1791-00035

SIERRA SAGE GOLF COURSE

EFFLUENT MANAGEMENT PLAN

Project No. 97046.30

October, 2000

Prepared for:

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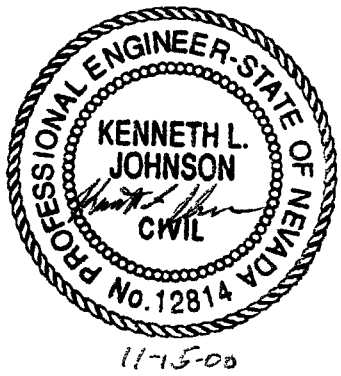

11-15-00

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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
333 W. Nye Lane, Room 138
Carson City, Nevada 89706-0851

November 6, 2000

Mr. Ken Johnson, P.E.
AGRA Infrastructure Inc.
1105 Terminal Way, Suite 304
Reno, Nevada 89502

RE: Revised Effluent Management Plan for the Sierra Sage Golf Course
Permitt #: NEV99010

Dear Mr. Johnson:

The Division has reviewed the revised EMP for the Sierra Sage Golf Course submitted in compliance with the recently issued discharge permit. Upon review of this document, the Division hearby approves this manual.

If you have any questions on this review, please call me at 687-4670 ext. 3151.

Sincerely,

Joseph L. Maez

Joseph L. Maez, P.E.
Technical Services Branch
Bureau of Water Pollution Control

CC: Darrell Rasner, P.E., NDEP
Joe Casares, Sierra Sage Golf Course, 4555 Silverlake Blvd., Reno, NV 89505

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SECTION 1 — INTRODUCTION AND GENERAL SUMMARY

Sierra Sage Golf Course is located west of Stead Boulevard and north of Silver Lake Boulevard in Stead, Nevada (Figure 1.1). The course consists of 18 holes with a driving range and putting area and contains approximately 95 irrigated acres. The course is irrigated by a newly installed (1997-98) spray system, with drip irrigation being restricted to landscaping features surrounding the clubhouse.

Effluent for the system is supplied by the Reno-Stead Water Reclamation Facility (RSWRF), effluent delivery to the pond is automated, and the pond level is monitored by a pressure transducer. The discharge valve is controlled by a programable logic controller (PLC) using the transducer information. The effluent is pumped from the plant to the storage pond on a daily basis during the irrigation season. The irrigation system consists of the effluent storage pond which is connected to a wet well equipped with two 75 hp vertical turbine pumps that feed the irrigation system. With the exception of hand watering, normal operation of the irrigation system is during nighttime hours. The irrigation system is operated by the Sierra Sage Golf Course Maintenance Staff under the Washoe County Parks and Recreation Department.

The Reno-Stead Water Reclamation Facility is located at 4250 Norton Drive in Stead, Nevada. The phone number is (775) 972-1233.

The Sierra Sage Golf Course is located at 635 Silver Lake Road in Stead, Nevada. The phone number for the maintenance shop is (775) 972-1334.

FIGURE 1.1 — LOCATION MAP

SILVER KNOLLS

RENO-STEAD

MAYOR'S PARK

RENO/STEAD WATER RECLAMATION FACILITY

LEMMON VALLEY

LEMMON DRIVE

EFFLUENT P.S.

MILITARY DRIVE

SIERRA SAGE GOLF COURSE

SKY VISTA DEVELOPMENT

SILVER LAKE

LEMMON VALLEY MOBILE VILLAGE

GOLDEN VALLEY

WASHOE COUNTY SPORTS COMPLEX

US 395

UNION PACIFIC RAILROAD

SILVER LAKE BLVD.

STEAD BLVD.

SKY VISTA PRKY.

LEAR BLVD.

R.18 E.

R.19 E.

T.21 N.

T.20 N.

25 30 29 28 27 36 31 32 33 34 1 5 4 3

N

2000 1000 0 2000
1500 500

SCALE: 1" = 2000'

RENO-STEAD EFFLUENT REUS

SIERRA SAGE E.M.P
LOCATION MAP

SCALE:	1" = 2000'
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FIGURE 1.1

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PROJECTS\1997\97046.31\SS-LOC

SECTION 2 — DESCRIPTION OF IRRIGATION SITE

2.1 Site Description

Sierra SageGolf Course is located in Section 6, Township 20N Range 19E, on the Verdi 7½ minute USGS topographic maps. There are no water supply wells in the reuse areas.

2.2 Site Characteristics

The site is approximately 5,000 ft. above sea level and has low to moderate relief. Areas which are not irrigated are typically covered with sage and other desert vegetation. Soil types present in the area include Northmore sandy loam and Cassiro gravelly loam (see Figure 2.1). Detailed descriptions for these soil types are included in Appendix D. The bulk of the irrigated area supports turf grass (Kentucky bluegrass) with the remainder planted in various trees and shrubs. The average annual precipitation is about eight to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days. The prevailing wind is generally from the west. Appendix B contains a Wind Rose Diagram for the Stead Airport showing the dominant wind direction.

2.3 Effluent Supply

Effluent used for irrigation is generated from the main Reno-Stead Water Reclamation Facility, which discharges under the authority of the National Pollutant Discharge Elimination System (NPDES) permit NV0020168. Reuse of the effluent by the golf course is under the authority of Discharge Permit NEV99010. The effluent is of the quality to meet NDEP guidelines set forth in WTS-9 Section IX.A.1. This quality of effluent does not require a buffer zone, but this type of application requires that public access during irrigation is controlled.

Appendix A contains influent and effluent water chemistry data for samples collected by NDEP during annual inspections of the Reno-Stead Water Reclamation Facility. The composition of the effluent delivered to the course should be better than the above referenced samples due to the additional level of treatment resulting from the facility modification and expansion.

2.4 Effluent Delivery

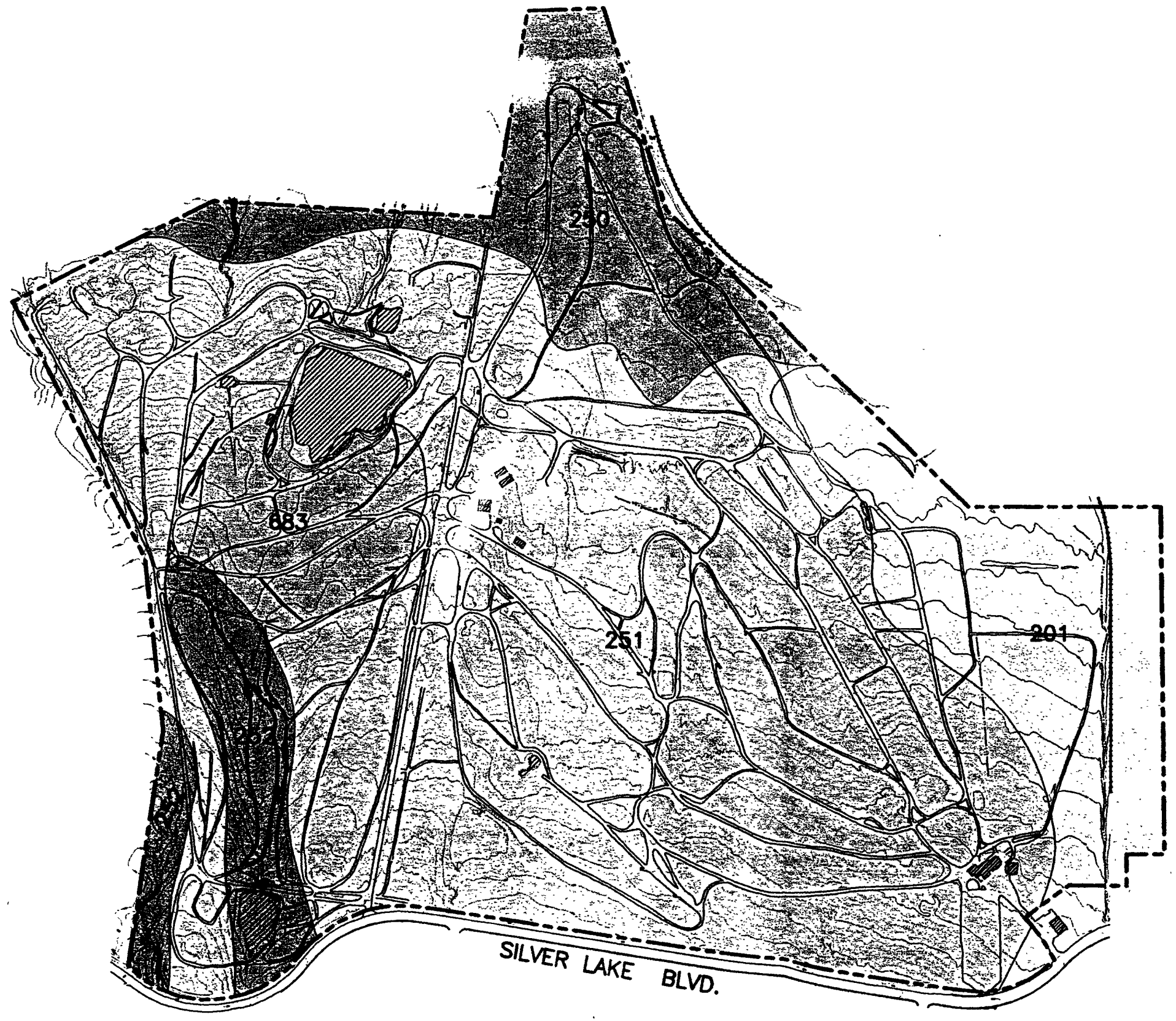
Effluent will be delivered from the RSWRF to the golf course storage pond via a 12-inch diameter effluent pipeline. Flow will be monitored via magflow meters with instantaneous and totalized readings with displays in respective pumphouses. These will be checked and logged daily by operators. Discharge to the storage pond will occur primarily during the daytime non-irrigation period, with the stored effluent being pumped into the irrigation

system at night. The effluent discharge into the storage pond will be flow controlled and metered. High level sensors will automatically close the effluent discharge flow control valve at a preset high water level. The high water level sensor will trigger an alarm and a manual valve will allow operators to override the electrical valve in case of failure or malfunction. The pond will make use of weed control, and erosion protection by using standard riprap materials. In order to control algae and odor problems, provisions are available in the meter vault allowing for chemical injection. The pond will also be under continuous mechanical aeration.

