SUMMARY REPORT
MONITORING WELL REDEVELOPMENT
AND SAMPLING PROGRAM

BOEING
REALTY COMPANY C-6 FACILITY
LOS ANGELES, CALIFORNIA

K/J 974012.00

APRIL 1998

Kennedy/Jenks Consultants

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1.0 INTRODUCTION

The Boeing Realty Company (BRC) C-6 Facility, formally McDonnell Douglas Realty Company (MDRC) C-6 Facility, is located at 19503 South Normandie Avenue, Los Angeles, California (Figure 1). Redevelopment and bi-weekly sampling have been conducted on 15 existing monitoring wells since the last quarterly groundwater monitoring event conducted in May 1997 (Figure 2). This report summarizes the redevelopment and laboratory analytical data generated through the chemical analysis of groundwater samples collected during the six bi-weekly sampling events performed since completion of redevelopment of the 15 wells. This report also includes a discussion of our conclusions based on the data collected during the redevelopment and the six bi-weekly sampling events.

Table 1 summarizes monitoring well construction details. Depth to water measurements and calculated groundwater elevations from each bi-weekly sampling event are listed on Table 2. Table 3 and Figure 3 summarize the results of the chemical analysis of groundwater samples collected during the six bi-weekly sampling events. Table 3 also shows results from the last quarterly sampling event that occurred on 6 May 1997. Figure 4 illustrates changes in groundwater elevation since the last quarterly sampling event on 6 May 1997. Concentration trends of selected constituents detected in the groundwater samples are presented on Figures 5, 6, 7, and 8. Copies of laboratory data sheets, groundwater purge and sample forms, and Chain-of-Custody records for each of the six bi-weekly sampling events are included in Appendices A, B, and C respectively for each of the *Groundwater Monitoring Data Summary Reports* dated 8 July, 24 July, 6 August, 22 August, 5 September and 18 September 1997, and are not included with this summary.

2.0 REDEVELOPMENT AND SAMPLING PROGRAM

2.1 Redevelopment Procedures

The wells were redeveloped with the use of a bottom discharge bailer and surge block to remove material from the bottom of each well. Water was bailed from each well until five well volumes had been removed or until the water was clear of suspended material. Surging and bailing was then repeated until less than 2-percent solids remained in the water or four hours had elapsed. At the end of redevelopment, the wells were sounded to determine the total depth of the casing in an effort to correlate with existing well construction details. Approximately five to six well volumes were purged from each well. Purged groundwater generated as a result of the redevelopment was stored onsite in DOT approved 55 gallon barrels pending the results of laboratory analysis of samples.

During the redevelopment of well WCC-2S, the surge block became lodged at a depth of approximately 80 bgs. Several attempts were made to dislodge the surge block but all were unsuccessful. This well had been damaged as a result of construction activities at the ground surface. Visible damage at the surface indicated that earth moving equipment had driven over

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the well head, dislodging the well head and apparently causing failure to the well casing at depth. This lower casing failure apparently caused the surge block to lodge in the well.

2.2 Groundwater Sampling Procedures

Groundwater sampling was performed in accordance with standard sampling procedures. Static water level depths were measured in all accessible wells during each biweekly event prior to initiating purging of groundwater from any monitoring well. Groundwater samples were collected from the following thirteen wells (Figure 2) on all of the six bi-weekly events and chemically analyzed for volatile organic compounds (VOCs) by EPA Method 8260.

> WCC-1S, WCC-3S, WCC-4S, WCC-5S, WCC-7S, WCC-8S, WCC-9S, WCC-10S, WCC-11S, WCC-12S, DAC-P1, WCC-1D, and WCC-3D.

WCC-6S was blocked by construction debris on two of the six sampling events and therefore not accessible for sampling on those dates. WCC-2S was not measured or sampled during any of the six events because of the obstruction caused by the lodged surge block as previously discussed.

Prior to collecting groundwater samples from each well, groundwater was purged using an electrical submersible pump that was temporarily installed in the monitoring well. After lowering the pump to the approximate mid-point of the wetted well screen, approximately three to five wetted casing volumes of groundwater were purged from the well until the following groundwater monitoring parameters had stabilized to within 10% of preceding values: pH, electrical conductivity, and temperature. A wetted casing volume is the volume of water that occupies the casing from the static water level to the bottom of the well (i.e., excluding the volume from the top of casing to the static water level). Purged groundwater was stored onsite in DOT approved 55 gallon barrels pending the results of laboratory analysis of samples.

Following groundwater purging, the flow rate of the submersible pump was reduced to 200 milliliters/minute. The recovered water was discharged into three labeled 40-ml capacity vials, preserved with HCl.

2.3 Field QA/QC Procedures

Duplicate groundwater samples were collected from various wells during each of the sampling rounds for quality control purposes. The duplicates were collected in three HCl-preserved vials and identified by means which did not indicate from which well the duplicate had been collected. No further sample identification was provided to the laboratory. Daily sampling reports recorded the wells from which the duplicates had been collected.

An equipment rinsate blank was prepared for each day of sampling at the site. The submersible pump was decontaminated between use in each well. The equipment rinsate blanks were collected after decontamination between the second to the last and the last well of

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the day. Once decontamination was complete, the pump was turned off, and Reagent Grade II water, prepared by the laboratory, was poured over the pump housing and screen, and the runoff collected into two 40-ml vials preserved with HCl. The blanks were identified as EB- followed by the date of collection. Trip blanks were also analyzed for sampling and shipping activities and were identified as TB- followed by the date of collection.

All groundwater, duplicate, and field blank samples were transported in ice-cooled chests to Quanterra Environmental Services, Santa Ana, California using U.S. EPA-recommended Chain-of-Custody procedures.

3.0 FIELD AND ANALYTICAL RESULTS

3.1 Redevelopment

The monitoring wells were redeveloped between 19 and 30 June 1997. The wells were repeatedly surged, bailed, and pumped until sediment had been cleaned out of the casing and filter pack. Between 40 and 200 gallons of water were purged from the wells until the field parameters of electrical conductivity, pH, temperature, and turbidity had stabilized. Depth to bottom measurements made on 1 July 1997 show that bottoms of most of the wells were cleared of between 0.03 and 0.98 feet of sediment. Well WCC-1S, however, was cleared of 3.35 feet of sediment in the bottom of the casing. WCC-1S is the only 2-inch-diameter monitoring well; other monitoring well casings are 4 inches in diameter (Table 1). Measurements taken during the rest of the monitoring program show that the bottoms of the casings have not refilled with sediment.

3.2 Groundwater Gradient

Groundwater levels were measured prior to each sampling event (Table 2). The groundwater elevation graph presented on Figure 4 shows that the groundwater levels varied only slightly between sampling rounds, rising or falling between 0.05 and 0.09 feet. Between May and September 1997 the groundwater elevation has undergone an average net rise of about 0.14 feet. An exception to this observation is well DAC-P1, in which the groundwater elevation has undergone a net rise of 0.29 feet, with only one decrease throughout the monitoring period (two decreases in groundwater levels were observed in all other monitoring wells between dates of measurement during the monitoring period). Figure 4A presents the changes in groundwater elevation measured in the monitoring wells since 1987. The graphs shows that the groundwater elevation has been rising since 1993.

The potentiometric surface maps generated during the six sampling rounds show that the surface has undergone little change in gradient or shape throughout the monitoring period (Figures 9-14). The south and southeast flow directions and the southerly-directed trough between monitoring wells WCC-12S and WCC-7S appear to be consistent features in the potentiometric surface.

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3.3 Analytical Data

The results of chemical analysis of groundwater samples are summarized in Table 3. Dual entries for a particular sample on the table show the results of the original and duplicate samples, respectively. Concentration trends over this monitoring period of the four constituents 1,1-DCE, TCE, toluene, and cis-1,2-DCE are shown in Figures 5, 6, 7, and 8, respectively. These constituents were chosen because they have been detected most frequently, and in the highest concentrations, among the VOCs detected in the groundwater samples.

In general the table and graphs show that constituent concentrations detected in the monitoring wells have remained stable over the monitoring period, and are consistent with historical data.

The concentration of TCE declined about one order of magnitude in groundwater sampled from well DAC-P1 between the first and second sampling rounds, and from well WCC-8S between the second and third sampling rounds (Figure 6). The concentration of 1,1-DCE also declined in groundwater sampled from well WCC-8S between the second and third sampling round (Figure 5). In the subsequent sampling rounds the concentrations of these constituents returned to their previous levels and remained at their historical levels through the rest of the monitoring period. The reason for these drops is uncertain and the specific data are assumed to be anomalous. Because of the low order of magnitude of TCE concentrations in groundwater sampled from well WCC-5S, fluctuations as shown on Figure 6 are not significant.

Despite the anomalies presented on Figures 5 and 6 and discussed above, the concentrations of 1,1-DCE and TCE in the sampled groundwater have undergone little fluctuation through the six sampling events. These concentrations do not significantly differ from historical concentrations observed during quarterly monitoring.

Toluene has been detected in wells WCC-3S, WCC-6S, and DAC-P1 throughout the biweekly monitoring period and in most of the previous quarterly monitoring events (Figure 7). During the six bi-weekly sampling rounds, toluene was detected in samples from seven wells that historically have rarely contained toluene. In one of these seven wells, WCC-4S, toluene was detected in the third round at 560 μg/l. In six other wells, WCC-5S, 7S, 9S, 10S, 11S, and 12S, toluene was detected in the second, third, fifth, and sixth rounds only. The concentrations detected in these samples are similar to each other, and follow a similar trend over time, averaging 10 μg/l in the third round, and increasing to an average of 27 μg/l in the sixth round.

The consistency of detections and concentration trends suggests that these data are not laboratory errors, but that toluene levels have increased in some of the monitoring wells during the biweekly sampling period. Compared to concentrations of toluene found regularly in the other wells, however, these concentrations are insignificant.

Concentrations of cis-1,2-DCE have followed stable trends over the monitoring period, and are consistent with historical trends (Figure 8). Cis-1,2-DCE concentrations fluctuated somewhat in monitoring well WCC-6S, but averaged about 950 μg/l.

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Other chemicals detected in at least one groundwater sample obtained during the biweekly monitoring program included carbon tetrachloride, chloroform, 1,1-DCA, trans-1,2-DCE, ethylbenzene, methylene chloride, PCE, 1,2,3-trichlorobenzene, 1,1,1-TCA, 1,1,2-TCA, xylenes, and acetone. With the exception of 1,2,3-trichlorobenzene, all of these constituents were detected at least once during the quarterly monitoring.

Analytical data from the equipment rinsate blanks, sample duplicates, trip blanks, and laboratory spikes and duplicates analyzed over the monitoring period are indicative of reliable data.

4.0 CONCLUSIONS

The following conclusions are based on the data collected throughout the bi-weekly monitoring well sampling program.

- Post-redevelopment measurements of well depth are consistent with well construction details.
- Potentiometric surface maps generated from depth to groundwater measurements taken over the six-round monitoring period following redevelopment show that the groundwater beneath the site has a consistent south to southeast flow direction, and a south-directed trough centered around wells WCC-12S and WCC-7S. These observations are consistent with, and substantiate the reliability of the potentiometric surface observations during previous quarterly monitoring.
- In general the concentrations of VOCs in groundwater samples collected over the six-round monitoring period following redevelopment showed little variance from the levels observed during previous quarterly monitoring. These data substantiate the reliability of the analytical data collected during quarterly monitoring.

5.0 RECOMMENDATIONS

Based on the conclusions of this monitoring well redevelopment and biweekly sampling program, we recommend that quarterly groundwater monitoring continue throughout the life of the project.

