TECHNICAL MEMORANDUM

TO: Bruce Buel, General Manager, Nipomo Community Services District

FROM: Drew Beckwith, SAIC

RE: Revision of Groundwater in storage underneath the Nipomo Mesa Management Area as of April 2007, Project Number 01-0236-00-9100

DATE: August 28, 2007

INTRODUCTION

Nipomo Community Services District (NCSD) directed SAIC to: (1) determine the amount of groundwater in storage within the deep aquifer underneath Nipomo Mesa Management Area (NMMA) based on groundwater surface elevation data; (2) compare the groundwater in storage between 2007, 2006, and 2000; and, (3) compute the volumes of groundwater in storage above sea level for 2007, 2006, and 2000. Similar prior analyses were conducted by SAIC in October 2006 (TM #1) and May 2007 (TM #4).

RESULTS

The results are presented in Table 1.

Table 1: Groundwater in Storage Underneath the NMMA

SAIC Deliverable	Volume of groundwater in storage above sea level (AF)			Comment
	Spring 2000	Spring 2006	Spring 2007	
TM 1, dated 10-11-2006	124,000	121,000	-	Initial estimates based on available data
TM 4, dated 5-29-07	105,000	102,000	90,000	Well location and measurement reference point updated from GPS survey
TM 4 Revision, dated 8-21-2007	108,000	107,000	93,000	Potential Monitoring Well refinements based on review of well data provided by DWR

Tables and figures are attached, which support the above results.

METHODOLOGY

Data provided by DWR, consisting of well completion reports, lithographic logs, electronic logs, and pump tests, was used to develop the hydrogeologic conditions underlying the NMMA. A systematic review of the wells used for storage calculations was conducted in

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order to verify that each well's screened interval is within the primary production aquifer (Paso Robles Formation). Groundwater surface elevation measurements that do not represent water in the Paso Robles Formation were not included in the calculations. None of NCSD's production wells were included in the analysis. Groundwater in storage calculations were made from a "master list" of wells in which each well has a groundwater surface elevation measurement for each of the three years (2000, 2006, 2007).

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Groundwater Surface Elevation Measurements

Groundwater surface elevation data was obtained from the San Luis Obispo County Department of Public Works (SLO DPW), NCSD, and Woodlands. SLO DPW measures groundwater surface elevations in monitoring wells in the spring and the fall of each year. Woodlands and NCSD measures groundwater surface elevations in their monitoring wells monthly. Woodlands' groundwater surface elevation data for April 2007 had not been released at the time of this analysis so January 11th was used. Table 2 lists the groundwater surface elevation data for Spring 2000, Spring 2006, and Spring 2007.

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The groundwater surface elevation data was reviewed in combination with well completion reports and historical hydrographic records in order to flag data that appeared to be anomalous. Wells that do not access the primary production aquifer or were otherwise determined to not accurately represent static water levels within the aquifer were not included in analysis. The groundwater surface elevation measured at each well location in Spring 2000, Spring 2006, and Spring 2007 is posted in Figures 2, 3, and 4, respectively.

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Groundwater Surface Interpolation

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The individual groundwater surface measurements from each year were interpolated to a groundwater surface elevation field using the inverse distance weighting method. The interpolation is based on groundwater surface elevation data alone, and does not incorporate structural geology that may or may not influence the groundwater surface. Estimates of the groundwater surface elevation field in Spring 2000, Spring 2006, and Spring 2007 are shown in color on Figures 2, 3, and 4, respectively.

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Groundwater Volume Estimate

The amount of groundwater in storage under the NMMA was estimated using the boundary determined in Phase III of the trial. The groundwater volume above sea level as shown in Table 1 was estimated by subtracting both the sea level surface (elevation equals zero) and the volume of bedrock above sea level from the saturated volume. The bedrock surface elevation is based on Figure 11: Base of Potential Water-Bearing Sediments, presented in the report, Water Resources of the Arroyo Grande – Nipomo Mesa Area (DWR 2002). The bedrock surface elevation was preliminarily verified by reviewing driller reports obtained from DWR. The saturated volume above sea level was multiplied by the specific yield of 11.7% to estimate