2.5 Pond Drain

The pond is equipped with a 12" outlet pipe which will serve as a pond drain in emergency situations. This pipe has a 4" gate valve which may be opened on an as needed basis. The drain is placed approx. 12-14 feet below the normal water level. The valve is located in a concrete lined shaft placed within the earthen dike surrounding the pond. Drain and valve are both protected by 2" of chip seal and gravel. This would prevent an unwanted release, tampering or vandalism. The valve would only be used in flooding situations to prevent catastrophic failure of the impoundment, and flow would proceed into an earthen ditch for approx. 1/4 mile to a rock lined culvert. At this point, flow would continue to Silver lake.

FIGURE 2.1 — EFFLUENT REUSE AREAS & EMP SOILS MAP



LEGEND

201	NORTHMORE SANDY LOAM, 2 TO 4% SLOPES
250	CASSIRO GRAVELLY SANDY LOAM, 2 TO 4% SLOPES
251	CASSIRO GRAVELLY SANDY LOAM, 4 TO 8% SLOPES
252	CASSIRO GRAVELLY SANDY LOAM, 8 TO 15% SLOPES
683	RENO STONEY SANDY LOAM, 2 TO 8% SLOPES
———	EFFLUENT REUSE AREA & APPROXIMATE PROPERTY BOUNDARY

N

500 250 0 500

SCALE: 1" = 500'

RENO–STEAD EFFLUENT REUSE

SIERRA SAGE GOLF COURSE EFFLUENT REUSE AREAS & E.M.P. SOILS MAP

SCALE:	1" = 500'
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FIGURE 2.1

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SECTION 3 — OPERATION OF EFFLUENT IRRIGATION SYSTEM

3.1 Irrigation System

The irrigation system consists of two vertical turbine pumps located in a wet well which is gravity fed from the storage pond.

The irrigation practice will follow the procedures per the NDEP guidelines Section VIII B. The effluent is of the quality to meet NDEP guideline Section VIII A.2. that requires no buffer zone. Effluent is applied using spray and drip type heads. The large spray guns typically operate from 20 - 30 minutes for each zone, up to seven times a week. The smaller spray heads (similar to residential type) and drip system are restricted to the landscape areas surrounding the clubhouse and operate 10-15 minutes per zone. The irrigation system is operated by several maintenance crew which inspect the irrigation system and grounds daily. Proper operation and maintenance of the irrigation system is essential to maintaining the condition of the precious turfgrass at the course and therefore receives high priority.

The irrigation system will employ a wind speed and direction monitor. The monitor is a microprocessor-based system which is programed to shut down the sprinkler irrigation system when wind speeds exceed 20 miles per hour for five minutes. Irrigation can resume if the wind speed remains below 20 mph for 30 minutes.

3.2 Irrigation Requirements

Irrigation requirements were calculated using local climatological data. Average monthly evapotranspiration rates were derived from 40 years of observations at the Sparks Tree Farm. The information was prepared by the Sparks Parks Maintenance Division in conjunction with Irrigation Technologists Incorporated and Rainbird Irricalc® software. The baseline climate data for the Irricalc® software was obtained from published data supplied by the Federal government. Average monthly precipitation values were calculated using National Oceanic and Atmospheric Administration Annual Climatological Data Summaries for Stead, Nevada for the years 1986-1996. Table 3.1 is a monthly water balance for the irrigation season that was developed from the above referenced data.

3.3 Hydraulic Loading

The slowest permeability for the soils ranges from 0.06-0.20 inches per hour, as published by the Soil Conservation Service. At peak demand during July, the application rate for a nine-hour irrigation period is 0.03 inches per hour. This is well below the lowest permeability rate for the site and indicates that ponding is not likely to occur, even at maximum loading rates. Therefore, excess application rates for the effluent are not likely to occur. To insure proper hydraulic loading, maintenance personnel will monitor daily

irrigation flows and apply effluent in accordance with Table 3.1.

TABLE 3.1 — WATER DEMAND

TABLE 3.1

WATER DEMAND AT SIERRA SAGE GOLF COURSE

Demand = ET (ft) * Area (acre)
ET = evapotranspiration (Sparks Tree Farm Data)
Hours of Irrigation per Day 16
Assume loss through irrigation syste 20 %
Assume Leaching Fraction 10 %

Month	No. Days	Average Precip (in)	Average ET (in)	Net ET/Precip (-/+) (in)	Irrigation ET/Precip (-/+) (AF)	Total Demand (AF)	Total Demand (ft3)	Adjusted[1] Total Demand (ft3)	Total[2] Demand (gal)	Total Demand (gpd)	Total 16hr Demand (gpm)
Apr	30	0.59	-4.20	-3.61	-28.58	28.58	1,244,909	1,643,279	12,291,729	409,724	426.80
May	31	0.93	-6.20	-5.27	-41.72	41.72	1,817,360	2,398,915	17,943,881	578,835	602.95
Jun	30	0.71	-7.20	-6.49	-51.38	51.38	2,238,077	2,954,261	22,097,872	736,596	767.29
Jul	31	0.53	-8.99	-8.46	-66.98	66.98	2,917,431	3,851,009	28,805,547	929,211	967.93
Aug	31	0.31	-7.75	-7.44	-58.90	58.90	2,565,684	3,386,703	25,332,538	817,179	851.23
Sep	30	0.47	-5.40	-4.93	-39.03	39.03	1,700,111	2,244,146	16,786,211	559,540	582.85
Oct	31	0.62	-3.41	-2.79	-22.09	22.09	962,132	1,270,014	9,499,702	306,442	319.21
Totals	214	4.16	-43.15	-38.99	-309	308.67	13,445,702	17,748,326	132,757,478		

Irrigated 4,138,200 ft2
95.00 acres

[1]Includes loss and leaching fraction
[2]This number includes a loss to the atmosphere based on irrigation efficiency which is not applied to the site. therefore, total demand is represented as greater than max daily amount.

3.4 Nutrient Balance

Table 3.2 lists the nutrient uptake rates for various types of grasses. Turfgrass at the golf course is comprised primarily of Kentucky bluegrass.

TABLE 3.2 — NUTRIENT UPTAKE RATES (EPA, 1981& PETTYGROVE ET.AL., 1986)

	Nitrogen (kg/ha•yr)[1]	Phosphorous (kg/ha•yr)	Potassium (kg/ha•yr)
Bentgrass	170	---	---
Coastal Bermudagrass	400-675	35-45	225
Kentucky bluegrass	200-270	45	200
Ryegrass	200-800	60-85	270-325
Tall Fescue	150-325	30	300

• [1]Multiply by 0.89 to obtain lbs./acre.

Table 3.3 summarizes the nitrogen loading for the irrigation season. Data from the table indicate that the applied nitrogen never exceeds the maximum uptake for Kentucky bluegrass. The minium uptake is exceeded only during the height of the growing season when nitrogen demand for the turfgrass should be at its peak. These data demonstrate that movement of nitrogen past the root zone of the turfgrass would appear to be unlikely, even during peak irrigation periods. However, caution must be exercised when fertilizer is applied to prevent any migration of nitrogen into the groundwater.

TABLE 3.3 — NITROGEN LOADING FOR SIERRA SAGE GOLF COURSE

TABLE 3.3

NITROGEN LOADING FOR SIERRA SAGE GOLF COURSE

Loading = Irrigation * Nitrogen Content

Total Nitrate Concentration* 14.7 mg/l
Loss through volatilization and denitrification (%) 20

Month	No. Days	Total Demand (gal)	Total Nitrogen (lbs)	Applied Nitrogen (lb/ac/d)	Uptake** minimum (lb/ac/d)	Uptake** maximum (lb/ac/d)
Apr	30	12,291,729	1205.55	0.423	0.83	1.12
May	31	17,943,881	1759.91	0.598	0.83	1.12
Jun	30	22,097,872	2167.32	0.760	0.83	1.12
Jul	31	28,805,547	2825.20	0.959	0.83	1.12
Aug	31	25,332,538	2484.57	0.844	0.83	1.12
Sep	30	16,786,211	1646.36	0.578	0.83	1.12
Oct	31	9,499,702	931.72	0.316	0.83	1.12
Totals	214	132,757,478	13020.64	0.640		

Irrigated 4,138,200
Acres 95.00

* NDEP average effluent quality - data from 1995-1997
** Published Nitrogen Uptake for Kentucky Bluegrass (Pettygrove, et. al. 1986)

3.5 Effluent Release Prevention

Normal irrigation procedures will include monitoring of the spray and drip systems to avoid ponding and potential runoff of effluent from the site. When evidence of ponding or runoff is present, maintenance personnel will adjust the irrigation system accordingly to eliminate these conditions.

The drainage leading to the effluent storage pond has been modified to divert stormwater runoff away from the pond to a natural channel below the pond location, and as such, isolate the storage pond from most stormwater runoff.