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TABLES

TABLE 1

MONITORING WELL CONSTRUCTION DETAILS
BOEING REALTY COMPANY C-6 FACILITY
LOS ANGELES, CALIFORNIA
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Well	Date Constructed	Well Diameter (inches)	Total Depth of Borehole (Feet)	Depth of Screened Interval (Feet)	Depth to top of Sand Filter Pack (Feet)	Well Casing Material and Slot Size	Hydrogeologic Unit Screened
WCC-1S[1]	3/26/87	2	91	78-88	72	Schedule 40 PVC0.020-Inch Slots	Shallow
WCC-2S[1]	10/28/87	4	90.5	70-90	63	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-3S[1]	10/26/87	4	92	69-89	64	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-4S[1]	10/27/87	4	91.5	70.5-90.5	65	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-5S[1]	11/24/87	4	91	60.5-91	58.5	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-6S[2]	9/22/89	4	91	60-90	N/A[3]	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-7S[2]	6/8/89	4	90.5	60-90	54	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-8S[2]	6/12/89	4	90	59.5-89.5	54	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-9S[2]	9/21/89	4	91.5	60-90	55	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-10S[2]	6/7/89	4	90.8	60-90	54	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-11S	N/A	4	N/A	60-90(?)	N/A	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-12S	N/A	4	N/A	60-90(?)	N/A	Schedule 40 PVC0.010-Inch Slots	Shallow
DAC-P1[1]	9/25/89	4	N/A	60-90(?)	N/A	Schedule 40 PVC0.010-Inch Slots	Shallow
WCC-1D[2]	6/30/89	4	140	120-140	115	Schedule 40 PVC0.010-Inch Slots	Deeper
WCC-3D[2]	6/27/89	4	140	120-140	114	Schedule 40 PVC0.010-Inch Slots	Deeper

NOTES:

1. Data from Woodward-Clyde Consultants Phase II Report, May 1988
2. Data from Woodward-Clyde Consultants Phase III Report, March 1990
3. N/A = Not Available

TABLE 2

SUMMARY OF GROUNDWATER ELEVATION DATA
BOEING REALTY COMPANY C-6 FACILITY
LOS ANGELES, CALIFORNIA
K/J 974012.00

Monitoring Well	Reference Point[1] Elevation (Feet Above MSL)	5/6/97		7/1/97		7/22/97		8/4/97		8/19/97		9/3/97		9/16/97	
		Depth[2,3]	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation
WCC-1S	50.7	65.28	-14.58	65.21	-14.51	65.28	-14.58	65.23	-14.53	65.17	-14.47	65.23	-14.53	65.16	-14.46
WCC-2S	50.59	64.95	-14.36	-[4]	-[4]	-[4]	-[4]	-[4]	-[4]	-[4]	-[4]	-[4]	-[4]	-[4]	-[4]
WCC-3S	51.19	65.82	-14.63	65.72	-14.53	65.83	-14.64	65.72	-14.53	65.71	-14.52	65.77	-14.58	65.72	-14.53
WCC-4S	49.69	64.43	-14.74	64.35	-14.66	64.42	-14.73	64.38	-14.69	64.30	-14.61	64.38	-14.69	64.30	-14.61
WCC-5S	48.22	63.03	-14.81	62.93	-14.71	62.99	-14.77	62.93	-14.71	62.87	-14.65	62.94	-14.72	62.86	-14.64
WCC-6S	50.95	65.85	-14.90	65.74	-14.79	65.84	-14.89	65.79	-14.84	-[5]	-[5]	-[5]	-[5]	65.68	-14.73
WCC-7S	48.29	63.48	-15.19	63.41	-15.12	63.49	-15.20	63.44	-15.15	63.37	-15.08	63.44	-15.15	63.35	-15.06
WCC-8S	50.56	65.12	-14.56	65.00	-14.44	65.06	-14.50	65.02	-14.46	64.95	-14.39	65.02	-14.46	64.95	-14.39
WCC-9S	47.01	62.11	-15.10	62.01	-15.00	62.08	-15.07	62.01	-15.00	61.97	-14.96	62.02	-15.01	61.94	-14.93
WCC-10S	51.12	64.90	-13.78	64.86	-13.74	64.88	-13.76	64.85	-13.73	64.81	-13.69	64.84	-13.72	64.82	-13.70
WCC-11S	49.97	63.85	-13.88	63.73	-13.76	63.81	-13.84	63.71	-13.74	63.71	-13.74	63.78	-13.81	63.72	-13.75
WCC-12S	46.92	62.07	-15.15	61.99	-15.07	62.05	-15.13	62.01	-15.09	61.95	-15.03	62.02	-15.10	61.94	-15.02
DAC-P1	52.44	66.64	-14.20	66.47	-14.03	66.45	-14.01	66.42	-13.98	66.35	-13.91	66.37	-13.93	66.35	-13.91
WCC-1D	50.45	65.32	-14.87	65.27	-14.82	65.36	-14.91	65.3	-14.85	65.25	-14.80	65.29	-14.84	65.24	-14.79
WCC-3D	51.18	65.90	-14.72	65.83	-14.65	65.91	-14.73	65.87	-14.69	65.79	-14.61	65.83	-14.65	65.81	-14.63

Notes:

1. Reference point is north side, top of well casing
2. Depth in feet below ground surface.
3. Last quarterly monitoring event prior to redevelopment.
4. Depth to water not measured due to obstruction in the well and destruction of part of the well casing.
5. Depth to water not measured due to surface obstructions during building demolition preventing access to monitoring well.

TABLE 3

DETECTIONS OF SELECTED CHEMICALS IN GROUNDWATER SAMPLES
BOEING REALTY COMPANY C-6 FACILITY
LOS ANGELES, CALIFORNIA
K/J 974012.00

COMPOUNDS DETECTED BY EPA METHOD 8260 - All results in ug/l.

WELL I.D.	SAMPLE DATE†	1,1-DCE		1,1,-DCA		1,1,1-TCA		TCE		cis-1,2-DCE		trans-1,2-DCE		Chloroform	Ethylbenzene	Toluene		Total Xylenes
WCC-1S	5/8/97	3,200						2,700				69						
	7/8/97	3,900						2,800				65						
	7/24/97	2,600						2,400										
	8/6/97	3,800						2,700				60						
	8/22/97	3,800						2,700				66						
	9/5/97	3,500						2,500				61						
	9/17/97	3,400						2,700				63						
WCC-2S	5/7/97	12	11					25	24	18	17							
	*	*		*		*		*		*		*		*	*	*		*
	*	*		*		*		*		*		*		*	*	*		*
	*	*		*		*		*		*		*		*	*	*		*
	*	*		*		*		*		*		*		*	*	*		*
	*	*		*		*		*		*		*		*	*	*		*
	*	*		*		*		*		*		*		*	*	*		*
WCC-3S	5/8/97	6,300	6,200	140	<250	470	520	230	<250	2,000	2,000	180	<250			8,800	9,100	
	7/8/97	9,200				1,100		400		2,900		260				14,000		
	7/24/97	14,000		350		1,900		420		4,000		380				22,000		
	8/6/97	12,000		310		1,500		250		3,900		350				18,000		
	8/22/97	16,000		410		2,200		290		4,600		540				23,000		
	9/5/97	13,000		350		1,600				3,700		390				18,000		
	9/18/97	12,000	13,000	300	300	1,500	1,600		260	3,500	3,600	350	360			18,000	18,000	
WCC-4S	5/8/97	1,000						1,100				14						
	7/8/97	1,300						1,200										
	7/24/97	940						1,200										
	8/6/97	1,000						1,000							42	560		130
	8/22/97	1,200						1,200										
	9/5/97	1,100						1,000										
	9/17/97	960						1,100										

Notes follow at end of table.

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TABLE 3

DETECTIONS OF SELECTED CHEMICALS IN GROUNDWATER SAMPLES
BOEING REALTY COMPANY C-6 FACILITY
LOS ANGELES, CALIFORNIA
K/J 974012.00

COMPOUNDS DETECTED BY EPA METHOD 8260 - All results in ug/l.

WELL I.D.	SAMPLE DATE†	1,1-DCE	1,1,-DCA	1,1,1-TCA	TCE	cis-1,2-DCE	trans-1,2-DCE	Chloroform	Ethylbenzene	Toluene	Total Xylenes
WCC-5S	5/7/97	10			3.1						
	7/2/97	11			2.1						
	7/23/97	12			14					9.8	
	8/5/97	18		1.2	31	1.0				23	
	8/20/97	12			2.1						
	9/4/97	19		1.6	32	1.6				33	
	9/16/97	19		1.8	40	1.5				38	
WCC-6S	5/9/97	6,800 7,000		720 740	1,900 2,000	1,100 1,200	<100 120			1,800 1,800	
	7/8/97	3,600		410	950	540				2,400	
	7/24/97	2,700		320	820	510				1,600	
	8/6/97	7,700		630	2,100	1,400	110			3,100	
	*	*	*	*	*	*	*	*	*	*	*
	*	*	*	*	*	*	*	*	*	*	*
	9/18/97	5,500		500	1,600	910				1,800	
WCC-7S	5/8/97	120			140						
	7/2/97	130			150						
	7/24/97	67			130					8	
	8/6/97	130			160					18	
	8/21/97	120			140						
	9/4/97	120	3.1		150					17	
	9/17/97	110			160					21	
WCC-8S	5/8/97	2,600			1,600		51				
	7/8/97	3,200			1,900						
	7/24/97	2,500			1,900						
	8/6/97	130			160					18	
	8/22/97	2,800			1,900						
	9/5/97	2,500			1,600						
	9/17/97	2,600			1,800						

Notes follow at end of table.
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TABLE 3

DETECTIONS OF SELECTED CHEMICALS IN GROUNDWATER SAMPLES
BOEING REALTY COMPANY C-6 FACILITY
LOS ANGELES, CALIFORNIA
K/J 974012.00

COMPOUNDS DETECTED BY EPA METHOD 8260 - All results in ug/l.

WELL I.D.	SAMPLE DATE†	1,1-DCE		1,1,-DCA		1,1,1-TCA		TCE		cis-1,2-DCE		trans-1,2-DCE	Chloroform		Ethylbenzene	Toluene		Total Xylenes
WCC-9S	5/7/97	2.4						16		3.0			3.5					
	7/2/97	4.4						29		1.9			6.7					
	7/23/97	7.6						43		2.0			7.6			12		
	8/5/97	9.9						51		2.6			8.2			20		
	8/20/97	6.0						31		2.0			9.0					
	9/4/97	9.8						48		2.4			8.2			24		
	9/16/97	10	11			1.3	1.4	58	59	2.4	2.4		8.1	8.0		29	30.0	
WCC-10S	5/7/97	29						160					3.2					
	7/2/97	25						140					2.5					
	7/23/97	26	26					150	150				2.8	2.9		10.0	10.0	
	8/5/97	30						140					2.6			15		
	8/21/97	25						120					2.6					
	9/4/97	28						140					2.7			18		
	9/17/97	29						150								23		
WCC-11S	5/7/97	33						170		5.1								
	7/2/97	29						160		4.4								
	7/24/97	31						150		4.9						10		
	8/5/97	33						160		5.2						15		
	8/21/97	30						150		5.0								
	9/4/97	29	28					140	150	4.7	4.5					21	19	
	9/17/97	29						160		4.9						19		
WCC-12S	5/8/97	47		16				150		2.6								
	7/2/97	38	38	14	14			130	130	2.4	2.4							
	7/23/97	34		14				140		2.2						9.2		
	8/6/97	42		14				140		2.8						20		
	8/21/97	39		13				120		2.4			2.0					
	9/4/97	37		18				130		2.9						20		
	9/17/97	40	34	13	11			150	120	3.0						27	23	

Notes follow at end of table.
97401200.009

BOE-C6-0133654

TABLE 3

DETECTIONS OF SELECTED CHEMICALS IN GROUNDWATER SAMPLES
BOEING REALTY COMPANY C-6 FACILITY
LOS ANGELES, CALIFORNIA
K/J 974012.00

COMPOUNDS DETECTED BY EPA METHOD 8260 - All results in ug/l.

