Dragan

1506-00018

CONSTRUCTION AND TESTING SUMMARY

DOUBLE DIAMOND NORTH

JANUARY 1993

# **WASHOE COUNTY**

DEPARTMENT OF PUBLIC WORKS

UTILITY DIVISION

P.O. BOX 11130 RENO, NEVADA 89520



# CONSTRUCTION AND TESTING SUMMARY

DOUBLE DIAMOND NORTH

JANUARY 1993

Prepared by:
WASHOE COUNTY UTILITY DIVISION
1195-B Corporate Blvd.
P.O. Box 11130
Reno, Nevada 89520

# TABLE OF CONTENTS

	Page
FIGURES AND TABLES	i
SUMMARY AND RECOMMENDATIONS	1
INTRODUCTION	2
BOREHOLE DRILLING AND LITHOLOGY	2
WELL CONSTRUCTION	6
DEVELOPMENT	8
TEST PUMPING	8
WELL CAPACITY RECOMMENDATION	13
WATER QUALITY	13
REFERENCES	16
APPENDICES	17

# FIGURES AND TABLES

	FIGURES	
		page
1.,	Location Map	3
2.	Borehole Geophysical Results	4
3.	Sieve Analysis	5
4.	Well Construction Diagram	7
5.	Step Test Results	9
6.	Calculation of Well and Formation Loss Coefficients	10
7.	Diagrams of Well Efficiency	11
8.	Drawdown Results of 23 Hour Constant Discharge Test	12
9.	Drawdown Results of 72 Hour Constant Discharge Test	14
10.	Drawdown Results of Observation Wells (72 Hour)	15
	TABLES	page
1.	Lithologic Log	6
_	INITE Devices & American Devembers	•

### SUMMARY AND RECOMMENDATIONS

During the time frame of November 20, 1992 through January 11, 1993, a replacement well for the Double Diamond North well was undertaken. The well was completed as a 12 inch diameter well to a depth of 180 feet. A 24 inch diameter conductor casing was installed and cemented to a depth of 100 feet. Wire wrap Johnson "HiCap" screen, 60 slot, was placed from 175 feet to 100 feet. The filter pack consisted of 4 x 12, rounded to well rounded sand.

Well development consisted of 18 hours of air jetting and 2 hours of pumping and surging resulting in a fully developed and sand free well. A four step drawdown test was conducted at rates varying from 218 to 437 gpm. At 350 gpm, the well is 83 % efficient. A constant discharge test at 400 gpm was conducted for 23 hours before generator failure occured. A 72 hour test was later conducted at 350 gpm. No boundary conditions were observed. No effects from pumping were measured in the Dotta and Flindt wells located approximately 1,000 feet to the west. No long term effects on these wells from pumping the County well were calculated given the lack of sufficient hydrogeological data. The Flindt agricultural well should be monitored on a quarterly basis.

It is recommended that this replacement well be equipped to pump 350 gpm. The pump intake level should be 95 below land surface. The pumping level would be at 82 feet below land surface after 48 hours of pumping. The static water level is approximately four feet below land surface.

Water quality meets all Federal and State drinking water standards. The arsenic content is 0.012 ppm. Water quality should be monitored annually in order to determine if any deterioration in quality is occuring.

#### INTRODUCTION

The Double Diamond North well was constructed in 1980 to serve as a quasi-municipal water well (Hydro Search, 1981). Figure 1 shows the location of this well in the South Truckee Meadows. The well was aquired by Washoe County, tested in 1983 and again in 1992 (Widmer, 1992). While this 8" diameter, mill slot cased well was fairly efficient, it produced sand on the order of 150 ppm and was eventually abandoned. The site, however, was favorable for a replacement well. In the autumn of 1992, Washoe County contracted with Sargent Irrigation, Inc. to redrill and construct a replacement well with more efficient materials. Additionally, the replacement well was required by State regulations to be constructed with a 100 foot sanitary seal due to its nearby location to Thomas Creek (the old well has a 50 foot seal).

Design, construction supervision, data collection and analyses were conducted by Washoe County Utility Division personnel. Drilling began on November 20, 1992 with the well construction completed on Dec 9, 1992. Development and testing took place from December 11 through January 11, 1993.

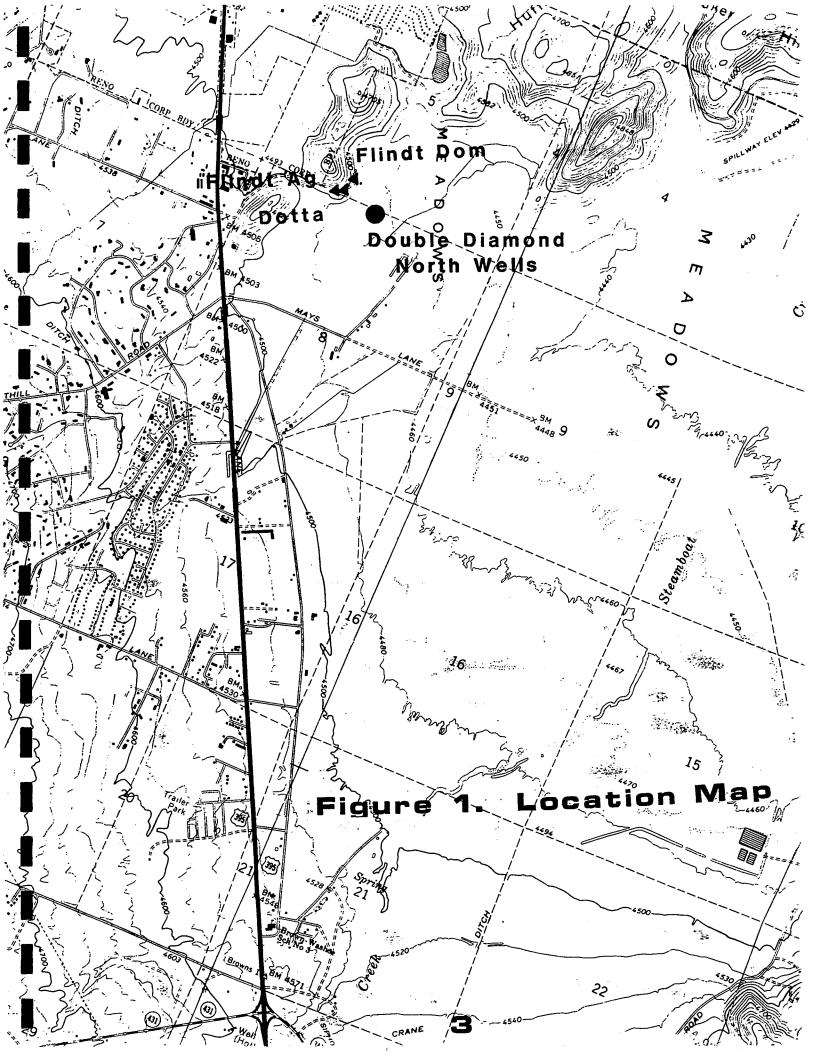
#### BOREHOLE DRILLING AND LITHOLOGY

A 7-7/8 inch diameter borehole was drilled to a depth of 180 feet. The standard mud rotary method was employed using a Speedstar rotary drill rig. The drilling fluid consisted of high yield bentonite clay. The borehole was drilled in one day without any problems.

Table 1 is the lithology log of this borehole. Clays, silts, sands and gravels were encountered to a depth of 149 feet. A fine sand or coarse silt was present throughout most of the aquifer material below 95 feet. From 149 to 180 feet a purplish andesite was found. The andesite drilled as if fractured to a depth of 170 feet, then competent to 180 feet. The most promising aquifer materials occured from 70 to 90 feet and from 110 to 140 feet.

Figure 2 shows the geophysical logs run downhole. These were the standard electric logs, natural gamma, temperature and caliper logs. These logs verified the aquifer materials noted above. Because of borehole sluff, the logging tools could not penetrate below 173 feet.

Figure 3 is the results from the sieve analysis. Analysis were taken of aquifer material from 95 to 100 feet, 110 to 120 feet and from 130 to 140 feet. Based on this analysis and the availability of material, a  $4 \times 12$  gravel pack was specified.



GEO-FILE SE FUATA

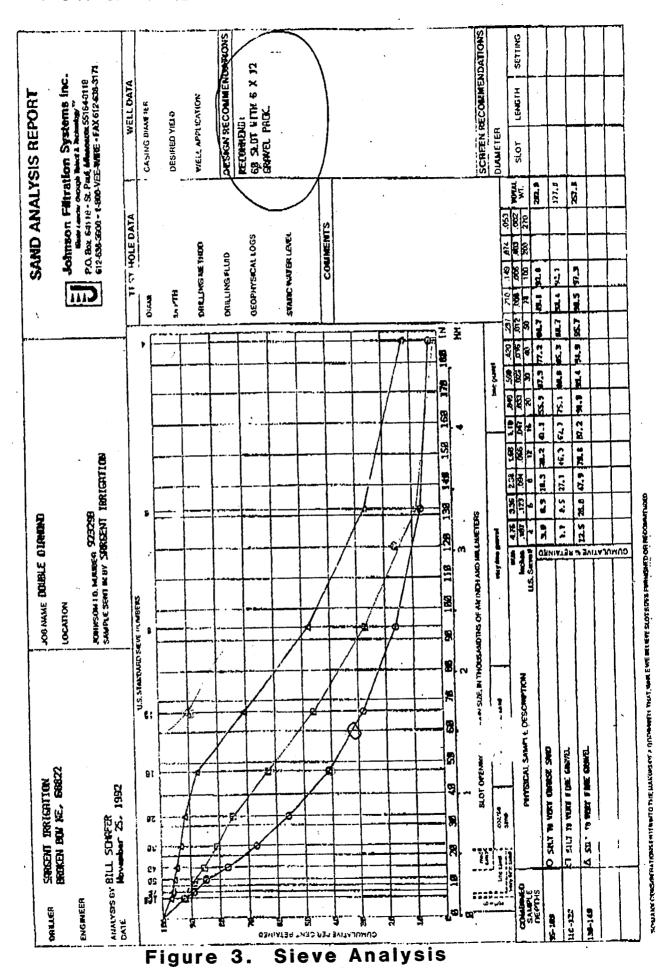
GEO-HYDRO-DATA

4

NATURAL GAMMA LOG ELECTRIC WELL LOG : MANO COMITY
: MANO COMITY
: MANO COMITY OTHER SERVICES ECTION LIMIT CONTACTOR TO MITT OTHER SERVICES: SECTION STATE COUNTY : 11/21/92 BETTH PRILLER LOS BOTTON LOS BOTTON ELEV PORT, MATER: LOC HEASINED FROM: C.L. NEL HEASINED FROM: C.L. : 11/21/12 : 130 : 177 16 : 6.44 CASING MILLER : "MOTHER TYPE : HASHIN PHICHESS" : : 100 100 . • 1040 . • 1140 CASING MILLER AND STATE : 8.75
MARGETIC DECL . .
MADELY DESCRIP : .
FLUID DESCRIP :
MERITAR MATRIX : MIT SIZE MODETIC NEEL. MITEIX MODELLY FLUID MODELLY FILE : FROCESSED 1776 : 9841A 106 : 1 PLOT : 00 0 FLUID DELIA T MILLED BY, SENEDIT IMPORTION MULTICH WHITE :

MILLID BY: SAPCON INCICATION FLESS SCLIA I 110 120 130 140 150 160

Figure 2. Borehole Geophysical Results



5

# TABLE 1 Lithologic Log Double Diamond North Well

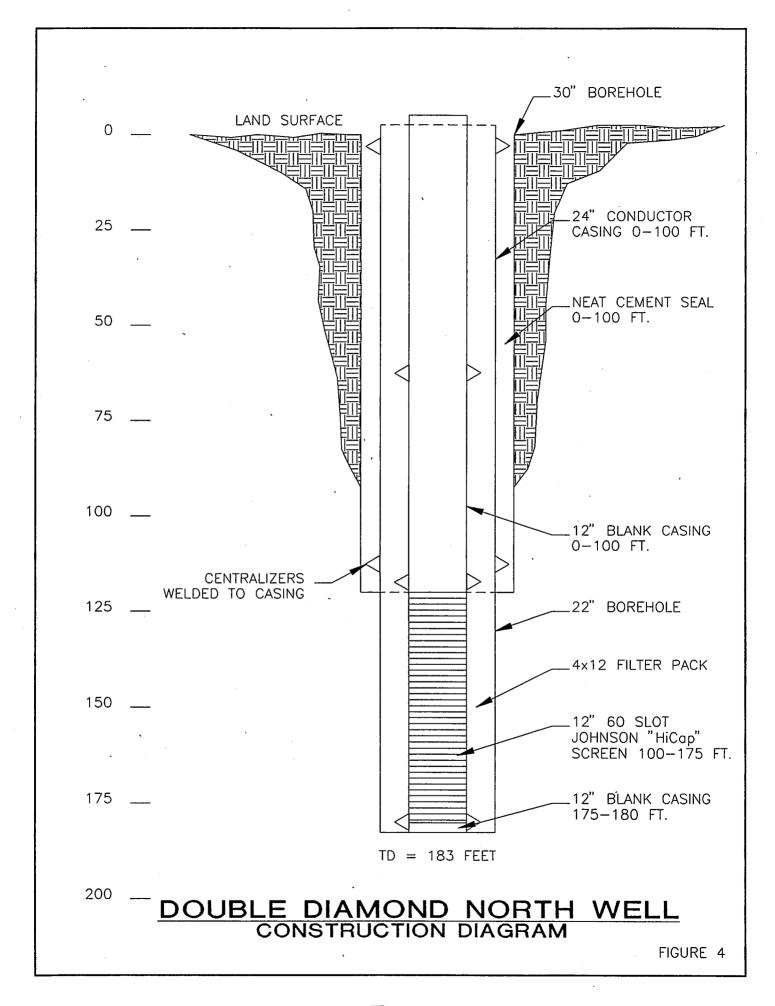
<u>Depth</u>	Lithology
000-020 020-040 040-070 070-080 080-093 093-096 096-108 108-115 115-149 149-180	silt, sand and gravel silty, gravelly, coarse sand sandy clay with minor gravel clay and silty sand, very fast drilling sandy, med. grained gravel silty, sandy clay fine sand silty, sandy clay silty, coarse sand with some clay purplish andesite, broken to 170 feet, competent to 180 feet

#### WELL CONSTRUCTION

Figure 4 illustrates the well construction. A 100 foot seal was required by NRS 534.390. Since the alluvial aquifer has a depth of 150 feet, a conductor casing construction was used in order to maximize all 50 feet of this alluvial aquifer. The pilot hole was redrilled with the reverse rotary drilling method using a Sargent 55 drill rig and water. A 100 foot, 30 inch borehole was drilled with a three-way drag bit. From land surface to 100 feet a 24 inch diameter conductor casing was installed. This casing wall thickness is 0.388 inch. Centralizers were attached at the bottom of the casing and at 50 feet. Grouting was accomplished with a tremmie pipe and pump. The slurry was neat cement. A total of 16 yards of slurry was used. The slurry was allow to set 12 days before drilling resumed.

From 100 feet to 180 feet the pilot bore was opened to 22 3/4 inches using a two-tiered reamer bit. Blank 12 1/4 inch O.D. casing was installed from 180 to 175 feet and 100 feet to surface. Johnson "Hi-Cap" 60 slot screen was installed from 175 to 100 feet. Centralizers were installed at 176 and 99 feet.

The filter pack was installed via tremmie pipe, beginning at the 175 foot level and subsequent 32 foot upward levels. The filter pack is a 4 x 12, rounded to well rounded sand from the Silica Resources pit located near Marysville, California. Nineteen yards was installed up to a depth of 38 feet. The rest of the annular space was "topped off" with Cheavruex 6 x 12 gravel.



#### DEVELOPMENT

Development consisted of both air jetting and rawhiding (pumping and surging). Eighteen hours of airjetting was performed until the discharge was clear throughout the screened interval. Rawhiding was performed for only two hours as the discharge was always sand free (less than 1 ppm) and could never be made unclear. Sand content was measured with a Rossum Sand Tester and standard methods.

