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FLOW MODELING REPORT

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905008

ERM-Northeast

DRAFT

GROUND WATER FLOW MODELING REPORT
PLANT NO.1
VAN DER HORST CORPORATION SITE
SITE NO. 9-05-008
OLEAN, CATTARAUGUS COUNTY

DRAFT

JUNE 1991

SUBMITTED TO:

DIVISION OF HAZARDOUS WASTE REMEDIATION
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233

SUBMITTED BY:

ERM-NORTHEAST, INC.
5500 MAIN STREET
WILLIAMSVILLE, NEW YORK 14221

ERM-Northeast

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1.0 INTRODUCTION

1.1 Project Background

The Van Der Horst (VDH) Plant No. 1 ground water model was completed by ERM-Northeast, Inc. (ERM) as part of the Remedial Investigation/Feasibility Study (RI/FS) at the Site. This report includes a discussion of the model's setup, calibration, sensitivity analysis, verification, limitations and the various recovery well simulations.

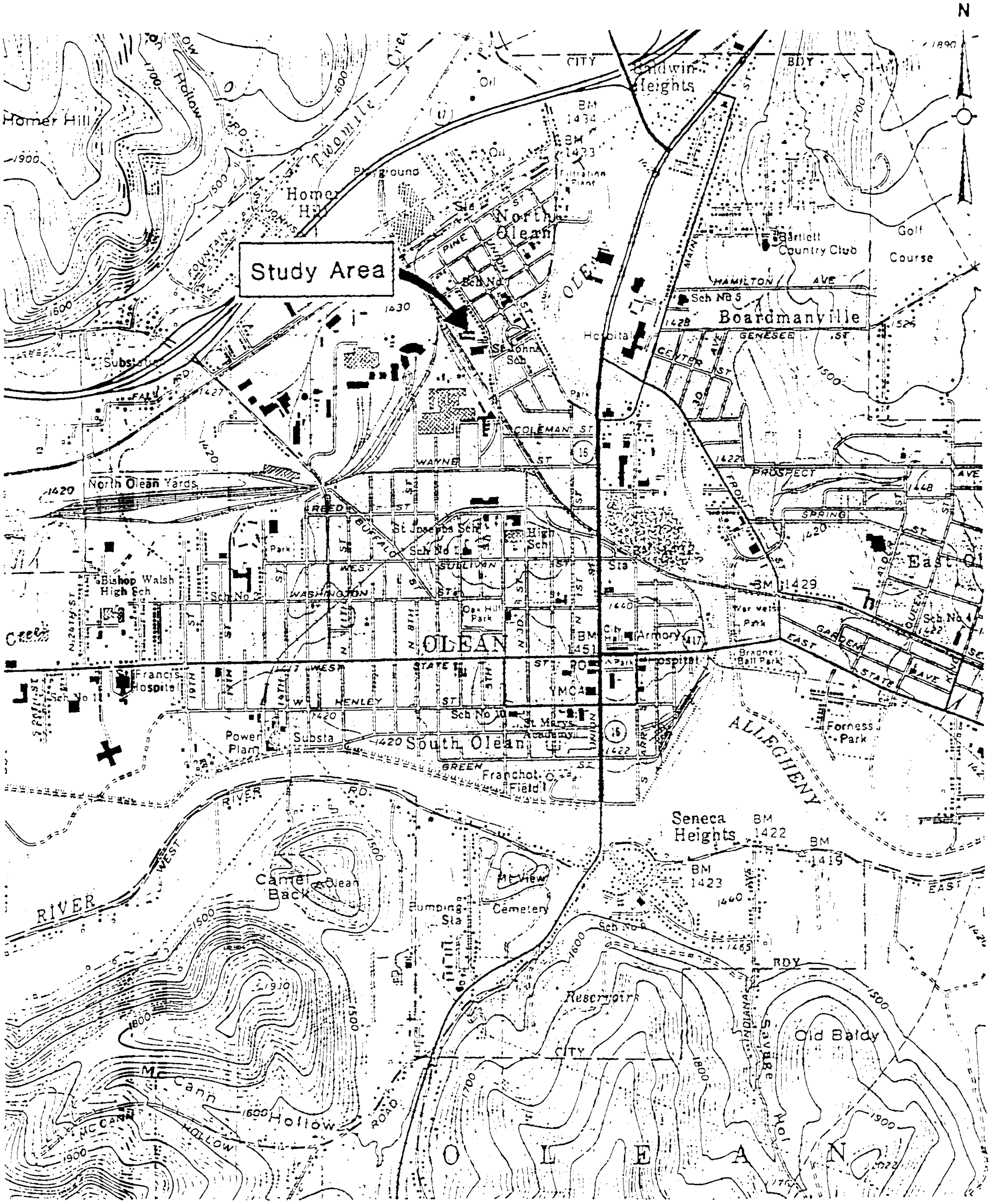
1.2 Purpose and Scope of Ground Water Modeling

The primary goal of ground water modeling at Van Der Horst Plant No. 1 was to aid in the selection of recovery wells for potential remediation of chromium contamination in the underlying ground water. The model was used to evaluate the effect of well placement, number, and discharge on the well capture area relative to the estimated area of chromium contamination. The location of the Plant No. 1 site is presented in Figure 1-1.

1.3 Model Area

Selection of the area to be modelled in this study was based on an estimated distribution of total chromium contamination within

FIGURE 1-1
Site Location Map - Van Der Horst Company
RI/FS Plant No.1



Source: U.S.G.S. Quadrangle Map, Olean, N.Y.

Scale: 1"-2000'

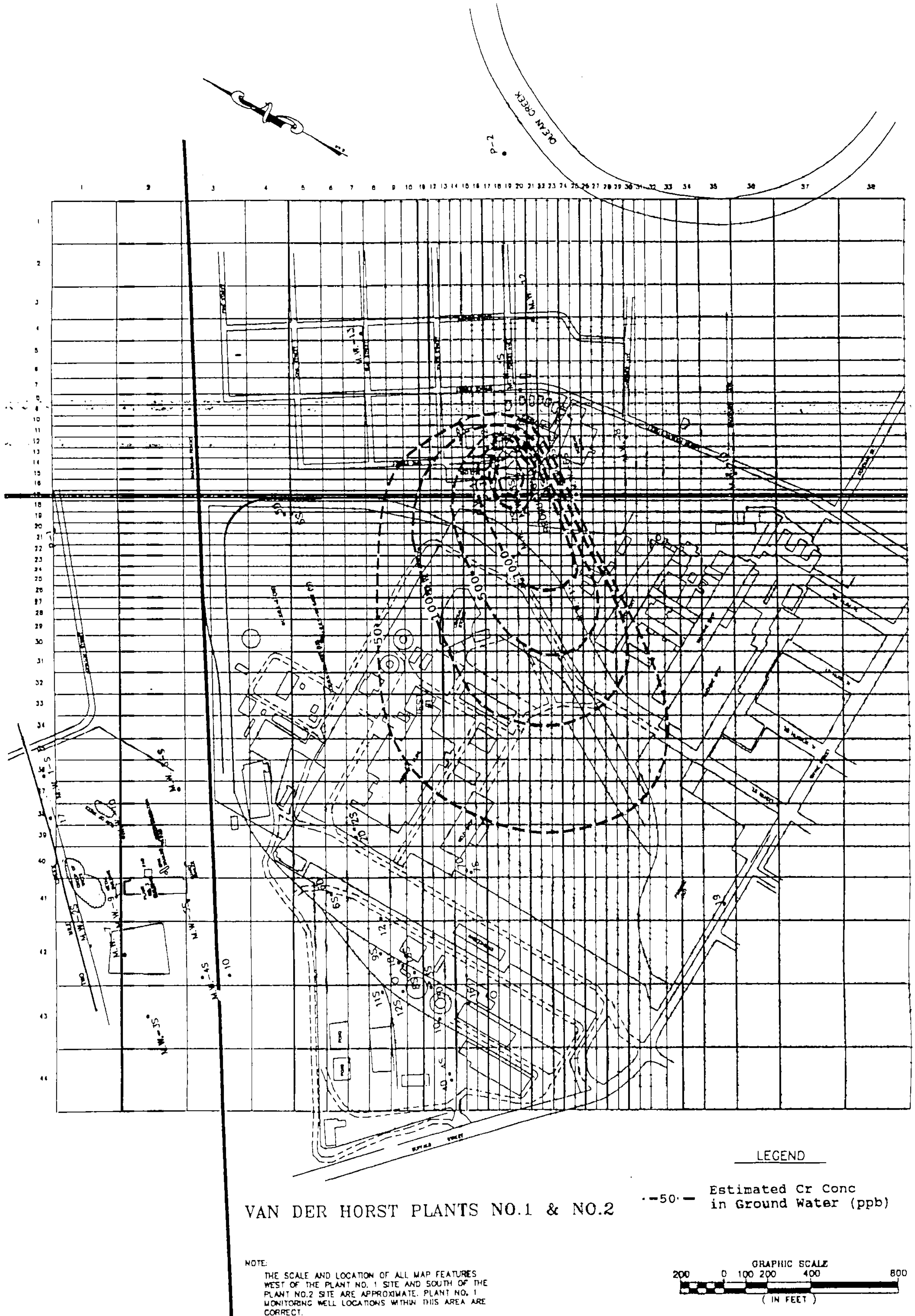
ERM-Northeast
Environmental Resources Management

the aquifer beneath Plant No. 1. Although the extent of chromium contamination has been approximated to the north and east of the site, the extent of contamination southwest (downgradient) of Plant No. 1 has not yet been delineated.

ERM initially considered ground water velocity as a means to estimate the extent of chromium contamination in the aquifer. However, the chromium distribution in existing wells suggested that chromium had not migrated at the same velocity as ground water (which may be in excess of 2000 ft/year at some locations). The slower migration rate of chromium is probably due to sorptive properties of the aquifer which can retard contaminant transport. Thus, the estimation of chromium distribution southwest of monitoring well MW-11D is based on ground water flow direction and an extrapolation of the observed concentrations near the site. Figure 1-2 illustrates the estimated distribution of chromium within the aquifer. It should be noted that this estimate is based on limited data and may not represent the exact boundary of the chromium plume. The downgradient model boundary was extended 1200 feet beyond the estimated plume boundary to provide an additional safeguard that the plume area was encompassed by the modelled area.

Figure 1-2

Estimated Distribution of Chromium Contamination in Ground Water



2.0 BACKGROUND INFORMATION

2.1 Previous Studies

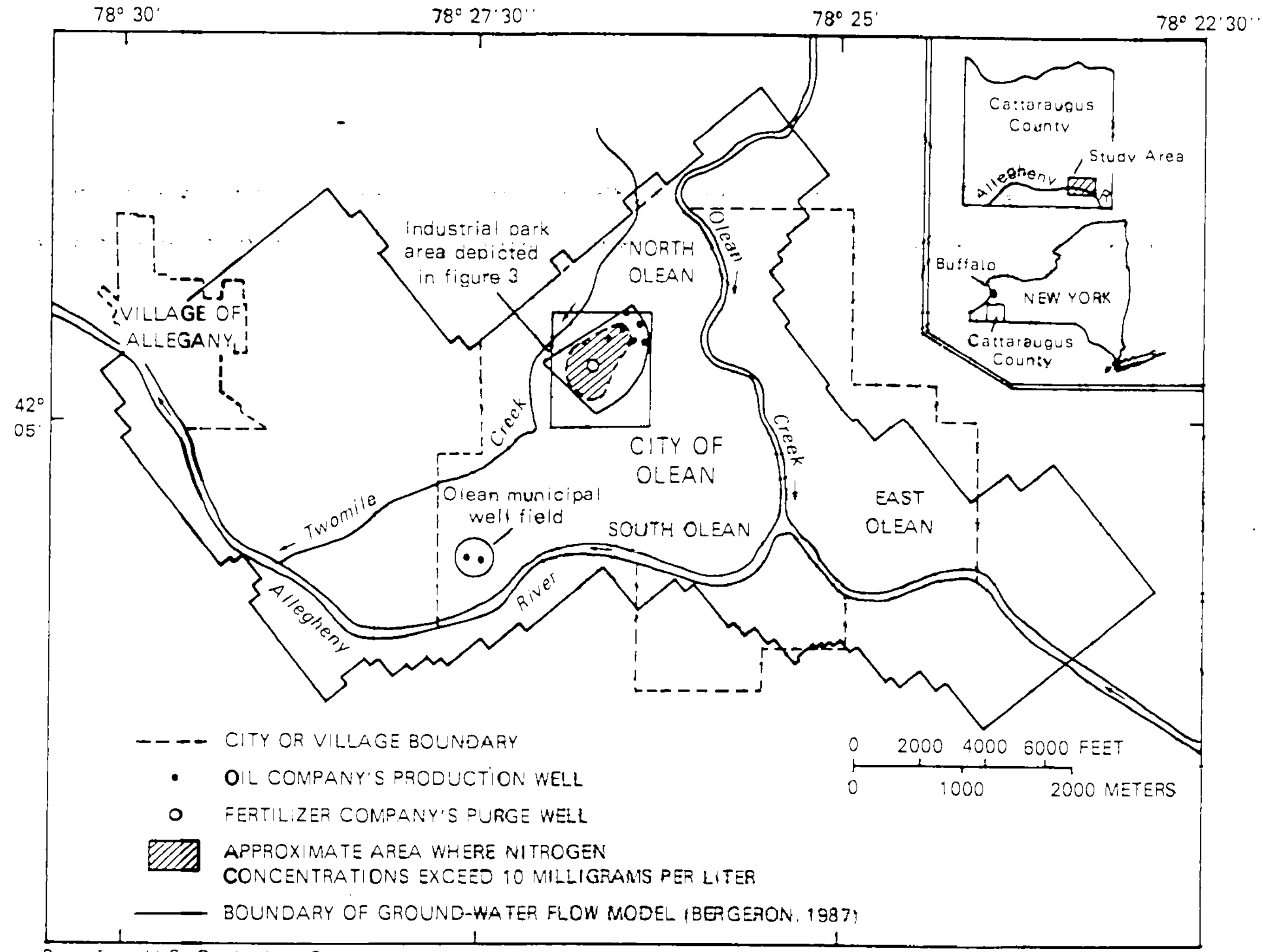
Previous ground water studies in the Olean area have included two United States Geological Survey (USGS) ground water modeling reports. The first study (USGS, 1987a) examined the regional ground water flow within Olean area and along the Allegheny River and Olean Creek. The potential for dissolved nitrogen migration towards the Olean well field was the primary focus of this study. Figure 2-1 shows the USGS modelled area.

The second study (USGS, 1988) simulated nitrogen transport in ground water from a known source area to the Olean well field. This study was used to predict nitrogen concentrations at the well field after an industrial recovery well was shut off near the nitrogen source.

Previous ground water evaluation at Van Der Horst Plant 1 has included slug testing of monitoring wells in the Phase I Remedial Investigation report (December, 1989) and a pump testing of well P-5 in the Phase II Remedial Investigation report (May, 1991). Ground water flow direction and contaminant distribution were also discussed in the Phase I and II RI reports.

Figure 2-1

USGS Ground Water Modeling Area



Base from U.S. Geological Survey,
Olean, 1980, Knapp Creek, 1961, 1:24,000

2.2 Regional Geology

The City of Olean lies within the glaciated Allegheny River Basin. This basin is a glacially-scoured valley that has an east-west trend, and a bedrock relief of several hundred feet. After glacial scouring, the valley was then backfilled with and sediments deposited by post-glacial and fluvial processes. Presently, the only bedrock outcrops are found in the hills on the north and south sides of the Allegheny River Basin while in the valley the bedrock is covered by up to three hundred feet of valley-fill glaciofluvial sediment. These surficial glacial deposits are present at the Van Der Horst site, and they overly the predominantly shale and siltstone bedrock of the Upper Devonian Series.

Previous geological studies (USGS, 1987b; USGS, 1988) have concluded that the overlying surficial material locally consists of unconsolidated glacial and fluvial deposits, ranging from 150 to 300 feet in thickness. The underlying material consists of unconsolidated sediments which have tentatively been identified as predominately lacustrine clays and silts. Such sediments are deposited in glacial lakes and locally can range up to 150 feet in thickness (USGS, 1988). Shallower sediments consist of till and stratified drift which were deposited by a former glacial ice tongue which extended down Olean Creek. The post-glacial deposits generally consist of well sorted sand-and-gravel alluvium overlain by silt, and these range from 10 to 30 feet in thickness.

The surficial soils in the valleys are classified as Recent alluvium and exhibit a wide range of sediment grain size. These deposits are made up of gravelly silt loams which may range in thickness from 10 to 30 feet in some areas of the valleys.

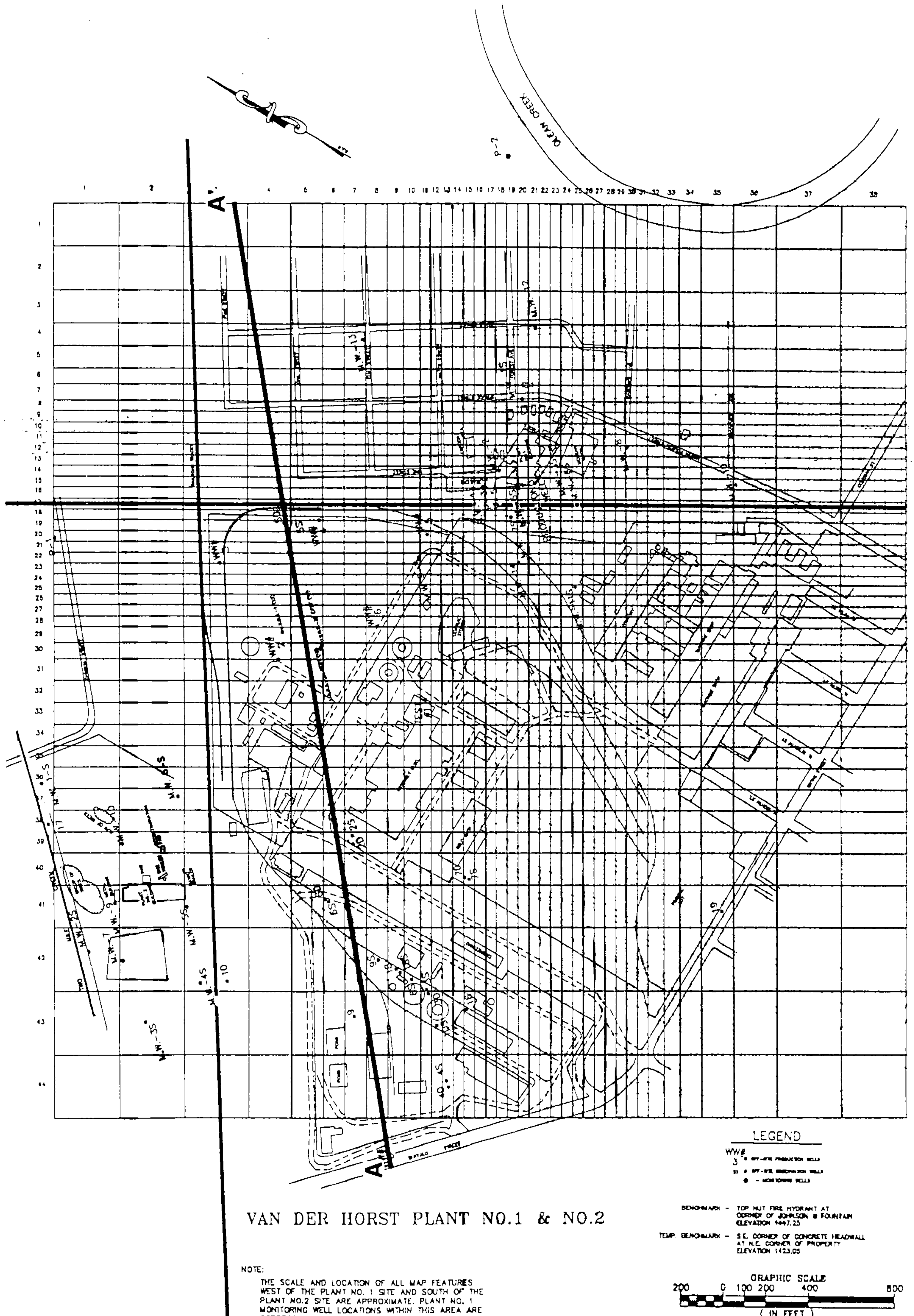
A valley fill deposit of fluvial sands and gravels generally occurs beneath the Recent alluvium. The fluvial deposits are typically 40 - 60 feet thick and extend to an average depth of 80 feet below land surface. This deposit of fluvial sands and gravels constitutes the major aquifer in the Olean area and is saturated at depths of 15 - 20 feet below grade. Clay lenses have been documented to occur within the valley fill deposit.

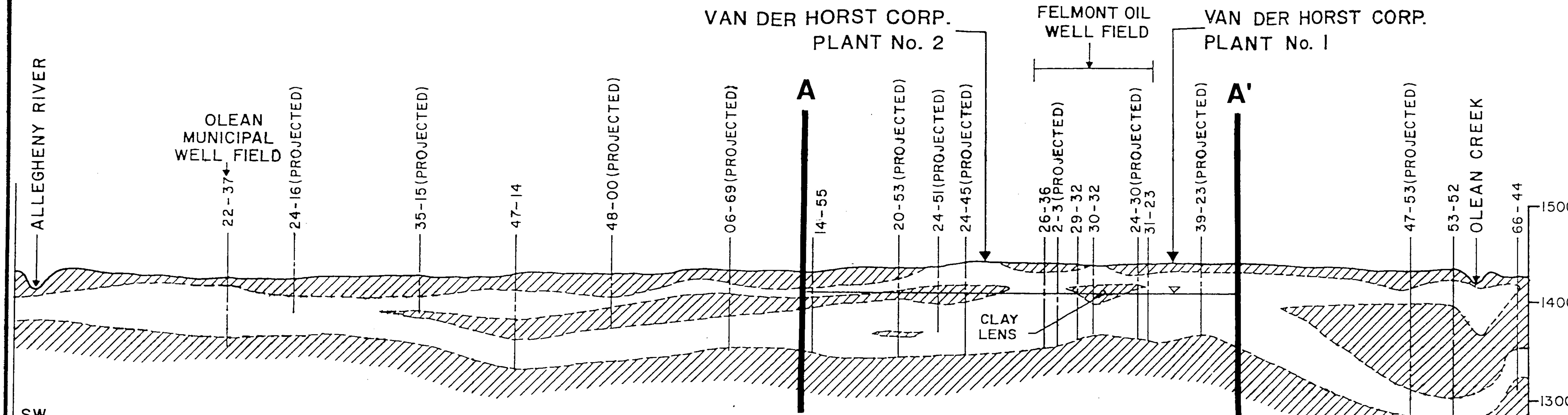
A map of the modelled area is presented in Figure 2-2. Line A - A' is the location of a cross section which passes through the modelled area. Figure 2-3 illustrates the aquifer cross section along A - A'.

2.3 Site Hydrogeology

Local hydrogeologic conditions at Plant No. 1 have been found to be somewhat different than those of earlier studies. The

Figure 2-2
Cross Section Map of Modelled Area





LEGEND

22-37

WELL LOCATION AND NUMBER (LATITUDE AND LONGITUDE)

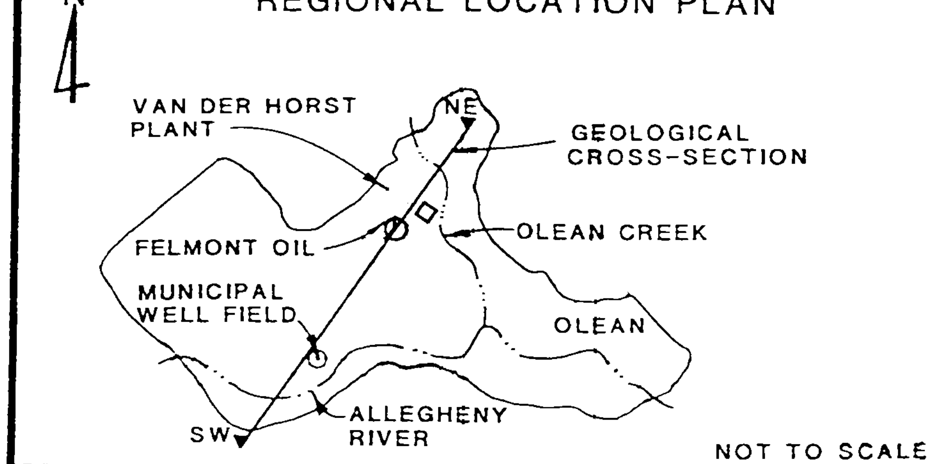
DEPOSITS OF SILTS AND CLAYS (GLACIOLACUSTRINE OR ALLUVIAL)

FLUVIAL DEPOSITS OF SAND AND GRAVEL

NOTE:

GROUND WATER FLOWS FROM THE NORTHEAST TO THE SOUTHWEST. CONSEQUENTLY, THE CLAY LENS BENEATH THE FELMONT OIL FACILITY MUST BE CONSIDERED WHEN INSTALLING DOWNGRADIENT WELLS.

REGIONAL LOCATION PLAN



NOT TO SCALE

HORIZONTAL SCALE: 1"= 1,000'
VERTICAL SCALE: 1"= 100'
VERTICAL EXAGGERATION: 10X
(SOURCE: U.S.G.S., 1985)

TITLE	VAN DER HORST RI/FS GEOLOGICAL CROSS-SECTION
PREPARED FOR	NYSDEC
ERM-Northeast Environmental Resources Management	SCALE: / DATE: / FIGURE 2-3

139839

thickness of Recent alluvial deposits is approximately 10 feet. The top of the upper aquifer at Plant No. 1 is at a depth of about 20 feet. The base of the upper aquifer occurs at a depth of 90 feet (at well MW-5B), and lies above a 19-foot thick, silty clay aquitard. Beneath this aquitard is a semi-confined lower aquifer of unknown thickness. Both the upper and lower aquifers are within sand and gravel deposits. The lower aquifer at Plant No. 1 is not in good hydraulic connection with the upper aquifer, based on pumping test results. Thus, the lower aquifer was not incorporated within the model.

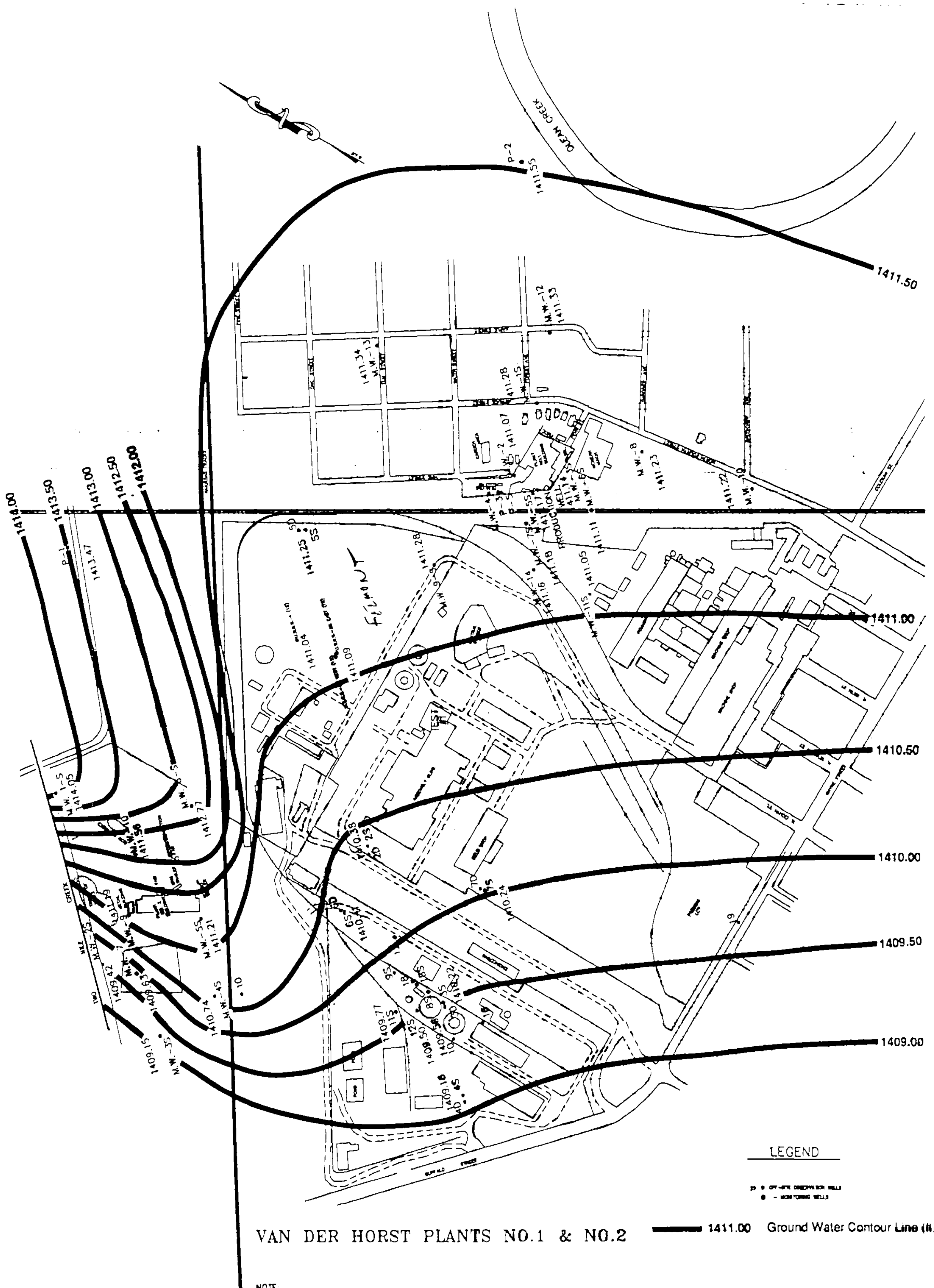
2.4 Ground Water Flow in the Aquifer

Figure 2-4 presents the April 3, 1991 regional ground water flow in shallow wells within the modelled area. The direction of flow downgradient of Plant No. 1 was towards the southwest. The hydraulic gradient at the two plants were different. The gradient at Plant No. 1 was 0.00025 whereas the gradient southwest of Plant No. 2 was 0.005.

