-210**	**76**			**76**
34D' 6	502BF	20070207	20.30	C	-125	7100					7100
DP											250
34DG	**502X**	**20070108**	**8.00**	**C**	**-190**	**66**	**-205**	**64**			**66**
DP											250
34F 5	502BU	20070104	9.30	C	-191	82	-201	82	-211	82	82
34F 10	502AP	20070109	8.80	C	-211	84					84
DP											250
DP											250
34F'13	503R	20070206	21.00	C	-79	2500					2500
34JL	**503AR**	**20070103**	**7.20**	**C**	**-161**	**108**					**108**
34L' 1	503N	20070109	10.30	C	-162	78					78
34L 10	502AK	20070305	5.60	C	-169	82					82
DP											250
34LS	**503BF**	**20070103**	**7.00**	**C**	**-133**	**130**	**-151**	**106**	**-163**	**102**	**130**
34T0.1	**503AB**	**20070103**	**6.10**	**C**	**-134**	**100**					**100**
34U 8	513D	20061228	5.40	C	-150	100	-165	108			108
35F 20	513L	20061227	6.50	C	-70	185	-78	230	-85	500	500
PZ5	492CH	20060607	16.30	(C,B)	-25	42					42

DP = Dummy point with an assumed chloride concentration of 250 mg/L

ALAMITOS BARRIER PROJECT
B-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

PROJ	FCD	DATE	REF PT EL.	AQUIFER	For Cross-Section **(Internodal Wells in Bold)**						For Contours
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHLORIDE
33JL	**492BQ**	**20060209**	**16.00**	**B**	**3**		**-7**	**135**			**135**
33NQ	**492BN**	**20070109**	**18.40**	**B**	**-4**	**78**	**-15**	**74**			**78**
33Q 9	492CM	20070301	35.00	B	-85	180	-95	330	-105	330	330
33Q 15	492AN	20070221	10.00	B	-268	1250					1250
33ST	**492BK**	**20061128**	**14.90**	**(C,B)**	**-25**	**17700**					**17700**
33T 3	492CL	20060606	10.00	B	-40	40	-57	42	-75	46	46
33T 9	492YY	20061219	11.20	B	-168	96					96
DP											250
33U 11	492AK	20061220	12.60	B	-260	118					118
33W 11	502S	20061220	8.90	B	-241	102	-271	220			220
DP											250
33X 10	502BC	20070212	10.00	B	-275	80					80
33X 20	502K	20061221	23.50	B	-277	76					76
33XY	**502BM**	**20061129**	**10.00**	**B**	**-245**	**36**					**36**
DP											**250**
33YZ	**502AC**	**20061129**	**10.60**	**B**	**-214**	**61**	**-264**	**42**			**61**
34D' 6	502BG	20070207	20.30	B	-180	98	-200	102			102
34DG	**502Y**	**20070108**	**8.00**	**B**	**-232**	**33**	**-257**	**33**			**33**
34F 5	502BS	20070104	9.30	B	-231	47	-271	47			47
34F 10	502AQ	20070109	8.80	B	-271	78					78
34JL	**503AQ**	**20070102**	**7.20**	**B**	**-196**	**600**	**-211**	**530**			**600**
34L 10	502AL	20070305	5.60	B	-224	90	-249	40			90
34LS	**503BE**	**20070103**	**7.00**	**B**	**-188**	**82**					**82**
34T0.1	**503AC**	**20070103**	**6.10**	**A B**	**-174**	**98**	**-207**	**104**	**-239**	**104**	**104**
34U 8	513E	20061228	5.40	B	-225	2850					2850
35F 20	513K	20061227	6.50	B	-115	470					470
35J1	*514M*	*20041227*	*7.42*	*A B*	*-135*	*2000*	*1030*	*-150*	*-155*	*555*	*2000*
35K1	*523A*	*20041227*	*7.96*	*A B*	*-135*	*134*	*155*	*-150*	*-165*	*170*	*170*
PZ5	492CH	20070301	16.30	(C,B)	-25	42					42

DP = Dummy point with an assumed chloride concentration of 250 mg/L

Italicized purple wells are old values, but included because they're reasonably recent and their historical values are consistantly in this range

ALAMITOS BARRIER PROJECT
A-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

PROJ	FCD	DATE	REF PT EL.	AQUIFER	For Cross-Section **(Internodal Wells in Bold)**						For Contours
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHLORIDE
33G 9	482F	20070208	57.20	A			-23	110			110
33H'13	493YY	20070213	9.20	(R,A)	-18	3625	-38	2250	-58	850	3625
33JL	**492BW**	**20061128**	**16.00**	**(A,I)**	**-41**	**106**	**-79**	**100**	**-116**	**96**	**106**
33L 3	492	20070213	25.20	A	-60	86					86
33L 23	492RR	20070214	9.40	A	-344	3850					3850
33NQ	**492BP**	**20070109**	**18.40**	**(A,I)**	**-49**	**78**	**-93**	**74**	**-137**	**78**	**78**
33Q 15	492AM	20070221	10.90	A	-340	98					98
33S 18	492AE	20070222	11.10	A	-351	130					130
33S 20	492BR	20070212	8.90	A	-317	130	-336	120	-355	110	130
33S 43	491E	20070214	13.00	A	-333	148	-344	148			148
33S 52	491H	20070215	12.50	A	-284	188	-309	248			248
33ST	**492BL**	**20061128**	**14.90**	**A**	**-65**	**110**	**-86**	**86**	**-100**	**40**	**110**
33T 9	492TT	20061218	10.50	A	-262	88					88
33T 15	492SS	20070221	11.20	A	-334	105					105
33T 29	491C	20070214	12.20	A	-350	120					120
33U 11	492AJ	20061220	13.60	A	-348	138					138
33U' 3	492WW	20060615	10.90	A	-89	310					310
33UV	**492BH**	**20061128**	**10.80**	**A**	**-106**	**178**	**-131**	**242**	**-155**	**265**	**265**
33V' 8	492BY	20070301	10.00	(R,A)	-24	17100	-54	19100			19100
33W 11	502T	20061220	8.90	A	-321	72	-349	74	-376	74	74
33WX	*502AF*	*20060207*	*10.40*	*A*	*-258*	*64*	*-281*	*122*	*-303*	*112*	*122*
33X 10	502BD	20070212	10.00	A	-320	230	-340	270	-360	310	310
33X 20	502J	20061221	23.20	A	-359	56					56
33XY	**502BN**	**20061129**	**10.00**	**A**	**-279**	**35**	**-296**	**38**	**-314**	**36**	**38**
33Y 42	501A	20070220	24.90	A	-342	70					70
33YZ	**502AD**	**20061129**	**10.60**	**A**	**-296**	**44**	**-318**	**50**			**50**
33Z' 1	502G	20060525	20.00	A	-320	155					155
33Z 11	502V	20061226	23.10	A	-321	66	-351	60			66
34D' 6	502BH	20070207	20.30	A	-270	750	-303	940	-335	1050	1050
34DG	**502Z**	**20070108**	**8.00**	**A**	**-292**	**52**	**-327**	**54**			**54**
34F 5	502BR	20070104	9.50	A	-297	18	-322	23	-347	80	80
34F 10	502AR	20070109	8.80	A	-311	72	-326	78			78
34F'13	503Q	20070208	21.20	A	-177	330					330
34H 25	502AH	20070109	8.20	A	-297	126	-312	140	-332	118	140
34H5	*512E*	*20041227*	*7.21*	*A*	*-305*	*82*	*-320*	*82*	*-335*	*96*	*96*
34HJ	**502BX**	**20070104**	**9.40**	**A**	**-301**	**62**	**-321**	**66**	**-331**	**64**	**66**
34JL	**503AP**	**20070102**	**7.20**	**A**	**-263**	**54**	**-288**	**72**	**-308**	**84**	**84**
34L 10	502AM	20070315	5.60	A	-310	78	-330	84	-354	96	96
34LS	**503BD**	**20070103**	**7.00**	**A**	**-238**	**72**	**-283**	**72**			**72**
34N 21	512B	20070312	6.80	A	-328	112	-354	130			130

ALAMITOS BARRIER PROJECT
A-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

PROJ	FCD	DATE	REF PT EL.	AQUIFER	For Cross-Section **(Internodal Wells in Bold)**						For Contours
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHLORIDE
34N' 7	503AF	20070215	7.00	A	-106	198	-144	294	-181	1260	1260
34T0.1	**503AC**	**20070103**	**6.10**	**A**	**-174**	**98**	**-207**	**104**	**-239**	**104**	**104**
34U 8	513F	20061228	5.40	A	-280	98	-310	106			106
34V 20	513B	20061228	6.30	A	-234	76	-265	44	-292	37	76
34VZ	**503BH**	**20070108**	**6.20**	**A**	**-146**	**74**	**-156**	**80**			**80**
34W' 5	503AJ	20070306	13.60	A	-81	210	-101	110	-119	180	210
35E0.1	**503BK**	**20070108**	**6.50**	**A**	**-74**	**76**					**76**
35F 20	513J	20061227	6.50	A	7		-158	106			106
35H 11	514G	20061227	7.00	A	-123	1225	-146	4900			4900
35H 12	514D	20061227	6.50	A	-137	106					106
35J1	*514L*	*20041227*	*7.42*	*A*	*-200*	*75*	*-215*	*610*	*-235*	*1800*	*1800*
35K1	*523B*	*20041227*	*7.96*	*A*	*-205*	*34*	*-220*	*240*	*-235*	*515*	*515*
36F' 1	505D	20070312	35.65	A	-103	418					418