#### TEST PUMPING

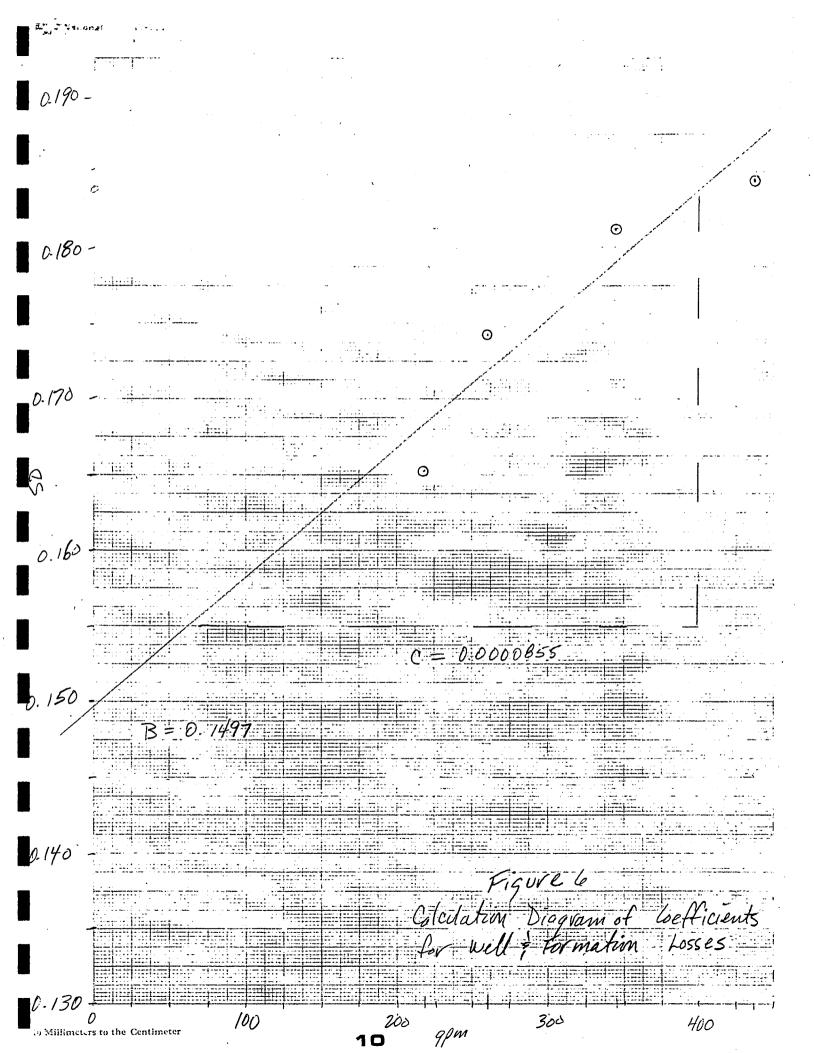
Test pumping consisted of a four step-drawdown test and a 23 hour constant discharge test. The constant discharge test was scheduled for 96 hours, but after 23 hours the generator failed. The data collected after 23 hours was considered adequate for the well capacity analysis and previous testing of the old well yielded adequate data for aquifer analysis. Finally, a 72 hour pumping test was conducted in order to estimate potential water level declines on periphrial domestic and agricultural wells.

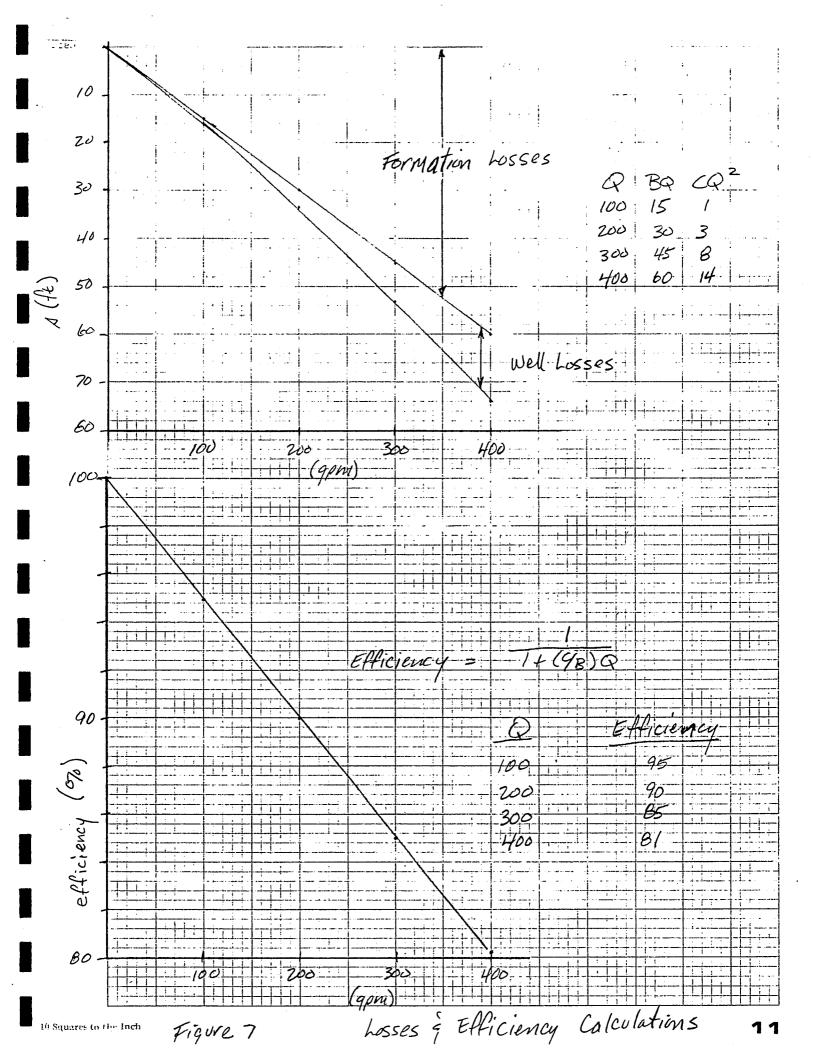
The step test consisted of four pumping rates held at 100 minutes each and were 218 gpm, 268 gpm, 345 gpm and 437 gpm. Figures 5, 6 and 7 show the results of testing. As shown in figure 5, the specific capacity of the well at 350 gpm is 5.5 gpm/ft of drawdown. In figure 6 the well (C) and aquifer (B) loss coefficients are determined with the illustrated graph. Figure 7 illustrates the well and formation losses. As shown, most of the total losses are associated with the aquifer formation (and probably the gravel pack). At a pumping rate of 350 gpm, the well efficiency is 83%.

The 400 gpm constant discharge test was conducted for 23 hours before generator failure occured. As can be seen from figure 8, no boundary effects were discernable. Previous testing of the old well also showed no boundary effects (Widmer, 1992). Using the WHIP program (Gupta and Walter, 1988), transmissivities and storativity values were derived. Table 2 shows these results. A transmissivity of 6,400 gpd/ft and a storativity of 0.04 was derived for the well. A transmissivity of 21,000 gpd/ft was then

TABLE 2
WHIP Derived Aquifer Parameters

<u>Well</u>	<u>Transmissivity</u>	<u>Storativity</u>	Hydr. Cond
New	6,400 gpd/ft	0.04	12.2 ft/day
Old	8,100 gpd/ft	0.0003	10.1 ft/day
0bs	14,700 gpd/ft	0.0002	18.8 ft/day
Aqu	21,000 gpd/ft		18.7 ft/day





Semi-Logarithmic 2 5

8 8

12

& (fe)

calculated for the entire alluvial aquifer using a hydraulic conductivity value of 18.8 ft/day and 145 feet of alluvial aquifer. Considering a clay layer from 40 to 70 feet and a storativity value of 0.0002 (Observation well), the aquifer section penetrated by the new production well can be considered confined.

Figures 9 and 10 show the results from the 72 hours of constant pumping at a rate of 350 gpm. A flattening of the curves at the latter stages of the test indicate downward leakage of ground water. This is probably from the aquifer section above 40 feet (see Lithologic log).

During testing, nearby domestic and agricultural wells were monitored (see appendix for measurements). These are the Dotta and Flindt domestic wells and the Flindt agricultural well located approximately 1,000 feet to the west. The Dotta and Flindt agricultural wells are completed in volcanics. No discernable impacts were measured in any of these wells during testing. term effects on these wells from the pumping of the County production well cannot be realistically determined as hydraulics of the volcanics are not understood. That is to say the storativity and transmissivity of these volcanics could not be determined from the testing. Simplifying the hydrogeology in order to use the Theis Equation did not result in reliable results. Quarterly monitoring of the Flindt agricultural well should be undertaken indefinately to determine if any long term effects are occuring.

## WELL CAPACITY RECOMMENDATION

It is recommended that this replacement well be equipped to pump 350 gpm. The pump intake level should be set at 95 below land surface. This is five feet above the well screen. The pumping level would be at 82 feet below land surface after 48 hours of pumping at 350 gpm. The static water level is approximately four feet below land surface.

## WATER QUALITY

Water quality analysis was conducted at the Nevada State Health Lab. The results are included in the appendices. The analysis shows that this water meets all of the Safe Drinking Water Act Standards. The total dissolved solids was measured at 245 ppm. This water primarily consists of calcium, magnesium, sodium and bicarbonate. The arsenic content was detected at 0.012 ppm. From earlier testing on the "Old" production well, no heavy metals were detected. Gross Alpha, Beta and Radon were measured at 8, 10 and less than 3 picocurries/liter, respectively, also in the Old Well.

€ Ø 0-

Semi-Logarithmic 4 Cycles x 10 to the inch

40

29

09

(#) P (

BC

14

Semi-Logaritheic

- FIE

۾ و

### REFERENCES

Hydro-Search, Inc. 1981. <u>TEST WELL CONSTRUCTION AND TESTING, DOUBLE DIAMOND RANCH, RENO, NEVADA</u>. Consultant Report preparerd for Collins and Ryder; Reno, Nevada. 36 p.

Widmer, Michael, 1992. <u>Double Diamond Well Testing</u>. April 7, 1992 Office Memorandum to Paul Orphan, Washoe County Utility Division, Reno, Nevada. 2 p.

Gupta and Walter, 1988. <u>Well Hydraulics Interpretation Program</u>. Hydro Geo Chem, Inc. Tucson, Arizona.

### **APPENDICES**

## Pumping Test Field Notes

- 1. Step Drawdown Test
- 2. First 23 Hour Test
- 3. Second 23 Hour Test
- 4. 72 Hour Constant Discharge Test
- 5. Miscellaneous Peripheral Well Soundings

Water Quality Analysis

Miscellaneous Calculations

Double Diamond North Wells Cross Section Illustration

Bid Proposal, Change Order and Actual Costs

Well Drillers Report

## WELL DOUSIC Diamond alorth PUMPING OBSERVATION WELL PUMPING/RECOVERY DATA **DEPARTMENT OF PUBLIC WORKS** PUMPING TEST DATA **UTILITY DIVISION** STEP DRAWDOWN PAGE TYPE of PUMPING TEST . Drifice 43/8 X 6/4 HOW Q MEASURED Solnist HOW WL's MEASURED DEPTH of PUMP/AIRLINE DD North 13 PUMPED WELL NO. ; pumping . % SUBMERGENCE: initial RADIUS of PUMPED WELL \_ PUMP ON: date 12-16-92 time 08/1 PUMP OFF: date 12-16-92 time 1441 DISTANCE from PUMPED WELL

TIME t= at t'=0			WATER LEVEL DATA 5.90					WAT		COMMENTS		
CLOCK	LOCK ELAPSED TIME TIME mins t t' t/t'		READING	CONVERSIONS CORRECTIONS	WATER SorS'			Ín	Q	(NOTE ANY CHANGES IN OBSERVERS)		
0811		0				CONNECTIONS						- sevecid
<u> </u>		-1					<del></del>				-	adi Q+
		7			30.60			24.70		8	218	aay 4
		2			31.00		_	25.10		_ <i>D</i>	110	
·			<u> </u>		31.78			25.88				
		4			32.38		<del></del> .	26.48				
		6			32.69			26.99		8	`	
		7			33.43	-	,	27.53	-	8		
		8			33.85		-	27.95				
		9			34-04			28.14				
		10			34.55		<del></del>	28.65		778		<u>}</u>
		12			35.03	~ · · · · · ·		29.13		8		<u></u>
		14			35.70			29.80		8	218	
·		16			36.15		<del>"</del>	36.25			<i>D</i> , 0	
		18			36-37		<del></del>	30.47				
		20			36.83	-		30.93				
		25			37.47			31.57				
		30			37.95			32.05				
		3			38.47			32.57				
		40			38.92			33.02		8		
		45			39.25			33. 35				
		50			39.60		· · ·	33.70				
·		62			40.20			34.30				
		70			40.50			34.60				
		80			40.98			3500				
		90			41.34			35.44	2	734		Q1
0941		100			41.94			36.04		8		
		2			Hb.50		• •	40.60	چ	12	268	
		2			47.07			41.17				
		4			47.36			41.46				
		5			47.74			41.84				<u></u>
		6			47.99			42.09				
		7		<u> </u>	48.19			42.29				
		R		-	48.30			42.29		212		Q1
		8			48.62			42.72		12		<del></del>
		10		<u> </u>	48-82	7		4292		12		
		12			49.05			43.15			268	
		• •			1.00					- T - E	000	
										<del></del>	-	
			<b></b>									

# **WASHOE COUNTY**

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION PUMPING TEST DATA

WELL Double Diamond Vorth PUMPING/OBSERVATION WELL POMPING/RECOVERY DATA

TYPE of PUMPING TEST STEP DRAWDOWN	PAGE 2 OF 3
HOW O MEASURED Drifice 644 4 43/8	M.P. for WL's top of PVC elev.
HOW WL'S MEASURED Solnist	DEPTH of PUMP/AIRLINE 94 wrt top of cosing
PUMPED WELL NO. Di North	_ % SUBMERGENCE: initial; pumping
RADIUS of PUMPED WELL	PUMP ON: date 12-16-92 time 0811
DISTANCE from PUMPED WELL	PUMP OFF: date 12-16-92 time 1441

TIME t= at t'=0		WATER LEVEL DATA 5.90				· date _	WATER PRODUCT.		COMMENTS			
CLOCK TIME	ELAPS mins hrs	ED TII	ME t'	t/t¹	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	S or S'		in	Q	(NOTE ANY CHANGES IN OBSERVERS)
0955		14			49.22			43.32		12	268	
		16			49.48			43.58				
		18			49.64			43.74		12		
1001		20			49.76			43.86	•			
		25			50.11			44.21		12		
		30	*****		50.34			44.44		12		
		35			50.57			44.67		12		
		40			50.77	-		44.87		12		
		45			50.95			45.05		412		
		50			51.10			45.20		412		# Q
		60			51.58			45.68		12		
		70			51.91			46.01		12		22.80 0 Cld wall
		80			52.15			46.25		12		
		90			52.36			46.46		12		
1121		100			52.62	_		46.72		12	268	
		2			59.80			53.90		420	345	10
		3	,		60.86			54.96		20		
		4			61.48			55.58		=20		Q1
		5			62.02			56.12		20		
		6			62.34			56.44				
		7			62.66			56.76		20		
		в			62.98			57.08				
		9			63.20			57.30				
		10			63.35			57.45		420		91
		12		,	63.72		`	57.82		20		
		14			64.00			58.10		20		
		16			64.34			58.44		20		
		18			64.59			58.69		20	345	
		20			64.80			58.90		20		
		25			65.20			59.30				
		30			65.48			59.58		420		Q1
		35			65.93			60.03		20		
		40			66.19			60.29		£20		Q1
		45			66.60			60.70		20		
		50			66.81			60.91		20		
1221		60			67.22			61.32		20		
		70			67.57			61.67		20		
		80			67.87			61.97		20		

#### **WASHOE COUNTY** WELL Double Diamond North **DEPARTMENT OF PUBLIC WORKS** PUMPING / OBSERVATION WELL PUMPING TEST DATA PLIMPING/RECOVERY DATA PAGE 3 OF 3 **UTILITY DIVISION** TYPE of PUMPING TEST Step Drawdown How Q MEASURED Orifice 644 x 4318 X 4318 M.P. for WL's top of PVC elev. DEPTH of PUMP/AIRLINE 94 wrrtop COSING HOW WL'S MEASURED Solnist PUMPED WELL NO. DA North \_\_\_\_\_\_ % SUBMERGENCE: initial \_\_\_\_\_; pumping \_ RADIUS of PUMPED WELL 12" PUMP ON: date 12-16-92 time 08 // PUMP OFF: date 12-16-92 time 1441 DISTANCE from PUMPED WELL WATER TIME WATER LEVEL DATA COMMENTS 5.90 at t'=0 STATIC WATER LEVEL PRODUCT. CLOCK ELAPSED TIME CONVERSIONS WATER (NOTE ANY CHANGES IN OBSERVERS) READING †/†'| S or S' LEVEL 90 62.22 68.12 20 345 62.50 100 68.40 1301 76.76 70.86 2 32 77.65 3 71.75 132 4 78.39 72.49 01 **Z32** 5 79.10 73.20 32 79.65 73.75 80.00 74.10 В 74.40 80.30 9 80.59 74.69 80.84 74.94 32 10 75.27 81.17 12 £32 21 81.60 75.70 14 32 81.90 76.00 18 82.15 76.25 B2.34 ≤ 32 20 Qt 83.00 77.10 25 83.40 30 77.50 35 83.72 77.82 32 84.00 32 40 78.10 84.30 28.40 45 32 84.53 78.63 50 32 1401 85.10 79.20 62 79.56 70 85.46 79.89 85.79 80 90 86.23 80.33 1441 Old = 38.80 20 395 min 100 80.60 86.50 Obs = 17.60) 25 386 30 423 400 \*