In general, along the railroad tracks between Plants No. 1 and No. 2, the ground water flow direction in the shallow wells is southeast. This southeastern component of ground water flow is believed to result from the much lower hydraulic conductivity of the shallow sediments northwest of Johnson Street. The gradient in

Figure 2-4

Ground Water Contours for Shallow Monitoring Wells on April 3, 1991



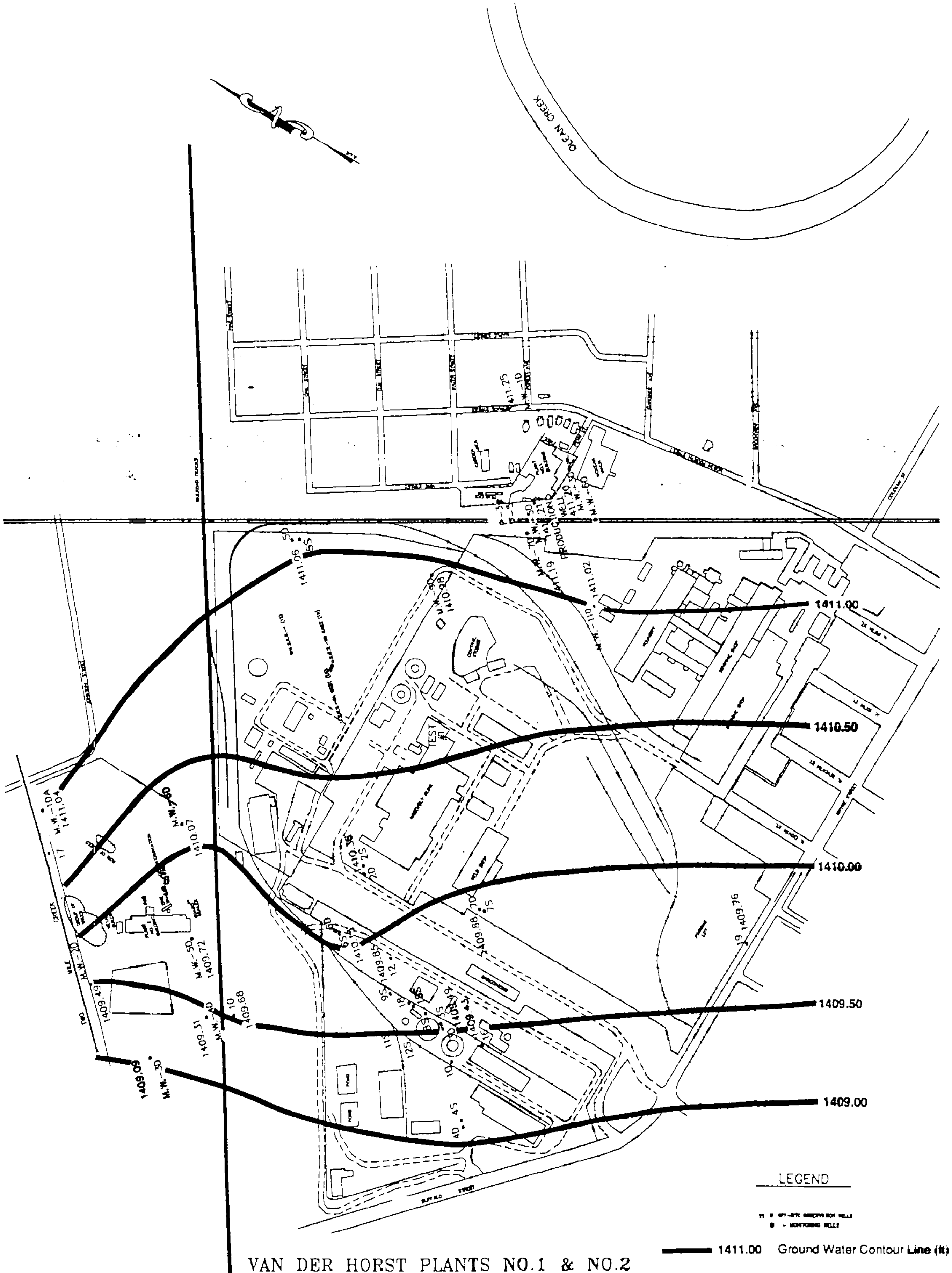
VAN DER HORST PLANTS NO.1 & NO.2

NOTE:
THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO. 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO. 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT.

the shallow wells of this area is not believed to be representative of the overall regional flow direction of the aquifer.

Figure 2-5 presents the regional ground water flow in the deep wells. The flow direction in the deep wells throughout the modelled area is to the southwest, and the hydraulic gradient ranges from 0.0003 at Plant No. 1 to 0.0009 southwest of Plant No. 1. The direction and magnitude of the hydraulic gradient in the deep monitoring wells is believed to be representative of the predominant flow characteristics of the aquifer.

Figure 2-5
Ground Water Contours for Deep Monitoring Wells on April 3, 1991



NOTE:
THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO. 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO. 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT.

2.5 Hydraulic Properties of the Aquifer

Aquifer parameters which were used for modeling purposes include: transmissivity, hydraulic conductivity, storativity and specific yield (ie., effective porosity). Typical aquifer parameters used within the present study area for the USGS 1987 modeling report are listed below:

Transmissivity	
total aquifer thickness	14 ft^2/min
Hydraulic Conductivity	
top layer	0.075 ft/min
bottom layer	0.31 ft/min
Storativity	
bottom layer	0.015
Specific Yield	
top layer	0.15

Higher transmissivities were obtained from the USGS specific capacity tests of industrial pumping wells within the modelled area. These transmissivities ranged from 12 to 138 ft^2/min and are presented in Figure 2-6.

Figure 2-6

USGS Transmissivity Calculations from Specific Capacity

NOTE: THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO. 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO. 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT.

The following average aquifer characteristics have been calculated or estimated from slug test and aquifer test data at Plant No. 1:

Parameter	Method	Value
Transmissivity	P-5 Pumping Test	193 ft^2/min
Hydraulic Cond.	P-5 Pumping Test	2.8 ft/min
Hydraulic Cond.	Shallow Well Slug Tests	0.2 ft/min
Hydraulic Cond. -	Deep Well Slug Tests	0.10 ft/min
Storativity	Pumping Test	0.017
Specific Yield	Estimated Range	0.15 - 0.25

The Plant No. 1 pumping test and USGS specific capacity results appear to provide the best data for estimating the transmissivity distribution within the modelled area. Plant No. 1 slug tests did not appear to sufficiently stress the aquifer to achieve representative results for hydraulic parameter estimation.

3.0 MODEL SETUP INFORMATION

3.1 Model Description and Discretization

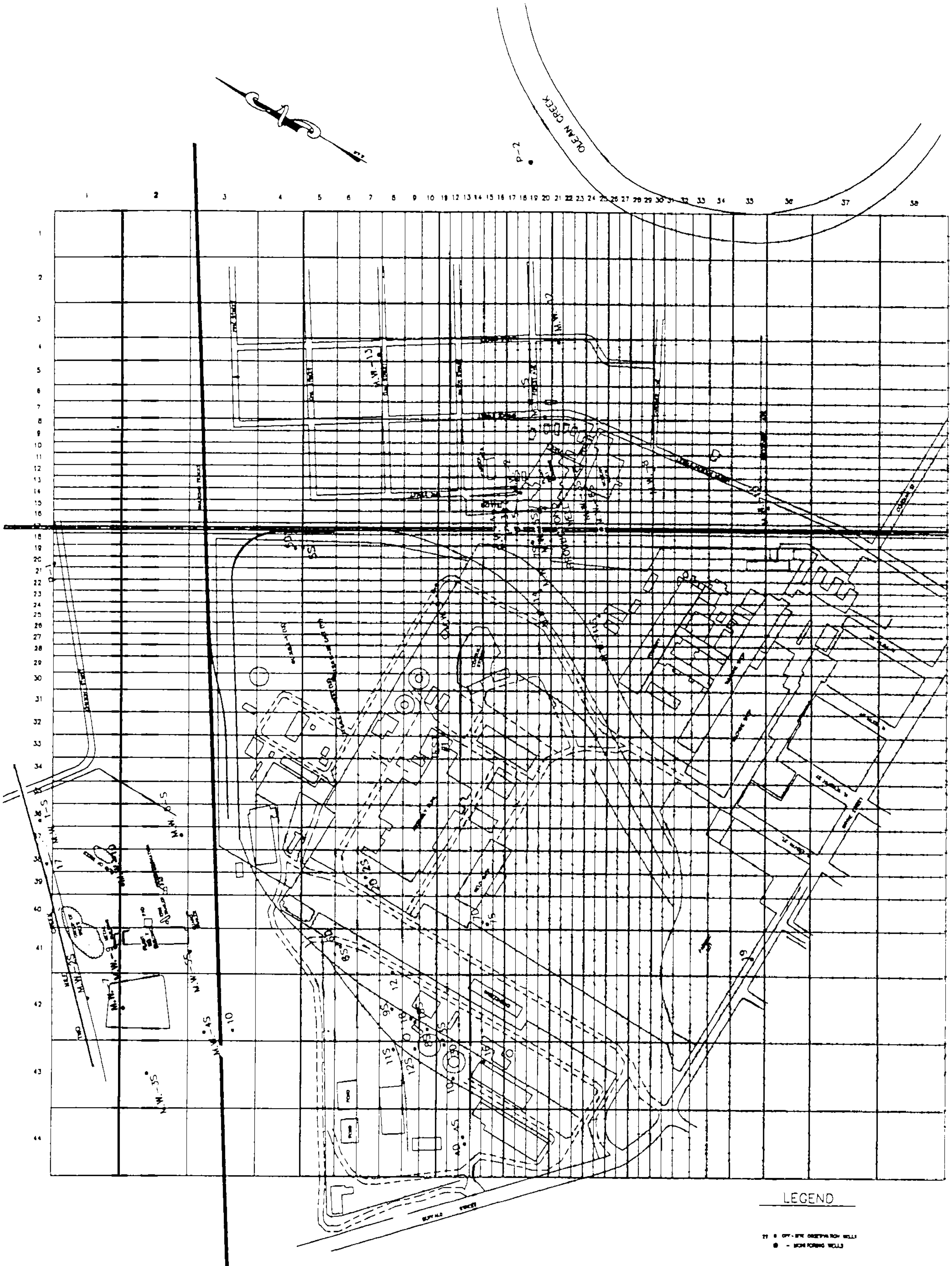
Numerical modeling was completed using the USGS (McDonald and Harbaugh, 1988) modular, 3-D finite-difference ground water flow model (MODFLOW). MODFLOW simulates ground water flow by a series of finite difference equations which are solved by the Strongly Implicit Procedure (SIP) numerical problem solver. The model consists of a Main Program and a set of independent subroutines (modules). Specific modules were used to simulate ground water to/from wells and from aquifer recharge. Two dimensional (1-layer) ground water modeling was conducted using steady state or transient ground water flow and confined aquifer conditions. Discretization of the modeled aquifer area was carried out by dividing the area into 44 rows and 38 columns of rectangular nodes (Figure 3-1).

3.2 Model Boundary Conditions

There were 3 types of boundaries used in the ground water model: constant head, constant flux, and a special type of constant flux boundary called no-flow. Final calibrations were completed using constant head and no-flow boundary conditions.

Constant head nodes formed the upgradient and downgradient

Figure 3-1
Modeling Grid Map



VAN DER HORST PLANTS NO.1 & NO.2

BENCHMARK – TOP NUT FIRE HYDRANT AT CORNER OF JOHNSON & FOUNTAIN ELEVATION 1447.25

TEMP. BENCHMARK – S.E. CORNER OF CONCRETE HEADWALL AT N.E. CORNER OF PROPERTY ELEVATION 1423.05

NOTE:
THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO. 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO. 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT.

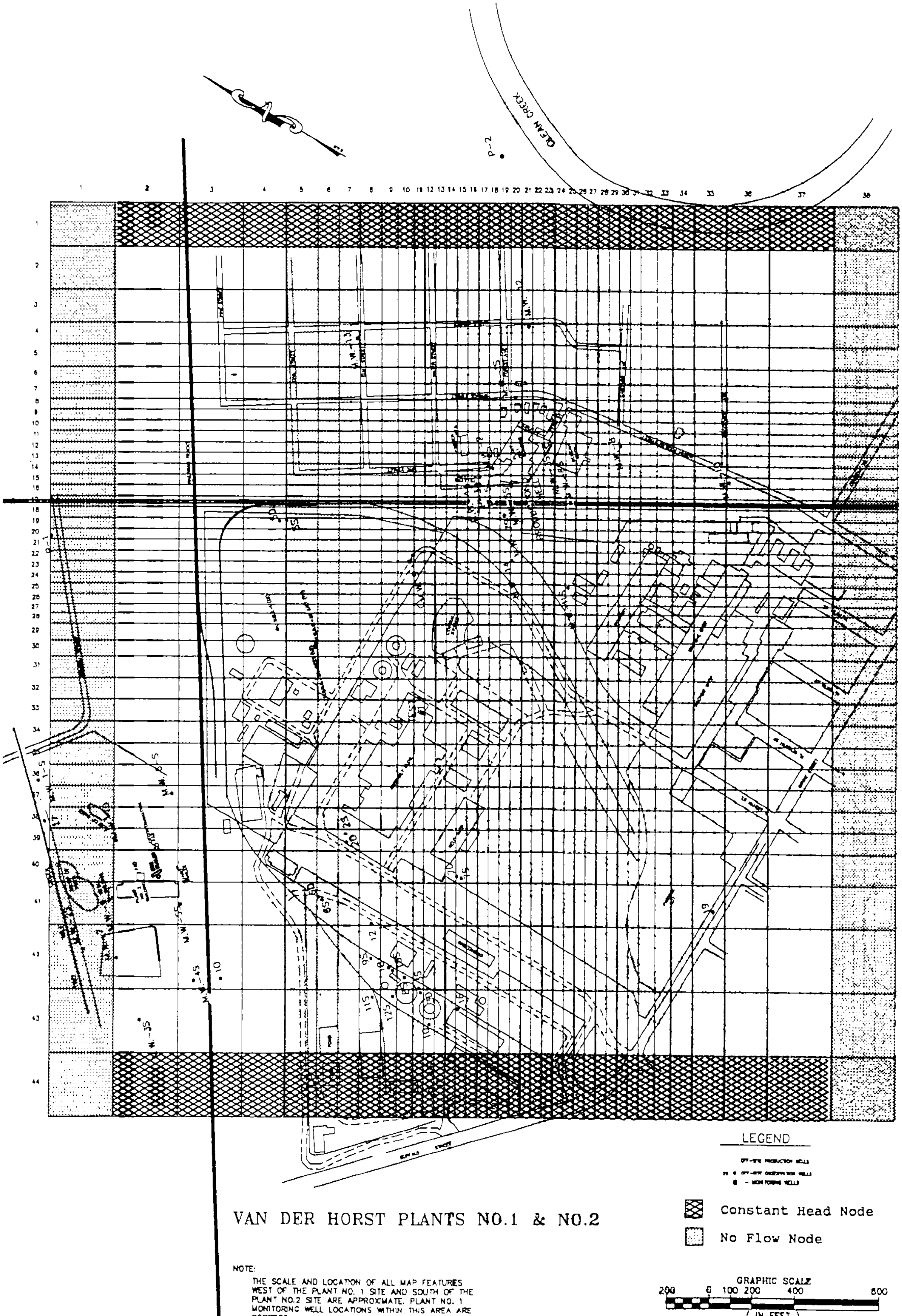
boundaries of the model during most of the simulations (see Figure 3-2). Ground water levels at these nodes remained the same throughout the simulation. Constant head nodes provided a source and a sink for ground water flow at the upgradient and downgradient boundaries.

Constant flux nodes were used instead of constant head nodes along the upgradient boundary during some modeling simulations. Constant flux nodes along this boundary simulated a constant rate of water injection throughout the modeling run. The amount of flow to each upgradient boundary node remained constant, but the ground water elevation (head) was allowed to vary. Constant flux nodes were also used within the modelled area to represent recovery wells in some of the simulations.

No-flow boundaries formed the northern and southern sides of the modelled area. No-flow boundaries are actually constant flux nodes which have been given a zero value for ground water flow. During periods of no pumping, ground water flow in the modelled area was generally parallel to these boundaries. The direction of flow along the north and south model boundaries indicated that the boundaries would not be providing ground water flow to the rest of the modelled area during times of no pumping. No-flow boundaries represent barriers to ground water flow.

Figure 3-2

Model Boundary Map



Most of the non-boundary nodes within the model were designated as active nodes. Both the ground water head and flow were allowed to change in the active nodes during model simulation.

3.3 Model Node Input Parameters

Input parameters for each of the model nodes included: node dimensions, initial water level, transmissivity, type of node, storativity, and ground water recharge. Storativity and ground water recharge remained constant throughout the modeling area during simulation. Storativity (0.015) and ground water recharge (19 inches/year) were varied only during the initial calibration process and sensitivity analyses. Storativity data were not required for steady state simulations. During recovery well simulations, recovery well discharge was input for the grid node where the recovery well was located.

3.4 Model Assumptions

The following assumptions were made in the design of the ground water model for Van Der Horst Plant No. 1:

Ground Water Flow and Recharge

- Ground water flow is primarily to the southwest parallel to the model grid rows.

- Olean Creek is a loosing stream within the model area. The water elevation in the creek has been observed to be above the ground water level near the creek.

- Areal recharge within the modelled area is approximately 19 inches/year based on the USGS ground water flow modeling.

Aquifer Hydraulic Parameters

- Aquifer storativity is approximately 0.015 based on USGS data and Plant No. 1 pumping test results.

- The aquifer behaves as a confined aquifer within the modelled area, although no confining layer was observed during Plant No. 1 monitoring well installation. This assumption is based on P-5 pumping test results. Pumping test drawdown closely matched the Theis curve for confined aquifers. Other factors supporting the confined aquifer assumption include: Small drawdown during pumping test and recovery well simulations compared to the aquifer thickness; Little delayed drainage during pumping due to high aquifer transmissivity; and Observed water level fluctuations in monitoring wells during changes in barometric pressure.

Area of Interest

- The area of interest within the model is between rows 4 and 38, and columns 5 and 33 (see Figure 1-2) because chromium contamination lies within this area.

- The upper aquifer within the area of interest predominantly occurs as a single layer and was simulated as such. Southwest and northwest of this area the upper aquifer occurs as two layers. The lower layer is about 10 times more transmissive than the upper layer (USGS, 1987).

- Model calibration outside the area of interest will primarily utilize water levels from deep observation wells. The gradient of the deep aquifer in this area follows a trend that is consistent with the single layer aquifer.

- The lower aquifer beneath Plant No. 1 (below a depth of 109 feet) was not incorporated within the model. Based on P-5 pumping test results, this lower aquifer is in poor hydraulic connection with the upper aquifer. A 19-foot thick clay layer separates the lower and upper aquifers at monitoring well MW-5B.

4.0 MODEL CALIBRATION

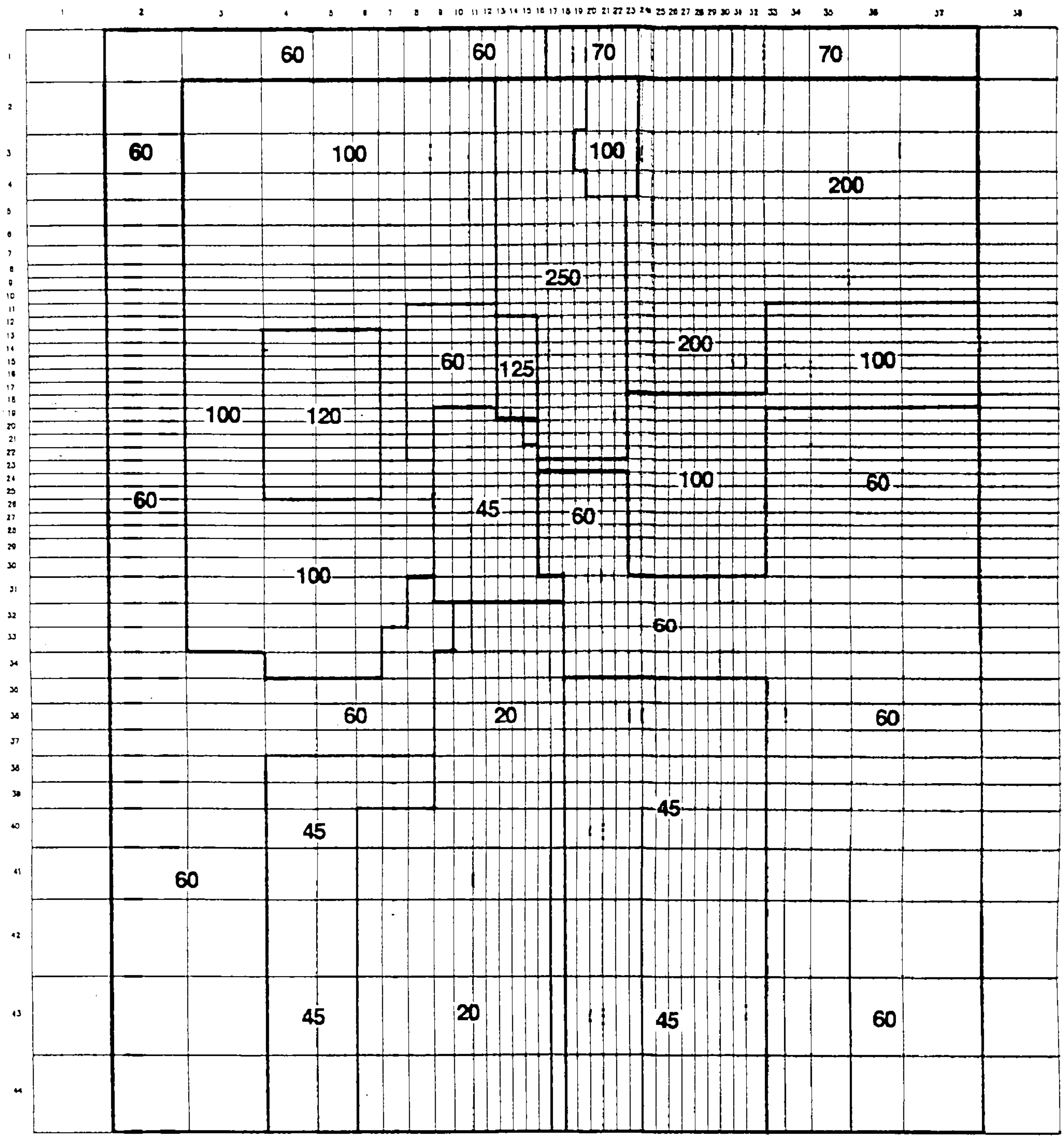
4.1 General Methodology

The Plant No. 1 ground water flow model was calibrated to April 3, 1991 water elevations from Plant 1 and 2 monitoring wells and USGS observations wells within the modelled area. The model was calibrated by systematically varying aquifer transmissivity. Transmissivity varied from 20 to 250 ft^2/min (see Figure 4-1), but was primarily based on the transmissivity distribution from the USGS specific capacity tests (Figure 2-3) and the ERM pumping test. Recharge was held constant in the steady state calibrations and recharge and storativity were constants in the 900-minute pumping test calibration. Transmissivity was adjusted until the ground water levels in the model were within an acceptable range (+/- 0.05 feet) of the monitoring well data. Deep wells (60 to 80 feet) were primarily used for the calibration because ground water flow in the deep wells was most representative of regional ground water flow. However, shallow wells at Plant No. 1 were also used in areas where there was no deep well, and the shallow well water level was believed to represent regional flow conditions.

Model calibration was conducted using constant head upgradient and downgradient boundaries; and also by using a constant flux upgradient boundary and constant head downgradient boundary. The

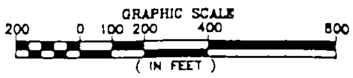
Figure 4-1

Transmissivity Distribution in Final Model Calibration



Legend

60 Transmissivity (sq ft/min)



model was calibrated with both types of boundary conditions to see which simulation best represented actual aquifer conditions.

4.2 Steady State, Non-Pumping Calibration

The first calibration performed on the model was to simulate steady state conditions with no ground water pumping. Model results were compared with measured ground water levels on April 3, 1991. The primary steady state calibration had constant head nodes for the upgradient and downgradient boundaries. Ground water elevation at the upgradient boundary was set at 1411.50 feet and the downgradient boundary was set at 1409.00 feet. A map of the simulated, steady-state ground water contours is depicted in Figure 4-2. Ground water contours in Figure 4-2 are most similar to the deep well ground water contour map in Figure 2-5.

Simulated versus measured ground water levels were compared at wells throughout the modelled area. The most important wells for the calibration were monitoring and observation wells near the Plant No. 1 site. A comparison of simulated versus measured water levels in these wells is presented in Table 4-1. The average difference between measured and simulated heads for these wells during the constant head, steady state calibration was +/- 0.026 feet.

Figure 4-2

Model Simulated Ground Water Contours on April 3, 1991

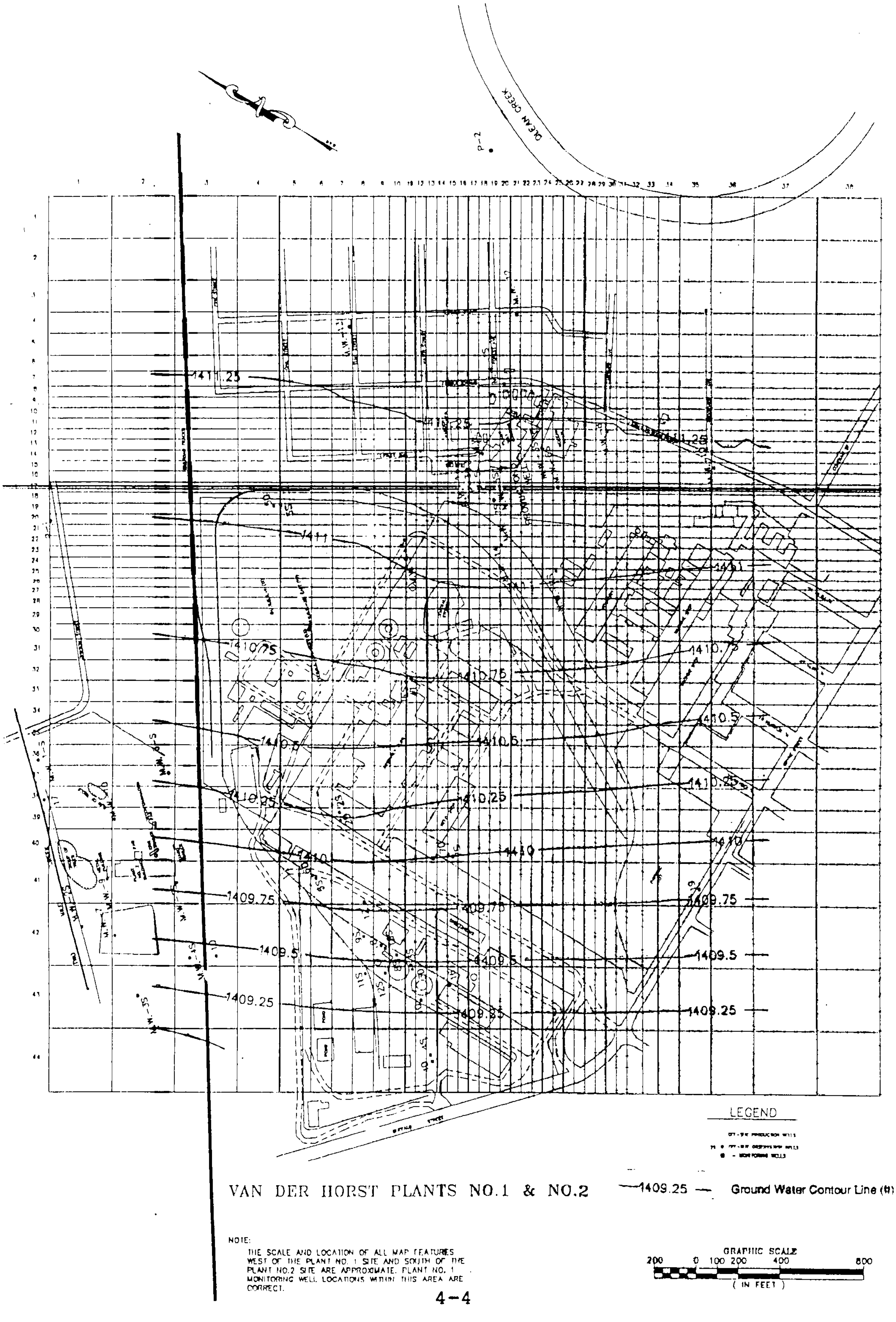


Table 4-1

NO PUMPING CONSTANT HEAD AND CONSTANT FLUX CALIBRATION RUN COMPARISON

			Constant Head Steady State Calibration File: OUTPUT.91		Constant Flux Steady State Calibration		Constant Head Transient Calibration		Constant Flux Transient Calibration	
Monitoring Well	Grid Location	Measured Head 4/3/91 (Feet)	Steady State Head (Feet)	SS - Meas (Feet)	Flux Head (Feet)	Flux - Meas (Feet)	Transient Head (Feet)	Trans - Meas (Feet)	Model Head (Feet)	Flux - Meas (Feet)
MW-1D	20,7	1411.25	1411.29	0.04	1411.31	0.06	1411.29	0.04	1411.31	0.06
MW-3D	23,13	1411.20	1411.22	0.02	1411.24	0.04	1411.22	0.02	1411.24	0.04
MW-4	15,15	1411.15	1411.19	0.04	1411.21	0.06	1411.19	0.04	1411.21	0.06
MW-5D	20,15	1411.21	1411.19	-0.02	1411.22	0.01	1411.19	-0.02	1411.22	0.01
MW-7D	19,18	1411.19	1411.16	-0.03	1411.18	-0.01	1411.16	-0.03	1411.18	-0.01
MW-8	30,12	1411.23	1411.24	0.01	1411.26	0.03	1411.24	0.01	1411.26	0.03
MW-9D	10,22	1410.98	1411.03	0.05	1411.05	0.07	1411.03	0.05	1411.05	0.07
MW-10	36,15	1411.22	1411.21	-0.01	1411.21	-0.01	1411.21	-0.01	1411.23	0.01
MW-11D	25,25	1411.02	1411.00	-0.02	1411.03	0.01	1411.00	-0.02	1411.03	0.01
MW-12	21,4	1411.33	1411.34	0.01	1411.37	0.04	1411.34	0.01	1411.37	0.04
MW-13	7,4	1411.34	1411.34	0.00	1411.36	0.02	1411.34	0.00	1411.36	0.02
MW-14	20,22	1411.16	1411.11	-0.05	1411.13	-0.03	1411.11	-0.05	1411.13	-0.03
USGS-5D	4,19	1411.06	1411.02	-0.04	1411.04	-0.02	1411.02	-0.04	1411.04	-0.02
			Average Diff. = +/-	0.0262	Average Diff. = +/-	0.0315	Average Diff. = +/-	0.0262	Average Diff. = +/-	0.0315
			% Water Balance =	-0.03	% Water Balance =	0.30	% Water Balance =	-0.05	% Water Balance =	0.30

The percent water balance at the bottom of Table 4-1 is a measure of the difference between water coming into and going out of the model. The water balance evaluates how well the model distributes water during the simulation. Modeling runs with water balances less than 1 percent were considered acceptable.