The natural soils hydraulic conductivity in the pond bottom ranges from 7.7 x 10 cm/sec to 4.0 x 10 cm/sec which translates to a permeability of approximately 10^{-2} cm^2. Golf course maintenance personnel have observed minimal water loss in the pond over the winter months. Based on the observed permeability of the shallow soils, there is either a less permeable lower layer or a very thick layer of the material with 10^{-2} cm^2 permeability. With this observation, nitrate migration to the groundwater is not anticipated to be an issue.

3.6 Monitoring Wells

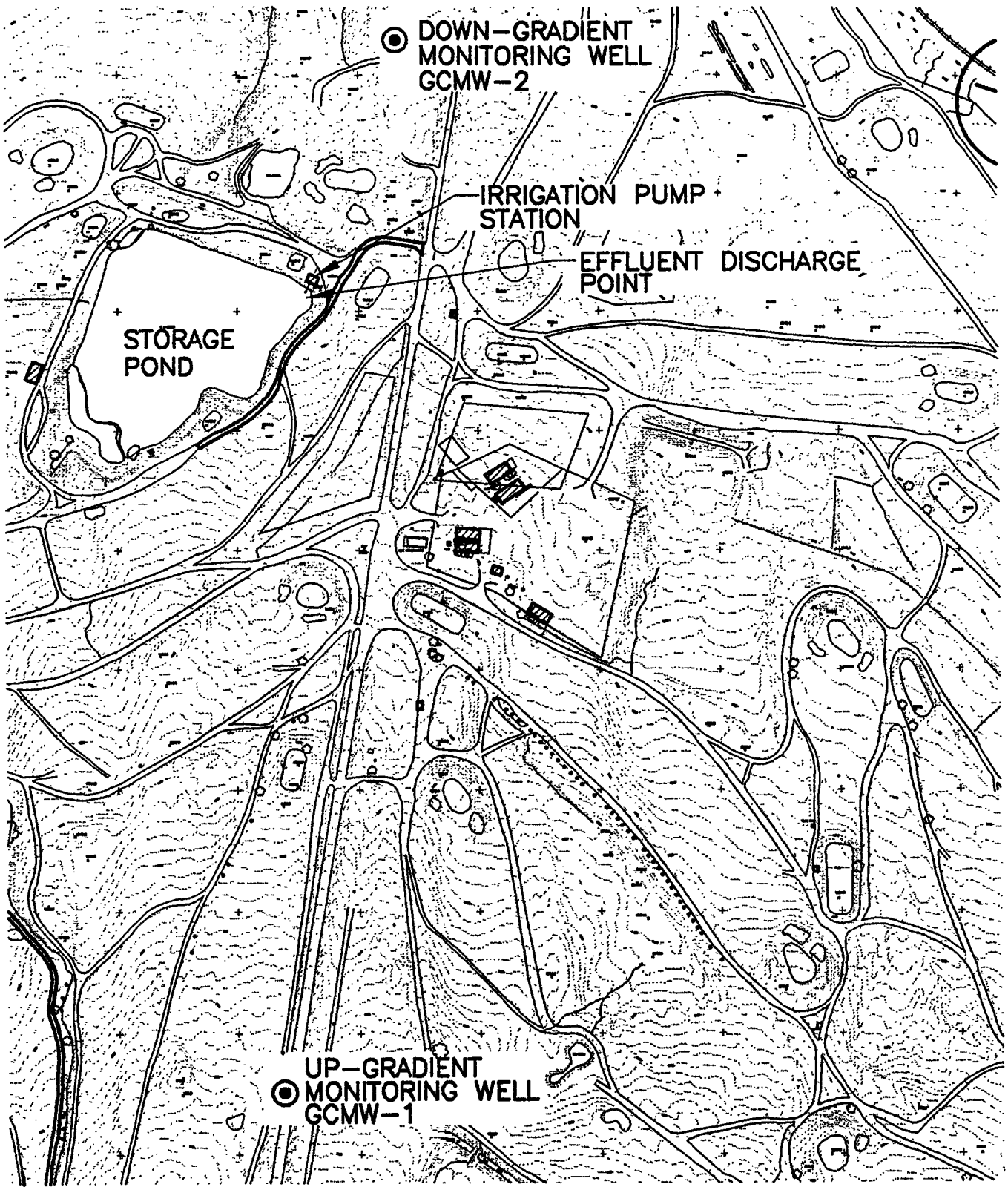
To insure no migration of nitrate occurs due to pond leakage or irrigation practices, monitoring wells were installed in the vicinity of the effluent storage pond. One well designated GCMW-1 is located on the up-gradient groundwater side of the pond, and well GCMW-2 is located on the groundwater down -gradient side of the pond (see Figure 3.1). Table 3-2 lists the details of the well construction. No drillers reports were constructed for these wells. For details of well construction see Figures 3.2,3.3. Screen intervals are placed below static water level in order to allow for development of well. Had they been placed above aquifer, development may have pulled silt and clay into the monitoring well from the formation.

TABLE 3.4 — MONITORING WELL CONSTRUCTION DETAILS

Well ID	Static Water Level[1]	Total Depth Feet	Screen Interval	Well Dia. I.D. Inches	Well Volume gal/ft
GCMW-1	112.26	195	175-195	2	0.16
GCMW-2	33.54	80	40-80	2	0.16

[1] Measured in feet from top of PVC casing on 2/22/00.

FIGURE 3.1 — MONITORING WELL LOCATIONS



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300 150 0 300

SCALE: 1" = 300'

PROJECTS\1997\97046.WM\SSGC-FIG31

RENO-STEAD EFFLUENT REUSE

MONITORING WELL LOCATIONS

SCALE: 1" = 300'	FIGURE
DRAWN BY: RJC	3.1
DATE: 3/30/00	
JOB NO.: 97046.WM	

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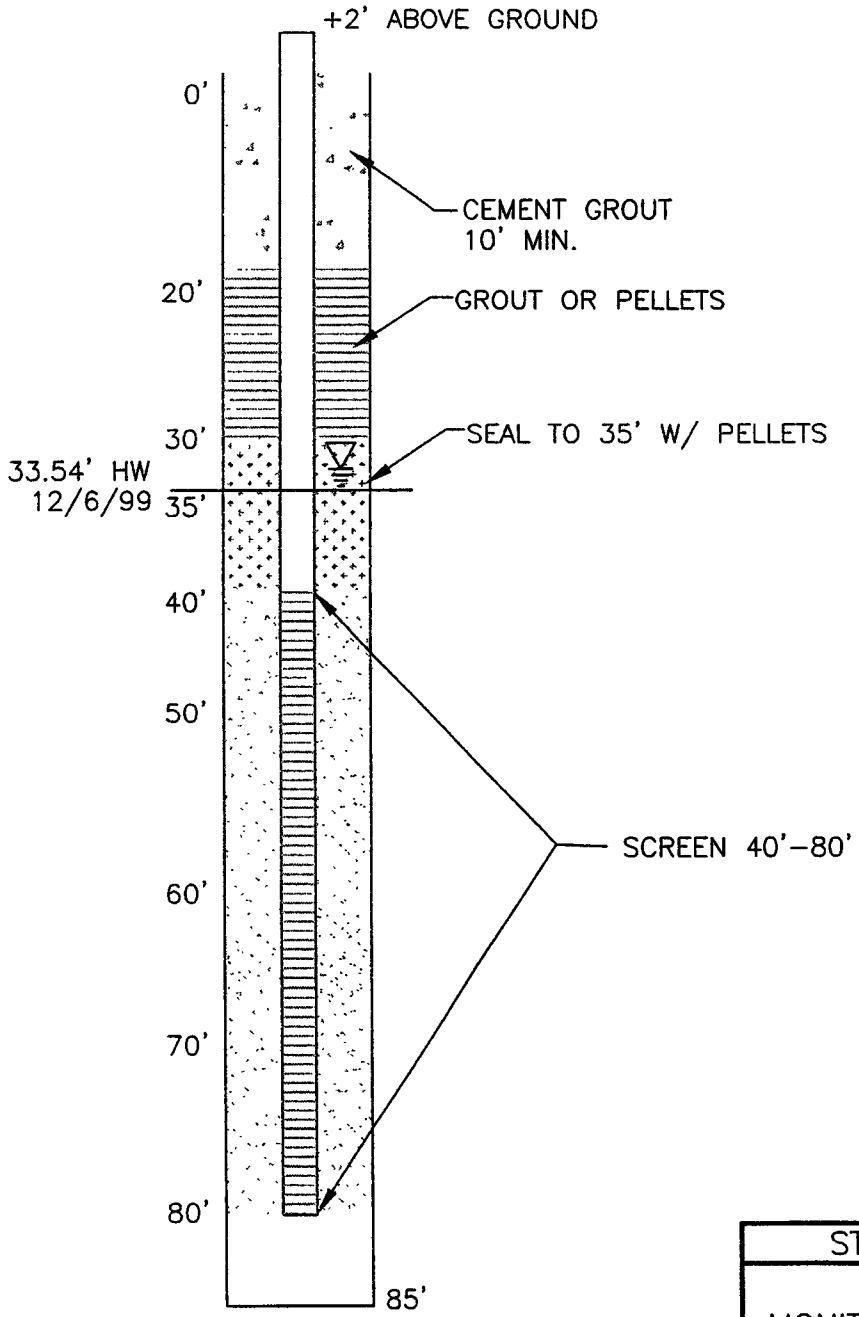
FIGURE 3.2 — MONITORING WELL #1 DETAIL

FIGURE 3.3 — MONITORING WELL #2 DETAIL



STEAD EFFLUENT	
GCMW-2 MONITORING WELL # 2	
SCALE: N.T.S. DRAWN BY: RJC DATE: 9/21/00 JOB NO.: 97046.51	FIGURE 3.3

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PROJECTS\1997\97046.51\FIG-2

Quarterly sampling of the monitoring wells is required by the permit for the constituents listed in the discharge permit (Appendix C). Proper sampling techniques are necessary to ensure that a representative sample is collected for analysis. Attention must be paid to the following criteria to help ensure good sampling results:

A. Purge the well. Water sitting in the well for long periods of time may become stagnant. The stagnant water must be pumped out and allowed to be displaced by fresher formation water prior to sample collection. Good indicators that formation water has been encountered are stable readings of pH, electrical conductivity or temperature. If instruments are not available to measure these parameters, purging volume is the next best criteria. For monitoring wells of the type constructed on this golf course, a sample can be taken after a minimum of three (3) well-bore volumes have been removed. To calculate a purge volume, subtract the total well depth from the static water level and multiply this difference by three (3) and then multiply by the well volume in gal/ft.