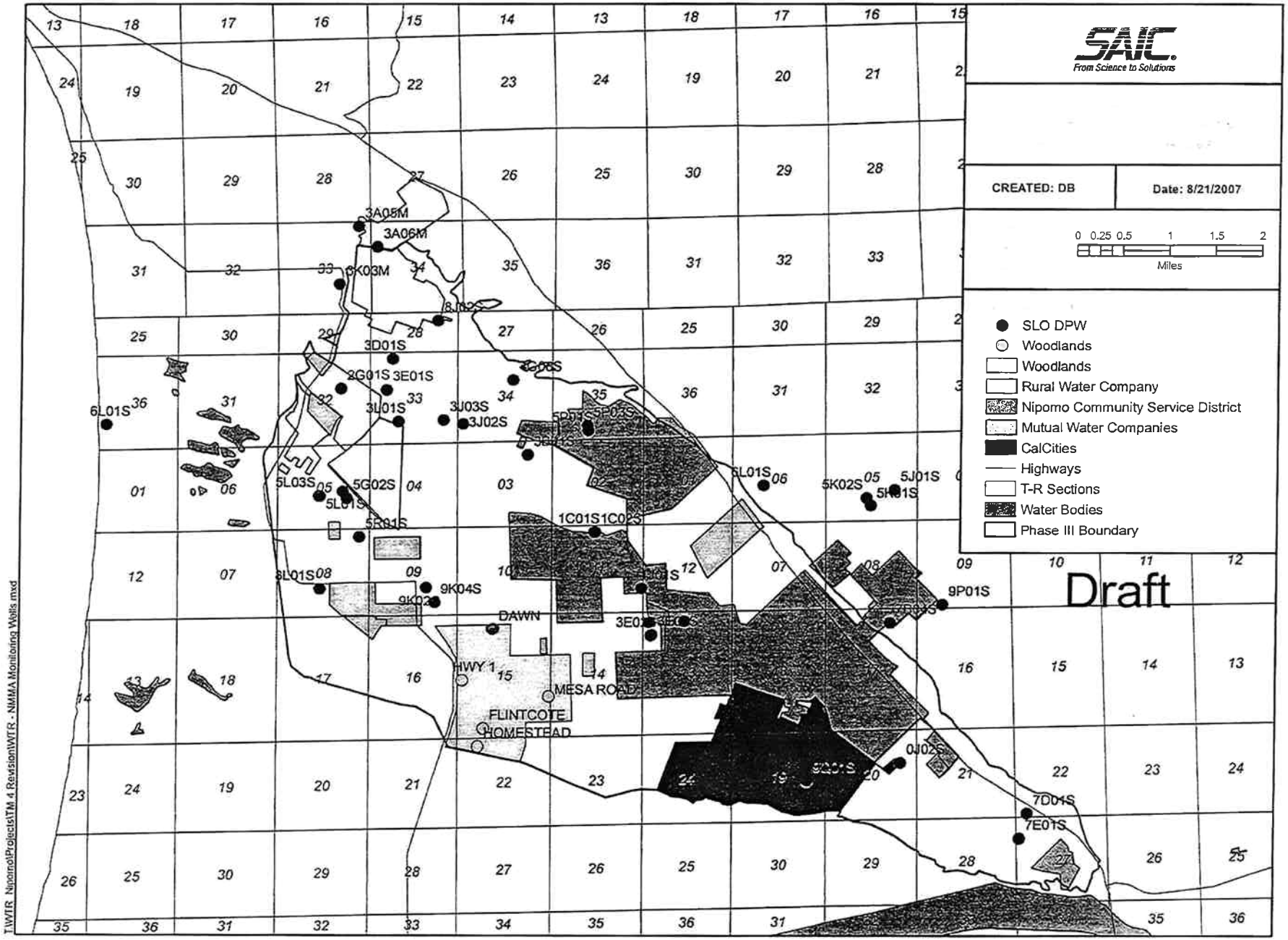
the amount of groundwater in storage above sea level. The specific yield was based on the average weighted specific yield for the Nipomo Mesa Hydrologic Sub-Area (DWR 2002, pg. 86).

REFERENCES

Department of Water Resources (DWR). 2002. Water Resources of the Arroyo Grande – Nipomo Mesa Area, Southern District Report.