A printout of the final steady state, non-pumping calibration has been included as Appendix A. Note that 1000 feet must be added to all of the ground water elevations presented on the model printouts, (e.g., 411.50 should be 1411.50).

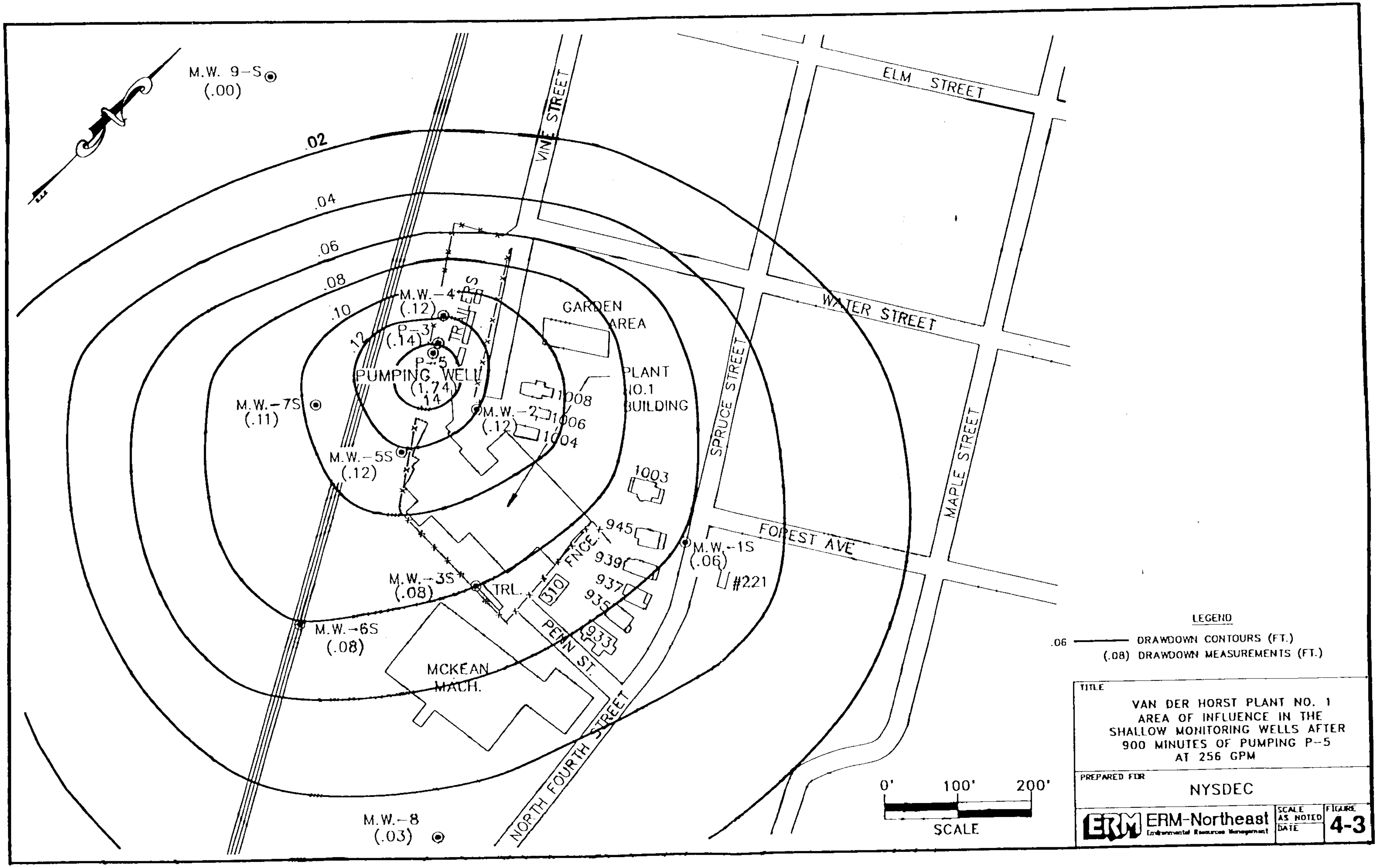
Steady state calibration was also conducted using constant flux nodes for the upgradient boundary. Constant flow from each upgradient boundary node was estimated from flow which occurred during the steady state calibration. The average difference between measured and simulated heads for the constant flux calibration was +/- 0.032 feet.

Transient flow calibrations were also run for constant head and constant flux boundary conditions. Transient flow was simulated for a period of 1 year. Head summary data in Table 4-1 indicate that steady state and transient results were identical for constant head and constant flux, respectively.

4.3 900-Minute Pumping Test Calibration

Following steady state, non-pumping calibration, the model was calibrated to a 900-minute pumping test. This calibration was used to evaluate how well the model simulated transient flow during stressed conditions. The results from the steady state calibration were used for the initial head of the model simulation. The model calibration compared simulated drawdown versus drawdown measured during the December 5, 1990 pumping test of well P-5. Constant head nodes were used for the upgradient and downgradient boundaries. A printout of the pumping test calibration can be found in Appendix B. Figures 4-3 and 4-4 show pumping test drawdown contours based on measured water levels and Figure 4-5 is a map of the simulated pumping test drawdown.

Table 4-2 compares measured versus simulated drawdown results. In general, wells near P-5 had the smallest percent difference between measured and modelled drawdown. Wells MW-6D, MW-8 and MW-9D were the three furthest wells from P-5 and had the highest percent difference between measured and simulated results. The average difference between measured and simulated drawdown in wells near P-5 was 0.031 feet; however, the average difference drops to 0.015 feet if MW-6D, MW-8 and MW-9D are not included.



M.W. 9-S
(.00)
.02
.04
.06
.08
.10
.12
.14
M.W.-4
(.12)
P-3
(.14)
P-5
PUMPING WELL
(1.74)
M.W.-7S
(.11)
M.W.-5S
(.12)
M.W.-2
(.12)
M.W.-3S
(.08)
M.W.-6S
(.08)
M.W.-1S
(.06)
M.W.-8
(.03)
TRAILERS
TRL.
FNCE.
GARDEN AREA
PLANT NO.1 BUILDING
1008
1006
1004
1003
945
939
937
935
933
310
#221
MCKEAN MACH.
VINE STREET
ELM STREET
WATER STREET
SPRUCE STREET
MAPLE STREET
FOREST AVE
PENN ST.
NORTH FOURTH STREET
0'
100'
200'
SCALE
LEGEND
.06 DRAWDOWN CONTOURS (FT.)
(.08) DRAWDOWN MEASUREMENTS (FT.)
TITLE
VAN DER HORST PLANT NO. 1
AREA OF INFLUENCE IN THE
SHALLOW MONITORING WELLS AFTER
900 MINUTES OF PUMPING P-5
AT 256 GPM
PREPARED FOR
NYSDEC
ERM-Northeast
Environmental Resources Management
SCALE AS NOTED
DATE
FIGURE 4-3

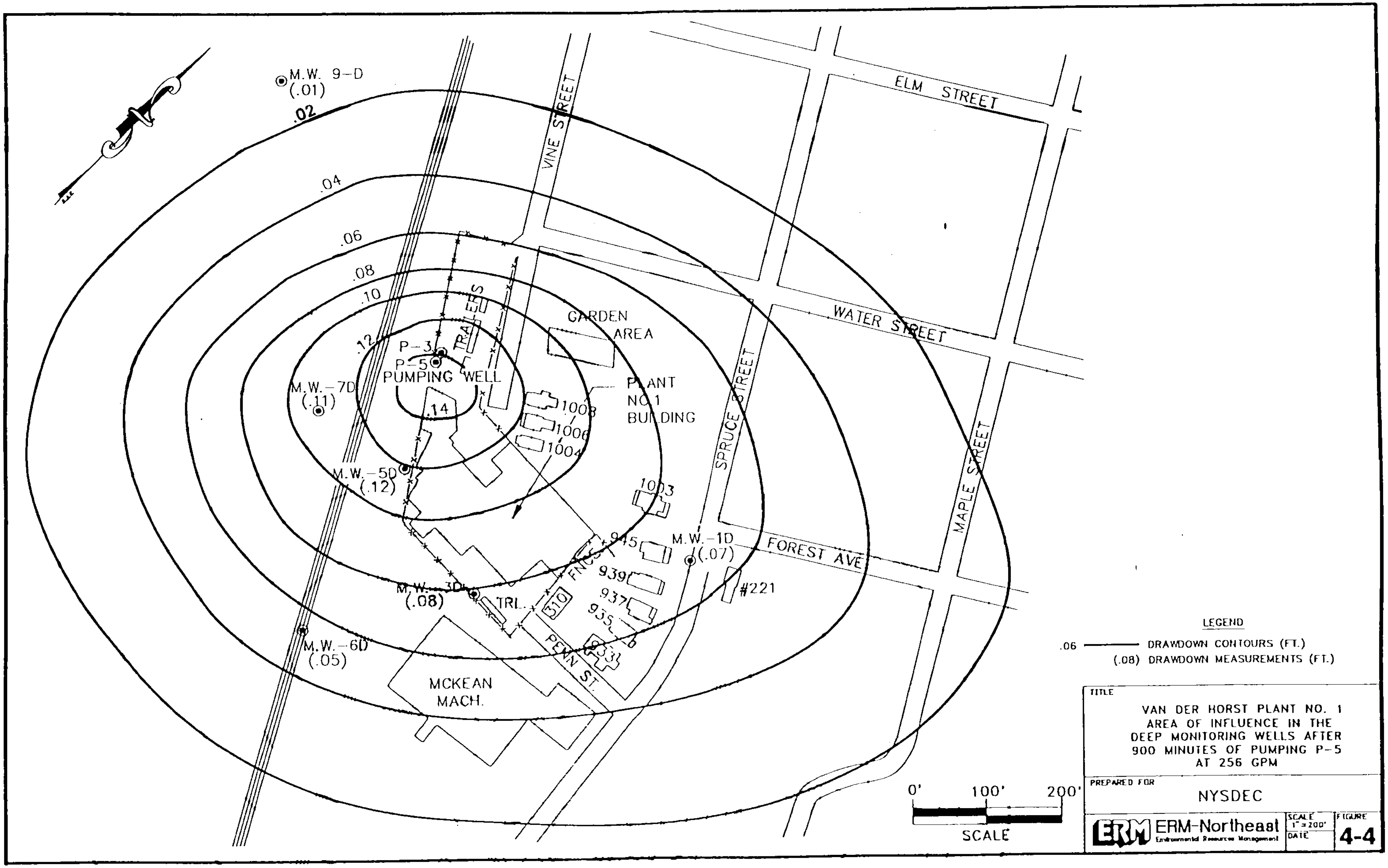
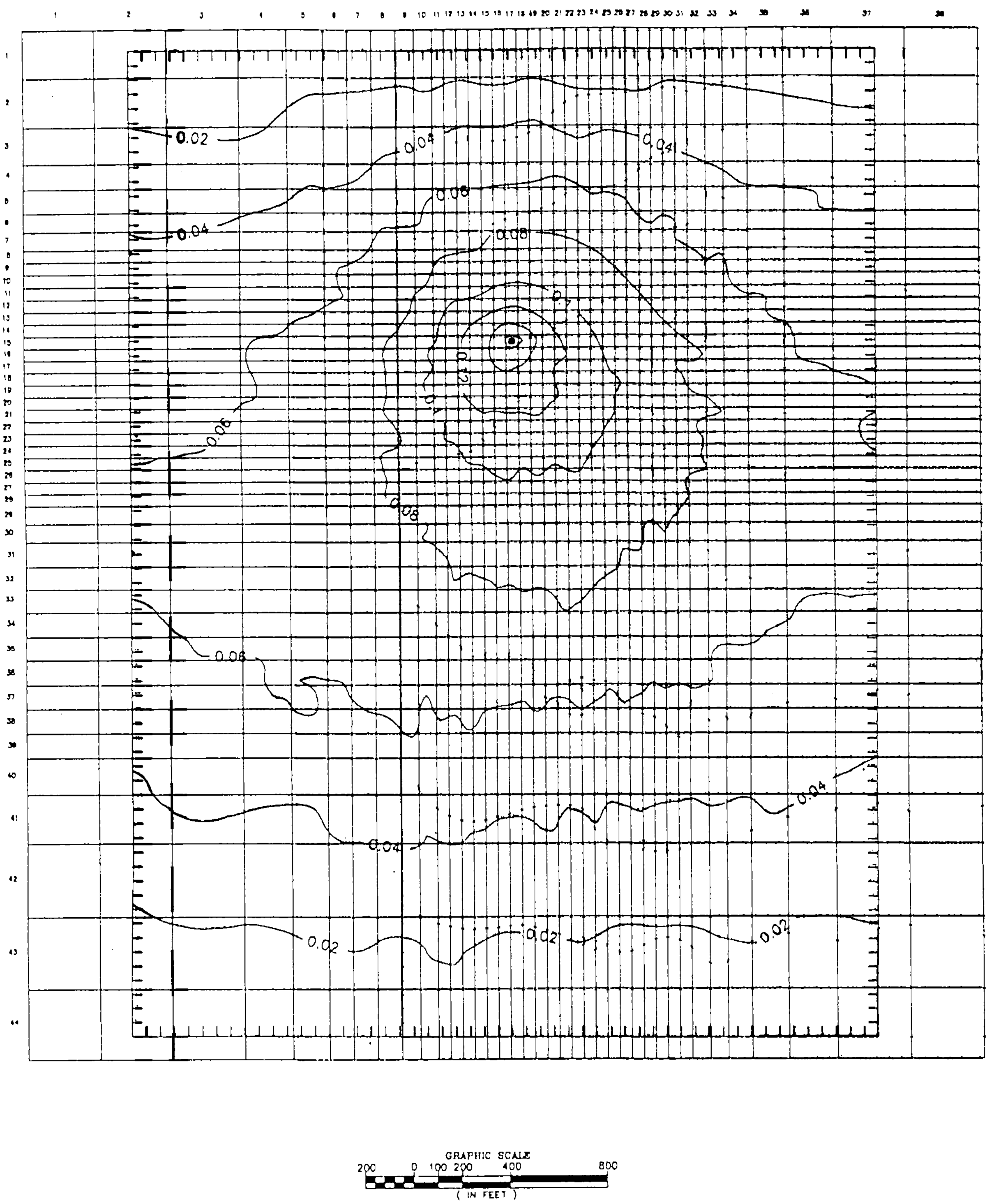

M.W. 9-D
(.01)
.02
.04
.06
.08
.10
.12
.14
P-3
P-5
PUMPING WELL
M.W.-7D
(.11)
M.W.-5D
(.12)
M.W.-3D
(.08)
M.W.-6D
(.05)
M.W.-1D
(.07)
TRAILERS
GARDEN
AREA
PLANT
NO 1
BUILDING
1008
1006
1004
1003
945
939
937
935
931
310
#221
TRL.
FNCE
PENN ST.
MCKEAN
MACH.
VINE STREET
ELM STREET
WATER STREET
SPRUCE STREET
MAPLE STREET
FOREST AVE
0' 100' 200'
SCALE
LEGEND
.06 DRAWDOWN CONTOURS (FT.)
(.08) DRAWDOWN MEASUREMENTS (FT.)
TITLE
VAN DER HORST PLANT NO. 1
AREA OF INFLUENCE IN THE
DEEP MONITORING WELLS AFTER
900 MINUTES OF PUMPING P-5
AT 256 GPM
PREPARED FOR
NYSDEC
ERM-Northeast
Environmental Resources Management
SCALE 1" = 200'
DATE
FIGURE
4-4

Figure 4-5

Simulated Drawdown for 900 Minute Pumping Test at 256 gpm



– 0.02 – Recovery Well Drawdown (ft)

• Recovery Well

Table 4-2

900 MINUTE PUMPING TEST CALIBRATIONS

		M	1			2		
			Constant Head Pumping Calibration File: PDCALOUT.05			Constant Flux Pumping Calibration		
Monitoring Well	Grid Location	Measured Draw. 12/6/90 (Feet)	Calibration Drawdown (Feet)	1 - M Calib - Meas (Feet)	Calib vs Meas % diff	Calibration Drawdown (Feet)	2 - M Flux - Meas (Feet)	Calib vs Meas % diff
MW-1D	20,7	0.07	0.084	0.014	20.000	0.213	0.143	204.286
MW-3D	23,13	0.08	0.099	0.019	23.750	0.219	0.139	173.750
MW-4	15,15	0.12	0.139	0.019	15.833	0.254	0.134	111.667
MW-5D	20,15	0.12	0.128	0.008	6.667	0.244	0.124	103.333
MW-6D	25,17	0.05	0.098	0.048	96.000	0.212	0.162	324.000
MW-7D	19,18	0.11	0.126	0.016	14.545	0.238	0.128	116.364
MW-8	30,12	0.03	0.073	0.043	143.333	0.196	0.166	553.333
MW-9D	10,22	0.01	0.090	0.080	800.000	0.183	0.173	1730.000
MW-10	36,15	NA	0.057	NA	NA	0.176	NA	NA
MW-11D	25,25	NA	0.092	NA	NA	0.189	NA	NA
MW-12	21,4	NA	0.059	NA	NA	0.198	NA	NA
MW-13	7,4	NA	0.051	NA	NA	0.176	NA	NA
MW-14	20,22	NA	0.110	NA	NA	0.216	NA	NA
USGS-5D	4,19	NA	0.060	NA	NA	0.148	NA	NA
			Average Diff. = +/-	0.031	Ave % Diff 140.016	Average Diff. = +/-	0.146	Ave % Diff 414.592
			% Water Balance =	0.01		% Water Balance =	-0.03	

difference between measured and simulated drawdown for the constant flux calibrations was .146 feet.

4.4 Comparison of Constant Head versus Constant Flux Model Boundaries

Calibrations with constant head boundaries were slightly better at simulating ground water head during no stress conditions than the constant flux upgradient boundary condition. The average head difference between simulated and measured head was +/- 0.026 feet for constant head boundaries and +/- 0.032 feet for the constant flux upgradient boundary scenario.

The greatest difference between the two boundary scenarios occurred during the pumping test calibration. The average head difference between simulated and measured drawdown was 0.031 feet for constant head boundaries and 0.146 feet for constant flux upgradient boundary scenario. Thus, constant head boundaries were used for recovery well simulations.

5.0 SENSITIVITY ANALYSIS

5.1 General Methodology

Sensitivity analysis was conducted on the model calibrations to evaluate the relative effect of input parameters on predicted water levels or drawdown. One input parameter was changed for each sensitivity run. Transmissivity and recharge were adjusted to test parameter sensitivity for steady state calibrations. Transmissivity, recharge and storativity were adjusted for transient flow calibrations.

Sensitivity was analyzed in the following four calibrations:

- Steady State - Constant Head - No Pumping;
- Steady State - Upgradient Constant Flux - No Pumping;
- Transient Flow - Constant Head - No Pumping; and
- Transient Flow - Constant Head - 900-Minute Pumping Test

5.2 Steady State - Constant Head - No Pumping

The following four sensitivity tests were run for the steady state, constant head, no pumping scenario:

1) Transmissivity / 2; Recharge Constant
2) Transmissivity Constant; Recharge / 2
3) Transmissivity X 2; Recharge Constant
4) Transmissivity Constant; Recharge X 2

In each case the transmissivity or recharge were divided or multiplied by 2 in order to evaluate the relative head differences predicted by the model. The resultant heads for these sensitivity runs are presented on Table 5-1.

Cases 2 and 3 produced identical results with an average head difference between these sensitivity runs and the calibrated steady state condition of 0.0285 feet. Cases 1 and 4 showed a similar corresponding relationship with an average head difference between the sensitivity runs and the calibrated condition of 0.0715 feet.

5.3 Steady State - Constant Flux - No Pumping

Four sensitivity analyses were also conducted for the steady state, constant flux, no pumping condition. Transmissivity or recharge were multiplied or divided by 2 for each run. Simulation results are shown in Table 5-2. These data indicate that changing the recharge produced a smaller head difference than changing the transmissivity. Multiplying or dividing the transmissivity by 2 yielded respective head differences of -1.1815 and 1.9354 feet while multiplying or dividing by 2 yielded respective head differences of 0.400 and 0.3015 feet.

Table 5-1

STEADY STATE, NO PUMPING SENSITIVITY ANALYSES

Monitoring Well	Grid Location	Measured Head 4/3/91 (Feet)	Steady State Calibration File: OUTPUT.91 Model Head (Feet)	Mod - Meas (Feet)	1st Sensativity Analysis T = 2 X Calib. Model Head (Feet)	Mod - Meas (Feet)	2nd Sensativity Analysis T = 0.5 X Calib. Model Head (Feet)	Mod - Meas (Feet)	3rd Sensativity Analysis Rech = 2 X Calib. Model Head (Feet)	Mod - Meas (Feet)	4th Sensativity Analysis Rech = 0.5 X Calib. Model Head (Feet)	Mod - Meas (Feet)
MW-1D	20,7	1411.25	1411.29	0.04	1411.27	0.02	1411.34	0.09	1411.34	0.09	1411.27	0.02
MW-3D	23,13	1411.20	1411.22	0.02	1411.20	0.00	1411.29	0.09	1411.29	0.09	1411.20	0.00
MW-4	15,15	1411.15	1411.19	0.04	1411.17	0.02	1411.26	0.11	1411.26	0.11	1411.17	0.02
MW-5D	20,15	1411.21	1411.19	-0.02	1411.18	-0.03	1411.27	0.06	1411.27	0.06	1411.18	-0.03
MW-7D	19,18	1411.19	1411.16	-0.03	1411.14	-0.05	1411.24	0.05	1411.24	0.05	1411.14	-0.05
MW-8	30,12	1411.23	1411.24	0.01	1411.23	0.00	1411.31	0.08	1411.31	0.08	1411.23	0.00
MW-9D	10,22	1410.98	1411.03	0.05	1411.00	0.02	1411.09	0.11	1411.09	0.11	1411.00	0.02
MW-10	36,15	1411.22	1411.21	-0.01	1411.19	-0.03	1411.28	0.06	1411.28	0.06	1411.19	-0.03
MW-11D	25,25	1411.02	1411.00	-0.02	1410.98	-0.04	1411.10	0.08	1411.10	0.08	1410.98	-0.04
MW-12	21,4	1411.33	1411.34	0.01	1411.33	0.00	1411.39	0.06	1411.39	0.06	1411.33	0.00
MW-13	7,4	1411.34	1411.34	0.00	1411.32	-0.02	1411.38	0.04	1411.38	0.04	1411.32	-0.02
MW-14	20,22	1411.16	1411.11	-0.05	1411.09	-0.07	1411.20	0.04	1411.20	0.04	1411.09	-0.07
USGS-5D	4,19	1411.06	1411.02	-0.04	1410.99	-0.07	1411.12	0.06	1411.12	0.06	1410.99	-0.07
			Average Diff. = +/-	0.0262	Average Diff. = +/-	0.0285	Average Diff. = +/-	0.0715	Average Diff. = +/-	0.0715	Average Diff. = +/-	0.0285
			% Water Balance =	-0.03	% Water Balance =	-0.78	% Water Balance =	-0.03	% Water Balance =	-0.03	% Water Balance =	-0.78

Table 5-2

STEADY STATE, CONSTANT FLUX, NO PUMPING SENSITIVITY ANALYSES

Monitoring Well	Grid Location	Measured Head 4/3/91 (Feet)	Constant Flux Steady State Calibration: Flux Head (Feet)	Constant Flux Steady State Calibration: Flux - Meas (Feet)	1st Sensitivity Analysis T = 2 X Calib.: Model Head (Feet)	1st Sensitivity Analysis T = 2 X Calib.: Mod - Flux (Feet)	2nd Sensitivity Analysis T = 0.5 X Calib.: Model Head (Feet)	2nd Sensitivity Analysis T = 0.5 X Calib.: Mod - Flux (Feet)	3rd Sensitivity Analysis Rech = 2 X Calib.: Model Head (Feet)	3rd Sensitivity Analysis Rech = 2 X Calib.: Mod - Flux (Feet)	4th Sensitivity Analysis Rech = 0.5 X Calib.: Model Head (Feet)	4th Sensitivity Analysis Rech = 0.5 X Calib.: Mod - Flux (Feet)
MW-1D	20,7	1411.25	1411.31	0.06	1410.07	-1.24	1413.33	2.02	1411.71	0.40	1410.88	-0.43
MW-3D	23,13	1411.20	1411.24	0.04	1410.04	-1.20	1413.20	1.96	1411.64	0.40	1410.82	-0.42
MW-4	15,15	1411.15	1411.21	0.06	1410.02	-1.19	1413.16	1.95	1411.62	0.41	1410.80	-0.41
MW-5D	20,15	1411.21	1411.22	0.01	1410.03	-1.19	1413.16	1.94	1411.62	0.40	1410.80	-0.42
MW-7D	19,18	1411.19	1411.18	-0.01	1410.01	-1.17	1413.09	1.91	1411.58	0.40	1410.77	-0.41
MW-8	30,12	1411.23	1411.26	0.03	1410.04	-1.22	1413.23	1.97	1411.65	0.39	1410.83	-0.43
MW-9D	10,22	1410.98	1411.05	0.07	1409.95	-1.10	1412.87	1.82	1411.45	0.40	1410.66	-0.39
MW-10	36,15	1411.22	1411.21	-0.01	1410.02	-1.19	1413.15	1.94	1411.61	0.40	1410.79	-0.42
MW-11D	25,25	1411.02	1411.03	0.01	1409.94	-1.09	1412.81	1.78	1411.41	0.38	1410.64	-0.39
MW-12	21,4	1411.33	1411.37	0.04	1410.09	-1.28	1413.43	2.06	1411.76	0.39	1410.93	-0.44
MW-13	7,4	1411.34	1411.36	0.02	1410.10	-1.26	1413.46	2.10	1411.78	0.42	1410.94	-0.42
MW-14	20,22	1411.16	1411.13	-0.03	1409.99	-1.14	1413.01	1.88	1411.53	0.40	1410.73	-0.40
USGS-5D	4,19	1411.06	1411.04	-0.02	1409.95	-1.09	1412.87	1.83	1411.45	0.41	1410.66	-0.38
			Average Diff. = +/-	0.0315	Average Diff. = +/-	1.1815	Average Diff. = +/-	1.9354	Average Diff. = +/-	0.4000	Average Diff. = +/-	0.4123
			% Water Balance =	0.30	% Water Balance =	-0.84	% Water Balance =	0.17	% Water Balance =	0.45	% Water Balance =	-0.72

5.4 Transient Flow - Constant Head - No Pumping

Six sensitivity runs were conducted on the transient flow, constant head, no pumping condition by multiplying or dividing transmissivity, recharge or storativity by 2. Sensitivity analysis data are presented in Table 5-3. The model sensitivity to changes in transmissivity and recharge was fairly similar to the steady state, constant head calibration. Changes in storativity had little effect on the model heads.