Italicized purple wells are old values, but included because they're reasonably recent and their historical values are consistantly in this range

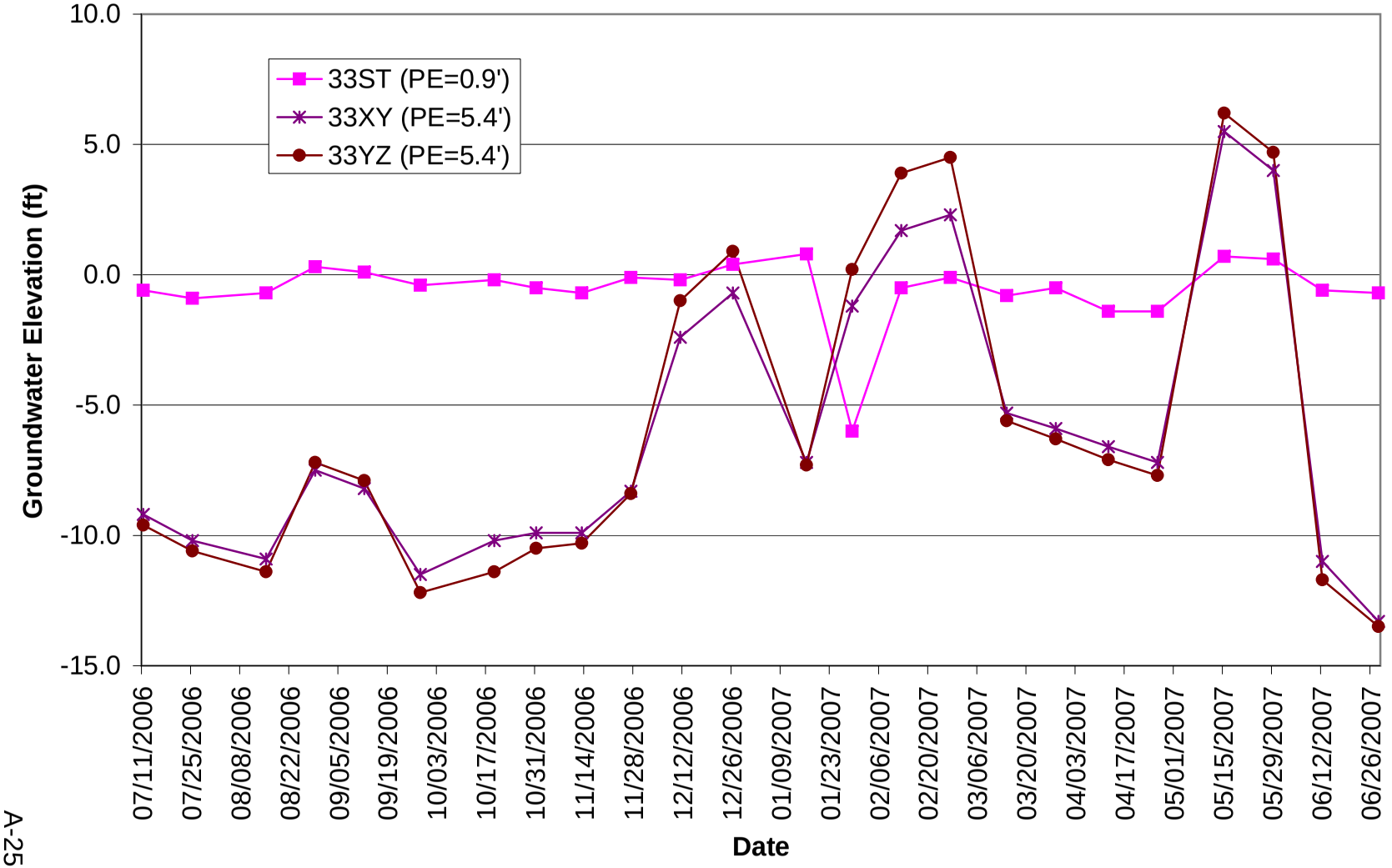
ALAMITOS BARRIER PROJECT
I-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

PROJ	FCD	DATE	REF PT EL.	AQUIFER	For Cross-Section **(Internodal Wells in Bold)**						For Contours
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHLORIDE
32V 22	482N	20070208	73.70	I	-51	124					124
33G 9	482G	20070208	57.20	I	-34	54	-68	96	-78	82	96
33H'13	493XX	20070213	9.20	I	-89	270					270
33JL	**492BW**	**20061128**	**16.00**	**(A,I)**	**-41**	**106**	**-79**	**100**	**-116**	**96**	**106**
33N 21	492BV	20070214	9.00	I	-457	68	-471	70			70
33NQ	**492BP**	**20070109**	**18.40**	**(A,I)**	**-49**	**78**	**-93**	**74**	**-137**	**78**	**78**
33S 40	491F	20070215	11.80	I	-470	260					260
33ST	**492BM**	**20061128**	**14.90**	**I**	**-130**	**98**	**-148**	**100**	**-165**	**100**	**100**
33T 9	492XX	20061219	10.50	I	-364	92					92
33T 12.5	492BT	20070221	9.50	I	-423	120	-438	110	-452	110	120
33T'24	493RR	20070208	8.10	I	-60	18300	-75				18300
33U' 3	492QQ	20070220	9.80	I	-147	1890					1890
33UV	**492BJ**	**20061128**	**10.80**	**I**	**-209**	**37**	**-228**	**41**	**-246**	**41**	**41**
33V' 8	492BX	20070301	10.00	I	-109	2850	-139	3800			3800
33W 11	502U	20061220	8.90	I	-423	80	-446	80	-468	82	82
33WX	**502AG**	**20061221**	**10.40**	**I**	**-374**	**44**	**-391**	**44**	**-408**	**42**	**44**
33X 10	502BE	20070212	10.00	I	-420	1150	-440	950	-460		1150
33X 20	502H	20061221	23.10	I	-465	78					78
33XY	**502BP**	**20061129**	**10.00**	**I**	**-404**	**66**	**-420**	**66**	**-436**	**70**	**70**
33Y'35	493ZZ	20070222	12.50	I	-67	21500					21500
33YZ	**502AE**	**20061129**	**10.60**	**I**	**-402**	**204**	**-435**	**230**			**230**
33Z 11	502W	20061226	23.10	I	-417	120	-437	124	-457	120	124
34D' 6	502BI	20070207	20.30	I	-400	1160	-410	1575	-420	1300	1575
34DG	**502AA**	**20070108**	**8.00**	**I**	**-402**	**110**	**-432**	**116**			**116**
34E'13	503AT	20070206	21.00	I	-289	6000	-309	4900			6000
34F 5	502BQ	20070104	9.20	I	-411	60	-426	58	-441	58	60
34F 10	502AS	20070109	8.80	I	-416	74	-446	74			74
34GH	**502BV**	**20070104**	**8.30**	**I**	**-412**	**45**	**-427**	**52**	**-442**	**50**	**52**
34H 25	502AJ	20070109	8.30	I	-407	470	-427	490	-445	500	500
34HJ	**502BW**	**20070104**	**9.50**	**I**	**-407**	**132**	**-417**	**132**	**-427**	**158**	**158**
34JL	**503AN**	**20070102**	**7.20**	**I**	**-383**	**124**	**-408**	**116**			**124**
34L 10	502AN	20070305	5.60	I	-404	72	-439	74			74
34LS	**503BC**	**20070103**	**6.80**	**I**	**-338**	**400**	**-368**	**2850**			**2850**
34N 21	512C	20070312	6.80	I	-423	104	-453				104
34N' 7	503AG	20070215	7.00	I	-221	112	-254	212	-286	240	240