Table 2: Groundwater Surface Elevation Data for Spring 2000, Spring 2006, and Spring 2007

Well_ID	Well_Name	Latitude (decimal degrees)	Longitude (decimal degrees)	Monitoring Agency	Date	Groundwater Elevation (ft msl)	Date	Groundwater Elevation (ft msl)	Date	Groundwater Elevation (ft msl)
11N34W05J01S	-	35.0604	-120.4757	SLO DPW	4/21/2000	369.0	4/11/2006	372.8	4/19/2007	359.2
11N34W05K01S	TODD DOMESTIC	35.0580	-120.4803	SLO DPW	4/21/2000	339.7	4/11/2006	338.6	4/19/2007	334.8
11N34W05K02S	TODD IRRIGATION	35.0592	-120.4810	SLO DPW	4/21/2000	304.2	4/11/2006	292.8	4/19/2007	252.7
11N34W06L01S	-	35.0616	-120.5011	SLO DPW	4/21/2000	206.7	4/11/2006	213.1	4/19/2007	201.6
11N34W09P01S	-	35.0417	-120.4667	SLO DPW	4/21/2000	305.5	4/11/2006	288.2	4/19/2007	285.0
11N34W17B04S	-	35.0389	-120.4769	SLO DPW	4/21/2000	280.7	4/6/2006	263.6	4/19/2007	253.2
11N34W19Q01S	BENNY - DIVISION	35.0138	-120.4935	SLO DPW	4/21/2000	54.9	4/11/2006	46.1	4/23/2007	29.5
11N34W20J02S	EGG FARM	35.0164	-120.4753	SLO DPW	4/21/2000	76.7	4/11/2006	73.0	4/23/2007	70.2
11N34W27D01S	P G & E	35.0078	-120.4510	SLO DPW	4/21/2000	180.9	4/6/2006	206.3	4/23/2007	207.6
11N34W27E01S	LAMPHIER - MESA	35.0039	-120.4525	SLO DPW	4/21/2000	106.6	4/6/2006	82.1	4/23/2007	101.4
11N35W03B01S	FITZPATRICK - FRANKIE	35.0674	-120.5469	SLO DPW	4/20/2000	39.7	4/18/2006	38.4	4/23/2007	36.8
11N35W05G01S	ANDREWS - FOWLER LANE	35.0622	-120.5830	SLO DPW	4/19/2000	12.5	4/10/2006	15.7	4/24/2007	8.2
11N35W05G02S	WHITE - FOWLER LANE	35.0610	-120.5823	SLO DPW	4/19/2000	11.5	4/10/2006	9.3	4/24/2007	-4.1
11N35W05L01S	SACKMAN - HWY #1	35.0615	-120.5874	SLO DPW	4/19/2000	5.9	4/10/2006	8.7	4/24/2007	-3.2
11N35W05L03S	SACKMAN	35.0615	-120.5876	SLO DPW	4/19/2000	19.3	4/10/2006	22.0	4/24/2007	6.4
11N35W05R01S	GATES - CALLENDER	35.0548	-120.5800	SLO DPW	4/19/2000	16.1	4/13/2006	18.6	4/24/2007	6.1
11N35W08L01S	-	35.0465	-120.5878	SLO DPW	4/19/2000	20.2	4/30/2006	19.0	4/24/2007	4.1
11N35W09K02S	SCHAEFER - HWY#1/WILLOW	35.0463	-120.5671	SLO DPW	4/19/2000	34.3	4/10/2006	32.7	4/24/2007	21.1
11N35W09K04S	CASANO - HWY#1/WILLOW	35.0439	-120.5655	SLO DPW	4/19/2000	4.6	4/10/2006	11.8	4/24/2007	-6.4
11N35W11C01S	NASHOLM - MESA	35.0547	-120.5340	SLO DPW	4/21/2000	-19.7	4/11/2006	0.2	4/24/2007	-4.1
11N35W11C02S	STRUBLE - MESA	35.0547	-120.5342	SLO DPW	4/21/2000	-20.1	4/11/2006	-6.0	4/24/2007	-22.2