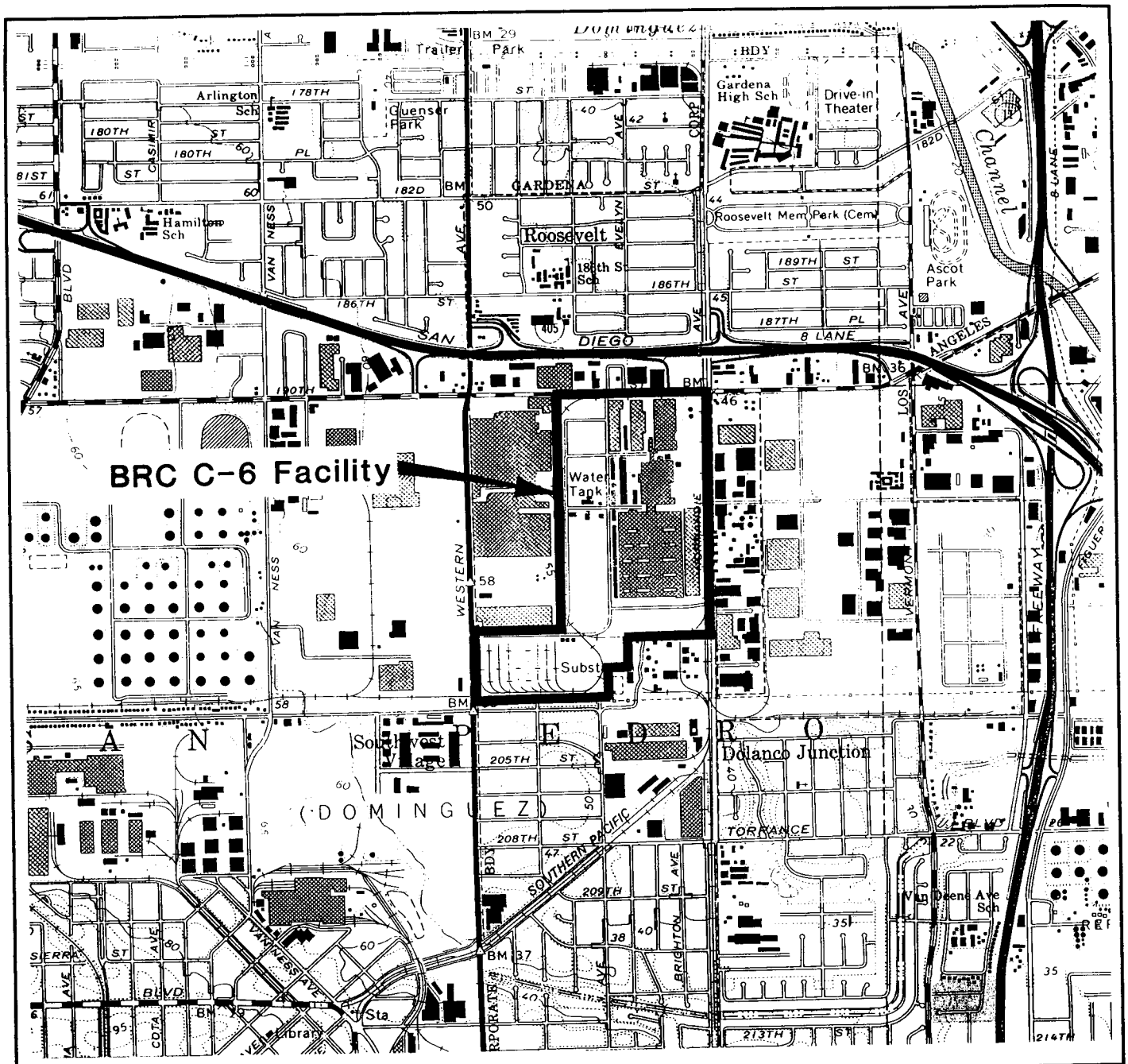
WELL I.D.	SAMPLE DATE†	1,1-DCE		1,1,-DCA	1,1,1-TCA		TCE		cis-1,2-DCE		trans-1,2-DCE	Chloroform	Ethylbenzene	Toluene		Total Xylenes
DAC-P1	5/9/97						15,000									
	7/8/97						13,000							450		
	7/24/97						3,200							110		
	8/6/97						15,000							460		
	8/22/97	470					17,000							1,300		
	9/5/97	270					15,000							810		
	9/18/97						14,000							540		
WCC-1D	5/7/97						3.1		1.2							
	7/8/97						3.3		1.1							
	7/23/97	2.1					14.0		1.2					7.5		
	8/5/97	3.4	3.5				20	20	1.3	1.3				14	16	
	8/20/97						2.6									
	9/4/97	6.3			1.2		25		1.6					27		
	9/17/97	6.0			1.2		28		1.5					26		
WCC-3D	5/8/97	43			11		63		1.7					3		
	7/8/97	70	30		15	6	87	45	2.3	1.1				14	6	
	7/24/97	55	53		7.9	8.5	79	89	2.1	1.9				12	12	
	8/6/97	34	35		8.8	8.6	58	56	2.0	2.2				17	17	
	8/22/97	61	60		21	22.0	70	72	1.9	1.8				21	22	
	9/5/97	53	48		15	14.0	66	63	2.0	1.9				29	27	
	9/18/97	35			18		47		1.7					32		

Notes: Shaded cells indicate constituent concentration did not exceed its reporting limit. Reporting limits are shown in laboratory report.
Samples with dual entries had duplicate samples collected. 66 63 = original sample (66) duplicate sample (63).
ug/l = micrograms per liter
1,1-DCE = Dichloroethene
1,1-DCA = Dichloroethane
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
cis-1,2,-DCE = cis-1,2-Dichloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
* Wells WCC-2S and WCC-6S were not sampled due to obstructions.
† 5/8/97 sampling of last quaterly monitoring event prior to redevelopment.

Notes follow at end of table.
97401200.009

BOE-C6-0133655

FIGURES



Source: Basemap modified from
U.S.G.S. Torrance, California
7.5 Minute Quadrangle
Photorevised 1981