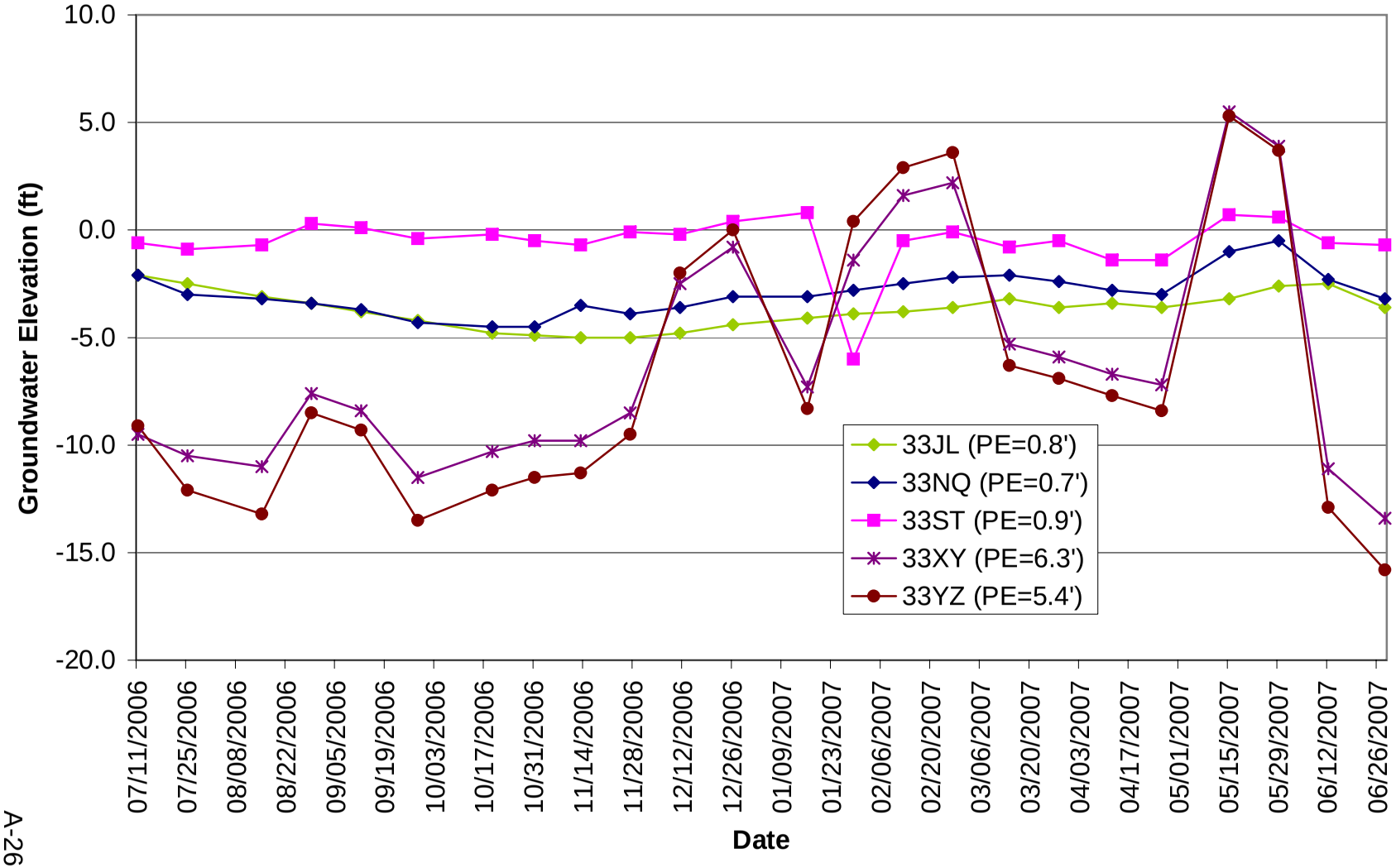
ALAMITOS BARRIER PROJECT
I-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

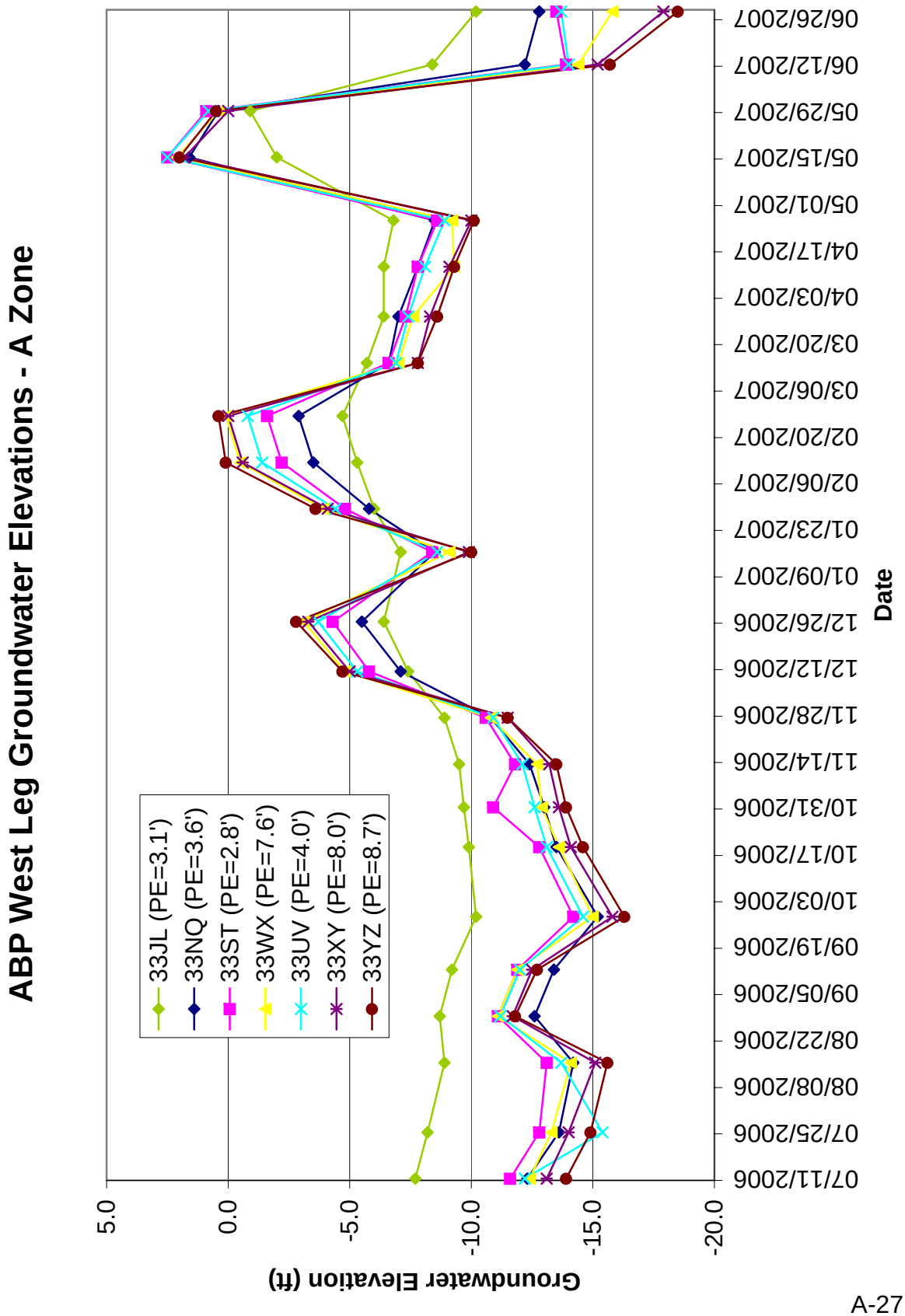
PROJ	FCD	DATE	REF PT EL.	AQUIFER	For Cross-Section **(Internodal Wells in Bold)**						For Contours
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHLORIDE
34Q'15	503H	20070305	8.30	I	-108	16900					16900
34T0.1	**503AD**	**20070103**	**6.10**	**I**	**-289**	**116**	**-312**	**154**	**-334**	**124**	**154**
34U 8	513G	20061228	5.40	I	-360	118	-375	148			148
34V 20	513C	20061228	6.30	I	-386	20					20
34VZ	**503BG**	**20070108**	**6.20**	**I**	**-214**	**86**	**-224**	**88**			**88**
34W' 5	503AK	20070306	13.60	I	-156	7050					7050
35D' 5	503AM	20070313	13.20	I	-89	4800					4800
35E0.1	**503BJ**	**20070108**	**6.50**	**I**	**-114**	**5300**					**5300**
35F 20	513H	20061227	6.50	I	-235	680	-245	1200	-255	3400	3400
35H 11	514H	20061227	7.00	I	-203	410					410
35N0.1	504N	20070306	7.30	I	-76	7750					7750