11N35W11J01S	CAMACHO - MESA	35.0454	-120.5251	SLO DPW	4/20/2000	80.9	4/11/2006	88.2	4/23/2007	88.6
11N35W13C01S	ARLT - POMEROY	35.0399	-120.5169	SLO DPW	4/20/2000	55.1	4/11/2006	52.2	4/19/2007	51.5
11N35W13D01S	KAMINAKA	35.0398	-120.5238	SLO DPW	4/20/2000	38.6	4/6/2006	33.0	4/23/2007	24.6
11N35W13E02S	KAMINAKA - SOUTH	35.0377	-120.5235	SLO DPW	4/20/2000	58.0	4/6/2006	46.8	4/19/2007	55.0
11N35W13E03S	KAMINAKA - NORTH	35.0378	-120.5233	SLO DPW	4/20/2000	52.4	4/6/2006	59.0	4/19/2007	58.2
12N35W28J02S	BARNETT - HALCYON	35.0893	-120.5640	SLO DPW	4/13/2000	142.4	4/13/2006	132.9	4/17/2007	133.7
12N35W32G01S	COLE - HALCYON	35.0787	-120.5830	SLO DPW	4/20/2000	9.5	4/19/2006	11.8	4/24/2007	4.3
12N35W33D01S	PHIL - BEN	35.0833	-120.5729	SLO DPW	4/13/2000	109.9	4/13/2006	90.1	4/17/2007	88.8
12N35W33E01S	RENO - HALCYON	35.0783	-120.5742	SLO DPW	4/20/2000	112.7	4/19/2006	110.1	4/24/2007	107.5
12N35W33J02S	DICK - FERNDALE	35.0727	-120.5595	SLO DPW	4/20/2000	-7.2	4/18/2006	-1.3	4/23/2007	-5.0
12N35W33J03S	FAGUNDES - FERNDALE	35.0733	-120.5633	SLO DPW	4/20/2000	5.5	4/18/2006	15.9	4/23/2007	3.8
12N35W33L01S	JOHNSON - HALCYON	35.0732	-120.5721	SLO DPW	4/20/2000	7.7	4/19/2006	4.8	4/23/2007	2.3
12N35W34G08S	OLIVER - LOS BERROS	35.0795	-120.5496	SLO DPW	4/17/2000	165.5	4/13/2006	164.4	4/17/2007	153.9
12N35W35P01S	JOHNSON - APPLEGATE RANCH	35.0711	-120.5351	SLO DPW	4/20/2000	179.0	4/18/2006	181.1	4/19/2007	182.8
12N35W35P03S	SEVERENCE - DOMESTIC	35.0719	-120.5352	SLO DPW	4/20/2000	160.0	4/18/2006	167.7	4/19/2007	168.5
12N36W36L01S	PISMO BEACH - EAST	35.0737	-120.6283	SLO DPW	4/28/2000	-6.1	4/20/2006	-6.1	4/18/2007	-7.4
32S13E33A05M	GARING - LOS BERROS	35.1049	-120.5792	SLO DPW	4/13/2000	75.2	4/13/2006	71.3	4/17/2007	67.7
32S13E33A06M	GARING NEW DOM	35.1014	-120.5756	SLO DPW	4/13/2000	60.0	4/13/2006	50.6	4/17/2007	41.3
32S13E33K03M	WALLER SEED COMPANY	35.0956	-120.5830	SLO DPW	4/14/2000	22.5	4/13/2006	23.7	4/17/2007	17.6
-	DAWN	35.0393	-120.5542	Woodlands	4/18/2000	30.3	4/17/2006	31.6	1/11/2007	21.3
-	FLINTCOTE	35.0234	-120.5564	Woodlands	4/18/2000	37.7	4/17/2006	40.5	1/11/2007	31.5
-	HOMESTEAD	35.0205	-120.5575	Woodlands	4/18/2000	41.6	4/17/2006	40.6	1/11/2007	21.4
-	HWY 1	35.0312	-120.5603	Woodlands	4/18/2000	33.4	4/17/2006	34.3	1/11/2007	23.9
-	MESA ROAD	35.0282	-120.5435	Woodlands	4/18/2000	42.3	4/17/2006	41.4	1/11/2007	31.8