0 2000 4000

Approximate Scale in Feet

N

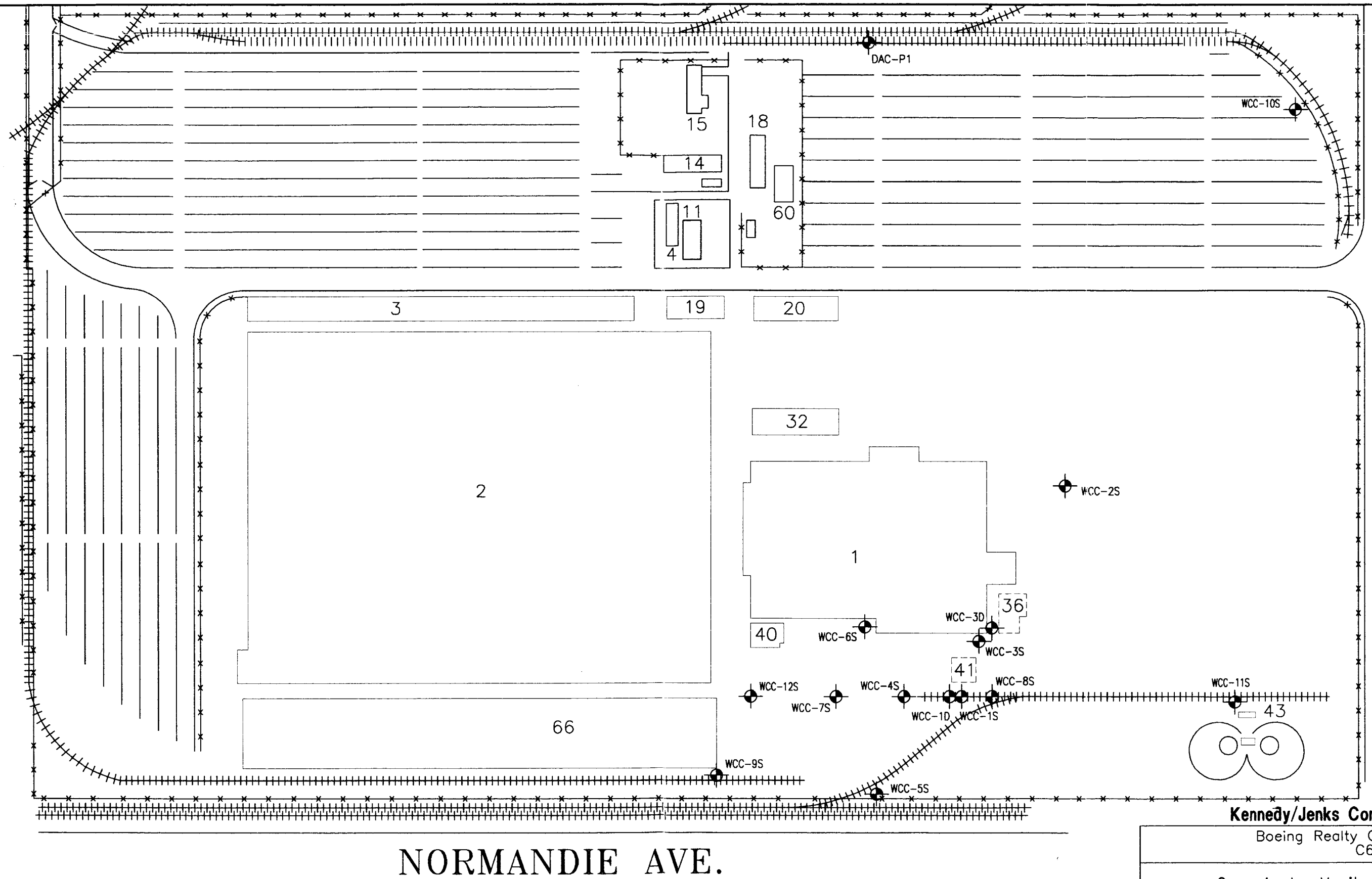
Kennedy/Jenks Consultants

Boeing Realty Company
C-6 Facility

Site Location Map

January 1998
K/J 974012.00

Figure 1



N

0 200

Scale in Feet

LEGEND

WCC-1S Monitoring Well Location, Designation

Kennedy/Jenks Consultants

Boeing Realty Company
C6 Facility

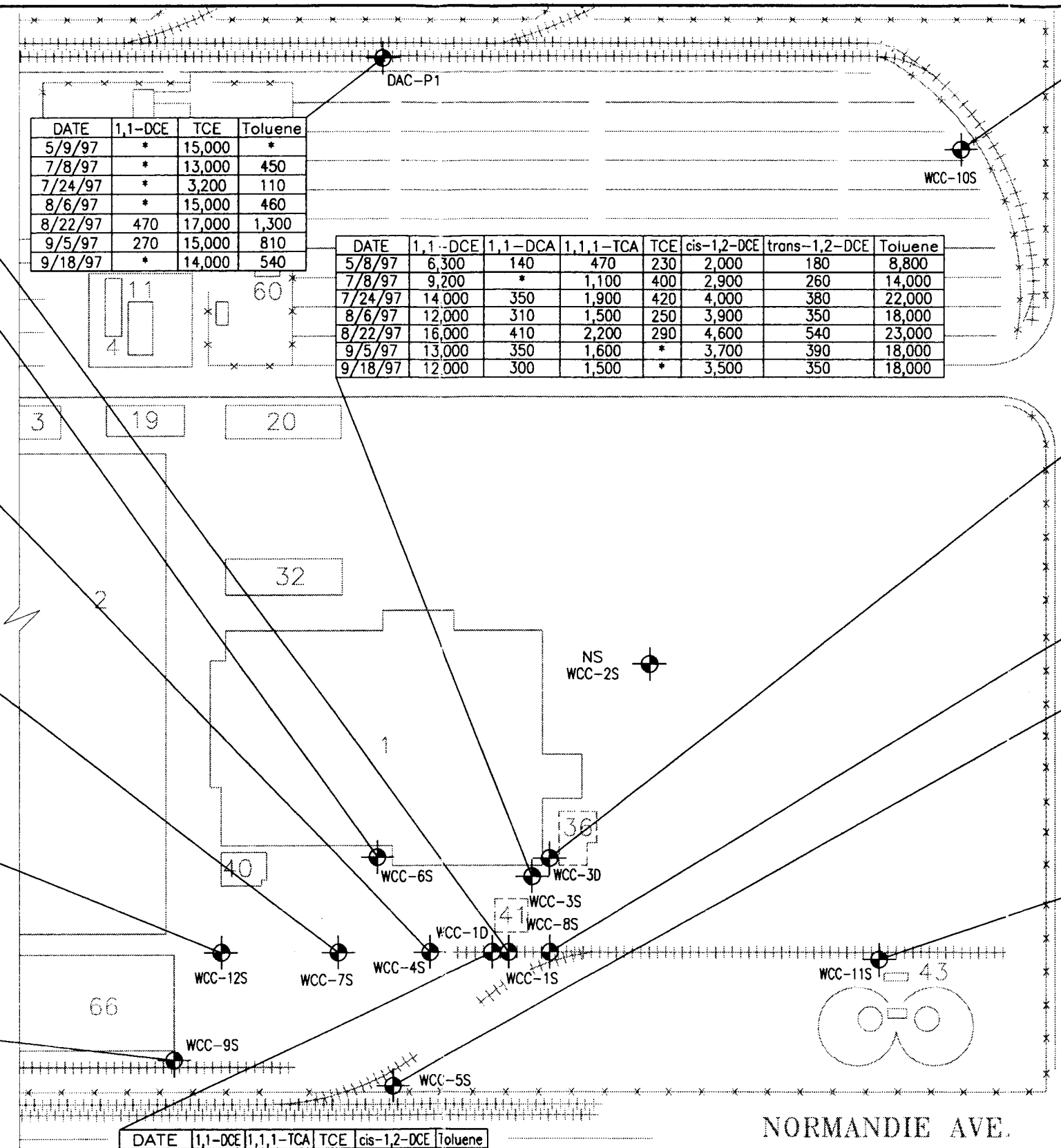
Groundwater Monitoring Well Locations

January 1998
K/J 974012.00

Figure 2

FIG 2

BOE-C6-0133658



DATE	1,1-DCE	TCE	trans-1,2-DCE
5/8/97	3,200	2,700	69
7/8/97	3,900	2,800	65
7/24/97	2,600	2,400	*
8/6/97	3,800	2,700	60
8/22/97	3,800	2,700	66
9/5/97	3,500	2,500	61
9/17/97	3,400	2,700	63

DATE	1,1-DCE	TCE	Toluene
5/9/97	*	15,000	*
7/8/97	*	13,000	450
7/24/97	*	3,200	110
8/6/97	*	15,000	460
8/22/97	470	17,000	1,300
9/5/97	270	15,000	810
9/18/97	*	14,000	540

DATE	1,1-DCE	1,1-DCA	1,1,1-TCA	TCE	cis-1,2-DCE	trans-1,2-DCE	Toluene
5/8/97	6,300	140	470	230	2,000	180	8,800
7/8/97	9,200	*	1,100	400	2,900	260	14,000
7/24/97	14,000	350	1,900	420	4,000	380	22,000
8/6/97	12,000	310	1,500	250	3,900	350	18,000
8/22/97	16,000	410	2,200	290	4,600	540	23,000
9/5/97	13,000	350	1,600	*	3,700	390	18,000
9/18/97	12,000	300	1,500	*	3,500	350	18,000

DATE	1,1-DCE	TCE	Chloroform	Toluene
5/7/97	29	160	3.2	*
7/2/97	25	140	2.5	*
7/23/97	26	150	2.8	10.0
8/5/97	30	140	2.6	15
8/21/97	25	120	2.6	*
9/4/97	28	140	2.7	18
9/17/97	29	150	*	23

DATE	1,1-DCE	1,1,1-TCA	TCE	cis-1,2-DCE	trans-1,2-DCE	Toluene
5/9/97	6,800	720	1,900	1,100	<100	1,800
7/8/97	3,600	410	950	540	*	2,400
7/24/97	2,700	320	820	510	*	1,600
8/6/97	7,700	630	2,100	1,400	110	3,100
9/18/97	5,500	500	1,600	910	*	1,800

DATE	1,1-DCE	1,1,1-TCA	TCE	cis-1,2-DCE	Toluene
5/8/97	43	11	63	1.7	3
7/8/97	70	15	87	2.3	14
7/24/97	55	7.9	79	2.1	12
8/6/97	34	8.8	58	2.0	17
8/22/97	61	21	70	1.9	21
9/5/97	53	15	66	2.0	29
9/18/97	35	18	47	1.7	32

DATE	1,1-DCE	TCE	trans-1,2-DCE	Ethylbenzene	Toluene	Total Xylenes
5/8/97	1,000	1,100	14	*	*	*
7/8/97	1,300	1,200	*	*	*	*
7/24/97	940	1,200	*	*	*	*
8/6/97	1,000	1,000	*	42	560	130
8/22/97	1,200	1,200	*	*	*	*
9/5/97	1,100	1,000	*	*	*	*
9/17/97	960	1,100	*	*	*	*

DATE	1,1-DCE	TCE	trans-1,2-DCE	Toluene
5/8/97	2,600	1,600	51	*
7/8/97	3,200	1,900	*	*
7/24/97	2,500	1,900	*	*
8/6/97	130	160	*	18
8/22/97	2,800	1,900	*	*
9/5/97	2,500	1,600	*	*
9/17/97	2,600	1,800	*	*

DATE	1,1-DCE	1,1-DCA	TCE	Toluene
5/8/97	120	*	140	*
7/2/97	130	*	150	*
7/24/97	67	*	130	8
8/6/97	130	*	160	18
8/21/97	120	*	140	*
9/4/97	120	3.1	150	17
9/17/97	110	*	160	21

DATE	1,1-DCE	1,1,1-TCA	TCE	cis-1,2-DCE	Toluene
5/7/97	10	*	3.1	*	*
7/2/97	11	*	2.1	*	*
7/23/97	12	*	14	*	9.8
8/5/97	18	1.2	31	1.0	23
8/20/97	12	*	2.1	*	*
9/4/97	19	1.6	32	1.6	33
9/16/97	19	1.8	40	1.5	38

DATE	1,1-DCE	1,1-DCA	TCE	cis-1,2-DCE	Chloroform	Toluene
5/8/97	47	16	150	2.6	*	*
7/2/97	38	14	130	2.4	*	*
7/23/97	34	14	140	2.2	*	9.2
8/6/97	42	14	140	2.8	*	20
8/21/97	39	13	120	2.4	2.0	*
9/4/97	37	18	130	2.9	*	20
9/17/97	40	13	150	3.0	*	27

DATE	1,1-DCE	TCE	cis-1,2-DCE	Toluene
5/7/97	33	170	5.1	*
7/2/97	29	160	4.4	*
7/24/97	31	150	4.9	10
8/5/97	33	160	5.2	15
8/21/97	30	150	5.0	*
9/4/97	29	140	4.7	21
9/17/97	29	160	4.9	19

DATE	1,1-DCE	1,1,1-TCA	TCE	Chloroform	Toluene
5/7/97	2.4	*	16	3.0	*
7/2/97	4.4	*	29	1.9	6.7	*
7/23/97	7.6	*	43	2.0	7.6	12
8/5/97	9.9	*	51	2.6	8.2	20
8/20/97	6.0	*	31	2.0	9.0	*
9/4/97	9.8	*	48	2.4	8.2	24
9/16/97	10	1.3	58	2.4	8.1	29

DATE	1,1-DCE	1,1,1-TCA	TCE	cis-1,2-DCE	Toluene
5/7/97	*	*	3.1	1.2	*
7/8/97	*	*	3.3	1.1	*
7/23/97	2.1	*	14.0	1.2	7.5
8/5/97	3.4	*	20	1.3	14
8/20/97	*	*	2.6	*	*
9/4/97	6.3	1.2	25	1.6	27
9/17/97	6.0	1.2	28	1.5	26

LEGEND

N

0 200

Scale in Feet

WCC-1S — Monitoring Well Location, Designation

* — Constituent was not detected.

NS — Not Sampled

NOTES:
1. Samples Analyzed by EPA Method 8240/8260
2. All Results Reported in ug/l (ppb)