5.5 Transient Flow - Constant Head - 900-Minute Pumping Test

Six sensitivity analyses were conducted on the pumping test calibration by multiplying or dividing transmissivity, recharge or storativity by 10. Each parameter was multiplied by 10 instead of by 2 because of the small head differences which occurred when multiplying by 2. These data are listed in Table 5-4. Changes in storativity had the least impact on predicted drawdown. Drawdown changes were -0.042 feet and 0.016 feet respectively, when storativity was multiplied and divided by 10. Small drawdown differences were also observed when transmissivity was multiplied by 10 (-0.031 feet) or recharge was divided by 10 (-0.056 feet). The greatest difference in drawdown occurred when transmissivity

Table 5-3

TRANSIENT FLOW, NO PUMPING SENSITIVITY ANALYSES

			Transient Flow Calibration		1st Sensitivity Analysis T = 2 X Calib.		2nd Sensitivity Analysis T = 0.5 X Calib.		3rd Sensitivity Analysis Recharge = 2 X Calib.		4th Sensitivity Analysis Recharge = 0.5 X Calib.		5th Sensitivity Analysis Storativity = 2 X Calib.		6th Sensitivity Analysis Storativity = 0.5 X Calib	
Monitoring Well	Grid Location	Measured Head 4/3/91 (Feet)	Transient Head (Feet)	Trans - Meas (Feet)	Model Head (Feet)	Mod - Trans (Feet)	Model Head (Feet)	Mod - Trans (Feet)	Model Head (Feet)	Mod - Trans (Feet)	Model Head (Feet)	Mod - Trans (Feet)	Model Head (Feet)	Mod - Trans (Feet)	Model Head (Feet)	Mod - Trans (Feet)
MW-1D	20,7	1411.25	1411.29	0.04	1411.27	-0.02	1411.34	0.05	1411.34	0.05	1411.27	-0.02	1411.30	0.01	1411.30	0.01
MW-3D	23,13	1411.20	1411.22	0.02	1411.20	-0.02	1411.29	0.07	1411.29	0.07	1411.20	-0.02	1411.23	0.01	1411.23	0.01
MW-4	15,15	1411.15	1411.19	0.04	1411.17	-0.02	1411.26	0.07	1411.26	0.07	1411.17	-0.02	1411.20	0.01	1411.20	0.01
MW-5D	20,15	1411.21	1411.19	-0.02	1411.18	-0.01	1411.27	0.08	1411.27	0.08	1411.18	-0.01	1411.21	0.02	1411.21	0.02
MW-7D	19,18	1411.19	1411.16	-0.03	1411.14	-0.02	1411.24	0.08	1411.24	0.08	1411.14	-0.02	1411.17	0.01	1411.17	0.01
MW-8	30,12	1411.23	1411.24	0.01	1411.22	-0.02	1411.31	0.07	1411.31	0.07	1411.22	-0.02	1411.25	0.01	1411.25	0.01
MW-9D	10,22	1410.98	1411.03	0.05	1411.00	-0.03	1411.13	0.10	1411.13	0.10	1411.00	-0.03	1411.04	0.01	1411.04	0.01
MW-10	36,15	1411.22	1411.21	-0.01	1411.19	-0.02	1411.28	0.07	1411.28	0.07	1411.19	-0.02	1411.22	0.01	1411.22	0.01
MW-11D	25,25	1411.02	1411.00	-0.02	1410.98	-0.02	1411.10	0.10	1411.10	0.10	1410.98	-0.02	1411.02	0.02	1411.02	0.02
MW-12	21,4	1411.33	1411.34	0.01	1411.33	-0.01	1411.39	0.05	1411.39	0.05	1411.33	-0.01	1411.35	0.01	1411.35	0.01
MW-13	7,4	1411.34	1411.34	0.00	1411.32	-0.02	1411.38	0.04	1411.38	0.04	1411.32	-0.02	1411.34	0.00	1411.34	0.00
MW-14	20,22	1411.16	1411.11	-0.05	1411.09	-0.02	1411.20	0.09	1411.20	0.09	1411.09	-0.02	1411.12	0.01	1411.12	0.01
USGS-5D	6,19	1411.06	1411.02	-0.04	1410.99	-0.03	1411.12	0.10	1411.12	0.10	1410.99	-0.03	1411.04	0.02	1411.03	0.01
			Average Diff. = +/-	0.0262	Average Diff. = +/-	0.0200	Average Diff. = +/-	0.0746	Average Diff. = +/-	0.0746	Average Diff. = +/-	0.0200	Average Diff. = +/-	0.0115	Average Diff. = +/-	0.0108
			% Water Balance =	-0.05	% Water Balance =	-0.09	% Water Balance =	0.05	% Water Balance =	0.17	% Water Balance =	-0.13	% Water Balance =	-0.71	% Water Balance =	0.04

Table 5-4

900 MINUTE PUMPING SENSITIVITY ANALYSES

Pumping Test Calibration, File: PDCALOUT.05
1st Sensitivity Analysis: T = 10 X Calib.
2nd Sensitivity Analysis: T = 0.1 X Calib.
3rd Sensitivity Analysis: Recharge = 10 X Calib.
4th Sensitivity Analysis: Recharge = 0.1 X Calib.
5th Sensitivity Analysis: Storativity = 10 X Calib
6th Sensitivity Analysis: Storativity = 0.1 X Calib

Monitoring Well	Grid Location	Measured Draw. 12/6/90 (Feet)	Calibration Drawdown (Feet)	Calib - Meas (Feet)	Calib vs Meas % diff	1st: Model Drawdown (Feet)	1st: Mod - Calib (Feet)	2nd: Model Drawdown (Feet)	2nd: Mod - Calib (Feet)	3rd: Model Drawdown (Feet)	3rd: Mod - Calib (Feet)	4th: Model Drawdown (Feet)	4th: Mod - Calib (Feet)	5th: Model Drawdown (Feet)	5th: Mod - Calib (Feet)	6th: Model Drawdown (Feet)	6th: Mod - Calib (Feet)
MW-1D	20,7	0.07	0.084	0.014	20.000	0.056	-0.028	0.408	0.324	-0.268	-0.352	0.128	0.044	0.055	-0.029	0.097	0.013
MW-3D	23,13	0.08	0.099	0.019	23.750	0.061	-0.038	0.545	0.446	-0.325	-0.424	0.153	0.054	0.065	-0.034	0.116	0.017
MW-4	15,15	0.12	0.139	0.019	15.833	0.071	-0.068	1.009	0.870	-0.313	-0.452	0.206	0.067	0.111	-0.028	0.166	0.027
MW-5D	20,15	0.12	0.128	0.008	6.667	0.073	-0.055	0.808	0.680	-0.319	-0.447	0.190	0.062	0.097	-0.031	0.151	0.023
MW-6D	25,17	0.05	0.098	0.048	96.000	0.067	-0.031	0.464	0.366	-0.367	-0.465	0.154	0.056	0.059	-0.039	0.114	0.016
MW-7D	19,18	0.11	0.126	0.016	14.545	0.074	-0.052	0.783	0.657	-0.357	-0.483	0.191	0.065	0.091	-0.035	0.149	0.023
MW-8	30,12	0.03	0.073	0.043	143.333	0.055	-0.018	0.257	0.184	-0.332	-0.405	0.118	0.045	0.036	-0.037	0.084	0.011
MW-9D	10,22	0.01	0.090	0.080	800.000	0.083	-0.007	0.256	0.166	-0.531	-0.621	0.154	0.064	0.037	-0.053	0.102	0.012
MW-10	36,15	NA	0.057	NA	NA	0.059	0.002	0.025	-0.032	-0.382	-0.439	0.100	0.043	0.015	-0.042	0.063	0.006
MW-11D	25,25	NA	0.092	NA	NA	0.081	-0.011	0.261	0.169	-0.499	-0.591	0.154	0.062	0.039	-0.053	0.105	0.013
MW-12	21,4	NA	0.059	NA	NA	0.042	-0.017	0.241	0.182	-0.221	-0.280	0.092	0.033	0.035	-0.024	0.068	0.009
MW-13	7,4	NA	0.051	NA	NA	0.036	-0.015	0.066	0.015	-0.263	-0.314	0.068	0.017	0.012	-0.039	0.042	-0.009
MW-14	20,22	NA	0.110	NA	NA	0.073	-0.037	0.579	0.469	-0.415	-0.525	0.174	0.064	0.067	-0.043	0.129	0.019
USGS-5D	4,19	NA	0.060	NA	NA	0.081	0.021	-0.039	-0.099	-0.582	-0.642	0.117	0.057	0.007	-0.053	0.065	0.005
			Average Diff. = +/-	0.031	Ave % Diff 140.016	Average Diff. = +/-	0.031	Average Diff. = +/-	0.358	Average Diff. = +/-	0.495	Average Diff. = +/-	0.056	Average Diff. = +/-	0.042	Average Diff. = +/-	0.016
			% Water Balance =	0.01		% Water Balance =	-0.13	% Water Balance =	-0.01	% Water Balance =	0.00	% Water Balance =	0.00	% Water Balance =	0.02	% Water Balance =	-0.06

was divided by 10 (.358 feet) or recharge was multiplied 10 (-0.495 feet).

5.6 Conclusions from Sensitivity Analysis

The following conclusions have been made base on the sensitivity analysis results:

- Model calibrations with constant flux boundaries appeared to be more sensitive than constant flow boundary calibrations. The greatest head difference in constant flux simulations occurred when transmissivity was modified.
- Constant head calibrations were most affected by decreases in transmissivity and increases in recharge. These two parameter changes generally produced similar head differences.
- In all of the transient flow calibrations changes in storativity produced minor head differences.
- Parameter sensitivity was fairly similar in both steady state and transient calibrations with constant head boundaries.

6.0 RECOVERY WELL SIMULATIONS

6.1 General Methodology

Ground water recovery well simulations were performed by modifying the calibrated pumping test simulation. The simulation length was extended to 1 year and different combinations of recovery wells were evaluated. Four recovery well simulations, employing 1, 3, 4 and 5 wells, have been selected for review in this report. The ground water capture area and recovery well drawdown for each simulation are illustrated in Figures 6-1 to 6-8.

Ground water capture areas were estimated by the ground water elevations produced from the recovery well simulations. Capture area delineation employed the basic premise that ground water flow is perpendicular to ground water elevation contours. Ground water contours were not included in the capture area figures so that the estimated ground water chromium concentration contours could be easily compared with the capture area.

Figure 6-1

Estimated Ground Water Capture Area for 1 Well Pumping at 256 gpm for 1 Year

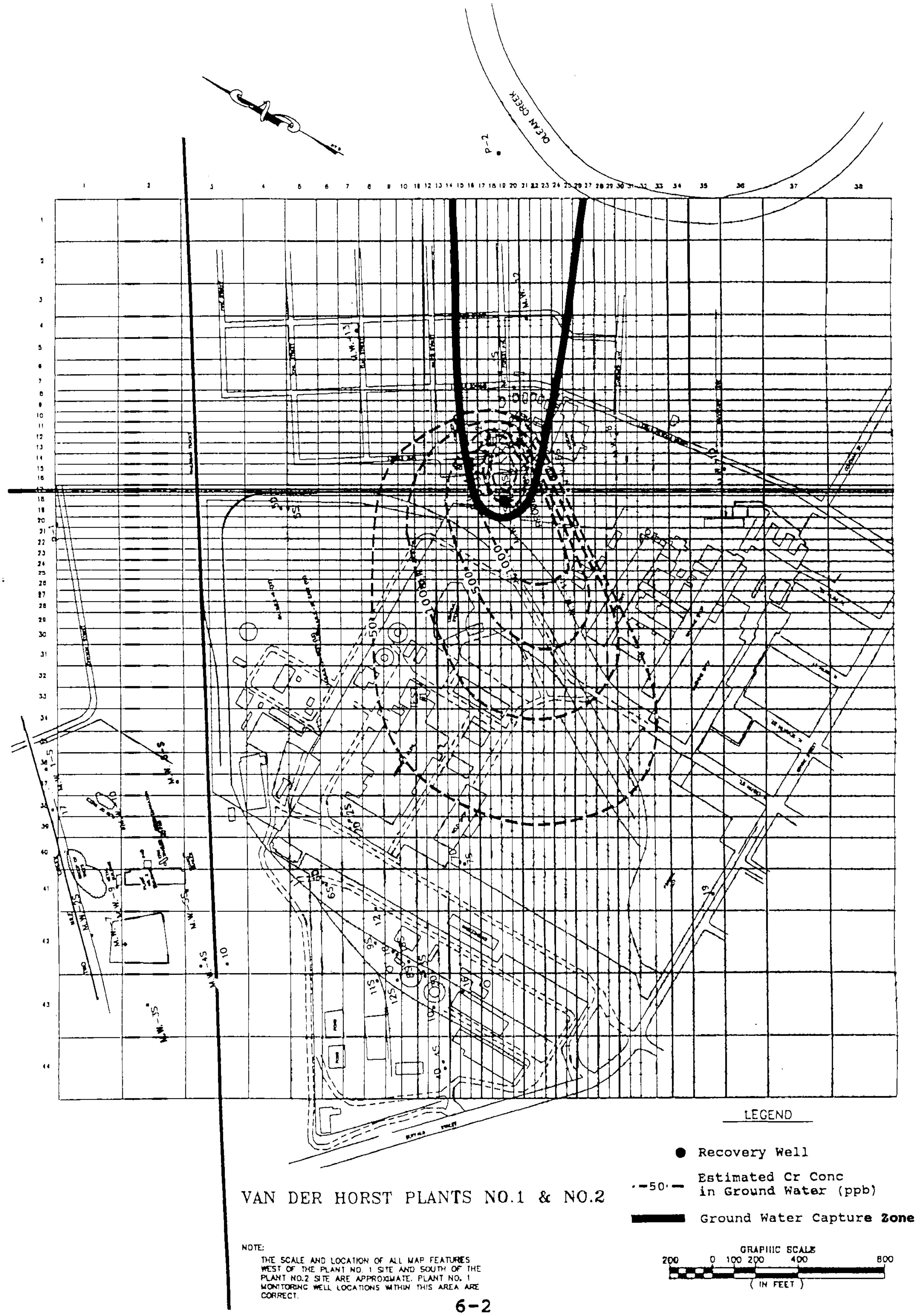
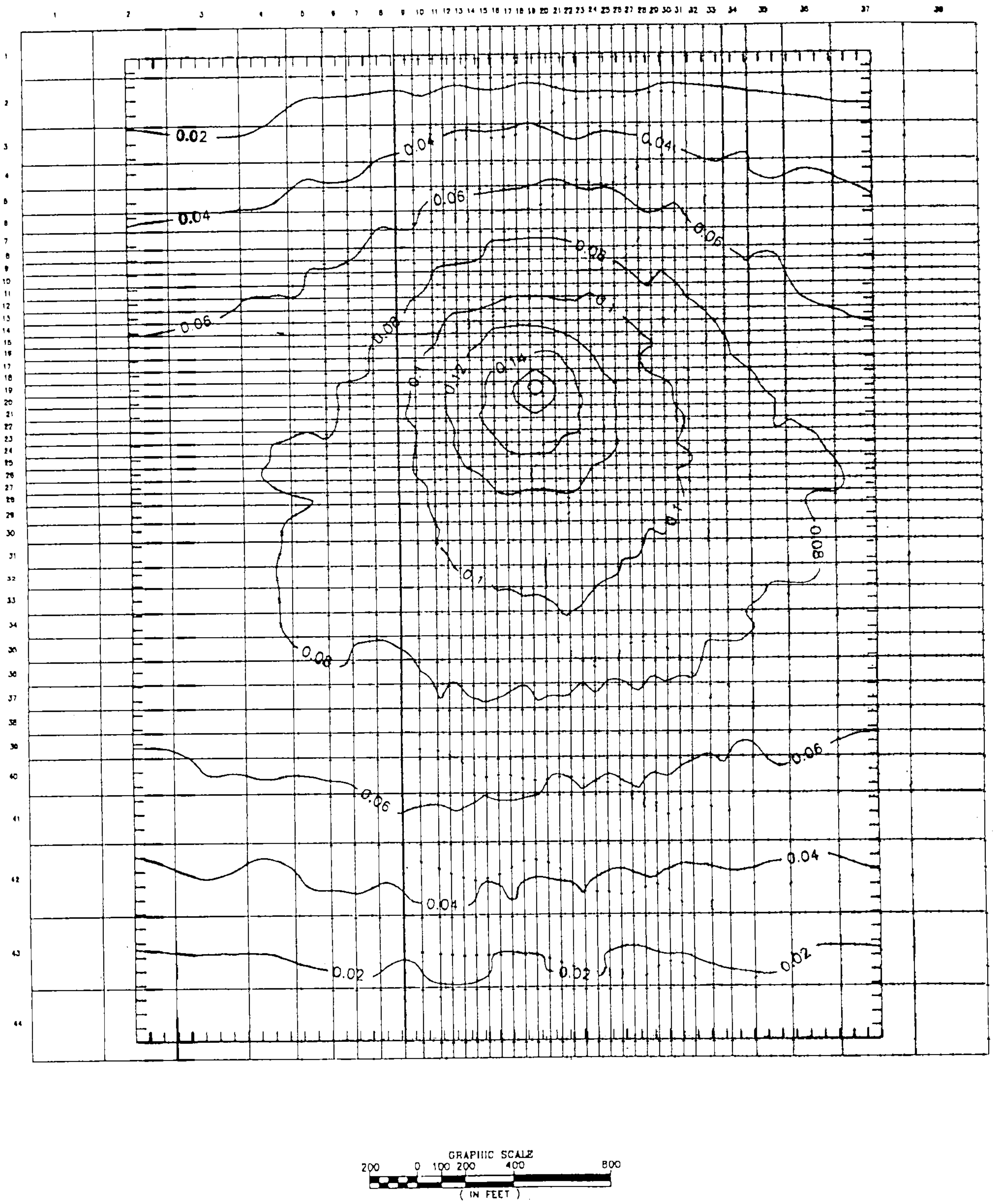


Figure 6-2

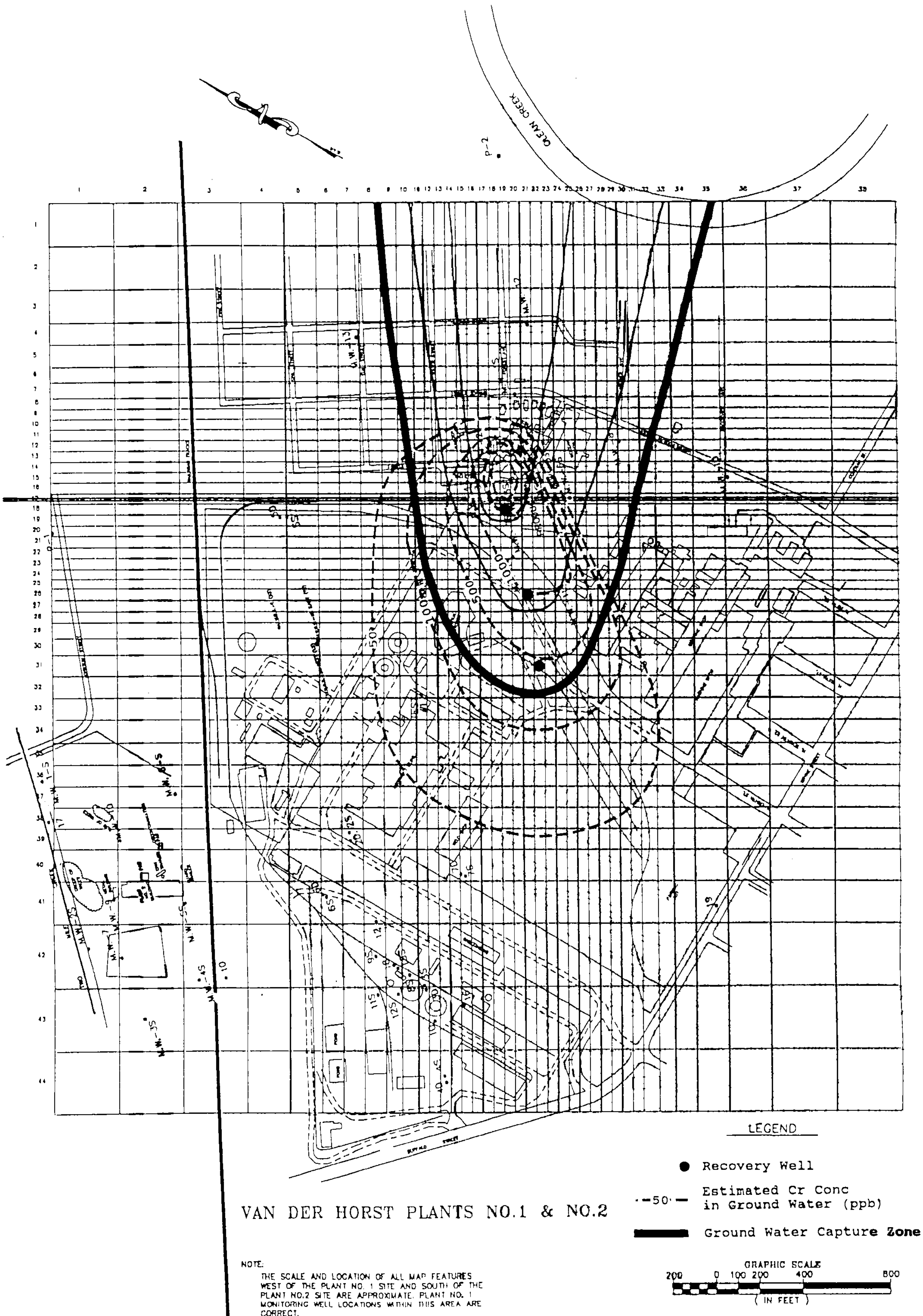
Estimated Drawdown for 1 Well Pumping at 256 gpm for 1 year



- 0.02 - Recovery Well Drawdown (ft)

Figure 6-3

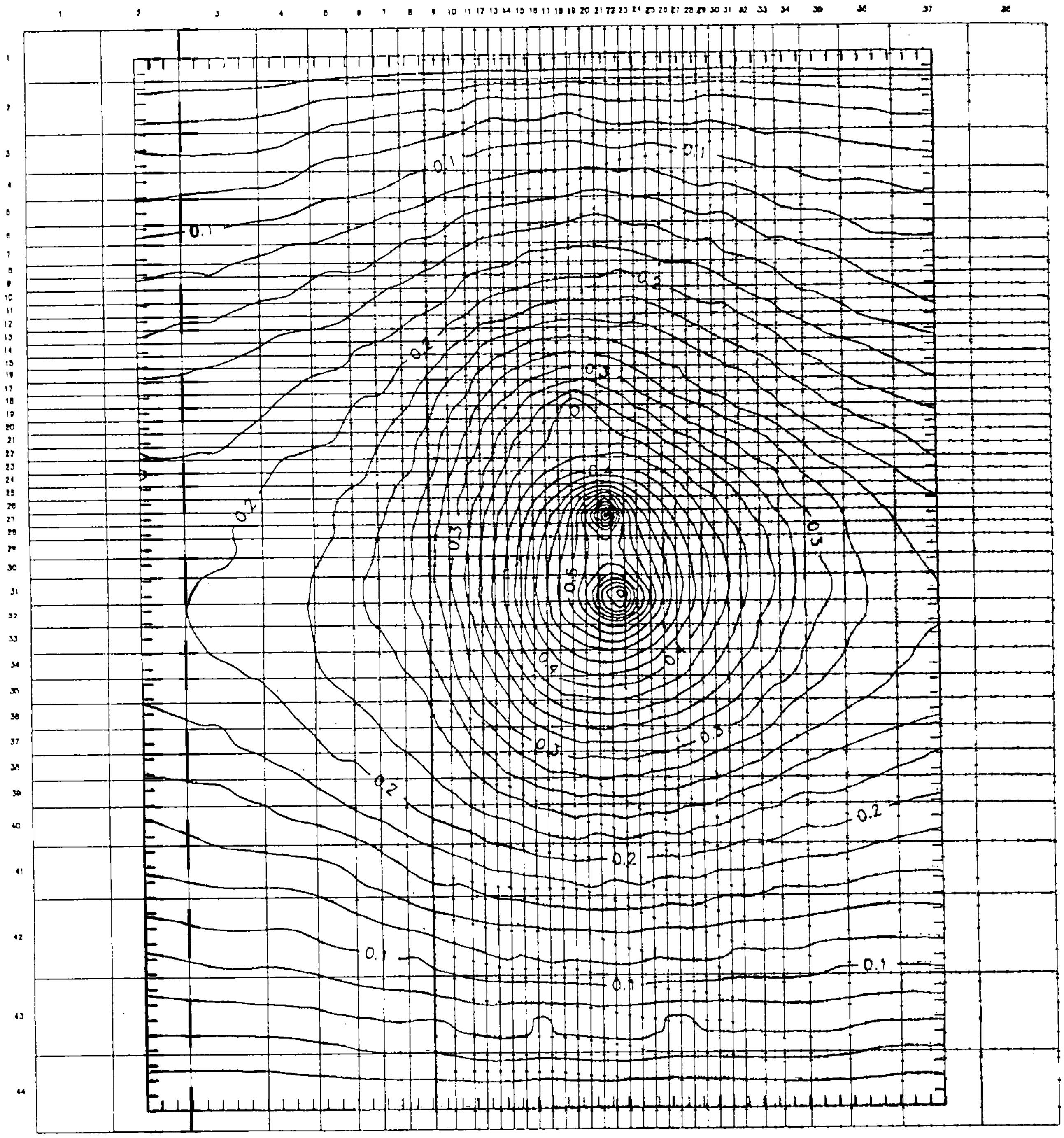
Estimated Ground Water Capture Area for 3 Wells Pumping at 256 gpm for 1 Year



NOTE:
THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO. 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO. 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT.

Figure 6-4

Estimated Drawdown for 3 Wells Pumping at 256 gpm for 1 year

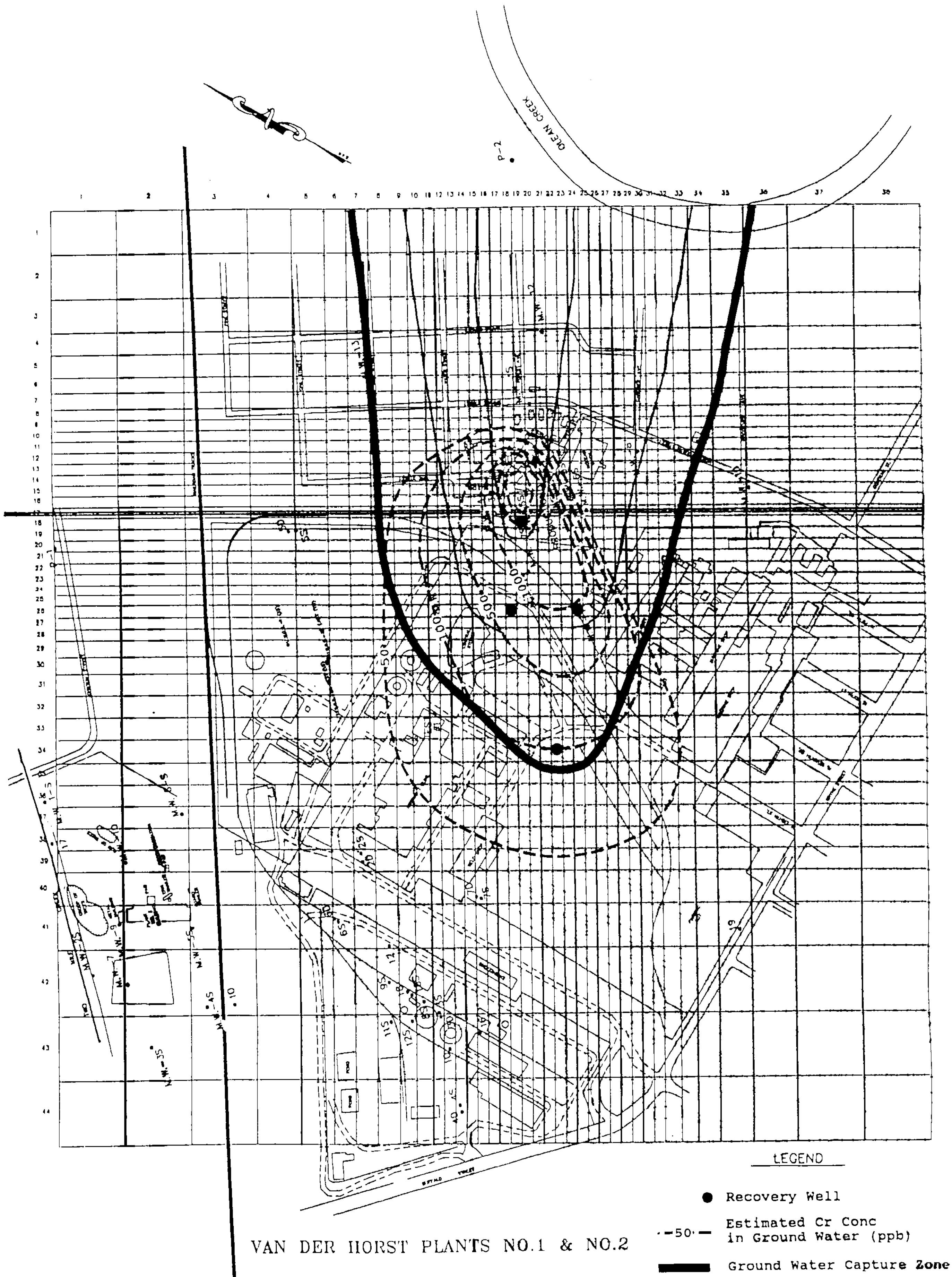


GRAPHIC SCALE
200 0 100 200 400 800
(IN FEET)

- 0.02 - Recovery Well Drawdown (ft)

Figure 6-5

Estimated Ground Water Capture Area for 4 Wells Pumping at 256 gpm for 1 Year

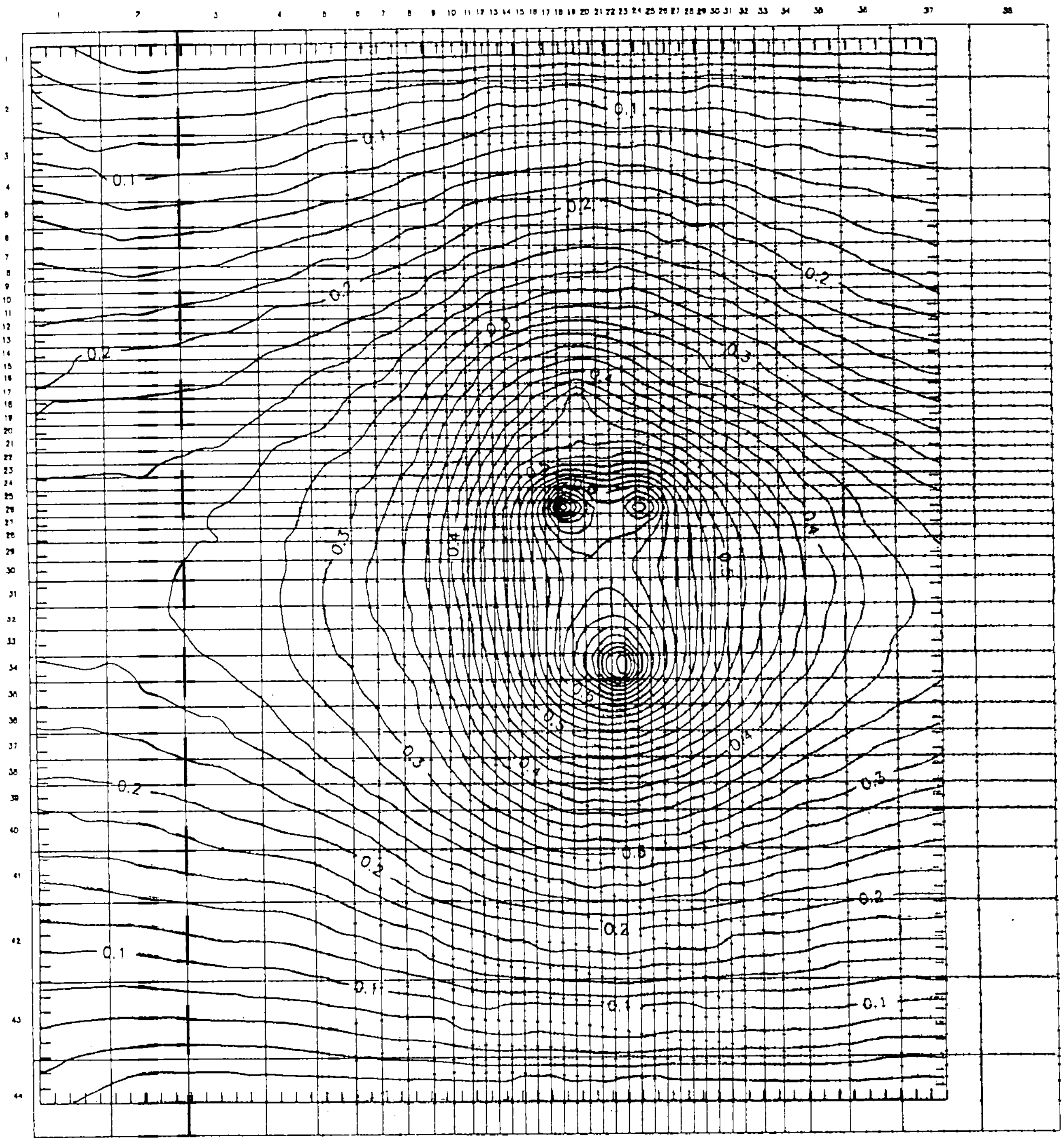


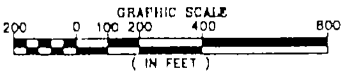
VAN DER HORST PLANTS NO.1 & NO.2

NOTE:
THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO. 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO. 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT.