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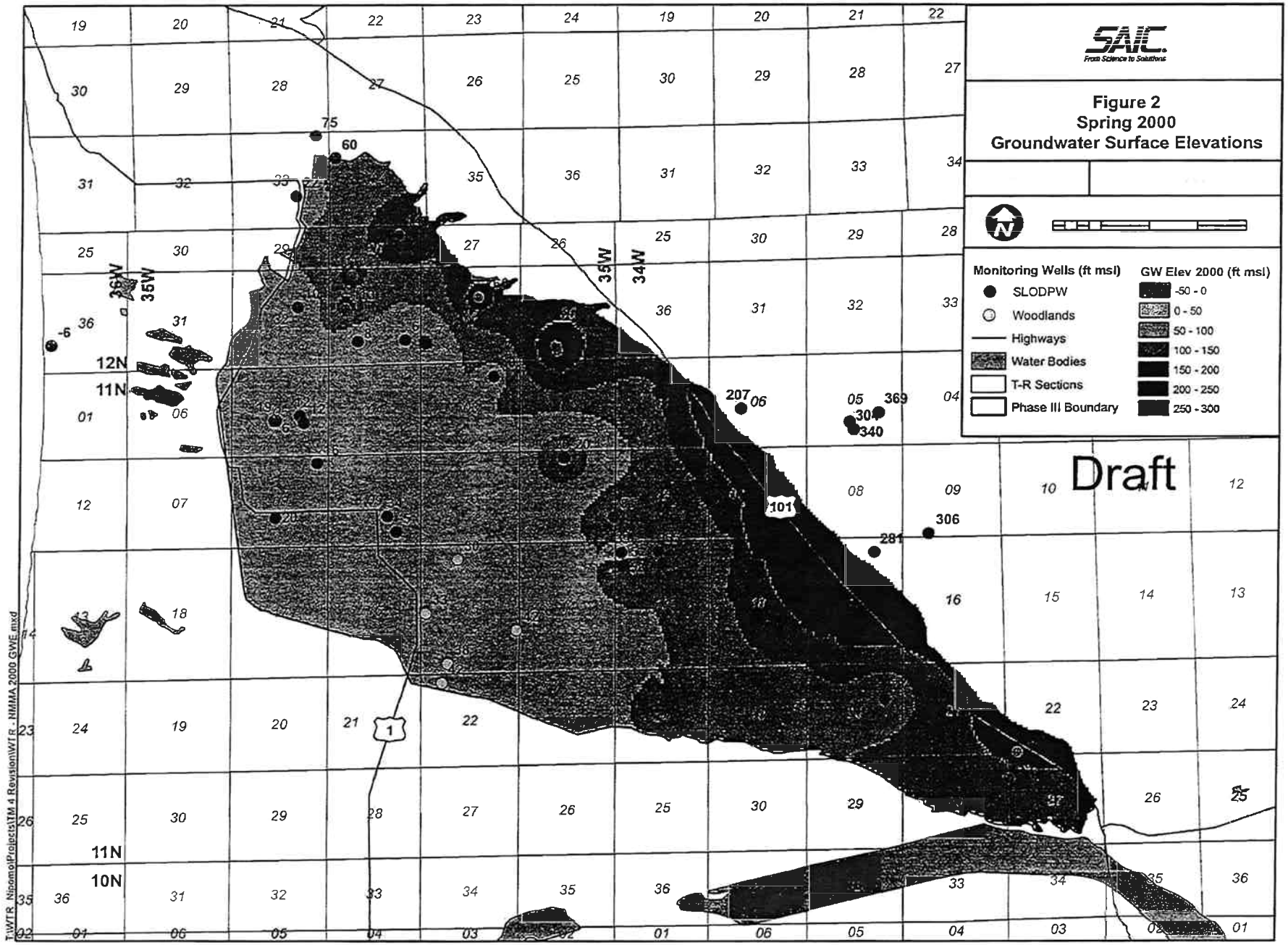
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Figure 2
Spring 2000
Groundwater Surface Elevations
Monitoring Wells (ft msl)
SLODPW
Woodlands
Highways
Water Bodies
T-R Sections
Phase III Boundary
GW Elev 2000 (ft msl)
-50 - 0
0 - 50
50 - 100
100 - 150
150 - 200
200 - 250
250 - 300