   Once the purge volume has been calculated, a typical purge time can be determined by recording the time needed to fill a known volume with the pump running in the sampling position for each monitoring well. For instance, if the purge volume is 40 gallons and the pump takes two (2) minutes to fill a five (5) gallon bucket, the purge time is 40 gallons ÷ 5 gallons per bucket = 8 buckets; then 8 buckets x 2 minutes per bucket = 16 minutes total purge time before taking the sample.

B. Avoid contamination. Care must be taken to ensure that sampling equipment is thoroughly cleaned by flushing with clear water after each sample is taken to prevent contamination of subsequent samples. Sample containers must remain closed until the samples are collected in the field, and the bottles must be securely closed after the sample has been collected.

C. Properly preserve the sample. Some samples require a chemical preservative to stabilize the sample until the lab can perform the specified analysis. Other samples require refrigeration to retard biological activity so the sample does not degrade before the lab can perform the required analysis. A good practice is to dedicate a cooler as the normal sample transport container for all sampling.

D. Deliver the sample promptly. The samples should be delivered as soon after they are collected as practicable. Samples should not be collected unless personnel will be available to transport them to the lab on the day they are collected. The only exception to this would be to arrange for a representative of the laboratory to pick them up at the sample site for transport to the lab.

SECTION 4 — PUBLIC NOTIFICATION AND SAFETY

4.1 Public Notification

The effluent irrigation site is posted with signs identifying the source of the water as reclaimed. The wording is as follows:

RECLAIMED WATER
DO NOT DRINK

Signs are placed at all corners, gates and at 500 ft. intervals around the indicated areas. Other suggestions for public notification are:

1. Once per year notice in the local newspaper.

2. Printed notification on score cards.

3. Post warnings at ball wash stands.

4. Plans are made to cover drinking water fountains located on the reuse site prior to the start of irrigation. Additionally, areas where food is handled are to be shielded.

4.2 Health / Safety

One of the major concerns with spray irrigation of wastewater effluent is aerosols containing pathogens. The concentration of pathogens in aerosols is directly related to their concentration in the wastewater. Studies show that in the spray irrigation of wastewater 0.1% to 2.0% of the water is aerosoled. Aerosols are defined as particles ranging from 0.01 to 50 μm in diameter that are suspended in air. In general, pathogens in aerosols remain viable and travel farther with increased wind velocity, increased relative humidity, lower temperature, and darkness (Pettygrove et.al., 1986).

Listed below are the risks and precautions to be taken while using reclaimed wastewater for irrigation.

1. Reclaimed wastewater from this facility may contain disease-causing organisms and viruses. Open wounds are especially susceptible to infection. Treat cuts with disinfectant immediately.

2. Workers are to keep their typhoid and tetanus shots current and practice good hygiene. No food or drink should be consumed while working in the reclaimed water irrigation area. Smoking is also prohibited due to the possibility of hand to mouth

contamination. Workers are to wear boots, gloves, closed-toe shoes, trousers (i.e., not shorts) or other protective clothing to minimize direct contact with reclaimed water.

3. Workers should wash hands thoroughly.

SECTION 5 — NAMES, CONTACTS, ADDRESSES, PHONE NUMBERS OF THE USER(S) AND GENERATOR(S)

The following is an excerpt from a typical NPDES Discharge Permit concerning proper handling of effluent:

Noncompliance, Unauthorized Discharge, Bypassing and Upset

a. Any diversion, bypass, spill, overflow or discharge of treated or untreated wastewater from wastewater treatment or conveyance facilities under the control of the permittee is prohibited except as authorized by this permit. In the event the permittee has knowledge that a diversion, bypass, spill, overflow or discharge not authorized by this permit is probable, the permittee shall notify the Division immediately.

b. The permittee shall notify the Division within twenty-four (24) hours of any diversion, bypass, spill, upset, overflow or discharge of treated or untreated sewage other than that which is authorized by the permit. A written report shall be submitted to the Administrator within five (5) days of diversion, bypass, spill, upset, overflow or discharge, detailing the entire incident including:

(1) time and date of discharge;

(2) exact location and estimated amount of discharge;

(3) flow path and any bodies of water which the discharge reached;

(4) the specific cause of the discharge; and

(5) the preventive and/or corrective actions taken.

SECTION 6 — DISCHARGE MONITORING REPORT (DMR)

6.1 Monitoring and Reporting

Washoe County is the permittee responsible for the discharge permit governing the use of effluent at the golf course. The County is responsible for completion of the Discharge Monitoring Reports (DMR's) which must be submitted quarterly to NDEP. These reports contain the water quantity and quality data required by the discharge permit. Calculation of the proper hydraulic and nitrogen loading rates is the responsibility of County personnel.

6.2 Nitrogen loading calculation

Calculated annual nitrogen applied from the irrigation water. Average nitrogen value can be obtained from water quality data collected by the State which is located in Appendix A. An estimated 20% will be lost due to soil denitrification. Therefore, 80% of the total is estimated to be available to the turfgrass.

lbs./yr. Total - N = Irrigation flow (MG/Year) * 8.34 * Avg. N (mg/L) * 0.80

1. Estimate nutrients removed by turfgrass. Use a value of 151 lb./acre-yr. Assume 95 acres of irrigated turfgrass uptake. This value may be adjusted based on more specific data as to the type of grass found.

2. Estimate the annual nitrogen balance by subtracting the uptake value from the total nitrogen applied. A positive result indicates possible accumulation of nitrogen in the soil or percolation to the groundwater. A negative result could mean a deficiency of nitrogen for the turfgrass.

3. The nitrogen applied by the irrigation water and the nitrogen applied by fertilization should not exceed the estimated nutrients removed by the turfgrass.

4. Additional nitrogen calculations may be performed using attached nitrogen loading limit worksheets. WTS-1B and 2-C.

6.3 Hydraulic Loading

Application of irrigation water shall be in accordance with the evapotranspiration rates listed in Table 3.1.

REFERENCES

Guidelines for Using Disinfected Recycled Water, 1984 & 1997. Awwa California-Nevada Section

Guidelines for Water Reuse, 1992. US Environmental Protection Agency

Land treatment of Municipal Wastewater, 1981. US Environmental Protection Agnecy

Nevada Irrigation Guide, 1981. US Department of Agriculture, Soil Conservation Service

Wastewater Reuse For Golf Course Irrigation, 1994. US Golf Association, Lewis Publishers

Water Reuse Manual of Practice, 1989. Water Environment Federation

Wastewater Engineering Treatment, Disposal and Reuse, 1991. Metcalf & Eddy, Mcgraw-hill Publishers.

Irrigation with Reclaimed Municipal Wastewater - A guidance manual, 1985. G.S. Pettygrove and T. Asano, Lewis Publishers

NOAA, 1995. Climatological Data Annual Summary, Nevada, 1995.

U.S. Department of Agriculture, Soil Conservation Service, 1983. Soil Survey of Washoe County, Nevada, South Part.