Figure 6-6

Estimated Drawdown for 4 Wells Pumping at 256 gpm for 1 year

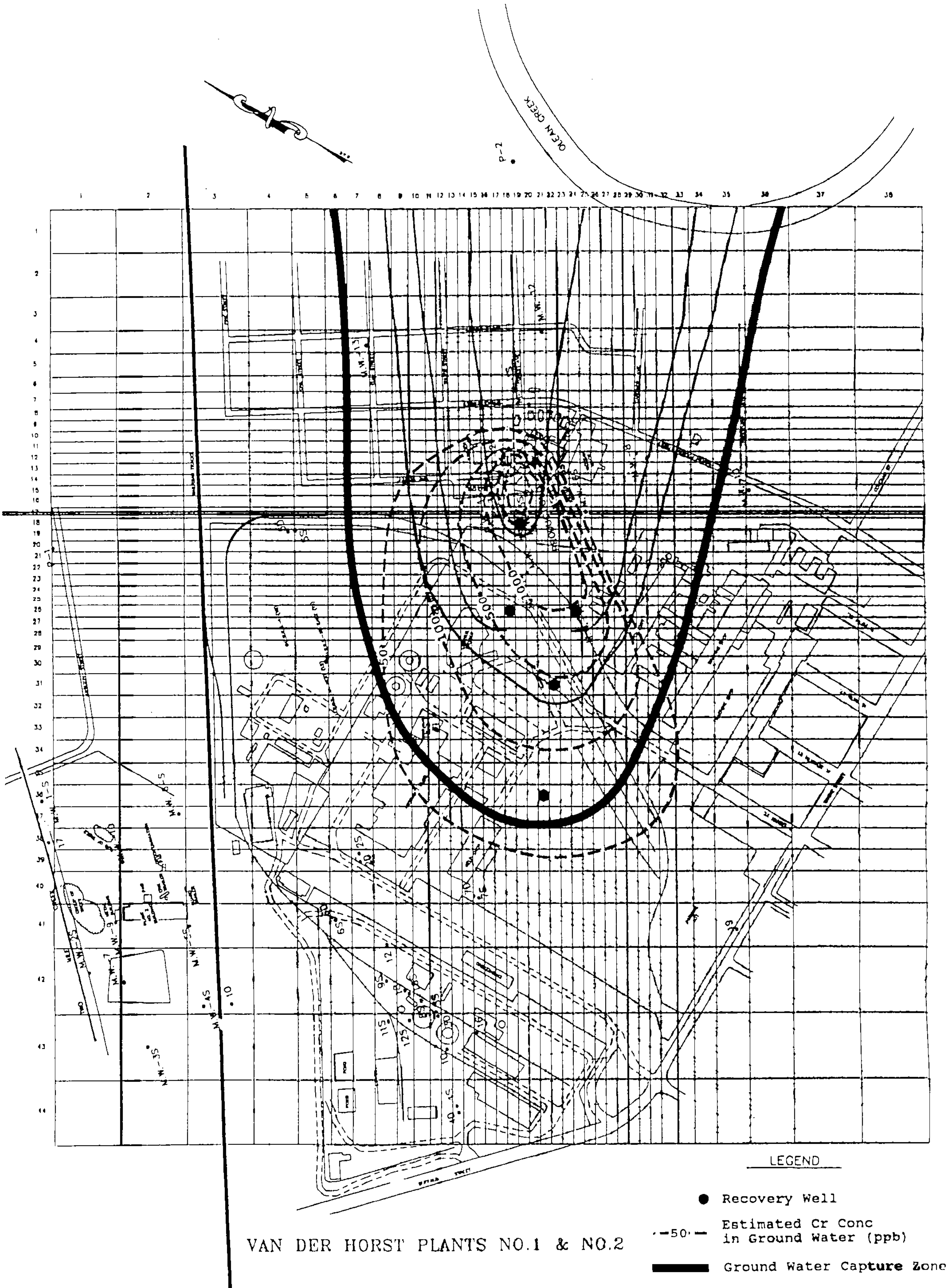




– 0.02 – Recovery Well Drawdown (ft)

Figure 6-7

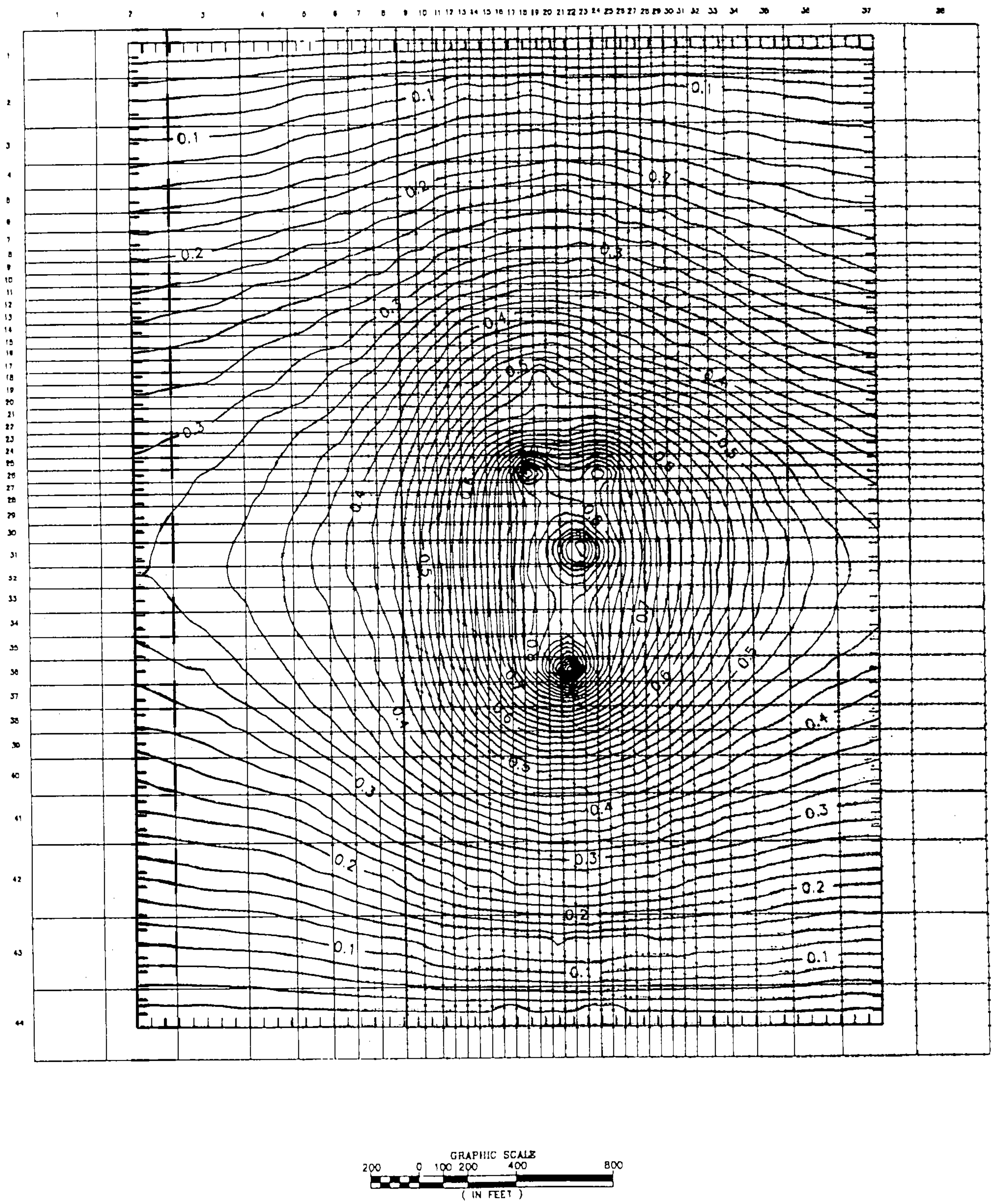
Estimated Ground Water Capture Area for 5 Wells Pumping at 256 gpm for 1 Year



NOTE:
THE SCALE AND LOCATION OF ALL MAP FEATURES WEST OF THE PLANT NO. 1 SITE AND SOUTH OF THE PLANT NO.2 SITE ARE APPROXIMATE. PLANT NO. 1 MONITORING WELL LOCATIONS WITHIN THIS AREA ARE CORRECT.

Figure 6-8

Estimated Drawdown for 5 Wells Pumping at 256 gpm for 1 year



- 0.02 - Recovery Well Drawdown (ft)

A 256 gpm pumping rate was used for each of the wells in the ground water recovery simulations. This discharge is similar to the pumping test discharge. Although several other pumping rates were used for recovery well simulations, an approximate rate of 256 gpm was found to be the best discharge for optimizing the ground water capture area.

6.2 One Recovery Well Simulation

Figure 6-1 shows the estimated ground water capture area of one well pumping at 256 gpm. The recovery well location was close to MW-7D. The capture area appeared to encompass the region of chromium contamination greater than 5,000 ppb. This simulation is important because it appears that the high chromium contamination of the ground water in this region may require special treatment during remediation. Thus, being able to isolate this ground water from the less contaminated ground water will be an objective of the extraction system.

A single recovery well simulation was also conducted for a well near MW-5D. This location did not provide a capture area of sufficient size to recover all of the chromium contaminated ground water greater than 5,000 ppb.

6.3 Three Recovery Well Simulation

The estimated capture zone for the three recovery well scenario (Figure 6-3), each pumped at a rate of 256 gpm, captured most of the chromium contamination greater than 100 ppb. The individual capture area of the recovery well near MW-7D was somewhat smaller than for the single well scenario; however, the well still appeared to collect all of the ground water with chromium contamination levels greater than 5,000 ppb.

6.4 Four Recovery Well Simulation

The four recovery well simulation (each pumping at 256 gpm) seemed to capture almost all of the estimated chromium contamination area greater than 100 ppb, and some of the contamination area between 100 and 50 ppb (see Figure 6-5). The individual capture zone was wider with four wells than with three wells, since the two middle recovery wells were placed parallel to the unstressed ground water flow direction.

The capture area of the recovery well near MW-7D was more narrow than in the three well simulation. However, its capture area was sufficient to extract the majority of the over 5,000 ppb chromium contaminated ground water.

6.5 Five Recovery Well Simulation

The five recovery well simulation (each pumping at 256 gpm) seemed to capture most of the ground water at aquifer chromium levels, greater than 50 ppb (see Figure 6-7). The capture area for the recovery well near MW-7D was slightly wider than in the four well simulation.

7.0 MODEL VERIFICATION

A single well, pumping test model developed by Walton (1987) was used to provide an independent check on drawdown observed in the MODFLOW model. Two, 1 year, 1,000 gpm recovery well simulations were run with the Walton model using transmissivities of 100 and 200 ft^2/min. All other parameters were similar to the MODFLOW model. Data from the Walton simulations are presented in Tables 7-1 and 7-2.

A MODFLOW single recovery well simulation was also run at grid location (21,26). The well was pumped at 1,000 gpm for 1 year. Drawdown was compared in the Walton and MODFLOW models at relatively similar distances from the recovery well. The drawdown comparison is presented in Table 7-3 and the location of MODFLOW nodes used for the comparison is illustrated in Figure 7-1.

Drawdown in the MODFLOW simulation was generally between the range of drawdown in the Walton model for transmissivities of 100 and 200 ft^2/min. The upgradient boundary appeared to have the greatest influence on the drawdown. The drawdown 1,256 feet east of the recovery well was observed to be 0.20 feet in the MODFLOW simulation. The drawdown at this distance in the Walton pumpingtest with a transmissivity of 200 ft^2/min was 0.33 ft.

Figure 7-1

1 Year, 1000 gpm Recovery Well and Grid Nodes Analyzed in Walton Comparison

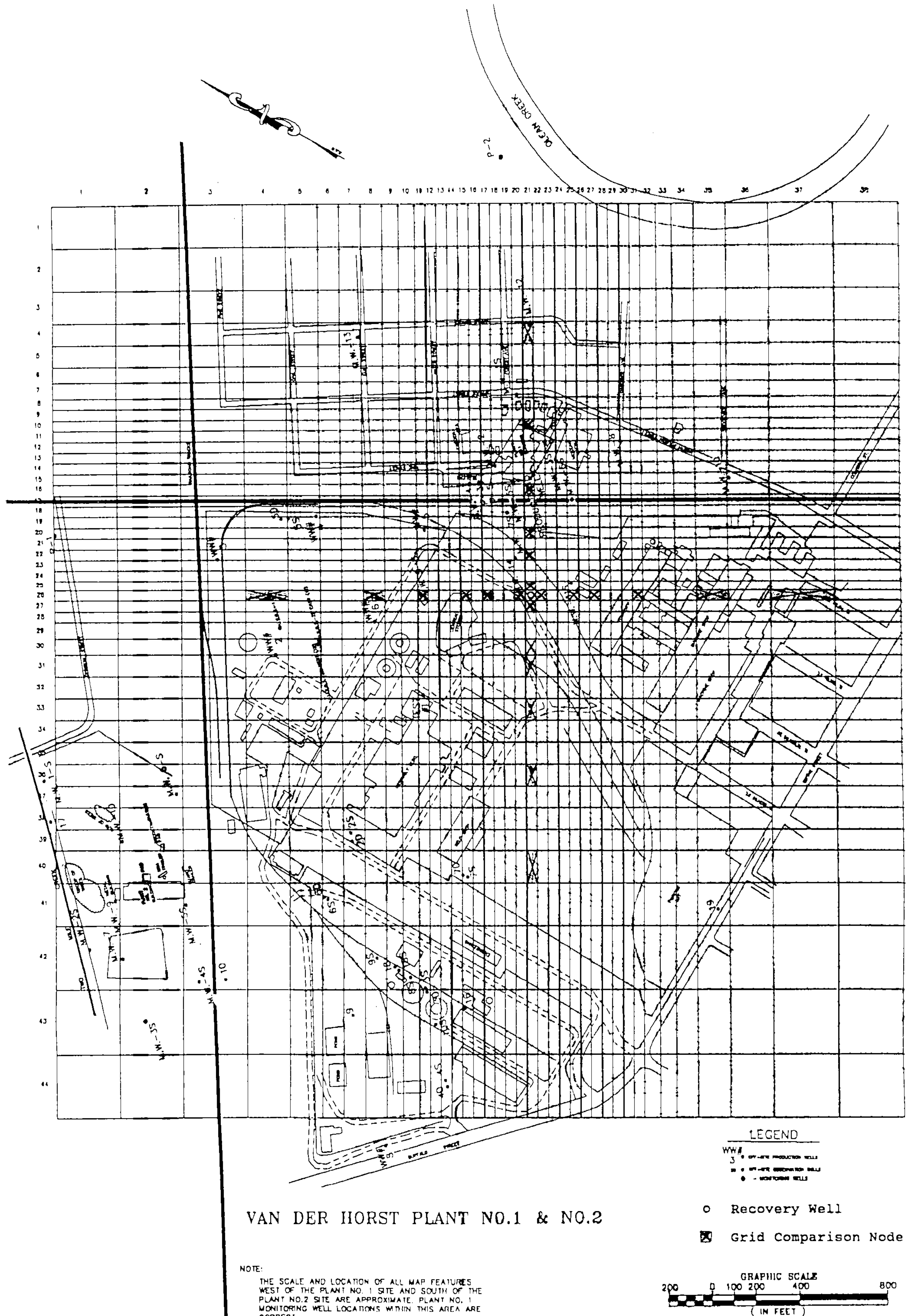


Table 7-1

Walton Simulation of 1 Year 1000 gpm Recovery Well (T = 200 sqft/min)

DATA BASE:
:

AQUIFER HORIZ. HYDR. COND. (GPD/SQ FT)= 30806.00
ARTESIAN AQUIFER STORATIVITY (DIM)= 1.5000D-02
WATER TABLE STORATIVITY (DIM)= 0.2000
PRODUCT. WELL EFFECTIVE RADIUS (FT)= 0.500
TOP OF AQUIFER DEPTH (FT)= 20.00
BASE OF AQUIFER DEPTH (FT)= 90.00
INITIAL WATER LEVEL DEPTH (FT)= 20.00
INFINITE AQUIFER SYSTEM

COMPUTATION RESULTS:

PRODUCTION WELL DISCHARGE RATE (GPM)= 1000.00

TIME-DRAWDOWN OR WATER LEVEL VALUES (FT)

	SELECTED DISTANCES (FT)					
TIME(MIN)	0.50	79.24	199.05	500.00	1255.94	3154.79
0.12	20.36	20.00	20.00	20.00	20.00	20.00
0.19	20.39	20.00	20.00	20.00	20.00	20.00
0.30	20.41	20.00	20.00	20.00	20.00	20.00
0.47	20.44	20.00	20.00	20.00	20.00	20.00
0.74	20.46	20.00	20.00	20.00	20.00	20.00
1.18	20.49	20.01	20.00	20.00	20.00	20.00
1.86	20.51	20.01	20.00	20.00	20.00	20.00
2.95	20.54	20.03	20.00	20.00	20.00	20.00
4.68	20.56	20.04	20.00	20.00	20.00	20.00
7.42	20.59	20.06	20.01	20.00	20.00	20.00
11.76	20.61	20.08	20.01	20.00	20.00	20.00
18.64	20.64	20.10	20.03	20.00	20.00	20.00
29.55	20.66	20.12	20.04	20.00	20.00	20.00
46.83	20.69	20.15	20.06	20.01	20.00	20.00
74.22	20.71	20.17	20.08	20.01	20.00	20.00
117.63	20.74	20.19	20.10	20.03	20.00	20.00
186.42	20.76	20.22	20.12	20.04	20.00	20.00
295.46	20.79	20.24	20.15	20.06	20.01	20.00
468.28	20.81	20.27	20.17	20.08	20.01	20.00
742.17	20.83	20.29	20.19	20.10	20.03	20.00
1176.26	20.86	20.32	20.22	20.12	20.04	20.00
1864.24	20.88	20.34	20.24	20.15	20.06	20.01
2954.62	20.91	20.37	20.27	20.17	20.08	20.01
4682.76	20.93	20.39	20.29	20.19	20.10	20.03
7421.68	20.96	20.41	20.32	20.22	20.12	20.04
11762.57	20.98	20.44	20.34	20.24	20.15	20.06
18642.41	21.01	20.46	20.37	20.27	20.17	20.08
29546.23	21.03	20.49	20.39	20.29	20.19	20.10
46827.62	21.06	20.51	20.41	20.32	20.22	20.12
74216.78	21.08	20.54	20.44	20.34	20.24	20.15
117625.67	21.11	20.56	20.46	20.37	20.27	20.17
186424.13	21.13	20.59	20.49	20.39	20.29	20.19
295462.34	21.16	20.61	20.51	20.41	20.32	20.22
368640.00	21.17	20.63	20.53	20.43	20.33	20.23

TIME AFTER PUMPING STARTED(MIN)=%368640.00

DISTANCE-DRAWDOWN OR WATER LEVEL VALUES AT END OF PUMPING PERIOD

NODE NO	RADIUS(FT)	DRAWDOWN OR WATER LEVEL (FT)
2	0.50	21.17
3	0.79	21.12
4	1.26	21.07
5	1.99	21.02
6	3.15	20.97
7	5.00	20.92
8	7.92	20.87
9	12.56	20.82
10	19.91	20.77
11	31.55	20.72
12	50.00	20.67
13	79.24	20.63
14	125.59	20.58
15	199.05	20.53
16	315.48	20.48
17	500.00	20.43
18	792.45	20.38
19	1255.94	20.33
20	1990.54	20.28
21	3154.79	20.23
22	5000.00	20.18
23	7924.47	20.14
24	12559.43	20.09
25	19905.36	20.05
26	31547.87	20.02
27	50000.01	20.00

Table 7-2

Walton Simulation of 1 Year 1000 gpm Recovery Well (T = 100 sqft/min)

DATA BASE:

AQUIFER HORIZ. HYDR. COND. (GPD/SQ FT)= 15403.00
ARTESIAN AQUIFER STORATIVITY (DIM)= 1.5000D-02
WATER TABLE STORATIVITY (DIM)= 0.2000
PRODUCT. WELL EFFECTIVE RADIUS (FT)= 0.500
TOP OF AQUIFER DEPTH (FT)= 20.00
BASE OF AQUIFER DEPTH (FT)= 90.00
INITIAL WATER LEVEL DEPTH (FT)= 20.00
INFINITE AQUIFER SYSTEM

COMPUTATION RESULTS:

PRODUCTION WELL DISCHARGE RATE (GPM)= 1000.00

TIME-DRAWDOWN OR WATER LEVEL VALUES (FT)

SELECTED DISTANCES (FT)

TIME(MIN)	0.50	79.24	199.05	500.00	1255.94	3154.79
0.15	20.68	20.00	20.00	20.00	20.00	20.00
0.24	20.73	20.00	20.00	20.00	20.00	20.00
0.37	20.78	20.00	20.00	20.00	20.00	20.00
0.59	20.83	20.00	20.00	20.00	20.00	20.00
0.94	20.88	20.00	20.00	20.00	20.00	20.00
1.48	20.93	20.01	20.00	20.00	20.00	20.00
2.35	20.98	20.01	20.00	20.00	20.00	20.00
3.73	21.03	20.03	20.00	20.00	20.00	20.00
5.91	21.08	20.05	20.00	20.00	20.00	20.00
9.37	21.13	20.08	20.01	20.00	20.00	20.00
14.84	21.18	20.12	20.01	20.00	20.00	20.00
23.53	21.23	20.16	20.03	20.00	20.00	20.00
37.28	21.28	20.20	20.05	20.00	20.00	20.00
59.09	21.33	20.25	20.08	20.01	20.00	20.00
93.66	21.38	20.29	20.12	20.01	20.00	20.00
148.43	21.43	20.34	20.16	20.03	20.00	20.00
235.25	21.48	20.39	20.20	20.05	20.00	20.00
372.85	21.53	20.44	20.25	20.08	20.01	20.00
590.92	21.58	20.49	20.29	20.12	20.01	20.00
936.55	21.63	20.54	20.34	20.16	20.03	20.00
1484.34	21.68	20.59	20.39	20.20	20.05	20.00
2352.51	21.73	20.63	20.44	20.25	20.08	20.01
3728.48	21.78	20.68	20.49	20.29	20.12	20.01
5909.25	21.83	20.73	20.54	20.34	20.16	20.03
9365.52	21.88	20.78	20.59	20.39	20.20	20.05
14843.36	21.93	20.83	20.63	20.44	20.25	20.08
23525.13	21.98	20.88	20.68	20.49	20.29	20.12
37284.83	22.03	20.93	20.73	20.54	20.34	20.16
59092.47	22.08	20.98	20.78	20.59	20.39	20.20
93655.25	22.13	21.03	20.83	20.63	20.44	20.25
148433.56	22.18	21.08	20.88	20.68	20.49	20.29
235251.35	22.23	21.13	20.93	20.73	20.54	20.34
368640.00	22.28	21.18	20.98	20.78	20.58	20.39

TIME AFTER PUMPING STARTED(MIN)=%368640.00

DISTANCE-DRAWDOWN OR WATER LEVEL VALUES AT END OF PUMPING PERIOD

NODE NO	RADIUS(FT)	DRAWDOWN OR WATER LEVEL (FT)
2	0.50	22.28
3	0.79	22.18
4	1.26	22.08
5	1.99	21.98
6	3.15	21.88
7	5.00	21.78
8	7.92	21.68
9	12.56	21.58
10	19.91	21.48
11	31.55	21.38
12	50.00	21.28
13	79.24	21.18
14	125.59	21.08
15	199.05	20.98
16	315.48	20.88
17	500.00	20.78
18	792.45	20.68
19	1255.94	20.58
20	1990.54	20.49
21	3154.79	20.39
22	5000.00	20.29
23	7924.47	20.20
24	12559.43	20.12
25	19905.36	20.05
26	31547.87	20.01
27	50000.01	20.00

Table 7-3

COMPARISON OF RESULTS FROM WALTON AND MODFLOW
SIMULATED 1 YEAR, 1000 GPM RECOVERY WELL

	Walton Method		MODFLOW Simulation			
Distance from Pumping Well (ft)	T=200 sqft/min Drawdown (ft)	T=100 sqft/min Drawdown (ft)	Drawdown East (ft)	Drawdown South (ft)	Drawdown West (ft)	Drawdown North (ft)
0.5	1.17	2.28	1.956	1.956	1.956	1.956
50	0.67	1.27	1.261	1.272	1.336	1.317
200	0.53	0.97	0.646	0.783	0.809	0.796
315	0.48	0.87	0.572	0.685	0.732	0.675
500	0.43	0.77	0.450	0.560	0.606	0.508
792	0.38	0.68	0.320	0.438	0.463	0.383
1256	0.33	0.58	0.200	0.366	0.293	0.301

Note: MODFLOW recovery well is at model grid coordinates (21,26)

The influence of the upgradient boundary appears to decrease with distance. The difference between the MODFLOW and Walton drawdown at 792 feet from the recovery well was 0.08 ft, as compared with 0.13 ft at 1,256. The relatively small drawdown differences observed between the MODFLOW and Walton models indicate that the predicted capture areas of the recovery well simulations approximate the behavior of the system under stressed conditions.

8.0 MODEL LIMITATIONS

8.1 Model Boundaries

The Van Der Horst Plant No. 1 model used constant head nodes for the upgradient and downgradient boundaries, and no-flow nodes for the north and south boundaries. These boundaries had minimal effect on ground water flow during unstressed conditions. During stressed conditions however, the boundaries were observed to have a slight influence on ground water head and drawdown. This influence was most noticeably observed during recovery well simulations, where drawdown was believed to extend beyond the model boundaries.

One indication of the MODFLOW model boundary effects can be seen in the drawdown contours for recovery well simulations in Figures 6-2, 6-4, 6-6, and 6-8. The drawdown pattern in these figures is slightly widened at the north and south no-flow boundaries and slightly compressed at the upgradient and downgradient constant head boundaries. In both cases, boundary effects are greatest near the boundary and are also more prominent in simulations with more ground water recovery.

8.2 Recovery Well Design

The recovery well simulations assumed that the wells were screened throughout the entire aquifer thickness. Actual recovery wells may be designed somewhat differently. Recovery wells will probably be screened within the interval of detected chromium contamination in the aquifer. In some areas, these design considerations may require that recovery wells only be screened in the lower depths of the aquifer. Drawdown in recovery well simulations has not been corrected for partial penetrating well affects. These affects may produce minor changes in the ground water capture area which will require further evaluation during remedial design.