ABP West Leg Groundwater Elevations - C Zone

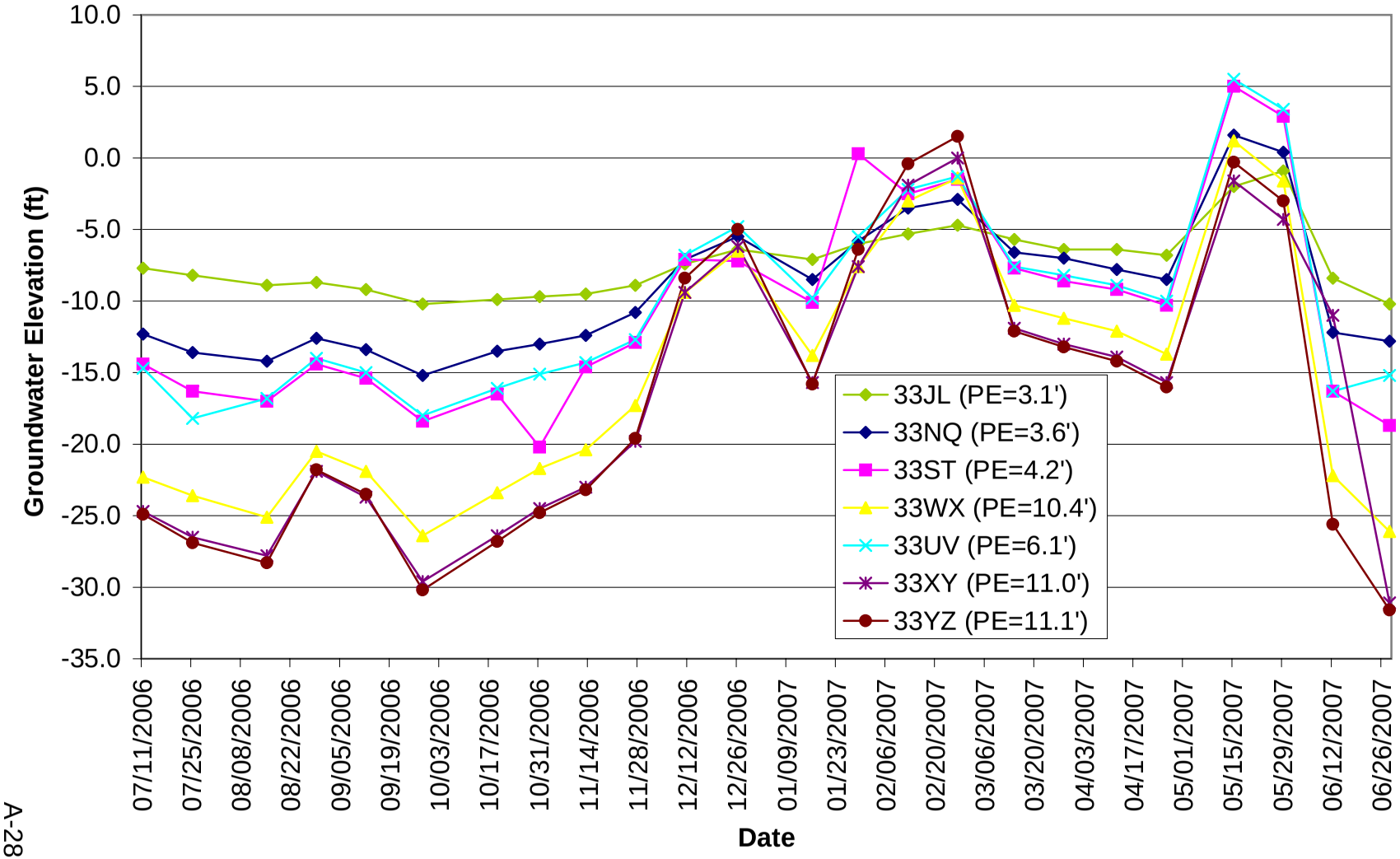


ABP West Leg Groundwater Elevations - B Zone

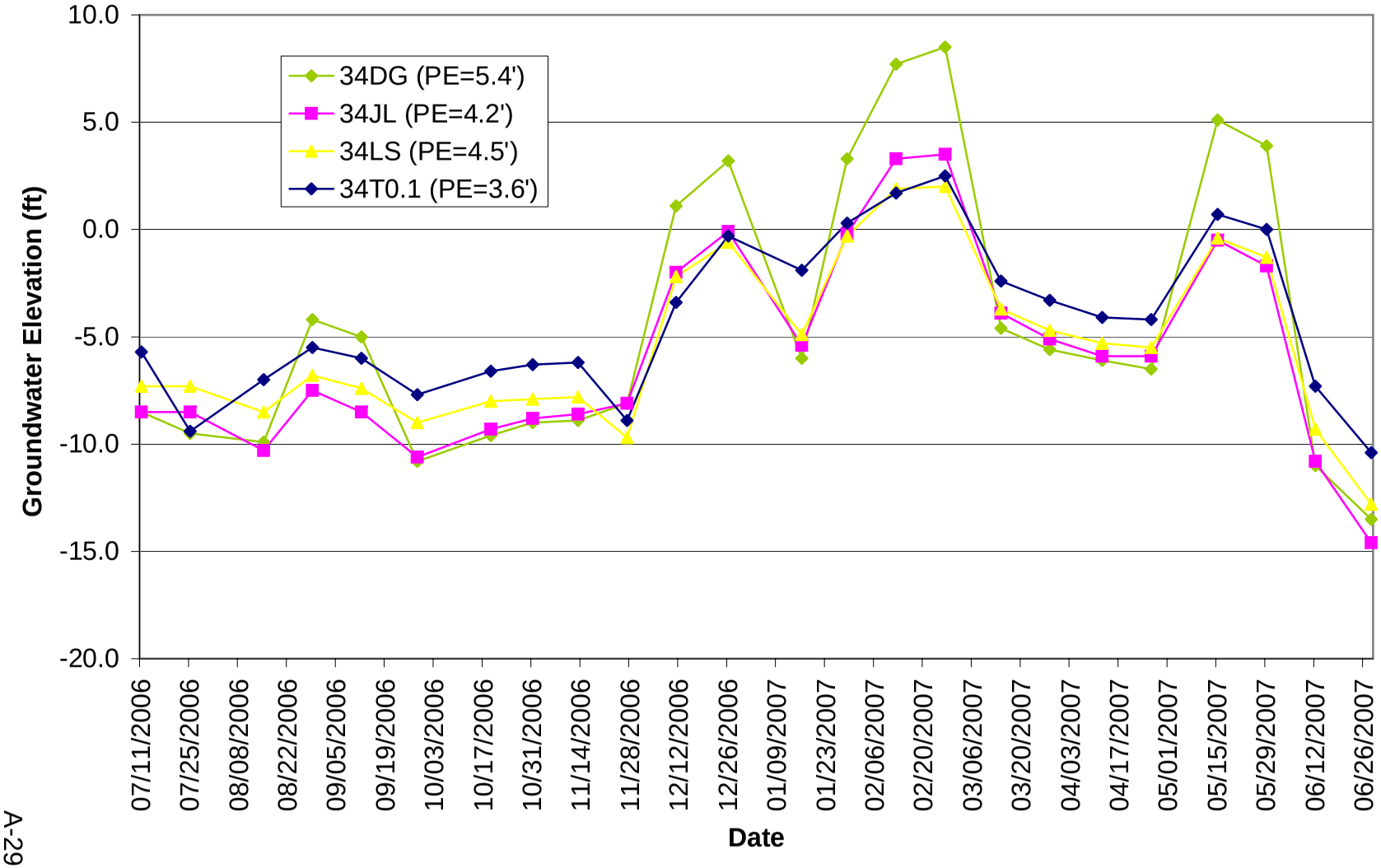



ABP West Leg Groundwater Elevations - A Zone
Groundwater Elevation (ft)
5.0
0.0
-5.0
-10.0
-15.0
-20.0
Date
07/11/2006
07/25/2006
08/08/2006
08/22/2006
09/05/2006
09/19/2006
10/03/2006
10/17/2006
10/31/2006
11/14/2006
11/28/2006
12/12/2006
12/26/2006
01/09/2007
01/23/2007
02/06/2007
02/20/2007
03/06/2007
03/20/2007
04/03/2007
04/17/2007
05/01/2007
05/15/2007
05/29/2007
06/12/2007
06/26/2007
33JL (PE=3.1')
33NQ (PE=3.6')
33ST (PE=2.8')
33WX (PE=7.6')
33UV (PE=4.0')
33XY (PE=8.0')
33YZ (PE=8.7')

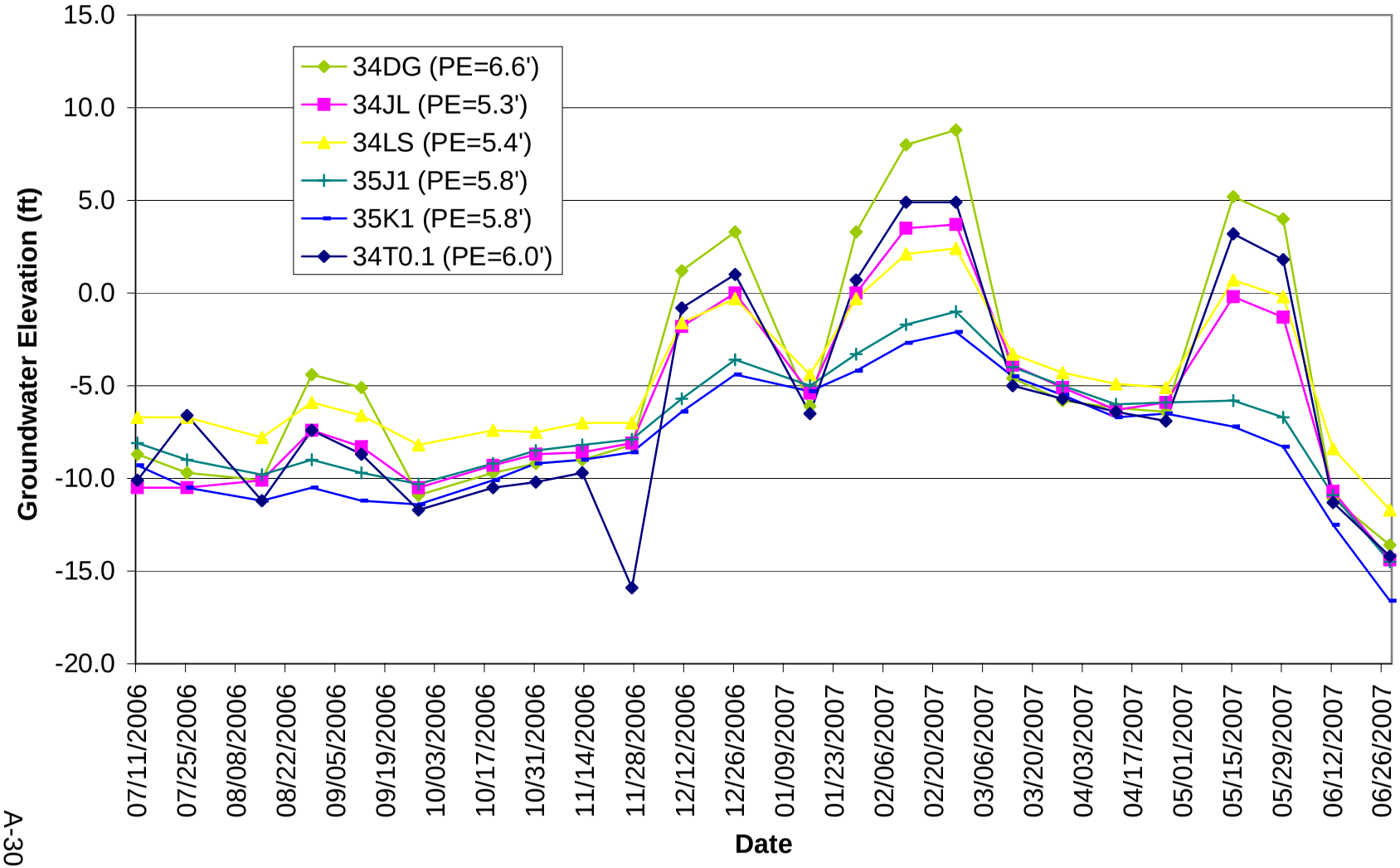
ABP West Leg Groundwater Elevations - I Zone