#### **WASHOE COUNTY** WELL Double Dianird North TYPE of PUMPING TEST Land Constant PUMPING OBSERVATION WELL PAGE \_\_\_\_ OF \_\_\_\_ HOW Q MEASURED OVIFICE 644 X 43/8 M.P. for WL's top of PVC elev. wrt top of Casing HOW WL'S MEASURED \_\_Solvist-PUMPED WELL NO. DD North % SUBMERGENCE: initial \_\_\_\_; pumping \_ PUMP ON: date 12-17-72 time 0900 RADIUS of PUMPED WELL 12" \_ PUMP OFF : date 12-18-92 time 0825 DISTANCE from PUMPED WELL \_\_\_\_ WATER TIME WATER LEVEL DATA COMMENTS at t'=0 PRODUCT. STATIC WATER LEVEL 6.23 CLOCK ELAPSED TIME CONVERSIONS WATER (NOTE ANY CHANGES IN OBSERVERS) t/t' (S) or S' READING LEVEL CORRECTIONS 0900 27 0 400 1 34.28 28.05 2 42.04 35.81 3 41.33 Q1 47.56 4 50.96 44.73 2734 **Q \** 5 52.58 46.35 54.24 48.01 55.74 49.51 8 56.90 50.67 7.9 9 51.60 57.83 0910 10 58.70 52.47 at 12 60.05 53.82 14 61.22 54.99 16 62.27 56.04 18 63.02 56.79 20 63.88 0920 57.65 25 65.50 59.27 30 66.64 60.41 6.6 35 67.55 61.32 40 62.18 68.41 45 69.08 62.85 50 69.66 63.43 01 60 1000 26 76-27/2" 63.73 69.96 at 70 72.00 65.77 80 72.72 66.49 91 90 67.43 73.66 100 5.9 74,26 68.03 120 69.11 1/00 75,34 20 120 140 76.28 70.05 160 77.23 71.00 5.6 140 1200 180 77.91 71.68 263/2 QT 210 78.98 72.75 5.5 230 240 79.97 73.74 300 ar 270 330 80.82 74.59 300 400 75.46 81.69 330 82.24 76.01 76.59 360 82.82 1500

#### WASHOE COUNTY WELL DD North **DEPARTMENT OF PUBLIC WORKS** PUMPING/OBSERVATION WELL PUMPING TEST DATA **UTILITY DIVISION** PUMPINGY RECOVERY DATA TYPE of PUMPING TEST \_ Constant Q PAGE 2 OF Z HOW Q MEASURED orifice plate 41/4 x 43/8 M.P. for WL's TOP OF PVC elev. HOW WL'S MEASURED \_ Solins+ \_\_ DEPTH of PUMP/AIRLINE 94- wrt \_\_\_\_\_ PUMPED WELL NO. \_\_ DD North % SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_ PUMP ON: date 12-17-92 time 0900 PUMP OFF: date 12-18-92 time 0825 DISTANCE from PUMPED WELL \_ WATER LEVEL DATA WATER TIME COMMENTS PRODUCT. at t'=0 STATIC WATER LEVEL 6.23 CONVERSIONS CORRECTIONS CLOCK ELAPSED TIME WATER (NOTE ANY CHANGES IN OBSERVERS) t/t1 READING S or S' TIME mins hrs LEVEL RV 83,24 77.01 390 1530 83.68 QΥ 77.45 1600 420 84.30 78.07 1630 450 1700 84.66 78.43 480 Q1 79.51 85.74 540 600 86.34 80.11 1900 86.86 QT 660 80.66 2000 81.37 EE 87.60 2100 12 720 81,77 13 780 88.00 QT 2200 14 840 82.16 91 2300 88.39 2400 15 900 82.70 88.93 83.35 0200 17 1025 89.58 2634-21" 19/1140 QA 90.05 83.82 0400 84.39 5600 721 1260 90.62 90.94 84.71 0800 QT

#### WASHOE COUNTY WELL DD Old DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION TYPE OF PUMPING TEST CONSTANT Q HOW Q MEASURED Orifice plate HOW WL'S MEASURED Solvist M.P. for WL'S DEPTH OF PUMP/AIRLINE wrt DEPARTMENT OF PUBLIC WORKS PUMPING / OBSERVATION WELL TYPE of PUMPING TEST Constant Q PUMPED WELL NO. DE North % SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_\_ PUMP ON: date $\frac{12-17-92}{12-18-92}$ time $\frac{0.9}{0.9}$ 2.5 \_\_\_\_\_; pumping \_\_\_\_\_ RADIUS of PUMPED WELL 12" 721 DISTANCE from PUMPED WELL WATER WATER LEVEL DATA TIME COMMENTS PRODUCT. at t'=0 STATIC WATER LEVEL 5-25 5.21 CLOCK ELAPSED TIME TIME mins hrs t t' CONVERSIONS CORRECTIONS WATER (NOTE ANY CHANGES IN OBSERVERS) READING SorS t/t" LEVEL 8:58 521 DRAGAN 0 1.60 6.81 2 9 22 4.01 3 11. 24 6.03 7.48 12.69. 5 13.94 8.73 6 9.66 14.87 15.78 10.57 B 16.52 11.31 9 17.18 11.17 10 12.56 17.77 12 13.64 18 85 14 14.56 19.77 16 15.21 70.42 18 21.10 15.89 20 21.69 16.48 25 17.80 23.01 30 18.95 24.16 35 19.70 25,11 40 25.83 20.62 45 26.45 21.24 50 27.06 21.85 bo 28.21 23.00 70 29.25 24.04 BO 29.34 24.63 90 30.50 25.21 100 25.91 31.11 120 32.13 26.92 140 32.91 27.70 28,53 160 33.74 180 34.38 29.17 35 30 30.09 210 36.16 241 30.95 36.91 31.70 272 37.52 32.31 302 32.82 38.03 331 33.27 362 1502 38.48

#### **WASHOE COUNTY** WELL DD Old PUMPING OBSERVATION WELL PUMPING RECOVERY DATA **DEPARTMENT OF PUBLIC WORKS** PUMPING TEST DATA UTILITY DIVISION PAGE 2 OF 2 TYPE of PUMPING TEST \_ Constant Q PUMPED WELL NO. DD North Submergence: initial \_\_\_\_\_; pumping \_\_\_ RADIUS of PUMPED WELL 12" PUMP ON: date 12-17-92 time 0900 DISTANCE from PUMPED WELL 72' PUMP OFF: date 12-18-92 time 0825 WATER WATER LEVEL DATA TIME COMMENTS at t'=0 PRODUCT. STATIC WATER LEVEL 5.2/ CLOCK ELAPSED TIME CONVERSIONS CORRECTIONS (NOTE ANY CHANGES IN OBSERVERS) WATER (Sors' t/t<sup>t</sup> READING LEVEL 33.72 390 32,93 1530 34.13 1600 420 39.34 34,58 450 1630 39,79 1700 480 40.08 34.87 35.66 1800 540 40.87 36,23 600 41,44 1900 36.70 660 41.91 2000 37.26 EE 42.47 2100 720 47.87 37.66 2200 780 38.01 840 43.22 2300 38.39 2400 43.60 900 38.99 44.20 0210 1030 44.69 39.48 0405 1145 0605 45.18 39.97 1265 45,46 40.25 0800 1380 DD ald

#### **WASHOE COUNTY** WELL DID observation PUMPING / OBSERVATION WELL PUMPING / RECOVERY DATA **DEPARTMENT OF PUBLIC WORKS** PUMPING TEST DATA **UTILITY DIVISION** TYPE of PUMPING TEST Lonstant & PAGE 1 OF 2 HOW Q MEASURED Drifice plate M.P. for WL's top of 2" elev. HOW WL'S MEASURED actat \_\_\_\_DEPTH of PUMP/AIRLINE \_\_\_\_\_\_ wrt \_\_\_\_ PUMPED WELL NO. DD North \_\_\_\_\_ % SUBMERGENCE: initial \_\_\_\_\_\_; pumping \_\_\_ RADIUS of PUMPED WELL 12" PUMP ON: date 12-17-93 time 0900 \_\_\_\_\_ PUMP OFF: date 12-18-92 time 0825 WATER TIME WATER LEVEL DATA COMMENTS at t'=0 STATIC WATER LEVEL 4.34 PRODUCT. CLOCK ELAPSED TIME CONVERSIONS WATER (NOTE ANY CHANGES IN OBSERVERS) t/t1 READING S or S' TIME mins hrs LEVEL CORRECTIONS 0 <u> 2900</u> 4.34 ٥. 2 4.37 03 4.52 -18 4 4.72 .38 4.21 .57 6 5,10 .76 7 .93 5,27 В 5,44 1,10 5,60 1.26 10 5.76 1,42 12 6.11 1.77 14 6.38 2.04 16 6.65 2.31 18 6.90 2,56 $z\omega$ 2.81 7.15 25 3,40 7.74 30 8.26 3,92 8.73 4.39 40 9118 4,84 45 9.58 5,24 50 5.63 9.97

60 6.34 10.68 70 6.93 11.27 BO 7.42 11.76 90 12.30 7.96 100 8.38 12.72 120 9.26 1100 13,60 140 9.86 14,20 10.46 14.80 160 16.94 1200 180 15.28 210 11.64 15.98 1300 240 16.54 12.20 274 17.10 12.76 1330 13,19 1403 303 17.53 1430 13.56 330 17.90 18,28 1503 363 13.94

#### WASHOE COUNTY WELL DD observation **DEPARTMENT OF PUBLIC WORKS** PLIMPING / OBSERVATION WELL PUMPING TEST DATA **UTILITY DIVISION** PUMPING RECOVERY DATA TYPE of PUMPING TEST COnstant Q PAGE 2 OF 2 HOW Q MEASURED orifice plate M.P. for WL's top of 2" elev. HOW WL'S MEASURED A \_\_\_\_\_\_ DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_ PUMPED WELL NO. \_\_\_\_\_\_ ; pumping \_\_\_\_\_\_ ; pumping \_\_\_\_\_\_ ; PUMP ON: date 12-17-92 time 0900 DISTANCE from PUMPED WELL 271 PUMP OFF: date 12-18-92 time 08 25 WATER LEVEL DATA TIME WATER COMMENTS at t'=0 STATIC WATER LEVEL 4.34 PRODUCT. CONVERSIONS CORRECTIONS CLOCK ELAPSED TIME WATER (NOTE ANY CHANGES IN OBSERVERS) (S) or S' 1/t' READING TIME mins hrs LEVEL 300 18.58 1530 14.24 420 18.88 14.54 1600 450 14.84 19.18 1630 480 1700 19,42 15.08 540 15.59 1800 19,93 15,94 1900 600 20,28 2000 660 20.60 16.26 16.55 20,89 EE 2100 720 780 21.08 16.74 2200 2300 840 21.27 16,93 2400 900 21.48 17.14 0215 17,47 1035 21.81 2410 1150 22.06 17.72 0610 22.25 1270 17.91 2805 1385 22.36 18.02 DI Objection

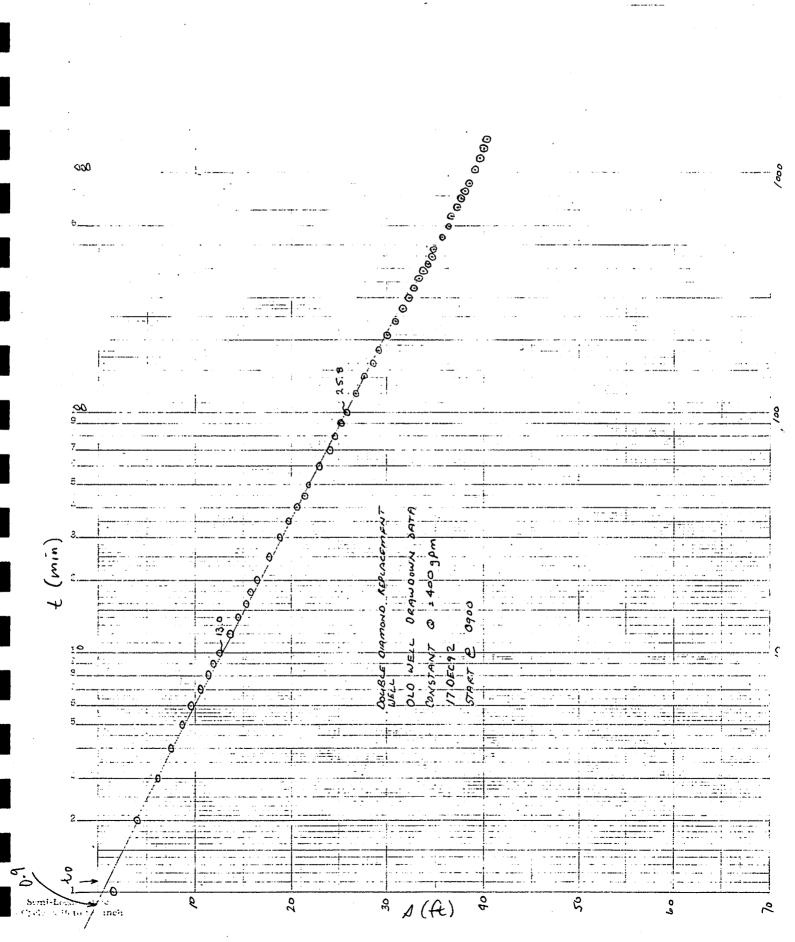
# WASHOE COUNTY WELL DOTTA DOMESTIC PUMPING OBSERVATION WELL PUMPING RECOVERY DATA PAGE L OF / **DEPARTMENT OF PUBLIC WORKS** PUMPING TEST DATA **UTILITY DIVISION** TYPE of PUMPING TEST \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Q M.P. for WL's TOP B' CASAL elev. HOW Q MEASURED \_\_\_\_\_ HOW WL'S MEASURED ACTAT 300 DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_ PUMPED WELL NO. Double DIAMONO NORTH % SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_ PUMP ON: date 12/17/92 time 0900 RADIUS of PUMPED WELL \_\_\_\_\_ DISTANCE from PUMPED WELL ~ 1000 1 PUMP OFF: date 12-18 92 time 0825 WATER WATER LEVEL DATA COMMENTS at t'=0 PRODUCT. STATIC WATER LEVEL 86.46 CLOCK ELAPSED TIME CONVERSIONS CORRECTIONS WATER (NOTE ANY CHANGES IN OBSERVERS) t/t1 (S) or S' LEVEL 65 1015 86.85 R.V. 86.84 1053 113 E.E. 12!3 143 86.84 R.V. \$6.82 1505 E.E. R.V. 1816 86.82 ēΕ 2217 86.87 86.87 EE 0236 DOTTA

# WASHOE COUNTY WELL FLINDT ALRICULTURE WELL PUMPING OBSERVATION WELLT PUMPING RECOVERY DATA **DEPARTMENT OF PUBLIC WORKS** PUMPING TEST DATA **UTILITY DIVISION** TYPE of PUMPING TEST CONSTANT Q PAGE \_\_ | OF \_\_ /\_\_\_ M.P. for WL's ACCESS PORT elev. HOW Q MEASURED HOW WL'S MEASURED ACTAT 300 DEPTH of PUMP/AIRLINE wrt PUMPED WELL NO. \_\_\_\_\_; pumping \_\_\_\_\_; pumping \_\_\_\_\_; RADIUS OF PUMPED WELL Darsie Diamono Noute PUMP ON: date 12/17/12 time 0900 DISTANCE from PUMPED WELL 1000' PUMP OFF: date 12-18-92 time 0825 WATER TIME WATER LEVEL DATA COMMENTS PRODUCT. at t'=0 STATIC WATER LEVEL 50.05 CLOCK ELAPSED TIME TIME mins hrs t t' CONVERSIONS WATER (NOTE ANY CHANGES IN OBSERVERS) t/t' READING CONVERSIONS WATER CONS' 72 R.V. 50,28 012 E.E. 117 50.27 057 RV 50.25 1217 197 510 50.26 EE 1821 50.24 RV 2225 EE 50.31 EE 0241 50.32 FLINGT AL

# WASHOE COUNTY WELL FLINDT DOMESTIC **DEPARTMENT OF PUBLIC WORKS** PUMPING OBSERVATION WELD PUMPING TEST DATA PUMPING/RECOVERY DATA **UTILITY DIVISION** PAGE \_ | OF \_ / TYPE of PUMPING TEST \_\_\_\_\_CONSTANT Q M.P. for WL's CROUND LEVEL elev. HOW Q MEASURED \_\_\_\_\_ HOW WL'S MEASURED ACTIFT 300 DEPTH of PUMP/AIRLINE wrt % SUBMERGENCE : initial \_\_\_\_\_; pumping \_\_\_\_\_ PUMPED WELL NO. RADIUS of PUMPED WELL Dance DIAMOND NORTH WELL PUMP ON: date 12/17/92 time 6900 DISTANCE from PUMPED WELL NOOO' PUMP OFF: date 12-18-92 time 0825 WATER LEVEL DATA WATER TIME COMMENTS PRODUCT. at t'=0 STATIC WATER LEVEL 35.22 CONVERSIONS WATER CORRECTIONS LEVEL CLOCK ELAPSED TIME (NOTE ANY CHANGES IN OBSERVERS) (Sors' t / t' READING 77 R.V. 1014 35,29 120 35.28 . سے ہتے 100 RV 1220 35.33 200 1513 35,30 EE 35.27 RV 1833 1230 ΕE 35.30 0249 35.29 БE

FLINDT DOM

# WASHOE COUNTY WELL WEIK PISTERNO / OBSERVATION WELL **DEPARTMENT OF PUBLIC WORKS** PUMPING TEST DATA PUMPING RECOVERY DATA **UTILITY DIVISION** TYPE of PUMPING TEST \_\_\_\_\_ Constaut. 4 PAGE / OF / \_\_\_ M.P. for WL's WEIR elev. HOW Q MEASURED HOW WL'S MEASURED 1.75 PANSIANL FAUNE NEIN DEPTH OF PUMP/AIRLINE wrt PUMPED WELL NO. D.D. North % SUBMERGENCE: initial ; pumping \_\_\_\_\_; pumping \_\_\_\_; pumping \_ RADIUS of PUMPED WELL DON DISTANCE from PUMPED WELL ~/000' PUMP OFF: date 12-18-92 time 0825 WATER LEVEL DATA WATER TIME COMMENTS PRODUCT. at t'=0 STATIC WATER LEVEL CLOCK ELAPSED TIME CONVERSIONS CORRECTIONS WATER (NOTE ANY CHANGES IN OBSERVERS) S or S' t/t' READING LEVEL t E.E. 0815 0.36 0.33 Z.V. 003 0.33 1048 E.E. R.V. 0.32 209 E.E. 500 0,33 R.V 1812 0,33 E.E. 2213 0.34 Œ 0230 0.33 MEIN