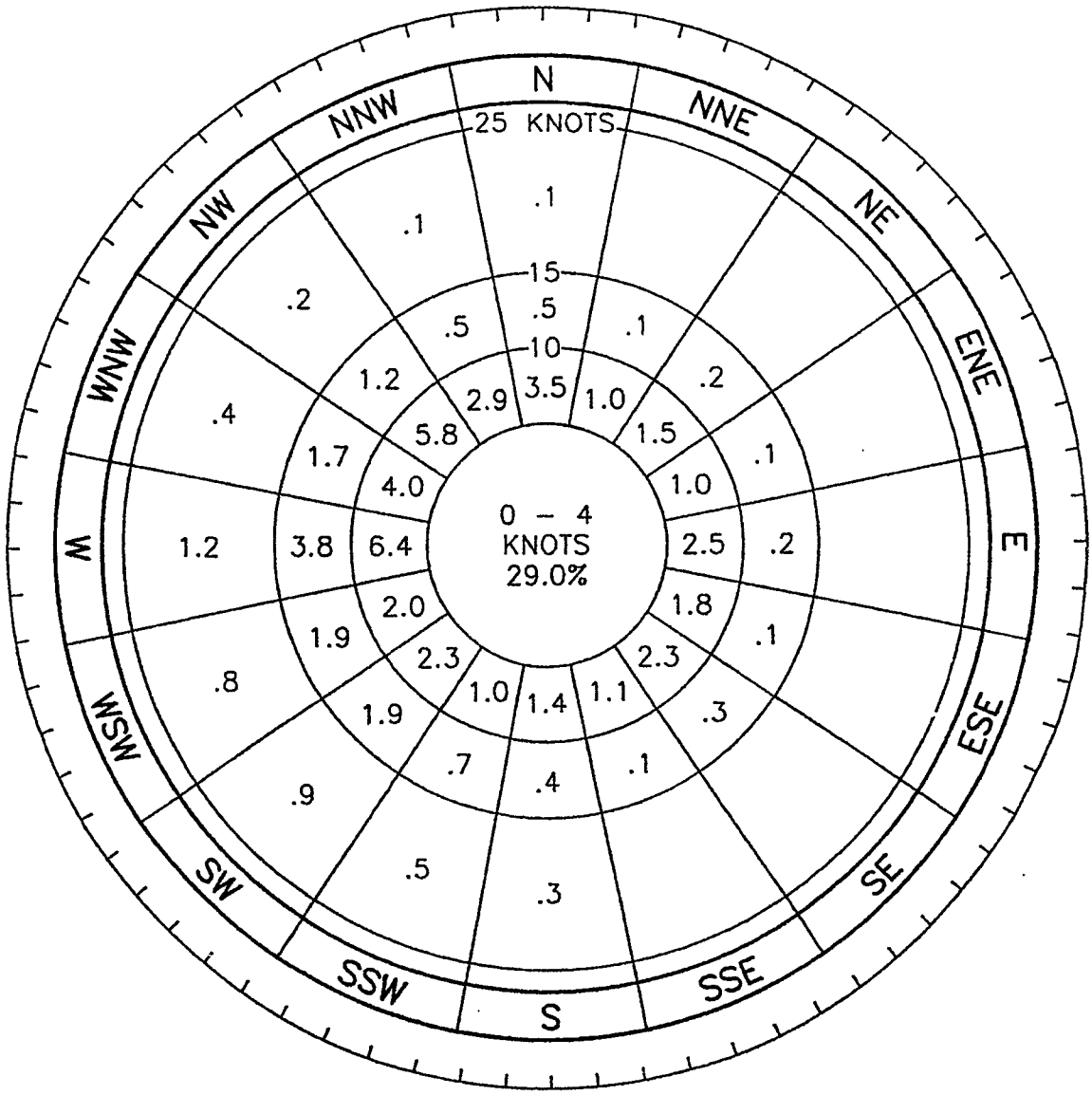
RENO/STEAD WATER RECLAMATION FACILITY
WASTEWATER QUALITY DATA

SAMPLE DATE	6/25/95		4/4/96		5/8/97		AVERAGE	
ANALYTE	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.
TDS (PPM)	354	390	429	430	397	395	393	405
TSS (PPM)	118	2	98	10	172	12	129	8
EC (SU)	642	549	768	655	729	603	713	602
TURBIDITY (NTU)	58.0	2.0	105.0	1.4	100.0	2.1	87.7	1.8
COLOR (SU)	55	17	40	10	>70	30	48	19
pH (LAB) (SU)	7.85	7.43	7.50	8.06	7.66	7.95	7.7	7.8
ALKALINITY AS $CAC0_3$ (PPM)	196	56	216	106	184	74	199	79
HCO3 AS HCO_3 (PPM)	239	68	264	129	224	90	242	96
CO_3 (PPM)	0	0	0	0	0	0	0	0
TOTAL N AS N (PPM)	31.47	20.62	30.12	14.77	30.25	19.19	30.61	18.19
HCO_3 AS $CACO_3$ (PPM)	196	56	216	106	184	74	199	79
CO_3 AS $CACO_3$ (PPM)	0	0	0	0	0	0	0	0
KJELDAHL N AS N (PPM)	31.35	1.28	29.50	2.70	29.90	5.60	30.25	3.19
NITRATE NO_3 AS NO_3 (PPM)	0.50	85.60	0.18	50.90	0.30	58.58	0.33	65.03
NITRITE N AS N (PPM)	0.01	<0.01	0.58	0.58	0.28	0.36	0.29	0.47
AMMONIA N AS N (PPM)	22.10	0.22	21.25	0.79	20.30	0.25	21.22	0.42
ORTHO P (PPM)	3.29	3.37	2.87	3.09	2.93	2.74	3.03	3.07
TOTAL P (PPM)	4.90	3.56	5.25	3.19	5.26	3.00	5.14	3.25
CHLORIDE (PPM)	43	52	61	58	52	52	52	54
COD (PPM)	220.00	24.00	480.00	60.00	112.00	25.00	270.67	36.33
BOD (PPM)	NA	NA	212.0	7.1	153.5	3.9	182.8	5.5
NO_3 N AS N (PPM)	0.11	19.33	0.04	11.49	0.07	13.23	0.07	14.68
SULFATE (PPM)	59	59	72	77	72	72	68	69
CADMIUM (PPM)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHROMIUM(PPM)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
COPPER (PPM)	0.04	0.01	0.04	0.03	0.07	0.00	0.05	0.01
IRON (PPM)	0.73	0.07	0.31	0.03	0.67	0.04	0.57	0.05
LEAD (PPM)	0.007	<0.005	0.006	<0.005	0.020	<0.005	0.011	0.000
MERCURY (PPM)	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	0.0013	<0.0005
SELENIUM (PPM)	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
ZINC (PPM)	0.10	0.06	0.09	0.03	0.14	0.09	0.11	0.06
ARSENIC (PPM)	0.005	<0.003	0.009	0.011	0.006	0.005	0.007	0.008
BORON (PPM)	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3
HARDNESS AS $CACO_3$ (PPM)	108	98	130	124	114	111	117	111
CALCIUM (PPM)	30	26	34	32	29	28	31	29
MAGNESIUM (PPM)	8	8	11	11	10	10	10	10
SODIUM (PPM)	62	69	83	84	74	70	73	74
SAR (SU)	2.6	3.0	3.2	3.3	3.0	2.9	2.9	3.1

Note: Data Supplied by NDEP PPM = Milligrams/Liter SU = Standard Units NTU = Nephelometric Turbidity Units

APPENDIX B

WIND ROSE DIAGRAM



ALL WEATHER WIND ROSE

SOURCE: AIR WEATHER/DATA PROCESSING DIVISION/USAF
STATION: STEAD AIR FORCE BASE RENO, NEVADA
PERIOD: ALL HOURS, ALL MONTHS 1943–49 & 1952–66
OBSERVATIONS: 139,984

RENO STEAD AIRPORT	
WIND ROSE DIAGRAM	
SCALE: N.T.S. DRAWN BY: SOS DATE: 4-7-00 JOB NO.: 97046.31	APPENDIX B

AGRA Infrastructure, Inc.
ENGINEERING GLOBAL SOLUTIONS
1105 TERMINAL WAY, SUITE 304
RENO, NEVADA 89502
PHONE (775) 786-5873 FAX (775) 786-6138

APPENDIX C

DISCHARGE PERMIT

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

FACT SHEET

(pursuant to NAC 445A.236)

Permittee Name: Washoe County Department of Parks and Recreation, 2601 Plumas Street, Reno, Nevada, 89509

Permit Number: NEV99010

General: The Washoe County Department of Parks and Recreation will be utilizing treated effluent from the Reno-Stead Water Reclamation Facility (RSWRF) for spray irrigation at the **Sierra Sage Golf Course**. The golf course reservoir stores approximately 7.4 million gallons of water and will supply treated effluent for spray irrigation of approximately 95 acres of Kentucky Bluegrass turf, with drip irrigation of various trees and shrubs. The current irrigation system was installed in 1997/1998.

Description of the Location of the Discharge: The Sierra Sage Golf Course is located at 6355 Silver Lake Road in Stead, Washoe County, Nevada, 89506. Township 20 North, Range 19 East, Section 6. Latitude 39° 37' 30" North, Longitude 119° 52' 30" West.

Receiving Water Characteristics: Groundwater in the vicinity of the golf course is approximately 40 to 60 feet below land surface and is currently being used for irrigation of the golf course. Two groundwater monitoring wells were installed at the course in early December, 1999. The "South Well" is located upgradient of the irrigation pond, along the access road near the #3 fairway. The "North Well" is located downgradient of the storage pond, north of the 16th hole. The regional groundwater flow direction is toward the Silver Lake Basin. There are no water supply wells in the reuse area.

Flow: The permitted 30-day average flow is 0.80 MGD.

Procedures for Public Comment: The Notice of the Division's intent to issue a permit authorizing the facility to discharge to the groundwater of the State of Nevada subject to the conditions contained within the permit, was published in the December 29, 1999 edition of the **Reno Gazette-Journal**. The notice was also mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit could do so in writing for a period of 30 days following the date of the public notice. The comment period was not extended by the Administrator.

A public hearing on the proposed determination could be requested by the applicant, any affected State, any affected interstate agency, the Regional Administrator or any interested agency, person or group of persons. The request must have been filed within the comment period and must have indicated the interest of the person filing the request and the reasons why a hearing was warranted. Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.238.

The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445A.605.

Proposed Effluent Limitations: As noted in Table I.1 below, the RSWRF will be providing the golf Course with a high quality recycled water product. The coliform requirement is set at 2.2 cfu or mpn/100 ml Total Coliform, 30-day average. Therefore, in accordance with NAC 445A.277, a buffer zone and control of public access are not required.