8.3 Data Limitations

The findings of this model are based upon explorations, field measurements and analyses which are subject to certain limitations. These limitations are summarized below:

Explorations and Measurements

Ground water level readings have been made in the monitoring wells at various times and under varying conditions. These data have been reviewed and interpretations have been made. However, note that fluctuations in the ground water level will occur due to variations in rainfall and other factors occurring at the time of measurement.

Surveying (elevation of monitoring wells at Plant No. 1 and Plant No.2) was done by others using optical survey techniques. These data were used in developing conclusions made in this report. Should variations become evident, it will be necessary to evaluate the findings of this report.

Ground water elevations from USGS observation wells are only approximate values do to the uncertainty of the measuring point elevations. Approximate measuring point elevations were obtained from USGS files however, factors such as surveying inaccuracies, bent well casings, and frost heaving of well casings could have effected ground water elevations from these wells.

Analyses

This model was completed following the Phase II RI. Data from the Phase III RI were not available at the time this model was developed. Phase III RI data may ultimately impact the conclusions presented herein.

The analyses and conclusions submitted in this report are based in part on data provided by others, and are contingent up their validity. Fluctuations of contaminant levels, types and migration paths may occur due to seasonal fluctuations, temperature variations, ground water fluctuations and other factors.

Use of Report

This report was prepared exclusively for the NYSDEC for specific application to the Van Der Horst Plant No. 1 site in accordance with generally accepted engineering practice. No other warranty, expressed or implied is made.

9.0 MODELING CONCLUSIONS AND RECOVERY WELL RECOMMENDATIONS

9.1 Modeling Conclusions

The USGS ground water model MODFLOW was used to predict the capture area of several patterns of recovery wells around the Van Der Horst Plant No. 1 site. The model was initially calibrated to non-pumping steady state conditions and also to a 900 minute pumping test at Plant No. 1. Calibration was conducted by changing aquifer transmissivity until the difference between the modelled heads and the field-measured heads was acceptable. The general distribution and magnitude of aquifer transmissivity was based on USGS specific capacity tests in production wells and a pumping test in well P-5 at Plant No. 1.

The model was calibrated using constant head or constant flux upgradient boundaries; however, final calibrations were made only with constant head boundaries. The constant flux calibrations produced unrealistic drawdown for ground water pumping simulations.

Sensitivity analysis of calibrations revealed the following tendencies in the model:

- Parameter changes in constant flux calibrations produced greater head differences than in constant head calibrations.
- Constant head calibrations were most greatly affected by

changes in transmissivity and recharge. Storativity changes for transient flow calibrations had little effect on the predicted head.

- Parameter sensitivity was fairly similar for both steady state and transient flow calibrations with constant head boundaries.

Recovery well simulations were evaluated for 1, 3, 4 and 5 well systems. Drawdown from recovery wells was found to extend beyond the model boundaries.

The Walton (1987) pumping test model was used to independently verify the influence of model boundaries on predicted drawdown. The upgradient constant head boundary was found to have the greatest influence on the predicted drawdown. This influence appeared to be relatively minor, and was not believed to significantly affect the predicted ground water capture area of the recovery wells.

9.2 Recovery Well Recommendations

Based on predicted recovery well capture areas and the estimated extent of chromium contamination in the aquifer, a four or five recovery well system is recommended for ground water remediation at Plant No. 1. Each well in the system would be pumped at a rate of approximately 250 gpm. Although several other pumping rates were used for recovery well simulations, an approximate rate of 250 gpm was found to be the best discharge for optimizing the ground water capture area.

The estimated capture area for a four recovery well system appears to capture almost all of the suspected chromium contamination greater than 100 ppb. Ground water with chromium levels between 50 and 100 ppb could be allowed to attenuate naturally by the sorptive properties of the aquifer. The NYSDEC ground water standard for chromium is 50 ppb.

~ 1.44 mgd

The total ground water recovery rate of the four well system would be 1,000 gpm. At this rate of recovery, roughly 2.5 times the estimated volume of chromium contaminated water would be pumped annually.

Based on the model-predicted ground water capture area results, a five recovery well system is recommended if it is necessary to capture most of the ground water with chromium levels between 50 and 100 ppb. Each recovery well in this system would also be pumped at a rate of 250 gpm.

LIST OF REFERENCES

McDonald, M. G. and Harbaugh, A. W., 1988. A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model. USGS Open-File Report 83-875, Book 6.

NYSDEC, 1989. Phase I Remedial Investigation Plant No. 1 Van Der Horst Corporation Site, Site No. 9-05-008, Olean, Cattaraugus County.

NYSDEC, 1991. Phase II Remedial Investigation Plant No. 1 Van Der Horst Corporation Site, Site No. 9-05-008, Olean, Cattaraugus County.

USGS, 1987a. Effect of Reduced Industrial Pumpage on the Migration of Dissolved Nitrogen in an Outwash Aquifer at Olean, Cattaraugus County, New York. Water-Resources Investigations Report 85-4082.

USGS, 1987b. Hydrogeology of the Olean Area, Cattaraugus County, New York. Water-Resources Investigations Report 85-4157.

USGS, 1988. Nitrogen Transport in a Shallow Outwash Aquifer at Olean, Cattaraugus County, New York. Water-Resources Investigations Report 87-4043.

Walton, W. C., 1987. Groundwater Pumping Tests Design and Analysis. Lewis Publishers Inc.

APPENDIX A

STEADY STATE - CONSTANT HEAD - NO PUMPING - FINAL CALIBRATION (OUTPUT.91)

Steady State - Constant Head - No Pumping - Final Calibration (OUTPUT.91)

```
1                         U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-WATER MODEL

    1 LAYERS         44 ROWS         38 COLUMNS
   1 STRESS PERIOD(S) IN SIMULATION
 MODEL TIME UNIT IS MINUTES
0I/O UNITS:
 ELEMENT OF IUNIT:  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
         I/O UNIT: 11  0  0  0  0  0  0 18 19  0  0 22  0  0  0  0  0  0  0  0  0  0  0  0
0BAS1 -- BASIC MODEL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT  1
 ARRAYS RHS AND BUFF WILL SHARE MEMORY.
 START HEAD WILL NOT BE SAVED -- DRAWDOWN CANNOT BE CALCULATED
    13462 ELEMENTS IN X ARRAY ARE USED BY BAS
    13462 ELEMENTS OF X ARRAY USED OUT OF  100000
0BCF1 -- BLOCK-CENTERED FLOW PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 11
 STEADY-STATE SIMULATION
 CONSTANT HEAD CELL-BY-CELL FLOWS WILL BE PRINTED
      LAYER  AQUIFER TYPE
      ------------------
         1        0
        1 ELEMENTS IN X ARRAY ARE USED BY BCF
    13463 ELEMENTS OF X ARRAY USED OUT OF  100000
0RCH1 -- RECHARGE PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 18
 OPTION 1 -- RECHARGE TO TOP LAYER
     1672 ELEMENTS OF X ARRAY USED FOR RECHARGE
    15135 ELEMENTS OF X ARRAY USED OUT OF  100000
0SIP1 -- STRONGLY IMPLICIT PROCEDURE SOLUTION PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 19
 MAXIMUM OF 100 ITERATIONS ALLOWED FOR CLOSURE
  5 ITERATION PARAMETERS
     7093 ELEMENTS IN X ARRAY ARE USED BY SIP
    22228 ELEMENTS OF X ARRAY USED OUT OF  100000
1JUNK                                                                  TRIAL TEST OF PREMOD AND MODFLOW
0

                                   BOUNDARY ARRAY FOR LAYER  1 WILL BE READ ON UNIT  1 USING FORMAT: (40I2)
                              ----------------------------------------------------------------------------
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
0 1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0
0 2	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 3	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 4	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 5	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 6	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 7	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 8	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 9	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 10	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 11	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 12	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 13	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 14	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 15	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 16	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 17	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 18	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 19	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 20	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0 21	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

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0 22  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 23  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 24  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 25  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 26  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 27  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 28  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 29  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 30  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 31  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 32  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 33  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 34  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 35  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 36  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 37  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 38  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 39  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 40  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 41  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 42  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 43  0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 44  0 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 0
0AQUIFER HEAD WILL BE SET TO  77.000     AT ALL NO-FLOW NODES (IBOUND=0).
0
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INITIAL HEAD FOR LAYER 1 WILL BE READ ON UNIT 1 USING FORMAT: (7G11.4)

	1	2	3	4	5	6	7	8	9	10
	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30
	31	32	33	34	35	36	37	38		
0 1	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 2	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 3	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 4	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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0 5	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 6	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 7	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5

	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 8	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 9	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 10	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 11	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 12	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 13	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 14	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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0 16	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 17	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 18	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 19	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 20	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 21	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 22	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5

	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 23	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 24	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 25	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 26	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 27	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 28	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 29	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
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	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 30	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 31	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 32	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 33	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 34	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 35	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 36	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5
	411.5	411.5	411.5	411.5	411.5	411.5	411.5	.0000		
0 37	.0000	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5	411.5

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      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     .0000
0 38  .0000     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     .0000
0 39  .0000     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     .0000
0 40  .0000     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     .0000
0 41  .0000     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     .0000
0 42  .0000     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     .0000
0 43  .0000     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5     411.5
      411.5     411.5     411.5     411.5     411.5     411.5     411.5     .0000
0 44  .0000     408.8     408.9     409.0     409.0     409.0     409.0     409.0     409.0     409.0
      409.0     409.0     409.0     409.0     409.0     409.0     409.0     409.0     409.0     409.0
      409.0     409.0     409.0     409.0     409.0     409.0     409.0     409.0     409.0     409.0
      409.0     409.0     409.0     409.0     409.0     409.0     409.0     .0000
0HEAD PRINT FORMAT IS FORMAT NUMBER  -4    DRAWDOWN PRINT FORMAT IS FORMAT NUMBER   0
0HEADS WILL BE SAVED ON UNIT 77    DRAWDOWNS WILL BE SAVED ON UNIT   0
0OUTPUT CONTROL IS SPECIFIED EVERY TIME STEP
0                                            COLUMN TO ROW ANISOTROPY =    1.000000
0


                                      DELR WILL BE READ ON UNIT 11 USING FORMAT: (7G11.4)
                              ------------------------------------------------------------------------

   300.00     300.00     300.00     200.00     150.00     100.00     100.00     100.00     75.000     75.000
   50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000
   50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000
   50.000     75.000     75.000     100.00     150.00     200.00     300.00     300.00
0


                                      DELC WILL BE READ ON UNIT 11 USING FORMAT: (7G11.4)
                              ------------------------------------------------------------------------

   200.00     200.00     150.00     100.00     100.00     75.000     75.000     50.000     50.000     50.000
   50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000
   50.000     50.000     50.000     50.000     50.000     50.000     50.000     50.000     75.000     75.000
   100.00     100.00     100.00     100.00     100.00     100.00     100.00     100.00     100.00     150.00
   200.00     300.00     300.00     300.00
0


                        TRANSMIS. ALONG ROWS FOR LAYER  1 WILL BE READ ON UNIT 11 USING FORMAT: (7G11.4)
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	1	2	3	4	5	6	7	8	9	10
	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30
	31	32	33	34	35	36	37	38		
0 1	.0000	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	70.00	70.00	70.00	70.00
	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00
	70.00	70.00	70.00	70.00	70.00	70.00	70.00	.0000		
0 2	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	100.0
	100.0	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 3	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	100.0
	100.0	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 4	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	100.0
	100.0	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 5	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 6	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 7	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 8	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 9	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 10	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 11	.0000	60.00	100.0	100.0	100.0	100.0	100.0	60.00	60.00	60.00
	60.00	60.00	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 12	.0000	60.00	100.0	100.0	100.0	100.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 13	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 14	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00

	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 15	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 16	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 17	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 18	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 19	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	45.00	45.00
	45.00	45.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 20	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	45.00	45.00
	45.00	45.00	45.00	45.00	100.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 21	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	45.00	45.00
	45.00	45.00	45.00	45.00	100.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 22	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	45.00	45.00
	45.00	45.00	45.00	45.00	100.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 23	.0000	60.00	100.0	120.0	120.0	120.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 24	.0000	60.00	100.0	120.0	120.0	120.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 25	.0000	60.00	100.0	120.0	120.0	120.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 26	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 27	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 28	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 29	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00

	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 30	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 31	.0000	60.00	100.0	100.0	100.0	100.0	100.0	60.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 32	.0000	60.00	100.0	100.0	100.0	100.0	100.0	60.00	60.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 33	.0000	60.00	100.0	100.0	100.0	100.0	60.00	60.00	60.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 34	.0000	60.00	60.00	100.0	100.0	100.0	60.00	60.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 35	.0000	60.00	60.00	60.00	60.00	60.00	60.00	60.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 36	.0000	60.00	60.00	60.00	60.00	60.00	60.00	60.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 37	.0000	60.00	60.00	60.00	60.00	60.00	60.00	60.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 38	.0000	60.00	60.00	45.00	45.00	45.00	45.00	45.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 39	.0000	60.00	60.00	45.00	45.00	20.00	20.00	45.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 40	.0000	60.00	60.00	45.00	45.00	20.00	20.00	20.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 41	.0000	60.00	60.00	45.00	45.00	20.00	20.00	20.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 42	.0000	60.00	60.00	45.00	45.00	20.00	20.00	20.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 43	.0000	60.00	60.00	45.00	45.00	20.00	20.00	20.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 44	.0000	60.00	60.00	45.00	45.00	20.00	20.00	20.00	20.00	20.00

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        20.00      20.00      20.00      20.00      20.00      20.00      20.00      45.00      45.00      45.00
        45.00      45.00      45.00      45.00      45.00      45.00      45.00      45.00      45.00      45.00
        45.00      45.00      60.00      60.00      60.00      60.00      60.00      .0000
0

                                                  SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE
                                                  -------------------------------------------
0                                        MAXIMUM ITERATIONS ALLOWED FOR CLOSURE =       100
                                                         ACCELERATION PARAMETER =     1.0000
                                             HEAD CHANGE CRITERION FOR CLOSURE =     .10000E-03
                                             SIP HEAD CHANGE PRINTOUT INTERVAL =         1
0                                            CALCULATE ITERATION PARAMETERS FROM MODEL CALCULATED WSEED
1                                           STRESS PERIOD NO.   1, LENGTH =   525600.0
                                            ---------------------------------------------

                                            NUMBER OF TIME STEPS =      1

                                             MULTIPLIER FOR DELT =     1.000

                                         INITIAL TIME STEP SIZE =   525600.0
0                                                            RECHARGE =   .3050000E-05
0AVERAGE SEED =  .00073333
 MINIMUM SEED =  .00005013
0
    5 ITERATION PARAMETERS CALCULATED FROM AVERAGE SEED:

            .0000000E+00   .8354398E+00   .9729199E+00   .9955437E+00   .9992667E+00
0
    26 ITERATIONS FOR TIME STEP   1 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ------------------------------------------------------------------------------------------------------------------------------------
   -1.603      (  1, 43,  2)  -.7333      (  1, 42,  6)  -.6623      (  1, 41,  6)  -.7121      (  1, 39, 29)  -.5859      (  1, 37, 10)
   -.5648E-01 (  1, 42,  2)   .4428E-01 (  1, 38,  4)  -.6208E-01 (  1, 33, 21)   .1016      (  1, 39,  9)  -.9279E-01 (  1, 29, 25)
    .1024E-01 (  1, 33, 16)   .1080E-01 (  1, 33, 16)   .1461E-01 (  1, 32, 15)  -.1482E-01 (  1, 16,  6)  -.1353E-01 (  1, 27, 27)
   -.1041E-02 (  1, 33, 23)  -.1599E-02 (  1, 33, 22)  -.1881E-02 (  1, 35, 16)  -.3202E-02 (  1, 36,  7)   .1319E-02 (  1, 34,  6)
    .2293E-03 (  1, 26,  2)  -.2427E-03 (  1, 30, 11)  -.3839E-03 (  1, 26, 13)  -.8000E-03 (  1, 25, 16)  -.6719E-03 (  1, 32, 22)
    .5509E-04 (  1, 40,  7)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 1     TOTAL BUDGET PRINTOUT FLAG = 1     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:
   HEAD    DRAWDOWN  HEAD  DRAWDOWN
 PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------
     1        0        1       0
1                    HEAD IN LAYER  1 AT END OF TIME STEP  1 IN STRESS PERIOD  1
             ---------------------------------------------------------------------

             1       2       3       4       5       6       7       8       9      10      11      12      13      14      15
 ..........................................................................................................................
0  1     77.00  411.50  411.50  411.50  411.50  411.50  411.50  411.50  411.50  411.50  411.50  411.50  411.50  411.50  411.50
0  2     77.00  411.43  411.42  411.42  411.42  411.42  411.42  411.42  411.42  411.42  411.42  411.41  411.41  411.41  411.41
0  3     77.00  411.37  411.37  411.37  411.37  411.37  411.37  411.37  411.37  411.37  411.37  411.37  411.37  411.37  411.37
0  4     77.00  411.33  411.32  411.33  411.33  411.33  411.34  411.34  411.34  411.34  411.34  411.34  411.34  411.34  411.34
0  5     77.00  411.29  411.29  411.29  411.30  411.30  411.31  411.31  411.31  411.32  411.32  411.32  411.32  411.32  411.32
0  6     77.00  411.26  411.26  411.27  411.27  411.28  411.28  411.29  411.29  411.30  411.30  411.30  411.30  411.30  411.30
0  7     77.00  411.23  411.24  411.24  411.25  411.25  411.26  411.27  411.27  411.28  411.28  411.28  411.29  411.29  411.29
0  8     77.00  411.21  411.21  411.22  411.22  411.23  411.24  411.25  411.26  411.26  411.27  411.27  411.27  411.27  411.27
0  9     77.00  411.19  411.20  411.20  411.21  411.22  411.22  411.24  411.25  411.25  411.26  411.26  411.26  411.26  411.26
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0 10	77.00	411.18	411.18	411.18	411.19	411.20	411.21	411.22	411.23	411.24	411.25	411.25	411.25	411.25	411.25
0 11	77.00	411.16	411.16	411.16	411.17	411.18	411.19	411.21	411.22	411.23	411.23	411.24	411.24	411.24	411.24
0 12	77.00	411.14	411.14	411.14	411.15	411.16	411.17	411.19	411.20	411.21	411.22	411.22	411.23	411.23	411.23
0 13	77.00	411.12	411.12	411.12	411.13	411.14	411.15	411.17	411.18	411.19	411.20	411.21	411.21	411.22	411.22
0 14	77.00	411.10	411.10	411.11	411.12	411.13	411.14	411.15	411.17	411.18	411.19	411.19	411.20	411.20	411.20
0 15	77.00	411.08	411.08	411.09	411.10	411.11	411.12	411.13	411.15	411.16	411.17	411.18	411.18	411.19	411.19
0 16	77.00	411.06	411.06	411.07	411.08	411.09	411.10	411.11	411.13	411.14	411.16	411.16	411.17	411.17	411.18
0 17	77.00	411.04	411.05	411.05	411.06	411.07	411.08	411.10	411.11	411.13	411.14	411.15	411.16	411.16	411.16
0 18	77.00	411.02	411.03	411.04	411.04	411.05	411.06	411.08	411.10	411.11	411.13	411.14	411.15	411.15	411.15
0 19	77.00	411.00	411.01	411.02	411.03	411.03	411.04	411.06	411.08	411.09	411.11	411.12	411.13	411.14	411.14
0 20	77.00	410.98	410.99	411.00	411.01	411.01	411.02	411.03	411.05	411.07	411.09	411.10	411.11	411.12	411.13
0 21	77.00	410.96	410.97	410.98	410.99	410.99	411.00	411.01	411.03	411.05	411.07	411.08	411.09	411.10	411.11
0 22	77.00	410.94	410.94	410.96	410.97	410.97	410.98	410.99	411.01	411.03	411.04	411.06	411.07	411.08	411.10
0 23	77.00	410.91	410.92	410.94	410.95	410:95	410.96	410.97	410.98	411.00	411.02	411.03	411.05	411.06	411.08
0 24	77.00	410.89	410.90	410.92	410.93	410.93	410.94	410.95	410.96	410.98	411.00	411.01	411.02	411.03	411.05
0 25	77.00	410.87	410.88	410.90	410.91	410.92	410.92	410.93	410.94	410.96	410.97	410.98	410.99	411.00	411.01
0 26	77.00	410.84	410.86	410.88	410.89	410.89	410.90	410.91	410.92	410.93	410.95	410.96	410.97	410.98	410.99
0 27	77.00	410.82	410.83	410.85	410.86	410.87	410.88	410.89	410.90	410.91	410.92	410.93	410.94	410.95	410.96
0 28	77.00	410.80	410.81	410.83	410.84	410.85	410.86	410.86	410.88	410.89	410.90	410.91	410.92	410.92	410.93
0 29	77.00	410.76	410.78	410.80	410.81	410.82	410.83	410.84	410.85	410.86	410.87	410.88	410.88	410.89	410.90
0 30	77.00	410.73	410.74	410.76	410.77	410.78	410.79	410.81	410.81	410.83	410.84	410.84	410.85	410.85	410.86
0 31	77.00	410.68	410.70	410.72	410.73	410.74	410.75	410.76	410.77	410.79	410.80	410.81	410.81	410.81	410.82
0 32	77.00	410.62	410.65	410.67	410.68	410.69	410.70	410.71	410.71	410.73	410.74	410.74	410.75	410.75	410.75
0 33	77.00	410.56	410.60	410.62	410.63	410.64	410.65	410.65	410.66	410.66	410.66	410.67	410.67	410.67	410.67
0 34	77.00	410.49	410.53	410.56	410.58	410.58	410.58	410.59	410.59	410.59	410.59	410.59	410.59	410.59	410.59
0 35	77.00	410.41	410.45	410.50	410.51	410.52	410.52	410.52	410.52	410.51	410.51	410.51	410.51	410.50	410.50
0 36	77.00	410.33	410.37	410.41	410.44	410.45	410.45	410.45	410.44	410.44	410.43	410.43	410.42	410.42	410.42
0 37	77.00	410.25	410.28	410.33	410.36	410.38	410.38	410.38	410.37	410.36	410.35	410.34	410.34	410.33	410.33
0 38	77.00	410.16	410.19	410.24	410.27	410.31	410.31	410.31	410.29	410.27	410.26	410.26	410.25	410.24	410.24
0 39	77.00	410.07	410.09	410.13	410.16	410.20	410.22	410.22	410.20	410.18	410.17	410.16	410.16	410.15	410.14
0 40	77.00	409.95	409.97	410.01	410.03	410.05	410.07	410.08	410.06	410.05	410.05	410.04	410.04	410.03	410.02
0 41	77.00	409.78	409.80	409.82	409.84	409.86	409.87	409.87	409.87	409.87	409.87	409.86	409.86	409.86	409.85
0 42	77.00	409.52	409.54	409.57	409.58	409.59	409.60	409.61	409.61	409.61	409.61	409.61	409.61	409.61	409.61
0 43	77.00	409.18	409.22	409.26	409.28	409.29	409.30	409.30	409.30	409.31	409.31	409.31	409.31	409.31	409.31
0 44	77.00	408.80	408.90	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00

1 HEAD IN LAYER 1 AT END OF TIME STEP 1 IN STRESS PERIOD 1

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
0 1	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50
0 2	411.41	411.41	411.41	411.41	411.42	411.42	411.42	411.42	411.42	411.42	411.42	411.42	411.42	411.42	411.42
0 3	411.37	411.37	411.37	411.37	411.37	411.37	411.38	411.38	411.38	411.38	411.38	411.38	411.38	411.38	411.38
0 4	411.34	411.34	411.34	411.34	411.34	411.34	411.34	411.34	411.35	411.35	411.35	411.35	411.35	411.36	411.36
0 5	411.32	411.32	411.32	411.32	411.32	411.32	411.32	411.32	411.32	411.33	411.33	411.33	411.33	411.33	411.34
0 6	411.30	411.30	411.30	411.30	411.30	411.30	411.30	411.30	411.31	411.31	411.31	411.31	411.31	411.31	411.32
0 7	411.29	411.29	411.29	411.29	411.29	411.29	411.29	411.29	411.29	411.29	411.29	411.30	411.30	411.30	411.30
0 8	411.27	411.27	411.27	411.27	411.27	411.27	411.27	411.28	411.28	411.28	411.28	411.28	411.28	411.28	411.29
0 9	411.26	411.26	411.26	411.26	411.26	411.26	411.26	411.26	411.27	411.27	411.27	411.27	411.27	411.27	411.28
0 10	411.25	411.25	411.25	411.25	411.25	411.25	411.25	411.25	411.25	411.26	411.26	411.26	411.26	411.26	411.26
0 11	411.24	411.24	411.24	411.24	411.24	411.24	411.24	411.24	411.24	411.25	411.25	411.25	411.25	411.25	411.25
0 12	411.23	411.23	411.23	411.23	411.23	411.23	411.23	411.23	411.23	411.23	411.24	411.24	411.24	411.24	411.24
0 13	411.22	411.22	411.22	411.22	411.22	411.22	411.22	411.22	411.22	411.22	411.22	411.22	411.23	411.23	411.23
0 14	411.20	411.20	411.20	411.21	411.21	411.21	411.21	411.21	411.21	411.21	411.21	411.21	411.21	411.22	411.22
0 15	411.19	411.19	411.19	411.19	411.19	411.19	411.20	411.20	411.20	411.20	411.20	411.20	411.20	411.20	411.20
0 16	411.18	411.18	411.18	411.18	411.18	411.18	411.18	411.19	411.19	411.19	411.19	411.19	411.19	411.19	411.19
0 17	411.17	411.17	411.17	411.17	411.17	411.17	411.17	411.18	411.18	411.18	411.18	411.18	411.18	411.18	411.18
0 18	411.15	411.16	411.16	411.16	411.16	411.16	411.16	411.16	411.16	411.16	411.16	411.16	411.16	411.16	411.16
0 19	411.14	411.14	411.14	411.14	411.14	411.14	411.14	411.14	411.14	411.14	411.14	411.14	411.14	411.14	411.14
0 20	411.13	411.13	411.13	411.13	411.13	411.13	411.13	411.13	411.12	411.12	411.12	411.12	411.12	411.11	411.11

0 21	411.12	411.12	411.12	411.12	411.12	411.12	411.12	411.11	411.11	411.10	411.10	411.09	411.09	411.09	411.09
0 22	411.11	411.11	411.11	411.11	411.11	411.11	411.10	411.09	411.09	411.08	411.07	411.07	411.07	411.07	411.06
0 23	411.09	411.09	411.09	411.09	411.09	411.09	411.08	411.07	411.06	411.06	411.05	411.05	411.04	411.04	411.04
0 24	411.06	411.06	411.06	411.07	411.06	411.06	411.05	411.04	411.04	411.03	411.03	411.02	411.02	411.02	411.01
0 25	411.02	411.03	411.03	411.03	411.03	411.03	411.02	411.01	411.01	411.00	411.00	411.00	410.99	410.99	410.99
0 26	410.99	411.00	411.00	411.00	411.00	410.99	410.99	410.99	410.98	410.98	410.97	410.97	410.97	410.96	410.96
0 27	410.96	410.96	410.97	410.97	410.97	410.96	410.96	410.96	410.95	410.95	410.95	410.95	410.94	410.94	410.93
0 28	410.93	410.93	410.94	410.94	410.93	410.93	410.93	410.93	410.93	410.93	410.92	410.92	410.92	410.91	410.91
0 29	410.90	410.90	410.90	410.90	410.90	410.90	410.90	410.90	410.89	410.89	410.89	410.89	410.88	410.88	410.88
0 30	410.86	410.86	410.86	410.85	410.85	410.85	410.85	410.86	410.86	410.85	410.85	410.85	410.85	410.84	410.84
0 31	410.82	410.81	410.80	410.80	410.80	410.80	410.80	410.80	410.80	410.80	410.79	410.79	410.79	410.78	410.78
0 32	410.75	410.74	410.73	410.73	410.73	410.73	410.72	410.72	410.72	410.72	410.72	410.71	410.71	410.70	410.70
0 33	410.66	410.66	410.66	410.66	410.65	410.65	410.65	410.65	410.65	410.64	410.64	410.64	410.63	410.63	410.62
0 34	410.58	410.58	410.58	410.58	410.58	410.58	410.58	410.58	410.57	410.57	410.57	410.56	410.56	410.55	410.55
0 35	410.50	410.50	410.50	410.50	410.50	410.50	410.50	410.49	410.49	410.49	410.48	410.48	410.47	410.47	410.46
0 36	410.41	410.41	410.41	410.41	410.41	410.40	410.40	410.40	410.40	410.39	410.39	410.38	410.38	410.38	410.37
0 37	410.32	410.32	410.32	410.31	410.31	410.31	410.31	410.30	410.30	410.30	410.29	410.29	410.29	410.28	410.28
0 38	410.23	410.23	410.22	410.22	410.22	410.22	410.21	410.21	410.21	410.20	410.20	410.20	410.19	410.19	410.19
0 39	410.14	410.13	410.13	410.13	410.12	410.12	410.12	410.12	410.11	410.11	410.11	410.10	410.10	410.10	410.09
0 40	410.02	410.01	410.01	410.01	410.01	410.00	410.00	410.00	410.00	409.99	409.99	409.99	409.98	409.98	409.98
0 41	409.85	409.85	409.84	409.84	409.84	409.84	409.83	409.83	409.83	409.83	409.83	409.82	409.82	409.82	409.82
0 42	409.60	409.60	409.60	409.60	409.60	409.59	409.59	409.59	409.59	409.59	409.59	409.59	409.58	409.58	409.58
0 43	409.30	409.30	409.30	409.30	409.30	409.30	409.30	409.30	409.30	409.30	409.30	409.30	409.30	409.29	409.29
0 44	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00

1 HEAD IN LAYER 1 AT END OF TIME STEP 1 IN STRESS PERIOD 1

	31	32	33	34	35	36	37	38
0 1	411.50	411.50	411.50	411.50	411.50	411.50	411.50	77.00
0 2	411.42	411.42	411.42	411.42	411.42	411.43	411.43	77.00
0 3	411.38	411.39	411.39	411.39	411.39	411.39	411.39	77.00
0 4	411.36	411.36	411.36	411.36	411.37	411.37	411.37	77.00
0 5	411.34	411.34	411.34	411.34	411.35	411.35	411.35	77.00
0 6	411.32	411.32	411.32	411.33	411.33	411.33	411.34	77.00
0 7	411.30	411.31	411.31	411.31	411.32	411.32	411.32	77.00
0 8	411.29	411.29	411.30	411.30	411.30	411.31	411.31	77.00
0 9	411.28	411.28	411.29	411.29	411.30	411.30	411.30	77.00
0 10	411.27	411.27	411.28	411.28	411.29	411.29	411.29	77.00
0 11	411.25	411.26	411.26	411.27	411.27	411.28	411.28	77.00
0 12	411.24	411.24	411.25	411.25	411.26	411.26	411.26	77.00
0 13	411.23	411.23	411.23	411.24	411.24	411.24	411.24	77.00
0 14	411.22	411.22	411.22	411.22	411.22	411.23	411.23	77.00
0 15	411.20	411.20	411.20	411.21	411.21	411.21	411.21	77.00
0 16	411.19	411.19	411.19	411.19	411.19	411.19	411.19	77.00
0 17	411.18	411.18	411.18	411.17	411.17	411.17	411.17	77.00
0 18	411.16	411.16	411.16	411.16	411.16	411.16	411.15	77.00
0 19	411.14	411.14	411.14	411.14	411.13	411.13	411.13	77.00
0 20	411.11	411.11	411.11	411.11	411.11	411.10	411.10	77.00
0 21	411.09	411.09	411.08	411.08	411.08	411.07	411.07	77.00
0 22	411.06	411.06	411.06	411.05	411.05	411.04	411.04	77.00
0 23	411.04	411.03	411.03	411.02	411.02	411.01	411.01	77.00
0 24	411.01	411.01	411.00	411.00	410.99	410.98	410.97	77.00
0 25	410.98	410.98	410.98	410.97	410.96	410.95	410.94	77.00
0 26	410.96	410.95	410.95	410.94	410.93	410.92	410.91	77.00
0 27	410.93	410.93	410.92	410.91	410.90	410.89	410.88	77.00
0 28	410.90	410.90	410.89	410.88	410.87	410.85	410.84	77.00
0 29	410.87	410.86	410.85	410.84	410.83	410.81	410.80	77.00
0 30	410.83	410.82	410.81	410.79	410.78	410.76	410.75	77.00
0 31	410.77	410.76	410.75	410.73	410.72	410.70	410.69	77.00