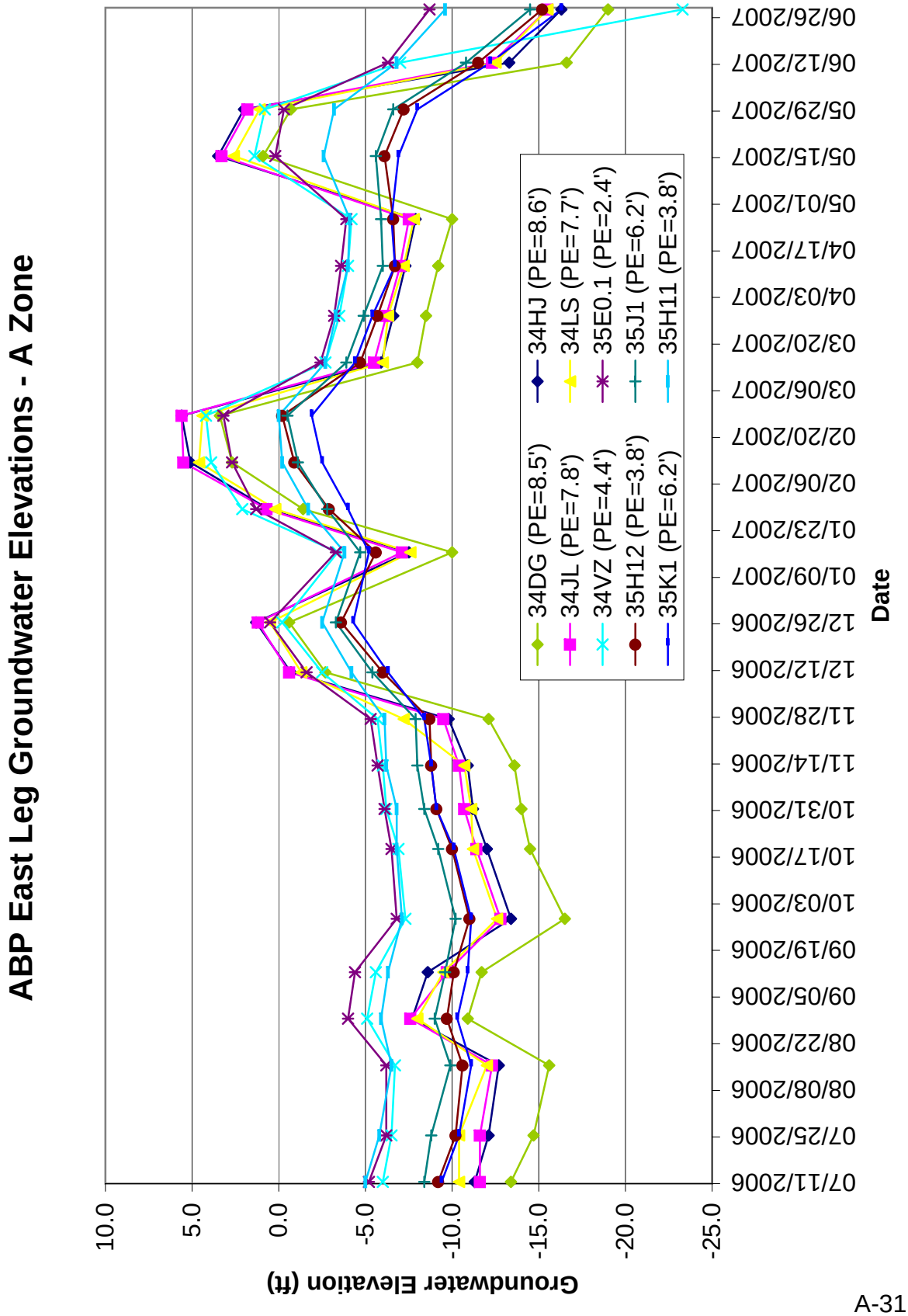


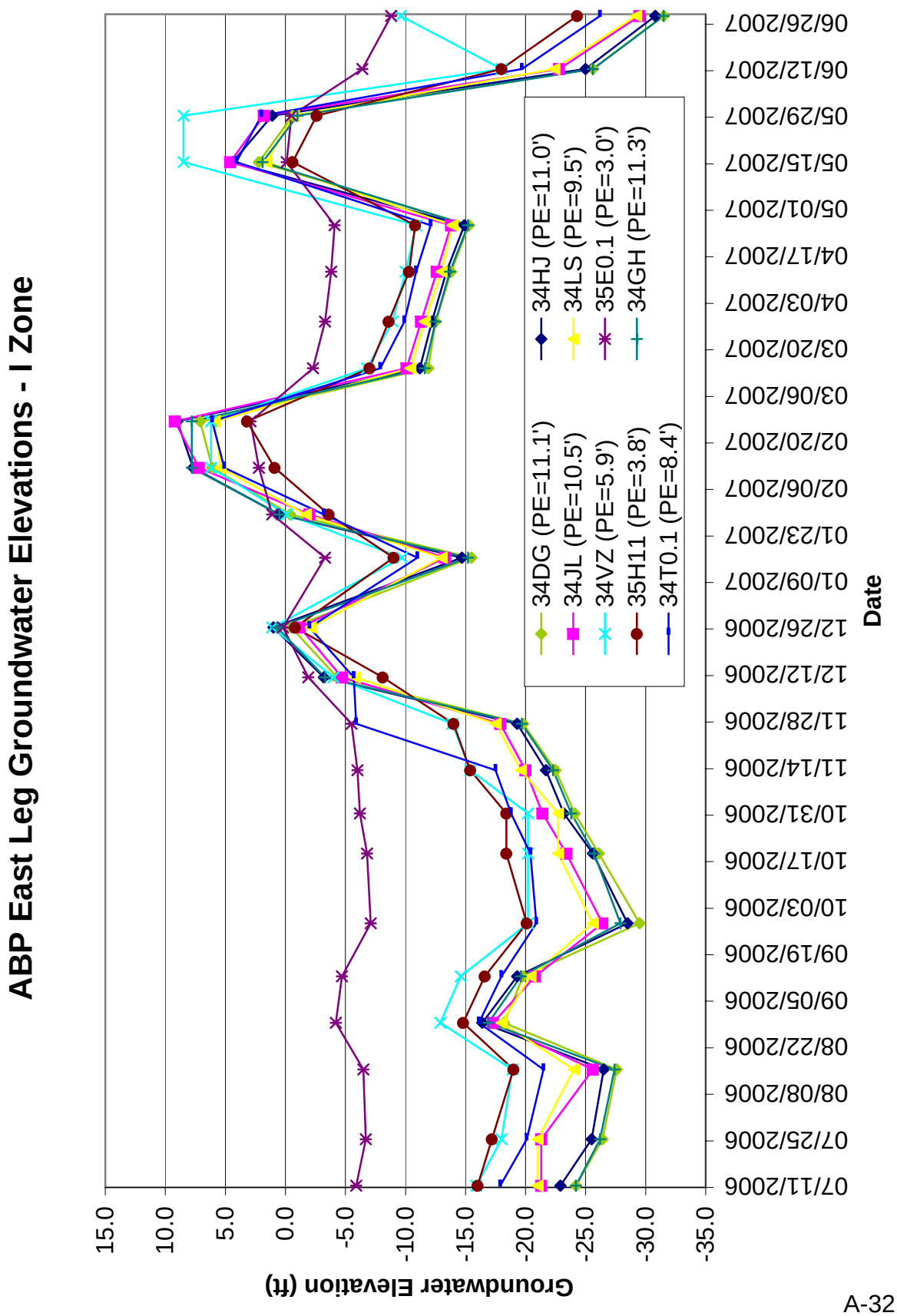
ABP East Leg Groundwater Elevations - C Zone