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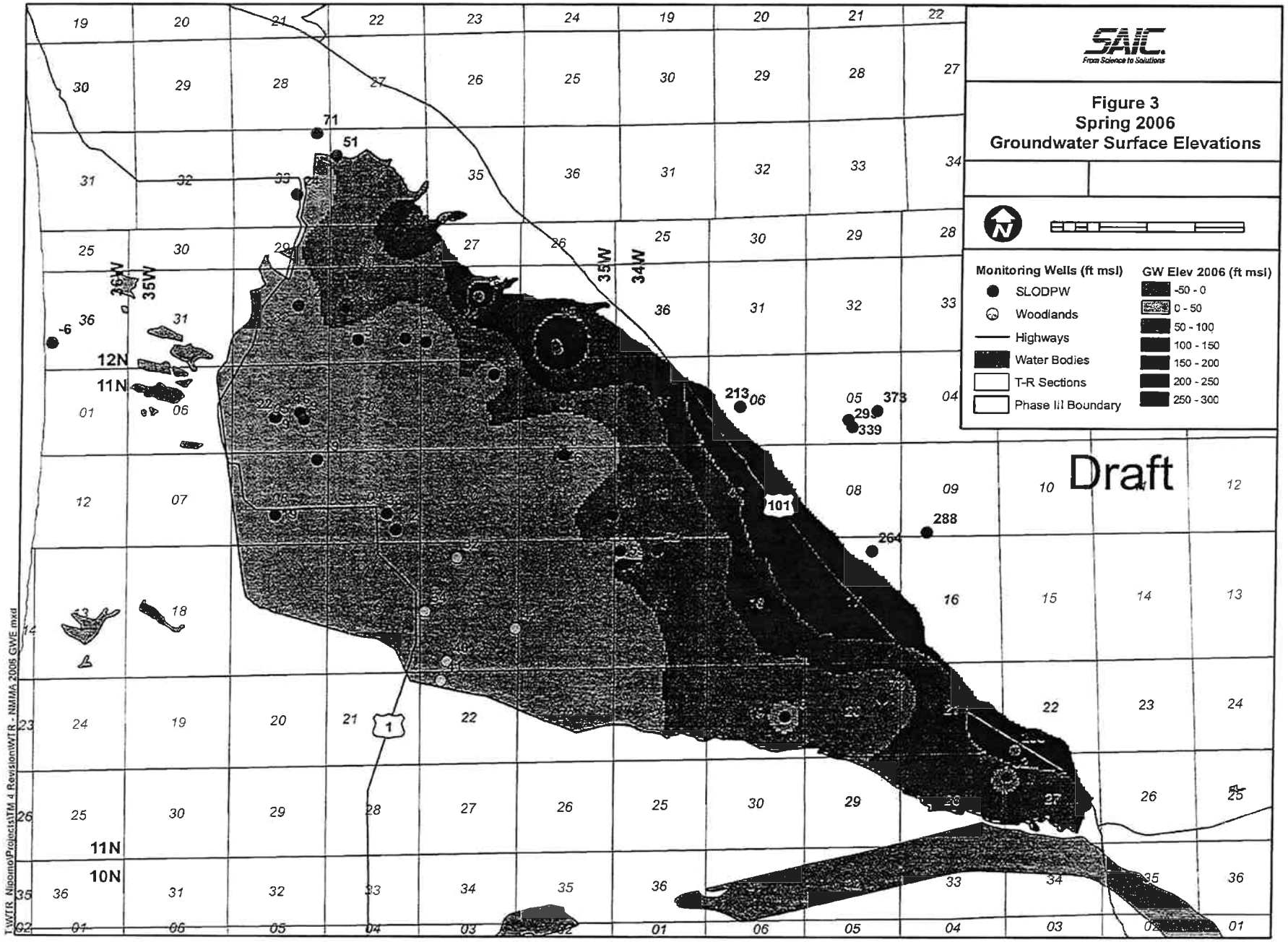
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Figure 3
Spring 2006
Groundwater Surface Elevations
Monitoring Wells (ft msl)
SLODPW
Woodlands
Highways
Water Bodies
T-R Sections
Phase III Boundary
GW Elev 2006 (ft msl)
-50 - 0
0 - 50
50 - 100
100 - 150
150 - 200
200 - 250
250 - 300
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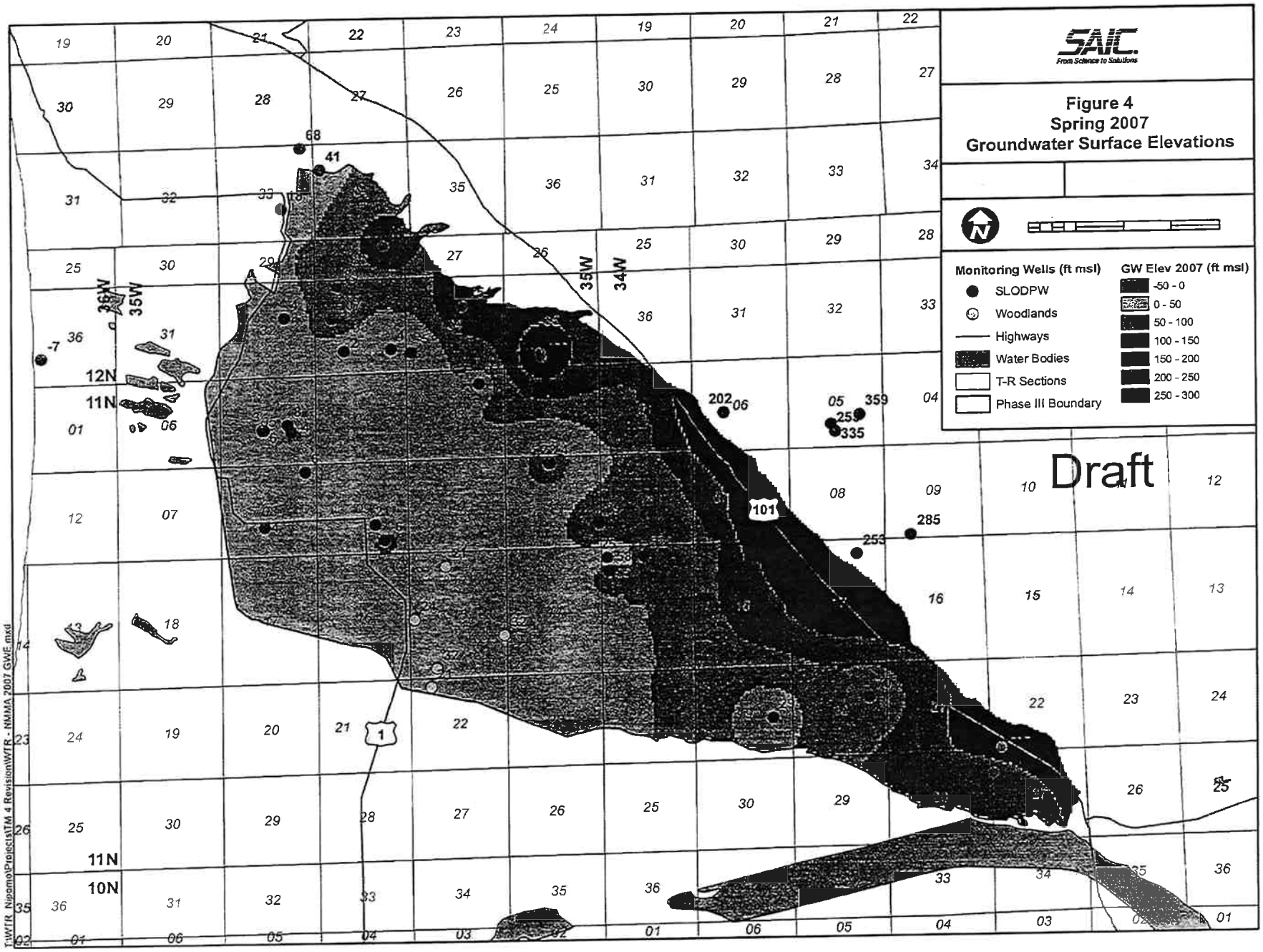
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Figure 4
Spring 2007
Groundwater Surface Elevations
Monitoring Wells (ft msl)
SLODPW
Woodlands
Highways
Water Bodies
T-R Sections
Phase III Boundary
GW Elev 2007 (ft msl)
-50 - 0
0 - 50
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100 - 150
150 - 200
200 - 250
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