Kennedy/Jenks Consultants

Boeing Realty Company
C6 Facility

Monitoring Well Detected Chemical Concentrations

January 1998
K/J 974012.00

Figure 3

FIG.3

BOE-C6-0133659

FIGURE 4
HYDROGRAPH SHOWING CHANGES IN GROUNDWATER ELEVATION SINCE MAY 1997
BOEING REALTY COMPANY
K/J 974012.01

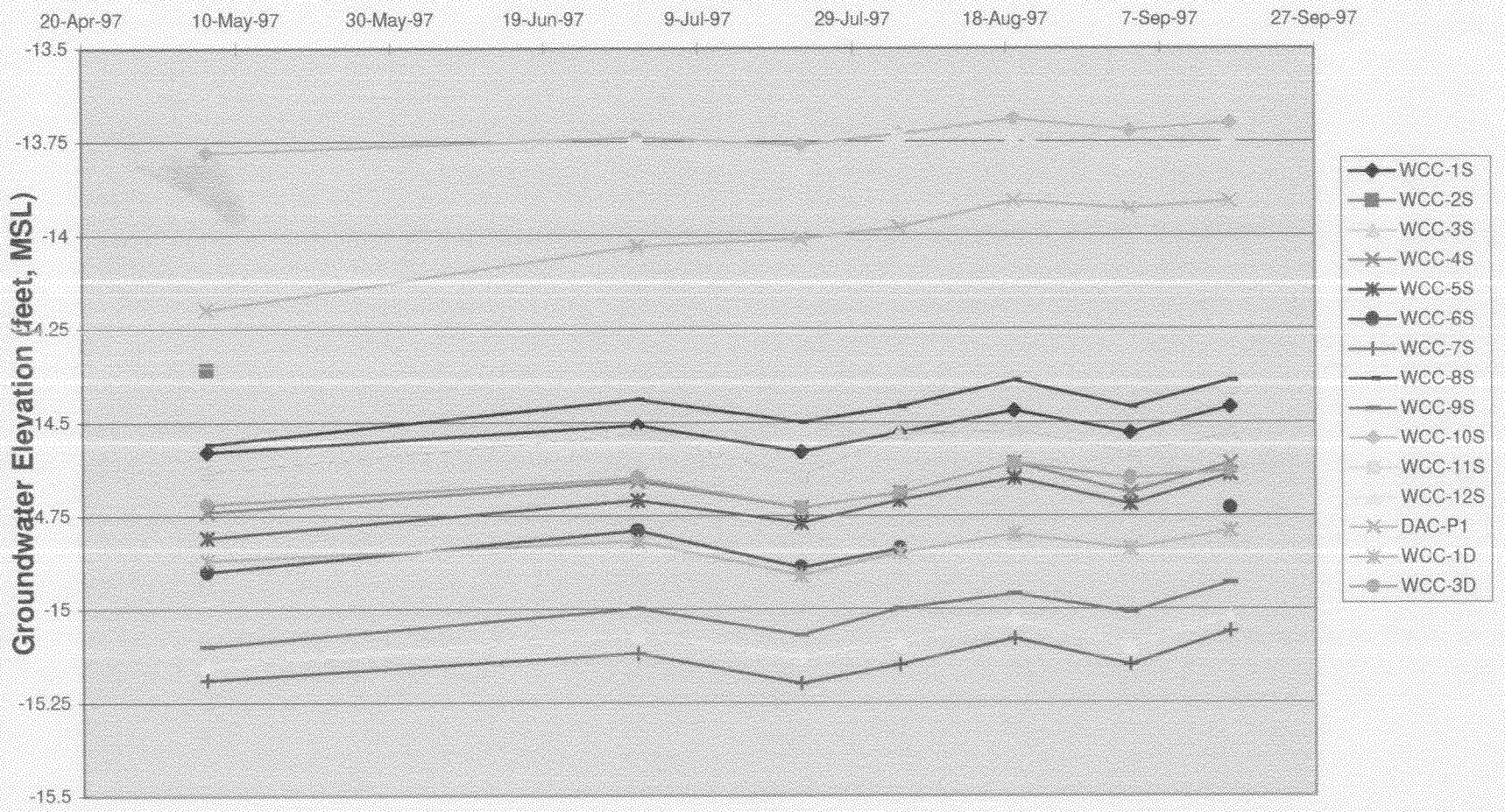
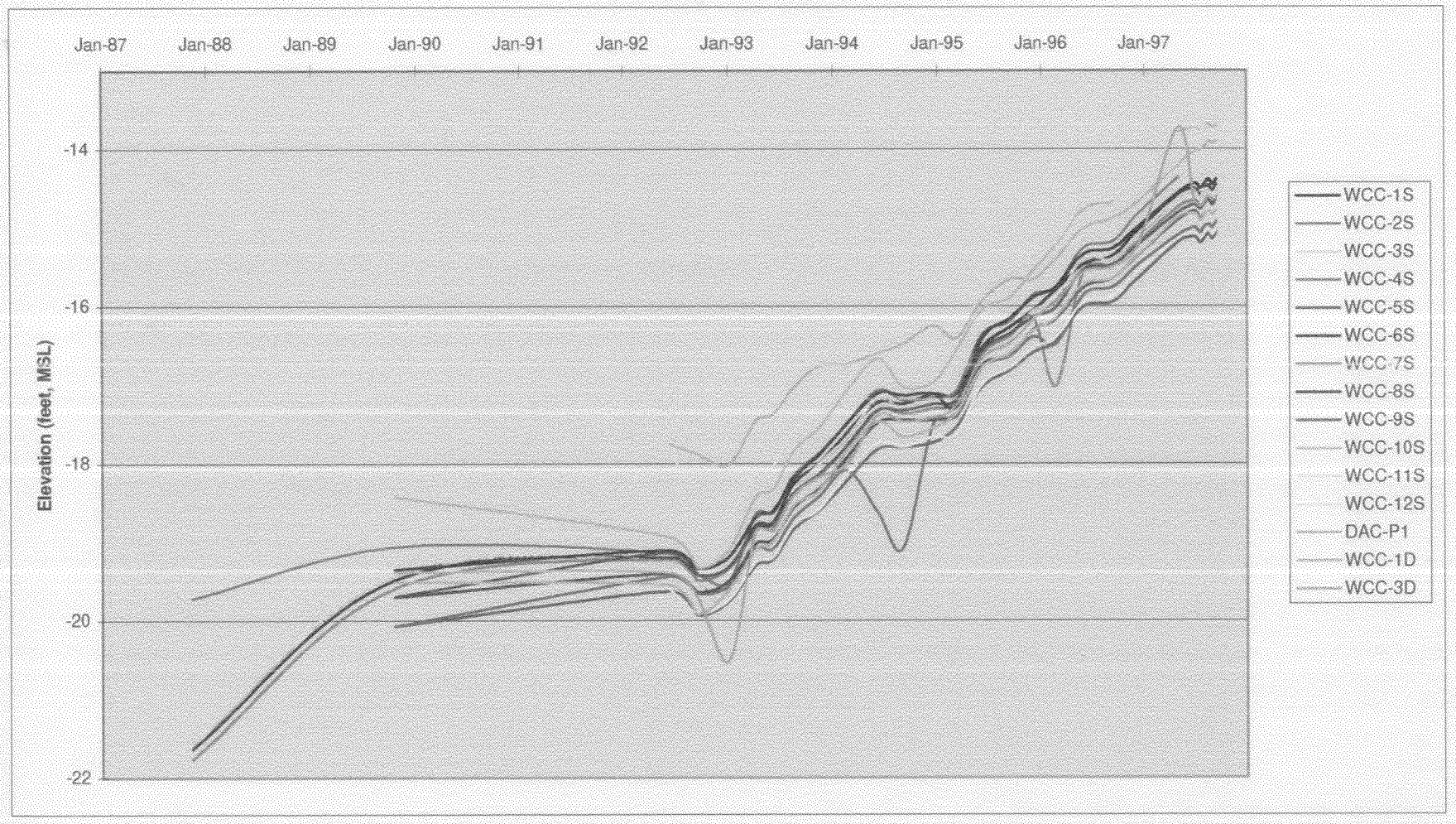