TABLE I.1: Discharge Limitations

PARAMETERS	EFFLUENT DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	30 Day Ave.	Daily Max.	Measurement Frequency	Sample Type
Flow	0.80 MGD	0.90 MGD	Continuous	Flow meter
pH	Between 6.0 - 9.0 std units		Weekly	Discrete
Total Coliform	2.2 cfu or mpn/100 ml	23 cfu or mpn/100 ml	Weekly	Discrete
BOD_5	30 mg/l	45 mg/l	Weekly	Composite
Total Suspended Solids	30 mg/l	45 mg/l	Weekly	Composite
Chlorine Residual	Monitor and Report		Weekly	Discrete
Total Nitrogen as N[(1)]	Monitor and Report		Monthly	Calculate
Total Kjeldahl Nitrogen as N	Monitor and Report		Monthly	Composite
Total Oxidized Nitrogen as N (Nitrate + Nitrite)	Monitor and Report		Monthly	Composite
Ammonia as N	Monitor and Report		Monthly	Composite

(1) Total Nitrogen as N can be reported as the sum of Total Oxidized Nitrogen and Total Kjeldahl Nitrogen

Groundwater monitoring in "North Well" and "South Well" is required according to the schedule included in Table I.2 below. The wells shall be conspicuously labeled, capped to prevent migration of surface contaminants to the groundwater, and locked to restrict access.

Table I.2: Groundwater Monitoring

PARAMETERS	GROUNDWATER LIMITATIONS	MONITORING REQUIREMENTS	
		Measurement Frequency	Sample Type
Depth to Groundwater	Monitor and Report	Quarterly	Discrete
Groundwater Elevation	Monitor and Report	Quarterly	Discrete
Total Nitrogen as N	Monitor and Report	Quarterly	Discrete
Total Kjeldahl Nitrogen	Monitor and Report	Quarterly	Discrete
Total Oxidized Nitrogen	Nitrate 10 mg/l **See permit condition I.A.7.**	Quarterly	Discrete
Total Dissolved Solids	Monitor and Report	Quarterly	Discrete
Chloride	Monitor and Report	Quarterly	Discrete

Soil monitoring parameters or frequency are not specifically defined by the permit; however, if the permittee is performing nutrient testing for turfgrass management, the results are to be reported annually with the Fourth Quarter Report.

Schedule of Compliance: The permittee shall implement and comply with the provisions of the following schedule of compliance after approval by the Administrator, including in said implementation and compliance, any additions or modifications which the Administrator may make in approving the schedule of compliance.

a. The permittee shall achieve compliance with the effluent limitations upon issuance of the permit.

b. A final Effluent Management Plan (EMP) shall be prepared by a qualified professional and submitted to the Division for review and approval. **The Permittee shall not use effluent prior to having an approved EMP per NAC 445A.275.**

c. **Prior to use of treated effluent**, the Permittee shall submit the cross-connection control documentation required by permit condition I.B.12.

Rationale for Permit Requirements: Monitoring is required to assess the level of treatment being provided by the RSWRF, to assess the management of recycled water usage, and to protect the local groundwater quality. Discharge limits for BOD5, TSS, and pH are standard secondary treatment conditions. This data is to be evaluated, retained and reported by the permittee as the receiver of the recycled water. Total Coliform and nitrogen species are required for monitoring the quality of recycled water being applied, and for protection of human health and the environment.

Proposed Determination: The Division has made the determination to issue the permit for a five-year period as proposed.

Prepared by: Jennifer L. Carr, P.E.
December, 1999 (Draft)
February, 2000 (Final)

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Permit #NEV99010

Nevada Division of Environmental Protection

AUTHORIZATION TO DISCHARGE

In compliance with Chapter 445A of the Nevada Revised Statutes,

Washoe County Department of Parks & Recreation
2601 Plumas Street
Reno, Nevada 89509

is authorized to discharge from a facility located at

Sierra Sage Golf Course
6355 Silver Lake Road
Stead, Washoe County, Nevada 89506

Longitude: 119° 52' 30"W, Latitude: 39° 37' 30"N
Township 20 North, Range 19 East, Section 6

to receiving waters named

groundwaters of the State via effluent percolation by irrigation

in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Part I, II and III hereof.

This permit shall become effective on **February 17, 2000**.

This permit and the authorization to discharge shall expire at midnight, **February 17, 2005**.

Signed this 17th day of February, 2000.

Jennifer L. Carr

Jennifer L. Carr, P.E.
Staff II, Associate Engineer
Bureau of Water Pollution Control

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PART I
I.A. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS AND CONDITIONS

I.A.1. During the period beginning on the effective date of this permit, and lasting until the permit expires, the permittee is authorized to discharge treated wastewater effluent from the Reno-Stead Water Reclamation Facility to the Sierra Sage Golf Course for irrigation.

I.A.2. Samples taken in compliance with the monitoring requirements specified below shall be collected at the following locations: irrigation reuse water, after final treatment and prior to use; soil samples; and groundwater samples. The discharge shall be limited and monitored by the permittee as specified below.

TABLE I.1: Discharge Limitations

PARAMETERS	EFFLUENT DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	30 Day Ave.	**Daily Max.**	**Measurement Frequency**	**Sample Type**
Flow	0.80 MGD	0.90 MGD	Continuous	Flow meter
pH	Between 6.0 - 9.0 std units		Weekly	Discrete
Total Coliform	2.2 cfu or mpn/100 ml	23 cfu or mpn/100 ml	Weekly	Discrete
BOD_5	30 mg/l	45 mg/l	Weekly	Composite
Total Suspended Solids	30 mg/l	45 mg/l	Weekly	Composite
Chlorine Residual	Monitor and Report		Weekly	Discrete
Total Nitrogen as N[(1)]	Monitor and Report		Monthly	Calculate
Total Kjeldahl Nitrogen as N	Monitor and Report		Monthly	Composite
Total Oxidized Nitrogen as N (Nitrate + Nitrite)	Monitor and Report		Monthly	Composite
Ammonia as N	Monitor and Report		Monthly	Composite

(1) Total Nitrogen as N can be reported as the sum of Total Oxidized Nitrogen and Total Kjeldahl Nitrogen

I.A.3. Flow shall be measured by the Permittee at the reuse site.

I.A.4. Effluent water quality monitoring requirements may be satisfied by data generated by the Reno-Stead Water Reclamation Facility (RSWRF) under permit number NV0021068. The Permittee shall maintain copies of, and submit Discharge Monitoring Reports for, the data required by this permit.

I.A.5. Results from any soil analyses that are performed for the Permittee shall be submitted annually with the fourth quarter report. For soil monitoring requirements only, the Permittee is exempt from the analysis requirement for a State certified laboratory outlined in condition I.D.1.

I.A.6. **Groundwater monitoring wells** "North Well" and "South Well" at the reuse site shall be conspicuously labeled, capped to prevent migration of surface contaminants to the groundwater, and locked to restrict access. The groundwater monitoring wells shall be sampled for the parameters and frequency listed in Table I.2.

Table I.2: Groundwater Monitoring

PARAMETERS	GROUNDWATER LIMITATIONS	MONITORING REQUIREMENTS	
		Measurement Frequency	Sample Type
Depth to Groundwater	Monitor and Report	Quarterly	Discrete
Groundwater Elevation	Monitor and Report	Quarterly	Discrete
Total Nitrogen as N	Monitor and Report	Quarterly	Discrete
Total Kjeldahl Nitrogen	Monitor and Report	Quarterly	Discrete
Total Oxidized Nitrogen(1)	Nitrate 10 mg/l **See permit condition I.A.7.**	Quarterly	Discrete
Total Dissolved Solids	Monitor and Report	Quarterly	Discrete
Chloride	Monitor and Report	Quarterly	Discrete

Note: (1) Total Oxidized Nitrogen = Nitrate as N + Nitrite as N. Total Nitrogen as Nitrogen (N) = Total Kjeldahl Nitrogen + Total Oxidized Nitrogen.

I.A.7. If the Nitrate as N levels measured in the groundwater increase to 7.0 mg/l, as a result of effluent storage or reuse, the Effluent Management Plan shall be revised to provide management practices which increase the nitrogen uptake by vegetation and/or adjust other nitrogen sources such as fertilizer application rates. If the Nitrate as N levels increase to 9.0 mg/l the Permittee shall take all corrective action necessary to ensure that there is no further degradation of groundwater, including a pond liner investigation to evaluate the potential for leakage. If the Nitrate as N levels increase to 10.0 mg/l the discharge to groundwater shall cease.

I.A.8. There shall be no discharge of substances that would cause an exceedance of drinking water standards in the groundwater.

I.A.9. The permittee shall remit an annual review and services fee in accordance with NAC 445A.232 starting **July 1, 2000** and every year thereafter until the permit is terminated.

I.A.10. The Discharge Monitoring Reports (DMRs) must be signed by the facility's highest ranking officer, or the person directly responsible for operating the facility. The first DMR submitted under this permit must include the written designation of the officer (required by Part III A.2) as the authorized representative to sign the DMRs. If the officer in responsible charge changes, a new designation letter must be submitted.

I.B. EFFLUENT MANAGEMENT

I.B.1. The irrigation storage, distribution and ancillary facilities shall be operated in accordance with the Effluent Management Plan (EMP) which must be approved by this Division prior to the use of treated effluent. The EMP shall contain the information required to comply with this permit. It is recommended that the Permittee utilize "WTS-1: Guidance Document for Effluent Management Plan for Reuse of Wastewater Effluent" (NDEP, 1999), as a guideline to prepare the EMP.

I.B.2. The permittee shall provide a copy of a brief, but complete and understandable, document describing the possible hazards and proper hygiene of working with and around treated wastewater to all grounds keepers and other course personnel. The document shall be printed in any language applicable to course workers. Copies shall be included in the EMP.