ABP East Leg Groundwater Elevations - B Zone




ABP East Leg Groundwater Elevations - A Zone
Groundwater Elevation (ft)
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
Date
07/11/2006
07/25/2006
08/08/2006
08/22/2006
09/05/2006
09/19/2006
10/03/2006
10/17/2006
10/31/2006
11/14/2006
11/28/2006
12/12/2006
12/26/2006
01/09/2007
01/23/2007
02/06/2007
02/20/2007
03/06/2007
03/20/2007
04/03/2007
04/17/2007
05/01/2007
05/15/2007
05/29/2007
06/12/2007
06/26/2007
34DG (PE=8.5')
34HJ (PE=8.6')
34JL (PE=7.8')
34LS (PE=7.7')
34VZ (PE=4.4')
35E0.1 (PE=2.4')
35H12 (PE=3.8')
35J1 (PE=6.2')
35K1 (PE=6.2')
35H11 (PE=3.8')


ABP East Leg Groundwater Elevations - I Zone
Groundwater Elevation (ft)
15.0
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
Date
07/11/2006
07/25/2006
08/08/2006
08/22/2006
09/05/2006
09/19/2006
10/03/2006
10/17/2006
10/31/2006
11/14/2006
11/28/2006
12/12/2006
12/26/2006
01/09/2007
01/23/2007
02/06/2007
02/20/2007
03/06/2007
03/20/2007
04/03/2007
04/17/2007
05/01/2007
05/15/2007
05/29/2007
06/12/2007
06/26/2007
34DG (PE=11.1')
34JL (PE=10.5')
34VZ (PE=5.9')
35H11 (PE=3.8')
34T0.1 (PE=8.4')
34HJ (PE=11.0')
34LS (PE=9.5')
35E0.1 (PE=3.0')
34GH (PE=11.3')

ALAMITOS BARRIER PROJECT
Overview Map

N

POINT A

PRV Renovation Project

Cathodic Protection Project, Phase 2
(the rest of alignment along the channel is part of Phase 1 with the exception of east leg (OCWD) where cathodic protection was not required.

33W110

Station 2+65
Blow-Off Repair

Cathodic Protection Project, Phase 2
(the rest of alignment along the channel is part of Phase 1 with the exception of east leg (OCWD) where cathodic protection was not required.

Station 224+97
Blow-Off Repair

POINT B

POINT C

ABP Telemetry System, Phases 1 and 2, covers the two ends of the barrier. The center segment was previously covered as part of a pilot study.

900 0 900 1800 Feet

LEGEND

- Extraction Well
- Observation Well
- LACFCD Injection Well
- OCWD Injection Well
- ABP Water Supply Line (owned jointly)
- ABP Water Supply Line (owned by LACFCD)
- ABP Water Supply Line (owned by OCWD)

ALAMITOS BARRIER PROJECT
R-Zone
Groundwater Elevation Data for Contours and Tables

PROJ	FCD	DATE	AQUIFER	ELEV
32Y'43	493WW	20070327	R	1.2
33H'13	493YY	20070327	R,A	-2.7
33S 18	492AH	20070322	R	-2.2
33S 52	491J	20070322	R	-0.3
33T 29	491D	20070329	R	-2.6
33T'13	492AU	20070327	R	-2.7
33T'24	493SS	20070326	R	-0.6
33V' 8	492BY	20070326	RA	-4.0
33V'14	492JJ	20070326	R	-4.6
33V'46	493UU	20070327	R	2.5
33W 54	501C	20070327	R	0.7
33W'14	492AT	20070327	R	-0.9
33W'17	493PP	20070327	R	-4.4
33WX	502AZ	20070328	R	-1.4
33X 20	502L	20070314	R	-0.2
33Y'35	493AB	20070327	R	-2.6
33Z' 1	502AU	20070314	R	-0.8
34E'13	503AU	20070314	R	-1.9
34E'23	503X	20070326	R	-1.7
34F 5	502BT	20070313	R	-3.9
34H'17	503Y	20070314	R	-2.0
34H'38	493QQ	20070326	R	2.8
34J'12	503U	20070326	R	-3.7
34L' 1	503P	20070328	R	-2.2
34N' 7	503AE	20070327	R	-3.2
34N'16	503W	20070319	R	-2.9
34Q'22	503T	20070314	R	-2.1
34V'18	503V	20070326	R	-3.5
34W' 5	503AH	20070327	R	-3.3
35D' 5	503AL	20070313	R	-2.5
35H 11	514F	20070327	R	-4.6
35S'24	504K	20070314	R	0.3

ALAMITOS BARRIER PROJECT
C-Zone
Groundwater Elevation Data for Contours and Tables

PROJ	FCD	DATE	AQUIFER	ELEV
33S 18	492AH	20070322	C	-2.2
33ST	492BK	20070327	C,B	-0.5
33X 10	502BB	20070312	C	-4.9
33XY	502BL	20070328	C	-5.9
33YZ	502AB	20070328	C	-6.3
34D' 6	502BF	20070314	C	-2.7
34DG	502X	20070328	C	-5.6
34F 5	502BU	20070313	C	-4.2
34F'13	503R	20070327	C	1.1
34JL	503AR	20070328	C	-5.1
34L' 1	503N	20070328	C	-4.4
34L 10	502AK	20070313	C	-4.4
34LS	503BF	20070328	C	-4.7
34U 8	513D	20070313	C	-4.0
35F 20	513L	20070313	C	-1.7
PZ5	492CH	20070327	C,B	-2.0

ALAMITOS BARRIER PROJECT
B-Zone
Groundwater Elevation Data for Contours and Tables

PROJ	FCD	DATE	AQUIFER	G.W. ELEV
33H 57	481	20070314	B	-12.9
33JL	492BQ	20070328	B	-3.6
33NQ	492BN	20070327	B	-2.4
33Q 9	492CM	20070312	B	-4.0
33Q 15	492AN	20070221	B	-14.7
33S 18	492AF	20070322	B	-8.4
33ST	492BK	20070327	CB	-0.5
33T 3	492CL	20070312	B	-0.5
33X 10	502BC	20070312	B	-5.6
33X 20	502K	20070314	B	-10.2
33XY	502BM	20070328	B	-5.9
33YZ	502AC	20070328	B	-6.9
33Z 13	502E	20070314	B	-2.0
34D' 6	502BG	20070314	B	-4.7
34DG	502Y	20070328	B	-5.8
34F 5	502BS	20070313	B	-4.9
34JL	503AQ	20070328	B	-5.1
34LS	503BE	20070328	B	-4.3
34T0.1	503AB	20070328	B	-3.3
34U 8	513E	20070313	B	-4.8
35J1	514M	20070327	B	-5.0
35K1	523A	20070327	B	-5.5
PZ5	492CH	20070327	CB	-2.0

ALAMITOS BARRIER PROJECT
A-Zone
Groundwater Elevation Data for Contours and Tables

PROJ	FCD	DATE	AQUIFER	ELEV
32U 15	482M	20070327	A	-13.2
32V 22	482P	20070327	A	-15.1
33G 9	482F	20070327	A	-6.6
33H'13	493YY	20070327	R,A	-2.7
33JL	492BW	20070328	A,I	-6.4
33L 3	492	20070327	A	-5.8
33L 23	492RR	20070322	A	-9.7
33N 21	492BU	20070322	A	-10.8
33NQ	492BP	20070327	A,I	-7.0
33Q 15	492AM	20070327	A	-9.1
33S 18	492AE	20070322	A	-6.0
33S 20	492BR	20070322	A	-10.4
33S 43	491E	20070322	A	-10.8
33S 52	491H	20070322	A	-13.6
33ST	492BL	20070327	A	-7.3
33T 15	492SS	20070327	A	-7.8
33T 29	491C	20070322	A	-8.8
33U' 3	492WW	20070326	A	-5.8
33UV	492BH	20070328	A	-7.4
33V' 8	492BY	20070326	R,A	-4.0
33W 11	502T	20061220	A	-7.8
33W110	1009K	20070319	A	-19.0
33WX	502AF	20070328	A	-7.6
33X 10	502BD	20070312	A	-7.9
33X 20	502J	20070314	A	-10.4
33XY	502BN	20070328	A	-8.3
33Y 42	501A	20070327	A	-11.9
33YZ	502AD	20070328	A	-8.6
33Z' 1	502G	20070314	A	-9.6
34D' 6	502BH	20070314	A	-8.1
34DG	502Z	20070328	A	-8.5
34F 5	502BR	20070313	A	-8.4
34F'13	503Q	20070314	A	-3.1
34HJ	502BX	20070328	A	-6.6
34JL	503AP	20070328	A	-6.2
34L 10	502AM	20070315	A	-6.6
34LS	503BD	20070328	A	-6.3
34N 21	512B	20070312	A	-11.4
34N' 7	503AF	20070327	A	-3.8
34T0.1	503AC	20070328	A	-5.7
34U 8	513F	20070313	A	-5.9
34VZ	503BH	20070328	A	-3.5
34W' 5	503AH	20070327	R	-3.3
35E0.1	503BK	20070328	A	-3.2
35F 20	513J	20070313	A	-3.8
35H 11	514G	20070327	A	-3.3
35H 12	514D	20070327	A	-5.7
35J1	514L	20070327	A	-4.9
35K1	523B	20070327	A	-5.4
36F' 1	505D	20070312	A	-13.3