FIGURE 4A
HYDROGRAPH SHOWING CHANGES IN GROUNDWATER ELEVATION SINCE 1987
BOEING REALTY COMPANY
K/J 974012.01



97401200.009

974012.00

BOE-C6-0133661

FIGURE 5
1,1-DCE CONCENTRATION TRENDS
BOEING REALTY COMPANY
K/J 9740012.00

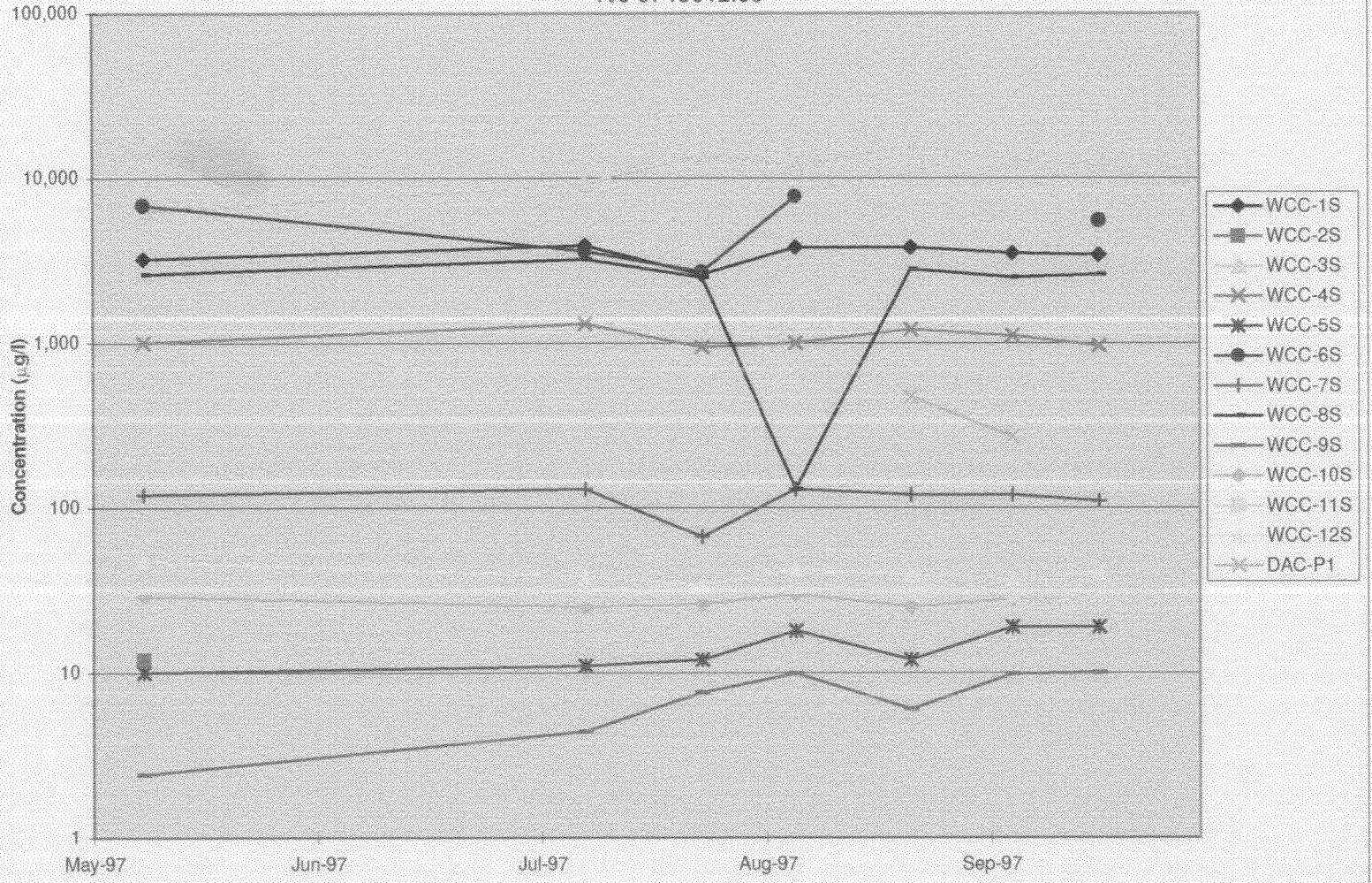


FIGURE 6
TCE CONCENTRATION TRENDS
BOEING REALTY COMPANY
K/J 9740012.00

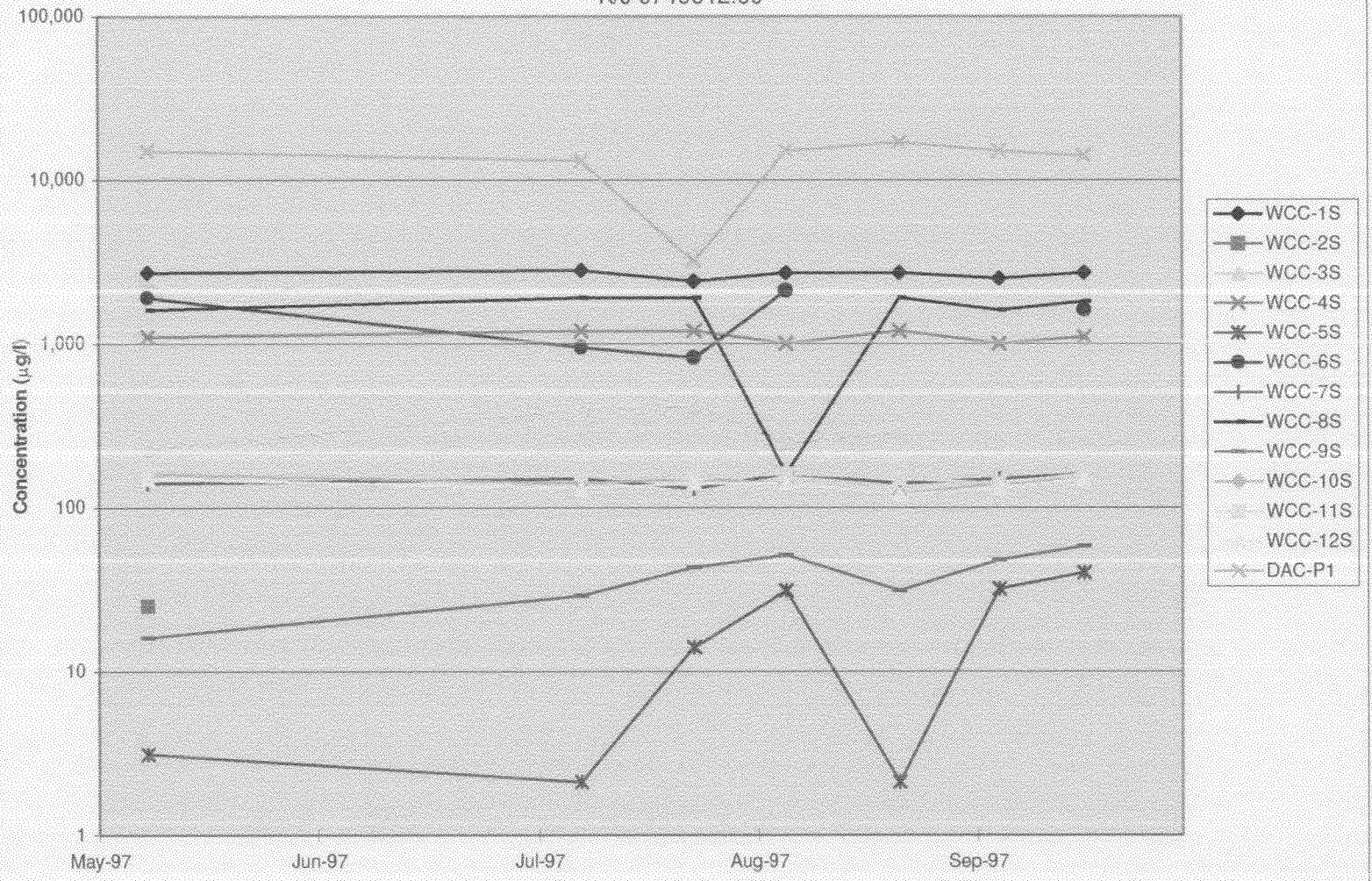


FIGURE 7
TOLUENE CONCENTRATION TRENDS
BOEING REALTY COMPANY
K/J 9740012.00

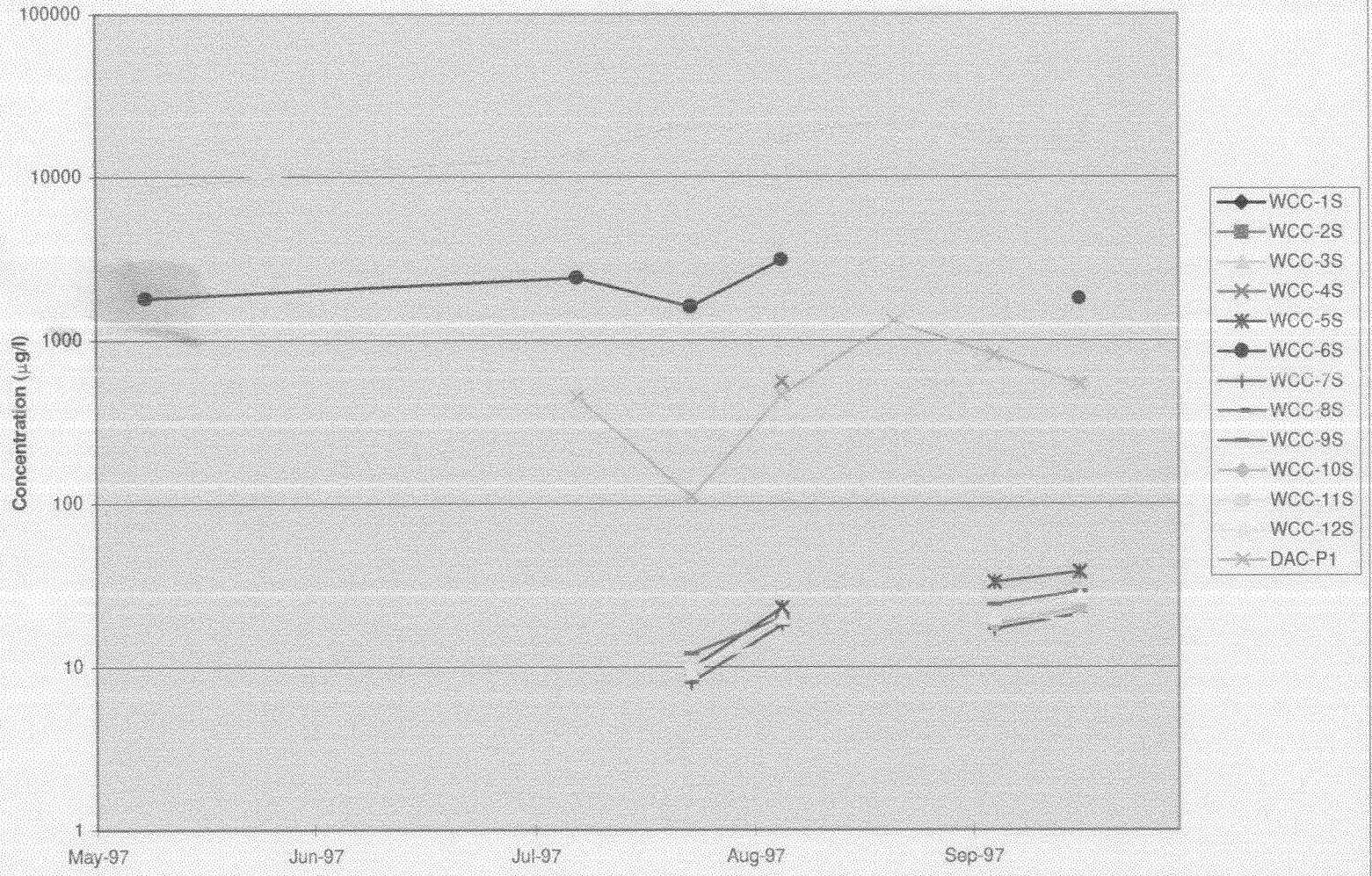
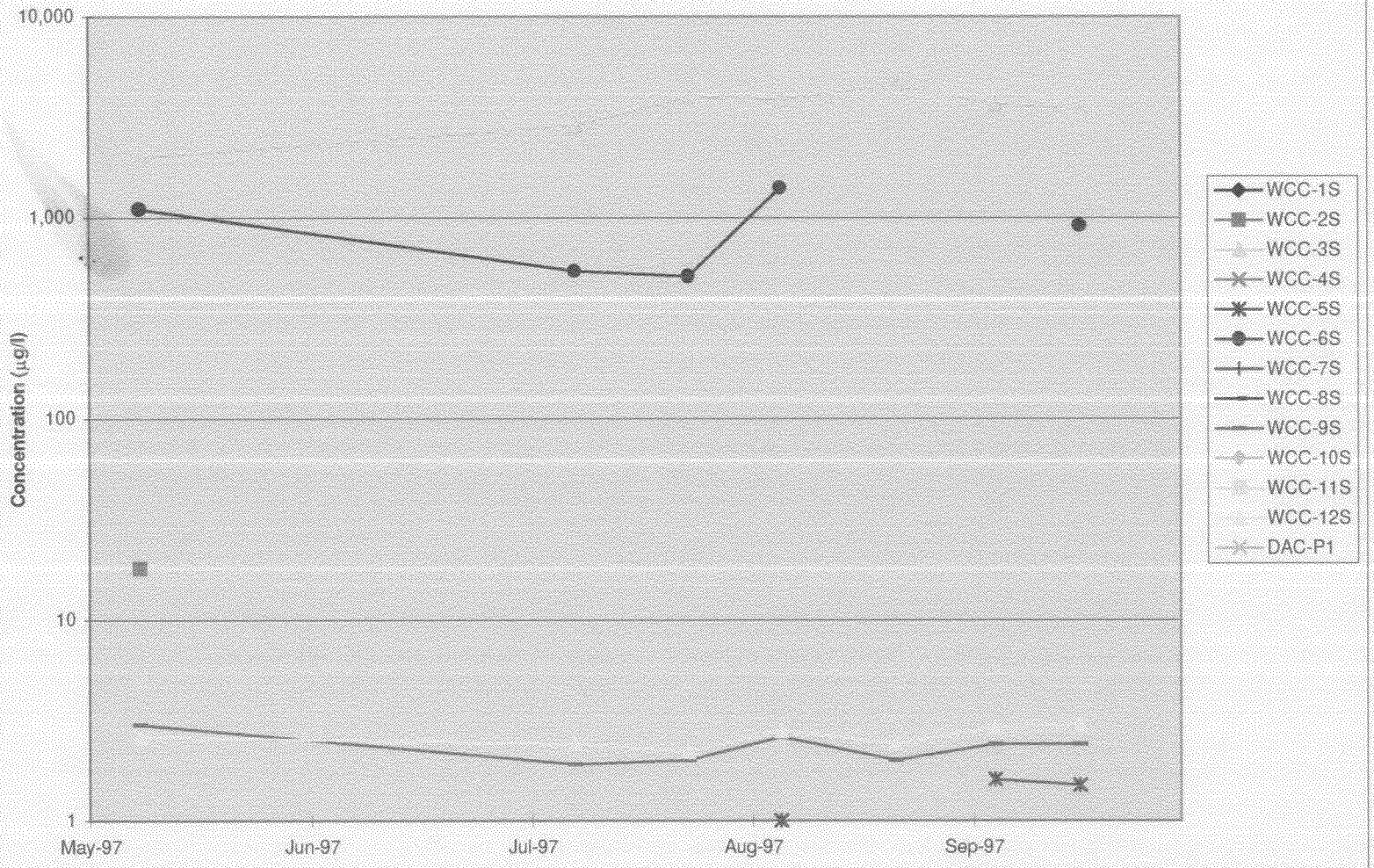