6 0 0 Θ ο .°. ن ښ Semi-Legarithmic 2.0 ė A i Cycles x 16 to the inch

# DEPAI UTILIT

## **WASHOE COUNTY**

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

#### PUMPING TEST DATA

WELL DOUBLE DIAMONO	Vonzr
PUMPING/OBSERVATION WELL PUMPING/RECOVERY DATA	
PUMPING/ RECOVERY DATA	
DAGE / OF 2	

TYPE of PUMPING TEST CONSTANT Q	PAGE / OF 2
	M.P. for WL's TOP PUC STILL WELL elev.
HOW WL'S MEASURED SOLINST SOUNDER	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO	. % SUBMERGENCE: initial; pumping
RADIUS of PUMPED WELL 12	PUMP ON: date 4 JAN93 time 1035
DISTANCE from PUMPED WELL	PUMP OFF: date 5 Jan 93 time 0830

DIS	DISTANCE from PUMPED WELL PUMP OFF: date 500073 time 0830											
TIME  t = ot t'=0  CLOCK ELAPSED TIME					WATER LEVEL DATA STATIC WATER LEVEL 4.36					WAT PROD		COMMENTS
CLOCK TIME	mins hrs	SED II	ME t'	1/11	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	(Sors'	9/5	H "	Q	(NOTE ANY CHANGES IN OBSERVERS)
1036		/			30.00	-	:	25.64		21	350	VALVE FROZEN Q1
		2		<u> </u>	36.50			32:14				
<b> </b>		3			40.78			36.42	·		•	SET @ 21-21.5"
ļ <b></b>	/	4	<u> </u>		43.20		,	38.84	•			
<u> </u>		5	<u> </u>		44.91	·		40.55				
		6			46.23			41.87				
1042		7			47.90			43.04				
		8			48.44			44.08				97
		9			49.45			45.09				
1045		10	<u> </u>		50.19	<del></del>		45.83		ļ		
1047		12	ļ		51.50			47.14		ļ <u>.</u>		96
1049		14			52.31			.17.95				
1051		16			53.09			48.73				
1053		18			53.76			49.40				
1055	20	20			54.35			49.99				QT SLICUTLY
1100	25	25			55.63			51.27	<del></del>			
F	30	30			56.62			52.26				
1110	35	35			57.45			53.09				ot
1115	40	40		-	58.18			53.82				
	50	45			58.80		· · · · · ·	54.44				
7.73	<u> </u>	50		<u> </u>	59 36		-	55.00				Q1-
1135	10/	60			60.33			55.97				
1145	20	70			61.41			57.05				
1155	30	80			62.15			57.79				
1205	40	90			62.82			58.46				
1215		100			63.44			59.08				
1235		120			64.48			60.12				
1255	5 2	140			65.33			60.97				
1340	<u> </u>	185	-		66.99			62.58				QT
1,,,,,		210			67.91			63.55				
1435		240			68.67			64.31				
1505	30 4	270			69.34			64.98				
1535	30 5	300			69.99			65.63	<del>,</del>			Q1
1,000	30 5	330	_		70.86			66.50	·			DD
1635		360			71.32			66.96	· · · · · · · · · · · · · · · · · · ·			
1705		390			72.02			67.66				
1805		450			72.92			b8.50		<b> </b>		
1930		535			74 24			69.33	<del> </del>			QAQuite a bit
2035		000			74.50			70.14				
2100	/	blen	-		7502	1		71.47	*		ı	DDH2F=4

#### WASHOE COUNTY WELL DUBLE DIAMOND NON **DEPARTMENT OF PUBLIC WORKS** PUMPING OBSERVATION WELL PUMPING TEST DATA **UTILITY DIVISION** PUMPING/RECOVERY DATA PAGE Z OF Z HOW WL'S MEASURED \_\_\_\_\_\_ DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_ PUMPED WELL NO. DDD N % SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_ PUMP ON: date 4 JAN 93 time 1035 PUMP OFF: date 5Jan 93 time 0830 DISTANCE from PUMPED WELL TIME WATER LEVEL DATA WATER COMMENTS at t'=0 STATIC WATER LEVEL 4.36 PRODUCT. CLOCK ELAPSED TIME CONVERSIONS CORRECTIONS WATER (NOTE ANY CHANGES IN OBSERVERS) 1/11 READING (S) or S' TIME mins hrs LEVEL 720 2235 76.51 72.15 2335 780 76.89 72.53 OT 0035 840 77.57 73.21 900 0135 77.93 73.57 21-21/2 78.48 0335 17/1020 74.12 25 19 1165 0600 79.12 74.76 QT SWEATLY 0835 22 1320 @ 030 GENERATUR STANGE DIESUNE FLOW SIMILIKAS 84 25-50%. SANCENT EVELT' DANORTH

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

#### PUMPING TEST DATA

WELL DOUSLE DI 9 MONO	-04
PUMPING OBSERVATION WEI	ここ
PUMPING RECOVERY DATA	
DAGE / DE 7	

TYPE of PUMPING TEST	PAGE / OF Z
HOW Q MEASURED	M.P. for WL's TOP OF CASING elev.
HOW WL's MEASURED	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO. DOYSE DIAMONO NOATH  RADIUS OF PUMPED WELL 12"	% SUBMERGENCE: initial; pumping;
RADIUS of PUMPED WELL 12"	PUMP ON: date
DISTANCE from PUMPED WELL 72'	PUMP OFF: date 5than 43 time 0830

<b>I</b> _	DISTANCE from PUMPED WELL 10 PUMP OFF: date 3 Row 13 time 08 32												
TIME t= at t'=0						WATER LEVEL DATA STATIC WATER LEVEL 3.48					WATER PRODUCT.		COMMENTS
	CLOCK TIME	ELAPS mins hrs	SED TI	ME	t/t'		CONVERSIONS CORRECTIONS	WATED	(3 or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
Γ			1			5,88	e.		2.40				מס
			2		"	7.68			4.20				
			3			9.22		-	5.74				
_ [			4			10.42			6.94				
			5			11.42			7.94				
			حا			12,23			8.75				
• [			7			12,94			9.46				
			8			13.56			10.08				
╸┌			9			14.12			10.64				
╻┌			10			14.64		•	11.16				
			12			15.51			12.03				
<u> </u>			14			16.26			17.78				
ıſ			16			16.90			13.42				
			18			17,43			13.45				
Ī			20	"		17,93			14.45				
			15			18.80			15.32				
▋፟			30			19.85			16.37				
			35			20.60			17.12				
			40	_		21.24	<del></del>	<del></del>	17.76				
╸┌			45			21.82			18.34				
_ †			50			22.32			18.84				E.E.
			60			23. 28			19.80				
╸┌			7-0	,		24.06			20.58				
▄▐			80			24.74			21.26				
lt			90			25.31			21.83				
<b>-</b>  -			100			25.84			22.36				
∎↾			120			26.76			23.78				
			140			27.52			24.04				
_			185			28.95			25.47				
ı			210			29.64			26.16				
▋↾			240			30.33	-		26.85				
t			270			30.94			27.46				
			300			31.48			28.00				
▋┞			350			32.06			28.58				
_			365		T	32.48			29.00				$\mathcal{D}\mathcal{D}$
			395		<b>†</b>	33.03			29.55				
╸┟	1804		449	<del> </del>		33 72			30.24				
	1935		340	<del>                                     </del>		34.18			31.30				
	2035		600			35.22			31.74				
	3 13 Z		انواها			360,			27 65				מיר מס
- 1	. 11: 4.		,,	ı	1	4 / No. 5 /	1	1	1 97 7 7 1	•	•	•	124

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

#### PUMPING TEST DATA

WELL DO OLO WELL

PUMPING KOBSERVATION WELD

(PUMPING) RECOVERY DATA

PAGE 2 OF 2

TYPE of PUMPING TEST CONSTANT Q	PAGE 2 OF 2
HOW Q MEASURED OR IFICE WEIK	M.P. for WL's TOP OF CASING elev.
HOW WL'S MEASURED	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO. DA North	% SUBMERGENCE: initial; pumplng
RADIUS of PUMPED WELL	PUMP ON: date <u>4TAN93</u> time <u>1035</u>
DISTANCE from PUMPED WELL 72'	PUMP OFF: date 5 lan 13 time _ 0830

	DISTANCE from PUMPED WELL 70 PUMP OFF : date							· dale 2	T			
	TIME t= at t'=0			WATER LEVEL DATA STATIC WATER LEVEL 3.48					WAT PROD	UCT.	COMMENTS	
CLO	E mins h	PSED T	IME t'	1/1	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	Sors'			Q	(NOTE ANY CHANGES IN OBSERVERS)
223		720			36.47			32.99				E <del>-</del>
233		780			36.89			33,41				
003	5	840	)		37.33			33.85				
013	5	900			37.36			34.18	,			
033	5	1020			38, 19			34.71				
000	0	1165		ļ	38.83			35.35	<u>:</u>			
083	5	1320	,		39.15							
			ļ									
<u> 684</u>	15	1	<u> </u>	ļ								
L	-						,	, -		ļ		
<u> </u>	_/_				<u> </u>							
<u> </u>	_/_											
	-							, 5.	1			
			ļ									
<u> </u>												·
		1								<u> </u>		
										<u> </u>		
<u> </u>				ļ	·							
<u> </u>			ļ	ļ								
<u> </u>		1										
							,					
			<u> </u>	<u> </u>								,
<u> </u>		1										
L												
L												
		1					,					
		1		<u> </u>		<u></u>						
		1										
		1								<u> </u>		
		1										
		1										
		1			4							
		$1^{-}$		1						<u> </u>		
5 [		7	1 .	1						!		Disco

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

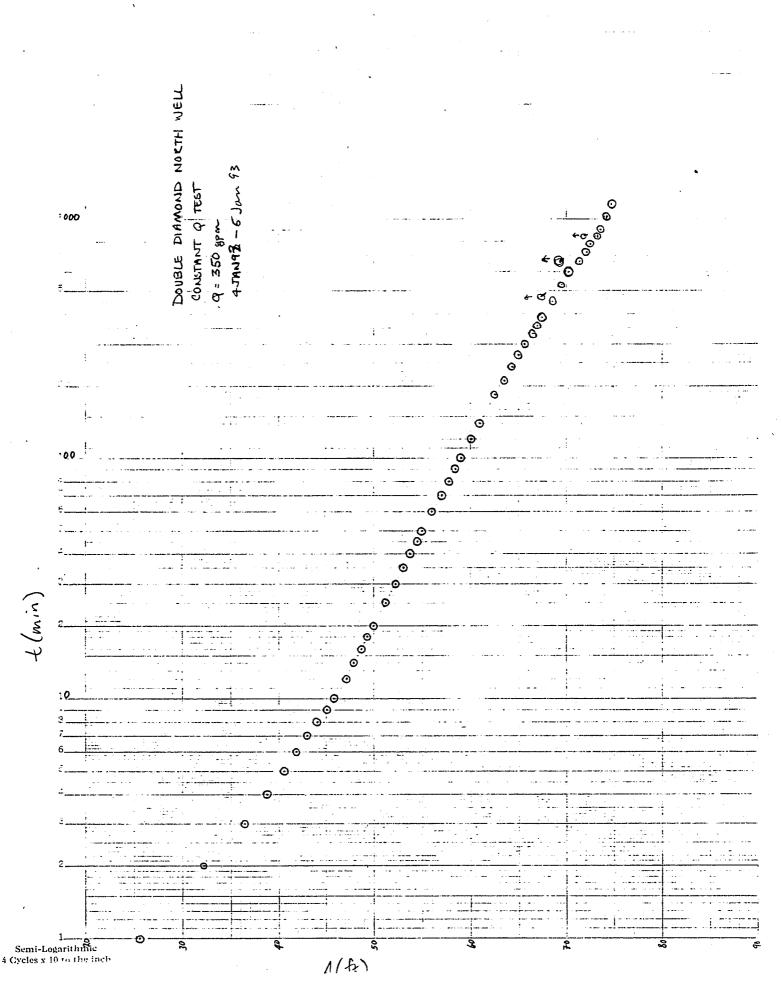
#### PUMPING TEST DATA

WELL DOUGLE DIEARS OKS
PUMPING OBSERVATION WELD PUMPING RECOVERY DATA
PUMPING/ RECOVERY DATA
200 ( 05 2

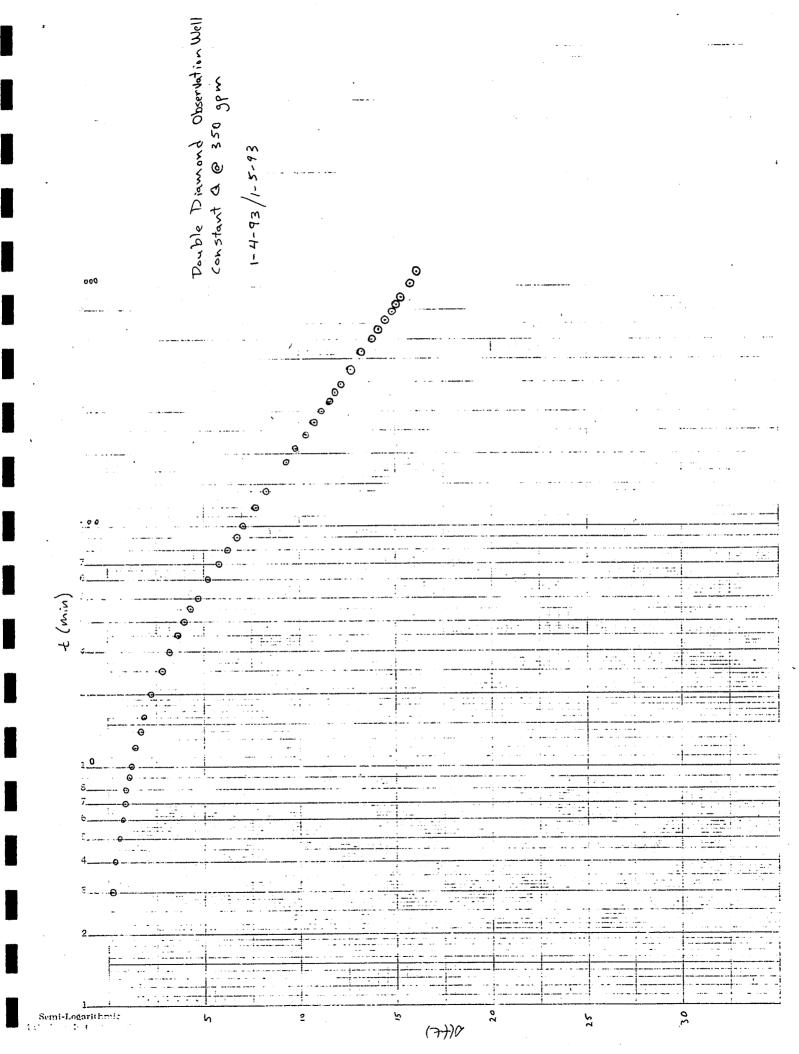
TYPE of PUMPING TEST	PAGE / OF 2
HOW Q MEASURED Orifice weir	— M.P. for WL's 78/4/ elev.
HOW WL's MEASURED Actat Sounder / tape	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO. DD North	
RADIUS of PUMPED WELL 12"	PUMP ON: date 4 JAN 93 time 1035
DISTANCE from PUMPED WELL 271	PLIMP OFF: date 5 Jay 93 time 1830

DIS	DISTANCE from PUMPED WELL 271' PUMP OFF: date							: date .	2 3040	72 ti	me	
	TIME  t = at t'=0				WATER LEVEL DATA STATIC WATER LEVEL 3.10					WATER PRODUCT.		COMMENTS
CLOCK TIME	Mins hrs	SED TI	ME t'	1/1	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	S or S'			O	(NOTE ANY CHANGES IN OBSERVERS)
1035		0			3.10							
1036		,			3.10			0.0		<u> </u>		
103.7		2			3.20		•••	.10				
1038		3			3,32			.22	•			<del></del>
1639		4			3.47			.37		<u> </u>		
Ic 40		5			3,6/			.51				
1041		6			3.77	,		.67	-			
1042		j			3.91			.8/				
1643		8			4,05	-		. 45				
1644		9			4,18			1.08	-			
1045		10			4.32			1.22		<u> </u>		
1047		12			4,57		-	1,47				
1049		14			4.80			1.70				
1051		16			5.02			1,92				
1053		18	_		5.23			2,13				
1055		20	··		5.42			2,32				
1100		25			5,90			2.80				
1105		20			6.32			3,22	,			
1110		35			6.73		-	3.63				
1115		40			7,10			4.00				
1120		45		·	7.45			4.35	-			· · · · · · · · · · · · · · · · · · ·
1125		56			7.76		_	4.66				
1135	91	60			8.34			5.24	!			
1145		70			8,89			5.79				
1155		80			9.36			6.26				
1205		90			9.80		<del></del>	6.70				,
1215		100			10.16	·		7.06				· · · · · · · · · · · · · · · · · · ·
1235	0/3	120			10,82			7.72				`
1255		140			11.39			8.29				
1340		185		•	12.46			9.36				
1405		210			12.48			9.79				
1435	0 4	2.40			13.42			10,32				
1505		270			13.72			10.77	-			
1535	9/5	300			14.29	<del> </del>						
1605		330			14.63			11.19				
1640		345			14.95			11.85				New sounder
1705		390			15.24		<del></del>	12.14				
1806		451			15.8(			12.71				,
1935		540			16.46			13.30		•		
020		600	-		11.90			12 00				DDOES
•		ا دوي			10.54	<u>'</u>		1200	l	•	1	