I.B.3. The Permittee shall calculate the limiting effluent application rate for the site using "WTS-1: Guidance Document for Effluent Reuse" (NDEP, 1999), or other approved calculations. The evaluation of the rates shall be included in the EMP. The application rate shall ensure that the application of effluent does not violate permit condition I.A.7.

I.B.4. The total nitrogen applied (lb/acre-year) shall not be greater than the maximum yearly nitrogen application defined in the EMP.

a. If the Permittee determines that the calculated application rate has been exceeded in any one year, the Permittee shall prepare a report which includes an evaluation of the application rates in the EMP, an explanation of conditions which lead to the exceedance, and any planned changes the Permittee deems necessary. The evaluation shall be submitted with the fourth quarter DMR's.

I.B.5 The EMP shall detail the procedures for collecting monitoring samples required by this permit.

I.B.6. The effluent irrigation storage pond and decorative lakes using treated effluent shall not cause objectionable odors on or off the site.

I.B.7. The irrigation system, storage ponds and ancillaries shall be constructed and operated in accordance with plans approved by the Division. All plans must be approved by the Division prior to the start of construction. **All changes to the approved plans must be approved by the Division.**

I.B.8. Spray irrigation shall be conducted in accordance with management practices which minimize treated effluent from drifting or carrying off the course property to the fullest extent possible. The EMP shall contain the details of all management practices which address the minimization of overspray and drift.

I.B.9. Irrigation areas and "lakes" shall be posted with conspicuous warning signs clearly stating that reclaimed water from sewage is utilized and to avoid contact. Ancillary equipment used for effluent shall be clearly marked to indicate use with effluent.

I.B.10. Drinking water fountains shall be covered during effluent irrigation.

I.B.11. Soil flushing activities shall be conducted pursuant to the EMP. Run-off of effluent is prohibited (NAC 445A.275.6).

I.B.12. The Permittee shall provide documentation to the Division that notification has been made to the local water purveyor and the local health agency, of the Permittee's intent to use effluent at this facility. The documentation shall describe the plan for complying with the cross-connection control requirements of the local water purveyor. This documentation shall be received prior to effluent re-use as detailed in the schedule of compliance.

I.C. SCHEDULE OF COMPLIANCE

I.C.1 The permittee shall implement and comply with the provisions of the following schedule of compliance after approval by the Administrator, including in said implementation and compliance, any additions or modifications which the Administrator may make in approving the schedule of compliance.

a. The permittee shall achieve compliance with the effluent limitations upon issuance of the permit.

b. A final Effluent Management Plan (EMP) shall be prepared by a qualified professional and submitted to the Division for review and approval. **The Permittee shall not use effluent prior to having an approved EMP per NAC 445A.275.**

c. **Prior to use of treated effluent,** the Permittee shall submit the cross-connection control documentation required by part I.B.12.

I.D. MONITORING AND REPORTING

I.D.1. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. Analysis shall be performed by a State of Nevada certified laboratory. **Results from this lab must accompany the Discharge Monitoring Report.**

I.D.2. **Reporting**

a. Annual Report

i. The fourth quarter report shall contain a plot of the date (x-axis) versus concentration (y-axis) for each analyzed constituent. The plot shall include data from the preceding five years, if available. Any data point from the current year that is greater than the limits in Part I.A. must be explained by a narrative.

ii. The fourth quarter report shall demonstrate that the facility has maintained compliance with the maximum yearly application rate of nitrogen. The demonstration shall include the total nitrogen in the applied wastewater, nitrogen from fertilizer applications, nitrogen uptake by plant materials, evapotranspiration rate, precipitation rate, and fraction of applied nitrogen removed by denitrification and volatilization. Any soil samples taken to monitor compliance with the nitrogen loading requirements of this permit shall be submitted annually.

iii. If the Permittee determines that the yearly nitrogen application rate has been exceeded, an evaluation shall be submitted with the fourth quarter report which either justifies this exceedance or proposes operational changes for the facility as per permit condition I.B.4.

iv. The fourth quarter report shall contain all data required to be collected annually.

b. Quarterly Report

Monitoring results obtained during the previous three (3) months shall be summarized for each month and reported quarterly on a Discharge Monitoring Report (DMR) Form received in this office no later than the 28th day of the month following the end of each quarter. The first report is due on **July 28, 2000**. An original signed copy of these, and all other reports required herein, shall be submitted to the State at the following address:

Division of Environmental Protection
Bureau of Water Pollution Control
ATTN: Compliance Coordinator - Shannon Bell
333 West Nye Lane
Carson City, Nevada 89706-0851

I.D.3. Definitions

a. The "30-day average discharge" means the total discharge during a month divided by the number of samples in the period that the facility was discharging. Where less than daily sampling is required by this permit, the 30-day average discharge shall be determined by the summation of all the measured discharges divided by the number of samples during the period when the measurements were made.

b. The "daily maximum" is the highest measurement during the monitoring period.

c. The "30-day average concentration", other than for fecal coliform bacteria, means the arithmetic mean of measurements made during a month. The "30-day average concentration" for fecal coliform bacteria means the geometric mean of measurements made during a month. The geometric mean is the "n^{th}" root of the product of "n" numbers. Geometric mean calculations where there are non-detect results for fecal coliform shall use one-half the detection limit as the value for the non-detect results.

   If fewer than four measurements are made during a month, the compliance or noncompliance with the 30-day average concentration limitation shall not be determined.

d. A "discrete" sample means any individual sample collected in less than 15 minutes.

e. For flow-rate measurements a "composite" sample means the arithmetic mean of no fewer than six individual measurements taken at equal time intervals for 24 hours, or for the duration of discharge, whichever is shorter.

   For other than flow-rate a "composite" sample means a combination of no fewer than six individual flow-weighted samples obtained at equal time intervals for 24 hours, or for the duration of discharge, whichever is shorter. Flow-weighted sample means that the volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling.

f. "cfu" means colony forming units.

I.D.4. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations (40 CFR, Part 136) published pursuant to Section 304(h) of the Act, under which such procedures may be required unless other procedures are approved by the Division.

I.D.5. Recording the Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record and maintain at the facility, the following information:

a. the exact place, date, and time of sampling;
b. the dates the analyses were performed;
c. the person(s) who performed the analyses;
d. the analytical techniques or methods used; and
e. the results of all required analyses.

I.D.6. **Additional Monitoring by Permittee**

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form. Such increased frequency shall also be indicated.

I.D.7. **Records Retention**

All records and information resulting from the monitoring activities required by this permit, including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation, shall be retained for a minimum of three (3) years, or longer if required by the Administrator.

I.D.8. **Modification of Monitoring Frequency and Sample Type**

After considering monitoring data, stream flow, discharge flow and receiving water conditions, the Division, may for just cause, modify the monitoring frequency and/or sample type by issuing an order to the permittee.

I.D.9. All laboratory analysis conducted in accordance with this discharge permit must have detection at or below the permit limits.

PART II

II.A. MANAGEMENT REQUIREMENTS

II.A.1. **Change in Discharge**

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, or treatment modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Any changes to the permitted treatment facility must comply with Nevada Administrative Code NAC 445A.283 to 445A.285. Pursuant to NAC 445A.263, the permit may be modified to specify and limit any pollutants not previously limited.

II.A.2. **Facilities Operation**

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities, collection systems or pump stations installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

II.A.3. **Adverse Impact**

The permittee shall take all reasonable steps to minimize any adverse impact to receiving waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

II.A.4. **Noncompliance, Unauthorized Discharge, Bypassing and Upset**

a. Any diversion, bypass, spill, overflow or discharge of treated or untreated wastewater from wastewater treatment or conveyance facilities under the control of the permittee is prohibited except as authorized by this permit. In the event the permittee has knowledge that a diversion, bypass, spill, overflow or discharge not authorized by this permit is probable, the permittee shall notify the Division immediately.

b. The permittee shall notify the Division within twenty-four (24) hours of any diversion, bypass, spill, upset, overflow or release of treated or untreated discharge other than that which is authorized by the permit. A written report shall be submitted to the Administrator within five (5) days of diversion, bypass, spill, overflow, upset or discharge, detailing the entire incident including:

i. time and date of discharge;
ii. exact location and estimated amount of discharge;
iii. flow path and any bodies of water which the discharge reached;
iv. the specific cause of the discharge; and
v. the preventive and/or corrective actions taken.

c. The following shall be included as information which must be reported within 24 hours: any unanticipated bypass which exceeds any effluent limitation in the permit; any upset which exceeds any effluent limitation in the permit; and violation of a limitation for any toxic pollutant or any pollutant identified as the method to control a toxic pollutant.

d. The permittee shall report all instances of noncompliance not reported under Part II.A.4.b. at the time monitoring reports are submitted. The reports shall contain the information listed in Part II.A.4.b.

e. An "upset" means an incident in which there is unintentional and temporary noncompliance with the permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational

error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

f. In selecting the appropriate enforcement option, the Division shall consider whether or not the noncompliance was the result of an upset.

g. The burden of proof is on the permittee to establish that an upset occurred. In order to establish that an upset occurred, the permittee must provide, in addition to the information required under paragraph II.A.4.b. above, properly signed contemporaneous logs or other documentary evidence that:

   i. The facility was at the time being properly operated as required in paragraph II.A.2. above; and
   ii. All reasonable steps were taken to minimize adverse impacts as required by paragraph II.A.3. above.

II.A.5. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste waters shall be disposed of in a manner such as to prevent any pollution from such materials from entering any navigable waters.