ALAMITOS BARRIER PROJECT
I-Zone
Groundwater Elevation Data for Contours and Tables

PROJ	FCD	DATE	AQUIFER	ELEV
32U 15	482L	20070327	I	-5.4
32V 22	482N	20070327	I	-13.5
33G 9	482G	20070327	I	-11.1
33H'13	493XX	20070327	I	-6.7
33JL	492BW	20070328	AI	-6.4
33N 21	492BV	20070322	I	-15.4
33NQ	492BP	20070327	AI	-7.0
33S 20	492BS	20070322	I	-14.4
33S 40	491F	20070322	I	-14.9
33ST	492BM	20070327	I	-8.6
33T 12.5	492BT	20070327	I	-14.1
33T'24	493RR	20070326	I	-1.5
33U' 3	492QQ	20070326	I	-8.3
33UV	492BJ	20070328	I	-8.2
33V' 8	492BX	20070326	I	-0.6
33WX	502AG	20070328	I	-11.2
33X 10	502BE	20070312	I	-12.6
33X 20	502H	20070314	I	-13.6
33XY	502BP	20070328	I	-13.0
33Y'35	493ZZ	20070327	I	-3.3
33YZ	502AE	20070328	I	-13.2
34D' 6	502BI	20070314	I	-12.5
34DG	502AA	20070328	I	-12.5
34E'13	503AT	20070314	I	-11.8
34F 5	502BQ	20070313	I	-12.0
34GH	502BV	20070328	I	-12.5
34HJ	502BW	20070328	I	-12.2
34JL	503AN	20070328	I	-11.3
34L 10	502AN	20070313	I	-11.3
34LS	503BC	20070328	I	-11.6
34N 21	512C	20070312	I	-9.0
34N' 7	503AG	20070327	I	-6.1
34Q'15	503H	20070326	I	-8.1
34T0.1	503AD	20070328	I	-9.9
34U 8	513G	20070313	I	-9.8
34VZ	503BG	20070328	I	-8.9
34W' 5	503AK	20070327	I	-4.2
35D' 5	503AM	20070313	I	-2.4
35E0.1	503BJ	20070328	I	-3.3
35F 20	513H	20070313	I	-3.8
35H 11	514H	20070327	I	-8.6
35N0.1	504N	20070306	I	-3.3