#### WASHOE COUNTY WELL Double Durand Of PUMPING LOBSERVATION WELD PUMPING RECOVERY DATA PAGE \_ OF \_ DEPARTMENT OF PUBLIC WORKS PUMPING TEST DATA **UTILITY DIVISION** TYPE of PUMPING TEST CONSTRUTE Q HOW Q MEASURED HOW WL'S MEASURED M.P. for WL's top of 2" elev. DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_ PUMPED WELL NO. BA North Submergence: initial \_\_\_\_; pumping \_\_\_\_\_ RADIUS of PUMPED WELL 12" PUMP ON: date 4JA:193 time 10:35 DISTANCE from PUMPED WELL 27/ PUMP OFF: date 5 Jan 93 time 0830 WATER WATER LEVEL DATA TIME COMMENTS PRODUCT. at t'=0" STATIC WATER LEVEL 3.10 CLOCK ELAPSED TIME TIME mins hrs + + CONVERSIONS CORRECTIONS (NOTE ANY CHANGES IN OBSERVERS) WATER t/t1 READING (Sors' LEVEL 14.17 E.E. 2135 الماما 17.27 14.51 2235 720 17.61 14.82 2335 17.92 780 640 15.09 18.19 0035 15.34 0135 900 18.44 0335 15.72 1020 18.82 16.10 0600 19.20 1165 0835 1320 19,52 DDOES



17-10



# DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION TYPE OF PUMPING TEST CONSTANT

WELL	DD D.	, No

PUMPING TEST DATA

PAGE / OF |

TIPE OF PUMPING TEST	
HOW Q MEASURED <u>Orifice</u>	M.P. for WL's top of PVC elev.
HOW WL'S MEASURED <u>solvist</u>	DEPTH of PUMP/AIRLINE wrt
A = A = A	% SUBMERGENCE: initial; pumping
RADIUS of PUMPED WELL 12"	PUMP ON: date 1-6-93 time 0 930

t =		ME at t			STATIC	DATA	WAT PROD		COMMENTS		
CLOCK	ELAPS mins hrs	SED TI	ME †'	t/t'	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	S or S'	iu	Q	(NOTE ANY CHANGES IN OBSERVERS)
0935		5			47.50			40.72	21		
		10	·····		52.81			46.03	21		
		15			55.28			48.50	<u> </u>		· · · · · · · · · · · · · · · · · · ·
		20			57.33		· · ·	50.55	-		,
		25			58.94	V		52.1b	421		Q+
1000		30			60.10		-	53.32	421		471
		40			61.90			55.12	= 21	• •	Qt
		50			63.39			56.61	221		
1030	<i>'</i>	60			64.41			67.63	221		
		80			66.04			59.26	221		
1110		100			67.26		·	60.48	21		
.1130		120			68.19			61.41	421		Qt
1200		150			19.80			63.02	€214		
123°		180			70.87			64.09	=214		
1360		210			71.85			65.07	21		
400		270			73.31			66,53	21		
1540		330			73.60			66.82	203/4		01 214
1600		390			74.78			68.00	211/4		
1700		450			75.52			68.74	2012		Q1 21
1800		510			77.02			70.24	221		
2000		630			78.38			71.60	221		
2200		750			79.36			72.58	21		orthy moony
2400		870			80.06			73.28	21		
0410		1120			81.27			74,49	21		SNOW ING
0745		1335			81.98		Λ.	15.20	521		/
1135		1565			92.60			75.82	221		
1535		1805			83.12			76.34	≥21		
1953		2063			83.54	·		76.76	+21		Q1
2345	·/	2295			84.30			77.52	221		
0415		2565			84.65			77.87	321	<u> </u>	
0735		2765			84.81			78.03	21		
13:00		3030	1		85.14			78.36	21		g <sup>man</sup> r.
1600		3270			85.32			78.54			QT E.E.
1950		3500			86.68			78.90	721		~214
2400		3750			85.83			79.05	721		1214
0430		4020			86.98			79.20	2214		
0930		4320			86.05			79.27	2214		
						, , , , , , , , , , , , , , , , , , ,					
			1	1	-				1	l .	

DEPARTMENT OF PUBLIC WORKS

#### PUMPING TEST DATA

WELL 1	D W.	Old	
PUMPIN	OBSER	VATION-WELL	2
PUMPIN	RECOVE	ERY DATA	
PAGE	/ OF	•1	

UTILITY DIVISION	PUMPING IES	UAIA PUMPING/ RECO	OVERY DATA
TYPE of PUMPING TEST	istant or	PAGEOF	
HOW Q MEASURED	fice	M.P. for WL's top of cosinge	lev
HOW WL's MEASURED 50	<i>lnist</i>	DEPTH of PUMP/AIRLINE	
PUMPED WELL NO Nort	h now	% SUBMERGENCE: initial	_ ; pumping
RADIUS of PUMPED WELL	12 "	PUMP ON: date $\frac{f-6-93}{f}$ time	0930
		PUMP OFF: date $1-9-93$ time	0930

TIME t= at t'=0					WATER LEVEL WATER LEVEL	DATA	: date _	WAT PROD	ER	COMMENTS		
	ELAP	SED TI	MÉ	Τ .		CONVERSIONS	WATER	5.48		I KOD		INOTE ANY CHANGES IN
TIME	mins hrs	†	†'	1/1	READING	CONVERSIONS CORRECTIONS	LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
									<u>-</u>			
		34			22.85			17.37				
		62			25.82			20.34				
		92			27.94			22.46				
1157		147			30.22			24.74	•			
		211			32.28			26.80	-			•
		271			33.54			28.00				
		331			34.28			28.80				
		391	,		34.96			29.48				
		452			35.69			30.21				
		512			36.58			31.10				
		633			37.65			32.17				
		745			38.46			32.98				
		872			39.13			33.65				
0412		1122			39.96			34.48				
0747		1337			40.78		•	35.30				
1135		1560			41.32			35.84				
1535		1800			41.75			36.27				,
1951		2067			42.14			36.66			<u> </u>	
2341		2294			42.62			37.14				
0421		2559			42.96			37.48				
6740		2770			43.15			37.67				
はい		<i>3</i> 030			43.35			37.87				
1603		3273			43.55			38.07			<u> </u>	€.E.
1948		3498			43.79			38.31				
262		3752	-		43.94			38.H6				
0432		4022	_		44.08			38.60	•			
								<b></b>			<u> </u>	
											<u> </u>	
												1
									·····	ļ		
										<u> </u>		
				1						1		NA

DE	PARTM	ENT O	F PUE	BLIC W	ORKS	UNTY PUMPING		DATA	PU!	MPING/	OBSERVATION WELL RECOVERY DATA
ኒ TYF	E of Pl	JMPING	TEST	· _ Con	istant-	<u>φ</u>			/ PAG	E	OF
HOV	V Q ME	EASURE	D.	DIT	سنا سا	<del></del>		M.P. for WL			
HOV	V WL's	MEAS	JRED	soln	15+-			DEPTH of F	PUMP/AIRLIN	IE	wrt
PUM	MPED V	VELL N	10	Neu	ر						; pumping
RAD	DIUS of	PUMP	ED WE	:LL	<u> </u>			PUMP ON:	date <u>1-6-</u>	<u>93</u> 1	time <u>0.736</u>
DIS	TANCE	from P	UMPE	D WELL	611			PUMP OFF:	date 1-9-	<del>43</del> t	ime <u>0930</u>
† =		ME at t	= 0		STATIC	WATER LEVEL	DATA	4.80		TER DUCT.	COMMENTS
CLOCK TIME	ELAPS mins hrs	SED TII	ME t'	1/1		CONVERSIONS	WATER LEVEL	SorS		Q	(NOTE ANY CHANG OBSERVERS)
		32			7.96			3.16			
		63			9.90			5.10			,
		90			11.17			6.37	•		
159		149			12.86			8.06			
		213			14.24			9.44			
		273			15.23			10,43			
		333			15.82			11.02			
		393			16.34			11.54			
		453			1685	· ·		12.05			
		514.			17.40			12.60		<u></u> ,	
		635			18.08			13.28			
		746	<u></u>		18.67			13.87			
		873			19.1b			14.36			
0413		1123			19.72			14.92			
0748		1338			W.28			15.48			
1135		1560			20.64			15.84			·
		1800		ļ	20.92			16,12			`
1535 1950		2060	ļ		21.15			16.35		<b>_</b>	<del> </del>
2340		2290			21.36			16.56		ļ	ļ
0423		2572			21.56			16.76			<u> </u>
739		2769		<del>                                     </del>	21.68			16.88			<b></b>
13:40		3030		1	21.80			17.00		_	· · · · · · · · · · · · · · · · · · ·
1605		3275			21.90			17.10			E.E.
1947		3497		*	22.00			17.20			<u> </u>
2403		<b>3</b> 753		<del> </del>	22.11			17.31		-	
1434		4024	<b></b>		22.20			17.40		-	<u> </u>
							- :	-		-	
		<u> </u>		-	ļ						-
	<del>//</del> _		<del> </del>		<u> </u>						<u> </u>
			ļ		<del> </del>			+			
		ļ	ļ	-	<del> </del>			1			
		-	ļ	+	<del>                                     </del>			<del>  </del>		<del>-  </del>	
		<u> </u>	<del> </del>	-	<u> </u>			<del>  -</del>		-	
		<u> </u>	<b> </b>	ļ							
			<del> </del>	<b>_</b>	ļ		<u> </u>			<del> </del>	
			<del> </del>	<u> </u>	ļ			-		-	
		<u> </u>			ļ					4	
			<u> </u>								CLC

#### WASHOE COUNTY WELL DOTTA DOMESTIC PUMPING OBSERVATION WELL PUMPING RECOVERY DATA DEPARTMENT OF PUBLIC WORKS PUMPING TEST DATA **UTILITY DIVISION** TYPE of PUMPING TEST Constant Q PAGE \_\_ | OF \_\_ /\_\_\_ - M.P. for WL's top of Casing elev. HOW Q MEASURED HOW WL'S MEASURED \_actat DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_ PUMPED WELL NO. DD North \_\_\_\_\_\_ % SUBMERGENCE: initial \_\_\_\_\_\_; pumping \_\_\_\_\_\_ PUMP ON: date 1-4-93 time 1035 PUMP OFF: date 1-9-93 time 0930 DISTANCE from PUMPED WELL ~/000 WATER WATER LEVEL DATA TIME COMMENTS PRODUCT. at t'=0 STATIC WATER LEVEL 86.86 CLOCK ELAPSED TIME TIME mins hrs t t' CONVERSIONS (NOTE ANY CHANGES IN OBSERVERS) WATER READING (Sor S' **1/**t<sup>1</sup> CORRECTIONS LEVEL 1625 86.80 2256 86.86 end test 86.84 920 86.82 0950 86 81 2315 86.82 86.83 86.84 1515 86.82 0510 Dette dance

#### WASHOE COUNTY WELL FLINDT AGR TYPE of PUMPING TEST CONSTANT Q PUMPING KOBSERVATION WELL RUMPING/ RECOVERY DATA PAGE \_\_\_\_/ OF \_\_\_/\_\_\_ HOW Q MEASURED M.P. for WL's \_\_\_\_\_\_ elev. \_\_\_\_\_ HOW WL'S MEASURED \_\_\_\_\_ Wrt \_\_\_\_ PUMPED WELL NO. D.D. North % SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_ RADIUS of PUMPED WELL 12" PUMP ON: date 1-4-93 time 1035 DISTANCE from PUMPED WELL $\frac{\nu_{1000}}{}$ PUMP OFF: date $\frac{1-9-93}{}$ time $\frac{0930}{}$ WATER WATER LEVEL DATA TIME COMMENTS PRODUCT. at t'=0STATIC WATER LEVEL 50, 28 CLOCK ELAPSED TIME TIME mins hrs + + + CONVERSIONS WATER (NOTE ANY CHANGES IN OBSERVERS) S or S' READING t/t' LEVEL CORRECTIONS 1630 50.27 2250 50.30 end tost 0932 50.30 50.28 2320 50,28 50.30 50.28 515

#### WASHOE COUNTY WELL FLINET DOMESTIC DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION PUMPING / OBSERVATION WELD PUMPING / RECOVERY DATA PUMPING TEST DATA TYPE of PUMPING TEST Constant Q PAGE \_\_\_/\_ OF \_\_/\_\_\_ \_ M.P. for WL's \_\_\_\_\_\_ elev. \_\_\_\_ HOW Q MEASURED Actat HOW Q MEASURED \_ DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_ PUMPED WELL NO. \_\_\_\_\_\_\_ % SUBMERGENCE: initial \_\_\_\_\_\_; pumping \_\_\_\_\_\_ RADIUS of PUMPED WELL 12" PUMP ON: date 1-4-9 3 time 1035 DISTANCE from PUMPED WELL 27/ \_\_\_\_\_ PUMP OFF : date 1-9-43 time 0930 WATER TIME WATER LEVEL DATA COMMENTS PRODUCT. at t'=0 STATIC WATER LEVEL 35, 72 CLOCK ELAPSED TIME TIME mins hrs t t' CONVERSIONS WATER CORRECTIONS LEVEL (NOTE ANY CHANGES IN OBSERVERS) SorS 1/t' READING 35.40 1633 2250 35.41 end test 0930 35,43 35.52 1005 3:00 2325 35.41 35.69 1515 35.44 0520 gage Weir 1-7-93 2315 3.0

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

#### PUMPING TEST DATA

WELL DENorth New

PUMPING OBSERVATION WELL PUMPING RECOVERY DATA

	PUMPING RECOVERY DATA
TYPE of PUMPING TEST Constant Discharge Recovery	PAGE L OF 2
HOW Q MEASURED Crifice	- M.P. for WL's top of puc elev.
	_ DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO. New	_ % SUBMERGENCE: initial; pumping
	PUMP ON: date 1-6-93 time 0930
DISTANCE from PUMPED WELL	_ PUMP OFF : date <u>1~9~93</u> time <u>0930</u>

DISTANCE from PUMPED WELI					PUMP OFF : date /						1-9-93 time 0930			
t =		ME at t				WATER LEVEL DATA 6.78					TER OUCT.	COMMENTS		
CLOCK	mins hrs	SED TI	ME t'	1/1	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	S or S			O	(NOTE ANY CHANGES IN OBSERVERS)		
0930		432c	0		86.05			79.27				<del></del>		
		4541	I	4321	56.30			49.52						
		4322	2	2161	52.70			45.92	•					
		4323	3	1441	49.56			42.78						
		4324	ij	1291	46.70			39.92						
		4325	5	865	44.84			37.70						
		4326	6	721	43.15			36-37						
		432.7	7	618	41.43		,	34.65						
		4328		541	40.40			33.62						
		43- 4	9	481	39.92	·		33.14						
		4330	7.2	433	38.3€			31.60						
		4332	12	361	36.96			30.18						
		4334	14	310	35.59		-	28.81						
		4336	16	271	34.60			27.82						
		4338	18	241	33.83			27.05						
		4340	20	217	33.14			26.36				· · · · · · · · · · · · · · · · · · ·		
		4345	25	174	31.75			24.97						
1000		4350	30	145	30.65			23.87						
		4355	35	124	29.72	· · · · · · ·	٠.	22.94						
		4360		109	28.93			2215						
		4365	45	97	28-25			21.47						
		4370	58	87	27.60			20.82						
1030		4380	60	78	26.63			19.85	.4					
		4390	70	6.3	25.74			18.96						
		4460		55	24.96			18.18						
1100		4410	90	49	24.37			17.59						
		4420			23.78			17.00	¢.					
		4440	120	37	22.63			15.85	,					
1150	2/2	4460	140	.32	21.81			15.03				-		
1210		4480	160	:58	21.62			14.84						
1230		4500		25	2015			13.67						
1300		4530		22.	19.60			12.82						
1330		4560		19	-18.68			11.90						
1400		4590	Ĭ	17	17.90			11.12						
1500		4650		14	16.61			9.83						
1600			390	12	15.70			892				,		
1700	_	4770			14.88			8.60		· · · · · · ·				
1850		4560			13.54			6.76						
C 13	$\overline{}$				11 1.2			4 0%						

#### WASHOE COUNTY WELL DO NOITH **DEPARTMENT OF PUBLIC WORKS** PUMPING OBSERVATION WELL PUMPING TEST DATA **UTILITY DIVISION** PUMPING/ RECOVERY DATA TYPE of PUMPING TEST CONSTANT Q KELDJEYY PAGE 2 OF 2 \_\_\_ M.P. for WL's top of puc elev. HOW Q MEASURED \_\_ HOW WL'S MEASURED Solvist \_\_\_\_\_ DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_ PUMPED WELL NO. DD NOAL % SUBMERGENCE: initial ; pumping \_\_\_\_\_; pumping \_\_\_\_\_; pumping \_\_\_\_\_; pumping \_\_\_\_; pu \_\_\_\_\_; pumping \_\_\_\_\_ RADIUS of PUMPED WELL 12" PUMP OFF: date 1-9-93 time 0930 DISTANCE from PUMPED WELL \_\_\_\_ WATER LEVEL DATA WATER TIME COMMENTS at t'=0 PRODUCT. STATIC WATER LEVEL 6.78 CLOCK ELAPSED TIME CONVERSIONS WATER (NOTE ANY CHANGES IN OBSERVERS) t/t' READING S or S' TIME mins hrs t t' CORRECTIONS LEVEL 5375 1055 5.1 10.18 9 JA, 193 0305 3.40 5835 1515 39 8.52 1.74 6220 1900 3.3 08,0 1710 7.64 -0.44 7236 2910 2.5 له .34 000

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

#### PUMPING TEST DATA

MELL 17	DD 01	_D
		ATION WELL
PUMPING	RECOVE	ATION WELL
PAGE	OF	1

,	POMPING RECOVERY DATA
TYPE of PUMPING TEST Constant & Recovery	PAGE/_ OF/
HOW Q MEASURED Orifice	- M.P. for WL's top of casing elev.
HOW WL'S MEASURED Solvist	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO. "NEW"	_ % SUBMERGENCE: initial; pumping
RADIUS of PUMPED WELL	PUMP ON: date 1-6-93 time 0930
DISTANCE from PUMPED WELL	PUMP OFF: date 1-9-93 time 3930.