FIGURE 8
Cis-1,2-DCE CONCENTRATION TRENDS
BOEING REALTY COMPANY
K/J 9740012.00



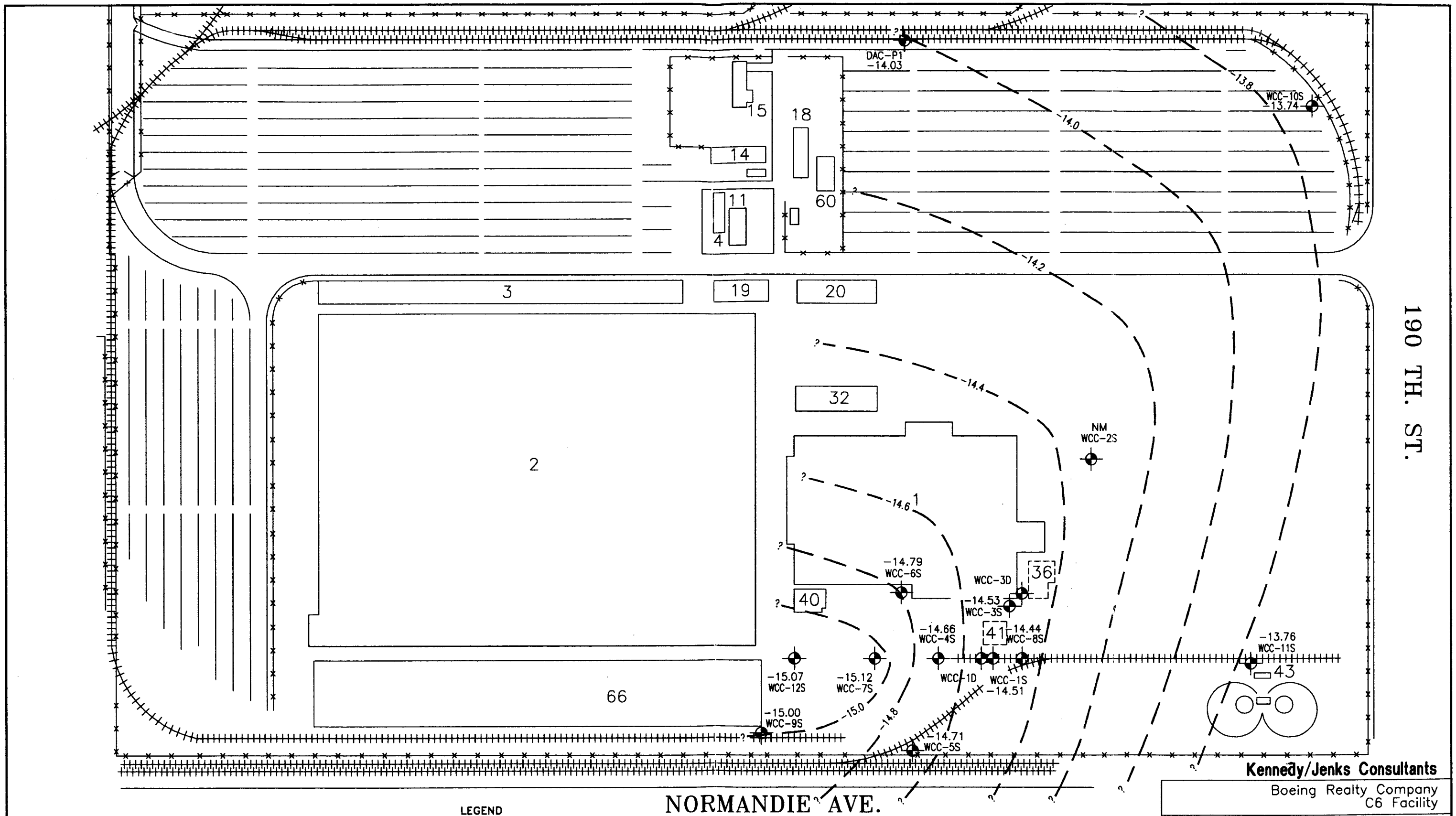
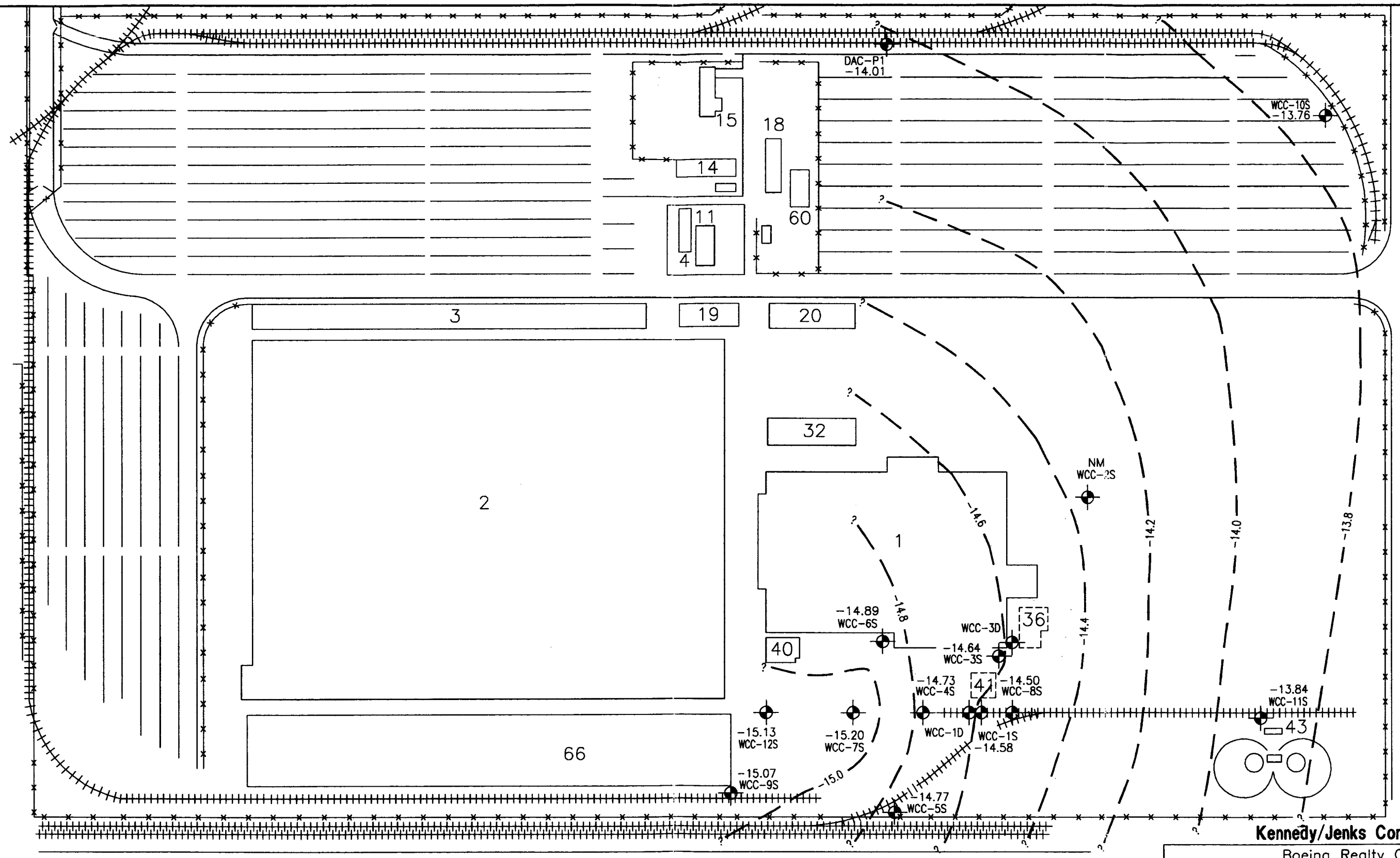


FIG 9

BOE-C6-0133666



N

0 200

Scale in Feet

LEGEND

WCC-1S -14.58 — Monitoring Well Location, Designation and groundwater elevation, feet MSL, measured 7/22/97.

-15.0 — Groundwater Elevation contours, dashed where inferred, queried where uncertain.

NM — Not Measured

NOTE: 1) Contour Interval = 0.2 feet

2) Wells WCC-3D and WCC-1D are screened across the deeper zone. Therefore, their water elevations are not included.

Boeing Realty Company
C6 Facility

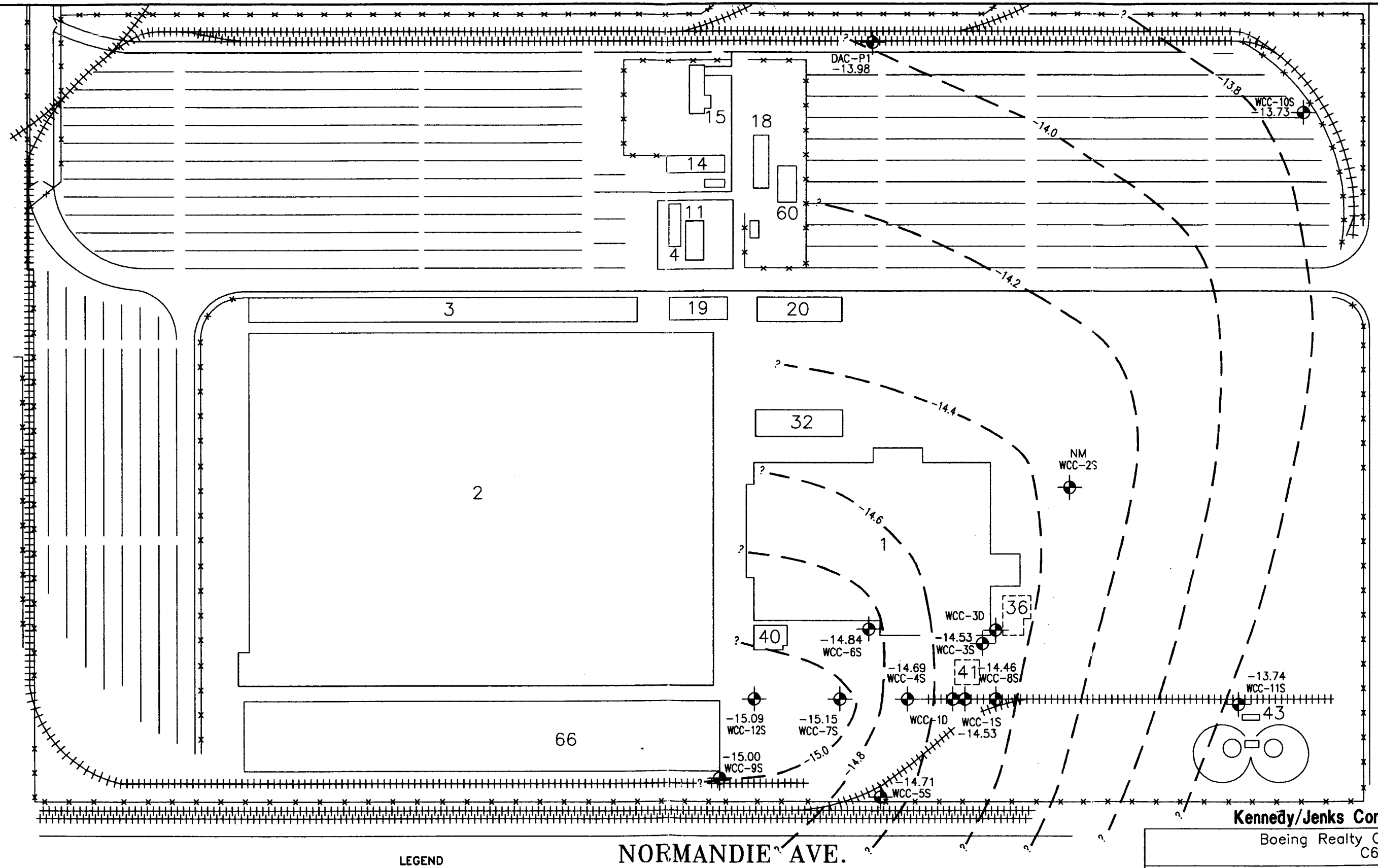
Estimated Groundwater Elevation Contour Map, Shallow Zone, 22 July 1997

January 1998
K/J 974012.00

Figure 10

FIG 10

BOE-C6-0133667



Kennedy/Jenks Consultants

Boeing Realty Company
C6 Facility

Estimated Groundwater Elevation Contour Map, Shallow Zone, 4 August 1997

January 1998
K/J 974012.00

Figure 11

N

0 200
Scale in Feet

LEGEND

WCC-1S
-14.58
Monitoring Well Location, Designation and groundwater elevation, feet MSL, measured 8/4/97.

-15.0 —?
Groundwater Elevation contours, dashed where inferred, queried where uncertain.