```
0 32   410.69  410.68  410.67  410.66  410.64  410.63  410.62   77.00
0 33   410.62  410.61  410.60  410.58  410.57  410.55  410.54   77.00
0 34   410.54  410.53  410.52  410.51  410.49  410.48  410.47   77.00
0 35   410.46  410.45  410.43  410.42  410.41  410.40  410.39   77.00
0 36   410.36  410.36  410.35  410.34  410.33  410.32  410.31   77.00
0 37   410.27  410.27  410.26  410.25  410.24  410.23  410.22   77.00
0 38   410.18  410.18  410.17  410.16  410.16  410.15  410.14   77.00
0 39   410.09  410.09  410.08  410.08  410.07  410.06  410.06   77.00
0 40   409.98  409.97  409.97  409.96  409.96  409.95  409.95   77.00
0 41   409.81  409.81  409.81  409.80  409.80  409.80  409.79   77.00
0 42   409.58  409.58  409.58  409.57  409.57  409.57  409.57   77.00
0 43   409.29  409.29  409.29  409.29  409.29  409.29  409.29   77.00
0 44   409.00  409.00  409.00  409.00  409.00  409.00  409.00   77.00
OHEAD WILL BE SAVED ON UNIT 77 AT END OF TIME STEP  1, STRESS PERIOD  1
0

                      VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP  1 IN STRESS PERIOD  1
                      ---------------------------------------------------------------------------
0           CUMULATIVE VOLUMES      L**3                         RATES FOR THIS TIME STEP      L**3/T
            ------------------                                   ------------------------

                   IN:                                                    IN:
                   ---                                                    ---
                     STORAGE =    .00000                                    STORAGE =    .00000
               CONSTANT HEAD =    .61139E+08                          CONSTANT HEAD =    116.32
                    RECHARGE =    .20139E+08                               RECHARGE =    38.315
0                   TOTAL IN =    .81277E+08                               TOTAL IN =    154.64
0                 OUT:                                                   OUT:
                  ----                                                   ----
                     STORAGE =    .00000                                    STORAGE =    .00000
               CONSTANT HEAD =    .81302E+08                          CONSTANT HEAD =    154.68
                    RECHARGE =    .00000                                   RECHARGE =    .00000
0                  TOTAL OUT =    .81302E+08                              TOTAL OUT =    154.68
0                   IN - OUT =   -24880.                                   IN - OUT =   -.47348E-01
0       PERCENT DISCREPANCY =                 -.03          PERCENT DISCREPANCY =                -.03


0

          TIME SUMMARY AT END OF TIME STEP  1 IN STRESS PERIOD  1
                                 SECONDS      MINUTES       HOURS        DAYS        YEARS
                              -----------------------------------------------------------
      TIME STEP LENGTH        .315360E+08    525600.      8760.00      365.000     .999316
    STRESS PERIOD TIME        .315360E+08    525600.      8760.00      365.000     .999316
 TOTAL SIMULATION TIME        .315360E+08    525600.      8760.00      365.000     .999316
1
```

APPENDIX B

TRANSIENT - CONSTANT HEAD - PUMPING TEST - FINAL CALIBRATION (PDCALOUT.05)

Transient - Constant Head - Pumping Test - Final Calibration (PDCALOUT.05)

```
1                   U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-WATER MODEL
0900 MINUTE PUMPING TEST SIMULATION AT P-5
   1 LAYERS        44 ROWS        38 COLUMNS
  1 STRESS PERIOD(S) IN SIMULATION
 MODEL TIME UNIT IS MINUTES
0I/O UNITS:
 ELEMENT OF IUNIT:  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
       I/O UNIT: 11 12  0  0  0  0  0 18 19  0  0 22  0  0  0  0  0  0  0  0  0  0  0  0
0BAS1 -- BASIC MODEL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT  1
 ARRAYS RHS AND BUFF WILL SHARE MEMORY.
 START HEAD WILL BE SAVED
    15134 ELEMENTS IN X ARRAY ARE USED BY BAS
    15134 ELEMENTS OF X ARRAY USED OUT OF  100000
0BCF1 -- BLOCK-CENTERED FLOW PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 11
 TRANSIENT SIMULATION
 CONSTANT HEAD CELL-BY-CELL FLOWS WILL BE PRINTED
      LAYER  AQUIFER TYPE
      ------------------
        1        0
     1673 ELEMENTS IN X ARRAY ARE USED BY BCF
    16807 ELEMENTS OF X ARRAY USED OUT OF  100000
0WEL1 -- WELL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM 12
 MAXIMUM OF    1 WELLS
        4 ELEMENTS IN X ARRAY ARE USED FOR WELLS
    16811 ELEMENTS OF X ARRAY USED OUT OF  100000
0RCH1 -- RECHARGE PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 18
 OPTION 1 -- RECHARGE TO TOP LAYER
     1672 ELEMENTS OF X ARRAY USED FOR RECHARGE
    18483 ELEMENTS OF X ARRAY USED OUT OF  100000
0SIP1 -- STRONGLY IMPLICIT PROCEDURE SOLUTION PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 19
 MAXIMUM OF 100 ITERATIONS ALLOWED FOR CLOSURE
  5 ITERATION PARAMETERS
     7093 ELEMENTS IN X ARRAY ARE USED BY SIP
    25576 ELEMENTS OF X ARRAY USED OUT OF  100000
 900 MINUTE PUMPING TEST SIMULATION AT P-5                                 TRIAL TEST OF PREMOD AND MODFLOW
0


                                    BOUNDARY ARRAY FOR LAYER  1 WILL BE READ ON UNIT  1 USING FORMAT: (40I2)
                                 ----------------------------------------------------------------------------------------------

      1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
 ..........................................................................................................................
0 1   0 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1  0
0 2   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 3   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 4   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 5   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 6   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 7   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 8   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 9   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 10  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 11  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 12  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 13  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 14  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 15  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 16  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 17  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
```

```
0 18   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 19   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 20   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 21   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 22   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 23   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 24   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 25   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 26   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 27   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 28   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 29   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 30   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 31   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 32   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 33   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 34   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 35   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 36   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 37   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 38   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 39   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 40   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 41   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 42   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 43   0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  0
0 44   0 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1  0
0AQUIFER HEAD WILL BE SET TO  77.000     AT ALL NO-FLOW NODES (IBOUND=0).
0


                                   INITIAL HEAD FOR LAYER  1 WILL BE READ ON UNIT  1 USING FORMAT: (11G7.2)
                              ----------------------------------------------------------------------------------

           1        2        3        4        5        6        7        8        9       10
          11       12       13       14       15       16       17       18       19       20
          21       22       23       24       25       26       27       28       29       30
          31       32       33       34       35       36       37       38
 .......................................................................................................
0  1    .0000    411.5    411.5    411.5    411.5    411.5    411.5    411.5    411.5    411.5
        411.5    411.5    411.5    411.5    411.5    411.5    411.5    411.5    411.5    411.5
        411.5    411.5    411.5    411.5    411.5    411.5    411.5    411.5    411.5    411.5
        411.5    411.5    411.5    411.5    411.5    411.5    411.5    .0000
0  2    .0000    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    .0000
0  3    .0000    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    .0000
0  4    .0000    411.3    411.3    411.3    411.3    411.3    411.3    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    .0000
0  5    .0000    411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3
        411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3
        411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.4
        411.4    411.4    411.4    411.4    411.4    411.4    411.4    .0000
0  6    .0000    411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3    411.3
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	411.3	411.3	411.3	411.3	411.3	411.3	411.3	.0000		
0 9	.0000	411.2	411.2	411.2	411.2	411.2	411.2	411.3	411.3	411.3
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	411.3	411.3	411.3	411.3	411.3	411.3	411.3	.0000		
0 10	.0000	411.2	411.2	411.2	411.2	411.2	411.2	411.2	411.2	411.3
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0 12	.0000	411.1	411.1	411.2	411.2	411.2	411.2	411.2	411.2	411.2
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0 16	.0000	411.1	411.1	411.1	411.1	411.1	411.1	411.1	411.1	411.2
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0 17	.0000	411.1	411.1	411.1	411.1	411.1	411.1	411.1	411.1	411.1
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0 19	.0000	411.0	411.0	411.0	411.0	411.0	411.1	411.1	411.1	411.1
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	411.1	411.1	411.1	411.1	411.1	411.1	411.1	.0000		
0 20	.0000	411.0	411.0	411.0	411.0	411.0	411.0	411.0	411.1	411.1
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	411.1	411.1	411.1	411.1	411.1	411.1	411.1	.0000		
0 21	.0000	411.0	411.0	411.0	411.0	411.0	411.0	411.0	411.0	411.1

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	411.1	411.1	411.1	411.1	411.1	411.1	411.1	.0000		
0 22	.0000	411.0	411.0	411.0	411.0	411.0	411.0	411.0	411.0	411.0
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0 23	.0000	410.9	410.9	411.0	411.0	411.0	411.0	411.0	411.0	411.0
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0 24	.0000	410.9	410.9	410.9	411.0	411.0	411.0	411.0	411.0	411.0
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0 25	.0000	410.9	410.9	410.9	410.9	410.9	410.9	411.0	411.0	411.0
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0 26	.0000	410.9	410.9	410.9	410.9	410.9	410.9	410.9	410.9	411.0
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0 27	.0000	410.8	410.9	410.9	410.9	410.9	410.9	410.9	410.9	410.9
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	411.0	410.9	410.9	410.9	410.9	410.9	410.9	.0000		
0 28	.0000	410.8	410.8	410.9	410.9	410.9	410.9	410.9	410.9	410.9
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0 29	.0000	410.8	410.8	410.8	410.8	410.8	410.9	410.9	410.9	410.9
	410.9	410.9	410.9	410.9	410.9	410.9	410.9	410.9	410.9	410.9
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	410.9	410.9	410.9	410.9	410.8	410.8	410.8	.0000		
0 30	.0000	410.8	410.8	410.8	410.8	410.8	410.8	410.8	410.8	410.9
	410.9	410.9	410.9	410.9	410.9	410.9	410.9	410.9	410.9	410.9
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	410.9	410.8	410.8	410.8	410.8	410.8	410.8	.0000		
0 31	.0000	410.7	410.7	410.7	410.8	410.8	410.8	410.8	410.8	410.8
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	410.8	410.8	410.8	410.8	410.8	410.8	410.8	410.8	410.8	410.8
	410.8	410.8	410.8	410.8	410.7	410.7	410.7	.0000		
0 32	.0000	410.6	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.8
	410.8	410.8	410.8	410.8	410.8	410.8	410.8	410.8	410.8	410.8
	410.8	410.8	410.8	410.7	410.7	410.7	410.7	410.7	410.7	410.7
	410.7	410.7	410.7	410.7	410.7	410.6	410.6	.0000		
0 33	.0000	410.6	410.6	410.6	410.7	410.7	410.7	410.7	410.7	410.7
	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.6	410.6	410.6
	410.6	410.6	410.6	410.6	410.6	410.6	410.6	.0000		
0 34	.0000	410.5	410.6	410.6	410.6	410.6	410.6	410.6	410.6	410.6
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	410.6	410.5	410.5	410.5	410.5	410.5	410.5	.0000		
0 35	.0000	410.4	410.5	410.5	410.5	410.5	410.5	410.5	410.5	410.5
	410.5	410.5	410.5	410.5	410.5	410.5	410.5	410.5	410.5	410.5
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	410.5	410.5	410.5	410.4	410.4	410.4	410.4	.0000		
0 36	.0000	410.4	410.4	410.4	410.5	410.5	410.5	410.5	410.5	410.5

	410.5	410.5	410.5	410.5	410.4	410.4	410.4	410.4	410.4	410.4
	410.4	410.4	410.4	410.4	410.4	410.4	410.4	410.4	410.4	410.4
	410.4	410.4	410.4	410.4	410.4	410.3	410.3	.0000		
0 37	.0000	410.3	410.3	410.4	410.4	410.4	410.4	410.4	410.4	410.4
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	410.3	410.3	410.3	410.3	410.3	410.3	410.2	.0000		
0 38	.0000	410.2	410.2	410.3	410.3	410.3	410.3	410.3	410.3	410.3
	410.3	410.3	410.3	410.3	410.3	410.3	410.3	410.2	410.2	410.2
	410.2	410.2	410.2	410.2	410.2	410.2	410.2	410.2	410.2	410.2
	410.2	410.2	410.2	410.2	410.2	410.2	410.2	.0000		
0 39	.0000	410.1	410.1	410.2	410.2	410.2	410.2	410.3	410.2	410.2
	410.2	410.2	410.2	410.2	410.2	410.2	410.1	410.1	410.1	410.1
	410.1	410.1	410.1	410.1	410.1	410.1	410.1	410.1	410.1	410.1
	410.1	410.1	410.1	410.1	410.1	410.1	410.1	.0000		
0 40	.0000	410.0	410.0	410.0	410.0	410.1	410.1	410.1	410.1	410.1
	410.1	410.1	410.1	410.0	410.0	410.0	410.0	410.0	410.0	410.0
	410.0	410.0	410.0	410.0	410.0	410.0	410.0	410.0	410.0	410.0
	410.0	410.0	410.0	410.0	410.0	410.0	410.0	.0000		
0 41	.0000	409.8	409.8	409.8	409.9	409.9	409.9	409.9	409.9	409.9
	409.9	409.9	409.9	409.9	409.9	409.9	409.9	409.9	409.9	409.9
	409.9	409.9	409.9	409.9	409.8	409.8	409.8	409.8	409.8	409.8
	409.8	409.8	409.8	409.8	409.8	409.8	409.8	.0000		
0 42	.0000	409.5	409.6	409.6	409.6	409.6	409.6	409.6	409.6	409.6
	409.6	409.6	409.6	409.6	409.6	409.6	409.6	409.6	409.6	409.6
	409.6	409.6	409.6	409.6	409.6	409.6	409.6	409.6	409.6	409.6
	409.6	409.6	409.6	409.6	409.6	409.6	409.6	.0000		
0 43	.0000	409.2	409.2	409.3	409.3	409.3	409.3	409.3	409.3	409.3
	409.3	409.3	409.3	409.3	409.3	409.3	409.3	409.3	409.3	409.3
	409.3	409.3	409.3	409.3	409.3	409.3	409.3	409.3	409.3	409.3
	409.3	409.3	409.3	409.3	409.3	409.3	409.3	.0000		
0 44	.0000	408.8	408.9	409.0	409.0	409.0	409.0	409.0	409.0	409.0
	409.0	409.0	409.0	409.0	409.0	409.0	409.0	409.0	409.0	409.0
	409.0	409.0	409.0	409.0	409.0	409.0	409.0	409.0	409.0	409.0
	409.0	409.0	409.0	409.0	409.0	409.0	409.0	.0000		

OHEAD PRINT FORMAT IS FORMAT NUMBER -4 DRAWDOWN PRINT FORMAT IS FORMAT NUMBER -10

OHEADS WILL BE SAVED ON UNIT 98 DRAWDOWNS WILL BE SAVED ON UNIT 99

OOUTPUT CONTROL IS SPECIFIED EVERY TIME STEP

0 COLUMN TO ROW ANISOTROPY = 1.000000

0

DELR WILL BE READ ON UNIT 11 USING FORMAT: (7G11.4)

300.00	300.00	300.00	200.00	150.00	100.00	100.00	100.00	75.000	75.000
50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000
50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000
50.000	75.000	75.000	100.00	150.00	200.00	300.00	300.00		

0

DELC WILL BE READ ON UNIT 11 USING FORMAT: (7G11.4)

200.00	200.00	150.00	100.00	100.00	75.000	75.000	50.000	50.000	50.000
50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000
50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	75.000	75.000
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00
200.00	300.00	300.00	300.00						

0

PRIMARY STORAGE COEF = .1500000E-01 FOR LAYER 1

0

TRANSMIS. ALONG ROWS FOR LAYER 1 WILL BE READ ON UNIT 11 USING FORMAT: (7G11.4)

	1 11 21 31	2 12 22 32	3 13 23 33	4 14 24 34	5 15 25 35	6 16 26 36	7 17 27 37	8 18 28 38	9 19 29	10 20 30
0 1	.0000	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	70.00	70.00	70.00	70.00
	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00
	70.00	70.00	70.00	70.00	70.00	70.00	70.00	.0000		
0 2	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	100.0
	100.0	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 3	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	100.0
	100.0	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 4	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	100.0
	100.0	100.0	100.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 5	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 6	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 7	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 8	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 9	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 10	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	200.0	200.0	200.0	200.0	200.0	.0000		
0 11	.0000	60.00	100.0	100.0	100.0	100.0	100.0	60.00	60.00	60.00
	60.00	60.00	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 12	.0000	60.00	100.0	100.0	100.0	100.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		

0 13	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 14	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 15	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 16	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 17	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	200.0	200.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 18	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	60.00	60.00
	60.00	60.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0000		
0 19	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	45.00	45.00
	45.00	45.00	125.0	125.0	125.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 20	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	45.00	45.00
	45.00	45.00	45.00	45.00	100.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 21	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	45.00	45.00
	45.00	45.00	45.00	45.00	100.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 22	.0000	60.00	100.0	120.0	120.0	120.0	100.0	60.00	45.00	45.00
	45.00	45.00	45.00	45.00	100.0	250.0	250.0	250.0	250.0	250.0
	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 23	.0000	60.00	100.0	120.0	120.0	120.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 24	.0000	60.00	100.0	120.0	120.0	120.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 25	.0000	60.00	100.0	120.0	120.0	120.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 26	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 27	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		

0 28	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 29	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 30	.0000	60.00	100.0	100.0	100.0	100.0	100.0	100.0	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	100.0	100.0	60.00	60.00	60.00	60.00	60.00	.0000		
0 31	.0000	60.00	100.0	100.0	100.0	100.0	100.0	60.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 32	.0000	60.00	100.0	100.0	100.0	100.0	100.0	60.00	60.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 33	.0000	60.00	100.0	100.0	100.0	100.0	60.00	60.00	60.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 34	.0000	60.00	60.00	100.0	100.0	100.0	60.00	60.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
	60.00	60.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 35	.0000	60.00	60.00	60.00	60.00	60.00	60.00	60.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 36	.0000	60.00	60.00	60.00	60.00	60.00	60.00	60.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 37	.0000	60.00	60.00	60.00	60.00	60.00	60.00	60.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 38	.0000	60.00	60.00	45.00	45.00	45.00	45.00	45.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 39	.0000	60.00	60.00	45.00	45.00	20.00	20.00	45.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 40	.0000	60.00	60.00	45.00	45.00	20.00	20.00	20.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 41	.0000	60.00	60.00	45.00	45.00	20.00	20.00	20.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		
0 42	.0000	60.00	60.00	45.00	45.00	20.00	20.00	20.00	20.00	20.00
	20.00	20.00	20.00	20.00	20.00	20.00	20.00	45.00	45.00	45.00
	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	45.00	45.00	60.00	60.00	60.00	60.00	60.00	.0000		

```
0 43   .0000     60.00     60.00     45.00     45.00     20.00     20.00     20.00     20.00     20.00
       20.00     20.00     20.00     20.00     20.00     20.00     20.00     45.00     45.00     45.00
       45.00     45.00     45.00     45.00     45.00     45.00     45.00     45.00     45.00     45.00
       45.00     45.00     60.00     60.00     60.00     60.00     60.00     .0000
0 44   .0000     60.00     60.00     45.00     45.00     20.00     20.00     20.00     20.00     20.00
       20.00     20.00     20.00     20.00     20.00     20.00     20.00     45.00     45.00     45.00
       45.00     45.00     45.00     45.00     45.00     45.00     45.00     45.00     45.00     45.00
       45.00   - 45.00     60.00     60.00     60.00     60.00     60.00     .0000
0

                                          SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE
                                          ---------------------------------------
0                                   MAXIMUM ITERATIONS ALLOWED FOR CLOSURE =       100
                                                   ACCELERATION PARAMETER =     1.0000
                                       HEAD CHANGE CRITERION FOR CLOSURE =     .10000E-03
                                       SIP HEAD CHANGE PRINTOUT INTERVAL =        1
0                                      CALCULATE ITERATION PARAMETERS FROM MODEL CALCULATED WSEED·
1                                     STRESS PERIOD NO.   1, LENGTH =   900.0000
                                      --------------------------------------------

                                      NUMBER OF TIME STEPS =     4

                                       MULTIPLIER FOR DELT =     1.500

                                    INITIAL TIME STEP SIZE =   110.7692
0            1 WELLS
                                   LAYER    ROW    COL    STRESS RATE   WELL NO.
                                   ------------------------------------------
                                     1       15     17     -34.200          1
0                                                      RECHARGE =   .3050000E-05
0AVERAGE SEED =  .00073333
 MINIMUM SEED =  .00005013
0
   5 ITERATION PARAMETERS CALCULATED FROM AVERAGE SEED:

          .0000000E+00   .8354398E+00   .9729199E+00   .9955437E+00   .9992667E+00
0
   16 ITERATIONS FOR TIME STEP   1 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ------------------------------------------------------------------------------------------------------------------------------------
  -.4510E-01 (  1, 15, 17)  -.1998E-01 (  1, 16, 16)  -.2372E-01 (  1, 16, 16)  -.3750E-01 (  1, 18, 16)  -.2689E-01 (  1,  8, 14)
   .2203E-02 (  1, 25, 15)   .2634E-02 (  1, 26, 16)  -.2542E-02 (  1, 21,  5)   .5412E-02 (  1, 13, 22)   .3126E-02 (  1,  9, 33)
   .2653E-03 (  1,  9,  3)  -.2721E-03 (  1, 18, 27)  -.6481E-03 (  1, 16, 26)  -.9361E-03 (  1, 19, 22)  -.7831E-03 (  1, 26, 24)
   .8165E-04 (  1, 24, 15)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:
   HEAD    DRAWDOWN  HEAD  DRAWDOWN
 PRINTOUT  PRINTOUT  SAVE    SAVE
 ---------------------------------
     0         0       0       0
   11 ITERATIONS FOR TIME STEP   2 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ------------------------------------------------------------------------------------------------------------------------------------
  -.2590E-02 (  1, 30, 37)  -.2527E-02 (  1, 32, 36)  -.5304E-02 (  1, 34,  6)  -.1170E-01 (  1, 24, 16)  -.1294E-01 (  1, 23, 23)
  -.4323E-03 (  1, 11, 35)  -.7548E-03 (  1,  6, 34)  -.8934E-03 (  1,  7, 35)   .1154E-02 (  1, 28, 21)  -.7201E-03 (  1, 26, 17)
   .9665E-04 (  1, 33, 12)
```

```
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:
   HEAD    DRAWDOWN  HEAD  DRAWDOWN
 PRINTOUT  PRINTOUT  SAVE    SAVE
 ---------------------------------
     0         0       0       0
    11 ITERATIONS FOR TIME STEP   3 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ------------------------------------------------------------------------------------------------------------------------------------
   -.2404E-02 (  1, 31, 37)  -.2456E-02 (  1, 34, 36)  -.5346E-02 (  1, 36,  7)  -.7719E-02 (  1, 33, 25)  -.8103E-02 (  1, 23, 23)
   -.3018E-03 (  1, 40,  2)  -.4112E-03 (  1,  6, 34)  -.5535E-03 (  1,  8, 35)  -.7285E-03 (  1,  8, 32)  -.9057E-03 (  1, 22, 23)
    .6864E-04 (  1, 33, 11)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 0     TOTAL BUDGET PRINTOUT FLAG = 0     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:
   HEAD    DRAWDOWN  HEAD  DRAWDOWN
 PRINTOUT  PRINTOUT  SAVE    SAVE
 ---------------------------------
     0         0       0       0
    11 ITERATIONS FOR TIME STEP   4 IN STRESS PERIOD  1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ------------------------------------------------------------------------------------------------------------------------------------
   -.1556E-02 (  1, 35,  2)  -.1669E-02 (  1, 38,  3)  -.3877E-02 (  1, 38,  8)  -.5231E-02 (  1, 35, 24)  -.5223E-02 (  1, 29, 11)
   -.2740E-03 (  1, 41,  2)  -.3063E-03 (  1, 28, 17)  -.3216E-03 (  1,  8, 35)  -.4771E-03 (  1,  9, 31)  -.7512E-03 (  1, 21, 24)
    .4134E-04 (  1, 33, 10)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 1     TOTAL BUDGET PRINTOUT FLAG = 1     CELL-BY-CELL FLOW TERM FLAG = 0
0OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:
   HEAD    DRAWDOWN  HEAD  DRAWDOWN
 PRINTOUT  PRINTOUT  SAVE    SAVE
 ---------------------------------
     1         1       1       1
1                    HEAD IN LAYER  1 AT END OF TIME STEP  4 IN STRESS PERIOD  1
                  ------------------------------------------------------------------
```

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0 1	77.00	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50
0 2	77.00	411.42	411.41	411.41	411.41	411.41	411.41	411.40	411.40	411.40	411.39	411.39	411.38	411.38	411.38
0 3	77.00	411.35	411.35	411.35	411.35	411.35	411.35	411.34	411.34	411.34	411.34	411.34	411.33	411.33	411.33
0 4	77.00	411.31	411.30	411.30	411.30	411.30	411.30	411.30	411.30	411.30	411.30	411.30	411.30	411.30	411.29
0 5	77.00	411.27	411.27	411.27	411.27	411.27	411.27	411.27	411.27	411.27	411.27	411.27	411.27	411.27	411.26
0 6	77.00	411.23	411.23	411.23	411.23	411.24	411.24	411.24	411.24	411.24	411.24	411.24	411.24	411.24	411.24
0 7	77.00	411.21	411.20	411.21	411.21	411.21	411.21	411.22	411.22	411.22	411.22	411.22	411.22	411.22	411.22
0 8	77.00	411.18	411.18	411.18	411.18	411.19	411.19	411.20	411.20	411.20	411.20	411.20	411.20	411.20	411.20
0 9	77.00	411.16	411.16	411.16	411.16	411.17	411.17	411.18	411.18	411.19	411.19	411.18	411.18	411.18	411.18
0 10	77.00	411.14	411.14	411.14	411.15	411.15	411.16	411.17	411.17	411.17	411.17	411.17	411.17	411.17	411.16
0 11	77.00	411.12	411.12	411.12	411.13	411.13	411.14	411.15	411.15	411.15	411.16	411.15	411.15	411.15	411.15
0 12	77.00	411.10	411.10	411.10	411.11	411.11	411.12	411.13	411.13	411.13	411.13	411.13	411.14	411.13	411.13
0 13	77.00	411.08	411.08	411.08	411.09	411.09	411.10	411.11	411.11	411.11	411.11	411.11	411.11	411.11	411.10
0 14	77.00	411.06	411.06	411.06	411.07	411.07	411.08	411.09	411.09	411.10	411.10	411.09	411.09	411.09	411.08
0 15	77.00	411.04	411.04	411.05	411.05	411.06	411.06	411.07	411.07	411.08	411.08	411.08	411.07	411.07	411.06
0 16	77.00	411.02	411.03	411.03	411.03	411.04	411.04	411.05	411.06	411.06	411.06	411.06	411.06	411.06	411.05
0 17	77.00	411.00	411.01	411.01	411.01	411.02	411.02	411.03	411.04	411.04	411.05	411.05	411.05	411.05	411.04
0 18	77.00	410.98	410.99	410.99	410.99	411.00	411.00	411.01	411.02	411.03	411.03	411.04	411.04	411.04	411.04
0 19	77.00	410.96	410.96	410.97	410.98	410.98	410.98	410.99	411.00	411.01	411.02	411.02	411.03	411.03	411.03
0 20	77.00	410.94	410.94	410.95	410.96	410.96	410.96	410.97	410.98	410.99	411.00	411.01	411.01	411.02	411.02

Greg, 4653 2-9-91

: VDH #1

all I can say is 250gpm x 5 wells is
one heck of a lot of water to be treated!