TIME t= at t'=0					WATER LEVEL DATA 5.48					WAT PROD		COMMENTS
CLOCK TIME	ELAP mins hrs	SED TI	ME t'	t/t	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
0430					44.12			38.64				
		4321	1	4321	42.56			37.08	-			
		4323	3	1441	37.48			32.00				
		4325	5	865	34.96			29.48				
		172	4.28		31.11	?		27.40				
		4327	7.50	618	37.88			27 40				
		4330.		433	30.98			25.50				
		4334	14.0	310	29.40			23.92				
		4338	17.5	241	28.18			22.70				
,		4340	20.5		27,32			21.84				,
		4344	24	181	26.52			21.04				
		4348	28	155	25.74			20 26	····-			
		4353	33	132	24.90	·		19.42				
		4357	37	118	24.34			18.86				
		4362	42	104	23.68			18.20				
		4367	47	93	23.12			17.64				
		4372	52	84	22.62							
1030		4380	60	73	21.92			16.44				
1		4390	70	63	21.15			15.67				
		4\$00	80	55	20.50	:		15.02				
1/00		4410	90	49	19.92			14.44				
<u> </u>		4420	100	44	19.39			13.91				
		4143	123	36	18.34							
								1286				
12:24		9461	141	32	17.72			12.24				
12.54		4494	204		16.73			11.25				·
1332		4524 4562	242	22	15.92 15.0 <del>4</del>			10.44 9.56				
1358		4588									•	
1500	$\overline{}$	4588 4650			14.56			9.08				
			330	14	13.47			7.99	<del></del>			
1556		4706			12.72		·	7.24				
1656		4766			12.01			U.53				
1945	$\leftarrow$	<del>9</del> 875			10.97			5.49				
2201					9.64			4.16				
0310	-	5380			8.24		•	2.76			-	10 JAN 93
10:45		583 <i>5</i>			6.96			1.48				
1715		4275		3.3	6.28			0 80				
1000		7230	2910	2.5	5.23			-0.25	··. · ·			11 Jan 93
-										-		
<b> </b>		!					· ····			-		

DEPARTMENT OF PUBLIC WORKS

#### PUMPING TEST DATA

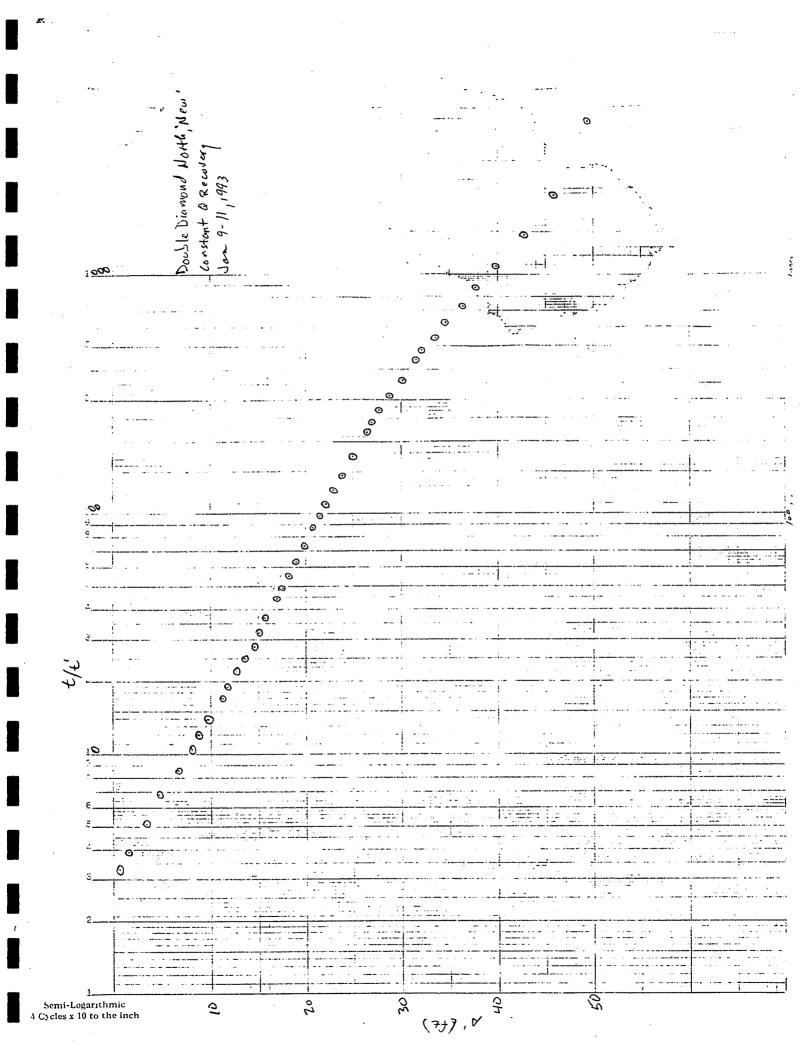
WELL OE. WELL	
PUMPING OBSERVATION WELL	Ż
PUMPING RECOVERY DATA	

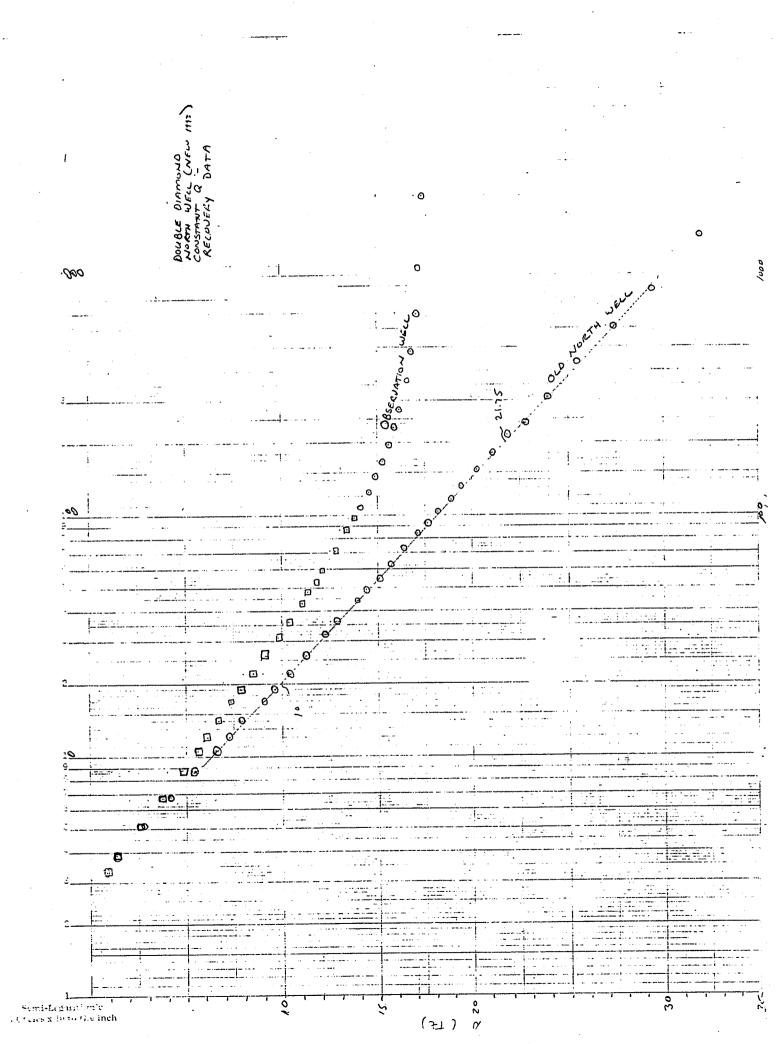
UTILITY DIVISION	FUMPING TES	PUMPING RECOVERY DATA
TYPE of PUMPING TEST CONSTANT C	Recovery	PAGE _/_ OF
HOW Q MEASURED	<u> </u>	M.P. for WL's top of 2" elev.
HOW WL's MEASURED		DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO. DD North	^	% SUBMERGENCE: initial; pumping
RADIUS of PUMPED WELL		PUMP ON: date <u>/-6-93</u> time <u>0930</u>
DISTANCE from PUMPED WELL 271	1	PUMP OFF : date <u>1-9-93</u> time <u>093</u>

TIME   1   1   1   1   1   1   1   1   1	DÍS	TANCE	from P	UMPEC	WELL				PUMP OFF	: date _	1-9-9	3 ti	me <u>093</u>
TIME DIFFIGURE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	t= at t'=0				WATER LEVEL		4.80						
0720 4320 2 2161 27.26 17.46 4321 2 2 161 27.26 17.46 1821 27.27 17.46 1821 27.27 17.46 1821 27.27 17.28 1 17.31 17.31 17.31 17.31 1 1	CLOCK	mins hrs	SED TH	ME t'	t/t¹	READING	CONVERSIONS		S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
4322 2 261 22.26  4324 4 1081 72.11  4323 1.25 1.72 2.11  4323 1.25 1.72 2.11  4323 1.25 1.72 2.11  4323 1.25 1.25 1.25  4332 1.2 361 2.34  4332 1.2 361 2.34  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 361 2.37  4332 1.2 4.3 1.3 1.4 6.2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 2  4421 1.2 36 1.5 2.2  11.4 3 31 1.4 6.6  13.3 1 4.6 6.7  13.5 1 4.6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7			1			2232							
4324   4   1081   72.11   17.31   17.31   14324   1.25   1.71   1.7.11   1.7.11   1.20   1.	17 1.57			2	2141				17.46				
				4						-			
4329   9   481   21 L5   16.85   16.85   18.52   17.72   17.72   18.51   18.52   18.				6.25						•			
4332 12 36 21.34  4336 16 271 2047  15.71  43878 18.75 231 20.71  15.91  4342 22 197 2040  4346 26 167 20.08  15.28  4350 30 145 17.69  14.87  4350 40 107 18.95  14.15  4370 50 87 18.27  14.31  4391 62 17 17.59  12.71  4391 74.5 57 16.70  14.12  14.12  14.12  14.12  14.12  14.13  15.14  16.15  16.17  17.15  18.15  18.15  18.15  18.15  18.15  18.15  18.15  18.15  18.15  18.15  18.16  18.15  18.17  18.18  18.18  18.19  18.19  18.19  18.19  18.20  18.17  18.30  18.17  18.30  1													
438.75   18.15   23.1   20.71   15.91   15.40   15.40   15.40   15.40   15.40   15.40   15.40   15.40   15.28   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   14.51   15.7			4332	12		21.34			16.54				
4342   22   197   20 40   15.60			4336	16	271	20.97			16.17				
434			4338.75	18.75	231	20.71			15.91				
4250 30   145   17.69			4342	22	197	20.40			15.60				
425   35   124   19.31   14.51   14.51   14.51   14.51   14.51   14.55   14.15   14.			4346	26	167	20.08			15.28				
4356 35 124 14.31  4360 40 100 18.95  4370 50 87 18.27  4382 62 71 17.59  43945 74.5 59 10.90  4412 92 48 10.27  4421 102 43 15.80  11.06  4422 102 43 15.80  11.06  12.12  4492 122 26 13.47  12.55  4591 201 17 12.20  13.51  4597 201 17 12.20  7.40  1359 4597 201 17 12.20  4710 37 12 10.90  4710 37 12 10.90  4710 37 12 10.90  4710 37 12 10.90  4710 37 12 10.90  4710 37 12 10.90  4710 37 12 10.90  4710 37 12 10.90  4710 37 12 10.90  4710 37 12 10.90  4710 450 10.6 10.42  1850 4880 560 87 9.54  2907 5077 7576 6.7 8 95  5831 1515 3.7 6.21  10.90  7230 2910 2.5 1.731  10.90  7230 2910 2.5 1.76  10.90  7230 2910 2.5 1.76  10.90  7230 2910 2.5 1.76  10.90			4350	30		19.69			14.89		<u> </u>		
43c5   45   97   18.59   13.71   13.47   4370   50   87   18.27   12.79   12.79   12.79   12.79   12.16   17.58   11.78   14.72   14			4255	35	124	19.31		,	14.51				
4370   50   87   18.27   13.47   12.74   13.47   14382   62   71   17.59   12.74   12.16   12.76   12.76   12.76   1403   83   53   16.58   11.78   14.12   142   142   162   143   15.86   11.06   142   142   162   13.47   16.42   14.23   14.33   14.66   14.66   14.66   14.66   14.66   14.67   14.68   14.27   16.42   14.28   14.29   16.42   14.20   13.37   14.66   14.20   13.37   12.55   16.52   16.47   16.40   14.50   17.90   17.90   13.51   14.66   17.90   17.90   13.51   16.45   16.67   17.51   16.67   17.51   16.67   17.51   16.67   17.51   16.67   17.51   16.67   17.51   16.67   17.51   16.67   17.51   16.67   17.51   16.45   15.51   16.45   15.51   16.45   15.51   16.45   15.51   16.45   15.51   16.45   15.51   16.45   15.51   16.66   17.30   11.69   11.69   11.60		/	4360	40	109	18.95			14.15				
4382 62 71   17.59   12.79   12.10   Mr S			4365	45	97	18.59			13.71				
4394.5 74.5 59   10.90   12.10   Mr. 5dec     4403 83 53   16.58   11.78     4412 92 48   16.27   11.42     4421 102 43   15.80   11.00     4442 122 36   15.22   10.42     4163 143 31   14.60   9.86     18.122   4492   172 26   13.97   9.17     12.55   4525 205 22   13.32   8.52     13.1   4561 241   19   12.70   7.90     1359   4599 209 17   12.20   7.40     1453   4649 329   14   11.52   6.72     1100   4710 39   12   10.90   6.10     1850   4850 500 87   9.54   4.14     2907   5072 752 6.7   8 45   3.70     0386   5836 1515 38   6.21   1.41     1115   6225 1965 3.2 5.64   0.84     1000   7230 2910 2.5   4.75   -0.05   11   1.29 3			4370	50	87	18.27			13.47				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			4382	62	71	17.59			12.79		ļ		
4412   92   48   16.27   11.42   421   102   43   15.86   11.06   442   12.2   36   15.22   10.42   10.42   14.63   14.3   31   14.66   9.86   18.22   442   172   26   13.47   9.17   12.55   4525   205   22   13.32   8.52   13.31   4561   241   19   12.70   7.90   1369   4599   269   17   12.28   7.40   1859   4649   329   14   11.52   6.72   1600   4710   39   12   10.40   6.10   1700   470   450   10.6   10.42   5.62   1850   4880   560   87   9.54   4.74   2207   5072   752   6.7   8   45   3.70   7.31   2.51   10.45   5836   1515   3.7   6.21   1.41   1715   12.25   19.65   3.3   5.64   0.84   11.62   11.62   10.84   11.62	·				59	16.90			12.16		ļ		New Sounder
442   102   43   15.86   11.06   4442   122   36   15.22   10.42   1463   143   31   14.66   9.86   18.22   4492   172   26   13.97   9.17   12.55   4525   205   22   13.32   8.52   13.32   8.52   13.59   209   17   12.20   7.90   13.59   209   17   12.20   7.40   1859   40.49   329   14   11.52   6.72   16.00   4710   39   12   10.90   6.10   17.00   4700   4500   10.60   10.42   5.62   4850   5600   8.7   9.54   4.74   8207   50.77   752   6.7   8 95   3.70   2.51   10.45   5835   1515   38   6.21   1.41   1115   6225   1905   3.3   5.64   0.84   1000   7230   2910   2.5   4.75   -0.05   11   4.93   4.93   4.93   4.93   4.93   4.93   4.93   4			4403		53	16.58			11.78		<b> </b>		
4442   122   36   15.22   10.42     1463   143   31   14.66   9.86     12:22   4492   172   26   13.47   9.17     12:55   4525   205   22   13.32   8.52     13:31   4561   241   19   12.70   7.90     13:59   4599   269   17   12.28   7.40     1459   4649   329   14   11.52   6.72     1600   4770   450   10.6   10.42   5.62     1850   4850   560   8.7   9.54   9.54     2307   5072   752   6.7   8 95   3.70     2380   2660   5.1   7.31   2.51     251   10.45   5835   1515   3.9   6.21     11:5   6225   19.65   3.3   5.64   0.84     1000   7230   2910   2.5   4.75   -0.05   11   42.93     10.45   7230   2910   2.5   4.75   -0.05   11   42.93     10.47   11.57   11.57   11.57   11.57     10.48   1515   3.9   6.21   1.41     11:5   6225   19.65   3.3   5.64   0.84     1000   7230   2910   2.5   4.75   -0.05   11   42.93     10.49   14.40   14.40   14.40     11.50   11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.50   11.50   11.50     11.	<u>-</u>		4412	92	48	16.22		,	11.42				
1463   143   31   14.66   9.86       12:22   4492   172   26   13.97   9.17     12:55   4525   205   22   13.32   8.52     13:31   4561   241   19   12.70   7.90     13:59   4599   269   17   12.20   7.40     1451   4649   329   14   11.52   6.72     1600   4710   39   12   10.90   6.10     1700   4770   450   106   10.42   5.62     1850   4380   560   87   9.54   9.54     2207   5072   752   6.7   8 95   3 70     2308   5380   1060   5.1   7.31     10:45   5835   1515   39   6.21     10:45   5835   1515   39   6.21     10:50   7230   2910   2.5   4.75   70.05     11   42.93     1000   7230   2910   2.5   4.75   70.05     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     11   42.93     12   13.97     13   14.10     13   14.10     14   15   15     15   16   16     16   17   17     17   18   18     18   18   18     18   18			1			15.86			11.06				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			4442	122		15.22			T				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			4463	143		14.60						ļ	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					26				1				
1359													
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$									-		ļ		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$											-		
1700   4770   450   10.6   10.42   5.62   1850   4850   560   8.7   9.54   4.74   2907   5072   752   6.7   8 45   3 70   10.45   5835   1515   3.9   6.21   1.41   1115   622.5   1905   3.3   5.64   0.84   1000   7230   2910   2.5   4.75   -0.05   11   4.93		_					<u> </u>			<u>-</u>	<del> </del>		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$											<del> </del>	-	
2907 5072 752 67 8 95 370 370 310 5380 1060 5.1 7.31 2.51 10 JAN 93 10:45 5835 1515 39 6.21 1.41 115 6225 1905 3 3 5.64 0.84 1000 7230 2910 2.5 4.75 -0.05 11 12 93									1		-	-	
0310   5380 1060 5.1 7.31   2.51   10 JAN 93 10:45   5835 1515 39 6.21   1.41   1.41   1.45   1.25 1905 3.3 5.64   0.84   0.84   1.40											<del>                                     </del>	-	
10:45 5835 1515 3.9 6.21 1.41 13:5 622.5 1905 3:3 5.64 0.84 1000 7230 2910 2.5 4.75 -0.05 11 12.93										<del></del>			10.7-107
135 6225 1905 3 3 5.64 0.84 0.84 1000 7230 2910 2.5 4.75 -0.05 11 Jan 9 3						1			1			<del>                                     </del>	10 JAN93
1000 7230 2910 2.5 4.75 -0.05											<del>                                     </del>		
			1		1								11 16 93
	סטטן		1630	4710	6.3	-1./>		<del> </del>	J. J.				11 1/2-13
	<del> </del>				<b>†</b>					``		† · · · · ·	
			<u> </u>						· 1			<u> </u>	
											t		
	<del>                                     </del>			<b> </b>	<del> </del>								