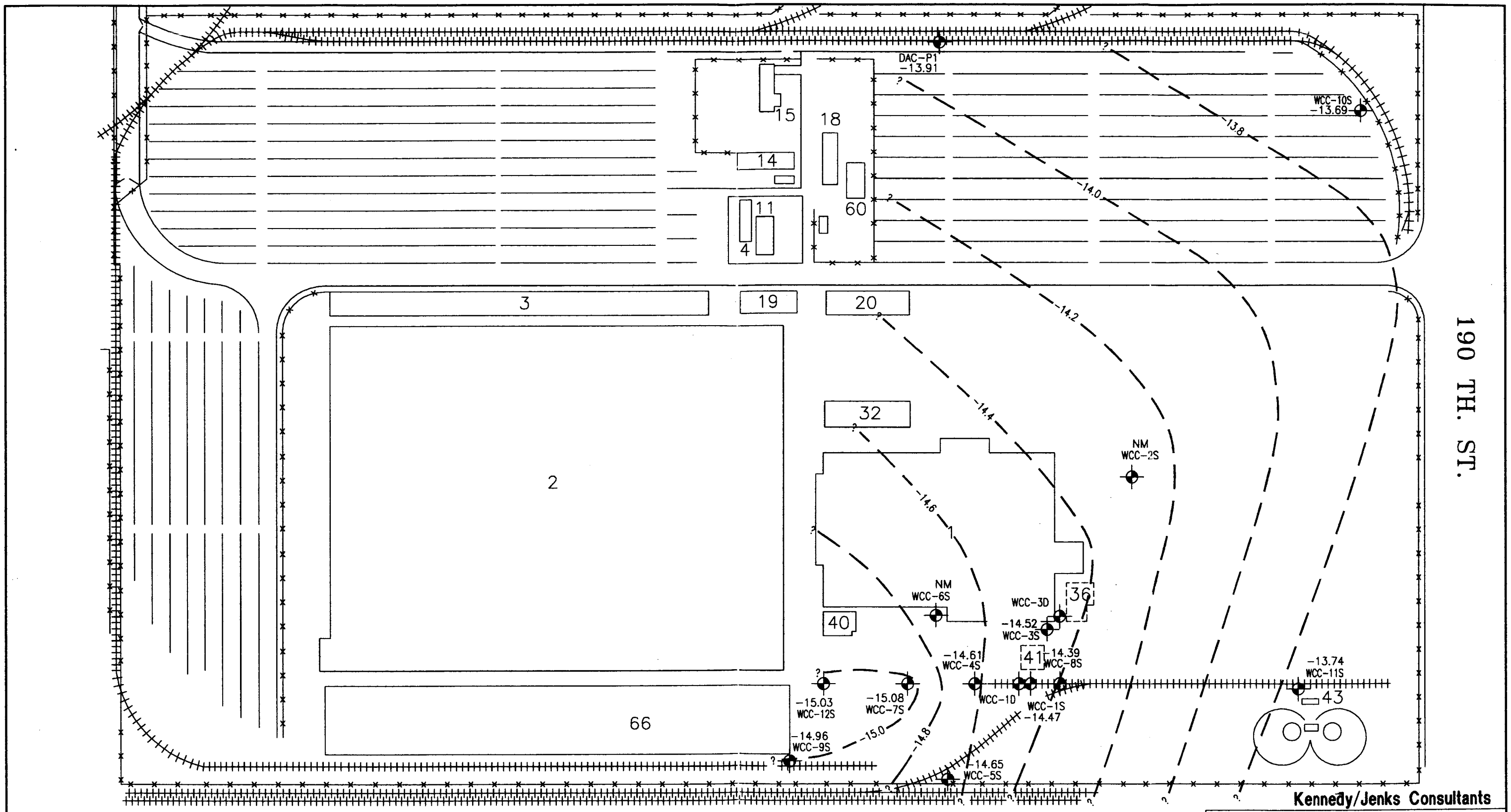
NM – Not Measured

NOTE: 1) Contour Interval = 0.2 feet

2) Wells WCC-3D and WCC-1D are screened across the deeper zone. Therefore, their water elevations are not included.

FIG 11

BOE-C6-0133668



Kennedy/Jenks Consultants

Boeing Realty Company
C6 Facility

Estimated Groundwater Elevation Contour Map, Shallow Zone, 19 August 1997

January 1998
K/J 974012.00

Figure 12

N

0 200

Scale in Feet

LEGEND

WCC-1S
-14.58
Monitoring Well Location, Designation and groundwater elevation, feet MSL, measured 8/19/97.

-15.0 —?
Groundwater Elevation contours, dashed where inferred, queried where uncertain.

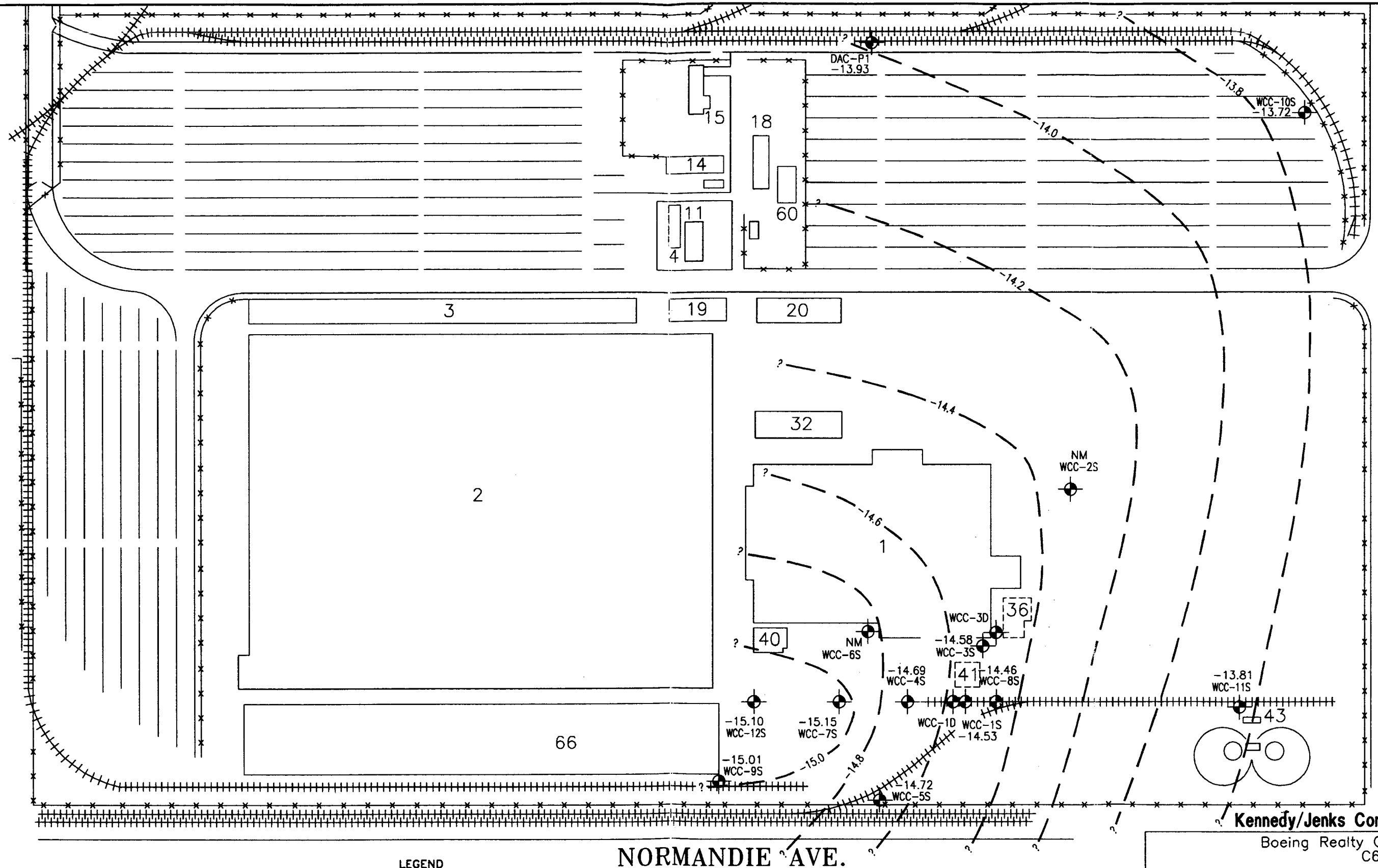
NM – Not Measured

NOTE: 1) Contour Interval = 0.2 feet

2) Wells WCC-3D and WCC-1D are screened across the deeper zone. Therefore, their water elevations are not included.

FIG 12

BOE-C6-0133669



Kennedy/Jenks Consultants

Boeing Realty Company
C6 Facility

Estimated Groundwater Elevation Contour Map, Shallow Zone, 3 September 1997

January 1998
K/J 974012.00

Figure 13

N

0 200

Scale in Feet

LEGEND

WCC-1S
-14.58
Monitoring Well Location, Designation and groundwater elevation, feet MSL, measured 9/3/97.

-15.0 ?
Groundwater Elevation contours, dashed where inferred, queried where uncertain.

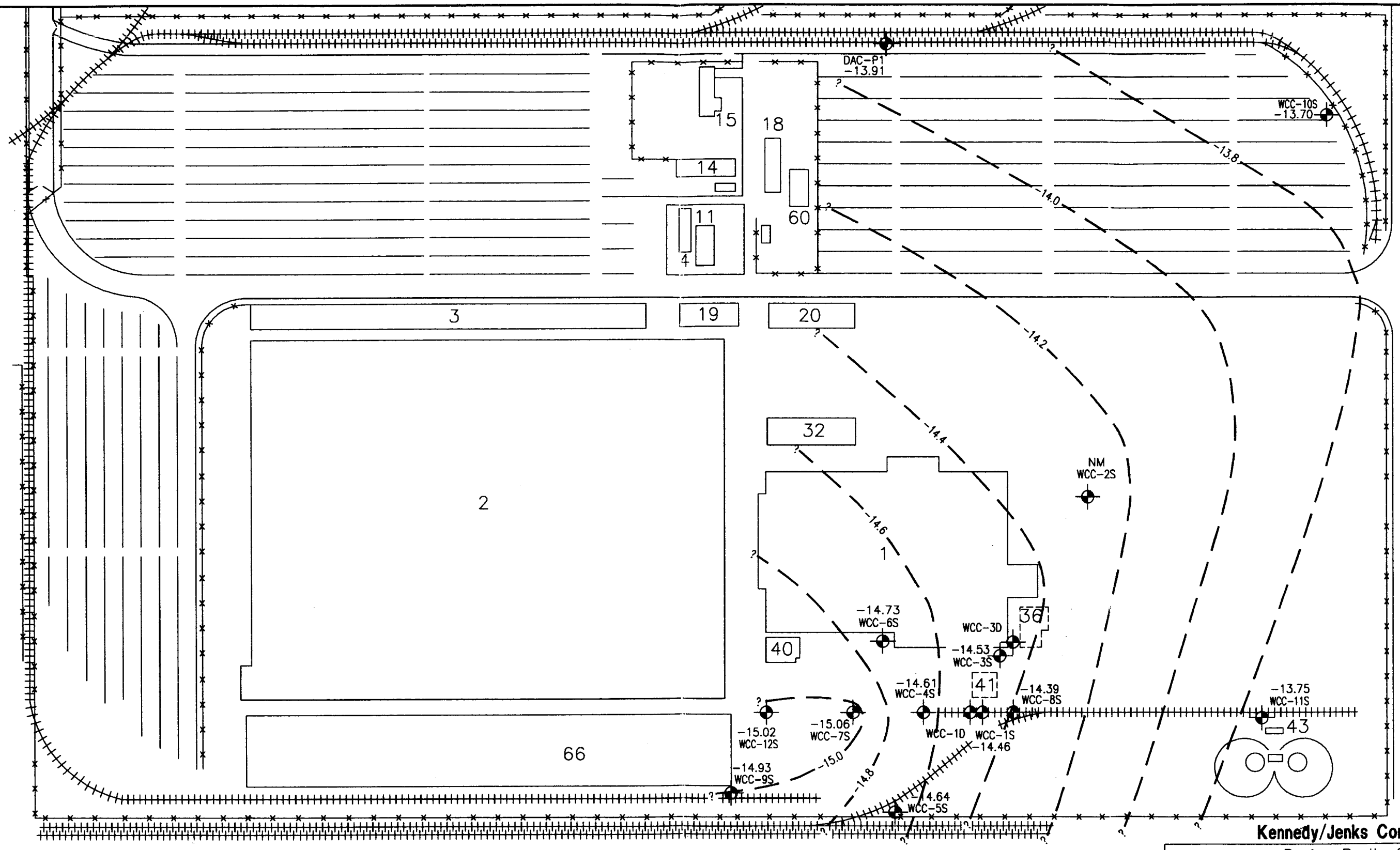
NM – Not Measured

NOTE: 1) Contour Interval = 0.2 feet

2) Wells WCC-3D and WCC-1D are screened across the deeper zone. Therefore, their water elevations are not included.

FIG 13

BOE-C6-0133670



Kennedy/Jenks Consultants

Boeing Realty Company
C6 Facility

Estimated Groundwater Elevation Contour Map, Shallow Zone, 16 September 1997

January 1998
K/J 974012.00

Figure 14

N

0 200

Scale in Feet

LEGEND

WCC-1S
-14.58
Monitoring Well Location, Designation and groundwater elevation, feet MSL, measured 9/16/97.

-15.0 ? Groundwater Elevation contours, dashed where inferred, queried where uncertain.

NM – Not Measured

NOTE: 1) Contour Interval = 0.2 feet

2) Wells WCC-3D and WCC-1D are screened across the deeper zone. Therefore, their water elevations are not included.

FIG 14

BOE-C6-0133671