~~Design~~ flow 7.0mgd - MLD
ADF 2.4 mgd → peak > 7.0
Chromium (T) eff. limit. 2.0 lb/D new limit A.L.
→ 34 ppb

WQ - 50ppb

0 21	77.00	410.92	410.92	410.93	410.94	410.94	410.94	410.95	410.96	410.97	410.98	410.99	411.00	411.00	411.01
0 22	77.00	410.90	410.90	410.91	410.92	410.92	410.92	410.93	410.94	410.95	410.96	410.97	410.98	410.99	411.00
0 23	77.00	410.87	410.88	410.89	410.90	410.90	410.90	410.91	410.92	410.93	410.94	410.95	410.96	410.97	410.98
0 24	77.00	410.85	410.86	410.87	410.88	410.88	410.89	410.89	410.90	410.91	410.92	410.93	410.94	410.94	410.95
0 25	77.00	410.83	410.84	410.85	410.86	410.86	410.87	410.87	410.88	410.89	410.90	410.91	410.91	410.92	410.93
0 26	77.00	410.81	410.82	410.83	410.84	410.84	410.85	410.85	410.86	410.87	410.88	410.88	410.89	410.90	410.90
0 27	77.00	410.78	410.79	410.81	410.82	410.82	410.82	410.83	410.84	410.85	410.86	410.86	410.87	410.87	410.88
0 28	77.00	410.76	410.77	410.78	410.79	410.80	410.80	410.81	410.82	410.83	410.83	410.84	410.85	410.85	410.85
0 29	77.00	410.73	410.74	410.75	410.76	410.77	410.78	410.78	410.79	410.80	410.81	410.81	410.82	410.82	410.82
0 30	77.00	410.69	410.70	410.72	410.73	410.74	410.74	410.75	410.76	410.77	410.78	410.78	410.79	410.79	410.79
0 31	77.00	410.64	410.66	410.68	410.69	410.70	410.70	410.71	410.72	410.73	410.74	410.75	410.75	410.75	410.75
0 32	77.00	410.58	410.61	410.63	410.64	410.65	410.66	410.66	410.67	410.68	410.69	410.69	410.69	410.69	410.69
0 33	77.00	410.52	410.56	410.58	410.59	410.60	410.60	410.61	410.62	410.62	410.62	410.62	410.62	410.62	410.61
0 34	77.00	410.46	410.50	410.53	410.54	410.54	410.54	410.54	410.55	410.55	410.54	410.54	410.54	410.54	410.54
0 35	77.00	410.38	410.42	410.46	410.48	410.48	410.48	410.48	410.48	410.47	410.47	410.47	410.46	410.46	410.46
0 36	77.00	410.30	410.34	410.38	410.40	410.41	410.41	410.41	410.41	410.40	410.39	410.39	410.38	410.38	410.38
0 37	77.00	410.22	410.25	410.30	410.33	410.34	410.35	410.35	410.34	410.32	410.31	410.31	410.30	410.30	410.29
0 38	77.00	410.14	410.16	410.21	410.24	410.27	410.28	410.27	410.26	410.24	410.23	410.22	410.22	410.21	410.20
0 39	77.00	410.05	410.07	410.11	410.14	410.17	410.19	410.19	410.17	410.15	410.14	410.13	410.13	410.12	410.12
0 40	77.00	409.93	409.95	409.98	410.01	410.03	410.04	410.05	410.04	410.03	410.02	410.02	410.01	410.01	410.00
0 41	77.00	409.76	409.78	409.81	409.82	409.84	409.85	409.85	409.85	409.85	409.85	409.84	409.84	409.84	409.83
0 42	77.00	409.51	409.53	409.55	409.57	409.58	409.59	409.59	409.60	409.60	409.60	409.60	409.60	409.59	409.59
0 43	77.00	409.18	409.22	409.26	409.27	409.28	409.29	409.30	409.30	409.30	409.30	409.30	409.30	409.30	409.30
0 44	77.00	408.80	408.90	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00

1 HEAD IN LAYER 1 AT END OF TIME STEP 4 IN STRESS PERIOD 1

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
0 1	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50	411.50
0 2	411.38	411.38	411.38	411.39	411.39	411.39	411.40	411.40	411.40	411.40	411.40	411.40	411.40	411.40	411.40
0 3	411.33	411.33	411.33	411.33	411.33	411.34	411.34	411.34	411.34	411.34	411.35	411.35	411.35	411.35	411.35
0 4	411.29	411.29	411.29	411.29	411.29	411.29	411.29	411.30	411.30	411.31	411.31	411.31	411.31	411.32	411.32
0 5	411.26	411.26	411.26	411.26	411.26	411.26	411.26	411.27	411.27	411.28	411.28	411.28	411.29	411.29	411.29
0 6	411.24	411.24	411.24	411.24	411.24	411.24	411.24	411.24	411.25	411.25	411.25	411.26	411.26	411.27	411.27
0 7	411.21	411.21	411.21	411.22	411.22	411.22	411.22	411.22	411.23	411.23	411.23	411.24	411.24	411.25	411.25
0 8	411.20	411.19	411.20	411.20	411.20	411.20	411.20	411.20	411.21	411.21	411.22	411.22	411.22	411.23	411.23
0 9	411.18	411.18	411.18	411.18	411.18	411.18	411.19	411.19	411.19	411.20	411.20	411.21	411.21	411.21	411.22
0 10	411.16	411.16	411.16	411.16	411.17	411.17	411.17	411.18	411.18	411.18	411.19	411.19	411.20	411.20	411.21
0 11	411.14	411.14	411.14	411.15	411.15	411.15	411.16	411.16	411.17	411.17	411.17	411.18	411.18	411.19	411.19
0 12	411.12	411.12	411.12	411.13	411.13	411.14	411.14	411.15	411.15	411.16	411.16	411.17	411.17	411.17	411.18
0 13	411.10	411.10	411.10	411.11	411.11	411.12	411.13	411.13	411.14	411.14	411.15	411.15	411.16	411.16	411.16
0 14	411.07	411.07	411.08	411.09	411.10	411.10	411.11	411.12	411.12	411.13	411.13	411.14	411.14	411.15	411.15
0 15	411.05	411.02	411.05	411.07	411.08	411.09	411.10	411.10	411.11	411.12	411.12	411.13	411.13	411.13	411.14
0 16	411.04	411.04	411.05	411.06	411.07	411.08	411.08	411.09	411.10	411.10	411.11	411.11	411.12	411.12	411.12
0 17	411.04	411.04	411.04	411.05	411.06	411.07	411.07	411.08	411.09	411.09	411.10	411.10	411.10	411.11	411.11
0 18	411.03	411.04	411.04	411.04	411.05	411.05	411.06	411.06	411.07	411.08	411.08	411.08	411.09	411.09	411.09
0 19	411.03	411.03	411.03	411.03	411.04	411.04	411.04	411.05	411.05	411.06	411.06	411.06	411.06	411.07	411.07
0 20	411.02	411.02	411.02	411.03	411.03	411.03	411.03	411.03	411.03	411.04	411.04	411.04	411.04	411.04	411.04
0 21	411.01	411.01	411.02	411.02	411.02	411.02	411.02	411.02	411.02	411.02	411.02	411.02	411.02	411.02	411.02
0 22	411.00	411.01	411.01	411.01	411.01	411.01	411.01	411.00	411.00	411.00	410.99	410.99	410.99	410.99	410.99
0 23	410.99	410.99	410.99	411.00	411.00	410.99	410.99	410.98	410.98	410.97	410.97	410.97	410.97	410.97	410.97
0 24	410.96	410.97	410.97	410.97	410.97	410.97	410.96	410.96	410.95	410.95	410.95	410.95	410.95	410.95	410.94
0 25	410.93	410.94	410.94	410.94	410.94	410.94	410.94	410.93	410.93	410.93	410.93	410.92	410.92	410.92	410.92
0 26	410.91	410.91	410.91	410.91	410.91	410.91	410.91	410.91	410.91	410.90	410.90	410.90	410.90	410.90	410.89
0 27	410.88	410.88	410.89	410.89	410.89	410.89	410.88	410.88	410.88	410.88	410.88	410.88	410.87	410.87	410.87
0 28	410.86	410.86	410.86	410.86	410.86	410.86	410.86	410.86	410.86	410.85	410.85	410.85	410.85	410.85	410.84
0 29	410.83	410.83	410.83	410.83	410.83	410.83	410.83	410.83	410.83	410.82	410.82	410.82	410.82	410.82	410.81
0 30	410.79	410.79	410.79	410.79	410.78	410.78	410.79	410.79	410.79	410.79	410.79	410.79	410.78	410.78	410.78
0 31	410.75	410.75	410.74	410.74	410.73	410.73	410.73	410.73	410.74	410.73	410.73	410.73	410.73	410.73	410.72

0 32	410.69	410.68	410.67	410.67	410.67	410.67	410.67	410.67	410.66	410.66	410.66	410.66	410.65	410.65	410.65
0 33	410.61	410.61	410.60	410.60	410.60	410.60	410.60	410.60	410.59	410.59	410.59	410.59	410.58	410.58	410.57
0 34	410.54	410.53	410.53	410.53	410.53	410.53	410.53	410.53	410.52	410.52	410.52	410.52	410.51	410.51	410.50
0 35	410.46	410.46	410.46	410.45	410.45	410.45	410.45	410.45	410.45	410.44	410.44	410.44	410.43	410.43	410.42
0 36	410.37	410.37	410.37	410.37	410.36	410.36	410.36	410.36	410.35	410.35	410.35	410.34	410.34	410.34	410.33
0 37	410.29	410.28	410.28	410.28	410.27	410.27	410.27	410.27	410.26	410.26	410.26	410.25	410.25	410.25	410.24
0 38	410.20	410.19	410.19	410.19	410.18	410.18	410.18	410.18	410.17	410.17	410.17	410.16	410.16	410.16	410.15
0 39	410.11	410.10	410.10	410.10	410.09	410.09	410.09	410.09	410.08	410.08	410.08	410.07	410.07	410.07	410.07
0 40	409.99	409.99	409.98	409.98	409.98	409.98	409.97	409.97	409.97	409.97	409.96	409.96	409.96	409.96	409.95
0 41	409.83	409.82	409.82	409.82	409.82	409.82	409.81	409.81	409.81	409.81	409.81	409.80	409.80	409.80	409.80
0 42	409.59	409.59	409.58	409.58	409.58	409.58	409.58	409.58	409.58	409.58	409.57	409.57	409.57	409.57	409.57
0 43	409.30	409.30	409.30	409.29	409.29	409.29	409.29	409.29	409.29	409.29	409.29	409.29	409.29	409.29	409.29
0 44	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00	409.00

1 HEAD IN LAYER 1 AT END OF TIME STEP 4 IN STRESS PERIOD 1

	31	32	33	34	35	36	37	38
0 1	411.50	411.50	411.50	411.50	411.50	411.50	411.50	77.00
0 2	411.40	411.40	411.40	411.41	411.41	411.41	411.41	77.00
0 3	411.35	411.36	411.36	411.36	411.37	411.37	411.37	77.00
0 4	411.32	411.32	411.33	411.33	411.34	411.34	411.35	77.00
0 5	411.30	411.30	411.30	411.31	411.31	411.32	411.32	77.00
0 6	411.27	411.28	411.28	411.29	411.29	411.30	411.31	77.00
0 7	411.25	411.26	411.26	411.27	411.28	411.28	411.29	77.00
0 8	411.24	411.24	411.25	411.26	411.26	411.27	411.28	77.00
0 9	411.22	411.23	411.24	411.24	411.25	411.26	411.27	77.00
0 10	411.21	411.22	411.23	411.23	411.24	411.25	411.26	77.00
0 11	411.20	411.20	411.21	411.22	411.23	411.24	411.24	77.00
0 12	411.18	411.19	411.19	411.20	411.21	411.22	411.22	77.00
0 13	411.17	411.17	411.18	411.18	411.19	411.20	411.21	77.00
0 14	411.15	411.16	411.16	411.17	411.17	411.18	411.19	77.00
0 15	411.14	411.14	411.15	411.15	411.16	411.16	411.17	77.00
0 16	411.13	411.13	411.13	411.13	411.14	411.14	411.15	77.00
0 17	411.11	411.11	411.11	411.12	411.12	411.13	411.13	77.00
0 18	411.09	411.10	411.10	411.10	411.10	411.11	411.11	77.00
0 19	411.07	411.07	411.08	411.08	411.08	411.08	411.09	77.00
0 20	411.04	411.05	411.05	411.05	411.05	411.05	411.06	77.00
0 21	411.02	411.02	411.02	411.02	411.02	411.02	411.02	77.00
0 22	410.99	410.99	410.99	410.99	410.99	410.99	410.99	77.00
0 23	410.97	410.97	410.97	410.97	410.97	410.96	410.96	77.00
0 24	410.94	410.94	410.94	410.94	410.94	410.93	410.93	77.00
0 25	410.92	410.92	410.91	410.91	410.91	410.90	410.90	77.00
0 26	410.89	410.89	410.89	410.88	410.88	410.87	410.87	77.00
0 27	410.87	410.86	410.86	410.85	410.85	410.84	410.83	77.00
0 28	410.84	410.84	410.83	410.82	410.82	410.81	410.80	77.00
0 29	410.81	410.81	410.80	410.79	410.78	410.77	410.76	77.00
0 30	410.77	410.77	410.75	410.74	410.73	410.72	410.71	77.00
0 31	410.72	410.71	410.70	410.68	410.67	410.66	410.65	77.00
0 32	410.64	410.63	410.62	410.61	410.60	410.59	410.58	77.00
0 33	410.57	410.56	410.55	410.54	410.53	410.51	410.50	77.00
0 34	410.50	410.49	410.48	410.46	410.45	410.44	410.43	77.00
0 35	410.42	410.41	410.39	410.38	410.37	410.36	410.35	77.00
0 36	410.33	410.32	410.31	410.30	410.29	410.28	410.27	77.00
0 37	410.24	410.23	410.23	410.22	410.21	410.20	410.19	77.00
0 38	410.15	410.15	410.14	410.13	410.13	410.12	410.11	77.00
0 39	410.06	410.06	410.05	410.05	410.04	410.04	410.03	77.00
0 40	409.95	409.95	409.94	409.94	409.93	409.93	409.92	77.00
0 41	409.79	409.79	409.79	409.79	409.78	409.78	409.77	77.00
0 42	409.57	409.56	409.56	409.56	409.56	409.55	409.55	77.00

0 43	409.29	409.29	409.28	409.28	409.28	409.28	409.28	77.00
0 44	409.00	409.00	409.00	409.00	409.00	409.00	409.00	77.00

0HEAD WILL BE SAVED ON UNIT 98 AT END OF TIME STEP 4, STRESS PERIOD 1

1 DRAWDOWN IN LAYER 1 AT END OF TIME STEP 4 IN STRESS PERIOD 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0 1	*****	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
0 2	*****	.010	.010	.012	.022	.023	.024	.026	.029	.022	.027	.031	.035	.027	.027	.027	.027	.036	.034	.030
0 3	*****	.027	.022	.023	.034	.034	.035	.036	.038	.040	.043	.045	.046	.047	.047	.048	.048	.048	.047	.046
0 4	*****	.024	.027	.028	.038	.037	.037	.048	.049	.050	.052	.053	.054	.055	.055	.056	.056	.057	.057	.059
0 5	*****	.032	.034	.034	.043	.042	.051	.051	.051	.062	.063	.064	.064	.065	.065	.066	.066	.067	.068	.070
0 6	*****	.035	.037	.047	.045	.053	.051	.060	.059	.059	.070	.070	.071	.071	.072	.072	.073	.073	.073	.073
0 7	*****	.044	.045	.045	.053	.050	.057	.064	.062	.072	.072	.073	.074	.074	.085	.085	.086	.085	.085	.084
0 8	*****	.038	.039	.049	.056	.052	.058	.064	.071	.070	.081	.082	.082	.083	.084	.085	.085	.085	.084	.083
0 9	*****	.047	.048	.048	.055	.061	.066	.069	.076	.075	.085	.086	.087	.088	.090	.091	.092	.091	.090	.088
0 10	*****	.047	.048	.048	.055	.060	.064	.064	.070	.078	.088	.090	.092	.093	.095	.098	.099	.099	.097	.095
0 11	*****	.046	.047	.058	.054	.059	.063	.072	.077	.085	.085	.095	.096	.098	.101	.106	.108	.107	.105	.101
0 12	*****	.046	.047	.059	.055	.059	.062	.074	.078	.086	.095	.105	.105	.107	.112	.118	.119	.117	.113	.108
0 13	*****	.046	.056	.058	.064	.068	.072	.074	.078	.096	.095	.106	.117	.121	.126	.132	.134	.129	.122	.116
0 14	*****	.056	.056	.056	.061	.066	.071	.073	.088	.095	.104	.115	.118	.122	.140	.148	.155	.143	.132	.123
0 15	*****	.056	.055	.064	.060	.065	.070	.083	.086	.093	.102	.113	.125	.130	.139	.153	.184	.157	.139	.128
0 16	*****	.056	.055	.062	.068	.063	.068	.081	.085	.100	.108	.118	.120	.134	.140	.147	.153	.141	.130	.130
0 17	*****	.057	.055	.061	.067	.072	.067	.080	.092	.096	.103	.112	.122	.124	.138	.141	.141	.135	.128	.121
0 18	*****	.058	.055	.060	.065	.071	.077	.079	.089	.102	.107	.114	.123	.123	.135	.135	.135	.131	.126	.122
0 19	*****	.059	.055	.060	.064	.070	.076	.079	.088	.100	.103	.117	.122	.121	.122	.132	.131	.128	.125	.122
0 20	*****	.060	.056	.059	.064	.070	.076	.080	.089	.099	.101	.114	.117	.122	.121	.120	.128	.126	.124	.122
0 21	*****	.061	.056	.069	.063	.069	.076	.081	.090	.089	.100	.103	.115	.117	.121	.118	.116	.114	.123	.111
0 22	*****	.063	.057	.068	.072	.069	.076	.074	.081	.090	.100	.102	.103	.113	.112	.117	.114	.112	.111	.110
0 23	*****	.055	.059	.068	.072	.068	.076	.075	.082	.090	.100	.102	.103	.113	.110	.111	.118	.116	.114	.114
0 24	*****	.058	.060	.068	.071	.067	.075	.082	.082	.090	.091	.093	.105	.105	.106	.107	.112	.110	.109	.109
0 25	*****	.061	.062	.068	.071	.076	.075	.081	.082	.091	.092	.094	.097	.099	.101	.105	.101	.099	.108	.098
0 26	*****	.064	.065	.070	.072	.067	.075	.080	.082	.082	.093	.096	.100	.093	.097	.102	.099	.097	.096	.097
0 27	*****	.058	.068	.063	.065	.069	.075	.080	.082	.082	.084	.088	.092	.097	.092	.098	.096	.094	.094	.094
0 28	*****	.062	.061	.067	.068	.072	.077	.081	.083	.083	.086	.090	.085	.090	.096	.093	.092	.091	.091	.091
0 29	*****	.063	.060	.067	.067	.070	.073	.076	.079	.079	.082	.087	.082	.089	.085	.093	.093	.093	.094	.094
0 30	*****	.062	.066	.062	.072	.074	.076	.075	.080	.081	.083	.079	.085	.081	.089	.088	.089	.092	.084	.086
0 31	*****	.059	.069	.065	.074	.075	.067	.077	.071	.077	.078	.083	.080	.088	.087	.088	.083	.090	.084	.087
0 32	*****	.066	.068	.063	.072	.073	.073	.069	.074	.072	.074	.080	.078	.078	.079	.082	.079	.086	.079	.081
0 33	*****	.057	.067	.063	.071	.064	.066	.073	.073	.074	.074	.074	.074	.075	.077	.079	.073	.076	.077	.079
0 34	*****	.055	.061	.063	.070	.065	.067	.065	.068	.073	.076	.067	.069	.071	.073	.074	.076	.076	.076	.077
0 35	*****	.058	.061	.060	.063	.068	.060	.061	.062	.066	.070	.073	.066	.069	.071	.073	.064	.075	.065	.066
0 36	*****	.056	.053	.060	.059	.059	.067	.068	.063	.060	.066	.061	.065	.069	.063	.067	.060	.063	.064	.066
0 37	*****	.047	.058	.059	.063	.056	.061	.063	.064	.057	.065	.062	.057	.063	.058	.063	.058	.061	.063	.056
0 38	*****	.053	.047	.049	.058	.055	.056	.056	.062	.058	.059	.056	.063	.059	.055	.061	.056	.051	.053	.055
0 39	*****	.042	.049	.050	.051	.057	.050	.057	.059	.056	.058	.055	.052	.049	.055	.051	.047	.051	.054	.046
0 40	*****	.038	.048	.047	.044	.044	.048	.048	.049	.049	.047	.053	.049	.045	.050	.046	.051	.045	.048	.040
0 41	*****	.037	.039	.034	.036	.043	.042	.046	.046	.039	.042	.045	.039	.043	.036	.041	.035	.038	.040	.042
0 42	*****	.021	.030	.026	.031	.031	.032	.025	.033	.032	.032	.033	.034	.026	.028	.030	.033	.025	.026	.028
0 43	*****	.013	.012	.012	.016	.017	.019	.014	.012	.020	.020	.020	.020	.020	.011	.012	.013	.015	.015	.016
0 44	*****	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

1 DRAWDOWN IN LAYER 1 AT END OF TIME STEP 4 IN STRESS PERIOD 1

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
0 1	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	*****
0 2	.027	.025	.024	.024	.024	.024	.023	.022	.031	.030	.029	.028	.027	.025	.023	.020	.018	*****
0 3	.044	.042	.040	.048	.046	.044	.043	.041	.039	.037	.035	.033	.031	.038	.034	.030	.027	*****

0	4	.059	.057	.052	.057	.054	.051	.049	.046	.043	.051	.048	.045	.042	.038	.034	.039	.034	*****
0	5	.070	.068	.064	.059	.064	.061	.057	.054	.051	.058	.055	.051	.047	.042	.047	.041	.036	*****
0	6	.072	.070	.067	.073	.069	.065	.061	.058	.064	.061	.057	.053	.048	.053	.046	.040	.044	*****
0	7	.082	.080	.077	.074	.070	.066	.072	.068	.065	.061	.057	.062	.057	.050	.053	.046	.040	*****
0	8	.081	.088	.085	.081	.077	.073	.069	.076	.072	.068	.063	.058	.061	.054	.056	.048	.042	*****
0	9	.086	.093	.090	.086	.082	.077	.073	.069	.075	.071	.067	.061	.063	.055	.056	.048	.042	*****
0	10	.092	.088	.094	.090	.086	.081	.077	.073	.069	.075	.070	.064	.064	.055	.056	.048	.042	*****
0	11	.098	.094	.099	.095	.090	.085	.081	.077	.073	.079	.075	.069	.069	.060	.061	.052	.047	*****
0	12	.104	.099	.094	.099	.094	.089	.085	.081	.077	.073	.069	.074	.067	.068	.059	.051	.046	*****
0	13	.110	.104	.099	.093	.098	.093	.088	.084	.080	.077	.073	.069	.073	.066	.057	.060	.055	*****
0	14	.115	.109	.103	.097	.091	.096	.092	.088	.084	.081	.078	.074	.069	.063	.065	.059	.054	*****
0	15	.120	.113	.106	.100	.094	.089	.095	.091	.087	.084	.081	.078	.075	.069	.063	.057	.052	*****
0	16	.123	.116	.109	.102	.096	.091	.087	.083	.080	.077	.085	.082	.070	.066	.061	.055	.051	*****
0	17	.115	.119	.111	.104	.098	.093	.089	.086	.083	.080	.078	.076	.076	.073	.068	.064	.060	*****
0	18	.117	.112	.105	.109	.104	.100	.096	.093	.091	.088	.077	.075	.072	.070	.066	.062	.059	*****
0	19	.118	.116	.112	.107	.104	.091	.089	.087	.085	.083	.081	.079	.075	.072	.069	.066	.063	*****
0	20	.120	.108	.107	.105	.104	.092	.091	.090	.088	.087	.086	.085	.082	.070	.068	.066	.065	*****
0	21	.110	.110	.112	.103	.104	.094	.093	.093	.082	.082	.081	.080	.079	.078	.067	.066	.056	*****
0	22	.110	.112	.108	.102	.094	.095	.096	.086	.086	.086	.086	.076	.075	.075	.066	.067	.057	*****
0	23	.105	.109	.098	.103	.096	.098	.089	.089	.090	.081	.081	.081	.082	.073	.075	.067	.059	*****
0	24	.101	.105	.102	.096	.099	.091	.092	.083	.084	.085	.086	.077	.079	.071	.074	.068	.060	*****
0	25	.100	.103	.097	.090	.092	.094	.086	.087	.089	.080	.081	.083	.076	.069	.074	.069	.062	*****
0	26	.098	.100	.093	.095	.086	.088	.090	.082	.083	.085	.077	.079	.073	.078	.074	.070	.065	*****
0	27	.095	.096	.088	.089	.091	.082	.084	.086	.078	.080	.082	.075	.080	.076	.074	.062	.067	*****
0	28	.092	.092	.093	.084	.085	.087	.088	.080	.083	.085	.078	.081	.078	.076	.065	.064	.060	*****
0	29	.085	.085	.084	.085	.085	.087	.078	.080	.083	.076	.079	.074	.073	.073	.064	.064	.062	*****
0	30	.086	.084	.081	.080	.081	.082	.084	.076	.079	.082	.077	.073	.077	.070	.072	.064	.062	*****
0	31	.088	.087	.085	.085	.085	.077	.079	.081	.075	.079	.074	.072	.075	.067	.071	.063	.063	*****
0	32	.083	.084	.085	.076	.077	.080	.072	.076	.069	.074	.069	.067	.067	.068	.061	.064	.064	*****
0	33	.081	.082	.074	.076	.078	.071	.074	.068	.072	.067	.073	.070	.070	.061	.064	.056	.056	*****
0	34	.079	.071	.073	.075	.068	.071	.074	.068	.073	.068	.064	.063	.065	.066	.059	.061	.061	*****
0	35	.068	.070	.072	.065	.068	.071	.065	.069	.063	.069	.065	.063	.055	.055	.057	.058	.057	*****
0	36	.068	.060	.063	.065	.058	.062	.065	.059	.064	.059	.064	.061	.059	.057	.057	.057	.055	*****
0	37	.058	.060	.063	.056	.059	.062	.055	.059	.053	.057	.052	.058	.054	.051	.049	.048	.045	*****
0	38	.058	.051	.053	.056	.049	.052	.055	.049	.052	.056	.050	.055	.050	.046	.053	.050	.047	*****
0	39	.049	.051	.054	.046	.049	.052	.045	.048	.051	.045	.048	.042	.047	.042	.047	.044	.040	*****
0	40	.043	.045	.048	.040	.043	.045	.048	.041	.043	.046	.039	.043	.047	.040	.045	.041	.036	*****
0	41	.034	.037	.039	.041	.033	.035	.037	.039	.032	.034	.036	.039	.032	.035	.039	.033	.037	*****
0	42	.029	.031	.032	.023	.025	.026	.028	.029	.031	.022	.024	.026	.028	.030	.022	.025	.028	*****
0	43	.017	.017	.018	.019	.009	.010	.011	.012	.012	.013	.014	.015	.016	.017	.018	.010	.011	*****
0	44	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	*****

0DRAWDOWN WILL BE SAVED ON UNIT 99 AT END OF TIME STEP 4, STRESS PERIOD 1

0

VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP 4 IN STRESS PERIOD 1

	CUMULATIVE VOLUMES	L**3	RATES FOR THIS TIME STEP	L**3/T
0				
	IN:		IN:	
	STORAGE =	9949.4	STORAGE =	4.2173
	CONSTANT HEAD =	.12440E+06	CONSTANT HEAD =	143.14
	WELLS =	.00000	WELLS =	.00000
	RECHARGE =	34484.	RECHARGE =	38.315
0	TOTAL IN =	.16884E+06	TOTAL IN =	185.67
0	OUT:		OUT:	
	STORAGE =	2.6745	STORAGE =	.00000

	CONSTANT HEAD =	.13804E+06	
	WELLS =	30780.	
	RECHARGE =	.00000	
0	TOTAL OUT =	.16882E+06	
0	IN - OUT =	15.781	
0	PERCENT DISCREPANCY =		.01

CONSTANT HEAD =	151.49	
WELLS =	34.200	
RECHARGE =	.00000	
TOTAL OUT =	185.69	
IN - OUT =	-.23071E-01	
PERCENT DISCREPANCY =		-.01

0

TIME SUMMARY AT END OF TIME STEP 4 IN STRESS PERIOD 1

	SECONDS	MINUTES	HOURS	DAYS	YEARS
TIME STEP LENGTH	22430.8	373.846	6.23077	.259615	.710788E-03
STRESS PERIOD TIME	54000.0	900.000	15.0000	.625000	.171116E-02
TOTAL SIMULATION TIME	54000.0	900.000	15.0000	.625000	.171116E-02

1