#### WELL\_Misc. WASHOE COUNTY **DEPARTMENT OF PUBLIC WORKS** PUMPING / OBSERVATION WELL PUMPING TEST DATA UTILITY DIVISION PUMPING/RECOVERY DATA TYPE of PUMPING TEST Gustant PAGE \_\_\_\_\_ OF \_\_\_\_\_ \_\_ M.P. for WL's \_\_\_\_\_\_ elev. \_\_\_\_ HOW Q MEASURED HOW WL'S MEASURED actut \_ DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_ PUMPED WELL NO. DO NOTTH \_ % SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_ \_\_ PUMP ON : date \_\_\_\_\_ time \_\_ DISTANCE from PUMPED WELL ~1000' \_\_ PUMP OFF : date \_\_\_\_\_ time \_ WATER LEVEL DATA 852-3108 TIME WATER COMMENTS at t'=0 328 = 3044 WPRODUCT. STATIC WATER LEVEL CLOCK ELAPSED TIME TIME mins firs t t' CONVERSIONS WATER (NOTE ANY CHANGES IN OBSERVERS) t/t' READING S or S' LEVEL 4,0,0. B" DOTTA N1300 220 EST # P SET 87.05 1.60 79' Shp 80 gpm FUNT AG WELL 0.50 50.47 1953 7/7/12 ( T.D. 198' Pure 105' OLD SIMPLOW 3'eeum FLINDT DOMESTIC 35,28 WOLL MA IS AT GO LIVEL 86.92 DOMESTIC WELL 50.35 FLINDT AL Wal FUNDT DOMESTIC 35.36 86.50 DOTTA DOMESTIC 50.10 FLINDT AL 35.23 FLINDT DOWN

#### **WASHOE COUNTY** WELL \_ **DEPARTMENT OF PUBLIC WORKS** PUMPING TEST DATA PUMPING/OBSERVATION WE PUMPING/RECOVERY DATA PUMPING/OBSERVATION WELL **UTILITY DIVISION** PAGE \_\_\_\_\_ OF \_\_\_\_ TYPE of PUMPING TEST \_\_\_\_\_ HOW Q MEASURED \_\_\_\_\_ M.P. for WL's \_\_\_\_\_ elev.\_\_\_\_ HOW WL's MEASURED \_\_\_\_\_ DEPTH of PUMP/AIRLINE \_\_\_\_ wrt \_\_\_\_ PUMPED WELL NO. \_\_\_\_\_\_\_ % SUBMERGENCE: initial \_\_\_\_\_\_; pumping \_\_\_\_\_\_ RADIUS of PUMPED WELL \_\_\_\_\_ PUMP ON: date \_\_\_\_\_ time \_\_\_\_ DISTANCE from PUMPED WELL \_\_\_\_\_\_ PUMP OFF: date \_\_\_\_\_\_ time \_\_\_ TIME WATER LEVEL DATA WATER COMMENTS at t'=0 PRODUCT. STATIC WATER LEVEL CLOCK ELAPSED TIME CONVERSIONS CORRECTIONS WATER (NOTE ANY CHANGES IN OBSERVERS) READING TIME mins hrs + t/t' S or S LEVEL 1710 7.64 6.28 564 1000 115- 97 6.34 Don 5.23 DDOLD 4.75 100035





NEVADA STATE HEALTH LABORATORY (PLEASE PRINT OR TYPE) NEVADA DIVISION OF HEALTH itginia Street 101085 ATER CHEMISTRY ANALYSIS: All of the information below must be filled in Attn: Fees may apply to some types of samples. or the analysis will not be performed. TYPE OF ANALYSIS: Check here for ROULINE DOMESTIC ANALYSIS. Circle the constituents needed for PARTIAL ANALYSIS AMPLING INSTRUCTIONS: The sample submitted must be representative of the source. Spring and surface **REASON FOR ANALYSIS:** USE OF WATER: ater samples should be as free of dirt and debris as possible. Wells should be ☐ Loan Domestic drinking water umped thoroughly before sampling, changing the water in the casing at least ☐ Personal health reasons ree times. Product water from filters should be sampled after running for ☐ Geothermal about ten (10) minutes. ☐ Purchase of the property ☐ Industrial or mining Date 12-21-92 M. Widmer ☐ Rental or sale of property ☐ Irrigation Subdivisio approval Other..... Other.... Address PO BO Initials..... ily Reno REPORT TO: M. Widmer SOURCE OF WATER: Filter Yes □ No Type..... Public X Yes | No Name ..... Address..... Surface.... Depth 180 Casing diameter. 12 in. Hot ......Cold ..... Casing depth. 180 ft. IN USE 🗌 Yes 🔀 No The results below are representative only of the sample submitted to this laboratory. PRINT OTHER DESIRED CONSTITUENTS BELOW FOR LABORATORY USE ONLY Constituen 568 -56<sup>6bm</sup> Onstituent 31.5 ppm 1 Constituent <sub>co</sub>រួល្អរួល្គ85 S.U. Constituent Γ.D.S. @ 245 03° C. Chloride Iron 0.06 Color 3 Hardness 150 Nitrate -N 1.2 Manganese 0.00 **Turbidity** 0.9 27 Calcium **Alkalinity** 188 0.00 Copper pΗ 7.63 lagnesium 20 229 Bicarbonate Zinc 0.09 EC 347 Sodium 15 Carbonate 0 Barium 0.17 7 otassium Fluoride 0.07 Boron 0.0 Sulfate 5 Arsenic 0.012 Silica **67** Remarks.. parts per million, milligrams per liter Standard Units

Well Information for 1108 East Holcomb Lane, Reno, NV.

197' deep 8" well casing, percolation starts at 160 to 197' 77' water level 145 recommended setting for pump 200 gallons per minute when tested 11-20-80 10" outside casing, then reduced to 8" last 50" on top. 5 H.P. 60 G.P.M. 2" main line to house. 2 CA 220 Pressure Tanks in basement of home.

Paul WILLIAMS, drilled well.

OWENS BROTHERS PUMP, set pump.

Dotta Domestic



"To Protect and To Serve"



1195-B CORPORATE BOULEVARD POST OFFICE BOX 11130 RENO, NEVADA 89520 January 3, 1993 PHONE: (702) 785-4743 FAX #. (702) 785-5978

**UTILITY DIVISION DEPARTMENT OF PUBLIC WORKS** John M. Collins, Chief Sanitary Engineer

To: Caesar Dotta

1108 E. Holcomb Lane

Reno, Nv 89511

Water level measurements. Re:

Dear Caesar,

Attached is the information you requested from our meeting of February 1, 1993. This includes copies of the original data sheets that contain our measurements of water levels in the Dotta domestic well, the Flindt agricultural well and the Flindt domestic well. I have also summarized these measurements with respect to testing that occured on the new Double Diamond North well. As you can see there was no response measured in any of these wells that can be related to the limited pumping at the production well. was difficult to measure the springs, we were not able to detect any change in the flow during this time.

At this time I do not know when this well will be equipped and put into production. As we have discussed, our office would like to continue to measure your and the Flindt wells quarterly, for purposes of determining any impacts the Double Diamond well might influence on them. This information will be given to you at the time of our measurements and at your request.

If I can answer any questions or provide you any information, please do not hesitate to contact me at 785-4743.

Yours very truly,

Michael C. Widmer Hydrogeologist

c: John Collins Jack Ferris

Dec	04				with Caesa	
		Date			Ag Well	
		12-04	1315	87.05*	50.47*	35.28*
Dec	11-15	Develo	pment	pumping	•	
		12-14		86.92	50.35	35.28
Dec	16	Step To	est			
		12-16		86.50	50.10	35.23
Dec	17	23 Hour	r Cons	tant Tes	st (0900)	
		12-17	1005	86.85	50.28	35.29
			1053	86.84	50.27	35.28
			1213	86.84	50.25	35.33
					50.26	
					50.24	
•			2217	86.87	50.31	35.30
		12-18			50.32	
Jan	4- 5	23 Hour	c Cons	tant Tes	st	
					50.27	35.40
		1-04	2250	86.86	50.30	35.41
		1-05			50.30	
Jan	6- 9	72 Hou	Cons	tant Tes	st	
		1-07			50.28	35.52
				86.81		35.48
				86.82		none
		1-08			50.38	
					50.30	
		1-09		86.82	50.28	35.44

<sup>\*</sup> water level measurements in feet below measuring point.

**DEPARTMENT OF PUBLIC WORKS** UTILITY DIVISION

John M. Collins, Chief Sanitary Engineer POST OFFICE BOX 11130 RENO, NEVADA 89520 PHONE: (702) 785-4743

. Some in Common		DATE Jan 93
PROJECT DDN"New" To	st: Loctost whigh	PAGE/_ OF PAGES
fumping Rate 1	Locamp	
Pumping Well		
old well	hocold 7	2'
ols well	Locobs 27	n'
T= 1969 FLYday= 1		well
5= 0.0002 K=18	2.75 ft/day )	
T= 1084 Pt2/day = 8,	100 gpd/fz)	
S= 0.0003 K=10	S Old a	ell ,
T = 853 Far/day = 6.	> New we	ll III
S= 0,04 K=1	2.2	
T for allevial	aquiter a 2800 Pryda	w = 21000 apd/fz
		7 // 30/
good lit on o	bs uf T= 1450 = 5=0.	1005

UTILITY DIVISION

POST OFFICE BOX 11130 RENO, NEVADA 89520 PHONE: (702) 785-4743



John M. Collins, Chief Sanitary Engineer DATE Jan 93 of 3 PAGE \_ **PAGES** Calculations - Double Diamond PROJECT WHIP Novth STPUMP puny dola Stroma LOC STP = 14 to when (0-400 g) 0.000015

# **DEPARTMENT OF PUBLIC WORKS POST OFFICE BOX 11130** RENO, NEVADA 89520 PHONE: (702) 785-4743 UTILITY DIVISION John M. Collins, Chief Sanitary Engineer DATE\_ Jan 3 OF 3 **PAGES** PAGE Double Diamond North to = 12 min = 0.0083 day 0.5 A 72 Az entire aguiter 18,000) 0.0008

**DEPARTMENT OF PUBLIC WORKS** 

POST OFFICE BOX 11130 RENO, NEVADA 89520

**UTILITY DIVISION** PHONE: (702) 785-4743 John M. Collins, Chief Sanitary Engineer DATE Han PAGE \_ OF\_ / PAGES PROJECT Cross Section Double Diamond North carte W 

#### 4. Production Well Construction

A. Pilot Bore - The diameter of the pilot bore for the production well shall be not less than 6-3/4 inches. Formation samples shall be taken at ten (10) foot intervals and at each change in formation. Samples shall be stored in Ziploc freezer bags or equivalent and properly labeled as to depth and date.

Upon completion of the pilot hole, the Contractor shall employ a commercial logging service such as Welenco, Geo-Hydro-Data or approved equal. The commercial logging service shall run spontaneous potential, long and short resistivity, point resistivity and temperature logs or the well pilot borehole.

The Contractor, at the request of the Owner, shall have a grain size analysis performed by an approved laboratory, on each of three formation samples selected by the geologist. The results of the analysis, including distribution curves and recommendations for slot size screen openings, shall be delivered to the geologist for review prior to ordering well screen.

Drilling Fluid - When it becomes necessary to add clays в. or chemicals to the drilling fluid, it must be borne in mind that it is desirable to maintain a mud system containing a minimum of clay and fine sand and to deposit a thin, easily removable filter cake on the face of the borehole. If there should be a conflict between the mud requirements for ease in drilling and the requirements for protection of the aquifer, then the ruling requirements shall be those for protection.

In the event it is the opinion of the Owner that drilling fluid properties are not being maintained in the best interest of aquifer protection, the Owner may require the Contractor to obtain the services of a qualified mud engineer. The Contractor shall be responsible for any payment required for the services of the mud engineer. The mud engineer shall have the responsibility to maintain mud and loss-circulation properties, in a manner meeting the goals of aquifer protection.

The Contractor shall monitor and maintain the fluid properties as outlined by the mud engineer. In the event the Contractor cannot attain these properties, the mud shall be replaced at no additional cost to the Owner.

C. <u>Installation of Conductor Casing</u> - The conductor casing borehole shall be a minimum 26-inch diameter and drilled to a depth of 101 feet. The conductor casing shall be of new, first quality material and free of defects in workmanship and handling. No reject, subgrade or limited-use pipe is acceptable. The conductor casing shall meet the same requirements as the production casing with an outside diameter of 20 inches and a minimum wall thickness of 0.375 inches. The lower end of the conductor casing shall be fitted with a standard guide shoe.

The conductor casing shall be equipped with centering guides, with the first ones located about 4 feet above the bottom of the casing and then approximately every 30 feet. The centering guides shall be approved by the geologist prior to installation. The top of the casing shall extend 1 foot above land surface.

- Installation of Grout Surface Seal Grouting the annular space between the conductor casing and the 26 inch borehole wall shall be by the Standard Halliburton This involves pumping from the bottom of the casing through the guide shoe up the outside of the The grout shall be composed of a thoroughly casing. mixed, free of lumps and stones, cement grout. The grout shall consist of a mixture of 5.2 gallons of clean water mixed with each sack (94 lbs.) of Portland type C cement. The slurry mix shall produce a slurry weight of 15.6 lbs./gal.The cement after placement shall be allowed to set up for a period of not less that 36 hours, after which the plug at the bottom of the casing may be drilled. Stand by time will not be paid during this set up period. A reserve of at least fifty percent (50%) over the calculated volume of cement required shall be stocked on location to allow for volume differences due to washouts.
- E. <u>Production Well Construction</u> The production casing borehole shall be 16-inch minimum diameter to a minimum depth of 185 feet. The production well will consist of

100 feet of blank, then continuously screened from a depth of 98 to 178 feet and five feet of blank on the bottom of the well at a depth of 178 to 183 feet.