Comparison of ABP Annual Chloride Values - Spring 2006 vs. Spring 2007

	PROJ. NO.	AQ	FCD NO.	RP ELEV	DEP1 (ft.)	DEP2 (ft.)	DEP3 (ft.)	DATE	DATE	CHL1 (mg/l)	CHL1 (mg/l)	CHL2 (mg/l)	CHL2 (mg/l)	CHL3 (mg/l)	CHL3 (mg/l)	COMPARISON MAX (mg/L)	COMPARISON MAX (mg/L)	SND (ft.)	SND (ft.)	MEAS. DIST.	MEAS. DIST.	WS ELEV.	WS ELEV.
1	**32U15**	A	482M	51.0	68			02/13/06	02/08/07	240	190					**240**	**190**	92	89	55.9	56.2	-4.9	-5.2
	32U15	I	482L	51.0	125			02/13/06	02/08/07	100	102					**100**	**102**	141	135	60.6	66.5	-9.6	-15.5
2	**32V22**	A	482P	73.7	85			06/05/06	02/08/07							**N/A**	**N/A**		88	84.3	87.1	-10.6	-13.4
	32V22	I	482N	73.7	~~120~~			06/05/06	02/08/07	132	124					**132**	**124**	122	133	94.9	90.4	-21.2	-16.7
3	**32Y'43**	R	493WW	4.1	47			06/26/06	02/15/07	1825	8300					**1825**	**8300**			2.7	2.4	1.4	1.7
4	**33G9**	A	482F	57.2		80		06/05/06	02/08/07			122	110			**122**	**110**			63.9	69.6	-6.7	-12.4
	33G9	I	482G	57.2	91	125	135	06/06/06	02/08/07	44	54	60	96	80	82	**80**	**96**			62.5	64.0	-5.3	-6.8
5	**33H'13**	(R,A)	493YY	9.2	27	47	67	06/13/06	02/13/07	650	3625	660	2250	1425	850	**1425**	**3625**	80	77	9.4	11.5	-0.2	-2.3
	33H'13	I	493XX	9.2	98			06/13/06	02/13/07	240	270					**240**	**270**	112	107	15.0	15.5	-5.8	-6.3
6	**33L3**	A	492	25.2	85			06/06/06	02/13/07	74	86					**74**	**86**			30.6	28.6	-5.4	-3.4
7	**33L23**	A	492RR	9.4	353			02/14/06	02/14/07	3800	3850					**3800**	**3850**	374	374	12.5	20.8	-3.1	-11.4
8	**33L30**	R	491G	10.0	60			02/14/06	02/14/07	2300	1725					**2300**	**1725**	70	70	7.7	9.2	2.3	0.8
9	**33N21**	A	492BU	9.0				06/07/06	02/14/07							**N/A**	**N/A**		361		17.2		-8.2
	33N21	I	492BV	9.0	466	480		06/07/06	02/14/07	66	68	66	70			**66**	**70**	502	502	31.4	22.0	-22.4	-13.0
10	**33Q9**	B	492CM	35.0	120	130	140	06/08/06	03/01/07	82	180	84	330	140	330	**140**	**330**			38.7	36.9	-3.7	-1.9
11	**33Q15**	A	492AM	10.9	351			02/14/06	02/21/07	500	98					**500**	**98**	369	354	10.0	16.2	0.9	-5.3
	33Q15	B	492AN	10.0	278			02/14/06	02/21/07	400	1250					**400**	**1250**	288	279	12.3	24.7	-2.3	-14.7
12	**33S18**	A	492AE	11.1	362			06/07/06	02/22/07	200	130					**200**	**130**	205	290	20.6	15.3	-9.5	-4.2
	33S18	B	492AF	11.1	278			06/07/06								**N/A**	**N/A**		20				
	33S18	C	492AG	10.6	236			06/07/06		2350						**2350**	**N/A**	51	241	15.5		-4.9	
	33S18	R	492AH	10.8	78			06/07/06								**N/A**	**N/A**		85	9.0		1.8	
13	**33S20**	A	492BR	8.9	326	345	364	06/07/06	02/12/07	88	130	76	120	92	110	**92**	**130**		387	20.8	15.5	-11.9	-6.6
	33S20	I	492BS	8.9	~~481~~			06/07/06	02/12/07							**N/A**	**N/A**	33	59				
14	**33S40**	I	491F	11.8	482			02/22/06	02/15/07	400	260					**400**	**260**	523	503	20.6	26.0	-8.8	-14.2
15	**33S43**	A	491E	13.0	346	357		06/08/06	02/14/07	142	148	136	148			**142**	**148**	380	380	27.2	21.6	-14.2	-8.6
16	**33S52**	A	491H	12.5	296	321		02/22/06	02/15/07	450	188	400	248			**450**	**248**	340	334	19.8	24.6	-7.3	-12.1
	33S52	R	491J	12.5	66			02/22/06	02/15/07	1300	1200					**1300**	**1200**	75	75	11.8	12.8	0.7	-0.3
17	**PZ5**	(C,B)	492CH	16.3	41			06/07/06	03/01/07	42	3550					**42**	**3550**			16.8	17.6	-0.5	-1.3
18	**33T3**	B	492CL	10.0	50	67	85	06/06/06	02/13/07	40	582	42	660	46	3050	**46**	**3050**			10.3	9.8	-0.3	0.2
19	**33T12.5**	I	492BT	9.5	432	447	461	06/06/06	02/21/07		120		110		110	**N/A**	**120**		457	28.8	16.4	-19.3	-6.9
20	**33T15**	A	492SS	11.2	345			06/12/06	02/21/07	108	105					**108**	**105**	363	363	20.8	13.4	-9.6	-2.2
21	**33T29**	A	491C	12.2	362			06/13/06	02/14/07	36	120					**36**	**120**	371	371	23.7	18.4	-11.5	-6.2
	33T29	M	491B	11.2	684	690		06/13/06	02/14/07	1150	850	625	1300			**1150**	**1300**	716	716	38.0	28.4	-26.8	-17.2
	33T29	R	491D	10.7	67			06/13/06	03/29/07	4600	5300					**4600**	**5300**	85	85	9.4	13.3	1.3	-2.6
22	**33T'13**	R	492AU	10.0	51	61		06/13/06	03/01/07	700	11050	1275	11800			**1275**	**11800**	76	76	10.9	11.5	-0.9	-1.5
23	**33T'24**	I	493RR	8.1	68	83		02/21/06	02/08/07	17700	18300					**17700**	**18300**	67	67	8.3	9.5	-0.2	-1.4
	33T'24	R	493SS	8.0	37			02/21/06	02/08/07	11600	13250					**11600**	**13250**	50	50	8.3	10.2	-0.3	-2.2
24	**33U'3**	A	492WW	10.9	100			06/15/06	02/20/07	310	8150					**310**	**8150**	119	113	17.7	11.0	-6.8	-0.1
	33U'3	I	492QQ	9.8	157			06/15/06	02/20/07	300	1890					**300**	**1890**	160	157	20.4	11.7	-10.6	-1.9
25	**33V'8**	(R,A)	492BY	10.0	34	64		06/19/06	03/01/07	8200	17100	3550	19100			**8200**	**19100**	66	64	8.6	9.7	1.4	0.3
	33V'8	I	492BX	10.0	119	149		06/19/06	03/01/07	1700	2850	2100	3800			**2100**	**3800**	152	145	14.4	8.2	-4.4	1.8
26	**33V'14**	R	492JJ	9.6	81			06/19/06	03/01/07	5200	11150					**5200**	**11150**	84	84	15.1	9.4	-5.5	0.2
27	**33V'46**	R	493UU	5.4	66			02/23/06	02/15/07	6600	9250					**6600**	**9250**	70	70	2.0	2.6	3.4	2.8
28	**33W54**	R	501C	13.5	46	66		06/08/06	02/20/07	82	108	142	100			**142**	**108**	75	75	11.5	12.6	2.0	0.9
29	**33W'14**	R	492AT	15.7	62	82		06/15/06	02/20/07	775	1800	4000	6100			**4000**	**6100**	101	101	16.8	11.0	-1.1	4.7
30	**33W'17**	R	493PP	9.3	50	60		06/19/06	02/20/07	2900	4200	3500				**3500**	**4200**	76	76	13.9	8.6	-4.6	0.7
31	**33X10**	A	502BD	10.0	330	350	370	06/19/06	02/12/07	148	230	120	270	150	310	**150**	**310**	390	384	20.5	12.3	-10.5	-2.3
	33X10	B	502BC	10.0	285			06/12/06	02/12/07	88	80					**88**	**80**	306	292	17.3	9.1	-7.3	0.9
	33X10	C	502BB	10.0	200	225		06/12/06	02/12/07	84	142	84	154			**84**	**154**	239	234	16.8	9.7	-6.8	0.3
	33X10	I	502BE	10.0	430	450	470	06/22/06	02/12/07	230	1150	315	950	154		**315**	**1150**	440	460	29.2	16.0	-19.2	-6.0
32	**33Y10**	R	502BA	23.0	81	110		06/12/06	03/13/07	760	800	4350	3750			**4350**	**3750**	116	116	22.8	23.5	0.2	-0.5
33	**33Y42**	A	501A	24.9	367			06/08/06	02/20/07	200	70					**200**	**70**	384	384	42.9	35.1	-18.0	-10.2
	33Y42	R	501B	25.0	92			06/08/06								**N/A**	**N/A**	14	16				
34	**33Y'35**	I	493ZZ	12.5	79			06/15/06	02/22/07	20300	21500					**20300**	**21500**	87	87	14.8	15.3	-2.3	-2.8
	33Y'35	R	493AB	12.5	48			06/15/06	02/22/07	19900	17600					**19900**	**17600**	56	56	14.5	15.3	-2.0	-2.8
35	**34D'6**	A	502BH	20.3	290	323	355	06/20/06	02/07/07	495	750	260	940	590	1050	**590**	**1050**	379	379	30.2	21.6	-9.9	-1.3
	34D'6	B	502BG	20.3	200	220		06/20/06	02/07/07	125	98	90	102			**125**	**102**	230	230	26.2	17.6	-5.9	2.7
	34D'6	C	502BF	20.3	145			06/20/06	02/07/07	11600	7100					**11600**	**7100**	159	159	22.9	21.9	-2.6	-1.6
	34D'6	I	502BI	20.3	420	430	440	06/20/06	02/07/07	280	1160	230	1575	2150	1300	**2150**	**1575**	464	464	39.4	21.9	-19.1	-1.6
36	**34E'13**	I	503AT	21.0	310	330		06/20/06	02/06/07	2350	6000	2750	4900			**2750**	**6000**	351	332	39.1	21.6	-18.1	-0.6
	34E'13	R	503AU	21.0	40	78		06/20/06	02/06/07	2550	2350	5600	2600			**5600**	**2600**	81	77	23.7	18.5	-2.7	2.5
37	**34E'23**	R	503X	10.1	53			06/12/06	03/05/07	4100	4600					**4100**	**4600**	84	84	11.5	12.2	-1.4	-2.1
38	**34F'13**	A	503Q	21.2	198			02/16/06	02/08/07	250	330					**250**	**330**	207	207	13.5	18.4	7.7	2.8
	34F'13	C	503R	21.0	100			02/16/06	02/06/07	2500	2500					**2500**	**2500**	109	105	17.9	19.7	3.1	1.3
39	**34H'17**	R	503Y	19.6	66			06/21/06	02/06/07	4000	4550					**4000**	**4550**	83	83	22.2	19.0	-2.6	0.6
40	**34H'38**	R	493QQ	9.4	42			06/15/06	03/13/07	500	1200					**500**	**1200**	50	50	6.2	6.1	3.2	3.3
41	**34J'12**	R	503U	19.8	48	56		06/21/06	03/08/07	2500	6000	7350	7000			**7350**	**7000**		101	18.1	18.1	1.7	1.7
42	**34L10**	A	502AM	5.6	316	336	360	06/14/06	03/15/07	78	78	78	84	72	96	**78**	**96**		364	14.4	12.2	-8.8	-6.6
	34L10	B	502AL	5.6	230	255		06/14/06	03/05/07	88	90	88	40			**88**	**90**		263	11.9	1.8	-6.3	3.8
	34L10	C	502AK	5.6	175			06/14/06	03/05/07	86	82					**86**	**82**		180	11.7	2.4	-6.1	3.2
	34L10	I	502AN	5.6	410	445		06/14/06	03/05/07	68	72	70	74			**70**	**74**		366	24.2	0.9	-18.6	4.7
43	**34N21**	A	512B	6.8	335	361		06/14/06	03/12/07	90	112	96	130			**96**	**130**		346	20.0	18.2	-13.2	-11.4
	34N21	I	512C	6.8	430	460		06/14/06	03/12/07	102	104	94				**102**	**104**			26.5	15.8	-19.7	-9.0
44	**34N'7**	A	503AF	10.5	116	154	191	06/21/06	02/15/07	175	198	150	294	380	1260	**380**	**1260**	201	201	12.0	4.8	-1.5	5.7
	34N'7	I	503AG	10.5	231	264	296	06/21/06	02/15/07	165	112	285	212		240	**285**	**240**	277	277	14.3	2.2	-3.8	8.3
	34N'7	R	503AE	10.5	61	71	81	06/21/06	02/15/07	240	1370	335	1180	2700	2000	**2700**	**2000**	87	87	9.8	5.7	0.7	4.8
45	**34Q'15**	I	503H	8.3	116			06/21/06	03/05/07	17200	16900					**17200**	**16900**				15.4		-7.1
46	**34Q'22**	R	503T	18.3	60	75		02/16/06	02/06/07	10750	10800	12450	13900			**12450**	**13900**	85	85	16.4	18.5	1.9	-0.2
47	**34V'18**	R	503V	18.3	66			06/21/06	03/08/07	8150	9900					**8150**	**9900**			17.3	17.3	1.0	1.0
48	**34W'5**	A	503AJ	13.6	95	115	133	06/21/06	03/06/07	160	210	88	110	115	180	**160**	**210**	145	145	10.5	10.5	3.1	3.1
	34W'5	I	503AK	13.6	170			06/22/06	03/06/07	4900	7050					**4900**	**7050**			9.5	9.5	4.1	4.1
	34W'5	R	503AH	13.6	65			06/22/06	03/06/07	535	480					**535**	**480**	77	77	8.7	8.7	4.9	4.9
49	**35D'5**	I	503AM	13.2	102			06/22/06	03/13/07	4150	4800					**4150**	**4800**	109	109	15.6	15.6	-2.4	-2.4
	35D'5	R	503AL	13.2	70			06/22/06	03/13/07	1750	2200					**1750**	**2200**			15.7	15.7	-2.5	-2.5
50	**35N'15**	R	504P	7.4	40	65		06/14/06	03/13/07	780	1800	11300	12900			**11300**	**12900**			9.7	9.1	-2.3	-1.7
51	**35N0.1**	I	504N	7.3	83			06/14/06	03/06/07	8300	7750					**8300**	**7750**			10.6	10.6	-3.3	-3.3
	35N0.1	R	504M	7.3	45	75		06/14/06	03/06/07	480	600	3150	2750			**3150**	**2750**			10.5	11.0	-3.2	-3.7
52	**35S'24**	R	504K	7.3	62			06/22/06								**N/A**	**N/A**	27	27	7.3	7.3	0.0	0.0
53	**35T'24**	(R,M)	504A	7.9	75	142	209	06/20/06	03/12/07	14500	19600	15800	18600	19300		**19300**	**19600**	553	553	9.2	9.2	-1.3	-1.3
54	**36F'1**	A	505D	39.5	142			06/20/06	03/12/07	380	418					**380**	**418**				52.8		-13.3

53	Increased in chloride concentration
27	Decreased in chloride concentration
1	No change in chloride concentration
9	Missing one or both data points
90	Total sampled well casings