II.A.6. Safeguards to Electric Power Failure

In order to maintain compliance with the effluent limitations and prohibitions of this permit the permittee shall either:

a. provide at the time of discharge an alternative power source sufficient to operate the wastewater control facilities;

b. halt or reduce all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

II.B. RESPONSIBILITIES

II.B.1. Right of Entry

The permittee shall allow the Administrator and/or his authorized representatives, upon the presentation of credentials:

a. to enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. at reasonable times, to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring

method required in this permit; and to perform any necessary sampling to determine compliance with this permit or to sample any discharge.

II.B.2. **Transfer of Ownership or Control**

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall notify the succeeding owner or controller of the existence of this permit, by letter, a copy of which shall be forwarded to the Administrator. ALL transfer of permits shall be approved by the Division.

II.B.3. **Availability of Reports**

Except for data determined to be confidential under NRS 445A.665, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of the Division. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NRS 445A.710.

II.B.4. **Furnishing False Information and Tampering with Monitoring Devices**

Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained by the provisions of NRS 445A.300 to 445A.730, inclusive, or by any permit, rule, regulation or order issued pursuant thereto, or who falsifies, tampers with or knowingly renders inaccurate any monitoring device or method required to be maintained under the provisions of NRS 445A.300 to 445A.730, inclusive, or by any permit, rule, regulation or order issued pursuant thereto, is guilty of a gross misdemeanor and shall be punished by a fine of not more than $10,000 or by imprisonment. This penalty is in addition to any other penalties, civil or criminal, provided pursuant to NRS 445A.300 to 445A.730, inclusive.

II.B.5. **Penalty for Violation of Permit Conditions**

Nevada Revised Statutes NRS 445A.675 provides that any person who violates a permit condition is subject to administrative and judicial sanctions as outlined in NRS 445A.690 through 445A.705.

II.B.6. **Permit Modification, Suspension or Revocation**

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. violation of any terms or conditions of this permit;

b. obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. a change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

II.B.7. **Toxic Pollutants**

Notwithstanding Part II.B.6. above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

II.B.8. **Liability**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable Federal, State or local laws, regulations, or ordinances.

II.B.9. **Property Rights**

The issuance of this permit does not convey any property rights, in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

II.B.10. **Severability**

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART III

III.A. OTHER REQUIREMENTS

III.A.1. **Reapplication**

If the permittee desires to continue to discharge, he shall reapply not later than 180 days before this permit expires on the application forms then in use. The Permittee shall submit the reapplication fee required by NAC 445A.232 with the application.

III.A.2. **Signatures required on application and reporting forms.**

a. Application and reporting forms submitted to the department must be signed by one of the following:

i. A principal executive officer of the corporation (of at least the level of Vice President) or his/her authorized representative who is responsible for the overall operation of the facility from which the discharge described in the application or reporting form originates;
ii. A general partner of the partnership;

iii. The proprietor of the sole proprietorship; or
iv. A principal executive officer, ranking elected official or other authorized employee of the municipal, state or other public facility.

b. Each application must contain a certification by the person signing the application that he is familiar with the information provided, that to the best of his knowledge and belief the information is complete and accurate and that he has the authority to sign and execute the application.

c. **Changes to Authorization.** If an authorization under paragraph b. of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph b. of this section must be submitted to the Division prior to or together with any reports, information, or applications to be signed by an authorized representative.

III.A.3. **Holding Pond Conditions**

Ponds shall be located, operated and constructed so as to:

a. contain with no discharge the once-in-a-twenty-five year 24 hour storm at said location;

b. withstand with no discharge the once-in-one-hundred year flood of said location;

c. prevent escape of wastewater by leakage other than as authorized by this permit; and

d. maintain freeboard at a minimum of 2 ft, unless otherwise approved by the Division.

APPENDIX D

SOILS DATA

Sierra Sage Soils Data

132-Greenbrae sandy loam, 2 to 4 percent slopes.

This very deep, well drained soil is on terraces and lower parts of alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 8 inches thick. The subsoil is brown clay loam about 20 inches thick. The substratum to a depth of 63 inches or more is pale brown, stratified coarse sand, gravelly loam, and loam.

Included in this unit are Orr Variant soils on lower-lying alluvial fans, Indian Creek soils on remnants of higher terraces, and Northmore soils along the top of the unit.

The unit is about 5 percent Orr Variant soils, 5 percent Indian Creek soils, and 5 percent Northmore soils.

Permeability of this Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available. If this unit is used for urban development, a moderate limitation to use as sites for dwellings is high clay content, which results in moderately high shrink-swell potential. The moderately high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. The limitation of slow permeability can be overcome by increasing the size of the absorption field. Percolation can be improved in some areas by placing the leach line below the least permeable layer.

Low load-bearing strength, susceptibility to frost heaving, and high clay content are moderate limitations to use of this soil as sites for roads. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and Thurber needlegrass. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed to insure that enough vegetation is left to protect the unit from excessive erosion. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIs, nonirrigated, and IIs, irrigated.

171-Indian Creek gravelly sandy loam, 0 to 4 percent slopes.

This shallow, well drained soil is on dissected fans and terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 25 to 35 percent of the surface is covered with gravel. The surface layer is pale brown gravelly sandy loam about 7 inches thick. The subsoil is light brown gravelly clay about 11 inches thick. The upper 7 inches of the substratum is a reddish yellow indurated hardpan. The lower part to a depth of 60 inches is reddish yellow, stratified very gravelly loamy coarse sand through gravelly sandy clay loam. Depth to the hardpan ranges from 14 to 20 inches.

Included in this unit are Cassiro soils an higher, smooth alluvial fans; Northmore soils on smooth, long slopes of alluvial fans on lower landscape positions; and Washoe soils near drainageways. This unit is about 5 percent Cassiro soils, 5 percent Northmore soils, and 5 percent Washoe soils.

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the hardpan. Heavy equipment is needed to cut through the hardpan. The main limitations to use of this unit as septic tank absorption fields are the very slowly permeable subsoil and the hardpan.

The hardpan is the main limitation to use of this soil as sites for roads. Deep cuts should be avoided because of the underlying hardpan.

The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the restricted depth of the root zone over the hardpan and the very low available water capacity. This soil is rated as poorly suited to rangeland seeding, mainly because of the very low available water capacity and the restricted depth of the root zone over the hardpan. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

173-Indian Creek sandy loam, 8 to 15 percent slopes

This shallow, well drained soil is on dissected alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 10 to 20 percent of the surface is covered with gravel. The surface layer is pale brown sandy loam about 8 inches thick. The subsoil is light brown gravelly clay about 10 inches thick. The upper 7 inches of the substratum is a white indurated hardpan. The lower part to a depth of 60 inches is reddish yellow, stratified very gravelly loamy coarse sand to gravelly sandy clay loam. Depth to the hardpan ranges from 14 to 20 inches.

Included in this unit are Cassiro soils along the upper edge of the unit on smooth alluvial fans; Northmore soils on smooth, long slopes of lower alluvial fans; and Washoe soils near drainageways. This unit is about 5 percent Cassiro soils, 5 percent Northmore soils, and 5 percent Washoe soils.

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the hardpan. Heavy equipment is needed to cut through the hardpan. The main limitations to use of this soil as septic tank absorption fields are the very slowly permeable subsoil and the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitation to use of this soil as sites for roads is the hardpan. Deep cuts should be avoided because of the hardpan.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. The production of forage is limited by the shallowness of the root zone over the hardpan and the very low available water capacity. Because the root zone is shallow and the available water capacity is very low, this soil is rated as very poorly suited to rangeland seeding. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

202-Northmore sandy loam, 4 to 8 percent slopes.

This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The subsoil is brown sandy clay about 35 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam.

Included in this unit are Greenbrae soils on inset alluvial fans at lower elevations, Indian Creek soils on terrace remnants, Cassiro soils near drainageways and at higher elevations, and wet areas that occur as seeps. The unit is about 6 percent Greenbrae soils, 4 percent Indian Creek soils, 3 percent Cassiro soils, and 2 percent wet areas.

Permeability of this Northmore soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitation to use as , sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and high clay content. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas of this soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough soil is left to protect the unit from excessive erosion.

This soil is in capability subclasses lVe, irrigated, and Vls, nonirrigated.

203-Northmore sandy loam, 8 to 15 percent slopes.

This very deep, well drained soil is on side slopes of alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The subsoil is brown sandy clay about 35 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam.

Included in this unit are Indian Creek soils on terrace remnants, Cassiro soils near drainageways at higher elevations, and Oest soils on steep side slopes an along the top of the unit. The unit is about 5 percent Indian Creek soils, 5 percent Cassiro soils, and 5 percent Oest soils.

Permeability of this Northmore soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content. The high clay content can cause high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated.

250-Cassiro gravelly sandy loam, 2 to 4 percent slopes.

This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is brown gravelly sandy loam about 15 inches thick. The subsoil is brown very gravelly sandy clay about 30 inches thick. The substratum to a depth of 60 inches or more is stratified dense interbedded tuff, silt, ash, and valley fill.

Included in this unit are Indian Creek soils on terrace remnants, Oest soils near uplands on alluvial fan collars, Northmore soils on low, smooth alluvial fans, and wet areas that occur as seeps. The unit is about 5 percent Indian Creek soils, 4 percent Oest soils, 4 percent Northmore soils, and 2 percent wet areas.

Permeability of this Cassiro soil is moderately slow. Available water capacity is moderate. Effective rooting substratum. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

The high clay content is a moderate limitation to use of this unit as sites for dwellings. The high clay content can cause moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water so that the soil near buildings is kept dry. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

A moderate limitation to use of this unit as sites for roads is the high clay content. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by the moderately low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because of the moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil in capability subclasses IIe, irrigated, and VIc, nonirrigated.