All production casing shall be of new, first quality material and free of defects in workmanship and No reject, subgrade or limited-use pipe is handling. acceptable. Production casing shall be black steel pipe, welded or seamless. Either fabricated or mill type pipe Steel for fabricated pipe shall conform is acceptable. ASTM Standard A 283 Grade B or better. applicable, fabricated and mill pipe shall conform to ASTM Standard A-53 or A 120, or API Standard 5A or 5L. The outside diameter shall be 10 3/4-inches with a wall The Contractor shall furnish thickness of 0.250 inch. the Owner with mill certification from the casing manufacturer prior to installation of the casing.

- Well Screen Well screen shall be of the continuous slot design, wire wound Hi Cap (TM) as manufactured by UOP Johnson, Inc., or approved equal. Screen shall be of new, first quality material, free of defects in workmanship or handling. The screen shall be constructed of low carbon steel and have a wire size for extra strong construction. Well screen shall have an outside diameter of 10 3/4-inches. A blank casing sump, five (5) feet in length shall be added to the well screen. The bottom of the sump shall be covered with a steel, rounded bull-nosed plug fabricated of the same material as the 10 3/4-inch diameter production casing.
- G. Casing & Screen Installation The borehole shall be drilled with diligence and without undue delays. The gravel must be at or near the project site so there will be no waiting on gravel once the casing has been installed. The reamed borehole shall be drilled to a minimum diameter of sixteen (16) inches.

Casing and screen shall be installed using methods approved by the Owner. The casing and screen shall be suspended above the bottom of the hole at a sufficient distance to insure that neither will be supported from the bottom. The suspended casing shall be firmly secured at the surface until the gravel installation is complete. The casing shall have centering guides approved by the Owner. Centering guides shall be installed at

points specified by the Owner but in no case shall be more than fifty (50) feet apart.

Welders required for field assembly of well casing and screen shall be qualified in accordance with the latest revision of the section titled, "Welding Procedures" of the AWA Standard Qualification Procedure. All sections shall be joined by a watertight continuous, full fillet weld.

H. Gravel - The gravel to be installed shall be composed of sound, durable, well-rounded particles containing no silt, clay, organic matter or deleterious materials. It shall be well-graded within limits determined by the Owner, within two working days of receipt of grain size distribution curves described in Section 12 B, Pilot Bore. Gravel dumped on site shall be protected from contamination by covering with plastic sheeting or shall be delivered in protective bag containers. For bid purposes, Contractor shall anticipate a "design" gravel pack of "Chevreaux" 1/4 x 1/8 inch washed material or equivalent.

The Contractor shall have the responsibility and shall determine when conditions with respect to drilling fluid and hole stability are satisfactory for gravel placement to begin without bridging. Placement of gravel shall be through a 2-inch minimum diameter tremmie pipe installed to a depth as defined by the Owner.

Placement of gravel by end-dumping with a loader or shoveling directly into the hole will not be allowed. The Contractor shall be responsible for placing the gravel in the annulus without bridging. If the gravel bridges, the Contractor shall correct the problem with no damage to the well or drill a new well, complete, at his expense. If the Contractor chooses to drill a new well, he shall be responsible for all costs associated with properly abandoning the existing well. Bridging of gravel pack shall be assumed if gravel packing does not utilize at least 90% of the calculated annular space volume.

#### 5. <u>Development</u>

A. Air Jetting - Initial development shall be by air jetting. The Contractor shall provide an air-jetting tool approved by the Owner. The tool shall have horizontal nozzles so air is directed directly into screen. The compressor for air jetting shall have a minimum capacity of 125 psi, and produce a minimum air volume of 400 cubic feet per minute. Contractor shall provide compressor specifications if requested by Owner.

Air development shall begin at the top of the screen and shall move downward gradually to within five (5) feet of the bottom of the well. Once one complete pass of the well has been made, development by surging shall continue at five (5) foot intervals, until is it the opinion of the Owner that the air development is complete.

B. Development Pumping - The Contractor shall furnish, install, operate and remove a submersible pump for developing the well. The pump shall have a capacity in excess of 600 gallons per minute (gpm) against a total head of 80 feet, with an anticipated bowl setting of 90 feet. The pump shall not have a check valve at the bottom so water is allowed to free-fall back through the column pipe and pump when the pump is shut off.

The Contractor shall provide a generator of sufficient capacity to run the pump. For bid purposes, the Contractor shall anticipate a "Wisper Watt" or "Aggreko", quiet running generator available through local generator rental agencies.

The Contractor shall furnish and install discharge piping of sufficient size and length to conduct water to a point designated by the Owner. The discharge rate shall be measured using a properly constructed orifice weir. The weir dimensions shall include a 6-inch diameter pipe with two interchangeable orifice plates, one 5-inches in diameter and one 4-inches in diameter. The discharge piping shall also include an easily operable gate valve to control flow rates (see figure for orifice design). All flow and flow rate monitoring equipment shall be approved by the Owner prior to installation.

The Contractor shall include with the pump installation, a 3/4-inch diameter PVC stilling well installed to a depth of five (5) feet above the pump intake. The PVC pipe shall be open at the bottom and shall provide easy access for measuring water levels during development and testing.

The initial pumping rate shall be restricted and as the water clears, the rate shall be gradually increased until the maximum rate is reached. The maximum rate will be determined by the Owner after consideration of the well drawdown and discharge characteristics. At periodic intervals, the pump shall be stopped and water in the pump column shall be allowed to surge back through the pump bowls and into the well. While pumping and surging, the Contractor shall periodically measure the gravel level in the gravel feed tube and shall add gravel if necessary. The Owner shall determine when development is complete.

#### 6. Testing for Yield and Drawdown

Following development operations, the Contractor shall perform a The test pumping equipment complete pumping test of the well. shall have a capacity range between 200 and 600 gpm against a total head of 80 feet, with an anticipated pump intake setting of 90 The Contractor shall furnish and install discharge piping for the pumping unit, of sufficient size and length to conduct the Installation of water to a point designated by the Owner. necessary appurtenances such as orifice weir, gate valve and stilling well, shall be approved by the Owner prior to initiation of testing for Yield and Drawdown. Appurtenances will be evaluated by the Owner based on correct installation, quality of equipment and ease of operation. The Contractor shall provide a 1/4-inch threaded tap into the discharge line to allow attachment of a Rossum Sand Tester to be provided by the Owner. The Owner shall operate the sand testing device.

Test pumping shall be directed by the Owner with the anticipated pumping scenario to include, but not be limited, to the following:

1) Step Test - Pumping at four different rates ranging between 200 and 600 gpm. Each rate will be pumped for a minimum 100 minutes. After completion of the step test the well

shall be allowed to recover for a minimum of 12 hours before beginning the Constant Q test. Equipment installation for the Step test shall be installed and ready to operate prior to 10:00 a.m. If equipment is not ready by 10:00 a.m., the test will be delayed until 8:00 a.m. the following morning and no standby time will be paid for the overnight delay.

2) Constant Q - Pumping at the design capacity + 15% or 600 gpm, whichever is less, for a minimum uninterrupted period of 48 hours. Pumping beyond 48 hours shall be at the discretion of the Owner but shall not exceed 72 hours. Equipment installation for the Constant Q test shall be installed and ready to operate prior to 10:00 a.m. If equipment is not ready by 10:00 a.m., start up of the test will be delayed until 8:00 a.m. the following morning and no standby time will be paid for the overnight delay.

Actual measurements taken while testing for yield and drawdown will be the responsibility of the Owner. The Contractor shall maintain and operate all equipment and ensure its continuous uninterrupted operation as required. Test must be continuous without interruption for a minimum 48 hours. If the Constant Q test is interrupted before 48 hours of pumping have elapsed, the well shall be allowed to recover for at least the amount of time the pump ran before failure. No payment shall be made for a Constant Q test that does not extend for a minimum 48 hours or the time specified by the Owner.

At the completion of testing, the well shall be sounded for total depth and sand and debris shall be removed from the bottom of the well.

Payment for development and testing by pumping shall be at the hourly rate specified in the bid sheet and shall include all fuels and other emergency sources necessary for completion of work as specified. The hourly rate does not include the time spent for equipment installation and removal.

#### 7. Plumbness and Alignment

The Contractor shall guarantee that the well when completed, shall

# **BID PROPOSAL**

`		
	Approx. Quantity	Description of Item With Unit Price Total Unit Price Written In Words
1.	1 Each	Mobilization & Demobilization including all materials, labor, and equipment for completion of one production well as described in Specifications for the lump sum price of  Two Thousand Five Hundred and no/100  \$2,500.00 \$2,500.00
2.	24 Hrs	Standby hours specifically at the request of the Owner at the rate of Two Hundred per hour. \$ 200.00 \$4,800.00
·3.	185 FT	Drill minimum diameter 6 3/4- inch diameter pilot hole to a depth of 185 feet at  Sixteen and no/100  per foot. \$ 16.00 \$2,960.00
4.	1 EA.	Provide a geophysical log to 185  feet at Nine Hundred Twenty-five and no/100 lump sum.\$ 925.00 \$ 925.00
5.	101 FT	Drill minimum 26-inch diameter conductor borehole to a depth of 101 ft. at Fifty and no/100 per lineal ft. \$ 50.00 \$5,050.00.

	Approx. Quantity	Description of Item With Unit Price Total Unit Price Written In Words
6.	100 FT	Provide and install 20-inch diamter blank conductor casing to a depth of 100 ft. at
		Forty-six and no/100 per lineal ft. \$ 46.00 \$4,600.00
7.	101 Feet	Provide and install surface seal to 101 feet at  Two Thousand Five Hundred and no/100 lump sum. \$2,500.00 \$2,500.00 /
	•	and no/100 lump sum. \$2,500.00 \$2,500.00
8.	85 Feet	Drill minimum 16-inch diameter production casing borehole, approximately 85 feet at
		<u>Thirty-five and no/100</u> per lineal ft. \$ 35.00 \$2,975.00
9.	105 Feet	Furnish & install 10-inch diameter blank production casing, approximately 105 feet at
		Fourteen and 68/100 per lineal ft. \$ 14.68 \$1.541.40
10.	80 Feet	Furnish & install 10-inch diameter wire wrap well screen, approximately
		80 feet at <u>Forty-four and 65/100</u> per lineal foot.\$ 44.65 \$3,572.00
11.	9 Yards <sup>3</sup>	Furnish & install design gravel pack, estimated 9 yds <sup>3</sup> at Two Hundred and no/100
		per yd <sup>3</sup> . \$ 200.00 \$1,800.00

# Contract Documents and Specifications for Double Diamond Well

Item No.	Approx. Quantity	Description of Item With Unit Price Total Unit Price Written In Words	
12.	30 Hours	Development by jetting, estimated at 30 hours at Two Hundred Twenty and no/100 per hour. \$ 220.00 \$6,600.00	_ ′
13.	18 Hours	Furnish, install, operate and remove necessary equipment, including discharge piping for development pumping, estimated 18 hours at One Hundred Forty and no/100 per hour. \$ 140.00 \$2,520.00	_ /
14.	56 Hours	Furnish, install, operate and remove necessary equipment for test pumping, estimated at  One Hundred Ten and no/100  per hour. \$ 110.00 \$6,160.00	_/
15.	1 Each	Well disinfection and capping, at the lump sum price of	
TOT	'AL BID (Wri	tten in Words) TOTAL	
For	ty-nine Thou	sand Four Hundred Three	
_and	1 40/100 Doll	ars	
		\$ 49,403.40	

#### SARGENT IRRIGATION CO.

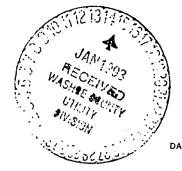
9955 North Virginia RENO, NEVADA 89506

#### (702) 677-0150

Washoe County Utility Division
Post Office Box 11130

Reno, Nevada 89520

TERMS Net 30 days



R 1558

DATE

January 13, 1993  $_{\rm JOB\ NO.}$  R1558

JOB NAME Double Diamond Well

JOB LOCATION Reno, Washoe County, Nevada

	DESCRIPTION	PRICE	AMOUNT	
1 each	Mobilization & Demobilization including all			
	materials, labor, and equipment for completion			
,	of one production well	\$.lump sum	\$ 2,500	00
180 feet	Drill minimum diameter 7 7/8 inch diameter			[   
	pilot hole	16.00/ft	2,880	00
177 feet	Provide a geophysical log	lump sum	907	50
100 feet	Drill minimum 30 inch diameter conductor borehole	60.00/ft	6,000	00
.JO feet	Provide and install 24 inch diameter blank			
_	conductor casing	55.00/ft	5,500	00
97 feet	Provide and install surface seal	lump sum	3,500	00
80 feet	Drill minimum 22 inch diameter production casing			
	borehole	40.00/ft	3,200	00
105 feet	Furnish and install 12 inch diameter blank			
	production casing	22.00/ft	2,310	00
75 feet	Furnish and install 12 inch diameter wire			
	wrap well screen	46.60/ft	3,495	00
18.75 yards	Furnish and install Silica Resource design gravel pack	230.00/yd	4,312	50
2 yards	Furnish and install Chevreaux design gravel pack	200.00/yd	. 400	00
17 hours	Development by air jetting method	220.00/hr	3,740	00

Thank You

DRIGINAL

#### SARGENT IRRIGATION CO.

9955 North Virginia Street RENO, NEVADA 89506

(702) 677-0150

TO Washoe	County Utility Division DATE Januar	у 13 <b>,</b> 1993 <sub>ЈОВ</sub>	NO R1558	
		Diamond Well		
Reno, 1	Nevada 89520 JOB LOCATION Reno,	Washoe County	, Nevada	
TERMS Net	30 days			
	DESCRIPTION	PRICE	AMOU	NT
6 hours	Furnish, install, operate and remove			·
	necessary equipment, including discharge			
	piping for development pumping	140.00/hr	\$ 840	00
103.5 hours	Furnish, install, operate and remove			
	necessary equipment for test pumping	110.00/hr	11,385	00
1 each	Well disinfection and capping	lump sum	900	00
	Total Amount Due-Invoice R1558		\$51,870	00
		- Ch	1-10	
			1-1:	
				! 
			***************************************	
			***************************************	
·				
				····



WHITE—DIVISION OF WATER RESOURCES CANARY—CLIENT'S COPY PINK—WELL DRILLER'S COPY

#### STATE OF NEVADA

#### DIVISION OF WATER RESOURCES

#### WELL DRILLER'S REPORT

OFFICE USE ONLY	
og No	
ermit No.	•
asin	
asin	

PRINT OR TYPE ONLY DO NOT WRITE ON BACK				rm in its entirety in .170 and NAC 534.340	Basin		211 M M
1. OWNER WAShoe County U MAILING ADDRESS 1195 B CO REDO NV 8	tility I proorb	)(VISI	αΛ		NOTICE OF IN LOCATION EAS RENO , NV	t MOXU	ia Lane
	Sec. 8	Parcel No.	8	Osrdo E Washos Cou	Ma ONTY Per (1) Subdivision Name	shoe 1+ # 46	County
3. WORK PERFORMED  New Well	ndition r		Domestic .	PROPOSED USE ☐ Irrigation Industrial ☐ Monitor		WELL TYP able A Rota ir D Othe	ry 🗆 RVC
6. LITHOLOGIC	LOG			8.	VELL CONSTRUCT	ION	2.5
Material Wate		То	Thick- ness			<del>-</del>	3 <u>0</u> Feet
Clay, Silt, Sand	0	5	5	20	E DIAMETER (BIT From ches O Fee	To	₹eet
Black Fine Sand	5	7	ಎ		ches / OO Fee	1.80 1	Feet
Tan Clau Smllg Sant.					CASING SCHEDU	<del></del>	
Small Graves	7	31	24	Size O.D. Weight/Ft. (Pounds)	1	From (Feet)	To (Feet)
Small LG Sands Grave	31	39	8	24 63.41 12 33.38	· 250	00	180
Tan Clay, 5m Gravets	39	72	33	Perforations:			
Sml4 Sand, Gravel	72	90	18	Type perforation	Johnson I	HI-CAP	
Tan Clay's	90	95	5		feet to	199	feet Blank
5M/LG Sand, Gravel	95	108	13	FromFrom	feet to		feet
Tan Clay's, Fine Sard	108	113	5	Surface Seal: DLY	'es □ No OO	Seal Ty	
SMILG Sand, Gravel Thin Tayer's tan Cay	113	138	25	Placement Method:	☑ Pumped ☐ Poured	Ĺc	ement Grout oncrete Grout
Broken up lite Redland ROCK	138	148	10	Gravel Packed: 128	Yes No No feet to	180	feet
TOOK .	1.00	, 10		9.	WATER LEVEL		
Solic lite reclava Kar	148	140	32	Static water level		G.P.M	v land surface
Charcoal Gray LAVA	170	180	10	Water temperature 10. DR	LLLER'S CERTIFIC		
Date started!\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	9 5		, 19.95 19.92	This well was drilled u	•	and the repor	t is true to the
			., 194.	Name DAKGE	NT IRRIC	FATION	<u>Co</u>
7. WELL TEST I	DATA V Pump	☐ Air L	ift	Address 9955	NORTH V	IRGINI	A ST
G.P.M. Draw Dov	n static)	Time (Hou	urs)	KENU	<u>, NV 8</u>	39506	
350 17		96		Nevada contractor's li- issued by the State (	Contractor's Board	2124	<u></u>
				Nevada driller's licens Division of Water R	se number issued by the esources, the on-site	the driller 13	91
					er performing actual driff	ing on site or cor	ntractor
				Date Janua	ry 13, 1	993	*